Earthquake Ready Burnside Bridge:
Combined Final Environmental Impact Statement/Record of Decision

Chapter 1

Executive Summary

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U.S. Department of Transportation
Federal Highway Administration

Multnomah County

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1. Executive Summary

This Final Environmental Impact Statement (Final EIS) and Record of Decision (ROD) for the Earthquake Ready Burnside Bridge Project (Project) has been prepared pursuant to Council on Environmental Quality (CEQ) regulations at 40 CFR 1502 and 40 CFR 1505.2 and Federal Highway Administration (FHWA) regulations at 23 CFR 771.124–127. This Final EIS provides supplementary information and presents revisions to the February 2021 Earthquake Ready Burnside Bridge (EQRB) *Draft Environmental Impact Statement* (Draft EIS) and the April 2022 EQRB *Supplemental Draft Environmental Impact Statement* (SDEIS).[1] The full text of the Draft EIS and SDEIS are not reproduced in this document. Rather, this Final EIS describes changes and updates to the Draft EIS and SDEIS and summarizes and responds to public and agency comments. The contents of the Draft EIS and SDEIS remain valid except where changes are noted in this Final EIS and are incorporated by reference into this Final EIS.

A combined Final EIS and ROD document (per 23 USC §139(n), 23 CFR 771.124) does not have a comment period or a 30-day waiting period because these documents are published as a single document. The US Environmental Protection Agency publishes a Notice of Availability in the Federal Register for combined Final EIS/ROD documents.

The EQRB Draft EIS included four build alternatives and identified one (the Long-span Alternative) as the Preferred Alternative. Following the publication of the Draft EIS, additional cost and funding analysis identified a substantial risk that the construction costs of any of the build alternatives would be too high to reasonably be able to fund. This risk led Multnomah County (County) to direct the project team to identify and evaluate ways to reduce the Project's construction costs while still meeting the Project's purpose and need and strive to achieve the other advantages of the Draft EIS Preferred Alternative. The Refined Long-span Alternative evaluated in the SDEIS addressed that directive and was selected as the SDEIS Preferred Alternative.

The ROD issued by FHWA accompanies this Final EIS (see Chapter 7); it identifies the SDEIS Refined Long-span Alternative as the Selected Alternative. The ROD documents a formal decision on the Selected Alternative, presents the basis for the decision, specifies the "environmentally preferable alternative," and identifies the adopted means to avoid, minimize, and compensate for environmental impacts.

[1] All EQRB Project–related documents are available in the project library at https://www.multco.us/earthquake-ready-burnside-bridge/project-library.

1.1 What is being proposed and why?

1.1.1 What is the purpose of an earthquake ready bridge in downtown Portland?

The primary purpose of the EQRB Project is to create a seismically resilient Burnside Street lifeline route [2] crossing of the Willamette River that would remain fully operational and accessible for emergency responders, cars, trucks, buses, bicycles, and pedestrians immediately following the next Cascadia Subduction Zone (CSZ) earthquake. None of the old bridges in downtown Portland were designed to withstand this type of seismic event. A seismically resilient Burnside Bridge would support the region's ability to provide rapid and reliable emergency response, rescue, and evacuation after a major CSZ earthquake, as well as enable post-earthquake economic and community recovery. In addition to creating a crossing that is seismically resilient, the purpose is also to provide a long-term, low-maintenance safe crossing for all users for the next 100 years.

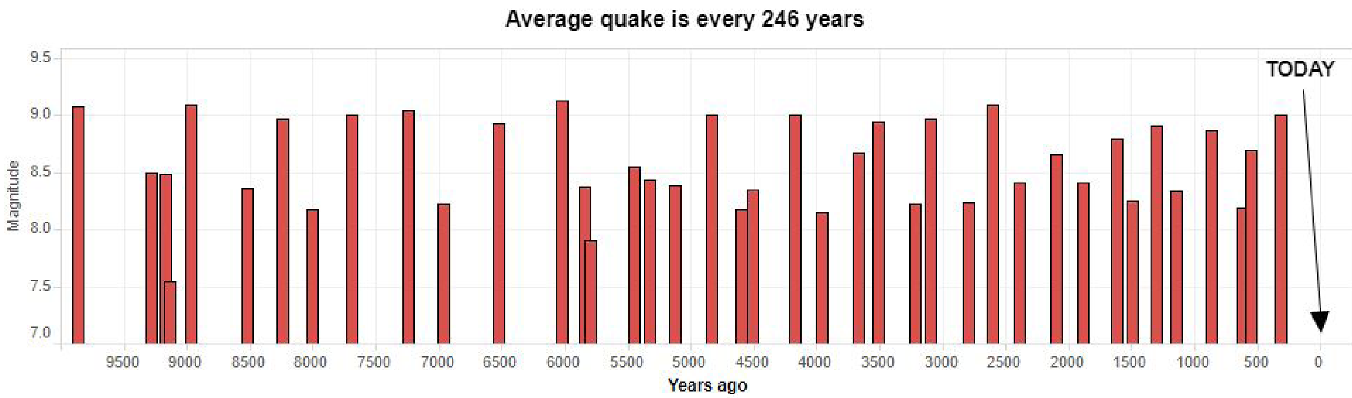
1.1.2 What is the need for a seismically resilient river crossing and lifeline route?

Oregon is located in the CSZ making it subject to some of the world's most powerful, recurring earthquakes. Geologic evidence shows that more than 40 such earthquakes have originated along the CSZ fault over the last 10,000 years. The last CSZ earthquake occurred 320 years ago—a timespan that exceeds 75 percent of the intervals between these major earthquakes (see Figure 1-1). The Oregon Resilience Plan predicts extensive casualties, infrastructure damage, and economic losses from the next CSZ earthquake (OSSPAC 2013). [3]

[2] A lifeline route is a road that allows emergency services to respond after a major earthquake or other disaster, allows evacuation, and allows for transport of food, water, medical supplies, and other necessities.

[3] All citations refer to references in the SDEIS references attachment. It is available in the project library at https://www.multco.us/earthquake-ready-burnside-bridge/project-library.

Figure 1-1. Frequency and Magnitude of CSZ Earthquakes



Note: Earthquake magnitude (strength) numbers are approximate and based on the Richter scale.

Source: Oregon Live n.d.

We also know that the impacts of the next CSZ earthquake can be reduced through preparation including creating seismically resilient transportation lifeline routes—particularly to provide access to critical facilities in urban areas. Such lifeline routes will facilitate emergency response, rescue, and evacuation, as well as enable post-disaster economic and community recovery and help prevent permanent population loss and long-term economic decline (OSSPAC 2013). The importance of having a seismically resilient lifeline route across the Willamette River is why Multnomah County has proposed to make the Burnside Bridge earthquake ready.

1.1.3 Why is the Burnside Street crossing the best location?

Burnside Street extends 17 miles from Washington County to Gresham with very few overpasses that are vulnerable to collapse. By comparison, Interstate 84 (I-84), which runs relatively parallel to Burnside Street for the first 3 miles east of the river, is crossed in this section by 18 overpasses that were not built to current earthquake standards. In addition, unlike nearly all of the other downtown bridges, the Burnside Bridge approaches are not crossed by any Interstate 5 (I-5) or other highway overpasses that would collapse and block bridge access after a major earthquake. The intrinsic resiliency of Burnside Street (not including the existing bridge) is a key reason that a regional task force consisting of Metro, counties, cities, and the Red Cross designated the Burnside Corridor as a "Primary East West Emergency Transportation Route" (Task Force 1996); this designation is later reflected in regional plans (ODOT 2014). The Burnside Bridge provides a key link in the Burnside Street lifeline route connecting two sides of our region across the Willamette River.

However, at 96 years old, the bridge is an aging structure that requires increasingly more frequent and significant repairs and maintenance. Given its design and condition, the current Burnside Bridge would collapse in the next CSZ earthquake. In fact, none of the aging bridges crossing the Willamette River would be usable after such an event.[4]

The *Multnomah County Willamette River Bridges Capital Improvement Plan (2015–2034)* (Multnomah County 2015) prioritized creating a Burnside Street river crossing that can withstand a major earthquake. That led to the feasibility study (Multnomah County 2018) that confirmed that Burnside was the best location for creating an earthquake ready bridge in downtown Portland that would meet the proposed action's purpose and need.

[4] Sources: Multnomah County Willamette River Bridges Capital Improvement Plan 2015; EQRB Geotechnical Report 2020; OSSPAC 2013; Oregon DOT Highways Seismic Plus Report 2014

1.1.4 What is the project setting?

The Burnside Bridge, which crosses the Willamette River, is located in the center of Portland, Oregon (see Figure 1-2). Burnside Street is Portland's north-south street address baseline, and the Willamette River is the east-west baseline. The bridge provides daily connection across the Willamette River for about 35,000 vehicle trips and over 3,000 pedestrian and bicycle trips per day.

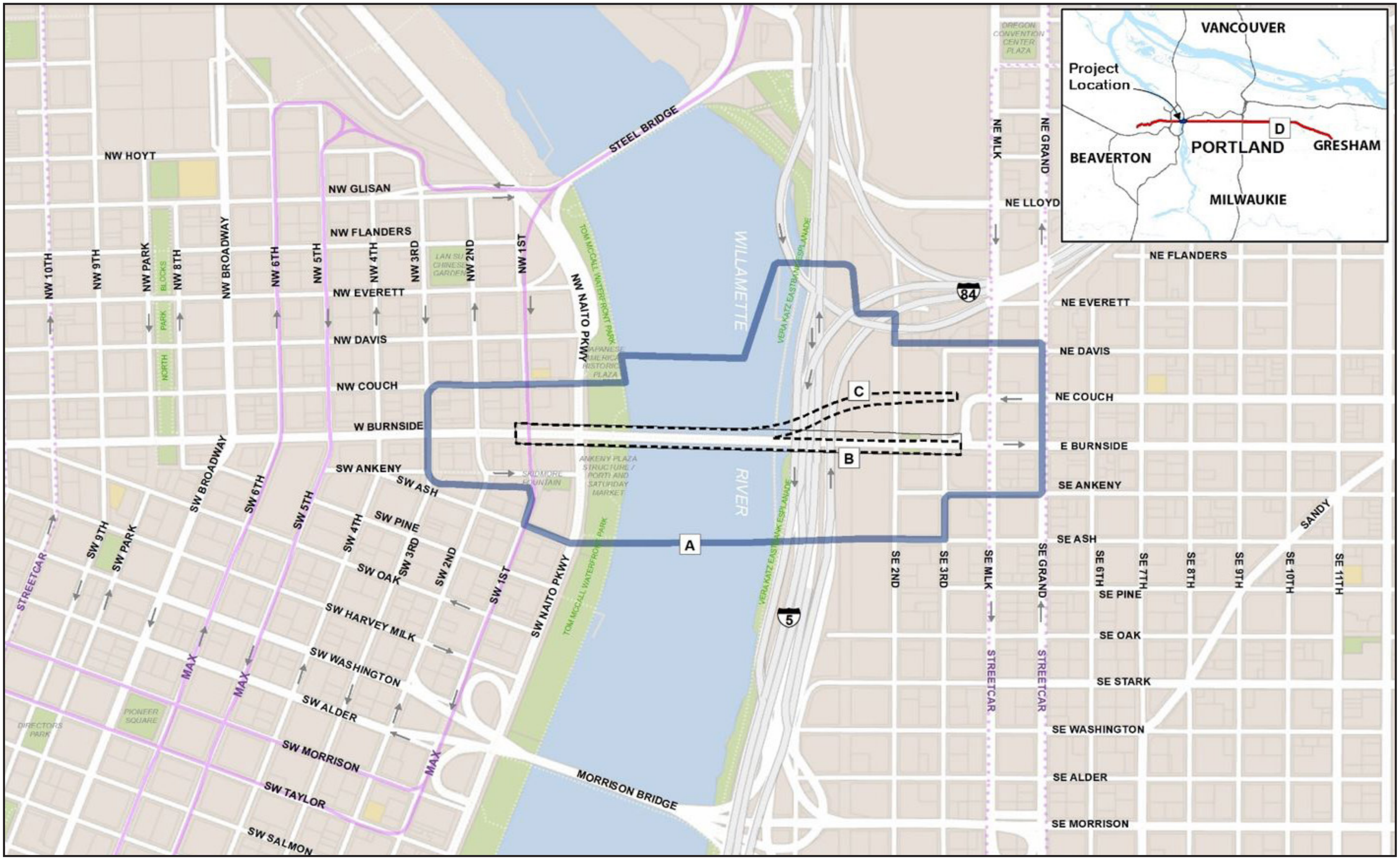
The current Burnside Bridge was built in 1926; it replaced the original 1892 bridge. The current bridge supports four lanes of general traffic, one transit-only lane, bicycle lanes, and sidewalks. It also provides on-street parking at the far western approach.

1.1.5 What needs is the Project addressing?

Need for a Seismically Resilient River Crossing and Lifeline Route

As noted above, all of the older bridges crossing the Willamette River are anticipated to suffer seismic damage in a major earthquake. None of the downtown bridges, including the newer ones, are expected to be usable immediately following the earthquake (see Figure 1-3). Some of the older bridges are anticipated to collapse; those that do not collapse are anticipated to suffer moderate to extensive damage. Many of the bridges, including the Tilikum Crossing, which is designed to not fail in the next CSZ earthquake, will nevertheless be unusable because the east approach is not seismically resilient due to liquefiable soils and because the west approach will be blocked by the collapse of major highway viaducts and ramps located above it. The new Sellwood Bridge is also designed to not fail, but it is far from downtown and may be inaccessible from downtown due to landslide-prone slopes along Macadam Avenue.

Figure 1-2. Project Area



Project Area

Project Area A

Retrofit
Short-span Alterative
Long-span Alternative B

Couch Extension C

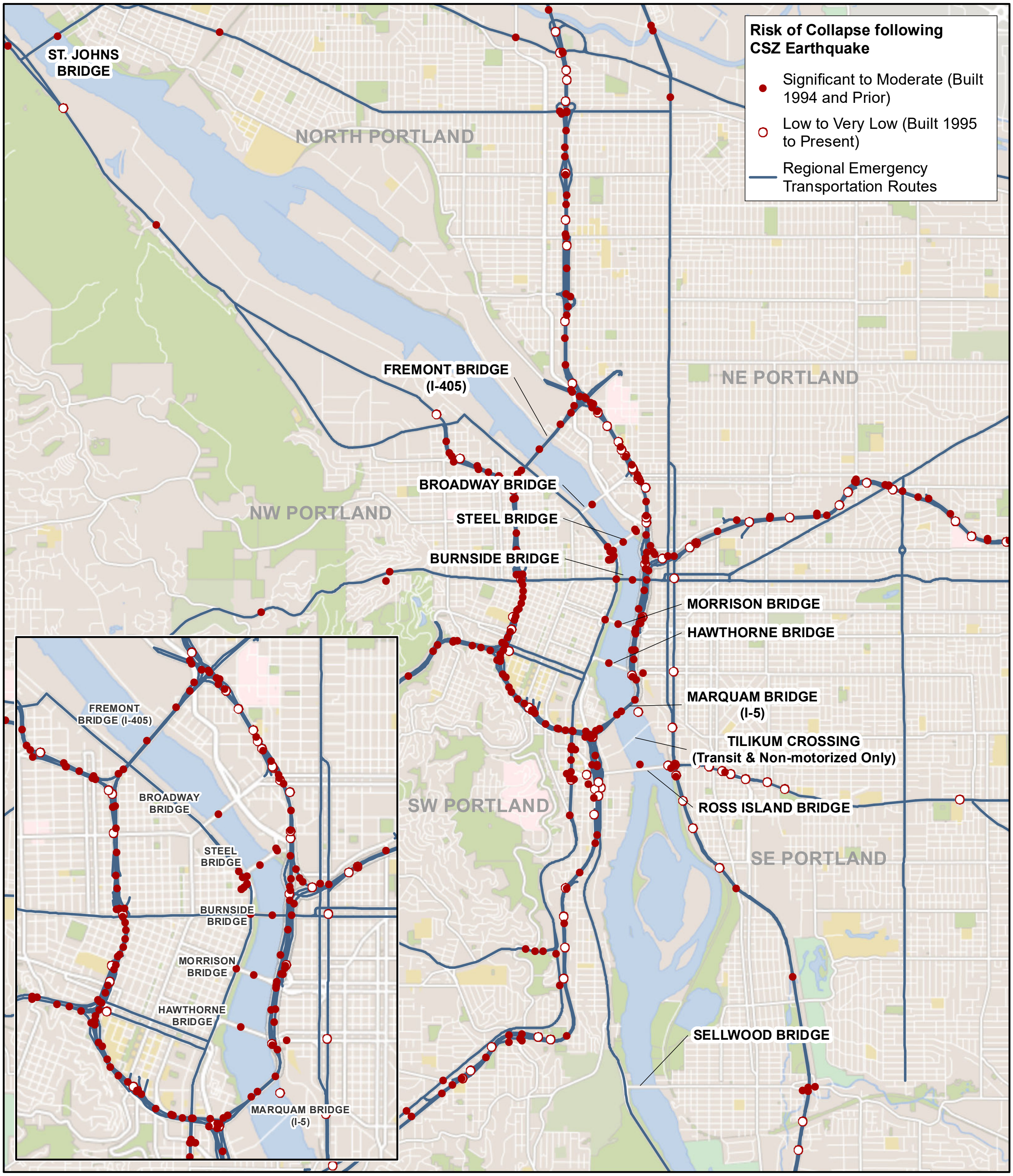
E/W Burnside St D

HDR, Parametrix

0 250 500 1,000 Feet

Earthquake Ready Burnside

Figure 1-3. Potential for Bridge and Road Structure Collapse/Failure



Bridge Collapse Potential

0 0.5 1 2 Miles

Need for Post-Earthquake Emergency Response

In their current condition, none of the designated lifeline routes or evacuation routes across the Willamette River will be available for emergency response, rescue, or evacuation immediately following, or possibly for months after, the earthquake. Figure 1-4 is a simulation of how a major CSZ earthquake would impact the existing Burnside Bridge.[5] Although not simulated in this graphic, the I-5 and I-84 ramps on the east side and the Harbor Wall on the west side would also be anticipated to fail.

