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

Attachment H

Final Nationwide Programmatic Section 4(f) Evaluation for Projects that Necessitate the Use of Historic Bridges

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U.S. Department of Transportation
Federal Highway Administration

Multnomah County

Attachment H. Final Nationwide Programmatic Section 4(f) Evaluation for Projects that Necessitate the Use of Historic Bridges

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Acronyms, Initialisms, and Abbreviations

APE	Area of Potential Effect (term used for cultural resources)
API	Area of Potential Impact
CFR	Code of Federal Regulations
CIP	Capital Improvement Plan
CSZ	Cascadia Subduction Zone
EIS	Environmental impact statement
EQRB	Earthquake Ready Burnside Bridge
FHWA	Federal Highway Administration
FR	Federal Register
HAER	Historic American Engineering Record
NHPA	National Historic Preservation Act of 1966
NRHP	National Register of Historic Places
ODOT	Oregon Department of Transportation
OWJ	Official with Jurisdiction
SHPO	State Historic Preservation Office
USC	United States Code
USDOT	U.S. Department of Transportation

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Chapter 1 – Introduction

1.1 Introduction

This Final Nationwide Programmatic Section 4(f) Evaluation for Projects that Necessitate the Use of Historic Bridges has been prepared with and is attached as part of the Final Environmental Impact Statement (Final EIS) for the Earthquake Ready Burnside Bridge (EQRB) Project. It is an update to the Section 4(f) analysis prepared as part of the Supplemental Draft EIS (SDEIS).

The Final Section 4(f) analysis for the Project is attached to the Final EIS separately and includes the technical analysis identifying, describing, and providing determination of Section 4(f) use for Section 4(f) properties within the Project's Area of Potential Impact (API). It also provides the Section 4(f) Evaluation analyzing the alternatives that avoid Section 4(f) properties and determines if they are feasible and prudent.

1.2 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 1-1 shows the project area.

1.3 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 (CSZ) earthquake. The Burnside Bridge would provide a reliable crossing for emergency response, evacuation, and economic recovery after an earthquake. Additionally, the bridge would provide a long-term safe crossing with low-maintenance needs.

Figure 1-1. Project Area

Source: City of Portland, HDR, Parametrix

1.4 Project Alternatives

The project alternatives are described in detail with text and graphics in the *EQRB Description of Alternatives Report* (Multnomah County 2021b) and in Chapter 2 of the EQRB *Supplemental Draft Environmental Impact Statement* (Multnomah County 2022c). That memo describes the alternatives' current design as well as operations and construction assumptions. Chapter 6 of the Final EIS describes the Preferred Alternative.

This technical analysis, as well as the Draft EIS, SDEIS, and Final EIS, evaluates the No-Build Alternative and four build alternatives. The Draft EIS studied an Enhanced Seismic Retrofit Alternative that would replace certain elements of the existing bridge and retrofit other elements, and it studied three replacement alternatives that would completely remove and replace the existing bridge. The Draft EIS identified one of the replacement alternatives, known as the Replacement Long-span Alternative, as the Preferred Alternative. The draft Section 4(f) Analysis that was published with the Draft EIS demonstrated that the Replacement Long-span Alternative was the Section 4(f) least harm alternative. After the publication of the Draft EIS, the Multnomah Board of County Commissioners requested that the project team identify and evaluate ways to reduce project construction costs while still achieving the performance and impact advantages of the Long-span Alternative. Toward that end, the project team developed a Refined Long-span Alternative that is very similar to the Draft EIS Long-span Alternative except that it has one less vehicle lane (four versus five) and has a narrower bridge deck and bridge piers. Evaluating the impacts and performance of the Refined Long-span Alternative was the focus of the SDEIS and the Section 4(f) analysis published with the SDEIS. This final Section 4(f) analysis also discusses how the impacts would compare for refined (narrowed) versions of the other replacement alternatives, including the Short-span and Couch Extension Alternatives.[1] Figure 1-11 (see Final EIS Attachment D, Final Section 4(f) Analysis) shows the Refined Long-Span Alternative footprint and Boundary of Potential Construction Impacts. The refined versions of the other replacement alternatives would have the same Boundary of Potential Construction Impacts. In addition, this technical analysis considers options for managing traffic during construction. Nomenclature for the alternatives/options is:

- No-Build Alternative
- Build Alternatives
    - Enhanced Seismic Retrofit (Retrofit Alternative)
    - Replacement Alternative with Short-span Approach (Short-span Alternative) and the refined, narrower version of the Short-span Alternative (Refined Short-span Alternative)

[1] There is no narrower version of the Enhanced Retrofit Alternative that was studied in the Draft EIS because this alternative would retrofit large sections of the existing bridge and therefore the bridge width is fixed and could not be narrowed. Also, this alternative is already the same width as the refined (narrowed) versions of the replacement alternatives.

  - Replacement Alternative with Long-span Approach (Draft EIS Long-span Alternative), the Draft EIS names this alternative as the Preferred Alternative (with no temporary bridge)
  - Refined Replacement Alternative with Long-span Approach (Refined Long-span Alternative), this is a refinement of the Draft EIS Preferred Alternative, also with no temporary bridge, and is the Final EIS Preferred Alternative (see Chapter 6 of the Final EIS for a full description).
  - Replacement Alternative with Couch Extension (Couch Extension) and the refined, narrower version of the Couch Extension Alternative (Refined Couch Extension)
- Construction Traffic Management Options
  - Temporary Detour Bridge Option (temporary bridge) includes three modal options:
    - Temporary Bridge: All modes
    - Temporary Bridge: Transit, Bicycles and Pedestrians only
    - Temporary Bridge: Bicycles and Pedestrians only
  - Without Temporary Detour Bridge Option (No Temporary Bridge)

Additional details for each of the project alternatives evaluated can be found in the *EQRB Description of Alternatives Report* (Multnomah County 2021b), Chapter 2 of the *EQRB Supplemental Draft Environmental Impact Statement* (Multnomah County 2022c), and Chapter 6 of the *EQRB Final Draft Environmental Impact Statement.* for text, maps, and graphical descriptions of the alternatives.

1.5 Definitions

The following terminology is used when discussing geographic areas in the EIS and this analysis:

- **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. The API for Section 4(f) properties is defined in Section 1.7.1.

1.6 Section 4(f) Regulations

Federal requirements protecting publicly owned parks, greenspaces, recreational areas and trails, wildlife and waterfowl refuges, and public or private historic sites apply to all transportation projects that receive USDOT funding or require USDOT approval. These requirements, known as Section 4(f), are originally from Section 4(f) of the USDOT Act of 1966, which was recodified in 1983 as 49 United States Code (USC) 303, Policy on lands, wildlife and waterfowl refuges, and historic sites and 23 USC 138 Preservation of parklands. The implementing regulations for Section 4(f) are located at 23 CFR 774.

The Section 4(f) analysis relies on information from, and coordination conducted for, the *EQRB Parks and Recreation Technical Report* (Multnomah County 2021d), *EQRB Parks and Recreation Supplemental Memorandum* (Multnomah County 2022b), *EQRB Cultural Resources Technical Report* (Multnomah County 2021a), and the *EQRB Cultural Resources Supplemental Memorandum* (Multnomah County 2022a).

1.6.1 Use of Section 4(f) Properties

Section 4(f) prohibits the use of Section 4(f) properties for USDOT-approved transportation projects except under certain defined circumstances. USDOT agencies, including the Federal Highway Administration:

> *…may approve a transportation program or project (other than any project for a park road or parkway under section 204 of title 23) requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of an historic site of national, State, or local significance (as determined by the Federal, State, or local officials having jurisdiction over the park, area, refuge, or site) only if—*
>
> 1. *there is no prudent and feasible alternative to using that land; and*
> 2. *the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.*

A Section 4(f) "use" occurs under the following three scenarios:

(1) A Section 4(f) property is permanently incorporated into a transportation facility. Permanent incorporation can include fee simple acquisition as well as permanent easements.

(2) A Section 4(f) property is required, in whole or in part, for project construction-related activities. The Section 4(f) property is not permanently incorporated into a transportation facility, but the effects are considered to be adverse in terms of the preservation purposes the Section 4(f) statute. Such effects constitute a "use" unless the effects meet all the conditions for "temporary occupancy" as stated in 23 CFR §774.13(d). Temporary occupancy is not a "use."

(3) A Section 4(f) property is not permanently incorporated, but the transportation project's proximity effects are so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially

impaired. This is known as "constructive use." Examples of such use include the following:

- **Noise** – The projected noise level increase from the project substantially interferes with the use and enjoyment of a resource that is protected by Section 4(f), such as enjoyment of a historic site where a quiet setting is a generally recognized feature or attribute of the site's significance.
- **Aesthetics** – The proximity of the proposed project impairs the aesthetic quality of a resource, where aesthetic qualities are considered important contributing elements to the value of a resource, such as impairment to visual or aesthetic qualities that obstructs or eliminates the primary views of an architecturally significant historic building.
- **Access Restrictions** – The project results in a restriction of access to the Section 4(f) resource, which substantially diminishes the utility of the resource.
- **Vibration** – A vibration impact from the operation of a project substantially impairs the use of a Section 4(f) resource, such as projected vibration levels from a rail transit project great enough to affect the structural integrity of a historic building.
- **Ecological Intrusion** – The ecological intrusion of the project substantially diminishes the value of wildlife habitat in a wildlife or waterfowl refuge adjacent to the project or substantially interferes with the access to a wildlife or waterfowl refuge. There are no wildlife or waterfowl refuges in or adjacent to the project area, so ecological intrusion is not discussed further.

1.6.2 Exceptions to Section 4(f) Use

23 CFR 774.13 identifies various exceptions to the requirement for Section 4(f) approval. Subsection (d) provides that temporary occupancies of land that are so minimal as to not constitute a use are not considered a Section 4(f) use when the following conditions are satisfied:

- Duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land;
- Scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) property are minimal;
- There are no anticipated permanent adverse physical impacts, nor will there be interference with the protected activities, features, or attributes of the property, on either a temporary or permanent basis;
- The land being used must be fully restored, i.e., the property must be returned to a condition which is at least as good as that which existed prior to the project; and
- There must be documented agreement of the official(s) with jurisdiction over the Section 4(f) resource regarding the above conditions.

