Revised Utilities Technical Report

Multnomah County | Earthquake Ready Burnside Bridge Project

Portland, OR

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Earthquake Ready Burnside Bridge
Revised Utilities Technical Report

Prepared for

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CERTIFICATION

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.

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Acronyms, Initialisms, and Abbreviations

API	Area of Potential Impact
BAT	Business Access and Transit
BES	City of Portland Bureau of Environmental Services
BTS	City of Portland Bureau of Technology Services
CFR	Code of Federal Regulations
CSZ	Cascadia Subduction Zone
DEIS	Draft Environmental Impact Statement
DSL	Oregon Department of State Lands
EIS	environmental impact statement
EQRB	Earthquake Ready Burnside Bridge
FHWA	Federal Highway Administration
GIS	geographic information system
I-5	Interstate 5
I-84	Interstate 84
ITS	Intelligent Transportation System
LNS	Local Network Services
LRT	Light Rail Transit
MLK	Martin Luther King, Jr.
OAR	Oregon Administrative Rules
ODOT	Oregon Department of Transportation
ORS	Oregon Revised Statute
PBOT	Portland Bureau of Transportation
PP&R	Portland Parks & Recreation
PWB	Portland Water Bureau
ROW	right-of-way
SDEIS	Supplemental Draft Environmental Impact Statement
UPRR	Union Pacific Railroad
USC	United States Code
USDOT	U.S. Department of Transportation

Executive Summary

Existing public and private utility information was collected from known utility providers within the project limits and assessed for impacts for each project alternative. The utility impacts are similar in nature for each construction alternative; however, the Retrofit Alternative is likely to have the greatest impact on the utilities in relocations needed (temporary and permanent), associated cost, and longest duration for scheduling.

The estimated maximum reimbursable and non-reimbursable relocation costs likely are $150 million and $16 million, respectively, and assume all utilities within the Project Area are relocated. Based on the current design information available and assumptions, the reasonably expected reimbursable and non-reimbursable costs likely are to range from $5.7-$26 million and $1.6-$2.6 million, respectively. The variable range is dependent on which alternative is constructed, the construction of a temporary bridge, and if the Project would be able to protect the 30-inch and 42-inch sewer force mains constructed in 1953 across the Willamette River.

Impacts were assessed based on one-call survey mapping, as-built drawings, and discussions with utility providers. No subsurface investigations were conducted.

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1 Introduction

As a part of the preparation of the Environmental Impact Statement (EIS) for the Earthquake Ready Burnside Bridge (EQRB) Project, this technical report has been prepared to identify and evaluate utilities within the Project's Area of Potential Impact (API).

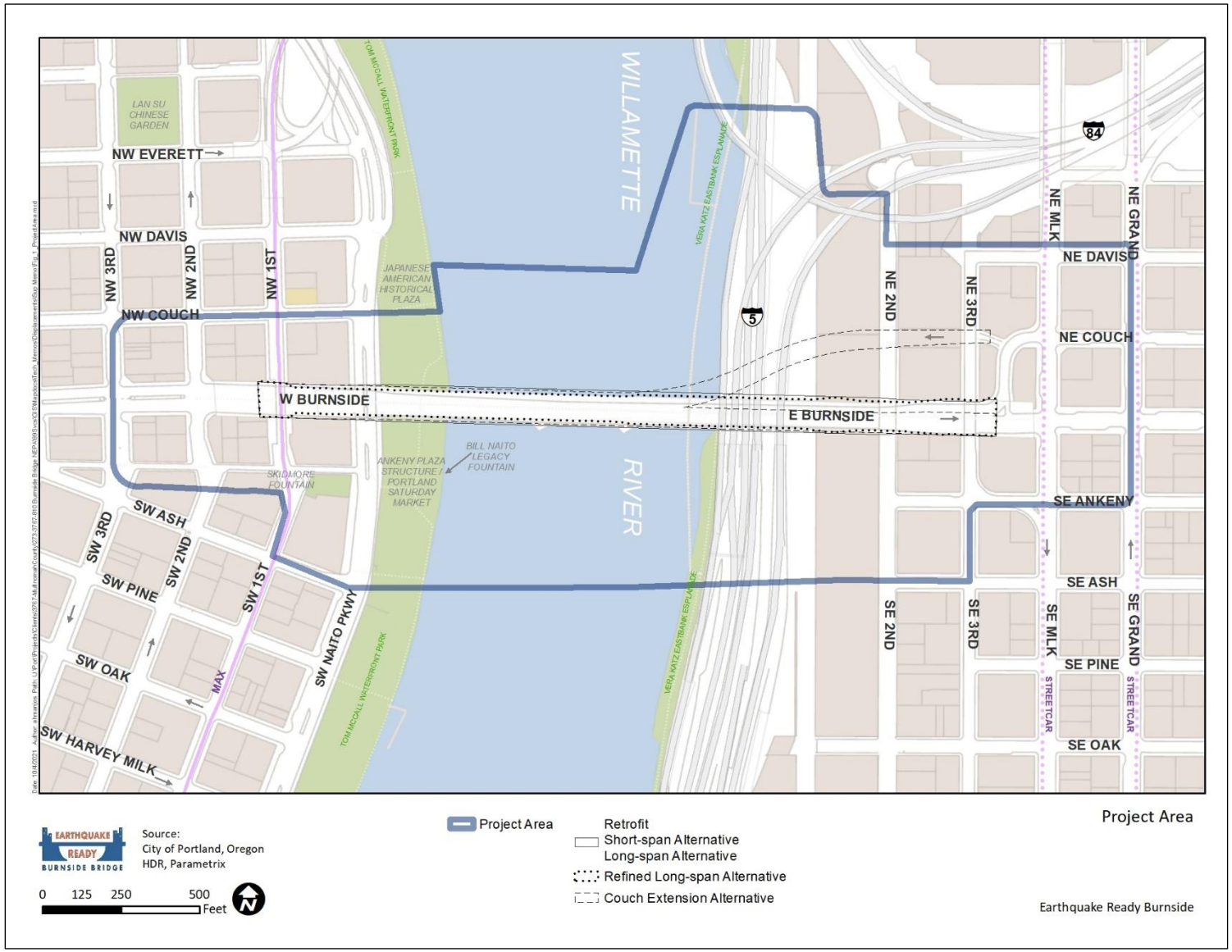
1.1 Project Location

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 (St), from NW/SW 3rd Avenue(Ave) on the west side of the river and NE/SE Grand Ave on the east side. Several neighborhoods surround the area including Old Town/Chinatown, Downtown, Kerns, and Buckman. Figure 1 shows the Project Area.

1.2 Project Purpose

The primary purpose of the Project is to build a seismically resilient Burnside St 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 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.

Figure 1. Project Area



2 Project Alternatives

The Draft EIS project alternatives are summarized in Chapter 2 of the *EQRB Draft Environmental Impact Statement* (Multnomah County 2021c) and described in detail in the *EQRB Description of Alternatives Report* (Multnomah County 2021b). This revised technical report evaluates potential design refinements to the Draft EIS Preferred Alternative. To make this evaluation, this revised technical report also incorporates updated utility information, including changes in utility ownership, in the evaluation of the Draft EIS Project Alternatives.

Briefly, the Draft EIS evaluated the No-Build Alternative and four Build Alternatives. Among the Build Alternatives there is an Enhanced Seismic Retrofit Alternative that would replace certain elements of the existing bridge and retrofit other elements. There are three Replacement Alternatives that would completely remove and replace the existing bridge. In addition, the Draft EIS considered options for managing traffic during construction. Nomenclature for the Draft EIS alternatives/options are:

- No-Build Alternative
- Build Alternatives:
  - Enhanced Seismic Retrofit (Retrofit Alternative)
  - Replacement Alternative with Short-span Approach (Short-span Alternative)
    - Replacement Alternative with Long-span Approach (Long-span Alternative)
  - Replacement Alternative with Couch Extension (Couch Extension Alternative)
- 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)

One of the Draft EIS Build Alternatives, the Long-span Alternative, was identified as the Preferred Alternative.

The potential refinements to the Draft EIS Long-span Alternative are collectively referred to as the “Refined Long-span Alternative (4-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.

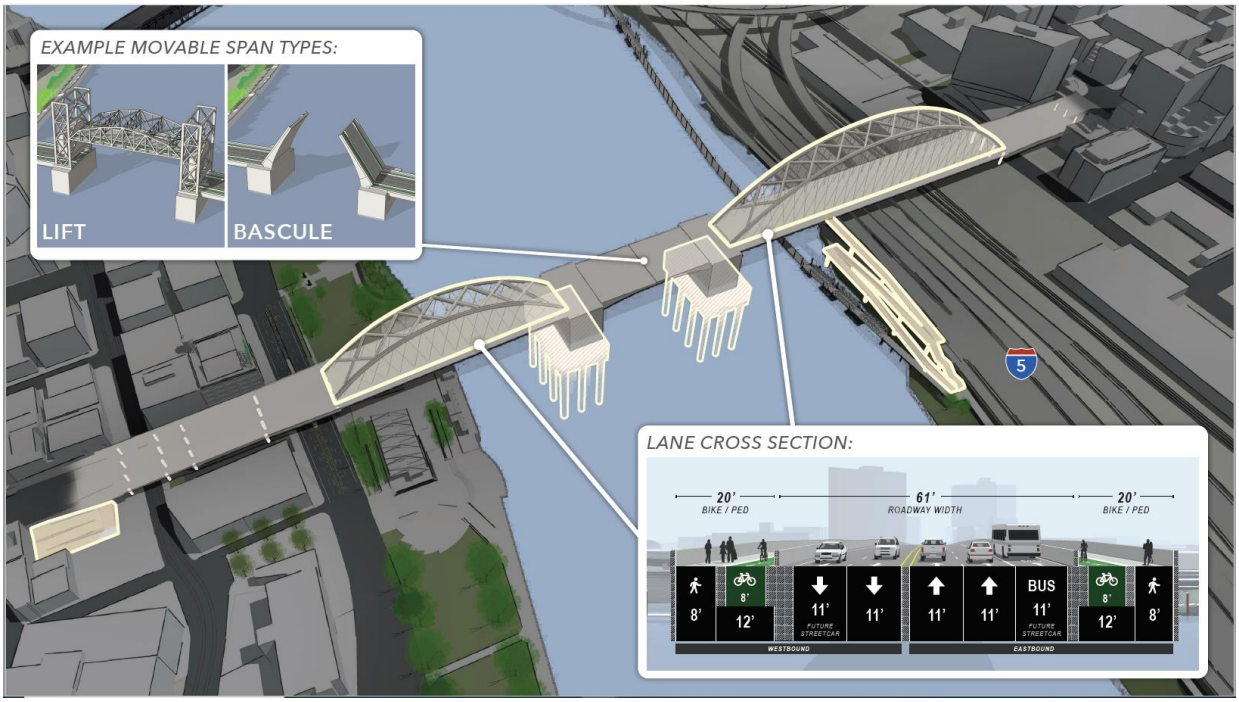
- Bridge width – The total width of the bridge over the river would be approximately 82 to 93 feet (the range varies depending on the bridge type and segment). For comparison, the Draft EIS Replacement Alternatives were approximately 110 to 120 feet wide over the river. The refined bridge width would 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 proposed in the Draft EIS for the replacement alternatives. Physical barriers between vehicle lanes and the bicycle lanes are proposed and are 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 revised report evaluates a refined girder bridge type for the approach over the west channel of the river, Tom McCall 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 Tom McCall Waterfront Park compared to just one with the Draft EIS tied-arch option and five with the existing bridge.
    - East approach – This revised report 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 revised report evaluates a refined approach for providing direct ADA access between the bridge and the 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 revised report 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.

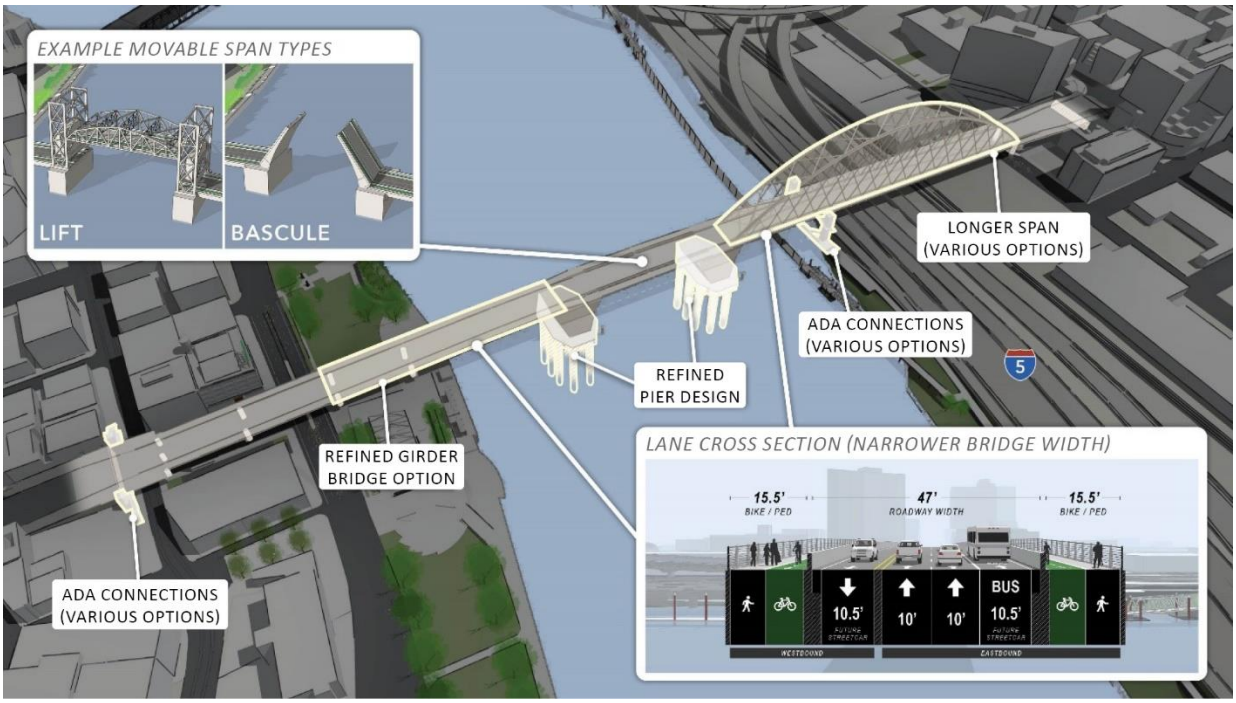
Figure 3 highlights the elements of the Draft EIS Long-span Alternative that have been modified to create the Refined Long-span Alternative, as described above. Figure 2 shows the Draft EIS Long-span Alternative and Figure 3 shows the Refined Long-span Alternative. Both figures include the tied-arch 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 Alternative 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 2022a). 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 approach. 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 Tom McCall 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 Alternative would remove slightly fewer trees and vegetation impacts than the Draft EIS Long-span Alternative, primarily within Tom McCall 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 discussed the use of cofferdams to isolate in-water work, the Refined Long-span Alternative proposes to 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 be 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 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 ten 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
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 Tom McCall 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 Tom McCall 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
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 St, from NW/SW 3rd Ave on the west side of the river and NE/SE Grand Ave 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 utilities is defined in Section 5.1.

- **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.

The following terminology will be used that relate to the utility analysis:

- **Prior right -** When a utility is found to have an ownership interest in the land where the utility is located, and the utility's relocation, if required, is determined to be compensable by the Project.
- **Submarine Cable -** A cable or conduit that is laid on the ground, within a body of water.

4 Legal Regulations and Standards

4.1 Laws, Plans, Policies, and Regulations

The following subsections provide a list of federal, state, and local laws, regulations, plans, and policies that may guide or inform the assessment of utilities.

4.1.1 Federal

The following list applies to federal-aid projects with highway funding or projects that are located on the federal highway system. These documents identify the requirements for utility accommodation, and the requirements associated with utility relocation.

- Title 23 of the United States Code (23 USC), Section 109(l) Federal-aid Highways Standards
    - Section (l) addresses the accommodation of utility facilities within the right-of-way (ROW) of federal-aid highways and the criteria used to analyze eligibility
- 23 USC 123, Federal-aid Highways - Relocation of Utility Facilities
- 23 CFR 645 - Subpart A - Utility Relocations, Adjustment, and Reimbursements
- 23 CFR 645 - Subpart B - Accommodation of Utilities
- 49 CFR 24, the Uniform Relocation Assistance and Real Property Acquisition Regulations for Federal and Federally Assisted Programs, Final Rule and Notice, issued by the U.S. Department of Transportation (USDOT)
    - Section 24.306 specifically to utility facility relocation and reimbursement policies and procedures
- FHWA, Program Guide, Utility Relocation and Accommodation on Federal-Aid Highway Projects, Sixth Edition. 2003

4.1.2 State

The following list applies to projects located within Oregon.

These Oregon Revised Statute (ORS) documents identify the legislation regarding eminent domain and the public acquisition of property, liability for damages, parties responsible for cost of relocations, the jurisdiction and use of streets by government agencies, the authority of the utilities within public ROW, and the ownership of roadways.

- ORS 35.510 (2019) - Duties of public entities acquiring real property
    - Relocation duties of public entity; use of certain federal relocation assistance program policies
- ORS 105.760 (2019) - State or county liability for damages resulting from change of grade of streets
- ORS 366.321 (2019) - Expense of relocating municipal facilities payable by department; exceptions
    - Relates to expenses for relocation on state highways
- ORS 373.020 (2019) - Jurisdiction over streets taken over for state highway routing through cities; effect on public utility duties
- ORS 373.130 (2019) - County use of city streets as bridge approach
- ORS 374.305 to 374.330(2017) - Necessity of permission to build on rights of way
- ORS 758.010 (2019) - Authority to construct lines and facilities
- ORS 758.020 (2019) - Joint occupancy of poles
- ORS 758.025 (2019) - Relocation of utilities in highway right of way
- ORS 758.210 to 758.270 (2019) - Underground electric and communication facilities
- ORS 810.010 (2019) - Jurisdiction over highways

These Oregon Administrative Rules (OAR) are the requirements for utilities to maintain maps and records of their facilities, to protect underground facilities, and the rules and procedures of the Oregon Utility Notification Center:

- OAR 860-024-0005 - Maps and records
- OAR 860-024-0007 - Location of underground facilities
- OAR 952 - Oregon Utility Notification Center

The OAR below provides the basis for implementing the Oregon Drinking Water Quality Act of 1981, to assure safe drinking water at all water systems serving the public, and to promote coordination between agencies for supervising water systems:

- OAR 333-061 - Drinking Water

The manual below provides details on the related rules, laws, and utility coordination work and process during project development of state or federal-aid projects performed in Oregon:

- Oregon Department of Transportation (ODOT), *Oregon Utility Relocation Manual*. 2018

4.1.3 County

The following rules apply to roads and bridges where Multnomah County has jurisdiction:

- Multnomah County Road Rules, Chapter 18.000 (2018) - Right-of-Way Use Permits
- Multnomah County Road Rules, Chapter 25.000 (2018) - Willamette River Bridges

4.1.4 City

The following rules are for working within the City ROW, the requirements of public utilities within the City ROW, the designation of districts in Portland where overhead utilities are prohibited, and the protection of utilities during construction.

