Public Services Supplemental Memorandum

Multnomah County | Earthquake Ready Burnside Bridge Project

Portland, OR

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Earthquake Ready Burnside Bridge Public Services Supplemental Memorandum

Prepared for

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Acronyms, Initialisms, and Abbreviations

ADA	Americans with Disabilities Act
API	Area of Potential Impact
DEIS	Draft Environmental Impact Statement
EIS	environmental impact statement
EQRB	Earthquake Ready Burnside Bridge
SDEIS	Supplemental Draft Environmental Impact Statement

Executive Summary

Impacts to public services were assessed for the Refined Long-span Alternative and compared to the Draft EIS Long-span Alternative and the No-Build Alternative that are evaluated in the Earthquake Ready Burnside Bridge Draft Environmental Impact Statement. The impacts from the Refined Long-span Alternative differ for emergency vehicle movement in the Project Area due to changes in the number of lanes and lane configurations. Traffic queuing impacts to emergency vehicle movement through the corridor differ for each of the four Refined Long-span Alternative lane configuration options. Increases in queuing could impact emergency vehicle movement through the corridor. Lane reductions on the bridge could also result in impacts that impede emergency vehicle movement over the bridge by reducing the space for vehicles to move out of the way. The impacts to emergency vehicle operations differ for each of the four Refined Long-span Alternative lane configuration options.

1 Introduction

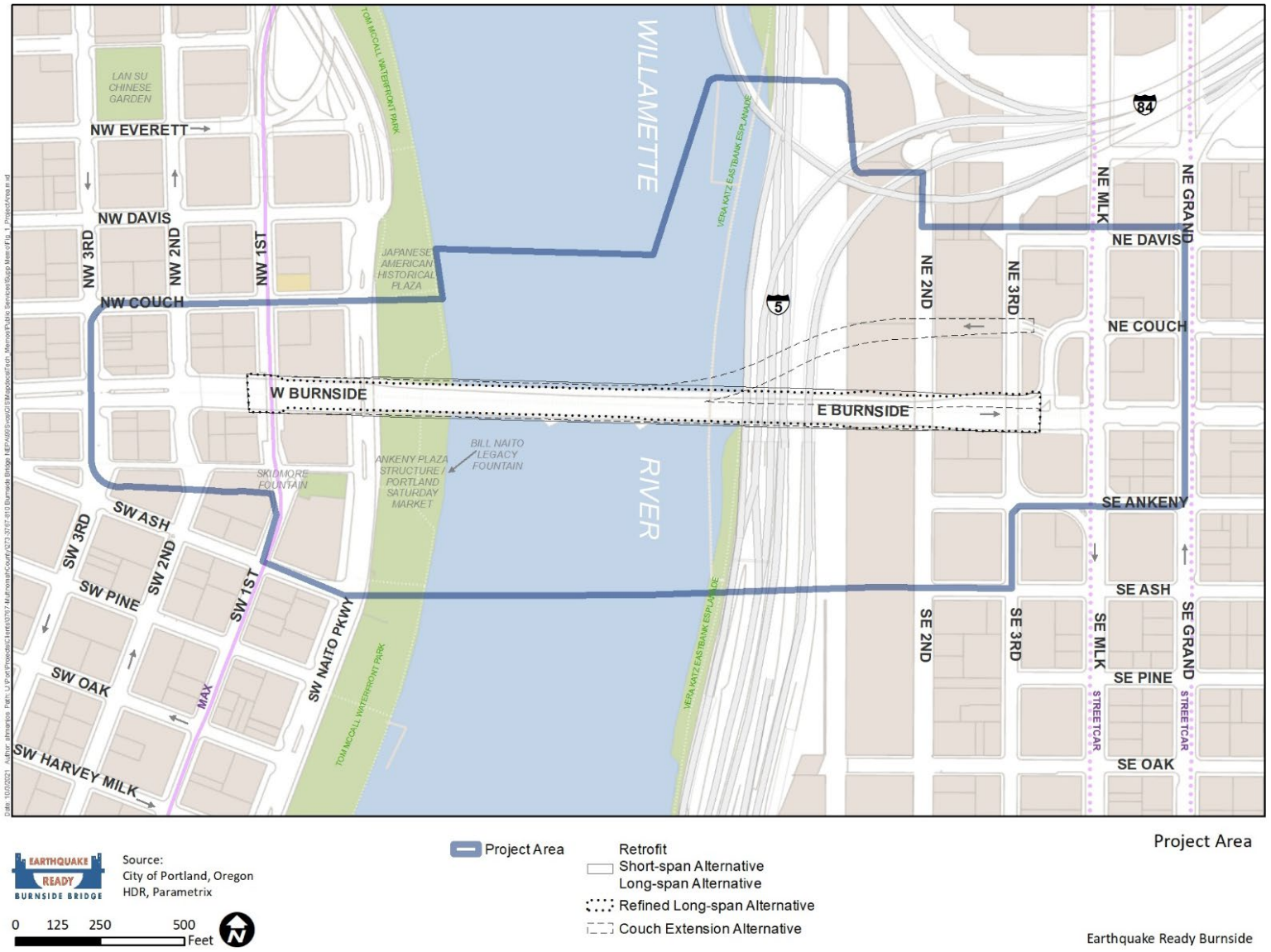
In support of the Supplemental Draft Environmental Impact Statement (SDEIS) for the Earthquake Ready Burnside Bridge (EQRB) Project, this supplemental technical memorandum has been prepared to evaluate the impacts of potential design refinements to the Draft EIS Preferred Alternative to public services within the Project's Area of Potential Impact (API). The intent of the design modifications is to reduce the overall cost and improve the affordability of the EQRB Project. This technical memorandum is a supplement to the Draft EIS technical reports and as such does not repeat all of the information in those reports, but instead focuses on the impacts of the design modification options, how they compare to each other, and how they compare to the version of the preferred alternative that was evaluated in the *EQRB Draft Environmental Impact Statement* (Multnomah County 2021b).