1.6.3 Approval of Section 4(f) Use

When there is a use of Section 4(f) property, FHWA will determine what level of documentation is needed to make a Section 4(f) approval. Under Section 4(f), FHWA cannot approve the use of land from Section 4(f) properties as part of a transportation project unless:

- There is no feasible and prudent avoidance alternative to the use of land and the action includes all possible planning to minimize harm to the Section 4(f) property resulting from such use; or
- FHWA determines that the use of the property will have a *de minimis* impact. *De minimis* impacts related to historic sites are defined as the determination of either "no adverse effect" or "no historic properties affected" in compliance with Section 106 of the National Historic Preservation Act (NHPA). *De minimis* impacts on publicly owned parks, recreation areas, and wildlife and waterfowl refuges are defined as those that do not "adversely affect the activities, features, and attributes" of the Section 4(f) property. The Official with Jurisdiction (OWJ) must concur with the *de minimis* determination. For historic sites, the State Historic Preservation Office (SHPO) is the OWJ; for parks, recreation areas, and wildlife and waterfowl refuges, the OWJ is the official of the agency that owns and/or administers the property. If a transportation use of Section 4(f) property results in *de minimis* impact, analysis of avoidance alternatives is not required, and the Section 4(f) evaluation process is complete.

If impacts to a Section 4(f) resource do not meet the conditions for a *de minimis* impact determination, there are two approval options depending on the type of Section 4(f) use: A programmatic Section 4(f) evaluation or an individual Section 4(f) evaluation. These approval types are described below.

1.6.3.1 Programmatic Section 4(f) Evaluations

FHWA has issued five nationwide programmatic Section 4(f) evaluations which can be implemented if the project meets specific conditions. Two of the nationwide programmatic evaluations may be applicable to this Project:

1.6.3.2 Historic Bridge Programmatic Section 4(f) Evaluation

One of the five nationwide programmatic evaluations includes the Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges. This programmatic Section 4(f) evaluation may be applied by FHWA to projects which meet the following criteria:

1. The bridge is to be replaced or rehabilitated with federal funds.
2. The project will require the use of a historic bridge structure which is on or is eligible for listing on the National Register of Historic Places (NRHP).
3. The bridge is not a National Historic Landmark.

4. The FHWA Division Administrator determines that the facts of the project match those sections of the programmatic Section 4(f) evaluation guidelines regarding alternatives, findings, and mitigation.
5. Agreement among FHWA, SHPO, and the Advisory Council on Historic Preservation has been reached through procedures pursuant to Section 106 of the NHPA.

See Chapter 3 of this final Section 4(f) Analysis for compliance with this programmatic Section 4(f) evaluation.

1.6.3.3 Net Benefit Programmatic Section 4(f) Evaluation

The net benefit nationwide programmatic Section 4(f) evaluation is applicable when FHWA and the OWJ agree that due to the project, the use of the Section 4(f) property would result in a net benefit to the Section 4(f) property. The criteria for use include the following:

1. The proposed transportation project uses a Section 4(f) park, recreation area, wildlife or waterfowl refuge, or historic site.
2. The proposed project includes all appropriate measures to minimize harm and subsequent mitigation necessary to preserve and enhance those features and values of the property that originally qualified the property for Section 4(f) protection.
3. For historic properties, the project does not require the major alteration of the characteristics that qualify the property for the NRHP such that the property would no longer retain sufficient integrity to be considered eligible for listing. For archaeological properties, the project does not require the disturbance or removal of the archaeological resources that have been determined important for preservation in place rather than for the information that can be obtained through data recovery. The determination of a major alteration or the importance to preserve in place will be based on consultation consistent with 36 CFR Part 800.
4. For historic properties, consistent with 36 CFR Part 800, there must be agreement reached amongst the SHPO and/or Tribal Historic Preservation Officer, as appropriate, FHWA and the applicant on measures to minimize harm when there is a use of Section 4(f) property. Such measures must be incorporated into the project.
5. The official(s) with jurisdiction over the Section 4(f) property agree in writing with the assessment of the impacts; the proposed measures to minimize harm; and the mitigation necessary to preserve, rehabilitate and enhance those features and values of the Section 4(f) property; and that such measures will result in a net benefit to the Section 4(f) property.
6. FHWA determines that the project facts match those set forth in the Applicability, Alternatives, Findings, Mitigation and Measures to Minimize Harm, Coordination, and Public Involvement sections of the programmatic evaluation.

1.6.3.4 Individual Section 4(f) Evaluations

An individual Section 4(f) evaluation must be completed when approving a project that requires the use of Section 4(f) property if the use results in a greater than *de minimis*

impact and a programmatic Section 4(f) evaluation cannot be applied. An individual Section 4(f) evaluation must document the proposed use of Section 4(f) properties by all project alternatives and make the following determinations:

1. That there is no feasible and prudent alternative that completely avoids the use of the Section 4(f) property; and
2. The project includes all possible planning to minimize harm to the Section 4(f) property resulting from the transportation use. (23 CFR 774.3).

This chapter identifies and describes the Section 4(f) properties in the EQRB project area and analyzes the potential of each of the Alternatives to use those resources.

1.7 Affected Environment

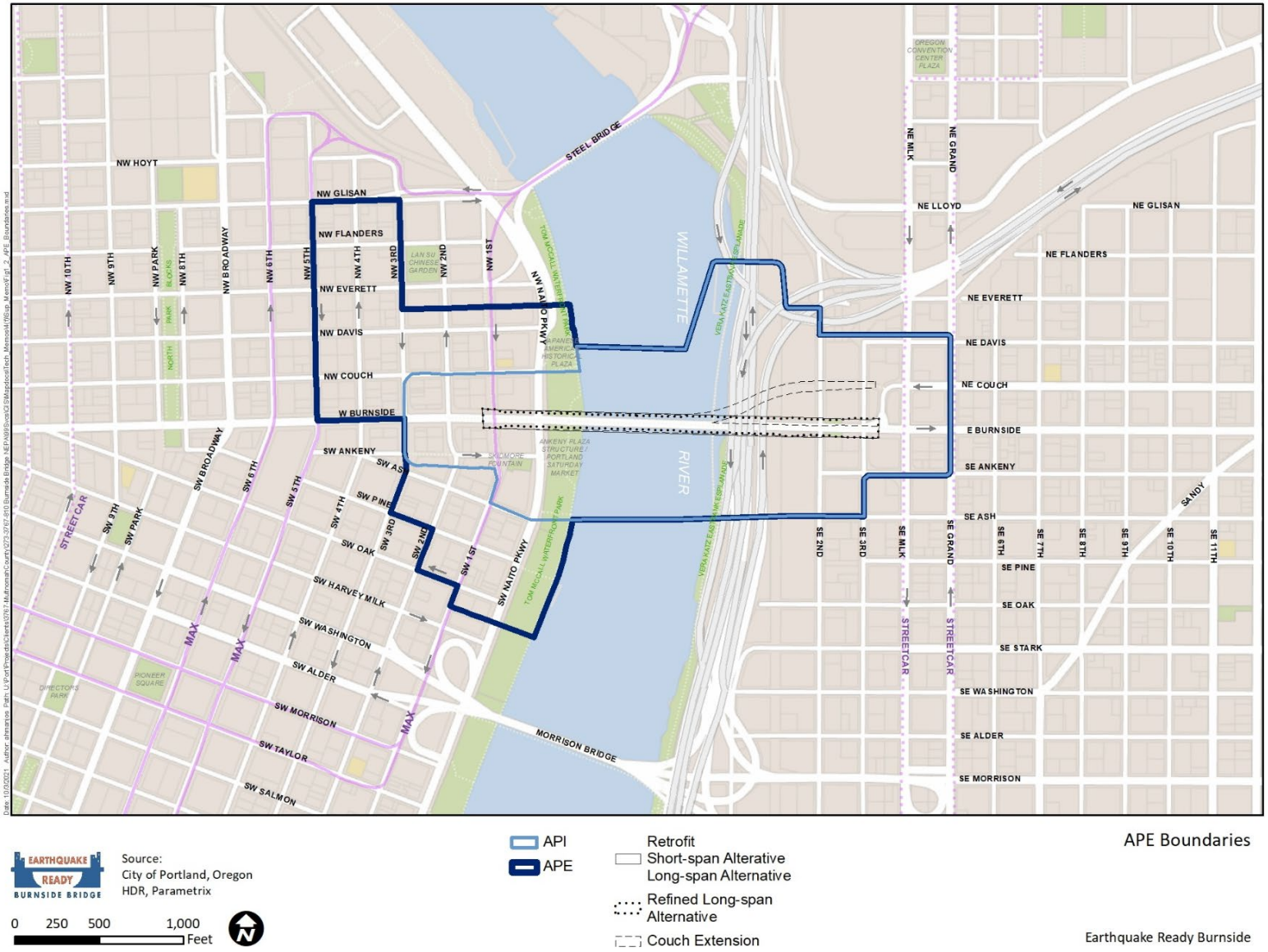
1.7.1 Area of Potential Impact

The API specifically for the Section 4(f) analysis is a combined API including the same area as that for the parks and recreation and archaeologic and historic resources Area of Potential Effect (APE).[2] The parks and recreation API is bounded by the parcels of land immediately adjacent to the project area (see Figure 1-1). There are no wildlife/waterfowl refuges present in or nearby the project area, so no separate API is defined for refuges.

FHWA is the lead federal agency and is responsible for defining the APE for EQRB; FHWA has delegated some NHPA responsibilities to the Oregon Department of Transportation (ODOT). Formal definition of the APE has been made in consultation with Oregon SHPO. The APE for the Project has been defined to address where the Project may have physical alterations to historic properties, as well as where there may be effects from noise and vibration, and changes to traffic patterns and the visual setting. The APE defined in consultation with the SHPO includes the maximum footprint of the build alternatives, including approaches and the temporary bridge proposed during construction. The APE has also been defined to include all of the geographic extent of the New Chinatown/Japantown Historic District and Skidmore/Old Town National Historic Landmark District. The APE abuts the East Portland Grand Avenue Historic District at SE Ankeny and SE Grand Avenue, but that historic district is not within the APE. The APE therefore extends from SE Grand Avenue on the east to NW 5th Avenue on the west. The New Chinatown/Japantown Historic District boundaries are West Burnside north to NW Glisan, NW 5th Avenue on the west, and NW 3rd on the east. The Skidmore/Old Town National Historic Landmark District boundaries are irregular and are best defined as mapped in Figure 1-2.