- City of Portland Code and Charter, Chapter 17.24 (2011) - Permits
- City of Portland Code and Charter, Chapter 17.56 (2011) - Public Utilities
- City of Portland Code and Charter, Chapter 17.60 (2011) - Undergrounding Wiring Districts
- City of Portland Code and Charter, Chapter 17.64 (1999) - Protection of City Owned Telecommunications Line and Equipment, Street Lighting and Traffic Signal Systems
- City of Portland Code and Charter, Title 21 (2021), Water
- City of Portland Code and Charter, Chapter 21.24 (2021), Rules and Regulations (Water)
- City of Portland Water Bureau, *Guidelines for Utility Protection*. 2012
- City of Portland Water Bureau, Bureau Confidentiality Policy and Procedures, 2018
- City of Portland Zoning Code 33.420.045, Items Exempt from Design Review and Design Review Standards
- City of Portland Zoning Code 33.445.320, Development and Alterations in a Historic District

4.2 Design Standards

Design standards that relate to the utilities analysis may include, but are not limited to the following:

- Location requirements, including longitudinal and median installations, which may differ for each road authority and each rail authority
- Separation requirements, including horizontal and vertical separations from other utilities or other features
- Cover requirements for underground utilities

5 Affected Environment

5.1 Area of Potential Impact

The API for the utilities analysis includes the Project Area and anticipated areas of construction staging. The API also includes the adjacent roadways and ROW where utility relocation is likely to occur beyond the improvement footprint. The API for the utilities analysis is shown as "Utility API" in Figure 4. Since temporary traffic control measures do not impact utilities, the portions of the Project Area that would not be permanently improved, would not be used for construction staging, and would not include utility relocation under any Project Alternative, will not be included in the utility analysis API. The stormwater, environmental mitigation sites, and offsite staging areas are still unknown, however, these sites are considered to be part of the Project Area, even if they are located outside of the Utility API boundary represented in Figure 4.

Roadways within the Utility API are listed in Table 2 as depicted on Figure 4.

Table 2. Roadways within the Utility API

Street	From	To
West Side		
NW Couch St	NW 3rd Ave	NW Naito Pkwy
W Burnside St	NW 3rd Ave	Willamette River
SW Ankeny St	SW 3rd Ave	SW Naito Pkwy
SW Ash St	SW 1st Ave	SW Naito Pkwy
W 3rd Ave	SW Ankeny St	NW Couch St
W 2nd Ave	SW Ankeny St	NW Couch St
W 1st Ave	SW Ash St	NW Couch St
W Naito Pkwy	SW Ash St	NW Couch St
East Side		
NE Davis St	NE 2nd Ave	NE Grand Ave
NE Couch St	NE 2nd Ave	NE Grand Ave
E Burnside St	Willamette River	E Grand Ave
SE Ankeny St	SE 2nd Ave	SE Grand Ave
SE Ash St	SE 2nd Ave	SE 3rd Ave
I-5	SE Ash St	NE Flanders St
E 2nd Ave	SE Ash St	NE Davis St
E 3rd Ave	SE Ash St	NE Davis St
E MLK Blvd	SE Ankeny St	NE Davis St
E Grand Ave	SE Ankeny St	NE Davis St

Notes: Ave = Avenue; St = Street; Pkwy = Parkway; Blvd = Boulevard

Figure 4. Utility API Boundary

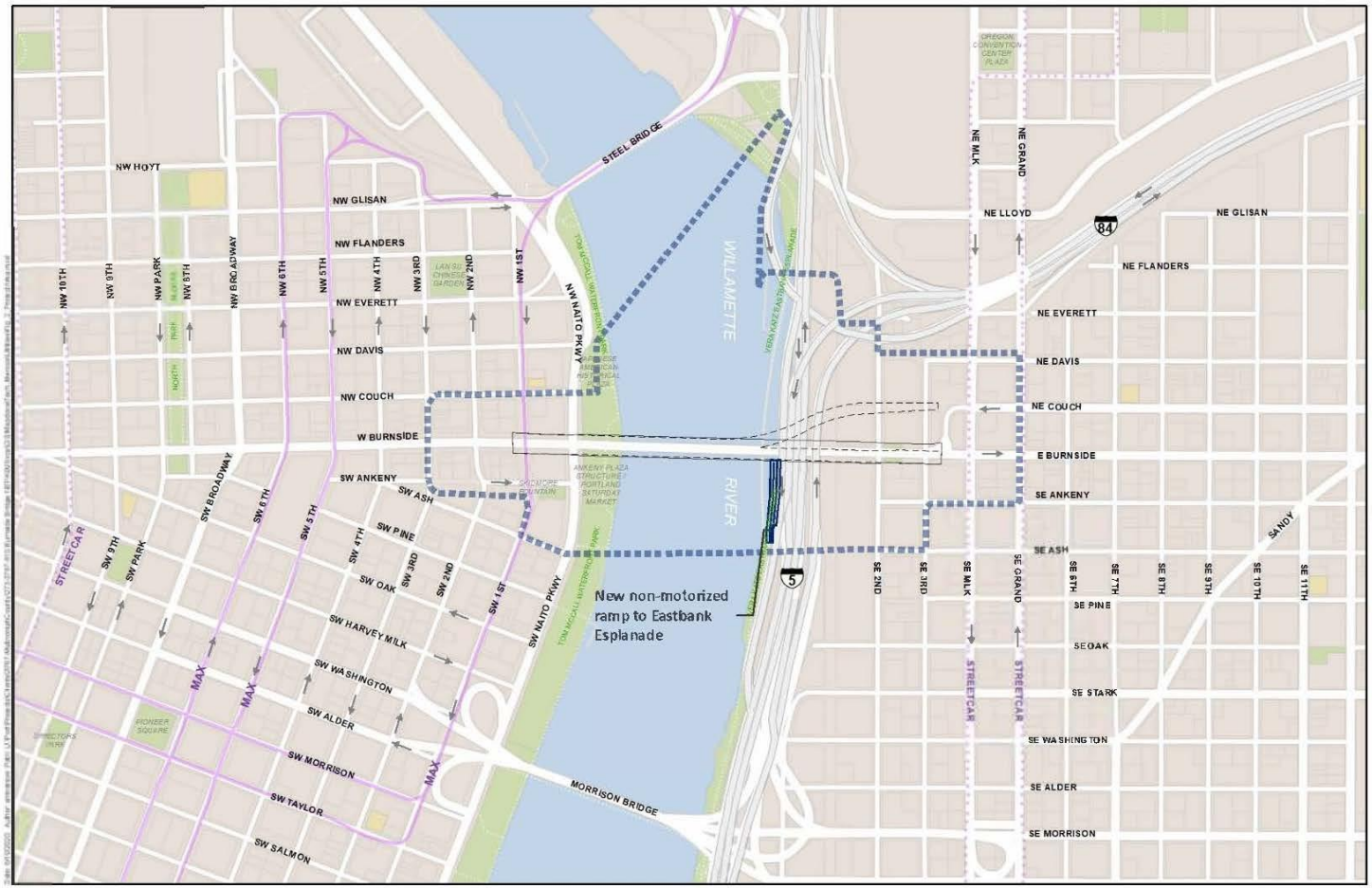


Figure 4
Utility API
Utilities

Earthquake Ready Burnside

5.2 Resource Identification and Evaluation Methods

5.2.1 Published Sources and Databases

The utility owners were identified by contacting the Oregon Utility Notification Center (One-call, 811, 800-332-3244) and submitting a pre-design survey, "mapping-only," ticket request for the Project Area through the online ITIC program.[1] The identified utilities are as follows:

- Comcast Cable Communication Management (referred to as Comcast)
- Electric Lightwave, Inc. (now Zayo)
- Henkels & McCoy
- Level 3 (Now Lumen, referred to as Lumen National)[2]
- Multnomah County Bridge Section
- MCI (now Verizon)
- NW Natural
- Oregon Department of Transportation Electrical
- Portland General Electric
- City of Portland, Bureau of Maintenance
- Pacific Power
- City of Portland, Portland Streetcar
- City of Portland
    - The “City of Portland” identification by the ITIC notification includes multiple departments:
        - Portland Water Bureau
        - Portland Bureau of Environmental Services
        - Portland Bureau of Transportation (PBOT), Signals, Street Lighting and ITS
        - Portland Bureau of Technology Services
- City of Portland, Parks & Recreation
- CenturyLink (Now Lumen, referred to as Lumen Local)
- AT&T Local Network Services (referred to as AT&T LNS)
- TriMet
- Wave Broadband

[1] Ticket 19234729 dated August 22, 2019, (Oregon Utility Notification Center, 2019)

[2] CenturyLink has changed their name to Lumen. Lumen has a Local and National division where the National division maintains the Level 3 acquired infrastructure.

Maps provided by the utility owner from the ITIC request were collected. Maps from the following utility owners were provided:

- City of Portland, Bureau of Environmental Services (BES)
- City of Portland, Portland Water Bureau (PWB)
- City of Portland, PBOT Signals, Street Lighting and ITS
- City of Portland, Portland Parks & Recreation (PP&R)
- City of Portland, Bureau of Technology Services (BTS)
- City of Portland, Portland Streetcar
- Lumen Local
- Lumen National
- Comcast
- NW Natural
- ODOT
- PGE
- TriMet
- Verizon
- Wave Broadband
- Zayo

Record drawing maps and topographic survey gathered from Burnside Bridge Maintenance Projects were gathered and reviewed. The following documents were included:

- Burnside Br Electrical Renovations Plans (1995)
- 2016-11-01, Burnside Bridge Paint and Rehab Plans (2016)
- Survey from the Burnside Bridge Maintenance Project

Published online record and GIS mapping data were gathered, when available. The following online record data was reviewed:

- ODOT TransGIS[3]
- City of Portland, BES[4]

Online sources were researched to review the jurisdictional limits of each road authority and rail authority. ODOT's jurisdictional limits are from the east riverbank to Union Pacific Railroad (UPRR) ROW, within the I-5 corridor. UPRR jurisdictional limits are along the railroad tracks located in the street grid for E 1st St. Multnomah County has jurisdiction over the Burnside Bridge, and all bridge-related infrastructure. TriMet jurisdictional limits

[3] https://gis.odot.state.or.us/transGIS/

[4] Portland Sewer Pipes at https://www.portlandmaps.com/advanced/?action=gallery

are along the Light Rail Transit (LRT) tracks. The City of Portland has jurisdiction over the local street network not controlled by other authorities. PP&R has jurisdiction over Tom McCall Waterfront Park and Vera Katz Eastbank Esplanade.

5.2.2 Contacts and Coordination

Contacts and coordination with utilities (public and private) are outlined below:

- Contacted the utility owners identified in the ITIC request to identify a representative for their utility. Utility contacts are listed in Section 9.
    - Requested record mapping from each utility owner, if not already obtained through published sources. Non-confidential maps are included in the Appendices.
- Requested confirmation of field topographic survey mapping, where base mapping information was available.
    - Survey mapping was sent to Comcast, Lumen Local, Lumen National, BES, PBOT Signals, Street Lighting and ITS, PWB, PP&R, NW Natural, ODOT, PGE, Portland Streetcar, TriMet, Verizon, and Wave Broadband.
    - Confirmation was received from Lumen Local, Lumen National, NW Natural, PGE, PP&R, Verizon, and Wave Broadband.
    - Comcast confirmed the mapping on the west side of the river, but the contact for the east side of the river was non-responsive.
    - Survey mapping was not sent to AT&T or Pacific Power, as they responded that they did not have facilities within the surveyed Project Area.
    - Zayo's location is strictly confidential and will not be shared.
- Contacted utility and local agency representative personnel to request information on the following:
    - Operational constraints, including staging and phasing limitations. Utility responses are included in Section 8.
    - Maintenance and/or maintenance access constraints. No utility provided any specific information in response to this request.
    - Maximum amount of grade change that could be accommodated. No utility provided any specific information in response to this request.
    - Whether they might request bridge attachment. Utility responses are included in Section 8.
    - The ease of moving utilities. Utility responses are included in Section 8.
    - Required protection measures if impacts are trying to be avoided. Utility responses are included in Section 8.
    - Approximate duration for planning and budgeting relocations. Utility responses are included in Section 8.

- Approximate duration for relocation design. Utility responses are included in Section 8.
- Utility segments with prior property rights (prior rights) that would qualify for compensable relocation. Utility responses are summarized in Section 5.3.
- Planned expansion or improvements within the Project Area independent of Project work. No utility responded that they have planned expansion or improvements within the Project Area.

- Contacted the permit specialist for each road authority and each rail and transit authority to determine whether any utility has a compensable interest or prior right to occupy that ROW. Compensable rights are summarized in Section 5.3.
- Reviewed the jurisdictional limits of roadway and rail ROW within the Project Area and summarized in Section 5.2.1.

5.2.3 Field Visits and Surveys

A windshield survey was not conducted for the utilities analysis to view existing utility geographic data for which no information was otherwise obtained via the efforts described in Sections 5.2.1 and 5.2.2. The unknown utility locations are underground utilities, and locations cannot be verified by this method.

5.2.4 Methods of Reimbursable Rights for Utilities

A full prior rights assessment was not performed for this analysis, as it is an assessment typically performed as part of the design phase of a project. The utilities analysis indicated whether a facility appears to be within or outside an existing ROW (Section 5.3). Utilities outside the ROW and those within a rail or transit-owned ROW were assumed to have a prior right for the purposes of this analysis. Utilities owned by and within the ROW of the applicable road authority were assumed to have a prior right for the purposes of this analysis. Utilities owned by and within the rail-owned property of the applicable rail or transit authority were assumed to have a prior right.

The Project improvements include crossing a state highway. When a state highway is routed over city streets, relocation of city utilities within state ROW is compensable. Unless record mapping or easements identified in accordance with Section 5.2.1 indicated otherwise, for the purpose of this analysis the following was assumed:

- The City-compensable relocation within ODOT's ROW occurred with the initial highway construction and would not be compensable a second time.
- Utilities within mapped easements overlapping ODOT's ROW (Multnomah County, BES) would continue to have a compensable prior right.
- Utilities within UPRR ROW have a compensable right (BES, Lumen National, City of Portland Traffic and Lighting, and Verizon).

Relocation requests for utilities located within the UPRR ROW are required to be submitted through UPRR, and they will facilitate the relocation coordination.

5.3 Existing Conditions

Existing infrastructure data was collected through owner website access when possible, or direct contact with assigned utility representatives, when available. No subsurface investigations were conducted. The data below includes (when available) the type of utility, size, and general roadway limits of the utility's infrastructure within the Project Area.

Utilities are not obligated to respond during a planning phase. Some utilities wait for a project to have topographic base mapping performed by the Project before responding to requests for information, particularly in those cases where a utility owner cannot release its facility maps. The Oregon Utility Relocation Manual (ODOT 2018) requires verification of utility facility mapping to be performed during design. The manual further requires that in those cases where a utility has not released their facility maps prior to performing field survey, a copy of the topographic base map is provided to the utility owner. The utility owner returns the base map with corrections corresponding to their facilities at that time. As summarized in Section 5.2.2, this process was followed for the portion of the Project Area with survey available, with varying success.

5.3.1 Comcast Cable

Comcast Cable is a communication provider, with facilities that include overhead lines, underground lines, joint poles, and pedestals. The map on file was obtained from a previous project[5], and is not of the entire Project Area. Comcast may have additional facilities within the Project Area, which are not listed below.

The underground locations listed below describe the general location of the main path location, but do not include the location of service meters, junction boxes, vaults, or other appurtenances that are part of the system.

The aerial locations listed below describe the general locations of the aerial lines, but do not include service connections, pole locations, transformers, or other appurtenances that are part of the system.

Comcast did not indicate what, if any, infrastructure is critical to their system; however, Comcast's contact for the east side of the river has been non-responsive.

- **East 2nd Ave** - Underground conduit size not specified, from south of E Burnside St to midblock between NE Couch St and NE Davis St.
- **NE Martin Luther King (MLK) Boulevard (Blvd)** - Aerial cable on the eastern side of the road, from the southern side of E Burnside St to NE Davis St.
- **NE Davis St** - Aerial cable on the southern side of the road, from SE 3rd Ave to east of NE Grand Ave.

Comcast Cable does not have any known prior rights.

[5] Burnside St: Willamette River Bridge Painting and Rehabilitation Project, Multnomah County (2016)

5.3.2 Zayo

Zayo Group (Zayo) acquired the communication company Electric Lightwave, Inc. Zayo has facilities within the utility API, however, their specific location is strictly confidential and no further information was provided.

Zayo does not have any known prior rights.

5.3.3 Henkels & McCoy

Henkels & McCoy is a construction contractor and installs new fiber optic infrastructure for Verizon. Henkels & McCoy maintains ownership of the infrastructure until Verizon accepts the work, and ownership then is transferred to Verizon. The location of this infrastructure requires Verizon's approval for the release of the maps, which was not granted. Multnomah County provided a location and sizing description from the Multnomah County Right-of-Way Permit 83249 for Henkels & McCoy to install conduit within the Project API, which was included in the impact analysis and costs given in Section 7. The quantities and costs were summarized along with Verizon's impacts.

Henkels & McCoy does not have any known prior rights.

5.3.4 Lumen National

Lumen National is a communication provider and has overhead and underground facilities within the Project Area. Lumen National also rents underground facilities from other utility purveyors within the Project Area. The locations of Lumen National's infrastructure are not disclosed here. Any impacts to rented infrastructure will be coordinated through the owner of the facilities. The location of Lumen's infrastructure is deemed strictly confidential, and as a condition of providing the mapping information for the Project's consideration, public disclosure or posting on an internet site is not allowed. Generally, Lumen National's infrastructure is located on three of Portland's streets within the Project Area, and within the railroad ROW.

Lumen National's infrastructure within the railroad ROW is assumed to have prior rights.

5.3.5 Multnomah County Bridge Section

Multnomah County has a PVC waterline, 2 electrical conduits, a street light conduit, and a fiber optic conduit attached to the southern side of the Burnside Bridge. Between the two center piers, the 2 electrical conduits run along the bottom of the river (known as submarine cables).

Multnomah County's infrastructure has prior rights within the limits of Multnomah County's bridge jurisdiction for the Burnside Bridge for all bridge-related infrastructure. For the bridge approaches in City of Portland's ROW, ORS 373.130[6] states that the power, dominion, and right of control over the city street for improvement and maintenance belong exclusively to the County. The County's position on the limits of the bridge approach is to the nearest intersection from the point of touchdown, which is W 2nd Ave and E MLK Blvd.

[6] ORS 373.130 (2017) - County use of city streets as bridge approach

5.3.6 Verizon

Verizon is a communication provider and is currently expanding their infrastructure throughout Portland and the surrounding areas. The contractor, Henkels & McCoy, is currently installing Verizon's infrastructure within the Project Area, which is further discussed under Section 5.3.3. Verizon is also currently in discussion with ODOT regarding possible locations to cross the Willamette River, one of which is along the Burnside Bridge (pers. comm., Daniel Ruiz [Verizon], September 3, 2019).

The general location of Verizon's infrastructure is as follows:

- **NW 3rd Ave** - From W Burnside St to NW Couch St.
- **NW Couch St** - From NW 3rd Ave to NW 1st Ave.
- **SW 2nd Ave** - From SW Ash St to SW Ankeny St.
- **W 1st Ave** - From beyond SW Ash St to beyond NW Couch St.
- **UPRR ROW** - Within the UPRR ROW through the Project Area
- **E 2nd Ave** - From SE Ankeny St to the gore area of the I-5/I-84 interchange
- **E 3rd Ave** - From SE Ash St to NE Everett St.
- **SE Ankeny St** - From SE 2nd Ave to SE 3rd Ave.
- **NE Couch St** - From NE 2nd Ave to NE Grand Ave.
- **NE Davis St** - From NE 2nd Ave to NE Grand Ave.

Verizon's infrastructure within the railroad ROW is assumed to have prior rights.

5.3.7 NW Natural

NW Natural has 1-inch to 6-5/8-inch steel and poly distribution lines throughout the Project Area, and a 20-inch high pressure transmission line within Naito Pkwy. NW Natural's infrastructure also includes service lines, meters, and valves. Mains sized 6-5/8 inch and larger are more critical to NW Natural's system than the smaller mains. General locations of the distribution and transmission lines 4-1/2-inches and larger, are described below.

20-inch High-Pressure Transmission

- **Naito Pkwy** - Steel line, from SW Ash St to NW Couch St.

6-5/8-inch Distribution

- **SW Ankeny St** - Steel line, from NW 3rd Ave to NW 2nd Ave.
- **W 3rd Ave** - Steel line, from SW Ash St to NW Couch St.

4-1/2-inch Distribution

- **NW Couch St** - Steel line from NW 3rd Ave to NW 1st Ave.
- **SW Ankeny St** - Steel line from NW 3rd Ave to NW 1st Ave.

