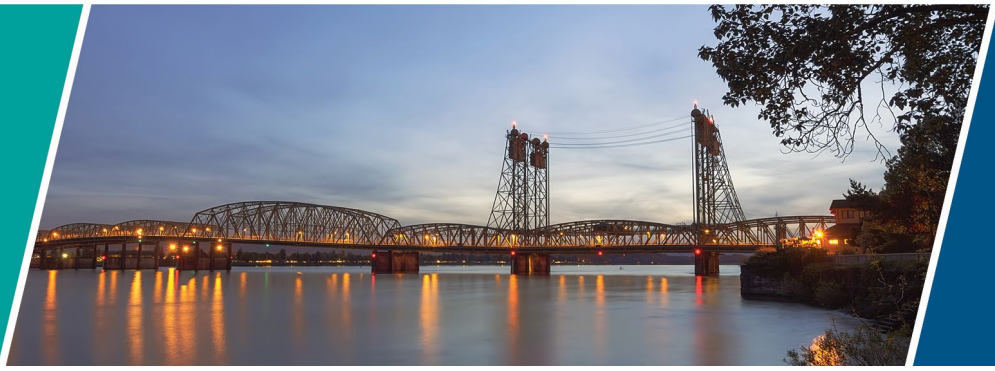
Interstate BRIDGE Replacement Program

Considering the importance of our natural environment



Public Services Technical Report

September 2024

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Public Services Technical Report

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CONTENTS

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
ADA	Americans with Disabilities Act
BRT	bus rapid transit
CRC	Columbia River Crossing
CTR	Commute Trip Reduction
C-TRAN	Clark County Public Transit Benefit Area Authority
EIS	environmental impact statement
FHWA	Federal Highway Administration
FSCR	Flood Safe Columbia River
GMA	Growth Management Act
I-5	Interstate 5
IBR	Interstate Bridge Replacement
LOS	Level-of-service
LPA	locally preferred alternative
LRT	light-rail transit
LRV	light-rail vehicle
MAX	Metropolitan Area Express
MCSO	Multnomah County Sheriff's Office
NAVD 88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
ODOT	Oregon Department of Transportation
OTC	Oregon Transportation Commission
PF&R	Portland Fire & Rescue
PMLS	Portland Metro Levee System

Acronym/Abbreviation	Definition
PNCD	Preliminary Navigation Clearance Determination
RCW	Revised Code of Washington
ROD	Record of Decision
SOV	single-occupancy vehicle
SR	State Route
TriMet	Tri-County Metropolitan Transportation District of Oregon
UFSWQD	Urban Flood Safety and Water Quality District
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
v/c	volume to capacity
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation
WSTC	Washington State Transportation Commission

1. PROGRAM OVERVIEW

This technical report identifies, describes, and evaluates short-term and long-term effects on public services from the Interstate Bridge Replacement (IBR) Program The construction and operation of transportation infrastructure can have temporary and permanent effects on public services such as police, fire, and emergency medical services, as well as on facilities such as public schools, hospitals, and nursing homes. The Modified Locally Preferred Alternative (Modified LPA) would be designed to avoid and/or minimize these effects to the greatest extent possible. This report provides mitigation measures for potential effects to these resources when avoidance is not feasible.

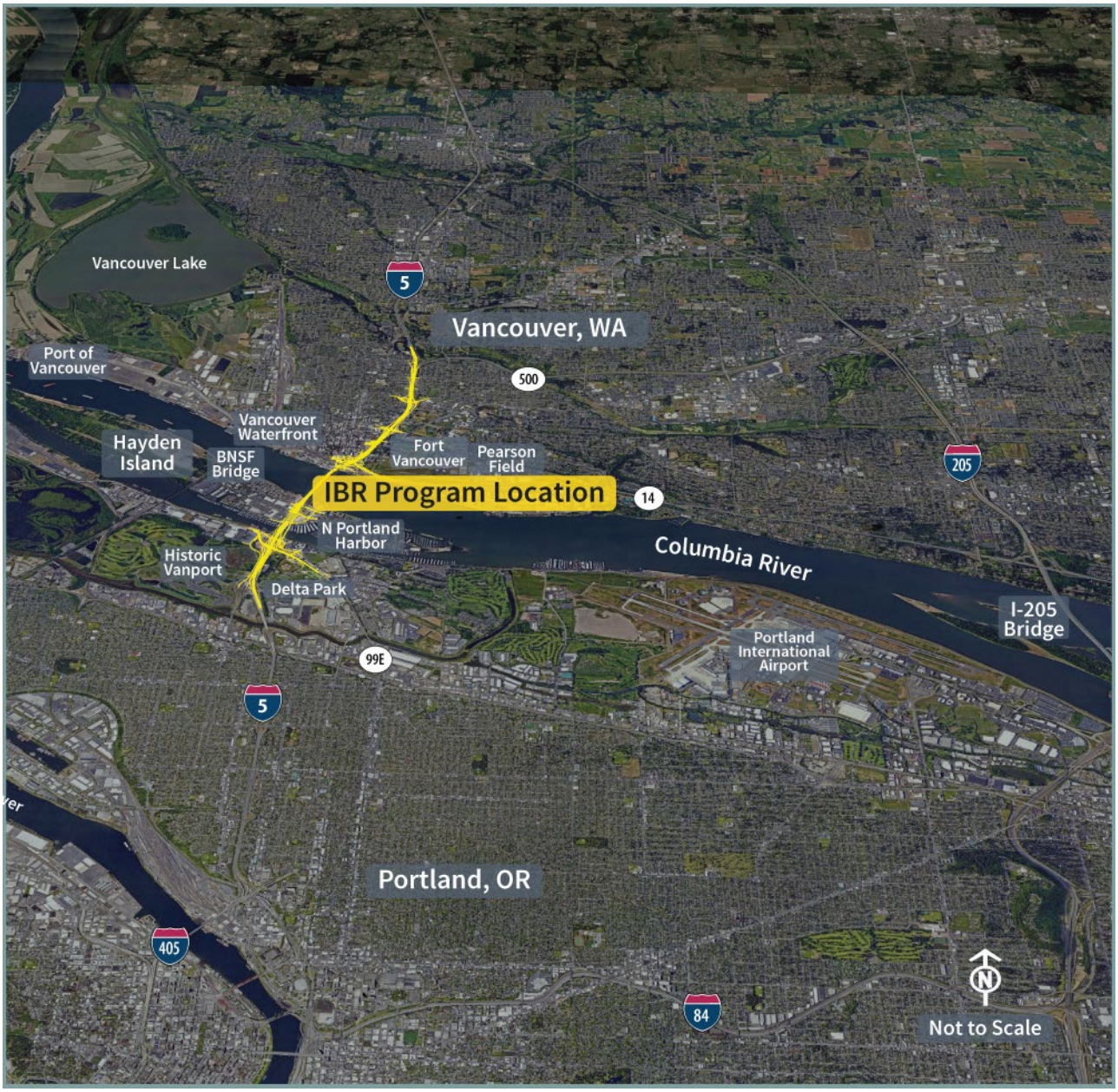
The purpose of this report is to satisfy applicable portions of the National Environmental Policy Act (NEPA) 42 United States Code (USC) 4321 "to promote efforts which will prevent or eliminate damage to the environment." Information and potential environmental consequences described in this technical 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 public services within the study area (Chapter 3).
- Discuss potential long-term, temporary, and indirect effects to public services resulting from construction and operation of the Modified LPA in comparison to the No-Build Alternative (Chapters 4, 5, and 6).
- Provide proposed avoidance and mitigation measures to help prevent, eliminate or minimize environmental consequences from the Modified LPA (Chapter 7).
- Identify federal, state, and local permits that would be required (Chapter 8).

The IBR Program is a continuation of the previously suspended 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.

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 1.1.51-45, 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 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.

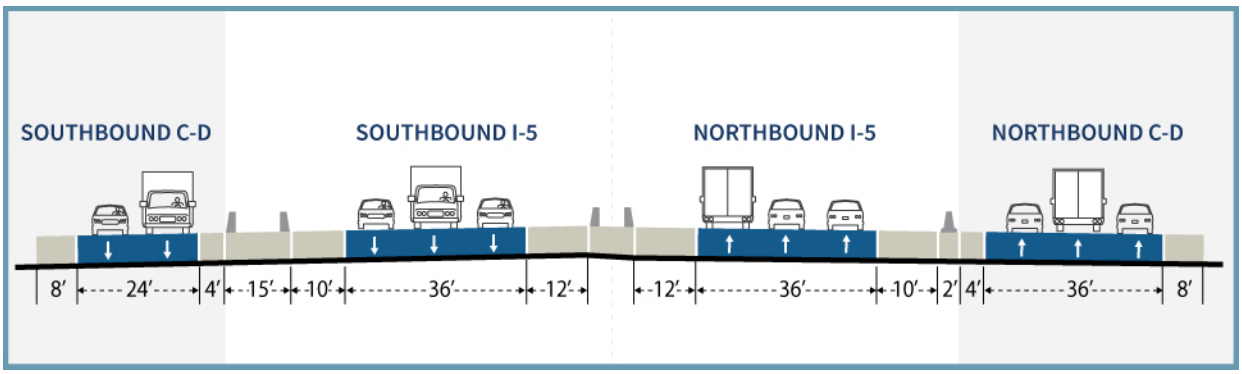
On I-5 northbound, the auxiliary lane that would begin at the on-ramp from Marine Drive would continue across the Columbia River bridge and end at the off-ramp to the C-D roadway, north of SR 14 (see Figure 1-5). The on-ramp from SR 14 westbound would join the off-ramp to the C-D roadway, forming the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

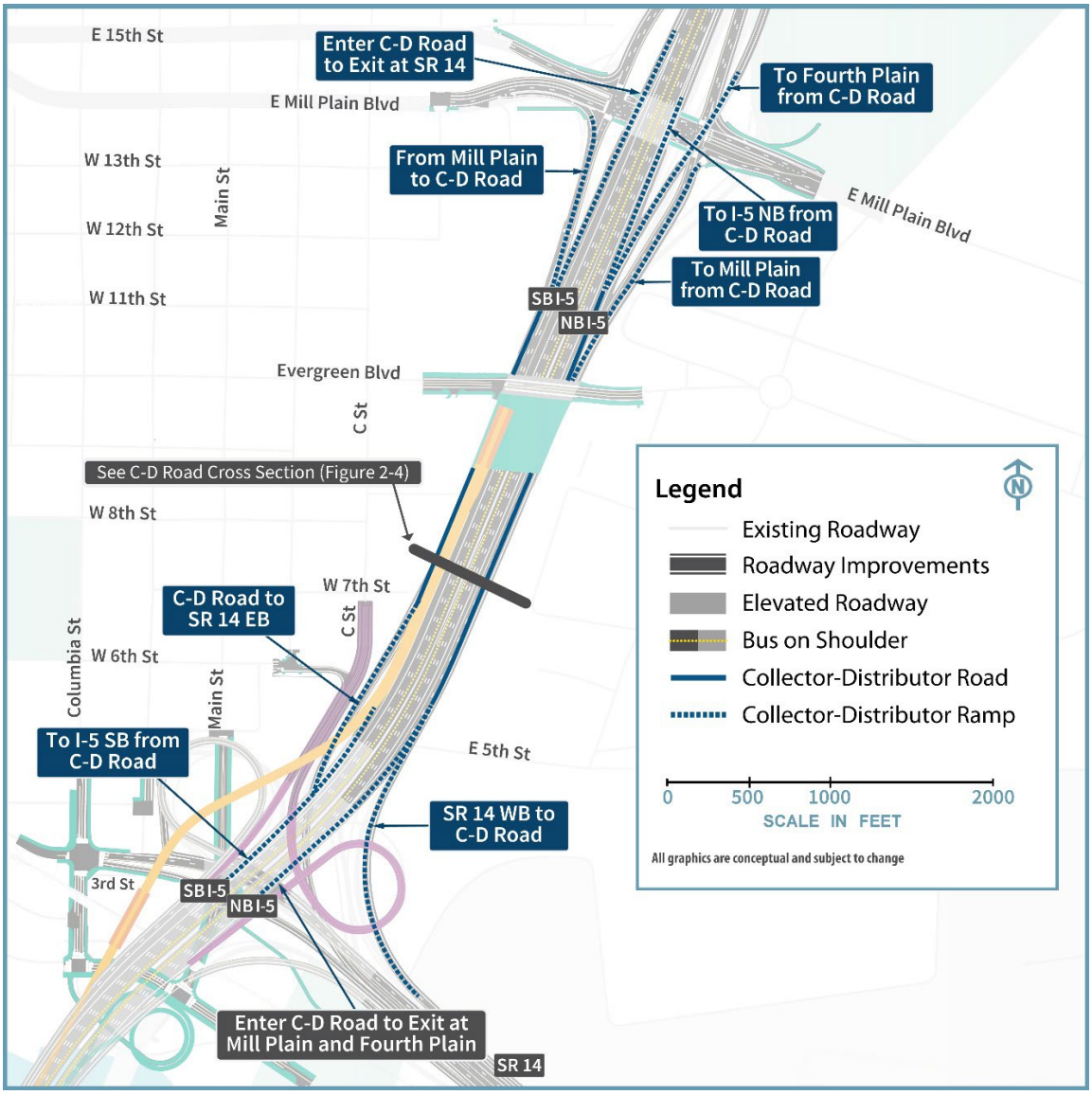
On I-5 southbound, an auxiliary lane would begin at the on-ramp from the C-D roadway and would continue across the southbound Columbia River bridge and end at the off-ramp to Marine Drive. The combined on-ramp from SR 14 westbound and C Street would merge into this auxiliary lane.

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

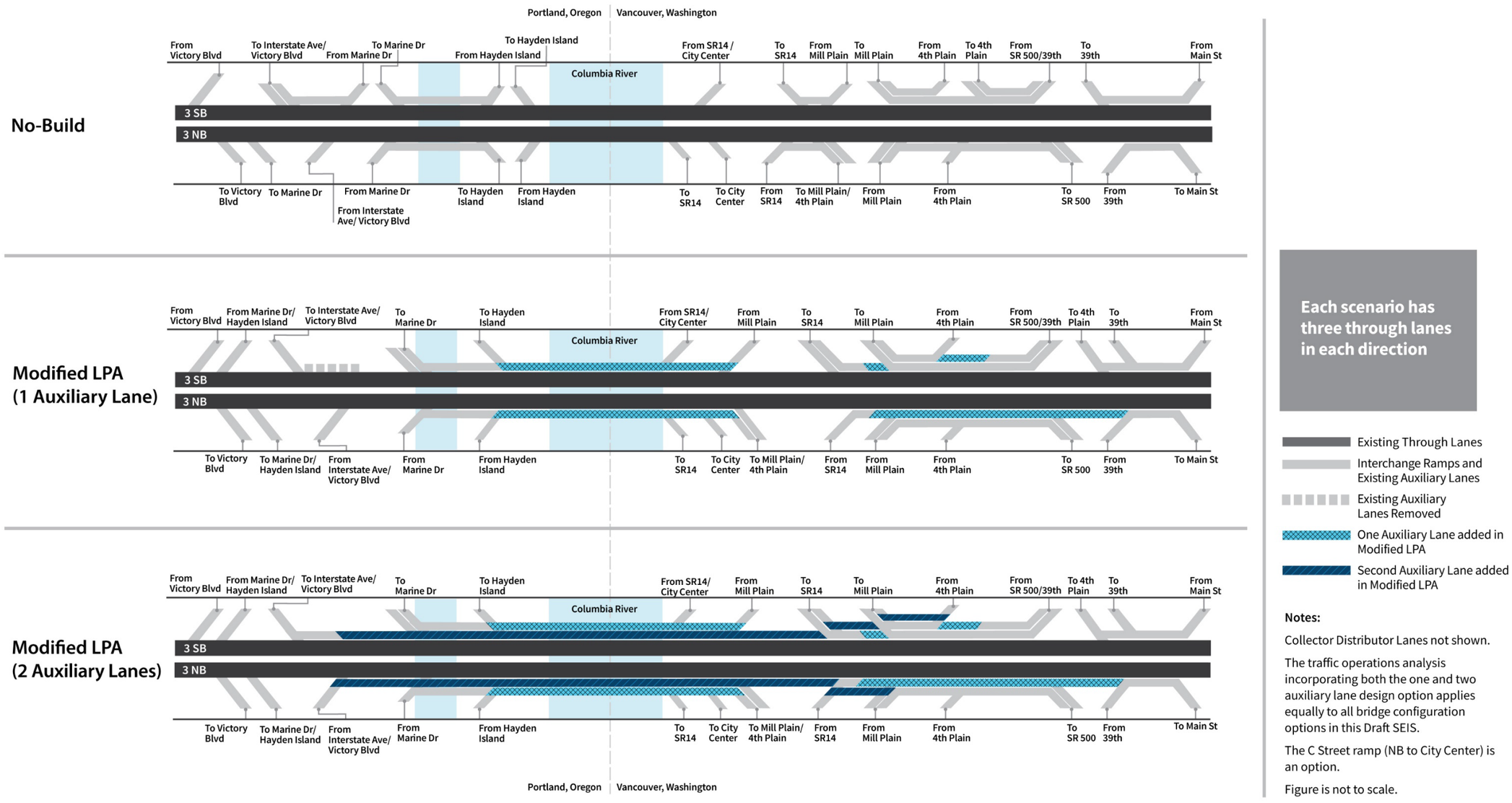
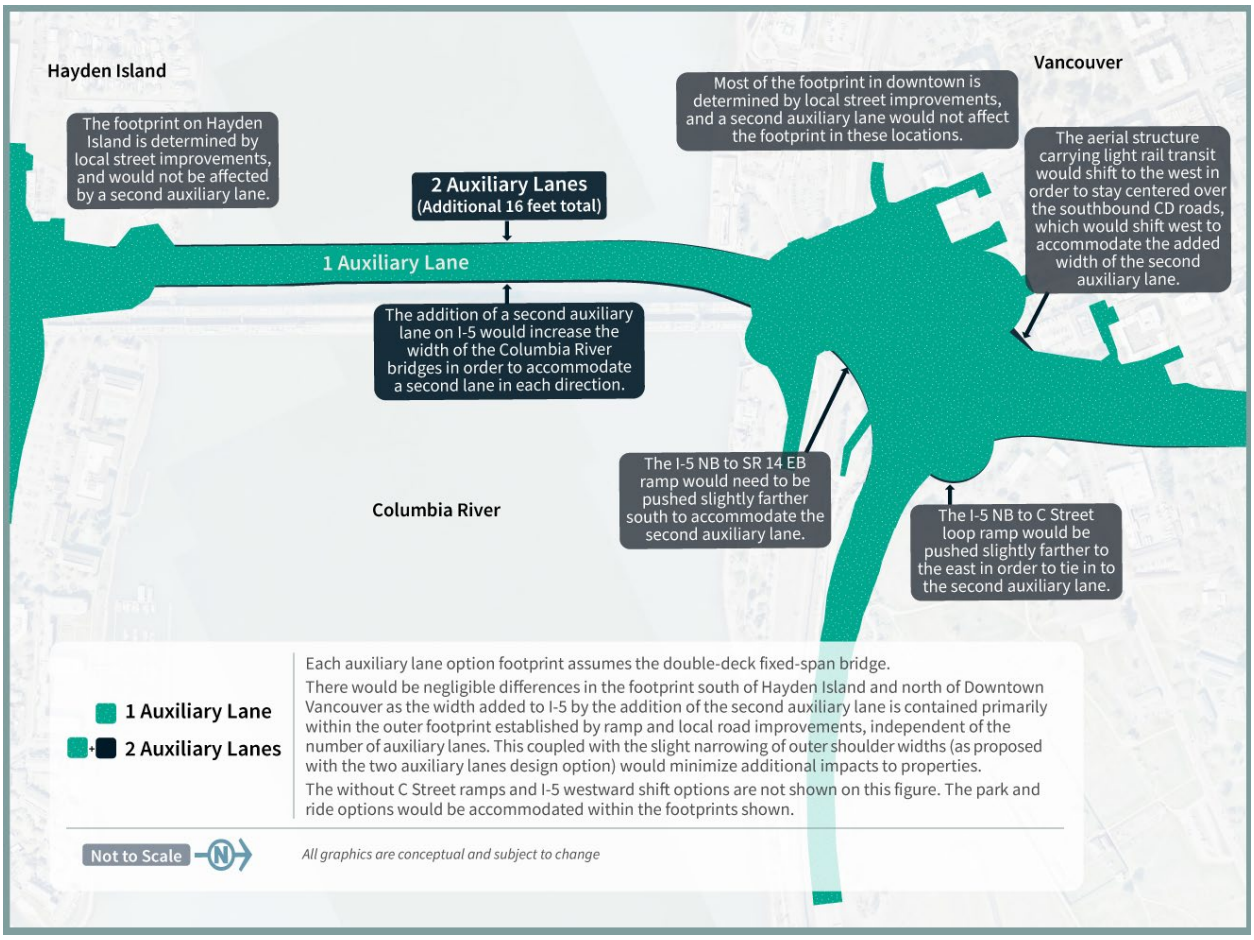