[2] Area of Potential Effect, or APE, is the term used when discussing an impact area for cultural or historic resources. When discussion all other type of resources, the term used is Area of Potential Impact, or API.

Figure 1-2. APE Boundaries



Source: City of Portland, HDR, Parametrix

1.7.2 Resource Identification and Evaluation Methods

This report relies on the data collected and analyzed in the *EQRB Parks and Recreation Technical Report* (Multnomah County 2021d), *EQRB Parks and Recreation Supplemental Memorandum* (Multnomah County 2022b), *EQRB Cultural Resources Technical Report* (Multnomah County 2021a), and the EQRB *Cultural Resources Supplemental Memorandum* (Multnomah County 2022a).

Field visits to Section 4(f) properties within the API were conducted to confirm descriptions of existing conditions and observe activities at these properties.

1.7.3 Historic Sites

Above-ground cultural resources that qualify as Section 4(f) resources and that have the potential for Section 4(f) use are described in this section. The remainder of the historic above-ground resources discussed in the *EQRB Cultural Resources Technical Report* (Multnomah County 2021c) and *EQRB Cultural Resources Supplemental Memorandum* (Multnomah County 2022a) are not considered likely to be impacted or to have a Section 4(f) use and are not discussed further in this report.

1.7.3.5 Burnside Bridge

No-Build Alternative

There would be no Section 4(f) use of this resource as a result of the No-Build Alternative. However, with no action, in the event of the predicted CSZ earthquake, the existing Burnside Bridge would fail and collapse, and thus would no longer exist as a historic structure.

Enhanced Seismic Retrofit Alternative

The Burnside Bridge would undergo substantial upgrades with the Retrofit Alternative but would retain the bridge type and some of the existing design characteristics of its current condition. However, the Retrofit Alternative would remove and reconstruct Pier 4 approximately 34 feet to the west, which would visually shorten the eastern fixed span. In addition, the retrofit would compromise the bridge's historic integrity by altering the design, materials, workmanship and feeling of the structure. Those changes would alter the historic significance of the bridge to the extent that this Alternative would cause an overall adverse effect under Section 106 (see Appendix C, Findings of Effect).

- Permanent Incorporation Use: Yes – Section 106 analysis determined the proposed alteration of the bridge would remove its historic integrity.

Replacement Alternatives

All replacement alternatives, including the Refined Long-span Alternative, would constitute a complete replacement of the current bridge which would be considered a permanent use under Section 4(f).

- Permanent Incorporation Use: Yes – The removal and replacement of the Burnside Bridge would result in an adverse effect under Section 106 and a permanent Section 4(f) use.

Temporary Bridge

The option of using a temporary bridge would not cause a Section 4(f) use of the Burnside Bridge.

De Minimis Analysis

The Retrofit Alternative and all replacement alternatives are expected to have a permanent Section 4(f) use of the Burnside Bridge. The impact is not considered to be *de minimis*.

Programmatic

As discussed in Section 1.6.2, the Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges is available for projects that necessitate the use of historic bridges. This programmatic approach is only available if the project demonstrates there are no feasible and prudent alternatives to the use of the historic bridge structure and the project includes all possible planning to minimize harm.

According to 23 CFR 774.17, an alternative is not feasible if it cannot be built as a matter of sound engineering judgment, and an alternative is not prudent if:

- It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need;
- It results in unacceptable safety or operational problems;
- After reasonable mitigation, it still causes:
    - Severe social, economic, or environmental impacts;
    - Severe disruption to established communities;
    - Severe disproportionate impacts to minority or low-income populations; or
    - Severe impacts to environmental resources protected under other federal statutes.
- It results in additional construction, maintenance, or operation costs of an extraordinary magnitude;
- It causes other unique problems or unusual factors; or
- It involves multiple factors of the above, that while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude.

Analysis of the use of this programmatic for Section 4(f) use of Burnside Bridge is provided in Chapter 3.

Agency Coordination

Review of use of the programmatic Section 4(f) evaluation has included FHWA, Multnomah County, ODOT, and Oregon SHPO. Multnomah County has conducted an extensive public outreach and agency coordination program; this is described in Chapter 5 of the Final EIS.

Section 4(f) Use Determination

The Burnside Bridge would be subject to Section 4(f) use that would be approved under the Nationwide Programmatic Section 4(f) Evaluation for Projects that Necessitate the Use of Historic Bridges for all build alternatives with or without the temporary bridge.

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Chapter 2 – Nationwide Programmatic Section 4(f) Evaluation for Projects that Necessitate the Use of Historic Bridges

2.1 Federal Highway Administration Nexus

The Earthquake Ready Burnside Bridge (EQRB) Project (Project) would replace the existing Burnside Bridge. Planning and design costs are entirely locally funded, but the project is pursuing a combination of local, state, and federal funding for the construction costs.

2.2 Description of the Section 4(f) Resource

When it opened to traffic in 1926, the Burnside Bridge, which replaced the original 1892 bridge, was acclaimed for its use of the double-leaf bascule while also employing a concrete deck for the movable span. The Burnside Bridge remains largely intact and continues to maintain its historic integrity and to convey its period of significance (Kramer 2012). The current bridge initially supported six lanes of traffic, but in 1995, one traffic lane was converted into bicycle lanes. The bridge now has bicycle lanes and sidewalks in both directions, and it has five motor vehicle lanes: two westbound and two eastbound general traffic lanes plus one eastbound transit-only lane. The bridge has had minor modifications since it was constructed: electric streetcar service ended in the late 1940s, lighting and traffic control devices were updated in the 1950s, automobile traffic gates were installed in 1971, and the bascule pier fenders were replaced on the upstream side in 1983. Multiple deck resurfacing projects and expansion joint repairs have been conducted over the years.

The Burnside Bridge is one of Portland's most iconic bridges. Its design is a notable contrast with the downriver Steel and Broadway Bridges and the upriver Morrison and Hawthorne Bridges, all of which are truss bridges. The Burnside Bridge is one of only three bascule-lift bridges in Portland (the other two are the Broadway and Morrison Bridges) and the only Strauss-type bascule bridge. It was one of the first Strauss-type bascule-lift bridge constructed in the United States, and its concrete pavement makes it one of the heaviest such bridges. The integration of architecturally influenced elements such as the operator towers make an aesthetically pleasing bridge in the city center. The bridge has served for decades as the route for the Rose Parade crossing the Willamette River to the city center; the parade has been a culturally and socially defining event in Portland for over a century. The bridge's central position in the city has also made it a focus of protest actions and marches in the recent past.

The bridge has been the subject of a Historic American Engineering Record (HAER) documentation (Wood Wortman 2006) and is listed individually in the NRHP in 2012 as a part of the Willamette River Highway Bridges Multiple Property District meeting the eligibility requirements under Criterion A and Criterion C (Kramer 2012). The west

approach of the bridge is within the Skidmore/Old Town National Historic Landmark District boundaries; however, the bridge is not a contributing resource in the District. Ira G. Hedrick and Robert E. Kremers produced the initial bridge design for Multnomah County employing a bascule-type patented by Joseph B. Strauss. Noted bridge engineer Gustav Lindenthal replaced the bridge team and completed the work with minor changes to the original design, employing architects Houghtaling and Dougan for consultation of design. Portland Bridge Company completed the construction work.

2.3 National Register Status

The Burnside Bridge was listed individually in the NRHP in 2012 as a part of the Willamette River Highway Bridges Multiple Property District meeting the eligibility requirements under Criterion A and Criterion C. The Burnside Bridge has been determined eligible under Criterion A for its statewide significance for its association with the development of Portland and its transportation network, especially in contributing to the development of central business district since its construction in 1926. The Burnside Bridge is also of statewide significance under Criterion C as one of the heaviest bascule bridges in the United States and as the first such bridge to rely upon a concrete deck surface for its movable span.

2.4 Project Use of Section 4(f) Resource

The Burnside Bridge would undergo substantial upgrades with the Retrofit Alternative but would retain the bridge type and some of the existing design characteristics of its current condition. However, the Retrofit Alternative would remove and reconstruct Pier 4 approximately 34 feet to the west, which would visually shorten the eastern fixed span. In addition, the retrofit would compromise the bridge's historic integrity by altering the design, materials, workmanship and feeling of the structure. Those changes would alter the historic significance of the bridge to the extent that this alternative would cause an overall adverse effect under Section 106.

The replacement alternatives (including the Refined Long-span Alternative) would constitute a complete replacement of the current bridge which would result in an adverse effect under Section 106 and a permanent Section 4(f) use.

The option of using a temporary bridge would not cause a Section 4(f) use of the Burnside Bridge.

A Section 106 Finding of Effect (FOE), by the FHWA through coordination with Multnomah County and ODOT, resulted in a finding of "Historic Properties Adversely Affected" for the Project's effects to the Burnside Bridge. Oregon SHPO concurred with the adverse effect finding in September 2022 (see Appendix A). Consequently, the project impacts constitute a Section 4(f) use. To mitigate this adverse effect finding, FHWA, Multnomah County, and SHPO executed a Section 106 Programmatic Agreement. The project team sought input through the Section 106 process from consulting parties, Oregon SHPO, and the Advisory Council on Historic Preservation (ACHP). Mitigation measures were discussed in multiple meetings with Consulting Parties from 2020 through 2022, and the final Section 106 Programmatic Agreement was signed in June 2023.