Much of the information included in the Draft EIS and Draft EIS technical reports, including project purpose, relevant regulations, analysis methodology and affected environment, is incorporated by reference because it has not changed, except where noted in this technical memorandum.

1.1 Project Location

The Project Area is located within the central city of Portland. The Burnside Bridge crosses the Willamette River connecting the west and east sides of the city. The Project Area encompasses a one-block radius around the existing Burnside Bridge and W/E Burnside Street, from NW/SW 3rd Avenue on the west side of the river and NE/SE Grand Avenue on the east side. Several neighborhoods surround the area including Old Town/Chinatown, Downtown, Kerns, and Buckman. Figure 1 shows the Project Area.

Figure 1. Project Area



1.2 Project Purpose

The primary purpose of the Project is to build a seismically resilient Burnside Street lifeline crossing over the Willamette River that will remain fully operational and accessible for vehicles and other modes of transportation following a major Cascadia Subduction Zone earthquake. The Burnside Bridge will provide a reliable crossing for emergency response, evacuation, and economic recovery after an earthquake. Additionally, the bridge will provide a long-term safe crossing with low-maintenance needs. The full project purpose and need can be found in the EQRB Draft EIS, Chapter 1 (Multnomah County 2021b).

2 Project Alternatives

This technical memorandum evaluates potential design refinements to the Draft EIS Preferred Alternative. All of the Project Alternatives evaluated in the Draft EIS are summarized in Chapter 2 of the Draft EIS and described in detail in the *EQRB Description of Alternatives Report* (Multnomah County 2021a). Briefly, the Draft EIS evaluated a No Build Alternative and four Build Alternatives. One of the Build Alternatives, the Long-span Alternative, was identified as the Preferred Alternative. The potential refinements evaluated in this technical memorandum are collectively referred to as the Refined Long-span Alternative (Four-lane Version) or the Refined Long-span. The Refined Long-span includes project elements that were studied in the Draft EIS but have been modified as well as new options that were not studied in the Draft EIS. These refinements and new options are intended to provide lower cost and, in some cases, lower impact designs and ideas that could be adopted to reduce the cost of the Draft EIS Preferred Alternative while still achieving seismic resiliency. The potential design refinements, and how they differ from the Draft EIS Long span Alternative, are described below.

