Attachment J

Summary of Potential Mitigation

For information about this project in other languages or ADA accommodations (Americans with Disabilities Act), please call 503-988-5970 or email burnsidebridge@multco.us.

Para obtener información sobre este proyecto en español, ruso u otros idomas, llame al 503-988-5970 o envíe un correo electronico a burnsidebridge@multco.us.

Для получения информации об этом проекте на испанском, русском или других языках, свяжитесь с нами по телефону 503-988-5970 или по электронной почте: burnsidebridge@multco.us.

Multnomah County

Attachment J-1. Potential Mitigation Measures for Short-Term / Construction Impacts

This table lists potential mitigation measures to address short-term/temporary impacts identified during the Draft EIS process. Following the DEIS comment period, any refinements to design or construction assumptions, and any updated impacts analysis, mitigation commitments for the preferred alternative will be recorded in the Record of Decision.

Legend:

AQ = Air Quality
CC = Climate Change
CR = Cultural Resources.
DI = Displacements
EC= Economics
EQ= Equity and Environmental Justice
FL = Flooding and Hydraulics
HI = Health Impact Assessment
HZ = Hazardous Materials
LU = Land Use
NO = Noise
PR= Parks and Recreational resources
PS = Public Services
SG = Soils and Geology
SN = Social/Neighborhoods
SU = Sustainability
ST = Stormwater
TR = Transportation
UT = Utilities
VR = Visual Resources
VF = Vegetation, Wildlife and Fish
WW = Wetlands and Waters
4f = Section 4(f)

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
4f, CR, PR	Replacement Alternatives	Burnside Skatepark temporary closure. Construction would temporarily close public access to and use of the Skatepark.	- Select alternatives or options with minimal duration of closure. - Determine if there are other opportunities to support other existing DIY Skatepark that are accessible to Skatepark users. - Attempt to reduce closure duration through design modifications or construction methods. - Extensive documentation of the Skatepark in its current form, working with the skater community and others to recover and preserve as many images as possible of the evolution of the Skatepark since 1990. - Ensure city representation from a permitting standpoint	Section 106, Section 4(f)	Temporary Bridge: All modes	- Skatepark would be restored after removing temporary bridge. - Total duration of closure would be longer with the Retrofit Alternative than the Replacement Alternatives, and longer with Temp Bridge than with No Temp Bridge.
CR, PR, 4f, SN, EQ	Enhanced Seismic Retrofit	Burnside Skatepark demolition – retrofitting the columns and foundations under the bridge (with Retrofit Alternative) requires demolishing the facility. This would fully demolish and permanently occupy part of the area currently used for Skatepark.	- A portion of Burnside Skatepark could be rebuilt after construction. Investigate opportunities to replace lost area adjacent to remaining area occupied by Skatepark. This mitigation would include close coordination with Skatepark managers and City of Portland. - Investigate opportunities to replace lost area adjacent to remaining area occupied by Skatepark. This mitigation would include close coordination with Skatepark managers and City of Portland. - Ensure city representation from a permitting standpoint	Section 106, Section 4(f)	Temporary Bridge: All modes	Burnside Skatepark is not an official park, but it is a recreational resource.

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
AQ, NO, HI, EQ, SN	All	Noise/Vibration/Dust - Air pollution can be a trigger for people with mental disabilities and respiratory issues. - May force tenants/occupants to keep windows closed and face high temps during summer, or open windows and increase exposure.	- Support establishment of a hot line for homeless or displaced people in the area affected by construction activities. - Partner with social service providers or other organization to engage people sleeping outside during construction regarding impacts and staying safe. - Consider providing indoor respite space. - Adhere to clean diesel contracting rules and use electric equipment or other pollution controls when feasible. -- Noise monitoring during construction. - Establish plans for pollution reductions on days with wildfire smoke infiltration, high ozone, or wintertime inversions. - Adopt dust control measures for demolition of buildings and the bridge. -- Coordinate with staff and residents – homeless and others – to understand potential impacts. - Engage people sleeping outside during construction regarding impacts and staying safe. - Consider air filters and/or air conditioning for spaces that can only be cooled by opening windows.	City of Portland Clean Air Construction Requirements; Clean Air Act; Federal Noise Control Act; City of Portland Construction Noise Regulations (Code section 18.10.060)	Temporary Bridge: All modes	
AQ	All	Increases in vehicular emissions during construction	- To reduce the impact of construction delays on traffic flow and resultant emissions, road or lane closures should be restricted to non-peak traffic periods, when possible.		All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
AQ, HI	All	Increases in dust during construction	- Application of asphalt, oil, water, or other suitable chemicals on unpaved roads, materials stockpiles, and other surfaces that can create airborne dusts. - Full or partial enclosure of materials stockpiled in cases where application of oil, water, or chemicals are not sufficient to prevent particulate matter from becoming airborne. - When in motion, always cover open-bodied trucks transporting materials likely to become airborne.	Division 208 of Oregon Administrative Rules (OAR) 340. - Subsection of OAR 340-208.	Temporary Bridge: All modes	
CC	All	Alternatives requiring extensive grout injection to stabilize soils would increase embedded GHG emissions.	- Select an alternative that requires the least amount of grout injection (Long-Span Alternative has the least, followed by Short-Span Alternative)	N/A	Temporary Bridge: All modes	Varies by alternative.
CC, HI	N/A	Increased GHG emissions	- It is assumed that the lift bridge portion of the temporary bridge could be purchased or rented from a manufacturer and reused by other projects. - Attempt to reuse portions of the temporary approach spans in other construction projects. Recycle the materials after deconstruction.	N/A	Temporary Bridge: All modes	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
CR	All	Vibrations from construction equipment could cause adverse effects to unreinforced masonry (URM) historic buildings	- Conduct engineering assessments to better define the vulnerability to vibration damage for individual buildings. - Regularly monitor the condition of vulnerable buildings during construction and revise construction. - Wherever practical, the contractor should use equipment that minimizes vibration impact when within 100 feet of a historic property of unreinforced masonry construction. - For those buildings for which there is currently no available information on seismic retrofitting, contact building owners or managers to determine if seismic retrofitting has been undertaken or is planned. - Coordinate with the City of Portland and Prosper Portland on the Old Town/Chinatown Five -Year Action Plan Extension, 2019-2024, which defines an objective of rehabilitating historic buildings of unreinforced masonry construction. The project would not fund rehabilitation of buildings that are not impacted by the project but could encourage prioritization of seismic retrofitting from other funding sources. - Further document those historic properties vulnerable to vibration impacts.	N/A	Temporary Bridge: All modes	
CR	Enhanced Seismic Retrofit	Removal and replacement of part of the Harbor Wall due to alterations at Pier 1	- Rebuild this section of Harbor Wall to complement appearance of existing wall.	Section 106 NHPA		Removal and replacement of part of the Harbor Wall due to alterations at Pier 1

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
DI, LU, EC, SN, PS	All	Multiple impacts to parking and vehicular ingress/egress (City / UO; Saturday Market Bldg.; Mercy Corps; etc.)	- Compensation for loss of parking.	49 CFR Part 24	Temporary Bridge: All modes	
EC; TR	All	Temporary impacts from traffic diversion and delay during construction, especially if there is full closure of the crossing	- Signage and advanced information about detours and closures to allow travelers to plan their trips in advance and avoid confusion and minimize delays. - Scheduling of work requiring temporary closures of various transportation facilities for periods of low traffic levels (such as at night and during weekends). - Construction approach / measures that could reduce the overall extent and duration of construction noise, street closures, park closures, crossing closure. - Increase public awareness about the project, construction schedule, and various impacts that may affect various members of the public.		All	Diversion and delay are highest with No Temp Bridge option
EC	All	Partial access impacts to businesses that are not displaced	- Provision of parking in alternative locations (if feasible).	N/A	All	Partial access impacts to businesses that are not displaced.