- **NW 2nd Ave** - Steel line from W Burnside St to NW Couch St.
- **NW 1st Ave** - Steel line from W Burnside St to NW Couch St.
- **SW Ash St** - Steel line from SW 1st Ave to SW Naito Pkwy.
- **SW Ankeny St** - Steel line from SW 1st Ave to SW Naito Pkwy.

NW Natural does not have any known prior rights within the Project Area.

5.3.8 Oregon Department of Transportation

ODOT is identified on the Oregon Utility Notification Center ticket. Facilities include highway-related infrastructure associated with the state-maintained traffic signals, interconnects, ramp signals, intelligent transportation, street lighting, and storm infrastructure located along the I-5 and I-84 corridors.

ODOT has a 30-inch storm pipe draining south between NE 2nd St and NE 3rd St, which connects to the City of Portland's system at the intersection of NE 2nd St and E Burnside Ave.

ODOT has fiber optic communications along the western side of Naito Pkwy, and conduit attached to the east side of the Eastbank Esplanade.

ODOT's infrastructure located within the state highway ROW has prior rights, except where Multnomah County owns an easement which predates the highway and ODOT's infrastructure[7].

5.3.9 Portland General Electric

PGE is the primary power service provider within the Project Area. PGE has underground power and associated vaults, switches, meters, and other equipment throughout the City street network. PGE provides service to the adjacent buildings, street lighting, and the Burnside Bridge. PGE's aerial facilities are limited to the eastern side of NE MLK Blvd. Some of the power poles have other utilities attached to them (joint use poles) and have street lighting attached. The locations where other utilities are attached to PGE poles are covered in the respective utility sections.

PGE does not have any known prior rights for their distribution system; however, it may have reimbursable work for the maintenance or relocation of service facilities that they maintain or operate for Multnomah County and the City of Portland. Generally, the location where the owner is responsible for paying PGE begins at the service meter.

5.3.10 Pacific Power

Pacific Power (PacifiCorp) was identified on the Oregon Utility Notification Center ticket. The Pacific Power contact person stated that the Project Area is outside of their jurisdiction, and power services are solely provided by PGE within the Project Area.

[7] Easement to Multnomah County from Oregon and California Railroad Company dated August 18, 1924, Journal 21, Page 394

5.3.11 City of Portland

Portland Water Bureau

PWB is the potable water provider within the Project Area. PWB's infrastructure includes water distribution piping varying in sizes from 4-inch to 16-inch, fire hydrants, drinking fountains, services, and fire services.

Within the Project Area, the water services are generally located on the side streets, with the exception of waterline located within the parking area under the Burnside Bridge, between W 1st Ave and Naito Pkwy.

To maintain the safety and security of the City's drinking water, PWB cannot release their maps, and deems the location of its water mains sized 12 inches and larger as strictly confidential (pers. comm., Interagency Liaison [PWB], August 29, 2019). This is in compliance with:

- Bio Terrorism Act of 2002, Public Law 107–188— Title IV—Drinking Water Security and Safety (U.S. Government Publishing Office, 2002)
    - Comply with US Bioterrorism Act which requires water providers to secure and maintain critical records as confidential
- USC, Title 42, Section 300i-2, Terrorist and other intentional acts (U.S. Government Publishing Office, 2012)
    - Comply with US Bioterrorism Act which requires water providers to secure and maintain critical records as confidential
- ORS 192.355, Public records exempt from disclosure, [ORS 192.355 (33)]
    - Exempts Public Records from disclosure for water information that is related to review or approval of programs involving the security of water

PWB's infrastructure has prior rights within the limits of City of Portland roadway jurisdiction, city parks, city owned parcels, and acquired easements.

Portland Bureau of Environmental Services

BES is the stormwater and sanitary service provider within the Project Area. BES's infrastructure includes gravity sewer and storm pipelines, gravity combined sewers, pressurized force mains, manholes, stormwater inlets, a sanitary pump station, and combined sewer overflow system.

The Ankeny pump station is located within Waterfront Park, near SW Ankeny St.

Two odor control vaults are located on the northern side of W Burnside St, within Waterfront Park. They are connected to the Ankeny wet well and Ankeny shaft on the southern side of the bridge by a 24-inch duct.

Within the Project Area, BES maintains over 16,000 feet of sewer piping, varying in size from 4 inches to 264 inches in diameter. Below are the locations of the 24-inch and larger sewer piping.

24 Inch Sewer (1,500 feet)

- **W Burnside St** - Combined Sewer from W 3rd Ave to W Naito Pkwy
- **NW 3rd Ave** - Combined Sewer from W Burnside St to NW Couch St
- **NE Davis St** - Combined Sewer from NE 3rd Ave to NE Grand Ave
- **NE 3rd Ave** - Combined Sewer from NE Couch St (Vacated) to NE Davis St

28 Inch Sewer (550 feet)

- **SE 3rd Ave** - Combined Sewer from NE Couch St (Vacated) to NE Davis St
- **NE 3rd Ave** - Combined Sewer from E Burnside St to NE Davis St

30 Inch Sewer (3,250 feet)

- **Waterfront Park** - Force Main from SW Ankeny St to NW Couch St, constructed across the river in 1953
- **E Burnside St** - Storm Sewer from the Willamette River to E 2nd St
- **NE Davis St** - Combined Sewer from NE 3rd Ave to NE MLK Blvd
- **SE 3rd Ave** - Combined Sewer from SE Ash St to E Burnside St

34 Inch Sewer (300 feet)

- **SE 3rd Ave** - Combined Sewer from SE Ash St to SE Ankeny St

42 Inch Sewer (2,500 feet)

- **Waterfront Park** - Force Main from SW Ankeny St to NW Couch St, constructed across the river in 1953

48 Inch Sewer (300 feet)

- **SW Naito Pkwy** - Combined Sewer from W Burnside St to NW Couch St

54 Inch Sewer (300 feet)

- **SW Naito Pkwy** - Combined Sewer from SW Ankeny St to W Burnside St

72 Inch Sewer (2,000 feet)

- **SW Ankeny St** - Combined Sewer and CSO from SW Naito Pkwy to the Willamette River
- **SW Naito Pkwy** - Combined Sewer from SW Ash St to SW Ankeny St
- **NE Davis St** - Combined Sewer from NE 2nd Ave to NE Grand Ave
- **SE Grand Ave** - Combined Sewer from SE Ankeny St to NE Davis St

74 Inch Sewer (100 feet)

- **SW Ankeny St** - CSO from SW Naito Pkwy to the Willamette River

78 Inch Sewer (250 feet)

- **SW Ankeny St** - Combined Sewer and CSO from SW Naito Pkwy to the Willamette River

102 Inch Sewer (700 feet)

- **NE Davis St** - NE 2nd Ave to NE Grand Ave

168 Inch Sewer (900 feet)

- **Waterfront Park** - CSO from SW Ash St to NW Couch St

264 Inch Sewer (1,150 feet)

- **SE 3rd Ave -** CSO from SE Ash St to NE Davis St
    - At SE Ankeny St, the CSO diverges to the west side of NE 2nd Ave, crossing E Burnside St between E 2nd Ave and E 3rd Ave

BES's infrastructure has prior rights within the limits of City of Portland roadway jurisdiction, city parks, city owned parcels, and acquired easements.

Signals, Street Lighting & ITS

City of Portland is the provider of traffic signals and street lighting on the roadways under Portland's road authority. Infrastructure includes signals, poles, lights, cabinets, underground conduit and wiring, and junction boxes.

Lighting is generally located along both sides of all streets within the Project Area. Lighting is also located on the underside of the Burnside Bridge, between W 1st Ave and Naito Pkwy.

A traffic camera for viewing traffic conditions is located at the intersection of W Burnside St and SW 2nd Ave (ODOT TransGIS 2019). Traffic signals are located at the following intersections:

- **NE Davis St** - NE MLK Blvd and NE Grand Ave
- **N Couch St** - NW 1st Ave, NW Naito Pkwy, NE MLK Blvd, and NE Grand Ave
- **Burnside St** - W 3rd Ave, W 2nd Ave, NE Couch St, and at E MLK Blvd
- **S Ankeny St** - SW Naito Pkwy and SE Grand Ave
- **S Ash St** - SW 1st Ave and SW Naito Pkwy

City of Portland Traffic and Lighting has prior rights in Portland's roadways and acquired easements. The City of Portland did not provide a response to confirm where they have compensable rights. Currently, it is unknown if the lighting attached to the underside of the Burnside Bridge is eligible for reimbursement.

Portland Bureau of Transportation, Portland Streetcar

Within the Project Area, the Portland Streetcar is located on E MLK Blvd, and E Grand Ave. The facilities typically include tracks, track drainage, overhead catenary (power)

lines, poles, train signals, underground conduits, communication lines, and associated cabinets and junction boxes.

The Portland Streetcar infrastructure is owned by PBOT, and therefore has reimbursable rights within the city ROW[8].

Portland Parks & Recreation

PP&R has facilities within the Tom McCall Waterfront Park located between Naito Pkwy and the harbor wall and along the Vera Katz Eastbank Esplanade. PP&R has lights attached to the underside of the Burnside Bridge and along the Vera Katz Eastbank Esplanade. PP&R underground facilities include power, sanitary sewers, stormwater facilities, potable water, natural gas, and irrigation.

PP&R has reimbursable rights within the park properties.

Portland Bureau of Technology Services

BTS has communication facilities that service government buildings, including the fire department, Ankeny Pump Station, and the University of Oregon. The underground fiber is located within Naito Pkwy and E 3rd Ave.

BTS has reimbursable rights for their facilities within the city street right-of-way and on private property where the service connections are made.

5.3.12 Lumen Local

Lumen Local is a communication provider that has underground facilities, facilities attached to the bridge, and a submarine cable located between the piers at the Bascule lift, within the Project Area. The infrastructure includes fiber optic lines, conduits, vaults, services, pull boxes, and associated equipment.

Lumen Local is the only franchise utility that is attached to the bridge and crosses the river. The ductbank attached to the Burnside Bridge is comprised of eight 3-inch conduits and portions that were recently replaced with four 4-inch conduits.

From SW 3rd Ave, the ductbank is along SW Ankeny St to SW Naito Pkwy, where it turns north to W Burnside St and then attaches to the northern side of the Burnside Bridge. Between the two center piers, the ductbank runs along the bottom of the river in a 6-inch steel conduit. At NE 3rd Ave, the ductbank turns south to SE Ankeny St, where the ductbank turns east, beyond the limits of the Project Area.

Lumen Local has additional ductbanks along the following roadways:

- **NW Couch St** - NW 3rd Ave to NW Naito Pkwy
- **SW Ash St** - SW 1st Ave to SW Naito Pkwy
- **SW 1st Ave** - SW Ash St to SW Ankeny St
- **E Burnside St** - E MLK Blvd to E Grand Ave

[8] PBOT owns and maintains the Portland Streetcar infrastructure. The “Portland Streetcar” entity is a non-profit that provides support for the streetcar system.

- **NE Couch Court** - NE 3rd Ave to NE Couch St
- **E 2nd Ave** - SE Ankeny St to NE Couch St
- **E 3rd Ave** - SE Ankeny St to NE Davis St
- **E MLK Blvd** - SE Ankeny St to NE Davis St

Lumen Local has prior rights for the submarine cable located between Pier 2 and Pier 3[9]. Lumen Local had a temporary access easement with the Oregon Department of State Lands (DSL) that expired on 2/29/20[10], and they are currently in the process of negotiating with DSL for a permanent easement/permit[11]. The temporary access easement was for maintenance of their facilities from riverbank to riverbank and does not address rights for reimbursement.

5.3.13 AT&T Local Network Services

PIVOTAL (pivotalcomm.com) is an authorized representative that provides the engineering and management of the AT&T LNS infrastructure. PIVOTAL provided an initial response that they believe that AT&T LNS does not have facilities within the Project Area (pers. comm., David Sakamoto [PIVOTAL], September 9, 2019). During final design, PIVOTAL will review the plans to confirm that AT&T LNS does not have facilities within the Project Area.

5.3.14 TriMet

Within the Project Area, TriMet lightrail is located on W 1st Ave. The facilities for the track system typically include tracks, track drainage, overhead catenary (power) lines, poles, underground conduits and power lines, communication lines, train signals, and associated cabinets and junction boxes. The facilities for its transit stops typically include equipment and systems for purchasing fares, platform lighting, and closed-circuit television systems for passenger safety. The location and details of TriMet's facilities are confidential and will not be disclosed further in this report.

TriMet has stated that they are eligible for compensation for impacts to light rail service within the City of Portland's ROW, including costs for temporary bus shuttles[12] for rail closures[13]. No documents have been provided, supporting this claim.

It is not currently known if TriMet has infrastructure within the Project Area that was adopted into their system from previously constructed rail. TriMet infrastructure located within any City of Portland ROW that predates TriMet's construction was allowed by construction permit[14], and would not be eligible for reimbursement.

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[9] Scott Miller, personal communication, October 28, 2019

[10] State of Oregon, Department of State Lands, 2019

[11] David Dodd, personal communication, September 14, 2021

[12] TriMet may refer to "temporary bus shuttles" as a "bus bridge."

[13] John Griffiths, personal communication, December 17, 2019

[14] City of Portland Ordinance No. 154995, dated August 24, 1983, for the Banfield Light Rail Project Continuing Control Agreement

5.3.15 Wave Broadband

Wave Broadband has aerial lines along E MLK Blvd from SE Ash St to NE Davis St, and on NE Davis St from NE 2nd Ave to NE Grand Ave, attached to PGE poles. The aerial distribution connects to underground services to 1 property location on NE Davis St between NE 2nd Ave and NE 3rd Ave, and 2 properties located along NE MLK Blvd, between E Burnside St and NE Couch St.

Wave Broadband does not have any known prior rights within the Project Area.

5.3.16 Burnside Skatepark

The Burnside Skatepark is an independently maintained and operated skateboard park located beneath the east end of the Burnside Bridge on SE 2nd Ave on City of Portland right-of-way. The skatepark was built in 1990 without public funding and without permission from the City of Portland or Multnomah County, but has been acknowledged as an important recreation feature in the city. A non-profit was established to maintain and operate the skatepark, and to allow for the application of grants for the maintenance and expansion of the park.

Lighting was installed for the skatepark as mitigation for the loss of natural light from the construction of the "Yard" building on the northern side of the park, by the building owner, who also provides the electricity[15]. There are two lights attached to the "Yard" building to the north, and two light poles on the southern side of the skatepark.

6 Impact Assessment Methodology and Data Sources

The impacts analysis addresses the direct long-term, direct short-term, indirect, and cumulative utility impacts of the Project Alternatives.

6.1 Long-Term Impact Assessment Methods

The analysis of direct long-term impacts includes the degree to which the Alternatives affect utilities at an operational level based on the following:

- Potential impacts to utility facilities due to maintenance access and maintenance depth constraints if not relocated
- Impacts to utility facilities that require a functional replacement rather than relocation
- Operational impacts

6.2 Short-Term Impact Assessment Methods

Short-term impacts are primarily construction-related impacts based on the following:

[15] Sage Bolyard, personal communication, May 5, 2020

- Potential impacts on utility facilities due to required relocation. The analysis includes the following:
  - Identify utilities with prior rights that qualify for compensable relocation
  - Estimate costs to relocate utilities, including costs for relocation that is the responsibility of the Project (compensable) and relocation that is the responsibility of the utility owner (non-compensable)
- Potential relocations to utility facilities to mitigate maintenance access or depth constraints
- The ease of moving or mitigating impacts to utilities

The analysis considers all known or mapped utilities within the Project Area, including those located along the river bottom. Each alternative was assessed for likely utility impacts from the bridge work, based on the current design assumption for foundation placement and assumed excavation limits for foundation work. For the Temporary Bridge, LRT station pedestrian connections, Vera Katz Eastbank Esplanade tie in location, NE 2nd Ave to NE 3rd Ave pedestrian connections, and the NE 3rd Ave reconstruction, impacts were assumed to occur for every utility within the work area until design is sufficiently detailed to show where avoidance or protection is feasible.

Impacts from stormwater and mitigation sites are not yet known and have not been evaluated.

Additional temporary impacts from staging areas, crane placement, work access, work bridges, etc., have not yet been determined.

Utility facilities that would affect a large part of the Portland metropolitan region in the event of a service disruption, and those that warrant special consideration during design, are discussed in Section 7.2.

6.3 Indirect Impact Assessment Methods

Most impacts to utilities are addressed through the direct long-term and short-term impacts analyses, but the indirect impact assessment considers other activities that may occur. The analysis of indirect impacts for utilities focuses on potential indirect effects to the Project vicinity over time, such as those related to the indirect effects of transportation and roadway upgrades in the Project Area that could incentivize further development in the Project vicinity. For example, utility providers generally forecast increases in demand for their services over time. The Project is not adding any new vehicular capacity on the bridge thus is not expected to impact the population and development patterns found in the long-range plans for the communities in the Project vicinity and indirectly alter the future demand for services.

6.4 Cumulative Impact Assessment Methods

The cumulative impacts analysis considered Project's impacts combined with other past, present, and reasonably foreseeable future actions that would have environmental impacts in the Project vicinity. Based on the list of foreseeable transportation and other development projects that are anticipated to occur in the Project vicinity within the same

time frame, as well as relevant past actions that have defined the Project vicinity, a qualitative analysis of cumulative effects was conducted for utility impacts. The analysis of potential cumulative utility impacts was examined for both near-term construction effects as well as long-term operational impacts.

7 Environmental Consequences

7.1 Introduction

This section discusses the anticipated adverse impacts of the Project with regard to utilities for the No-Build and Build Alternatives for both pre-earthquake and post-earthquake scenarios.

Utilities generally occupy existing City of Portland roadway ROW. Utility locations vary within the ROW and may occur under the pavement or above-ground where they do not impede vehicular, pedestrian, or transit traffic. City of Portland utilities located within City of Portland's ROW would require relocation and are considered compensable relocations and add to the cost of the Project. TriMet stated they are eligible for compensation of impacts to light rail service within City of Portland's ROW (see Section 5.3.14). The other utilities are allowed to be located in the City's ROW by permit and would be non-compensable relocations; all costs for such relocations would be borne by the utility owner.

Some utilities are located on private property, including those within the UPRR ROW, Portland parks, easements over vacated rights-of-way, and acquired easements. Relocation of these utilities is assumed to be compensable until a full Prior Rights assessment is performed.

As described in the *EQRB Description of Alternatives Report* (Multnomah County 2021b), the No-Build Alternative consists of existing conditions and other planned and funded transportation improvement projects. The specific projects applicable to the utilities analysis are the funded transportation improvement projects that occur within the geographic extents of the utility analysis API. The following projects were considered in the utility analysis[16]:

- **SW Naito Pkwy, SW Madison St to NW Couch St** - Reduce by one travel lane, add bi-directional bike facility. Seasonally since 2015, permanent in 2020.
- **Burnside, W 4th Ave to E MLK Jr Blvd** - Convert a travel lane to a Business Access and Transit (BAT) lane. Complete by 2025.
- **Burnside, E MLK Jr Blvd to E 12th Ave** - Convert a travel lane to a BAT lane. Complete by 2021.
- **MLK Jr Blvd, NE Schuyler St to SE Hawthorne Blvd** - Convert a travel lane to a BAT lane. Complete by 2025.

[16] The utility analysis evaluated all listed projects to be consistent with the No-Build Alternative described in the Draft EIS, even if the project has already been completed.

- **Grand, SE Hawthorne Blvd to NE Schuyler St** - Convert a travel lane to a BAT lane. Complete by 2025.
- **SE Ankeny St at MLK Jr Blvd** - Install traffic signal, no changes to lanes. Complete by 2021.
- **I-5 Rose Quarter Improvement Project** - Adding ramp-to-ramp (auxiliary lanes) and shoulders along I-5. Proposed southbound highway improvements would extend to the Morrison off-ramp at Exit 300B. Completion estimated in 2027-2028.[17]

7.2 Pre-Earthquake Impacts

Utility relocation prior to and during construction may result in interruptions of service. Potential disruptions are expected to be minimal for most of the utilities, with utility providers scheduling outages to accommodate cut-overs. Temporary connections likely would be established before relocating the utility conveyances.