Figure 1-7. Auxiliary Lane Configuration Footprint Differences



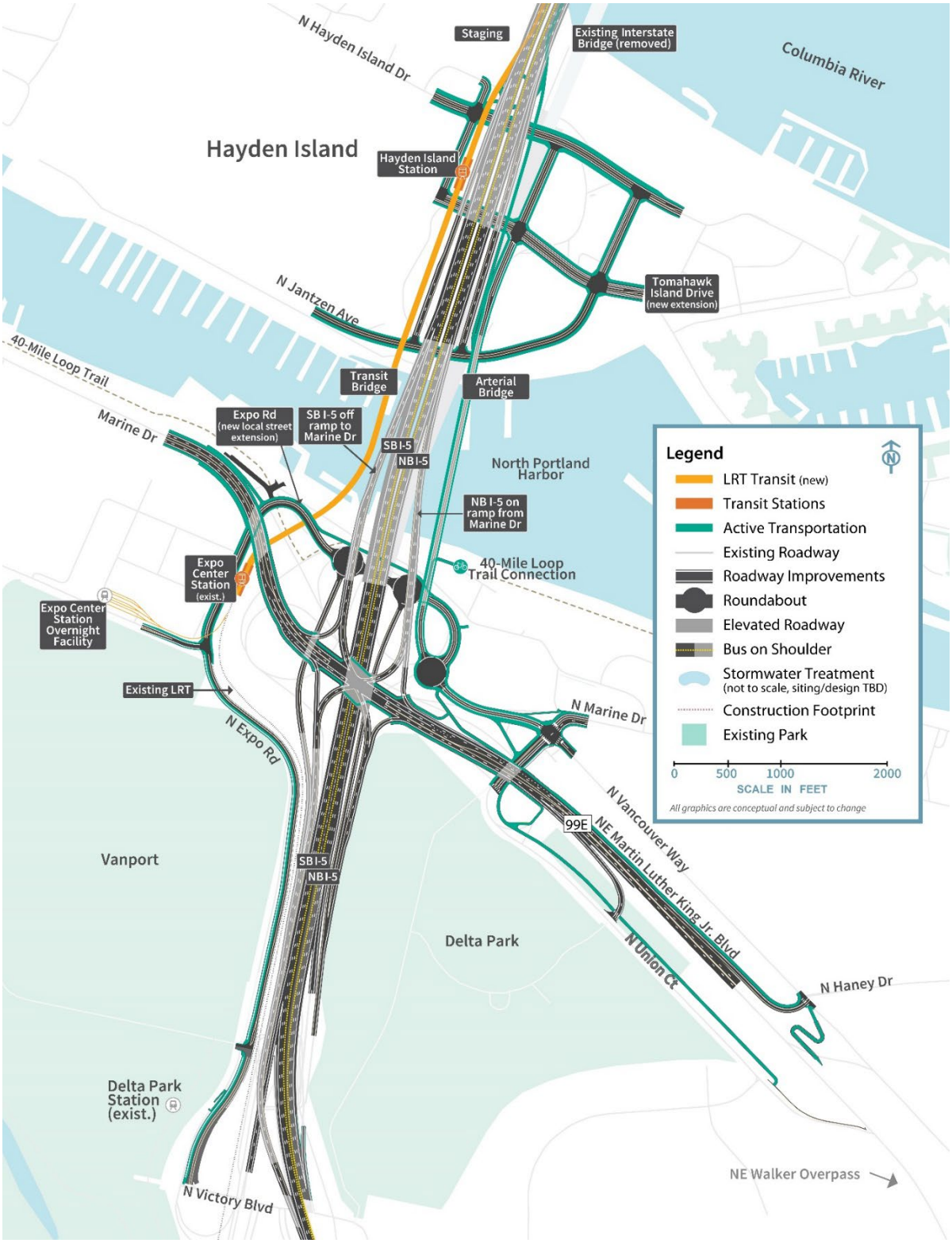
1.1.2 Portland Mainland and Hayden Island (Subarea A)

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:

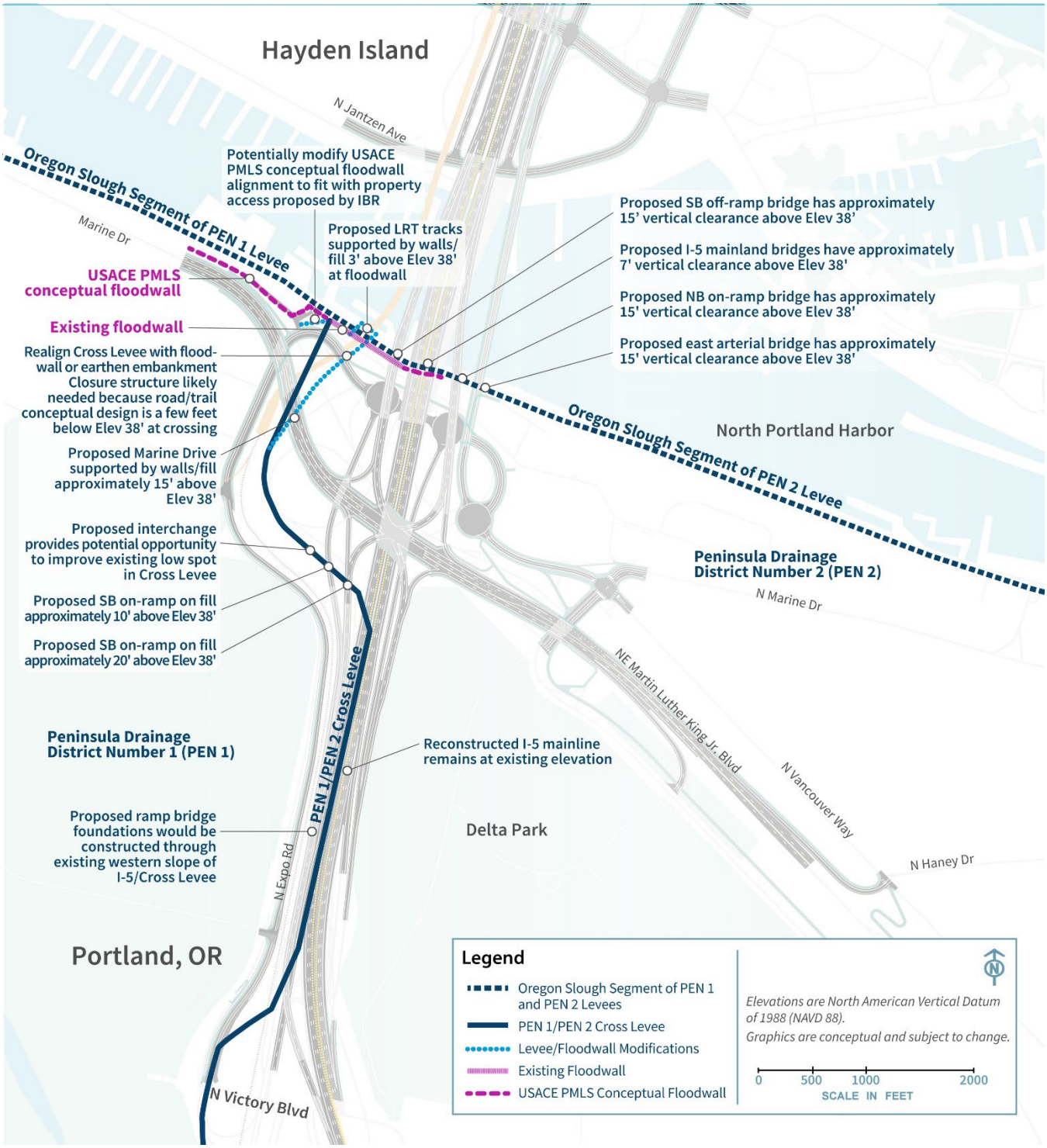
- The U.S. Army Corps of Engineers (USACE) Portland Metro Levee System (PMLS) project.
- The Flood Safe Columbia River (FSCR) program (also known as "Levee Ready Columbia").

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.

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

- 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.

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.

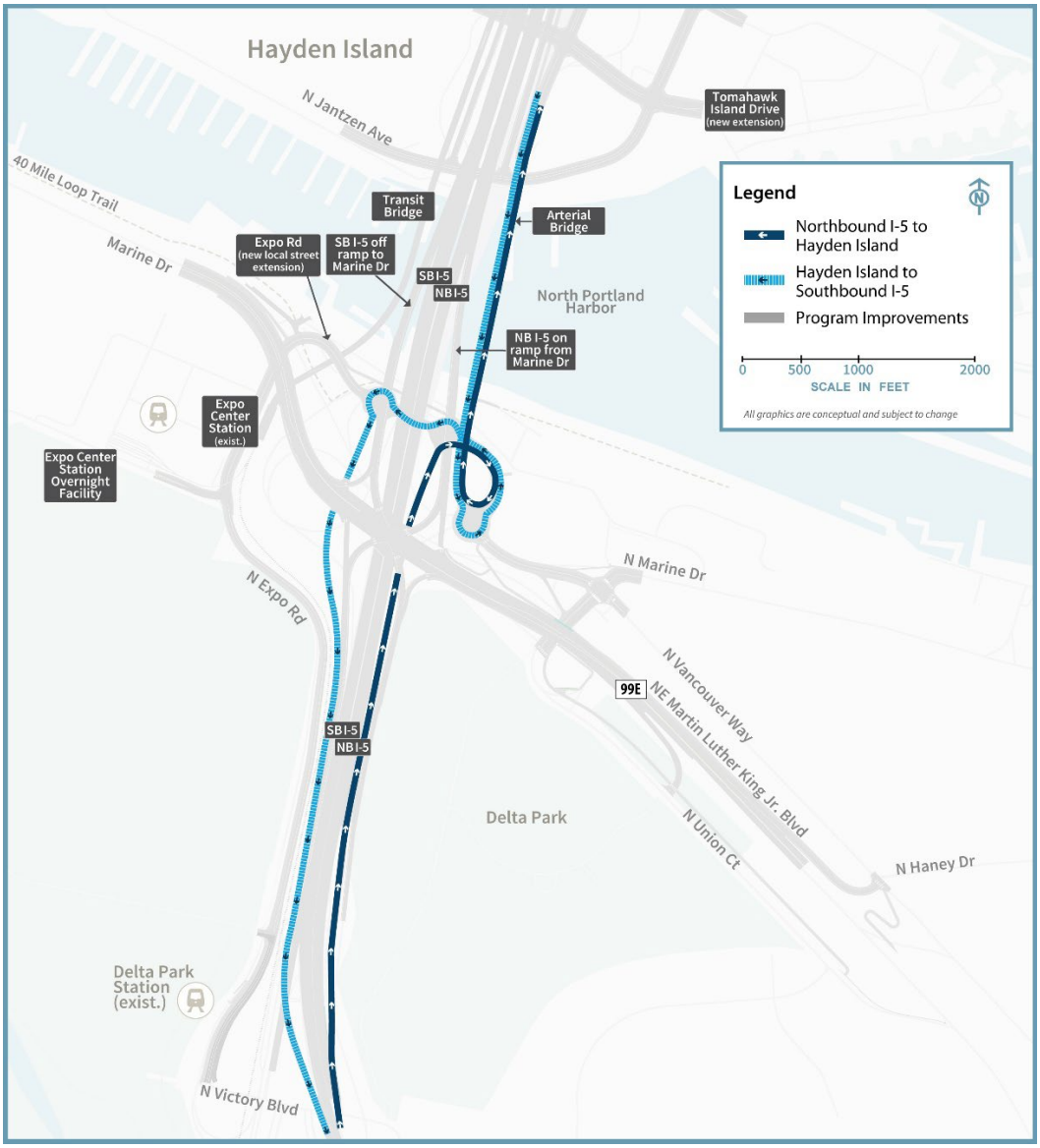
HAYDEN ISLAND INTERCHANGE AREA

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.

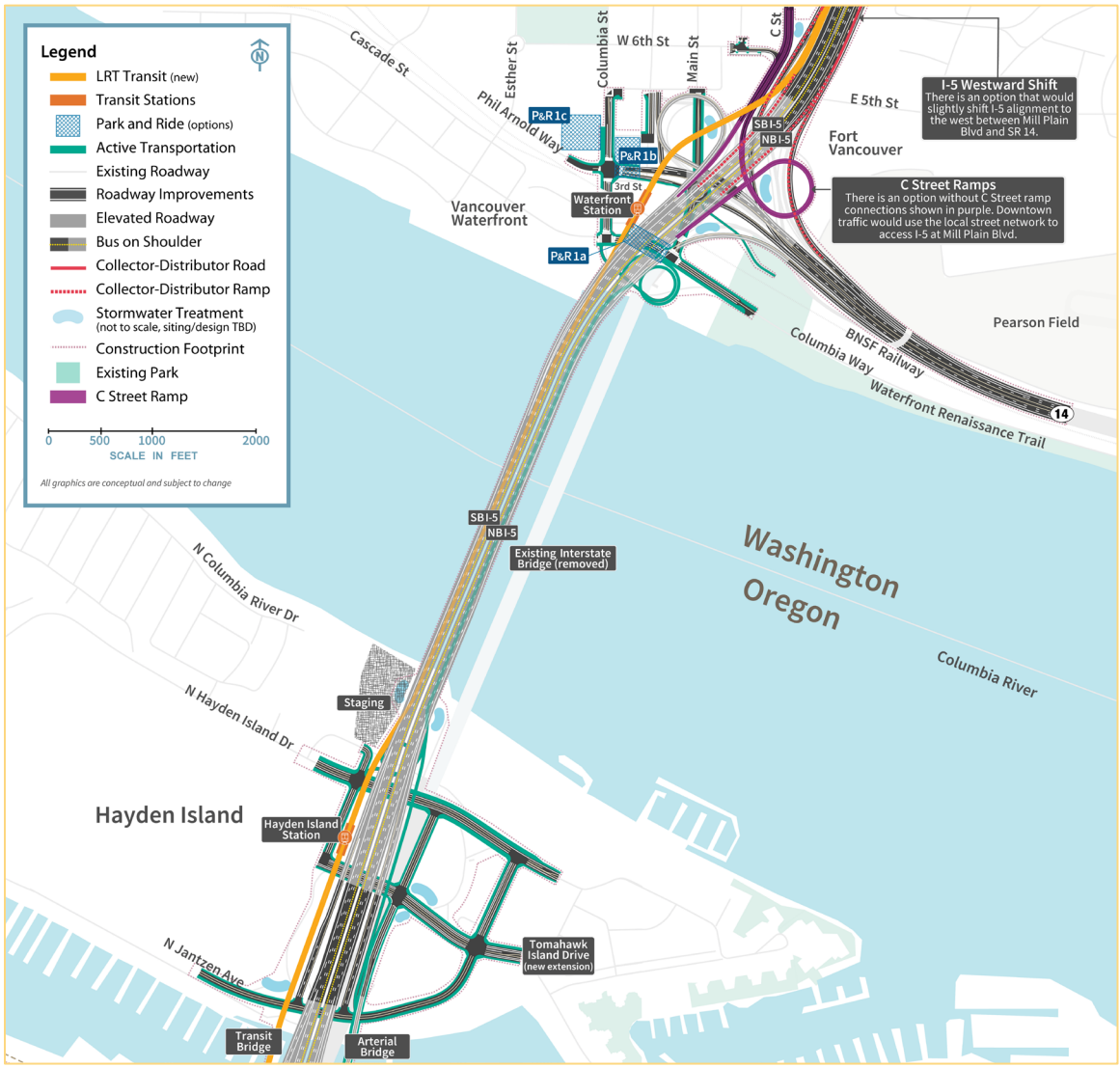
1.1.3 Columbia River Bridges (Subarea B)

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.

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.

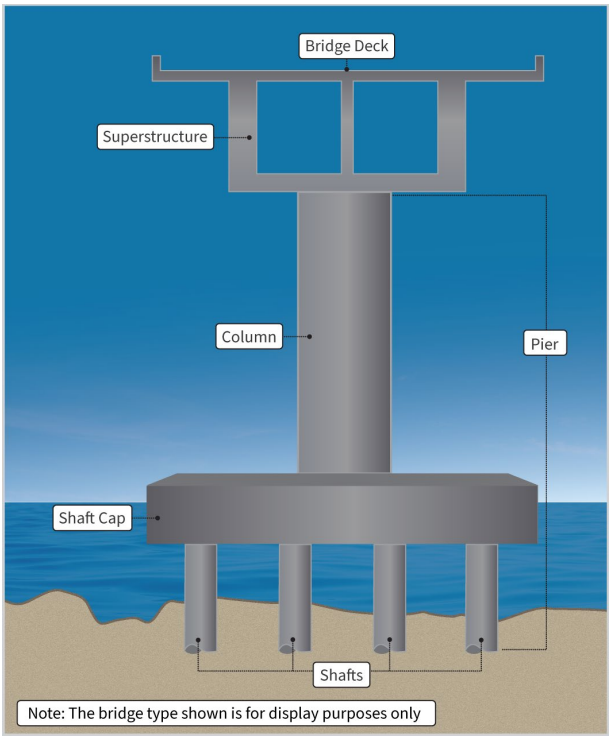
Figure 1-11. Columbia River Bridges (Subarea B)



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.

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).