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
EC, EQ, TR	All	Use of temporary bus bridging to offset temporary TriMet Max shutdowns	- Coordinate with TriMet on potential for them to provide "bus bridging" or other supplemental bus services to transport passengers around the Skidmore MAX station when closed for project construction. - Coordinate with TriMet on potential for supplemental transit services for routes affected by temporary closures. -- Schedule work requiring temporary closures of Skidmore MAX station for periods of low traffic levels (such as at night and during weekends) to the extent feasible		All	Temporary TriMet Skidmore MAX station shutdowns (if station is open during construction)
EC, EQ, TR	All	Rerouting TriMet bus routes	- Schedule work requiring temporary closures of various transportation facilities for periods of low traffic levels (such as at night and during weekends) to the extent feasible. - Coordinate with TriMet on potential for supplemental transit services for routes affected by temporary closures.	N/A	No Temporary Bridge; Temporary Bridge: Bicycles and Pedestrians only	
EC, LU, SN, DI, PS	All	Multiple impacts to parking and vehicular ingress/egress (City / UO; Saturday Market Bldg.; Mercy Corps; etc.)	- Preparation of a schedule and plan for communicating temporary access closures. - As design and construction assumptions advance, identify potential opportunities to reduce property impacts.	49 CFR Part 24	All	
EQ; TR	All	Lengthens bus trip and walking trip for some SS clients and will likely prevent some SS clients from being able to obtain services	- Free or subsidized TriMet passes to SS agency clients.	N/A	All, but especially the No Temporary Bridge option	Impacts greater with No Temporary Bridge.

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
EQ	All	Displaced people who sleep under bridge on sidewalk and in Park, and who shelter or use park area during daytime hours. Relocating Saturday Market will also remove the temporary bathrooms and trash cans that Saturday Market provides.	- When Portland Saturday Market-provided temporary bathrooms and/or trash cans are displaced, coordinate to ensure availability in alternative locations.	N/A	All	
EQ, EC, HI, PR	All	Partial access impacts to businesses that are not displaced.	- Establish alternative access points to buildings where access will be made more difficult (if feasible).	Section 4(f)	All	
EQ, SN	Enhanced Seismic Retrofit	Temp closure of Portland Rescue Mission (PRM) access off Burnside Street sidewalk	- Temporary relocation of the PRM services is likely not feasible. - Identify opportunities to avoid or reduce property impacts through design and construction refinements. - If feasible, construct an opening on the other side of the building as well as a temporary elevator for the period in which construction would block PRM access and egress doors off Burnside Street. - Prepare a schedule and plan for communicating temporary access closures.	N/A	All	
EQ, SN	All	Displacement of Night Strike	- Support replacement location for Night Strike, as close as possible.	49 CFR Part 24	All	
EQ, SN	All	Increases distance and decreases convenience for clients, esp. mobility to impaired, to access services (including PRM, Central City Concern (CCC), Homeless Veterans Center, and Mercy Corps)	- Provide signage and advanced information about detours and closures would allow travelers to plan their trips in advance, avoid confusion, and additional delays.	N/A	All	Temporary closure of MAX Station on 1st Avenue (if station is open during construction)

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
EQ, SN	All Replacement Alternatives	TCE at CCC Shoreline Building and Salvation Army	- Coordination with these organizations would be ongoing throughout the duration of the Project. - Prepare a schedule and plan for communicating temporary access issues; provide signage and advanced information about access modifications. - Provide counseling for the vulnerable populations affected by construction. - Formation of an advocacy group or hotline to answer questions be made available - Identify opportunities to avoid or reduce access impacts through design and construction refinements.	N/A	All	
EQ, SN	Enhanced Retrofit	Pedestrian access to Mercy Corps would be obstructed on the west side. Would impact buildings located on corner of 3rd Street and the south side of E Burnside Street on the east side	- Coordination with Mercy Corps would be ongoing throughout the duration of the Project. - Prepare a schedule and plan for communicating temporary access issues; provide signage and advanced information about access modifications. - Provide counseling for the vulnerable populations affected by construction. - Formation of an advocacy group or hotline to answer questions be made available - Identify opportunities to avoid or reduce access impacts through design and construction refinements.	N/A	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
EQ, SN, TR	All	More difficult access to CCC, Salvation Army and PRM. Full bridge closure and partial closures with Temp Bridge could impede ability of emergency responders to park in front of PRM	- Coordination with these organizations would be ongoing throughout the duration of the Project. - Prepare a schedule and plan for communicating temporary access issues; provide signage and advanced information about access modifications. - Provide counseling for the vulnerable populations affected by construction. - Identify opportunities to avoid or reduce access impacts through design and construction refinements. - It may be possible for ambulances to access PRM from the corner of Burnside Street and NW 2nd Avenue while the bridge is closed to traffic. - Use 211 hotline number for updates	N/A	All	
EQ, TR	All	Rerouting TriMet bus routes	- Coordination with TriMet on potential for supplemental transit services for routes affected by temporary closures.	N/A	Temporary Bridge: Bicycles and Pedestrians only; No Temporary Bridge	
FL	All	Temporary changes in water surface elevations resulting from placement of a temporary bridge structure	- Temporary bridge design modification to minimize the footprint of temporary structures. - Limiting in-water work and construction equipment traffic to tasks that can only occur in-stream, such as pier construction.		Temporary bridge	
HI	All	Prevent harm and create health benefits for people experiencing homelessness	- Conduct outreach regarding construction impacts including air pollution exposure, noise, and access to social services. - Mitigate short-term displacement of facilities used by people experiencing homelessness.		All	If there is no temporary bridge, provide assistance such as transit passes to people accessing social services near the western bridge head.

