Interstate BRIDGE Replacement Program

Considering the importance of our natural environment

Wetlands and Other Waters Technical Report

September 2024

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
BMP	best management practice
BRT	bus rapid transit
CIA	contributing impervious area
CPC	City of Portland Code
CRC	Columbia River Crossing
CTR	Commute Trip Reduction
C-TRAN	Clark County Public Transit Benefit Area Authority
CWA	Clean Water Act
DEQ	Oregon Department of Environmental Quality
DSL	Oregon Department of State Lands
Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAC	facultative
FACU	facultative upland
FACW	facultative wetland
FSCR	Flood Safe Columbia River
GMA	Growth Management Act
GPS	global positioning system
HGM	hydrogeomorphic
I-5	Interstate 5
IBR	Interstate Bridge Replacement

Acronym/Abbreviation	Definition
LPA	Locally Preferred Alternative
LRT	light-rail transit
LRV	light-rail vehicle
MAX	Metropolitan Area Express
NAVD 88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOL	not on list
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRMP	Natural resource management plan
NWI	National Wetlands Inventory
OAR	Oregon Administrative Rules
OBL	obligate
ODFW	Oregon Department of Fish and Wildlife
OHWM	ordinary high water mark
ORS	Oregon Revised Statutes
ORWAP	Oregon Rapid Wetland Assessment Protocol
OTC	Oregon Transportation Commission
PEM	palustrine emergent
PEMA	palustrine emergent, temporarily flooded
PEMC	palustrine emergent, seasonally flooded
PEMCx	palustrine emergent, seasonally flooded, excavated
PFO/SS/EM	palustrine forested/scrub-shrub/emergent

Acronym/Abbreviation	Definition
PFO/SS/EMHx	palustrine, forested/scrub-shrub/emergent, permanently flooded, excavated
PFOC	palustrine, forested, seasonally flooded
PJWA	potentially jurisdictional water area
PMLS	Portland Metro Levee System
PNCD	Preliminary Navigation Clearance Determination
PRM	permittee responsible mitigation
PUBHh	palustrine, unconsolidated bottom, permanently flooded, diked/impounded
PUBHx	palustrine, unconsolidated bottom, permanently flooded, excavated
PUSCx	palustrine unconsolidated shore, seasonally flooded, excavated
R2UBH	riverine, lower perennial, unconsolidated bottom, permanent flooded
RCW	Revised Code of Washington
redox	oxidation-reduction
RM	river mile
ROD	Record of Decision
SEIS	Supplemental Environmental Impact Statement
SEPA	Washington State Environmental Policy Act
SFAM	stream functional assessment method
SMA	Shoreline Management Act
SOV	single-occupancy vehicle
SR	State Route
TriMet	Tri-County Metropolitan Transportation District of Oregon
UFSWQD	Urban Flood Safety and Water Quality District

Acronym/Abbreviation	Definition
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
VMC	Vancouver Municipal Code
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WSTC	Washington State Transportation Commission

1. PROGRAM OVERVIEW

This technical report identifies, describes, and evaluates temporary, long-term, and indirect effects on wetlands and other water resources from the Interstate Bridge Replacement (IBR) program's Modified Locally Preferred Alternative (LPA). The construction and operation of transportation infrastructure can have temporary and permanent effects on wetland resources, including wetland buffers, and other waters. The Modified LPA would be designed to avoid and/or minimize these effects on the greatest extent possible. This report provides mitigation measures for potential effects on these resources when avoidance is not feasible.

The purpose of this report is to satisfy applicable portions of the National Environmental Policy Act (NEPA) 42 United States Code (USC) 4321 "to promote efforts which will prevent or eliminate damage to the environment." Information and potential environmental consequences described in this technical report will be used to support the Draft Supplemental Environmental Impact Statement (SEIS) for the IBR Program pursuant to 42 USC 4332.

The objectives of this report are to:

- Define the study area and the methods of data collection and evaluation used for the analysis (Chapter 2).
- Describe existing wetlands and other waters within the study area (Chapter 3).
- Discuss potential long-term, temporary, and indirect effects on wetlands and other waters resulting from construction and operation of the Modified LPA in comparison to the No-Build Alternative (Chapters 4 and 5).
- Provide proposed avoidance and mitigation measures to help prevent, eliminate, or minimize environmental consequences from the Modified LPA (Chapter 6).
- Identify federal, state, and local permits that would be required (Chapter 7).

The IBR Program is a continuation of the previously suspended Columbia River Crossing (CRC) project with the same purpose to replace the aging Interstate 5 (I-5) Bridge across the Columbia River with a modern, seismically resilient multimodal structure. The proposed infrastructure improvements are located along a 5-mile stretch of the I-5 corridor that extends from approximately Victory Boulevard in Portland to State Route (SR) 500 in Vancouver as shown in Figure 1-1.

The Modified LPA is a modification of the CRC LPA, which completed the NEPA process with a signed Record of Decision (ROD) in 2011 and two re-evaluations that were completed in 2012 and 2013. The CRC project was discontinued in 2014. This Technical Report is evaluating the effects of changes in project design since the CRC ROD and re-evaluations, as well as changes in regulations, policy, and physical conditions.

Figure 1-1. IBR Program Location Overview

1.1 Components of the Modified LPA

The basic components of the Modified LPA include:

- A new pair of Columbia River bridges—one for northbound and one for southbound travel—built west of the existing bridge. The new bridges would each include three through lanes, safety shoulders, and one auxiliary lane (a ramp-to-ramp connection on the highway that improves interchange safety by providing drivers with more space and time to merge, diverge, and weave) in each direction. When all highway, transit, and active transportation would be moved to the new Columbia River bridges, the existing Interstate Bridge (both spans) would be removed.
    a. Three bridge configurations are under consideration: (1) double-deck truss bridges with fixed spans, (2) single-level bridges with fixed spans, and (3) single-level bridges with movable spans over the primary navigation channel. The fixed-span configurations would provide up to 116 feet of vertical navigation clearance, and the movable-span configuration would provide 178 feet of vertical navigation clearance in the open position. The primary navigation channel would be relocated approximately 500 feet south (measured by channel centerline) of its existing location near the Vancouver shoreline.
    b. A two auxiliary lane design option (two ramp-to-ramp lanes connecting interchanges) across the Columbia River is also being evaluated. The second auxiliary lane in each direction of I-5 would be added from approximately Interstate Avenue/Victory Boulevard to SR 500/39th Street.
- A 1.9-mile light-rail transit (LRT) extension of the current Metropolitan Area Express (MAX) Yellow Line from the Expo Center MAX Station in North Portland, where it currently ends, to a terminus near Evergreen Boulevard in Vancouver. Improvements would include new stations at Hayden Island, downtown Vancouver (Waterfront Station), and near Evergreen Boulevard (Evergreen Station), as well as revisions to the existing Expo Center MAX Station. Park and rides to serve LRT riders in Vancouver could be included near the Waterfront Station and Evergreen Station. The Tri-County Metropolitan Transportation District of Oregon (TriMet), which operates the MAX system, would also operate the Yellow Line extension.
    a. Potential site options for park and rides include three sites near the Waterfront Station and two near the Evergreen Station (up to one park and ride could be built for each station location in Vancouver).
- Associated LRT improvements such as traction power substations, overhead catenary system, signal and communications support facilities, an overnight light-rail vehicle (LRV) facility at the Expo Center, 19 new LRVs, and an expanded maintenance facility at TriMet's Ruby Junction.
- Integration of local bus transit service, including bus rapid transit (BRT) and express bus routes, in addition to the proposed new LRT service.
- Wider shoulders on I-5 from Interstate Avenue/Victory Boulevard to SR 500/39th Street to accommodate express bus-on-shoulder service in each direction.
- Associated bus transit service improvements would include three additional bus bays for eight new electric double-decker buses at the Clark County Public Transit Benefit Area Authority (C-

TRAN) operations and maintenance facility (see Section 1.1.7, Transit Operating Characteristics, for more information about this service).

- Improvements to seven I-5 interchanges and I-5 mainline improvements between Interstate Avenue/ Victory Boulevard in Portland and SR 500/39th Street in Vancouver. Some adjacent local streets would be reconfigured to complement the new interchange designs, and improve local east-west connections.
    a. An option that shifts the I-5 mainline up to 40 feet westward in downtown Vancouver between the SR 14 interchange and Mill Plain Boulevard interchange is being evaluated.
    b. An option that eliminates the existing C Street ramps in downtown Vancouver is being evaluated.
- Six new adjacent bridges across North Portland Harbor: one on the east side of the existing I-5 North Portland Harbor bridge and five on the west side or overlapping with the existing bridge (which would be removed). The bridges would carry (from west to east) LRT tracks, southbound I-5 off-ramp to Marine Drive, southbound I-5 mainline, northbound I-5 mainline, northbound I-5 on-ramp from Marine Drive, and an arterial bridge for local traffic with a shared-use path for pedestrians and bicyclists.
- A variety of improvements for people who walk, bike, and roll throughout the study area, including a system of shared-use paths, bicycle lanes, sidewalks, enhanced wayfinding, and facility improvements to comply with the Americans with Disabilities Act. These are referred to in this document as *active transportation* improvements.
- Variable-rate tolling for motorists using the river crossing as a demand-management and financing tool.

The transportation improvements proposed for the Modified LPA and the design options are shown in Figure 1-2. The Modified LPA includes all of the components listed above. If there are differences in environmental effects or benefits between the design options, those are identified in the sections below.

Figure 1-2. Modified LPA Components

Section 1.1.1, Interstate 5 Mainline, describes the overall configuration of the I-5 mainline through the study area, and Sections 1.1.2, Portland Mainland and Hayden Island (Subarea A), through Section 1.1.5, Upper Vancouver (Subarea D), provide additional detail on four geographic subareas (A through D), which are shown on Figure 1-3. In each subarea, improvements to I-5, its interchanges, and the local roadways are described first, followed by transit and active transportation improvements. Design options are described under separate headings in the subareas in which they would be located.

Table 1-1 shows the different combinations of design options analyzed in this Technical Report. However, **any combination of design options is compatible**. In other words, any of the bridge configurations could be combined with one or two auxiliary lanes, with or without the C Street ramps, a centered or westward shift of I-5 in downtown Vancouver, and any of the park-and-ride location options. Figures in each section show both the anticipated limit of ground disturbance, which includes disturbance from temporary construction activities, and the location of permanent infrastructure elements.

Figure 1-3. Modified LPA – Geographic Subareas

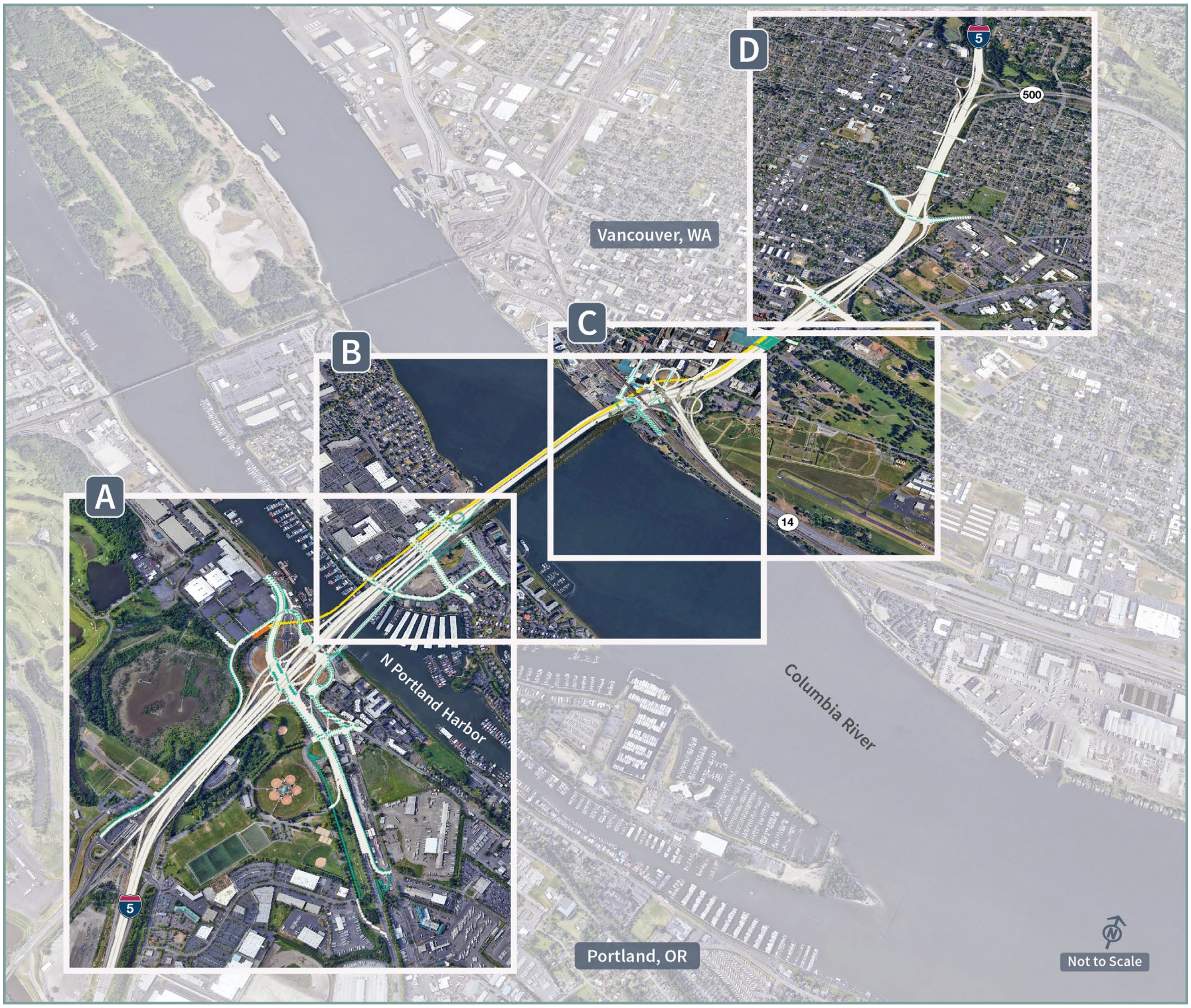


Table 1-1. Modified LPA and Design Options

Design Options	Modified LPA	Modified LPA with Two Auxiliary Lanes	Modified LPA Without C Street Ramps	Modified LPA with I-5 Shifted West	Modified LPA with a Single-Level Fixed-Span Configuration	Modified LPA with a Single-Level Movable-Span Configuration
Bridge Configuration	**Double-deck fixed-span***	Double-deck fixed-span	Double-deck fixed-span	Double-deck fixed-span	**Single-level fixed-span**	**Single-level movable-span**
Auxiliary Lanes	**One***	**Two***	One	One	One	One
C Street Ramps	**With C Street ramps***	With C Street ramps	**Without C Street Ramps***	With C Street ramps	With C Street ramps	With C Street ramps
I-5 Alignment	**Centered***	Centered	Centered	**Shifted West***	Centered	Centered
Park-and-Ride Options	**Waterfront**: * 1. Columbia Way (below I-5); 2. Columbia Street/SR 14; 3. Columbia Street/Phil Arnold Way **Evergreen**: 1. Library Square; 2. Columbia Credit Union					

Bold text with an asterisk (*) indicates which design option is different in each configuration.

1.1.1 Interstate 5 Mainline

Today, within the 5-mile corridor, I-5 has three 12-foot-wide through lanes in each direction, an approximately 6- to 11-foot-wide inside shoulder, and an approximately 10- to 12-foot-wide outside shoulder with the exception of the Interstate Bridge, which has approximately 2- to 3-foot-wide inside and outside shoulders. There are currently intermittent auxiliary lanes between the Victory Boulevard and Hayden Island interchanges in Oregon and between SR 14 and SR 500 in Washington.

The Modified LPA would include three 12-foot through lanes from Interstate Avenue/Victory Boulevard to SR 500/39th Street and a 12-foot auxiliary lane from the Marine Drive interchange to the Mill Plain Boulevard interchange in each direction. Many of the existing auxiliary lanes on I-5 between the SR 14 and Main Street interchanges in Vancouver would remain, although they would be reconfigured. The existing auxiliary lanes between the Victory Boulevard and Hayden Island interchanges would be replaced with changes to on- and off-ramps and interchange reconfigurations. The Modified LPA would also include wider shoulders (12-foot inside shoulders and 10- to 12-foot outside shoulders) to be consistent with ODOT and WSDOT design standards. The wider inside shoulder would be used by express bus service to bypass mainline congestion, known as “bus on shoulder” (refer to Section 1.1.7, Transit Operating Characteristics). The shoulder would be available for express bus service when general-purpose speeds are below 35 miles per hour (mph).

Figure 1-4 shows a cross section of the collector-distributor (C-D)[1] roadways, Figure 1-5 shows the location of the C-D roadways, and Figure 1-6 shows the proposed auxiliary lane layout. The existing Interstate Bridge over the Columbia River does not have an auxiliary lane; the Modified LPA would add one auxiliary lane in each direction across the new Columbia River bridges.

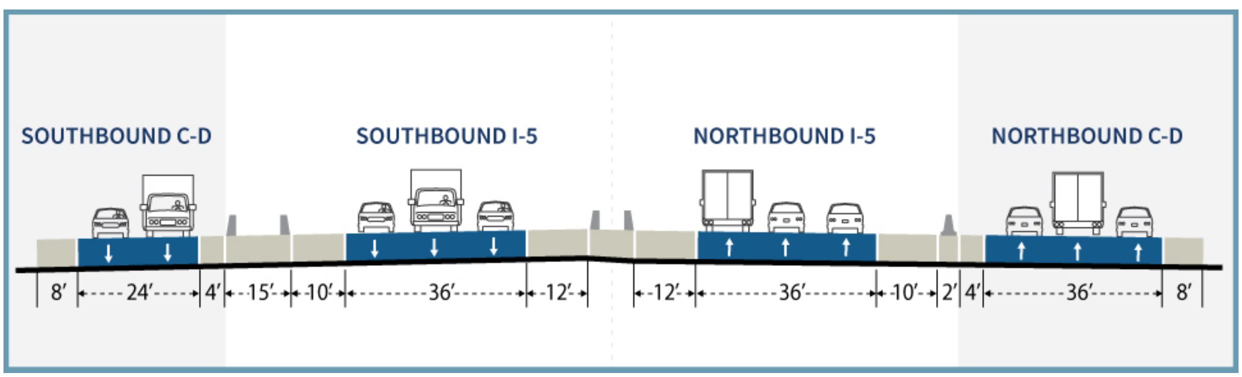
On I-5 northbound, the auxiliary lane that would begin at the on-ramp from Marine Drive would continue across the Columbia River bridge and end at the off-ramp to the C-D roadway, north of SR 14 (see Figure 1-5). The on-ramp from SR 14 westbound would join the off-ramp to the C-D roadway, forming the northbound C-D roadway between SR 14 and Fourth Plain Boulevard. The C-D roadway would provide access from I-5 northbound to the off-ramps at Mill Plain Boulevard and Fourth Plain Boulevard. The C-D roadway would also provide access from SR 14 westbound to the off-ramps at Mill Plain Boulevard and Fourth Plain Boulevard, and to the on-ramp to I-5 northbound.

On I-5 northbound, the Modified LPA would also add one auxiliary lane beginning at the on-ramp from the C-D roadway and ending at the on-ramp from 39th Street, connecting to an existing auxiliary lane from 39th Street to the off-ramp at Main Street. Another existing auxiliary lane would remain between the on-ramp from Mill Plain Boulevard to the off-ramp to SR 500.

On I-5 southbound, the off-ramp to the C-D roadway would join the on-ramp from Mill Plain Boulevard to form a C-D roadway. The C-D roadway would provide access from I-5 southbound to the off-ramp to SR 14 eastbound and from Mill Plain Boulevard to the off-ramp to SR 14 eastbound and the on-ramp to I-5 southbound.

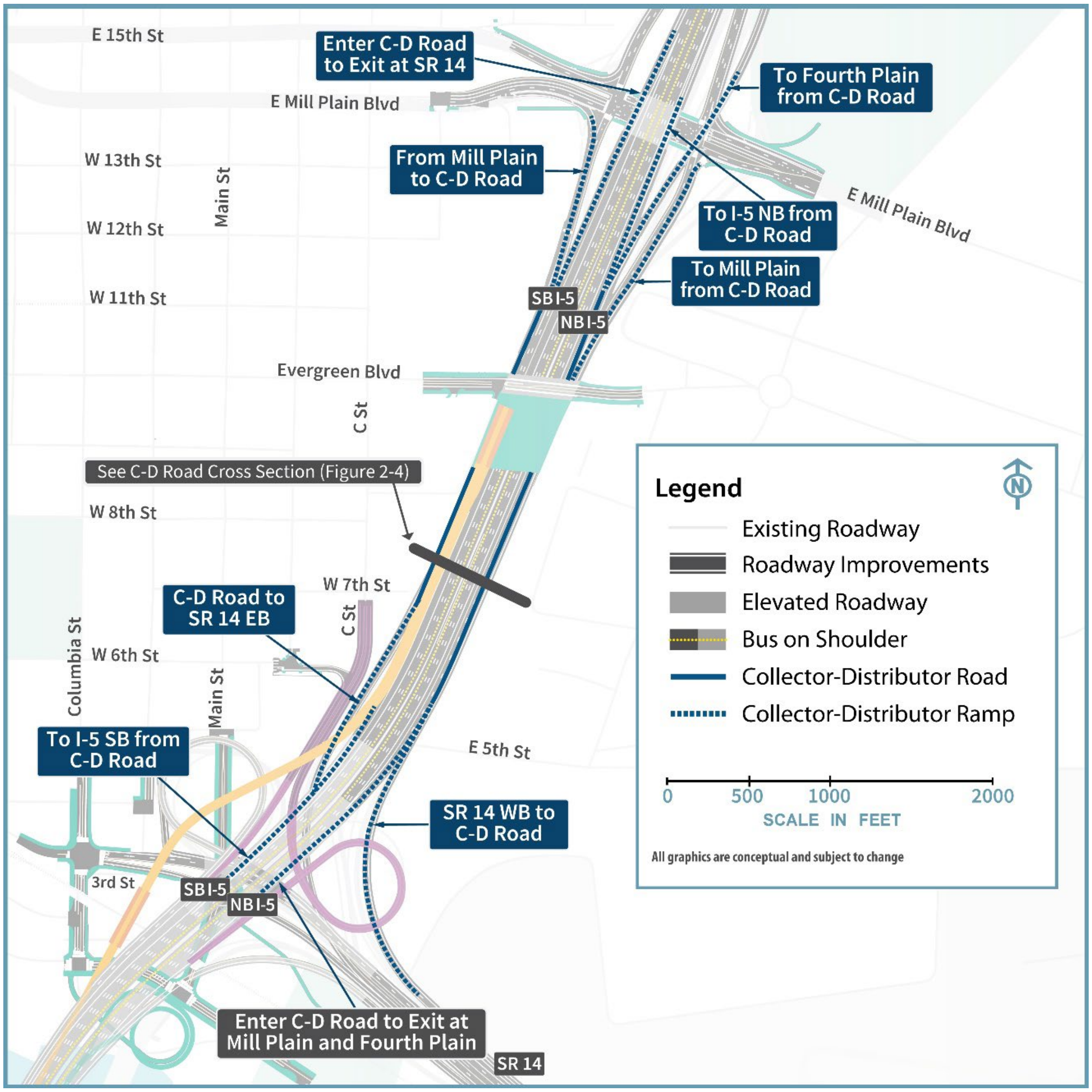
On I-5 southbound, an auxiliary lane would begin at the on-ramp from the C-D roadway and would continue across the southbound Columbia River bridge and end at the off-ramp to Marine Drive. The combined on-ramp from SR 14 westbound and C Street would merge into this auxiliary lane.

Figure 1-4. Cross Section of the Collector-Distributor Roadways



[1] A collector-distributer roadway parallels and connects the main travel lanes of a highway and frontage roads or entrance ramps.

Figure 1-5. Collector-Distributor Roadways



C-D = collector-distributor; EB = eastbound; NB = northbound; SB = southbound; WB = westbound

1.1.1.1 Two Auxiliary Lane Design Option

This design option would add a second 12-foot-wide auxiliary lane in each direction of I-5 with the intent to further optimize travel flow in the corridor. This second auxiliary lane is proposed from the Interstate Avenue/Victory Boulevard interchange to the SR 500/39th Street interchange.

On I-5 northbound, one auxiliary lane would begin at the combined on-ramp from Interstate Avenue and Victory Boulevard, and a second auxiliary lane would begin at the on-ramp from Marine Drive. Both auxiliary lanes would continue across the northbound Columbia River bridge, and the on-ramp from Hayden Island would merge into the second auxiliary lane on the northbound Columbia River bridge. At the off-ramp to the C-D roadway, the second auxiliary lane would end but the first auxiliary lane would continue. A second auxiliary lane would begin again at the on-ramp from Mill Plain Boulevard. The second auxiliary lane would end at the off-ramp to SR 500, and the first auxiliary lane would connect to an existing auxiliary lane at 39th Street to the off-ramp at Main Street.

On I-5 southbound, two auxiliary lanes would begin at the on-ramp from SR 500. Between the on-ramp from Fourth Plain Boulevard and the off-ramp to Mill Plain Boulevard, one auxiliary lane would be added to the existing two auxiliary lanes. The second auxiliary lane would end at the off-ramp to the C-D roadway, but the first auxiliary lane would continue. A second auxiliary lane would begin again at the southbound I-5 on-ramp from the C-D roadway. Both auxiliary lanes would continue across the southbound Columbia River bridge, and the combined on-ramp from SR 14 westbound and C Street would merge into the second auxiliary lane on the southbound Columbia River bridge. The second auxiliary lane would end at the off-ramp to Marine Drive, and the first auxiliary lane would end at the combined off-ramp to Interstate Avenue and Victory Boulevard.

Figure 1-6 shows a comparison of the one auxiliary lane configuration and the two auxiliary lane configuration design option. Figure 1-7 shows a comparison of the footprints (i.e., the limit of permanent improvements) of the one auxiliary lane and two auxiliary lane configurations on a double-deck fixed-span bridge. For all Modified LPA bridge configurations (described in Section 1.1.3, Columbia River Bridges (Subarea B)), the footprints of the two auxiliary lane configurations differ only over the Columbia River and in downtown Vancouver. The rest of the corridor would have the same footprint. For all bridge configurations analyzed in this document, the two auxiliary lane option would add 16 feet (8 feet in each direction) in total roadway width compared to the one auxiliary lane option due to the increased shoulder widths for the one auxiliary lane option.[2] The traffic operations analysis incorporating both the one and two auxiliary lane design options applies equally to all bridge configurations in this Technical Report.

[2] Under the one auxiliary lane option, the width of each shoulder would be approximately 14 feet to accommodate maintenance of traffic during construction. Under the two auxiliary lane option, maintenance of traffic could be accommodated with 12-foot shoulders because the additional 12-foot auxiliary lane provides adequate roadway width. The total difference in roadway width in each direction between the one auxiliary lane option and the two auxiliary lane option would be 8 feet (12-foot auxiliary lane – 2 feet from the inside shoulder – 2 feet from the outside shoulder = 8 feet).

Figure 1-6. Comparison of Auxiliary Lane Configurations

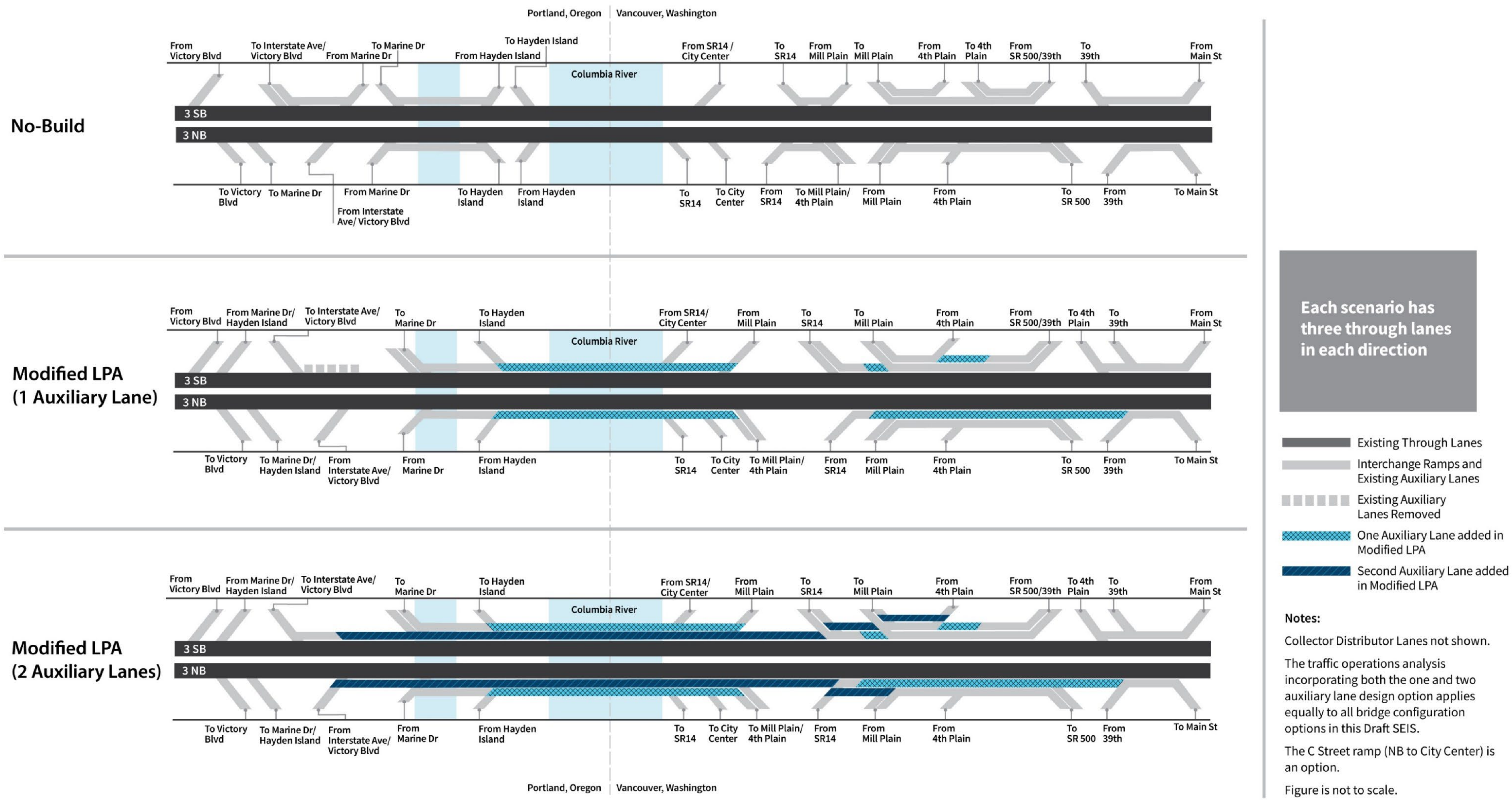
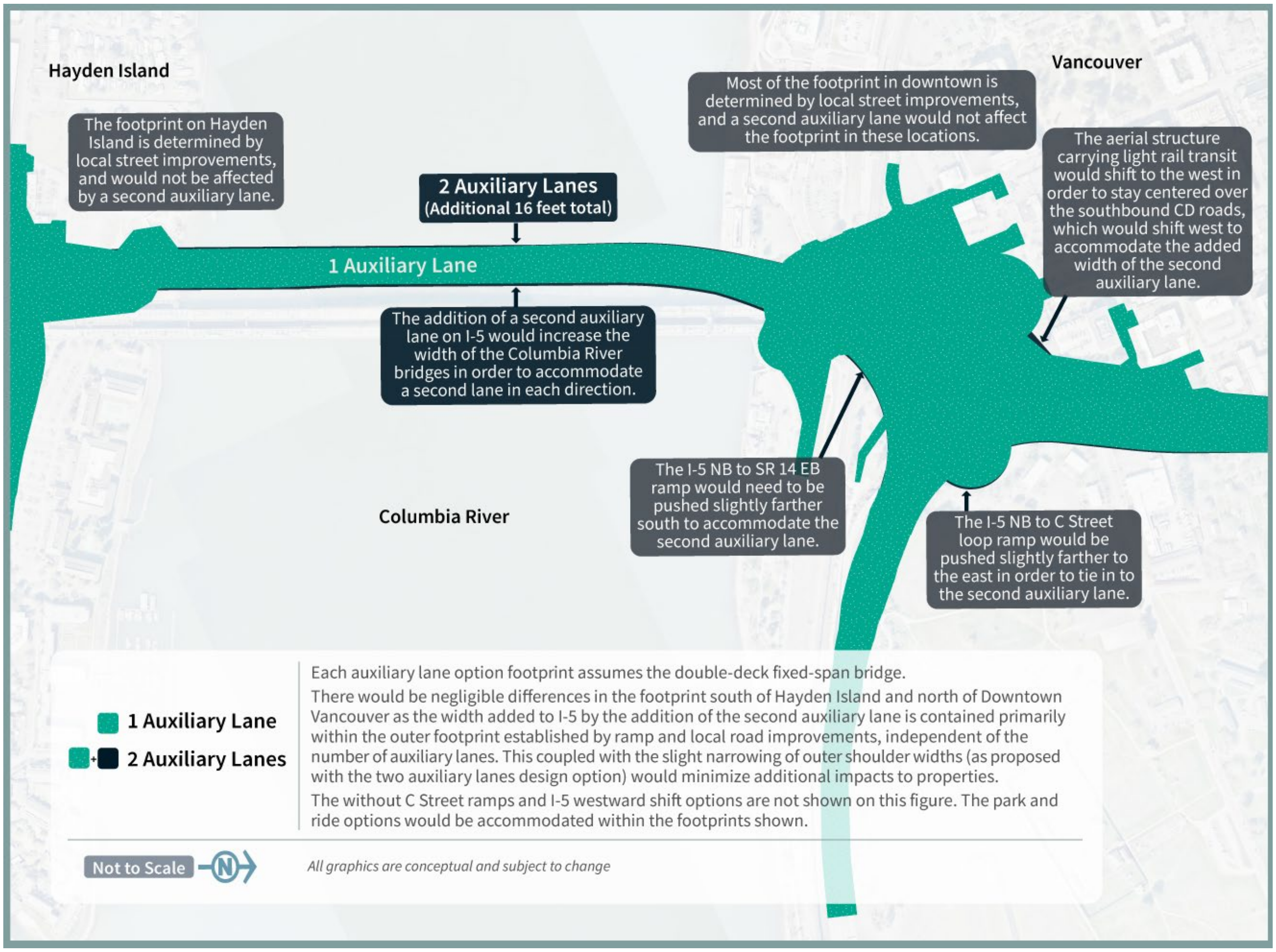


Figure 1-7. Auxiliary Lane Configuration Footprint Differences



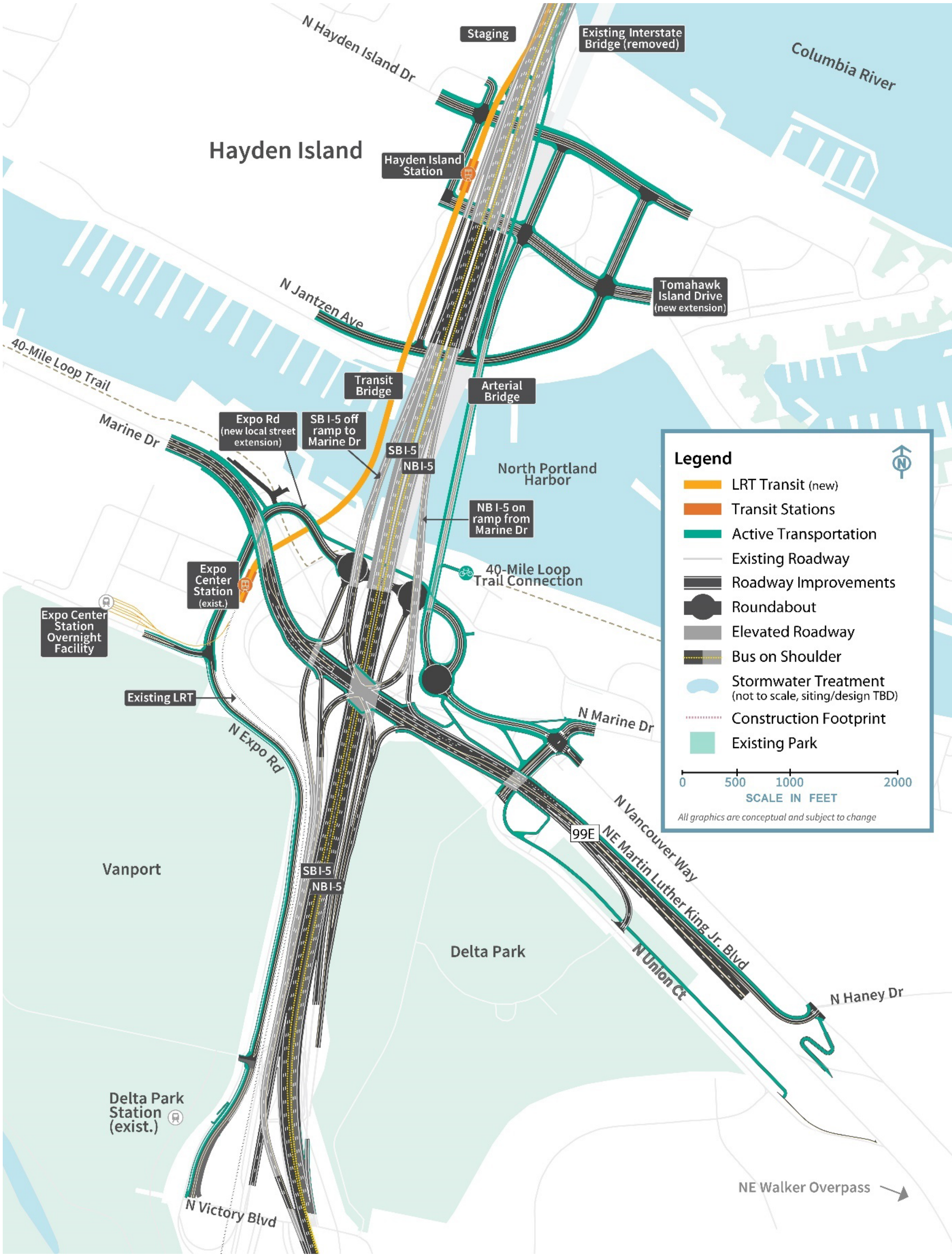
1.1.2 Portland Mainland and Hayden Island (Subarea A)

This section discusses the geographic Subarea A shown in Figure 1-3. See Figure 1-8 for highway and interchange improvements in Subarea A, including the North Portland Harbor bridge. Figure 1-8 illustrates the one auxiliary lane design option; please refer to Figure 1-6 and the accompanying description for how two auxiliary lanes would alter the Modified LPA's proposed design. Refer to Figure 1-3 for an overview of the geographic subareas.