Figure 1-12. Bridge Foundation Concept



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 vertical navigation clearance recommended for the

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

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

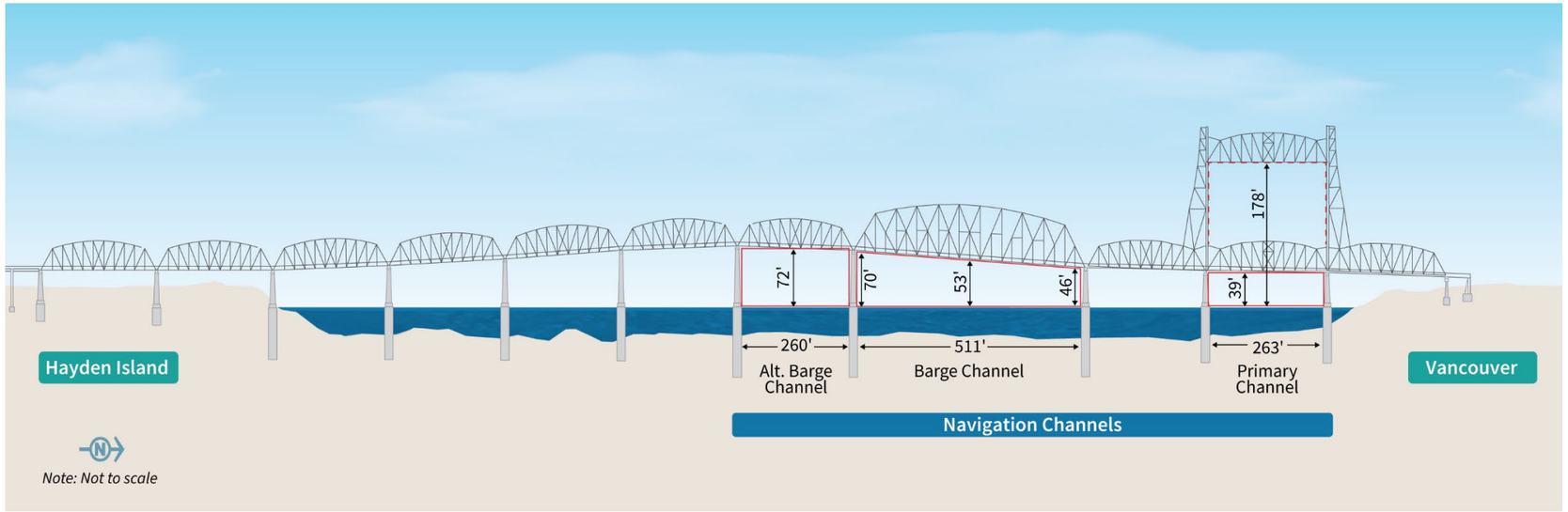
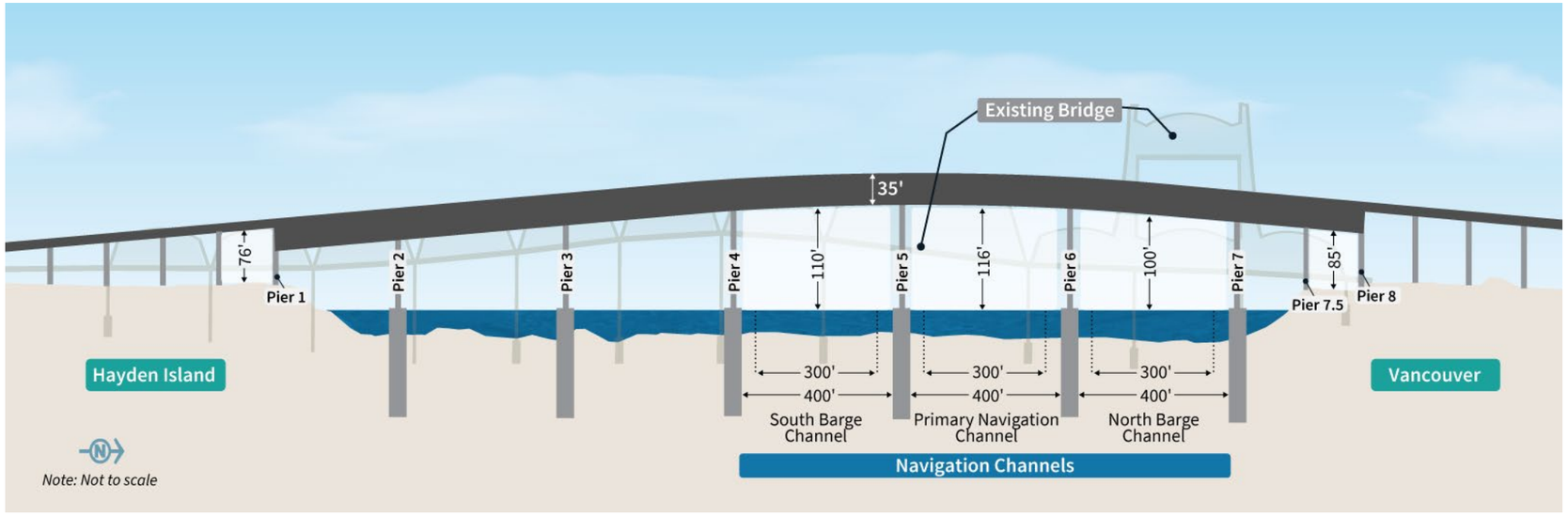


Figure 1-14. Profile and Navigation Clearances of the Proposed Modified LPA Columbia River Bridges with a Double-Deck Fixed-Span Configuration



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]

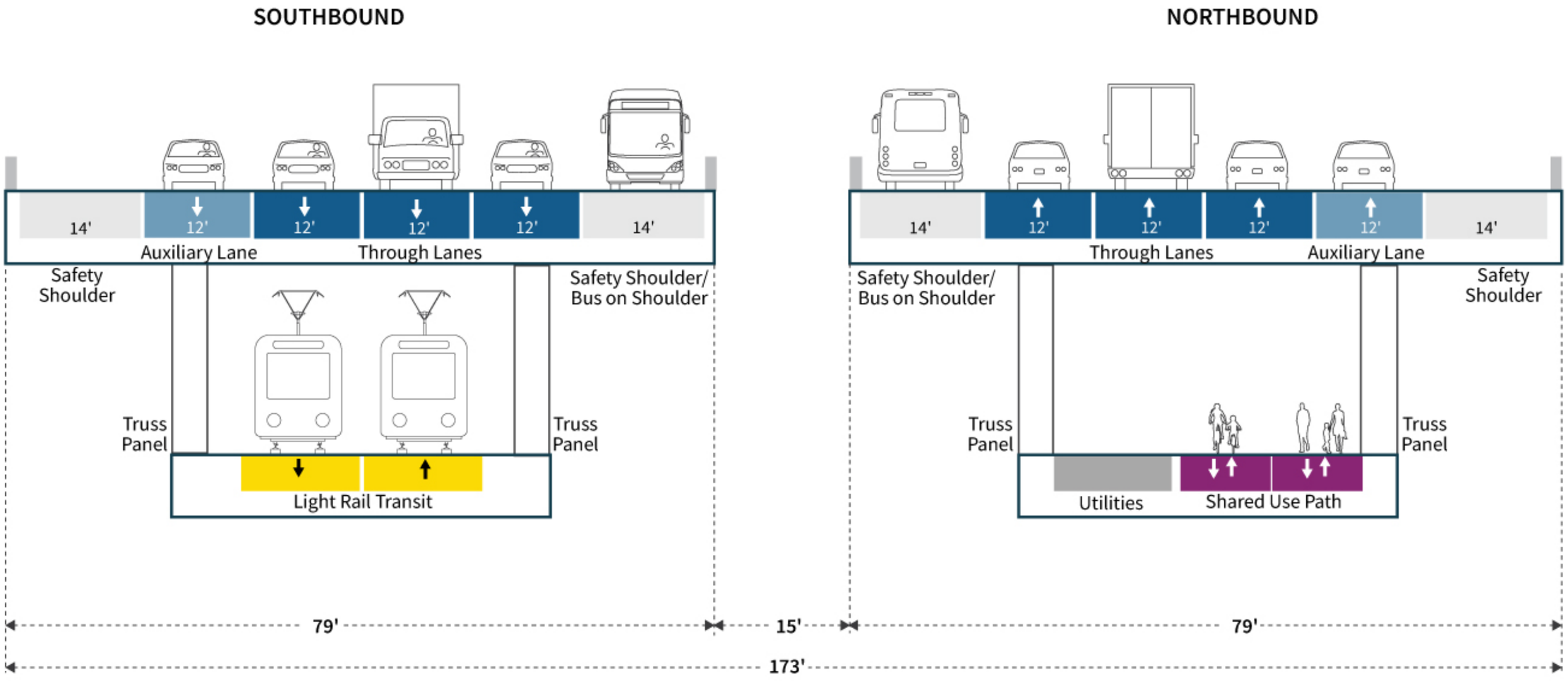
Figure 1-15. Conceptual Drawing of a Double-Deck Fixed-Span Configuration

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.

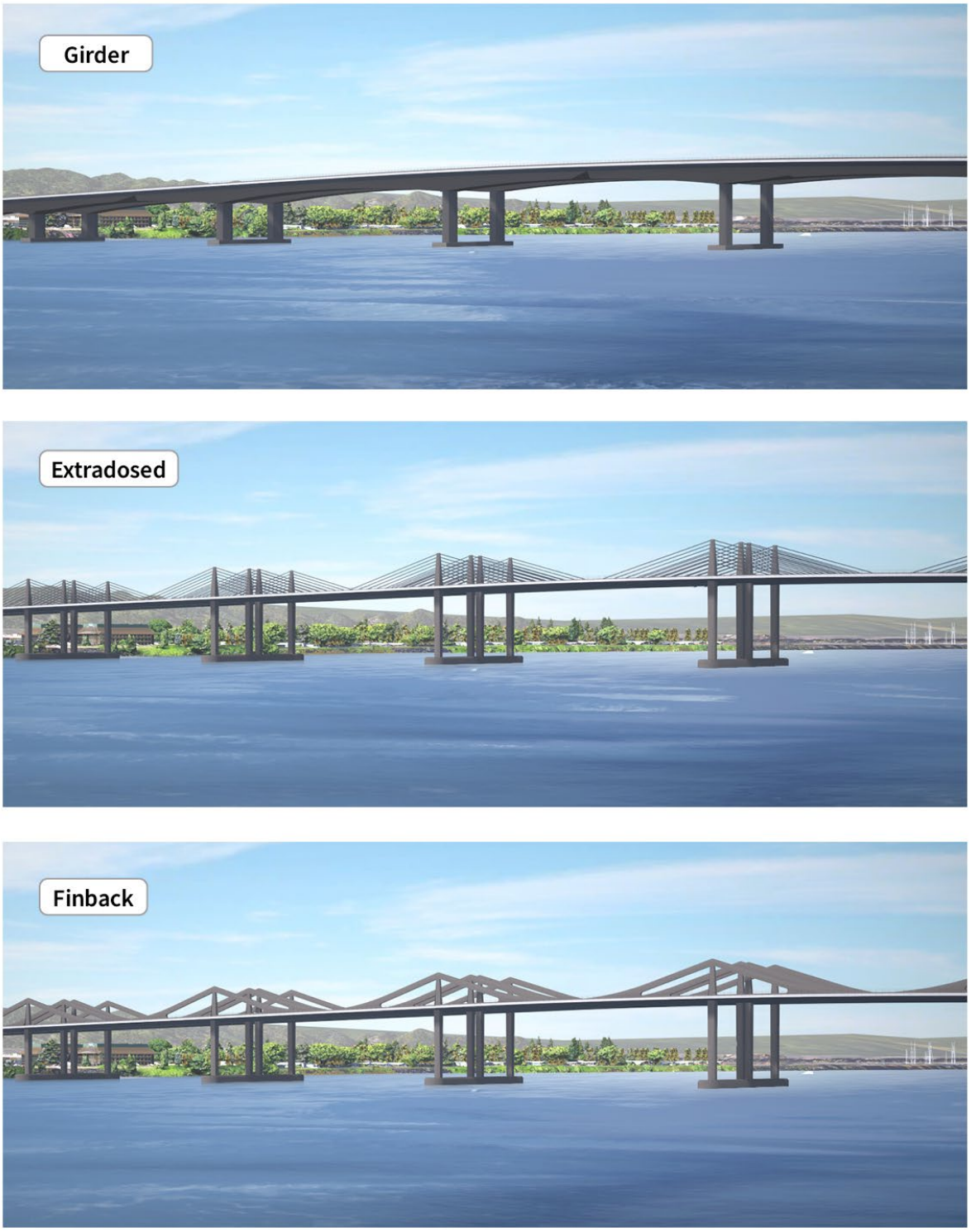
This configuration would provide 116 feet of vertical navigation clearance for river traffic using the primary navigation channel and 400 feet of horizontal navigation clearance at the primary navigation channel, as well as barge channels. This bridge height would not impede takeoffs and landings by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

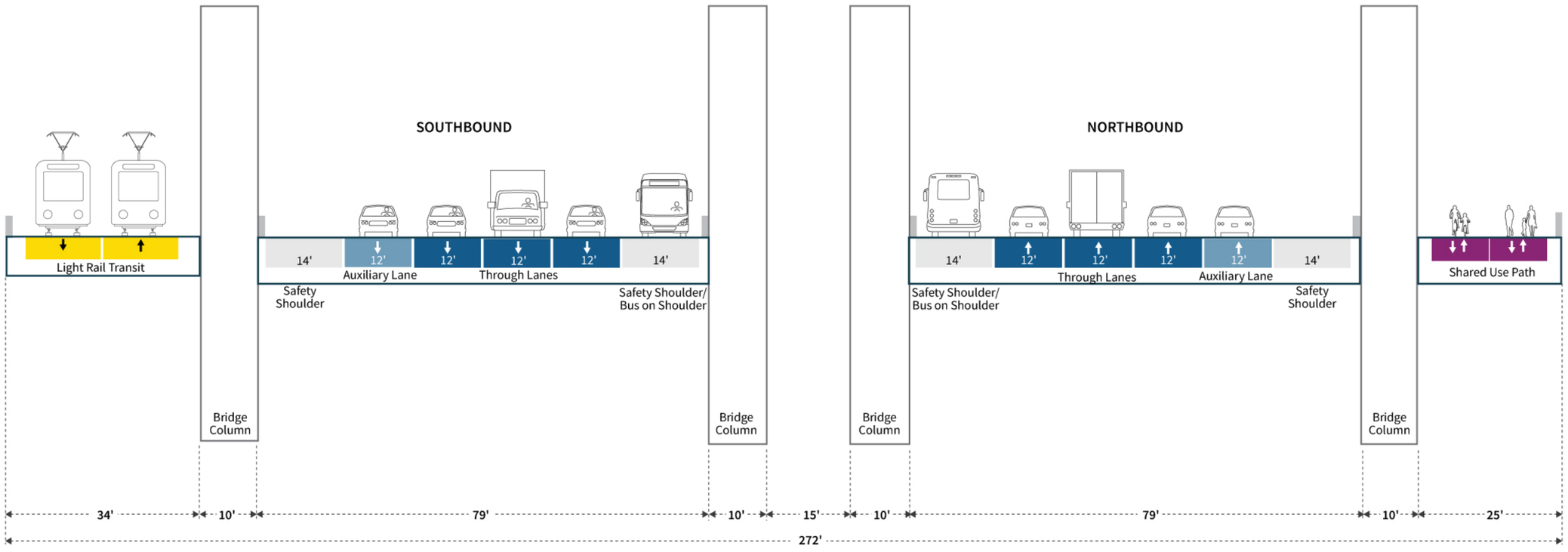
This bridge configuration would have a 3% maximum grade on both the Oregon and Washington sides of the bridge.

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.

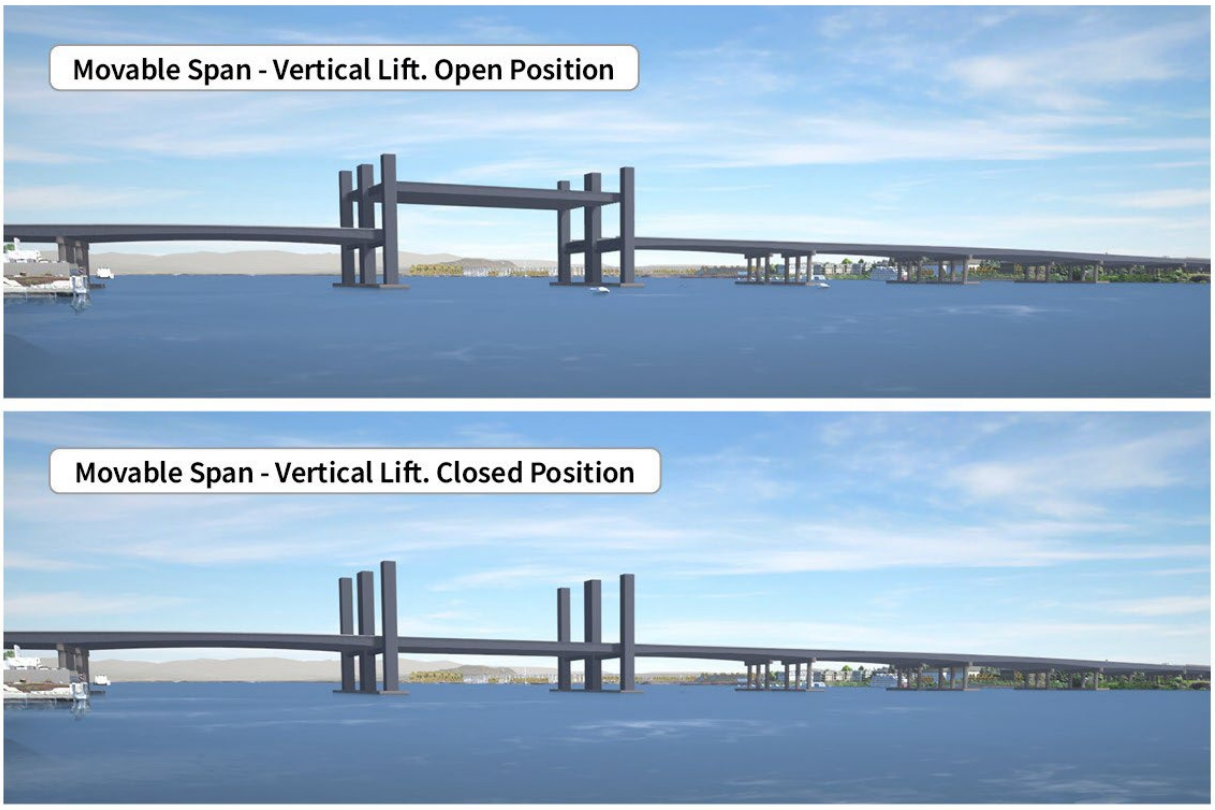
The vertical lift-span towers would be approximately 243 feet high; this is shorter than the existing lift-span towers, which are 247 feet high. This height of the vertical lift-span towers would not impede takeoffs and landings by aircraft using Portland International Airport. At Pearson Field, the 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.