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
HI	All	Potential health impacts from construction-related emissions	- Establish plans for pollution reductions on days with wildfire smoke infiltration, high ozone, or wintertime inversions. - Offer indoor air filtration and air conditioning to affected residents and small businesses.		All	
HI	All	Closure of Eastbank Esplanade and Waterfront Trail disrupts physical activity	- Minimize closure of the Eastbank Esplanade. The Replacement Alternative with Long-Span Approach with no temporary bridge would result in the least displacement of physical activity on the esplanade.		No Temporary Bridge	
HI	All	Prevent harm and create health benefits for people experiencing homelessness	- Work with partner agencies to identify opportunities to provide long-term benefits from the project, such as restrooms or storage facilities.		All	
HI; PR; SN	All	Construction can disrupt social cohesion	- Mitigate impacts to the Japanese American Historical Plaza, special events, Portland Saturday Market, and Parks and Recreation facilities.		All	
HI, PR	All	Temporary closure of Burnside Skatepark disrupts physical activity	- Minimize the duration of Skatepark closure. Promote alternate venues for skating and related cultural events during the closure, consulting with users on preferences prior to finalizing a plan.		All	
HI	All	Closure of Eastbank Esplanade and Waterfront Trail disrupts physical activity	- Mitigation for restricted use is being provided in the form of detour routes for the Waterfront Trail and Eastbank Esplanade to ensure these north-south bike and pedestrian connections remain usable.		All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
HI, AQ, SN, EQ	All	Increases in dust during construction	- Particular consideration will be given to reducing potential impacts from construction dust and emissions on the residents and occupants of older buildings (such as PRM and CCC) located immediately adjacent to the construction zone on the west end. - Use of water or chemicals, where possible, for the control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of land. - The prompt removal from paved streets of earth or other material that does or may become airborne. - Document control measures in the erosion and sediment control plan the contractor is required to submit prior to the preconstruction conference. -- Adequate containment during sandblasting or other similar operations. - Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials.	Construction contractors are required to comply with Division 208 of Oregon Administrative Rules (OAR) 340, which addresses visible emissions and nuisance requirements. Subsection of OAR 340-208 places limits on fugitive dust that causes a nuisance or violates other regulations. Violations of the regulations can result in enforcement action and fines.	All	
HI, CC	N/A	Increased GHG emissions	- Reuse or partial reuse of the temporary bridge after construction is complete would reduce the net cumulative GHG emissions used for materials and construction of the temporary bridge.		All	