Within Subarea A, the IBR Program has the potential to alter three federally authorized levee systems:

- The Oregon Slough segment of the Peninsula Drainage District Number 1 levee (PEN 1).
- The Oregon Slough segment of the Peninsula Drainage District Number 2 levee (PEN 2).
- The PEN1/PEN2 cross levee segment of the PEN 1 levee (Cross Levee).

Figure 1-8. Portland Mainland and Hayden Island (Subarea A)



LRT = light-rail transit; NB = northbound; SB = southbound; TBD = to be determined

The levee systems are shown on Figure 1-9, and intersections with Modified LPA components are described throughout Section 1.1.2, Portland Mainland and Hayden Island (Subarea A), where appropriate. Within Subarea A, the IBR Program study area intersects with PEN 1 to the west of I-5 and with PEN 2 to the east of I-5. PEN 1 and PEN 2 include a main levee along the south side of North Portland Harbor and are part of a combination of levees and floodwalls. PEN 1 and PEN 2 are separated by the Cross Levee that is intended to isolate the two districts if one of them fails. The Cross Levee is located along the I-5 mainline embankment, except in the Marine Drive interchange area where it is located on the west edge of the existing ramp from Marine Drive to southbound I-5.[3]

There are two concurrent efforts underway that are planning improvements to PEN1, PEN2, and the Cross Levee to reduce flood risk:

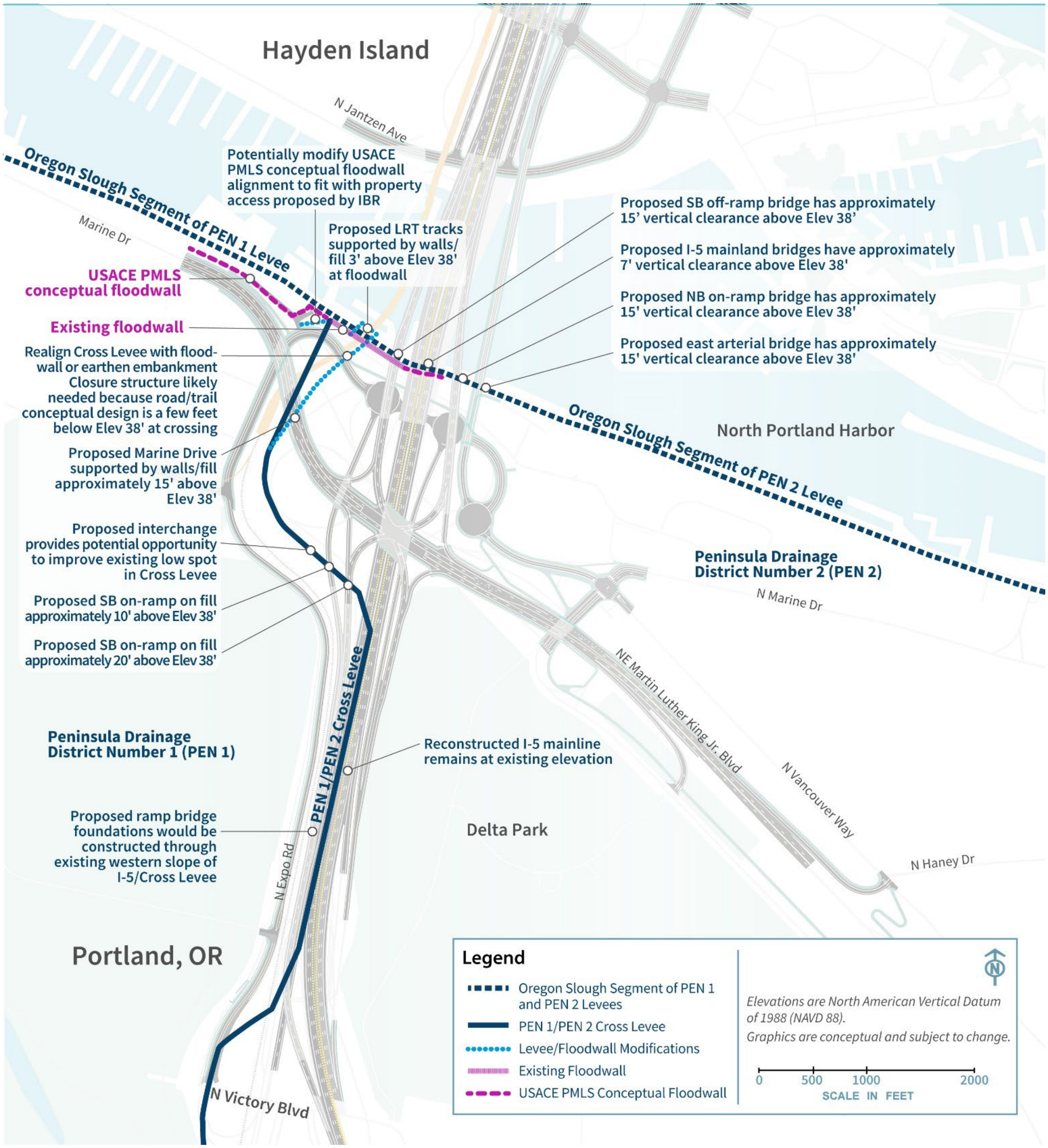
- The U.S. Army Corps of Engineers (USACE) Portland Metro Levee System (PMLS) project.
- The Flood Safe Columbia River (FSCR) program (also known as "Levee Ready Columbia").

The Urban Flood Safety and Water Quality District (UFSWQD)[4] is working with the USACE through the PMLS project, which includes improvements at PEN 1 and PEN 2 (e.g., raising these levees to elevation 38 feet North American Vertical Datum of 1988 [NAVD 88]).[5] Additionally, as part of the FSCR program, UFSWQD is studying raising a low spot in the Cross Levee on the southwest side of the Marine Drive interchange.

The IBR Program is in close coordination with these concurrent efforts to ensure that the IBR Program's design efforts consider the timing and scope of the PMLS and the FSCR proposed modifications. The intersection of the IBR Program proposed actions to both the existing levee configuration and the anticipated future condition based on the proposed PMLS and FSCR projects are described below, where appropriate.

[3] The portion of the original Denver Avenue levee alignment within the Marine Drive interchange area is no longer considered part of the levee system by UFSWQD.
[4] UFSWQD includes PEN 1 and PEN 2, Urban Flood Safety and Water Quality District No. 1, and the Sandy Drainage Improvement Company.
[5] NAVD 88 is a vertical control datum (reference point) used by federal agencies for surveying.

Figure 1-9. Levee Systems in Subarea A



1.1.2.1 Highways, Interchanges, and Local Roadways

VICTORY BOULEVARD/INTERSTATE AVENUE INTERCHANGE AREA

The southern extent of the Modified LPA would improve two ramps at the Victory Boulevard/Interstate Avenue interchange (see Figure 1-8). The first ramp improvement would be the southbound I-5 off-ramp to Victory Boulevard/ Interstate Avenue; this off-ramp would be braided below (i.e., grade separated or pass below) the Marine Drive to the I-5 southbound on-ramp (see the Marine Drive Interchange Area section below). The other ramp improvement would lengthen the merge distance for northbound traffic entering I-5 from Victory Boulevard and from Interstate Avenue.

The existing I-5 mainline between Victory Boulevard/Interstate Avenue and Marine Drive is part of the Cross Levee (see Figure 1-9). The Modified LPA would require some pavement reconstruction of the mainline in this area; however, the improvements would mostly consist of pavement overlay and the profile and footprint would be similar to existing conditions.

MARINE DRIVE INTERCHANGE AREA

The next interchange north of the Victory Boulevard/Interstate Avenue interchange is at Marine Drive. All movements within this interchange would be reconfigured to reduce congestion for motorists entering and exiting I-5. The new configuration would be a single-point urban interchange. The new interchange would be centered over I-5 versus on the west side under existing conditions. See Figure 1-8 for the Marine Drive interchange's layout and construction footprint.

The Marine Drive to I-5 southbound on-ramp would be braided over I-5 southbound to the Victory Boulevard/Interstate Avenue off-ramp. Martin Luther King Jr. Boulevard would have a new more direct connection to I-5 northbound.

The new interchange configuration would change the westbound Marine Drive and westbound Vancouver Way connections to Martin Luther King Jr. Boulevard. An improved connection farther east of the interchange (near Haney Street) would provide access to westbound Martin Luther King Jr. Boulevard for these two streets. For eastbound travelers on Martin Luther King Jr. Boulevard exiting to Union Court, the existing loop connection would be replaced with a new connection farther east (near the access to the East Delta Park Owens Sports Complex).

Expo Road from Victory Boulevard to the Expo Center would be reconstructed with improved active transportation facilities. North of the Expo Center, Expo Road would be extended under Marine Drive and continue under I-5 to the east, connecting with Marine Drive and Vancouver Way through three new connected roundabouts. The westernmost roundabout would connect the new local street extension to I-5 southbound. The middle roundabout would connect the I-5 northbound off-ramp to the local street extension. The easternmost roundabout would connect the new local street extension to an arterial bridge crossing North Portland Harbor to Hayden Island. This roundabout would also connect the local street extension to Marine Dr and Vancouver Way.

To access Hayden Island using the arterial bridge from the east on Martin Luther King Jr. Boulevard, motorists would exit Martin Luther King Jr. Boulevard at the existing off-ramp to Vancouver Way just west of the Walker Street overpass. Then motorists would travel west on Vancouver Way, through the intersection with Marine Drive and straight through the roundabout to the arterial bridge.

From Hayden Island, motorists traveling south to Portland via Martin Luther King Jr. Boulevard would turn onto the arterial bridge southbound and travel straight through the roundabout onto Vancouver Way. At the intersection of Vancouver Way and Marine Drive, motorists would turn right onto Union Court and follow the existing road southeast to the existing on-ramp onto Martin Luther King Jr. Boulevard.

The conceptual floodwall alignment from the proposed USACE PMLS project is located on the north side of Marine Drive, near two industrial properties, with three proposed closure structures[6] for property access. The Modified LPA would realign Marine Drive to the south and provide access to the two industrial properties via the new local road extension from Expo Road. Therefore, the change in access for the two industrial properties could require small modifications to the floodwall alignment (a potential shift of 5 to 10 feet to the south) and closure structure locations.

Marine Drive and the two southbound on-ramps would travel over the Cross Levee approximately 10 to 20 feet above the proposed elevation of the improved levee, and they would be supported by fill and retaining walls near an existing low spot in the Cross Levee.

The I-5 southbound on-ramp from Marine Drive would continue on a new bridge structure. Although the bridge's foundation locations have not been determined yet, they would be constructed through the western slope of the Cross Levee (between the existing I-5 mainline and the existing light-rail).

NORTH PORTLAND HARBOR BRIDGES

To the north of the Marine Drive interchange is the Hayden Island interchange area, which is shown in Figure 1-8. I-5 crosses over the North Portland Harbor when traveling between these two interchanges. The Modified LPA proposes to replace the existing I-5 bridge spanning North Portland Harbor to improve seismic resiliency.

Six new parallel bridges would be built across the waterway under the Modified LPA: one on the east side of the existing I-5 North Portland Harbor bridge and five on the west side or overlapping the location of the existing bridge (which would be removed). From west to east, these bridges would carry:

- The LRT tracks.
- The southbound I-5 off-ramp to Marine Drive.
- The southbound I-5 mainline.
- The northbound I-5 mainline.
- The northbound I-5 on-ramp from Marine Drive.
- An arterial bridge between the Portland mainland and Hayden Island for local traffic; this bridge would also include a shared-use path for pedestrians and bicyclists.

Each of the six replacement North Portland Harbor bridges would be supported on foundations constructed of 10-foot-diameter drilled shafts. Concrete columns would rise from the drilled shafts and connect to the superstructures of the bridges. All new structures would have at least as much vertical navigation clearance over North Portland Harbor as the existing North Portland Harbor bridge.

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[6] Levee closure structures are put in place at openings along the embankment/floodwall to provide flood protection during high water conditions.

Compared to the existing bridge, the two new I-5 mainline bridges would have a similar vertical clearance of approximately 7 feet above the proposed height of the improved levees (elevation 38 feet NAVD 88). The two ramp bridges and the arterial bridge would have approximately 15 feet of vertical clearance above the proposed height of the levees. The foundation locations for the five roadway bridges have not been determined at this stage of design, but some foundations could be constructed through landward or riverward levee slopes.

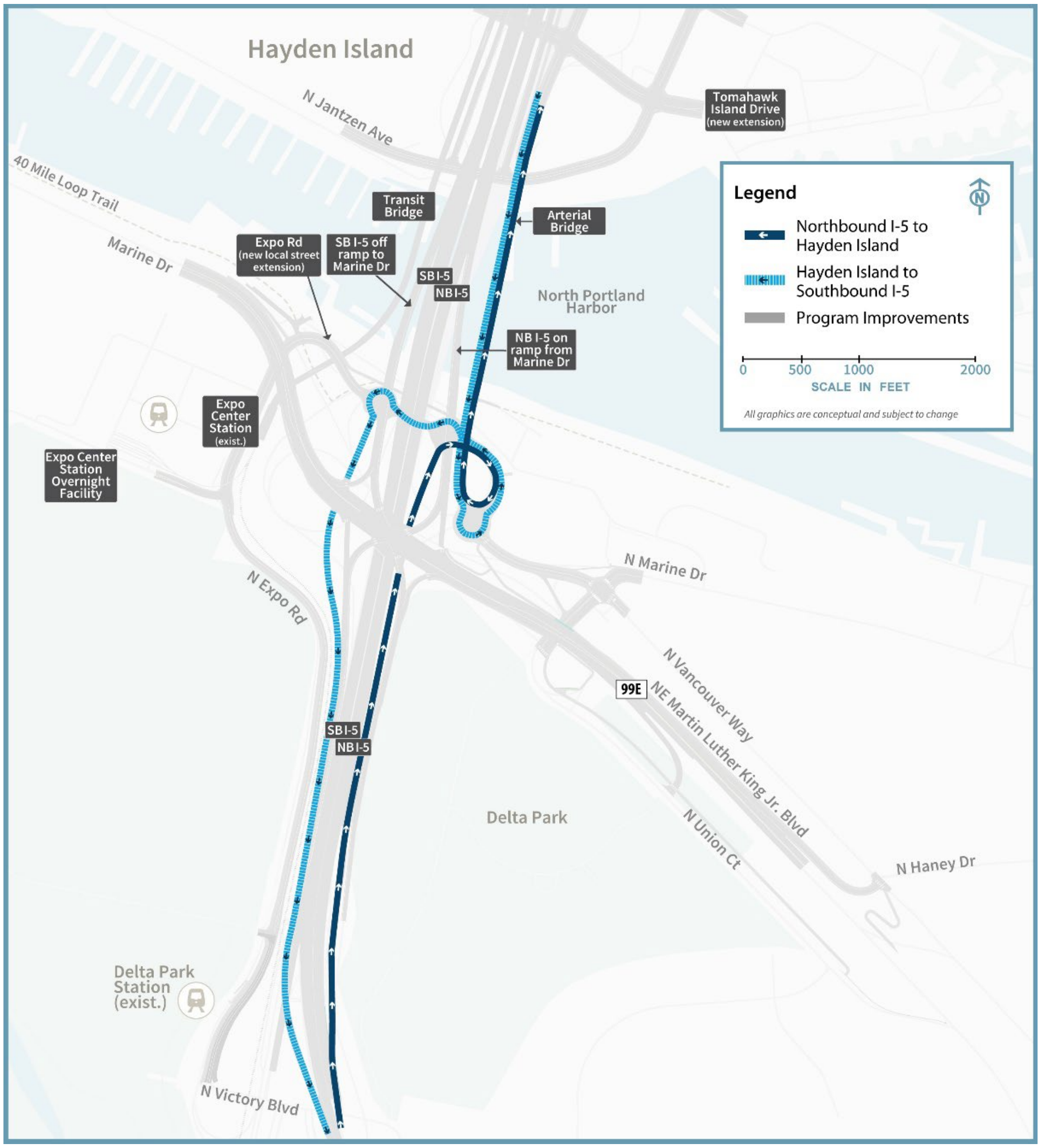
HAYDEN ISLAND INTERCHANGE AREA

All traffic movements for the Hayden Island interchange would be reconfigured. See Figure 1-8 for a layout and construction footprint of the Hayden Island interchange. A half-diamond interchange would be built on Hayden Island with a northbound I-5 on-ramp from Jantzen Drive and a southbound I-5 off-ramp to Jantzen Drive. This would lengthen the ramps and improve merging/diverging speeds compared to the existing substandard ramps that require acceleration and deceleration in a short distance. The I-5 mainline would be partially elevated and partially located on fill across the island.

There would not be a southbound I-5 on-ramp or northbound I-5 off-ramp on Hayden Island. Connections to Hayden Island for those movements would be via the local access (i.e., arterial) bridge connecting North Portland to Hayden Island (Figure 1-10). Vehicles traveling northbound on I-5 wanting to access Hayden Island would exit with traffic going to the Marine Drive interchange, cross under Martin Luther King Jr. Boulevard to the new roundabout at the Expo Road local street extension, travel east through this roundabout to the easternmost roundabout, and use the arterial bridge to cross North Portland Harbor. Vehicles on Hayden Island looking to enter I-5 southbound would use the arterial bridge to cross North Portland Harbor, cross under I-5 using the new Expo Road local street extension to the westernmost roundabout, cross under Marine Drive, merge with the Marine Drive southbound on-ramp, and merge with I-5 southbound south of Victory Boulevard.

Improvements to Jantzen Avenue may include additional left-turn and right-turn lanes at the interchange ramp terminals and active transportation facilities. Improvements to Hayden Island Drive would include new connections to the new arterial bridge over North Portland Harbor. The existing I-5 northbound and southbound access points from Hayden Island Drive would also be removed. A new extension of Tomahawk Island Drive would travel east-west through the middle of Hayden Island and under the I-5 interchange, thus improving connectivity across I-5 on the island.

Figure 1-10. Vehicle Circulation between Hayden Island and the Portland Mainland



NB = northbound; SB = southbound

1.1.2.2 Transit

A new light-rail alignment for northbound and southbound trains would be constructed within Subarea A (see Figure 1-8) to extend from the existing Expo Center MAX Station over North Portland Harbor to a new station at Hayden Island. An overnight LRV facility would be constructed on the southeast corner of the Expo Center property (see Figure 1-8) to provide storage for trains during hours when MAX is not in service. This facility is described in Section 1.1.6, Transit Support Facilities. The existing Expo Center MAX Station would be modified to remove the westernmost track and platform. Other platform modifications, including track realignment and regrading the station, are anticipated to transition to the extension alignment. This may require reconstruction of the operator break facility, signal/communication buildings, and traction power substations. Immediately north of the Expo Center MAX Station, the alignment would curve east toward I-5, pass beneath Marine Drive, cross the proposed Expo Road local street extension and the 40-Mile Loop Trail at grade, then rise over the existing levee onto a light-rail bridge to cross North Portland Harbor. On Hayden Island, proposed transit components include northbound and southbound LRT tracks over Hayden Island; the tracks would be elevated at approximately the height of the new I-5 mainline. An elevated LRT station would also be built on the island immediately west of I-5. The light-rail alignment would extend north on Hayden Island along the western edge of I-5 before transitioning onto the lower level of the new double-deck western bridge over the Columbia River (see Figure 1-8). For the single-level configurations, the light-rail alignment would extend to the outer edge of the western bridge over the Columbia River.

After crossing the new local road extension from Expo Road, the new light-rail track would cross over the main levee (see Figure 1-9). The light-rail profile is anticipated to be approximately 3 feet above the improved levees at the existing floodwall (and improved floodwall), and the tracks would be constructed on fill supported by retaining walls above the floodwall. North of the floodwall, the light-rail tracks would continue onto the new light-rail bridge over North Portland Harbor (as described above).

The Modified LPA's light-rail extension would be close to or would cross the north end of the Cross Levee. The IBR Program would realign the Cross Levee to the east of the light-rail alignment to avoid the need for a closure structure on the light-rail alignment. This realigned Cross Levee would cross the new local road extension. A closure structure may be required because the current proposed roadway is a few feet lower than the proposed elevation of the improved levee.

1.1.2.3 Active Transportation

In the Victory Boulevard interchange area (see Figure 1-8), active transportation facilities would be provided along Expo Road between Victory Boulevard and the Expo Center; this would provide a direct connection between the Victory Boulevard and Marine Drive interchange areas, as well as links to the Delta Park and Expo Center MAX Stations.

New shared-use path connections throughout the Marine Drive interchange area would provide access between the Bridgeton neighborhood (on the east side of I-5), Hayden Island, and the Expo Center MAX Station. There would also be connections to the existing portions of the 40-Mile Loop Trail, which runs north of Marine Drive under I-5 through the interchange area. The path would continue along the extension of Expo Road under the interchange to the intersection of Marine Drive and Vancouver Way, where it would connect under Martin Luther King Jr. Boulevard to Delta Park.

East of the Marine Drive interchange, new shared-use paths on Martin Luther King Jr. Boulevard and on the parallel street, Union Court, would connect travelers to Marine Drive and across the arterial bridge to Hayden

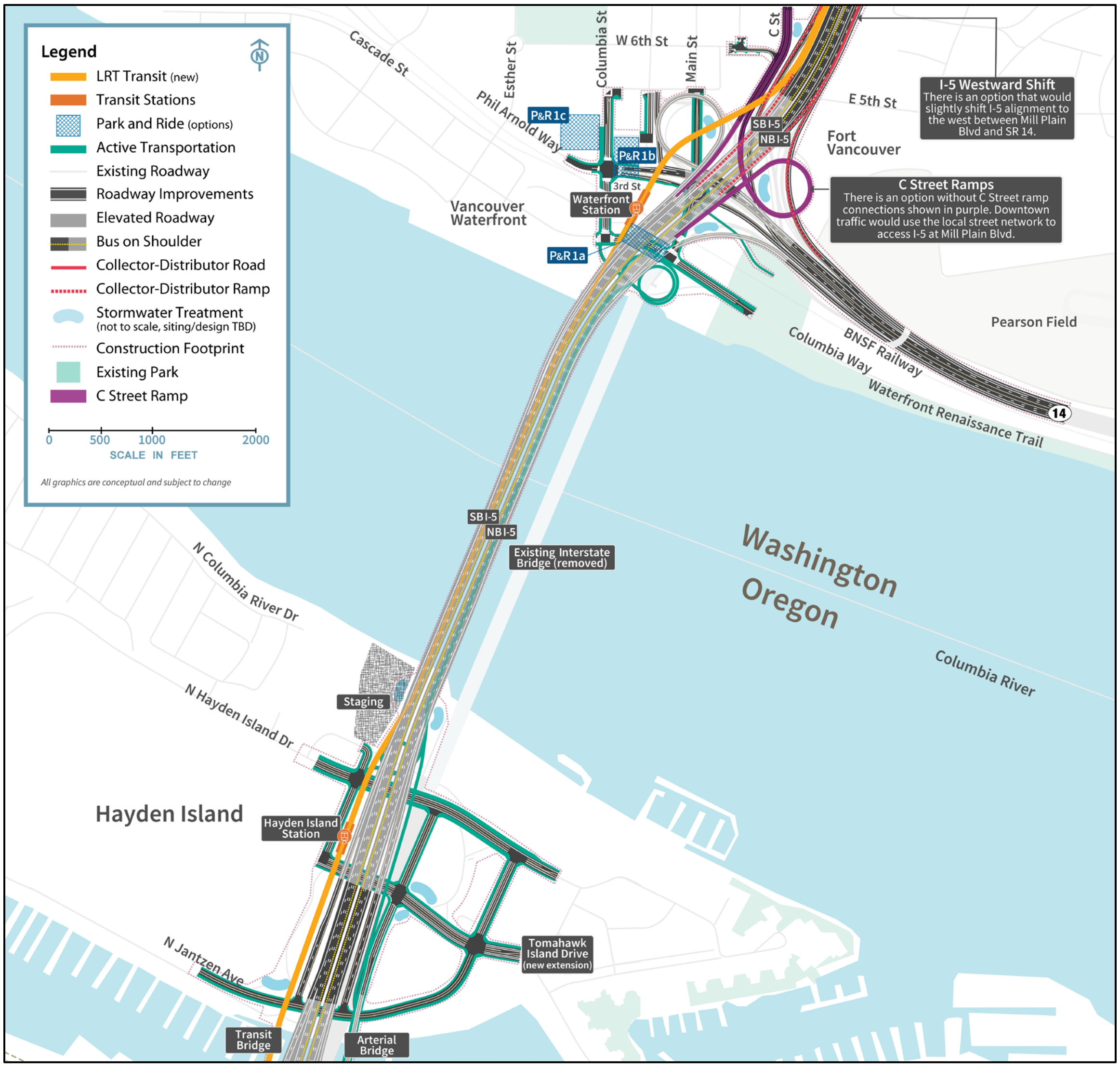
Island. The shared-use facilities on Martin Luther King Jr. Boulevard would provide westbound and eastbound cyclists and pedestrians with off-street crossings of the interchange and would also provide connections to both the Expo Center MAX Station and the 40-Mile Loop Trail to the west.

The new arterial bridge over North Portland Harbor would include a shared-use path for pedestrians and bicyclists (see Figure 1-8). On Hayden Island, pedestrian and bicycle facilities would be provided on Jantzen Avenue, Hayden Island Drive, and Tomahawk Island Drive. The shared-use path on the arterial bridge would continue along the arterial bridge to the south side of Tomahawk Island Drive. A parallel, elevated path from the arterial bridge would continue adjacent to I-5 across Hayden Island and cross above Tomahawk Island Drive and Hayden Island Drive to connect to the lower level of the new double-deck eastern bridge or the outer edge of the new single-level eastern bridge over the Columbia River. A ramp down to the north side of Hayden Island Drive would be provided from the elevated path.

1.1.3 Columbia River Bridges (Subarea B)

This section discusses the geographic Subarea B shown in Figure 1-3. See Figure 1-11 for highway and interchange improvements in Subarea B. Refer to Figure 1-3 for an overview of the geographic subareas.

Figure 1-11. Columbia River Bridges (Subarea B)

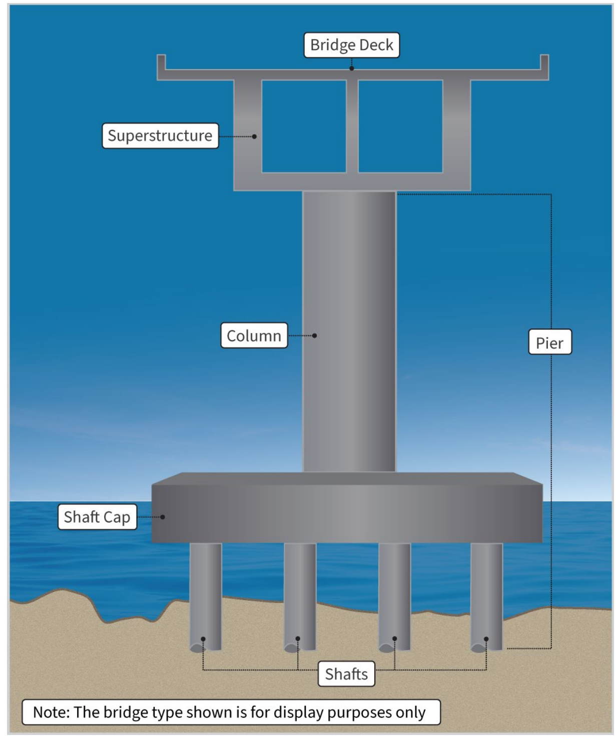


1.1.3.1 Highways, Interchanges, and Local Roadways

The two existing parallel I-5 bridges that cross the Columbia River would be replaced by two new parallel bridges, located west of the existing bridges (see Figure 1-11). The new eastern bridge would accommodate northbound highway traffic and a shared-use path. The new western bridge would carry southbound traffic and two-way light-rail tracks. Whereas the existing bridges each have three lanes with no shoulders, each of the two new bridges would be wide enough to accommodate three through lanes, one or two auxiliary lanes, and shoulders on both sides of the highway. Lanes and shoulders would be built to full design standards.

As with the existing bridge (Figure 1-13), the new Columbia River bridges would provide three navigation channels: a primary navigation channel and two barge channels (see Figure 1-14). The current location of the primary navigation channel is near the Vancouver shoreline where the existing lift spans are located. Under the Modified LPA, the primary navigation channel would be shifted south approximately 500 feet (measured by channel centerlines), and the existing center barge channel would shift north and become the north barge channel. The new primary navigation channel would be 400 feet wide (this width includes a 300-foot congressionally or USACE-authorized channel plus a 50-foot channel maintenance buffer on each side of the authorized channel) and the two barge channels would also each be 400 feet wide.

Figure 1-12. Bridge Foundation Concept



The existing Interstate Bridge has nine in-water pier sets,[7] whereas the new Columbia River bridges (any bridge configuration) would be built on six in-water pier sets, plus multiple piers on land (pier locations are shown on Figure 1-14). Each in-water pier set would be supported by a foundation of drilled shafts; each group of shafts would be tied together with a concrete shaft cap. Columns or pier walls would rise from the shaft caps and connect to the superstructures of the bridges (see Figure 1-12).

BRIDGE CONFIGURATIONS

Three bridge configurations are being considered: (1) double-deck fixed-span (with one bridge type), (2) a single-level fixed-span (with three potential bridge types), and (3) a single-level movable-span (with one bridge type). Both the double-deck and single-level fixed-span configurations would provide 116 feet of vertical navigation clearance at their respective highest spans; the same as the CRC LPA. The CRC LPA included a double-deck fixed-span bridge configuration. The single-level fixed-span configuration was developed and is being considered as part of the IBR Program in response to physical and contextual changes (i.e., design and operational considerations) since 2013 that necessitated examination of a refinement in the double-deck bridge configuration (e.g., ingress and egress of transit from the lower level of the double-deck fixed-span configuration on the north end of the southbound bridge).

Consideration of the single-level movable-span configuration as part the IBR Program was necessitated by the U.S. Coast Guard's (USCG) review of the Program's navigation impacts on the Columbia River and issuance of a Preliminary Navigation Clearance Determination (PNCD) (USCG 2022). The USCG PNCD set the preliminary

[7] A pier set consists of the pier supporting the northbound bridge and the pier supporting the southbound bridge at a given location.

vertical navigation clearance recommended for the issuance of a bridge permit at 178 feet; this is the current vertical navigation clearance of the Interstate Bridge.

The IBR Program is carrying forward the three bridge configurations to address changed conditions, including changes in the USCG bridge permitting process, in order to ensure a permittable bridge configuration is within the range of options considered. The IBR Program continues to refine the details supporting navigation impacts and is coordinating closely with the USCG to determine how a fixed-span bridge may be permittable. Although the fixed-span configurations do not comply with the current USCG PNCD, they do meet the Purpose and Need and provide potential improvements to traffic (passenger vehicle and freight), transit, and active transportation operations.

Each of the bridge configurations assumes one auxiliary lane; two auxiliary lanes could be applied to any of the bridge configurations. All typical sections for the one auxiliary lane option would provide 14-foot shoulders to maintain traffic during construction of the Modified LPA and future maintenance.

Figure 1-13. Existing Navigation Clearances of the Interstate Bridge

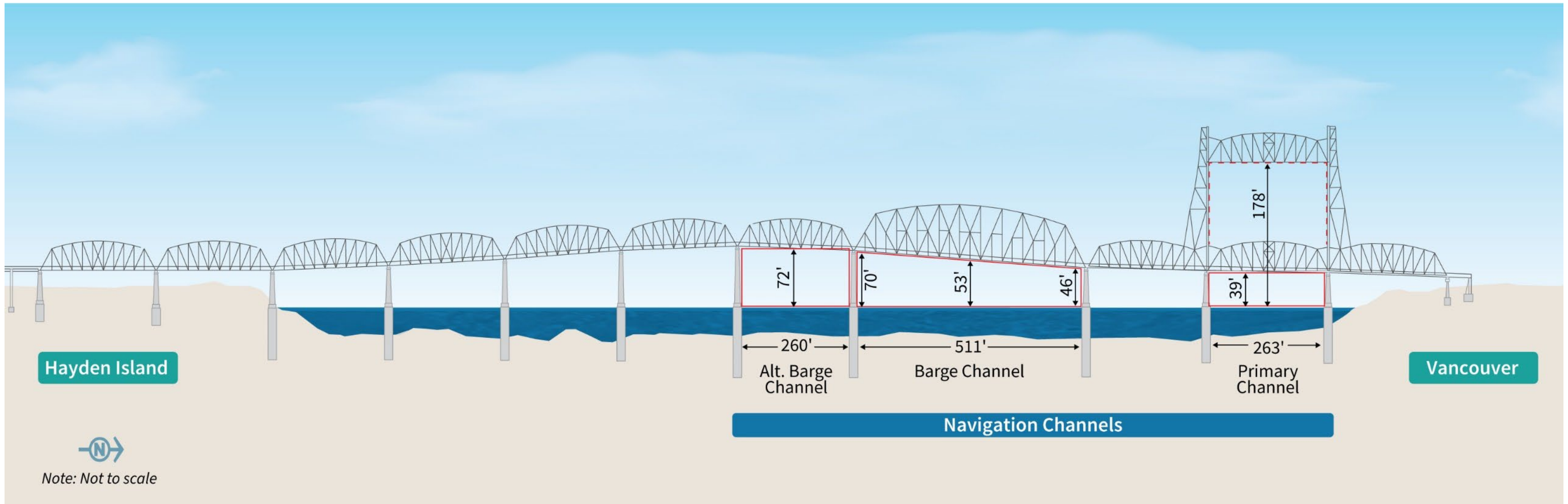
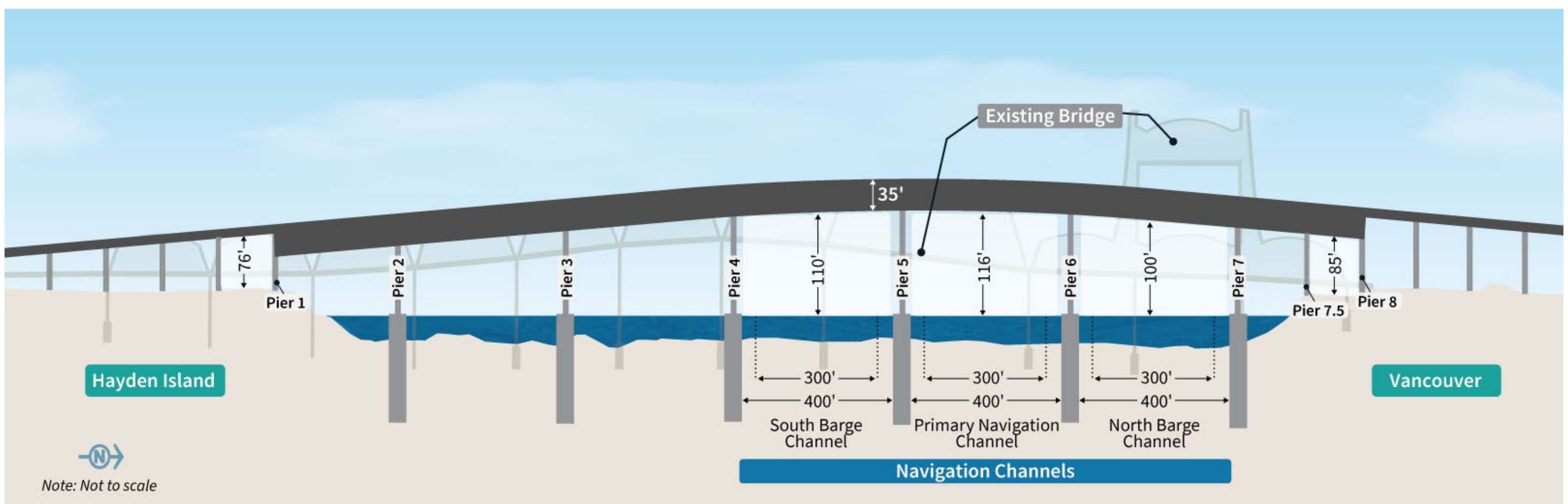


Figure 1-14. Profile and Navigation Clearances of the Proposed Modified LPA Columbia River Bridges with a Double-Deck Fixed-Span Configuration



Note: The location and widths of the proposed navigation channels would be same for all bridge configuration and bridge type options. The three navigation channels would each be 400 feet wide (this width includes a 300-foot congressionally or USACE-authorized channel (shown in dotted lines) plus a 50-foot channel maintenance buffer on each side of the authorized channel). The vertical navigation clearance would vary.