Figure 1-4. Simulation of Existing Burnside Bridge after CSZ Earthquake

[5] This simulation was prepared by the project team based on the best available information on the likely magnitude, duration, and behavior of the next CSZ earthquake, as well as analysis of how the CSZ event would be likely to affect different elements of the existing bridge. The full video simulation can be found at: https://www.youtube.com/watch?v=sn98JkN5HXc&feature=emb_title.

Need for Post-Earthquake Recovery

Building resilient infrastructure is less costly to a community than losing access to and attempting to rebuild infrastructure following a disaster (Chang 2000). Transportation infrastructure damaged by an earthquake impairs a region's long-term ability to recover economically and socially after a disaster; this adversely affects a region's population and economy for many years after a major earthquake (OSSPAC 2013; Madhusudan and Ganapathy 2011).

Need for Emergency Transportation Routes and Seismic Resiliency as Stated in Plan and Policy Directives

Local plans and policies that designate Burnside Street as a lifeline and primary evacuation route help describe the need for this Project. In addition, statewide policy describes the need through recommendations for creating seismically resilient transportation routes such as this proposed project. Relevant plans and policies include:

- Regional Emergency Transportation Routes (Metro Task Force 1996)
- City of Portland Evacuation Plan (Portland BEM 2017)
- Oregon Resilience Plan (OSSPAC 2013)

Need for Long-Term Multimodal Travel Across the River

In addition to its function as a lifeline route, Burnside Street serves as an important long-term multimodal (multiple modes of travel such as pedestrians, bicyclists, cars, trucks, and transit) connection between the east and west sides of the Willamette River in downtown Portland and between Gresham and Washington County. The existing Burnside Bridge carries approximately 35,000 vehicles and over 3,000 bicyclists and pedestrians per day. The bridge currently carries three bus routes and is planned to carry a streetcar line. Any changes to the existing crossing should serve not only the post-earthquake lifeline need but should also address the continued long-term need for a safe multimodal crossing.

See Chapter 1 of the SDEIS for the full discussion of the project's purpose and need statement.

1.2 What are the possible solutions to meet the project purpose?

This section first describes the Draft EIS alternatives followed by the Refined Long-span Alternative studied in the SDEIS.

1.2.1 Feasibility Study

The process to identify and screen alternatives began in 2016 with the *EQRB Feasibility Study*. The EQRB project team worked with community and agency stakeholders to develop project objectives and a problem statement, build project awareness through early engagement, and analyze more than 100 options for creating an earthquake ready Willamette River crossing. The options covered a wide range of potential solutions including (see Figure 1-5):

- Preservation alternatives (update the bridge, but not to full seismic resiliency, and supplement with a lower investment seismic solution such as trams, ferries, and other technologies)
- Seismic retrofit alternatives (retrofit the existing bridge to full seismic resiliency)
- Replacement alternatives (replace the existing bridge with a new bridge or tunnel)
- Enhanced seismic retrofit alternatives (partial retrofit and partial replacement of existing bridge)
- Enhance or replace a different bridge (make a different crossing earthquake ready)

Screening criteria were developed and applied (see the *EQRB Alternatives Screening Technical Memorandum*) with the Project's Stakeholder Representative Group, and the results were shared with other project committees (the Senior Agency Staff Group and the Policy Group), as well as with the public through online events and in-person open houses. Following public input, the feasibility study was completed in November 2018, and the Multnomah County Board of Commissioners adopted the draft project purpose and need statement and the range of alternatives for further study.

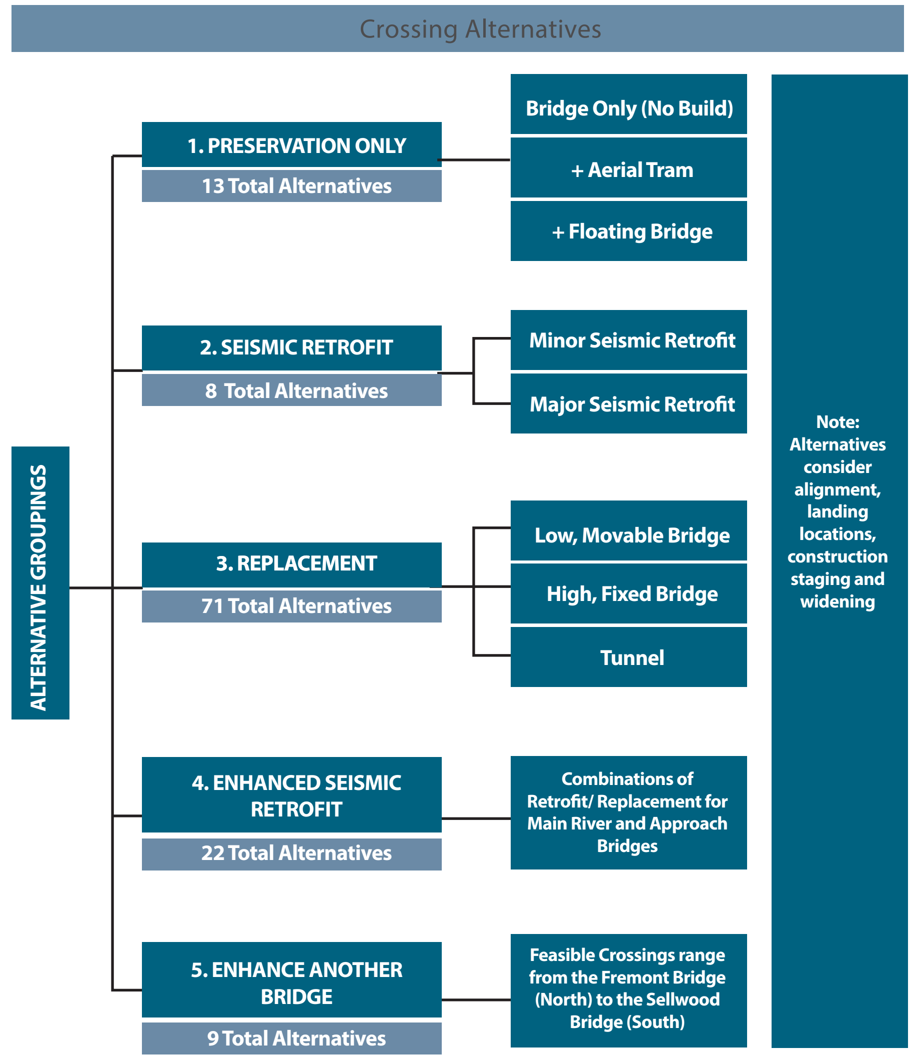
1.2.2 Informal Scoping and Screening

Following the feasibility study, the project team conducted additional analysis and gathered stakeholder input to further evaluate, test, and refine the recommended alternatives prior to initiating an EIS. This analysis and input led to further revisions to the range of alternatives:

- The High Fixed Bridge was dropped from further consideration because of added impacts and costs, and because it could not reasonably meet the US Coast Guard (USCG) vertical clearance requirements.
- Further geotechnical analysis clarified a heightened risk of seismic damage to bridge piers[6] within deep, liquefiable soils located near both the east and west banks of the river. This led to the development of a long-span alternative that would minimize the number of piers within those zones and reduce overall construction costs.
- Agency and stakeholder input influenced the development and location of pedestrian, bicycle, and Americans with Disabilities Act (ADA)-accessible connections at both the east and west ends of the bridge.
- Input from social services providers influenced revisions to the west bridge abutment so that the replacement alternatives could avoid blocking essential access doors to the Portland Rescue Mission during construction.
- Users of the Burnside Skatepark requested that the Project preserve the skatepark. In addition, historic preservation specialists determined that the skatepark is eligible for listing on the National Register of Historic Places. Through refined design and construction approaches, three of the four build alternatives studied in the Draft EIS would preserve the skatepark.

As a result of this additional analysis and input, the alternatives were refined, and four were advanced to the Draft EIS.

Figure 1-5. Range of Potential Crossing Types Evaluated in the Feasibility Study



[6] Pier (aka, bent) – An intermediate vertical support under a bridge; the support consists of one or more columns connected at their top-most ends by a cap, strut, or other member. A pier is sometimes differentiated from a bent by the number of columns (one versus more than one, respectively).

1.2.3 Alternatives Carried Forward to the Draft EIS

The following summarizes the four build alternatives and options, as well as the No-Build Alternative, that were studied in detail in the Draft EIS. More detail can be found in Chapter 2 of the Draft EIS or in the *EQRB Bridge Replacement Technical Report*.

Because the Project is intended to serve two reasonably foreseeable future conditions (both before and after the next CSZ earthquake), the EIS analysis considered how each alternative would perform in both of those scenarios.

No-Build Alternative

As required by the National Environmental Policy Act (NEPA), the EIS evaluated a No-Build Alternative and compared its impacts to the proposed build alternatives. The No-Build analysis describes the impacts and outcomes if the proposed action is not implemented. The No-Build Alternative assumes that all other programmed and planned projects within the corridor would move forward, but that the Burnside Bridge would not be made earthquake ready.

Build Alternatives – Common Elements of Operations and Design

The four Draft EIS build alternatives are described below:

- The Enhanced Seismic Retrofit Alternative would partially retrofit the existing bridge, as well as replace major components required to meet seismic design criteria.
- Three different replacement alternatives would remove the existing bridge structure and build a new bridge at the same location. These include the Replacement Alternative with Short-span Approach, the Replacement Alternative with Long-span Approach, and the Replacement Alternative with Couch Extension.

Under normal operations, all build alternatives would provide access across the bridge for the same transportation modes that presently use the bridge. They were also designed to accommodate potential future streetcar service. All build alternatives would also accommodate all river navigation and surface transportation modes (Union Pacific Railroad [UPRR] tracks, I-5, local streets, the MAX light rail transit line, and bicycle and pedestrian paths) that presently pass under the bridge.

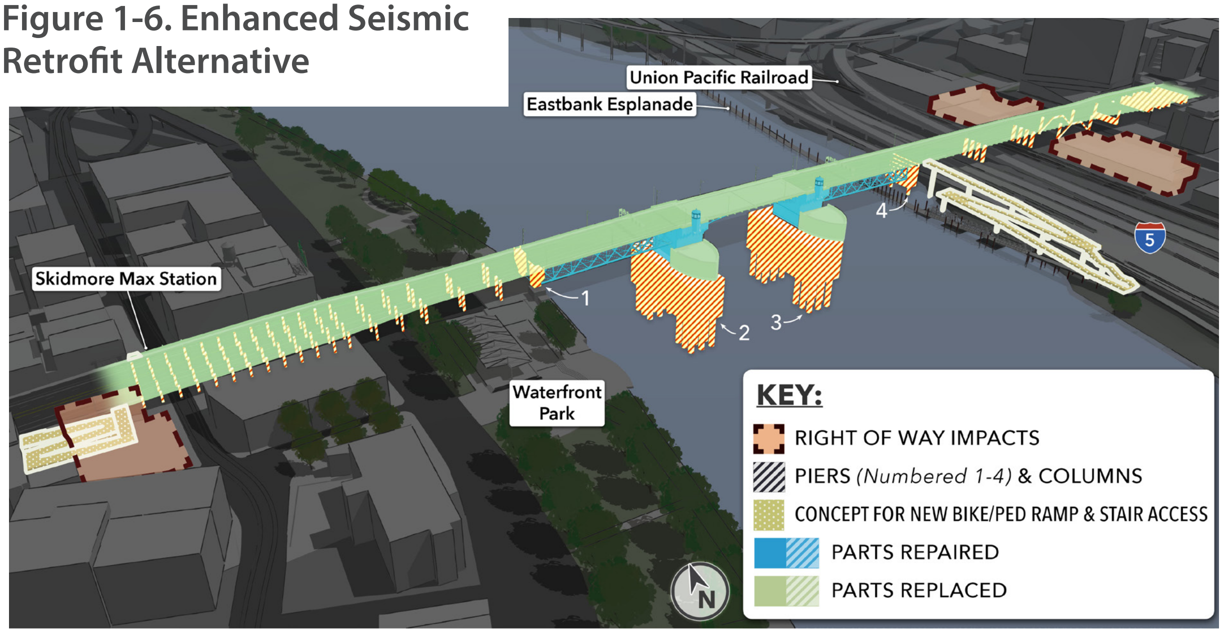
All build alternatives are anticipated to remain fully operational and accessible for all modes of transportation following a CSZ earthquake of up to a 9.0 magnitude on the Richter scale, thus providing a reliable crossing for emergency response, evacuation, and community and economic recovery. The replacement alternatives would be designed and constructed to provide at least 2 feet of clearance between the bridge and adjacent buildings to allow independent movement during a seismic event. Presently, buildings and elevated highway infrastructure are very close (in some places there is only a one-inch gap) to the bridge, making it likely that they would knock into each other during a major seismic event and increase the damage to both.

Enhanced Seismic Retrofit Alternative

With this alternative, some parts of the bridge would be retrofitted and some would be replaced. Figure 1-6 is an aerial view of the Retrofit Alternative, and Figure 1-7 shows which elements would be retrofitted or replaced. See Table 1-1 for a comparison of the major bridge elements for all of the build alternatives.

Under this alternative, the bridge width would be the same as existing, which narrows over the water. Cross sections showing bus, vehicle, and pedestrian and bicycle lanes for different sections of each alternative are shown in Figure 1-8.