Short-term (construction) impacts are summarized in Table 3 and Table 4. The relocation quantities provided in Table 3 and Table 4 are estimated values and would be refined as the Project design progresses. Relocation costs are summarized in Table 5 and Table 6. Cost estimates for utility relocation have been requested from the utility representatives; however, estimated unit costs were not provided. Conservative relocation unit costs were assumed in order to include other utility features and appurtenances that are not quantified. The estimated relocation or adjustment costs summarized in Table 5 and Table 6 include engineering, temporary traffic control, and contingencies.

All utilities attached to the bridge will be affected by each alternative, regardless of the moveable span option chosen for the project[18]. The utility impacts would be the same between the moveable span options.

Potential disruptions for the BES 24-inch and larger utility infrastructure listed in Section 5.3.11 and in Table 3 and Table 4, could pose a design challenge due to the conveyance volumes involved. Service disruptions to these facilities could affect a large part of the City of Portland metro area. Where feasible, mitigation measures would be implemented to avoid or minimize impacts to affected facilities through design modifications. The 42-inch and 30-inch sewer lines landside of the west bank sea wall require protection unless relocation is determined feasible by engineering analysis and confirmed by BES. Any required relocation of these two sewer lines riverside of the west bank sea wall is expected to warrant a complete pipe replacement from the Ankeny pump station to each pipe's outfall at NE Lloyd Blvd, on the eastern side of the river.

Each Build Alternative will require relocation of Lumen Local's submarine cable. The three large fiber cables on the bridge may serve Federal Aviation Administration and 911 circuits, which are critical. Because Lumen likely will not relocate back onto the bridge, due to the nature and duration of the relocation work, it will require at least 2 years to complete the design, permitting, and construction of the relocation off the bridge.

[17] From https://www.i5rosequarter.org

[18] The movable span options being considered to accommodate river traffic are a Vertical lift or Bascule.

Design features that require relocation of NW Natural's 20-inch high-pressure line should be avoided if possible. Further evaluation will be needed as the design develops, to determine if it can be protected. NW Natural will require 12 months or more to relocate the 20-inch line.

The Couch Extension Alternative may require relocation of ODOT's 30-inch storm sewer that conveys stormwater runoff from I-84 south to a BES manhole at E Burnside St and E 2nd Ave. The storm sewer location as it crosses Couch St was estimated from record drawings and will need to be confirmed by survey during design.

PGE provides and maintains power to the existing bridge. The Project is responsible for the costs associated with relocating or providing power to the bridge service vaults. PGE will require 18 months for planning, budgeting, and designing relocations.

TriMet's limits of potential utility relocations are similar for each alternative, however, the construction methods for a retrofit and new construction differ in the expanse and duration of the impacts. The costs provided in Table 5 and Table 6 do not take into account the additional costs associated with providing a bus shuttle during work within the trackway. For the Retrofit Alternative, with No Temporary Bridge, the total time of shutdown would be approximately 8 weeks. For the Replacement Alternatives, with No Temporary Bridge, the total time of shutdown would be approximately 5 weeks. For the Retrofit Alternative, with a Temporary Bridge, the total time of shutdown would be approximately 16 weeks. For the Replacement Alternatives, with a Temporary Bridge, the total time of shutdown would be approximately 10 weeks.

Table 3. Build Alternative Short-Term (Construction) Impacts for Draft EIS Alternatives

Utility Owner	Category	Affects Portland Metro Region	Warrants Special Consideration	Enhanced Retrofit Potential Impact	Replacement:			Additional with Temporary Bridge Potential Impact
					Short-span Potential Impact	Long-span Potential Impact (1)	Couch Extension Potential Impact	
BES	Pump Station	Yes	Yes	Protect	Protect	Protect	Protect	Protect
	4 IN							
	6 IN			90 FT	90 FT	90 FT	90 FT	
	8 IN							
	10 IN			100 FT				
	12 IN			30 FT	30 FT	30 FT	30 FT	
	14 IN			20 FT	20 FT	20 FT	20 FT	
	15 IN			40 FT	40 FT	40 FT	40 FT	
	16 IN			230 FT	180 FT	180 FT	180 FT	
	18 IN			200 FT	200 FT	200 FT	200 FT	
	21 IN						160 FT	
	24 IN	Yes	Yes	520 FT	290 FT	290 FT	290 FT	
	28 IN	Yes	Yes	300 FT			450 FT	
	30 IN	Yes	Yes	520 FT	470 FT	470 FT	470 FT	
	30 IN, Deep Bore	Yes	Yes	2,460 FT	Protect	Protect	Protect	
	34 IN	Yes	Yes					
	42 IN, Deep Bore	Yes	Yes	2,460 FT	Protect	Protect	Protect	
	48 IN	Yes	Yes					
	54 IN	Yes	Yes					270 FT
	72 IN	Yes	Yes					
	74 IN	Yes	Yes					85 FT
	78 IN	Yes	Yes	100 FT	100 FT	100 FT	100 FT	50 FT
	102 IN	Yes	Yes	Protect	Protect	Protect	Protect	Protect
	168 IN	Yes	Yes	Protect	Protect	Protect	Protect	Protect
	264 IN	Yes	Yes	Protect	Protect	Protect	Protect	Protect
Lumen Local	Underground	Yes		630 FT	510 FT	510 FT	810 FT	50 FT
	Submarine	Yes	Yes	400 FT	400 FT	400 FT	400 FT	
	Bridge Attachment	Yes	Yes	1,490 FT	1,490 FT	1,490 FT	1,490 FT	
AT&T LNS	None							
Lumen National	Communications			Unknown	Unknown	Unknown	Unknown	Unknown

Utility Owner	Category	Affects Portland Metro Region	Warrants Special Consideration	Enhanced Retrofit Potential Impact	Replacement:			Additional with Temporary Bridge Potential Impact
					Short-span Potential Impact	Long-span Potential Impact (1)	Couch Extension Potential Impact	
Multnomah County Bridge (2)	PVC waterline Electrical conduits Street light conduit Fiber optic conduit	....	....	All ..... All ..... All ..... All	All ..... All ..... All ..... All	All..... All..... All..... All	All..... All..... All..... All	All..... All..... All..... All
Comcast	Overhead Underground	....	....	300 FT	300 FT	300 FT	300 FT ..... 370 FT	..... 60 FT .....
Zayo	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
City of Portland Traffic & Lighting	Overhead Underground UG Fiber	....	....	50 FT ..... 2,050 FT ..... 600 FT	50 FT ..... 1,160 FT ..... 400 FT	50 FT ..... 1,160 FT ..... 400 FT	50 FT ..... 2,130 FT ..... 400 FT	....
NW Natural	Service/Meter 1 IN 2 IN 4-1/2 IN 6-5/8 IN 20 IN	.... Yes	.... Yes	.... 400 FT .... 200 FT	2 EA..... ..... 200 FT ..... 200 FT	2 EA .... 200 FT ..... 200 FT .... 200 FT	5 EA .... 600 FT ..... 200 FT .... 200 FT	1 EA .... 100 FT .... 100 FT .....
ODOT	Underground UG Fiber 12 IN 18 IN 30 IN 42 IN	....	....	100 FT ..... 200 FT	100 FT	100 FT	100 FT .... 100 FT	....
PGE	Overhead Underground	....	....	..... 1.660 FT.....	..... 1.110 FT.....	..... 1.110 FT	..... 1.490 FT	..... 510 FT .....
Portland Streetcar	Rail.....	Yes	.....	None	None	None	None	None

Utility Owner	Category	Affects Portland Metro Region	Warrants Special Consideration	Enhanced Retrofit Potential Impact	Replacement:			Additional with Temporary Bridge Potential Impact
					Short-span Potential Impact	Long-span Potential Impact (1)	Couch Extension Potential Impact	
PP&R	Electric			790 FT	790 FT	790 FT	790 FT	400 FT
	Gas, 2 IN							130 FT
	Lighting			460 FT	460 FT	460 FT	460 FT	
	Sanitary, 4 IN			200 FT	200 FT	100 FT	200 FT	
	Storm							
	1 IN							80 FT
	3 IN							240 FT
	4 IN							120 FT
	6 IN							270 FT
	8 IN			330 FT	120 FT	110 FT	120 FT	130 FT
	10 IN							20 FT
	12 IN			60 FT	60 FT	60 FT	60 FT	
	Irrigation			130 FT				410 FT
	Fountain							790 FT
BTS	UG Fiber			250 FT		120 FT	120 FT	280 FT
PWB	Water Main			1,630 FT	1,500 FT	1,440 FT	1,820 FT	
TriMet	Trackwork	Yes	Yes	150 FT				
	Power Distribution	Yes	Yes	150 FT	150 FT	150 FT	150 FT	
	Communications	Yes	Yes	150 FT	150 FT	150 FT	150 FT	
	Fare Collection	Yes	Yes	4 EA	2 EA	2 EA	2 EA	
	At-Grade Station	Yes	Yes	1 EA	1 EA	1 EA	1 EA	
Verizon	Underground			300 FT	400 FT	400 FT	400 FT	200 FT
Henkels & McCoy	Underground			Unknown	Unknown	Unknown	Unknown	Unknown
Wave Broadband	Overhead			Unknown	Unknown	Unknown	Unknown	Unknown
	Underground			Unknown	Unknown	Unknown	Unknown	Unknown

Utility Owner	Category	Affects Portland Metro Region	Warrants Special Consideration	Enhanced Retrofit Potential Impact	Replacement:			Additional with Temporary Bridge Potential Impact
					Short-span Potential Impact	Long-span Potential Impact (1)	Couch Extension Potential Impact	
Burnside Skatepark	Lighting	.....	Yes	100 FT	.....	.....	.....	100 FT .....
Total Length of Relocated Utilities (3)				**19,600 FT**	**12,020 FT**	**12,050 FT**	**15,670 FT**	**4,180 FT**

[1] Draft EIS Long-span Alternative shown. See Table 4 for the Draft EIS Long-span Alternative comparison to the Refined Long-span Alternative.
[2] Multnomah County Bridge was not quantified, as their relocation work is part of the Project.
[3] Does not include unknown impacts.

Table 4. Long-span Build Alternative Short-Term (Construction) Impacts

Utility Owner	Category	Affects Portland Metro Region	Warrants Special Consideration	Draft EIS Long-span Alternative Potential Impact	Refined Long-span Alternative Potential Impact		
					East Approach Tied-Arch Option 1	East Approach Tied-Arch Option 2	Cable-stay Option
BES	Pump Station	Yes	Yes	Protect	Protect	Protect	Protect
	4 IN						
	6 IN			90 FT			
	8 IN						
	10 IN						
	12 IN			30 FT	50 FT	50 FT	50 FT
	14 IN			20 FT	20 FT	20 FT	20 FT
	15 IN			40 FT	80 FT	80 FT	80 FT
	16 IN			180 FT	180 FT	180 FT	180 FT
	18 IN			200 FT			
	21 IN						
	24 IN	Yes	Yes	290 FT	490 FT	490 FT	490 FT
	28 IN	Yes	Yes				
	30 IN	Yes	Yes	470 FT			380 FT
	30 IN, Deep Bore	Yes	Yes	Protect	Protect	Protect	Protect
	34 IN	Yes	Yes				
	42 IN, Deep Bore	Yes	Yes	Protect	Protect	Protect	Protect
	48 IN	Yes	Yes				
	54 IN	Yes	Yes				
	72 IN	Yes	Yes				
	74 IN	Yes	Yes				
	78 IN	Yes	Yes	100 FT			
	102 IN	Yes	Yes	Protect	Protect	Protect	Protect
	168 IN	Yes	Yes	Protect	Protect	Protect	Protect
	264 IN	Yes	Yes	Protect	Protect	Protect	Protect
Lumen Local	Underground	Yes		510 FT	120 FT	120 FT	120 FT
	Submarine	Yes	Yes	400 FT	400 FT	400 FT	400 FT
	Bridge Attachment	Yes	Yes	1,490 FT	1,490 FT	1,490 FT	1,490 FT
AT&T LNS	None						

Utility Owner	Category	Affects Portland Metro Region	Warrants Special Consideration	Draft EIS Long-span Alternative Potential Impact	Refined Long-span Alternative Potential Impact		
					East Approach Tied-Arch Option 1	East Approach Tied-Arch Option 2	Cable-stay Option
Lumen National	Communications	.....	.....	Unknown	Unknown	Unknown	Unknown
Multnomah County Bridge[1]	PVC waterline.... Electrical conduits Street light conduit Fiber optic conduit	....	....	All..... All..... All..... All.....	All..... All..... All..... All.....	All..... All..... All..... All.....	All..... All..... All..... All.....
Comcast	Overhead..... Underground.....	....	....	300 FT	300 FT	300 FT	300 FT ....
Zayo	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
City of Portland Traffic & Lighting	Overhead..... Underground..... UG Fiber.....	....	....	50 FT ..... 2,010 FT ..... 400 FT	50 FT ..... 1,810 FT ..... 200 FT	50 FT ..... 1,810 FT ..... 200 FT	50 FT..... 1,810 FT ..... 200 FT .....
NW Natural	Service/Meter ..... 1 IN ..... 2 IN ..... 4-1/2 IN..... 6-5/8 IN..... 20 IN	.... Yes.....	.... Yes.....	2 EA .... 200 FT ..... 200 FT .... 200 FT	1 EA	1 EA	1 EA ....
ODOT	Underground..... UG Fiber..... 12 IN ..... 18 IN ..... 30 IN ..... 42 IN	....	....	100 FT	.... 80 FT	.... 80 FT	....

Utility Owner	Category	Affects Portland Metro Region	Warrants Special Consideration	Draft EIS Long-span Alternative Potential Impact	Refined Long-span Alternative Potential Impact		
					East Approach Tied-Arch Option 1	East Approach Tied-Arch Option 2	Cable-stay Option
PGE	Overhead Underground	 	 	 1,110 FT	 450 FT	 450 FT	 450 FT
Portland Streetcar	Rail	Yes		None	None	None	None
PP&R	Electric Gas, 2 IN Lighting Sanitary, 4 IN Storm 1 IN 3 IN 4 IN 6 IN 8 IN 10 IN 12 IN Irrigation Fountain	 	 	790 FT 460 FT 100 FT 110 FT 60 FT 	 430 FT 120 FT 50 FT 	 430 FT 120 FT 50 FT 	 430 FT 120 FT 50 FT
BTS	UG Fiber			120 FT			
PWB	Water Main			1,440 FT	210 FT	210 FT	210 FT
TriMet	Trackwork Power Distribution Communications Fare Collection At-Grade Station	Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes	 150 FT 150 FT 2 EA 1 EA	 150 FT 150 FT 2 EA 1 EA	 150 FT 150 FT 2 EA 1 EA	 150 FT 150 FT 2 EA 1 EA
Verizon	Underground			400 FT			
Henkels & McCoy	Underground			Unknown	Unknown	Unknown	Unknown

Utility Owner	Category	Affects Portland Metro Region	Warrants Special Consideration	Draft EIS Long-span Alternative Potential Impact	Refined Long-span Alternative Potential Impact		
					East Approach Tied-Arch Option 1	East Approach Tied-Arch Option 2	Cable-stay Option
Wave Broadband	Overhead..... Underground.....	....	....	Unknown Unknown	Unknown Unknown	Unknown Unknown	Unknown Unknown
Burnside Skatepark	Lighting.....	.....	Yes.....	.....	.....	.....	.....
Total Length of Relocated Utilities (2)				**12,050 FT**	**6,830 FT**	**6,830 FT**	**7,130 FT**

[1] Multnomah County was not quantified, as their relocation work is part of the Project.
[2] Does not include unknown impacts.

Table 5. Relocation Costs for Draft EIS Alternatives

Utility Owner [1]	Cost Type	Enhanced Retrofit	Replacement, Short-span	Replacement, Long-span [2]	Replacement with Couch Extension	Additional with Temporary Bridge
BES [3]	Reimbursable Non-Reimbursable	$ 1,980,000 $ -	$ 660,000 $ -	$ 660,000 $ -	$ 940,000 $ -	$ 360,000 $ -
Lumen Local	Reimbursable Non-Reimbursable	$ 300,000 $ 960.000	$ 300,000 $ 900.000	$ 300,000 $ 900.000	$ 300,000 $ 1.040.000	$ - $ 50.000
Lumen National	Reimbursable Non-Reimbursable	Unknown	Unknown	Unknown	Unknown	Unknown
Comcast	Reimbursable Non-Reimbursable	$ - $ 70.000	$ - $ 70.000	$ - $ 70.000	$ - $ 240.000	$ - $ 30.000
Zayo	Reimbursable Non-Reimbursable	Unknown	Unknown	Unknown	Unknown	Unknown

Utility Owner [1]	Cost Type	Enhanced Retrofit	Replacement, Short-span	Replacement, Long-span [2]	Replacement with Couch Extension	Additional with Temporary Bridge
City of Portland Traffic & Lighting	Reimbursable Non-Reimbursable	$ 830,000 $ 390.000	$ 720,000 $ 390.000	$ 720,000 $ 390.000	$ 1,150,000 $ 390.000	$ - $ -
NW Natural	Reimbursable Non-Reimbursable	$ - $ 200.000	$ - $ 140.000	$ - $ 240.000	$ - $ 380.000	$ - $ 90.000
ODOT	Reimbursable Non-Reimbursable	$ - $ 140.000	$ - $ 50.000	$ - $ 50.000	$ - $ 100.000	$ - $ -
PGE	Reimbursable Non-Reimbursable	$ 480,000 $ 270.000	$ 300,000 $ 210.000	$ 300,000 $ 210.000	$ 300,000 $ 380.000	$ 190,000 $ 50.000
Portland Streetcar	Reimbursable Non-Reimbursable	$ - $ -	$ - $ -	$ - $ -	$ - $ -	$ - $ -
PP&R	Reimbursable Non-Reimbursable	$ 530,000 $ 200.000	$ 460,000 $ 200.000	$ 440,000 $ 200.000	$ 460,000 $ 200.000	$ 630,000 $ -
BTS	Reimbursable Non-Reimbursable	$ 120,000 $ -	$ - $ -	$ 60,000 $ -	$ 60,000 $ -	$ 130,000 $ -
PWB	Reimbursable Non-Reimbursable	$ 510,000 $ -	$ 450,000 $ -	$ 430,000 $ -	$ 520,000 $ -	$ - $ -
TriMet	Reimbursable Non-Reimbursable	$ - $ 4.550.000	$ - $ 2.290.000	$ - $ 2.290.000	$ - $ 2.290.000	$ - $ -
Verizon	Reimbursable Non-Reimbursable	$ - $ 140.000	$ - $ 180.000	$ - $ 180.000	$ - $ 180.000	$ - $ 90.000
Henkels & McCoy	Reimbursable Non-Reimbursable	$ - $ -	$ - $ -	$ - $ -	$ - $ -	$ - $ -
Wave Broadband	Reimbursable Non-Reimbursable	$ - $ -	$ - $ -	$ - $ -	$ - $ -	$ - $ -

Utility Owner [1]	Cost Type	Enhanced Retrofit	Replacement, Short-span	Replacement, Long-span [2]	Replacement with Couch Extension	Additional with Temporary Bridge
Burnside Skatepark	Reimbursable Non-Reimbursable	$ - $ -	$ - $ -	$ - $ -	$ - $ -	$ - $ 50.000
Total	**Reimbursable** **Non-Reimbursable**	**$ 4,750,000 [4]** **$ 6,920,000**	**$ 2,890,000** **$ 4,230,000**	**$ 2,910,000** **$ 4,530,000**	**$ 3,730,000** **$ 5,200,000**	**$ 1,310,000** **$ 360,000**

[1] Multnomah County was not included in this evaluation, as their cost is part of the project.

[2] Draft EIS Long-span Alternative shown. See Table 6 for the Draft EIS Long-span comparison to the Refined Long-span Alternative.