Double-Deck Fixed-Span Configuration

The double-deck fixed-span configuration would be two side-by-side, double-deck, fixed-span steel truss bridges. Figure 1-15 is an example of this configuration (this image is subject to change and is shown as a representative concept; it does not depict the final design). The double-deck fixed-span configuration would provide 116 feet of vertical navigation clearance for river traffic using the primary navigation channel and 400 feet of horizontal navigation clearance at the primary navigation channel, as well as barge channels. This bridge height would not impede takeoffs and landings by aircraft using Pearson Field or Portland International Airport.

The eastern bridge would accommodate northbound highway traffic on the upper level and the shared-use path and utilities on the lower level. The western bridge would carry southbound traffic on the upper level and two-way light-rail tracks on the lower level. Each bridge deck would be 79 feet wide, with a total out-to-out width of 173 feet.[8]

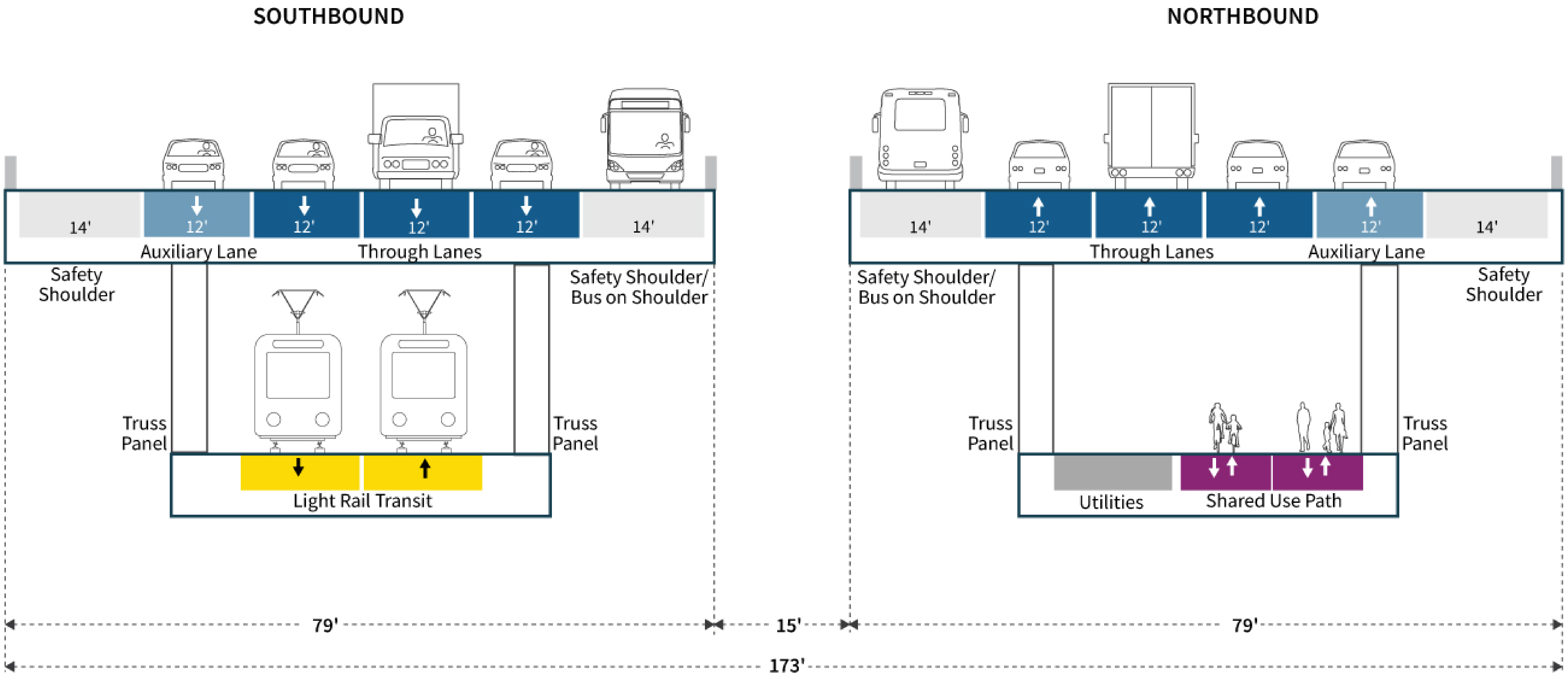
Figure 1-15. Conceptual Drawing of a Double-Deck Fixed-Span Configuration

Note: Visualization is looking southwest from Vancouver.

Figure 1-16 is a cross section of the two parallel double-deck bridges. Like all bridge configurations, the double-deck fixed-span configuration would have six in-water pier sets. Each pier set would require 12 in-water drilled shafts, for a total of 72 in-water drilled shafts. Each individual shaft cap would be approximately 50 feet by 85 feet. This bridge configuration would have a 3.8% maximum grade on the Oregon side of the bridge and a 4% maximum grade on the Washington side.

[8] "Out-to-out width" is the measurement between the outside edges of the bridge across its width at the widest point.

Figure 1-16. Cross Section of the Double-Deck Fixed-Span Configuration



Single-Level Fixed-Span Configuration

The single-level fixed-span configuration would have two side-by-side, single-level, fixed-span steel or concrete bridges. This report considers three single-level fixed-span bridge type options: a girder bridge, an extradosed bridge, and a finback bridge. The description in this section applies to all three bridge types (unless otherwise indicated). Conceptual examples of each of these options are shown on Figure 1-17. These images are subject to change and do not represent final design.

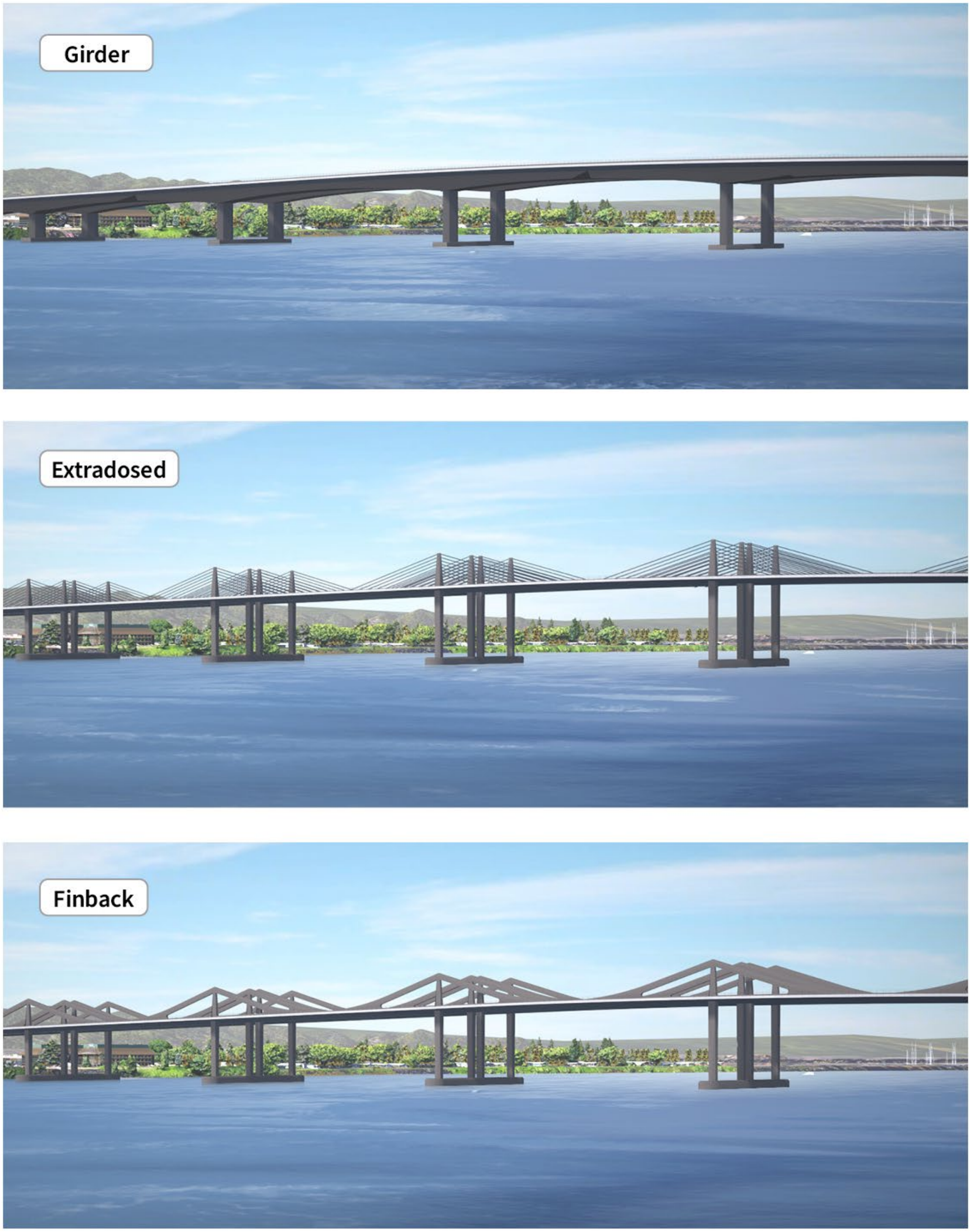
This configuration would provide 116 feet of vertical navigation clearance for river traffic using the primary navigation channel and 400 feet of horizontal navigation clearance at the primary navigation channel, as well as barge channels. This bridge height would not impede takeoffs and landings by aircraft using Pearson Field or Portland International Airport.

The eastern bridge would accommodate northbound highway traffic and the shared-use path; the bridge deck would be 104 feet wide. The western bridge would carry southbound traffic and two-way light-rail tracks; the bridge deck would be 113 feet wide. The I-5 highway, light-rail tracks, and the shared-use path would be on the same level across the two bridges, instead of being divided between two levels with the double-deck configuration. The total out-to-out width of the single-level fixed-span configuration (extradosed or finback options) would be 272 feet at its widest point, approximately 99 feet wider than the double-deck configuration. The total out-to-out width of the single-level fixed-span configuration (girder option) would be 232 feet at its widest point. Figure 1-18 shows a typical cross section of the single-level configuration. This cross section is a representative example of an extradosed or finback bridge as shown by the 10-foot-wide superstructure above the bridge deck; the girder bridge would not have the 10-foot-wide bridge columns shown on Figure 1-18.

There would be six in-water pier sets with 16 in-water drilled shafts on each combined shaft cap, for a total of 96 in-water drilled shafts. The combined shaft caps for each pier set would be 50 feet by 230 feet.

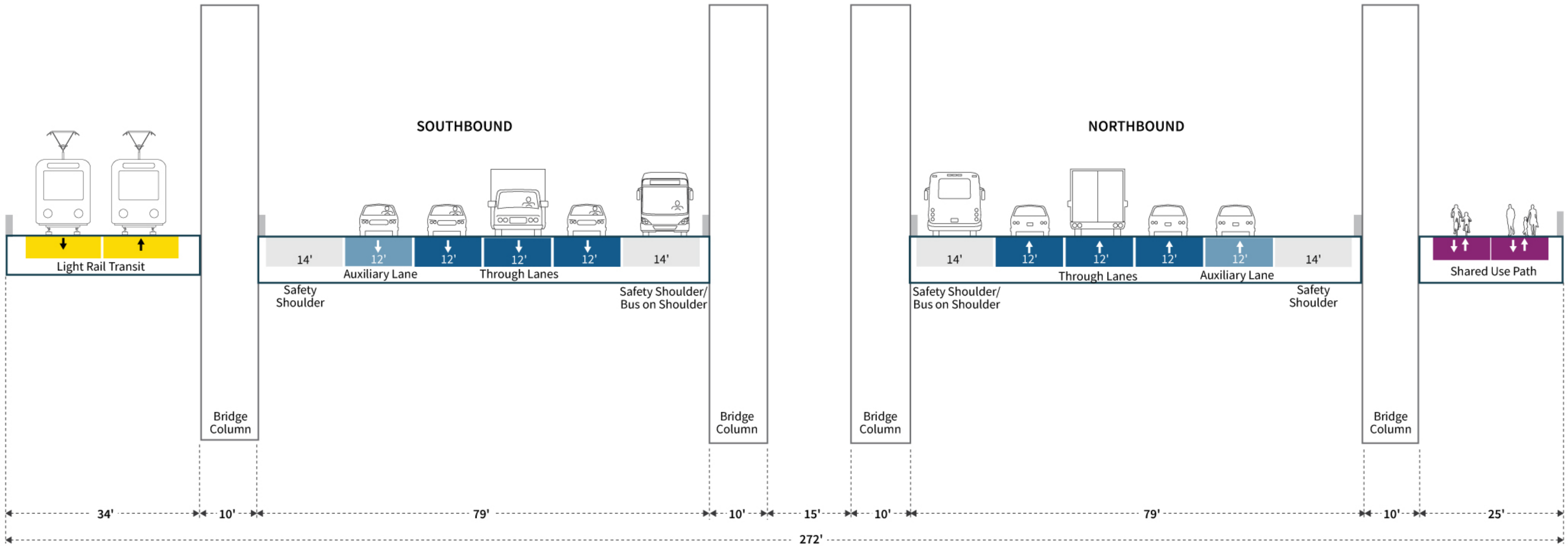
This bridge configuration would have a 3% maximum grade on both the Oregon and Washington sides of the bridge.

Figure 1-17. Conceptual Drawings of Single-Level Fixed-Span Bridge Types



Note: Visualizations are for illustrative purposes only. They do not reflect property impacts or represent final design. Visualization is looking southwest from Vancouver.

Figure 1-18. Cross Section of the Single-Level Fixed-Span Configuration (Extradosed or Finback Bridge Types)



Note: The cross section for a girder type bridge would be the same except that it would not have the four 10-foot bridge columns making the total out-to-out width 232 feet.

Single-Level Movable-Span Configuration

The single-level movable-span configuration would have two side-by-side, single-level steel girder bridges with movable spans between Piers 5 and 6. For the purpose of this report, the IBR Program assessed a vertical lift span movable-span configuration with counterweights based on the analysis in the *River Crossing Bridge Clearance Assessment Report – Movable-Span Options,* included as part of Attachment C in Appendix D, Design Options Development, Screening, and Evaluation Technical Report. A conceptual example of a vertical lift-span bridge is shown in Figure 1-19. These images are subject to change and do not represent final design.

A movable span must be located on a straight and flat bridge section (i.e., without curvature and with minimal slope). To comply with these requirements, and for the bridge to maintain the highway, transit, and active transportation connections on Hayden Island and in Vancouver while minimizing property acquisitions and displacements, the movable span is proposed to be located 500 feet south of the existing lift span, between Piers 5 and 6. To accommodate this location of the movable span, the IBR Program is coordinating with USACE to obtain authorization to change the location of the primary navigation channel, which currently aligns with the Interstate Bridge lift spans near the Washington shoreline.

The single-level movable-span configuration would provide 92 feet of vertical navigation clearance over the proposed relocated primary navigation channel when the movable spans are in the closed position, with 99 feet of vertical navigation clearance available over the north barge channel. The 92-foot vertical clearance is based on achieving a straight, movable span and maintaining an acceptable grade for transit operations. In addition, it satisfies the requirement of a minimum of 72 feet of vertical navigation clearance (the existing Interstate Bridge's maximum clearance over the alternate (southernmost) barge channel when the existing lift span is in the closed position).

In the open position, the movable span would provide 178 feet of vertical navigation clearance over the proposed relocated primary navigation channel.

Similar to the fixed-span configurations, the movable span would provide 400 feet of horizontal navigation clearance for the primary navigation channel and for each of the two barge channels.

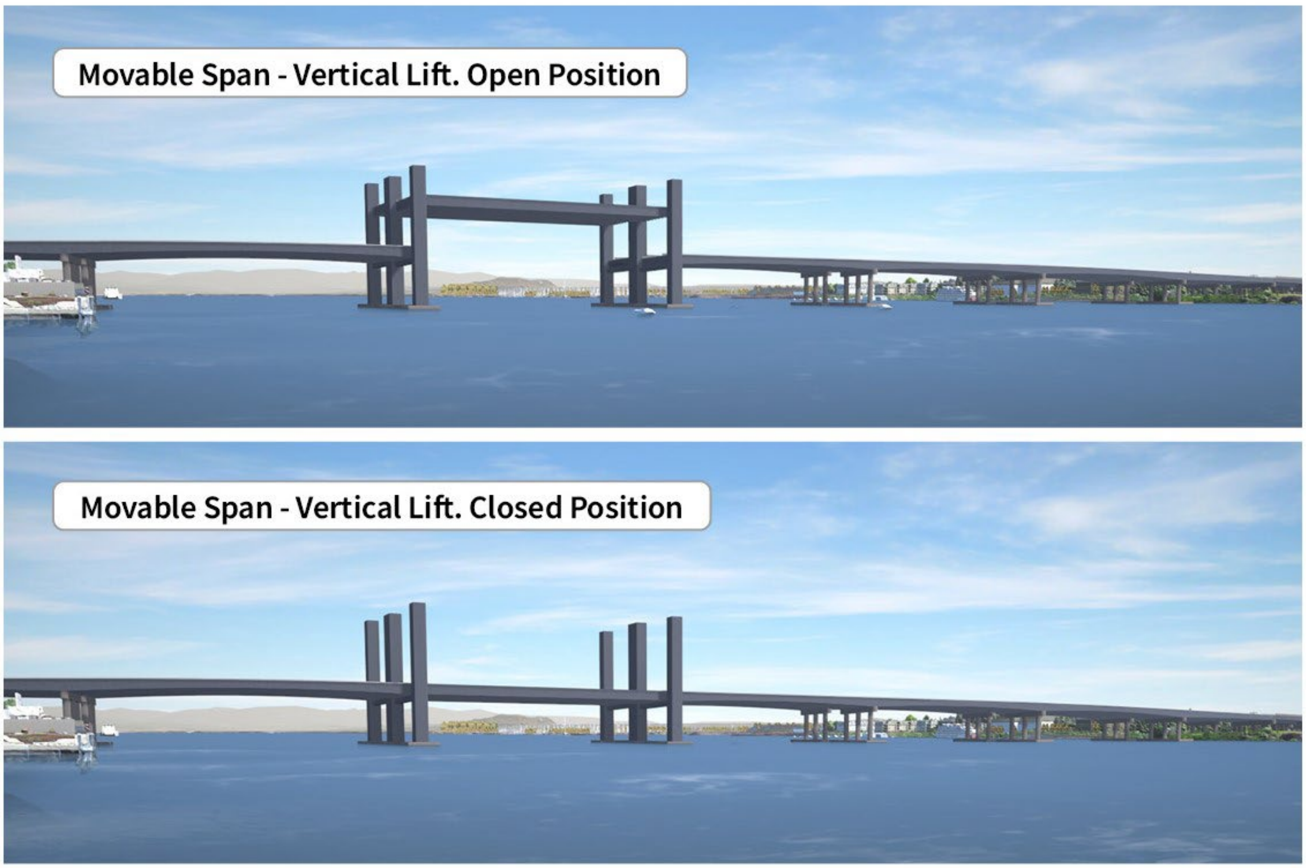
The vertical lift-span towers would be approximately 243 feet high; this is shorter than the existing lift-span towers, which are 247 feet high. This height of the vertical lift-span towers would not impede takeoffs and landings by aircraft using Portland International Airport. At Pearson Field, the Federal Aviation Administration issues obstacle departure procedures to avoid the existing Interstate Bridge lift towers; the single-level movable-span configuration would retain the same procedures.

Similar to the single-level fixed-span configuration, the eastern bridge would accommodate northbound highway traffic and the shared-use path, and the western bridge would carry southbound traffic and two-way light-rail tracks. The I-5 highway, light-rail tracks, and shared-use path would be on the same level across the bridges instead of on two levels as with the double-deck configuration. Cross sections of the single-level movable-span configuration are shown in Figure 1-20; the top cross section depicts the vertical lift spans (Piers 5 and 6), and the bottom cross section depicts the fixed spans (Piers 2, 3, 4, and 7). The movable and fixed cross sections are slightly different because the movable span requires lift towers, which are not required for the other fixed spans of the bridges.

There would be six in-water pier sets and two piers on land per bridge. The vertical lift span would have 22 in-water drilled shafts each for Piers 5 and 6; the shaft caps for these piers would be 50 feet by 312 feet to accommodate the vertical lift spans. Piers 2, 3, 4, and 7 would have 16 in-water drilled shafts each; the shaft caps for these piers would be the same as for the fixed-span options (50 feet by 230 feet). The vertical lift-span configuration would have a total of 108 in-water drilled shafts.

This single-level movable-span configuration would have a 3% maximum grade on the Oregon side of the bridge and a 1.5% maximum grade on the Washington side.

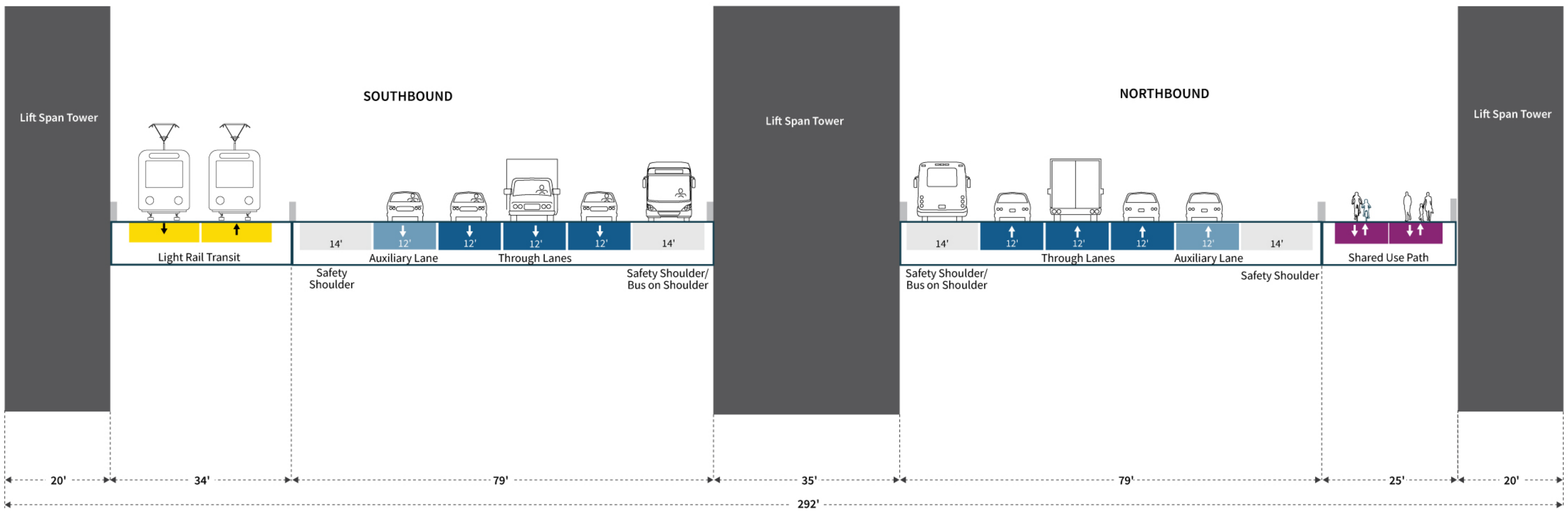
Figure 1-19. Conceptual Drawings of Single-Level Movable-Span Configurations in the Closed and Open Positions



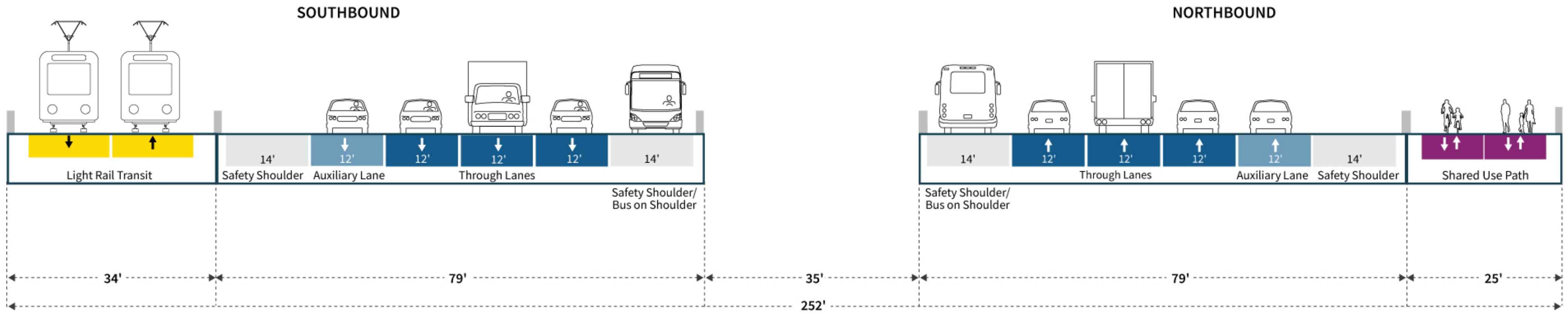
Note: Visualizations are for illustrative purposes only. They do not reflect property impacts or represent final design. Visualization is looking southeast (upstream) from Vancouver.

Figure 1-20. Cross Section of the Single-Level Movable-Span Bridge Type

Single-level Bridge with Movable Span - Vertical Lift Span Cross-section (Piers 5 and 6)



Single-level Bridge with Movable Span - Fixed Spans Cross-section (Piers 2, 3, 4, and 7)



Summary of Bridge Configurations

This section summarizes and compares each of the bridge configurations. Table 1-2 lists the key considerations for each configuration. Figure 1-21 compares each configuration's footprint. The footprints of each configuration would differ in only three locations: over the Columbia River and at the bridge landings on Hayden Island and Vancouver. The rest of the I-5 corridor would have the same footprint. Over the Columbia River, the footprint of the double-deck fixed-span configuration would be 173 feet wide. Comparatively, the finback or extradosed bridge types of the single-level fixed-span configuration would be 272 feet wide (approximately 99 feet wider), and the single-level fixed-span configuration with a girder bridge type would be 232 feet wide (approximately 59 feet wider). The single-level movable-span configuration would be 252 feet wide (approximately 79 feet wider than the double-deck fixed-span configuration), except at Piers 5 and 6, where larger bridge foundations would require an additional 40 feet of width to support the movable span. The single-level configurations would have a wider footprint at the bridge landings on Hayden Island and Vancouver because transit and active transportation would be located adjacent to the highway, rather than below the highway in the double-deck option.

Figure 1-22 compares the basic profile of each configuration. The lower deck of the double-deck fixed-span and the single-level fixed-span configuration would have similar profiles. The single-level movable-span configuration would have a lower profile than the fixed-span configurations when the span is in the closed position.

Figure 1-21. Bridge Configuration Footprint Comparison

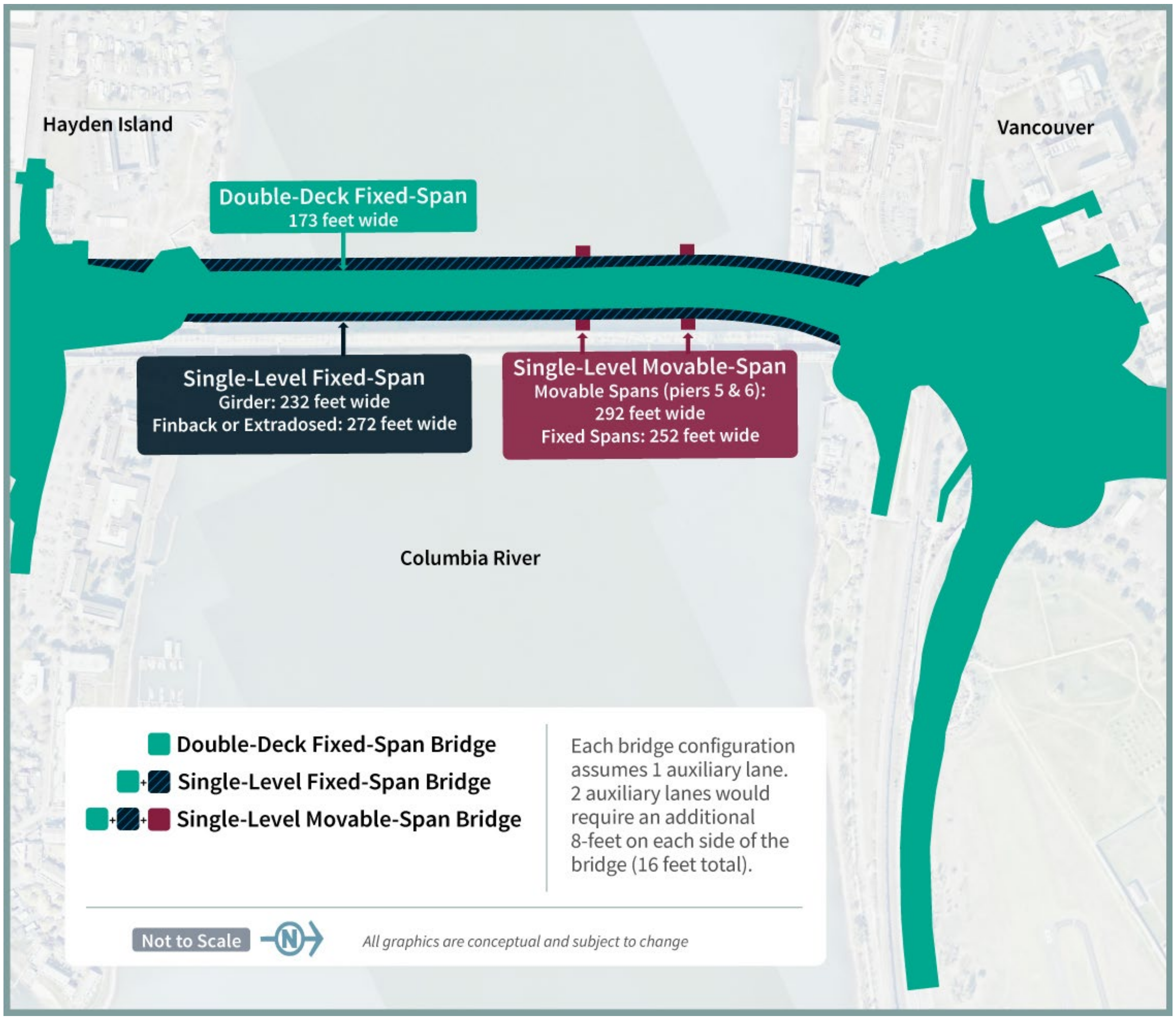
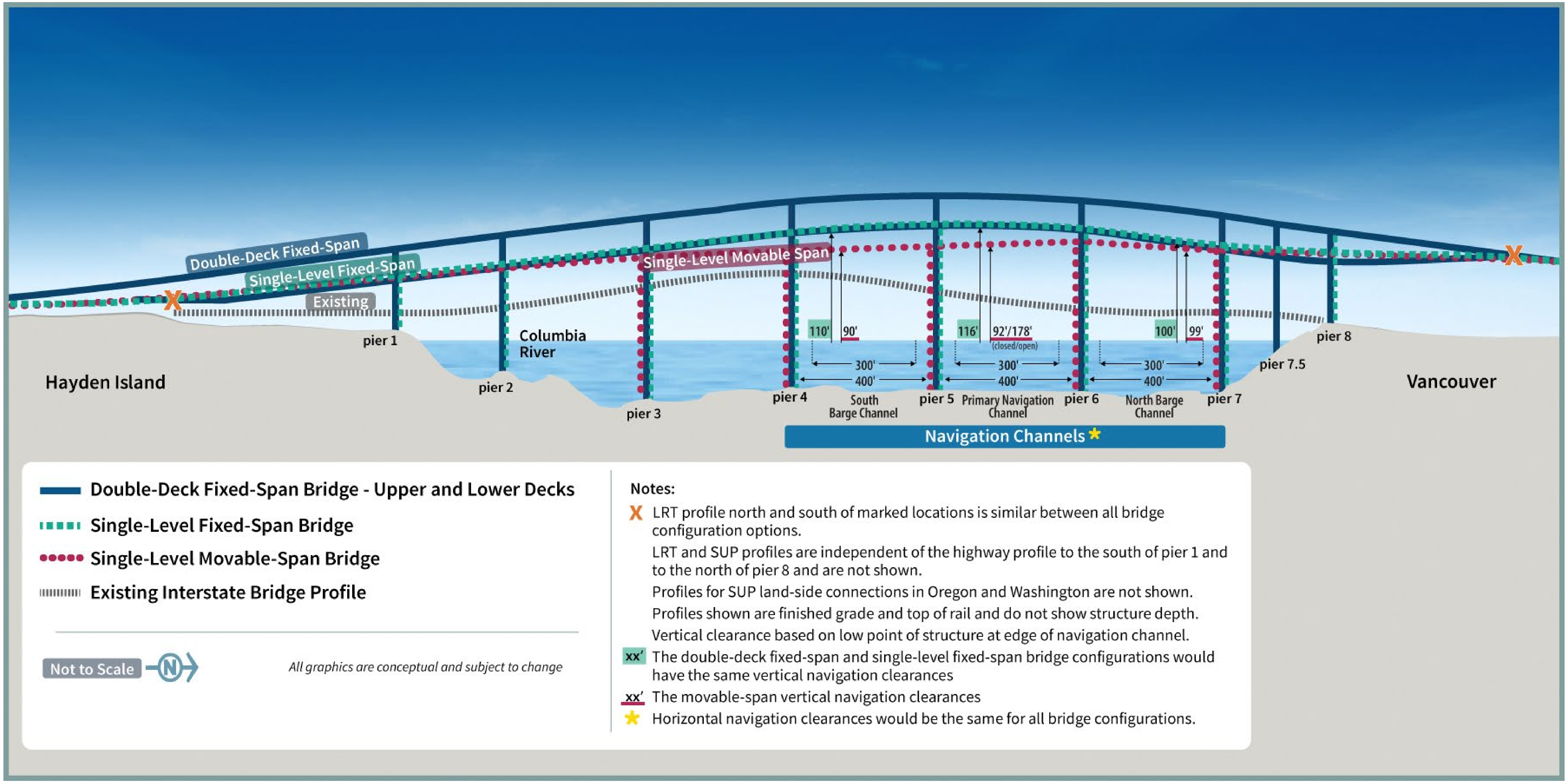


Figure 1-22. Bridge Configuration Profile Comparison



LRT = light-rail transit; SUP = shared-use path

Table 1-2. Summary of Bridge Configurations

	No-Build Alternative	Modified LPA with Double-Deck Fixed-Span Configuration	Modified LPA with Single-Level Fixed-Span Configuration [a]	Modified LPA with Single-Level Movable-Span Configuration
Bridge type	Steel through-truss spans.	Double-deck steel truss.	Single-level, concrete or steel girders, extradosed or finback.	Single-level, steel girders with vertical lift span.
Number of bridges	Two	Two	Two	Two
Movable-span type	Vertical lift span with counterweights.	N/A	N/A	Vertical lift span with counterweights.
Movable-span location	Adjacent to Vancouver shoreline.	N/A	N/A	Between Piers 5 and 6 (approximately 500 feet south of the existing lift span).
Lift opening restrictions	Weekday peak AM and PM highway travel periods. [b]	N/A	N/A	Additional restrictions to daytime bridge openings; requires future federal rulemaking process and authorization by USCG (beyond the assumed No-Build Alternative bridge restrictions for peak AM and PM highway travel periods).[b] Typical opening durations are assumed to be 9 to 18 minutes [c] for the purposes of impact analysis but would ultimately depend on various operational considerations related to vessel traffic and river and weather conditions. Additional time would also be required to stop traffic prior to opening and restart traffic after the bridge closes.

	No-Build Alternative	Modified LPA with Double-Deck Fixed-Span Configuration	Modified LPA with Single-Level Fixed-Span Configuration [a]	Modified LPA with Single-Level Movable-Span Configuration
Out-to-out width [d]	138 feet total width.	173 feet total width.	Girder: 232 feet total width. Extradosed/Finback: 272 feet total width.	• 292 feet at the movable span. • 252 feet at the fixed spans.
Deck widths	52 feet (SB) 52 feet (NB)	79 feet (SB) 79 feet (NB)	Girder: • 113 feet (SB) • 104 feet (NB) Extradosed/Finback: • 133 feet (SB) • 124 feet (NB)	113 feet SB fixed span. 104 feet NB fixed span.
Vertical navigation clearance	Primary navigation channel: • 39 feet when closed. • 178 feet when open. Barge channel: • 46 feet to 70 feet. Alternate barge channel: • 72 feet (maximum clearance without opening).	Primary navigation channel: • 116 feet maximum. North barge channel: • 100 feet maximum. South barge channel: • 110 feet maximum.	Primary navigation channel: • 116 feet maximum. North barge channel: • 100 feet maximum. South barge channel: • 110 feet maximum.	Primary navigation channel: • Closed position: 92 feet. • Open position: 178 feet. North barge channel: • 99 feet maximum. South barge channel: • 90 feet maximum.