2.5 Alternatives

Per the Programmatic Section 4(f) Evaluation for FHWA Projects that Necessitate the Use of Historic Bridges, the following alternatives avoid any use of the historic bridge:

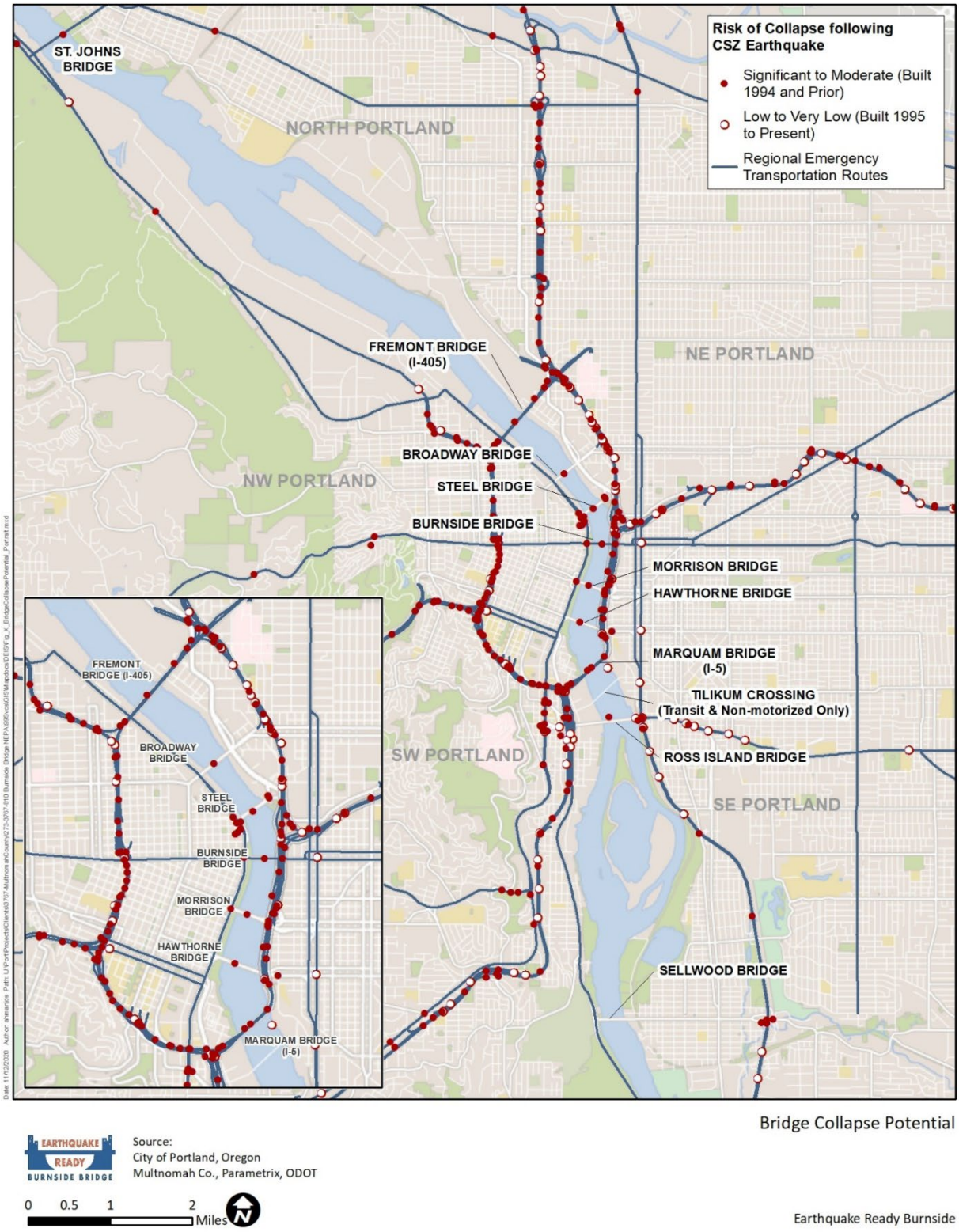
- Do nothing.
- Build a new structure at a different location without affecting the historic integrity of the old bridge, as determined by procedures implementing the NHPA.
- Rehabilitate the historic bridge without affecting the historic integrity of the structure, as determined by procedures implementing the NHPA.

The EQRB Project conducted multiple project planning and feasibility analyses to evaluate and screen potential alternatives. See the *EQRB Description of Alternatives Technical Report* (Multnomah County 2021b); the narrative below provides a summary of the process and alternatives considered.

2.5.1 Do nothing

This alternative consists of leaving Burnside Bridge in its current condition. Multnomah County first identified the need for seismic resiliency of the Burnside Bridge through the County's Willamette River Bridges Capital Improvement Plan (2015–2034) (CIP). The CIP process notes that the County's four historic movable bridges lack the seismic resiliency to withstand moderate to major earthquakes and identifies that as a component of Metro's Regional Lifeline Route corridor, the Burnside Bridge must meet a higher performance standard than the other three downtown movable bridges (see Figure 2-1). The CIP process determined that the Burnside Bridge should remain fully operational to vehicles and river traffic following a magnitude 9.0 CSZ earthquake, while the other three should meet a seismic standard allowing the bridge superstructure to not collapse during smaller magnitude 4 +/- earthquakes (Multnomah County 2015).
A seismically resilient Burnside Bridge, beyond its current capability, would support the region's ability to provide rapid and reliable emergency response, rescue, and evacuation after a major earthquake, as well as enable post-earthquake economic recovery. This is integral to the Project's purpose and need statement and means that taking no action under the do nothing alternative would not fulfill the purpose and need for the Project. Thus, the do nothing alternative is not a prudent alternative.

Figure 2-1. Bridge Collapse Potential



Per the Programmatic Section 4(f) Evaluation for FHWA Projects that Necessitate the Use of Historic Bridges:

The do nothing alternative has been studied. The do nothing alternative does not correct the situation that causes the bridge to be considered structurally deficient with respect to seismic standards. The do nothing alternative ignores the basic transportation need.

- Maintenance – The do nothing alternative does not address the above problem of the need for a seismically sufficient bridge connected to Metro's Regional Lifeline Route corridor. Normal maintenance is not considered adequate to correct the situation.
- Safety – The do nothing alternative does not address the above problem of the need for a seismically sufficient bridge connected to Metro's Regional Lifeline Route corridor. Because the bridge deficiencies with respect to seismic standards, it poses unacceptable safety hazards to the traveling public. As such, the do nothing alternative is not considered a feasible and prudent alternative.

2.5.2 Build a new structure at a different location without affecting the historic integrity of the old bridge, as determined by procedures implementing the NHPA.

This alternative consists of constructing a new bridge on a different alignment such that it would not affect the historic integrity of the existing bridge. The new bridge would meet all current traffic, load capacity, and safety design standards.

Multnomah County conducted a feasibility analysis, documented in the EQRB *Feasibility Study Report* (Multnomah County 2018) in which the project team analyzed more than 100 Willamette River crossing options. The alternatives development phase included options to attempt to accomplish the purpose and need for the Project in a different location, including nine alternatives for enhancing or replacing a bridge other than the historic Burnside Bridge, including the following:

- Fremont Bridge
- Broadway Bridge
- Steel Bridge
- Morrison Bridge
- Hawthorne Bridge
- Marquam Bridge
- Tilikum Crossing Bridge
- Ross Island Bridge
- Sellwood Bridge

All of these alternative bridge locations, except for the Morrison Bridge, failed Step 1 of the screening process that involved pass/fail criteria reflecting the Project's core intent. Except for the Morrison Bridge, the alternative locations failed each of the 12 criteria. The pass/fail criteria included:

Criterion I. Compatibility with other major infrastructure – This criterion eliminated alternatives that caused prolonged, substantial interruption or degradation of the use or function of adjacent, major public infrastructure.

Criterion II. Seismically resilient and operational Willamette River crossing – This criterion eliminated alternatives that did not meet the project's definition of being "fully functional" following a CSZ 8+ earthquake.

Criterion IIIa. Unobstructed Willamette River crossing lifeline route – This criterion eliminated alternative crossing locations (e.g., the Steel Bridge, Hawthorne Bridge, Tilikum Bridge, and others) that would have two or more earthquake-related blockages (on the access route to and from the Burnside lifeline route).

Criterion IIIb. Rapid emergency response across the Willamette River – This criterion eliminated alternative crossing locations that would add excessive travel time because of distance from the Burnside corridor for emergency vehicles crossing the river and using the Burnside lifeline route.

Criterion IIIc. Congestion avoidance on a Willamette River crossing – This criterion eliminated crossing alternatives that would have too little post-earthquake capacity to allow reliable and rapid emergency response after a major earthquake.

Step 2 used similar criteria to Step 1, focusing on meeting the core intent of the Project, but assigned a scoring system. The Morrison Bridge alternative, the only one left that would enhance a different bridge, received a score of 32 percent of the possible points, and it was determined through input from stakeholders, committees, and the project team that it offers no unique advantages compared to the other alternatives, and it did not perform well enough to advance for further analysis (Multnomah County 2018). In addition, the Morrison Bridge, like the Burnside Bridge, is also listed in the NRHP (as of 2012). Thus, no alternatives that would use a bridge different from the existing Burnside Bridge advanced to the next step of screening, meaning that none was considered a prudent alternative that would adequately fulfill the purpose and need of the Project.

Step 3 evaluated the remaining alternatives with six criteria divided into 17 scored measures. The six topics included:

Topic 1: Seismic Resiliency – Support Reliable and Rapid Emergency Response after an Earthquake

Topic 2: Non-Motorized Transportation – Support Access and Safety for Bicyclists, Pedestrians and People with Disabilities

Topic 3: Connectivity – Support Street System Integration and Function (Affects all Modes)

Topic 4: Equity/Environmental Justice – Minimize Adverse Impacts on Historically Marginalized Communities

Topic 5: Built Environment – Promote Land Use Compatibility and Minimize Impacts on Parks and Historic Resources

Topic 6: Financial Stewardship – Ensure Public Funds are Invested Wisely

Step 3 included 26 alternatives in the location of the Burnside Bridge, including a tunnel option and 12 twin bridge options. Based on criteria and measure evaluation, these options did not move forward in the study.

Per the Programmatic Section 4(f) Evaluation for FHWA Projects that Necessitate the Use of Historic Bridges:

Investigations have been conducted to construct a bridge on a new location or parallel to the old bridge (allowing for a one-way couplet), but, for the following reasons, these alternatives are not feasible and prudent:

- Adverse Social, Economic, or Environmental Effects – Building a new bridge away from the present site would result in social, economic, or environmental impact of extraordinary magnitude.

  Through the alternatives screening and evaluation process described above, it was determined that all potential locations away from the present site that did not pass Step 1 or Step 2 screening would result in social, economic, and environmental impacts of extraordinary magnitude because they would not provide a seismically resilient bridge meeting the purpose and need of the project and would leave the region vulnerable to extreme social, economic, and environmental harm from a major earthquake.

