FINDING OF NO SIGNIFICANT IMPACT (FONSI)
Hiram M. Chittenden Locks Large Lock Center Gate Project
King County, Washington

The U.S. Army Corps of Engineers, Seattle District (USACE) has conducted an environmental analysis in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended. The final Environmental Assessment (EA) dated January 2022 for the Hiram M. Chittenden Locks (Locks) Large Lock Center Gate Project addresses efficient navigation through the large lock and routine visual maintenance inspections of the large lock center gate (LLCG) at the Locks in Seattle, King County, Washington.

The final EA, incorporated herein by reference, evaluated various alternatives to maintain efficient navigation through the large lock and facilitate safe routine visual maintenance inspections of the LLCG. There is one Federal action analyzed in the EA summarized below.

Proposed Action: The preferred alternative is Alternative 3, Replace LLCG, which replaces the LLCG with a single-skin miter gate that meets current safety design standards and allows visual inspections without requiring entry into confined spaces.

Alternatives: In addition to a "no action" plan, two alternatives were evaluated. The alternatives included rehabilitate the LLCG (Section 2.2) and replace the LLCG (Section 2.3). The rehabilitate the LLCG alternative did not meet the purpose and need because it does not meet current safety standards and was not carried forward for detailed analysis. For all alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the recommended plan are listed in Table 1:

Table 1: Summary of Potential Effects of the Proposed Action

	Insignificant effects	Insignificant effects as a result of mitigation	Resource unaffected by action
Aesthetics	☒	☐	☐
Air quality	☒	☐	☐
Aquatic resources/wetlands	☒	☐	☐
Invasive species	☐	☐	☒
Fish and wildlife habitat	☒	☐	☐
Threatened/Endangered species/critical habitat	☐	☒	☐
Historic properties	☐	☒	☐
Other cultural resources	☒	☐	☐
Floodplains	☐	☐	☒
Hazardous, toxic and radioactive waste	☐	☐	☒

	Insignificant effects	Insignificant effects as a result of mitigation	Resource unaffected by action
Hydrology and geomorphology	☐	☐	☒
Land use	☐	☐	☒
Navigation	☐	☒	☐
Noise levels	☒	☐	☐
Public infrastructure	☒	☐	☐
Recreation	☐	☒	☐
Socioeconomics	☒	☐	☐
Environmental justice	☐	☐	☒
Soils	☐	☐	☒
Tribal trust resources	☒	☐	☐
Water quality	☐	☒	☐
Climate change	☐	☐	☒

Impact Minimization: All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Best management practices (BMPs) as detailed in the EA will be implemented, if appropriate, to minimize impacts. Sections 2.3.3 and 2.3.4 of the final EA lists BMPs and conservation measures related to Endangered Species Act (ESA)-listed species and water quality. This includes scheduling the in-water work window between 15 October and 15 February to avoid migrating ESA-listed salmon and monitoring for turbidity and pH changes during construction. The USACE will require the contractor to submit a spill prevention and countermeasures plan to prevent deleterious materials from entering the water. Further, the scheduling of the large lock closure (Section 2.3.2) considers the importance of minimizing disruption to navigation such that each lock closure within the in-water work window will be limited to 30 days with a navigation period of at least 15 consecutive days. Impact to recreation is mitigated by keeping the small lock open and maintaining public access across the Locks.

Mitigation: The recommended plan will result in unavoidable adverse impacts to the Lake Washington Ship Canal (LWSC) Historic District as there would be 100 percent loss of the original LLCG. To mitigate for these unavoidable adverse impacts, the USACE developed a Memorandum of Agreement (MOA) that documents the adverse effect (see Compliance part “e” below; Sections 3.7 and 7.7 of the final EA).

Public Review: Public review of the draft EA and FONSI was completed 11 February 2022. All comments submitted during the public review period are addressed in the final EA and FONSI (Appendix C of the final EA).

Treaty Tribes: The Muckleshoot Indian Tribe and the Suquamish Indian Tribe were contacted regarding the LLCG project and the USACE will continue to coordinate throughout the project to meet Tribal trust obligations. The Suquamish Indian Tribe expressed concerns with the in-water work window overlapping with the Tribal coho salmon fishery that takes place annually as early as mid-September and could extend to early November. It is expected that up to 10,000 adult coho salmon will pass the Locks on their annual migration. The USACE supplied additional project information and discussed construction logistics with the Suquamish Indian Tribe to avoid and minimize effects to the coho salmon fishery. Further coordination and consultation with both Tribes will occur throughout the construction effort.

Compliance:

a. Endangered Species Act:

The National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), and the U.S. Fish and Wildlife Service (USFWS) are responsible for implementing the ESA of 1973. The USACE evaluated potential effects to endangered species in a Biological Assessment (BA) and determined that the proposed action would have minor and discountable effects from in-water noise and disturbance, lock dewatering, and potentially degraded water quality, in a limited area. Coordination with the USFWS and NMFS was initiated through the submission of the BA on 15 December 2021. The USACE received a letter of concurrence from USFWS 14 March 2022 and from NMFS 15 March 2022, which accepted the USACE-proposed BMPs and conservation measures.

b. Manguson-Stevens Fishery Conservation and Management Act:

The BA contained the USACE determination that the proposed action will not adversely affect Essential Fish Habitat (EFH) for federally managed fish species in Washington waters. NMFS concluded the action would not adversely affect EFH, thus, consultation under the MSA is not required for this action.

c. Coastal Zone Management Act:

The USACE determined that the proposed project is consistent to the maximum extent practicable with the enforceable policies of the Washington State Coastal Zone Management Program. The USACE prepared a Coastal Zone Management Act (CZMA) Consistency Determination outlining this determination for concurrence of the Washington Department of Ecology (Ecology). The USACE submitted the CZMA Consistency Determination to Ecology 14 January 2022. Ecology requested a 15-day extension for their decision as provided for in CFR 930.41(b) in order to complete the public comment process, which extended the 60-day review period ending 15 March 2022 to 30 March 2022. Ecology requested an additional extension 29 March 2022, until 14 April 2022. USACE received Ecology’s concurrence 12 April 2022.

d. Clean Water Act:

Pursuant to both Section 404 of the CWA (33 USC 1344(f)(1)(b)) and Federal Regulations 33 CFR 323.4(a)(2), the USACE has determined that the proposed project falls within an exemption since the activity falls within the parameters of

maintenance. Therefore, the repair does not require a Section 404(b)(1) evaluation or Section 401 certification.

e. National Historic Preservation Act:

On 12 May 2021, the USACE initiated consultation with the State Historic Preservation Officer (SHPO) and affected tribes with an area of potential effect (APE) letter. On 14 May 2021, SHPO concurred with the APE. On 21 May 2021, the USACE sent the determination and findings letter to the SHPO, documenting the USACE finding of adverse effect to the LWSC Historic District by the demolition and replacement of the original center gate of the large lock. On 27 May 2021, USACE and SHPO staff had a teleconference to discuss the project. SHPO staff requested additional information regarding the APE, location of center gate in relation to the large lock and the demolition plan for the concrete surrounding the center gate on either side of the large lock. On 15 June 2021, the USACE sent a letter with the revised APE, and provided the additional information as requested. On 22 June 2021, the SHPO concurred with the revised APE and the USACE determination that the demolition and replacement of the original LLCG is an adverse effect. On 14 June 2021, letters were sent to the following identified consulting parties: City of Seattle Historic Preservation Program, Friends of the Ballard Locks, King County Historic Preservation Program, Historic Seattle, Muckleshoot Indian Tribe, and the Suquamish Indian Tribe. All consulting parties have declined to participate in the development of the MOA. The MOA was signed 11 November 2021 for the mitigation of the adverse effect this project will have on the LWSC Historic District.

f. Other Significant Environmental Compliance:

All applicable environmental laws have been considered and coordination with appropriate agencies and officials has been completed.

Finding: All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on the analysis presented in the EA, which has incorporated or referenced the best information available; the reviews by other Federal, State and local agencies, Tribes; input of the public; and the review by my staff, it is my determination that the recommended plan will not cause significant effects on the quality of the human environment. Therefore, preparation of an Environmental Impact Statement is not required.

2 May 2022
Date

Xander L Bullock
ALEXANDER “XANDER” L. BULLOCK
COL, Corps of Engineers
Commanding

FINAL Environmental Assessment

Hiram M. Chittenden Locks Large Lock Center Gate Project
Lake Washington Ship Canal, King County, Washington

April 2022

US Army Corps of Engineers®
Seattle District

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Hiram M. Chittenden Locks Large Lock Center Gate Project

Final Environmental Assessment

April 2022

Responsible Agency: The responsible agency for this maintenance project is the Seattle District, U.S. Army Corps of Engineers (USACE).

Abstract:

In accordance with the National Environmental Policy Act, this Environmental Assessment (EA) evaluates the impacts of the proposed large lock center gate (LLCG) replacement at the Hiram M. Chittenden Locks (Locks). The USACE operates and maintains the Lake Washington Ship Canal (LWSC) project, an eight-mile-long navigation channel located within the city of Seattle that extends from deep water in Puget Sound through Shilshole Bay, the Locks, Salmon Bay, Lake Union, Portage Bay and Union Bay to deep water in Lake Washington. The LWSC project includes the Locks, a navigation channel (often referred to as the LWSC or ship canal), and a reservoir that includes two natural lakes, Lake Washington and Lake Union. The reservoir is regulated for navigation and fish passage. The LLCG, commissioned in 1917, is over 100 years old. The LLCG has two leaves that swing out from the walls and meet in the center of the lock. The gate's design does not meet current safety standards and has exceeded its functional lifespan. Recent inspection shows the gate has excessive corrosion and wear and is dangerous to inspect due to confined spaces within the gate. The purpose of this project is to maintain efficient navigation through the large lock and facilitate safe routine visual maintenance inspections of the LLCG.

The recommended plan consists of replacing the LLCG with a single skin horizontally framed gate, which would maintain the functional integrity of the LLCG by replacing and modernizing the LLCG and associated components connecting the gate to the lock walls. This plan meets the purpose and need by maintaining reliable and efficient navigation through the large lock, meeting current safety standards, and allowing visual inspections without requiring entry into confined spaces.

The LLCG project would take up to four years to complete and could begin as early as 2022. All in-water work would occur during the established in-water work window between October 15 and February 15, which coincides with up to three potential navigation closures up to 30 days and/or vessel width and timing restrictions annually. Based on the analysis in the EA, the proposed project would not constitute a major Federal action significantly affecting the quality of the human environment, thus preparation of an environmental impact statement is not required.

THE OFFICIAL COMMENT PERIOD FOR THE DRAFT EA WAS FROM January 12, 2022 TO February 11, 2022.

This document is available online at:
https://www.nws.usace.army.mil/Missions/Environmental/Environmental-Documents/

under "Hiram M. Chittenden Locks Large Lock Center Gate Project".

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Acronyms and Abbreviations

BA	Biological Assessment
BiOp	Biological Opinion
BMPs	Best Management Practices
CAA	Clean Air Act
CWA	Clean Water Act
dB	Decibels
DO	dissolved oxygen
EA	Environmental Assessment
Ecology	Washington State Department of Ecology
ECS	Emergency Closure System
EFH	Essential Fish Habitat
EO	Executive Order
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FONSI	Finding of No Significant Impact
GHG	Greenhouse Gas
LLCG	Large Lock Center Gate
Locks	Hiram M. Chittenden Locks
LWSC	Lake Washington Ship Canal
MIT	Muckleshoot Indian Tribe
MLLW	Mean Lower Low Water
MOA	Memorandum of Agreement
NAAQS	National Ambient Air Quality Standards
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRHP	National Register of Historic Places
PM	Particulate Matter
PN	Public Notice
RL	Received Level
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office/Officer
SPCC	Spill Prevention Control and Countermeasures
SWPPP	Stormwater Pollution Prevention Plan
TTS	Temporary Threshold Shift
USACE	U.S. Army Corps of Engineers, Seattle District
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources

1 PROPOSAL FOR FEDERAL ACTION

This Environmental Assessment (EA) evaluates the environmental effects of the proposed large lock center gate (LLCG) replacement at the Hiram M. Chittenden Locks (Locks).

1.1 Location of the Proposed Action

The Lake Washington Ship Canal (LWSC) project is located at 3015 NW 54th Street, Seattle, King County, Washington, at Range 3 East, Township 25 North, Section 11. USACE operates and maintains the LWSC project, an eight-mile-long navigation channel located within the city of Seattle that extends from deep water in Puget Sound through Shilshole Bay, the Locks, Salmon Bay, Lake Union, Portage Bay and Union Bay to deep water in Lake Washington (Figure 1). The LWSC project includes the Locks, a navigation channel (often referred to as the LWSC or ship canal), and a reservoir that includes two natural lakes, Lake Washington and Lake Union. The operation of the Locks allows commercial navigation and connectivity of the saltwater of Puget Sound to the freshwater of Lakes Union and Washington.

The Locks also allow the passage of recreational vessels and anadromous fish species. For years, logs and coal traversed the over 100-year-old locks. Today, it is smaller recreational boats that make the Locks the busiest lock in the nation in terms of vessel traffic. More than 40,000 boats typically pass through the Locks each year. Fish have also been navigating the Locks for as long as the Locks have been operating. In addition to the missions of navigation and environmental stewardship, the LWSC project is authorized for recreation, receiving approximately one million pedestrian visitors each year. The reservoir is regulated for navigation and fish passage.

The project area encompasses the large lock and area immediately upstream and downstream shown in Figure 1.

1.2 Project Authority

The LWSC project was initially authorized for construction by the Rivers and Harbors Act (RHA) of 1910 in accordance with House Document No 953 of the 60th Congress, first session, for the purpose of facilitating commercial navigation between Puget Sound and Lake Washington. This included construction of a dam, two locks, and the necessary accessory works at the entrance to Salmon Bay, including a fish ladder. Construction occurred between 1911 and 1916 by the USACE.