	No-Build Alternative	Modified LPA with Double-Deck Fixed-Span Configuration	Modified LPA with Single-Level Fixed-Span Configuration [a]	Modified LPA with Single-Level Movable-Span Configuration
Horizontal navigation clearance	263 feet for primary navigation channel. 511 feet for barge channel. 260 feet for alternate barge channel.	400 feet for all navigation channels (300-foot congressionally or USACE-authorized channel plus a 50-foot channel maintenance buffer on each side).	400 feet for all navigation channels (300-foot congressionally or USACE-authorized channel plus a 50-foot channel maintenance buffer on each side).	400 feet for all navigation channels (300-foot congressionally or USACE-authorized channel plus a 50-foot channel maintenance buffer on each side).
Maximum elevation of bridge component (NAVD 88)[e]	247 feet at top of lift tower.	166 feet.	Girder: 137 feet. Extradosed/Finback: 179 feet at top of pylons.	243 feet at top of lift tower.
Movable span length (from center of pier to center of pier)	278 feet.	N/A	N/A	450 feet.
Number of in-water pier sets	Nine	Six	Six	Six
Number of in-water drilled shafts	N/A	72	96	108
Shaft cap sizes	N/A	50 feet by 85 feet.	50 feet by 230 feet.	Piers 2, 3, 4, and 7: 50 feet by 230 feet. Piers 5 and 6: 50 feet by 312 feet (one combined footing at each location to house tower/equipment for the lift span).
Maximum grade	5%	4% on the Washington side. 3.8% on the Oregon side.	3% on the Washington side. 3% on the Oregon side.	1.5% on the Washington side. 3% on the Oregon side.

	No-Build Alternative	Modified LPA with Double-Deck Fixed-Span Configuration	Modified LPA with Single-Level Fixed-Span Configuration [a]	Modified LPA with Single-Level Movable-Span Configuration
Light-rail transit location	N/A	Below highway on SB bridge.	West of highway on SB bridge.	West of highway on SB bridge.
Express bus	Shared roadway lanes.	Inside shoulder of NB and SB (upper) bridges.	Inside shoulder of NB and SB bridges.	Inside shoulder of NB and SB bridges.
Shared-use path location	Sidewalk adjacent to roadway in both directions.	Below highway on NB bridge.	East of highway on NB bridge.	East of highway on NB bridge.

a When different bridge types are not mentioned, data applies to all bridge types under the specified bridge configuration.

b The No-Build Alternative assumes existing conditions that restrict bridge openings during weekday peak periods (Monday through Friday 6:30 a.m. to 9 a.m.; 2:30 p.m. to 6 p.m., excluding federal holidays). This analysis estimates the potential frequency for bridge openings for vessels requiring more than 99 feet of clearance.

c For the purposes of the transportation analysis (see the Transportation Technical Report), the movable-span opening time is assumed to be an average of 12 minutes.

d “Out-to-out width” is the measurement between the outside edges of the bridge across its width at the widest point.

e NAVD 88 (North American Vertical Datum of 1988) is a vertical control datum (reference point) used by federal agencies for surveying.

NB = northbound; SB = southbound; USCG = U.S. Coast Guard

1.1.4 Downtown Vancouver (Subarea C)

This section discusses the geographic Subarea C shown in Figure 1-3. See Figure 1-23 for all highway and interchange improvements in Subarea C. Refer to Figure 1-3 for an overview of the geographic subareas.

1.1.4.1 Highways, Interchanges, and Local Roadways

North of the Columbia River bridges in downtown Vancouver, improvements are proposed to the SR 14 interchange (Figure 1-23).

SR 14 INTERCHANGE

The new Columbia River bridges would touch down just north of the SR 14 interchange (Figure 1-23). The function of the SR 14 interchange would remain essentially the same as it is now, although the interchange would be elevated. Direct connections between I-5 and SR 14 would be rebuilt. Access to and from downtown Vancouver would be provided as it is today, but the connection points would be relocated. Downtown Vancouver I-5 access to and from the south would be at C Street as it is today, while downtown connections to and from SR 14 would be from Columbia Street at 3rd Street.

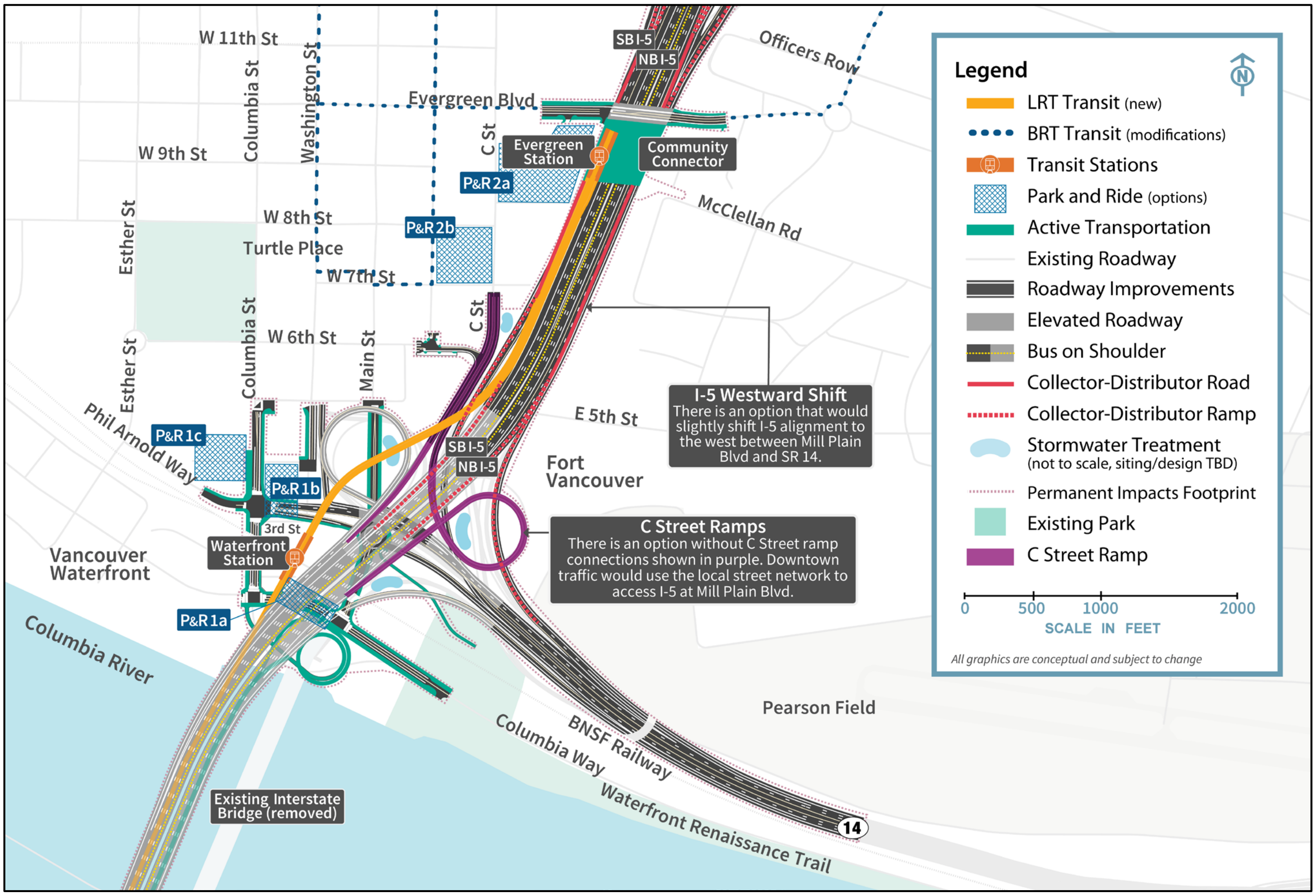
Main Street would be extended between 5th Street and Columbia Way. Vehicles traveling from downtown Vancouver to access SR 14 eastbound would use the new extension of Main Street to the roundabout underneath I-5. If coming from the west or south (waterfront) in downtown Vancouver, vehicles would use the Phil Arnold Way/3rd Street extension to the roundabout, then continue to SR 14 eastbound. The existing Columbia Way roadway under I-5 would be realigned to the north of its existing location and would intersect both the new Main Street extension and Columbia Street with T intersections.

In addition, the existing overcrossing of I-5 at Evergreen Boulevard would be reconstructed.

Design Option Without C Street Ramps

Under this design option, downtown Vancouver I-5 access to and from the south would be through the Mill Plain interchange rather than C Street. There would be no eastside loop ramp from I-5 northbound to C Street and no directional ramp on the west side of I-5 from C Street to I-5 southbound. The existing eastside loop ramp would be removed. This design option has been included because of changes in local planning that necessitate consideration of design options that reduce the footprint and associated direct and temporary environmental impacts in Vancouver.

Figure 1-23. Downtown Vancouver (Subarea C)



BRT = bus rapid transit; LRT = light-rail transit; NB = northbound; P&R = park and ride; SB = southbound

Design Option to Shift I-5 Westward

This design option would shift the I-5 mainline and ramps approximately 40 feet to the west between SR 14 and Mill Plain Boulevard. The westward I-5 alignment shift could also be paired with the design option without C Street ramps. The inclusion of this design option is due to changes in local planning, which necessitate consideration of design options that that shifts the footprint and associated direct and temporary environmental impacts in Vancouver.

1.1.4.2 Transit

LIGHT-RAIL ALIGNMENT AND STATIONS

Under the Modified LPA, the light-rail tracks would exit the highway bridge and be on their own bridge along the west side of the I-5 mainline after crossing the Columbia River (see Figure 1-23). The light-rail bridge would cross approximately 35 feet over the BNSF Railway tracks. An elevated light-rail station near the Vancouver waterfront (Waterfront Station) would be situated near the overcrossing of the BNSF tracks between Columbia Way and 3rd Street. Access to the elevated station would be primarily by elevator as the station is situated approximately 75 feet above existing ground level. A stairwell(s) would be provided for emergency egress. The number of elevators and stairwells provided would be based on the ultimate platform configuration, station location relative to the BNSF trackway, projected ridership, and fire and life safety requirements. Passenger drop-off facilities would be located at ground level and would be coordinated with the C-TRAN bus service at this location. The elevated light-rail tracks would continue north, cross over the westbound SR 14 on-ramp and the C Street/6th Street on-ramp to southbound I-5, and then straddle the southbound I-5 C-D roadway. Transit components in the downtown Vancouver area are similar between the two SR 14 interchange area design options discussed above.

North of the Waterfront Station, the light-rail tracks would continue to the Evergreen Station, which would be the terminus of the light-rail extension (see Figure 1-23). The light-rail tracks from downtown Vancouver to the terminus would be entirely on an elevated structure supported by single columns, where feasible, or by columns on either side of the roadway where needed. The light-rail tracks would be a minimum of 27 feet above the I-5 roadway surface. The Evergreen Station would be located at the same elevation as Evergreen Boulevard, on the proposed Community Connector, and it would provide connections to C-TRAN's existing BRT system. Passenger drop-off facilities would be near the station and would be coordinated with the C-TRAN bus service at this location.

PARK AND RIDES

Up to two park and rides could be built in Vancouver along the light-rail alignment: one near the Waterfront Station and one near the Evergreen Station. Additional information regarding the park and rides can be found in the Transportation Technical Report.

> Park and rides can expand the catchment area of public transit systems, making transit more accessible to people who live farther away from fixed-route transit service, and attracting new riders who might not have considered using public transit otherwise.

Waterfront Station Park-and-Ride Options

There are three site options for the park and ride near the Waterfront Station (see Figure 1-23). Each would accommodate up to 570 parking spaces.

1. Columbia Way (below I-5). This park-and-ride site would be a multilevel aboveground structure located below the new Columbia River bridges, immediately north of a realigned Columbia Way.
2. Columbia Street/SR 14. This park-and-ride site would be a multilevel aboveground structure located along the east side of Columbia Street. It could span across (or over) the SR 14 westbound off-ramp to provide parking on the north and south sides of the off-ramp.
3. Columbia Street/Phil Arnold Way (Waterfront Gateway Site). This park-and-ride site would be located along the west side of Columbia Street immediately north of Phil Arnold Way. This park and ride would be developed in coordination with the City of Vancouver's Waterfront Gateway program and could be a joint-use parking facility not constructed exclusively for park-and-ride users.

Evergreen Station Park-and-Ride Options

There are two site options for the park and ride near the Evergreen Station (see Figure 1-23).

1. Library Square. This park-and-ride site would be located along the east side of C Street and south of Evergreen Boulevard. It would accommodate up to 700 parking spaces in a multilevel belowground structure according to a future agreement on City-owned property associated with Library Square. Current design concepts suggest the park and ride most likely would be a joint-use parking facility for park-and-ride users and patrons of other uses on the ground or upper levels as negotiated as part of future decisions.
2. Columbia Credit Union. This park-and-ride site is an existing multistory garage that is located below the Columbia Credit Union office tower along the west side of C Street between 7th Street and 8th Street. The existing parking structure currently serves the office tower above it and the Regal City Center across the street. This would be a joint-use parking facility, not for the exclusive use of park-and-ride users, that could serve as additional or overflow parking if the 700 required parking spaces cannot be accommodated elsewhere.

1.1.4.3 Active Transportation

Within the downtown Vancouver area, the shared-use path on the northbound (or eastern) bridge would exit the bridge at the SR 14 interchange, loop down on the east side of I-5 via a vertical spiral path, and then cross back below I-5 to the west side of I-5 to connect to the Waterfront Renaissance Trail on Columbia Street and into Columbia Way (see Figure 1-23). Access would be provided across state right of way beneath the new bridges to provide a connection between the recreational areas along the City's Columbia River waterfront east of the bridges and existing and future waterfront uses west of the bridges.

Active transportation components in the downtown Vancouver area would be similar without the C Street ramps and with the I-5 westward shift.

At Evergreen Boulevard, a community connector is proposed to be built over I-5 just south of Evergreen Boulevard and east of the Evergreen Station (see Figure 1-23). The structure is proposed to include off-street pathways for active transportation modes including pedestrians, bicyclists, and other micro-mobility modes, and public space and amenities to support the active transportation facilities. The primary intent of the Community Connector is to improve connections between downtown Vancouver on the west side of I-5 and the Vancouver National Historic Reserve on the east side.

1.1.5 Upper Vancouver (Subarea D)

This section discusses the geographic Subarea D shown in Figure 1-3. See Figure 1-24 for all highway and interchange improvements in Subarea D. Refer to Figure 1-3 for an overview of the geographic subareas.

1.1.5.1 Highways, Interchanges, and Local Roadways

Within the upper Vancouver area, the IBR Program proposes improvements to three interchanges—Mill Plain, Fourth Plain, and SR 500—as described below.

MILL PLAIN BOULEVARD INTERCHANGE

The Mill Plain Boulevard interchange is north of the SR 14 interchange (see Figure 1-24). This interchange would be reconstructed as a tight-diamond configuration but would otherwise remain similar in function to the existing interchange. The ramp terminal intersections would be sized to accommodate high, wide heavy freight vehicles that travel between the Port of Vancouver and I-5. The off-ramp from I-5 northbound to Mill Plain Boulevard would diverge from the C-D road that would continue north, crossing over Mill Plain Boulevard, to provide access to Fourth Plain Boulevard via a C-D roadway. The off-ramp to Fourth Plain Boulevard would be reconstructed and would cross over Mill Plain Boulevard east of I-5, similar to the way it functions today.

FOURTH PLAIN BOULEVARD INTERCHANGE

At the Fourth Plain Boulevard interchange (Figure 1-24), improvements would include reconstruction of the overpass of I-5 and the ramp terminal intersections. Northbound I-5 traffic exiting to Fourth Plain Boulevard would first exit to the northbound C-D roadway which provides off-ramp access to Fourth Plain Boulevard and Mill Plain Boulevard. The westbound SR 14 to northbound I-5 on-ramp also joins the northbound C-D roadway before continuing north past the Fourth Plain Boulevard and Mill Plain Boulevard off-ramps as an auxiliary lane. The southbound I-5 off-ramp to Fourth Plain Boulevard would be braided below the 39th Street on-ramp to southbound I-5. This change would eliminate the existing nonstandard weave between the SR 500 interchange and the off-ramp to Fourth Plain Boulevard. It would also eliminate the existing westbound SR 500 to Fourth Plain Boulevard off-ramp connection. The existing overcrossing of I-5 at 29th Street would be reconstructed to accommodate a widened I-5, provide adequate vertical clearance over I-5, and provide pedestrian and bicycle facilities.

SR 500 INTERCHANGE

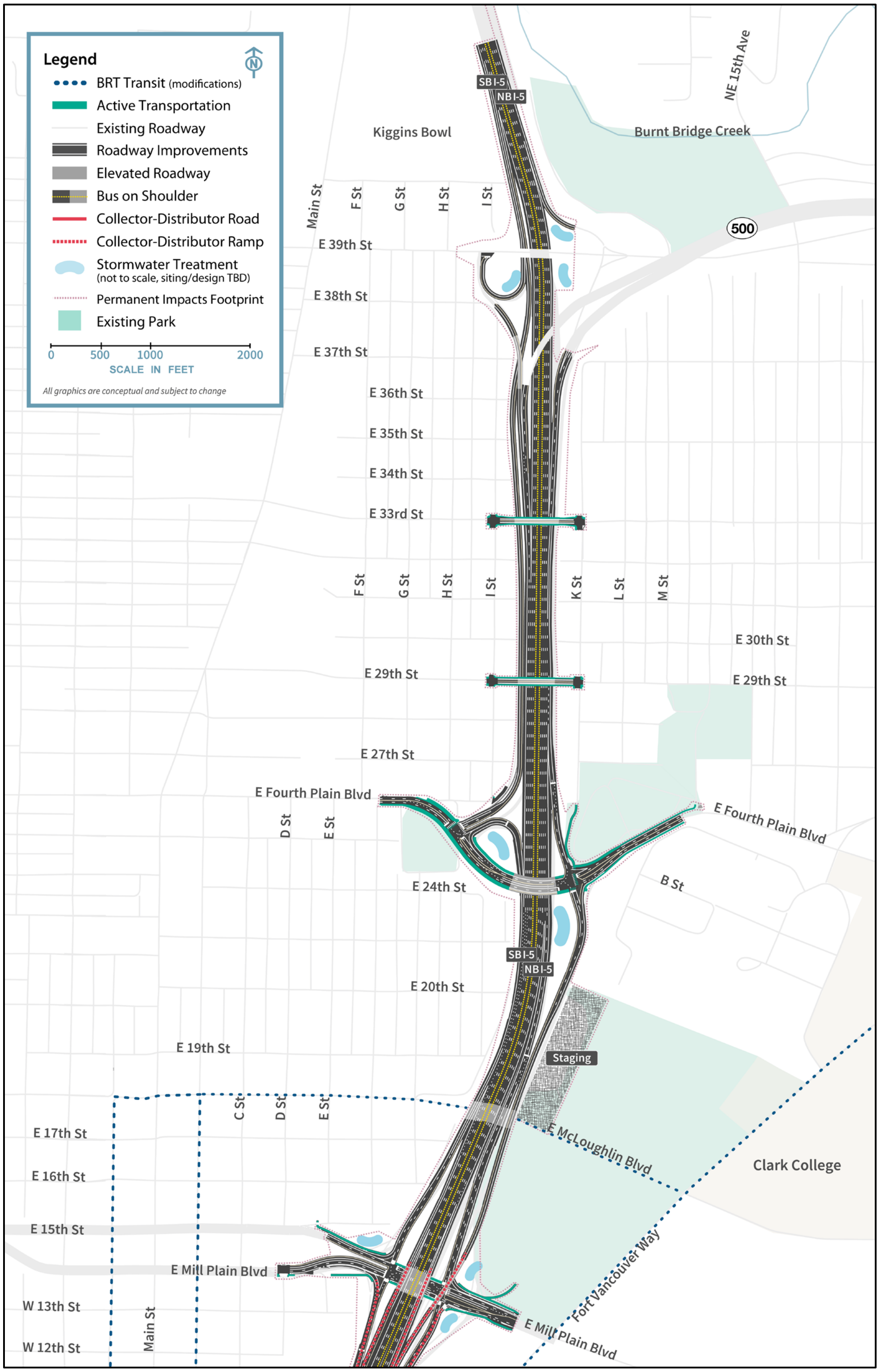
The northern terminus of the I-5 improvements would be in the SR 500 interchange area (Figure 1-24). The improvements would primarily be to connect the Modified LPA to existing ramps. The off-ramp from I-5 southbound to 39th Street would be reconstructed to establish the beginning of the braided ramp to Fourth Plain Boulevard and restore the loop ramp to 39th Street. Ramps from existing I-5 northbound to SR 500 eastbound and from 39th Street to I-5 northbound would be partially reconstructed. The existing bridges for 39th Street over I-5 and SR 500 westbound to I-5 southbound would be retained. The 39th Street to I-5 southbound on-ramp would be reconstructed and braided over (i.e., grade separated or pass over) the new I-5 southbound off-ramp to Fourth Plain Boulevard.

The existing overcrossing of I-5 at 33rd Street would also be reconstructed to accommodate a widened I-5, provide adequate vertical clearance over I-5, and provide pedestrian and bicycle facilities.

1.1.5.2 Transit

There would be no LRT facilities in upper Vancouver. Proposed operational changes to bus service, including I-5 bus-on-shoulder service, are described in Section 1.1.7, Transit Operating Characteristics.

Figure 1-24. Upper Vancouver (Subarea D)



BRT = bus rapid transit; TBD = to be determined

1.1.5.3 Active Transportation

Several active transportation improvements would be made in Subarea D consistent with City of Vancouver plans and policies. At the Fourth Plain Boulevard interchange, there would be improvements to provide better bicycle and pedestrian mobility and accessibility; these include bicycle lanes, neighborhood connections, and a connection to the City of Vancouver's planned two-way cycle track on Fourth Plain Boulevard. The reconstructed overcrossings of I-5 at 29th Street and 33rd Street would provide pedestrian and bicycle facilities on those cross streets. No new active transportation facilities are proposed in the SR 500 interchange area. Active transportation improvements at the Mill Plain Boulevard interchange include buffered bicycle lanes and sidewalks, pavement markings, lighting, and signing.

1.1.6 Transit Support Facilities

1.1.6.1 Ruby Junction Maintenance Facility Expansion

The TriMet Ruby Junction Maintenance Facility in Gresham, Oregon, would be expanded to accommodate the additional LRVs associated with the Modified LPA's LRT service (the Ruby Junction location relative to the study area is shown in Figure 1-25). Improvements would include additional storage for LRVs and maintenance materials and supplies, expanded LRV maintenance bays, expanded parking and employee support areas for additional personnel, and a third track at the northern entrance to Ruby Junction. Figure 1-25 shows the proposed footprint of the expansion.

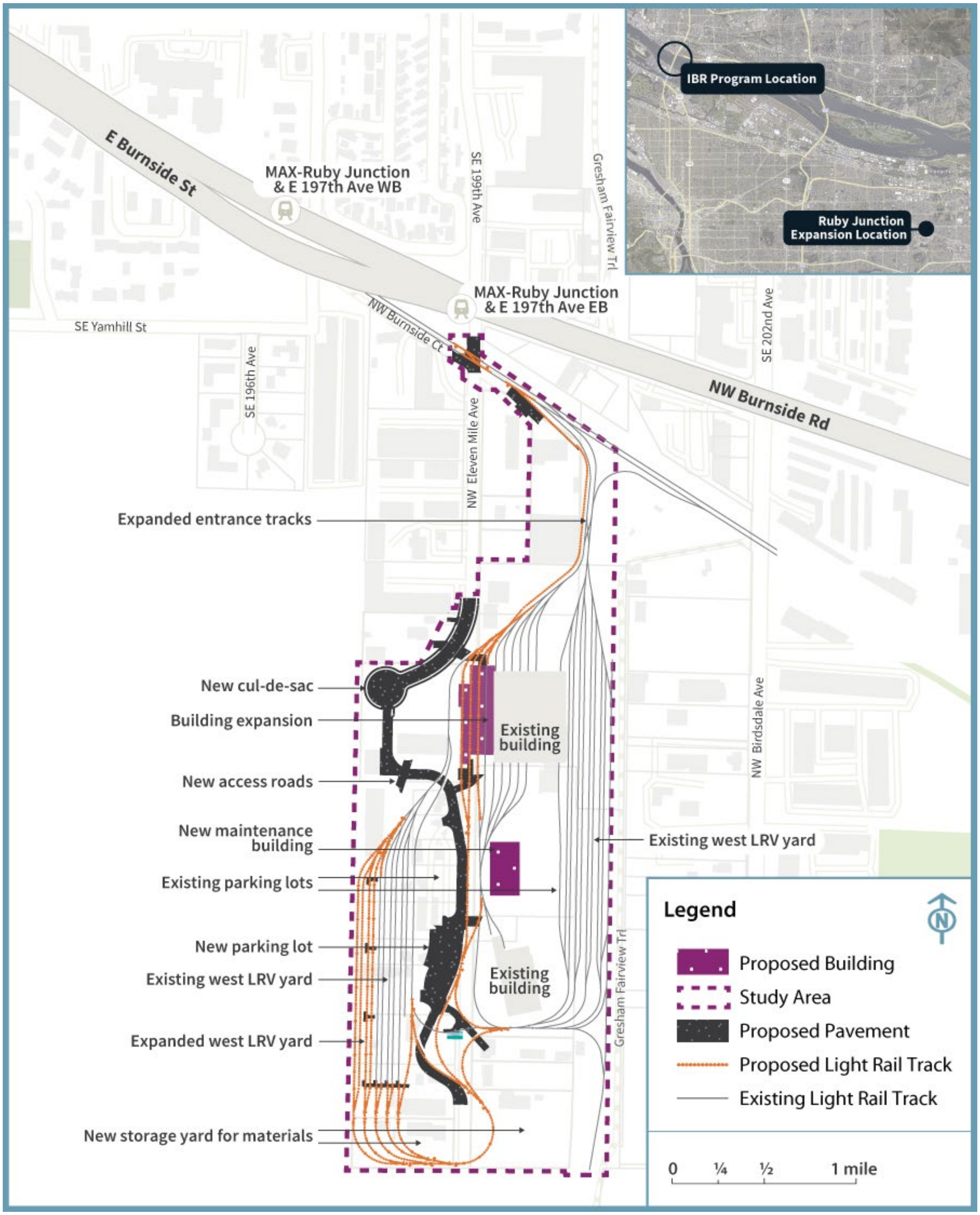
The existing main building would be expanded west to provide additional maintenance bays. To make space for the building expansion, Eleven Mile Avenue would be vacated and would terminate in a new cul-de-sac west of the main building. New access roads would be constructed to maintain access to TriMet buildings south of the cul-de-sac.

The existing LRV storage yard, west of Eleven Mile Avenue, would be expanded to the west to accommodate additional storage tracks and a runaround track (a track constructed to bypass congestion in the maintenance yard). This expansion would require partial demolition of an existing TriMet building (just north of the LRV storage) and would require relocating the material storage yard to the properties just south of the south building.

All tracks in the west LRV storage yard would also be extended southward to connect to the proposed runaround track. The runaround track would connect to existing tracks near the existing south building. The connections to the runaround track would require partial demolition of an existing TriMet building plus full demolition of one existing building and partial demolition of another existing building on the private property west of the south end of Eleven Mile Avenue. The function of the existing TriMet building would either be transferred to existing modified buildings or to new replacement buildings on site.

The existing parking lot west of Eleven Mile Avenue would be expanded toward the south to provide more parking for TriMet personnel.

Figure 1-25. Ruby Junction Maintenance Facility Study Area



EB = eastbound; LRV = light-rail vehicle; WB = westbound

A third track would be needed at the north entrance to Ruby Junction to accommodate increased train volumes without decreasing service. The additional track would also reduce operational impacts during construction and maintenance outages for the yard. Constructing the third track would require reconstruction of Burnside Court east of Eleven Mile Avenue. An additional crossover would also be needed on the mainline track where it crosses Eleven Mile Avenue; it would require reconstruction of the existing track crossings for vehicles, bicycles, and pedestrians.

1.1.6.2 Expo Center Overnight LRV Facility

An overnight facility for LRVs would be constructed on the southeast corner of the Expo Center property (as shown on Figure 1-8) to reduce deadheading between Ruby Junction and the northern terminus of the MAX Yellow Line extension. Deadheading occurs when LRVs travel without passengers to make the vehicles ready for service. The facility would provide a yard access track, storage tracks for approximately 10 LRVs, one building for light LRV maintenance, an operator break building, a parking lot for operators, and space for security personnel. This facility would necessitate relocation and reconstruction of the Expo Road entrance to the Expo Center (including the parking lot gates and booths). However, it would not affect existing Expo Center buildings.

The overnight facility would connect to the mainline tracks by crossing Expo Road just south of the existing Expo Center MAX Station. The connection tracks would require relocation of one or two existing LRT facilities, including a traction power substation building and potentially the existing communication building, which are both just south of the Expo Center MAX Station. Existing artwork at the station may require relocation.

1.1.6.3 Additional Bus Bays at the C-TRAN Operations and Maintenance Facility

Three bus bays would be added to the C-TRAN operations and maintenance facility. These new bus bays would provide maintenance capacity for the additional express bus service on I-5 (see Section 1.1.7, Transit Operating Characteristics). Modifications to the facility would accommodate new vehicles as well as maintenance equipment.

1.1.7 Transit Operating Characteristics

1.1.7.1 LRT Operations

Nineteen new LRVs would be purchased to operate the extension of the MAX Yellow Line. These vehicles would be similar to those currently used for the TriMet MAX system. With the Modified LPA, LRT service in the new and existing portions of the Yellow Line in 2045 would operate with 6.7-minute average headways (defined as gaps between arriving transit vehicles) during the 2-hour morning peak period. Mid-day and evening headways would be 15 minutes, and late-night headways would be 30 minutes. Service would operate between the hours of approximately 5 a.m. (first southbound train leaving Evergreen Station) and 1 a.m. (last northbound train arriving at the station), which is consistent with current service on the Yellow Line. LRVs would be deadheaded at Evergreen Station before beginning service each day. A third track at this northern terminus would accommodate layovers.

1.1.7.2 Express Bus Service and Bus on Shoulder

C-TRAN provides bus service that connects to LRT and augments travel between Washington and Oregon with express bus service to key employment centers in Oregon. Beginning in 2022, the main express route providing service in the IBR corridor, Route 105, had two service variations. One pattern provides service between Salmon Creek and downtown Portland with a single intermediate stop at the 99th Street Transit Center, and one provides service between Salmon Creek and downtown Portland with two intermediate stops: 99th Street Transit Center and downtown Vancouver. This route currently provides weekday service with 20-minute peak and 60-minute off-peak headways.

Once the Modified LPA is constructed, C-TRAN Route 105 would be revised to provide direct service from the Salmon Creek Park and Ride and 99th Street Transit Center to downtown Portland, operating at 5-minute peak headways with no service in the off-peak. The C-TRAN Route 105 intermediate stop service through downtown Vancouver would be replaced with C-TRAN Route 101, which would provide direct service from downtown Vancouver to downtown Portland at 10-minute peak and 30-minute off-peak headways.

Two other existing C-TRAN express bus service routes would remain unchanged after completion of the Modified LPA. C-TRAN Route 190 would continue to provide service from the Andresen Park and Ride in Vancouver to Marquam Hill in Portland. This route would continue to operate on SR 500 and I-5 within the study area. Route headways would be 10 minutes in the peak periods with no off-peak service. C-TRAN Route 164 would continue to provide service from the Fisher's Landing Transit Center to downtown Portland. This route would continue to operate within the study area only in the northbound direction during PM service to use the I-5 northbound high-occupancy vehicle lane in Oregon before exiting to eastbound SR 14 in Washington. Route headways would be 10 minutes in the peak and 30 minutes in the off-peak.

C-TRAN express bus Routes 105 and 190 are currently permitted to use the existing southbound inside shoulder of I-5 from 99th Street to the Interstate Bridge in Vancouver. However, the existing shoulders are too narrow for bus-on-shoulder use in the rest of the I-5 corridor in the study area. The Modified LPA would include inside shoulders on I-5 that would be wide enough (14 feet on the Columbia River bridges and 11.5 to 12 feet elsewhere on I-5) to allow northbound and southbound buses to operate on the shoulder, except where I-5 would have to taper to match existing inside shoulder widths at the north and south ends of the corridor. Figure 1-8, Figure 1-16, Figure 1-23, and Figure 1-24 show the potential bus-on-shoulder use over the Columbia River bridges. Bus on shoulder could operate on any of the Modified LPA bridge configurations and bridge types. Additional approvals (including a continuing control agreement), in coordination with ODOT, may be needed for buses to operate on the shoulder on the Oregon portion of I-5.

After completion of the Modified LPA, two C-TRAN express bus routes operating on I-5 through the study area would be able to use bus-on-shoulder operations to bypass congestion in the general-purpose lanes. C-TRAN Route 105 would operate on the shoulder for the full length of the study area. C-TRAN Route 190 would operate on the shoulder for the full length of the corridor except for the distance required to merge into and out of the shoulder as the route exits from and to SR 500. These two express bus routes (105 and 190) would have a combined frequency of every 3 minutes during the 2045 AM and PM peak periods. To support the increased frequency of express bus service, eight electric double-decker or articulated buses would be purchased.

If the C Street ramps were removed from the SR 14 interchange, C-TRAN Route 101 could also use bus-on-shoulder operations south of Mill Plain Boulevard; however, if the C Street ramps remained in place, Route 101 could still use bus-on-shoulder operations south of the SR 14 interchange but would need to begin merging over to the C Street exit earlier than if the C Street ramps were removed. Route 101 would operate at 10-minute peak and 30-minute off-peak headways. C-TRAN Route 164 would not be anticipated to use bus-on-shoulder operations because of the need to exit to SR 14 from northbound I-5.

1.1.7.3 Local Bus Route Changes

The TriMet Line 6 bus route would be changed to terminate at the Expo Center MAX Station, requiring passengers to transfer to the new LRT connection to access Hayden Island. TriMet Line 6 is anticipated to travel from Martin Luther King Jr. Boulevard through the newly configured area providing local connections to Marine Drive. It would continue west to the Expo Center MAX Station. Table 1-3 shows existing service and anticipated future changes to TriMet Line 6.

As part of the Modified LPA, several local C-TRAN bus routes would be changed to better complement the new light-rail extension. Most of these changes would reroute existing bus lines to provide a transfer opportunity near the new Evergreen Station. Table 1-3 shows existing service and anticipated future changes to C-TRAN bus routes. In addition to the changes noted in Table 1-3, other local bus route modifications would move service from Broadway to C Street. The changes shown may be somewhat different if the C Street ramps are removed.

Table 1-3. Proposed TriMet and C-TRAN Bus Route Changes

Bus Route	Existing Route	Changes with Modified LPA
TriMet Line 6	Connects Goose Hollow, Portland City Center, N/NE Portland, Jantzen Beach and Hayden Island. Within the study area, service currently runs between Delta Park MAX Station and Hayden Island via I-5.	Route would be revised to terminate at the Expo Center MAX Station. Route is anticipated to travel from Martin Luther King Jr. Boulevard through the newly configured Marine Drive area, then continue west to connect via facilities on the west side of I-5 with the Expo Center MAX Station.
C-TRAN Fourth Plain and Mill Plain bus rapid transit (The Vine)	Runs between downtown Vancouver and the Vancouver Mall Transit Center via Fourth Plain Boulevard, with a second line along Mill Plain Boulevard. In the study area, service currently runs along Washington and Broadway Streets through downtown Vancouver.	Route would be revised to begin/end near the Evergreen Station in downtown Vancouver and provide service along Evergreen Boulevard to Fort Vancouver Way, where it would travel to or from Mill Plain Boulevard or Fourth Plain Boulevard depending on clockwise/counterclockwise operations. The Fourth Plain Boulevard route would continue to serve existing Vine stations beyond Evergreen Boulevard.

Bus Route	Existing Route	Changes with Modified LPA
C-TRAN #2 Lincoln	Connects the 99th Street Transit Center to downtown Vancouver via Lincoln and Kaufman Avenues. Within the study area, service currently runs along Washington and Broadway Streets between 7th and 15th Streets in downtown Vancouver.	Route would be modified to begin/end near C Street and 9th Street in downtown Vancouver.
C-TRAN #25 St. Johns	Connects the 99th Street Transit Center to downtown Vancouver via St. Johns Boulevard and Fort Vancouver Way. Within the study area, service currently runs along Evergreen Boulevard, Jefferson Street/Kaufman Avenue, 15th Street, and Franklin Street in downtown Vancouver.	Route would be modified to begin/end near C Street and 9th Street in downtown Vancouver.
C-TRAN #30 Burton	Connects the Fisher's Landing Transit Center with downtown Vancouver via 164th/162nd Avenues and 18th, 25th, 28th, and 39th Streets. Within the study area, service currently runs along McLoughlin Boulevard and on Washington and Broadway Streets between 8th and 15th Streets.	Route would be modified to begin/end near C Street and 9th Street in downtown Vancouver.
C-TRAN #60 Delta Park Regional	Connects the Delta Park MAX station in Portland with downtown Vancouver via I-5. Within the study area, service currently runs along I-5, Mill Plain Boulevard, and Broadway Street.	Route would be discontinued.