  Through the alternatives screening and evaluation process described above, it was determined that all potential locations away from the present site that passed Step 1 and Step 2 in the alternatives screening and could meet the purpose and need for the Project would cause one or more unacceptable effects. These potential locations included a tunnel or one of the twin bridge options. Through Step 3 describe above, it was determined that these options would include displacement of a significant number of businesses, serious disruption of established travel patterns, increased impacts to parks and recreation resources, or adverse effects to historic sites or districts.

- Engineering and Economy – Where difficulty associated with the new location is less extreme than those encountered above, a new site would not be feasible and prudent where cost and engineering difficulties reach extraordinary magnitude.

  Estimated cost was evaluated as part of the Step 3 alternatives evaluation. Figure 11 in the 2018 Feasibility Study shows that the tunnel option was expected to be extraordinarily more expensive than the rest of the alternatives. The tunnel option cost estimate was $3,200 million, which the next most expensive option was $9 million (costs with detoured traffic).

2.5.3 Rehabilitate the historic bridge without affecting the historic integrity of the structure, as determined by procedures implementing the NHPA.

This alternative would rehabilitate the existing bridge to the extent possible. The Project studied the Enhanced Retrofit Alternative which would make changes to the bridge sufficient to create the seismic stability prescribed by the purpose and need for the

project, but would retain as much of the existing bridge as possible. Section 106 analysis found that the Retrofit Alternative would change the bridge to the extent that the bridge would no longer be considered eligible for NRHP listing. The Retrofit Alternative would modify piers, bents, footings, and some of the trusses of the Burnside Bridge, as well as replace other trusses, the bridge deck and mechanical equipment. A retrofit would modify Piers 1 through 3 and construct a new Pier 4. Piers 2 and 3 would be more massive in structure and form both above and below water. The new Pier 4 would be constructed approximately 34 feet west of the existing pier and would consist of a cross beam supported by two columns. It would therefore no longer be a concrete structure and it would no longer have the decorative pier cap also found on Pier 1. The relocation of Pier 4 would alter the original pier symmetry. With these alterations to the bridge's original engineering and design, the Burnside Bridge's integrity would be compromised, and it would no longer be eligible for listing on the NRHP. Thus, this alternative does not offer a feasible and prudent alternative that would not affect the bridge's integrity.

Per the Programmatic Section 4(f) Evaluation for FHWA Projects that Necessitate the Use of Historic Bridges:

Studies have been conducted of rehabilitation measures, but, for the following reason, this alternative is not feasible and prudent:

- Structural Sufficiency – The bridge is so structurally deficient that it cannot be rehabilitated to meet minimum acceptable seismic requirements without affecting the historic integrity of the bridge.

2.6 Measures to Minimize Harm

It has been determined that no feasible and prudent alternatives exist to the full replacement and removal of the Burnside Bridge.

Per the Programmatic Section 4(f) Evaluation for FHWA Projects that Necessitate the Use of Historic Bridges:

This programmatic Section 4(f) evaluation and approval may be used only for projects where the FHWA Division Administrator, in accordance with this evaluation, ensures that the proposed action includes all possible planning to minimize harm. The following apply to this Project:

- For bridges that are to be rehabilitated to the point that the historic integrity is affected or that are to be moved or demolished, the FHWA ensures that, in accordance with the HAER standards, or other suitable means developed through consultation, fully adequate records are made of the bridge;

  The Burnside Bridge would be demolished and replaced. The Section 106 Programmatic Agreement includes a stipulation for mitigating the adverse effects to the Burnside Bridge that incorporates documentation of the bridge. The stipulation requires HAER documentation in consultation with ODOT, Multnomah County, SHPO, and the National Park Service to be completed prior to demolition of the bridge.

- For bridges that are to be replaced, the existing bridge is made available for an alternative use, provided a responsible party agrees to maintain and preserve the bridge;

  The Burnside Bridge would be demolished and replaced. The Section 106 Programmatic Agreement includes a stipulation that ODOT and Multnomah County will explore potential salvage and reuse of features of the Burnside Bridge including railings, mechanical components, and the operator towers. Structural engineers do not believe that any structural components could be reused due to age and design, but non-structural components, such as operator towers and handrail balustrades, are likely feasible to reuse. Reuse of these components has been included as a mitigation commitment in the Final EIS.

- For bridges that are adversely affected, agreement among the SHPO, ACHP, and FHWA is reached through the Section 106 process of the NHPA on measures to minimize harm and those measures are incorporated into the project. This programmatic Section 4(f) evaluation does not apply to projects where such an agreement cannot be reached.

  The final Section 106 Programmatic Agreement developed in coordination with the Consulting Parties was signed in June 2023.

2.7 Coordination

The EQRB Project has coordinated with the SHPO and the *EQRB Cultural Resource Technical Report* (Multnomah County 2021a) has been reviewed by SHPO and City of Portland staff. For broader reach, the project solicited input from the public, various stakeholders and the Community Task Force during the Feasibility Study and other early scoping work, as well as through the public process to identify a recommended preferred alternative. ODOT has consulted with interested Tribes. See the 2019 EQRB Public Engagement Summary,[3] 2020 EQRB Public Engagement Summary,[4] and 2021 Public Engagement Summary[5] documents for details of coordination with affected parties. Six consulting party meetings were held as part of the Section 106 process and additional coordination with consulting parties, Tribes, and others will occur during final design. SHPO FOE concurrence was obtained in September 2022, and the Final Section 106 Programmatic Agreement was signed in June 2023.

2.8 Summary

The project meets all criteria included in the Nationwide Programmatic Section 4(f) Evaluation for Projects that Necessitate the Use of Historic Bridges approved on July 5, 1983.

[3] https://multco.us/file/87617/download

[4] https://multco.us/file/93292/download

[5] https://multco.us/file/113525/download

All required alternatives have been evaluated, and the findings made are clearly applicable to this Project. The Project includes all possible planning to minimize harm and assurances that those measures to mitigate for use of the Section 4(f) resource will be completed.

2.9 Approval

FEDERAL HIGHWAY ADMINISTRATION

KEITH LYNCH

Digitally signed by KEITH LYNCH
Date: 2023.06.30 14:38:39 -07'00'

By: _____ Date:_____

Keith Lynch, Division Administrator

Federal Highway Administration, Oregon Division

Chapter 3 – Preparers

Name	Professional Affiliation	Education	Years of Experience
Jennifer Hughes	Parametrix	Environmental Planner	20

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Chapter 4 – References

Multnomah County.

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2021a. EQRB Cultural Resources Technical Report. https://multco.us/earthquake-ready-burnside-bridge/project-library

2021b. EQRB Description of Alternatives. https://multco.us/earthquake-ready-burnside-bridge/project-library.

2021c. EQRB Noise and Vibration Technical Report. https://multco.us/earthquake-ready-burnside-bridge/project-library.

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Appendix A. Finding of Effect

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Oregon Department of Transportation

ODOT INVENTORY OF HISTORIC PROPERTIES

SECTION 106 LEVEL OF EFFECT FORM

Agency/Project: Oregon Department of Transportation/Earthquake Ready Burnside Bridge ODOT Key Number: :XXXXX, Federal Agency: Federal Highway Administration/Burnside Bridge [Federal-Aid No. C051(111)]		
Property Name: Burnside Bridge		Street Address: West Burnside Street
City, County: Portland, Multnomah		Latitude: 45.523042 Longitude: (-) 122.667545
Surveyor: Adam S. Alsobrook	Affiliation: WillametteCRA	Date Recorded: 08/10/2021

Photo:

Photo Caption: Burnside Bridge, aerial photograph looking southwest (Multnomah County)

Preliminary Finding of Effect:

☐ No Historic Properties Affected ☐ No Historic Properties Adversely Affected ☒ Historic Properties Adversely Affected

State Historic Preservation Office Comments:

☑ **Concur** ☐ **Do Not Concur:** ☐ No Historic Properties Affected ☐ No Historic Properties Adversely Affected

☐ Historic Properties Adversely Affected

Signed: _____ Date: 9/1/2022

Comments:

ODOT INVENTORY OF HISTORIC PROPERTIES

SECTION 106 LEVEL OF EFFECT FORM
Continuation Sheet

Agency/Project: Oregon Department of Transportation/ Earthquake Ready Burnside Bridge	
ODOT Key Number: XXXXX, Federal Agency: Federal Highway Administration/Burnside Bridge [Federal-Aid No. C051(111)]	
Property Name: Burnside Bridge	
Street Address: West Burnside Street	City, County: Portland, Multnomah

Provide written description of the project, and its potential effects on the subject property per 36 CFR 800. The project and findings, as per instructions, should include:

1. Introduction

This statement of finding of effect discusses the effect of the proposed Earthquake Ready Burnside Bridge (EQRB) Project in Portland, Oregon. The Burnside Bridge was listed in the National Register of Historic Places (NRHP) on November 14, 2012. Multnomah County is the project proponent with support from the Oregon Department of Transportation (ODOT) on behalf of the Federal Highway Administration (FHWA). Historical Research Associates, Inc. (HRA) prepared the original findings that have since been updated by WillametteCRA with the current Alignment Alternatives information on behalf of the Oregon Department of Transportation (ODOT). It is the finding of WillametteCRA, on behalf of ODOT, that the proposed project will have an adverse effect on the Burnside Bridge. This statement of finding of effect is made pursuant to the requirements of the National Historic Preservation Act of 1966 (36 CFR 800), Executive Order 11593, and the National Environmental Policy Act of 1969.

2. Project Description

The proposed project is to establish a Burnside Bridge that would survive a major Cascadia Subduction Zone (CSZ) earthquake. The existing bridge would fail in such an earthquake. The Refined Long-span alternative would replace the existing bridge with a new bridge on the same alignment as the current bridge, which necessitates the demolition of the existing Burnside Bridge.

3. Identification and Description of the Historic Resource

The Burnside Bridge spans the Willamette River at River Mile 12.7 in downtown Portland. The bridge is located at the geographic center of the city and connects West Burnside Street and East Burnside Street. It is the second bridge at this location, and the Burnside Bridge serves as an important transportation corridor linking Portland's downtown core on the west bank of the Willamette River with business and residential districts in East Portland. The Burnside Bridge was listed in the NRHP on November 14, 2012, as part of the *Willamette River Highway Bridges of Portland, Oregon* Multiple Property Documentation.