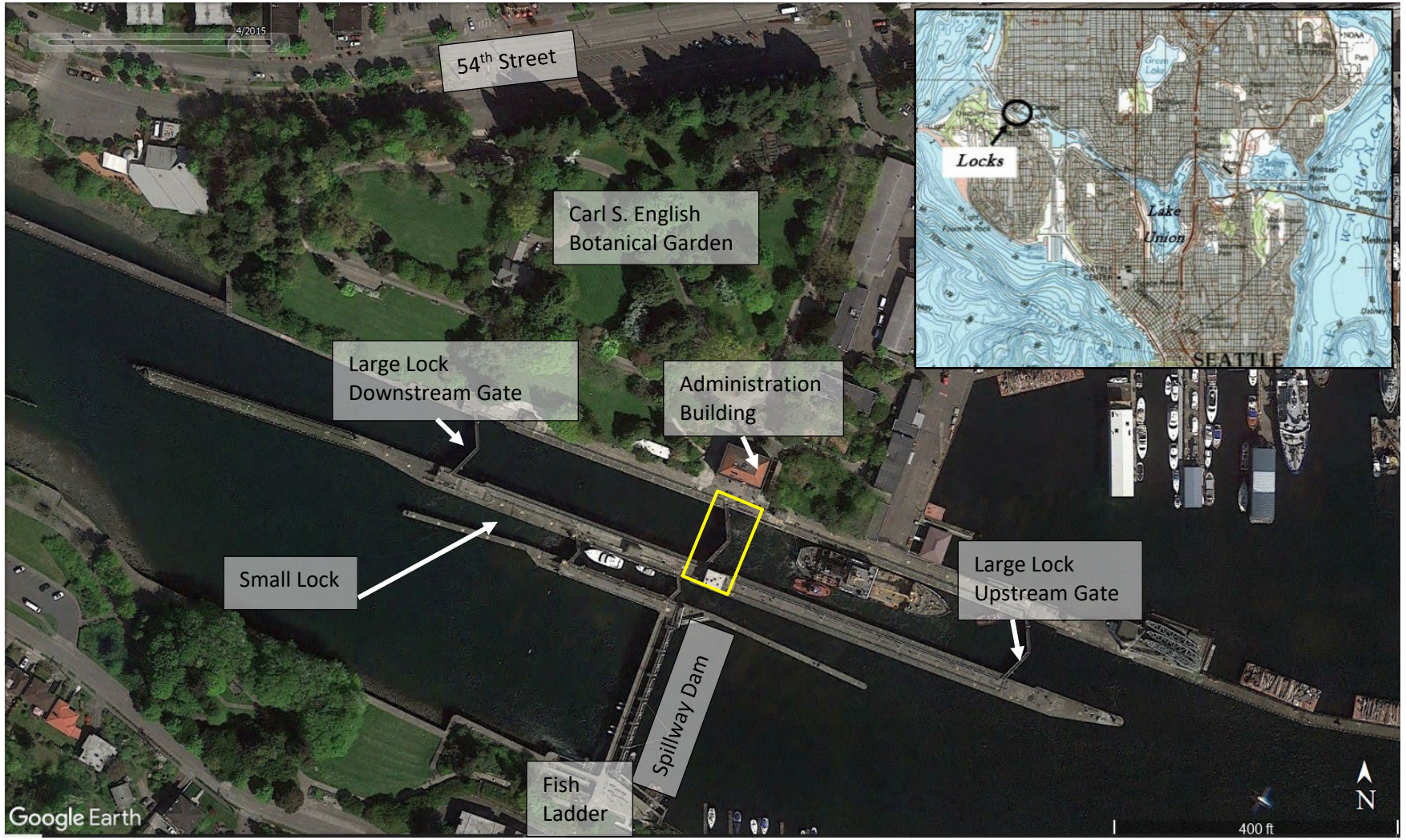

Figure 1. Overview of the LLCG location at the Locks (yellow box) with an inset map to show location relative to Seattle. Other landmarks are labelled.

1.3 Project Purpose and Need

The purpose of this project is to maintain efficient navigation through the large lock and facilitate safe routine visual maintenance inspections of the LLCG. Over 40,000 vessels use the Locks annually, about 15,000 of which using the large lock, making the Locks the busiest in the nation (McDowell Group 2017). The large lock is 825 feet long with three miter gates: one gate at the upstream end, one in the center, and one at downstream end of the large lock chamber. The LLCG is referred to as a miter gate because it has two leaves that swing out from the walls and meet in the center of the lock at an angle (miter). The LLCG is used to divide the large lock chamber into two smaller chambers. This configuration allows for quicker and more water-efficient lockings, and provides redundancy for the large lock by allowing vessel transit in half the lock if either the upstream or downstream gates were to malfunction. The LLCG is also used by pedestrians and staff to cross the large lock chamber, as it is the quickest route across the facility.

The LLCG, commissioned in 1917, is over 100 years old. The need arises from the fact that the gate's design does not meet current safety standards and has exceeded its functional lifespan (i.e., the time the gate operates before extensive maintenance is required or design standards change). Recent inspection shows the gate has excessive corrosion and wear. In addition, the two leaves of the LLCG are a double skin design with internal buoyancy chambers. The double skin design presents a major challenge for inspections because the interior components of the gate cannot be visually inspected without staff entering the chambers, which are considered a confined space and a high hazard workspace. Activities such as welding to repair portions of the gate cannot be done safely in a confined space due to the potential for a fire in the buoyancy chamber that could jeopardize lives of the workers. The non-compliance with updated safety standards, that in turn results in the inability of maintenance staff to inspect the condition of the gate and the difficulty of performing maintenance safely and thoroughly within the inner chambers, creates a potential for gate failure without advance warning. Depending on the type of failure**,** loss of LLCG function could have negative consequences to navigation, and the upstream communities that rely on the large lock for transportation through unexpected and potentially indefinite large lock closures or delays.

2 PROPOSED ACTION AND ALTERNATIVES

2.1 Alternative 1 – No Action

Under this alternative, there would be no repair to the gate or associated components; wear, corrosion, and deterioration of the system would continue unchecked on the LLCG which is beyond its functional lifespan. Should the gate or its components fail, and the gate leaves cannot be moved to the side of the lock chamber into recesses on each wall, then the large lock would be closed indefinitely until repairs could be made or the LLCG removed from the lock. A lock outage duration for emergency repairs or gate removal is unknown, but it is anticipated that the required mobilization and repair time could severely disrupt navigation and the maritime industry in Seattle. In circumstances where the gates can be moved, extended delays in operations and additional wear on lock systems would occur from the need to only conduct full lockages. In addition, the current gate design does not allow inspection and maintenance within the confined spaces of the buoyancy chambers and increases the risk of losing the redundancy of the large lock gates. This alternative does not meet the purpose and need because it does not reliably or efficiently maintain navigation and the LLCG would remain difficult to visually inspect; therefore, this is not an acceptable alternative. Nevertheless, the no-action alternative is carried forward for the sole purpose of comparative evaluation against the preferred alternative.

2.2 Alternative 2 – Rehabilitate LLCG

Under Alternative 2, rehabilitation of the gates and associated components would be performed to fix components that are currently experiencing deterioration. The two LLCG leaves would be removed and taken to an offsite facility for rehabilitation. Upon completion, the leaves would be returned to the lock and reinstalled.

Construction at the Locks for Alternative 2 would be limited because the LLCG rehabilitation would take place offsite. The large lock would be closed for about 15 days during the established in-water work window (October 15-February 15) to modify the existing center miter gates by installing hardware connections to allow removal of the gates, as necessary, so the gate leaves can be removed. A fender system would be installed in both gate leaf recesses to protect the concrete.

Removal of the LLCG is assumed to occur prior to work on the adjacent lock walls. Market research indicates there is limited availability of barge mounted cranes in the Seattle area that can fit in the lock chamber, so a gantry crane anchored across the chamber may be required. A gantry crane is a specialized crane that straddles a workspace—in this case, the crane would straddle the large lock. The crane is expected to be at least a 250-ton crane so that it can lift the gate from a stand-alone barge, and place into the gate recess. It is not anticipated that a land-based crane would be used as the boom height required to place the gate leaf on the southern chamber wall would push the crane size beyond accessibility limits (i.e., the crane would not reach the opposite side of the lock safely) and lock wall stability limits. If a crane were not used to remove the gate leaves from the large lock chamber, then the gate leaves would be floated off the connection points or transported via barge to a dry dock or other facility for transport. Rehabilitation of the LLCG would be performed at an off-site location, and could take approximately two years. During rehabilitation, the full large lock chamber would be used for navigation while pedestrian and bicyclist traffic would be routed over the remaining upper and lower large lock gates. Reinstallation of new miter gates via crane is one the last scheduled activities, so there is potential that a crane may be necessary at the start and end of the construction period. Similar to LLCG removal, the installation would take about 15 days during the in-water work window. The fender system would be removed from the gate recesses before the gate leaves are installed.

Rehabilitation would be difficult for several reasons. First, the metallurgy of the gates is unclear and all components that have not already been replaced are experiencing wear requiring replacement. Second, the delaminated, riveted steel is susceptible to grease penetration which prevents quality welds and bonds so typical rehabilitation techniques are impractical. Third, from a lifecycle engineering perspective, disassembly and rebuilding the majority of the LLCG would approach the cost of building new gates. Finally, repairing the gate may lead to poor design elements being carried forward as historic geometry constraints from the original design require replacement in kind.

During repairs, the gate would have to be handled in a way that puts loads onto the gate structure it was not designed to carry (e.g., torsion while lifting the gate) resulting in damage to the gate. Retrofitting the gate structure to carry these loads would be complex and costly. A rehabilitated gate would only have a 40-year life expectancy, compared with a 100-year lifespan of a new gate, while nearing the cost of a full replacement; therefore, it is not cost-effective to rehabilitate the gate. Retaining the original double skin gate design with buoyancy chambers would not solve maintenance or safety issues. This alternative does not meet the purpose and need because it does not meet current safety standards. It is therefore not an acceptable alternative and has not been carried forward in the analysis.

2.3 Alternative 3 – Replace LLCG (Preferred Alternative)

This alternative replaces the LLCG and associated components with modern equipment designed to have a lifespan of 100 years or more. This gate design is a single-skinned, horizontally framed miter gate (Figure 2). This alternative would require redesign and replacement components that hold the gate in

place such as the pintle bearing, quoin blocks, and gate anchorages. Modification of the existing concrete along the lock wall would also be necessary to accommodate the new gate design. A contractor would be used to finalize the design details, exact construction methods, and the construction schedule. The construction methods and schedule presented below are the range of potential options available to the contractor. Construction at the Locks for Alternative 3 would be limited to the established in-water work window (October 15 to February 15).

2.3.1 Design and Construction Elements

The new LLCG would be the same dimensions as the existing LLCG. The single sided skin plate design would allow access to all members for inspection and potential maintenance (Figure 2). The number and design of the horizontal girders was selected to reduce the overall weight of the gate and help reduce labor needed to adjust them. The structural steel for the miter gates is a fracture-resistant steel and incorporates stress and fatigue resistant details such as smooth transitions between steel of different thicknesses and weld locations moved to low stress areas.

Designs from other locks and dams were used to develop the design of a new LLCG, in conjunction with data specific to this gate and innovative techniques used successfully for other projects. Other gate types from the double-skinned gate design were considered. Following project research and modelling during design, a single-skinned, horizontally-framed miter gate was selected due to several factors: gate weight, complexity of constructing a new gate, long-term maintenance, safety, and cost (Figure 2).

Gate replacement would necessitate redesign of the associated LLCG components that connect the LLCG to the lock walls, like the pintle bearing and gate anchorages. The existing pintle base, where the gate leaf sits and is able to pivot for opening and closing, and surrounding concrete would be completely removed and replaced within the same footprint. A new gate pintle ball that sits in the pintle base would have self-lubricating bearing materials (i.e., only an ultra-smooth surface) that do not require petroleum grease. The LLCG is operated by direct acting hydraulic cylinders that are attached to a connection point on the top of the gate. The operating machinery would be disconnected from the decommissioned gate and reconnected to the new gate. The stainless bushing would be replaced with a self-lubricated bushing, which would eliminate greasing requirements.

Performing certain types of repairs, such as pintle ball replacement, may require the gate to be jacked (i.e., lifted and held) in place to allow access to gate components. The miter gate leaf has areas on the bottom to place jacks and support or lift the gate. However, the existing gate recess at the bottom of the lock has a sloped concrete surface that prevents the jacking cylinder from being located under the center of gravity of the miter gate. This sloped concrete would be removed in the areas of the jack locations to provide a stable surface and adequate gate support. Fabricated components required to both jack and provide stability of the gate would be provided to USACE for future maintenance.

There is a recess at the bottom of the lock that has a sill for the gate leaves to seal against. A new sill seal, which is bolted to the sill of the recess, would be a stainless-steel sealing plate that is filled in with grout. Stainless-steel is expected to be more durable than the previously used High Density Polyethylene or oak timber material.

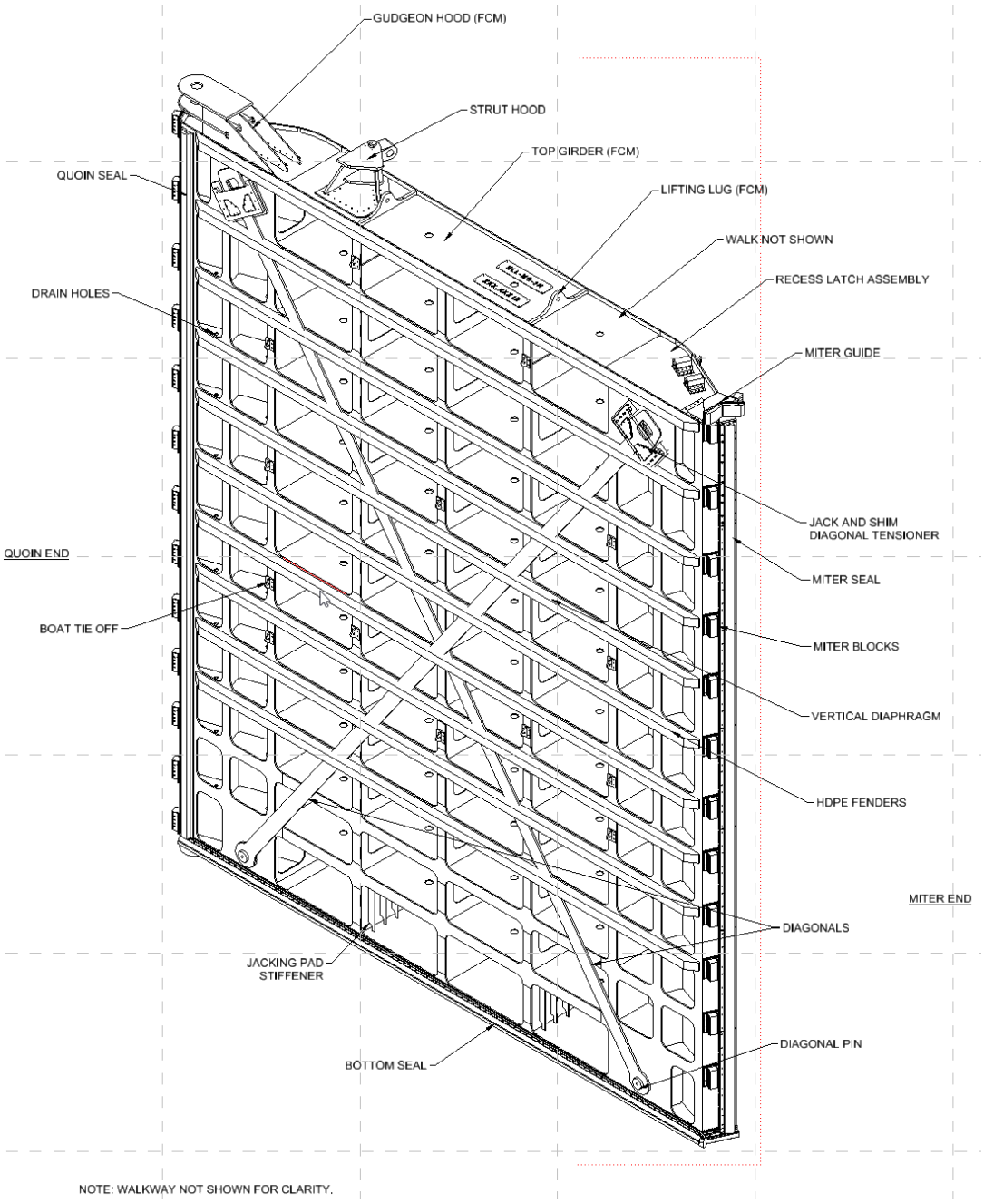

Figure 2. Replacement gate designed for Alternative 3.