Figure 1-6. Enhanced Seismic Retrofit Alternative



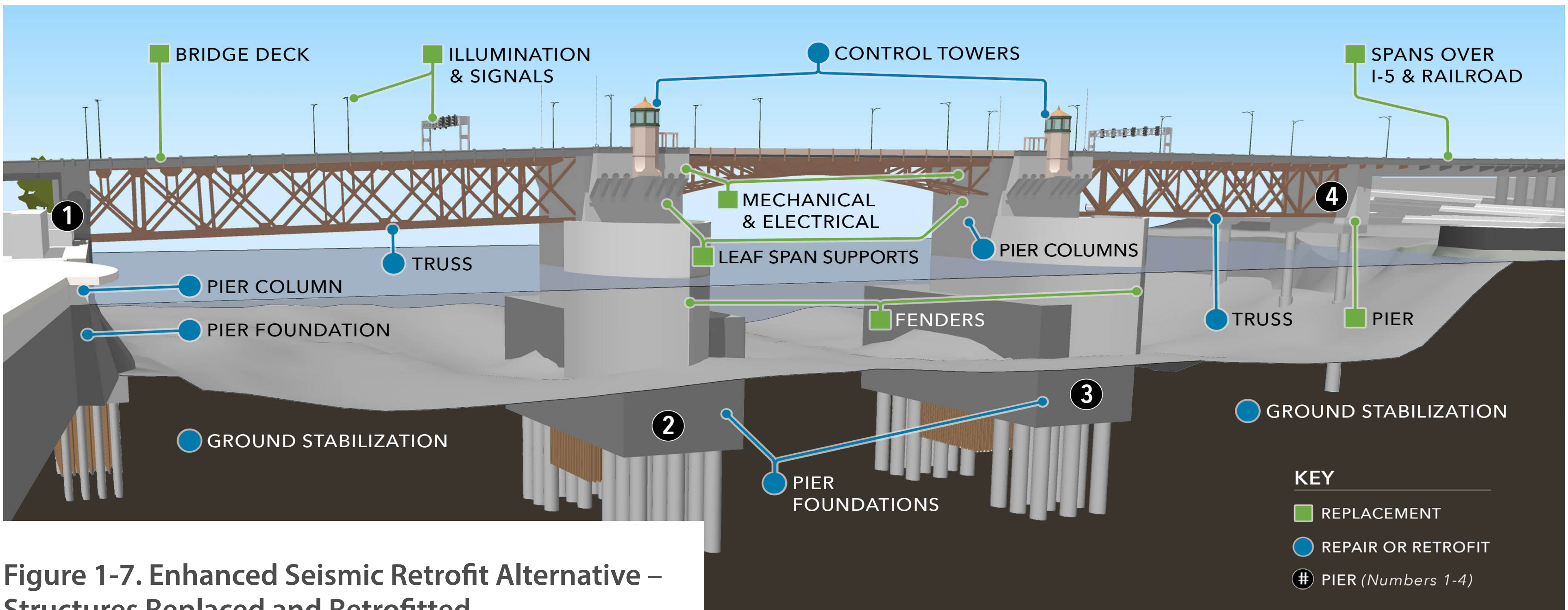
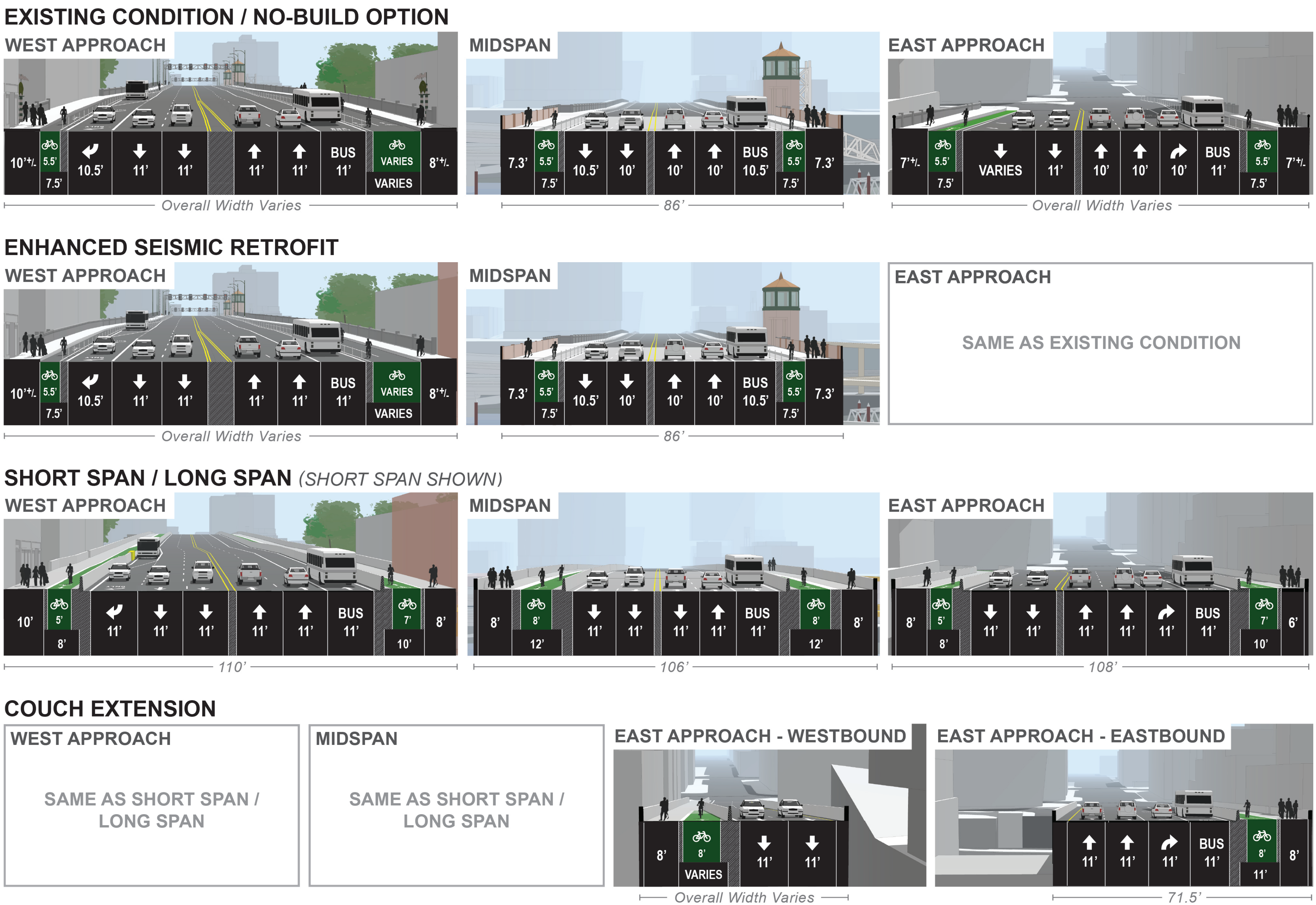


Figure 1-7. Enhanced Seismic Retrofit Alternative – Structures Replaced and Retrofitted

Figure 1-8. Lane Configurations for the Draft EIS Alternatives



Draft EIS Replacement Alternatives

The three replacement alternatives considered in the Draft EIS would remove and replace the existing Burnside Bridge. Like the existing bridge, they are comprised of three separate segments: the west approach spans, the east approach spans, and a movable center span system that would be constructed over the primary navigation channel. The Draft EIS replacement alternatives would widen the portion across the water to provide more space for bicycles, pedestrians, and safety buffers (see Figure 1-8). For the movable section of the replacement alternatives, the Draft EIS evaluated a bascule[7] span (similar to the existing bridge) and vertical lift options.

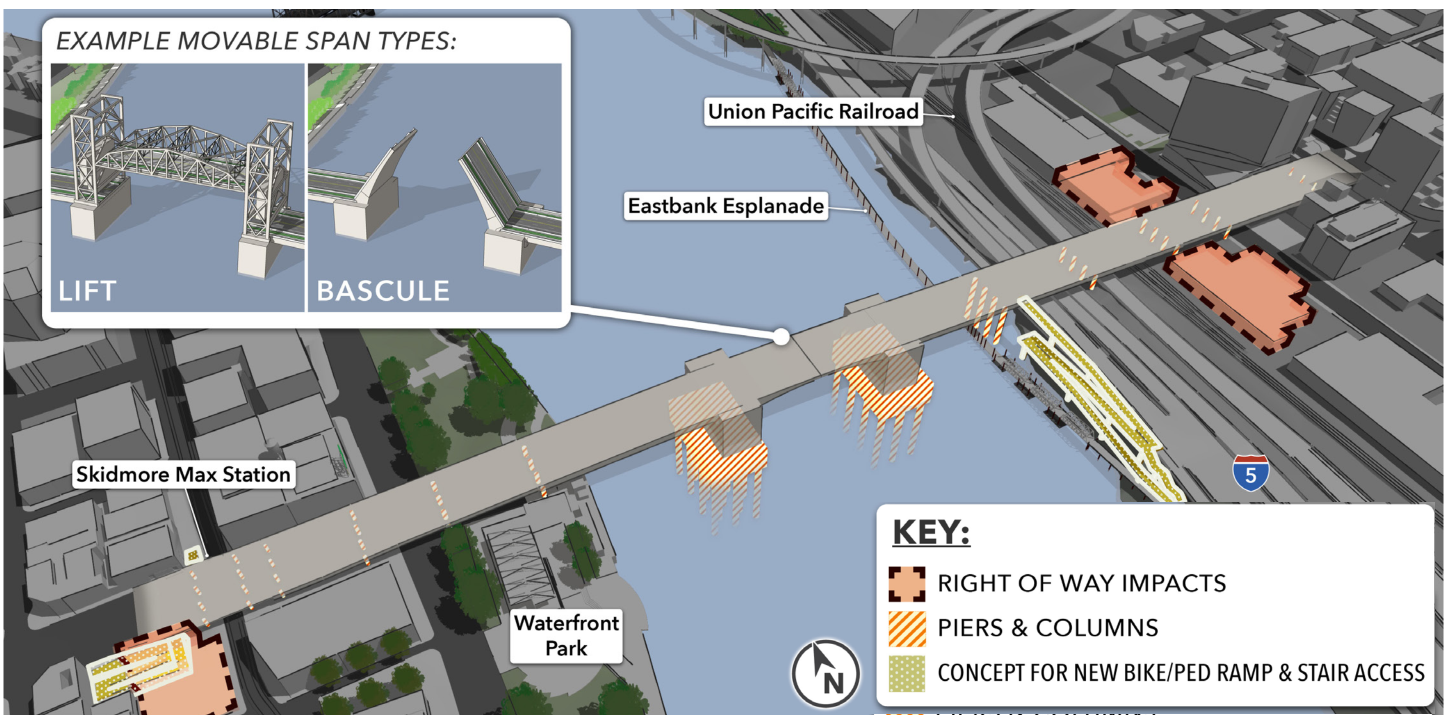
See Table 1-1 for a comparison of the major bridge elements of the Draft EIS Alternatives and the Refined Long-span Alternative.

Replacement Alternative with Short-Span Approach

The Short-span Alternative would completely replace the existing structure but would be very similar in alignment. As with the existing bridge, the structural members of the approach spans would be below the bridge deck, and it would have the same connection to W Burnside Street and only slightly modified connections to NE Couch Street and E Burnside Street on the east end. The east and west approaches of the Short-span Alternative would each be composed of six spans (fewer than the existing bridge) connecting to a central movable span and would eliminate the need for the existing support bent (Pier 1) along the Harbor Wall. On the east approach, it would place one additional bent in the river east of the Vera Katz Eastbank Esplanade to maintain an obstruction-free navigation channel. Figure 1-9 shows an aerial view of the proposed layout including the proposed locations of bents and span sections, as well as bascule and vertical lift options for the movable span.

This alternative would provide more space for bicycle and pedestrian infrastructure on the bridge, especially in the midspan of the bridge, than the Retrofit Alternative (Figure 1-8). Connection points for bicycles and pedestrians at either end of the bridge would be the same as shown for the Retrofit Alternative in (Figure 1-7).

Figure 1-9. Replacement Alternative Short-Span Approach



[7] Bascule – A bridge with one or two leaves which rotate from a horizontal to a near-vertical position, providing unlimited vertical clearance above.

Replacement Alternative with Long-Span Approach

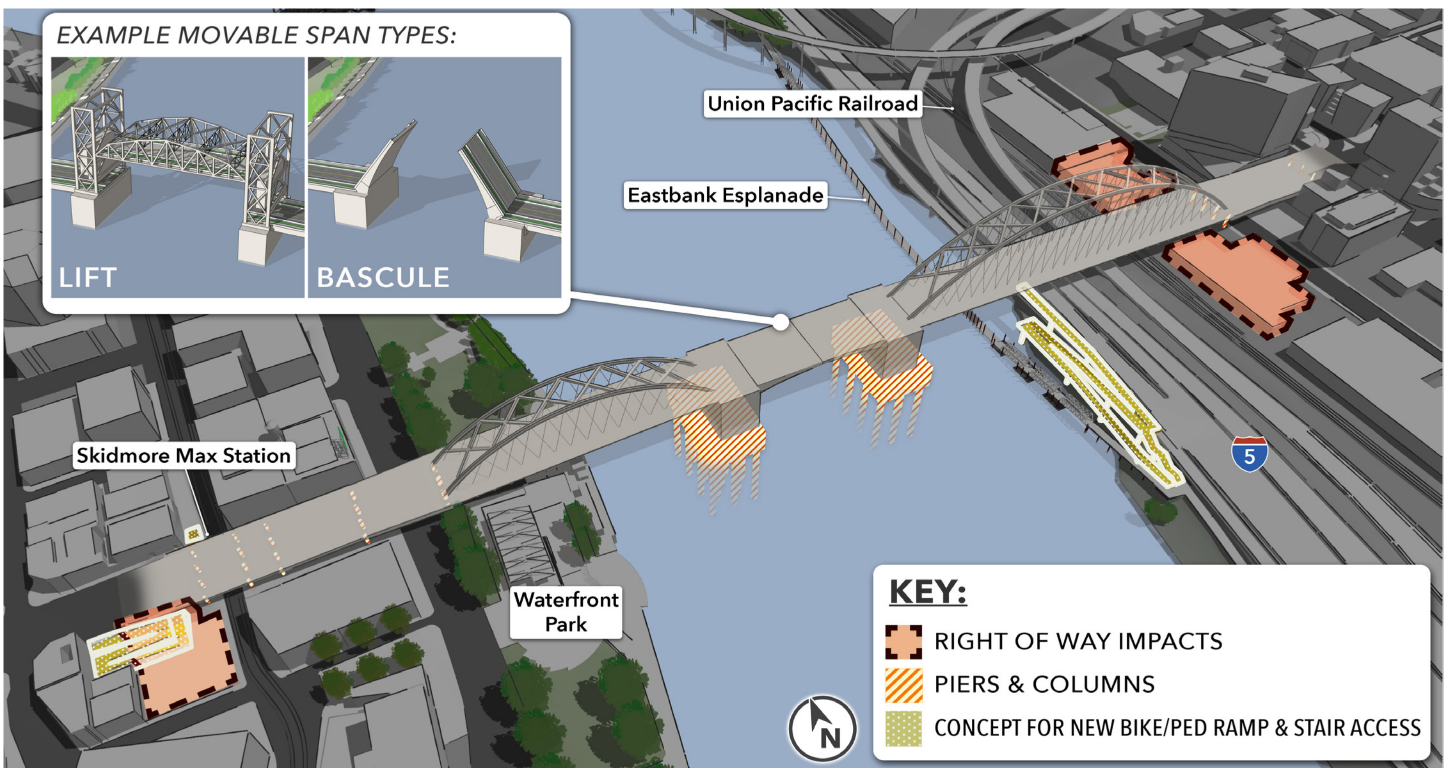
Except where identified below, the Long-span Alternative would be the same as the Short-span Alternative.

Bridge alignment and connections would be very similar to the Short-span Alternative. The primary differences would be that the Long-span Alternative approaches would be supported by above-deck superstructure that would reduce the need for piers, bents, deep foundation, and soil improvement work. Common long-span bridge types include tied-arch (e.g., Fremont), cable-stayed (e.g., Tilikum), and through-truss (e.g., Steel and Hawthorne) bridges. For the east approach, the height of the superstructure above the bridge deck could range from about 140 feet for a tied-arch bridge to about 250 feet or more for a cable-stayed bridge.

On the west side, the Long-span Alternative would include a clear span extending from the east side of Naito Parkway eastward approximately 450 feet to one of only two in-water piers at the west end of the center movable span (thus eliminating the columns in Gov. Tom McCall Waterfront Park and on the Harbor Wall). On the east side, the bridge would extend from the movable span in the river to just west of SE 2nd Avenue—a distance of approximately 740 feet; this would eliminate a pier from the river and two sets of piers west of SE 2nd Avenue. Table 1-1 compares the major bridge elements of the alternatives.

Figure 1-10 shows an aerial view of the Long-span Alternative with the proposed location of bents and bridge span sections assuming the superstructure would be a tied-arch span. It also shows examples of the two potential movable-span options: bascule and vertical lift.