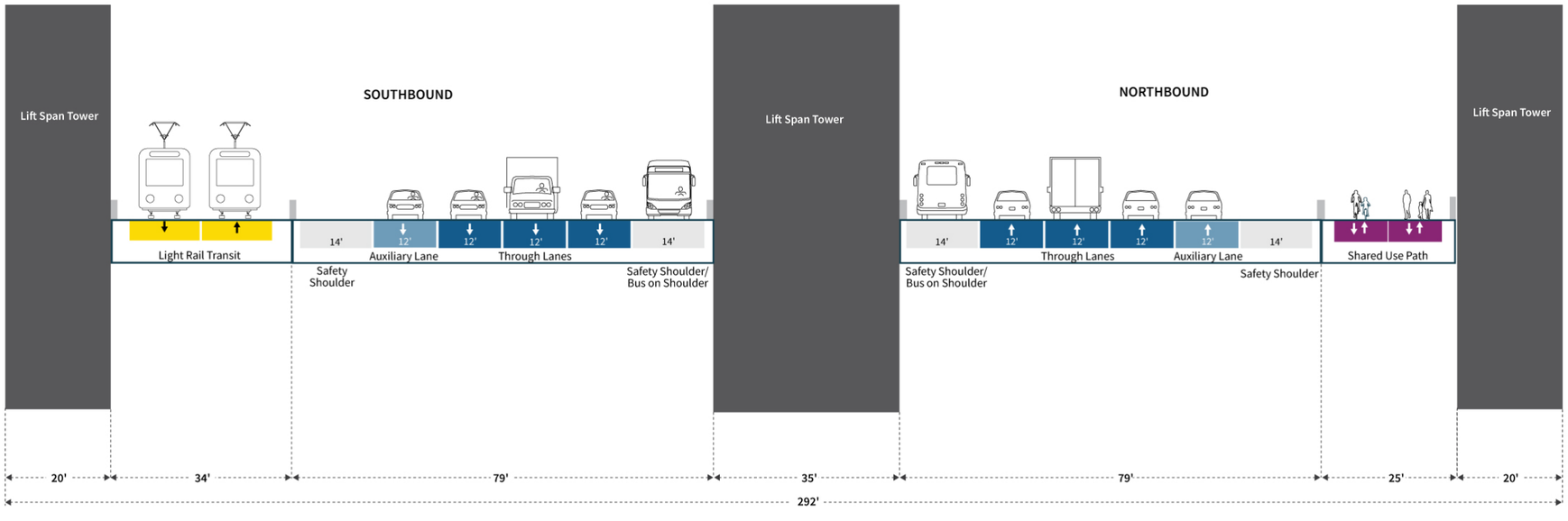
Figure 1-19. Conceptual Drawings of Single-Level Movable-Span Configurations in the Closed and Open Positions



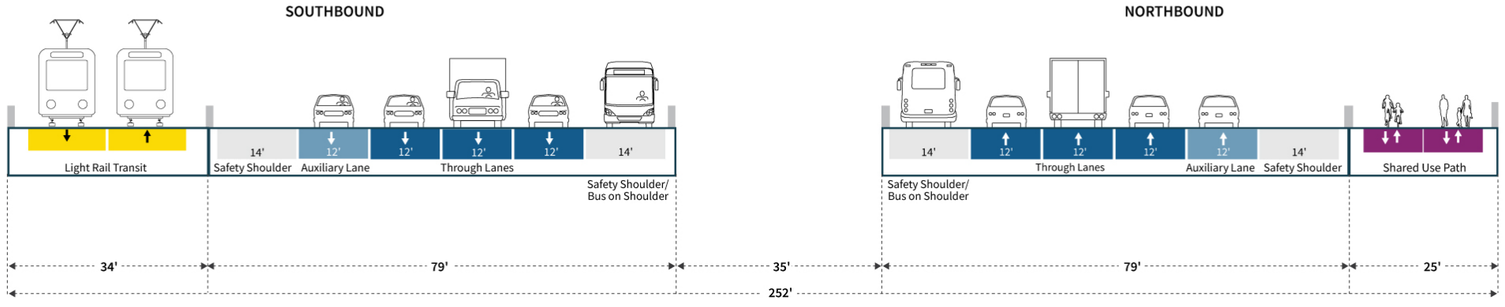
Note: Visualizations are for illustrative purposes only. They do not reflect property impacts or represent final design. Visualization is looking southeast (upstream) from Vancouver.

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.

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

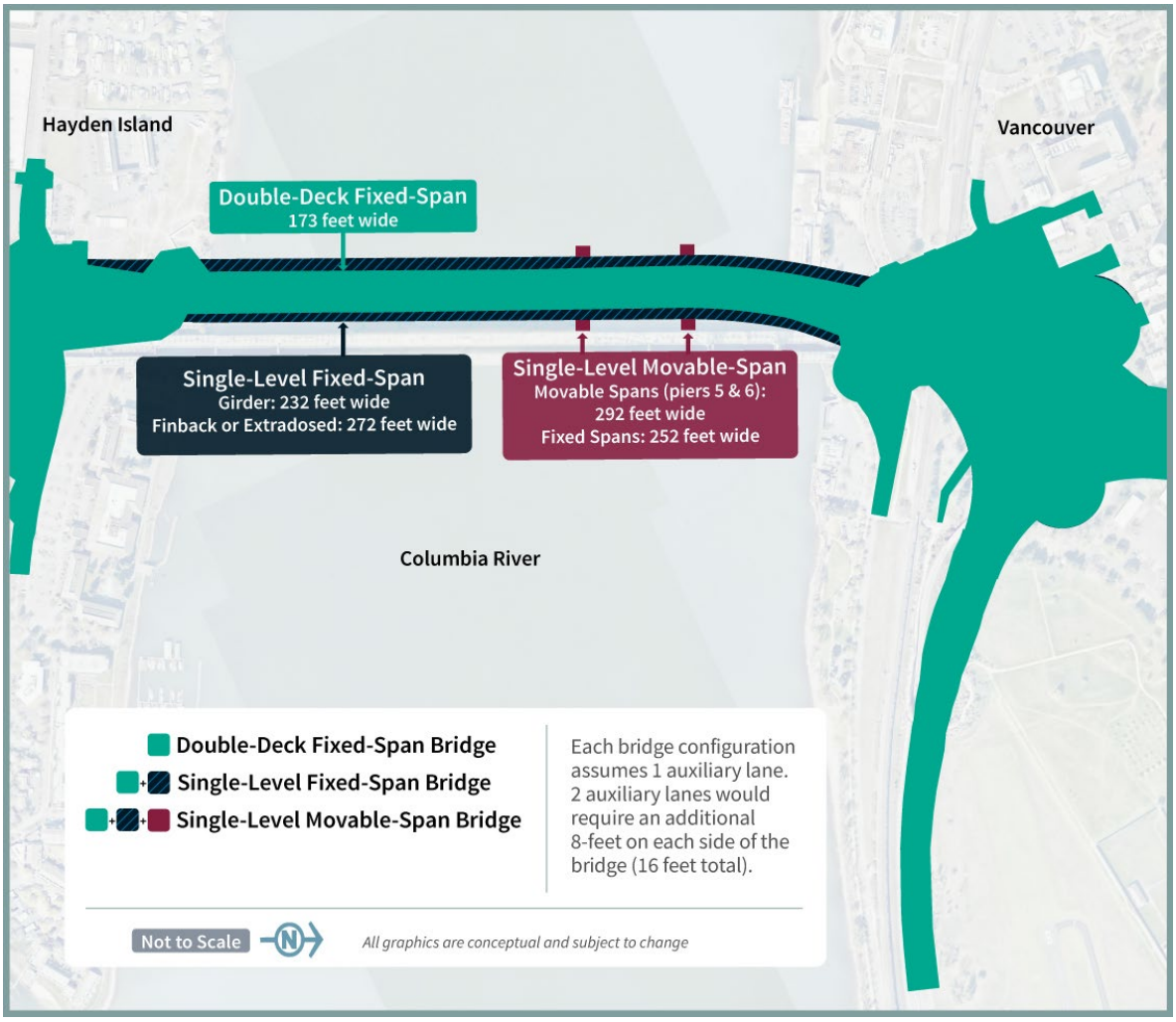


Figure 1-22. Bridge Configuration Profile Comparison

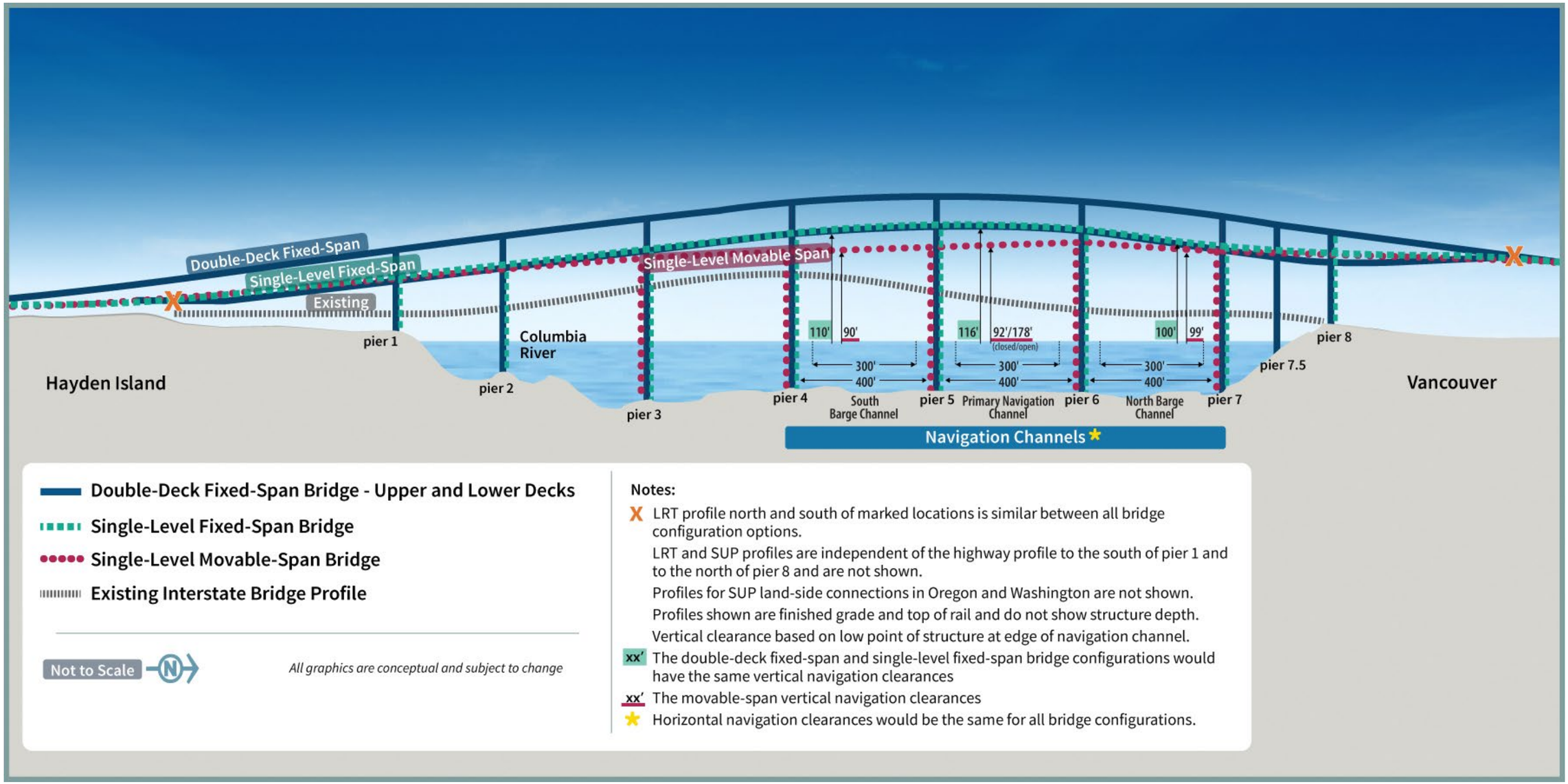


Table 1-2. Summary of Bridge Configurations

	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.
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).

	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
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.
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.

	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
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).

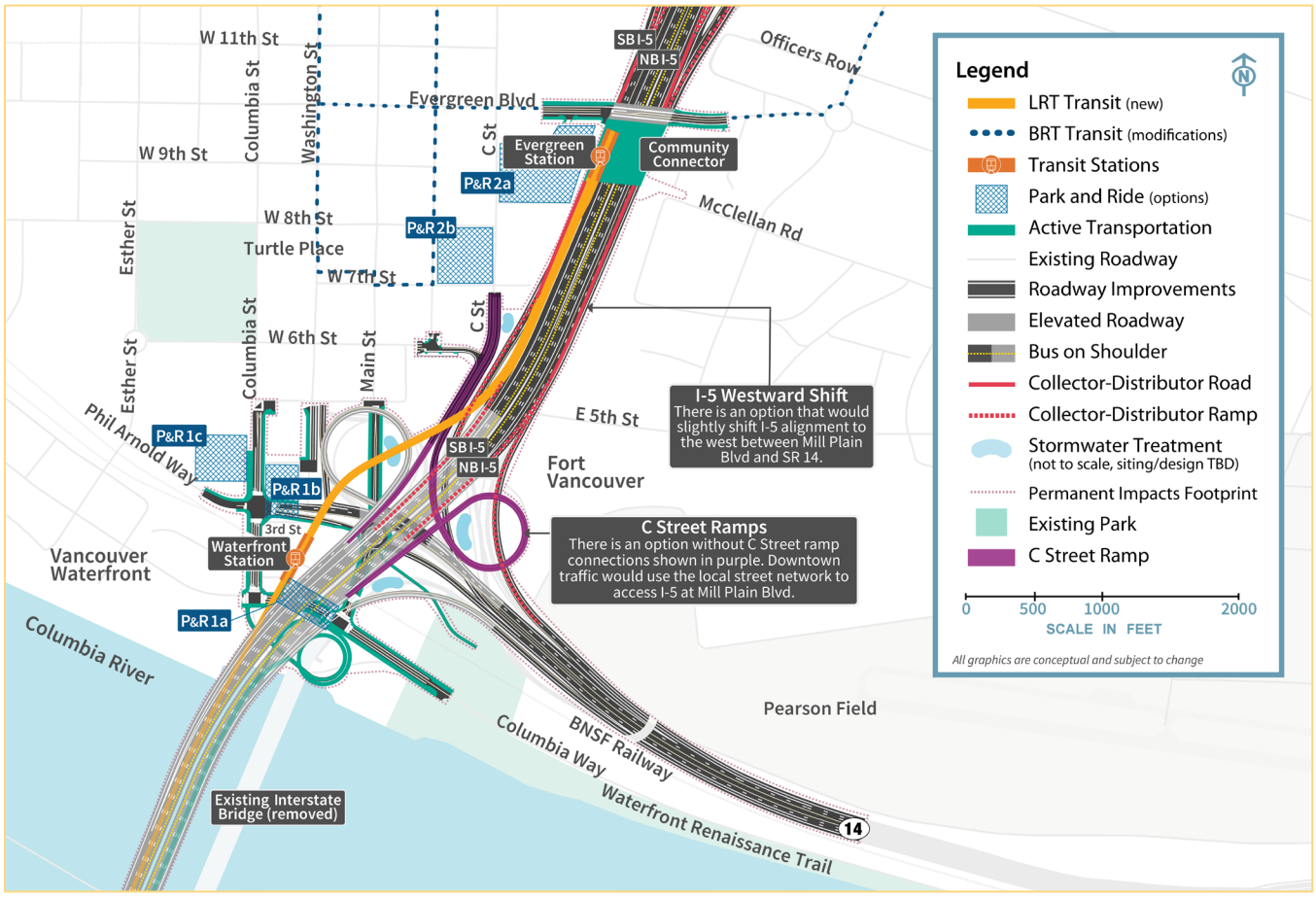
SR 14 INTERCHANGE

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.

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 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.

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.

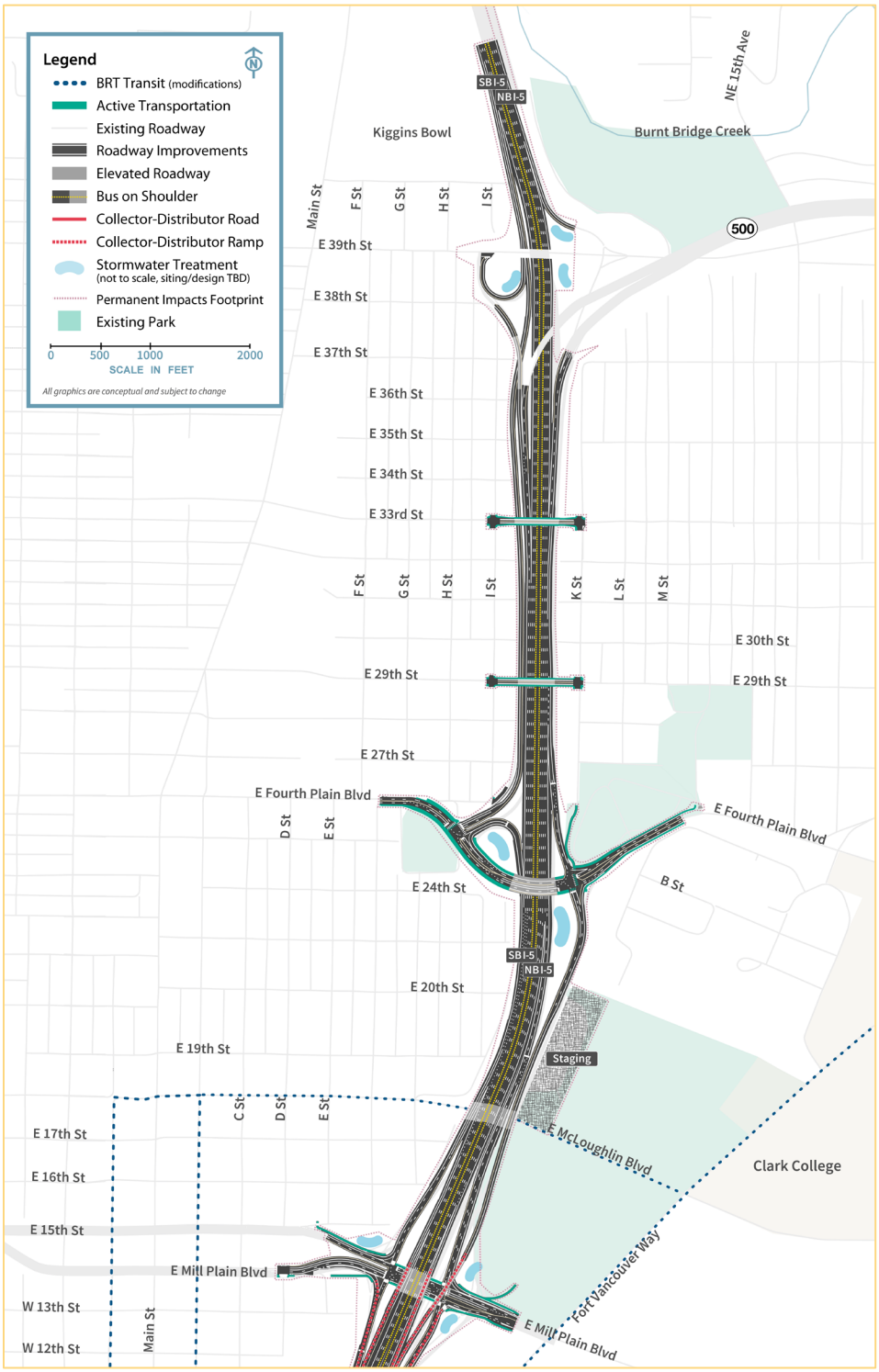
MILL PLAIN BOULEVARD INTERCHANGE

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.

Figure 1-24. Upper Vancouver (Subarea D)



BRT = bus rapid transit; TBD = to be determined

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.

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.