The new miter gate walkway would match the existing walkway dimensions, and configuration (Figure 3). However, the material of the new walkway plate would be aluminum instead of matching the existing steel plate. This would make the new plate lightweight so it can be removed and allow for maintenance and inspection. The new walkway would be bolted onto the gate instead of welded to facilitate removal of the walkway, if necessary.

The existing anchorage connection casting that connects the gate leaves to the lock walls would be replaced (Figure 4). The contractor would remove concrete around the connection casting to replace the connection, then install new concrete. Concrete debris would not be allowed to enter the water during removal.

Figure 3. Operating machinery connection and walkway.

Figure 4. Embedded Connection Casting.

The LLCG leaves sit in recesses in the lock walls when the LLCG is fully open. After the LLCG leaves are removed, vessel traffic would eventually be able to pass the area of the recess. With the LLCG leaves out of the recesses, the concrete at the ends would be susceptible to damage from passing traffic. A fender system that would likely consist of steel beams to act as guides when a cofferdam is not in place would likely be used to make the LLCG leaf recesses continuous with the wall and to avoid damage from vessel traffic.

Alternative 3 meets the purpose and need by maintaining reliable and efficient navigation through the large lock and meeting current safety standards which allow visual inspections without requiring entry into confined spaces.

2.3.2 Scheduling and Potential Methods

Construction duration would depend on construction methods selected by the contractor, but construction is expected to take place while the large lock is dewatered, within a localized cofferdam, or a combination of both. Requirements for lock outages and cofferdams would be articulated in contracting documents. The exact construction methods and associated schedule are not known until a contractor is chosen. However, timing of construction considers the importance of minimizing disruption to navigation. Once finalized, a notice to mariners would be published alerting vessel operators to large lock closures and restrictions, in addition to other public communications on the USACE website, Locks Facebook page, and stakeholder meetings. Furthermore, construction would have the following to facilitate navigation:

- One to three large lock dewatering outages between October 15 and February 15 each year, with each outage lasting as long as 30 days.
- Between each dewatering, there would be a navigation period of at least 15 consecutive days.
- Up to 90 consecutive days of temporary cofferdam use on either side of the large lock chamber between October 15 and February 15 each year.
- Only one approximately 15-foot-wide cofferdam would be used at a time, which restricts the available large lock width to about 65 feet wide for vessel passage.
- Vessels 60 feet wide or narrower could still use the large lock when workers are not in the cofferdam (i.e., 6:00 pm to 6:00 am).

Depending on when a contract is awarded, the earliest that construction could begin is the fall of 2022. Given in-water work window constraints and gate fabrication time frames, the total project duration is estimated to take about four years to complete. Construction and inspections would occur intermittently over this duration to accommodate in-water work windows and navigation. To minimize impacts of potentially multiple dewaterings, the large lock routine annual maintenance dewatering event would be part of a dewatering outage each year. This period includes time for USACE to perform the dewatering (approximately three days) and rewatering (approximately two days) of the large lock.

Construction activities for the use of cofferdams and dewatering events are divided into several work periods. This allows the large lock to remain open to navigation during certain construction events when it is safe to do so and to minimize impacts to navigation (Table 1). These work periods are classified as:

- Navigation **Restriction** Periods: Navigation use of the lock chamber would be prohibited while workers are inside the cofferdam to allow safe work inside a temporary cofferdam. At a minimum, vessels would be allowed to transit the lock chamber from 6:00 pm to 6:00 am. Vessels 60 feet wide or narrower can use the large lock during the width restriction of 65 feet in place to avoid potential collision with the temporary cofferdam.
- Navigation **Closure** Periods: No vessels may use the large lock chamber. At this time, the total duration of any given closure would not exceed 30 days, with at least 15 days between closures. Generally, navigation closure periods would be longer, up to 30 days, if cofferdams and navigation restriction periods are not used. The final duration would be determined by USACE based on feedback from the Maritime community and the public, and contractor proposals.
- Navigation **Passage** Periods: Normal navigation is allowed.

Table 1. Example schedule with the greatest potential number of large lock closures, restrictions, and unrestricted navigation passage periods. All durations are approximate, and 2022 is the earliest potential first year of construction.

Date	**Greatest potential number of large lock closures, restrictions, and unrestricted navigation passage periods**
Navigation **Closure** and/or **Restriction** 2022 October 15, 2022 through February 15, 2023	A combination of the following closures and/or restrictions may be needed: Up to three 30-day dewaterings with at least 15 days of navigation in between each outage Up to 90 days of work behind a temporary cofferdam
Navigation **Passage** 2023 February 16, 2022 through October 14, 2023	No width restrictions or scheduled dewaterings
Navigation **Closure** and/or **Restriction** 2023 October 15, 2023 through February 15, 2024	A combination of the following closures and/or restrictions may be needed: Up to three 30-day dewaterings with at least 15 days of navigation in between each outage Up to 90 days of work behind a temporary cofferdam (if used)
Navigation **Passage** Period 2024 February 16, 2024 through October 14, 2025	No width restrictions or scheduled dewaterings
Navigation **Closure** and/or **Restriction** 2024 October 15, 2024 through 15 February 2025	Up to three 30-day dewaterings with at least 15 days of navigation in between each outage Up to 90 days of work behind a temporary cofferdam (if used)
Navigation **Passage** 2025 February 16, 2024 through October 14, 2025	No width restrictions or scheduled dewaterings
Navigation **Closure** 2025 October 15, 2025 through February 15, 2026	Up to three 30-day dewaterings with at least 15 days of navigation in between each outage Up to 90 days of work behind a temporary cofferdam (if used)

Construction activities to replace the concrete and gate appurtenances may involve drilling, sawing, grinding, hammering, compressed air or water, and power tool use, but are not limited to these methods. Any of the available methods might generate loud noise, percussive noise, concrete dust, sparks, and a small amount of contained water laden with concrete particles. Discharge of water that may contain materials such as concrete would be managed to comply with water quality requirements. To replace the LLCG anchorage connection castings at the top of the wall, concrete would be removed and replaced using similar techniques but can be performed from the top of the wall. Areas needing new concrete may have a form placed to contain and shape the concrete as it cures. The concrete would be fully cured before contacting water. During concrete work, uncured concrete would not be allowed to enter the water and monitoring would occur to avoid impacts to water quality.

One of the first construction activities would be to erect a heavy-lift crane over the large lock, if necessary, and remove the existing LLCG leaves. To allow removal of the LLCG leaves, the existing center

miter gates would be modified by installing hardware connections, if necessary. The crane would likely be disassembled and removed from the site unless needed for removal and installation of the LLCG. Once the gate leaves are removed, the work would occur in a fully dewatered lock chamber, within a localized cofferdam, or a combination of both.

If used, a temporary cofferdam would be placed in the large lock, secured to the lock wall, dewatered with pumps, and then construction activities performed in the dry (Figure 5). Divers may assist with installation if it occurs in the water. If cofferdams are not used, Navigation Restriction Periods would not be needed except for removal and installation of the LLCG. If temporary cofferdams are used, design, fabrication, dewatering, and removal of the cofferdam would be the responsibility of the contractor with approval of USACE, but there are general cofferdam characteristics to expect (Figure 5). A typical localized cofferdam would be a three-sided, open bottom cofferdam that would bolt to the lock wall, similar to the example in Figure 5. Highly compressible neoprene seals would slow flow between the cofferdam and the wall, allowing maintenance pumping to maintain the area in the dry. Because the cofferdam would be in the large lock with vessels going past at times, safety requirements include reflective tape around the top perimeter of the cofferdam, flashing beacon lights at the corners or the cofferdam, and lighting of the cofferdam area.

Fender systems would be provided, installed, maintained, and removed by the contractor. The contractor would install fenders in the LLCG leaf recesses at the end of the in-water work period to reduce the risk of damage to new or existing features during navigation passage until the following in-water work period. The fender system can be installed in the wet or the dry and may require dive operations if installed in the wet. The fender system would be removed from the miter gate recesses, likely by crane, when construction is needed. After completion of the work within localized cofferdams, but prior to the installation of the new gate leaves, fender systems would be installed in both gate recesses.

Figure 5. (A) Localized cofferdam example. (B) Example of an installed localized cofferdam. (C) Example of the inside of a localized cofferdam.

After the LLCG is fabricated and construction elements (Section 2.3.1) are completed, the LLCG would be delivered. For installation of the LLCG, a heavy-lift crane would be erected, and fenders would be removed from the LLCG recesses in each wall. The LLCG leaves and the gate anchorages and machinery connections to the leaves would be installed without dewatering the large lock. After installation, the lock chamber would be dewatered to perform miter gate sill work and adjust/commission the LLCG. The heavy-lift crane would be removed from service to prepare the lock chamber for rewatering and normal customary use of the lock. All equipment would be removed from the large lock and the chamber would be rewatered. All testing (e.g., fit and function of the LLCG and controls) associated with LLCG would be completed during this period.

To complete the work within required in-water work period (October 15 to February 15), minimize impacts to navigation, and assure the large lock ready for customary use, multiple work shifts may be required, including 24-hours a day, as well as seven days per week. All construction activities would comply with local noise and light ordinances and noise variances would be obtained as needed. An example construction schedule appears below incorporating either a combination of closures/coffer dams or just closures (Table 1).

2.3.3 Best Management Practices

No compensatory environmental mitigation is proposed for this action as no loss of wetlands, no jeopardy to ESA-listed species, and no appreciable impacts to commercially important species are anticipated to occur based on the analyses in this document. Mitigation for an adverse effect to the LWSC Historic District is described in Section 3.7. USACE would implement several avoidance and minimization measures to ensure environmental impacts are no greater than minimal, short-term effects. The primary measures to avoid and minimize impacts are the timing of in-water work, conservation measures, and best management practices (BMPs).

BMPs include the following:

- The contractor would be required to submit a spill prevention control and countermeasures (SPCC) plan prior to the commencement of any construction activities, including spills of concrete. The SPCC plan would identify and recognize potential spill sources at the site, outline BMPs and secondary containment, delineate responsive actions in the event of a spill or release, and include notification and reporting procedures. Implementation of the SPCC plan would minimize the effect of construction activities on the quality of surrounding waters including, but not limited to, the following measures:

    1. A spill containment kit, including oil-absorbent materials would be kept on-site during construction and would be deployed for any spill or if any oil product is observed in the water. The contractor must be trained in its use. If a spill were to occur, work would be stopped immediately, steps would be taken to contain the material, and appropriate agency notifications would be made.
    2. Secondary containment would be used for all equipment on land and on boats or barges. This includes mechanical equipment, hydraulic concrete or grout pumping or mixing equipment, etc.
    3. The contractor would regularly check fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. for leaks, and would maintain and store materials properly to prevent spills, and a schedule for these checks would be provided.
    4. Equipment that enters the surface water would be maintained to prevent any visible sheen from petroleum products appearing on the water.

5. The contractor would regularly check all equipment from the source of concrete to placement locations, including hoses, hose clamps, drums, secondary containment berms, pans, and other containment, transfer valves, fittings, forms, grout bags, etc. for leaks, and would maintain and store materials properly to prevent spills. A schedule for these checks would be provided.
6. Equipment would be cleaned prior to construction so that it is free of external petroleum-based products while used around the waters of the state. Accumulation of soils or debris would be removed from the drive mechanisms (wheels, tires, tracks, etc.) and the undercarriage of equipment prior to its use.

- There would be no discharge of oil, fuels, or chemicals to surface waters, or onto land where there is a potential for reentry into surface waters.
- Environmentally-friendly fuel, oils, and grease oil would be used in machinery stationed on a boat or barge.
- Refueling of equipment such as generators and forklifts would not occur in the project area (i.e., the lock chamber) and spill containment trays would be used during refueling. Vessels would be refueled offsite in accordance with applicable regulations.
- The contractor would prevent any petroleum products, chemicals, or other toxic or deleterious materials from construction equipment and vehicles from entering the water.
- Wash water resulting from wash down of heavy equipment or work areas would be contained for proper disposal, and shall not be discharged into state waters unless authorized through a state discharge permit.
- No cleaning solvents or chemicals used for tools or equipment cleaning would be discharged to ground or surface waters.
- The contractor would be required to submit a stormwater pollution prevention plan (SWPPP) prior to construction using BMPs pursuant to DR 16-2009, Construction Stormwater Control Technical Requirements, to control stormwater impacts during construction.
- In the event of a discharge of oil, fuel, or chemicals into state waters, or onto land with a potential for entry into state waters, containment and cleanup efforts shall begin immediately and be completed as soon as possible, taking precedence over normal work. Cleanup shall include proper disposal of any spilled material and used cleanup materials. The Locks Environmental Compliance Coordinator (ECC) is responsible for spill reporting and response.
    1. Immediately notify Washington State Department of Ecology's (Ecology) Regional Spill Response Office at 206-594-0000 and the Washington Department of Fish and Wildlife (WDFW) at 800-258-5990 with the nature and details of the problem, any actions taken to correct the problem, and any proposed changes in operation to prevent further problems.
    2. Immediately notify the National Response Center at 1-800-424-8802, for actual spills to water only.
    3. Notify Ecology's Regional Spill Response Office at 425-649-7000 immediately if chemical containers (e.g., drums) are discovered on-site or any conditions present indicating disposal or burial of chemicals on-site that may impact surface water or ground water.
- Work causing distressed or dying fish, discharges of oil, fuel, or chemicals into state waters or onto land with a potential for entry into state waters, is prohibited. If such work, conditions, or

discharges occur, the contractor shall notify Ecology and the Locks ECC and immediately take the following actions:

1. Cease operations at the location of the non-compliance.
2. Assess the cause of the water quality problem and take appropriate measures to correct the problem and/or prevent further environmental damage.