HI, NO	All	Construction equipment noise	- Notify nearby residences whenever extremely noisy work will be occurring. - Reschedule construction operations to avoid periods of noise annoyance identified in the complaint. -The contractor shall comply with all state and local sound control and noise level rules, regulations, and ordinances that would apply to any work performed pursuant to the contract. - Shut off idling equipment. - Use manually adjustable or new broadband backup alarms which can be localized and focused to the danger zone and set to the low noise setting on all construction vehicles used during nighttime hours. - Use alternative methods or equipment which produces less noise. - All equipment shall comply with pertinent equipment noise standards of the US Environmental Protection Agency (EPA). - Noise from rock crushing or screening operations within 3,000 feet of any occupied dwelling shall be mitigated by strategic placement of material stockpiles between the operation and the affected dwelling or by other means approved by ODOT's Project Manager. - No pile driving, hoe ramming, or blasting operations shall be performed within 3,000 feet of any occupied dwelling unit on weekends, legal holidays, and between the hours of 10:00 PM and 7:00 AM on other days without the approval of ODOT's Project Manager. - Operate electric-powered equipment using line voltage power instead of on-site generators. - Locate stationary construction equipment as far from the nearby noise-sensitive properties as possible.	Federal Noise Control Act; City of Portland Construction Noise Regulations (Code section 18.10.060)	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
			- Install temporary or portable acoustic barriers around stationary construction noise sources - Obtain construction noise variances from the City of Portland via their variance process. - All equipment used shall have sound control devices no less effective than those provided on the original equipment. No equipment shall have unmuffled exhaust.			
HI, PR	All	Loud construction activity could impact park events such as concerts, etc.	- Coordinate particularly noisy construction activity to avoid impacting park programming.	City of Portland Construction Noise Regulations (Code section 18.10.060)	All	
HI, PR	All	General short-term disruptions to physical activity	- If using a temporary bridge during construction, open the bridge for bikes, pedestrians, emergency vehicles, and transit only		Temporary Bridge: All modes	
HI, SN, EQ	All	Construction noise can adversely impact health	- Communicate with residents about the nature and duration of noise impacts		All	
HI, SN, PR	All	Closure of Eastbank Esplanade and Waterfront Trail disrupts physical activity	- Select alternatives and options that minimize closure durations.		All	
HI, ST	N/A	Increased impervious surface area	- Select the temporary bridge option that results in the least amount of additional impervious surface area (pedestrian/bicycle).	City reg?	Temporary Bridge: All modes	
HI, TR	All	Construction traffic and activity can increase safety risks	- Develop an action plan to address safety concerns that arise during construction.	N/A	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
HZ	All	Potential to acquire property that may have contaminated soils, groundwater or building materials	- Due diligence through Phase I Environmental Site Assessments (ESAs), and where warranted Phase II ESAs.	Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); Resource Conservation and Recovery Act (RCRA); Federal Insecticide, Fungicide and Rodenticide Act; Toxic Substances Control Act (TSCA); Clean Water Act (33 USC 1251–1387)	All	
HZ	All	Potential impacts of encountering hazardous materials during construction	- Health and Safety Plan - Hazardous Building Materials Abatement - Contaminated Media Management Plan	Compensation and Liability Act (CERCLA); Resource Conservation and Recovery Act (RCRA); Federal Insecticide, Fungicide and Rodenticide Act; Toxic Substances Control Act (TSCA)	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
HZ, ST	All	Impacts on hazardous resources from construction activities	- Sediment evaluation framework (SEF), which includes a sampling and analysis plan (SAP), pre-construction sediment sampling, permitting, and other activities. Documentation, and construction standards will be required for in-water work activities. - Construction Stormwater and Erosion Control Plan - Spill Plan	Compensation and Liability Act (CERCLA); Resource Conservation and Recovery Act (RCRA); Federal Insecticide, Fungicide and Rodenticide Act; Toxic Substances Control Act (TSCA); Clean Water Act (33 USC 1251–1387)	All	
LU	All	Temporarily displaced land uses	- Compensation & Relocation assistance for temporarily displaced land uses.	49 CFR Part 24, the Uniform Relocation Assistance and Real Property Acquisition Regulations for Federal and Federally Assisted Programs.	All	
NO	All	Construction equipment noise/vibration	- Vibration producing construction equipment shall be operated in such a manner to avoid damaging nearby sensitive structures and causing annoyance to people living or utilizing institutional lands nearby. Specifically, the construction contractor will need to identify alternative construction methods in some areas to avoid damage and annoyance threshold limits identified. Potential mitigation strategies may include implementing caisson drilling rather than pile driving and using hand tools where it is not possible to construct with heavy machinery outside of the distances identified.	Federal Noise Control Act; City of Portland Construction Noise Regulations (Code section 18.10.060)	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
NO, HI	All	Construction equipment noise	-The contractor must provide a detailed construction noise control plan, which would list all the proposed construction equipment and types of construction activity. - No construction shall be performed within 1,000 feet of an occupied dwelling unit on weekends, legal holidays, and between the hours of 10:00 PM and 7:00 AM on other days without the approval of ODOT's Project Manager. - Multnomah County will obtain construction noise variances as needed from the City of Portland.	Federal Noise Control Act; City of Portland Construction Noise Regulations (Code section 18.10.060)	All	
PR	All	Impact on maintenance access to area of WF Park north of the Bridge.	- Provide flagger to allow access for maintenance two times a day.		All	
EC; PR	All	Temporary displacement of Portland Saturday Market (PSM)	- Relocation assistance. - Consider the loss of Parks revenue without PSM and mitigate for financial loss via correspondence with the City	49 CFR Part 24	All	Duration varies substantially across alternatives
PR	All	Temporary closure of Skatepark (not a park but it is a recreation facility)	- Explore construction and/or design methods to reduce duration of closure.	Section 4(f)	All	Duration varies substantially across alternatives
PR, HI	All	General short-term disruptions to physical activity in public spaces	- Select a construction approach that maximizes physical activity during the construction phase. - Collaborate with researchers to monitor changes to physical activity from recreation during closures.	Section 4(f)	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
PR, SN	All	The southern portion of the Japanese American Historical Plaza is within the Boundary of Potential Construction Impacts. Some elements would be demolished and reconstructed as part of the project to allow access for construction.	- Providing for a temporary exhibit in the unimpacted area of the Plaza to highlight the information currently provided in the southern half of the memorial. - Involve memorial designers and stone mason during deconstruction and reconstruction. - Coordinate closely with the Japanese American Museum of Oregon on the formation of other mitigation solutions. - Involve the Japanese Consul for replacement of removed ornamental flowering cherry trees.	Section 4(f)	All	
PR, SN	All	Temporary displacement of Portland Saturday Market (PSM)	- Ongoing coordination with PSM.		All	Duration varies substantially across alternatives
PR, SN, HI	All	Portions of Waterfront Park, Waterfront Trail and Eastside Esplanade will be unavailable for public access and recreation use for various durations.	- Provide permanent enhancements to bike/ped routes indirectly impacted by construction detours (i.e., those locations that are not physically impacted by the contractor but could be used as a method to avoid the construction direct area). - Select alternatives and options that minimize closure durations. - Mitigation for restricted use is being provided in the form of detour routes for the Waterfront Trail and Eastbank Esplanade to ensure these north-south bike and pedestrian connections remain usable. - Ensure these routes are separated and/or wide enough to emulate safety and separation from cars.	Section 4(f)	All	
PR	All	Waterfront Park closure	Allow Portland Parks vehicles to safely cross the closed section of Waterfront Park twice per day for parks maintenance activities	Section 4(f)	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
PS	All	Construction detour and/or congestion effects on emergency service provider response time	- Develop a pre-construction communications plan, with all affected emergency response agencies detailing how detour and road closure information would be provided to the services.		All	
PS	All	Construction detour and/or congestion effects on emergency service provider response time	- A Safety and Security Management Plan that would provide emergency access, develop alternate plans or routes to avoid delays in response times, and institute other features as necessary so that safety and emergency services are not compromised.		All	
PS	All	Adverse effects on access to public services	- Provide detour signs where construction activity requires detours on routes typically used by the public to access public service locations.		All	
PS	All	Adverse effects on access to public services (traffic congestion)	- Detailed coordination on construction locations with fire departments, emergency responder services, school transportation services, and law enforcement. Include any temporary access restrictions to highway on-ramps and exits and to critical emergency access routes. - Continued communication with PF&R at a minimum of one week prior to lane closures - County goal is to complete all capital projects on other bridges and limit minor maintenance during Burnside construction to ease traffic congestion		All	
PS, SN	All	Multiple impacts to parking and vehicular ingress/egress (City / UO; Saturday Market Bldg.; Mercy Corps; etc.)	- Preparation of a schedule and plan for communicating temporary access closures.	49 CFR Part 24	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
SG	All	At each of the in-water piers, existing revetment would be removed to enable the foundation enlargement.	- Following construction, new revetment would be placed to minimize future scour holes.		All	
SG, HZ	All	Drilling to construct new shafts	- Site-control measures would also be needed to ensure open excavations are secure and do not pose a risk to human health or ecological health.	Clean Water Act (33 USC 1251–1387; City of Portland BES Best Management Practices; City of Portland National Pollutant Discharge Elimination System Stormwater Discharge Permit No. 101314	All	
SG, HZ	All	Drilling to construct new shafts	- Drilling activities would need to be managed in a manner that contaminants are not introduced into the ground and potentially to groundwater or surface water. Potential contaminants can be sourced from equipment used for excavating (drilling) or from other sources such as stormwater that is allowed to discharge into an excavation.	Clean Water Act (33 USC 1251–1387; City of Portland BES Best Management Practices; City of Portland National Pollutant Discharge Elimination System Stormwater Discharge Permit No. 101314	All	
SN	Enhanced Seismic Retrofit	Temp closure of space under bridge rented by University of Oregon for classroom use.	- Relocation assistance.		All	
EQ; SN	All	Will displace people who sleep under bridge on sidewalk and in Park. Will displace people who shelter or use park area during daytime hours	- Support counseling and outreach due to construction and its impacts on the vulnerable population it serves. - When bathrooms and/or trash cans are displaced, coordinate to ensure availability in alternative locations.	N/A	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
SN		Construction reroutes Waterfront Trail and blocks use of section of Eastside Esplanade	- See parks and recreation.		All	Temporary closure of MAX Station on 1st Avenue (if station is open during construction)
EC; SN	All	Temporary displacement of Portland Saturday Market (PSM)	- Relocation assistance.	49 CFR Part 24	All	Duration varies substantially across alternatives
SN, EQ	All	PRM 1st Ave freight access restrictions	- Preparation of a schedule and plan for communicating and working around temporary access closures.		All	Restricted public access under bridge west and east of 1st Avenue and in Waterfront Park
SN, PS	Enhanced Seismic Retrofit	Temp closure of space under bridge rented by University of Oregon for classroom use.	- Coordination with UofO and property owner (City of Portland).		All	
ST	N/A	Increased impervious surface area	- Do not build a Temp Bridge.	City reg?	All	
ST	All	Increases in CSO flow	- Detention using underground pipes or vaults.	The current version of the City of Portland BES Sewer and Drainage Facilities Design Manual	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
ST, VF, WW	Replacement Alternatives	Impact to waters during construction from installation of temporary pilings, excavation of portions of the riverbed, installation of temporary cofferdams, complete demolition of the bridge substructure, and installation of permanent structure.	- Many measures for minimizing impacts have been identified in the Wetlands & Waters Technical Report and the Hydraulic Impact Analysis Technical Report. - Minimization would be achieved by constraining the in-water footprint as much as practicable as per design, implementing construction BMPs, and providing stormwater treatment.	Clean Water Act, Sections 404 and 401 (33 USC 1251–1387); Rivers and Harbors Act, Section 10 (33 U.S.C. 403); DSL Removal Fill Rules; City of Portland BES Best Management Practices; City of Portland NPDES Stormwater Discharge Permit No. 101314, Mult. Co. NPDES Permit covers discharges from the bridge (permit No. 103004)	All	-Long-Span alternative would have fewest number of piers and shafts in the river - Couch Extension would require more shafts in the river than the other replacement alternatives
TR	All	Impacts to Transit - Burnside St Buses 12,19, and 20) - TriMet Max on SW 1st Ave - Streetcar on MLK and Grand	- Max bus bridge caused by closure of the Max Station serving the Red and Blue lines. - Outreach and communications for service disruptions - Bus prioritization at Burnside bridgeheads leading onto the temporary bridge or Bus prioritization at Burnside bridgeheads and along DIRECT API detour routes. - Temporary bus stops near the construction zones due to bus stop closures on the bridge. - Coordinate with TriMet to assess the impact to bus routes that cross other bridges. If it is found that diverted traffic has a significant delaying effect on bus operations, routing additional bus lines over the temporary Burnside Bridge would be investigated.	N/A	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
TR	All	Impacts to Vehicle Traffic, Freight, and Transit – congestion	- Working with the City of Portland and Metro to develop a Traffic Management Plan and a temporary Travel Demand Management (TDM) plan and program to address resulting in Direct API diversions and congestion within the construction zone. - Specify and sign detour routes	N/A	All	
TR	N/A	Impacts to Active Transportation	- Implement temporary traffic calming or diversion measures, where warranted, in either: (1) places where bikeways don't have separated facilities within the Bicycle and Pedestrian Direct API, or (2) on select neighborhood greenway streets immediately adjacent to the dedicated bicycle / pedestrian detour routes. - Specify and sign/mark detour routes to the Steel Bridge to the north, and to either the Morrison or Hawthorne Bridge to the south	N/A	All	
TR	All	Impacts to Vehicle Traffic, Freight, and Transit – congestion	- Plan specific detour routes that minimize or avoid major transit streets where the additional detoured traffic volumes could significantly delay transit operations, including the Steel Bridge and the Rose Quarter Transit Center.		No Temporary Bridge; Temporary Bridge: Bicycles Pedestrians only; and Transit, Bicycles, and Pedestrians Only	
TR	All	Rerouting TriMet bus routes	- Rerouting additional bus lines to the Burnside Bridge.	N/A	Temporary Bridge: Transit, Bicycles, and Pedestrians	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
TR	All	Rerouting TriMet bus routes	- Detour routes for bus lines #12, 19, and 20 to the Steel Bridge. - Consider closure of Steel Bridge to all vehicles except buses and LRT during construction; would require additional outreach and analysis - Transit management plan that would consider transit priority, dedicated travel lanes, or other bus route and streetcar mitigation measures	N/A	No Temporary Bridge; Temporary Bridge: Bicycles Pedestrians only	
TR	All	Safety impacts	- Implement temporary, low-cost safety countermeasures at intersections within the Direct API, or on select neighborhood greenway streets immediately adjacent to the dedicated bicycle / pedestrian detour routes, such as: • Traffic signal reflective backplates • Right-turn or left-turn traffic calming to reduce motor vehicle turning speeds and increase driver visibility of pedestrians and bicyclists • Protected left-turn lane where a left-turn lane already exists - Implement temporary traffic signal phasing to separate pedestrians and bicyclists and turning motor vehicles - Develop a maintenance of traffic plan to designate and sign a detour route for traffic seeking to cross the Willamette River	N/A	All	
UT	All	NW Natural shuts down large diameter lines during warm months	- Protection measures include: • 30” of cover • 1-foot separation • Watchperson needed for excavations within 10 feet of high-pressure	ODOT Oregon Utility Relocation Manual	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
UT	All	Relocation of utilities	- Obtaining vertical and horizontal limits of key underground utilities could occur early in design and the recommended actions included as part of the early design package.	ODOT Oregon Utility Relocation Manual	All	Doing this work early in the design is not a regulatory requirement, or even a requirement within the relocation manual. The timing is discretionary, but you can choose to make it mandatory for the project.
UT	All	Potential disturbance to system users or facilities that do not require relocation or upgrades during construction.	- Proper coordination and the use of standard construction procedures and techniques to minimize disturbance.	OAR 952 - Oregon Utility Notification Center	All	Only relocation costs are included in utility report. Unknown if utility protection costs are included in the base costs. The only protection costs assumed in the utility report is $1 million for the protection of the 2 BES pipes attached to the sea wall.
UT	All	Relocation of Utilities	- 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. - During the final design phase, the relocation sites for affected utilities could be mapped and the effects of the relocation actions confirmed.	ODOT Oregon Utility Relocation Manual	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
UT	All	CenturyLink Local and PGE require 24/7 access to vaults and hatches for bridge	Protection measures include: • 12-inch separation for CenturyLink • 9-foot excavation clearance from poles for PGE	ODOT Oregon Utility Relocation Manual	All	
UT	All	TriMet utilities	Protection measures include: • 10-foot clearance of overhead wires • 10 feet from track centerline for excavation • 6-inch clearance to conduits • Protect rails with rubber mats/timbers	ODOT Oregon Utility Relocation Manual	All	
UT	All	CenturyLink Local and PGE require 24/7 access to vaults and hatches for bridge	- 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.	ODOT Oregon Utility Relocation Manual	All	
VF	All	Displacement of in-water habitat from cofferdams	- Work within IWWW - Fish salvage operations	ESA Section 7	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
VF	All	Terrestrial vegetation and wildlife habitat removal	-Clearing and grubbing would be conducted outside of nesting season or would be surveyed for nests prior to disturbance. - Compensatory mitigation to restore vegetated areas after construction is complete. Trees and vegetation to be replanted per City standards. -Cleaning plant materials from equipment and gear to reduce spread of invasive plant species -Invasive plant control, including removal in riparian habitat -Trees to be removed would be flagged during construction. Existing vegetation to be retained will be protected throughout construction and marked as off-limits to cutting or pruning with individual flagging and/or high-visibility construction fencing. -Trees to be removed could potentially be salvaged and preserved off-site during construction (e.g., cherry trees in Waterfront Park), with the possibility of being replanted on-site once construction is complete	City of Portland Zoning Code Title 33 Planning and Zoning	All	• The total amount of existing vegetation in the API is ~2.5 acres and ~310 trees. • Retrofit: 1.5 acres of existing vegetation removed; 87 trees • Short-Span: 1.5 acres; 87 trees • Long-span: 1.5 acres; 89 trees • Couch Extension: 1.5 acres; 114 trees
VF	All	Hydroacoustic impacts to fish from pile driving	- Bubble curtains when impact pile driving -Work within NMFS-specified IWWW -Work within cofferdams -Limited number of percussive pile strikes per day	ESA Section 7	All	
VF	All	Increase in turbidity/sedimentation	- Appropriate sediment and erosion control measures	ESA Section 7; Clean Water Act (33 USC 1251–1387)	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
VF	All	Noise disturbance may cause birds and wildlife to relocate	-Exclude bird-nesting from affected locations prior to construction. -Monitoring for nesting birds, marine mammals, and other wildlife during sensitive periods.	City of Portland BES Best Management Practices; Migratory Bird Treaty Act; Bald and Golden Eagle Protection Act	All	
VF, ST, WW	All	Impact on waters from installation of temporary pilings, excavation of portions of the riverbed, installation of temporary cofferdams, partial demolition of the bridge substructure, and installation of permanent structure.	-Prior to construction starting, an approved erosion and sediment control plan would be required. -During construction implement BMPs listed in the current version of the City of Portland Erosion, Sediment, and Pollutant Control Plan to prevent runoff with sediment or other pollutants from reaching drainage systems or the Willamette River. -In-water turbidity curtains will be installed to capture sediment suspended during select in-water construction activities.	Clean Water Act (33 USC 1251–1387); City of Portland BES Best Management Practices; City of Portland National Pollutant Discharge Elimination System Stormwater Discharge Permit No. 101314	All	
WW	Replacement Alternatives	Full demolition of the bridge substructure and erection of new permanent structures within the river for the new bridge, which would occur within the cofferdams.	-Does not entail removing and replacing a section of the harbor wall. -All portions of the demolished structures would be transported to upland storage facility or recycled.	Clean Water Act (33 USC 1251–1387); Rivers and Harbors Act of 1899 (33 USC 403); Oregon's Removal-Fill Law (ORS 196.795-990)	All	
WW	Enhanced Seismic Retrofit	Installation of temporary pilings, excavation of portions of the riverbed, installation of temporary cofferdams, and partial demolition of the bridge substructure.	- Minimization would be achieved by constraining the in-water footprint as much as practicable as per design, implementing construction BMPs, and providing stormwater treatment.	Clean Water Act (33 USC 1251–1387); Rivers and Harbors Act of 1899 (33 USC 403); Oregon's Removal-Fill Law (ORS 196.795-990)	All	Retrofit requires highest number of permanent shafts and the greatest areal extent of new footings within the river