[3] BES relocation costs include $1,000,000 for protecting the 30-inch and 42-inch Deep Bore pipes under the river. Relocation costs for the two pipes is estimated at an additional $15,000,000.

[4] $19,630,000 if 30-inch and 42-inch Deep Bore pipes are relocated.

Table 6. Long-span Build Alternative Relocation Costs

Utility Owner [1]	Cost Type	Draft EIS Long-span Alternative	Refined Long Span Alternative		
			East Approach Tied-Arch Option 1	East Approach Tied-Arch Option 2	Cable-stay Option
BES [2]	Reimbursable Non-Reimbursable	$ 660,000 $ -	$ 340,000 $ -	$ 340,000 $ -	$ 520,000 $ -
Lumen Local	Reimbursable Non-Reimbursable	$ 300,000 $ 900,000	$ 300,000 $ 730,000	$ 300,000 $ 730,000	$ 300,000 $ 730,000
Lumen National	Reimbursable Non-Reimbursable	Unknown	Unknown	Unknown	Unknown
Comcast	Reimbursable Non-Reimbursable	$ - $ 70,000	$ - $ 70,000	$ - $ 70,000	$ - $ 70,000
Zayo	Reimbursable Non-Reimbursable	Unknown	Unknown	Unknown	Unknown
City of Portland Traffic & Lighting	Reimbursable Non-Reimbursable	$ 720,000 $ 390,000	$ 540,000 $ 390,000	$ 540,000 $ 390,000	$ 540,000 $ 390,000
NW Natural	Reimbursable Non-Reimbursable	$ - $ 240,000	$ - $ 20,000	$ - $ 20,000	$ - $ 20,000
ODOT	Reimbursable Non-Reimbursable	$ - $ 50,000	$ - $ 40,000	$ - $ 40,000	$ - $ -
PGE	Reimbursable Non-Reimbursable	$ 300,000 $ 210,000	$ 130,000 $ 80,000	$ 130,000 $ 80,000	$ 130,000 $ 80,000
Portland Streetcar	Reimbursable Non-Reimbursable	$ - $ -	$ - $ -	$ - $ -	$ - $ -
PP&R	Reimbursable Non-Reimbursable	$ 440,000 $ 200,000	$ 40,000 $ 200,000	$ 40,000 $ 200,000	$ 40,000 $ 200,000
BTS	Reimbursable Non-Reimbursable	$ 60,000 $ -	$ - $ -	$ - $ -	$ - $ -
PWB	Reimbursable Non-Reimbursable	$ 430,000 $ -	$ 50,000 $ -	$ 50,000 $ -	$ 50,000 $ -
TriMet	Reimbursable Non-Reimbursable	$ - $ 2,290,000	$ - $ 2,220,000	$ - $ 2,220,000	$ - $ 2,220,000
Verizon	Reimbursable Non-Reimbursable	$ - $ 180,000	$ - $ -	$ - $ -	$ - $ -
Henkels & McCoy	Reimbursable Non-Reimbursable	$ - $ -	$ - $ -	$ - $ -	$ - $ -
Wave Broadband	Reimbursable Non-Reimbursable	$ - $ -	$ - $ -	$ - $ -	$ - $ -

Utility Owner [1]	Cost Type	Draft EIS Long-span Alternative	Refined Long Span Alternative		
			East Approach Tied-Arch Option 1	East Approach Tied-Arch Option 2	Cable-stay Option
Burnside Skatepark	Reimbursable	$ -	$ -	$ -	$ -
	Non-Reimbursable	$ -	$ -	$ -	$ -
Total	**Reimbursable**	**$ 2,910,000**	**$ 1,380,000**	**$ 1,380,000**	**$ 1,570,000**
	Non-Reimbursable	**$ 4,530,000**	**$ 3,720,000**	**$ 3,720,000**	**$ 3,680,000**

[1] Multnomah County was not included in this evaluation, as their cost is part of the project.
[2] BES relocation costs include $1,000,000 for protecting the 30-inch and 42-inch Deep Bore pipes under the river. Relocation costs for the two pipes is estimated at an additional $15,000,000.
[3] $19,630,000 if 30-inch and 42-inch Deep Bore pipes are relocated.

The conflicts quantified in Table 3 and Table 4 and the associated costs in Table 5 and Table 6 are based on the assumptions presented in Section 6.2. For comparison, if all utilities within the Project Area require relocation, with no utilities protected, it would result in a reimbursable relocation cost of $150 million, and a non-reimbursable relocation cost of $17 million.

The proceeding sub-sections discuss the primary differences between the alternatives and their assumed impacts.

7.2.1 No-Build

Under the No-Build Alternative, the only improvements that would occur within the utility analysis API are for the following projects as identified in Section 7.1.

SW Naito Pkwy, SW Madison St to NW Couch St - This project would reduce the roadway by one travel lane and add bi-directional bike facility. There are no direct impacts to utilities for the project on SW Naito Pkwy, as the improvement is making permanent an existing temporary condition.

Burnside, W 4th Ave to E MLK Jr Blvd; **Burnside, E MLK Jr Blvd to E 12th Ave; MLK Jr Blvd, NE Schuyler St to SE Hawthorne Blvd** - These four projects would convert a travel lane to a BAT lane. There are no direct impacts to utilities for these projects. Utility relocation would not be required for the change in roadway surface use.

Direct impact to utilities could occur at the remaining two projects located at SE Ankeny St and MLK Jr Blvd intersection, and along I-5. As mentioned in Section 5.1, the utility analysis API extends beyond the Project's improvement limits to include potential areas of construction staging and utility relocation.

SE Ankeny St at MLK Jr Blvd - This project would install a traffic signal, without any changes to the travel lanes. For this type of project, typical impacts to utilities are from signal pole foundations and any additional pedestrian pole foundations. There will likely be overhead impacts to the transmission power, distribution power, and communications line that may be affected by the placement of signal poles, mast arms, and lighting. Signal projects often include updating curb ramps to meet Americans with Disabilities Act standards and modifications to drainage due to grade changes, which may have additional impacts to underground utilities and Portland Streetcar infrastructure.

I-5 Rose Quarter Improvement Project - This project would add ramp-to-ramp (auxiliary) lanes and shoulders along I-5. Proposed southbound highway improvements would extend to the Morrison off-ramp at Exit 300B. The addition of an auxiliary lane and shoulder widening have the potential for affecting underground utilities but would have to be evaluated during design to determine impacts and protection of utilities.

Additionally, unplanned actions, as occurs with private development or emergency utility maintenance, may require installation of new utilities or adjustment or relocation of existing utilities in other limited locations. There are no known planned utility relocation projects that would occur within the Project Area under the No-Build Alternative.

7.2.2 Enhanced Retrofit

Direct

As discussed in Section 7.2 and summarized in Table 3 and Table 5, the Retrofit Alternative affects more utilities than the Replacement Alternatives and has the greatest associated relocation costs. The greater impacts are mainly due to the required excavation at each bent foundation for retrofit construction work. In addition to the cost and relocation work, is the schedule impacts for the project construction and relocation work. The costs provided in Table 5 do not include costs for temporary relocations, which could be needed as the foundation work proceeds from one side of the street to another. Temporary relocations would add additional costs to the Project.

The Retrofit Alternative would demolish the Burnside Skatepark, without rebuilding, therefore there is no associated relocation cost.

Indirect

Given that the project would not change traffic capacity on the bridge, it is not expected to result in indirect land use changes that would place substantial induced demand on utilities or otherwise substantially affect utilities. However, bridge construction would require removing a relatively small area of existing buildings on parcels that will not be permanently required by the project. If these newly vacant parcels are redeveloped at higher densities, they may result in higher demand on utilities than the current uses requiring an expansion of utility infrastructure. Any increased demand would likely be small compared to existing demand in the Project Area.

7.2.3 Replacement, Short-span

Direct

As discussed in Section 7.2 and summarized in Table 3 and Table 5, the Replacement Alternatives have the least amount of impacts to the utilities and associated relocation costs. The reduction in impacts is mainly due to the ability to limit the work within the crossing streets for the foundation construction work. Temporary relocations are less likely needed compared to the Retrofit Alternative.

Compared to the Draft EIS Long-span Alternative, the Short-span Alternative has an additional bent within Tom McCall Waterfront Park, which would impact a waterline servicing the boat connections, and stormwater drainage.

Indirect

See Section 7.2.2 for indirect impacts.

7.2.4 Replacement, Long-span

Direct

The Draft EIS Long-span Alternative generally has the same impacts as the Short-span Alternative, except within Tom McCall Waterfront Park. The Draft EIS Long-span Alternative has one less bent and instead has a larger foundation just east of Naito Pkwy. This larger foundation would impact additional electrical, gas, and communications infrastructure than the smaller Short-span Alternative foundation at the same location.

The Draft EIS Long-span Alternative was selected as the preferred alternative during the Draft EIS phase. Since then, a refined version of this alternative (referred to as the Refined Long-span Alternative) has been developed. The Refined Long-span Alternative includes three options for east span approach bridge type to reduce the quantity of piers. The Refined Long-span Alternative would maintain the west approach of the Draft EIS Long-span Alternative.

Each Long-span Alternative evaluated could be paired with either the movable lift or movable bascule configuration for the center span without any changes in direct impacts to utilities. The movable mechanism choice would not result in any differences to utility impacts.

The Refined Long-span Alternative has a reduced impact to utilities compared to the Draft EIS Long-span Alternative. This is due to Refined Long-span Alternative's reduction in the number of piers and foundations on the east bank. As summarized in Table 4 and Table 6, any of the Refined Long-span Alternative options considered would result in less total impact to utilities and lower utility relocation costs than the Draft EIS Long-span Alternative. It is expected that the Refined Long-span Alternative would reduce the utility relocation cost by more than $2 million dollars than that shown for the Draft EIS Long-span Alternative.

When the Refined Long-span Alternative options are compared to one another, as summarized in Table 4 and Table 6, the magnitude of utility impacts and estimated costs of utility relocation are found to be similar. The location of utility impacts and utility provider impacted would differ due to the different foundation sizes and locations.

The ADA refinements evaluated in the SDEIS would not have any additional impacts to the utilities.

Indirect

See Section 7.2.2 for indirect impacts.

7.2.5 Replacement with Couch Extension

Direct

As discussed in Section 7.2 and summarized in Table 3 and Table 5, the Replacement with Couch Extension Alternative has a greater amount of impacts to the utilities, and

has greater associated relocation costs, compared to the Short-span and Long-span Alternatives. The increase in impacts is mainly due to the Couch Extension Alternative work and lowering NE 3rd St. Temporary relocations are less likely needed compared to the Retrofit Alternative.

Indirect

See Section 7.2.2 for indirect impacts.

7.3 Post-Earthquake Impacts

7.3.1 No-Build Alternative

In addition to the Burnside Bridge collapsing on top of the utility infrastructure, the aging infrastructure may not be able to withstand the ground movement of a CSZ earthquake. It likely would be months before crews could make repairs.

7.3.2 Build Alternatives

The following post-earthquake impacts apply to all the Build Alternatives.

Direct

Existing utilities located within areas of soil improvements (associated with the Retrofit Alternative and Replacement Alternatives) could be affected by the soil's change in lateral spreading along the utility's alignment.

The utility infrastructure would be protected from the bridge collapsing on it, and the relocated utilities would have a better chance at surviving the ground movements due to newer materials, ability to consider applicable soil improvements during utility design, and updated design standards.

Indirect

With the Burnside Bridge available as the only route across the Willamette River in the downtown core, it would be easier to get crews and materials to and from both sides of the river.

7.4 Construction Impacts

7.4.1 Without Temporary Bridge

The construction impacts without the Temporary Bridge are as discussed in Section 7.2 and summarized in Table 3 and apply to all the Build Alternatives.

7.4.2 With Temporary Bridge

The Temporary Bridge construction impacts are as discussed in Section 7.2 and summarized in Table 3 and apply to all Build Alternatives. Although the temporary construction easement area would be increased with a Temporary Bridge, no differences in utility impacts are expected due to the easement size. Protection measures could be

used to avoid impacts to underground facilities and light poles located at the additional easement's perimeter.

7.4.3 Potential Off-site Staging Areas

Based on the four sample sites identified, the types of impacts that could occur from off-site staging include:

- Damage to existing utility infrastructure due to stockpiling, construction loading, or movement of equipment.
- Temporary maintenance inaccessibility from burying or blocking access points with materials or equipment.

If the contractor chooses to use an off-site staging area, then the contractor would be responsible for the coordination and mitigation of utility impacts from the use of any off-site staging area. It is not expected that there would be additional local, state, and federal regulations that would apply for off-site staging areas.

7.5 Cumulative Effects

Cumulative impacts are the environmental effects that result from the incremental effect of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes those other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

7.5.1 No-Build Alternative

In the event the No-Build Alternative is selected, there would not be any cumulative impacts to the utilities.

7.5.2 Build Alternatives

As indicated in the *EQRB Cumulative Impacts Approach Memorandum* (Multnomah County 2021a), with the possible construction of other major construction projects in the project vicinity, such as the I-5 Rose Quarter Project, utility funding, resources, and human power may be limited, causing delays in restoring services or performing the relocation work.

7.6 Compliance with Laws, Regulations, and Standards

The laws, regulations, and standards identified in Section 4 will be complied with in the identification and coordination of potential utility impacts by the Project. Utilities are required to acquire easements or permits from the respective road authorities, rail authorities, or property owners as needed, for the removal, installation, and maintenance of their facilities.

7.7 Conclusion

The magnitude and duration of direct impacts on utilities for short-term construction impacts would vary by the type of utility. Long-term operational impacts to the utilities are not expected. To limit potential impacts to utilities, the project would incorporate the avoidance, minimization, and mitigation recommendations of Section 8 to address identified potential impacts.

Through incorporating the avoidance, minimization, and mitigation recommendations identified in Section 8, the Short-span Alternative, Draft EIS Long-span Alternative, and the Couch Extension Alternative would be expected to have significantly less impact on utilities when compared to the Retrofit Alternative. The Refined Long-span Alternative would be expected to have less impact on utilities when compared to the Draft EIS Long-span Alternative. It is noted that substantial impacts could occur for several utilities, but by incorporating the avoidance, minimization, and mitigation recommendations, the impacts would be similar in context and severity to other complex highway and bridge improvement projects in urban areas.

8 Mitigation Measures

This section describes potential avoidance, minimization, and mitigation measures, including utility-specific mitigation recommendations that would be implemented to minimize disturbance to system users and impacts to existing facilities during Project construction and operation.

Further investigation of utilities and confirmation of anticipated impacts would occur during the final design phases of the Project development process. Multnomah County would work with utility owners to develop plans and incorporate design and engineering controls, to either protect or relocate utility facilities within the Project Area.

Utility coordination would occur in accordance with the ODOT Oregon Utility Relocation Manual and is expected to occur early enough during the Project development process to allow new facilities to be brought on-line prior to the Project's effect on the existing facilities. The potential roles and responsibilities of the utility coordination process are briefly summarized as follows:

- Multnomah County could perform utility surveying and mapping.
- The utility owners would confirm Multnomah County's mapping of their infrastructure and identify any corrections required.
- Multnomah County could design its Project improvements, identify resultant potential conflicts with utilities, and provide the conflict list and notification to the utility owners, including public agencies.
- Multnomah County could provide updated design plans and conflict lists as the Project design progresses and coordinate with the utility owners to determine the resolution of the identified conflicts.
- The utility owners will need to address conflicts identified by the County, review the plans for additional conflicts not identified by the County, and address those conflicts.

For addressing the conflicts, the utility owners may need to pothole locations, provide relocation design, and construct the relocation. This responsibility also would include obtaining permits and approvals from every applicable jurisdiction and review authority.

- The utility owners, including public agencies, might contract through a Utility Agreement to have Multnomah County perform some or all of these responsibilities. A Utility Agreement is required to be able to reimburse a utility owner with prior rights for its reimbursable expenses.[19]
- Multnomah County could coordinate with the utility owners to determine the timing and requirements associated with its relocation and coordinate schedule for any utility relocations that cannot occur prior to construction beginning.
- Multnomah County is required to certify that all arrangements have been made to resolve the identified utility conflicts and allow the Project improvements to proceed as identified in the construction contract. This certification is required prior to the Project bidding for construction.
- The utility owners are responsible for meeting the agreed-upon relocation timing.
- During construction, the Project contractor could work with utilities to locate their infrastructure and coordinate construction improvements with the utility relocations that occur during construction.

By following ODOT's Oregon Utility Relocation Manual (2018), there may be minimal to no disruption in service to the facility owners or users, a mitigation strategy to the otherwise substantial impacts to the utility owners. Relocation plans would be prepared and service disruptions approved by affected utility providers before construction begins. Coordination would occur with utility owners to ensure that contingency plans for management of potential utility service disruptions during construction are accommodated.

The action of relocation of utilities can result in impacts at the relocation site. During the final design phase, the relocation sites for affected utilities could be mapped and the effects of the relocation actions confirmed.

Avoiding and minimizing impacts to utilities that warrant special consideration and proactively addressing the operational constraints and design considerations listed in Table 7 is important to the success of the Project. For this Project, obtaining vertical and horizontal limits of these key underground utilities could occur early in design and the recommended actions included as part of the early design package.

Proper coordination and the use of standard construction procedures and techniques could minimize disturbance to system users and avoid damage or impacts to existing facilities that are deemed, during final design, to not require relocation or upgrades. Typically, new facilities such as poles or ducts are installed, and then service is switched over to the new facilities, thereby minimizing any disruption of service to the utility users.

[19] The Utility Agreement on federal-aid projects must be executed with ODOT. Multnomah County, as a certified local agency, may perform the agreed-upon responsibilities, when and if applicable.

Facilities within the UPRR ROW likely would require coordination with UPRR for locating and surveying utilities, as well as relocation permitting and construction. Time should be allowed in the Project schedule to accommodate UPRR's schedule and review requirements.

Designers and contractors could be required to develop construction sequence plans and coordinate schedules for utility work to minimize potential disruptions. The contractor and each utility could be required to comply with coordinated and agreed-upon notifications and time requirements for sequencing construction. The plans and coordination could also allow for ample advance notice when service disruptions are unavoidable, consistent with utility owner policies. The contractor could be required to have utilities accessible during construction.

If the Project incorporates phasing the improvements, direct impacts to utilities could be reduced by minimizing the multiple relocations of the same utility segment. This could be accomplished through design and planning.

Table 7. Potential Utility-Specific Mitigation and Coordination Requirements

Utility Owner	Operational Constraints	Ease of Relocating	Protection Measures	Time for Planning, Budgeting, Designing, Relocating
Comcast	N/A	N/A	N/A	10 Weeks
Lumen Local	Require 24/7 access to vaults and hatches for bridge.	~ Conduits on bridge can move laterally. ~ 1'-2' in roadway.	12" separation.	~ 1 year for roadway. ~ 2.5 years for submarine cable.
NW Natural	Shutdown large diameter lines during warm months.	N/A	~ 30" of cover. ~ 1' separation. ~ Watchperson needed for excavations within 10' of high-pressure.	~ 2-5 months for small mains. ~ 12+ Months for large mains.
PGE	24/7 access to vaults.	N/A	9' excavation clearance from poles.	18 months.
PP&R	Need to maintain maintenance access to control panel bank on north side of bridge.	Depends on utilities impacted.	N/A	12+ months for planning.
TriMet	~ TriMet to participate in contractor selection for LRT's overhead power work. ~ Utility locates are not completed through OneCall, schedule through TriMet.	N/A	~ 10-foot clearance of overhead wires. ~ 10-feet from track centerline for excavation. ~ 6-inch clearance to conduits. ~ Protect rails with rubber mats/timbers.	1 year for shutdowns.
Wave Broadband	Attached to PGE joint use poles	Dependent upon PGE	N/A	6 months, in addition to PGE's relocation schedule.