- Workers would monitor for visual turbidity plumes and discharge during in-water work. If turbidity was identified, turbidity monitoring and pH monitoring locations would be adjusted to capture the plume.
- All concrete washout locations would be identified by the contractor. Washout on-site would not be allowed to enter water, be dumped on land, and would not be within 50 feet of storm drains, open ditches, or water bodies. Washout would be contained in leak-proof containers for proper recycling, treatment, and/or disposal. If washout is disposed of at a municipal wastewater treatment plant, the plant would be contacted by the contractor so that any pretreatment requirements can be followed.
- Concrete process water and waste materials would be captured and contained by the contractor. Discharge of concrete process water or waste materials to the ground or surface waters is not allowed.
- Any new concrete installed would be texture and color matched to the surrounding existing concrete.
- The contractor would retrieve any debris generated during construction with a skiff and net. Retrieval would occur at slack tide or when current velocity is low.
- Containment will be used for debris pulled out of the water, so no material or turbid water returns to the water (e.g., concrete pieces).
- Information on fish passage rates and fish behavior, based on periodic observations as the action progresses, will be used to assess parameters of the action such as construction methodologies, materials, and timing, and any resulting impacts to migratory fish. USACE biologists or appropriate USACE staff will be onsite periodically to conduct regular monitoring of fish behavior and note observations of activities that may have impacts to salmon migration.

2.3.4 Conservation Measures

Implementation of the following conservation measures is dependent on the final work period and on the contractor's evaluation of what are feasible and infeasible actions.

- Schedule in-water work for October 15 through February 15, to avoid migrating salmon.
- Turbidity and pH would be monitored to ensure construction activities are in conformance with the protocols and criteria in the water quality monitoring plan (Appendix A). Work would be slowed or halted if turbidity exceeded required thresholds until measurements returned to background levels. BMPs would be implemented if pH exceeded required thresholds until measurements returned to background levels.
- Regular briefings would be held with USACE construction oversight team on environmental conditions and expected work. The briefings would include review of BMP effectiveness for turbidity control, fish behavior, pH control, spill prevention, water quality monitoring, and any planned changes in activities or new activities that could impact fish migration.

- Construction is expected to occur during daylight hours, but if work occurs at night, then lighting for safety of workers would be required and would be minimized to the extent feasible to conduct the work safely. Directional lighting would be used to focus light on the work area and minimize illuminating surrounding areas consistent with any relevant shoreline management plan with the city of Seattle.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section evaluates impacts to various resources by the different alternatives carried forward for evaluation. Table 2 identifies the resources evaluated for detailed analysis with a rationale for inclusion or exclusion. Resources are excluded from detailed analysis if they are not potentially affected by the alternatives or have no material bearing on the decision-making process.

Table 2. List of resources considered for detailed effects analysis and rationale for inclusion or exclusion.

Resource	Included in Detailed Analysis (Y/N)	Rationale for inclusion or exclusion
Navigation and Socioeconomic Conditions	Y	The purpose of the proposed action is to maintain structures associated with the large lock, which passes over 40,000 vessels annually.
Hydrology and Geomorphology	N	Replacement or rehabilitation of the LLCG would not change water management (hydrology). The proposed action takes place within the large lock chamber, a concrete structure, so there would be no effect to geomorphology.
Groundwater	N	The proposed action is limited to the subtidal environment. No groundwater would be affected.
Water Quality	Y	Analysis is required to determine the intensity of potential changes to turbidity and pH during the proposed action's construction phase.
Air Quality	Y	The air-pollutant concentrations in the project area have consistently been below the National Ambient Air Quality Standards; however, an analysis of pollutants emissions from the proposed construction is necessary to disclose to the public.
Greenhouse Gas Emissions	Y	Emissions that would occur during the proposed construction would be analyzed and disclosed to the public.
Underwater Noise	Y	The proposed action has the potential to impact sensitive noise receptors during construction, including fish and wildlife. Analysis is required to determine the intensity of effects. Noise impacts to fish and wildlife would be evaluated under the fish and wildlife sections (Sections 3.4 and 3.5).
Airborne Noise	N	Airborne noise from the proposed action would be attenuated by distance from the source to any sensitive receptors and would not be audible above ambient noise of Locks activities. Wildlife species in the project area are assumed to be habituated to noise of the Locks. Noise from construction adhere to the city of Seattle noise ordinances and variances (if needed).
Hazardous, Toxic, and Radiological Waste	N	There are no known or suspected contaminants in the concrete of the large lock.

Resource	Included in Detailed Analysis (Y/N)	Rationale for inclusion or exclusion
Benthic Organisms	N	The project is located within an engineered concrete basin that lacks natural substrate. Contact with the walls and floor of the large lock would be minimal and would not affect the benthic macroinvertebrate populations in the large lock, which consist of barnacles and mussels attached to the concrete.
Fish	Y	Many different fish species may be present. Analysis is required to determine which species would be present, the intensity of effects, and how to avoid or minimize effects (Section 3.5).
Wildlife (birds and mammals)	Y	Wildlife species may be present. Analysis is required to determine which species would be present, the intensity of effects, and how to avoid or minimize effects (Section 3.4).
Vegetation	N	There is no aquatic vegetation on the concrete infrastructure or in nearby waters. Impacts to aquatic vegetation is not anticipated.
Threatened and Endangered Species	Y	The proposed action may affect protected species in the project area. Analysis is required to determine the impacts of effects (Section 3.6).
Invasive Species	N	This proposed action has no effect to the risk for introduction of invasive species. Standard measures to prevent the introduction of invasive species from outside sources on maintenance equipment would be used for construction, and introduction of invasive species is not anticipated.
Cultural Resources	Y	Analysis is required to determine the extent of any effects the proposed action would have on the LWSC Historic District that is listed on the National Register of Historic Places (NRHP; Section 3.7).
Indian Trust Assets	Y	The project area is within treaty-reserved fishing areas, called Usual and Accustomed areas. No substantial negative effects are anticipated, but analysis and coordination are required to avoid and minimize effects (Section 7.122).
Aesthetics	Y	The proposed action would permanently affect the appearance of the LLCG, a historic structure. Analysis is required to determine the extent of potential effects (Cultural Resources; Section 3.7).
Recreation Resources	Y	Public access to land-based recreation within the project area would not be impacted during construction. Boat traffic is analyzed under Recreation (Section 3.8). Analysis is required to determine the impacts of effects.
Public Services and Utilities	N	The proposed action would have no substantial effect on electricity, water, wastewater and stormwater collection, sewer and solid waste, natural gas, oil/petroleum, or telecommunications services.
Public Health and Safety	N	No impacts to public health or safety are anticipated because emergency vessel navigation through the small lock would not be affected.

3.1 Navigation and Socioeconomic Conditions

Typical socioeconomic analysis considerations include employment, population, income, economic growth, and public infrastructure. The Northwest Marine Trade Association estimated there are 200

businesses that directly or indirectly depend on the Locks. These include marine services and manufacturing, fishing fleets that access marine services and moor in fresh water, Tribal fisheries, shipping companies, passenger cruise companies, and recreational and scientific vessels (McDowell Group 2017). Approximately 82 percent of vessels are recreational. Of the 18 percent non-recreational vessels, most are towboats (46 percent), followed by commercial fishing vessels (21 percent), passenger boats/ferries (15 percent), government vessels (8 percent), and cargo vessels/crew boats (8 percent; McDowell Group 2017).

The Locks provide services and recreational opportunities to the public such as emergency vehicle access, maintenance of public infrastructure like the Washington Route 520 and I-90 bridges, and movement of equipment and materials for infrastructure projects (McDowell Group 2017). Visitor spending in the area is estimated to be over $25 million. This number represents the amount visitors spent in the surrounding 30 miles from the Locks.

The reservoir shoreline has been extensively developed for residential and commercial purposes. The shoreline contains houseboats, private docks, marinas, and industrial facilities (McDowell Group 2017). There were 2,737 docks in Lake Washington in 2000 (Toft 2001). Moorage, marine services, and saltwater access made possible by the Locks support an estimated $41.2 billion in gross business sales annually.

Of the 2,190,200 residents in King County, the median household income is $78,000 and the top employment sectors are information/technology, admin (other services), and government/education (King County 2018). The Locks are located south of the Ballard neighborhood in Seattle, Washington, approximately one mile southeast of Shilshole Bay. The Locks are an important connection for pedestrian and bike commuters between the neighborhoods of Ballard and Magnolia, and between Puget Sound and Lake Washington.

3.1.1 Alternative 1 – No-Action Alternative

Under this alternative, there would be no repair to the gate or associated components; wear, corrosion, and deterioration of the system would continue unchecked on the LLCG which is beyond its functional lifespan. Should the gate or its components fail, and the gate leaves cannot be moved to the side of the lock chamber into recesses on each wall, the large lock would be closed indefinitely to navigation until repairs can be made or the LLCG removed from the lock. A lock outage duration for emergency repairs or gate removal is unknown, but it is anticipated that the required mobilization and repair time would disrupt navigation and the maritime industry in Seattle. Pedestrians and bikers would be unaffected because they could cross over the other two large lock gates. Some local businesses reported that unexpected closures of several days to weeks would affect their businesses, with closures over three months or during seasonal activities such as fishing potentially having a greater effect (McDowell Group 2017). Depending on the duration(s) and timing, unscheduled navigation outages could have a substantial effect on communities served by this transportation connection.

3.1.2 Alternative 3 – Replace LLCG (Preferred Alternative)

Alternative 3 would maintain navigation and socioeconomic conditions. The upper and lower large lock gates would remain available for pedestrian and bike commuters without interruption. During construction, the small lock would be available to vessels for navigation. The large lock would have scheduled closures and if a cofferdam is used may periodically restrict the large lock width to 65 feet wide to facilitate construction, which means only vessels 60 feet wide or less could use the lock during the 65-foot navigation restriction. According to historical commercial vessel data, use of a temporary cofferdam that creates a 65-foot width restriction could affect fewer than ten commercial vessels during the in-water work window, which represents less than one percent of the commercial traffic through the large locks from October 15 through February 15. Pedestrian and bike commuter traffic would

continue as normal over the upper and lower large lock gates. Compared to the No-Action alternative, Alternative 3 has scheduled closures rather than unscheduled closures (Table 3).

Table 3. Comparison of large lock closures among alternatives.

Alternative	Large Lock Closure(s) and Restrictions
No Action	Unscheduled closure(s) for an undetermined amount of time in the event of center gate failure.
Alternative 3	Up to three 30-day closures between October 15 and February 15 annually for four years. Closures would have 15 days of navigation between them. A 65-foot width navigation restriction if a cofferdam is installed October 15-February 15 over four years. Vessels 60 feet wide or less could use the lock during non-construction hours while a cofferdam is installed.

To minimize effects to commercial vessels, a notice to mariners would be published alerting vessel operators to large lock closures and restrictions, in addition to other public communications on the USACE website, Locks Facebook page, and stakeholder meetings to collect input on how to minimize effects to commercial vessels. This would allow lock users to plan around the closures thereby minimizing the disruption to their business compared to an unplanned outage which would occur under Alternative 1 (No-Action). The continued operation of the large lock would allow the Locks to support its navigation function and mission. Effects of the proposed action to navigation would be temporary with a long-term benefit to the region.

3.2 Water Quality

Under the Clean Water Act (CWA), Ecology establishes standards for physical parameters of water, such as temperature, pH level, dissolved oxygen (DO), and chemical concentrations. Waters that do not meet standards are considered “polluted waters.” Polluted waters are placed on a 303(d) list that Ecology regularly publishes (in reference to Section 303(d) of the CWA). Waters with signs of diminished health but still meet standards are “waters of concern” on the 303(d) list. Categories range from Category 1 (meets tested standards for clean waters) to Category 5 (polluted waters that require a water improvement project).

Ecology classifies the waters of Shilshole Bay as “Extraordinary Quality” (WAC 173-201A-612, Table 612). That means the project area contains extraordinary quality salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning. From the current Environmental Protection Agency (EPA)-approved 2015 Ecology 303(d) list, water below the Locks starting near the railroad bridge and downstream is listed for dissolved oxygen (category 2) and bacteria (category 5). Salmon Bay above the Locks is on the 303(d) list for lead, pH (based on measurements upstream of the Locks near Lake Union), aldrin (a pesticide), and bacteria (all category 5).

Physical parameters of water are regulated because they relate to healthy habitats for fish, invertebrates, and aquatic plants. Turbidity refers to the clarity or clearness of the water. The greater the amount of total suspended solids in the water, the murkier it appears, and the higher the measured turbidity. Turbidity is regulated because it can affect the amount of sunlight, growth, and respiration. The pH measures how acidic or basic water is. A pH of 7 is considered neutral, while above 7 is basic and a pH below 7 is acidic. Like turbidity, pH is regulated because is influences growth and behavior of plants and animals that live in water.

3.2.1 Alternative 1 – No-Action Alternative

Under the No-Action Alternative, there would be no repair to the gate or associated components; wear, corrosion, and deterioration of the system would continue unchecked on the LLCG that is beyond its functional lifespan. This Alternative is unlikely to result in effects to water quality because failure of the gates would not result in turbidity or pH changes. Securing the gates to the side, gate removal, or an emergency repair would adhere to BMPs for water quality protection, such as those listed in Section 2.3.3. The saltwater drain, fish ladder, small lock, and spillway would continue to operate normally so salinity and temperature would not be affected. For these reasons, the No-Action Alternative would not have a substantial effect on water quality.

3.2.2 Alternative 3 – Replace LLCG (Preferred Alternative)

Short-term, localized project-related increases in background turbidity levels and pH may occur during concrete work that occurs behind a temporary cofferdam. Concrete flour (very finely ground concrete particles) produced during concrete drilling or sawing could increase the turbidity or pH of the water if it is present in high enough quantities in the cofferdam discharge water. The maximum allowable increase above naturally occurring turbidity and pH for waters designated as "Extraordinary Quality" (i.e., the designation of Shilshole Bay) is 5 nephelometric units and 0.2 units, respectively, under State law (WAC 173-201A-612, Table 612).

Turbidity and pH would be monitored at a background location that is not influenced by construction (likely to the northeast) and downstream of the project site during construction to capture changes to water quality. If turbidity or pH exceed state water quality standards, particulate-generating activities and concrete work would be slowed or halted, and construction methods would be changed until these standards are met. The contractor would check that all appropriate BMPs are in place to prevent concrete spills or leakage into the water, such as checking the concrete pipes, pipe connections, secondary containment, and transfer valves on land and in the water for leaks. Stopping work for a water quality exceedance would be coordinated with the contractor so that a stoppage can be done safely.

BMPs would be used to minimize turbidity and pH increases caused by any potential concrete entering the water (Section 2.3.3). Water quality at the Locks is within State standards, so impacts of the proposed action would be temporary and cumulative impacts would occur only if other construction activities occurred at the same time as the proposed action. This is highly unlikely given there is no planned in-water construction activities in the large lock at this time, and the only other in-water presence is vessel traffic exiting the Locks and proceeding towards Puget Sound. Furthermore, no long-term impacts to water quality would be expected given the tidal flushing and currents in Shilshole Bay. The saltwater drain, fish ladder, small lock, and spillway would continue to operate normally so salinity and temperature would not be affected. Due to the expected minor and temporary nature of effects to pH and turbidity, the proposed action would have a minimal effect, if at all, on water quality.