During the planning of the second Burnside Bridge, Portland citizens pressed the authorities to make the bridge and approaches more ornamental and less utilitarian. In July 1923, Multnomah County Commissioners hired Portland architects Chester A. Houghtaling and Leigh L. Dougan to cooperate with the bridge engineers and devote their attention to the outward aesthetic appearance of the bridge. The architects were paid $10,000 (about $155,000 in 2021 dollars) to design the features of the structure most visible to the public, such as the operator towers and catwalks, kiosks, pylons, handrails, light fixtures, trolley poles, and the outer faces of the piers, abutments, and bridge spans. The architects were also asked to make provisions for future aesthetic treatments should funding not be available. Artistic renderings of the proposed bridge design were published in the *Oregonian* newspaper on January 1, 1924. These renderings included details such as the decorative treatments of the interior piers, the configuration of the operator towers, the appearance of the light fixtures, and the arrangement of trolley poles along the centerline of the bridge deck. Interestingly, the rendering of the bridge shows the two fixed main spans as concrete arch structures instead of steel trusses.

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The current Burnside Bridge was originally designed by engineers Ira G. Hedrick and Robert E. Kremers, who were both dismissed from the project following a complex political controversy over the initial contract award by the Multnomah County Commissioners in April 1924. Hedrick and Kremers were paid $25,000 (about $374,000 in 2021 dollars) to release the rights to their designs. Noted bridge engineer Gustav Lindenthal was hired to alter their plans and direct the construction of the bridge, which was completed in May 1926 for a total cost of $4.5 million, or about $67.3 million in 2021 dollars. This construction cost included both the main spans of the bridge and the approach spans on the east and west banks of the Willamette River.

The three (3) main spans of the Burnside Bridge measure 788 feet long between abutment walls. The central span of the bridge is a double leaf Strauss bascule that measures 252 feet between the trunnions. Each leaf is 126 feet long and constructed of riveted steel members, topped with a 4.75” concrete road deck. An ornamental cast-steel and cast-iron railing is located on both sides of each operable leaf. Each leaf weighs about 930 tons, with each leaf balanced with a counterweight of 1,700 tons. This operable central span provides approximately 200 feet of horizontal clearance when open. The Burnside Bridge is noted as one of the heaviest lift bridges in the United States. When it was completed in May 1926, it was also the largest double-leaf bascule bridge that had ever been constructed.

The central operable span is flanked on each side by massive interior piers constructed of reinforced concrete. Each of these interior piers was constructed *in situ* using large timber caissons measuring 78 feet by 68 feet and over 80 feet tall. The caissons for the abutment piers measured 68 feet by 36 feet and were 55 feet tall. Each caisson was built on the riverbank and then towed into the Willamette River, where they were sunk to the riverbed, which allowed for the underwater excavation of the bridge pier foundations. The upper section of each interior pier features machicolations supported by corbelled arches, which project from both the north (downriver) and south (upriver) sides of each interior pier. Rectangular recessions in the wall surface above the machicolations are centered on the arches below and create false windows. An octagonal-plan operator tower is located on the upriver side of each interior pier. The towers are situated above three of the corbelled supports which project outward from the face of the interior pier. The faces of the abutment piers that face upriver and downriver also feature details similar to those of the interior piers, such as the corbelled supports, cast concrete moldings, corbelled arches, and machicolations. The picturesque, almost castle-like design of the abutment and interior piers illustrate the profound influence that the architects Houghtaling and Dougan exerted over the appearance of the Burnside Bridge.

The central operable span is flanked by two (2) steel deck truss side spans. Each of these 268-foot-long side spans are double-intersection Warren trusses, which are also known as lattice trusses. These trusses are subdivided by vertical posts from the top chords of the truss to the diagonal intersections, creating sub-vertical elements. These truss spans have been noted as an extremely rare type of truss in Oregon, with the Ross Island and Sellwood Bridges, also in Portland and designed by Gustav Lindenthal, comprising two additional examples of this rare truss type. An ornate cast concrete spindle-type railing is located along each side of the road deck and sidewalks on the side spans. There are also a total of thirty-four (34) approach spans. These include nineteen (19) reinforced concrete spans on the west approach to the main spans; and seven (7) concrete and eight (8) steel spans on the east approach. Even though these approach spans tie the three (3) main spans of the bridge to the adjacent surface streets, they are not considered part of the main bridge structure.

Agency/Project: Oregon Department of Transportation/ Earthquake Ready Burnside Bridge	
ODOT Key Number: XXXXX, Federal Agency: Federal Highway Administration/Burnside Bridge [Federal-Aid No. C051(111)]	
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4. Undertaking Options Considered

A total of six (6) alternatives have been considered for this undertaking: two (2) no-build alternatives and four (4) build alternatives. The four (4) build alternatives included an Enhanced Seismic Retrofit Alternative and three (3) replacement alternatives. Extensive discussion and analysis of these alternatives is contained in the Supplemental Draft Environmental Impact Statement (SDEIS) of 2021. The following is a synopsis of the alternatives considered for this undertaking.

a. No-Build Alternative

Two (2) no-build alternatives were considered for this undertaking. These no-build alternatives assume that all other programmed and planned projects move forward and that the Burnside Bridge would remain seismically at risk. The first no-build scenario considered was the "No-Build Pre-Earthquake" alterative, which analyzed no-build conditions prior to a CSZ seismic event. The second no-build scenario considered was the "No-Build Post-Earthquake," which analyzed no-build conditions after a CSZ seismic event. The authors of the SDEIS concluded that the no-build alternatives would not address the acute seismic vulnerability of the existing Burnside Bridge, which is expected to be heavily damaged or completely collapse during a CSZ seismic event. The collapse of the Burnside Bridge would very likely result in a significant loss of life to people on or under the bridge during a CSZ seismic event. The loss of the Burnside Bridge would sever downtown Portland from the rest of the city on the east side of the Willamette River and would prevent emergency responders from being able to cross the river. Additionally, debris from the collapse of the Burnside Bridge would block all travel by land and water under the bridge. The loss of the Burnside Bridge due to a CSZ seismic event would hamper the long-term recovery of the city and surrounding region during the months following a major earthquake, and the potential adverse economic effects would likely persist for years.

b. Avoidance Alternative

The environmental team considered one (1) avoidance alternative. An Enhanced Seismic Retrofit Alternative was considered in lieu of the wholesale replacement of the Burnside Bridge. This alternative would partially retrofit the existing bridge and replace major structural components of the bridge to meet seismic design criteria. In this scenario, the retrofitted structural elements would be visually similar to the existing structure of the bridge, but the replacement approaches would be substantially different in appearance compared with the existing bridge. Under this scenario, the width of the bridge would be unchanged, and the modal connections at each end of the bridge would also not change. The environmental team made a preliminary analysis of potential effects to the NRHP-listed Burnside Bridge due to the Enhanced Seismic Retrofit Alternative scope of work. The team applied the Section 106 criteria of adverse effect and found that this potential scope of work would result in adverse effects to the NRHP-listed Burnside Bridge.

c. Proposed Undertaking

Three (3) build alternatives were considered for the proposed undertaking. Of these three alternatives, the Refined Long-span alternative would replace the existing bridge with a new bridge, which would necessitate the demolition of the existing Burnside Bridge.

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5. Evaluation of Effects

As it currently exists, the Burnside Bridge is located in its original alignment and remains on its original abutment and interior piers. The bridge is substantially "as-built," and the original steel and concrete structural character defining features of the structure remain intact. The Burnside Bridge also possesses integrity of feeling and association, and the original character, design, and appearance of the structure clearly conveys its relationship to the history of Portland.

Location: The demolition of the Burnside Bridge would destroy the structure's integrity of location and would therefore constitute an adverse effect to this NRHP-listed structure.

Setting: Removal of the Burnside Bridge would permanently destroy the structure's integrity of setting and would therefore constitute an adverse effect to this NRHP-listed structure.

Design: Demolition of the Burnside Bridge would permanently remove the combination of structural elements which create the overall form, structure, and style of the structure, and this loss of design integrity would therefore constitute an adverse effect to this NRHP-listed structure.

Materials: The original concrete and steel materials of the Burnside Bridge were combined by the designers in a certain manner to create the structure, and the complete removal of all these character defining features would destroy the structure's integrity of materials. This complete loss of material integrity would constitute an adverse effect to this NRHP-listed structure.

Workmanship: The Burnside Bridge represents the skillful work of several distinct building trades who worked in concert to create the structure and all its component parts. One example of a particular type of workmanship on this bridge would be the riveted steel members of the distinctive trusses which carry the bridge deck between Piers 1 and 2 and Piers 3 and 4. Riveting is a labor-intensive process and is practically never used in construction anymore, so the riveted steel trusses are physical representations of bridge-building technology at the time the bridge was constructed. Removing all the character defining features of the structure in a manner which removes evidence of particular skills or construction techniques would therefore destroy the bridge's integrity of workmanship, which would constitute an adverse effect to this NRHP-listed structure.

Feeling: The character defining features of the Burnside Bridge express the particular historic period of time during which the bridge was constructed, and removal of these features adversely affects the ability of the structure to convey the relationship that the bridge has to the broader patterns of our collective history. Therefore, demolition would destroy the structure's integrity of feeling, which would constitute an adverse effect to this NRHP-listed structure.

Association: The demolition of the Burnside Bridge would destroy the ability of the structure to serve as an overall representation of the bridge designer's talent and the skill of the workers who built it. Permanently severing the relationship of the historic structure with the people who designed and built it destroys the integrity of association of the bridge, which would therefore constitute an adverse effect to this NRHP-listed structure.

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6. Coordination and Public Output

The Earthquake Ready Burnside Bridge project has been the subject of public meetings since 2016. Multnomah County has established a Community Task Force in October 2018, which continues to meet regularly. Meetings of the Section 106 Consulting Parties have been meeting regularly since December 2020. Draft technical reports to address NHPA and NEPA requirements have been circulated for review by representatives of the SHPO, City of Portland, and ODOT. There has also been coordination with the Portland Historic Landmarks Commission, which is a CLG.