Figure 1-10. Replacement Alternative with Long-Span Approach



Replacement Alternative with Couch Extension

The Couch Extension Alternative (see Figure 1-11) has the same west approach and movable-span sections as the Short-span Alternative, but it would provide a different configuration for the east approach. The east approach span would extend the Burnside/Couch couplet approximately 1,100 feet farther west on a viaduct over SE 3rd and 2nd Avenues, the UPRR tracks, the freeway ramps, I-5, and the river; this would result in a bridge that splits just east of the movable span.

Figure 1-11. Replacement Alternative with Couch Extension

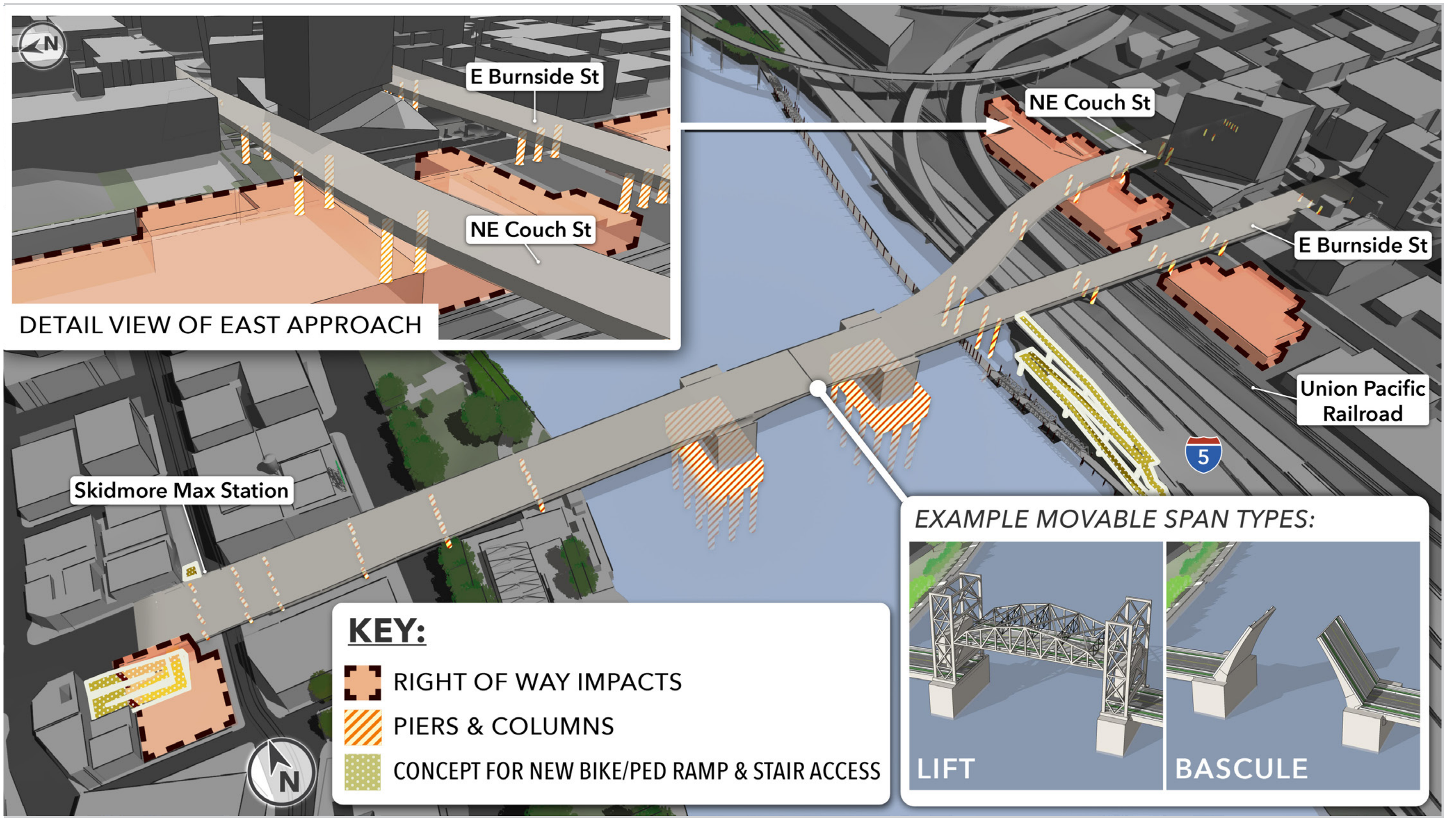


Table 1-1. Major Bridge Elements by Alternative

Element	Retrofit Alternative	Short-Span Alternative	Draft EIS Long-Span Alternative	Refined Long-Span Alternative	Couch Extension
Piers and Bents	Encase existing Piers 2 and 3 in concrete; Add multiple deep reinforced concrete foundation columns to Piers 1-4. Seismic upgrade of all 34 existing on-land support bents and E and W bridge abutments. 7 bents located in GHZ.	Replace all piers on deep foundations; Bent on both approaches supported by columns on drilled shafts. Stabilize soils surrounding 5 bents located in the GHZ on both approaches to protect against lateral spreading during a seismic event.	Same as Short-span. Stabilize soils surrounding 1 bent located in GHZ in east approach.	Same as Long-span. Stabilize soils surrounding 1 bent located in GHZ in east approach.	Same as Short-span. Stabilize soils surrounding 8 bents located in GHZ in both approaches.
West Approach	13 bents west of Naito Pkwy and 5 in Waterfront Park.	4 bents west of Naito Pkwy and 2 in Waterfront Park.	4 bents west of Naito Pkwy and 1 in Waterfront Park.	4 bents west of Naito Pkwy and 2 in Waterfront Park.	4 bents west of Naito Pkwy and 2 in Waterfront Park.
East Approach	15 bents on land and 1 in river.	4 bents on land and 1 in river.	3 bents on land and 0 in river.	Same as Draft EIS Long-span.	10 bents on land and 2 in river.
Movable Bridge Span	Retrofit or replace existing bascule span leaf.	Could be a bascule span or vertical lift bridge.	Same as Short-span.	Replace with bascule span leaf.	Same as Short-span.

E = east; GHZ = geologic hazard zone (see Section 1.3 and Figure 1-15); W = west.

1.2.4 Project Refinements Studied in the Supplemental Draft

Refined Long-Span Alternative

Horizontal and vertical bridge alignment, span lengths and connections would be very similar to the Draft EIS Long-span Alternative. The primary differences are that the Refined Long-span Alternative would be narrower. It would have four rather than five motor vehicle lanes, and it would have narrower bicycle lanes and sidewalks (the width of the sidewalk plus bicycle lane would range from 14 to 17 feet in each direction, compared with 20 feet for the Draft EIS Long-span and 12.8 feet for the existing bridge). Narrowing the bridge is the primary source of cost savings.

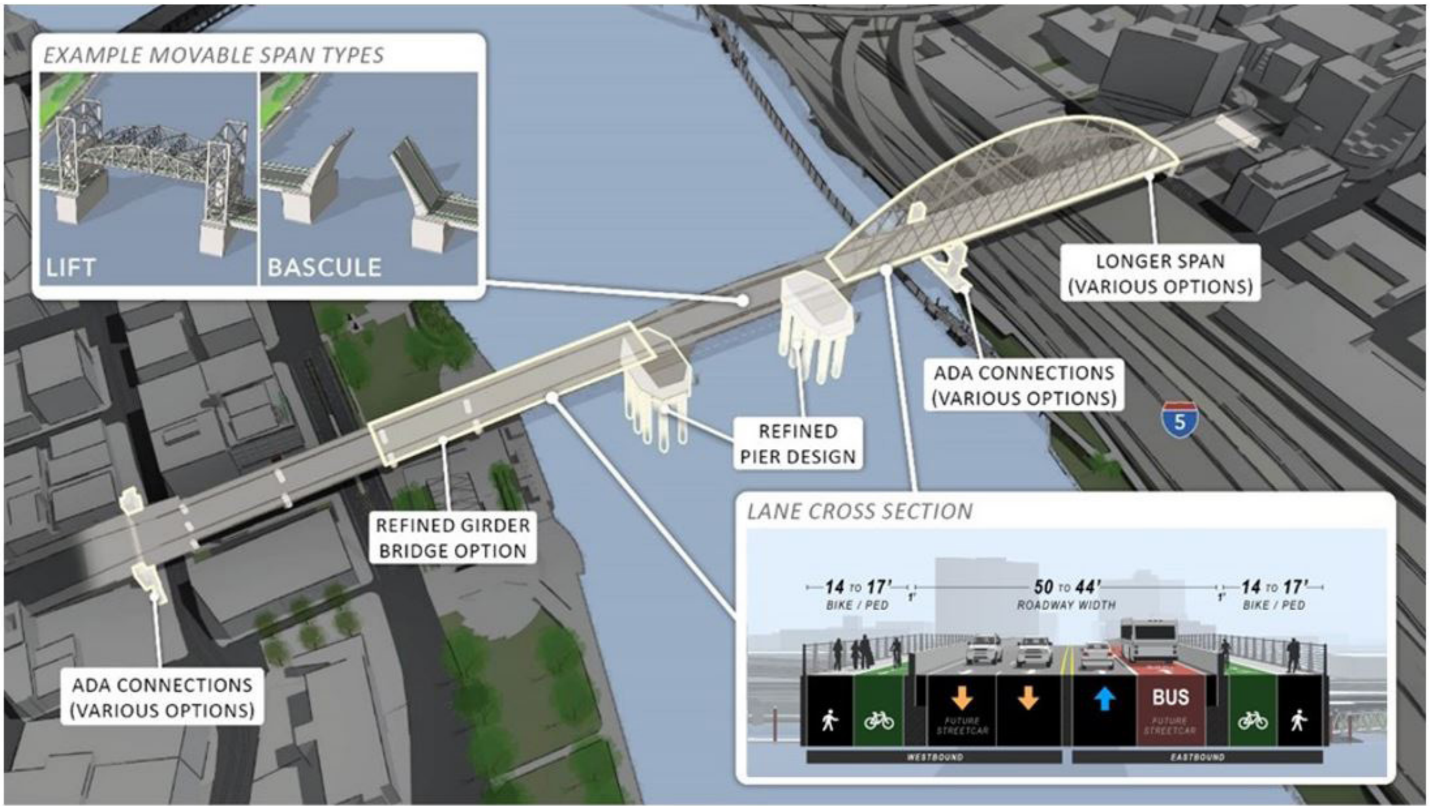
The Refined Long-span Alternative also identified one bridge type option (a girder bridge) for the west approach (whereas the Draft EIS Long-span has four types including girder, through-truss, cable-stayed, and tied-arch) and further evaluated bascule and vertical lift bridge options for the center movable span. The girder bridge and the bascule bridge are the lowest-cost options for those segments and would provide environmental advantages over the other bridge types evaluated for the Draft EIS Long-span Alternative. For the east approach, the Refined Long-span evaluated refined tied-arch options and a refined cable-stayed option.

Figure 1-12 identifies the elements of the Refined Long-span Alternative that are different from the Draft EIS Long-span Alternative that was identified in the Draft EIS as the Preferred Alternative. The SDEIS also studied four different lane configuration options for the Refined Long-span Alternative as shown in Figure 1-13. While the SDEIS analysis considered a range of potential widths for the vehicle lanes and the bicycle/pedestrian facility widths (ranging from 14 to 17 feet in each direction), the widths shown in Figure 1-12 and Figure 1-13 represent the approximate average of the range of widths.

Comparison with the Refined Short-Span and Refined Couch Extension Alternatives

The Refined Long-span Alternative was evaluated in detail for the SDEIS because it is a lower-cost version of the Draft EIS Preferred Alternative that would provide many of the Draft EIS Preferred Alternative's advantages over the other build alternatives evaluated in the Draft EIS. For comparison purposes, the project team also evaluated how refined versions of the other Draft EIS replacement bridge alternatives—the Short-span and the Couch Extension Alternatives—would compare with the Refined Long-span Alternative. The refinements include the same cost-cutting measures that were applied to create the Refined Long-span Alternative (for example, a narrower bridge with four rather than five lanes). This evaluation demonstrated that while many of the impacts would be the same, the Refined Long-span Alternative, very similar to the Draft EIS Preferred Alternative, has less seismic risk, lower impacts, and lower costs than similarly refined versions of the other replacement alternatives. Chapter 2 (Section 2.2.4) of the SDEIS provides an overall comparison of performance, impacts, and costs for the three refined alternatives, and Chapter 3 of the SDEIS provides a more detailed comparison of impacts for those environmental issues where there would be a meaningful difference among the refined alternatives.

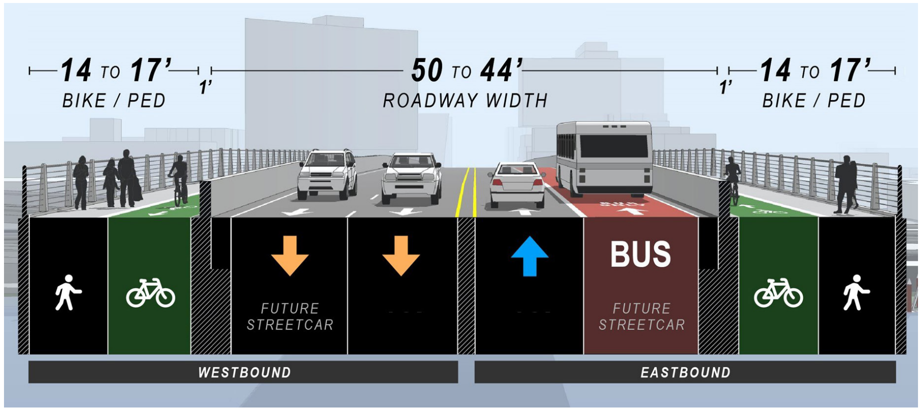
Figure 1-12. Replacement Alternative – Refined Long-Span Alternative



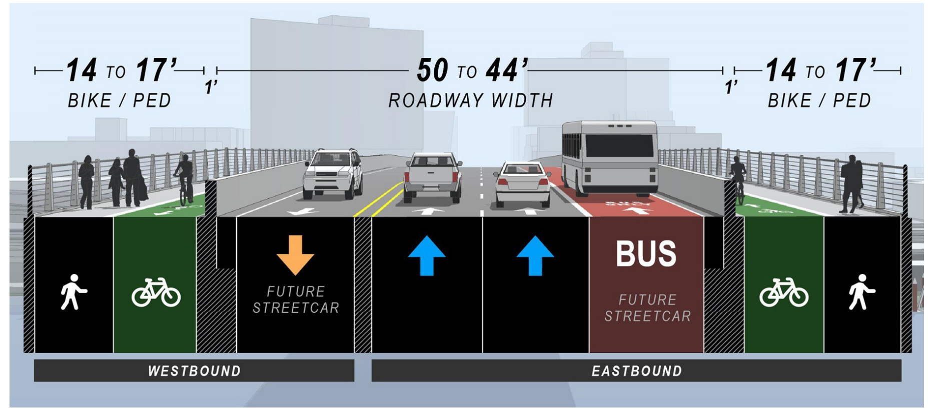
Notes: The Refined Long-span Alternative evaluated in the SDEIS includes both cable-stayed and tied-arch options for the east span. This figure shows only the tied-arch option. The Draft EIS studied and the SDEIS further evaluated bascule and vertical lift options for the center movable span. The inset shows both options, but the main figure shows the bascule option. This figure also shows just one of the lane configuration options considered in the SDEIS. All four lane configuration options studied are shown in Figure 1-13 below and in Figure 2.4-8 of the SDEIS.

Figure 1-13. Refined Long-Span Alternative – Lane Configuration Options

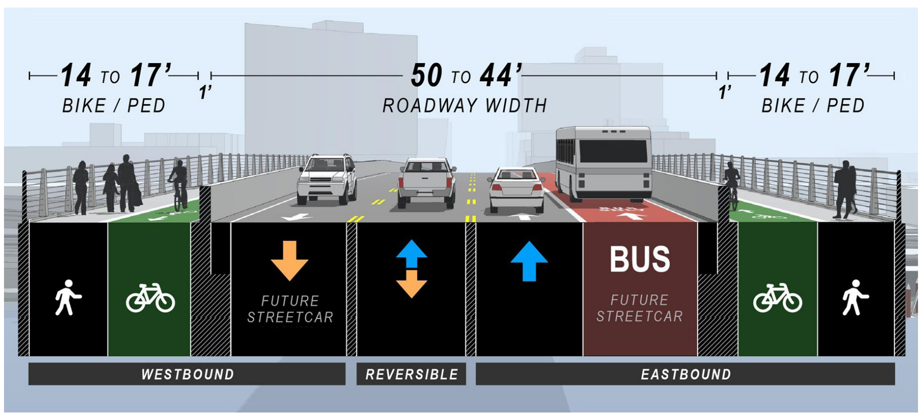
Four different lane configuration options are being evaluated for the Refined Long-span Alternative.