3.3 Air Quality and Greenhouse Gas Emissions

The Earth's atmosphere is changing, the climate system is warming, and the changes are due in part to human activities that produce greenhouse gases (GHGs). GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone (O_3), and some hydrocarbons and chlorofluorocarbons. These compounds create a greenhouse effect when they accumulate in the Earth's atmosphere. They act as a layer of insulation, retaining some of the thermal radiation that originated from the sun within the Earth's atmosphere. GHGs can have natural and human sources from activities such as the combustion of fossil fuels and cement production. CO_2 is naturally absorbed during some physiochemical and biological processes, but human activities can affect these processes. Projections for future emissions vary greatly based on the assumptions made about trends in human activities related to CO_2 production

and absorption. However, the scientific community agrees without significant changes to current policies and practices, CO_2 concentrations in the atmosphere will continue to increase.

Agencies with jurisdiction over ambient air quality in the project area are the EPA, Ecology, and the Puget Sound Clean Air Agency. EPA is responsible for establishing the National Ambient Air Quality Standards (NAAQS). The NAAQS criteria pollutants of concern in the project area are carbon monoxide (CO), ozone, reactive organic gases (ROGs), volatile organic compounds (VOCs), lead, nitrogen oxides (NOx), sulfur oxides (SOx), and particulate matter (PM). PM is classified by size: PM10 refers to all PM 10 microns in diameter or smaller, and PM2.5 refers to all PM 2.5 microns in diameter or smaller.

Where air quality does not meet NAAQS, the area is designated as a Non-Attainment Area. The EPA sets limits for NAAQS emissions in non-attainment areas. Areas that do meet NAAQS are designated as Attainment Areas. At areas previously designated as Non-Attainment, and where air quality has improved above NAAQS, the area is designated as a Maintenance Area. Areas without sufficient data to designate are unclassifiable. The area was previously a non-attainment area for CO and PM10. The 20-year maintenance periods for CO and PM10 ended in 2016 and 2021, respectively (EPA 2021a).

The project area is residential and commercial within the city of Seattle. The Air Quality Index reported for King County, Washington in 2020 was rated as good 81 percent of the year, moderate for 15 percent of the year, and unhealthy for sensitive groups, unhealthy, or very unhealthy for 2 percent of the year or less each (PSCAA 2021). Motor vehicles, including vessels transiting the Locks, are the largest source of air pollutants. Particulates, sulfur dioxide, ozone, and carbon monoxide are the pollutants of concern. Human exposure to diesel exhaust (a component of this project) can contribute to an increased risk of negative health effects such as lung cancer, chronic respiratory problems, and cardiovascular disease. Diesel emissions are associated with impaired visibility, acid deposition, and climate change.

Concern regarding the implications of global climate change is increasing across the public and private sectors and within Federal, State, and local governments. The concern for Federal projects is the contribution of GHGs to the atmosphere in such large quantities to outweigh the benefit of executing the proposed action. The most common source of anthropogenic GHG emissions is the burning of fossil fuels either by vehicles/equipment or to generate heat and power for buildings. Statewide GHG emissions produced from fossil fuel combustion in Washington's transportation sector (cars, trucks, ships, trains, and planes) in 2018 were estimated at 44.73 million metric tons CO_2 equivalent (EPA 2021a). There are currently no Federal GHG emission thresholds. Among the alternatives, GHGs and NAAQS criteria pollutants would be generated by sources such as intermittent barge and crane use, power tools, compressors, and generators.

3.3.1 Alternative 1 No-Action Alternative

The No-Action Alternative would have no direct effect on air quality Emergency actions may be required to protect property in the event of failure of the LLCG that affects navigation or stability of large lock structures such as the monolith. These actions would likely have similar air emissions effects as the Alternative 3; therefore, effects to air quality would be minor and temporary.

3.3.2 Alternative 3 – Replace LLCG (Preferred Alternative)

During construction, vehicles and heavy equipment would temporarily generate diesel and gasoline fumes, which can include particulate matter and carbon monoxide. The impact to air quality would be anticipated to be minor due to the small area of construction (< 1 acre) and the type of equipment used (e.g., generators, power tools, intermittent crane and barge use). Although greenhouse gas emissions associated with this alternative are not expected to noticeably increase the rate of climate change and sea level rise, fuel consumption from construction activities are a part of world-wide cumulative contributions to change in climate by way of increases in greenhouse gas emissions. Emissions

generated by the construction activity would be expected to be minor, short-term, and well below the *de minimis* threshold of 100 tons per year of CO or PM10. GHG emissions and other air pollutants are cumulative by nature, but given the minor and temporary nature of the proposed action when combined with emissions from other sources surrounding the Locks, including vessel and aircraft traffic, long-term impacts would be minor. Therefore, effects of Alternative 3 to air quality or GHG emissions would not be substantial.

3.4 Wildlife

Many bird species are present in September and October at the Locks, including Canada goose, mallards, Heermann's gull, ring-billed gull, California gull, glaucous-winged gull, double-crested cormorant, great blue heron, and belted kingfisher. A heron colony is located to the south of the Locks, over 500 feet away from the project area. Otters have been observed near the fish ladder, and beavers are typically farther upstream but could be present at the Locks. Harbor seals and sea lions are present nearly year-round although greater numbers are seasonally present during adult and juvenile migration periods. There are no records of southern resident killer whales (SRKW) entering the area below the spillway and they are highly unlikely to be present during construction. This may be due to the high vessel traffic, disturbance, and noise associated with vessel traffic in the area.

3.4.1 Alternative 1 – No Action Alternative

There would be no direct impacts to wildlife associated with this alternative. The in-water work window avoids most sensitive wildlife activities, such as adult and juvenile salmon migrations that provide food for wildlife and great blue heron and migratory bird nesting seasons. If an emergency repair were necessary, it would have similar or greater impacts to the preferred alternative if the repair cannot wait until the in-water work window begins (October 15).

3.4.2 Alternative 3 – Replace LLCG (Preferred Alternative)

The proposed project area is entirely within the large lock, and previously developed land or nearby piers would be used for staging areas. Removal of shrub or tree vegetation would not occur so there would be no loss of cover, perching, foraging, or nesting habitat. There would likely be minor and temporary displacement of wildlife on the adjacent shoreline due to construction noise and intermittent large lock closures that could limit wildlife movement to foraging areas around the locks, although the small lock would still be open for passage. This disturbance would not be appreciable because human activity is common due to the popularity of the Locks as a tourist attraction, and similar vegetation and habitat in adjacent areas for displaced animals is available.

There may be temporary disturbance to birds in the vicinity of the project during construction. However, construction of the proposed action (October 15–February 15) would mainly occur outside the great blue heron nesting season (February 1–August 31) and outside the general breeding season for migratory birds (April 16–August 15). Construction noise, when added to other noise from vessels, visitors, and water over the spillway that birds are likely accustomed to, would not substantially elevate noise over normal conditions. Therefore, impacts to nesting birds, including herons, would be minimal.

Work behind a temporary cofferdam would generate underwater noise and potential effects to water quality. Diving birds are anticipated to avoid the work area and forage nearby where there is no disturbance, including Shilshole Bay. Little is known about how underwater noise affects diving birds. Diving birds near regular sources of noise may be habituated to the sounds; diving birds near the Locks show no effects or alternations in behavior (University of Maryland 2000). The first measurements of underwater auditory thresholds for diving birds were measured on long-tailed ducks. They responded to high intensity stimuli greater than 117 dB (Therrien 2014). For marbled murrelets, the U.S. Fish and Wildlife Service (USFWS) uses 150 dB $_{RMS}$ as a "guideline" for where to consider exposure to continuous

sounds and the potential behavioral responses that exposure within that area would cause (E. Teachout, USFWS, pers. comm.). Given the differences in physiology and behavior of diving birds, it is hard to draw conclusions from the limited data. However, the most likely consequences of the construction noise, which is mainly from vessels in the water or work behind a dewatered cofferdam, would be avoidance of the limited area initially with the potential return of birds to regular behavior as they become accustomed to the noise.

The most likely impact to marine mammals from this alternative is due to the underwater noise generated during construction. Most noise would be generated by vessels in the water or work behind a dewatered cofferdam. Vessels are very common around the Locks, and not substantially different from what marine mammals typically experience around the project area. In addition to underwater noise generated by construction directly affecting marine mammals, noise may also cause the displacement of food sources, such as fish, that are avoiding the work area. Marine mammals are anticipated to avoid the work area, and any impacts are likely to be temporary with normal behaviors resuming once the proposed action is completed. No long-term substantial impacts to marine mammal or wildlife populations are anticipated.

3.5 Fish

Multiple fish species migrate through or use the large lock. Based on previous closures, estuarine fish common to the large lock includes starry flounder and shiner surfperch. However, it is mostly anadromous fish species using the large lock for migration. Juvenile salmon typically migrate through the Locks during the months of May, June, and July (R2 2017) and adult salmon migrate through the Locks starting in June and continuing through to October. Therefore, this section focuses primarily on adult salmonid passage, as the proposed in-water work would occur between October 15 and February 15 of any construction year, when juveniles are absent. Descriptions of Endangered Species Act (ESA)-listed fish (Chinook salmon, steelhead, and bull trout) and discussion of effects appear in Section 3.6.

Adult salmon migrate through the fish ladder and the large lock. Based on counts of Chinook salmon using the fish ladder and the large lock, 72 percent (53-95 percent range) of Chinook salmon migrated through the ladder from 1997-2005 (USACE and SPU 2008). In recent years, the split has been more even (Figure 6). In 2017, it was estimated 47 percent of the total used the ladder with the remainder passing through the large lock, and in 2018, the estimate was 46 percent using the ladder (Schaffler 2017; Mahovlich unpublished data 2018). The counts in the large lock are likely subject to significant error given the difficulty in visually seeing the fish and the high probability of individual fish being counted multiple times because they travel both directions through the lock and can remain in the lock over multiple lockages (Timko et al. 2002). Sockeye and coho salmon follow similar migration patterns.

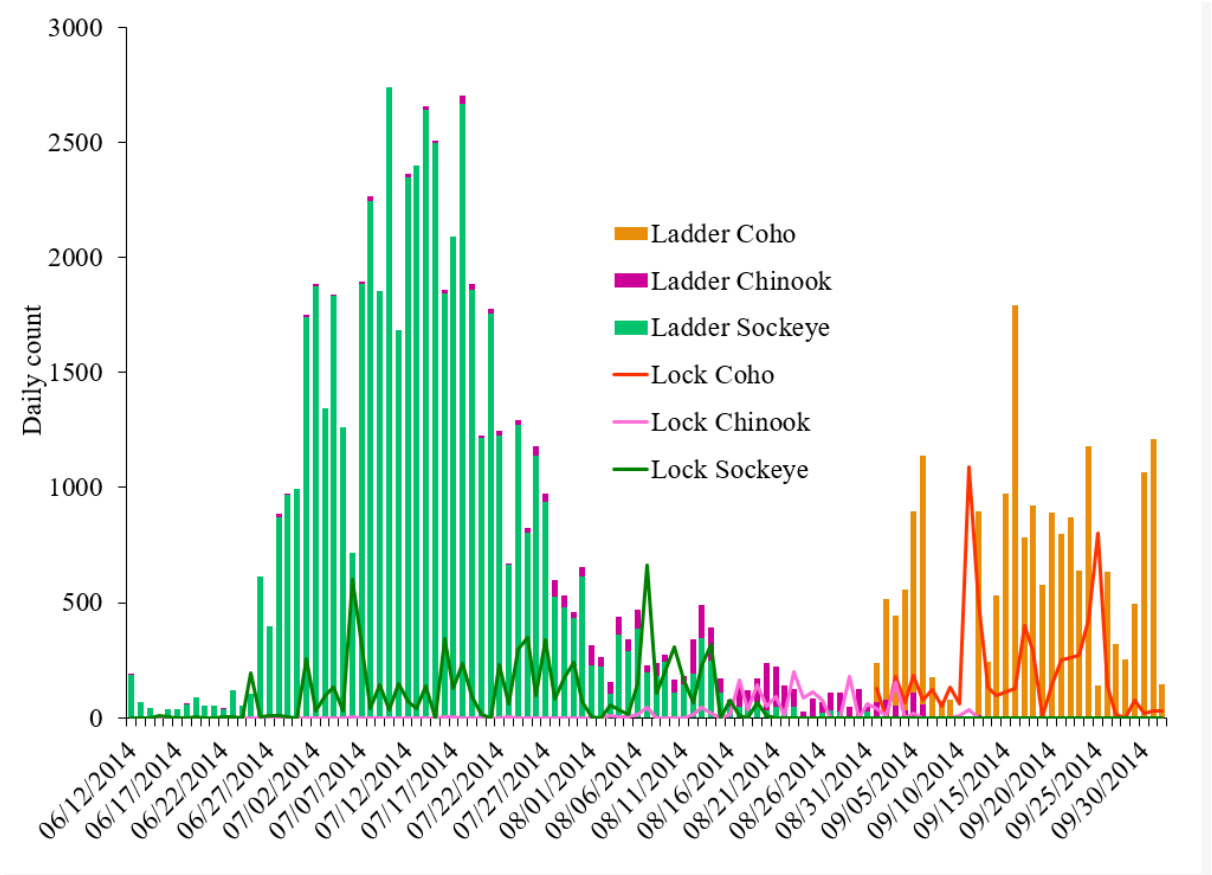

Figure 6. Fish passage through the ladder (bars) compared to the large lock (lines) by species (B. Footen, unpublished data).

The large lock does not contain quality fish habitat and is mainly used by fish to move upstream or downstream of the Locks. The concrete walls and floor lack sediment for benthic invertebrates, and mainly barnacles and mussels are present. Complex habitat such as overhanging vegetation, side channels, or in-water structures such as woody debris is not present in the large lock. These qualities mean fish are less likely to remain in the large lock for extended periods of time. Nevertheless, non-ESA listed species such as shiner perch, starry flounder, and sculpins are often trapped in the large lock after dewatering and may die if they are not removed. To prevent this, the USACE tries to scare fish out of the large lock prior to dewatering by pulling curtains of strobe lights from one end of the large lock to the other to crowd fish out before closing the gates. Fish crowding and removal actions target ESA-listed species, but these actions benefit non-ESA listed species as well.

3.5.1 Alternative 1 – No-Action Alternative

The No-Action Alternative would have little to no effect on fish if an emergency repair is not needed outside of the in-water work window (October 15). If the structural integrity of the LLCG is compromised, it could temporarily impede upstream migration of adult fish through the large lock. The fish ladder would likely be available for fish passage if the large lock is closed due to LLCG failure. An emergency repair would have similar or greater effects than Alternative 3 if the repair cannot wait until the in-water work window begins (October 15). The in-water work window avoids most of the juvenile and adult salmonid migration periods when fish are sensitive to disturbances.