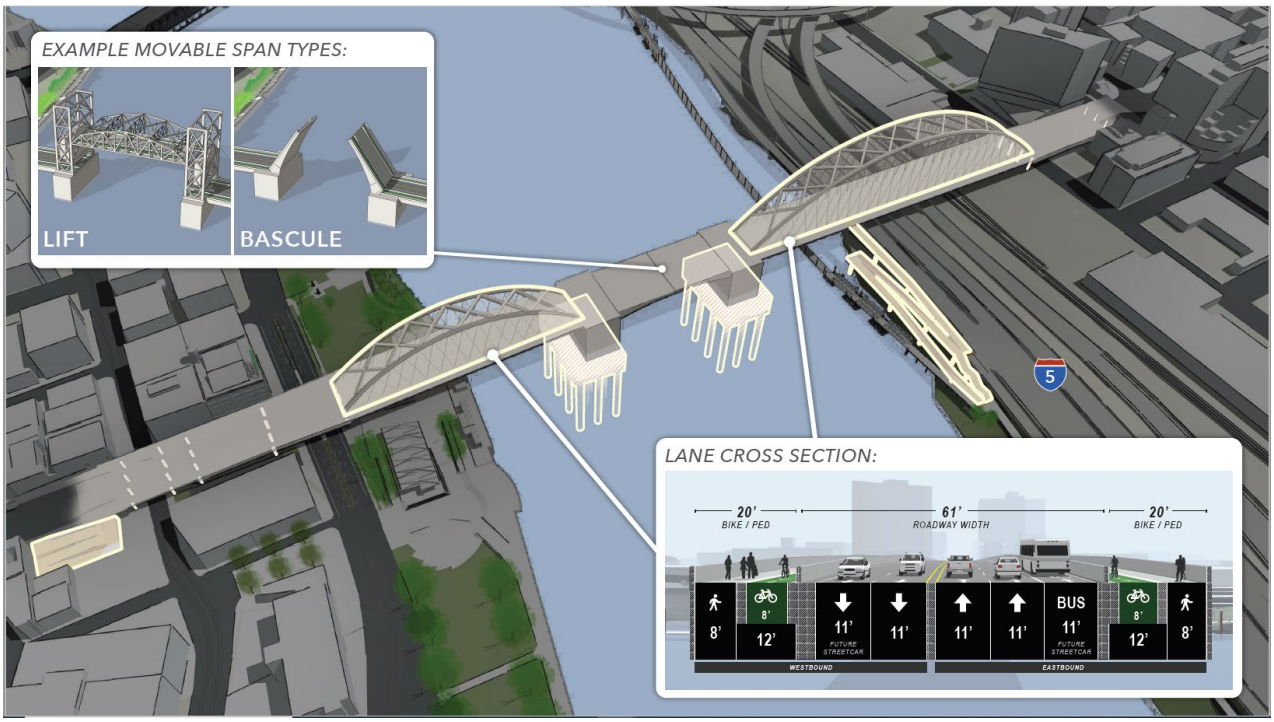
- Bridge width – The total width of the bridge over the river would be approximately 82 to 93 feet (the range varies depending on the bridge type and segment). For comparison, the Draft EIS Replacement Alternatives were approximately 110 to 120 feet wide over the river. The refined bridge width would accommodate approximately 78 feet for vehicle lanes, bike lanes, and pedestrians, which is comparable to the existing bridge.
    - The refined bridge design would accommodate four vehicle lanes (rather than five as evaluated in the Draft EIS). The following lane configuration options are being evaluated:
        - Lane Option 1 (Balanced) – Two westbound lanes (general-purpose) plus two eastbound lanes (one general-purpose and one bus-only lane)
        - Lane Option 2 (Eastbound Focus) – One westbound lane (general-purpose) plus three eastbound lanes (two general purpose and one bus only)
        - Lane Option 3 (Reversible Lane) – One westbound lane (general-purpose) plus two eastbound lanes (one general-purpose and one bus-only) plus one reversible lane (westbound AM peak and eastbound PM peak)

        - Lane Option 4 (General Purpose with Bus Priority) – Two westbound general-purpose lanes plus two eastbound general-purpose lanes, plus bus priority access (e.g., queue bypass) at each end of the bridge.
    - The width of the vehicle lanes would be, at minimum, 10 feet and could vary depending on how the total bridge width is allocated between the different modes.
    - The total width of the bicycle lanes and pedestrian sidewalks would be approximately 28 to 34 feet. This is wider than the existing bridge but narrower than what was described in the Draft EIS for the Replacement Alternatives. Physical barriers between vehicle lanes and the bicycle lanes would be in addition to the above dimensions.
    - The refined bridge would allow narrower in-water piers, due to less weight needing to be transferred to the in-water supports.
- Other design refinements being evaluated:
    - West approach – This memo evaluates a refined girder bridge type for the approach over the west channel of the river, Waterfront Park, and Naito Parkway. Compared to the cable-stayed and tied-arch options evaluated in the Draft EIS, this option would not only reduce costs but also avoid an adverse effect to the Skidmore/Old Town National Historic Landmark District. It would have two sets of columns in Waterfront Park compared to just one with the Draft EIS tied-arch option and five with the existing bridge.
    - East approach – This memo evaluates 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 be about 720 to 820 feet long and approximately 150 feet tall (the Draft EIS Long-span Alternative was the same height and 740 feet long). The refined alternative would place the eastern pier of the tied-arch span either on the east side of 2nd Avenue (Option 1) or just west of 2nd Avenue (Option 2). Increasing the length of the tied-arch span would also reduce the length and depth of the subsequent girder span to the east.
    - Americans with Disabilities Act (ADA) access – This memo evaluates a refined approach for providing direct ADA access between the bridge and the Vera Katz Eastbank Esplanade, as well as between the bridge and W 1st Avenue and the Skidmore Fountain MAX station. The Draft EIS evaluated multiple ramp, stair, and elevator options for these locations. This SDEIS memo evaluates a refined option that would provide enhanced ADA access at both locations using both elevators and stairs. These facilities would also provide pedestrian and potentially bicycle access. For the west end, there is also the potential for replacing the existing stairs with improved sidewalk access from the west end of the bridge to 1st Avenue.