1.1.8 Tolling

Tolling cars and trucks that would use the new Columbia River bridges is proposed as a method to help fund the bridge construction and future maintenance, as well as to encourage alternative mode choices for trips across the Columbia River. Federal and state laws set the authority to toll the I-5 crossing. The IBR Program plans to toll the I-5 river bridge under the federal tolling authorization program codified in 23 U.S. Code Section 129 (Section 129). Section 129 allows public agencies to impose new tolls on federal-aid interstate highways for the reconstruction or replacement of toll-free bridges or tunnels. In 2023, the Washington State Legislature authorized tolling on the Interstate Bridge, with toll rates and policies to be set by the Washington State Transportation Commission (WSTC). In Oregon, the legislature authorized tolling giving the Oregon Transportation Commission the authority to toll I-5, including the ability to set the toll rates and policies. Subsequently, the Oregon Transportation Commission (OTC) is anticipated to review and approve the I-5 tollway project application that would designate the Interstate Bridge as a "tollway project" in 2024. At the beginning of 2024, the OTC and the WSTC entered into a bi-state tolling agreement to establish a cooperative process for setting toll rates and policies. This included the formation of the I-5 Bi-State Tolling Subcommittee consisting of two commissioners each from the OTC and WSTC and tasked with developing toll rate and policy recommendations for joint consideration and adoption by each state's commission. Additionally, the two states plan to enter into a separate agreement guiding the sharing and uses of toll revenues, including the order of uses (flow of funds) for bridge construction, debt service, and other required expenditures. WSDOT and ODOT also plan to enter into one or more agreements addressing implementation logistics, toll collection, and operations and maintenance for tolling the bi-state facility.

The Modified LPA includes a proposal to apply variable tolls on vehicles using the Columbia River bridges with the toll collected electronically in both directions. Tolls would vary by time of day with higher rates during peak travel periods and lower rates during off-peak periods. The IBR Program has evaluated multiple toll scenarios generally following two different variable toll schedules for the tolling assessment. For purposes of this NEPA analysis, the lower toll schedule was analyzed with tolls assumed to range between $1.50 and $3.15 (in 2026 dollars as representative of when tolling would begin) for passenger vehicles with a registered toll payment account. Medium and heavy trucks would be charged a higher toll than passenger vehicles and light trucks. Passenger vehicles and light trucks without a registered toll payment account would pay an additional $2.00 per trip to cover the cost of identifying the vehicle owner from the license plate and invoicing the toll by mail.

The analysis assumes that tolling would commence on the existing Interstate Bridge—referred to as pre-completion tolling—starting April 1, 2026. The actual date pre-completion tolling begins would depend on when construction would begin. The traffic and tolling operations on the new Columbia River bridges were assumed to commence by July 1, 2033. The actual date that traffic and tolling operations on the new bridges begin would depend on the actual construction completion date. During the construction period, the two commissions may consider toll-free travel overnight on the existing Interstate Bridge, as was analyzed in the Level 2 Toll Traffic and Revenue Study, for the hours between 11 p.m. and 5 a.m. This toll-free period could help avoid situations where users would be charged during lane or partial bridge closures where construction delays may apply. Once the new I-5 Columbia River bridges open, twenty-four-hour tolling would begin.

Tolls would be collected using an all-electronic toll collection system using transponder tag readers and license plate cameras mounted to structures over the roadway. Toll collection booths would not be required. Instead, motorists could obtain a transponder tag and set up a payment account that would automatically bill the account holder associated with the transponder each time the vehicle crossed the bridge. Customers without transponders, including out-of-area vehicles, would be tolled by a license plate recognition system that would bill the address of the owner registered to that vehicle's license plate. The toll system would be designed to be nationally interoperable. Transponders for tolling systems elsewhere in the country could be used to collect tolls on I-5, and drivers with an account and transponder tag associated with the Interstate Bridge could use them to pay tolls in other states for which reciprocity agreements had been developed. There would be new signage, including gantries, to inform drivers of the bridge toll. These signs would be on local roads, I-5 on-ramps, and on I-5, including locations north and south of the bridges where drivers make route decisions (e.g., I-5/I-205 junction and I-5/I-84 junction).

1.1.9 Transportation System- and Demand-Management Measures

Many well-coordinated transportation demand-management and system-management programs are already in place in the Portland-Vancouver metropolitan region. In most cases, the impetus for the programs comes from state regulations: Oregon's Employee Commute Options rule and Washington's Commute Trip Reduction law (described in the sidebar).

The physical and operational elements of the Modified LPA provide the greatest transportation demand-management opportunities by promoting other modes to fulfill more of the travel needs in the corridor. These include:

- Major new light-rail line in exclusive right of way, as well as express bus routes and bus routes that connect to new light-rail stations.
- I-5 inside shoulders that accommodate express buses.
- Modern bicycle and pedestrian facilities that accommodate more bicyclists and pedestrians and improve connectivity, safety, and travel time.
- Park-and-ride facilities.
- A variable toll on the new Columbia River bridges.

In addition to these fundamental elements of the Modified LPA, facilities and equipment would be implemented that could help existing or expanded transportation system management measures maximize the capacity and efficiency of the system. These include:

- Replacement or expanded variable message signs in the study area. These signs alert drivers to incidents and events, allowing them to seek alternate routes or plan to limit travel during periods of congestion.
- Replacement or expanded traveler information systems with additional traffic monitoring equipment and cameras.
- Expanded incident response capabilities, which help traffic congestion to clear more quickly following accidents, spills, or other incidents.
- Queue jumps or bypass lanes for transit vehicles where multilane approaches are provided at ramp signals for on-ramps. Locations for these features will be determined during the detailed design phase.
- Active traffic management including strategies such as ramp metering, dynamic speed limits, and transit signal priority. These strategies are intended to manage congestion by controlling traffic flow or allowing transit vehicles to enter traffic before single-occupant vehicles.

State Laws to Reduce Commute Trips

Oregon and Washington have both adopted regulations intended to reduce the number of people commuting in single-occupancy vehicles (SOVs). Oregon's Employee Commute Options Program, created under Oregon Administrative Rule 340-242-0010, requires employers with over 100 employees in the greater Portland area to provide commute options that encourage employees to reduce auto trips to the work site. Washington's 1991 Commute Trip Reduction (CTR) Law, updated as the 2006 CTR Efficiency Act (Revised Code of Washington §70.94.521) addresses traffic congestion, air pollution, and petroleum fuel consumption. The law requires counties and cities with the greatest traffic congestion and air pollution to implement plans to reduce SOV demand. An additional provision mandates "major employers" and "employers at major worksites" to implement programs to reduce SOV use.

1.2 Modified LPA Construction

The following information on the construction activities and sequence follows the information prepared for the CRC LPA. Construction durations have been updated for the Modified LPA. Because the main elements of the IBR Modified LPA are similar to those in the CRC LPA (i.e., multimodal river crossings and interchange improvements), this information provides a reasonable assumption of the construction activities that would be required.

The construction of bridges over the Columbia River sets the sequencing for other Program components. Accordingly, construction of the Columbia River bridges and immediately adjacent highway connections and improvement elements would be timed early to aid the construction of other components. Demolition of the existing Interstate Bridge would take place after the new Columbia River bridges were opened to traffic.

Electronic tolling infrastructure would be constructed and operational on the existing Interstate Bridge by the start of construction on the new Columbia River bridges. The toll rates and policies for tolling (including pre-completion tolling) would be determined after a more robust analysis and public process by the OTC and WSTC (refer to Section 1.1.8, Tolling).

1.2.1 Construction Components and Duration

Table 1-4 provides the estimated construction durations and additional information of Modified LPA components. The estimated durations are shown as ranges to reflect the potential for Program funding to be phased over time. In addition to funding, contractor schedules, regulatory restrictions on in-water work and river navigation considerations, permits and approvals, weather, materials, and equipment could all influence construction duration and overlap of construction of certain components. Certain work below the ordinary high-water mark of the Columbia River and North Portland Harbor would be restricted to minimize impacts to species listed under the Endangered Species Act and their designated critical habitat.

Throughout construction, active transportation facilities and three lanes in each direction on I-5 (accommodating personal vehicles, freight, and buses) would remain open during peak hours, except for short intermittent restrictions and/or closures. Advanced coordination and public notice would be given for restrictions, intermittent closures, and detours for highway, local roadway, transit, and active transportation users (refer to the Transportation Technical Report, for additional information). At least one navigation channel would remain open throughout construction. Advanced coordination and notice would be given for restrictions or intermittent closures to navigation channels as required.

Table 1-4. Construction Activities and Estimated Duration

Component	Estimated Duration	Notes
Columbia River bridges	4 to 7 years	• Construction is likely to begin with the main river bridges. • General sequence would include initial preparation and installation of foundation piles, shaft caps, pier columns, superstructure, and deck.
North Portland Harbor bridges	4 to 10 years	• Construction duration for North Portland Harbor bridges is estimated to be similar to the duration for Hayden Island interchange construction. The existing North Portland Harbor bridge would be demolished in phases to accommodate traffic during construction of the new bridges.
Hayden Island interchange	4 to 10 years	• Interchange construction duration would not necessarily entail continuous active construction. Hayden Island work could be broken into several contracts, which could spread work over a longer duration.
Marine Drive interchange	4 to 6 years	• Construction would need to be coordinated with construction of the North Portland Harbor bridges.
SR 14 interchange	4 to 6 years	• Interchange would be partially constructed before any traffic could be transferred to the new Columbia River bridges.
Demolition of the existing Interstate Bridge	1.5 to 2 years	• Demolition of the existing Interstate Bridge could begin only after traffic is rerouted to the new Columbia River bridges.
Three interchanges north of SR 14	3 to 4 years for all three	• Construction of these interchanges could be independent from each other and from construction of the Program components to the south. • More aggressive and costly staging could shorten this timeframe.
Light-rail	4 to 6 years	• The light-rail crossing would be built with the Columbia River bridges. Light-rail construction includes all of the infrastructure associated with light-rail transit (e.g., overhead catenary system, tracks, stations, park and rides).

Component	Estimated Duration	Notes
Total construction timeline	9 to 15 years	• Funding, as well as contractor schedules, regulatory restrictions on in-water work and river navigation considerations, permits and approvals, weather, materials, and equipment, could all influence construction duration.

1.2.2 Potential Staging Sites and Casting Yards

Equipment and materials would be staged in the study area throughout construction generally within existing or newly purchased right of way, on land vacated by existing transportation facilities (e.g., I-5 on Hayden Island), or on nearby vacant parcels. However, at least one large site would be required for construction offices, to stage the larger equipment such as cranes, and to store materials such as rebar and aggregate. Criteria for suitable sites include large, open areas for heavy machinery and material storage, waterfront access for barges (either a slip or a dock capable of handling heavy equipment and material) to convey material to the construction zone, and roadway or rail access for landside transportation of materials by truck or train.

Two potential major staging sites have been identified (see Figure 1-8 and Figure 1-23). One site is located on Hayden Island on the west side of I-5. A large portion of this parcel would be required for new right of way for the Modified LPA. The second site is in Vancouver between I-5 and Clark College. Other staging sites may be identified during the design process or by the contractor. Following construction of the Modified LPA, the staging sites could be converted for other uses.

In addition to on-land sites, some staging activities for construction of the new Columbia River and North Portland Harbor bridges would take place on the river itself. Temporary work structures, barges, barge-mounted cranes, derricks, and other construction vessels and equipment would be present on the river during most or all of the bridges' construction period. The IBR Program is working with USACE and USCG to obtain necessary clearances for these activities.

A casting or staging yard could also be required for construction of the overwater bridges if a precast concrete segmental bridge design is used. A casting yard would require access to the river for barges, a slip or a dock capable of handling heavy equipment and material, a large area suitable for a concrete batch plant and associated heavy machinery and equipment, and access to a highway or railway for delivery of materials. As with the staging sites, casting or staging yard sites may be identified as the design progresses or by the contractor and would be evaluated via a NEPA re-evaluation or supplemental NEPA document for potential environmental impacts at that time.

1.3 No-Build Alternative

The No-Build Alternative illustrates how transportation and environmental conditions would likely change by the year 2045 if the Modified LPA is not built. This alternative makes the same assumptions as the Modified LPA regarding population and employment growth through 2045, and it assumes that the same transportation and land use projects in the region would occur as planned.

Regional transportation projects included in the No-Build Alternative are those in the financially constrained 2018 *Regional Transportation Plan* (2018 RTP) adopted in December 2018 by the Metro Council (Metro 2018) and in March 2019 (RTC 2019) by the Southwest Washington Regional Transportation Council (RTC) Board of Directors is referred to as the 2018 RTP in this report. The 2018 RTP has a planning horizon year of 2040 and includes projects from state and local plans necessary to meet transportation needs over this time period; financially constrained means these projects have identified funding sources. The Transportation Technical Report lists the projects included in the financially constrained 2018 RTP.

The implementation of regional and local land use plans is also assumed as part of the No-Build Alternative. For the IBR Program analysis, population and employment assumptions used in the 2018 RTP were updated to 2045 in a manner consistent with regional comprehensive and land use planning. In addition to accounting for added growth, adjustments were made within Portland to reallocate the households and employment based on the most current update to Portland's comprehensive plan, which was not complete in time for inclusion in the 2018 RTP.

Other projects assumed as part of the No-Build Alternative include major development and infrastructure projects that are in the permitting stage or partway through phased development. These projects are discussed as reasonably foreseeable future actions in the IBR Cumulative Effects Technical Report. They include the Vancouver Waterfront project, Terminal 1 development, the Renaissance Boardwalk, the Waterfront Gateway Project, improvements to the levee system, several restoration and habitat projects, and the Portland Expo Center.

In addition to population and employment growth and the implementation of local and regional plans and projects, the No-Build Alternative assumes that the existing Interstate Bridge would continue to operate as it does today. As the bridge ages, needs for repair and maintenance would potentially increase, and the bridge would continue to be at risk of mechanical failure or damage from a seismic event.

2. METHODS

This chapter describes the methods used to conduct the analysis of wetlands and other waters. It includes a description of the study area, relevant laws and regulations, and methods for collecting data, assessing impacts, and evaluating possible mitigation measures. The analysis is designed to comply with NEPA and relevant federal, state, and local laws.

All wetlands and other waters identified in this report are assumed to be subject to federal, state, and/or local regulatory jurisdiction control of these agencies. A jurisdictional determination will be conducted during the permitting process to determine which wetlands or other waters are subject to regulatory control.

This chapter addresses the following questions:

- How was the study area defined?
- What methods and data were used to determine the location and function of wetlands and other waters within the study area?
- How were potential short- and long-term impacts on wetlands and other waters identified and analyzed, and what constitutes a significant impact?
- How was mitigation identified and analyzed?

Since the CRC ROD and re-evaluations, the methods discussed in this chapter have been updated as follows:

- Conducting wetland delineations in accordance with the current version of the Regional Supplement to the USACE Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (USACE 2010), in addition to the 1987 USACE Wetlands Delineation Manual (Environmental Laboratory 1987).
- Using the updated *National Wetland Plant List* (USACE 2020) developed by the USACE, or current version.
- Conducting wetland functional assessments using the revised rating system in Washington (Hruby 2014) and the current version of the Oregon Rapid Wetland Assessment Protocol (ORWAP) as described in Adamus et al. (2020).
- Developing compensatory mitigation in accordance with the 2008 Mitigation Rule that prioritizes wetland mitigation using mitigation banks and in-lieu fee opportunities, while also considering on-site and off-site mitigation options where appropriate (USACE and EPA 2008).
- Using the *Wetland Mitigation in Washington State: Part 1 – Agency Policies and Guidance (Version 2)* guidance document to develop wetland mitigation in Washington (Ecology et al. 2021).
- Using the Oregon Department of State Lands (DSL) *Aquatic Resources Mitigation Framework* implemented in 2019, or as updated, to develop wetland and stream mitigation in Oregon.
- Assessing stream functions in Oregon using the current version of the Stream Functional Assessment Method (SFAM), if applicable, to the project and waterway. If not applicable, best

professional judgment methodology must be used and include, at a minimum, the group-level functions and values of the SFAM.

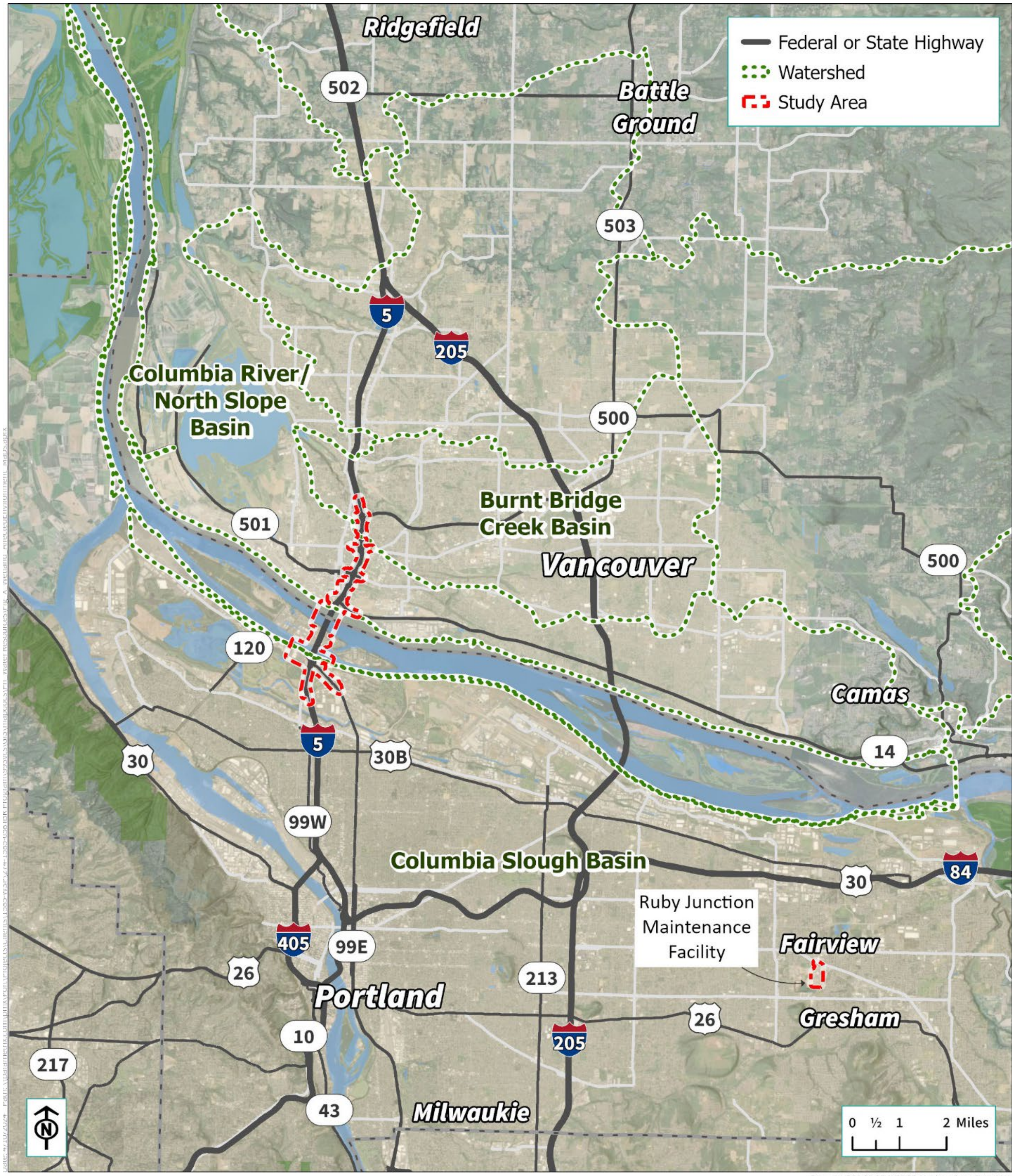
- Determining proposed mitigation for wetland and wetland buffers to reflect current guidance.
- Updated determination of waters of the U.S. based on the recent Sackett v. US EPA, 598 U.S. (2023) decision from the U.S. Supreme Court. This case held that “the Clean Water Act’s use of ‘waters’… refers only to ‘geographic[al] features that are described in ordinary parlance as ‘streams, oceans, rivers, and lakes’ and to adjacent wetlands that are ‘indistinguishable’ from those bodies of water due to a continuous surface connection.”
- Changes to the design of the CRC project’s LPA to develop a Modified LPA, including design options, and the resulting effects on wetlands and other waters.

2.1 Study Area

The study area is in northwestern Oregon and southwestern Washington and is bisected by the Columbia River, which also includes the Oregon Slough (also known as the North Portland Harbor). The study area encompasses portions of the Columbia Slough watershed, the Columbia River/Columbia Slope watershed, and the Burnt Bridge Creek watershed.

Figure 2-1 shows the wetlands and other waters study area for the Modified LPA, which includes a 5-mile segment of I-5, approximately between the SR 500 interchange in Washington and the I-5/Columbia Boulevard interchange in Oregon, and the area around Tri-County Metropolitan Transportation District's (TriMet’s) existing Ruby Junction Maintenance Facility in Gresham, Oregon. The study area includes temporary construction easements that would be established directly adjacent to proposed construction areas and the potential locations of larger staging areas and casting yards. Direct physical changes in the landscape would be limited to the study area, though mitigation strategies could be applied outside of it.

Figure 2-1. Wetlands and Other Waters Study Area



2.2 Effects Guidelines

The following describes how potential short- and long-term impacts to wetlands and other waters were evaluated and analyzed. The IBR Program team will coordinate with federal, state, and local resource agencies to determine the significance of impacts to wetlands and other waters.

- Modification of hydrologic regimes and/or excavation, grading, or discharge of fill material in wetlands and other waters that results in:
    - A significant adverse change in function of the wetland, waterbody, or its designated buffer.
    - Significant degradation in the quality of the wetland, other water, or its designated buffer.
- Substantial disturbance within a wetland, other water, or designated buffer.
- Loss of a substantial portion of the total area of wetlands and other waters within the study area.
- Conversion of wetlands (e.g., forested to emergent).
- Impacts on a wetland, waterbody, or its designated buffer that cannot be minimized or avoided.
- Net loss of wetland or other water function.

2.3 Data Collection Methods

The data collected to identify wetlands and other waters within the study area, and characterize their conditions, included a review of existing maps and literature. Wetlands that were identified in 2010 for the CRC project, the City of Portland's Wetland Inventory Project, and wetland boundaries confirmed through brief field delineations as described in Section 2.3.1, are used as wetland boundaries for purposes of analysis in this SEIS. Additional field delineations were conducted in 2023 and will be completed in 2024, as described in Section 2.3.2. Once the field delineations are completed, revised maps, showing present day wetland and other water boundaries within the study area, will be prepared.

2.3.1 2008 Wetlands and Other Waters Delineations

The CRC project delineated boundaries of wetlands and other waters within the study area using methods suitable for delineating wetlands and other waters in both Oregon and Washington (Environmental Laboratory 1987). Waters were determined to the ordinary high water mark (OHWM). Wetland and other water boundaries were recorded with a high-accuracy (sub-meter) global positioning system (GPS) receiver. Wetlands and other waters in both states were classified using the Cowardin classification method (Cowardin et al. 1979) and the hydrogeomorphic (HGM)-based classification system (Adamus 2001). The indicator status of vegetation within sample areas was determined using the *National Wetland Plant List* (USACE 2020). Wetlands and other waters extending outside of the study area boundary were considered in their entirety for the purposes of functional assessments.

In the summer of 2008, a wetland and other waters delineation report for the Oregon portion of the CRC project was submitted to the DSL for concurrence. It received concurrence in September 2008 (DSL #WD 2008-0205).

2.3.2 2023 Wetlands and Other Waters Delineations

To update the 2008 wetlands and other waters delineations, current literature on wetland resources was reviewed, including information on existing compensatory wetland mitigation sites. Within the study area, the IBR Program team has incorporated wetland data from the City of Portland's Wetland Inventory Project, as well as brief field visits to confirm wetland boundaries. The IBR Program team conducted field surveys in 2023 and will also conduct additional field surveys in 2024 to complete wetland and other waters delineations. Wetland and other water functional assessments will be performed using the Washington rating system as described in Hruby (2014), and the Oregon system, ORWAP, as described in Adamus et al. (2020), or the most recent version.

In Oregon, the Columbia River will be assessed using the current version of the SFAM, if applicable to the Modified LPA and waterway, or best professional judgment methodology if not applicable. In Washington, the Columbia River will be identified using the methods described in the document, *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State* (Anderson et al. 2016). In both states, the OHWM of the Columbia River and North Portland Harbor will be established using the elevations established by the USACE at each river mile. An updated wetland and other waters delineation report will be submitted to federal and state agencies for concurrence.

2.4 Analysis Methods

2.4.1 Identifying Regional Long-term Effects

Long-term impacts are considered impacts that occur when an alternative results in removal or fill within jurisdictional wetlands, regulated wetland buffers, or other waters of the state or U.S. The following process has been used to determine long-term operational impacts on wetlands and other waters:

- Map project impacts to wetlands and other waters and their buffers.
- Evaluate impacts to the functions of wetlands and other waters.
- Quantify the area of wetlands, other waters, and designated buffers affected.

Once these steps have been completed, consultation with local, state, and federal biologists to discuss potential impacts will occur.

2.4.2 Identifying Short-term Effects

Short-term impacts are considered impacts to wetlands and other waters of the state and U.S. that would occur in areas where construction activities would take place, but with functions returning to pre-impact performance after a duration of time. This period of time varies by agency and can be as long as two years or as short as six months. The following process has been used to determine short-term construction impacts on wetlands and other waters:

- Map project impacts to wetlands and other waters and their buffers.
- Evaluate impacts to the functions of wetlands and other waters.
- Quantify the area of wetlands, other waters, and designated buffers affected.

Once these steps have been completed, consultation with local, state, and federal biologists to discuss potential impacts will occur.

2.4.3 Identifying Mitigation Measures

To develop a broad and successful mitigation approach for impacts to wetlands and other waters, the IBR Program has:

- Evaluated design alternatives to avoid project impacts.
- Identified and evaluated ways to minimize impacts.
- Identified, evaluated, and ranked potential mitigation banks and sites. Input from local, state, and federal agencies has been and will continue to be obtained.
- Developed restoration concepts for temporary impacts.

Compensation for unavoidable impacts was evaluated consistent with the USACE, DSL, Washington State Department of Ecology (Ecology), Clark County, City of Portland, and City of Vancouver rules for wetland mitigation. In choosing among the mitigation options, regulatory requirements, ecological uplift, watershed benefits, temporal loss, likelihood for success, practicability of long-term monitoring and maintenance, and relative costs were evaluated. The mitigation goal is to replace the functions and values of impacted wetland and other waters.

2.5 Coordination

The IBR Program team has begun, and will continue, coordination with the USACE, DSL, Ecology, Washington Department of Fish and Wildlife (WDFW), Clark County, and the Cities of Portland and Vancouver to determine the jurisdiction of wetlands, other waters, and their buffers within the study area and develop appropriate mitigation for unavoidable impacts.

3. AFFECTED ENVIRONMENT

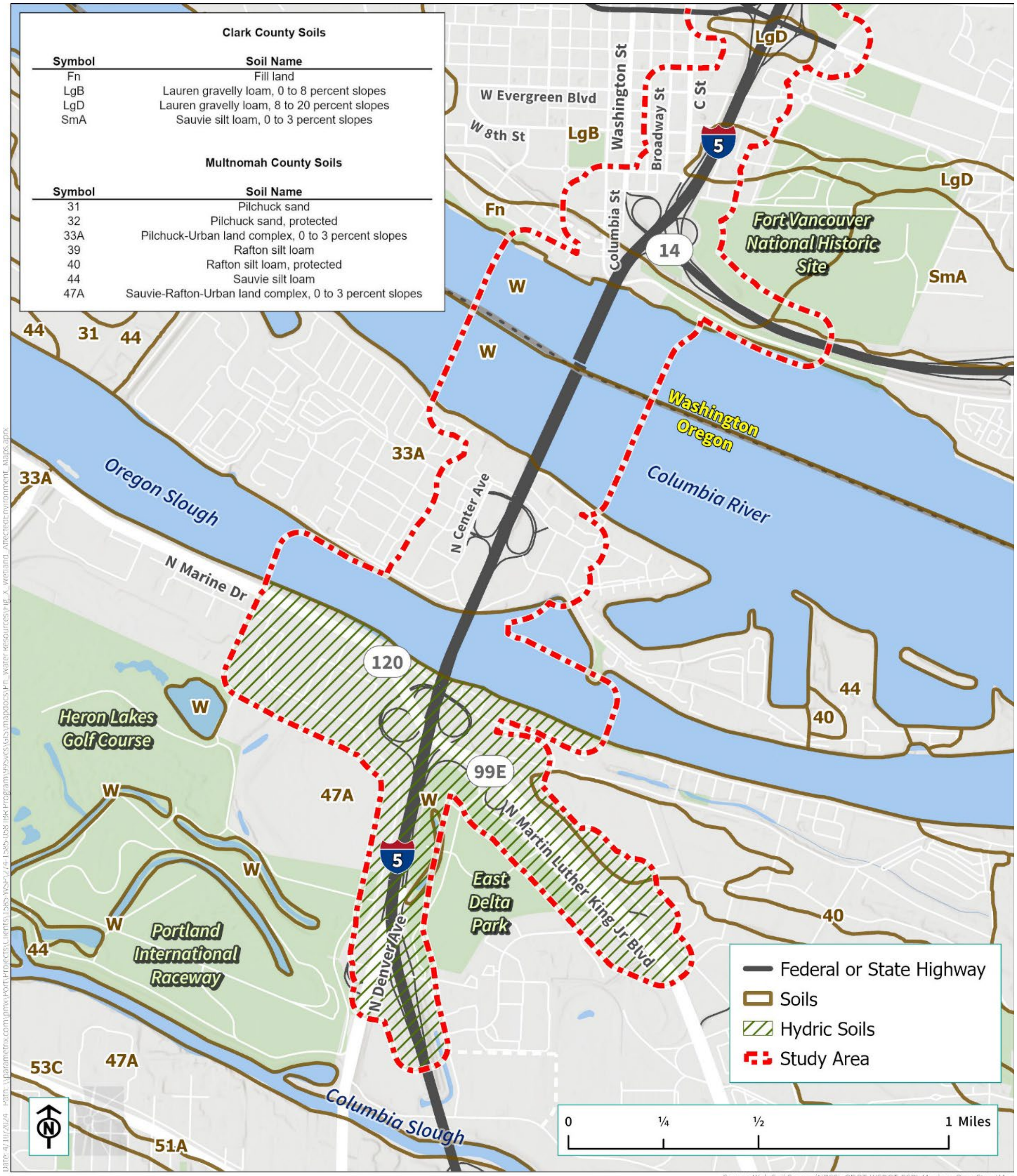
This chapter presents the existing wetlands and other waters conditions within the study area. As noted in Section 2.3.1, the identified wetlands and other waters of the state and U.S. discussed in the following sections were originally delineated in 2008 as part of the CRC project analysis (CRC-FEIS 2011). Since those data are more than five years old, a new wetland delineation and assessment are required and will be completed in 2023. Currently, the following descriptions of existing wetlands and other waters in the study area is based on information identified in the CRC Final EIS, the City of Portland's Wetland Inventory Project, and wetland boundaries confirmed through brief field delineations.

The study area is highly urbanized, with some remnant wetlands and other waters. The Natural Resources Conservation Service (NRCS) soils map in Figure 3-1 shows areas of hydric soils in mainland Oregon. No hydric soils are mapped in Washington within the study area (Figure 3-2). The National Wetlands Inventory (NWI) maps identify wetlands throughout the region (Figure 3-3 and Figure 3-4).

3.1 Regional Conditions

East and west of the study area, these are large wetland systems, including the Columbia Slough, Vapor wetland, Force Lake, Smith and Bybee Lakes, West Hayden Island wetlands, and Vancouver Lake wetlands. Southeast of the study area, the Columbia Slough watershed includes scattered wetlands and other waters present within the urban matrix. The Salmon Creek watershed, north of the study area, has similar characteristics. These large systems are remnants of the historical system of wetlands, sloughs, and marshes that once occupied most of the study area. Although they are now somewhat cut off from each other and the larger Columbia River system due to urbanization of the area, they performs many functions and have a high value due to their rarity and wildlife.

Figure 3-1. Mapped Soil Series – Oregon



Source: Web Soil Survey (NRCS), ODOT, WSDOT, ESRI, Mapbox, OpenStreetMap

Figure 3-2. Mapped Soil Series – Washington

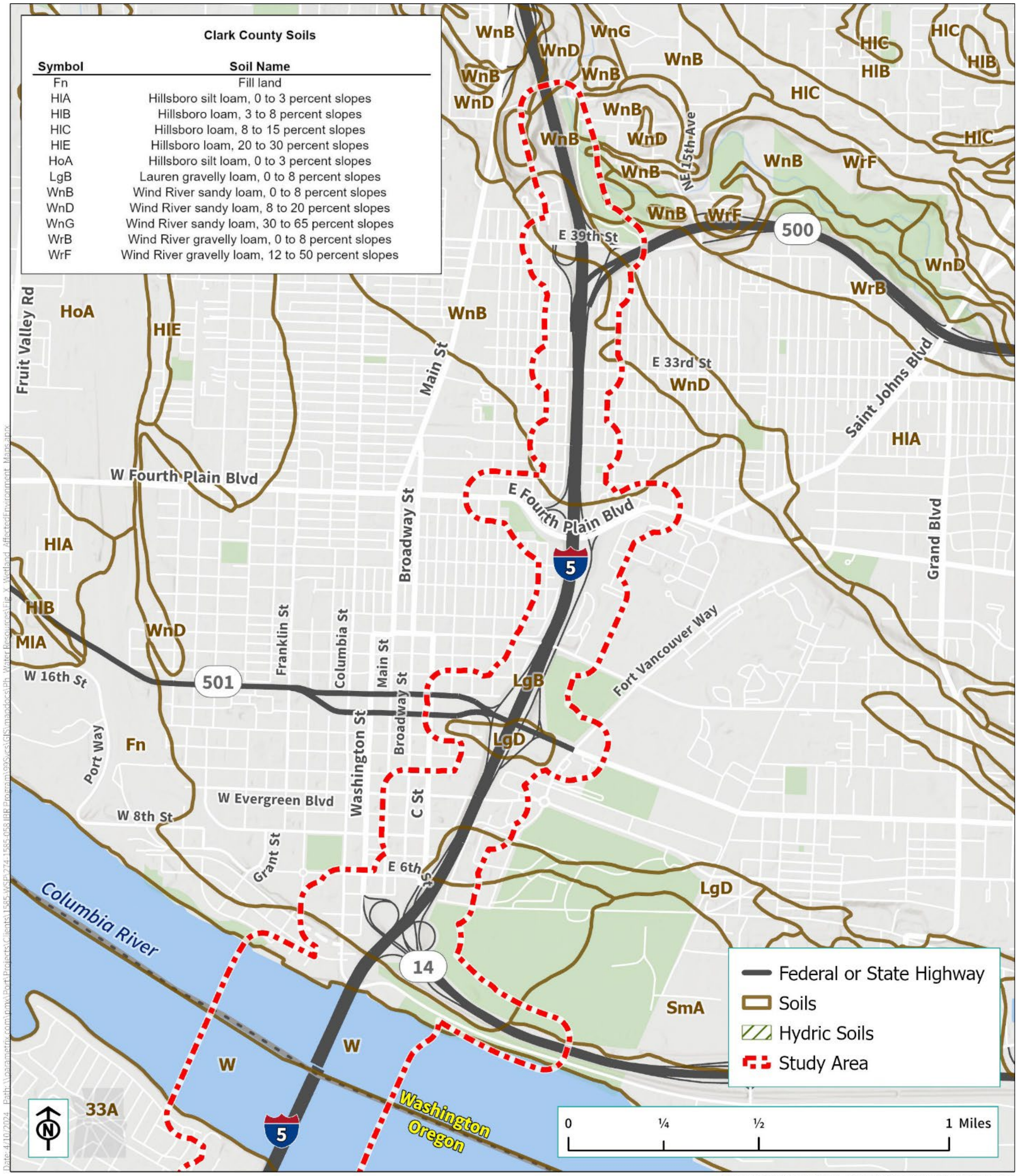
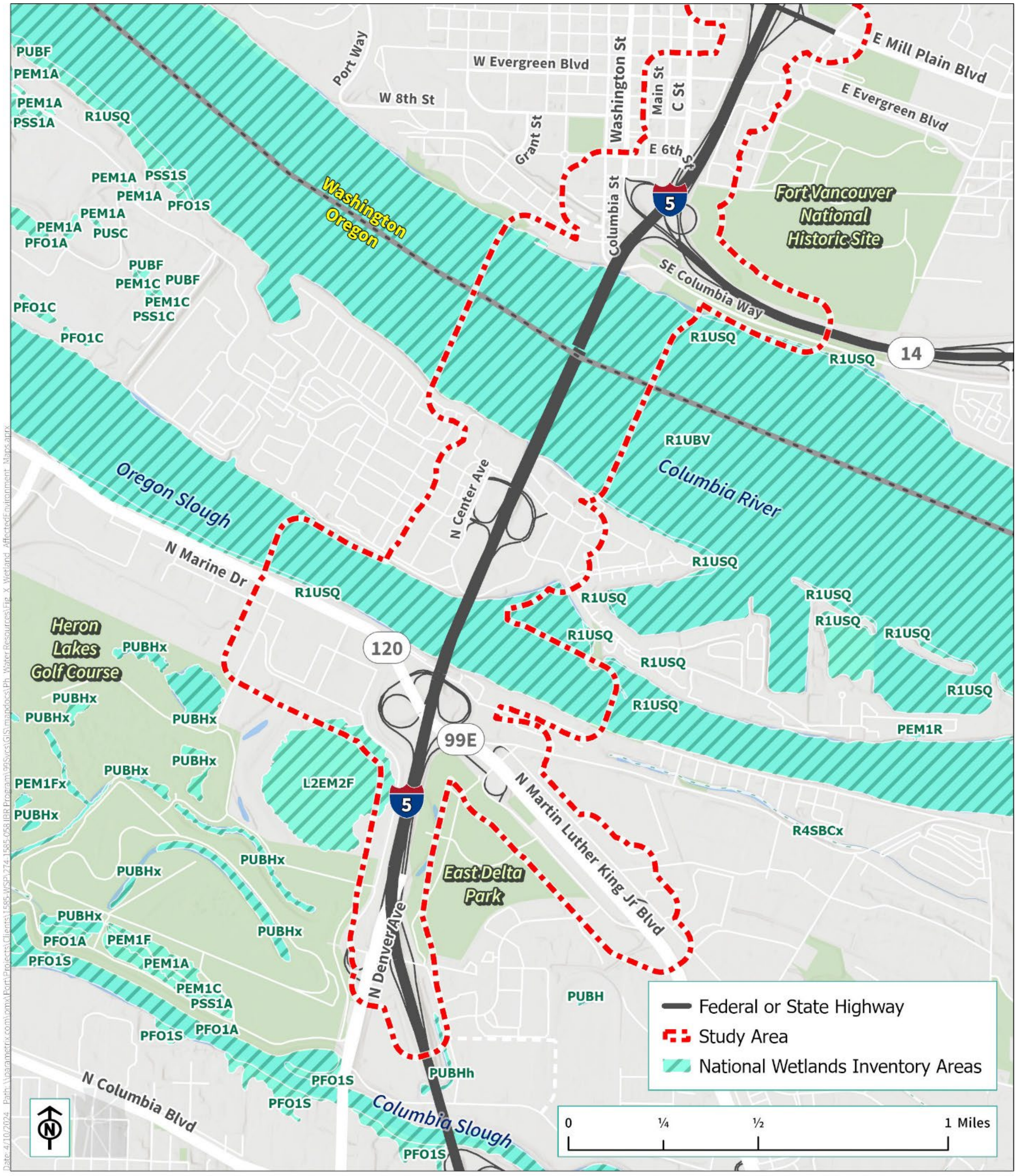


Figure 3-3. National Wetlands Inventory Areas – Oregon



Note: The Oregon Slough is also called the North Portland Harbor

Figure 3-4. National Wetlands Inventory Areas – Washington

3.2 Columbia Slough Watershed

The study area intersects approximately 69.51 acres of the Columbia Slough watershed. The Columbia Slough watershed drains approximately 37,741 acres in portions of Portland, Troutdale, Fairview, Gresham, Maywood Park, Wood Village, and Multnomah County (unincorporated areas) and is separated into lower, middle, and upper Columbia Slough. Near the study area, the predominant land use in the Columbia Slough watershed is light industrial, with some residential.