3.5.2 Alternative 3 – Replace LLCG (Preferred Alternative)

Aspects of LLCG replacement that could affect fish are the removal and reinstallation of the gate leaves, dewaterings, changes to water quality, and disturbances from work behind any cofferdam that is used. The large lock would be temporarily closed, then the gate leaves would likely be moved via crane or by floating them in or out, which could startle fish in the vicinity of the gate leaves moving through the water. This would not be substantially different from boats moving through the water and barges are frequently in the large lock, so noise from the tug engine is a common underwater noise. If adult coho salmon are migrating upstream, this could cause a minor delay and possibly increase the risk of marine mammal predation as they search for another passage such as the small lock or fish ladder. Moving the LLCG would occur during the established in-water work window (October 15–February 15) when the coho salmon migration period is past the peak and would be a brief disturbance (up to several days), and only during removal and installation of the gate leaves.

The work for Alternative 3 would be on a small scale within the large lock, such as work within temporary cofferdams or to remove the LLCG. Any turbidity plume would be limited in size (150 feet or less), which is allowable under state standards. The concentrations of total suspended sediments would be too low to cause anything more than temporary, non-injurious behavioral effects such as mild avoidance of the plume and mild gill flaring that would not affect the fitness or meaningfully affect normal behaviors in any salmon that may be exposed to the turbidity. Altered pH would be brief and undetectable within a few feet downstream of the work, and too small to cause anything more than temporary, non-injurious behavioral effects such as mild avoidance of the area immediately downstream of the cofferdam discharge, if used, that would not affect the fitness or meaningfully affect normal behaviors in salmon that may be exposed to the project area. It is highly unlikely that the amount of turbidity generated would affect temperature or dissolved oxygen of the water due to separation of construction by a temporary cofferdam, if used, or dewatering if not.

Elevated in-water noise and in-water activities capable of causing detectable effects in exposed fish would be caused by use of equipment behind a temporary cofferdam such as hand tools and tugboat operations in the large lock. Less in-water noise would be propagated as a result of machinery and power tool use in a dewatered large lock during periods of navigation closure, as compared with work behind a cofferdam. The National Marine Fisheries Service (NMFS) uses two metrics to estimate the onset of injury for fish exposed to high intensity impulsive sounds. The metrics are based on exposure to peak sound level and sound exposure level (SEL), respectively. Both are expressed in decibels (dB). The metrics are: 1) exposure to 206 dB_{peak}; and 2) exposure to 187 dB SEL_{cum} for fish 2 grams or larger, or 183 dB SEL_{cum} for fish under 2 grams. Any received level (RL) below 150 dB_{SEL} is considered "Effective Quiet," which would not produce temporary hearing damage (temporary threshold shift or TTS) or prevent recovery from a TTS.

The effects of fishes' exposure to noise vary with the hearing characteristics of the exposed fish, the frequency, intensity, and duration of the exposure, and the context under which the exposure occurs. At low levels, effects may include the onset of behavioral disturbances such as acoustic masking (Codarin et al. 2009), startle responses and altered swimming (Neo et al. 2014), abandonment or avoidance of the area of acoustic effect (Mueller 1980; Picciulin et al. 2010; Sebastianutto et al. 2011; Xie et al. 2008) and increased vulnerability to predators (Simpson et al. 2016). At higher intensities and/or longer exposure durations, the effects may rise to include temporary hearing damage (TTS; Scholik and Yan 2002) and increased stress (Graham and Cooke 2008). At even higher levels, exposure may lead to physical injury that can range from the onset of permanent hearing damage (permanent threshold shift or PTS) and mortality. The best available information about the auditory capabilities of salmonids suggest that their hearing capabilities are limited to frequencies below 1,500 Hz, with peak sensitivity between about 200 and 300 Hz (Hastings and Popper 2005; Picciulin et al. 2010; Scholik and Yan 2002; Xie et al. 2008).

The greatest source of underwater noise would come from any temporary cofferdam present on one side of the lock at a time. Based on information from a previous project at the Locks, noise levels above the 150 dB_{SEL} threshold could extend to about 72 feet around tugboats and barges, and about 52 feet around in-water operation of power tools such as concrete chippers or similar equipment (NMFS 2020). Fish that are beyond the 150 dB_{SEL} isopleth for any of these sources would likely be unaffected by the noise. However, fish within the 150 dB_{SEL} isopleth are likely to experience a range of behavioral disturbance, such as acoustic masking, startle responses, altered swimming patterns, avoidance, and increased risk of predation. Tugboat operations would likely be infrequent for the proposed action and tugboats are common in the large lock throughout the year. However, the operation of barge-mounted equipment such as generators, pump motors, and potentially a crane could be intermittently operated. The noise levels from that equipment would likely be similar to that of tugboat operations, and it would transfer into the water via the barge's hull.

The planned work window occurs during the end of the adult coho salmon run (Figure 6). The proposed work would not create injurious sound levels. However, the project-related noise would likely cause behavioral disturbance for late-arriving fish, such as avoidance of the area around the temporary cofferdam, which could increase their risk of predation by marine mammals and cause a migration delay to upstream spawning habitat. This would be a minimal delay on one side of the lock at a time because the large lock is 80 feet wide, 28 feet wider than the expected extent of noise from power tools. Salmon would have room to avoid project-related noise or could use the fish ladder for migration. Tugboats are frequently present in the large lock and assumed to be part of the background noise that is characteristic of the Locks.

Up to three dewatering events per in-water work window carries a minor risk of entrainment, and therefore, migration delays for anadromous species present October 15–February 15. The USACE attempts to remove fish from the lock as part of the dewatering process. The process has evolved over time and continues to evolve to more effectively remove fish. The USACE crowds fish from the lock immediately before closing the downstream gate for dewatering, and conducts a fish rescue by collecting individual fish from the substantially dewatered lock. The crowder system consisted of off-the-shelf flashing strobe lights (70,000 peak candlepower brightness) on lines weighted with heavy chain to create noise along the lock floor. The lines are attached to floating booms and spaced across the width of the lock. The lines with attached chains are pulled from the closed end of the lock (upstream end) to the open end. As the crowder exits the lock, the service gate is closed and dewatering initiated. Fish that collect in the filling culverts and large lock sumps are removed by nets and buckets to the degree feasible and transported to Puget Sound. Adult salmonids caught in the large lock during a dewatering would be generally unaffected by the activity and released unharmed as part of the fish rescue activities.

To minimize impacts to salmonids in the area, USACE proposes to work during the in-water work window, within temporary cofferdams if the large lock chamber is not completely dewatered, to monitor water quality, and ensure the small lock and fish ladder are available for migrating salmonids during construction. The full list of BMPs and conservation measures appears in Sections 2.3.3 and 2.3.4. By implementing the proposed BMPs and conservation measures to prevent changes to water quality and avoid migrating fish as much as possible, the proposed action would not substantially affect fish.

3.6 Threatened and Endangered Species

By accessing the USFWS Information for Planning and Consultation on June 14, 2021, and after reviewing previous consultation documents for the Locks, 11 species listed under the ESA were identified that could potentially be present in the project area. After further review, it was determined that only four listed species, shown in Table 4, have the potential to be present during the proposed repair operations and are the focus of the analysis. Marbled murrelet, streaked horned lark, yellow-

billed cuckoo, bocaccio, and yelloweye rockfish are not expected to occur within the project area because their particular specialized habitat requirements are absent, and/or the species have a lack of tolerance for human development. Green sturgeon and Pacific eulachon are considered uncommon in Central Puget Sound and extremely unlikely to occur within the action area due to lack of preferred habitat or typical spawning areas; therefore, there would be no effect to these species. Consequently, these species will not be considered further in this analysis because they are likely absent from the project area during the proposed work window.

Table 4. ESA listed species potentially located within the project area during the proposed action.

Species (Common Name and Scientific Name)	Distinct Population Segment (DPS)	Federal Listing	Year	Critical Habitat in Project Area	Potential Occurrence
Fish					
Chinook salmon (*Oncorhynchus tshawytscha*)	Puget Sound Evolutionarily Significant Unit (ESU)	Threatened Critical Habitat Designated	1999 2005	Yes	Unlikely
Steelhead (*O. mykiss*)	Puget Sound ESU	Threatened Critical Habitat Designated	2007 2016	No	Unlikely
Bull trout (*Salvelinus confluentus*)	Coastal/Puget Sound DPS	Threatened Critical Habitat Designated	1998 2010	Yes	Unlikely
Mammals					
Killer whale (*Orcinus orca*)	Southern Resident DPS	Endangered Critical Habitat Designated	2005 2021	Includes all waters in Puget Sound deeper than 20 feet; prey species	Extremely unlikely

Chinook salmon are well-studied in the watershed. It is unlikely for Chinook salmon to be present after October 15 when the in-water work window begins. The WDFW and Muckleshoot Indian Tribe (MIT) have counted adult salmon at the Locks for several decades. An estimated 84 percent of Chinook salmon passing the Locks were hatchery fish and 16 percent were wild fish for years 2013-2016 (WDFW 2016, 2017, 2020a). The multi-year count data (2009-2017) allowed calculation of the average daily number and proportion of fish passing through the project. The proportion of Chinook salmon run is 97 percent complete by September 15, and 99 percent complete by September 21.

Based on monitoring from 1980 to the mid-1990s, the general timing of adult steelhead migration through the Locks was from January to April, with most fish passing in March and April. Juvenile steelhead outmigration occurs in April and May. Lake Washington steelhead have been considered functionally extinct in the basin since the late 1990s. Fewer than 10 adults from the North Lake Washington and Lake Sammamish population returned to the watershed between 1994 and 1999 when the last WDFW survey was done. Similarly, 50 adults from the Cedar River population have returned to the watershed since 2000, with 10 or fewer returning annually since 2007 (WDFW 2020b). The small steelhead population makes the presence of adults during the in-water work window (February 15–October 15) unlikely.

Bull trout are not well documented in the action area but based on available information their presence is considered uncommon (R2 2014). Bull trout present near the Locks are most likely transient fish using the surrounding area for foraging or as a migration corridor to other foraging habitats. Bull trout have been observed in the fish ladder in late spring (E. Warner, MIT, pers. comm.), captured below the Locks in spring and early summer by seining (Brian Footen, MIT and USACE unpublished data) and tracked in Shilshole Bay with acoustic tags (Goetz et al. 2004). The acoustic tagged fish were from the Snohomish and Skagit Rivers. Very few bull trout are found in the marine environment from October to February and most fish that are there are moving from one river to another and not remaining in the marine areas (Goetz 2016). The October 15–February 15 timeframe does not coincide with juvenile salmonid outmigration that could attract bull trout to forage, and it is a time when very few bull trout enter the marine environment. In addition, the large lock does not offer complex habitat that would draw bull trout prey items.

The SRKW has a wide range and inhabit different regions seasonally. The species is known to visit coastal sites off Washington and Vancouver Island (Ford et al. 2000), and to travel as far south as central California and as far north as the Queen Charlotte Islands (NMFS 2008; Hanson et al. 2013; Carretta et al. 2017). Satellite-tagging, opportunistic sightings, and acoustic recording data suggest that the SRKW spend nearly all their time on the continental shelf, within about 21 miles of shore in water less than 656 feet deep (Hanson et al. 2013; 2017). Details of their winter range from satellite-tagging reveal the whales use the entire Salish Sea (northern end of the Strait of Georgia and Puget Sound) in addition to coastal waters from the central west coast of Vancouver Island, British Columbia to Point Reyes in northern California (Hanson et al. 2017). The SRKW critical habitat includes prey species such as Chinook salmon, which they are dependent upon as a food source more so than any other (NOAA 2018). According to Hanson et al. (2021), the contribution of Chinook salmon to SRKW diet ranges from approximately 50 percent in fall, 70-80 percent in mid-winter, and almost 100 percent in spring. Chum and coho salmon supplement SRKW diet mostly in fall and early winter in Puget Sound (Hanson et al. 2021).

3.6.1 Alternative 1 – No-Action Alternative

The No-Action Alternative would have no direct effect on any threatened or endangered species if an emergency repair is not needed outside of the in-water work window (October 15). Wear of the LLCG would continue that could lead to failure of LLCG. If an emergency repair were necessary, it could cause migration delays for ESA-listed fish and impacts to other ESA-listed species from noise and water quality effects as described for Alternative 3 if the repair cannot wait until the in-water work window begins (October 15). The in-water work window avoids most of the juvenile and adult salmonid migration periods when fish are sensitive to disturbances.

3.6.2 Alternative 3 – Replace LLCG (Preferred Alternative)

During construction, the small lock and fish ladder would remain available for passage. The most protective measure to implement to avoid effects to ESA-listed species is timing of the proposed action during the in-water work window. Although unlikely, if ESA-listed fish are present during construction, the primary effects would be due to in-water noise and disturbance, lock dewatering, and potentially degraded water quality as described in Section 3.2. Although construction in the dewatered large lock without the use of cofferdams would likely prolong the navigation closure periods to up to three periods of 30-day closures each year, separated by 15-day intervals of unrestricted navigation and fish passage, these closure periods would be confined to the in-water work window. Either construction methodology would commence no earlier than October 15 and thus late-arriving migrating adult Chinook salmon would not be further adversely affected by a construction approach that used no cofferdams.

Impacts to the SRKW would be minimal and the same as those described in Section 3.4 for marine mammals, including unlikely exposure to water quality impacts, noise, in-water activity, and negligible impacts to prey resources (adult salmon). There are no records of SRKW within the project area. Potential water quality effects are limited to within 150 feet downstream of the LLCG, and the whales are not known to venture into the vicinity of the Locks. This may be due to the high vessel traffic and all the disturbance and noise associated with vessel traffic in the action area. Therefore, it is unlikely that any SRKW would be directly exposed to construction-related stressors. In addition, data on Chinook salmon stocks (i.e., the Cedar River and Sammamish River stocks) returning to the watershed to spawn show that these runs represent about three to five percent of the total Puget Sound Chinook salmon abundance. Further, the proposed action would start well after the two Chinook runs, so only a miniscule amount of the fish in these runs have the potential to be affected by the construction. Salmon that use the large lock may spend time searching for passage through the fish ladder and this could leave them vulnerable to predation by seals and sea lions; it is extremely unlikely that the SRKW would be near the project area to take advantage of any confused Chinook salmon. The proposed action would affect far too few Puget Sound Chinook salmon or coho salmon to cause any detectable effects on SRKW.

Impacts to ESA-listed species are expected to be minor and discountable. USACE has prepared a biological assessment (BA) pursuant to Sec. 7(a)(2) of the ESA for consultation with the NMFS and USFWS. USACE's determinations from the BA are summarized in Table 5.

Table 5. Summary of Endangered Species Act determinations of effect.