9 Contacts and Coordination

Table 8. Utility Contacts

Entity/Agency	Name	Email	Phone
Comcast	Leroy Soumokil Richard Maroney	Leroy_Soumokil@comcast.com Richard_Maroney@comcast.com	(971) 801-5723 (971) 801-5695
Zayo	Joseph Kleinsasser	joseph.kleinsasser@zayo.com	(360) 524-7928
Henkels & McCoy	David Galvan	DGalvan@Henkels.com	503-577-2051
CenturyLink National Lumen National	Kendall Williams-Zetina Project #: 161871 OR	kendall.zetina@centurylink.com	(918) 547-0547
Multnomah County Bridge Section	Megan Neill	Megan.neill@multco.us	503-360-6222
Verizon	Daniel Ruiz	Daniel.Ruiz@VerizonWireless.com	503-350-3251
NW Natural	Jeremy Lorence Jodi Wright	Jeremy.Lorence@nwnatural.com Jodi.Wright@nwnatural.com	503-226-4211
ODOT	Justin Brandon	Justin.A.Brandon@odot.state.or.us	503-731-3137
PGE	Bryan Hangartner	Bryan.Hangartner@pge.com	503-963-6988
Pacific Power	Alisa Dunlap	Alisa.Dunlap@pacificorp.com	503-813-6756
City of Portland, Portland Streetcar	Erick Moe	Erick.Moe@portlandoregon.gov	503-823-2199
Portland Streetcar	Andrew Plambeck	Andrew.Plambeck@portlandstreetcar.org	503-222-4200
City of Portland, PWB	Cherri Warnke, Interagency Liaison	Cherri.warnke@portlandoregon.gov	503-823-6036
City of Portland, PBOT Signals, Street Lighting & ITS	Tanna Hiatt	tanna.hiatt@portlandoregon.gov	503-823-6341
City of Portland, BES	Kevin Kimble	Kevin.Kimble@portlandoregon.gov	
City of Portland, PP&R	Sandra Burtzos	Sandra.Burtzos@portlandoregon.gov	503-823-5594
CenturyLink Local Lumen Local	Scott Miller David Dodd	Scott.Miller4@CenturyLink.com David.Dodd@lumen.com	503-242-4144 503-242-8849
AT&T LNS (PIVOTAL)	David Sakamoto	dsakamoto@pivotalcomm.com	(360) 882-4268
TriMet	John Griffiths	GriffitJ@trimet.org	
Wave Broadband	Jeff McConville	jmcconville@wavebroadband.com	503-318-9804
Burnside Skatepark	Sage Bolyard	sagebolyard@yahoo.com	503-341-7963

10 Preparers

Name	Professional Affiliation	Education	Years of Experience
Cory Burlingame, PE	Casso Consulting, Inc.	B.S. Engineering	13
Tina Adams, PE	Casso Consulting, Inc.	B.S. Engineering	24

11 References

DSL (Oregon Department of State Lands)

2019 Short Term Access Agreement, Waterway, 60411-AA

Multnomah County

2021a EQRB Cumulative Impacts Approach Memo. https://multco.us/earthquake-ready-burnside-bridge/project-library

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

2021c EQRB Draft Environmental Impact Statement. https://www.multco.us/earthquake-ready-burnside-bridge/project-library

2022a EQRB Supplemental Draft Environmental Impact Statement. https://www.multco.us/earthquake-ready-burnside-bridge/project-library

ODOT (Oregon Department of Transportation)

2018 Oregon Utility Relocation Manual. Salem, Oregon, United States of America. Retrieved from Oregon Department of Transportation August 2018: https://www.oregon.gov/ODOT/ROW/Docs_Utilities/Utility-Relocation-Manual.pdf

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2019 Accessed from https://gis.odot.state.or.us/transGIS

Oregon Utility Notification Center

2019 "Search and Status." One Call Concepts. Original Call Date 08/22/19. Accessed September 12, 2019: http://www.managetickets.com/morecApp/ticketSearchAndStatusSelector.jsp?db=mo

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Appendix A. NW Natural Facility Maps

NW Natural does not warrant the accuracy of this map.
It should be used for informational purposes only.
For a current and exact location of facilities,
call your local utility locate center.

NW Natural
220 NW 2nd Avenue, Portland, Oregon 97209
(503) 226-4211

N

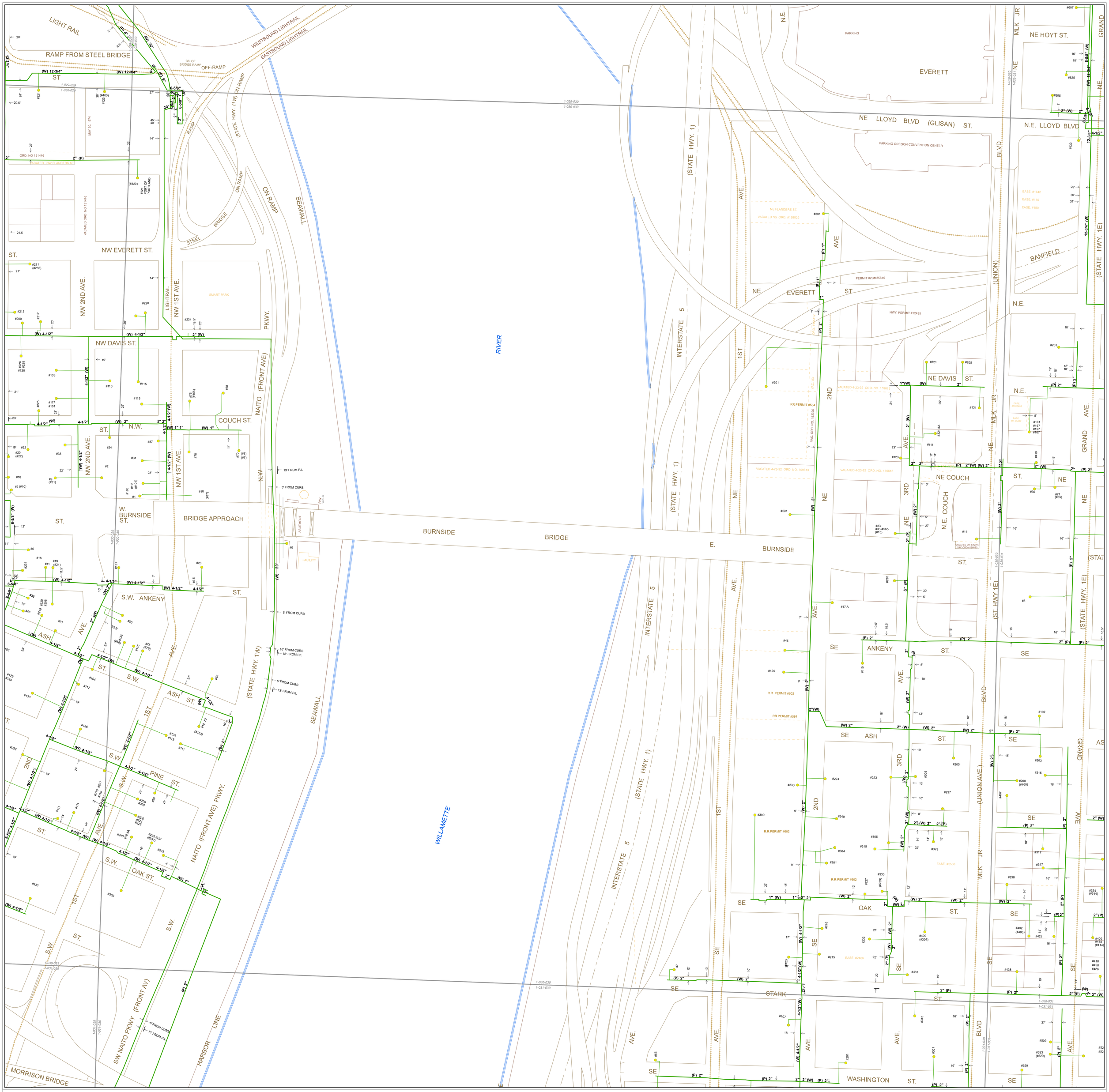
Legend
- Meter Location w/Address
- Gas Pipe
- City Limit
- Plat Index

50 25 0 50 100 Feet
1 inch = 100 feet

1-029-028	1-029-029	1-029-030
1-030-028	1-030-029	1-030-030
1-031-028	1-031-029	1-031-030

Legal Location: T01N R01E Sec34 SW
State: OREGON
County: MULTNOMAH
City: PORTLAND
Wallmap: PORTLAND

Plat ID: **1-030-029**
Plot Date: 7/31/2019



NW Natural does not warrant the accuracy of this map.
It should be used for informational purposes only.
For a current and exact location of facilities,
call your local utility locate center.

NW Natural
220 NW 2nd Avenue, Portland, Oregon 97209
(503) 226-4211

N

Legend
- Meter Location w/Address
- Gas Pipe
- City Limit
- Plat Index

50 25 0 50 100 Feet
1 inch = 100 feet

1-029-029	1-029-030	1-029-031
1-030-029	1-030-030	1-030-031
1-031-029	1-031-030	1-031-031

Legal Location: T01N R01E Sec34 SE
State: OREGON
County: MULTNOMAH
City: PORTLAND
Wallmap: PORTLAND

Plat ID: **1-030-030**
Plot Date: 7/31/2019

NW Natural does not warrant the accuracy of this map.
It should be used for informational purposes only.
For a current and exact location of facilities,
call your local utility locate center.

NW Natural
220 NW 2nd Avenue, Portland, Oregon 97209
(503) 226-4211

N

Legend
- Meter Location w/Address
- Gas Pipe
- City Limit
- Plat Index

50 25 0 50 100 Feet
1 inch = 100 feet

1-029-030	1-029-031	1-029-032
1-030-030	1-030-031	1-030-032
1-031-030	1-031-031	1-031-032

Legal Location: T01N R01E Sec35 SW
State: OREGON
County: MULTNOMAH
City: PORTLAND
Wallmap: PORTLAND

Plat ID: **1-030-031**
Plot Date: 7/31/2019

Appendix B. ODOT Facility Maps

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
2A,2B,2C	Typical Section
2D*,2E	Bridge Panel Details, *Summary
3	Plan & Profile
3A	Plan (Interstate Ave.)
4-10	Plans
10A,10B,10C,10D	Profile
11	Plan
11A	Profile

Drg Nos.
- 2070, 2070A } P.C.C. Pavt.
- 2105 - Inlets
- 2077 - Miscellaneous Details
- 2088 - A.C. Traffic Markers
- 1P22086 - Conduit
- 2094 - Guard Rail
- 2106 - Guide Posts
- 18370-18372, 16373 } Pedestrian Oxing
- 18381, 18382, 14657 } Retaining Walls
- 2050 - Driveways

7V 286

N. SHAVER ST.-MORRISON BR. INTER. UNIT EAST BANK FREEWAY SECTION PACIFIC HIGHWAY MULTNOMAH COUNTY				SHEET No. 1
FED. ROAD Div. No.	STATE	PROJECT NUMBER	FISCAL YEAR	TOTAL SHEETS
8	OREGON	I-5-6(38)302		See Index

Revised 1-7-63 Drg. No. 2050 - Added

REVISED AS CONSTRUCTED 3-28-67 CONTRACT 6218

STATE OF OREGON

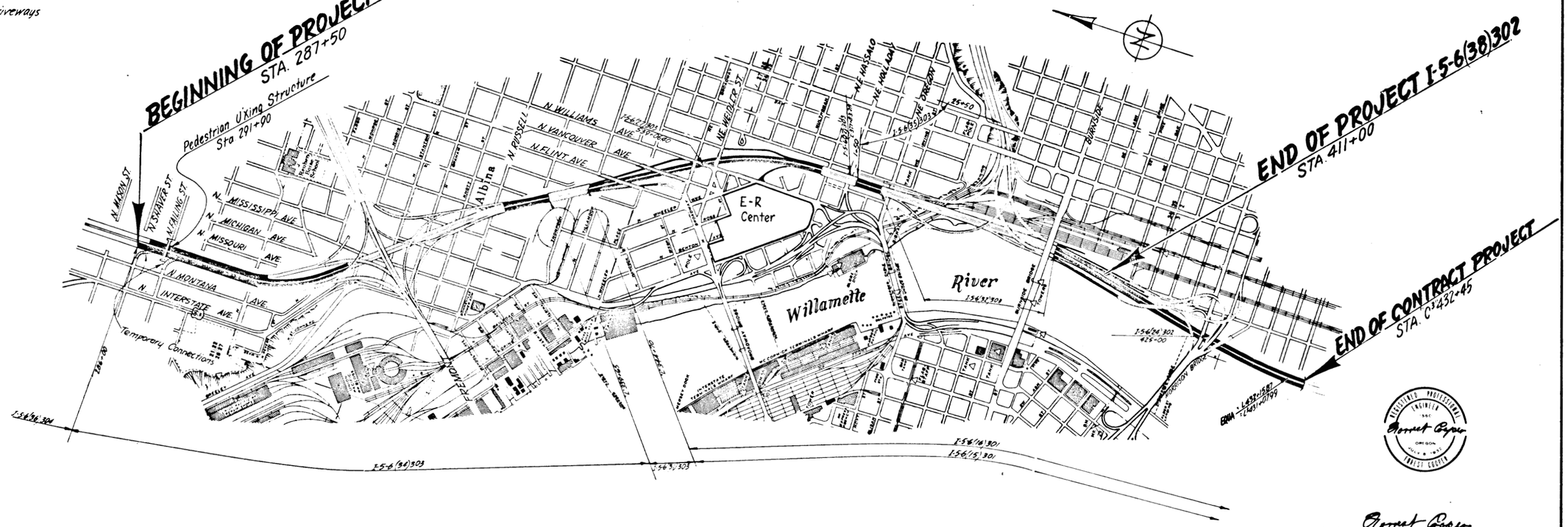
STATE HIGHWAY DEPARTMENT

PLANS FOR PROPOSED PROJECT

PAVING & STRUCTURE

N. SHAVER ST.-MORRISON BR. INTER. UNIT
EAST BANK FREEWAY SECTION

PACIFIC HIGHWAY
MULTNOMAH COUNTY
DECEMBER, 1962



SKETCH MAP
Scale 0 400 800 Ft.

Registered Professional Engineer — Bennett Boyce — Oregon — July 8, 1963

Bennett Boyce
STATE HIGHWAY ENGINEER

STATE HIGHWAY COMMISSION
Glenn L. Jackson Chairman
Kenneth N. Fridley Commissioner
David B. Simpson Commissioner

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS
APPROVED:
DIVISION ENGINEER — DATE

Rev.

SEC. 34, TIN., RIE., W.M.
~PORTLAND~

N. SHAVER ST - MORRISON BR. INTER. UNIT EAST BANK FREEWAY SECTION PACIFIC HIGHWAY MULTNOMAH COUNTY				SHEET No. 9
FED. ROAD Div. No.	STATE	PROJECT NUMBER	FISCAL YEAR	TOTAL SHEETS
8	OREGON	I-5-6(38)302		See Index

REVISED AS CONSTRUCTED
3-28-67 CONTRACT 6218

TABLE OF CURVE DATA

CURVE No.	DEG	TOTAL Δ	Ts_1	Ts_2	Lmc	Ls_1	Ls_2	S_1	S_2	a_1	a_2
EN-1	4° Lt.	42°48'42"	214.07'		425.00'	*230'	500'	15°48'42"	10°00'00"	2.5	0.8
ES-2	8°48 Rt	86°35'19.5"	746.88'	718.35'	816.69'	220'	160'	9°40'48"	7°02'24"	4.0	5.5
F-2	4° Rt	9°33'40"	199.84'		79.03'	160'		8°12'		2.5	
F-3	4° Lt.	9°33'40"	199.84'		79.03'	160'		3°12'		2.5	
G	37° Lt.	153°42'39"	63.16'		119.95'	272.50'	246.67'	63°41'49"	45°38'00"	10.0	15.0
H²	6° Lt.	9°45'14"	81.48'		162.56'	803.21'		24°05'47"		0.747	
NE-2	8°48 Lt.	138°56'36"	1856.95'		1358.90'	220'		9°40'48"		40	
O-2	4° Lt.	29°05'02.5"			243.10'	*240'	200'	15°21'36"	4°00'	2.0	2.0
SE-5	8°48 Rt	80°19'40"	662.07'		692.82'	220'		9°40'48"		4.0	
EN-2	9.75° Lt	62°15'00"	354.84'		638.46'						

*Spiral Segment

Portland Cement Conc. Pavement, Shown Thus.

Reinf. Conc. Panel at Bridge Ends

BRIDGE DETAILS CHECKED BY: TZ 8-5-11-67

Rev.

N.SHAVER ST.-MORRISON BR. INTER. UNIT EAST BANK FREEWAY SECTION PACIFIC HIGHWAY MULTNOMAH COUNTY				SHEET No. 10
FED. ROAD Div. No.	STATE	PROJECT NUMBER	FISCAL YEAR	TOTAL SHEETS
8	OREGON	I-5-6(38)302		See Index

REVISED AS CONSTRUCTED
3-28-67 CONTRACT 6218

TABLE OF CURVE DATA

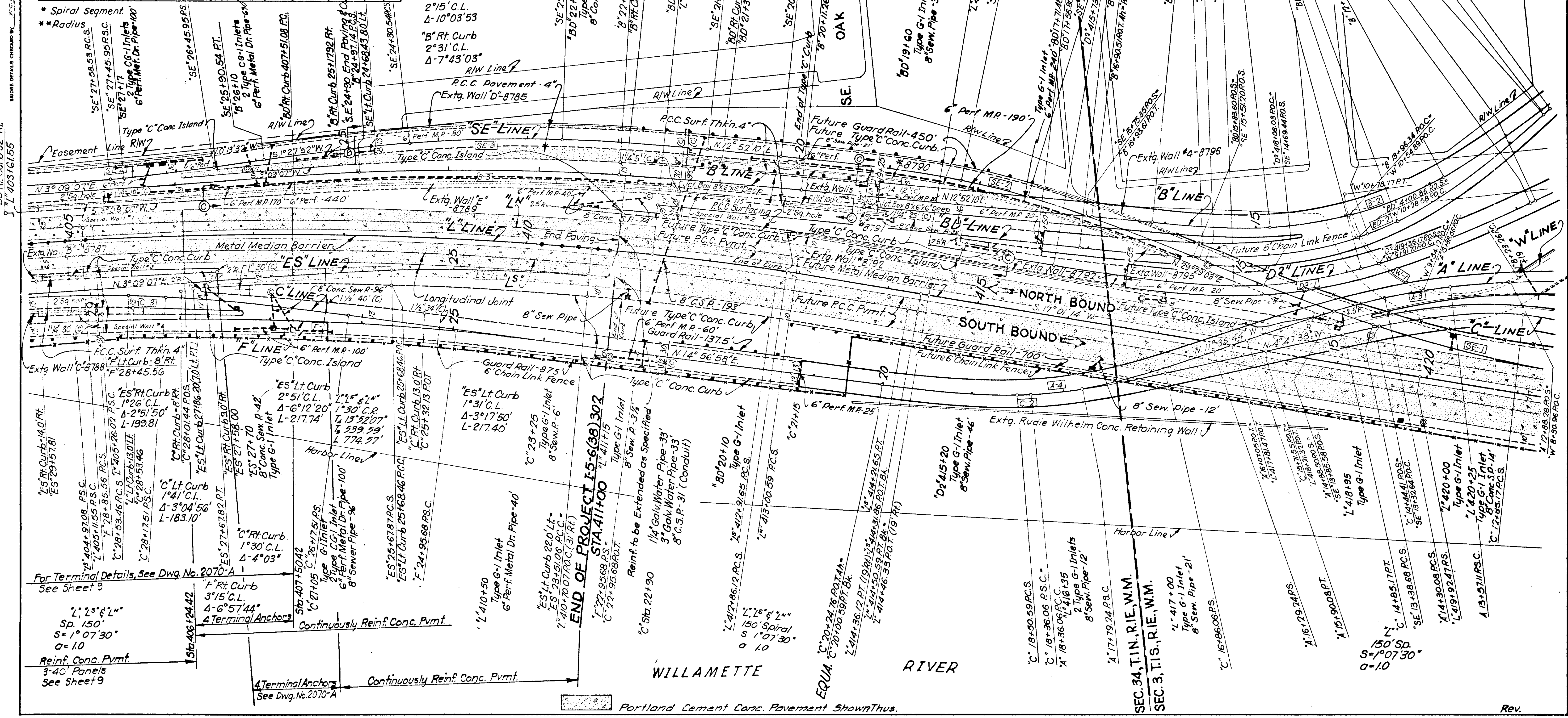
Curve No.	Deg.	Total Δ	Ts_1	Ts_2	Lmc	Ls_1	Ls_2	S_1	S_2	a_1	a_2
A-3	8° Lt.	18°38′14″	197.74′		72.97′	160′		6°24′00″		5.0	
A-4	12° Rt.	15°49′06″	134.37′	73.52′	56.82′	150′		9°00′		8.0	
B-2	13° Rt.	43°07′40″	239.76′		201.75′	130′		8°24′00″		10.0	
B-3	2° Lt.	9°43′03″	343.57′		285.88′	200′		2°00′		1.0	
BD-2	16° Rt.	47°28′30″	311.86′	269.01′	36.72′	320′	200′	25°36′00″	16°00′	5.0	8.0
C-2	12° Rt.	19°44′36″	158.37′		14.53′	150′		9°00′		8.0	
C-3	5° Lt.	11°47′51″	218.52′		35.95′	200′		5°00′		2.5	
D2-1	10° Lt.	34°11′30″	277.01′		141.92′	200′		10°00′		5.0	
ES-1	3° Lt.	9°30′10″	253.54′	164.03′	216.76′	200′		3°00′		1.5	
F-1	2° Lt.	11°47′51″	396.04′		389.88′	200′		2°00′		1.0	
SE-1	4° Rt.	15°05′19″			208.47′	200′	* 100′	4°00′	2°45′	2.0	2.0
SE-2	6° Lt.	16°36′53″	239.65′		76.91′	200′		6°00′		3.0	
SE-3	4° Lt.	13°05′42″	244.48′		167.38′	160′		3°12′00″		2.5	
SE-4	3° Rt.	3°22′39″	106.31′		12.58′	100′		1°30′		3.0	
W	** 125′	117°07′10″	204.46′		255.51′						

* Spiral Segment.
** Radius

1″ Electrical Conduit — 128′ Total — 1″ (C)
1¼″ Electrical Conduit — 297′ Total — 1¼″ (C)
1½″ Electrical Conduit — 160′ Total — 1½″ (C)
2″ Electrical Conduit — 70′ Total — 2″ (C)

PORTLAND

Conc. Walls, "B", "C", "D", "E", 4 & 8792
Class "A" Conc. 205 C.Y.
Metal Reinf. 20,000 lbs.
Parapet Rail - 1,975′
Dwg. Nos. 18381, 18382 & 14657



For Terminal Details, See Dwg. No. 2070-A
See Sheet 9

"L", "LS" & "LN"
Sp. 150′
S = 1° 07′ 30″
a = 1.0

Reinf. Conc. Pvmt.
3-40′ Panels
See Sheet 9

4 Terminal Anchors
See Dwg. No. 2070-A

Portland Cement Conc. Pavement Shown Thus.