The Columbia Slough, located to the south of the study area, is a slow-moving, low-gradient drainage canal running nearly 19 miles from Fairview Lake in the east to the Willamette River in the west. Running roughly parallel to the Columbia River, the slough is a remnant of the historical system of lakes, wetlands, and channels that dominated the south floodplain of the Columbia River. The eastern sections of the Columbia Slough are intensively managed to provide drainage and flood control with dikes, pumps, weirs, and levees (FHWA and ODOT 2005). The western section of the Columbia Slough has a free and open connection to the Willamette River and is tidally influenced.

3.2.1 Mapped Soils

In the Columbia Slough watershed in Oregon, mapped soils include Rafton silt loam, protected (40); Sauvie-Rafton-Urban land complex, 0 to 3 percent slopes (47A); and water (W) (Figure 3-1) (Green 1983). Rafton silt loam, protected and Sauvie-Rafton-Urban land complex, 0 to 3 percent slopes are hydric soils or a mixture of hydric and non-hydric soils, which are more likely to support wetlands versus non-hydric soils (USDA NRCS 2019).

3.2.2 Mapped Wetlands

Available NWI data indicate one lacustrine, one riverine, and one palustrine wetland within the intersection of the study area and the Columbia Slough watershed (Figure 3-3 and Figure 3-4) (USFWS 2021). The Vanport wetland, located south of N Marine Drive and west of I-5, is mapped as a lacustrine, littoral, emergent, non-persistent, semi-permanently flooded (L2EM2F) wetland. One small linear riverine, intermittent, streambed, seasonally flooded, excavated (R4SBCx) wetland is mapped north of N Marine Drive and east of I-5. A palustrine unconsolidated bottom, permanently flooded, excavated (PUBHx) wetland is mapped primarily east of I-5 along N Whitaker Road between N Victory Boulevard and N Schmeer Road. This wetland extends west under I-5, just north of N Schmeer Road.

3.2.3 Identified Wetlands and Other Waters

Within the Columbia Slough watershed there are 13 wetlands and a potentially jurisdictional ditch that intersect the study area (Figure 3-5).

3.2.3.1 Other Waters

A potentially jurisdictional ditch is adjacent to Wetland System L/M. The ditch enters the wetland system from the north and the south and is conducted to the Vanport wetland through two culverts that pass under N Expo Road. The ditch is located at the toe of slope from the existing roadway prism; it receives stormwater from the prism slope and the existing TriMet light rail tracks. In 2008, this ditch was not considered a jurisdictional resource by DSL. In January 2023, the U.S. Environmental Protection Agency (EPA) and USACE published new guidance defining "waters of the U.S." under the Clean Water Act (CWA), and this feature will be evaluated to determine its jurisdictional status during the permitting process.

3.2.3.2 Wetlands

Wetland areas are identified alphabetically, in the order in which they were identified in the field or using off-site data. As property access permission was not obtained sequentially, wetland areas are not named sequentially. Figure 3-5 shows the locations of these features.

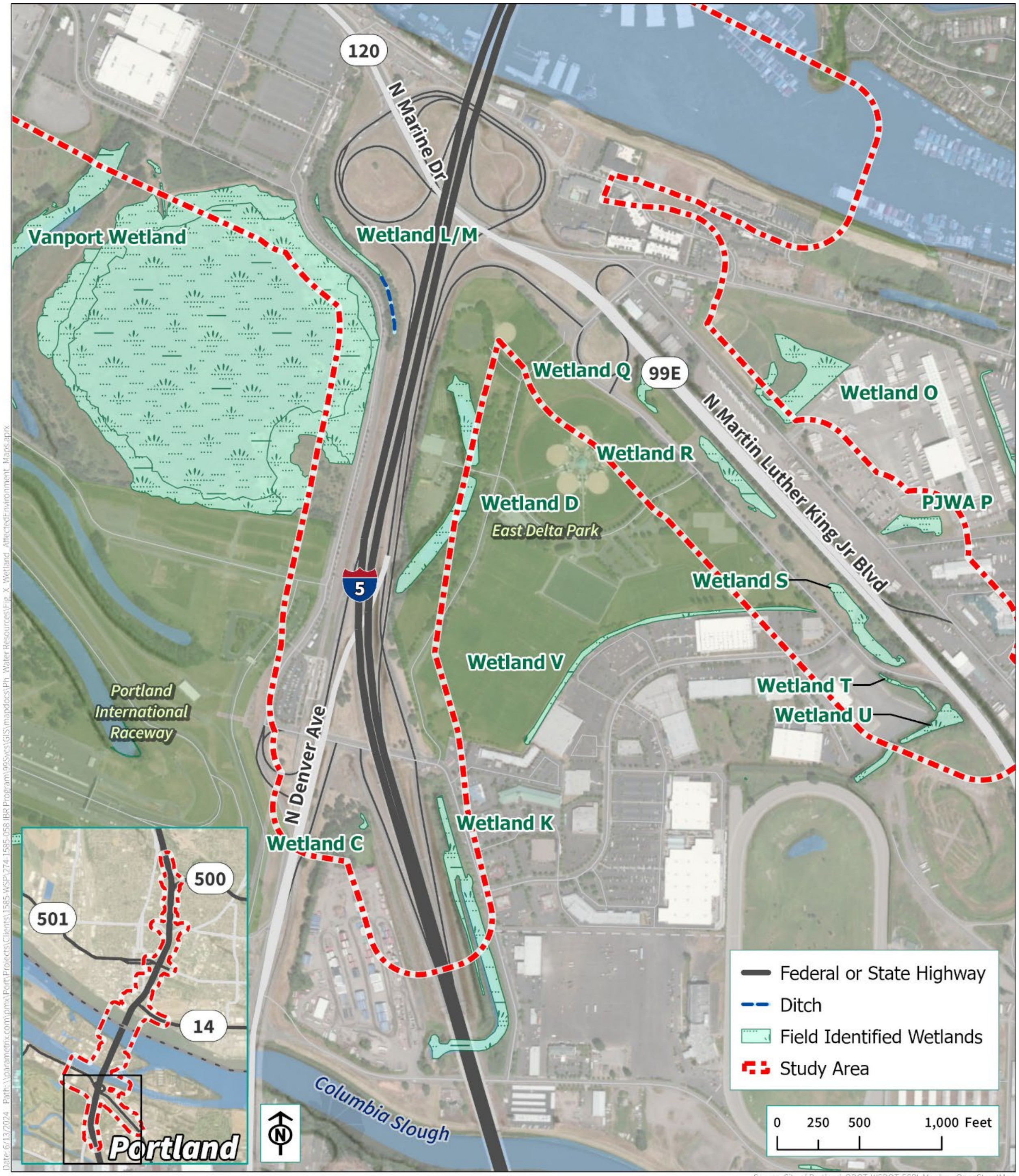
WETLANDS L/M

Wetland System L/M is a set of two palustrine, forested, seasonally flooded (PFOC) wetlands approximately 0.34 acres in size (Figure 3-5). It is within a City of Portland environmental zone. The HGM classification is Flats.

Wetland System L/M is southwest of the southbound I-5 on-ramp at N Marine Drive and northeast of the existing TriMet light rail tracks at the Expo Center. The NWI does not map a wetland in the vicinity of Wetland System L/M. The wetland, as identified in 2008 and confirmed during a brief field survey, appears to be part of a stormwater system and has two stormwater culverts for overflow from the wetland, one at the northwestern end and one at the southern end of the wetland system. Both culverts appear to drain to the Vanport wetland, west of this area. A potentially jurisdictional stormwater ditch enters Wetland System L/M from the north and the south. See Section 3.2.3.1 for further details.

The boundary of Wetland System L/M was determined by topography and a change in vegetation from wetland to upland species. Wetland System L/M is dominated by Pacific willow (*Salix lasiandra* – facultative wetland [FACW]), fringed willowherb (*Epilobium ciliatum* spp. *ciliatum* - FACW), Himalayan blackberry (*Rubus armeniacus* – facultative [FAC]), and reed canary grass (*Phalaris arundinacea* - FACW). Indicators of wetland hydrology present at the time of survey include watermarks, water-stained leaves, and surface organic pan. Soils are sandy (no color assessment), with oxidation-reduction (redox) concentrations and an organic pan.

Figure 3-5. Field Identified Wetlands and Other Waters – Oregon



Source: CRC Wetland Data (2011); City of Portland (2023); field verified

The upland areas around Wetland System L/M are dominated by fringed willowherb (FACW) and Himalayan blackberry (facultative [FAC]). No indicators of wetland hydrology were present at the time of the 2008 survey and confirmed during the brief 2023 field survey. Soils are sandy, without redox concentrations or an organic pan.

VANPORT WETLAND

The Vanport wetland is on the west side of I-5, west and south of N Expo Road (Figure 3-5). This wetland is a palustrine forested/scrub-shrub/emergent (PFO/SS/EM) system managed as a mitigation site by the Port of Portland. The Vanport wetland is mapped by the NWI as a palustrine emergent, seasonally flooded (PEMC) wetland. It is located within a City of Portland environmental zone. The wetland was not delineated in the 2008 survey but has been delineated by the Port of Portland and confirmed by DSL. The boundaries shown in Figure 3-5 are from the City of Portland's Wetland Inventory Project

WETLAND C

Wetland C is a small palustrine, emergent wetland (PEM) and occupies approximately 0.07 acres within the study area. It is west of I-5 and near the southbound highway on-ramp at N Victory Boulevard. It is located within a City of Portland environmental zone. In 2008, the boundary of Wetland C was determined by a shift from the presence of wetland hydrological indicators to the absence of indicators and a change in vegetation from wetland to upland species. The HGM classification is depressional closed, non-permanent.

Wetland C is dominated by reed canary grass (FACW), field horsetail (*Equisetum arvense* – FAC), and Himalayan blackberry (FAC). Indicators of wetland hydrology include sediment deposits, cracked soils, and drainage patterns. Soils exhibit low chroma colors (10YR 3/1 and 10YR 4/1) with redox concentrations.

The upland areas adjacent to Wetland C are dominated by fringed willowherb (FACW), balsam poplar (*Populus balsamifera* - FAC), Himalayan blackberry (FAC), and tall false rye grass (*Schedonorus arundinaceus* - FAC). There are no indicators of wetland hydrology in upland areas. Soils exhibit low chroma colors (10YR 3/1 and 10YR 4/1) with redox concentrations.

WETLAND D

Wetland D is a palustrine, forested/scrub-shrub/emergent, permanently flooded, excavated (PFO/SS/EMHx) wetland approximately 2.67 acres in size (Figure 3-5). It is in the northeast corner of the Oregon portion of the study area within Delta Park (Portland). It is within a City of Portland environmental zone. Wetland D is a remnant slough channel identified as Walker Slough. It consists of two smaller, oblong ponds connected by a culvert under a City of Portland Parks and Recreation access road.

The wetland receives stormwater from a culvert on the north end and from overland flow. Wetland D drains to Schmeer Slough through a storm drainpipe at the south end of the wetland. The HGM classification is depressional. The boundary of Wetland D was determined by topography and a change in vegetation from wetland to upland species. This boundary will be confirmed during a field survey in 2023.

Wetland D is dominated by Oregon ash (*Fraxinus latifolia* - FACW), fringed willowherb (FACW), coastal willow (*Salix hookeriana* - FACW), Sitka willow (*Salix sitchensis* - FACW), slough sedge (*Carex obnupta* – obligate [OBL]), nodding bur-marigold (*Bidens cernua* - FACW), and reed canary grass (*Phalaris arundinacea* - FACW). Wetland hydrology is demonstrated by free water and saturation in the upper 12 inches of soil, watermarks, and drift lines. The soils exhibit low chroma colors (10YR 2/1 and 10YR 3/1) with redox concentrations.

The upland areas adjacent to Wetland D were characterized by red alder (*Alnus rubra* - FAC), Oregon ash (FACW), fringed willowherb (FACW), choke cherry (*Prunus virginiana* - facultative upland [FACU]), vine maple (*Acer circinatum* - FAC), Himalayan blackberry (FAC), snowberry (*Symphoricarpos albus* - FACU), and reed canary grass (FACW). No indicators of wetland hydrology were present at the time of the 2008 survey. Soils in upland plots are very dark brown and very dark grayish brown (10YR 2/2 and 10YR 3/2) without redox concentrations.

WETLAND K

Wetland K is mapped by the NWI as a palustrine, unconsolidated bottom, permanently flooded, diked/impounded (PUBHh) wetland and is a deep excavated ditch with water levels managed by the Urban Flood Safety & Water Quality District. This wetland historically has been dredged by the Urban Flood Safety & Water Quality District. Wetland K is located east of I-5 with a portion wrapping under the highway overpass at N Schmeer Road. It is within a City of Portland environmental zone. In 2008, the boundary of Wetland K was determined by topography (toe of slope), a shift from the presence of wetland hydrological indicators to the absence of indicators, and a change in vegetation from wetland to upland species. This boundary will be confirmed during a field survey in 2023.

Wetland K is dominated by fringed willowherb (FACW), Pacific willow (FACW), trailing blackberry (*Rubus ursinus* - FACU), California brome (*Bromus carinatus* -not on list [NOL]), blue wildrye (*Elymus glaucus* - FACU), reed canary grass (FACW), meadow barley (*Hordeum brachyantherum* - FACW), and field horsetail (FAC), with plantings of Oregon ash (FACW) and *Ribes* sp. (assumed FAC) contributing to the understory. The water level within Schmeer Slough is controlled between 2.0 and 2.5 feet (National Geodetic Vertical Datum). Indicators of wetland hydrology in higher elevation portions of Wetland K include drainage patterns and sediment deposits. Wetland indicators in lower elevations, near the OHWM of Schmeer Slough, include soil saturation at the surface, watermarks, drift lines, and sediment deposits. Soils exhibit low chroma colors (10YR 5/1 and 10YR 4/1) with redox concentrations.

The upland areas around Wetland K are dominated by fringed willowherb (FACW), red elderberry (*Sambucus racemosa* - FACU), Himalayan blackberry (FAC), field horsetail (FAC), California brome (NOL), blue wildrye (FACU), and reed canary grass (FACW). No indicators of wetland hydrology were present in upland areas at the time of the 2008 survey and brief 2023 survey.

WETLAND O

Wetland O was previously identified as a potentially jurisdictional water area (PJWA) in 2008 and has since been delineated and confirmed by DSL. The boundaries shown in Figure 3-5 are from the City of

Portland's Wetland Inventory Project. This wetland is a PEM approximately 2.63 acres in size. It is east of I-5, and north of N Vancouver Way. It is located within the draft City of Portland environmental zone designation. The HGM classification is depressional closed, non-permanent.

POTENTIALLY JURISDICTIONAL WETLAND/WATER AREA P

PJWA P was identified by the City of Portland Wetland Inventory Project and visually confirmed during the 2023 brief field survey. It is a PEM wetland approximately 0.61 acres in size. It lies east of I-5, and north of N Vancouver Way near the intersection with North Hanley Drive. It is located within the draft City of Portland environmental zone designation. The HGM classification is depressional closed, non-permanent.

WETLAND Q

Wetland Q was identified by the City of Portland Wetland Inventory Project and visually confirmed during the 2023 field survey through the observation of standing water and wetland vegetation. It is a PEM wetland approximately 0.30 acres in size. It is located east of I-5, between NE Martin Luther King Jr. Boulevard and N Union Court. It is located within the draft City of Portland environmental zone designation. The HGM classification is depressional closed, non-permanent.

WETLAND R

Wetland R was identified by the City of Portland Wetland Inventory Project and confirmed during the 2023 field survey through the visual confirmation of wetland vegetation and standing water. It is a PEM wetland approximately 0.97 acres in size. It is located east of I-5, between NE Martin Luther King Jr. Boulevard and N Union Court, just north of N Denver Avenue. It is located within the draft City of Portland environmental zone designation. The HGM classification is depressional closed, non-permanent.

WETLAND S

Wetland S was identified by the City of Portland Wetland Inventory Project and visually confirmed during the 2023 field survey through the observation of standing water and wetland vegetation. It is a PEM approximately 1.10 acres in size. It is located east of I-5, between NE Martin Luther King Jr. Boulevard and N Union Court, just west of where the two roads intersect. It is located within the draft City of Portland environmental zone designation. The HGM classification is depressional closed, non-permanent.

WETLAND T

Wetland T was identified by the City of Portland Wetland Inventory Project and visually confirmed during the 2023 field survey. It is a PEM wetland approximately 0.18 acres in size. It is located east of I-5, south of N Union Court, just east of where N Union Court intersects with NE Martin Luther King Jr. Boulevard. It is located within the draft City of Portland environmental zone designation. The HGM classification is depressional flow-through, non-permanent.

WETLAND U

Wetland U was identified by the City of Portland Wetland Inventory Project and visually confirmed during the 2023 field survey. The wetland is a slough feature that contains standing water and is lined with balsam poplar (FAC) trees. It is located east of I-5, south of N Union Court, just south of the intersection of N Union Court and NE Martin Luther King Jr. Boulevard. It is located within the draft City of Portland environmental zone designation. It is a PEM wetland approximately 0.55 acres in size. The HGM classification is depressional flow-through, permanent.

WETLAND V

Wetland V was identified by the City of Portland Wetland Inventory Project and visually confirmed during the 2023 field survey. It is a long, linear PEM wetland approximately 1.18 acres in size. It is located east of I-5, south of N Union Court, south and east of Delta Park. It is located within the draft City of Portland environmental zone designation. The HGM classification is depressional flow-through, non-permanent.

3.3 Ruby Junction Maintenance Facility

The Ruby Junction Maintenance Facility is in Gresham, Oregon, and provides repair and maintenance for light rail vehicles. The Ruby Junction site is included in the analysis below.

3.3.1 Mapped Soils

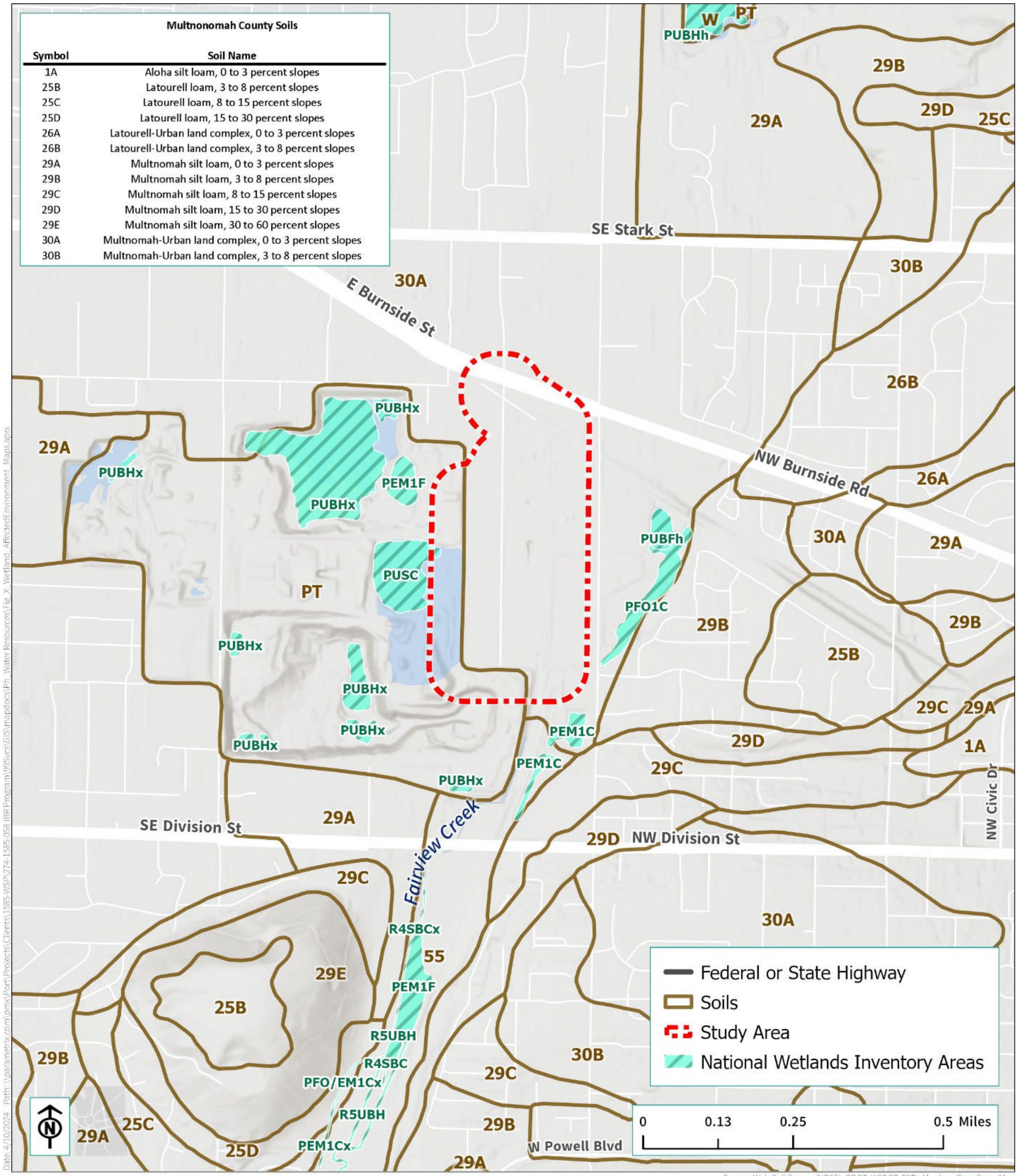
Soils mapped within the vicinity of the Ruby Junction Maintenance Facility (Figure 3-6) include Multnomah silt loam, 0 to 3 percent slopes (29A), Multnomah silt loam, 3 to 8 percent slopes (29B), Multnomah silt loam, 8 to 15 percent slopes (29C), Multnomah silt loam, 15 to 30 percent slopes (29D), Multnomah-Urban land complex, 0 to 3 percent slopes (30A), Pits (PT), and Wapato silt loam (55) (USDA NRCS 2019). Wapato silt loam is the only soil listed as a hydric soil but is located outside of the study area.

3.3.2 Mapped Wetlands and Other Waters

The NWI (USFWS 2021) mapped several PUBHx wetlands; two palustrine unconsolidated shore, seasonally flooded, excavated (PUSCx) wetlands; and one palustrine emergent, seasonally flooded, excavated (PEMCx) wetland west and southwest of the Ruby Junction area (Figure 3-6).

The NWI and U.S. Geological Survey mapped Fairview Creek in the vicinity of the Ruby Junction Maintenance Facility. Fairview Creek flows generally from southwest to northwest, passing south of the Ruby Junction Maintenance Facility. It connects to the Columbia River through Osborn Creek and the Columbia Slough.

Figure 3-6. Mapped Soils and National Wetlands Inventory Areas – Ruby Junction



3.3.3 Identified Wetlands and Other Waters

Hydric soils are mapped under a portion of the Ruby Junction Maintenance Facility (USDA NRCS 2019). Examination of aerial photographs confirmed the presence of several permanent wetland features west and southwest of the Ruby Junction Maintenance Facility and of Fairview Creek (CRC-FEIS 2011). The wetlands appear to be excavated quarries. Fairview Creek was also identified on the aerial photographs and appears to be highly constrained by the surrounding urban landscape. The wetlands and creek are both outside the Ruby Junction study area.

Table 3-1 summarizes wetlands, and their characteristics, identified in the study area in Oregon.

Table 3-1. Wetlands Identified within the Study Area in Oregon

Wetland	Size (acres)	Cowardin Class	HGM Class	Connected to Other Wetlands and Other Waters
Wetland C	0.07	PEM	Depressional	Isolated
Wetland D	2.67	PFO/SS/EMHx	Depressional	Connects to Wetland K and Columbia Slough
Wetland K	3.0	PUBHh	Depressional	Connects to Columbia Slough
Wetlands L/M	0.34	PFOC	Flats	Connect to Vanport Wetland
Wetland O	2.63	PEM	Depressional	Isolated
PJWA P	0.61	PEM	Depressional	Isolated
Wetland Q	0.30	PEM	Depressional	Isolated
Wetland R	0.97	PEM	Depressional	Isolated
Wetland S	1.10	PEM	Depressional	Connects to wetlands T and U, and Columbia Slough
Wetland T	0.18	PEM	Depressional	Connects to Wetland U and Columbia Slough
Wetland U	0.55	PEM	Depressional	Connects to Columbia Slough
Wetland V	1.18	PEM	Depressional	Connects to Columbia Slough
Vanport Wetland	66.6	PFO/SS/EM	Depressional	Connects to Columbia Slough

HGM = hydrogeomorphic; PEM = palustrine emergent; PFOC = palustrine, forested, seasonally flooded; PFO/SS/EM = palustrine forested/scrub-shrub/emergent; PFO/SS/EMHx = palustrine, forested/scrub-shrub/emergent, permanently flooded, excavated; PJWA = potentially jurisdictional water area; PUBHh = palustrine, unconsolidated bottom, permanently flooded, diked/impounded

3.4 Columbia River/Columbia Slope Watershed

The study area intersects approximately 146.48 acres of the Columbia River/Columbia Slope watershed. The Interstate Bridge is located at RM 106 of the Columbia River. Ten bridge footings are currently located below the OHWM.

The Columbia River within the study area is highly altered by human disturbance. Urbanization extends up to the shoreline. There has been extensive removal of historical streamside forests and wetlands. Riparian areas have been further degraded by the construction of dikes and levees and the placement of stream bank armoring. For several decades, industrial, residential, and upstream agricultural sources have contributed to profound water quality degradation in the Columbia River. Additionally, it receives high levels of disturbance in the form of heavy barge traffic.

The Columbia River is a highly managed stream that now resembles a series of slack water lakes upstream of the study area due to existing dams, rather than its original free-flowing state. Within the study area, the Columbia River is more free-flowing because it is below Bonneville Dam; however, the upstream dams are a major factor in downstream water discharge and quality. The major second factor regulating stream flow in the study area is tidal influence from the Pacific Ocean. Although the saltwater wedge does not extend into the study area, high tide events affect flow and stage in the Columbia River up to Bonneville Dam at RM 146.1.

3.4.1 Mapped Soils

In the Columbia River/Columbia Slope watershed, mapped soils include Pilchuck-urban land complex, 0 to 3 percent slopes (33A); Fill land (Fn); Lauren gravelly loam, 0 to 8 percent slopes (LgB); Lauren gravelly loam, 8 to 20 percent slopes (LgD); Wind River sandy loam, 0 to 8 percent slopes (WnB); Sauvie silt loam, 0 to 3 percent slopes (SmA); and Water (W) (Figure 3-1) (McGee 1972; USDA NRCS 2019). None of these soils are mapped as hydric soils.

3.4.2 Mapped Wetlands

The NWI maps the Columbia River (including North Portland Harbor) as a riverine tidal, unconsolidated bottom, permanent-tidal (R1UBV) wetland (USFWS 2021) (Figure 3-3 and Figure 3-4). The Clark County Wetland Inventory maps the Columbia River as a wetland area (Clark County 2022).

3.4.3 Identified Wetlands and Other Waters

In the Columbia River/Columbia Slope watershed the Columbia River is the one regulated waterway of the state and U.S. within the study area.

3.4.3.1 Columbia River

The Columbia River (including North Portland Harbor between the Oregon mainland and Hayden Island) flows from east to west through the study area. It is considered a traditional navigable water. It is the primary hydrologic feature of the study area. For more detailed discussion of this water of the state and U.S., refer to both the IBR Program's Ecosystems Technical Report and the Water Quality and Hydrology Technical Report. The City of Portland includes the Columbia River in its environmental overlay zone. The City of Vancouver/State of Washington considers the Columbia River a critical area and a shoreline of the state.

3.5 Burnt Bridge Creek Watershed

The study area intersects approximately 25.51 acres of the Burnt Bridge Creek watershed.

Burnt Bridge Creek is a small perennial tributary to the lower Columbia River. It originates within the northeastern limits of the City of Vancouver, Washington, and flows west (roughly paralleling SR 500 for approximately 5 miles) to its outlet at Vancouver Lake. The lake drains to the lower Columbia River via Lake River. I-5 crosses Burnt Bridge Creek at approximately RM 2.

3.5.1 Mapped Soils

In the Burnt Bridge Creek watershed, mapped soils within the study area include Lauren gravelly loam, 0 to 8 percent slopes (LgB); Hillsboro loam, 0 to 3 percent slopes (HIA); Wind River sandy loam, 0 to 8 percent slopes (WnB); Wind River sandy loam, 8 to 20 percent slopes (WnD); Wind River sandy loam, 30 to 65 percent slopes (WnG); Wind River gravelly loam, 0 to 8 percent slopes (WrB); and Wind River gravelly loam, 12 to 50 percent slopes (WrF) (Figure 3-2) (McGee 1972; USDA NRCS 2019). None of these soils are mapped as hydric soils.

3.5.2 Mapped Wetlands

The NWI maps one wetland feature within the portion of the Burnt Bridge Creek watershed in the study area (Figure 3-3) (USFWS 2021). Burnt Bridge Creek, a perennial stream, is mapped as a riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH) wetland.

The Clark County Wetland Inventory mapped wetlands in the northeastern portion of the study area within the Burnt Bridge Creek watershed (Clark County 2022). Two additional wetlands are mapped southeast of the I-5/SR 500 interchange, one at the northern terminus of M Street and one at the northern terminus of N Street, by the Clark County Wetland Inventory (Clark County 2022).

3.5.3 Identified Wetlands and Other Waters

There are two delineated wetland systems within the Burnt Bridge Creek watershed within the study area. These features are shown in Figure 3-7. Figure 3-7 also shows Wetland B and the WSDOT Burnt Bridge wetland complex, which were identified during the CRC analysis. These wetland systems are shown for additional context; however, they are outside of the current study area.

3.5.3.1 Other Waters of the State and U.S.

BURNT BRIDGE CREEK

Burnt Bridge Creek flows from southeast to northwest through the study area, passing under I-5 through a culvert. For further discussion of this water of the state and U.S., refer to both the IBR Program's Ecosystems Technical Report and the Water Quality and Hydrology Technical Report.

POTENTIAL JURISDICTIONAL WETLAND/WATER AREA I

PJWA I is in the Kiggins Bowl area immediately west of I-5, north of 39th Street, on Vancouver School District property (Figure 3-7). PJWA I is not likely a wetland but was included because of the borderline wetland characteristics. This will be further evaluated during future field delineation efforts.

PJWA I, which is approximately 1.00 acres in size, appears to be part of an existing drainage system. A stormwater conveyance system on Main Street discharges into a ditch traveling from the intersection of Main Street and 45th Street east toward PJWA I along an access road to Kiggins Bowl. The ditch discharges through a culvert to a steep slope on the northwest side of PJWA I. There is no defined channel east of the culvert discharge area. PJWA I also likely receives stormwater from the surrounding area, including I-5 and the school grounds. There is an additional discharge culvert on the southwest side of PJWA I. It is unclear where this culvert initiates. It discharges to the northeast, toward PJWA I. Riprap is present immediately below the culvert discharge area; however, there is no defined channel east of the riprap.

PJWA I is at the convergence of two steep topographic grades: one associated with the I-5 roadway prism and the other with a natural grade starting at the edge of the school grounds. The resulting low area runs parallel to I-5. The 2008 surveyed sample point is in the lowest topographic point in the area, near a culvert passing under I-5 and presumably draining into Wetland H. There is no defined drainage channel in the area; however, the valley bottom forms a diffuse linear depression. The area is dominated by fringed willowherb (FAC), *Salix* sp. (generally FAC or wetter), and reed canary grass (FACW). Soils are dark brown (10YR 3/3) sand without redox concentrations or other indicators of hydric conditions. There were no indicators of wetland hydrology at the time of the 2008 survey. However, this area may be considered jurisdictional by USACE and/or Ecology. Further coordination with these agencies is required.

Figure 3-7. Field Identified Wetlands and Other Waters – Washington

Source: CRC Wetland Data (2011); field verified

3.5.3.2 Wetlands

WETLAND H

Wetland H is a palustrine emergent, temporarily flooded (PEMA) wetland and is approximately 0.12 acres in size (Figure 3-7). The HGM classification is riverine impounding. Wetland H is northwest of Leverich Park, on the west side of Burnt Bridge Creek, east of I-5. The NWI does not map a wetland in the vicinity of Wetland H. In 2008, the boundary of Wetland H was determined by a shift from the presence of wetland hydrological indicators to the absence of indicators. The wetland receives water from a stormwater culvert passing under I-5 and from the adjacent Burnt Bridge Creek.

Wetland H is dominated by reed canary grass (FACW), mild water-pepper (*Persicaria hydropiper* - OBL), and spotted lady's-thumb (*Persicaria maculosa* - FACW). Indicators of wetland hydrology present at the time of the 2008 survey include saturation in the upper 12 inches of soil, watermarks, and drainage patterns. Soils exhibit low chroma colors (10YR 3/2) with redox concentrations.

The adjacent upland areas are dominated by red-osier dogwood (*Cornus alba* - FACW), beaked hazelnut (*Corylus cornuta* - FACU), Himalayan blackberry (FAC), and reed canary grass (FACW). No indicators of wetland hydrology were present at the time of the 2008 survey. Soils are very dark grayish brown (10YR 3/2) with redox concentrations.

3.6 Staging and Casting Yards/Sites

The staging and casting yards/sites, that have been identified and are within the study area, have not been subject to field study. The following information is based on NWI (USFWS 2021) and soils maps (USDA NRCS 2019) and should, therefore, be considered preliminary. The extent of wetlands shown on NWI maps of these areas should be treated cautiously given the high degree of historical site manipulation and changes to base conditions caused by levees, excavation, and flood control measures. In many areas, the extent of wetlands shown on NWI maps is likely greater than the extent of jurisdictional wetlands if studied and measured by field verification (Figure 3-8).