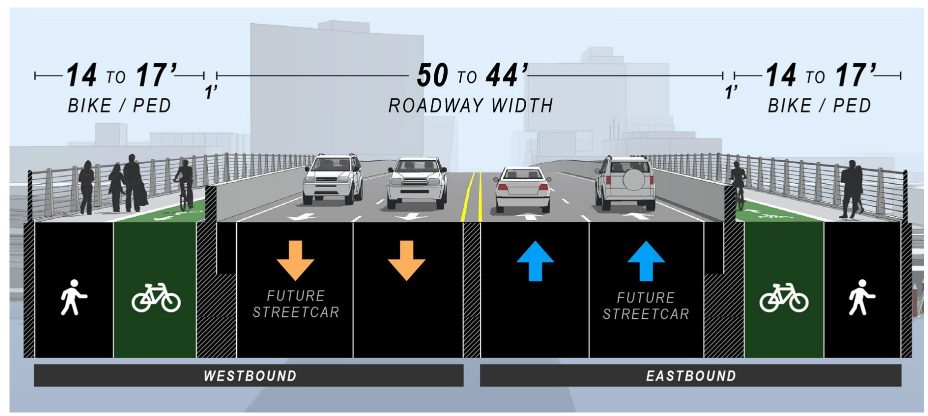
Option 1 – Two Westbound Lanes | One Eastbound + One Bus Lane



Option 2 – One Westbound Lane | Two Eastbound + One Bus Lane



Option 3 – Reversible Lane



Option 4 – Two Westbound Lanes | Two Eastbound Lanes (Bus Queue Jump)

Note: A range of potential lane widths for different modes are being considered and would be determined in final design. The analysis shows that within the range of sidewalk, bicycle lane and vehicle lane widths being considered, the differences in impacts are not significant.

1.2.5 Temporary Bridge Options

The EQRB Draft EIS analyzed three temporary bridge options that could be constructed to allow some level of vehicular, pedestrian, and bicycle traffic to cross the Willamette River at Burnside Street while the main bridge is closed during construction. A temporary detour bridge would help reduce the impacts on cross-river travel, but it would not accommodate all of the bridge's current vehicle travel demands.

Because the temporary bridge would have a high cost, higher impacts, longer duration of construction, and a limited ability to accommodate travel demand for the Burnside Bridge, the Draft EIS Preferred Alternative selected a No Temporary Bridge option and the Refined Long-span Alternative does not include a temporary bridge during construction. With this option, the Burnside crossing would be fully closed to all modes for about 4 years with the replacement alternatives. Traffic management would include rerouting buses, autos, bicycles, and pedestrians to adjacent river crossings, as well as potentially implementing travel demand and transportation system management to reduce trips and encourage more transit, pedestrian, and bicycle use. Buses would likely detour across the adjacent Steel Bridge. Vehicle, bicycle, and pedestrian traffic would detour over the Steel Bridge, Morrison Bridge, and the Hawthorne Bridge. See Figure 1-14.

1.2.6 Cost Estimates and Project Funding

The current cost estimates that were considered in the SDEIS range from $830 to $915 million for the Refined Long-span Alternative and its range of design options. Similar to the Draft EIS Preferred Alternative, no temporary bridge for motor vehicles, bicyclists, or pedestrians will be provided. Based on a high-level assessment, the Refined Long-span Alternative is still expected to be the lowest-cost alternative and the Couch Extension would be the highest-cost. Given the current conceptual level of design, these preliminary cost estimates are expressed as a "probable range," which means that a final cost is expected to be within that cost range. A risk analysis was performed by the County for the refinements with the Preferred Alternative in January 2022.The cost range for the Refined Long-span Alternative (see SDEIS Attachment O, *Cost Assessment Summary Sheets*) reflects the bridge types assumed and an assessment of risks with each bridge alternative. As the project design advances, the cost range will narrow. The final cost will be influenced by design details, bridge type selection, risk mitigation, market conditions at the time of construction, and exploring the use of a construction manager/general contractor (CM/GC) contracting method to identify cost-saving opportunities. Originally, the Draft EIS cost range for the Long-span Alternative was $800 to $965 million. Based on the results of the cost risk analysis performed after publication of the Draft EIS, a more current cost for the Draft EIS Long-span Alternative is estimated at approximately $1.05 billion.

The Project has secured funding for the design phase, which is scheduled to begin after the publication of Final EIS and issuance of the ROD.

Figure 1-14. Full Closure of Bridge During Construction

1.3 What would be the consequences of the different alternatives?

This section briefly summarizes the impacts of the Draft EIS alternatives and compares them to the impacts of the Refined Long-span Alternative that was studied in the SDEIS. The SDEIS Refined Long-span Alternative is the Selected Alternative identified in the ROD.

1.3.1 Consequences of the No-Build Alternative

The primary factor differentiating the No-Build Alternative from the build alternatives is that the No-Build Alternative would not meet the purpose and need of the Project. It would leave downtown Portland with no usable Willamette River crossing after the next CSZ earthquake. Currently, there are 45 traffic and transit lanes that cross the river in the downtown area. With the No-Build Alternative, all 45 lanes would be severed; this would significantly hamper emergency response, evacuation, reunification, and long-term community and economic recovery. The No-Build Alternative would forego the build alternatives' bicycle, pedestrian, and safety improvements, as well as the ancillary improvements including improved stormwater quality, park and recreation access, improved security, and removal of contaminated soils and sediment. On the other hand, it would avoid the immediate adverse impacts associated with constructing the build alternatives including the impact of removing the historic bridge. However, at 96 years old, the existing bridge will need to be replaced or significantly retrofitted at some point in the future.

1.3.2 Consequences of the Build Alternatives

All of the build alternatives would meet the basic purpose and need for the Project, although the Draft EIS Long-span Alternative and the Refined Long-span Alternative would each provide a greater level of seismic resiliency (due to fewer piers in the geologic hazard zone) compared with the other build alternatives. The following compares and contrasts the benefits and impacts of the build alternatives.

Traffic, Freight and Transit

Long-term impacts would include small safety improvements, especially with the replacement alternatives, and the ability to run streetcar service across the bridge. The main difference between the Refined Alternative compared to the Draft EIS alternatives would be the reduction of motor vehicle lanes from five to four. This would provide a significant cost savings but would also result in added intersection delay and queueing. Lane Configuration Options 1 and 2 would have the largest impact to intersection delay and queuing, Lane Option 3 would have less intersection delay but greater safety impacts, and Lane Option 4 would have the greatest impact to bus travel times.

Because the Draft EIS replacement alternatives would have narrower average offset distance to the roadside barrier compared to the No-Build, they would have greater vehicle crash rates. The Refined Long-span would have even narrower offset distances and accordingly would have greater vehicle crash rates than the Draft EIS replacement alternatives; this would vary by lane configuration option with Lane Option 4 having the greatest vehicle crash rates.

Short-term impacts would differ primarily in that the Retrofit Alternative would have the shortest temporary closure duration of 2 years compared to 4 years with the replacement alternatives. Construction of all the build alternatives would also require temporary closures of the MAX station under the west end of the bridge ranging from a total of 8 weeks for the Retrofit Alternative to a total of 14 weeks for the replacement alternatives; TriMet would use buses to shuttle passengers around the closed portion of MAX track.

Bicyclists and Pedestrians

Compared to the No-Build Alternative, all build alternatives, especially the replacement alternatives, would provide safer pedestrian and bicycle facilities across the bridge and would connect to the broader network; the replacement alternatives would also provide wider and more protected bicycle lanes and sidewalks. The Refined Long-span Alternative includes 14- to 17-foot bicycle/pedestrian facilities in each direction, compared to 12.8 feet on the existing bridge and 20 feet with the Draft EIS Long-span Alternative. All of the build alternatives would add a physical barrier separating the motor vehicle lanes from the bicycle and pedestrian facilities. While the Refined Long-span Alternative would be a substantial safety improvement for bicyclists and pedestrians compared to the existing bridge, it would not provide the same level of comfort as the Draft EIS Long-span Alternative and could have higher risk of conflict between bicyclists and pedestrians due to the bicycle and pedestrian facilities being narrower than those proposed with the Draft EIS Long-span.

The Draft EIS evaluated adding either stairs or ramps near the west end of the bridge to connect to W 1st Avenue and the Skidmore Fountain MAX station, and it studied ramp and elevator or stair options near the east end that would connect to the Vera Katz Eastbank Esplanade. The Refined Long-span Alternative analysis was expanded to include the addition of an elevator or stair option and an improved sidewalk connection option between the bridge and W 1st Avenue. While elevators and stairs would be an improvement over existing conditions and would generally be more convenient for pedestrians and many people with disabilities, they would be less convenient for bicyclists and subject to temporary maintenance closures and security concerns. The Draft EIS Long-span Alternative does not identify a preferred connection option, and potential refinements to the Preferred Alternative do not either, as discussed in Section 2.4.5 of the SDEIS.

Construction of all alternatives would temporarily (3.5 to 4.5 years) reroute approximately 500 to 1000 feet of the Waterfront Pathway around a construction zone in Gov. Tom McCall Waterfront Park. During construction, the Vera Katz Eastbank Esplanade would be closed for between 1.5 and 4.5 years, depending on the bridge alternative and Esplanade connection option. The Long-span Alternative (Draft EIS and Refined versions) would have the shortest closure durations (18 months), and the Couch Extension would have the longest (30 months). Building stairs and elevators for the connection between the bridge and the Esplanade would not increase closure durations, but building ramps, such as those evaluated in the Draft EIS, is estimated to increase the Esplanade closure duration by up to 2 to 3 years (for a total closure of 3.5 to 4.5 years). While the Esplanade is closed, there would be out-of-direction travel and potential avoidance of trips for pedestrians and bicyclists.

Land Use, Economics and Displacements

Property acquisitions and business displacements that would be required to build the bridge would be the main adverse impact. The main long-term difference among Draft EIS build alternatives would be that the Couch Extension would have two additional permanent property acquisitions. The Refined Long-span Alternative would have no permanent acquisitions (other than easements) and would have one less business displacement.

All of the build alternatives would have a positive effect on regional employment and income due to construction spending. None of the build alternatives would affect traffic enough to result in indirect effects on land use patterns or regional economics. During construction, all of the build alternatives would temporarily displace Portland Saturday Market operations from under the west end of the Burnside Bridge, but the replacement alternatives would displace the market for about one year longer than the Retrofit Alternative.

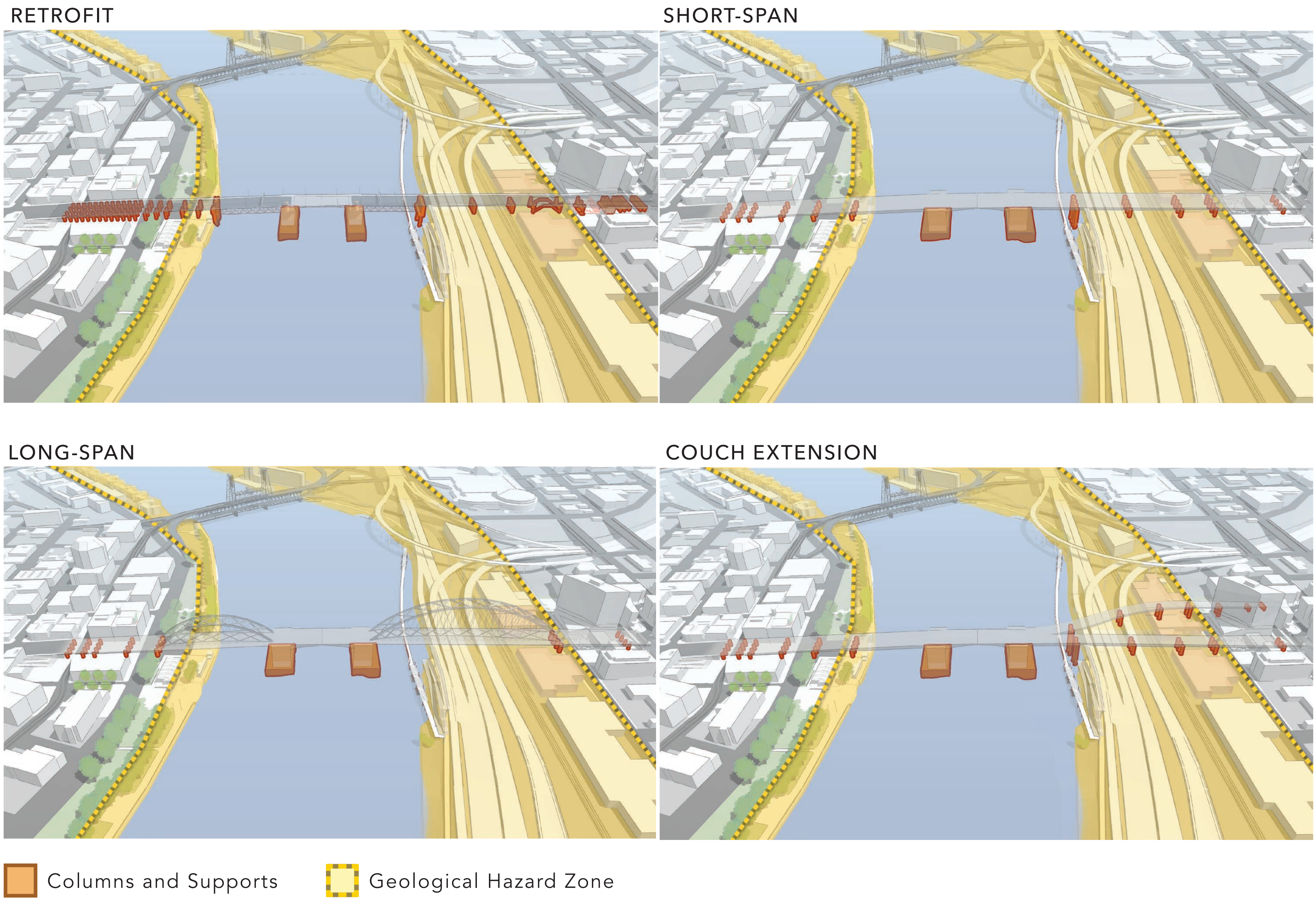
Water Quality

All of the build alternatives would treat more stormwater runoff (from the new bridge and from some areas around the bridge) than is treated under existing conditions. In-water construction with all build alternatives is likely to have temporary adverse impacts to water quality that could affect fish. The differences among build alternatives would be relatively minor.

Geology and Soils

While temporary erosion could occur during construction, the largest geologic impact from the build alternatives would be the beneficial creation of an earthquake ready bridge that would mitigate the seismic impacts on the Burnside crossing. The Long-span Alternative (both the Draft EIS and the Refined versions) is unique among the alternatives in that it would largely avoid placing bridge supports in the geologic hazard zones on the east and west banks of the river (see Figure 1-15).

Figure 1-15. Build Alternatives' Bridge Supports Located in Geologic Hazard Zones



Hydraulics

The conceptual designs evaluated during the Draft EIS indicated that while the Draft EIS Long-span Alternative would have less fill in the river than the other build alternatives, all of the build alternatives would have larger piers than the existing bridge and that increased fill would likely cause a small rise in future peak flood levels. Since publication of the Draft EIS, hydraulic modeling and modification of pier design indicate that the Draft EIS Long-span Alternative may be able to avoid a rise in peak flood levels. The Refined Long-span Alternative would require less fill in the river than the Draft EIS Long-span and even less than the existing bridge. This would reduce the impact on peak flood levels but would be expected to increase scour.[8] The proposed bridge pier design would be unaffected by the predicted scour. In-water construction activities such as cofferdams[9] and temporary piles would temporarily increase peak flood levels and scour with all build alternatives. The optional ADA, bicycle and pedestrian ramps, or elevator/stair connections from the Vera Katz Eastbank Esplanade would require added fill in the river which would increase impacts to flood level rise and scour; the impact would be greater with the ramp options than with the elevator/stair option. Reconnecting the existing City-owned staircase would avoid added flood level and scour impacts. Hydraulic modeling will be conducted again during the final design phase to confirm how any refinements to the Preferred Alternative would impact peak flood levels and expected scour, as well as to determine any needed permit conditions under the City of Portland's floodplain development program.