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
WW, ST	All	Temporary detour bridge impacts	-Choosing the option that requires less in-water structural support (No Temporary Bridge option) adds no additional in-water work; of the temporary bridge options, the option that accommodates pedestrians/bicycles only would have the least temporary in-water structure). -Temporary bridges with vehicles would need to treat all stormwater, temporary bridges with pedestrian access only would need to treat if runoff is concentrated prior to discharge. -If "temporary" bridge is in place longer than 3 years, it is not considered temporary from a water quality standpoint and would be subject to permanent stormwater treatment requirements.	Clean Water Act, Section 404 and 401(33 USC 1251–1387); Rivers and Harbors Act of 1899 (33 USC 403); Oregon's Removal-Fill Law (ORS 196.795-990)	Temporary Bridge: All modes	The Retrofit Alternative with a temporary detour bridge would require the removal of one additional tree
WW	Enhanced Seismic Retrofit	-A portion of the harbor wall (approx. 175') that extends along the west edge of the river's OHW would be removed during construction, causing short-term potential for sedimentation and flooding impacts while wall is not in place.	- Remove the wall section after stabilizing the upland area immediately landward of the wall and isolating the work area with a three-sided cofferdam. -Replace the wall section in-kind within the dewatered area as soon as retrofit of the pier is complete.	Clean Water Act, Section 404 and 401(33 USC 1251–1387); Rivers and Harbors Act of 1899 (33 USC 403); Oregon's Removal-Fill Law (ORS 196.795-990)	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
WW, VF	All	Impacts to aquatic functions, including shallow water habitat functions	- Compensatory mitigation would meet the requirements and guidance provided by USACE, Oregon DSL, and the City of Portland. Follow federal Final Mitigation Rule, Oregon's Aquatic Resource Mitigation Framework policy, and City of Portland mitigation requirements. -Mitigation may include Linnton Mill Mitigation Bank credit purchase (assumes City code will be revised to allow for mitigation outside of lower reach), permanent riprap removal, and returning areas of temporary impact to pre-construction conditions.	Clean Water Act Section 404 (33 USC 1251–1387); City of Portland Zoning Code Title 33 Planning and Zoning; Oregon's Removal-Fill Law	All	Assumes City code will be revised to allow for mitigation beyond lower reach at Linnton Mill Mitigation Bank.
WW, VF	All	Use of barges year-round to support equipment needed for demolition and transport of demolished structure can impact aquatic species through slightly increased turbidity and sedimentation from spudding and induced avoidance behavior of larger organisms	-Standard BMPs	Clean Water Act (33 USC 1251–1387); Oregon's Removal-Fill Law (ORS 196.795-990); Fish and Wildlife Coordination Act (16 U.S.C. 661-667e)	All	