Figure 3 highlights the elements of the Draft EIS Long-span Alternative that have been modified to create the Refined Long-span Alternative, as described above. Figure 2 shows the Draft EIS Long-span Alternative and Figure 3 shows the Refined Long-span

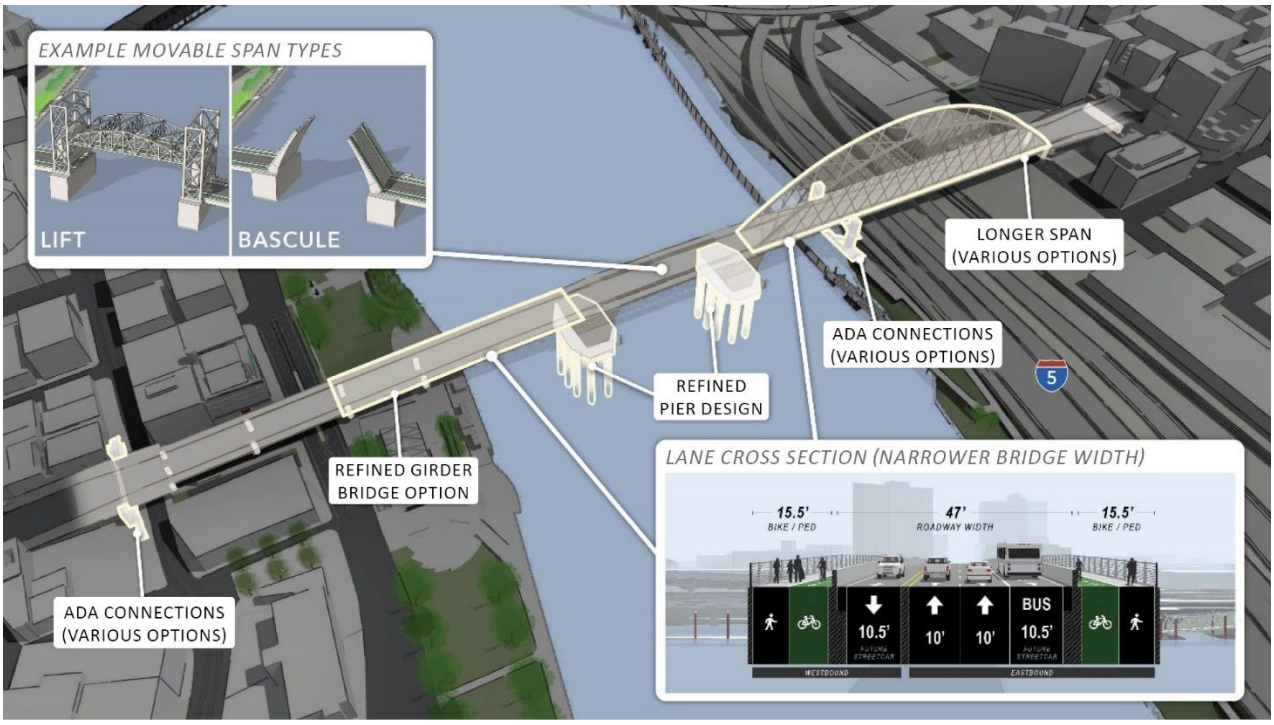
Alternative. Both figures include the tied-arch option for the east approach and the bascule option for the center movable span, but the east span could also be a cable-stayed bridge and the movable span could be a vertical lift bridge. For the west approach, the Draft EIS Long-span Alternative shows the tied-arch option while the Refined Long-span shows the refined girder bridge. The Refined Long-span Alternative image shows just one of the four possible lane configuration options being studied. All four configuration options, as well as many more graphics of the Refined Long-span Alternative, and how it compares to the Draft EIS Long-span Alternative, can be found in Chapter 2 of the *EQRB Supplemental Draft Environmental Impact Statement* (Multnomah County 2022b). Figure 3 also shows just one of the possible ways to allocate the bridge width between vehicle lanes, bicycle lanes and sidewalks; the total width of the bicycle and pedestrian facilities could range from approximately 28 to 34 feet.

Figure 2. Draft EIS Long-Span Alternative



Note: The Draft EIS Long-span Alternative included multiple bridge types for both the east and west approaches. This figure shows only the tied arch option.

Figure 3. Refined Long-Span Alternative



Notes: The Refined Long-span Alternative evaluated in this 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 SDEIS further studies, a bascule option and vertical lift option 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.

- Construction assumptions:
  - Construction duration – The expected duration of project construction is 4.5 to 5.5 years, dependent upon the design option. See Table 1 for more information regarding construction impact extent and closure timeframes.
  - Construction area – Compared to the Draft EIS Long-span Alternative, the main refinement is that the construction area would be smaller for the west approach south of the bridge, including a smaller area within Waterfront Park south of the bridge.
  - Construction access and staging – The construction access and staging is expected to be the same as that described in the Draft EIS.
  - Vegetation – The Refined Long-span would remove slightly fewer trees and vegetation impacts than the Draft EIS Long-span, primarily within Waterfront Park south of the bridge.
  - In-water work activity – The in-water work would be similar to that described in the Draft EIS, except that the replacement bridge in-water foundations would consist of a perched footing cap and a group of drilled shafts. Whereas the Draft EIS discusses the use of cofferdams to isolate in water work, the Refined Long-span Alternative would use a temporary caisson lowered to an elevation about mid height of the water column to construct footing caps, avoiding additional disturbance of the riverbed that would needed for a cofferdam.

Additionally, the existing Pier 4 would be fully removed, Pier 1 would be partially removed below the mudline, and Piers 2 and 3 would be removed to below the mudline. Existing in water piles would be removed, subject to the design option advanced.