7. Conclusion

In summary, the Refined Long-span option would necessitate complete removal of the existing Burnside Bridge, which is listed in the NRHP. The demolition of the Burnside Bridge would constitute an adverse effect on this NRHP-listed resource.

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Maps and Figures

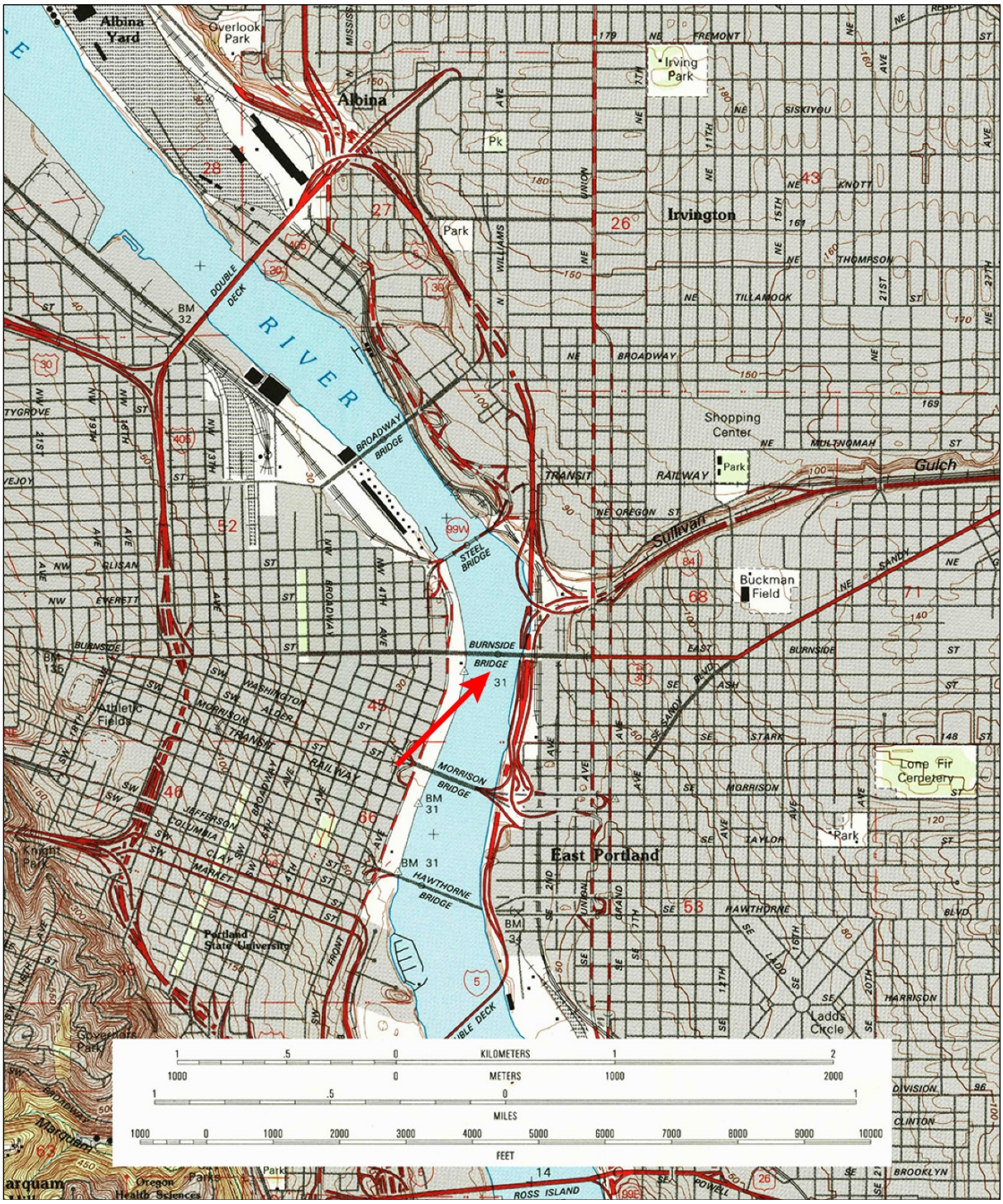

Figure 1: USGS, Portland, OR Quadrangle, 7.5 Minute, 1990. Red arrow indicates location of Burnside Bridge (USGS).

Agency/Project: Oregon Department of Transportation/ Earthquake Ready Burnside Bridge ODOT Key Number: XXXXX, Federal Agency: Federal Highway Administration/Burnside Bridge [Federal-Aid No. C051(111)]	
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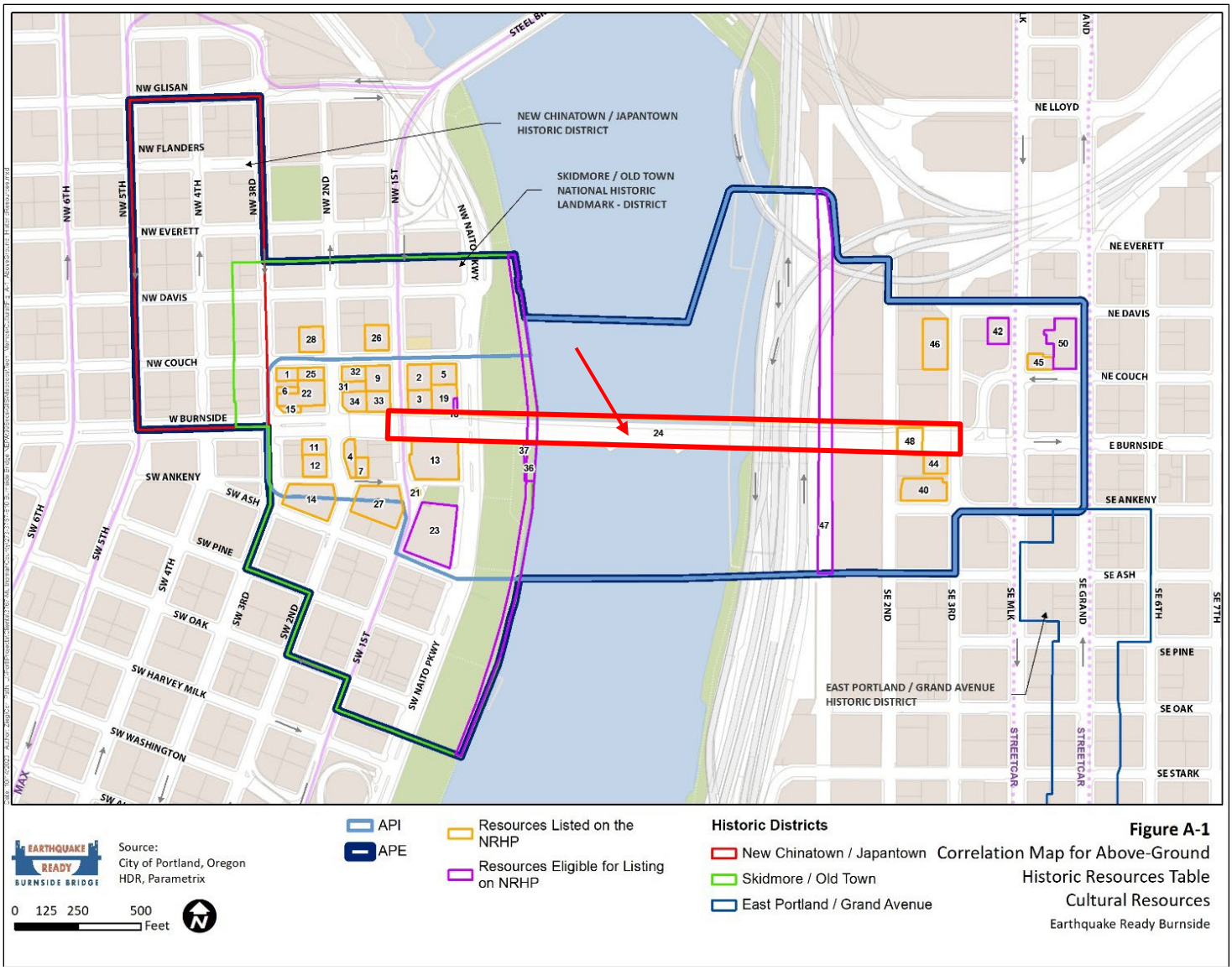

Figure 2: Map of the Area of Potential Effect (APE) with locations of NRHP-listed and NRHP-eligible resources within the APE. Red arrow indicates location of the Burnside Bridge, which is outlined in red.