Rev.

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
2	Misc. Details
2A,2B,2C,2D,2E,2F,2G,2H,2J,2JA	Median Barrier Plans & Details
2K,2L,2M,2N,2NA	Concrete Shoulder Barrier, Plans & Details
2P	Island Reconstruction Details
2Q,2R	Concrete Shoulder Barrier Plans & Details
2S	Pipe Data Sheet
2T	Summary
3,10 Incl	Plan
⚠ 10A,10B,10C,10D	Plan & Profile, Irrigation & Planting Plan
11-13	Plan

Drg Nos 2,998-Temporary Protection & Direction of Traffic

- 2502-Construction Identification Signs
- 2050, 2050A — Manholes
- 2105, 2105A — Concrete Inlets
- 2126, 2126A, 2126B, 23257 — Metal Guard Rail
- 2127, 26047 — Concrete Median & Shoulder Barriers
- 22960-Concrete Slope Paving
- 20077-Concrete Curbs
- 28037, 16552, 8589-I — Impact Attenuator
- 28027-28042 Incl., 18633A, 18634A, 18639A, 22478, 23743, 23836, 21353-21356 Incl., 28088, 28089 — Signing
- S-1, S-2, S-5, S-6, S-8, S-9A, S-11, S-12, S-15, S-16 — Signing Standards
- 28079-28087 Incl., 24596, ⚠ 28090-28093 Incl., ⚠ 28241, ⚠ 14657 — Illumination
- ⚠ 28599-Retaining Wall

Overall Length of Project 5.69 Miles

N. COLUMBIA BLVD.-MARQUAM BR. SECTION PACIFIC HIGHWAY MULTNOMAH COUNTY				SHEET No. 1
FED. ROAD Div. No.	STATE	PROJECT NUMBER	FISCAL YEAR	TOTAL SHEETS
10	OREGON	EHS-I-5-6(74)302 SAFETY		See Index

REVISED AS CONSTRUCTED 9-16-75 CONTRACT 7742

⚠ Revised 11-22-72 Drgs. Added
⚠ Revised 3-23-73 Sheet 10A, 10B, 10C Added & 10D

STATE OF OREGON

STATE HIGHWAY DIVISION

PLANS FOR PROPOSED PROJECT

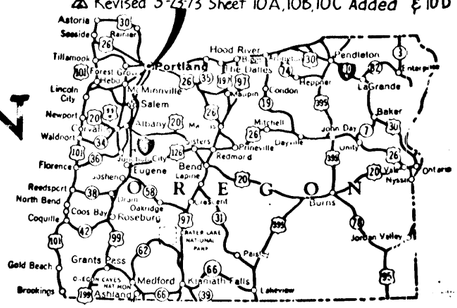
GUARD RAIL, MED'AN BARRIER, SIGNING & ILLUMINATION

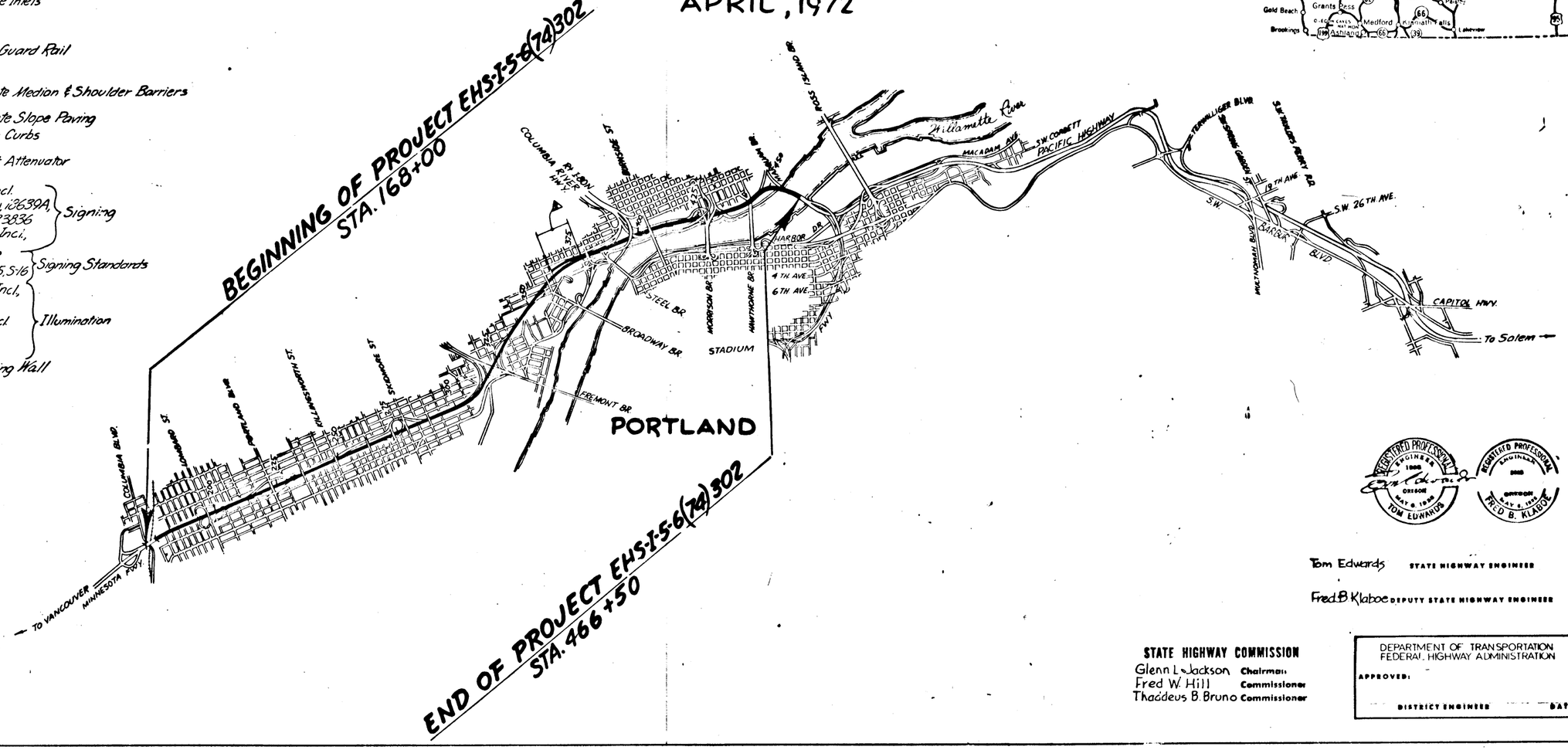
N. COLUMBIA BLVD.-MARQUAM BR. SECTION

PACIFIC HIGHWAY

MULTNOMAH COUNTY

APRIL, 1972





Tom Edwards STATE HIGHWAY ENGINEER

Fred B. Klaboe DEPUTY STATE HIGHWAY ENGINEER

STATE HIGHWAY COMMISSION

Glenn L. Jackson Chairman
Fred W. Hill Commissioner
Thaddeus B. Bruno Commissioner

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED:
DISTRICT ENGINEER — DATE

10V-278

PORTLAND

N. COLUMBIA BLVD. MARQUAM BR. SECTION PACIFIC HIGHWAY MULTNOMAH COUNTY				SHEET No. 11
FED. ROAD Div. No.	STATE	PROJECT NUMBER	FISCAL YEAR	TOTAL SHEETS See Index
10	OREGON	EHS 1-5 G(74) 302		

REVISED AS CONSTRUCTED 9-16-79 CONTRACT 7742

Sta 404+15 to Sta 407+05
Inst 10" Sewer Pipe - 292'
Granular Backfill Matl - 29 C.Y.
Under Pvmt - 292'
Tr. Exc. 42 C.Y.
(For Detail, See Sheet 2)

1°30' C.R.
Ta 13°52'07"
Ts 539.59'
L 1745.57'
2-150' Sp.
S 1°07'30"
a 1.0

Sta 407+05 to Sta 409+20
Inst 10" Sewer Pipe - 216'
Granular Backfill Matl - 17 C.Y.
Under Pvmt - 216'
Tr. Exc. 26 C.Y.
(For Detail, See Sheet 2)

Sta 411+10 to Sta 414+50
Inst 10" Sewer Pipe - 340'
Granular Backfill Matl - 35 C.Y.
Under Pvmt - 336'
Tr. Exc. 50 C.Y.
(For Detail See Sheet 2)

+10 Const Type "G-1" Inlet
Inst 8" Sewer Pipe - 8'
Granular Backfill Matl - 1 C.Y.
Under Pvmt - 8'
Tr. Exc. 1 C.Y.

+50 Const Type "G-1" Inlet

Sta "SE" 16+12 To Sta 429+08
Const Conc. Shoulder Barrier
(For Quantities See Sheet 12)

+80 Const Type "B" Inlet
(Intersect Exist. 8" Sewer Pipe)
Connect To Bridge Drain

+80 Const Type "B" Inlet

BURNSIDE BRIDGE

+15 Const Type "G" Inlet

+05 Const Manhole With Grate
(Intersect Exist. 12" Sewer Pipe)

+20 Const Type "G" Inlet

Const Guard Rail - 300' (Type 2A)
With 2 Bridge Conn's and 2
Wall Connections
(For Detail, See Sheet 2)

Const Guard Rail - 700' (Type 2A)
With 1 Anchor And 3 Bridge Conn.
(For Detail, See Sheet 2)

SEC. 34 T.1N. R.1E. W.M.
SEC. 3 T.1N. R.1E. W.M.

"SE" LINE
"ES" LINE
"NE" LINE
"F" LINE
"B" LINE
"BD" LINE
"D" LINE
"A" LINE
"W" LINE
"C" LINE

NORTH BOUND
SOUTH BOUND

S 3°09'07" W.

Conduit

398+41.00 P.O.T.
402+74.34 P.O.T.
403+61.55 P.S.
405+11.55 P.S.C.
412+86.12 P.C.S.
414+36.12 P.T.
419+92.47 P.S.

Const Impact Attenuator
For Details, See Drg No

Const Guard Rail - 1012.5' (Type 2A)
With 1 Anchor And 3 Bridge Conns.
(For Detail, See Sheet 2)

Sta 419+13 To Sta 427+00

Const Type "C" Curb
Class "A" Conc. 0.8 C.Y.
Const. Conc. Shldr. Barrier - 1,387'
Asph. Conc. Surfacing - 130 Sq. Yd.
Const. Conc. Shldr. Barrier Transition To Curb
Const. Earth Mound
Emb. In Place - 80 C.Y.
(For Details, See Sheets 2Q, 2R)

Const Conc Median Barrier Type 1 - 2372'
Const Conc Median Barrier Type 2 - 828'
Const P.C. Conc. Surfacing 349 Sq. Yds.
Granular Backfill 135 C.Y.
For Details, See Sheets 2A, 2B, 2F And 2G

411+10 Reconstruct Manhole
(Rotate Access 90° and
Reconstruct Ladder)
} Extra Work

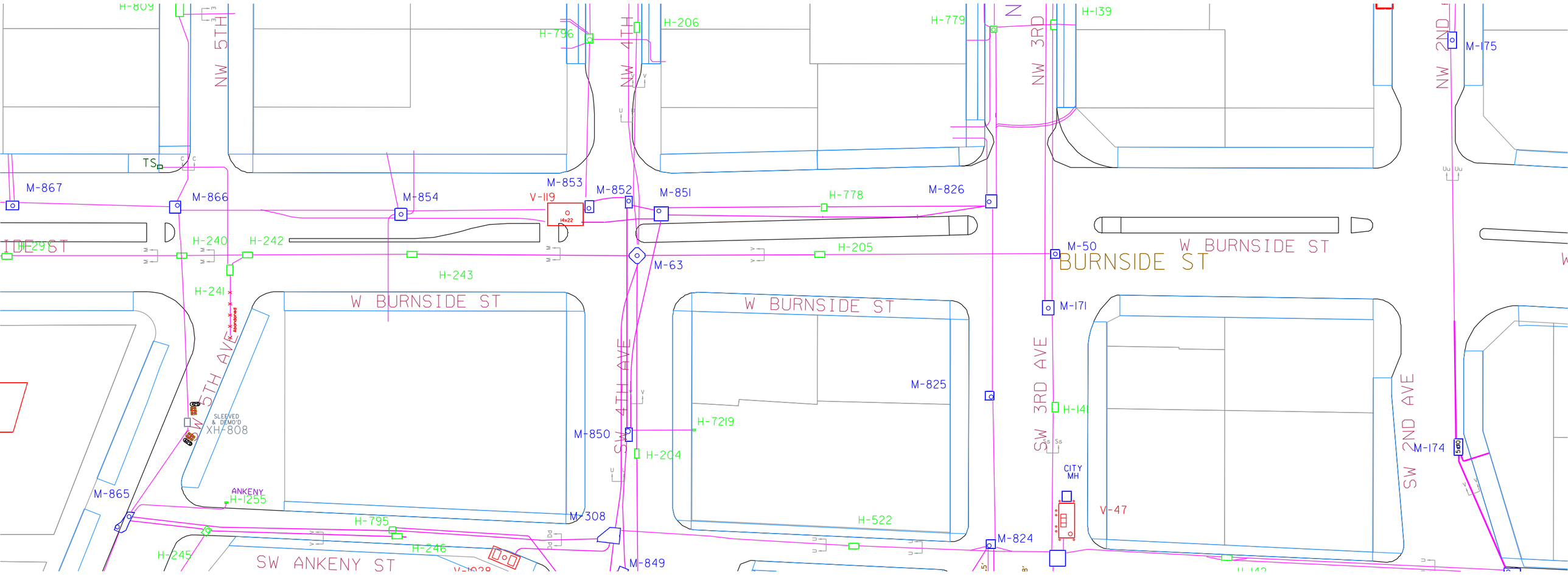
Sta 413+50 To Sta 415+60
Relocate Chain Link Fence
As Directed, See Sheet 2Q
} Extra Work

Sta 389+00

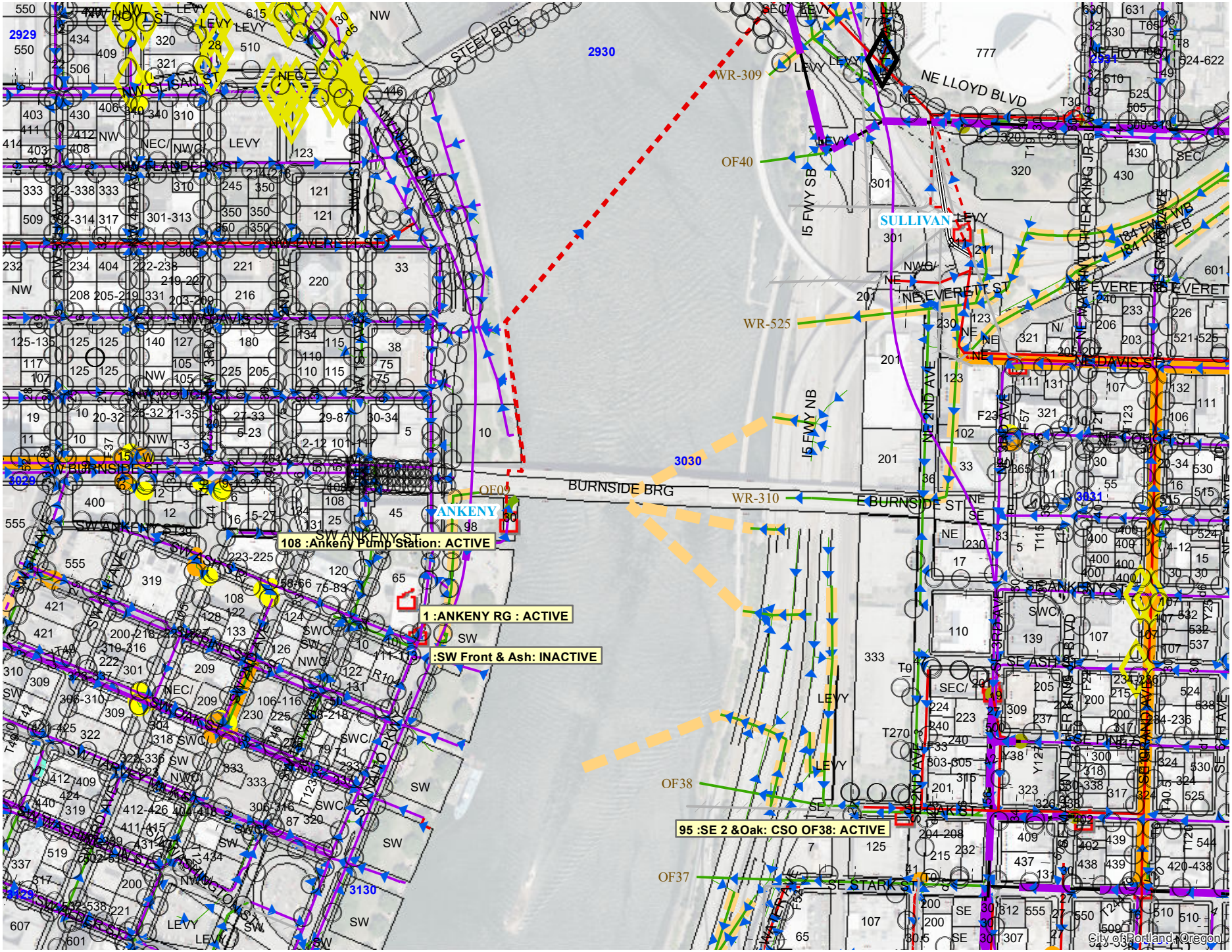
Sta 421+00

As constructed 9F 5-8

Appendix C. PGE Facility Maps


H-809
NW 5TH
H-796
NW 4TH
H-206
H-779
NW 3RD
H-139
NW 2ND
M-175
TS
M-867
M-866
M-854
M-853
V-119
14x22
M-852
M-851
H-778
M-826
IDE 29 ST
H-240
H-242
H-205
M-50
W BURNSIDE ST
BURNSIDE ST
H-243
M-63
H-241
Abandoned
W BURNSIDE ST
W BURNSIDE ST
M-171
SW 5TH AVE
SLEEVED & DEMO'D
XH-808
M-825
SW 4TH AVE
H-7219
M-850
H-204
SW 3RD AVE
H-141
SW 2ND AVE
M-174
5,660
CITY MH
V-47
ANKENY
H-1255
M-865
H-795
M-308
H-522
M-824
H-245
H-246
SW ANKENY ST
M-849