- Temporary freeway, rail, street, and trail closures – Temporary closures are expected to be the same as those described in the Draft EIS.
- Access for pedestrians and vehicles to businesses, residences, and public services – Access is expected to be the same as that described in the Draft EIS.
- On-street parking impacts – On-street parking impacts are expected to be the same as those described in the Draft EIS.
- Property acquisitions and relocations – Property acquisitions and relocations are similar to those listed in the Draft EIS, except that they have been modified to reflect a narrower set of bridge design options.
- Temporary use of Governor Tom McCall Waterfront Park – The park area that would be temporarily closed for construction has changed since the Draft EIS. On the north side of the bridge, the closure area has been reduced to avoid removing 10 cherry trees and a berm that are part of the Japanese American Historical Plaza; this change would apply to all of the build alternatives. On the south side of the bridge, the park closure area has also been reduced to include only the area north of the Tom McCall Waterfront Park trellis; this revision applies only to the Refined Long-span Alternative.

Table 1. Construction Impacts, Closure Extents, and Timeframes by Build Alternative

Facility Impacted	Draft EIS Long-Span Alternative	Refined Long-Span Alternative
Gov. Tom McCall Waterfront Park	4.5-year closure within boundary of potential construction impacts	Same; Smaller closure area south of the bridge
Willamette River Greenway Trail	Portion of trail within Waterfront Park closed for same duration as park; detours in place for construction duration	Same
Japanese American Historical Plaza	Southern portion of plaza would be closed for same duration as Waterfront Park	Same
Ankeny Plaza Structure	Closure for duration of construction but no impacts to Ankeny Plaza structure	Plaza structure would not be closed during construction or impacted
Bill Naito Legacy Fountain	No closure of fountain and associated hardscape	Same
Vera Katz Eastbank Esplanade	18 months (this could extend to 3.5 to 4.5 years if project builds ramps rather than elevators and stairs for the ADA/bicycle/pedestrian connection); detours in place for construction duration	Same
Burnside Skatepark	4-month full closure	Same
River Crossing on Burnside Street	4- to 5-year closure	Same

Facility Impacted	Draft EIS Long-Span Alternative	Refined Long-Span Alternative
Saturday Market Location	4.5-year closure or use of alternative location	Same
Skidmore Fountain MAX Station	Approximately 5 weeks	Same
Navigation Channel/Willamette River Water Trail	Intermittent closures; 2 to 10 closures; each closure up to 3 weeks	Same
Overall Construction Duration	**4.5 to 5.5 years**	Same

3 Definitions

The following terminology will be used when discussing geographic areas in the EIS:

- **Project Area –** The area within which improvements associated with the Project Alternatives would occur and the area needed to construct these improvements. The Project Area includes the area needed to construct all permanent infrastructure, including adjacent parcels where modifications are required for associated work such as utility realignments or upgrades. For the EQRB Project, the Project Area includes approximately a one-block radius around the existing Burnside Bridge and W/E Burnside Street, from NW/SW 3rd Avenue on the west side of the river and NE/SE Grand Avenue on the east side.
- **Area of Potential Impact (API) –** This is the geographic boundary within which physical impacts to the environment could occur with the Project Alternatives. The API is resource-specific and differs depending on the environmental topic being addressed. For all topics, the API will encompass the Project Area, and for some topics, the geographic extent of the API will be the same as that for the Project Area; for other topics (such as for transportation effects) the API will be substantially larger to account for impacts that could occur outside of the Project Area. The API for public services is defined in Section 5.1 of the *EQRB Public Services Technical Report* (Multnomah County 2021c).
- **Project vicinity –** The environs surrounding the Project Area. The Project vicinity does not have a distinct geographic boundary but is used in general discussion to denote the larger area, inclusive of the Old Town/Chinatown, Downtown, Kerns, and Buckman neighborhoods.

4 Relevant Regulations

There are no differences in regulations with the Refined Long-span Alternative.

5 Analysis Methodology

The analysis methodology is the same as was used the *EQRB Public Services Technical Report* (Multnomah County 2021c).

6 Affected Environment

The affected environment for the Refined Long-span Alternative is the same as that included in the *EQRB Public Services Technical Report*.

7 Impacts from the Design Modifications and Comparison to Draft EIS Alternatives

Impacts to emergency vehicle movement in the Project Area differ for the Refined Long-span Alternative compared to impacts evaluated for the Draft EIS Long-span Alternative studied in the *EQRB Public Services Technical Report* (Multnomah County 2021c). Within the Refined Alternative, impacts to emergency vehicle movement vary among the four different lane configuration options studied. Changes to traffic operations would impact traffic queuing times and emergency vehicle movement within the Project Area. All other impacts to public services from the Refined Long-span Alternative are the same as described in the in the Draft EIS. For the full analysis of impacts from the Draft EIS alternatives to public services, refer to the *EQRB Public Services Technical Report* (Multnomah County 2021c).