Species	**ESA Status**	**Determination of effect on species**	**Determination of effect on designated or proposed critical habitat**
Puget Sound Chinook Salmon	Threatened	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Steelhead	Threatened	May affect, not likely to adversely affect	No critical habitat present
Bull Trout	Threatened	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Southern Resident Killer Whale	Endangered	No effect	May affect, not likely to adversely affect

3.7 Cultural and Historic Properties

The Chittenden (Hiram M.) Locks and Related Features of the Lake Washington Ship Canal (LWSC Historic District) is listed on the National Register of Historic Places (NRHP), under Criteria A as a significant major engineering achievement completed under government auspices that created a navigable waterway joining Puget Sound to Lake Union and Lake Washington; under Criteria B as it is associated with significant individuals: Major Hiram M. Chittenden, the Seattle District Engineer who developed and promoted the plan for the canal; Colonel James B. Cavanaugh, who supervised the construction of the project; and Bebb and Gould, the architectural firm who designed the layout and complex of concrete buildings around the Locks; and Criteria C as the original eleven accessory concrete buildings were designed and constructed in the classical style and were designed by the architectural firm Bebb and Gould. The LLCG is a part of the large lock which is a contributing resource to the LWSC Historic District.

The USACE has coordinated its review of impacts on cultural resources for NEPA with its responsibilities to take into account effects on historic properties[1] as required by Section 106 of the National Historic Preservation Act (NHPA). See section 7.7 that documents USACE compliance under the NHPA.

3.7.1 Alternative 1 – No-Action Alternative

The No-Action Alternative would have no adverse effect on the LWSC Historic District as there would be no repair to the gate or associated components. Wear of the LLCG would continue which could lead to failure of LLCG. If failure occurred and an emergency repair were necessary, there would likely be an adverse effect to the LWSC Historic District depending on what the emergency repair entails.

3.7.2 Alternative 3 – Replace LLCG (Preferred Alternative)

The LLCG is a component of the large lock which is a contributing resource to the LWSC Historic District. In consultation with the State Historic Preservation Office (SHPO) and consulting parties, the USACE determined that the proposed project would have an adverse effect on the LWSC Historic District as there would be 100 percent loss of the original LLCG. As a result, a memorandum of agreement (MOA) was signed on November 11, 2021, between the SHPO and USACE. The MOA documents the adverse effect and the mitigation the USACE would undertake to resolve for the adverse effect (Appendix B). The mitigation to address the adverse effect includes: (1) completely revising and updating the 1978 National Register of Historic Places (NRHP) Inventory Nomination form; (2) completing historic property inventory forms (HPIFs) for all buildings and structures within the Historic District; and (3) updating the LWSC Historic Property Management Plan (HPMP). All changes that have occurred to the LWSC Historic District would be documented and all existing buildings and structures would be reviewed to determine if they are still contributing resources to the Historic District. Any buildings that were not 50 years of age in 1978 would be evaluated to determine whether they are contributing resources. The updated nomination form would be forwarded to the Keeper of the NRHP. The HPIFs would be completed at the intensive level in the Department of Archaeology and Historic Preservation Washington Information System for Architectural and Archaeological Records Data system. The LWSC HPMP would be updated with any new information obtained from the nomination form update and revision that is not currently in the HPMP.

3.8 Recreation

The Locks are authorized for recreation, receiving approximately one million pedestrian visitors each year. The fish ladder contains a large viewing window to the south of the large lock that is a popular tourist attraction, and visitors use the LLCG to cross the large lock. The upper and lower large lock gates are also used to cross the large lock. Commodore Park is a popular park to the south with views of the Locks.

Lockage frequency varies depending on the time of year and time of day. Typically, the large lock is used for larger vessels or during periods of high traffic. The small lock is used to transport smaller vessels. During certain times of the year, such as during the opening of boating season, the large and small locks have very high rates of lockages for a short period (e.g., one to three days). Large lock lockages typically occur throughout the day. The number of lockages vary over the course of the day with the peak number of lockages occurring in the early afternoon and the low in the early morning hours. On an average daily basis in the large lock, there are about 3 up and 3 down lockages (6 total) per day during

[1] A historic property is any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the National Register of Historic Places, including artifacts, records, and material remains related to such a property or resource.

the winter and 6-8 up and down daily lockages (12-16 total) during the summer. Individual days such as summer weekends and holidays may see more lockages than this average.

3.8.1 Alternative 1 – No-Action Alternative

Continued wear could compromise the structural integrity of the LLCG, which is part of the Locks—a popular tourist attraction. Visitors would have to use the other two large lock gates to cross the large lock if the LLCG was closed, creating crowded conditions and possibly minor delays. In addition, LLCG closure would compromise the ability to provide fish passage and could create long-term closures without public access, which could prevent continued educational and recreational opportunities.

3.8.2 Alternative 3 – Replace LLCG (Preferred Alternative)

Potential navigation restriction periods and closures associated with potential temporary cofferdam use and large lock dewaterings during the in-water work window (October 15–February 15) would occur for up to four years. During construction, including large lock closures for vessels, pedestrians and bicyclists would use the other gates to cross the large lock and would not lose access across the large lock to travel between the Ballard and Magnolia neighborhoods. The remainder of the Locks (including the adjoining gardens) would be accessible to the public during construction.

Effects to recreational vessels are the same as effects to navigation (Section 3.1). Compared to the No-Action Alternative that has an undetermined number of unscheduled closures, Alternative 3 would schedule closures and width restrictions of the large lock in advance (Table 1). Closures during the in-water work window (October 15–February 15) would temporarily prevent passage for recreational vessels that cannot use the small lock. During the in-water work period (October 15–February 15), width restrictions would temporarily prevent passage for recreational vessels that cannot use the small lock or fit in the 65-foot restricted width of the large lock (i.e., vessels over 60 feet wide would not fit). To minimize effects to recreational vessels, once the construction schedule is finalized, a notice to mariners would be published alerting vessel operators to large lock closures and restrictions. Other public communications on the USACE website, Locks Facebook page, and stakeholder meetings would be provided as construction details become available. Effects of the proposed action to recreation (i.e., recreational vessels) would be temporary with a long-term benefit. The continued operation of the large lock would allow the Locks to support its navigation function and mission. It is unlikely that other construction activities would occur at the same time that would also affect recreation.

4 COORDINATION

A draft EA for the proposed LLCG project was issued January 12, 2022, for a 30-day public review and comment period, and distributed to the following agencies and entities for public review and comment:

- National Marine Fisheries Service
- U.S. Fish and Wildlife Service
- Washington Department of Ecology
- Washington Department of Fish and Wildlife
- Washington Department of Natural Resources
- Muckleshoot Indian Tribe
- Suquamish Indian Tribe
- Water Resource Inventory Area (WRIA) 8 Technical Committee

Public comments appear in Appendix C with responses. Additional coordination measures have been developed to minimize disruption during construction:

- USACE would coordinate with the local Indian Tribes that have usual and accustomed fishing rights in the project area.
- USACE would coordinate and consult with the Suquamish Indian Tribe for their situational awareness in planning and executing fisheries below the locks. Their usual fishing period for coho salmon typically begins mid-September and may extend to early November.

Once the construction schedule is developed, a notice to mariners would be published alerting vessel operators to large lock closures and restrictions, in addition to other public communications on the USACE website, Locks Facebook page, and stakeholder meetings.

5 UNAVOIDABLE ADVERSE EFFECTS OF THE PREFERRED ALTERNATIVE

Unavoidable adverse effects associated with the preferred alternative at each site would be: (1) temporary and localized increases in noise, activity, and emissions which may affect fish and wildlife in the area; (2) temporary and localized disruption of local traffic and navigation by construction activity and vehicles; (3) irretrievable commitment of fuels and other materials for repairs; and (4) 100 percent loss of the original LLCG.

6 COMPENSATORY MITIGATION

No compensatory environmental mitigation is proposed for this action as no loss of wetlands, no jeopardy to ESA-listed species, and no appreciable impacts to commercially important species are anticipated to occur based on the analyses in this document. Mitigation for an adverse effect to the LWSC Historic District is described in Section 3.7. USACE would implement several avoidance and minimization measures (Section 2.3.3) to ensure environmental impacts are minimal, and short-term effects remain as described in Section 3.

7 ENVIRONMENTAL COMPLIANCE

USACE has analyzed the environmental effects of the alternatives and the following sections describe how the preferred alternative complies with pertinent environmental laws and executive orders.

7.1 National Environmental Policy Act (NEPA) (42 U.S.C.§ 4321 et seq.)

The NEPA (42 U.S.C. § 4321 et seq.) commits Federal agencies to considering, documenting, and publicly disclosing the environmental effects of their actions. It requires that an Environmental Impact Statement (EIS) be included in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment. The EIS must provide detailed information regarding the proposed action and alternatives, the environmental effects of the alternatives, appropriate mitigation measures, and any adverse environmental effects that cannot be avoided if the proposal is implemented. Agencies are required to demonstrate that decision makers have considered these factors prior to undertaking actions. Major Federal actions determined not to have a significant effect on the quality of the human environment may be evaluated through an EA.

This EA has been prepared pursuant to NEPA. Effects on the quality of the human environment as a result of the proposed LLCG repair are anticipated to be less than significant. The EA has incorporated any necessary and applicable modifications to the scope and/or nature of the project, any effects to the human environment resulting from these modifications, the procedures and practices used to implement the project, and/or the type and extent of compensatory mitigation associated with the project.

A draft EA/FONSI was made available for public review and comment January 12, 2022 to February 11, 2022. USACE invited submission of comments on the environmental impact of the proposed action and considered all submissions received during the comment period. Two comments were received (Appendix C). The Snoqualmie Tribe notified USACE of their review and did not offer further comment. The WRIA 8 Technical Committee expressed support for the project and recommended minimizing actions that could exacerbate salmonid predation, which is accomplished through in-water work windows and maintaining multiple migration paths during construction. Significant effects on the quality of the human environment were not identified and preparation of an EIS is not required. The Finding of no Significant Impact (FONSI) is in Appendix D.

7.2 Endangered Species Act of 1973, as Amended (16 U.S.C.§§ 1531-1544)

In accordance with Section 7(a)(2) of the ESA of 1973, as amended, (16 U.S.C. §§ 1531-1544) federally funded, constructed, permitted, or licensed projects must take into consideration effects to federally listed or proposed threatened or endangered species. USACE submitted a BA for the LLCG replacement to NMFS and USFWS. USACE received a letter of concurrence from NMFS on March 14, 2022 and from USFWS on March 15, 2022 (Appendix E) that concurred with USACE effects determinations (Section 3.6.2). In addition to BMPs (Section 2.3.3) and Conservation Measures (Section 2.3.4) in this EA, as indicated in the BA, the following measures for the protection of ESA-listed species will be incorporated into the proposed action:

- Information on fish passage rates and fish behavior, based on periodic observations as the action progresses, will be used to assess parameters of the action such as construction methodologies, materials, and timing, and any resulting impacts to migratory fish. USACE biologists or appropriate USACE staff will be onsite periodically to conduct regular monitoring of fish behavior and note observations of activities that may have impacts to salmon migration.
- Containment will be used for debris pulled out of the water, so no material or turbid water returns to the water (e.g., concrete pieces).

7.3 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act requires Federal agencies to consult with NMFS regarding actions that may adversely affect Essential Fish Habitat (EFH) for groundfish, coastal pelagic species, and three species of Pacific salmon. An EFH determination for the LLCG replacement was included in the BA submitted to NMFS. USACE determined the LLCG project would not adversely affect EFH, because the LLCG replacement would result in minor and temporary water quality impacts by possibly generating turbidity and altering pH. NMFS concluded the action would not adversely affect EFH in their letter of concurrence dated March 14, 2022 (Appendix E), therefore consultation for effects to EFH is not required for this action.

7.4 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 USC 661 et seq.) requires that wildlife conservation receive equal consideration and be coordinated with other features of water resource development projects. USFWS coordination is not required for maintenance work such as the proposed action.

7.5 Clean Water Act, as Amended (33 U.S.C. §1251 et seq.)

The purpose of the Federal Water Pollution Control Act (33 U.S.C § 1252 et seq.), commonly referred to as the Clean Water Act (CWA), is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly-owned treatment facilities for the improvement of wastewater treatment, and maintaining the integrity of wetlands.

The sections of the CWA that apply to the proposed Federal action are 401, regarding discharges to waterways, and 404, regarding fill material in waters and wetlands. USACE is the regulatory agency that provides individual and general Section 404 permit decisions. Even though the USACE does not issue Section 404 permits to itself for its Civil Works activities, the USACE must comply with the substantive requirements of Section 404 and 401 under the CWA. Pursuant to both Section 404 of the CWA (33 USC 1344(f)(1)(b)) and Federal Regulations 33 CFR 323.4(a)(2), the proposed activity falls within an exemption since the activity falls within the parameters of maintenance. Therefore, the repair does not require a Section 404(b)(1) evaluation or Section 401 certification.

The LLCG replacement is limited to maintenance of an existing serviceable dam and does not propose to change the scope, character, or size of the original fill design, so the discharge of fill material into Waters of the United States is exempt from regulation under Section 404. This is because 33 USC 1344(f)(1)(B) provides that discharge of material "for the purpose of maintenance, including urgent reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, groins, riprap, breakwaters, causeways, and bridge abutments or approaches, and transportation structures" is exempt from regulation as fill. In addition, use of materials such as concrete that do not contain toxic pollutants as listed under Section 307 of the CWA is consistent with the maintenance described in the exemption.

The LLCG replacement will be conducted within the existing footprint of the large lock as constructed in 1916. The components of the work include replacing infill concrete from 1916 in the lock wall and replacing the LLCG and associated components connected to the lock wall. To facilitate the work that is wholly inside the lock chamber, the repair may use a cofferdam with sandbags or other material inside to prevent leaks. This work will not change the character, scope, or size of the structure from the original fill design. New fill will conform to the original configuration and size of the original fill of the lock wall. Only as much concrete necessary for an adequate repair will be applied and overfilling will be avoided to maintain a similar profile to the surrounding structure. USACE considers modern concrete formulations as analogous to the 1916 concrete used in the initial construction of the large lock chamber.

The National Pollutant Discharge Elimination System (NPDES) stormwater program addresses water pollution during activities such as construction by regulating point sources that discharge pollutants to waters of the United States. "Stormwater" means stormwater runoff, snow melt runoff, and surface runoff and drainage. Discharge of stormwater associated with construction activities such as clearing, grading, and excavating, with greater than one acre of ground disturbance, requires compliance with the NPDES Stormwater Program. Section 402 of the CWA is not applicable to this project because the construction site is less than one acre of ground disturbance and no NPDES General Permit is required for construction. The contractor would prepare a SWPPP to control stormwater impacts during construction.

7.6 Coastal Zone Management Act (16 U.S.C. §§1451-1465)

The CZMA of 1972 as amended (16 U.S.C. §§ 1451-1465) requires Federal agencies to carry out their activities in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved Washington Coastal Zone Management Program. The USACE determined that the proposed project is consistent to the maximum extent practicable with the enforceable policies of the Washington State Coastal Zone Management Program. The USACE submitted a CZMA Consistency Determination to Ecology for their review and concurrence on January 14, 2022. Ecology requested a 15-day extension for their decision as provided for in CFR 930.41(b) to complete the public comment process, which extended the 60-day review period ending March 15, 2022 to March 30, 2022. Ecology requested an additional extension March 29, 2022, until April 14, 2022. USACE received Ecology's concurrence April 12, 2022 (Appendix F).