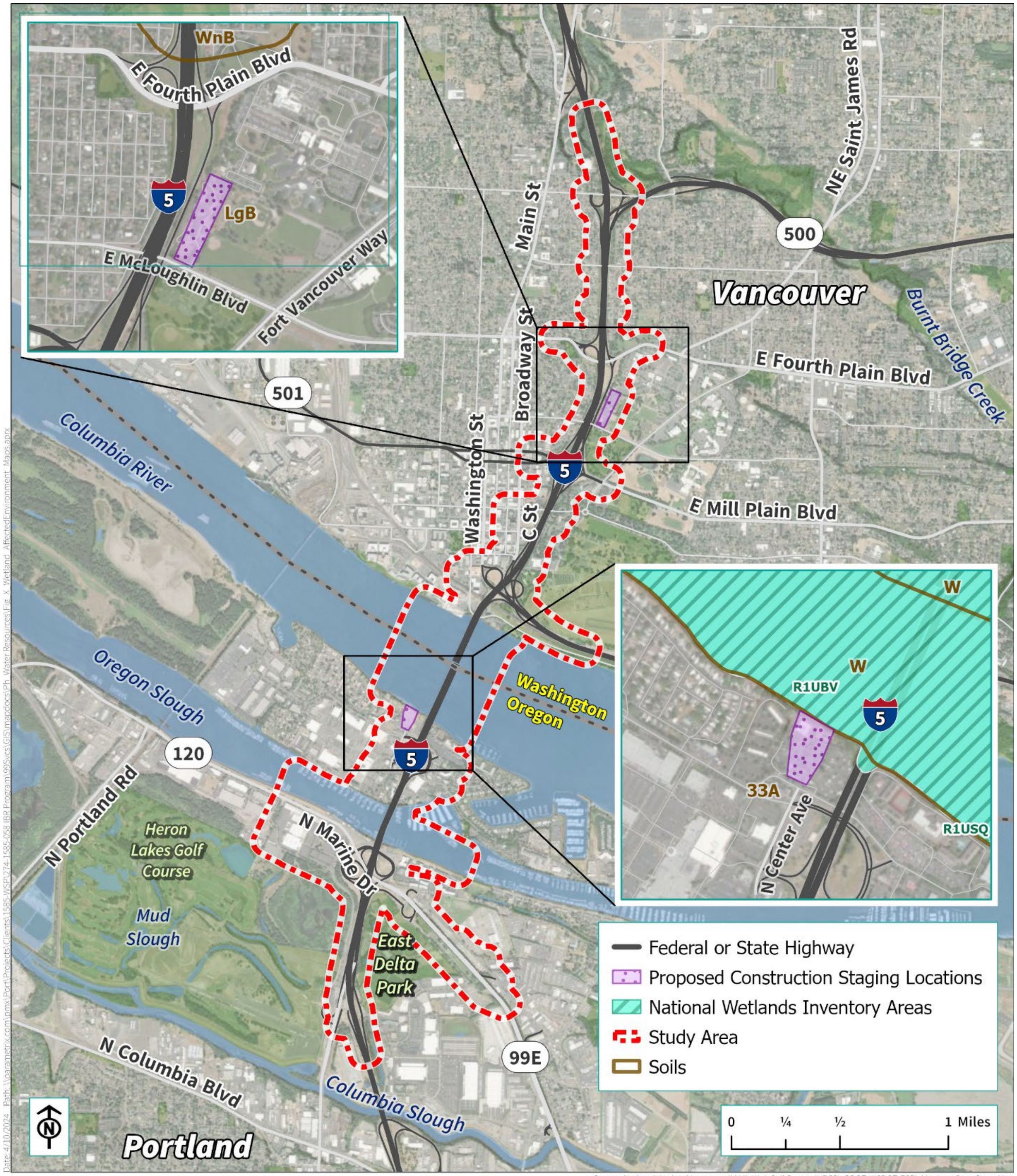
3.6.1 Thunderbird Hotel Site

There are no wetlands and no hydric soils mapped at the Thunderbird Hotel site (USDA NRCS 2019; USFWS 2021). The area consists entirely of paved surfaces, buildings and infrastructure, and landscaped vegetation (Figure 3-8).

3.6.2 Former Park and Ride, Downtown Vancouver, East of I-5 Site

There are no wetlands and no hydric soils mapped at the downtown Vancouver, east of I-5 site (USDA NRCS 2019; USFWS 2021). The area consists entirely of paved surfaces and landscaped vegetation (Figure 3-8).

Figure 3-8. Mapped Soil Series and NWI Areas - Staging and Casting Areas



Source: National Wetland Inventory (NWI), Web Soil Survey (NRCS), ODOT, WSDOT, ESRI, Mapbox, OpenStreetMap

4. LONG-TERM DIRECT AND INDIRECT EFFECTS

This section describes both the long-term impacts and indirect impacts from the No-Build Alternative and the Modified LPA. Long-term impacts occur when an alternative results in removal or fill within jurisdictional wetlands, regulated wetland buffers, or other waters of the state or U.S. These impacts are quantifiable and are discussed in units of area and volume where that information is available. In addition, long-term impacts to wetlands are discussed in terms of their specific wetland functions and values (DSL) and ratings (Ecology).

Less easily quantifiable direct impacts to wetlands and other waters would potentially occur where:

- The Modified LPA comes within the buffer area of existing wetlands (usually between 25 and 300 feet), disturbing natural resources and vegetation cover.
- Permanent bridge piers alter flow patterns.

Indirect impacts to wetlands and other waters of the state and U.S. would potentially occur where:

- Increased urbanization and improved public access to wetland areas may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.
- There is decrease in vegetation cover, or an increase in impervious surfaces (without associated stormwater treatment) or traffic volumes associated with the alternatives in the immediate vicinity of existing wetlands.

A vegetated area immediately surrounding a wetland provides a buffer from detrimental land uses. Vegetated buffers can provide water quality, hydrological, and wildlife habitat benefits. Adequate wetland buffer zones are highly dependent upon wetland quality, local topography, and other landscape features such as permeability and/or existing development. Wetland buffer widths shown in Figure 4-1 and Figure 4-2 are the widths that were established during CRC project based on the wetland rating determinations at that time. For the IBR Program, these wetlands have not yet been rated to determine current buffer width requirements. Wetland buffer widths, impacts, and subsequent mitigation would be determined during the permitting process.

4.1 No-Build Alternative

The No-Build Alternative would not result in the filling or reduction of wetlands or wetland buffers. Under the No-Build Alternative, untreated stormwater would continue to be discharged into wetlands and other waters in the study area. The No-Build Alternative would include development that would continue to occur along roadways in the study area, which would increase impervious surfaces.

4.2 Modified Locally Preferred Alternative

4.2.1 Regional

Anticipated filling or reduction of wetlands and other waters and their buffers, as a result of the Modified LPA, are mapped in Figure 4-1 and Figure 4-2. For both the Modified LPA and the No-Build Alternative, the anticipated impacts are listed in Table 4-1, Table 4-2, and Table 4-3.

The Modified LPA would affect corridor and regional impacts to wetlands and other waters. The Modified LPA would result in a direct increase in impervious surface areas associated with new or improved roadways and infrastructure.

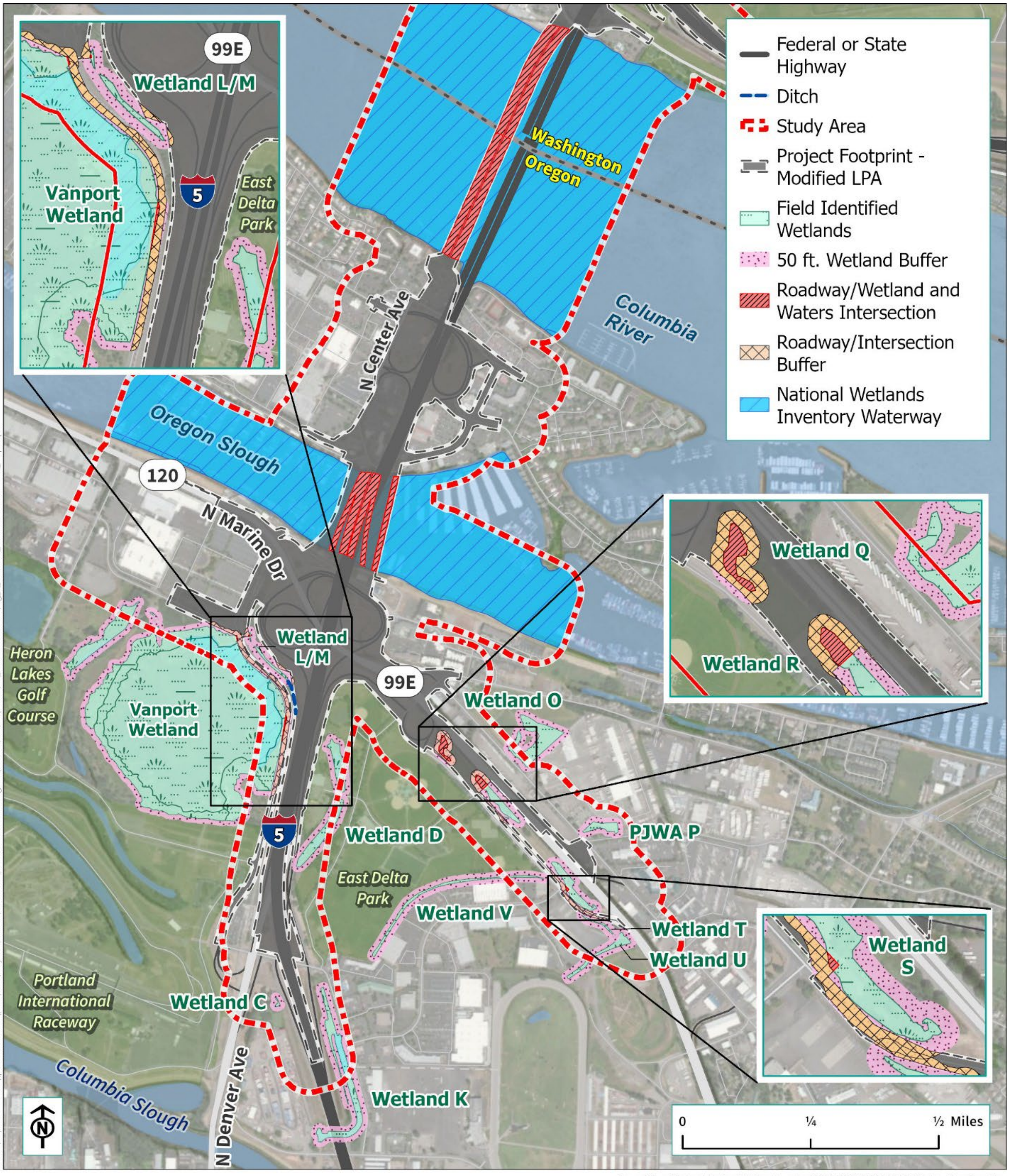
The Modified LPA could result in an indirect increase in impervious surface areas because of increased urbanization from other developments, such as transit-oriented development, not proposed as part of the Modified LPA. In most cases, new development would be required to provide stormwater treatment. However, stormwater runoff or other contaminants could reach wetlands if the increased contributing impervious area (CIA) is near the wetland area. In addition, increased traffic volumes or changes in traffic patterns are likely to occur with the alternatives because of non-IBR construction activities and/or population growth. Increases in traffic volume or trip time in the vicinity of wetlands could result in increased contaminant load in stormwater runoff.

The Modified LPA may result in increased public access to wetland areas because of nearby transit stations, park and rides, and other developments in the vicinity of wetlands. Increased public access may result in disruptions to normal wildlife activity, greater volumes of trash within and around wetland areas, introduction of nuisance plant species and non-native seeds, and damage to vegetation and substrates.

The Modified LPA may also alter flow patterns and aquatic wildlife activity from permanent bridge piers within the Columbia River. For more details regarding these indirect impacts, refer to both the IBR Program's Ecosystems Technical Report and the Water Quality and Hydrology Technical Report.

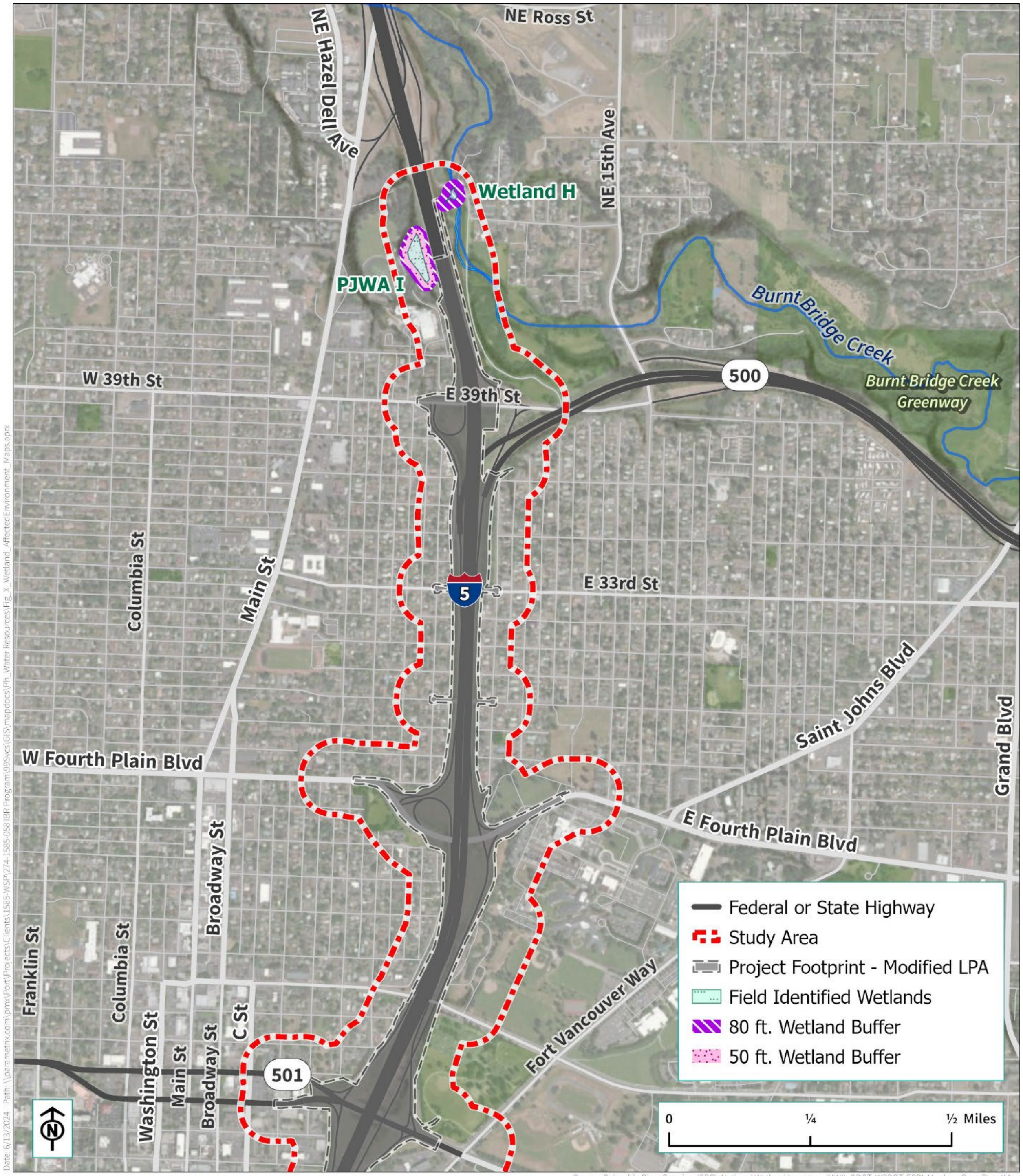
Activities associated with the Modified LPA would likely require both temporary and permanent modifications to portions of the Portland Metro Levee System, which is a system of federal flood control levees along the south bank of the Columbia River/North Portland Harbor. Modifications may include activities to restore temporarily disturbed portions of the levees, permanent modifications where proposed infrastructure would intersect with the existing levees, or where access to the levees would change as a result of reconfigured roadways. Modifications may also include improvements to existing levee function, if such improvements are requested or required. Modifications or improvements would be coordinated with USACE and Urban Flood Safety and Water Quality District for consistency with the planned future condition of the levees. The assessment of long-term effects to wetlands and other waters presented below includes those associated with potential modifications to the federal levee system.

Figure 4-1. Modified LPA Filling or Reduction of Wetlands and Other Waters - Oregon



Source: CRC Wetland Data (2011); City of Portland (2023); field verified.

Figure 4-2. Modified LPA Filling or Reduction of Wetlands and Other Waters - Washington



Source: CRC Wetland Data (2011); field verified.

Table 4-1. Long-Term Direct Impacts to Wetlands and Other Waters from the Modified LPA and the No-Build Alternative

Wetlands or Other Waters	Affected Resources	Modified LPA [a] Wetland Fill and Other Water Fill/Restoration (acres)	No-Build Alternative Wetland Fill and Other Water Fill/Restoration (acres)
WETLANDS	C	0	0
	D	0	0
	H	0	0
	K	0	0
	L/M Expo Road wetlands	0.002	0
	O	0	0
	PJWA P	0	0
	Q	0.30	0
	R	0.21	0
	S	0.02	0
	T	0	0
	U	0	0
	V	0	0
	PJWA I Kiggins Bowl wetlands	0	0
	Vanport wetland	0.05	0
	Total wetlands impact	**0.582**	**0**
WETLAND BUFFERS	C	0	0
	D	0.36	0
	H	0.06	0
	K	0	0
	L/M	0.56	0

Wetlands or Other Waters	Affected Resources	Modified LPA [a] Wetland Fill and Other Water Fill/Restoration (acres)	No-Build Alternative Wetland Fill and Other Water Fill/Restoration (acres)
	O	0	0
	PJWA P	0	0
	Q	0.95	0
	R	0.91	0
	S	0.70	0
	T	0.24	0
	U	0.11	0
	V	0	0
	PJWA I Kiggins Bowl buffer	0	0
	Vanport wetland buffer	3.5	0
	Total wetland buffer impact	**7.39**	**0**
OTHER WATERS	Columbia River/North Portland Harbor fill (bridge piers)	0.91	0
	Columbia River/North Portland Harbor removal (existing bridge piers)	-1.04	0

a = Modified LPA with the double-deck fixed-span configuration

LPA = Locally Preferred Alternative; PJWA = Potential Jurisdictional Water/Wetland Area

Table 4-2. Long-Term Indirect Impacts to Wetlands from the Modified LPA and the No-Build Alternative

Wetland	Modified LPA Indirect Impacts	No-Build Alternative Indirect Impacts
C	Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands. Potential improvement in stormwater runoff.	Continued discharge of untreated stormwater.
D	Potential stormwater improvement, but nearby footprint may result in temporary water quality impacts. Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.	Continued discharge of untreated stormwater.
H	Potential stormwater improvement, but nearby footprint may result in temporary water quality impacts. Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.	Continued discharge of untreated stormwater.
K	Potential stormwater improvement, but nearby footprint may result in temporary water quality impacts. Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.	Continued discharge of untreated stormwater.
L/M	Long-term, temporary change in vegetation structure during construction. Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.	Continued discharge of untreated stormwater.
O	Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.	Continued discharge of untreated stormwater.
PJWA P	Potential stormwater improvement, but nearby footprint may result in temporary water quality impacts. Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.	Continued discharge of untreated stormwater.
Q	Wetland functions lost from project impacts.	Continued discharge of untreated stormwater.

Wetland	Modified LPA Indirect Impacts	No-Build Alternative Indirect Impacts
R	Loss of wetland functions at impact site. Remaining wetland indirectly impacted from loss of buffer. Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.	Continued discharge of untreated stormwater.
S	Potential stormwater improvement, but nearby footprint may result in temporary water quality impacts. Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.	Continued discharge of untreated stormwater.
T	Potential stormwater improvement, but nearby footprint may result in temporary water quality impacts. Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.	Continued discharge of untreated stormwater.
U	Potential stormwater improvement, but nearby footprint may result in temporary water quality impacts. Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.	Continued discharge of untreated stormwater.
V	Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.	Continued discharge of untreated stormwater.
Vanport Wetland	Potential stormwater improvement, but nearby footprint may result in temporary water quality impacts. Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.	Continued discharge of untreated stormwater.

LPA = Locally Preferred Alternative; PJWA = Potential Jurisdictional Water/Wetland Area

Table 4-3. Long-Term Indirect Impacts to Other Waters from the Modified LPA and the No-Build Alternative

Other Waters	Modified LPA Indirect Impacts	No-Build Alternative Indirect Impacts
Columbia River	Potential stormwater improvement, but nearby footprint may result in temporary water quality impacts. Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.	Continued discharge of untreated stormwater.
Burnt Bridge Creek	Potential stormwater improvement, but nearby footprint may result in temporary water quality impacts.	Continued discharge of untreated stormwater.
PJWA I (stormwater feature)	Potential stormwater improvement, but nearby footprint may result in temporary water quality impacts. Increased urbanization and public access to wetland areas, which may introduce nuisance plant species and disrupt wildlife activity and other functions performed by existing wetlands.	Continued discharge of untreated stormwater.

LPA = Locally Preferred Alternative; PJWA = Potential Jurisdictional Water/Wetland Area

4.2.2 Columbia Slough Watershed

The Modified LPA would result in long-term direct effects (i.e., fill) to wetlands or other waters of the state and U.S. in the Columbia Slough watershed. Potential indirect effects are discussed below.

4.2.2.1 Wetlands

The Modified LPA, including each of the design options, would permanently excavate or fill approximately 0.58 acres of wetlands and 7.39 acres of wetland buffer. This fill and reduction in wetland size would result in a loss of wetland functions. In addition, the Modified LPA would increase the area of impervious surface in the vicinity of wetlands and decrease the distance between wetlands and roadway traffic, which could have an indirect effect on wetlands through the potential for increased stormwater flow and pollutants from stormwater. It should be noted that the buffer impacts in Oregon were calculated using the City of Portland’s environmental zone, which requires the inclusion of existing impervious surfaces.

The Modified LPA would provide stormwater detention and treatment facilities that would meet current standards and requirements for not only all new CIA, but also for portions of existing CIA that is currently untreated, which would be expected to result in a net beneficial effect to water quality and a beneficial indirect effect to wetlands by reducing pollutant loading and increasing their habitat value.

Other potential indirect effects on wetlands could occur from decreased vegetation cover in areas of new impervious surface, which may also result in water quality impacts, and the closer proximity of traffic that may disrupt wildlife activities associated with wetlands. For more information, refer to both the IBR Program's Ecosystems Technical Report and Water Quality and Hydrology Technical Report.

4.2.2.2 Other Waters of the State and U.S.

The Modified LPA would not result in long-term direct impacts to other waters of the state and U.S. in the Columbia Slough watershed. Indirect effects may result from the Modified LPA due to increased impervious surface area, which could result in a greater quantity of stormwater into the Columbia River (including North Portland Harbor), especially during large rain events.

However, as noted in Section 4.2.3.2, the Modified LPA would provide stormwater detention and treatment facilities that would meet current standards and requirements for all new CIA and for portions of existing CIA that is currently untreated, which would be expected to result in a net beneficial indirect effect on waters.

4.2.3 Ruby Junction Maintenance Facility

4.2.3.1 Wetlands

During a preliminary survey of the Ruby Junction Maintenance Facility and the surrounding properties, no wetlands were identified. However, right-of-entry for the properties was not obtained, and the study area could not be thoroughly examined. Prior to initiation of project activities, further wetland investigations would be conducted.

4.2.3.2 Other Waters of the State and U.S.

The Modified LPA would not result in long-term direct impacts to other waters of the state and U.S. in the Ruby Junction Maintenance Facility study area.

The Modified LPA would provide stormwater treatment in compliance with the City of Gresham's stormwater requirements, which may be an improvement to existing stormwater quality and an indirect benefit to waters.

4.2.4 Columbia River/Columbia Slope Watershed

Under the Modified LPA, there would be no long-term direct effects on wetlands in the Columbia River/Columbia Slope Watershed. Potential indirect impacts to the Columbia River are discussed in this section.

4.2.4.1 Wetlands

No wetlands were identified within the study area in the Columbia River/Columbia Slope Watershed.

4.2.4.2 Other Waters of the State and U.S.

The Modified LPA would construct new-in water permanent bridge piers in the Columbia River (including North Portland Harbor) for replacement bridges, with an additional area totaling

39,640 square feet (0. 91 acres) impacting the benthic habitat. Demolition of existing bridge piers would remove 45,302 square feet (1.04 acres) of structures effecting the benthic habitat. As such, the construction of the Modified LPA with the double-deck fixed-span configuration would result in a net restoration of approximately 5,663 square feet (0. 13 acres) of benthic habitat in other waters.

With the Modified LPA, permanent bridge piers in the Columbia River (including North Portland Harbor) for replacement bridges would affect flow patterns and travel for wildlife activity, which would be an indirect effect to waters. For further discussion refer to both the IBR Program's Ecosystems Technical Report and the Water Quality and Hydrology Technical Report.

The Modified LPA would provide more congestion relief than the No-Build Alternative and, with the addition of stormwater facilities, is most likely to result in improved water quality associated with vehicular traffic. Greater stormwater quantity into the Columbia River (including North Portland Harbor), especially during large rain events, may result in from the Modified LPA. However, the Modified LPA would provide a high level of water quality treatment. The Modified LPA would provide treatment for not only all new CIA, but also for portions of existing CIA that are currently untreated. This would be expected to result in a net beneficial effect to water quality, which would be a beneficial indirect effect to waters.

4.2.5 Burnt Bridge Creek Watershed

4.2.5.1 Wetlands

The permanent cut/fill line of the Modified LPA would impact approximately 0.06 acres of the Wetland H buffer, which could have an indirect effect on the wetland's function. Indirect effects may result from the Modified LPA due to the larger area of impervious surface in the vicinity of project wetlands and the closer proximity of traffic. However, the Modified LPA would provide stormwater detention and treatment facilities that would meet current standards and requirements for not only all new CIA, but also for portions of existing CIA that is currently untreated, which would be expected to result in a net beneficial effect to water quality and a beneficial indirect effect to wetlands. See Section 4.2.2.1 for additional information.

4.2.5.2 Other Waters of the State and U.S.

The Modified LPA would not result in long-term direct impacts to other waters of the state and U.S. in the Burnt Bridge Creek watershed. There would be no long-term direct impacts to PJWA I or Burnt Bridge Creek.

Potential indirect effects from the Modified LPA would be the same as in the Columbia Slough watershed. See Section 4.2.2.2.

4.2.6 Staging and Casting Yards/Sites

The Modified LPA would not result in long-term direct impacts from the temporary use of the two potential staging and casting yards/sites during construction. The identified sites have previously been disturbed from past development.

Other major staging/casting/bridge assembly sites may be identified as design progresses or by the contractor. They are likely to be adjacent to the Columbia River, Willamette River, or other waterbody in the region. As discussed in Section 5.2, the development and operations of a staging/casting yard would be subject to the same federal and state environmental regulations that apply to other aspects of construction (depending on which state it is in). Before a site is selected, a thorough, site-specific environmental analysis would be conducted, and all necessary permits would be secured.

4.2.7 Design Options

The Modified LPA with two auxiliary lanes would have the same or similar effect on wetlands and other waters as the Modified LPA with one auxiliary lane.

The Modified LPA with single-level fixed-span configuration would have the same or similar effect on wetlands and other waters as the Modified LPA with double-deck fixed-span configuration except that it would involve more drilled shafts and a slightly larger permanent benthic footprint, resulting in a net loss of benthic habitat. Approximately 1.07 acres of benthic habitat displacement would be required to construct the proposed Columbia River and North Portland Harbor bridge foundations, for a net loss of approximately 0.03 acres of benthic habitat.

The Modified LPA with single-level movable-span configuration would have the same or similar effects on wetlands as the Modified LPA with the double-deck or single-level fixed-span configurations. However, the Modified LPA with the single-level movable-span configuration would have more drilled shafts than the fixed-span configurations for a slightly larger permanent benthic footprint and a net loss of benthic habitat. Approximately 1.11 acres of benthic habitat displacement would be required to construct the proposed Columbia River and North Portland Harbor bridge foundations of the Modified LPA with the single-level movable-span configuration, for a net loss of approximately 0.07 acres of benthic habitat. The movable-span configuration would also have the potential for additional minor long-term water quality impacts associated with the maintenance and operation. These long-term water quality impacts are associated with the potential accidental discharge of chemicals from hydraulic and lubricating fluids associated with the movable-span configuration.

The Modified LPA with the I-5 mainline centered or shifted west, with the SR 14 interchange with or without the C Street Ramps, and the park and ride site options would have the same effects on wetlands and other waters because there are no wetlands or other waters in these locations.

When comparing the No-Build Alternative and the Modified LPA, including all configurations, the Modified LPA has more wetland and wetland buffer impacts but less fill within the other waters (see Table 4-4). When comparing Modified LPA configurations, all of them have the same level of direct, temporary, or indirect wetland and wetland buffer impacts. However, the configurations would have different levels of impacts to other waters as discussed above.

Table 4-4. Long-Term Effects Comparison of Alternatives and Configurations

Alternative and Configuration	Wetlands (acres)	Wetland Buffers (acres)	Other Waters (acres)	Other Waters – Net Change (acres)
No-Build Alternative	0	0	0	0
Modified LPA with Double-Deck Fixed-Span Configuration [a]	0.58	7.39	0.91 (fill) - 1.04 (removal)	-0.13 (restoration)
Modified LPA with Single-Level Fixed-Span Configuration [a]	0.58	7.39	1.07 (fill) -1.04 (removal)	0.03 (loss)
Modified LPA with Single-Level, Movable-Span Configuration [a]	0.58	7.39	1.11 (fill) -1.04 (removal)	0.07 (loss)

Notes: Data are approximate and have been rounded.

a Effects would be the same with one or two auxiliary lanes.

5. TEMPORARY EFFECTS

Temporary direct impacts to wetlands and other waters of the state and U.S. would occur in areas where construction activities would take place, but with functions returning to pre-impact performance after a duration of time. During construction, temporary disturbances to vegetation, wildlife activity, hydrology, and water quality would be avoided as much as possible using best management practices (BMPs) such as silt fences, construction fencing, and wildlife exclusionary netting. For this analysis, temporary impacts included both short-term and long-term temporary impacts as defined in the joint guidance developed by the EPA, USACE, and Ecology for wetland mitigation in Washington (Ecology et al. 2021). Short-term temporary impacts are those that last for a limited time with functions returning to pre-impact performance within about one year or one growing season of the impact. Short-term temporary impacts may include temporary disturbances to herbaceous wetland vegetation and soils during construction but are restored upon completion. Long-term temporary impacts affect functions that will eventually be restored or recover over time, but not within a year or more, and carry a risk of permanent loss due to the duration of the impact. Long-term temporary impacts may include the removal of woody vegetation within a wetland that cannot be replaced within a year.

Temporary direct impacts to the Columbia River would be anticipated due to the in-water work required to construct the new bridge structures and then deconstruct the existing bridge structures. For more details, refer to both the IBR Program's Ecosystems Technical Report and Water Quality and Hydrology Technical Report.

5.1 No-Build Alternative

The No-Build Alternative would not result in temporary effects on wetlands or other waters.

5.2 Modified Locally Preferred Alternative

5.2.1 Regional Temporary Effects

Construction of the Modified LPA would not result in temporary effects on regional wetlands or other waters.

5.2.2 Columbia Slough Watershed Temporary Effects

Within Columbia Slough watershed, temporary impacts to wetlands, wetland buffers, and other waters would occur in areas that would be disturbed during construction of the Modified LPA. During construction, temporary disturbances to wetland vegetation, hydrology, and water quality would be avoided as much as possible with BMPs such as silt fences and construction fencing.

5.2.2.1 Wetlands

Wetland System L/M, Wetland R, Wetland S, Wetland T, and Wetland U would undergo approximately 2.56 acres of temporary direct impacts due to construction activities (i.e., disturbances to vegetation and soil, temporary placement of fill) and proximity, resulting in a temporary disturbance to wetland vegetation. Additionally, approximately 7.11 acres of wetland buffer would also undergo temporary direct impacts due to construction activities.

5.2.2.2 Other Waters of the State and U.S.

There would be no temporary impacts to other waters of the state and U.S. in the Columbia Slough watershed portion of the study area.

5.2.3 Ruby Junction Maintenance Facility

No wetlands or other waters of the state or U.S. were identified in the Ruby Junction Maintenance Facility area; therefore, no temporary impacts would occur.

5.2.4 Columbia River/Columbia Slope Watershed Temporary Effects

5.2.4.1 Wetlands

There are no wetlands identified in the Columbia River/Columbia Slope watershed portion of the study area, and therefore no temporary impacts would occur.

5.2.4.2 Other Waters of the State and U.S.

Under the Modified LPA, temporary effects on the North Portland Harbor and the Columbia River would vary depending on the specific in-water construction methods used to construct the new bridge structures and deconstruct the existing bridge structures. No wetlands or other waters of the state or U.S. were identified in the downtown Vancouver portion of this watershed, and therefore no temporary impacts would occur. Temporary fill would result from temporary piles to support work platforms. During construction, temporary disturbances to vegetation, wildlife activity, hydrology, and water quality would be avoided as much as possible with BMPs, including the use of silt fences, construction fencing, and wildlife exclusionary netting. Further details are provided in the IBR Program's Ecosystems Technical Report.

5.2.5 Burnt Bridge Creek Watershed Temporary Effects

5.2.5.1 Wetlands

The Modified LPA permanent footprint and temporary construction footprint would not encroach on identified wetlands. However, approximately 1.19 acres of Wetland H and PJWA I buffer would have a temporary disturbance due to construction activities.

5.2.5.2 Other Waters of the State and U.S.

Temporary impacts to the Burnt Bridge Creek area may occur during construction of the Modified LPA based on the specific construction methods employed. Further details are provided in the IBR Program's Ecosystems Technical Report.

5.2.6 Staging and Casting Yards/Sites

No temporary impacts are anticipated from staging and casting yards/sites identified for the Modified LPA. Both the Thunderbird Hotel site on Hayden Island and the site on the east side of I-5 have been disturbed by past development and do not have wetlands or waters on the site. Other major staging/casting sites may be identified as design progresses or by the contractor.

As discussed in Section 4.2.6, the development and operation of any staging/casting yard would be subject to the same federal and state environmental regulations that apply to other aspects of project construction (depending on which state it is in). Before any site is selected, a thorough, site-specific environmental impact analysis would be conducted. All necessary permits would be secured prior to site development and construction activities.

5.2.7 Design Options

The Modified LPA with two auxiliary lanes and with one auxiliary lane would have the same or similar temporary effects on wetlands and other waters.

The Modified LPA with a single-level fixed-span configuration would have the same or similar temporary effects on wetlands and other waters as the Modified LPA with a double-deck fixed-span configuration, except that it would temporarily displace slightly more benthic in-water area with temporary pilings or within temporary cofferdams used during construction. The amount of increased temporary displacement would be minor and not significantly different between the two configurations.

The Modified LPA with the single-level movable-span configuration would have the same or similar temporary effects on wetlands and other waters as the Modified LPA with a single-level fixed-span configuration, except that they would temporarily displace slightly more benthic in-water area with temporary pilings and within temporary cofferdams used during construction. The amount of increased temporary displacement would be minor and not significantly different between the single-level fixed-span or single-level movable-span configurations.

The Modified LPA with the I-5 mainline centered or westward shift, with the SR 14 interchange with or without the C Street Ramps, and the park-and-ride site options would have the same temporary effects on wetlands and other waters because no wetlands or other waters exist in these areas.

6. POTENTIAL AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

6.1 Introduction

In accordance with state and federal regulations and Executive Order 11990, the design of the Modified LPA has avoided and minimized impacts to wetlands to the extent practicable with the design of the highway and transit alignments.

Mitigation to offset losses of wetland areas, wetland buffers, and functions and values would be explored in detail. Permittee responsible mitigation (PRM) opportunities in existing or newly acquired rights of way would be explored. Off-site PRM may occur within the same watershed but not necessarily near existing wetland resources, given the constrained urban area found in the study area. Likely off-site PRM sites depend on the area needed for mitigation, current and future ownership of potential mitigation sites, and site characteristics. Off-site PRM sites would be selected based on the ability of the mitigation site to offset wetland and other waters functions and value losses, including wetland buffers.

Due to statutory requirements, impacts to wetland and other water resources in Oregon require compensation within Oregon, and impacts in Washington require compensation within Washington. The compensatory mitigation selected is based on a functional assessment of adverse effects and replacement of equivalent functional value. Mitigation for the Modified LPA would compensate for impacts so that there would be no net loss of functions and values.

Currently, the IBR Program team is working with federal, state, and local agencies; tribes; and conservation groups to identify agency-approved compensatory mitigation banks and potential PRM sites in both Oregon and Washington that would meet the program's needs. Any PRM site selected would be able to fulfill the compensatory requirements for permanent, temporary, and indirect impacts. Specific designs for chosen PRM sites would be determined in coordination with federal, state, and local regulatory agencies.

6.2 Long-Term Adverse Effects

6.2.1 Regulatory Requirements

- Develop the Modified LPA consistent with the applicable federal, state, and local agency regulatory mitigation related to filling or removing material in wetlands and other waters of the U.S. and state.
- Prepare a compensatory mitigation plan that satisfies applicable federal, state, and local regulatory requirements, and that demonstrates no net loss of function and values of wetland resources.

6.2.2 Program-Specific Mitigation

- Continue to evaluate mitigation to offset losses of wetland and waters functions and values, including wetland buffers, as the Modified LPA design progresses.
- In cooperation with federal, state, and local agencies, tribes, and conservation groups, identify agency-approved compensatory mitigation banks and potential PRM sites in both Oregon and Washington to fulfill the compensatory requirements for permanent, temporary, and indirect impacts.
- For unavoidable impacts to Vanport wetland, increased mitigation ratios would be required because it is an existing wetland mitigation site.

6.3 Temporary Effects

6.3.1 Regulatory Requirements

- Implement appropriate high visibility/exclusionary fencing around avoided wetlands and other waters prior to the start of construction.
- Implement appropriate sediment and erosion control procedures during construction activities.
- Replace vegetation temporarily cleared for construction activity in accordance with local regulatory guidance.
- Avoid working outside of the in-water work window without first seeking an exception.
- Offset unavoidable temporary impacts that cannot be minimized through BMPs, through the purchase of credits from a mitigation bank or PRM, similar to the mitigation used for certain long-term effects.

6.3.2 Program-Specific Mitigation

- Avoid and minimize short-term impacts to wetland resources in final design to the extent practicable.
- Restore temporarily disturbed wetland and wetland buffer habitats consistent with applicable regulatory requirements.

7. PERMITS AND APPROVALS

The Modified LPA would be developed consistent with the regulations of applicable federal, state, and local agencies, including the USACE, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Oregon Department of Fish and Wildlife (ODFW), Ecology, WDFW, Oregon Department of Environmental Quality (DEQ), DSL, and the Cities of Vancouver and Portland. This section briefly summarizes the applicable agency-specific regulatory mitigation framework of each agency related to wetlands and other waters.