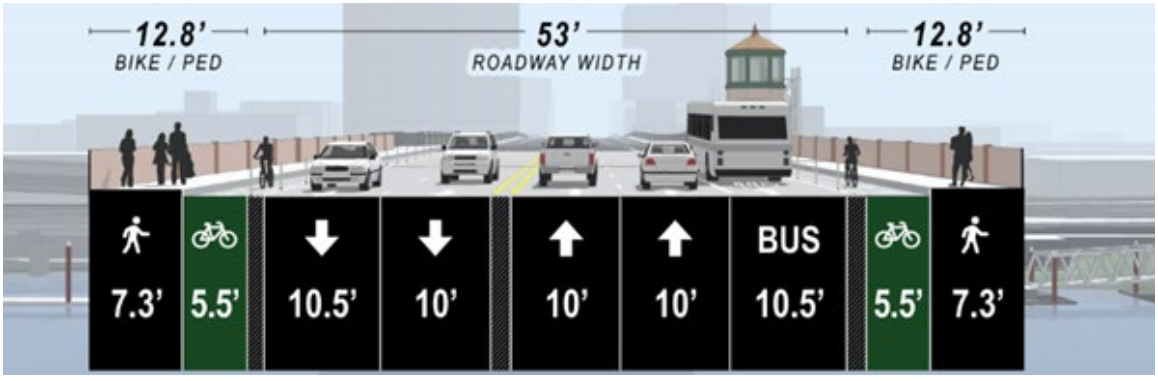
7.1 Direct Impacts

The *EQRB Public Services Technical Report* (Multnomah County 2021c) reports no changes to traffic movement or alterations to critical emergency access routes (the Burnside Bridge is a designated emergency corridor from west to east [see Figure 4]). Updated traffic operations and lane configurations for the Refined Long-span Alternative would result in impacts to traffic movement and critical emergency access routes that vary by lane configuration option. Detailed traffic analysis and comparisons of traffic impacts between the SDEIS lane options and Draft EIS Long-span Alternative can be found in the *EQRB Transportation Supplemental Memorandum* (Multnomah County 2022c).

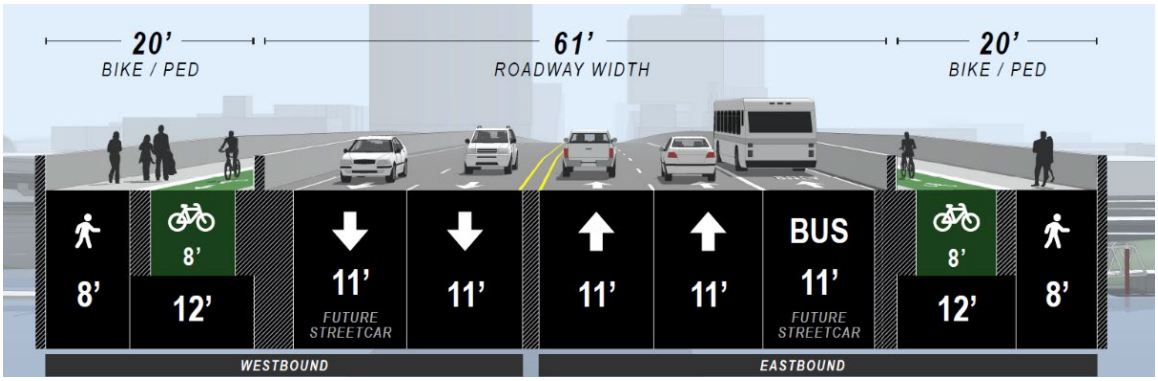
Figure 4. Existing Public Service Resources and Emergency Access Routes

The most influential difference to emergency vehicle operations with the Refined Long-span Alternative compared to the Draft EIS Long-span and No-Build Alternatives would result from the removal of one general-purpose lane on the bridge (see Figure 5 for designs of No-Build and Draft EIS Long-span Alternative lane configurations). The removal of a lane has the potential to restrict vehicles on the bridge from making way for emergency vehicles in the event of an emergency. This could cause an emergency vehicle to be more susceptible to traffic congestion, even when the emergency vehicle is using audible and/or visual signals. Every moment is crucial in response to fires, crimes, or medical emergencies. Delayed response times have the potential to lead to more severe impacts. Emergency vehicles moving eastbound across the bridge from Portland Fire and Rescue Station #1 are high priority, as emergency vehicles can take any bridge back to Station #1 but would typically use the eastbound Burnside Bridge as the most direct route for emergency response to incidents on the east side of the river. The four lane configuration options in the Refined Long-span Alternative would result in the changes to emergency vehicles that are described in the following sections.

Figure 5. Bridge Width – Cross Section Over River



Existing Bridge Width



Draft EIS Long-Span Bridge Width

Lane Option 1 (Balanced)

Lane Option 1 consists of two westbound lanes (general-purpose) plus two eastbound lanes (one general-purpose and one bus-only lane). This option would eliminate one general eastbound lane from the Draft EIS Long-span and No-Build Alternatives. The reduction of the eastbound lane would limit the ability for traffic to make way for

emergency vehicles heading eastbound on the Burnside critical emergency access route. Although vehicles would still have access to an outside lane in each direction on the bridge (general-purpose lane westbound, bus lane eastbound) to allow emergency vehicles to travel uninterrupted in the inside or center lane, the removal of a lane could still cause emergency vehicles to be more susceptible to traffic congestion. See Option 1 on Figure 6 for detailed lane configuration design for the Refined Long-span Alternative. Portland Fire and Rescue indicated that it has operational concerns about the potential for traffic congestion impacts to emergency vehicle movement with this lane option. Lane Option 1 would create the most congestion among all the lane options. This lane option would have increased delays and more intersections (three)[1] that would not meet City of Portland level of service standards, as compared to the Draft EIS Long-span Alternative and the No-Build scenario.