Vegetation and Wildlife

The primary long-term impact would be the loss of habitat where permanent piers would be located in the river. This impact would be lowest with the Refined Long-span Alternative and slightly lower with the vertical lift bridge option versus the bascule option. All the build alternatives would provide permanent improvements in stormwater treatment that would benefit aquatic organisms. During construction, pile-driving causes hydroacoustic impacts that can harm fish and so would need to be conducted during regulatory in-water work windows. Other in-water construction activities, such as installing cofferdams or drilling shafts, would temporarily affect water quality and/or displace habitat that could affect aquatic organisms.

Noise

Construction of all of the build alternatives would generate noise that could temporarily affect residents living adjacent to the ends of the bridge. Potential construction noise mitigation is discussed in Chapter 3 of the Draft EIS. None of the alternatives, including the Refined Long-span Alternative, would increase long-term noise impacts, although the Couch Extension would cause minor changes in the noise impact locations at the east end of the bridge. The main existing and projected future source of traffic noise in the area is I-5 and related ramps, not the Burnside Bridge

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[8] Scour is the removal of sediment (such as sand) from the river bed by water flow. Changing water velocity can change scour.

[9] A cofferdam is a temporary enclosure that is built/placed in a river or other water body, extending from below the river bottom to above the water surface. The water inside is pumped out in order to create a dry space for doing work, such as drilling shafts or building bridge piers.

Air Quality

The build alternatives would have no long-term impacts on air quality, but all of them would generate emissions and dust during construction that could affect the comfort and health of residents living adjacent to the west end of the bridge. Construction impacts are also possible for residents of older buildings on the east end, although they are located farther from the immediate construction area. Potential mitigation is discussed in Chapter 3 of the Draft EIS.

Hazardous Materials

Construction of all of the build alternatives would create the risk for accidental spills or contact with existing contamination. The risk could be largely mitigated through best practices and response planning. Construction would also be likely to have a beneficial impact by removing existing contaminated sediments or soils during excavation and in-water work.

Climate Change

The Draft EIS build alternatives would have the same traffic capacity and operations as the No-Build and the same predicted future traffic greenhouse gas (GHG) emissions. The Refined Long-span, however, with one less vehicle lane on the bridge, is modeled to cause minor traffic diversion to other bridges and increase congestion in some locations which would result in slightly higher GHG emissions than the other alternatives. With or without the project, future regional GHG emissions are predicted to be significantly lower than today because of expanded public transportation options, advancement in vehicle technologies, and more stringent fuel economy standards and emission-reduction efforts at the federal, state, and local levels. Modeling indicated that with the No-Build and Draft EIS build alternatives (a five-lane bridge), regional GHG traffic emissions would be 41 percent lower by 2045, whereas with the Refined Long-span Alternative (a four lane bridge), regional emissions would be 43 percent lower than existing. While not included in the model assumptions, the proposed pedestrian and bicycling improvements on the bridge could indirectly lead to more trips being taken by bicycle or walking rather than automobile, which could result in minor reductions in future GHG emissions. Construction activities, detours, and the manufacturing of construction materials would generate GHG emissions.

Social Services, Environmental Justice and Equity

During construction, all of the alternatives would generate increased noise, dust, and emissions that could disproportionately affect the residents staying in the transitional housing and shelters located adjacent to the western bridgehead and to other homeless individuals in the area. Potential measures to mitigate those impacts are described in Chapter 3 of the Draft EIS and are finalized in Chapter 7 of the combined Final EIS/ROD. The biggest adverse impact to social service providers and their clients would be from the Retrofit Alternative which would require a 2- to 3-month closure of the Portland Rescue Mission during construction. Over the long term, the improved pedestrian, bicycle, and safety features on the replacement bridges would be a substantial benefit to environmental justice[10] populations. The potential for improved security under the bridge in Gov. Tom McCall Waterfront Park and the Naito Parkway area (by eliminating columns that create shadows and reduce natural surveillance[11] of public spaces), especially with the Draft EIS Long-span and Refined Long-span Alternatives, would also benefit environmental justice populations. The Refined Long span Alternative, with narrower bicycle and pedestrian facilities than proposed with the Draft EIS replacement alternatives, would not provide as much benefit to low-income or minority bicyclists and pedestrians but would still be an improvement in safety and comfort compared to existing conditions or the Retrofit Alternative. The Refined Long-span Alternative with Lane Configuration Option 4, which eliminates the eastbound bus-only lane, would result in moderately longer bus travel times during parts of the day compared to the other Refined Long-span Alternative lane configuration options and to all of the Draft EIS alternatives.

Parks and Recreation

There would be no long-term adverse impacts to public parks, but the replacement alternatives, especially the Long-span Alternative (both the Draft EIS and Refined versions), would benefit Gov. Tom McCall Waterfront Park by removing three to four sets of existing bridge columns in the park under the bridge. The replacement alternatives would require short-term (4 to 8 months total) closures of the Burnside Skatepark during construction; the Retrofit Alternative would permanently displace the Burnside Skatepark. All of the alternatives would close part of Waterfront Park during construction for 3.5 (Retrofit Alternative) to 4.5 (replacement alternatives) years, and all would require tree removal to allow for bridge construction (trees would be replanted). All of the build alternatives would require temporarily closing an area of the park north and south of the bridge, although the area south of the bridge would be smallest with the Refined Long-span Alternative. All alternatives would temporarily close a portion of the Vera Katz Eastbank Esplanade. The closure duration would be 18 months for the Long-span Alternative (both the Draft EIS and Refined versions); this would increase to 3.5 to 4.5 years with the ramps option for access between the bridge and the Esplanade.

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[10] Environmental justice populations, as used in this document, refers to low-income and minority populations as defined by the Executive Order on Environmental Justice, Executive Order 12898.

[11] "Natural surveillance" is a principle of design that aims to increase personal safety and security in public spaces. It includes designing physical features so as to maximize visibility and foster positive social interaction.

Historic Resources

Additional analysis and agency input since the publication of the Draft EIS indicated that the above-deck bridge types (tied-arch, cable-stayed, and through-truss) considered for the west approach with the Draft EIS Long-span Alternative would likely cause an adverse effect on the Skidmore/Old Town Historic District (a National Historic Landmark). This adverse effect, due to the tall, modern structure contrasting with the adjacent, shorter historic structures of the National Historic Landmark District, would be avoided by selecting the girder bridge proposed with all other alternatives including the Refined Long-span Alternative. All the replacement alternatives would remove the Burnside Bridge, and the Retrofit Alternative would cause substantial changes that would render it no longer eligible for listing in the National Register of Historic Places. The Retrofit Alternative would also remove the Burnside Skatepark which is eligible for the National Register; all the replacement alternatives would only require a short-term closure of the skatepark for safety during construction. The Draft EIS Long-span Alternative would alter the view of the historic White Stag sign from some viewpoints but would not physically impact it; all other bridge alternatives, including the Refined Long-span Alternative, would avoid or minimize effects on views of the sign.

Vibration during construction would be monitored to guard against its potential to cause physical harm to nearby unreinforced masonry buildings.

No previously recorded archaeological sites would be impacted by any of the build alternatives. There would be less ground disturbance in archaeologically sensitive areas with the long-span alternatives and with the No Temporary Bridge option.

Visual

Because it would have the least visual change, the Retrofit Alternative would have the least potential for both adverse and beneficial visual impacts. The above-deck superstructures (tied-arch or cable-stayed) of the Draft EIS Long-span, and the potential for a vertical lift movable span with all of the Draft EIS replacement alternatives, have the highest potential to impact (both adversely and beneficially) views and visual experiences. Concerns and opportunities include the Skidmore/Old Town Historic District, Gov. Tom McCall Waterfront Park, river views, views from the bridge, compatibility with existing visual features, and potential new or enhanced visual experiences. The Refined Long-span Alternative, with a girder bridge for the west approach and bascule bridge for the center movable span, would avoid many of the potential adverse visual effects of the Draft EIS Long-span Alternative.

1.4 What was the process to select the Final EIS Preferred Alternative?

This section summarizes the Draft EIS evaluation process that resulted in the selection of the Long-span Alternative as the Preferred Alternative in the Draft EIS and summarizes the preferred alternative refinement process that has occurred since the Draft EIS was published. The refinement process has included (1) identifying and evaluating ways to refine the Draft EIS Preferred Alternative so as to reduce the overall cost while still meeting the purpose and need of the Project and achieving many of the performance and environmental advantages of the Draft EIS Preferred Alternative and (2) gathering agency and public input on those proposed refinements to help inform a decision on the refinements to the Draft EIS Preferred Alternative.

1.4.1 The Draft EIS Preferred Alternative

Following almost 2 years of coordination, analysis, and input, in June 2020, the Project's Community Task Force (CTF) recommended that the Draft EIS Long-span Approach Alternative and the No Temporary Bridge Option comprise the Draft EIS Preferred Alternative (see descriptions of this alternative and option in Section 1.2 above). The CTF's process to reach that recommendation included identifying the community's values, defining evaluation criteria and measures, and reviewing the performance and impacts of the various alternatives and options. It also considered the input from the project team's technical experts, from resource agencies and other participating agencies, and from other stakeholders including the public.

In August 2020, the project team solicited input on the CTF's recommendation from multiple stakeholder groups, agencies and the public through online open houses, an online survey and web meetings. This input, which indicated broad support (85 percent) for the Draft EIS Preferred Alternative recommendation, was provided back to the CTF who then reconfirmed their recommendation in September 2020. The recommendation was then unanimously endorsed by the voting members of the Project's Policy Group on October 2, 2020. The Multnomah County Board of Commissioners adopted a resolution on October 29, 2020, expressing approval for the recommended Draft EIS Preferred Alternative. Input received during the Draft EIS comment period confirmed that there was considerably more public support for the Draft EIS Long-span Alternative than for any of the other Draft EIS alternatives.

The CTF recommendation included consideration of how the alternatives performed on 49 different criteria covering 13 different topics:

- **Seismic resiliency**
- **Community quality of life**
- **Equity and environmental justice**
- **Crime reduction and personal safety**
- **Business and economics**
- **Parks and recreation resources**
- **Historic resources**
- **Visual and aesthetics**
- **Natural resources, climate change and sustainability**
- **Pedestrians, bicyclists and people with disabilities**
- **Motor vehicles, freight and emergency vehicles**
- **Transit**
- **Fiscal responsibility**

A description of the evaluation criteria and measures, as well as Draft EIS scoring results, can be found in the Draft EIS Attachment H. The Draft EIS Long-span Alternative scored 25 and 20 percent higher than the Retrofit Alternative and the Couch Extension Alternative, respectively, and just a little higher (about 4 percent) than the Short-span Alternative. The Draft EIS Long-span Alternative was also the lowest cost of the build alternatives evaluated in the Draft EIS.

1.4.2 Refinements to the Preferred Alternative

After the publication of the Draft EIS, updated cost and funding analysis identified a substantial risk that the construction cost of all of the build alternatives might exceed the availability of local, state, and federal funds to dedicate to the Project. Therefore, in winter 2021, County leadership directed the project team to identify and evaluate potential ways to reduce the overall cost of the Draft EIS Preferred Alternative (the Draft EIS Long-span Alternative) while still meeting the purpose and need of the Project and achieving many of that alternative's performance and environmental advantages. Initial findings regarding the cost savings, impacts, and tradeoffs of these potential revisions were provided to the public in November and early December 2021. Project committees endorsed the refinements to the Draft EIS Preferred Alternative, and the Multnomah County Board of Commissioners passed a resolution adopting the refinements on March 17, 2022.

The following outlines the elements of the Draft EIS Preferred Alternative that were considered for refinement in the SDEIS.

Bridge Width

The Draft EIS Preferred Alternative is a five-lane, 110- to 120-foot-wide bridge (range depends on bridge type). The narrower bridge studied in the SDEIS would be 82 to 93 feet wide over the river and would have one less traffic lane and narrower bicycle and pedestrian facilities. It would accommodate approximately 78 feet (comparable to the existing bridge) for four vehicle lanes as well as bicycle lanes and sidewalks in each direction. Narrowing the bridge presents the single greatest potential to reduce project costs.

- **Lane Configuration –** The Draft EIS Preferred Alternative studied one five-lane configuration for the bridge cross section. The SDEIS evaluated four different lane configurations for a four-lane bridge.
- **Bicycle and Pedestrian Facilities –** The Draft EIS Preferred Alternative includes 40 feet of cross section dedicated to bicycles and pedestrians. As noted above, bridge width, whether for vehicles or active transportation, is a substantial factor in project cost, which is why the SDEIS studied a narrower bridge. The SDEIS studied bicycle lane/sidewalk options ranging from 28 to 34 feet wide; narrower than the Draft EIS Preferred Alternative but still wider than the existing bridge (25.6 feet). The exact allocation likely would not be decided until final design. All of the build alternatives studied in the Draft EIS and SDEIS include physical barriers between vehicle lanes and the bicycle lanes, which would be in addition to the above bicycle and pedestrian facility dimensions.

Bridge Type

- **West Approach –** The Draft EIS Preferred Alternative includes a wide range of bridge types for the west approach over the west channel of the river, Gov. Tom McCall Waterfront Park, and Naito Parkway. The SDEIS evaluated a refined girder bridge that would be the low-cost option and would have lower impacts compared to the other bridge types in the west approach.
- **East Approach –** The Draft EIS Preferred Alternative includes three different bridge types for the east approach including cable-stayed, tied-arch, and through-truss. The SDEIS added two refined tied-arch options that had the potential to reduce costs by reducing geotechnical mitigation needs.
- **Movable Span –** The Draft EIS Preferred Alternative includes bascule and vertical lift options for the movable span. The SDEIS further studied both options and found the bascule bridge to be the lowest cost and to have the least impact on historic and visual resources, but it has larger in-water piers.

Ancillary Elements

The Draft EIS Preferred Alternative does not include decisions regarding potential ADA, bicycle, and pedestrian connections to the Vera Katz Eastbank Esplanade or to 1st Avenue. Such a connection to the Esplanade would serve no seismic resiliency function and is not needed to meet the project purpose and need; therefore, the Project could move forward with any or none of the potential connection options. Providing no connection, or reconnecting the existing City-owned stairs, would allow the pursuit of a new connection as a separate project with its own purpose, funding, and construction. At a minimum, the County would continue to coordinate with the City so the new bridge would be designed and built to meet ADA requirements and would not preclude future connections to the Esplanade.

? 1.5 What is the Final EIS Preferred Alternative?

The following outlines the major elements of the Preferred Alternative. See Table 1-2 for a summary of these major elements.

Table 1-2. Preferred Alternative Major Bridge Structural Elements

Structural Element	Preferred Alternative
West Approach	• One abutment and two supports west of Naito Parkway; two supports, each with two columns, in Waterfront Park • Girder bridge type between Abutment 1 and Bent 5, consisting of span over 1st Ave, a City-owned parking lot, Naito Parkway, and Waterfront Park • Bents to be supported by columns founded on drilled shafts
Main River Spans	• Two in-river pier supports • Girder bridge type for Span 5, starting over Waterfront Park and landing on Pier 6 (the west in-river pier) • Bascule bridge type for Span 6 • Replace all in-river piers with deep foundations, likely consisting of large-diameter drilled shafts

East Approach	• One two-column support east of the UPRR tracks; one two-column support on the west side of SE 3rd Ave; and one abutment east of SE 3rd Ave
	• Long-span bridge type consisting of either a cable-stayed or tied-arch type, starting at the east in-river pier and extending as follows:
	  ○ One-Span Tied-Arch Bridge Option: Support located to the west of SE 2nd Ave with girder spans continuing eastward to the abutment
	  ○ Two-Span Cable-Stayed Bridge Option: Support tower located between the UPRR tracks and SE 2nd Ave, and the end of the second cable-stayed span located on the west side of SE 3rd Ave; a girder/slab span continues eastward to the abutment
	• Bents are supported by columns founded on drilled shafts
	• Would likely need to stabilize soils below the cable-stayed option tower support located in the geologic hazard zone (between the UPRR track and SE 2nd Ave)

Structural Element	Preferred Alternative
West Side Access to 1st Avenue	• Range of options including multiple possible configurations of stairs and ramps, ADA-accessible elevators, and sidewalk improvements on both sides (north and south) of bridge. Conversely, options may include no additional connection (i.e., using improved sidewalks to access bridge). Decision on the need for and type of access at this location would be made during the final design phase.
Vera Katz Eastbank Esplanade Access	• Maintain existing City of Portland–owned staircase connecting the south side of the bridge to the Vera Katz Eastbank Esplanade. Staircase would be protected in place during demolition of the existing bridge and reconstruction of the new bridge. Access to existing stairs would be provided after the bridge construction phase is completed. A new, independent connection could be pursued as separate project with its own purpose, funding, and permitting.