7.1 Federal Permits

7.1.1 Clean Water Act. 1977. 33 USC 1251-1376, as amended

Impacts to jurisdictional wetlands or other jurisdictional waters would require a permit under Section 404 of the CWA and a CWA Section 401 certification.

Background: The CWA requires states to set water quality standards for all contaminants in surface waters based on the beneficial or designated uses for the waterbody and makes it unlawful for any person to discharge any pollutant from a point source into navigable waters unless a permit is obtained under its provisions. It also recognizes the need to address the problems posed by nonpoint source pollution. Some of the permitting processes that fall within the purview of the CWA include National Pollutant Discharge Elimination System (NPDES) permits, Section 404 permits, and Section 401 water quality certifications.

If there are impacts to jurisdictional wetlands or other waters of the U.S. (which may include ditches), then a Section 404 CWA permit from the USACE would be required. Dredging, filling, and other activities that alter a waterway require a Section 404 permit and Section 401 certification.

Section 401 of the CWA requires an applicant for a federal license or permit, who conducts an activity that may result in a discharge to waters of the state or U.S., to obtain a certification that the activity complies with water quality requirements and standards. Applicants must submit a Section 404 application form to the appropriate state agency and the USACE, who forwards the application to the certifying state agency. The state agency then certifies that the project meets state water quality standards and does not endanger waters of the state, U.S., or wetlands. Certifications are issued by DEQ in Oregon (Oregon Revised Statutes [ORS] 468, Oregon Administrative Rules [OAR] 340-041-001 to 340-041-0350) and by Ecology in Washington (Revised Code of Washington [RCW] 90.48, as amended, Washington Administrative Code [WAC] 173-201A and 173-201A-070).

7.1.2 Section 10 of the Rivers and Harbors Appropriation Act. 1899. 33 USC 403, as amended

Under the River and Harbors Appropriation Act, final plans for the Modified LPA would have to be submitted for congressional and USACE approval for construction of the bridge within navigable waters.

Background: Under the Rivers and Harbors Appropriation Act, the USACE is authorized to regulate the construction of any structure or work within navigable waters. The act prohibits the construction of any bridge over or in navigable waters of the U.S. without congressional approval and the consent of the Secretary of Transportation.

7.1.3 Fish and Wildlife Coordination Act. 1934. 16 USC 661-667e, as amended

Consultation with the USFWS, ODFW, and WDFW would be required if the Modified LPA impounds, diverts, channelizes, or otherwise controls or modifies the waters of any stream or other body of water. The agencies may place constraints on the Modified LPA to prevent damage or loss to wetlands within the study area. Currently, it is not anticipated that activities associated with the Modified LPA would have to be permitted under the Fish and Wildlife Coordination Act.

Background: The Fish and Wildlife Coordination Act requires consultation with the USFWS and the appropriate state wildlife agency when a project would impound, divert, channelize, or otherwise control or modify the waters of any stream or other body of water. Such actions would also require compliance with Section 404 of the CWA. Consideration must be given to preventing damage or loss to wildlife and to mitigating any effects caused by a federal project. The environmental assessment must include an evaluation of how the actions may affect fish and wildlife resources and must identify measures to reduce impacts to fish and wildlife.

7.1.4 Endangered Species Act. 1973. 16 USC 1531-1544, as amended

If the Modified LPA would affect listed species and/or designated critical habitat, a consultation under Section 7 of the Endangered Species Act (ESA) would be required. An incidental take permit may be required as part of a Section 7 consultation. If a Section 7 consultation is required, a biological assessment would be prepared and submitted to the USFWS or NMFS.

Background: The ESA prohibits the take of any listed species. “Take” is defined in the law to include “harass and harm.” “Harm” is further defined to include any act that actually kills or injures listed species, including acts that may modify or degrade habitat in a way that significantly impairs essential behavioral patterns of the species. Under Section 7 of the ESA, any federal agency that authorizes, funds, or carries out an action is required to ensure that the action is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat.

If there is a potential for the Modified LPA to impact a listed species or its critical habitat, then a biological assessment is required. If listed species are found within the study area, an informal or formal consultation with NMFS and the USFWS under Section 7 of the ESA may be required. Informal consultations occur for projects that would not likely adversely affect listed species, whereas formal consultations occur for projects that would likely adversely affect listed species.

7.2 State Permits

7.2.1 Oregon

7.2.1.1 Oregon Administrative Rules. Removal-Fill Law. ORS 196.795-990. Salem, OR, as amended.

Any person who plans to "remove or fill" material in "waters of this state" is required to obtain a permit from DSL. Impacts to jurisdictional wetlands and other waters would require a joint permit from the USACE and DSL.

Background: If there are any impacts to jurisdictional wetlands or other waters of the state (which may include ditches), then a Removal-Fill permit from the DSL would likely be required. This regulation is often associated with Section 404 of the CWA, and Section 10 of the Rivers and Harbors Appropriation Act, under the jurisdiction of the USACE. In most cases, the preparation of a joint permit application for impacts to wetlands and other jurisdictional waters and a wetland delineation and conceptual mitigation plan are required. A wetland delineation is required if wetlands are in the study area. Compensatory mitigation (e.g., for wetland or riverine habitats) is required for any unavoidable impact to wetlands or other waters.

7.2.1.2 Oregon Administrative Rules. Water Quality Standards. ORS 468, OAR 340-041-001 to 340-041-0350. Salem, OR, as amended.

In Oregon, DEQ issues and enforces NPDES permits and authorizes Section 401 water quality certifications. Impacts to jurisdictional wetlands or other waters would require a Section 404 CWA permit and a Section 401 certification.

Background: A joint 404 permit application is submitted to the DSL and USACE (Portland Regional Office), who forward it to DEQ. DEQ reviews the project for CWA Section 401 water quality certification. Frequently, applicants are required to incorporate protective measures into their construction and operational plans, such as bank stabilization, treatment of stormwater runoff, spill protection, and fish and wildlife protection. The DEQ certification process requires a Land Use Compatibility Statement, signed by the local government land use authority, to ensure that permits affecting land use are compatible with local government comprehensive plans.

7.2.1.3 Oregon Administrative Rules. 1973. "Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces." OAR 660-15-0000 (5). Salem, OR, as amended.

Permitting may be required through local government Goal 5 ordinances.

Background: Local governments throughout Oregon have adopted programs to protect natural resources and conserve scenic, historic, and open space resources under Goal 5. Goal 5 parameters related to jurisdictional wetlands and other waters within the IBR study area include the following:

- Fish and wildlife areas and habitats should be protected and managed in accordance with the ODFW's fish and wildlife management plans.

- Stream flow and water levels should be protected and managed at a level adequate for fish, wildlife, pollution abatement, recreation, aesthetics, and agriculture.
- Significant natural areas that are historically, ecologically, or scientifically unique, outstanding, or important, including those identified by the State Natural Area Preserves Advisory Committee, should be inventoried and evaluated.
- Plans should provide for the preservation of natural areas consistent with an inventory of scientific, educational, ecological, and recreational needs for significant natural areas.

7.2.2 Washington

7.2.2.1 Revised Code of Washington. "State Environmental Protection Act." 1971. RCW 43.21C, WAC 197-11, and WAC 468-12. Olympia, WA, as amended.

An EIS must be prepared when the lead agency determines that a proposed action is likely to have significant adverse environmental impacts. Approval of this EIS by state and local agencies is required.

Background: The State Environmental Quality Act (SEPA) requires all governmental agencies to consider the environmental impacts of a proposed action before making decisions. An EIS must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. RCW and WAC allow adoption of an EIS prepared in compliance with NEPA to fulfill SEPA obligations.

7.2.2.2 Revised Code of Washington. 1971. "Shoreline Management Act of 1971." RCW 90.58. Olympia, WA, as amended.

A permit would be required from the City of Vancouver for activities occurring along the shoreline of the Columbia River or Burnt Bridge Creek. A permit would be required from Clark County for activities occurring along Salmon Creek. Ecology review and approval would be required.

Background: The goal of Washington's Shoreline Management Act (SMA) is to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines. The SMA establishes a broad policy of shoreline protection, which includes fish and wildlife habitat, and uses a combination of policies, comprehensive planning, and zoning to create a special zoning code overlay for shorelines. Under the SMA, each city and county is required to adopt a shoreline master program that is based on state guidelines and may be tailored to the specific geographic, economic, and environmental needs of the community. Master programs provide policies and regulations addressing shoreline use and protection, as well as a permit system for administering the program.

7.2.2.3 Revised Code of Washington. 1949. State Water Pollutant Control Act. RCW 90.48, as amended, WAC 173-201A and 173-201A-070. Olympia, WA, as amended.

A permit would be required if jurisdictional wetlands and other waters are negatively impacted by the project under the Washington State Water Pollution Control Act.

Background: The State Water Pollutant Control Act gives Ecology "jurisdiction to control and prevent the pollution of streams, lakes, rivers, ponds, inland waters, salt waters, water courses, and other surface and underground waters of the state of Washington." Amendments to state water quality standards in 1997 included wetlands in the definition of surface waters. The act's definition of pollution includes impacts that typically degrade wetland function, including placing fill and discharging stormwater runoff.

The implementing standards for the act include surface water quality standards (WAC 173-201A) and an antidegradation policy (WAC 173-201A-070). The regulations allow for short-term impacts to waters of the state if the degradation does not "interfere(s) with or become injurious to existing water uses or causes long-term harm to the environment." Ecology can permit alterations of wetlands, including filling, only if the net result does not result in long-term harm to the environment. With adequate mitigation that effectively offsets the impacts, Ecology can permit projects that would otherwise not comply with the regulations.

7.2.2.4 Washington Administrative Code. 2005. "National Pollutant Discharge Elimination System Permit Program (Department of Ecology)." WAC 173-220. Olympia, WA, as amended.

Impacts to jurisdictional wetlands or other waters would require a Section 404 CWA permit and a Section 401 certification.

Background: This code establishes a state individual permit program, applicable to the discharge of pollutants and other wastes and materials to the surface waters of the state and operates under state laws as part of the NPDES created by the CWA. In the state of Washington, Ecology issues and enforces NPDES permits and authorizes Section 401 water quality certifications.

In Washington, a Joint Aquatic Resource Permits Application is submitted to both the USACE and Ecology. Ecology reviews the permit application for Section 401 water quality certification.

7.2.2.5 Revised Code of Washington. 1949. "Hydraulic Code." RCW 77.55.100 and WAC 220-110. Olympia, WA, as amended.

A Hydraulic Project Approval process would be required from WDFW for work occurring within the Columbia River.

Background: The state legislature has given WDFW the responsibility of preserving, protecting, and perpetuating all fish and shellfish resources of the state. To assist in achieving that goal, the state legislature passed a law in 1949, now known as the "Hydraulic Code." The purpose of the law is to ensure that damage or loss of fish and shellfish habitat does not result in direct loss of fish and shellfish production. The enactment of the Hydraulic Code by the state legislature served as recognition that virtually any construction within the high water area of the waters of the state has the potential to cause habitat damage. It was also an expression of a state policy to preclude that potential from occurring. The law's purpose is to ensure that required construction activities are performed in a manner to prevent damage to the state's fish, shellfish, and their habitat. By applying for and following the provisions of the Hydraulic Project Approval process from WDFW, most construction activities around water can be allowed with little or no adverse impact on fish or shellfish.

7.2.2.6 Revised Code of Washington. 1990. "Growth Management Act." RCW 36.70A. Olympia, WA, as amended.

A critical areas permit would be required from the City of Vancouver for impacts to wetlands, wetland buffers, streams, and their respective riparian habitat areas.

Background: Each county and city must adopt development regulations protecting critical areas that are required to be designated under the Growth Management Act (GMA). Counties and cities are required to periodically review and update their critical areas ordinance. The GMA defines critical areas that must be designated and protected as wetlands, critical habitat, geologic hazard areas, flood hazard areas, and critical aquifer recharge areas. The focus of the GMA is to avoid unplanned growth and conserve natural resources, while allowing for economic development. Under the GMA, counties, cities, and towns must classify, designate, and regulate critical areas through their critical areas ordinance. Any of the five types of critical areas listed above may serve as fish, wildlife, or sensitive plant habitat.

All regulated habitat and critical areas should be identified during the project development phase. Some local jurisdictions may have fish and wildlife habitat regulation inventory maps. These maps identify what types of habitats the jurisdiction has regulated, indicate where all of the inventoried habitat areas are, and identify the regulations that apply to the management and development of these areas. If available, these maps should be reviewed to help identify critical areas. Local planning departments should be contacted to determine requirements that could affect a project.

7.3 Local Permits

7.3.1 Portland

7.3.1.1 Metro. Nature in Neighborhoods. 2005. Ordinance No. 05-1077C. Portland, OR, as amended.

No permitting would be required through Metro, but implementation of Nature in Neighborhoods by the City of Portland may require permitting.

Background: The Nature in Neighborhoods ordinance is designed to help local communities meet the requirements of Goal 5: Open Spaces, Scenic and Historic Areas, and Natural Resources. This ordinance amends Metro's Regional Framework Plan and is implemented by cities and counties. It relies on voluntary, incentive-based approaches for development in upland areas and includes new regulations on future urban areas. The ordinance conserves and protects fish and wildlife habitat but does not prohibit development. It uses regulation to protect the region's highest-value streamside habitat, called habitat conservation areas, while also encouraging protection of other valuable habitat through a combination of incentives and voluntary efforts.

7.3.1.2 City of Portland Code. 1994. “Environmental Zones.” CPC 33.430, as amended, Portland, OR. CPC. 2002. “Streams, Springs, and Seeps.” CPC 33.640. Portland, OR, as amended.

Permits are required for development or disturbance within environmental zones.

Background: The Environmental Zones Code provides for fish habitat protection through the designation of environmental protection zones and environmental conservation zones. An environmental protection zone provides the highest level of protection to the most important resources and functional values. Development is approved in an environmental protection zone only in rare and unusual circumstances. An environmental conservation zone conserves important resources and functional values in areas where these can be protected while allowing environmentally sensitive urban development.

In these zones, development and disturbances must be at least 50 feet from the boundary of any wetland. Development within these zones requires a permit application and additional information. Natural resource management plans (NRMPs) may be developed and approved and may contain regulations that supersede or supplement the environmental zone regulations. Whenever NRMP provisions conflict with other environmental zone provisions, the NRMP provisions take precedence. NRMPs within the wetlands and other waters study area include the East Columbia Neighborhood NRMP and the Peninsula Drainage District No. 1 NRMP.

These regulations apply to building permit and development permit applications for activities within the resource area of an environmental conservation zone. Activities within an environmental conservation zone are subject to the development standards of Section 33.430.110-190. These regulations do not apply to building or development permit applications for development that has been approved through environmental review.

Fish habitat is also protected in the Streams, Springs, and Seep Code. This code is applicable when there are land division actions. The standards in this chapter ensure that important streams, springs, and seeps that are not already protected by the environmental overlay zones are maintained in their natural state.

7.3.2 Vancouver

7.3.2.1 Vancouver Municipal Code. 2005. “Critical Areas Protection Ordinance.” VMC 20.740. Vancouver, WA, as amended.

A Critical Areas Report and Permit would be required for activities occurring on properties containing critical areas, including wetlands, wetland buffers, waterbodies, and riparian management areas and riparian buffers.

Background: The City of Vancouver’s regulations that affect wetlands, waterbodies, and their buffers are found in the Critical Areas Protection Ordinance. Adopted on February 28, 2005, the ordinance combines separate permitting processes for critical areas (wetlands, frequently flooded areas, geologic hazard areas, and fish and wildlife habitat conservation areas) into a single integrated process. VMC 20.740, Critical Areas Protection, implements the goals and policies of the Vancouver

Comprehensive Plan, 2011-2030, under the GMA and other related state and federal laws. Regulations related to wetlands, waterbodies, and their buffers and ordinance compliance in Chapter 20.740 are described below. Applicants must provide a Critical Areas Report with their permit applications.

VMC. 2005 "WETLANDS." VMC 20.740.140. VANCOUVER, WA.

The Wetlands code outlines the City of Vancouver's regulations related to wetlands and their buffers, and it describes which areas are designated as wetlands. Designations include, but are not limited to, swamps, marshes, bogs, and similar areas and buffers (required buffer widths vary from 300 to 50 feet for wetlands surrounded by high intensity land use).

VMC. 2005 "FISH AND WILDLIFE HABITAT CONSERVATION AREAS." VMC 20.740.110. VANCOUVER, WA.

A Critical Areas Report for a riparian management area or riparian buffer must include an evaluation of habitat functions using the Clark County Habitat Conservation Ordinance Riparian Habitat Field Rating Form or another habitat evaluation tool approved by WDFW. In addition, there are several performance standards that apply to habitat conservation areas, riparian management areas, and riparian buffers that need to be addressed.

7.3.2.2 Vancouver Municipal Code. 2005. "Shoreline Management Area." VMC 20.760. Vancouver, WA.

Both a Substantial Development Permit and a Critical Areas Permit would be required for activities on properties containing a wetland, waterbody, or buffer in a shoreline area.

Background: The purpose of the Shoreline Management Area code is to implement the policies and procedures set forth by the SMA, as amended, and all applicable provisions contained in the WAC. The Shoreline Management Master Program (Ord. M-3231, as amended) is used to regulate uses within the Shoreline Management Area.

7.3.2.3 Vancouver Municipal Code. 2004. "SEPA Regulations." VMC 20.790.

An EIS must be prepared when the lead agency determines that a proposal is likely to have significant adverse environmental impacts. Approval of the EIS by state and local agencies would be required.

Background: This code is the adoption of Washington's SEPA law by the City of Vancouver. RCW and WAC allow adoption of an EIS prepared in compliance with NEPA to fulfill SEPA obligations.

7.3.2.4 City of Vancouver. Comprehensive Plan. 2004. Environmental Policies.

No permitting of activities would be required under the City of Vancouver's Comprehensive Plan.

Background: Vancouver's Comprehensive Plan includes the following provisions:

- Environmental protection (EN-1): Protect, sustain, and provide for healthy and diverse ecosystems.

- Habitat (EN-5): Protect riparian areas, wetlands, and other fish and wildlife habitat. Link fish and wildlife habitat areas to form contiguous networks. Support sustainable fish and wildlife populations.
- Trees and other vegetation (EN-8): Conserve and restore tree and plant cover, particularly native species, throughout Vancouver. Promote planting using native vegetation.

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APPENDIX A. OREGON DEPARTMENT OF STATE LANDS WETLAND DELINEATION CONCURRENCE FOR CRC PROJECT AREA

Oregon
Theodore R. Kulongoski, Governor

Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200
FAX (503) 378-4844
www.oregonstatelands.us.

September 24, 2008

Heather Gundersen
Columbia River Project Crossing Team
700 Washington Street, Suite 300
Vancouver, WA 98660

Re: Wetland Delineation Report for a Portion of the Columbia River Crossing Project, Multnomah County; T2N, R1E, Sec. 33 and 34; and T1N, R1E, Sec.3 and 4; Portions of Multiple Tax Lots; WD # 08-0205.

Dear Ms. Gundersen:

The Department of State Lands has reviewed the wetland delineation report prepared by Parametrix for the site referenced above. Please note that the study area for this report includes only the portion of the area described above as indicated on the attached maps. Based upon the information presented in the report and additional information submitted upon request, we concur with the wetland and waterway boundaries as mapped in revised Figures 6a through 6d. Please replace all copies of the preliminary wetland maps with these final Department-approved maps. Within the study area, 4 wetlands, totaling 2.61 acres, portions of the Columbia River and the Oregon Slough, and 2 roadside ditches were identified. The wetlands, river, slough, and the portion of the one ditch created from Wetland L are subject to the permit requirements of the state Removal-Fill Law. A state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in the wetlands or below the ordinary high water line (OHWL) of a waterway (or the 2 year recurrence interval flood elevation if OHWL cannot be determined). The portions of the 2 delineated roadside ditches created from uplands are exempt as per OAR 141-085-0015 (12) and are not subject to the permit requirements of the state Removal-Fill law.

In addition, the Columbia River and the Oregon Slough are state-owned waterways. Any activity encroaching within the submerged and submersible land below the line of ordinary high water may require a lease, registration, or easement to occupy state-owned land. Please contact Tami Hubert at (503) 986-5272 for more information.

This concurrence is for purposes of the state Removal-Fill Law only. Federal or local permit requirements may apply as well. The Army Corps of Engineers will review the report and make a determination of jurisdiction for purposes of the Clean Water Act at the time that a permit application is submitted. We recommend that you attach a copy of this concurrence letter to both copies of any subsequent joint permit application to speed application review.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter, unless new information necessitates a revision. Circumstances under which the Department may change a determination and procedures for renewal of an expired determination are found in OAR 141-090-0045 (available on our web site or upon request). The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within 60 calendar days of the date of this letter.

Thank you for having the site evaluated. Please phone me at (503) 986-5232 if you have any questions.

Sincerely,

Pete J

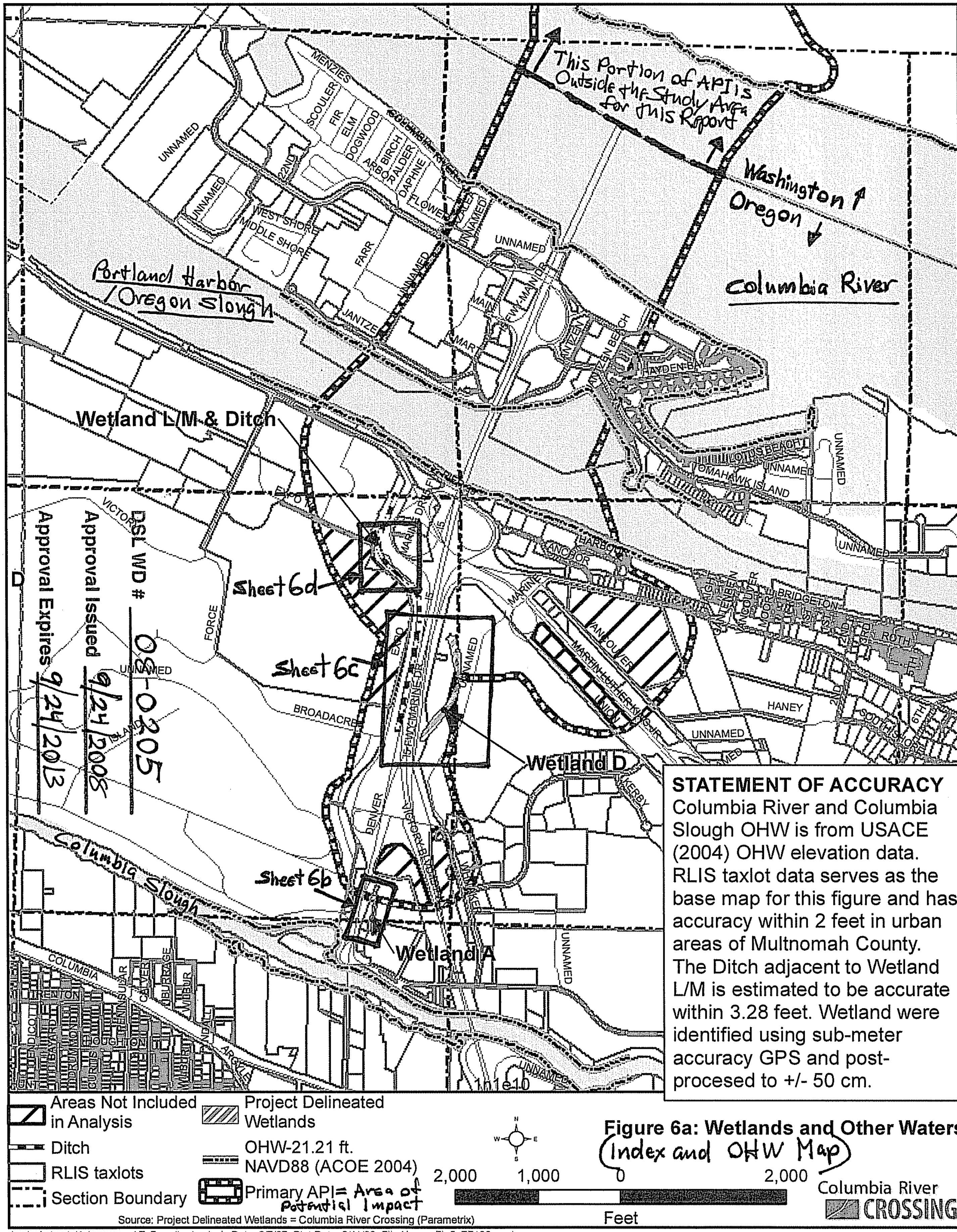
Peter Ryan, PWS
Wetland Specialist

Approved by Janet C. Morlan

Janet C. Morlan, PWS
Wetlands Program Manager

Enclosures

ec: Tina Farrelly, Parametrix
City of Portland Planning Department
James Holm, Corps of Engineers
Mike McCabe, DSL
Tami Hubert, DSL



STATEMENT OF ACCURACY
Columbia River and Columbia Slough OHW is from USACE (2004) OHW elevation data. RLIS taxlot data serves as the base map for this figure and has accuracy within 2 feet in urban areas of Multnomah County. The Ditch adjacent to Wetland L/M is estimated to be accurate within 3.28 feet. Wetland were identified using sub-meter accuracy GPS and post-procesed to +/- 50 cm.

Figure 6a: Wetlands and Other Waters (Index and OHW Map)

Source: Project Delineated Wetlands = Columbia River Crossing (Parametrix)

Analysis by J. Koloszar and T. Farrelly; Analysis Date: 8/7/07; Plot Date: 9/11/08; File Name: Fig5_TF120.mxd

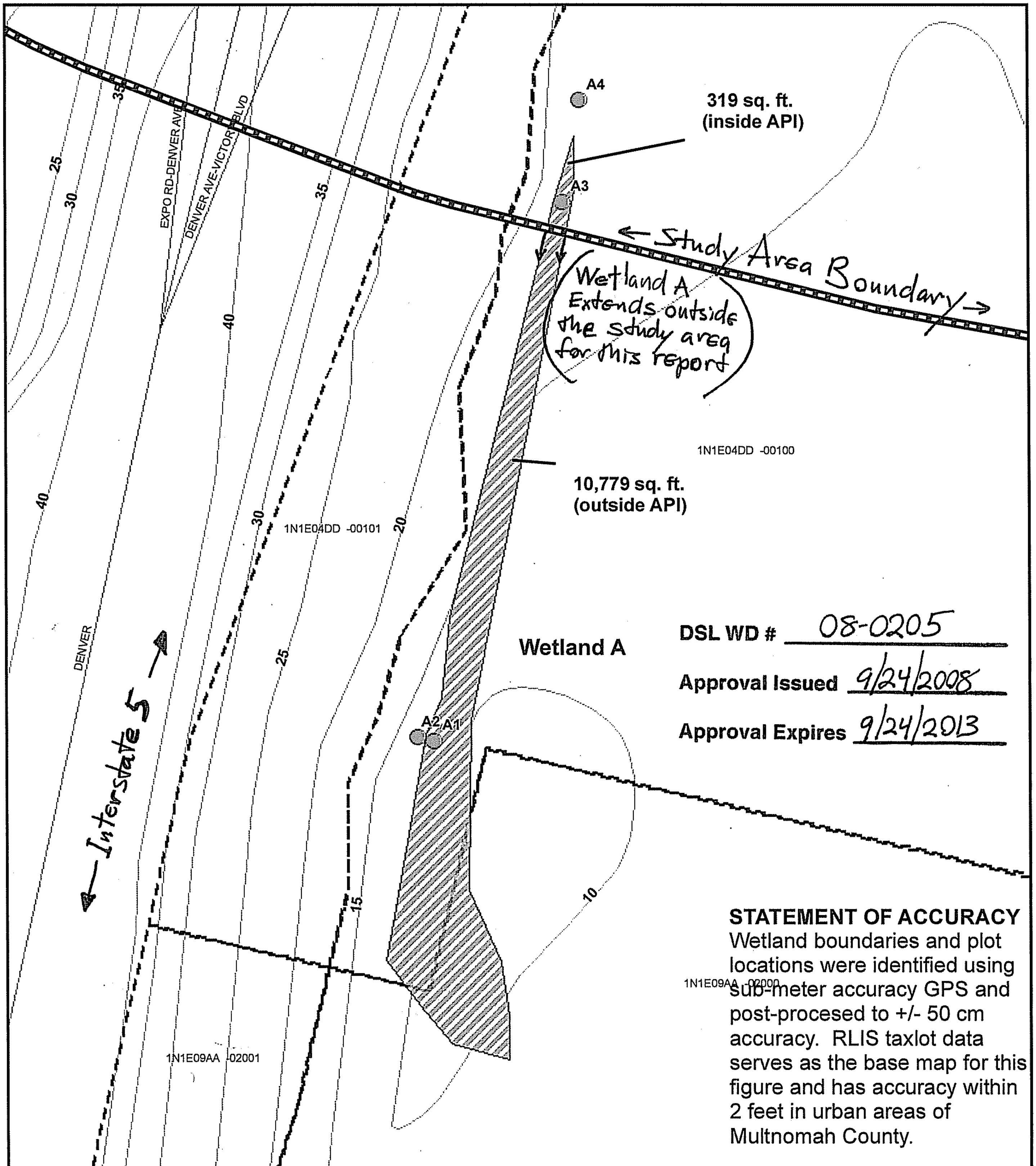


Figure 6b: Wetland A

0 37.5 75 150 Feet

5 ft.Contours

Wetland Data Plots

Tax Lots

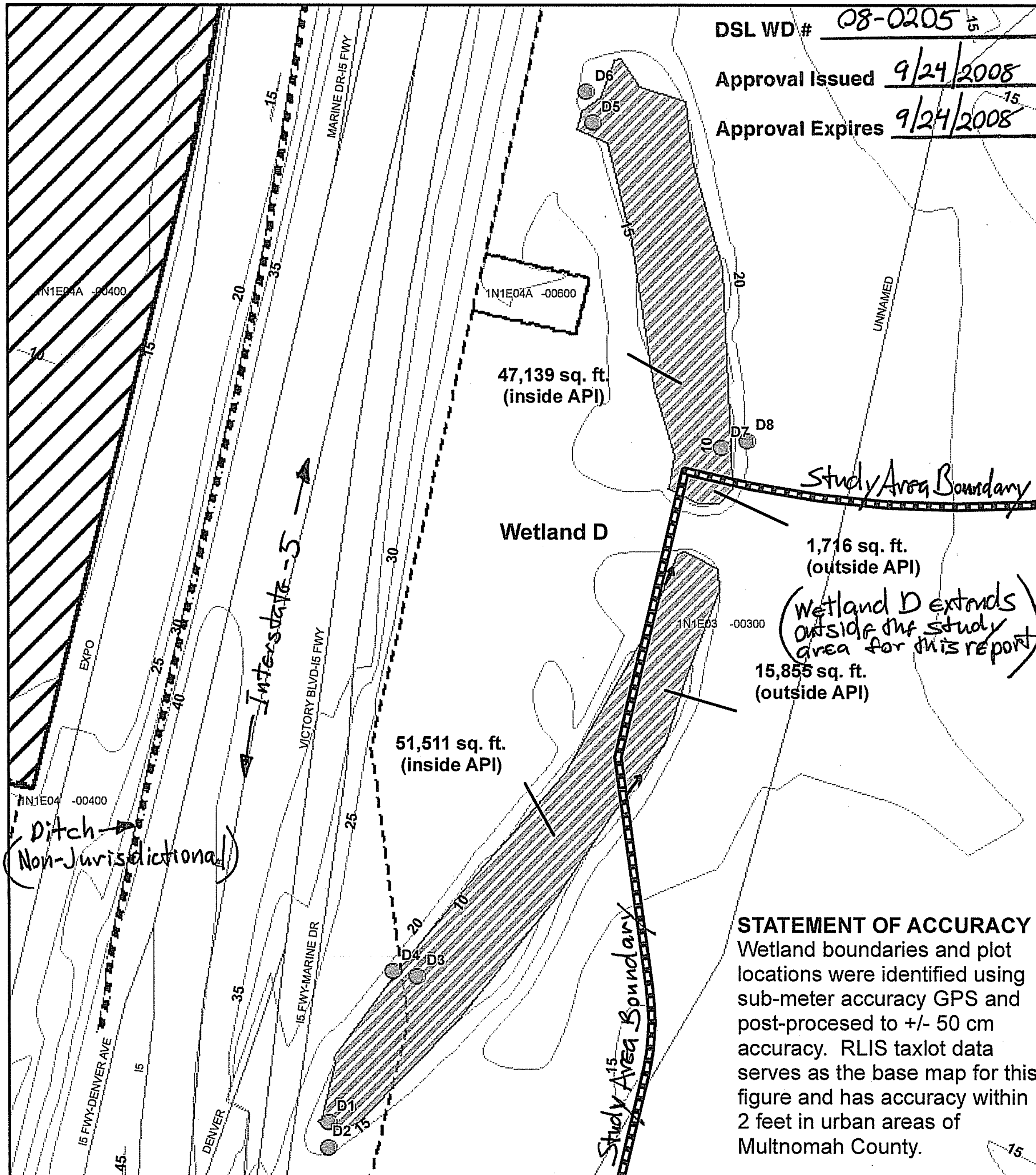
Project Delineated Wetlands

Primary API

Columbia River CROSSING

Source: Project Delineated Wetlands = Columbia River Crossing (Parametrix)

Analysis by J. Koloszar and T. Farrelly; Analysis Date: 8/7/07; Plot Date: 9/9/08; File Name: Fig5_TF120.mxd



0 95 190 380
Feet

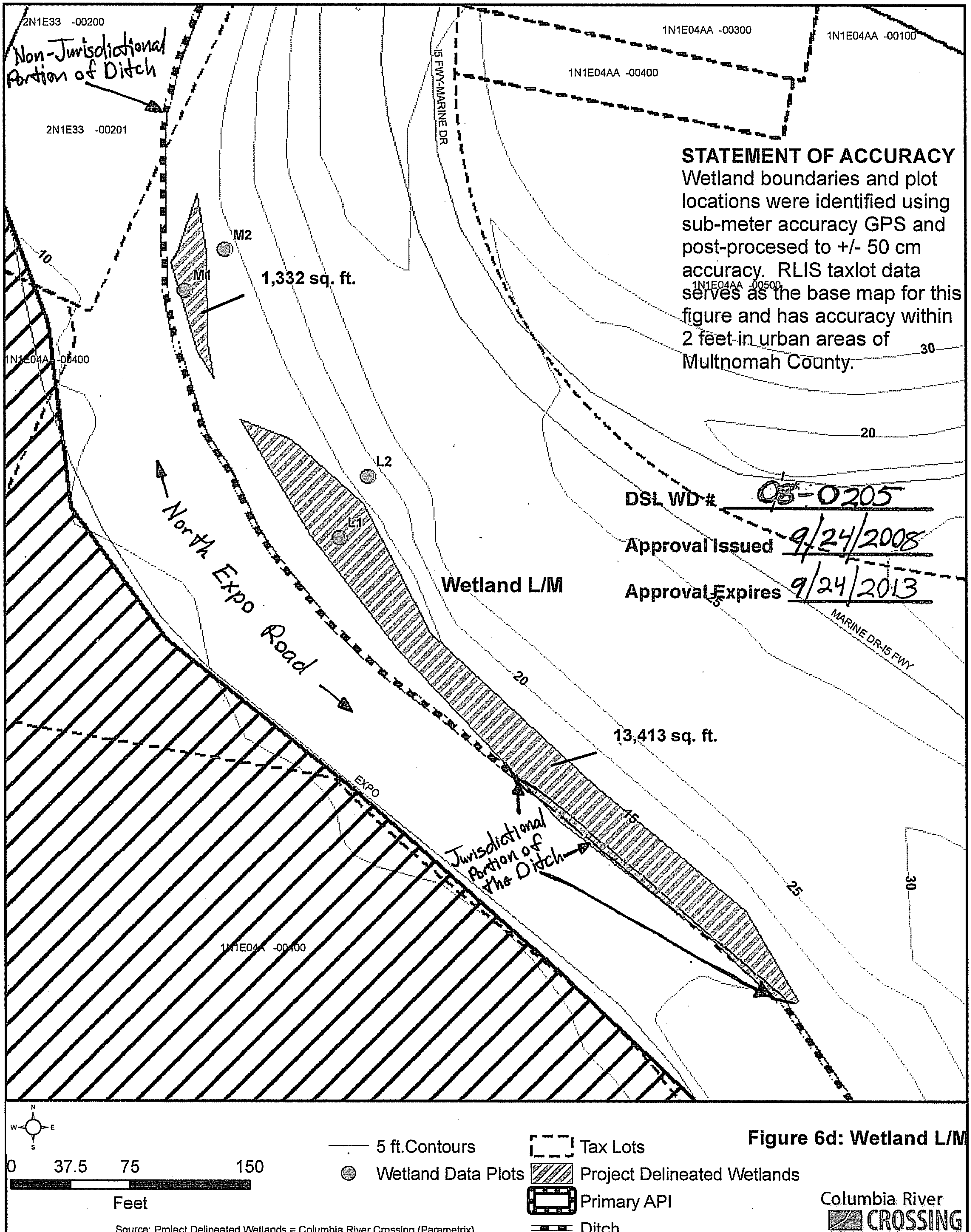
5 ft.Contours
Wetland Data Plots
Tax Lots
Project Delineated Wetlands
Primary API
Ditch

Figure 6c: Wetland D

Columbia River CROSSING

Source: Project Delineated Wetlands = Columbia River Crossing (Parametrix)

Analysis by J. Koloszar and T. Farrelly; Analysis Date: 8/7/07; Plot Date: 9/9/08; File Name: Fig5_TF120.mxd



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