Increases in queuing and decreases in level of service can impact an emergency vehicle's ability to move through the corridor, which has the potential to lead to delayed response times and, in some cases, serious impacts.

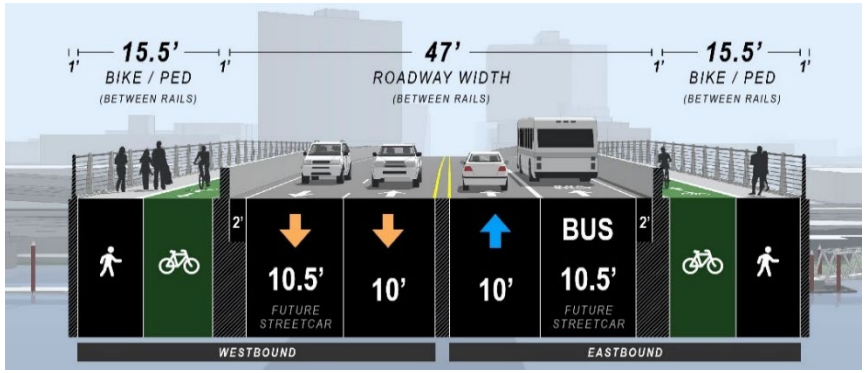
Lane Option 2 (Eastbound Focus)

Lane Option 2 consists of one westbound lane (general-purpose) plus three eastbound lanes (two general-purpose and one bus-only). This option would eliminate one general-purpose westbound lane from the Draft EIS Long-span and No-Build Alternatives. The removal of the westbound lane would limit the ability for traffic to make way for emergency vehicles heading westbound on the Burnside Bridge. Eastbound traffic would be required to move into the two outside lanes (one general-purpose and one bus-only lane) to allow for passage of the westbound emergency vehicle on the innermost eastbound lane. See Option 2 on Figure 6 for detailed lane configuration design for this Refined Long-span Alternative option.

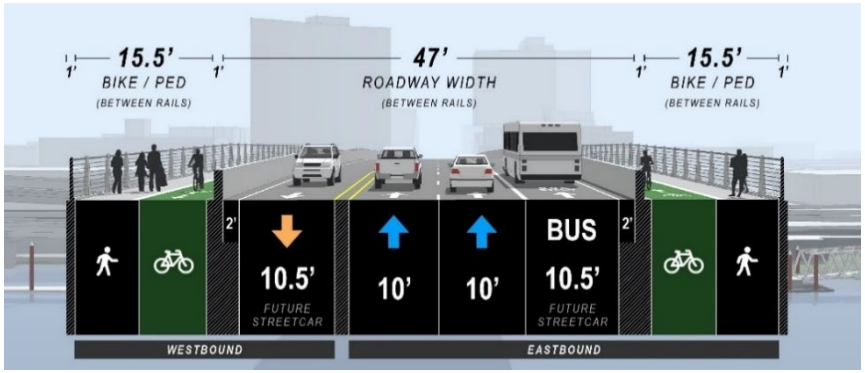
Portland Fire and Rescue indicated concerns about the potential for traffic congestion impacts to emergency vehicle movement in this lane option. Lane Option 2 would have the same amount of intersections (one) that do not meet City of Portland level of service standards, as compared to the Draft EIS Long-span Alternative and the No-Build scenario.

[1] Detailed traffic analysis and comparisons of traffic impacts between SDEIS Lane Options and Draft EIS Long-span alternative can be found in the *EQRB Draft Transportation Supplemental Memorandum.*

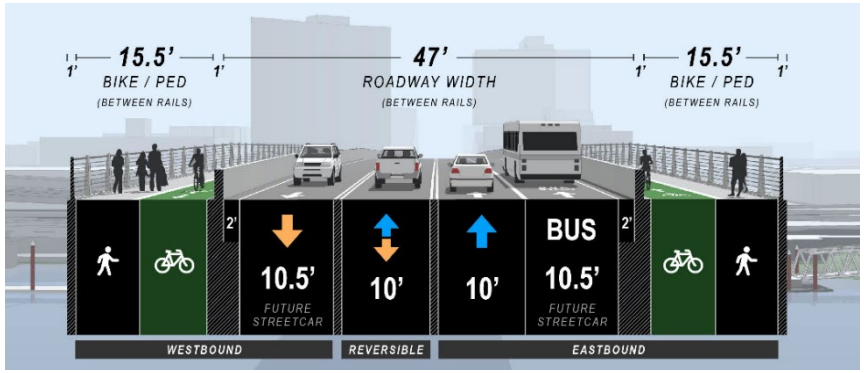
Figure 6. Refined Long-Span Lane Configuration Options