Topic	Build Alternative	Impact Description	Potential Mitigation Measures to Consider	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
VF, WW	All	Dredging of riverbed (mostly upstream of existing bridge; to -40 to -42 (NAVD 88) to achieve no net rise of floodplain elevation resulting in short-term turbidity and loss of riverbed habitat	-Work would be conducted within IWWW. - Turbidity curtains will be strategically placed to capture sediment suspended in the water during the proposed dredging of riverbed material -Riverbed material dredged to achieve a no net rise in flood elevation will be sampled according to a Sediment Analysis Plan -Material that is dredged will be disposed in an upland location or recycled. -Potential for future periodic dredging to maintain elevations.	Clean Water Act Section 404 and 401 (33 USC 1251–1387); Zoning Code Title 33 Planning and Zoning; Oregon's Removal-Fill Law; ESA Section 7 compliance	All	The Portland Sediment Evaluation Team is requiring a Sediment Analysis Plan prior to issuance of DEQ's 401 water quality certification. - CLOMR may be prepared to revise base flood elevation to minimize or negate need for dredging - Sampling according to the Sediment Evaluation Framework
FL, VF, WW	All	Removal of riprap along east bank of river to facilitate construction of the Eastbank Esplanade Pedestrian Connection may destabilize the bank	-Turbidity curtains installed during removal and replacement activities -Work would be conducted within published IWWW -Once construction ceases in this area, rip rap will be replaced and compacted to re-stabilize the bank.	Clean Water Act Section 404 and 401 (33 USC 1251–1387); Zoning Code Title 33 Planning and Zoning; Oregon's Removal-Fill Law	All	No temporary means of stabilizing the bank have been identified. Rip rap would be replaced at the close of construction.

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Attachment J-2. Potential Mitigation Measures for Long-Term

This table lists potential mitigation measures to address long-term impacts identified during the Draft EIS process. Following the DEIS comment period, any refinements to design or construction assumptions, and any updated impacts analysis, mitigation commitments for the preferred alternative will be recorded in the Record of Decision.

Legend:

AQ = Air Quality
CC = Climate Change
CR = Cultural Resources.
DI = Displacements
EC= Economics
EQ= Equity and Environmental Justice
FL = Flooding and Hydraulics
HI = Health Impact Assessment
HZ = Hazardous Materials
LU = Land Use
NO = Noise
PR= Parks and Recreational resources
PS = Public Services
SG = Soils and Geology
SN = Social/Neighborhoods
SU = Sustainability
ST = Stormwater
TR = Transportation
UT = Utilities
VR = Visual Resources
VF = Vegetation, Wildlife and Fish
WW = Wetlands and Waters
4f = Section 4(f)

Topic	Build Alternative	Impact Description	Potential Mitigation	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
CR	All	Bridge removal from national registry and as a city landmark	-Consider adding permanent physical mitigation	Section 106 NHPA		
CR	All	Bridge demolition/removal; historic preservation	- Develop a survey of historic events in the life of the Burnside Bridge - Incorporate public art regarding the Bridge (e.g. erect a cenograph to the current bridge) - Prepare an "obituary" of the Burnside Bridge - Publish oral histories regarding the bridge, such as histories of the bridge operators - Graphically illustrate for history's sake the engineering, including the timber piles and foundation design, of the bridge - Commission a public work of art to commemorate the bridge - Engage Oregon's poet laureate to commemorate the bridge - Update and elaborate on online encyclopedia submissions, such as the Wikipedia entry on the bridge - Create a museum exhibit (e.g. curate a "memory book" of essays about the bridge by local citizens for public display) - Develop an education component for elementary school children; update existing Willamette River Bridges curriculum used in Portland metro schools - Use of historic bridge components in the new design or project area - Update Historic American Engineering Record (HAER) documentation - Provide interpretive panels about the bridge - Support historic documentation efforts of local repositories - Develop documentation of the history of the Willamette River crossings	Section 106 NHPA	All	Updated based on information provided on 12/30/2020