1.5.1 Bridge Geometry

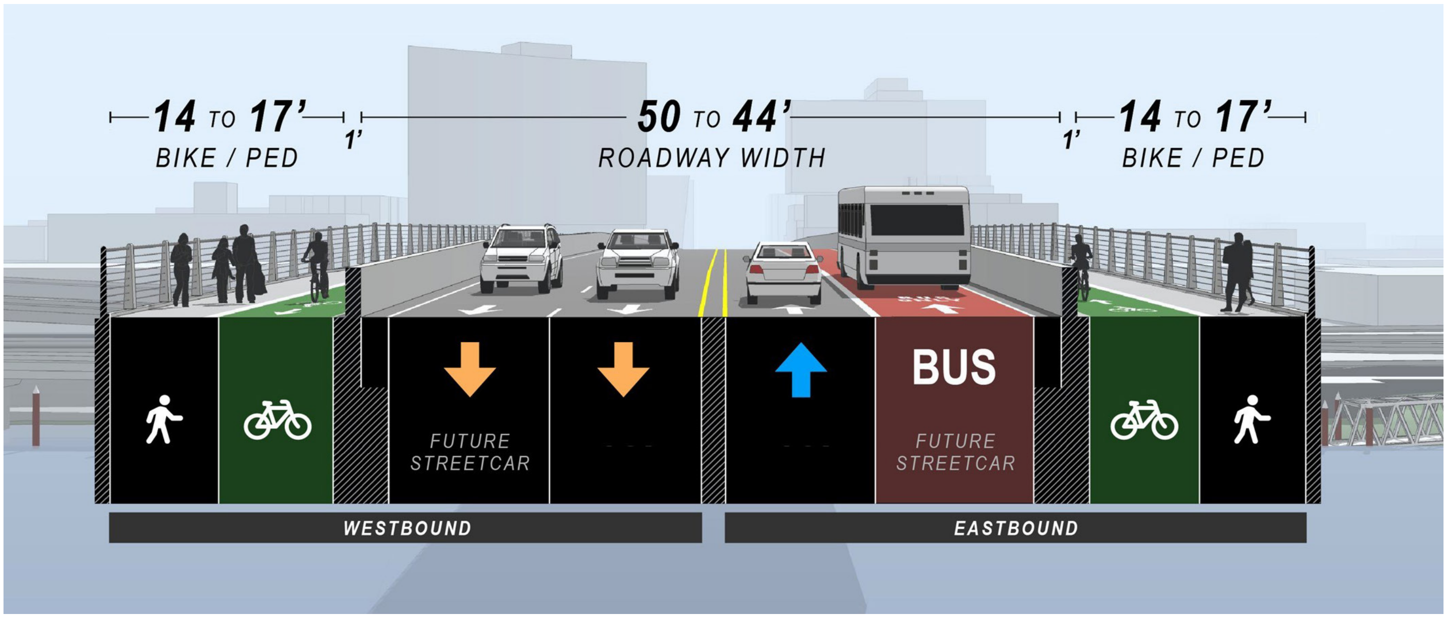
The proposed replacement bridge is placed at approximately the same location as the existing bridge. The total bridge length is approximately 2,290 feet, comparable to the existing bridge. The West Approach abutment is located approximately 80 feet east of the current abutment, and the East Approach abutment is located approximately 30 feet east of the existing abutment.

The height of the bridge deck is at approximately the same elevation as the existing bridge, and the proposed vertical profile grade is set to approximately 4.75 percent, which is slightly steeper than the existing bridge vertical profile grade of 3.84 percent.

The Preferred Alternative would accommodate approximately 78 feet for vehicle lanes, bicycle lanes, and pedestrians. This travelled-way width is comparable to the existing bridge (see Figure 1-16).

The Preferred Alternative would accommodate four vehicle lanes. As the road authority, the City of Portland on July 20, 2022, declared its preferred lane configuration as the SDEIS Lane Option 1 (Balanced), which includes two westbound lanes (general-purpose) and two eastbound lanes (one general-purpose and one bus-only lane). The SDEIS evaluated a range of widths for the travel lanes, sidewalks, and bicycle lanes (see Figure 1-16); precise widths of each would be determined in the final design phase. The analysis showed that within the range of a combined sidewalk and bicycle lane space (determined as 14 to 17 feet in each direction) and vehicle lane widths (10 to 12 feet) being considered, the differences in impacts are insignificant. Physical barriers between vehicle lanes and the bicycle lanes are included and are in addition to the lane dimensions provided above.
For the East Approach span, additional width is required for the above-deck superstructure members.

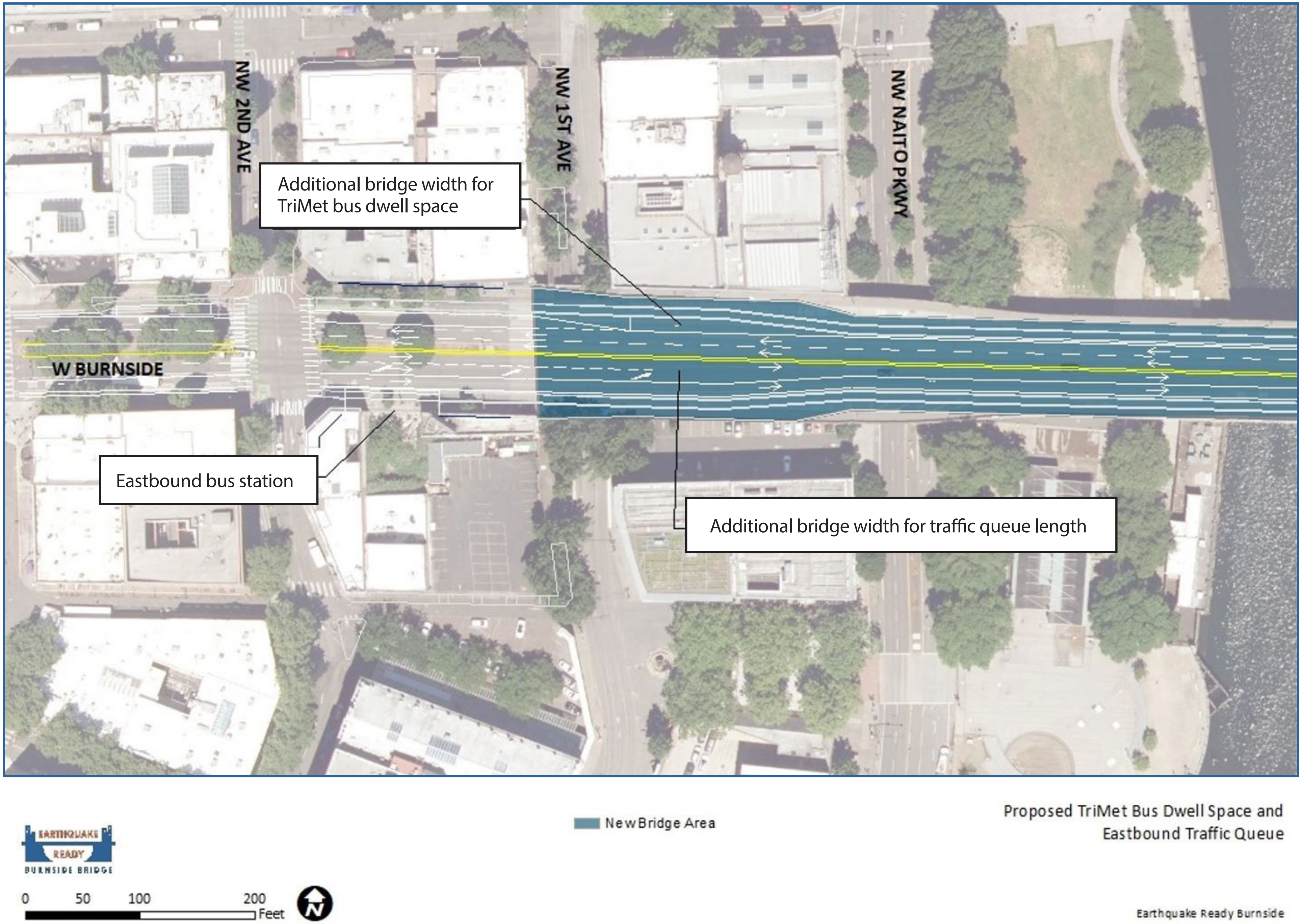
Figure 1-16. Preferred Alternative Lane Configuration Options (West Approach shown)



Option 1 – Two Westbound Lanes | One Eastbound + One Bus Lane

The Preferred Alternative would accommodate bus dwell space on the west end of the bridge for westbound buses on the West Approach between Bent 1 and Bent 3 (see Figure 1-17). While this dwell space would fit within the footprint of the existing bridge, this portion of the West Approach is wider than what was included in the SDEIS Refined Long-span Alternative. Similarly, additional vehicular lane queue length in the eastbound direction has been added to enable smoother merging. The inclusion of the bus dwell space and additional queue length in the Preferred Alternative would cause no additional impacts over those analyzed in the Draft EIS and SDEIS.

Figure 1-17. Preferred Alternative with TriMet Bus Dwell Space and Eastbound Traffic Queue Length



1.5.2 Bridge Type

West Approach

The Preferred Alternative includes a girder bridge for the West Approach, which would be about the same width as the existing bridge. It avoids an adverse effect to the Skidmore/Old Town National Historic Landmark District by preserving the open views above the deck both into and out of the district. The Preferred Alternative requires two sets of larger bridge columns in Waterfront Park (versus five with the existing bridge). They are located to provide the necessary horizontal offsets from Naito Parkway and the Willamette Trail that each traverse under the bridge.

Movable Span

The Preferred Alternative has a bascule bridge as the movable span (see Figure 1-18 and Figure 1-19). The movable span would satisfy the required USCG horizontal and vertical navigational clearances for the main span: 100 percent of vessel traffic must be able to safely transit under the bridge. The minimum clearances that will allow all vessel traffic to safely transit the bridge are as follows:

- Minimum Vertical Clearance (movable span in the closed position) would provide a minimum vertical clearance of 51.1 feet above mean high water and 65.8 feet above Columbia River Datum.
- Minimum Vertical Clearance (movable span in the raised position) would provide unlimited vertical clearance through a reduced horizontal clearance of 130 feet at either water surface elevation.
- Minimum Horizontal Clearance for the permanent bridge at either water surface elevation would be 205 feet.
- Minimum Horizontal Clearance during construction of the permanent bridge at either water surface elevation would be 165 feet. Existing minimum vertical clearances for the raised and fully closed positions would be maintained during construction except for temporary periods of 180 days or less, which would be reviewed and approved by the USCG.

The movable span would be supported by delta piers—trapezoid-shaped piers sized to accommodate a bascule counterweight within the interior void of the pier. The piers would be equipped with starlings, which are in-water structures that divide and deflect river water and floating debris on the upstream (south) side of the bridge. The starlings would also assist ships with pivoting away from the piers. While these are currently anticipated to be formed starlings, they may alternatively be a smaller structure of equivalent function, such as a dolphin.[12]

See Chapter 4 of this Final EIS, Supplementary Analysis and Discussion, for an analysis of impacts related to the use of the starlings or dolphins. Any pier protection structures would need to include protective features such as rub rails to avoid or reduce damage to vessels that may come into contact with the pier protection structures. All such structures would need to be reviewed and approved by the USCG.

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12 In this instance, a dolphin is a group of pilings used as a protective structure in a waterway. https://azdot.gov/sites/default/files/media/2020/04/Parts-of-a-Bridge-Structure.pdf

East Approach

The Draft EIS Preferred Alternative identified a long-span bridge type for the East Approach but left open the decision for a cable-stayed or tied-arch bridge type option. The SDEIS further evaluated a cable-stayed option and a refined tied-arch option as part of the Refined Long-span Alternative. The Refined Long-span Alternative included a potential span length change for the East Approach tied-arch option that would minimize the risks and reduce costs associated with placing a pier and foundation in the geologic hazard zone that extends from the river to about E 2nd Avenue. The refined tied-arch option would place the eastern pier of the tied-arch span farther east, terminating just west of 2nd Avenue. Increasing the length of the tied-arch span would reduce the length and depth of the subsequent girder span to the east, which would reduce its cost.

The SDEIS analysis determined that the impacts from a cable-stayed or tied-arch option would be very similar, and any significant impacts could be avoided or minimized. The primary differentiator between the two bridge types could be construction cost, which is influenced by the construction approach for each. Preliminary cost analysis suggests that the cable-stayed option could have a lower construction cost, but there is uncertainty because the construction approach and experience of the selected bridge contractor will be an important cost factor. Therefore, the Preferred Alternative does not make a selection regarding a cable-stayed or tied-arch option and carries both bridge type options forward into the final design phase so that the bridge type decision can be informed by more detailed cost information and estimates developed by a future contractor (see Figure 1-18 and Figure 1-19).

Figure 1-18. Preferred Alternative with Bascule Movable Span (Tied-Arch East Approach)

Figure 1-19. Preferred Alternative with Bascule Movable Span (Cable-Stayed East Approach)

1.5.3 Ancillary Elements

West Side Access to 1st Avenue

Near the west end of the existing bridge, there are County-owned stairs on both sides of the bridge that connect the existing on-bridge bus stop to West 1st Avenue (under the bridge) where the existing Skidmore Fountain MAX station is located. The Draft EIS evaluated stair and ramp options at this location. The SDEIS evaluated replacing the stairs with ADA-accessible elevators combined with stairs, a ramp, and improving the sidewalks between the end of the bridge and West 1st Avenue to create a safer ADA accessible surface level pedestrian route. In addition to improving the sidewalks, the range of supplemental connection options includes no additional connection (i.e., using the improved sidewalks to access the bridge); stairs on one or both sides of the bridge; a ramp on the south side of the bridge; or elevators on one or both sides of the bridge. There could also be combinations of these connection types. As stated in the SDEIS, TriMet is considering permanently relocating the bus stop off the Burnside Bridge, and TriMet is studying a proposal to close the existing Skidmore Fountain MAX station located under the bridge. The potential bus stop relocation and the potential MAX station closure would substantially reduce the purpose of any ADA and pedestrian stair, ramp, or elevator connection to 1st Avenue at this location. There is a possibility that the stairs would, therefore, not be replaced. In that case, the ADA, pedestrian, and bicycle access from the bridge to 1st Avenue would be via improved sidewalks connecting the west end of the bridge at 2nd Avenue to 1st Avenue just one block east. Therefore, the Preferred Alternative does not include a final selection of access to West 1st Avenue; a decision on the need for and type of access at this location will be made during the final design phase.

Vera Katz Eastbank Esplanade Access

The Draft EIS evaluated ramp and elevator or stair options near the east end that would connect the bridge to the Vera Katz Eastbank Esplanade. The SDEIS Refined Long-span Alternative analysis was expanded to include the addition of an elevator or stair option and an improved sidewalk connection option between the bridge and W 1st Avenue. It also evaluated in-kind replacement of the existing stairs or reconnection of the existing stairs to the new bridge. The Final EIS Preferred Alternative would maintain the existing City of Portland–owned staircase that currently connects the south side of the bridge by permit to the Vera Katz Eastbank Esplanade located about 50 feet below the bridge. The staircase would be protected in place during the demolition of the existing bridge and the reconstruction of the new bridge. Access to the existing stairs would be provided after the bridge construction phase is completed. A new, independent connection could be pursued as a separate project with its own purpose, funding, and permitting.