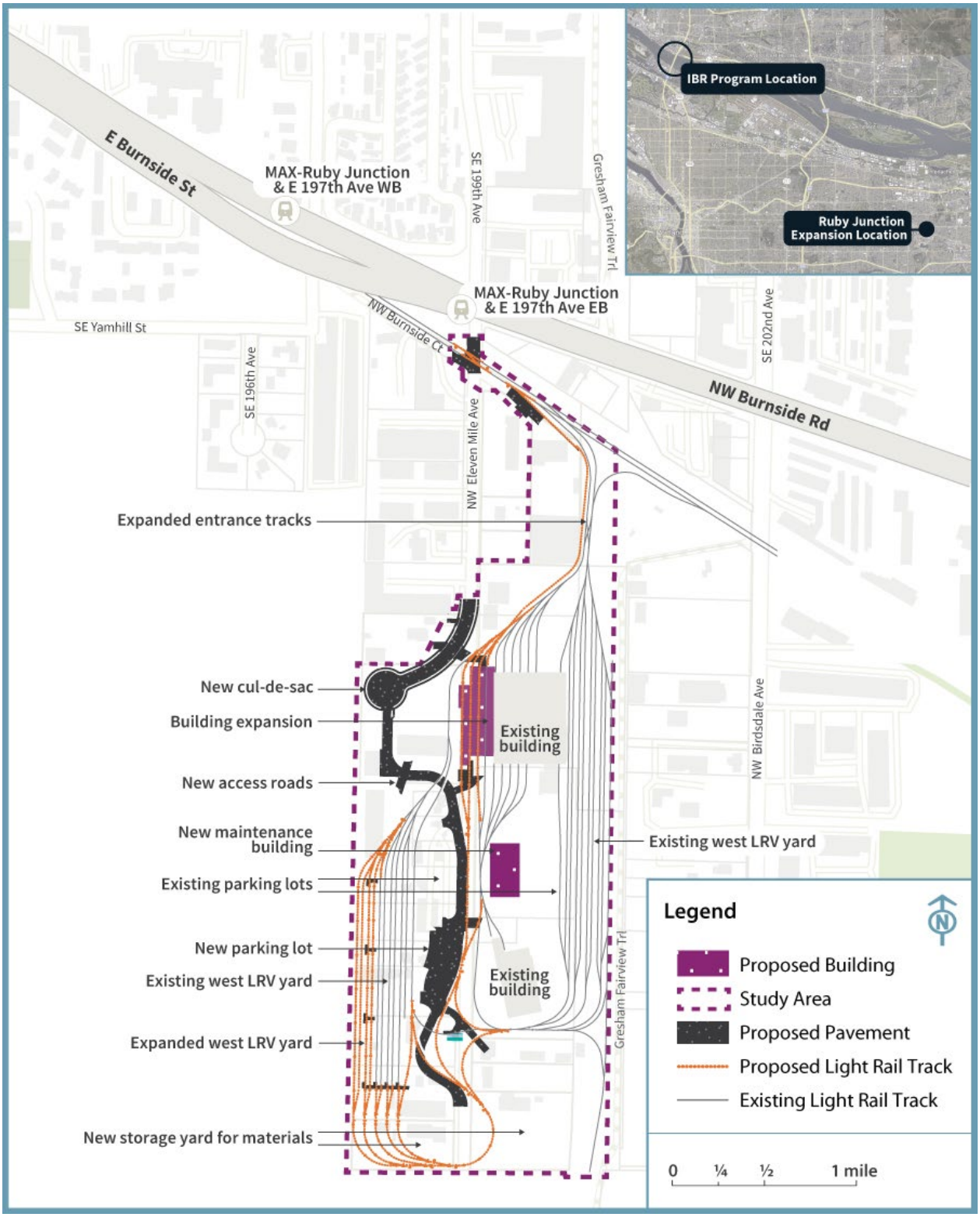
The existing LRV storage yard, west of Eleven Mile Avenue, would be expanded to the west to accommodate additional storage tracks and a runaround track (a track constructed to bypass congestion in the maintenance yard). This expansion would require partial demolition of an existing TriMet building (just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

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.

Figure 1-25. Ruby Junction Maintenance Facility Study Area



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

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.
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.

Bus Route	Existing Route	Changes with Modified LPA
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.

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.

- 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.

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 2018a) 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

2.1 Introduction

This chapter describes the methods used to support the IBR Program environmental evaluation. It outlines the approach to evaluate the beneficial and adverse impacts of the Modified LPA to public services.

This chapter 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 was designed to comply with NEPA and relevant federal, state and local laws. These methods are based on those developed for the CRC project, which completed the NEPA process with a signed Record of Decision (ROD) in 2011. NEPA reevaluations were completed in 2011 to address a change in Interstate Bridge height and in 2013 to address phasing of project construction. The CRC project was discontinued in 2014; the IBR Program is evaluating what changes in regulations, policy, and physical conditions have occurred since the completion of the ROD. The updated methods were used to evaluate the potential environmental impacts associated with the Modified LPA; the Modified LPA impacts are compared with the impacts disclosed in the CRC project ROD.

Public services include law enforcement, fire and emergency medical services (including hospitals), solid waste and recycling collection and disposal, federal post office service, public schools and school transportation, and cemeteries. Additional community resources such as libraries and childcare centers are discussed in the Neighborhoods and Populations Technical Report. Public transit, which is also a public service, is discussed in the Transportation Technical Report.

The methods used in this report have been updated for the IBR Program in the following ways:

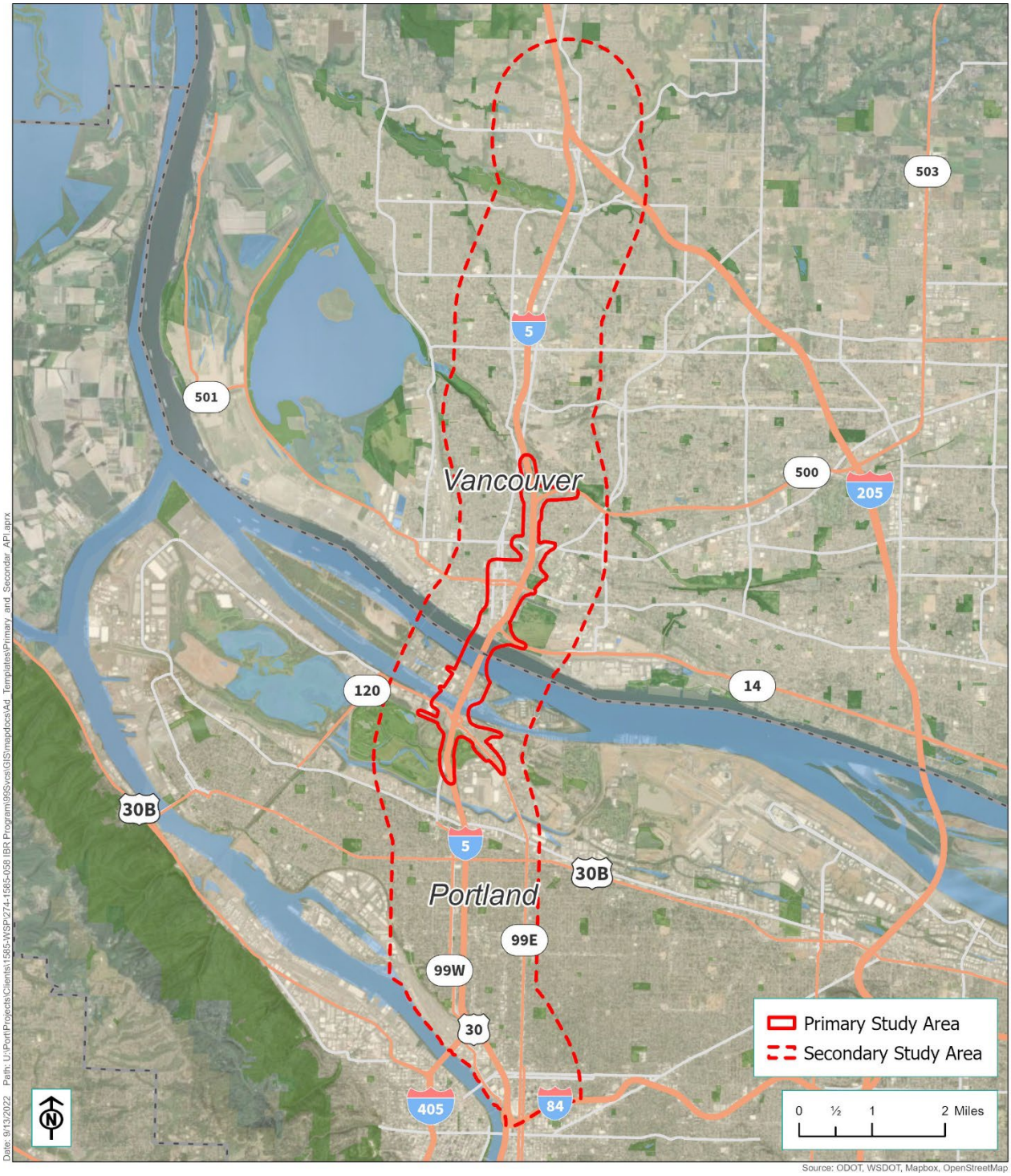
- Regulatory updates: federal, state, and local plans, policies, regulations and guidelines.
- Additional public services included per the WSDOT Environmental Manual (June 2022).
- Impacts assessment divided into long-term (operational) impacts and short-term (construction) impacts.

2.2 Study Area

The study area runs along a 5-mile segment of Interstate 5 (I-5), approximately between the State Route (SR) 500 interchange in Washington and the I-5/Columbia Boulevard interchange in Oregon. Most physical changes associated with the Modified LPA would occur in this area, though mitigation could still occur outside of it. Temporary construction easements would be established directly adjacent to the proposed construction areas, while larger staging areas and casting yards could be located upstream or downstream of the Interstate Bridge. The CRC LPA and the IBR Modified LPA also include expansion of the Ruby Junction Maintenance Facility in Gresham, Oregon.

This evaluation uses two study areas for environmental effects: the primary and secondary study areas. The primary study area addresses direct impacts, and the secondary study area addresses indirect impacts. IBR Program study areas are shown in Figure 2-1 and are described below.

Figure 2-1. Primary and Secondary Study Areas



2.2.1 Primary Study Area

The primary study area is the area most likely to experience direct impacts from construction and operation of the Modified LPA. Most physical and operational changes associated with the Modified LPA would occur in this area, though mitigation could still occur outside of it.

As currently defined, the primary study area extends about 5 miles from north to south. It starts north of the I-5/Main Street interchange in Washington and runs toward the I-5/Columbia Boulevard interchange in Oregon. North of the river, the study area expands west into downtown Vancouver and east near Clark College. Around the actual river crossing, the east and west sides each extend 0.25 mile from the I-5 right of way. South of the river crossing, this width narrows to 300 feet on each side.

2.2.2 Secondary Study Area

The secondary study area is the area analyzed for indirect impacts (e.g., traffic and development changes) that could occur as a result of the Modified LPA. This area, over 15 miles long, runs from a point approximately 1 mile north of the I-5/I-205 interchange south to the I-5/I-84 interchange. It also extends 1 mile on both the east and west sides of the I-5 right of way. These boundaries could change as traffic projections become available. Traffic projections will help determine the geographic extent of potential indirect impacts.

2.3 Relevant Laws and Regulations

2.3.1 Federal

- 49 Code of Federal Regulations Part 24, the Uniform Relocation Assistance and Real Property Acquisition Regulations for Federal and Federally Assisted Programs, Final Rule and Notice, issued by the U.S. Department of Transportation.
  - Applicable when public services properties are directly impacted by the Modified LPA.

2.3.2 Oregon

- Oregon Administrative Rule 660-015-0000(11), Oregon Statewide Planning Goal 11 (2005), Public Facilities and Services.
  - This rule requires local jurisdictions to develop community and public facilities plans.
- Oregon Revised Statutes (ORS) Chapter 459 (2019), Municipal Solid Waste Management.
  - This statute establishes the relationship and authorities of state and local governments with respect to solid waste management in Oregon, and it defines landfill permitting rules.
- ORS 327.043 (2019), When district required to provide transportation.
  - This statute defines the requirement for public school districts to provide students with transportation from their homes to public schools in Oregon.

- ORS 373.130 (2019), County use of city streets as bridge approach.
  - This statute states that whenever any county constructs a bridge across a stream that is wholly or in part within the limits of any city within the county, the county may use portions of any street of the city as approaches for the bridge, and that the power, dominion, and right of control over and to improve and maintain the portions of any street so used belong exclusively to the county.

2.3.3 City of Portland

2.3.3.1 Comprehensive Plan

- City of Portland, Bureau of Planning. 2035 Comprehensive Plan.
  - Chapter 8, Public Facilities and Services, establishes long-range goals and policies specific to public services.
  - Comprehensive Plan Goals and Policies guide Portland's population and employment growth through 2035. Goals listed in the plan that are applicable to public services are listed below.

COMPREHENSIVE PLAN GOALS

Goal 8.A – Quality public facilities and services

High-quality public facilities and services provide Portlanders with optimal levels of service throughout the city, based on system needs and community goals, and in compliance with regulatory mandates.

Goal 8.I – Public safety and emergency response

Portland is a safe, resilient and peaceful community where public safety, emergency response, and emergency management facilities and services are coordinated and able to effectively and efficiently meet community needs.

COMPREHENSIVE PLAN POLICIES

Policy 8.104 – Emergency preparedness, response, and recovery coordination

Coordinate land use plans and public facility investments between City bureaus, other public and jurisdictional agencies, businesses, community partners, and other emergency response providers, to ensure coordinated and comprehensive emergency and disaster risk reduction, preparedness, response and recovery.

Policy 8.105 – Emergency management facilities

Provide adequate public facilities—such as emergency coordination centers, communications infrastructure, and dispatch systems—to support emergency management, response and recovery.

Policy 8.106 – Police facilities

Improve and maintain police facilities to allow police personnel to efficiently and effectively respond to public safety needs and serve designated land uses.

Policy 8.107 – Community safety centers

Establish, coordinate and co-locate public safety and other community services in centers.

Policy 8.108 – Fire facilities

Improve and maintain fire facilities to serve designated land uses, ensure equitable and reliable response, and provide fire and life safety protection that meets or exceeds minimum established service levels.

Policy 8.109 – Mutual aid

Maintain mutual aid coordination with regional emergency response providers as appropriate to protect life and ensure safety.

Policy 8.110 – Community preparedness

Enhance community preparedness and capacity to prevent, withstand, and recover from emergencies and natural disasters through land use decisions and public facility investments.

Policy 8.111 – Continuity of operations

Maintain and enhance the City's ability to withstand and recover from natural disasters and human-made disruptions in order to minimize disruptions to public services.

Policy 8.112 – Waste management

Ensure land use programs, right of way regulations, and public facility investments allow the City to manage waste effectively and prioritize waste management in the following order: waste reduction, recycling, anaerobic digestion, composting, energy recovery, and then landfill.

Policy 8.118 – Schools as emergency aid centers

Encourage the use of seismically safe school facilities as gathering and aid-distribution locations during natural disasters and other emergencies.

2.3.3.2 Other Relevant City Laws and Regulations

- Central City 2035, Central City Plan District, Policy 6.1.c: Retrofitting.
  - This policy encourages the retrofitting of buildings and infrastructure to withstand natural hazards and recognizes the Burnside Bridge as the regionally designated priority.
- City of Portland, Portland Fire & Rescue. Strategic Plan/Coggle 2017–2020.
  - This plan establishes long-range operating goals and service standards used to evaluate impacts on facilities and response times.

- City of Portland, Portland Police Bureau. 2007–2012 Community Policing Strategic Plan.
  - This plan establishes long-range goals, strategies, and service standards used to evaluate programs and approaches to minimize public safety concerns.

2.3.4 Washington

- Revised Code of Washington (RCW). 1991. "Identification of lands useful for public purposes." RCW 36.70A.150.
  - This regulation establishes that each jurisdiction must identify lands useful for public purposes and essential public facilities such as airports, educational facilities, utility and transportation corridors, correctional facilities, solid waste handling facilities, in-patient facilities, and recreational facilities. This information will be used to help identify whether the Modified LPA would impact future demand or facilities for public services.
- Washington Administrative Code (WAC). 2016. "Transportation - Operation Rules." WAC 392-141-310. Olympia, WA.
  - This regulation governs the provision of transportation to and from public schools in Washington. It will be used to evaluate potential impacts on school districts due to a change in facility location.
- WAC. 1988. "Minimum Functional Standards for Solid Waste Handling." WAC 173-304.
  - This regulation provides requirements for siting, operation, permitting, and management of solid waste facilities in Washington. This information will be used to help identify whether the Modified LPA would impact future demand or facilities for public services.
- WSDOT Environmental Manual, June 2022.
  - Chapter 458.04 (3): Social and Community Effects, Public Services and Utilities – establishes guidelines for the analysis of transportation projects and improvements impacts on public services and utilities.

2.3.5 Clark County

- Clark County, 2015–2035 Comprehensive Plan, amended 2020. Vancouver, Washington.
  - Chapter 6, Capital Facilities and Utilities Element, identifies future growth needs for public services that will be used to evaluate impacts on potential future facilities and demand for public services.
  - Chapter 10, School Element, identifies the need for safe and reliable transportation.

2.3.6 City of Vancouver

- City of Vancouver, Long Range Planning. 2011–2030. City of Vancouver Comprehensive Plan.
  - Chapter 5, Public Facilities and Services, establishes service standards and future growth plans for many public services, including fire and emergency, police, solid waste, and public schools. These existing standards will be used to evaluate impacts on facilities and response times.

- Vancouver Fire Rescue Services. Strategic Plan 2019–2021.
  - Strategic Initiative A.3. Develop and implement strategies to reduce response times. The goal is to improve public safety by reducing response times.

2.4 Effects Guidelines

The IBR Program team evaluated the degree to which the Modified LPA would affect the provision of and access to public services. The evaluation considered both long-term and short-term (temporary) impacts. Because there are no regulatory guidelines to frame the assessment of these impacts, it is based on public service provider industry standards, or adopted strategic plans and goals.

The following two overall questions guided the effects analysis:

- Will the long-term use and operation of the Modified LPA affect existing or planned future facilities or provision of services provided by public services? These effects are described in the analysis as "Modified LPA Physical Impacts."
- Will the construction activities of the Modified LPA affect facilities or provision of services provided by public services? These effects are described in the analysis as "Modified LPA Operational Impacts."

This evaluation considers the following specific questions for each public service discussed below. Other community services and facilities, such as churches, child care facilities, and community centers, are addressed in the Neighborhoods and Populations Technical Report.

2.4.1 Law Enforcement and Fire and Emergency Medical Services

- After the completion of the Modified LPA, will fire and emergency medical response and law enforcement teams be able to reach accident or crime scenes as quickly as they would if no new crossing were built?
- Will detours or increased traffic during the construction of the Modified LPA prevent the use of critical access routes such that service is detrimentally delayed?
- Will induced growth, as described in the Land Use Technical Report, exceed growth planned for by these services? If so, will the induced growth require additional services?

2.4.2 Hospitals, Nursing Homes, Medical and Dental Clinics

- During the construction of the Modified LPA, will the transportation or facilities associated with hospitals, nursing homes, or medical and dental clinics be detrimentally affected? Will any facilities need to relocate?
- Will induced growth, as described in the Land Use Technical Report, exceed growth planned for by these services? If so, will the induced growth require additional services?

2.4.3 Public Schools and School Transportation

- After the completion of the Modified LPA, will school districts be able to collect and deliver students using the same major routes they would use without a new crossing? If a school

location is affected (e.g., sidewalks leading to a school are changed, or an intersection used by students is altered to remove the pedestrian crossing), would more or fewer students need to be bused to school?

- Will detours or increased traffic during construction of the proposed Modified LPA prevent the use of major routes such that service is detrimentally delayed, or additional students must be temporarily bused to school? For example, if roadways previously used by students walking to school would be made unsuitable for pedestrians during construction, then those students could need to be bused by the school district.
- Will induced growth, as described in the Land Use Technical Report, exceed growth planned for by school services? If so, will the induced growth require additional services?

2.4.4 Government Offices

- After the completion of the Modified LPA, will the transportation or facilities associated with government offices be detrimentally affected? Will any facilities need to relocate?

2.4.5 Cemeteries

- Will any cemeteries or direct access to cemeteries be displaced by the construction of the Modified LPA?

2.4.6 Postal Service and Solid Waste

- After the completion of the proposed Modified LPA, will the transportation or facilities associated with the U.S. Postal Service or municipal solid waste service be detrimentally affected? Will any facilities need to relocate, or will bulk transportation routes need to be shifted to new routes?
- Will detours or increased traffic during the construction of the Modified LPA prevent the use of or access to U.S. Postal Service distribution centers or solid waste disposal or transfer facilities?

2.5 Data Collection Methods

Data for each public service (within the primary study area) were gathered and analyzed. Where the facilities or key routes exist only within the secondary study area, data were collected within the secondary study area.

To answer the questions posed in this analysis, the Program team collected information from:

- Existing facility and operations reports.
- Available maps for route information.
- Interviews with representatives from public services.