Topic	Build Alternative	Impact Description	Potential Mitigation	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
CR	Enhanced Seismic Retrofit	Bridge demolition	- Retain as many of the original design and engineering features of the bridge as feasible. For example, retaining the octagonal form and Italianate architectural style of the retrofitted operator towers.	Section 106 NHPA		
CR	Enhanced Seismic Retrofit	URM historic building impacts – new bridge would create a 2-foot gap between the URM	- Potentially advocate for permanent seismic retrofit mitigation since many of them are owned by non-profits - Coordinate with URM building owners to see if retrofit measures have been taken			
CR	Replacement Alternatives	Burnside Bridge full removal	- It may be possible to salvage and reuse some architectural elements that would be removed or otherwise lost. - Appropriate interpretation and education (I&E) measures: brochures and other publications, development of displays and exhibits, interpretive panels, websites, and phone apps. - Events that recognize and celebrate the bridge's history. - Consult with SHPO to determine if the 2000 HAER documentation of the bridge should be updated. Alternatively, documentation of the bridge prior to any alterations would be state-level documentation in consultation with SHPO.	Section 106 NHPA		

Topic	Build Alternative	Impact Description	Potential Mitigation	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
CR	All	Disturbing and/or damaging archaeological resources due to removal/ placement of bents and proposed grouting	- Define locations where archaeological monitoring would be required during construction or other ground-disturbing activity. - Define procedures or protocols to be followed when archaeological resources are encountered during construction. This would include a rapid assessment to both optimize gathering relevant archaeological data and minimize construction delays. - Develop a more refined archaeological sensitivity model that would not only define where archaeological resources may be present but also the types of artifacts and features that may be present. - Once a preferred alternative is defined, identify those locations at which ground-disturbing activity is proposed and is an area defined as having a high potential for archaeological resources. Preliminary archaeological field excavations could be undertaken to determine if archaeological deposits are present (e.g., shovel probing, backhoe trenching). The results of these efforts could be used to further refine the model. - Prepare a research design that defines research questions that can potentially be addressed by archaeological resources in the project area. The research design would also define what artifacts and features are best for addressing the research questions.	Section 106 NHPA		
CR	All	PSM building removal	- Consider opportunities to enhance the historic district and develop that corner instead of an ADA ramp			- City has submitted comment of reservations about the location of the ramps because there is preference to use that area as a historic district

Topic	Build Alternative	Impact Description	Potential Mitigation	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
EC, EQ, DI, LU	Replacement with Couch Extension	Pacific Coast Fruit Company – displacement	- Acquisitions and Relocations conducted in accordance to Uniform Relocation & Real Property Acquisition Policy Act of 1970. - As design and construction assumptions advance, identify potential opportunities to reduce property impacts. - Coordinate with staff - Coordination with Multnomah County and the City of Portland to identify potential relocations sites for displaced businesses. - Preparation of a schedule and plan for communicating temporary access closures.	49 CFR Part 24	All	Workforce demographics of the Pacific Coast Fruit Company are not known at the time of this writing; therefore, impacts to the Pacific Coast Fruit Company are included in this analysis for broad consideration alone.
EQ	Couch Extension	Bikes from Ankeny St bikeway would need to be re-routed to Davis and MLK	- Provide bike/ped route upgrades to 3rd Ave, Davis St, and MLK Blvd.			
EQ, SN	Enhanced Seismic Retrofit	Permanent narrowing of Burnside sidewalk on north side of west approach	- Can the sidewalk narrowing be avoided?		All	PRM concerned about how this will affect safety of clients on sidewalk
FL	All	Increase in base flood elevation	- Lengthen the bridge spans to reduce the number of piers in the floodplain. - Design pier shaping to minimize energy losses.	- Floodplain Management Presidential EO 11988 and 23 CFR 650A - 23 CFR 650A Section 113 – FHWA, Location and Hydraulic Design of Encroachments on Flood Plains, Only practicable alternative finding - PCC 24.50.060.D and 44 CFR 60.3(d)(3)		- Construction within the Special Flood Hazard Area requires a permit from the City of Portland to ensure floodplain protection requirements are met.

Topic	Build Alternative	Impact Description	Potential Mitigation	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
FL	All	Increase in base flood elevation	- Design pier shaping to minimize energy losses. - Size the bridge pier structures to minimize increase in water surface elevation for the 100-year peak flood discharge, or to pass the 100-year peak flood discharge with little or no increase in the water surface elevation. - Lengthen the bridge spans to reduce the number of piers in the floodplain. - Appropriate mitigation measures would be developed after the hydraulic design of the bridge has been completed.	- Floodplain Management Presidential EO 11988 and 23 CFR 650A - 23 CFR 650A Section 113 – FHWA, Location and Hydraulic Design of Encroachments on Flood Plains, Only practicable alternative finding - PCC 24.50.060.D and 44 CFR 60.3(d)(3)		- Construction within the Special Flood Hazard Area requires a permit from the City of Portland to ensure floodplain protection requirements are met.
GS	All	Identified impacts to soils and geology are associated with strategies to enhance or replace the existing bridge and bridge access foundations to meet the objective of a seismically resilient Burnside Street Bridge.	- Seismic resiliency has been incorporated into the design of all alternatives. Additional mitigation measures to minimize impacts will be addressed using information obtained through subsequent geotechnical evaluations and during design engineering utilizing standard-of-practice bridge construction methods. Mitigation measures will be identified that meet applicable state and federal design and construction codes that govern transportation projects.	N/A		
HI	All	Economic impacts on local businesses	- Coordinate with existing non-profits to support recruiting and job training efforts, prioritizing low income residents and people of color.	N/A		
HI		Negative health impacts of a major earthquake	- Select one of the build alternatives that minimizes the risk of bridge collapse.	N/A		
HI; SN	All	Impacts on social cohesion	- Mitigate impacts to the Japanese American Historical Plaza. - Acknowledge native peoples and lands.	N/A		

Topic	Build Alternative	Impact Description	Potential Mitigation	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
HI	All	General impacts of urban heat				
HI		Long-term risks from air pollution during operation	- Select an alternative that allows design features that maximize distance between vehicle pollution and people walking and cycling.	N/A		
HI, TR	All	Traffic crash deaths in the project area; active transportation safety	- Allow maximum speeds of 25 mph. - The intersection of W Burnside and NW 2nd Avenue may warrant changes to signal phasing to better separate bicyclists and pedestrians from right-turning vehicle traffic in the westbound direction. Such mitigation would be further developed in the final design phase. As the Project proceeds into final design, consider updating traffic signals within the Safety Direct API to include reflective backplates, protected only left turn phasing where left turn lanes already exist, and right turn and left turn traffic calming to reduce motor vehicle turning speeds and increase driver visibility of pedestrians and bicyclists.	N/A	All	
PR	All	Removal and damage to landscaping and hardscape from construction activities	- The Project will follow PP&R landscape design guidelines and Bureau of Development Services mitigation requirements for work within the Greenway Overlay Zones. - Returning parks facilities to their pre-construction or better condition. This includes a need for close coordination with PP&R, the Nikkei Endowment association (Japanese American Museum of Oregon), and the Burnside Skatepark managers.	PP&R landscape design guidelines and Bureau of Development Services mitigation requirements Section 4(f)		
PR	Replacement Alternatives	Replacement alts beneficial impacts to Waterfront Park from removing bents and/or piers in the park	- Waterfront Park would gain usable space underneath the bridge because of the elimination of bridge supports. Coordination with City of Portland representatives would be necessary to ensure the finished design of the space after construction meets City design and maintenance preferences.	N/A		Largest benefit with Long-Span Approach