1.5.4 Preferred Alternative Evaluation

The following summarizes the primary advantages of the Selected Preferred Alternative (Refined Long-span Alternative) relative to the Draft EIS Preferred Alternative and all other Draft EIS build alternatives as described in the Draft EIS. It also summarizes why the Refined Long-span Alternative was selected as the Preferred Alternative in this Final EIS. Overall, the Preferred Alternative would perform very similarly to the Draft EIS Long-span Alternative including for the core purpose of the Project (seismic resiliency) and for impacts and benefits to parks and equity. Because it would have one less motor vehicle lane, it would not perform quite as well for peak period traffic or transit. However, the Preferred Alternative would substantially reduce project costs and would reduce impacts to historic, natural, and visual resources. The following also summarizes how the refined versions (narrower bridge with four lanes) of the Short-span and Couch Extension Alternatives presented in the SDEIS compare with the Preferred Alternative and other alternatives.

Seismic Resiliency

All the build alternatives would be seismically resilient, but the Preferred Alternative (and Draft EIS Long-span Alternative) would carry the least risk and cost for doing so. The Preferred Alternative (and Draft EIS Long-span Alternative) would place the fewest piers in the East Approach geologic hazard zones (one, compared to four to five with the Short-span and eight with the Couch Extension Alternative). A large earthquake is expected to liquefy the East Approach from the Willamette River to SE 2nd Avenue, as well as a small portion of the West Approach, within Waterfront Park. This liquefaction would cause lateral spread (essentially a localized landslide or mudslide directed towards the Willamette River) that would exert massive lateral forces on any piers in those zones (the closer to Willamette River, the greater the force). The other alternatives would require significant jet grouting at multiple locations to stabilize the slope, but the Preferred Alternative (and Draft EIS Long-span Alternative) would largely avoid this risk by installing a long approach span on the east side that would require only one pier near the upper portion of the zone. With the Preferred Alternative tied-arch option, that pier would be a little farther east than with the Draft EIS Long-span. On the west side, the Draft EIS Long-span would possibly have no piers in the geologically hazardous zone, and the Preferred Alternative would have up to one.

Parks and Recreation

With only one set of columns (the fewest of any alternative) in Gov. Tom McCall Waterfront Park, the Draft EIS Long-span Alternative would open the most new space in the park, create views to the river from the park space under the bridge, and improve personal security in the public spaces under the bridge. The Preferred Alternative (girder bridge) would need two sets of columns in the park (the same as the Short-span and Couch Extension Alternatives and three fewer than existing). All the replacement alternatives, including the Preferred Alternative, would avoid permanent impacts to the Burnside Skatepark, which would be removed with the Retrofit Alternative. The Preferred Alternative (and Draft EIS Long-span Alternative) would have the shortest-duration closure (intermittent, multi-month closures that sum to a total of up to 18 months) of the Vera Katz Eastbank Esplanade during construction, whereas the Short-span and Couch Extension Alternatives would close the facility for 30 months. The protection of the existing stairs to the Eastbank Esplanade would not extend the 18-month closure of the Eastbank Esplanade. The ramp options evaluated in the Draft EIS were estimated to close the Esplanade for 3.5 to 4.5 years total with any of the bridge alternatives.

Historic Resources

The Preferred Alternative, as well as the Short-span and Couch Extension Alternatives, with a girder bridge for the West Approach, would avoid causing an adverse effect on the Skidmore/Old Town Historic District (a National Historic Landmark). Analysis and agency input received after publication of the Draft EIS indicated that the other bridge types (cable-stayed, tied arch, or through-truss) that were considered for the Draft EIS Long-span in the West Approach would be expected to have an adverse effect on the historic district. All build alternatives would have an adverse effect on the bridge as a historic property. Only the Retrofit Alternative would avoid removing the historic Burnside Bridge, but the extent of work needed for the Retrofit Alternative would compromise the bridge's historic integrity and make it no longer eligible for listing in the National Register. The Retrofit Alternative is also the only alternative that would remove the Burnside Skatepark, which has been determined to be eligible for listing in the National Register of Historic Places. None of the alternatives would impact any previously recorded archaeological sites. The Preferred Alternative (and Draft EIS Long-span Alternative) would have the least soil disturbance in archaeologically sensitive areas.

Social Services and Equity

As with the other replacement alternatives, the Preferred Alternative (and Draft EIS Long-span Alternative) would maintain the operations of the Portland Rescue Mission during construction (which would be temporarily displaced by the Retrofit Alternative). As with all build alternatives, after the next major CSZ earthquake, the Preferred Alternative would provide the only seismically resilient crossing in downtown Portland—a significant resource for post disaster emergency aid and services. The Draft EIS Long-span would provide wider bicycle and pedestrian facilities on the bridge than the Preferred Alternative, but both the Draft EIS Long-span and the Preferred Alternative, as well as the Short-span and Couch Extension Alternatives, would improve comfort and safety for bicyclists, pedestrians, and ADA users compared to the existing bridge.

Natural Resources

The Preferred Alternative has the smallest permanent footprint in the river including avoiding placing any piers in shallow water habitat. The Draft EIS Long-span Alternative has the second smallest. The Short-span and the Couch Extension Alternatives (four and five-lane versions) would require an additional pier in the river and would place more total fill in the river compared with the Draft EIS Long-span Alternative.

Visual

Because the Preferred Alternative includes a girder bridge on the West Approach and a bascule bridge for the center movable span, it would avoid the Draft EIS Long-span adverse visual impacts associated with the tall, above-deck structures (tied-arch, cable-stayed, or through-truss) on the West Approach. Similarly, a bascule movable span would avoid the visual impacts associated with the lift towers required for the vertical lift option of the movable span. The girder and bascule bridge type options for these segments would maintain many of the existing, important views of the west side for travelers and park users including the iconic view of the historic White Stag sign. Also, by avoiding any large above-deck structures for the main river span and West Approach, a bascule bridge would better maintain the open character of the existing bridge that has been identified as an important visual as well as social amenity.

Cost

While the Draft EIS Long-span Alternative was the lowest-cost of the build alternatives in the Draft EIS, the cost of the Preferred Alternative would be substantially lower still, thus reducing the risk that the Project could not be adequately funded. Compared to the Draft EIS version of this alternative, the cost reduction for the Final EIS Preferred Alternative is primarily due to the 26-foot reduction in the bridge width, selection of a bascule movable-span bridge type, and the selection of conventional girders on the West Approach. The Couch Extension Alternative would have the highest cost followed by the Short-span Alternative.

Chapter 3 of both the Draft EIS and SDEIS provide a more-detailed impact analysis of all alternatives considered. Supplementary analysis conducted for the Preferred Alternative can be found in Chapter 4 of this Final EIS.

1.5.5 Cost Estimate

Similar to what is described above in Section 1.2.6, the current cost estimates range from $830 to $915 million for the Preferred Alternative. Given the current level of design, these preliminary cost estimates are expressed as a probable range, which means that a final cost is expected to be within this cost range. The cost range for the Preferred Alternative (see Attachment N, Cost Risk Assessment Cost Estimate Summaries, of the SDEIS) reflects the chosen bridge type and an assessment of risks. As part of the FHWA Major Project process, a risk analysis was also performed for the refinements with the Preferred Alternative in July 2022. As the project design advances, the cost range would narrow. The final cost would be influenced by design details, bridge type selection, risk mitigation, market conditions at the time of construction, and exploring the use of a CM/GC contracting method to identify cost-saving opportunities.

1.6 What federal regulatory consultation requirements were completed?

The project team has coordinated with federal and state resource and permitting agencies, as well as with other participating agencies and Tribes. The Project's Agency Coordination Plan (Attachment F of the Draft EIS) defined the basic approach and coordination steps and the EQRB Planning and Environment Linkages (PEL) Strategy (Attachment N of the Draft EIS) outline the Project's approach for meeting the requirements for agency coordination and specific NEPA guidelines outlined in Executive Order (EO) 13807.

PEL is a collaborative and integrated approach to decision-making that engages the public, agencies, and Tribes and considers environmental, community, and economic goals starting early in the planning process and continuing through project development and delivery. Integrating these considerations and engaging stakeholders and agencies before formally initiating the NEPA process can result in a project that better incorporates multiple interests and objectives, while also reducing redundancy and the duration of the project development process. FHWA guidance, issued November 2016, prescribes a PEL approach based on 23 USC 168 as amended by the Fixing America's Surface Transportation Act.[13] It is commonly referred to as "statutory PEL" or Section 168 PEL. Among other things, Section 168 PEL outlines requirements for pre Notice of Intent (NOI) activities including how agencies can conduct planning-phase analyses and make planning-phase decisions that they can use in the subsequent environmental review phase. It lays out various requirements including notification and timing with an emphasis on public and agency involvement. The EQRB Project used a PEL approach to help implement EO 13807 directives noted above, such as the goal to complete the EIS process in not more than 2 years. To ensure compliance with the EO and to secure the benefits of linking planning and the NEPA process, the project team developed a PEL strategy to guide informal scoping work as well as post-NOI activities. This strategy, including a summary of updated progress through the NOI and formal scoping, is included as Attachment N to the Draft EIS. EO 13807 was rescinded in February 2021 shortly before the Draft EIS was issued, and therefore no longer applies to the Project. Even so, the Project has generally followed the PEL strategy and strives to expedite NEPA compliance.

The Project secured cooperating agency agreement on a permitting timetable with the USCG, the US Army Corps of Engineers, and the National Marine Fisheries Service and secured their concurrence on the project purpose and need statement and the range of alternatives to be studied in the EIS. The project team will be seeking permits from these agencies, as well as other local, state, and federal agencies, after the completion of the NEPA process. Permit progress and issuance for federal permits are tracked on the Earthquake Ready Burnside Bridge Permitting Dashboard website.[14]

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[13] https://www.fhwa.dot.gov/hep/guidance/pel/pelqa2016.pdf

[14] https://www.permits.performance.gov/permitting-project/earthquake-ready-burnside-bridge

In addition, the Project had to complete two major federal approvals or agreements before FHWA could issue the ROD. Those include a Section 106 (of the National Historic Preservation Act) agreement regarding impacts to and mitigation for historic and archaeological resources, as well as a biological opinion that outlines the allowable impacts to fish or other species protected by the federal Endangered Species Act.

The Project initiated consultation for Section 106 with the Oregon State Historic Preservation Office and Consulting Parties in 2020. Six meetings were held with Consulting Parties including Tribes. The State Historic Preservation Office concurred on the Area of Potential Impact, the Determinations of Eligibility, and the Findings of Effect. The Project also coordinated with the National Park Service to secure input on the potential for project alternatives to adversely affect the Skidmore/Old Town Historic District (a National Historic Landmark). This work and coordination resulted in a Programmatic Agreement for Section 106 that was finalized in June 2023; it is included in Attachment E of this Final EIS.

A Biological Opinion was issued by the National Marine Fisheries Service in June 2021; it is included as Attachment F of this Final EIS.

1.7 What are the unresolved issues?

1.7.1 East Approach Bridge Type

Following the Draft EIS, the SDEIS further evaluated a cable-stayed option and a refined tied-arch option for the East Approach bridge type. The analysis indicated that the impacts would be very similar and any significant impacts could be avoided or minimized. The primary differentiator between the two bridge types could be construction cost. Preliminary cost analysis suggests that the cable-stayed option could have a lower construction cost, but there is substantial uncertainty because the construction approach and experience of any particular bridge contractor will be an important cost factor. Therefore, the County is carrying both bridge type options forward so that future contractor bids can specify either bridge type, thereby allowing the County to select a bridge type based on actual contractor bids.

1.7.2 Westside Active Transportation Connections to the Bridge

As discussed above, the Preferred Alternative does not identify a preferred pedestrian, bicyclist, and ADA access option to West 1st Avenue in part because of pending decisions by TriMet regarding the status of an existing bus stop on the bridge and the existing light rail MAX station beneath the bridge at this location; a decision on the need for and type of access at this location will be made during the final design phase.

See the *EQRB Revised Active Transportation Access Options Memorandum* for additional analysis and findings including potential measures to help mitigate maintenance and security issues associated with public elevators.

1.7.3 Lane Width Allocation

The exact lane width allocation among different modes is a detail that would be determined in the final design phase.

1.7.4 Construction Methods and Impacts

At this point in project development, there is uncertainty regarding the exact construction means and methods, timelines, and other details. And yet, it is necessary to evaluate the potential construction-phase impacts so as to disclose potential impacts and to understand potential tradeoffs among the alternatives. For this reason, the construction assumptions are generally conservative and may reflect over-estimated impacts. This will not be more precisely known until the final design is complete and a contractor has determined exactly how they will build the bridge, and even then, adjustments are not uncommon.

1.7.5 Off-Site Staging Areas

Off-site construction staging sites could be required due to limited storage space adjacent to the bridge. The location would be the contractor's choice so the exact location cannot be known at this time. The environmental technical reports and the Draft EIS identify and evaluate several potential locations for off-site storage to represent the likely type of sites that could be used and the likely impacts. It is anticipated that any chosen river access staging site would allow staging and the activities associated with staging would not displace existing uses, and that the site would already be developed for barge and road access.

1.8 How is the Final EIS organized?

The core of the Final EIS consists of seven chapters:

- **Chapter 1**, Executive Summary. This chapter summarizes the Draft EIS and SDEIS processes, discusses the Preferred Alternative evaluation process, presents the Final EIS Preferred Alternative and states unresolved issues to be determined during the final design phase.
- **Chapter 2**, Draft EIS Errata. This chapter presents changes made to Draft EIS narrative, figures, and tables based on comments received during the Draft EIS comment period.
- **Chapter 3**, Supplemental Draft EIS Errata. This chapter presents changes made to SDEIS narrative, figures, and tables based on comments received during the SDEIS comment period.
- **Chapter 4**, Supplementary Analysis and Discussion. This chapter provides supplementary analysis and discussion on topics in response to limited design refinements specific to the Final EIS Preferred Alternative and public and agency comments on the Draft EIS and the SDEIS.
- **Chapter 5**, Summary of Public Involvement, Agency Coordination, and Comments. This chapter summarizes public involvement and agency coordination efforts, and it discusses the types and categories of comments received via the public involvement and comment efforts.
- **Chapter 6**, Selected Preferred Alternative. This chapter describes the Final EIS Selected Preferred Alternative, the elements that define it, and why it was chosen.
- **Chapter 7**, Record of Decision. This chapter documents a formal decision by FHWA on the Selected Alternative, presents the basis for the decision, specifies the "environmentally preferable alternative," and identifies the adopted means to avoid, minimize, and compensate for environmental impacts.

See the SDEIS table of contents for a list of all of the SDEIS attachments. Key attachments include:

- **Attachment A**, Draft EIS Comments and Responses. This attachment lists all comments received during the public Draft EIS comment period and includes responses to all comments.
- **Attachment B**, SDEIS Comments and Responses. This attachment lists all comments received during the public SDEIS comment period and includes responses to all comments.
- **Attachment C**, Agency Correspondence. This attachment includes agency correspondence received during the EIS process.
- **Attachment D**, Final Section 4(f) Analysis. This attachment documents the Final Section 4(f) findings. Section 4(f) of the US Department of Transportation Act, and subsequent regulations, apply specific requirements to minimize impacts to ("use" of) public parks and recreation resources and historic resources for projects that involve funding or other actions by the US Department of Transportation.

- **Attachment E**, Section 106 Programmatic Agreement. This attachment includes the Programmatic Agreement regarding impacts to and mitigation for historic and archaeological resources.
- **Attachment F**, National Marine Fisheries Biological Opinion. This attachment includes the Biological Opinion regarding impacts to and mitigation for species regulated by the National Marine Fisheries Service under Section 7 of the Endangered Species Act.

Additional detail on the Draft EIS and SDEIS project alternatives and on the affected environment and impacts can be found in the Draft EIS and in the EQRB technical reports listed in Attachment D of the Draft EIS, in the SDEIS and supporting technical documents listed in Attachment D of the SDEIS, and on the project website.[15]

[15] https://www.multco.us/earthquake-ready-burnside-bridge