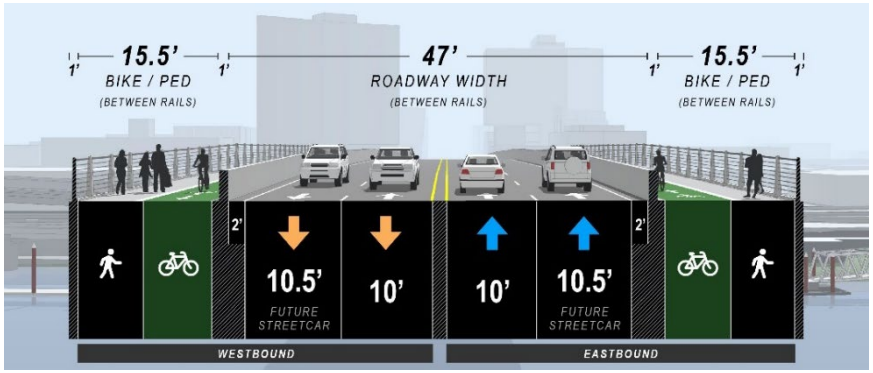
Option 1: Two Westbound Lanes | One Eastbound + One Bus Lane



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)

Lane Option 3 (Reversible Lane)

Lane Option 3 consists of one westbound lane (general-purpose) plus two eastbound lanes (one general-purpose and one bus-only) plus one reversible lane (westbound AM peak and eastbound PM peak). In this option, there would be two westbound general-purpose lanes during the AM peak period (5:00 a.m. to 10:00 a.m.) and two eastbound general-purpose lanes during the PM peak period (10:00 a.m. to 5:00 a.m.). This option would eliminate one general-purpose westbound or eastbound lane from the Draft EIS Long-span Alternative and No-Build Alternative depending on the time of day. During the AM peak period, traffic would be required to move to an outside lane in either direction on the bridge (general-purpose lane westbound, bus lane eastbound) to allow emergency vehicles to travel past in the inside or center lane. In the PM peak period, eastbound traffic would be required to move into the two outside lanes (one general-purpose and one bus-only lane) to allow for passage of the westbound emergency vehicle on the innermost eastbound lane.

Dynamic traffic controls on the bridge could aid emergency vehicle passage by blocking off the reversible lane to vehicle traffic in the event of an emergency. This scenario would require a real-time monitor at a traffic controls center. Portland Fire and Rescue prefers Lane Option 3 because it helps keep traffic moving in the reversible lane and retains the existing eastbound bus lane, which preserves lane space for cars to move over and make way for oncoming emergency response vehicles. See Option 3 on Figure 6 for detailed lane configuration design for this Refined Long-span Alternative. Lane Option 3 would have the same amount of intersections (one) that do not meet City of Portland level of service standards, as compared to the Draft EIS Long-span Alternative.

Lane Option 4 (General-Purpose with Bus Priority)

Lane Option 4 consists of two westbound general-purpose lanes, two eastbound general-purpose lanes, and bus priority access (i.e., queue bypass) at each end of the bridge. This option would eliminate one general-purpose eastbound lane from the Draft EIS Long-span and No-Build Alternatives. The removal of the eastbound lane would limit the ability for traffic to make way for incoming emergency vehicles heading eastbound on the Burnside critical emergency access route. Vehicles would still have access to an outside lane in each direction on the bridge to allow emergency vehicles to travel uninterrupted in the inside or center lane. The removal of the eastbound bus lane would make eastbound emergency responses more difficult because there would be limited space for cars to move over if all lanes were filled with vehicles during peak congestion. See Option 4 of Figure 6 for detailed lane configuration design for this option of the Refined Long-span Alternative.

The lack of a transit-only lane for traffic to pull into in order to make way for emergency vehicles in this lane option causes concern to Portland Fire and Rescue. Lane Option 4 would have the same amount of intersections (one) that do not meet City of Portland level of service standards, as compared to the Draft EIS Long-span alternative and the No-Build scenario.

8 Potential Mitigation

Mitigation is the same as discussed in the Draft EIS. To mitigate for temporary construction activities affecting public services, detailed coordination regarding construction locations and phasing would be required with the appropriate parties including fire departments, emergency responder services, school transportation services, and law enforcement. Motorists are required to yield right-of-way to emergency response vehicles that are using audible and/or visual signals, emergency vehicles would be substantially less affected by congestion compared to other motorists. In the Lane Option 3 (Reversible Lane) scenario, a traffic operations control center and dynamic signaling would assist emergency vehicle movement over the bridge.

9 Agency Coordination

The Project team is cooperating with Portland Fire and Rescue to discuss the impacts of the potential lane configurations and design changes to emergency vehicle movement across the Burnside Bridge.

10 Preparers

Name	Professional Affiliation	Education	Years of Experience
Garrett Augustyn	Parametrix	MS, Geography	3
Jennifer Hughes	Parametrix	Master of Urban and Regional Planning	20

11 References

Multnomah County.

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