Topic	Build Alternative	Impact Description	Potential Mitigation	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
PR, VI	All	Loss of street trees and trees in Waterfront Park	- Protect and maintain street and park trees where feasible. Post-construction replaces any trees removed during project construction.	N/A	All	Temporary Bridge removes additional trees south of the Bridge
PS, DI, EC, SN, EQ, LU	Replacement Alternatives	Displacement of University of Oregon classroom	- Acquisitions and Relocations conducted in accordance to Uniform Relocation & Real Property Acquisition Policy Act of 1970. - As design and construction assumptions advance, identify potential opportunities to reduce property impacts. - Coordination with Multnomah County and the City of Portland to identify potential relocations sites for displaced businesses. - Preparation of a schedule and plan for communicating temporary access closures.	49 CFR Part 24		
SN, DI, PS, EC, EQ, LU	All	Displacement of AMR, Saturday Market Administration Offices and others	- Acquisitions and Relocations conducted in accordance to Uniform Relocation & Real Property Acquisition Policy Act of 1970. - As design and construction assumptions advance, identify potential opportunities to reduce property impacts. - Coordination with Multnomah County and the City of Portland to identify potential relocations sites for displaced businesses. - Preparation of a schedule and plan for communicating temporary access closures.	49 CFR Part 24		
SN, DI, PS, EC, EQ, LU	All	Displacement of PSM	- Coordinate with PP&R regarding PSM relocation alternatives			

Topic	Build Alternative	Impact Description	Potential Mitigation	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
ST	All	Increased Runoff and Water Quality impacts. Permanent Contributing Impervious Area (CIA) adds pollutants to stormwater runoff	- Implement storm water quality measures approved by NMFS. Two bioswales 8' wide and 220' long would address treatment requirements; however, they are not practical given the developed character and shortage of available land in the bridge area. Instead, use underground, manufactured stormwater filters, location TBD.	- City of Portland National Pollutant Discharge Elimination System Stormwater Discharge Permit No. 101314. - Clean Water Act (33 USC 1251–1387); City of Portland BES Best Management Practices;		
ST	All	Portions of project will contribute to the City of Portland's Combined Sewer Overflow System.	- Mitigate any increases in storm water quantity through detention using underground pipes or vaults to meet the design criteria in the current version of the City of Portland BES Sewer and Drainage Facilities Design Manual.	City of Portland BES Sewer and Drainage Facilities Design Manual		
TR, HI	All	Traffic crash deaths in the project area	- Select an alternative with maximum crash reduction.	N/A		
UT	All	TriMet utilities	Protection measures include: • 10-foot clearance of overhead wires • 10 feet from track centerline for excavation • 6-inch clearance to conduits • Protect rails with rubber mats/timbers	ODOT Oregon Utility Relocation Manual		
UT	All	NW Natural shuts down large diameter lines during warm months	- 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.	ODOT Oregon Utility Relocation Manual		
UT	All	NW Natural shuts down large diameter lines during warm months	- Protection measures include: • 30" of cover • 1-foot separation • Watchperson needed for excavations within 10 feet of high-pressure	ODOT Oregon Utility Relocation Manual		
UT	All	CenturyLink Local and PGE require 24/7 access to vaults and hatches for bridge	- 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.	ODOT Oregon Utility Relocation Manual		

Topic	Build Alternative	Impact Description	Potential Mitigation	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
UT	All	Relocation of Utilities		ODOT Oregon Utility Relocation Manual		
UT	All	TriMet utilities	- 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.	ODOT Oregon Utility Relocation Manual		
UT	All	CenturyLink Local and PGE require 24/7 access to vaults and hatches for bridge	- Protection measures include: • 12-inch separation for CenturyLink • 9-foot excavation clearance from poles for PGE	ODOT Oregon Utility Relocation Manual		
VF	All	Loss of in-stream and shallow water habitat	- Purchase of credits at an off-site mitigation bank. The Linnton Mill Mitigation Bank will likely have credits available for purchase in 2021.	Clean Water Act (33 USC 1251–1387); Oregon's Removal-Fill Law (ORS 196.795-990); ESA Section 7, City of Portland zoning title 33		-The Linnton Mill Mitigation Bank, though not yet accredited, was constructed in 2019 within and along the lower Willamette River. -Permanent impacts to shallow water habitat are same under the Retrofit, Short- and Long-span alternatives (211 SF) as compared to the couch extension (231 SF)
VF	All	Loss of riparian habitat	-Restoration of 0.7 acre of riparian habitat on the east bank of the river within the Project Area.	ESA Section 7; City of Portland zoning title 33		Revegetation of the east bank will establish native riparian species and control non-native invasive species (e.g., Himalayan blackberry).
VI	All	Change in the visual character of the crossing and approaches	- Consider visual impacts when selecting bridge type. - Develop design to be compatible with the existing visual character of the project environments.			

Topic	Build Alternative	Impact Description	Potential Mitigation	Regulatory Requirement (if applicable)	Construction Traffic Management Option	Notes
VF, WW	All	The installation of permanent structure (i.e., drilled shafts, bridge footings, concrete seal course, permanent piling) within the river below OHWM.	-Purchase of credits at an off-site mitigation bank such as the Linton Mill Mitigation Bank. Another option is to support development and implementation of the Eastbank Crescent Riverfront project. -Minimization would be achieved by constraining the in-water footprint as much as practicable as per design, implementing construction BMPs, and providing stormwater treatment. --Purchase credits from Linnton Mill Mitigation Bank to offset net fill in the functional floodplain.	Clean Water Act (33 USC 1251–1387); Rivers and Harbors Act of 1899 (33 USC 403); ESA Section 7; Oregon's Removal-Fill Law (ORS 196.795-990)		The Long-span alternative will have the least in-water impact.
ST, VF	All	Increased runoff and water quality impacts. Permanent Contributing Impervious Area (CIA) adds pollutants to stormwater runoff	-Stormwater runoff would be treated prior to discharge into the Willamette -Implement stormwater quality measures approved by City of Portland, NMFS, and other applicable requirements. Underground, manufactured stormwater filters, location TBD, will be constructed.	City of Portland NPDES Stormwater Discharge Permit No. 101314; Mult. Co. NPDES Permit covers discharges from the bridge (permit No. 103004); Clean Water Act (33 USC 1251–1387); City of Portland BES Best Management Practices; City of Portland BES 2020 Stormwater Management Manual; ODOT FAHP Standards		Because project would require stormwater treatment to current regulatory standards, overall water quality from stormwater runoff is expected to improve. Stormwater treatment facilities will be constructed to treat newly created impervious surfaces as well as additional areas that are currently untreated. The biggest improvement will be removal of heavy metals which will benefit fish and aquatic organisms.
FL, WW, VF	All	Increased and/or altered erosion and sedimentation from larger piers, which may resuspend toxins buried in the sediment	-Modify pier shape and size to minimize effect on river hydraulics -Sample sediments prior to beginning construction to determine extent and nature of buried toxins	Clean Water Act (33 USC 1251–1387)		The Portland Sediment Evaluation Team is requiring sediment sampling according to the Sediment Evaluation Framework

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