Coordination with public service agencies was conducted primarily by telephone and electronic communication. The following agencies were contacted:

- City of Portland
- City of Vancouver
- City of Vancouver Public Works
- Portland Fire & Rescue
- Vancouver Fire Department
- Clark County Fire Marshal's Office
- Clark County Sheriff
- Portland Police Bureau
- Vancouver Police Department
- Oregon State Police
- Washington State Patrol

When needed, the team made site visits to public services facilities to confirm or refine collected information. To help ensure collaboration and consistency between analyses, in addition to direct data collection, coordination occurred with the analyses for other IBR Program technical reports including the Neighborhoods and Populations, Land Use, Parks and Recreation, Transportation, Acquisitions, and Noise and Vibration Technical Reports. The following information has been gathered from these analyses:

- Neighborhoods and Populations – School and other public facility impacts.
- Land Use – Population, development forecasts, and induced growth.
- Parks and Recreation – Details about construction mitigation for parks or recreation areas associated with schools.
- Transportation – Intersection level of service (LOS), travel time changes, traffic delay, and access changes.
- Acquisitions – Details of any facility displacements.
- Noise and Vibration – Details about increased noise at schools and other sensitive outdoor public service locations.

Existing reports and maps provided the basic understanding of how public services function within the primary and secondary study areas. Interviews with public services representatives provided the additional knowledge necessary to answer the key questions posed above. Program staff evaluated land identified for potential future use as public service facility sites within the primary study area to determine if any direct impacts on these sites would occur.

See the Neighborhoods and Populations Technical Report for information on how the public would access fixed locations of these public services—for example, whether a facility would be separated from the neighborhood or parts of the neighborhood it currently serves.

2.6 Analysis Methods

The following methods were employed to measure impacts to public services.

2.6.1 Long-Term Operational Impacts Approach

The Modified LPA was evaluated to determine long-term effects on the movement and efficiency of public services by reviewing:

- Displacement of facilities or planned future facility sites.
- Traffic movement restrictions (e.g., closed roads, turning restrictions, one-way designations, or new median barriers).
- Levels of traffic congestion, intersection performance ratings, and potential interference with movement of emergency service vehicles.

The Program team evaluated LOS and delay time for intersections considered critical access routes by the services and relied on the results of traffic modeling analysis to evaluate the Modified LPA. Emergency service vehicles use vehicle recognition signal priority technology at various intersections throughout the Portland-Vancouver metropolitan area and can pass through intersections against the signal if all other vehicles can move aside (Lawson 2023; Leek 2023). The use of signal priority technology and emergency service right of way affects passage through intersections. Thus, although LOS and delay time analysis is useful in predicting overall impacts to services, it is less accurate in predicting specific effects on emergency transportation. In some instances, an intersection may be physically constrained by the Program's actions such that other vehicles cannot move out of the way during an emergency. Therefore, in addition to reviewing LOS and delay times at the intersections analyzed for the Modified LPA, this analysis also reviewed intersections with the potential to be significantly affected by congestion due to physical constraints or delays resulting from the Modified LPA.

The Program team has also evaluated beneficial effects associated with the Modified LPA including improved access, reduced delays, and improved safety. The shoulders of the current Interstate Bridge are not wide enough for emergency vehicles to bypass traffic through the corridor. The Modified LPA would include adequate shoulder width for emergency response vehicles to address the needs for transit and emergency response use.

2.6.2 Short-Term Construction Impacts Approach

Short-term impacts were determined by evaluating the proposed construction methods and schedules and comparing the predicted detours, if any, and expected traffic delays with normal operation of public services. Temporary displacements and relocations of facilities were also evaluated to determine if short-term public service operations would be impacted. Past experience with major transportation development projects indicates that close coordination with fire, emergency, law enforcement, and school transportation providers is necessary during construction design and in the development of construction management plans (see Section 2.7).

2.7 Coordination

Early coordination with public services occurred to obtain information on the affected environment. For impact analysis, coordination occurred with the authors of other IBR Program technical reports: Historic Built Environment, Neighborhoods and Populations, Parks and Recreation, Transportation, and Acquisitions. Through coordination with these analyses, any public services resources that are also categorized as a historic, neighborhood, or park resource will be evaluated consistently.

The Program team also coordinated with the public service providers listed in Section 2.4. Representatives of public services were asked questions similar to those below:

- How do you handle construction detours and changes in access routes?
- Given the level of detail available for the alternative transit and roadway options, what features may be problematic for the mobile portion of your service?
- Which, if any, intersections or road segments could cause detrimental delay to the mobile portion of your service?
- Are there reasonable alternate routes for mobile services? What kinds of effects would using these have?

3. AFFECTED ENVIRONMENT

3.1 Introduction

This chapter provides an overview of the public services and service providers within the region and within the study area. Figure 3-1 shows the specific locations of services that are either within the primary study area or that serve population within the primary study area.

3.2 Regional Conditions

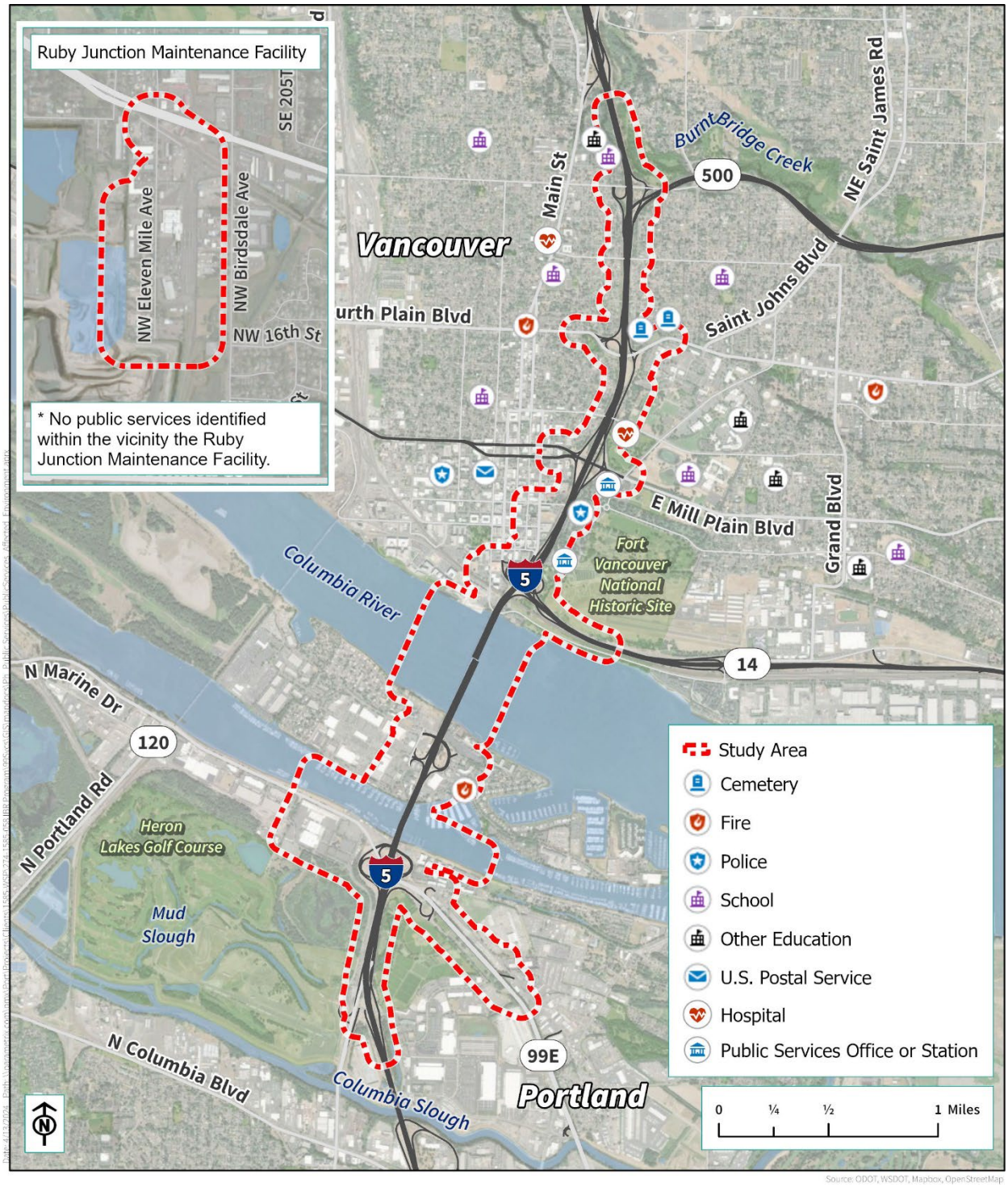
3.2.1 Fire and Life Safety

3.2.1.1 City of Portland

Portland Fire & Rescue (PF&R) provides fire suppression and emergency medical services within the city of Portland, which incorporates approximately 160.4 square miles and a population of 652,503, as of 2020 (U.S. Census Bureau 2020a). PF&R maintains intergovernmental agreements with all adjacent jurisdictions, such as the City of Vancouver, for backup emergency responses (Leek 2023). Critical emergency alternate access routes within or in proximity to the secondary study area include N Interstate Avenue to the west of I-5 and NE Vancouver Avenue, NE Williams Avenue, NE Marine Drive, and NE Martin Luther King Jr. Boulevard to the east of I-5. On Hayden Island, emergency alternate access routes include N Hayden Island Drive, N Jantzen Drive, Tomahawk Island Drive, and N Center Avenue (Lawson 2021). The primary study area falls within the boundaries of the PF&R designated Fire Management Areas (FMA) 17 and 8. Fire and rescue emergency responses within FMA 17 for 2020 included 1,503 total incidents, 82 fire responses, 788 emergency medical services, and 633 other responses. Fire and rescue emergency responses within FMA 8 for 2020 included 2,013 total incidents, 127 fire responses, 1,093 emergency medical services, and 793 other responses (Lawson 2021). Ninety percent of all fire and medical emergency response times in Portland for 2019 and 2020 were within 7 minutes and 38 seconds (City of Portland Fire and Rescue 2020).

Additionally, PF&R provides river rescue and emergency services on the Columbia River in the vicinity of the study area from Station 17 on Hayden Island. The station houses two water vessels that can be used for response to emergencies on the river or along the shoreline.

Figure 3-1. Public Services within or Serving the Primary Study Area



3.2.1.2 City of Vancouver

The City of Vancouver Fire Department provides fire suppression and emergency medical services for the city of Vancouver, which incorporates approximately 43 square miles and a population of 190,915 (U.S. Census Bureau 2020b). The agency maintains intergovernmental agreements with adjacent jurisdictions (e.g., City of Portland) for emergency backup responses (Leek 2023). Critical emergency alternate access routes within or near Vancouver's portion of the secondary study area include Main Street/SR 99, Columbia Street, W 8th Street, and Broadway Street to the west of I-5; Fort Vancouver Way and P Street to the east of I-5; and 39th Street, 15th Street, St. Johns Boulevard, E Fourth Plain Boulevard, McLoughlin Boulevard, Mill Plain Boulevard, and Evergreen Boulevard (McJilton 2021b; Leek 2023). Fire and rescue emergency responses for 2020 included 32,989 total calls received. The average response time for priority 1 and 2 emergencies[9] for 2020 was 8 minutes and 23 seconds (McJilton 2021a).

3.2.1.3 Clark County

The Clark County Fire Marshal's Office provides fire suppression and emergency medical services for all unincorporated portions of Clark County, Washington. It also provides contracted fire and emergency medical services to each of the cities within the county, with the exceptions of Vancouver and Camas. Contracted cities include Battle Ground, La Center, Ridgefield, Washougal, a portion of Woodland, and Yacolt. Including these cities, the fire marshal's office serves 574 square miles and over 200,000 individuals. Intergovernmental agreements for emergency backup responses are maintained between the County and all adjacent jurisdictions (e.g., City of Vancouver; Leek 2023). Critical north-south emergency alternate access routes within or near the County's portion of the study area are located within Fire District No. 6 and include NW Hazel Dell Avenue to the west of I-5 and I-205 and SR 99 to the east of I-5. The district's emergency responses for 2019 included 7,311 total incidents including fire-related, emergency medical services, or other services. Ninety-seven percent of all fire and medical emergency response times for 2019 were within 6 minutes (Clark County Fire District 6 2019).

3.2.1.4 U.S. Coast Guard

The U.S. Coast Guard Sector Columbia River is a unit of the Thirteenth Coast Guard District which provides critical maritime services within the Pacific Northwest. The Coast Guard Sector Columbia River office is located at 2185 SE 12th Place in Warrenton, Oregon, and has patrol units along the Columbia River to conduct search and rescue operations, enforce safety and fisheries regulations, conduct safety and compliance inspections, and protect strategic defense and critical infrastructure (USCG n.d.).

[9] Priorities 1 through 5 indicate call severity with 1 being the highest severity. For emergency medical service, an example of a Priority 1 would be incidents such as cardiac arrest. A fire example of a Priority 1 would be a structure fire. An emergency medical service example of a Priority 5 would be a lift assist (such as at a nursing home). A fire example of a Priority 5 would be an outdoor burning complaint (McJilton 2021a).

3.2.2 Law Enforcement

3.2.2.1 City of Portland

One Portland Police Bureau precinct, the North Precinct, provides service in the primary and secondary study areas. The precinct is bounded primarily by the Columbia River to the north, the Willamette River to the west, I-84 to the south, and the eastern city boundary to the east; however, it also serves the area located directly opposite the North Portland peninsula on the southwest side of the Willamette River (e.g., Linnton and Forest Park). This precinct serves approximately 177,554 people over 58.6 square miles (City of Portland Police Bureau 2021). Intergovernmental agreements with adjacent jurisdictions, such as the City of Vancouver, are maintained for emergency backup responses (White 2021). The critical north-south emergency alternate access routes within or near the precinct's portion of the study area include N Interstate, N Denver, NE Martin Luther King Jr. Boulevard, N Williams Avenue, and N Vancouver Avenue. Person and property crime incident responses for 2020 for the City of Portland were 9,582 and 49,092, respectively. Specific precinct incident response data was not available. The average emergency response time for 2022 within the study area was between approximately 15 and 17 minutes (City of Portland Police Bureau 2022).

3.2.2.2 Multnomah County Sheriff's Office

The Multnomah County Sheriff's Office (MCSO) does not have patrol units or facilities within Portland city limits and the study area. The MCSO River Patrol Unit partners with the Oregon State Marine Board, Clark County Sheriff's Office, and the U.S. Coast Guard to provide river rescue and emergency response on the Columbia River. The MCSO River Patrol Unit also provides boater safety education and intervention through classes, inspections, and enforcement of rules and regulations. The MCSO River Patrol Office is located at 4325 NE Marine Drive (MCSO 2022).

TRIMET

Additionally, MCSO is part of a multiagency law enforcement group called the Transit Police Division that provides security services for the TriMet system in Portland. Security personnel (transit police officers) coordinate with local and regional law enforcement agencies to provide surveillance services for the light rail, buses, and stations and respond to reported incidents as needed (TriMet 2023).

3.2.2.3 Oregon State Police

The Oregon State Police provide law enforcement services along all of Oregon's state and interstate roadways, including the section of I-5 located within the Oregon portion of the primary and secondary study areas. The state police serve all 4,237,256 Oregon residents within a service area of 95,997 square miles (U.S. Census Bureau 2020d). The agency monitors and patrols approximately 79,375 vehicle miles statewide and 2,964 vehicle miles in Multnomah County (ODOT 2021). The Oregon State Police maintain intergovernmental agreements with adjacent jurisdictions for emergency backup response; this includes Clark County and the Washington State Patrol (White 2021).

The agency has no designated critical north-south emergency alternate access route through the study areas; however, there are no alternative routes to the Interstate Bridge to or from Hayden Island

and across the Columbia River. Based upon discussions with other law enforcement agencies serving the area, the alternate access routes most likely to serve as detours along the Portland portion of the secondary study area include N Interstate, N Denver, and N Greeley Avenues to the west of I-5, and NE Martin Luther King Jr. Boulevard, N Williams Avenue, and N Vancouver Avenue to the east of I-5 (Lawson 2021).

Crimes reported statewide by the Oregon State Police in 2019 included 22,204 crimes against persons, 84,574 crimes against property, and 76,629 behavioral crimes (Oregon Uniform Crime Reporting Program 2019). These data are based on the Oregon National Incident Based Reporting System.

3.2.2.4 City of Vancouver

The Vancouver Police Department West Precinct provides law enforcement services for the portion of the city of Vancouver located west of NE Andresen Road. Neighborhoods included within the jurisdiction of the West Precinct are Arnada, Carter Park, Esther Short, Fruit Valley, Hough, Lincoln, Northwest, Rose Village, Shumway, West Minnehaha, Bagley Downs, Central Park, Columbia Way, DuBois Park, Edgewood Park, Evergreen Highlands, Fourth Plain Village, Maplewood, Harney Heights, Hudson's Bay, Meadow Homes, Northcrest, Riverview, Southcliff, and Vancouver Mall. The number of residents within this area is approximately 62,985 (McJilton 2021c). The Vancouver Police Department maintains intergovernmental agreements with the City of Portland, Clark County, and Washington State for emergency backup response (White 2021). The critical north-south emergency alternate access routes within, or in proximity to, the Washington portion of the study areas include Main Street/SR 99, NW Lakeshore Avenue, and Lower River Road to the west of I-5, and Fort Vancouver Way and P Street to the east of I-5. SR 500 provides east-west connectivity to/from I-205, which provides alternate north-south access through the city (McJilton 2021c).

C-TRAN

C-TRAN buses, vans, and vehicles are SafeWatch vehicles with instant access to emergency help. All C-TRAN coach operators and supervisors have direct access to the C-TRAN dispatch center that can immediately contact police, fire, or emergency medical services if assistance is needed. C-TRAN supervisors and security officers roam the transit service area to provide an additional security presence and to help if needed (C-TRAN 2022).

3.2.2.5 Clark County Sheriff's Office

The Clark County Sheriff's Office provides law enforcement services to Clark County and has an office situated in downtown Vancouver, outside of the primary study area but within the secondary study area. The Clark County Sheriff Office mainly serves the residents of unincorporated county boundaries as well the Yacolt population for a total of 237,955 people served by the office. When necessary during incident responses, the agency uses the Interstate Bridge. The alternate access routes most likely to serve as the agency's I-5 detour are NW Fruit Valley Road, NE Hazel Dell Road, NE Street Johns Boulevard, and NE Andresen Road (SR 500) (Clark County Sheriff's Office 2021).

The Clark County Sheriff's Office Marine Unit also provides law enforcement and emergency services to the Columbia River within the limits of Clark County and subsequently in the study area. Other

duties include water search and rescue, identification and removal of navigational hazards, and addressing vessel operation complaints and concerns (Clark County Sheriff Office's 2021).

3.2.2.6 Washington State

The Washington State Patrol provides law enforcement services along all state and interstate rights of way within Washington. The Vancouver Detachment of the Washington State Patrol District 5 serves I-5 within the Washington portions of the study areas. The agency's Vancouver Detachment is responsible for patrolling 124 miles of state highway in Clark County and provides law enforcement services to a population of 503,311 (U.S. Census Bureau 2020c). According to agency sources (White 2021), the Washington State Patrol has intergovernmental agreements for emergency backup responses with abutting city and county jurisdictions within the state of Washington, and it maintains similar contracts with Oregon law enforcement agencies, a partnership that has been in place in 2007. When necessary during police activity, the agency uses the Interstate Bridge. The alternate access routes most likely to serve as the agency's I-5 detour are Highway 99, Columbia Street, E Mill Plain Boulevard, and Main Street. This route parallels I-5; it runs west of the highway south of NE Hazel Dell Avenue and crosses east of the highway to the north, although near the river there is no alternate route. The average emergency response time for 2019 to 2020 within the study area was approximately 7 minutes and 23 seconds (Trebaczewski 2021). The District 5 2019–2020 traffic and crime statistics within the study area included 4,447 incidents (Trebaczewski 2021).

3.2.3 Medical Centers

Several hospitals provide hospital and emergency medical services to populations within the primary or secondary study areas. Portland facilities include Legacy Emanuel Hospital and Health Center and Kaiser Permanente, both west of I-5 and south of Columbia Boulevard. Vancouver facilities include Vancouver Division of Veterans Affairs Portland Health Care System adjacent east of I-5, PeaceHealth Memorial Urgent Care located west of I-5, Southwest Washington Medical Center in east Vancouver, Legacy Salmon Creek at the intersection of I-5 and I-205, and Southwest Washington Memorial Hospital and Urgent Care Center on Main Street.