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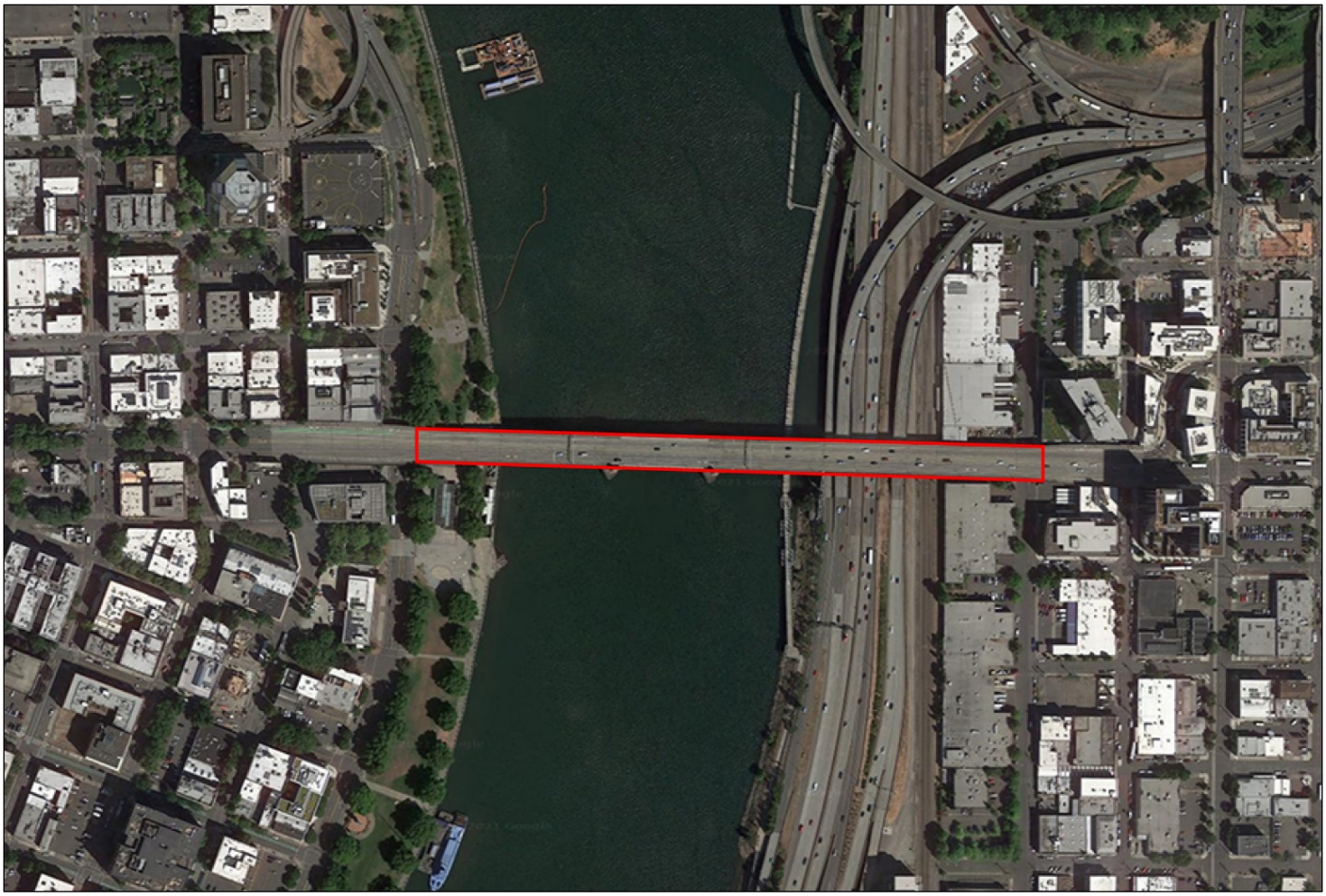

Figure 3: 2021 aerial photograph with Burnside Bridge NRHP designation boundary indicated by red line (Google Earth; NRHP 2012).

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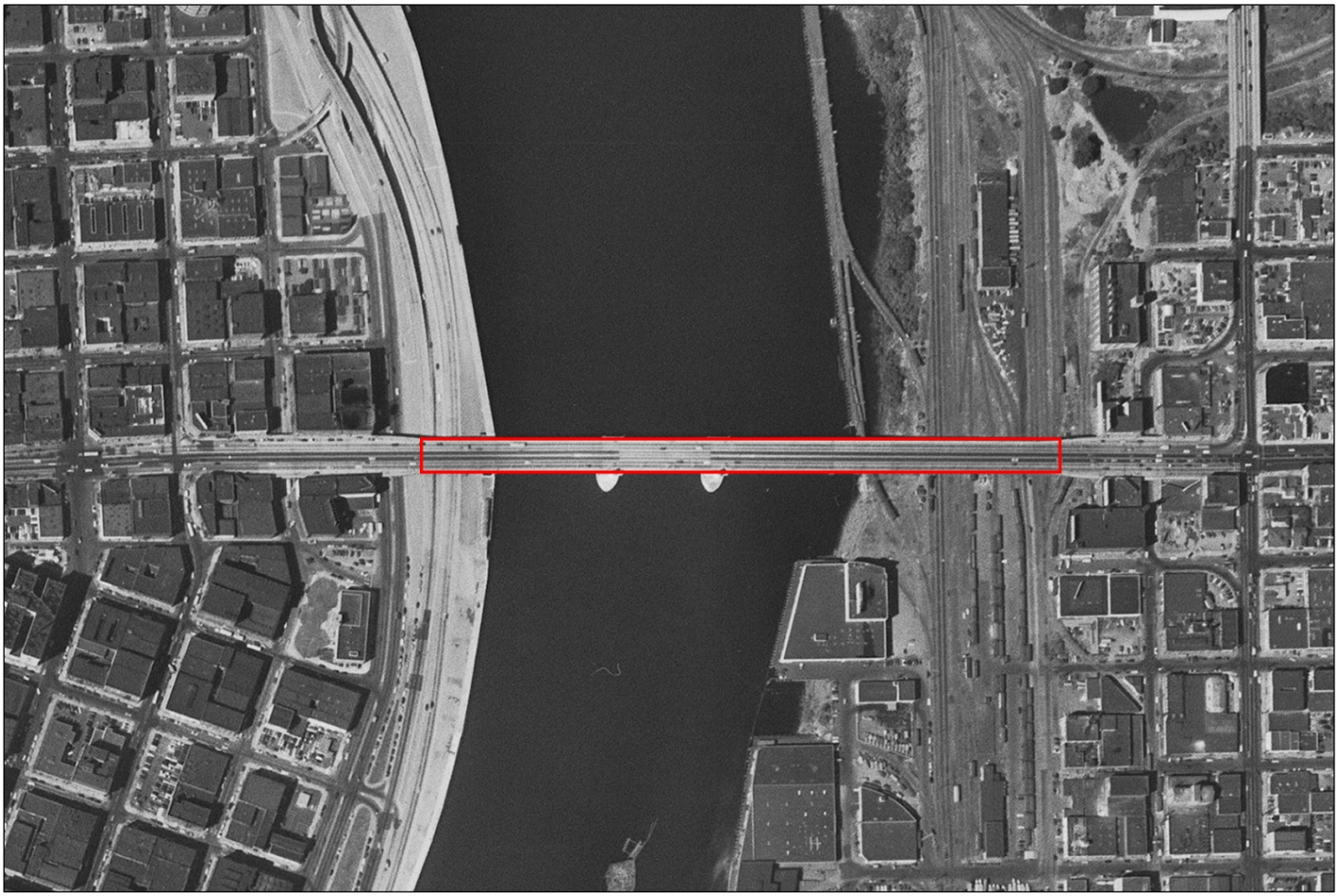

Figure 4: 1951 aerial photograph with Burnside Bridge NRHP designation boundary indicated by red line (USGS EarthExplorer; NRHP 2012).

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Photographs

Figure 5: Burnside Bridge, Portland, Ore., circa 1926-1949 postcard by Cross & Dimmitt, collection of Adam Alsobrook.

Figure 6: Burnside Bridge, Portland, Oregon, circa 1926-1942, postcard by Eddy, collection of Adam Alsobrook.

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Figure 7: Fire boat passing through the Burnside Bridge, Willamette River, Portland, Oregon, circa 1926-1942, postcard by Sawyer Scenic Photos, collection of Adam Alsobrook.

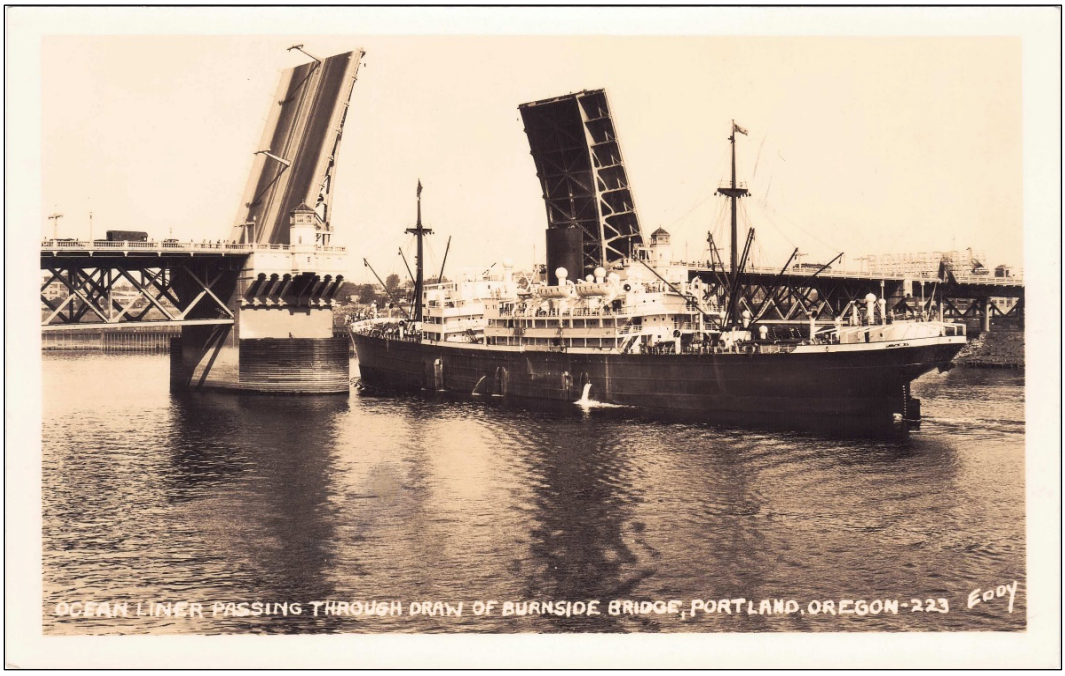

Figure 8: Ocean liner passing through draw of Burnside Bridge, Portland, Oregon, circa 1930-1950, postcard by Eddy, collection of Adam Alsobrook.

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Figure 9: General perspective of Burnside Bridge, looking northeast. Burnside Bridge, Spanning Willamette River at Burnside Street, Portland, Multnomah County, OR. Photos from Survey HAER OR-101 (Library of Congress).

Figure 10: General view of double leaf bascule drawspan of Burnside Bridge, looking northeast. Burnside Bridge, Spanning Willamette River at Burnside Street, Portland, Multnomah County, Oregon. Photos from Survey HAER OR-101 (Library of Congress).

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Figure 11: Detail of the operator's houses and drawspans of Burnside Bridge, looking northeast. Burnside Bridge, Spanning Willamette River at Burnside Street, Portland, Multnomah County, Oregon. Photos from Survey HAER OR-101 (Library of Congress).

Figure 12: General view of Burnside Bridge, looking northwest. Burnside Bridge, Spanning Willamette River at Burnside Street, Portland, Multnomah County, OR. Photos from Survey HAER OR-101 (Library of Congress).