Appendix D. City of Portland Facility Maps

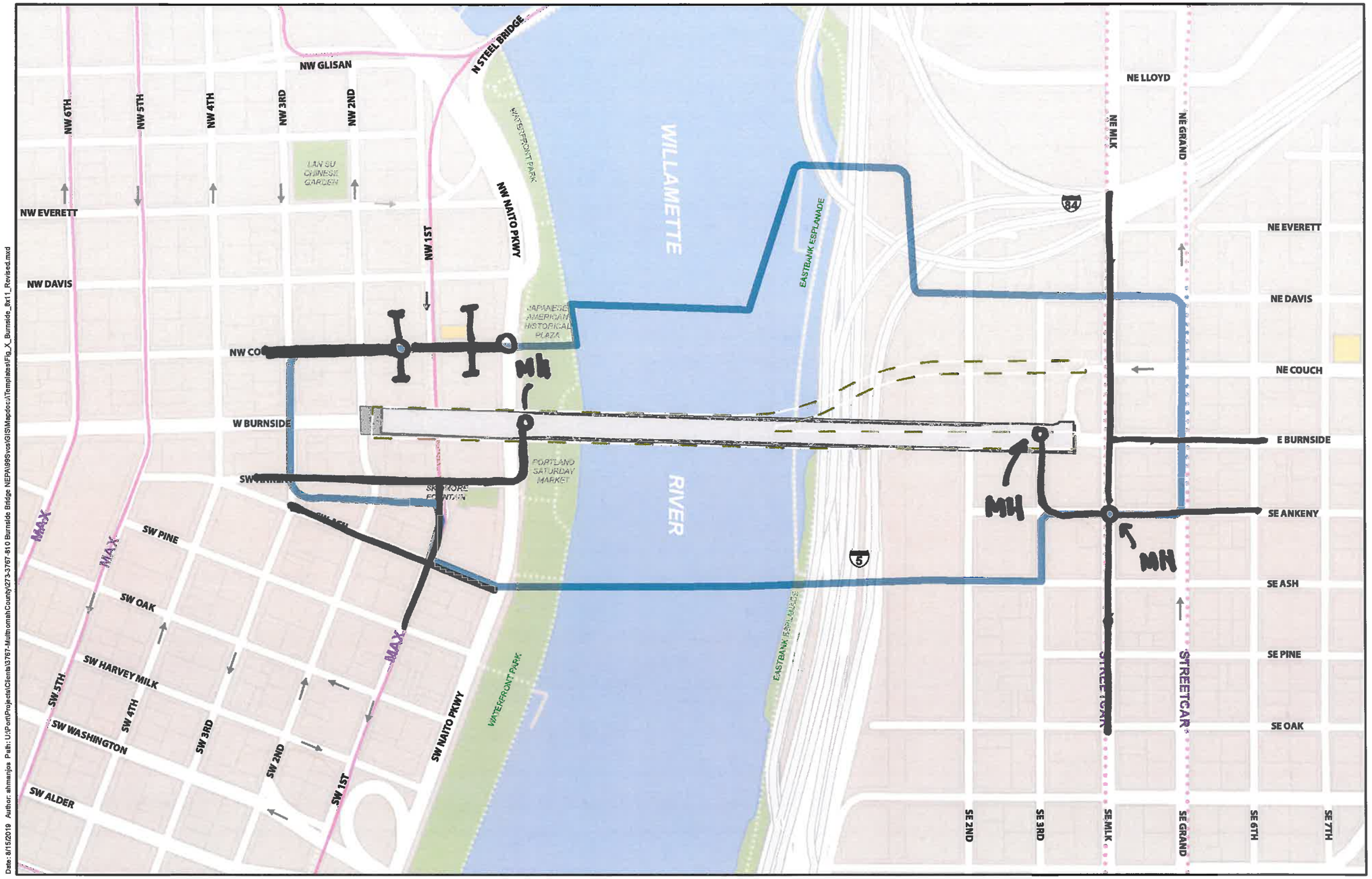

108 :Ankeny Pump Station: ACTIVE
1 :ANKENY RG : ACTIVE
:SW Front & Ash: INACTIVE
95 :SE 2 &Oak: CSO OF38: ACTIVE
OF40
OF38
OF37
WR-309
WR-525
WR-310
BURNSIDE BRG
I5 FWY SB
I5 FWY NB
SULLIVAN
ANKENY
NE LLOYD BLVD
NW HOYT ST
NW GLISAN ST
NW FLANDERS ST
NW EVERETT ST
NW DAVIS ST
NW COUCH ST
W BURNSIDE ST
SW ANKENY ST
SW OAK ST
SW STARK ST
SW WASHINGTON ST
NE EVERETT ST
NE DAVIS ST
NE COUCH ST
E BURNSIDE ST
SE ANKENY ST
SE ASH ST
SE PINE ST
SE OAK ST
SE STARK ST
STEEL BRG
MARQUAM BRG
2930
3030
3130
City of Portland, Oregon

Appendix E. Lumen Local Facility Maps

GTL 9/13/19

O = MH

— = DUCT BANK



Date: 8/15/2019 Author: ahmanjos Path: U:\Port\Projects\Clients\13767-Multnomah County\273-3767-810 Burnside Bridge NEPA\99Svcs\GIS\Mapdocs\Templates\Fig_X_Burnside_8x11_Revised.mxd

EARTHQUAKE READY BURNSIDE BRIDGE

Source:
City of Portland, Oregon
HDR, Parametrix

0 250 500 1,000 Feet

Project Area

Movable Bridge: NE Couch Connection

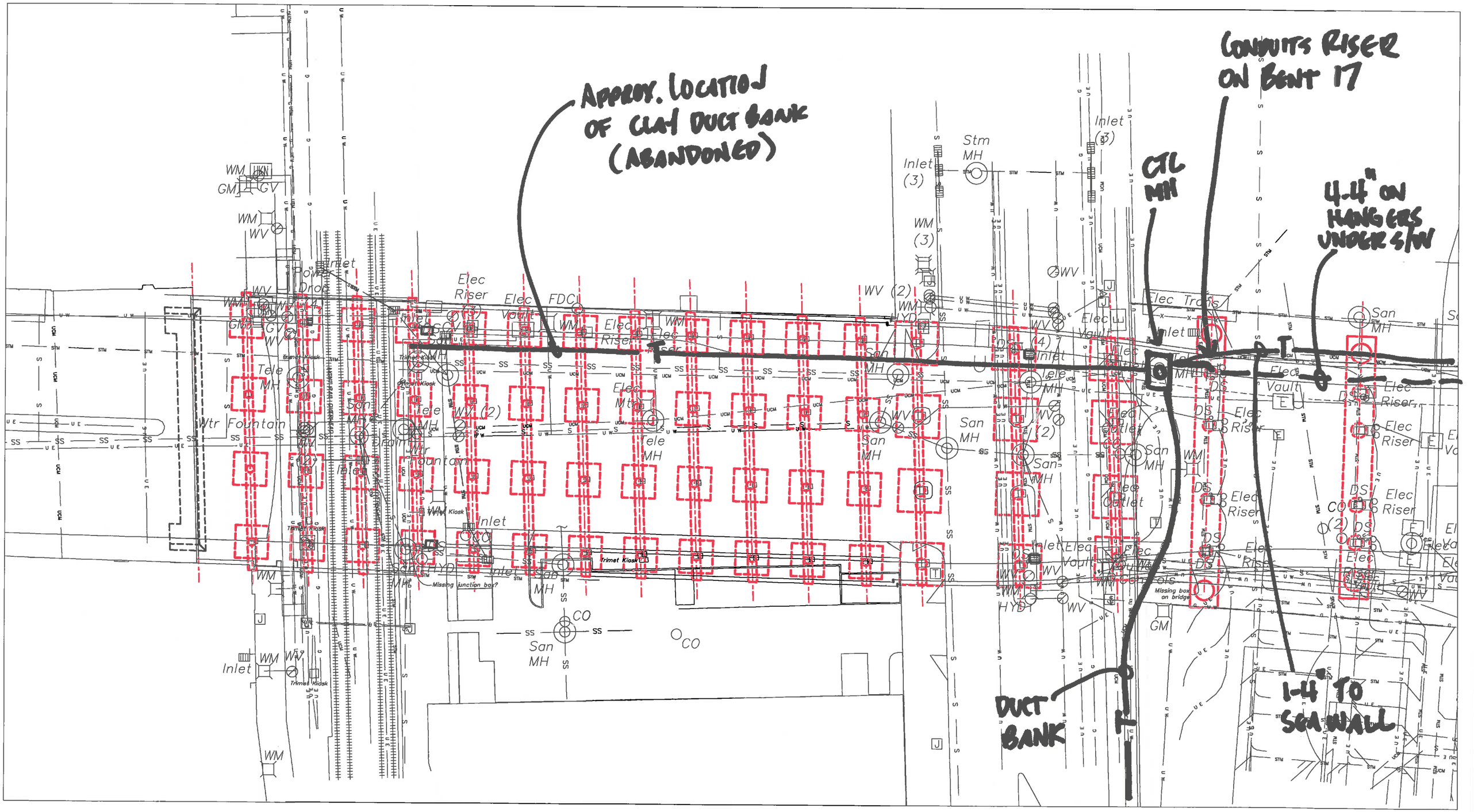
Enhanced Seismic Retrofit

Movable Bridge

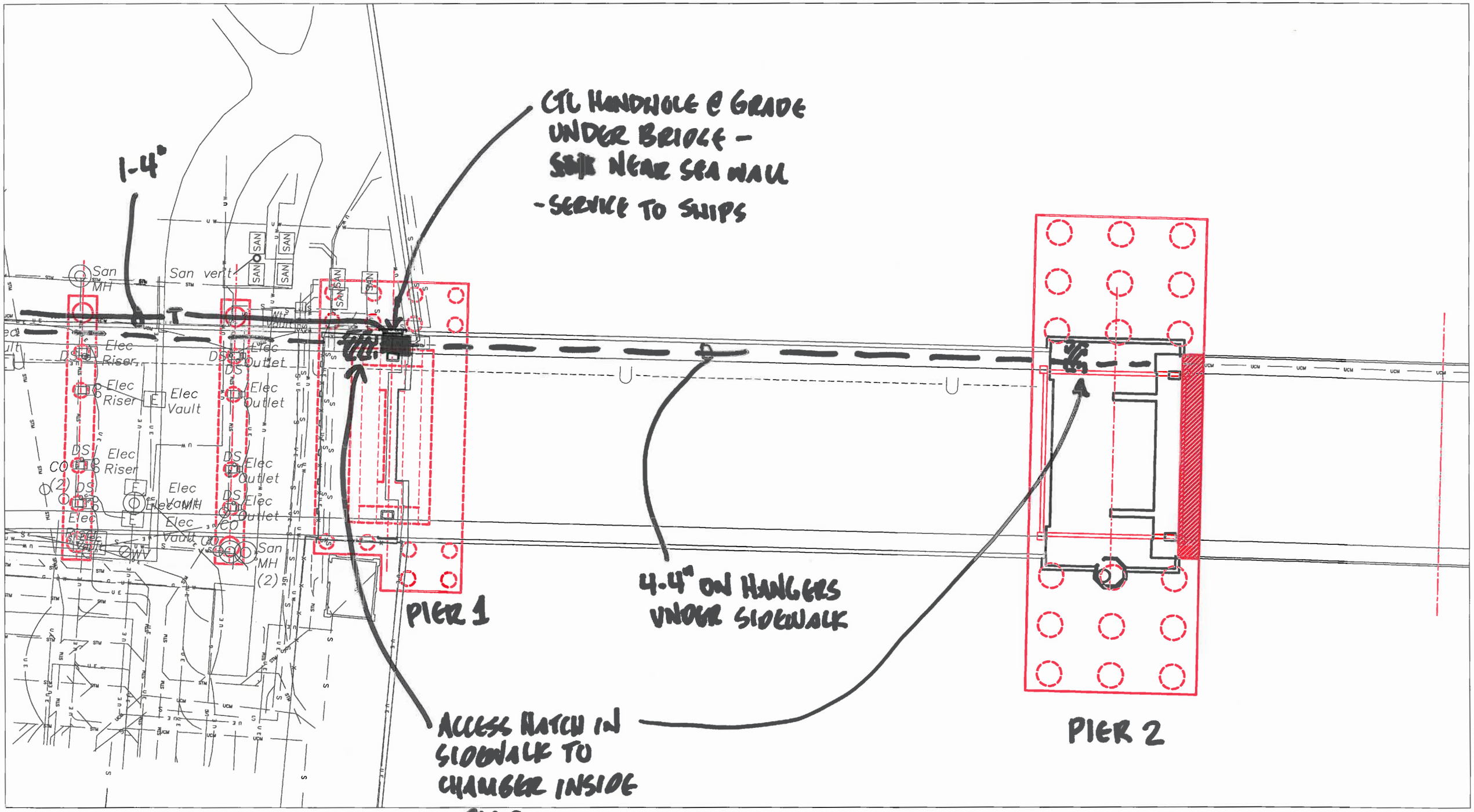
Figure X.
Map Template

Earthquake Ready Burnside

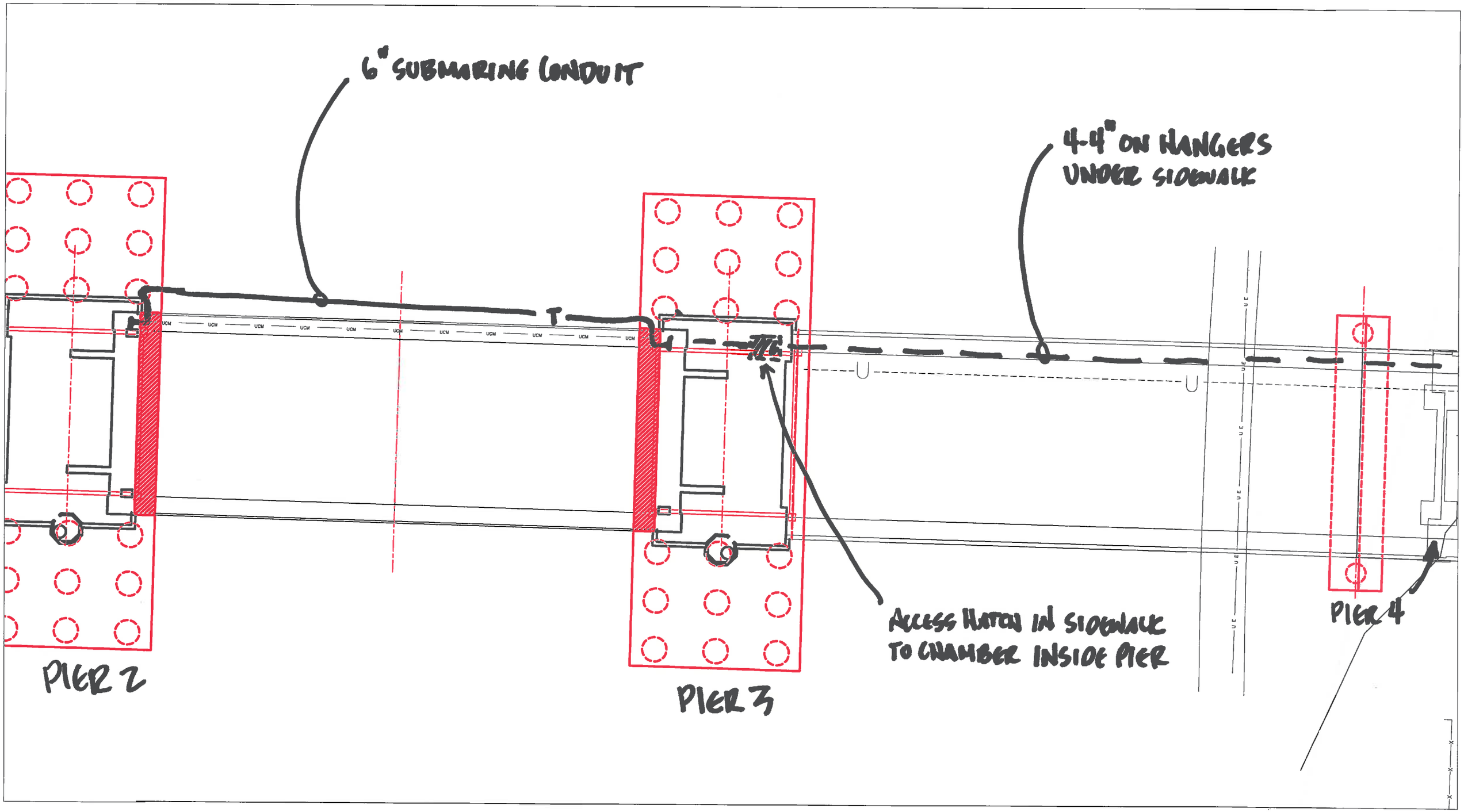
CTL 9/13/19


APPROX. LOCATION OF CLAY DUCT BANK (ABANDONED)
CONDUITS RISER ON BENT 17
CTL MH
4-4" ON HANGERS UNDER S/W
DUCT BANK
1-4" TO SEAWALL
Missing junction box?
Missing box on bridge
Trimet Kiosk
Elec Riser
Elec Vault
Elec Trans
Inlet
San MH
Stm MH
Tele MH
Wtr Fountain
WM
WV
GM
GV
FDC
HYD
DS
CO

CTL 9/13/19


1-4"
CTL HANDHOLE @ GRADE UNDER BRIDGE - NEAR SEA WALL
-SERVICE TO SHIPS
San MH
San vent
Elec Riser
Elec Vault
Elec Outlet
DS
Elec
CO
(2)
San MH (2)
PIER 1
4-4" ON HANGERS UNDER SIDEWALK
ACCESS HATCH IN SIDEWALK TO CHAMBER INSIDE PIER
PIER 2

GL 9/13/19


6" SUBMARINE CONDUIT
4-4" ON HANGERS UNDER SIDEWALK
ACCESS HATCH IN SIDEWALK TO CHAMBER INSIDE PIER
PIER 2
PIER 3
PIER 4

GTL 9/13/19

ACCESS HATCH IN SIDEWALK

8-3" ON HANGERS

PIER 4

21

22

23

24

25

RR Sig

RR Sig

GL 9/13/19

8-3" on Hangers

Match Access to Splice Vault Hanging from Sidewalk

GTL MH on SE 2nd

Conduits Riser on Pier

8-3"

4.4"

2.4"

GTL MH on SE 3rd

Riser on Bent 26 (2.4")

SE 2nd Ave

Duct Bank on SE 3rd

GV

WV

(2) Tele MH

San MH

Stm MH

Inlet

Skate Park

Ped Pole

Sig Cab

Sig Pole

Tele MH

Elec MH

Elec Trans

HYD

Billboard

27

28