3.2.4 Public Schools

3.2.4.1 City of Portland Schools

With a student enrollment of approximately 47,314, Portland Public Schools is the largest school district in Oregon. The district includes 39 elementary schools, 18 kindergarten through eighth grade schools, 13 middle schools, 10 high schools, and a number of alternative schools and special programs. Four Portland schools serve students within the primary study area: Woodlawn Elementary, Chief Joseph Elementary, Ockley Green Middle School, and Jefferson High School (Portland Public Schools 2021). None of the City of Portland School facilities are near areas that would be directly impacted by the Modified LPA.

3.2.4.2 Vancouver Public Schools and Colleges

In 2021, the Vancouver School District enrollment totaled 22,000 students in its 22 elementary schools, 6 middle schools, 5 high schools, and special programs (Vancouver School District 2021). There are 17 district schools or other educational facilities within or directly adjacent to the secondary study area. Seven schools and three other facilities are located within or serve the primary study area.

The district transportation department is responsible for transporting 16,000 students on a daily basis, and it has a fleet of 162 buses (Vancouver School District 2021). The district covers an area of approximately 58 square miles.

Clark College, located north of Fort Vancouver and just east of I-5, is a private two-year junior college offering a wide range of courses from high school equivalency programs and continuing education to technical certificate programs for the workforce. Enrollment for the 2021–2022 school year was 9,878 students (Community College Review 2021).

3.2.4.3 Washington State-funded Schools for the Blind and Deaf

The Washington State Schools for the Blind and the Deaf are located near the study area. The Washington State School for the Blind, at 2214 E 13th Street near Mill Plain Boulevard and E Reserve Street, provides direct and indirect services to visually impaired students on its Vancouver campus and in local communities throughout the state (Washington State School for the Blind 2021). The School for the Blind provides mobility classes with instruction on crossing streets, business area travel skills, and bus travel.

The Washington State School for the Deaf is at 611 Grand Boulevard, at Grand and Evergreen, and attempts to address the needs of deaf and hard-of-hearing students throughout the state. In cooperation with the Washington State Center for Childhood Deafness and Hearing Loss, the goal of the school and the center is to be a “statewide resource committed to ensuring all deaf and hard-of-hearing students in Washington reach their full potential regardless of where they live or attend school” (Washington State School for the Deaf 2019). Though both schools are located outside of the primary study area, they are addressed in this technical report because the communities that they serve require special consideration in the design of transportation facilities. No other public services or facilities were identified outside the study area that would require transportation considerations for service within the study area.

3.2.4.4 Ridgefield School District

The small area at the north end of the secondary study area that is not served by Vancouver School District is served by Ridgefield School District. The school district includes South Ridge and Union Ridge Elementary Schools, View Ridge Middle School, Sunset Ridge Intermediate School, and Ridgefield High School, and several alternative schools (Ridgefield School District 2021). None of the Ridgefield School District facilities are near areas that would be directly impacted by the Modified LPA.

3.2.5 Solid Waste Management

3.2.5.1 City of Portland

Garbage is collected in the city of Portland by several private collection companies. Two public transfer facilities are operated by the Metro regional government (Metro). The Metro Central transfer station is located in northwest Portland—approximately one mile southeast of where the secondary study area meets the Willamette River. The Metro South transfer station is located in Oregon City—approximately 15 miles south of the secondary study area. Metro holds a 10-year contract, beginning in 2020, with the Columbia Ridge Landfill in Arlington, Oregon, to receive mixed waste from these two transfer facilities (Metro 2018b). The predicted closure year of this landfill is 2130 (EPA 2022). Many other privately owned landfill facilities throughout the state of Oregon accept waste from within the Metro region (Metro 2021).

3.2.5.2 City of Vancouver and Clark County

Garbage collected in Vancouver and Clark County is transferred at one of two privately owned transfer stations, then is shipped on the Columbia River from the Port of Vancouver to the Port of Morrow where containers are unloaded and trucked to the Finley Butte Landfill in Boardman, Oregon. The predicted closure year of this landfill is 2186 (EPA 2022). A third transfer station in the regional solid waste system transports garbage to Wasco County Landfill in The Dalles, Oregon (predicted closure year of 2045 [EPA 2022]). The City of Vancouver partners with Clark County Public Health Solid Waste to plan and manage the regional solid waste system (Gilbertson 2021).

3.2.6 U.S. Postal Service

Four U.S. Post Office locations are within the secondary study area, and one is within downtown Vancouver in the primary study area.

3.2.7 Cemeteries

There are several small private cemeteries within the Portland portion of the secondary study area, but none within the Portland portion of the primary study area.

One cemetery, the Vancouver Barracks National Cemetery, is located within the primary study area and adjacent to I-5 and north of E Fourth Plain Boulevard. Mother Joseph Catholic Cemetery, just east of the Vancouver Barracks National Cemetery is located in the secondary study area. The City of Vancouver owns and manages two public cemeteries within or adjacent to the secondary study area. Old City Cemetery is at the corner of E Mill Plain Boulevard and N Grand Boulevard. Park Hill Cemetery is at 5915 E Mill Plain Boulevard.

Additional cemeteries in the secondary study area include Clark County Poor Farm Cemetery in the vicinity of Hazel Dell and NE 19th Avenue; Salmon Creek United Methodist Cemetery near NE 112th Street and NE 10th Avenue; St. John Lutheran Cemetery near NE 112th Street and NE 110th Street; and Manor Wilson Bridge Cemetery and Memory Memorial Cemetery (both near NE 72nd Avenue and NE 144th Street).

3.3 Conditions within the Primary Study Area

3.3.1 Portland

Figure 3-2 shows the locations of public services in Portland and on Hayden Island.

3.3.1.1 Fire and Life Safety

One PF&R station is located on Hayden Island and serves both Hayden Island and North Portland within the primary study area. Table 3-1 provides details about location and emergency routes.

Table 3-1. Fire and Life Safety Locations in Portland

Agency	Location	Critical Emergency Access Routes	Alternate Agency
Portland Fire & Rescue Station 17	848 N Tomahawk Drive, Hayden Island	N Interstate Avenue, N Denver Avenue, NE Marine Drive, NE Martin Luther King Jr. Boulevard, N Tomahawk Island, N Hayden Island Drive, N Jantzen Drive, and N Center Avenue. I-5 is the only critical access route to/from Hayden Island.	All adjacent jurisdictions

Sources: Lawson 2021; Leek 2023

3.3.1.2 Law Enforcement

Law enforcement services within the primary study area in North Portland are provided by the City of Portland Police Bureau's North Precinct. Table 3-2 lists the location of law enforcement facilities in North Portland, which is located south of the primary study area.

Table 3-2. Law Enforcement Locations in Portland

Precinct	Location	Critical Emergency Access Routes	Backup Response Precincts
City of Portland Police Bureau – North Precinct	449 NE Emerson Street Portland	N Interstate Avenue, N Denver Avenue, NE Martin Luther King Jr. Boulevard, and N Greeley Avenue; I-5 is the only critical access route to/from Hayden Island.	All adjacent jurisdictions

Sources: Lawson 2021; Leek 2023

3.3.1.3 Medical Centers

There are no medical centers within the primary study area in Portland.

Figure 3-2. Public Services in North Portland and Hayden Island

3.3.1.4 Public Schools

Portland Public Schools operates four public schools that serve the primary study area, as identified in Table 3-3. Only a small portion of land within the primary study area falls within the service boundaries of these schools. Students living on Hayden Island are served by Portland Public Schools in North Portland.

Table 3-3. Schools Serving the Primary study area in Portland

School	Location	2020–2021 Enrollment
Woodlawn Elementary (PK–5th)	7200 NE 11th Avenue	315
Chief Joseph Elementary (PK–5th)	2409 N Saratoga Street	305
Ockley Green Middle School (K–8th)	6031 N Montana Avenue	487
Jefferson High School	5210 N Kerby Avenue	620

3.3.1.5 Solid Waste Management

There are no transfer stations or solid waste disposal facilities within the primary study area in Portland.

3.3.1.6 U.S. Postal Service

There are no U.S. Post Office locations within the primary study area in Portland.

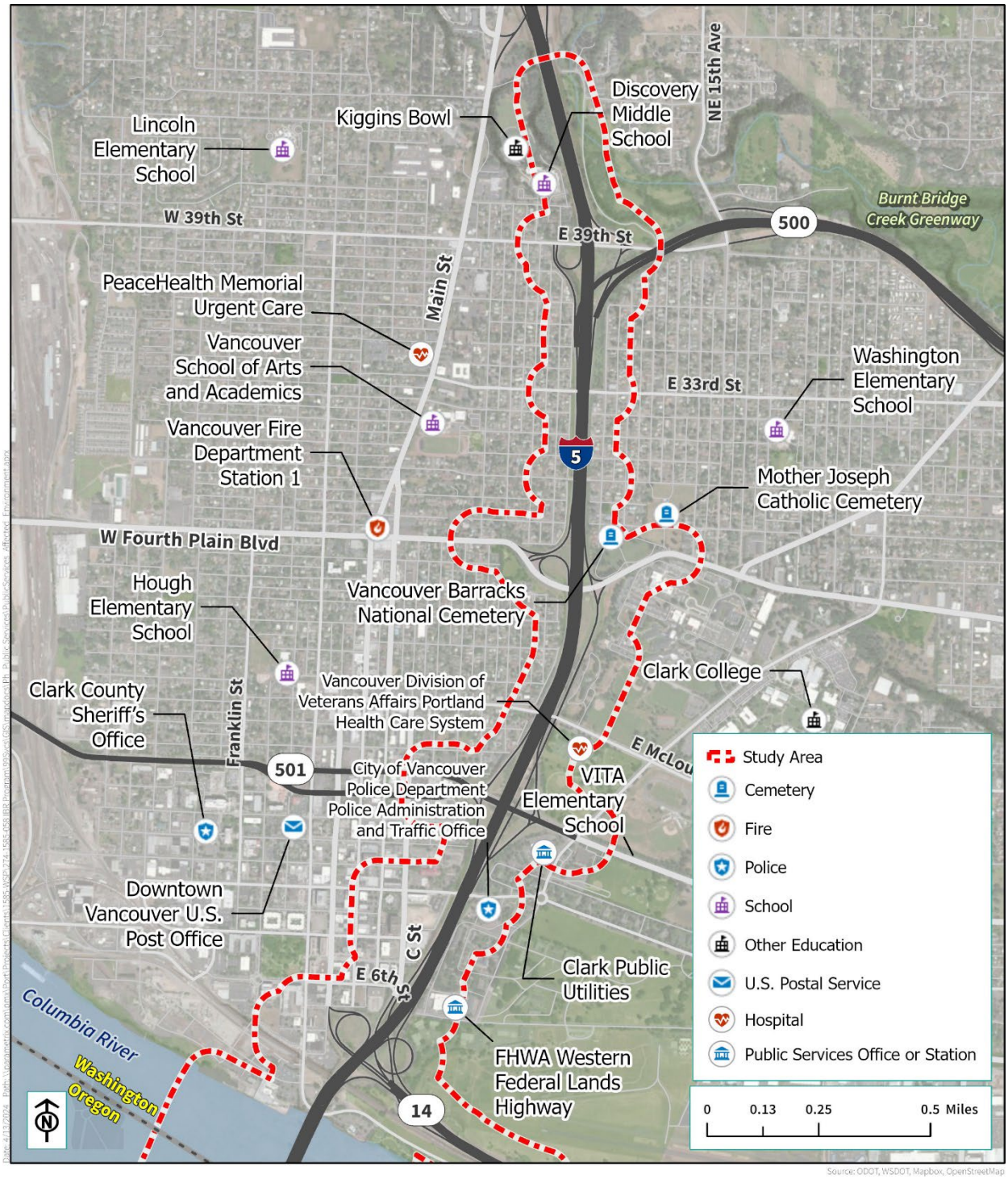
3.3.1.7 Cemeteries

There are no cemetery locations within the primary study area in Portland.

3.3.2 Vancouver

Figure 3-3 shows the location of public services within the primary study area in Vancouver.

Figure 3-3. Public Services in Downtown and Upper Vancouver



3.3.2.1 Fire and Life Safety

Two fire departments are either within or serve the primary study area in Vancouver (see Table 3-4). The Vancouver Fire Department's Downtown Station is located at 2607 Main Street and the Westside Station is at 2106 Norris Road. Clark County District 6 serves the area to the north of the study area and provides backup services to the Vancouver Fire Department.

Table 3-4. Fire and Life Safety Locations in Vancouver

Agency	Location	Critical Emergency Access Routes	Alternate Agency
Vancouver Fire Department Downtown Station (1)	2607 Main Street, Vancouver	Main Street/SR 99, W Fourth Plain Boulevard, Kauffman Avenue, 39th Street, 15th Street, St. Johns Boulevard, McLoughlin Boulevard, Mill Plain Boulevard, Evergreen Boulevard	All adjacent jurisdictions
Vancouver Fire Department Westside Station (2)	2106 Norris Road, Vancouver	E Fourth Plain Boulevard, E 18th Street, Grand Boulevard	All adjacent jurisdictions
Clark County Fire Marshal (District 6)	8800 NE Hazel Dell Avenue, Vancouver	I-205, SR 99 and NW Hazel Dell Avenue	All adjacent jurisdictions

Sources: Leek 2023; Lawson 2021.

3.3.2.2 Law Enforcement

Law enforcement services within the primary study area are provided by the City of Vancouver Police Administration and Traffic Office and the West Precinct and by the Clark County Sheriff's Office. Table 3-5 lists the locations of law enforcement facilities in Vancouver. The City has plans to relocate the police department headquarters to 521 Chkalov Drive, which is outside of the primary study area. According to the City of Vancouver website, the move was expected to occur by the end of 2020; however, renovations are still in progress, and the headquarters remains located at 605 E Evergreen Boulevard (City of Vancouver 2021).

Table 3-5. Law Enforcement Locations in Vancouver

Precinct	Location	Critical Emergency Access Routes	Backup Response Precincts
City of Vancouver Police Department Police Administration and Traffic Office	605 E Evergreen Boulevard Vancouver	None	Clark County and Washington State Police
City of Vancouver Police Department West Precinct	2800 NE Stapleton Road Vancouver	Main Street/SR 99, Fort Vancouver Way, P Street, SR 500 to I-205	Clark County and Washington State Police
Clark County Sheriff's Office	707 W 13th Street Vancouver	NW Fruit Valley Road, NE Hazel Dell Road, NE Street Johns Boulevard, and NE Andresen Road (SR 500)	All adjacent jurisdictions

Sources: Leek 2023; Lawson 2021.

3.3.2.3 Medical Centers

Two medical centers provide medical services in Vancouver in the primary study area. The facilities include the Vancouver Division of Veterans Affairs Portland Health Care System and the PeaceHealth Memorial Urgent Care (see Table 3-6).

Table 3-6. Medical Centers in Vancouver

Hospital/Clinic	Location	Critical Care Services	Emergency Facility
PeaceHealth Memorial Urgent Care	3400 Main Street	Urgent Care	No
Vancouver Division of Veterans Affairs Portland Health Care System	1601 E Fourth Plain Boulevard	None	No

3.3.2.4 Public Schools and Other School Facilities

Several school facilities serve the population within the primary study area in Vancouver, but only Discovery Middle School, Kiggins Bowl Stadium, Vancouver Innovation, Technology and Arts Elementary School, and recreation facilities for Clark College are located within the study area (see Table 3-7). Vancouver's Hudson's Bay High School is the public high school for the entire primary study area within Vancouver.

Table 3-7. Vancouver Schools and Facilities Serving the Primary Study Area

Facility Type	Name	Location
School	Hudson's Bay High School	1601 E McLoughlin Boulevard
	Harney Elementary School	3212 E Evergreen Boulevard
	Hough Elementary School	1900 Daniels Street
	Lincoln Elementary School	4200 Daniels Street
	Washington Elementary School	2908 S Street
	Discovery Middle School	800 E 40th Street
	Vancouver School of Arts and Academics (6-12)	3101 Main Street
	Vancouver Innovation, Technology and Arts Elementary School	1111 Fort Vancouver Way
Other Educational Facilities	Clark College	1933 Fort Vancouver Way
	Washington State School for the Blind	2214 E 13th Street
	Washington State School for the Deaf	611 Grand Boulevard
	Kiggins Bowl Stadium (at Discovery)	40th and H Streets

The Clark College Athletic Annex and Recreational Fields are located on the east side of I-5 north of McLoughlin. The recreation fields are a 13-acre park owned by Clark College; the softball field, tennis courts, and open fields are open to the public from 7 a.m. to dusk. The site facilities include sports fields for the college and the public, batting cages, and benches. The Athletic Annex, not open to the public, includes surface parking and a small building that includes bathrooms and office space used for equipment storage.

The Kiggins Bowl Sports Field/Stadium is a 3-acre sports venue adjacent to Discovery Middle School west of I-5 and north of 39th Street. The facility is owned and maintained by the Vancouver School District, but it is open to the public during non-school hours for approved activities. Site facilities include natural area and trails, as well as sports fields and a track including an artificial turf soccer/football field known as Kiggins Field. The trail that travels through the site and past Discovery Middle School is a spur that connects the Lincoln Neighborhood to the Burnt Bridge Creek portion of the Discovery Trail.

The Vancouver Innovation, Technology and Arts Elementary School is located east of I-5 along Fort Vancouver Way. A portion of the property is located within the primary study area. The facility opened in the fall of 2022 as a learning lab for elementary age students. Following the first year, the school will operate as an elementary school for project-based learning. The school also may serve as a neighborhood school for the downtown area, relieving enrollment at other elementary schools if needed.

3.3.2.5 Solid Waste Management

There are no transfer stations or solid waste disposal facilities within the primary study area in Vancouver.

3.3.2.6 U.S. Postal Service

The downtown Vancouver U.S. Post Office is located within the primary study area at 1211 Daniels Street (U.S. Postal Service 2021).

3.3.2.7 Cemeteries

The Vancouver Barracks National Cemetery, a military facility adjacent to I-5 and north of E Fourth Plain Boulevard, is located within the primary study area in Vancouver.

3.3.2.8 Other Facilities

Although not originally considered in the definition of public services for the scope of this report, some resources observed in the study area did not readily fall into other discipline categories and were added to this report. Within Vancouver, the Clark Public Utilities District storage and administration building (1200 Fort Vancouver Way), immediately east of the existing Interstate Bridge abutment on the north bank of the Columbia River, and the FHWA Western Federal Lands building (610 E 5th Street), immediately east of I-5 and north of Fort Vancouver, were both added to this report and are evaluated for impacts from the Modified LPA.

The Clark Public Utilities District storage and administration building functions as an information center and houses energy conservation staff; it is not part of the utility distribution system.

The FHWA Western Federal Lands building houses offices serving the needs of Oregon, Washington, Idaho, Montana, Alaska, and the Yellowstone and Grand Teton National Parks in Wyoming. Western Federal Lands administers the survey, design, and construction of forest highway system roads, parkways and park roads, Indian reservation roads, defense access roads, and other federal lands roads. Western Federal Lands also provides training, technology deployment, and engineering services.

4. LONG-TERM EFFECTS

This chapter describes the long-term impacts to public services that would be anticipated from the Modified LPA. The chapter analyzes both physical impacts (e.g., physical impacts to public service buildings or properties) and operational impacts (e.g., increased travel times for delivering mobile services). Physical impacts include full or partial acquisition or a displacement of a building or property within the primary study area that is used to provide a public service. Operational impacts include increased times for delivering mobile services, notable traffic movement restrictions, or changes in transportation service levels (road closures, one-way designations, new median barriers, or traffic congestion levels) that would permanently alter routes used to provide public services. Operational impacts were considered for the primary and secondary study areas. Beneficial effects associated with the completion of the Modified LPA are also described based on the results of the transportation traffic analysis.

4.1 No-Build Alternative

With the No-Build Alternative, no physical impacts to public services (including medical centers and school sites) are anticipated. There would be no change in intersection operations on critical access routes in Portland during either the AM or PM peak periods. In Vancouver, three intersections would not meet level of service standards during the AM peak period, and seven intersections would not meet level of service standards during the PM peak period, which could slow response times for emergency vehicles (see the Transportation Technical Report for further discussion). In addition, bridge openings to allow ship passage would continue to disrupt traffic and cause potential delays for emergency vehicles.

4.2 Modified LPA Physical Impacts

Most public services would not experience direct long-term impacts to facilities as a result of the Modified LPA, including:

- Fire and life safety
- Solid waste management
- Postal service
- Cemeteries

The Modified LPA would directly impact one police department building, one school site and two “other” (non-categorized) facilities. Additionally, temporary construction easements are planned for several other public services facilities, as discussed in Section 5.3.3, Temporary Construction Easements.

4.2.1 Law Enforcement Facilities

The Vancouver Police Department property, located east of I-5 and south of E Evergreen Boulevard, is planned for partial acquisition to accommodate I-5 and sidewalk improvements to E Evergreen Boulevard. No impacts to the building on the property are anticipated.

4.2.2 School Sites

None of Portland Public Schools' facilities are near areas that would be directly affected by the Modified LPA. In Washington, the Modified LPA would directly affect Discovery Middle School and Kiggins Bowl, which are located at the northern end of the study area in the Lincoln Neighborhood; both would have minor impacts and are planned for partial acquisition. No structures would be displaced, and long-term use of the site would not be affected by the construction of a retaining wall adjacent to the highway in the southwest corner of the property. The retaining wall would require a permanent subsurface easement with some long-term surface use restrictions. For more information about construction plans and mitigation at this location, please refer to the Parks and Recreation Technical Report. This permanent impact would not affect any provision of school transportation.

4.2.3 Other Public Service Sites

One non-categorized public service-related facilities would be impacted by the Modified LPA.

The Modified LPA with C Street ramps at the SR 14 interchange would partially acquire the parcel that contains the FHWA Western Federal Lands office, which is north of 5th Street and immediately east of I-5. This would affect six marked parking stalls, adjacent asphalt and curbing, landscaping, parking area illumination, and an electronic swing gate. The Modified LPA without C Street ramps would move building access to the south from E 5th Street.

4.3 Modified LPA Operational Impacts

For the analysis of operational impacts, intersection performance at locations likely to affect the mobility of fire, life safety, and law enforcement public services was considered.

Congestion along critical emergency routes can cause delays for emergency service providers. In general, the Modified LPA would improve traffic conditions on the highway; thus, response times for mobile public services relying on I-5 would not be adversely affected. The Modified LPA is intended to improve transportation safety, traffic flow, and predictability as well as reduce congestion. The shoulders of the current Interstate Bridge are not wide enough for emergency vehicles to bypass traffic through the corridor. The current design of the Modified LPA includes adequate shoulder width for emergency response vehicles. Mobile public services will ultimately benefit from the Modified LPA with decreased emergency response times and improved mobility for public service providers. I-5 is designated as a primary evacuation route in the event of a major earthquake in the region. It is anticipated the bridge would remain a primary evacuation route during and after the construction of the Modified LPA.

Any impacts to local streets that affect the critical emergency access routes could have an effect on response times of public services. Emergency and police services reported use of specific roadways as emergency access routes, as shown in Table 4-1.

Table 4-1. Mobile Public Service Critical Emergency Access Routes

Service	Critical Emergency Access Routes
North Precinct Portland Police	N Interstate Avenue, N Denver Avenue, NE Martin Luther King Jr. Boulevard, and N Greeley Avenue; I-5 is the only critical access route to/from Hayden Island.
Portland Fire & Rescue Station 17	N Interstate Avenue, N Denver Avenue, NE Marine Drive, NE Martin Luther King Jr. Boulevard, N Tomahawk Island, N Hayden Island Drive, N Jantzen Drive, and N Center Avenue.
Vancouver Fire Department Downtown Station (1)	Main Street/SR 99, W Fourth Plain Boulevard, Kauffman Avenue, 39th Street, 15th Street, St. Johns Boulevard, McLoughlin Boulevard, Mill Plain Boulevard, Evergreen Boulevard, and SR 14.
Vancouver Fire Department Westside Station (2)	E Fourth Plain Boulevard, E 18th Street, Grand Boulevard, and SR 14.
Clark County Fire Marshal (District 6)	I-205, SR 99 and NW Hazel Dell Avenue.
West Precinct City of Vancouver Police	Main Street/SR 99, Fort Vancouver Way, P Street, and SR 500 to I-205.
Clark County Sheriff's Office	NW Fruit Valley Road, NE Hazel Dell Road, NE St. Johns Boulevard, and NE Andresen Road (SR 500).

A total of 80 local street intersections were analyzed for current conditions (2019 data), No-Build conditions, and 2045 Modified LPA conditions. Of the total study area intersections, 63 (46 in Vancouver and 17 in Portland) are also on the critical emergency access routes identified in Table 4-1.

Intersections were given a score of A, B, C, D, E, or F for LOS, and each intersection either meets the standard or does not meet the standard, which is a function of LOS, seconds of delay, volume to capacity ratio (v/c, a measurement of whether or not the physical geometry and signal design provide sufficient capacity for the vehicle movements), and intersection capacity utilization (method of estimating intersection capacity). Below, the Modified LPA is compared to the No-Build by examining the intersections that do not meet standards and by comparing LOS ratings of each intersection (see Table 4-2). The traffic data used for this analysis and figures showing each intersection studied can be found in the Transportation Technical Report.

Assumptions (or traffic volumes) used in the traffic modeling were different between the Modified LPA and No-Build because the Modified LPA assumes that the project is built. New intersections incorporated into the design of the Modified LPA that do not exist yet would be designed to meet

standards based on regional models for each jurisdiction (WSDOT, City of Vancouver, ODOT, or City of Portland).

Table 4-2. Study Intersections that Pass/Fail Traffic Performance Standards

Pass/Fail	Existing – 2019 AM	Existing – 2019 PM	No-Build – 2045 AM	No-Build – 2045 PM	Modified LPA – 2045 AM	Modified LPA – 2045 PM
Pass	78	76	77	72	83	79
Fail	2	3 [a]	3	8 [a]	3	7 [a]
Total Intersections Evaluated	**80**	**80**	**80**	**80**	**86**	**86**

Source: Transportation Technical Report

a One failing intersection in these traffic scenarios is not on a critical access route.

The traffic performance standards across the jurisdictions in the study area are briefly outlined below. For additional information, see the Transportation Technical Report.

- **WSDOT** – For intersections under WSDOT control, WSDOT sets performance standards based on LOS. The LOS standards for I-5 and SR 14 ramp terminal intersections are LOS D, and for SR 500 ramp terminal intersections the LOS is E.
- **City of Vancouver** – LOS standards for intersections are defined as LOS E or better for both signalized and unsignalized intersections.
- **ODOT** – The performance standard for I-5 ramp terminal intersections in Oregon is a v/c ratio of 1.1. The performance standard for arterial intersections is a v/c ratio of 0.99 (an example is Martin Luther King Jr. Boulevard).
- **City of Portland –** LOS targets are defined as LOS D or better for all signalized and unsignalized intersections under City jurisdiction. These are performance targets not standards.

In Portland during the AM peak, two intersections on critical emergency access routes would not meet target standards under the No-Build Alternative. One intersection would not meet targets under the Modified LPA during the AM peak. By LOS, one intersection would perform slightly better under the Modified LPA than the No-Build, while three different intersections would perform slightly worse under the Modified LPA. In the AM peak in Portland, the Modified LPA would have slightly greater impacts to emergency services than the No-Build.

During the PM peak in Portland, four intersections would not meet target standards in the No-Build Alternative. With the Modified LPA, three intersections would not meet target standards. By LOS, and three intersections would perform better under the Modified LPA than the No-Build. In the PM peak in Portland, the Modified LPA would have less impact to emergency services than the No-Build.

In Vancouver, during the AM peak, three intersections would not meet standards under the No-Build Alternative. With the Modified LPA, three intersections would not meet standards. By LOS, six intersections would perform slightly better under the No-Build than under the Modified LPA, and five intersections would perform slightly better under the Modified LPA than the No-Build. The Modified LPA would have similar impacts to emergency services as the No-Build.

During the PM peak in Vancouver, three intersections would not meet standards in the No-Build Alternative and five intersections would not meet standards for the Modified LPA. By LOS, eight intersections would perform better under the Modified LPA than the No-Build, and ten intersections would perform better under the No-Build than the Modified LPA. The Modified LPA would have slightly greater impacts to emergency services than the No-Build.

In Vancouver, the street with the most impacts compared to the No-Build Alternative would be Mill Plain Boulevard during the PM peak period. During the PM peak, response times for mobile public services relying on Mill Plain Boulevard as a critical access route could be negatively affected. Shoulders on the Columbia River bridge would improve response times for emergency providers using I-5 to cross the river or access Hayden Island. Emergency access to the transit guideway and bike/pedestrian paths on the lower decks of the bridge would allow access for rescue trains and first responders.

4.4 Impacts from Other Modified LPA Elements

4.4.1 Transit Maintenance Base Options

Because of the introduction of light rail into Vancouver, the existing Ruby Junction Maintenance Facility in Gresham, Oregon, would be expanded to support the new light rail service under the Modified LPA. No public services facilities would be impacted by the expansion.

4.4.2 Additional Light Rail Stations and Guideway

The transit program included in the Modified LPA would bring new public systems that are anticipated to have additional needs for light rail stations and the guideway. The planned shared-use path is also a new facility. These elements of the Modified LPA would require additional emergency services including surveillance services from TriMet and C-TRAN security personnel, as well as emergency response from fire, police, and emergency medical services if an incident occurs. The shared-used path is discussed further in the Transportation Technical Report.

4.4.3 Tolling

As a part of the Modified LPA, all motor vehicle users on the Columbia River bridge would pay a toll. Open road tolling technology would be used to allow the collection of tolls without the use of lane-dividing barriers or tollbooths. With this technology, users are able to drive through at highway speeds without having to slow down at barriers or to physically pay a toll. Full use of open road tolling eliminates the need for toll plazas.

Tolls would be collected through the use of transponders mounted within vehicles. Motorists would establish a pre-paid account for their transponder. For those vehicles without a transponder, license plate images would be scanned and users would be mailed a bill. Due to the added operational cost associated with license plate scanning and bill collection, vehicles without transponders would pay a higher toll rate than vehicles with transponders.

Potential effects on mobile public services would decrease congestion on and near the Columbia River bridge that would result in faster travel times. This would potentially improve response times for emergency services that are required to use the bridge.

4.5 Design Options

As described in Chapter 1, the IBR Program is evaluating a number of design options for the Modified LPA. This section compares the effects of these design options to the effects of a Modified LPA configuration with one auxiliary lane; a double-deck, fixed-span configuration over the Columbia River; ramps at C Street; and a centered alignment for I-5 in downtown Vancouver. Each design option is discussed separately below.

4.5.1 Two Auxiliary Lanes

Same as the Modified LPA, except:

- Congestion would be further reduced and multimodal operations on I-5 would be improved.
- Response times for emergency vehicles using I-5 as an emergency route are expected to decrease because of the improvements in congestion, traffic flow, and transportation safety on I-5.

4.5.2 Single-Level Fixed-Span Configuration

Similar to the Modified LPA, except that emergency response times to transit and shared-use path incidents could improve compared to the Modified LPA. All facilities being located on a single level would allow access from the highway lanes, similar to the No-Build Alternative.

4.5.3 Single-Level Movable-Span Configuration

Similar to the single-level fixed-span configuration, except that delays and disruptions to emergency response as under the No-Build Alternative would continue due to bridge openings, but with less frequency.

4.5.4 I-5 Mainline Westward Shift

The I-5 mainline westward shift design option would have no impact to the FHWA Western Federal Lands office property (see Section 4.2.3). All other long-term direct effects would be the same as the Modified LPA.

4.5.5 SR 14 Interchange without C Street Ramps

The design option without the C Street ramps would have the same long-term direct effects as the Modified LPA except that it would result in additional congestion in downtown Vancouver; under this option, five intersections would not meet level of service standards in the AM peak period, and eight intersections would not meet the standards in the PM peak period.

4.5.6 Park and Rides

The public services impacts or benefits would be the same for all the park-and-ride options.

5. TEMPORARY EFFECTS

5.1 Modified LPA

This chapter describes the temporary impacts to public services that would be anticipated from construction of the Modified LPA. The temporary regional and systemwide impacts are addressed first, followed by a discussion of impacts within the primary study area.

The Modified LPA may include the temporary effects listed below. Mitigation measures for these effects are discussed in Chapter 7 of this report.

- Temporary easements for construction staging areas. These temporary acquisitions would be returned to the landowner after construction is complete or purchased for transit-oriented development. The locations of staging areas are yet to be confirmed based on final engineering designs.
- Noise impacts due to construction.
- Vibration from construction.
- Effects on air quality due to construction equipment.
- Traffic spillover during construction.
- Traffic detours and delays during construction.

5.2 Modified LPA Regional and Systemwide Impacts

Detours, increased delays, and traffic on streets under construction could cause response time delays for mobile public services. Construction on bridge structures would cause delays for mobile services needing to access or leave Hayden Island.

When any of the primary emergency transportation routes identified in Chapter 3 would be partially or fully under construction for any part of the project, advance communication with the impacted public services would be necessary to prevent potential delays in response times. With advance communication, dispatchers and responders would know about detours, areas susceptible to delays from detours, and any planned road closures and could plan routes accordingly. A preconstruction communication plan would be developed with affected emergency response groups and other public service agencies detailing how detour and road closure information would be provided to the services. Public outreach campaigns would be conducted prior to construction to ensure detours and traffic routing plans during construction are available to the public service providers and the communities they serve in the area. I-5 could be closed for certain construction activities. Provisions would be made for emergency services to proceed through the closures.

5.3 Modified LPA Primary Study Area Impacts

5.3.1 Oregon Mainland and Hayden Island

Temporary effects on public services on Hayden Island include temporary increased delays for the fire services stationed on Hayden Island which have to use I-5 to reach their service areas in North Portland. Other services, such as law enforcement, would also experience delays accessing Hayden Island from North Portland or Vancouver. More information about traffic impacts during construction can be found in the Transportation Technical Report.

5.3.2 Vancouver (Downtown and Upper Vancouver)

Construction of the Modified LPA would likely cause temporary effects in downtown and upper Vancouver consistent with all large construction projects. Those effects with the greatest potential to affect public services are traffic delays and noise and vibration at schools. As discussed above, all temporary construction on emergency transportation routes could cause delays in emergency services' response times and must be communicated with those agencies in advance. Additionally, temporary construction on school routes could cause delays for school transportation providers and advance coordination with school transportation services would be necessary. Temporary construction noise and vibration could affect Discovery Middle School; Vancouver Innovation, Technology and Arts Elementary School; and the recreation fields at Clark College. Standard construction practices would minimize these impacts. See the Noise and Vibration Technical Report for more detail.

5.3.3 Temporary Construction Easements

Temporary construction easements would be needed from several properties that contain public service facilities. The buildings on these properties would not be affected, and the ongoing function would not change. Specifically, a temporary construction easement is planned for the northwestern corner of the City of Portland Fire Department property (PF&R Station 17) on Hayden Island. No modifications to the building, parking lot, or driveway are planned.

A temporary construction easement and a construction staging area would be needed on the western portion of the Clark College Athletic Annex and recreation fields property. The temporary construction easement would not interrupt the function or public use of the recreation fields or modify the building on the western portion of the property. Chapter 5 of the SEIS, Draft Section 4(f) Evaluation, has more information on this temporary construction easement.

A temporary construction easement would be needed for the northwestern corner of the Clark Public Utilities District property, located on the east side of the existing northbound Interstate Bridge abutment. The building functions as an information center with energy conservation staff. Some landscaping would be lost, but there would be no modification to the building, parking lot, or access roads. The area would be revegetated and landscaped following construction.

A temporary construction easement is planned along the northwestern boundary of the Vancouver Division of Veterans Affairs Portland Health Care System. The impact would be limited to the

northwestern corner of the site adjacent to E Fourth Plain Boulevard and the far western portion of the site along the I-5 frontage road.

5.4 Design Options

The temporary impacts would be the same for the Modified LPA and each of the design options. No additional physical impacts to identified public services in the study area would occur with the design options, and traffic delays for public services, as well as emergency service response times, are not anticipated to be significantly different than the with the Modified LPA.

6. INDIRECT EFFECTS

Long-term changes to development and major traffic patterns are considered indirect effects on public services. Public service agencies that could be affected by indirect land use changes include schools, emergency responders, and hospitals. These public and private agencies generally plan for service based on forecast population and development patterns reflected in the long-range comprehensive plans of the jurisdictions they serve. The service providers evaluate future population growth and calculate provider needs such as increased numbers of police officers, expanded treatment plants, new equipment, or new station locations. Because anticipated density increases in downtown Vancouver and on Hayden Island are consistent with current long-range plans and growth assumptions, the Modified LPA is not anticipated to require changes to individual long-range service plans (see the Land Use Technical Report for additional information).

In general, the Modified LPA would improve traffic conditions on I-5 relative to the No-Build Alternative; thus, response times for mobile public services relying on I-5 would be positively affected.

As described in the Land Use Technical Report, the Modified LPA could support growth in the study area, particularly in new light rail station areas, in a manner consistent with local and regional land use plans. Development consistent with local land use plans would be consistent with the long-term service planning efforts of public and private utilities. Increased services for such new development would occur in urbanized areas that already have public services and utilities; it is not anticipated that any extension of service to new geographic areas would be required. For more discussion of indirect effects from land use change resulting from the Modified LPA, please refer to the Land Use Technical Report.

7. PROPOSED MITIGATION

7.1 Potential Avoidance, Minimization, and Mitigation Measures

7.1.1 Regulatory Requirements

Regulatory requirements for effects on public services include:

- Oregon Administrative Rules Chapter 660, Division 11: Public Facilities Planning. Governing bodies are directed to avoid, minimize, and mitigate impacts to public services if possible.
- Growth Management Act (GMA) RCW 36.70A.030(33) defines public services. The GMA directs local governments to avoid, minimize, and mitigate impacts to public services.

7.1.2 Program-Specific Mitigation

Program-specific mitigation measures for effects on public services include:

- Implement feasible mitigation strategies for increased travel times along emergency service routes as described in Section 3.1, Transportation, of the Draft SEIS.

7.2 Temporary Effects

7.2.1 Regulatory Requirements

- Measures to maintain traffic flow and access during construction and to avoid and minimize temporary utility service disruptions would be incorporated into contract specifications.

7.2.2 Program-Specific Mitigation

Program-specific mitigation for temporary effects on public services would include:

- The IBR Program team would work with service providers and the public to minimize temporary effects to the extent practicable. Advance communication with the impacted public services would be conducted to inform dispatchers and responders about planned road closures and detours. A preconstruction communication plan would be developed with affected emergency response groups and other public service agencies detailing how detour and road closure information would be provided to the services.
- Before construction, the Program team would evaluate the need for backup on-call emergency services to transport patients during bridge construction to mitigate highway delays.
- The IBR Program would conduct public outreach campaigns before construction to ensure that detours and traffic routing plans during construction are available to public service providers and the communities they serve. Provide detour signs on routes typically used and signed to access public service locations.

8. PERMITS AND APPROVALS

There are no federal, state, or local permits associated with public services.

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