7.7 National Historic Preservation Act (16 U.S.C. § 470 et seq.,)

Section 106 of the NHPA requires that a federally assisted or federally permitted project account for the potential effects on sites, districts, buildings, structures, or objects that are included in or eligible for inclusion in the National Register of Historic Places. On May 12, 2021, the USACE sent the area of potential effects (APE) letter to the Washington SHPO describing the project and the APE. The USACE notified the MIT and the Suquamish Indian Tribe via letter on May 21, 2021 and asked the Tribes to identify any concerns, and sought information about properties of religious or cultural significance that might be affected by the project. The Tribes did not identify any resources within the APE. On May 14, 2021, the SHPO concurred with the APE. On May 21, 2021, the USACE sent the determination and findings letter to the SHPO, documenting the USACE finding of adverse effect to the LWSC Historic District by the demolition and replacement of the original center gate of the large lock. On May 27, 2021, USACE and SHPO staff had a teleconference to discuss the project. SHPO staff requested additional information regarding the APE, location of center gate in relation to the large lock and the demolition plan for the concrete surrounding the center gate on either side of the large lock. On June 15, 2021, the USACE sent a letter with the revised APE, and provided the additional information as requested. On June 22, 2021, the SHPO concurred with the revised APE and the USACE determination that the demolition and replacement of the original LLCG is an adverse effect. On June 14, 2021, letters were sent to the following identified consulting parties: city of Seattle Historic Perseveration Program, Friends of the Ballard Locks, King County Historic Preservation Program, Historic Seattle, MIT, and the Suquamish Indian Tribe. All consulting parties have declined to participate in the development of the MOA. A MOA was signed between the SHPO and USACE on November 11, 2021. The MOA documents the mitigation that USACE will complete to resolve the adverse effect of removing the original center gate would have on the LWSC Historic District.

7.8 Clean Air Act as Amended (42 U.S.C. § 7401, et seq.)

The Clean Air Act (CAA) as amended (42 U.S.C. §7401, et seq.) prohibits Federal agencies from approving or conducting any action that does not conform to an approved state, Tribal, or Federal implementation plan. Under 40 CFR 93.153(c)(2)(iv), conformity determinations are not required for Federal maintenance and repair activities where the increase in emissions associated with the activity falls below the *de minimis* level. The impact to air quality is anticipated to be minor due to the small area of construction (< 1 acre) and the type of equipment used (e.g., generators, power tools, intermittent crane and barge use). The small area of construction and the nature of the work would limit the impact to air quality, which is expected to be well below the *de minimis* threshold of 100 tons per year of CO or PM10.

7.9 Marine Mammal Protection Act (16 U.S.C. §§ 1361-1407)

The Marine Mammal Protection Act of 1972 (MMPA), as amended, prohibits the taking of marine mammals by citizens of the U.S. except under certain conditions (16 U.S.C. 1361). Marine mammals can be found in Shilshole Bay and the adjacent waters. USACE has determined that the preferred alternative would not substantially disturb any marine mammal behavioral patterns (harassment or cause any harm), and thus it is not necessary to pursue an incidental harassment authorization under the MMPA. The rationale for this determination is the following:

1. Marine mammals can avoid the area while underwater, and seals and sea lions can haul out in areas nearby to avoid the limited area of elevated underwater construction noise within the large lock. The small lock would be available during large lock closures for marine mammal passage through the Locks.

2. Ambient underwater noise level in the LWSC and Locks area is higher than unconfined and undeveloped marine areas due to boat traffic. Marine mammals are likely acclimated to these disturbances.

3. The noise generated by construction is similar to conditions already present around the Locks and in Shilshole Bay.

7.10 Migratory Bird Treaty Act and Migratory Bird Conservation Act (16 USC 701-715)

The Migratory Bird Treaty Act (16 U.S.C. §703-712) as amended protects over 800 bird species and their habitat, and commits that the U.S. would take measures to protect identified ecosystems of special importance to migratory birds against pollution, detrimental alterations, and other environmental degradations. Executive Order (EO) 13186 directs Federal agencies to evaluate the effects of their actions on migratory birds, with emphasis on species of concern, and inform the USFWS of potential negative effects to migratory birds. USACE would not remove any vegetation that could affect migratory birds to ensure compliance with the Migratory Bird Treaty Act. Implementation of the preferred alternative would not have any direct and deliberate negative effects to migratory birds. The proposed construction is to occur during the in-water work window (October 15–February 15), which is outside the general breeding season for migratory birds (April 16–August 15). There would be no adverse effect on habitat and the proposed action would only have minor and temporary effects to a small number of individual birds that may be present in the project area.

7.11 Executive Order 12898, Environmental Justice, and Executive Order 14008, Tackling the Climate Crisis at Home and Abroad

EO 12898 directs Federal agencies to take the appropriate steps to identify and address any disproportionately high and adverse human health or environmental effects of Federal programs, policies, and activities on minority and low-income populations. Minority populations are those persons who identify themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native, and Pacific Islander. A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population. EO 14008 updates EO 12898 and has expanded Federal agencies' responsibilities for assessing environmental justice consequences of their actions to include the impact of climate change on the health of the American people.

An analysis of demographic data was conducted to derive information on the approximate locations of low-income and minority populations in the community of concern. Since the analysis considers disproportionate impacts, three areas were defined to compare the area affected by the proposed action and a larger regional area that serves as a basis for comparison and includes the area affected. The larger regional area is defined as the smallest political unit that includes the affected area and is called the community of comparison. For purposes of the analysis, the affected area is approximately a five-mile radius around the project area, and the city of Seattle, Washington, is the community of comparison. Demographic information was also compared against the state of Washington for reference. The EPA's "EJScreen" tool was used to obtain the study area demographics (EPA 2021b).

As shown in Table 6, the aggregate minority population is estimated at 28 percent in the affected area, 35 percent in the city of Seattle, and 29 percent in Washington State. The aggregate population percentage in the affected area does not exceed 50 percent and is not more than the state average. The EO does not provide criteria to determine if an affected area consists of a low-income population. For purposes of the assessment, the Council on Environmental Quality criterion for defining low-income population was adapted to identify whether the population in an affected area constitutes a low-income population. An affected geographic area is considered to consist of a low-income population (i.e., below the poverty level, for purposes of this analysis) where the percentage of low-income persons: 1) is greater than 50 percent, or 2) is meaningfully greater than the low-income population percentage in the general population or other appropriate unit of geographic analysis. The U.S. Census Bureau poverty

assessment weighs income before taxes and excludes capital gains and non-cash benefits (such as public housing, Medicaid, and food stamps). Table 6 provides a summary of the income and poverty status for the study area. As shown in the table, 20 percent of the individuals in the affected area are considered low-income. This percentage in the affected area does not exceed 50 percent. In addition, the affected area low-income population percentage is roughly equivalent to the low-income population in the city of Seattle (22 percent) and is less than the percentage of the state (31 percent). The affected area is not considered to have a high concentration of low-income population.

Table 6. Environmental Justice Demographic and Income Statistics (EPA 2021b).

Demographic Affected	Affected Area	City of Seattle	Washington State
Minority Population	28 percent	35 percent	29 percent
Low-Income Population	20 percent	22 percent	31 percent

The proposed action does not involve a facility siting decision and would not disproportionately affect disadvantaged minority or low-income populations including through any adverse human health impacts. The project maintains navigation for the affected area, and the preferred alternative of large lock center gate replacement would provide a universal benefit to persons, including disadvantaged minority, low-income, and tribal communities, residing in the area of analysis. No interaction with other projects would result in any such disproportionate impacts. No cumulative impacts to environmental justice are expected from interaction of the proposed LLCG replacement with other past, present, and reasonably foreseeable projects. Further, Tribal governments that are also environmental justice communities in the project area have been engaged and informed about the proposed action.

7.12 Native American Trust Resources

In the mid-1850s, the U.S. entered into treaties with nearly all of the Native American tribes in the territory that would become Washington State. These treaties guaranteed the signatory tribes the right to "take fish at usual and accustomed grounds and stations . . . in common with all citizens of the territory" (*U.S. v. Washington*, 384 F. Supp. 312 at 332 [WDWA 1974]). In *U.S. v. Washington*, 384 F. Supp. 312 at 343 - 344, the court resolved that the Treaty tribes had the right to take up to 50 percent of the harvestable anadromous fish runs passing through those grounds, as needed to provide them with a moderate standard of living (Fair Share). Over the years, the courts have held that this right comprehends certain subsidiary rights, such as access to their "usual and accustomed" fishing grounds. More than *de minimis* effects to access to usual and accustomed fishing area may violate this treaty right (*Northwest Sea Farms v. Wynn*, F. Supp. 931 F. Supp. 1515 at 1522 [WDWA1996]). In *U.S. v. Washington*, 759 F.2d 1353 (9th Circuit 1985) the court indicated that the obligation to prevent degradation of the fish habitat would be determined on a case-by-case basis. The Ninth Circuit has held that this right encompasses the right to take shellfish (*U.S. v. Washington*, 135 F.3d 618 [9th Cir 1998]).

The Federal government must consider the effects its actions may have on American Indian trust resources, traditions, and cultural practices. The Federal basis of a tribe's legal status rests within the context of U.S. Constitutional provisions for Federal government's powers for treaty making with other sovereign nations, and American Indian tribes' inherent sovereignty. Numerous tribes in the Puget Sound area are parties to treaties with the U.S., which reserve lands and rights to the tribes. One of the treaty-reserved rights is the ability to take fish at all places where the tribe fished at treaty time, commonly referred to as "Usual and Accustomed" (U&A) locations. Tribal fisheries are central to the cultural and economic existence of tribes and their members. Treaty terms and the rights arising from them cannot be rescinded or canceled without explicit Congressional consent. Federal agencies,

including the USACE, have a legal obligation to abide by treaty terms and to avoid interference with treaty-reserved fishing rights. The following tribes have U&A fishing rights in the project area:

- Muckleshoot Indian Tribe (MIT)
- Suquamish Indian Tribe

USACE notified the MIT and Suquamish Indian Tribe in writing of the proposed action and solicited comments and concerns by emailing early coordination letters (Appendix G) on October 13, 2021, and will be sent the draft EA during the public review period, to solicit comments and identify potential conflicts with fishing practices. USACE briefed biologists from the MIT and Suquamish Indian Tribe on the proposed project at the annual co-manager meeting conference call on May 27, 2021. The Suquamish Indian Tribe expressed concerns with the in-water work window overlapping with the Tribal coho salmon fishery that takes place annually as early as mid-September and potentially extending to early-November. Specifically, the Tribe is concerned about the potential for increased barge or large vessel traffic, vessel traffic through the small lock while the large lock is closed, and construction access points interfering with their fishing effort. USACE met with the Suquamish Indian Tribe in January 2022 to supply additional project information and discuss construction logistics with the Tribe to avoid and minimize effects to the coho salmon fishery. Further coordination and consultation with both Tribes is planned to take place throughout the construction period.

8 CONCLUSION

The proposed Federal action under the preferred alternative of Replace LLCG (Alternative 3) would not constitute a major Federal action significantly affecting the quality of the human environment, and therefore does not require preparation of an EIS. Conservation measures, BMPs, and coordination with Federal, State, and Tribal natural resource departments, and limiting work to the designated project footprints is sufficient to avoid significant impacts to natural resources.

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Hiram M. Chittenden Locks Large Lock Center Gate Project

Lake Washington Ship Canal, King County, Washington

Appendix A – Water Quality Monitoring Plan

April 2022

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Hiram M. Chittenden Locks Large Lock Center Gate Project

Lake Washington Ship Canal, King County, Washington

Appendix B – Cultural and Historic Properties Documentation

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Hiram M. Chittenden Locks Large Lock Center Gate Project

Lake Washington Ship Canal, King County, Washington

Appendix C – Public Comments and Response

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Hiram M. Chittenden Locks Large Lock Center Gate Project

Lake Washington Ship Canal, King County, Washington

Appendix D– Finding of No Significant Impact

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Lake Washington Ship Canal, King County, Washington

Appendix E – ESA Section 7 Consultation Documentation

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Hiram M. Chittenden Locks Large Lock Center Gate Project

Lake Washington Ship Canal, King County, Washington

Appendix F – Coastal Zone Management Act Consistency Determination and Concurrence

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Hiram M. Chittenden Locks Large Lock Center Gate Project

Lake Washington Ship Canal, King County, Washington

Appendix G – Example Tribal Environmental Coordination Letter

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Hiram M. Chittenden Locks Large Lock Center Gate Project

Lake Washington Ship Canal, King County, Washington

Appendix A – Water Quality Monitoring Plan

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Water Quality Monitoring Plan

Hiram M. Chittenden Locks
Large Lock Center Gate Replacement
April 2022

Constituents Monitored:

The Hiram M. Chittenden Locks (Locks) large lock center gate (LLCG) Replacement project area is located in Shilshole Bay, which is designated as "Extraordinary Quality" (WAC 173-201A-612, Table 612). The project area contains extraordinary quality salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

The proposed project requires the following water quality monitoring parameters pursuant to Public Notice of Availability CENWS-PMP-21-06 Seattle, WA for WAC 173- 201A-210. The contractor will conduct all work in a manner that does not exceed applicable turbidity standards beyond the limits established in WAC 173-201A200(1)(e)(i) or applicable pH standards beyond the limits established in WAC 173-201A(200)(1)(g):

- Turbidity applicable criteria:
  - Point of Compliance (POC) is 150 feet down-current of any in-water activity (i.e., work behind temporary cofferdams).
  - Turbidity readings at the POC will not exceed 5 NTU (nephelometric turbidity units) over background when the background is 50 NTU or less, or a 10 percent increase in turbidity when the background turbidity is more than 50 NTU (per WAC 173-201A200(1)(e)(i)).
  - Visual turbidity anywhere at or past the POC from the activity will be considered a possible exceedance of the standard and will be verified through measured turbidity sampling.
- pH applicable criteria:
  - The State of Washington water quality standards do not specify a POC for pH so the U.S. Army Corps of Engineers (Corps) has determined that the pH will be monitored near the point of concrete work and curing that takes place behind the temporary cofferdam (i.e., any water within the cofferdam) and any discharge.
  - pH readings must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.2 units (per WAC 173-201A(200)(1)(g)).
- Petroleum Sheen:
  - Visual monitoring throughout the project area for the duration of construction during all in- and over-water work.

Background Conditions:

- The contractor will take background measurements of turbidity outside of the area of influence of the in-water work using a water quality meter (HydroLab or similar) as close as possible in time to the start of concrete work and potential turbidity generating activities such as installing a temporary cofferdam. Background measurements will coincide as close as possible in time with each measurement taken at the POC. Determination of background water quality conditions will be made according to the following:
  - The contractor will calibrate the water quality meter with standardized samples prior to the start of each day's monitoring, per the manufacturer's specifications.

- The contractor will collect samples in the large lock at a location that will accurately represent background conditions. The contractor will determine the precise location that accurately represents background levels to acquire the samples.
- The contractor will collect samples at mid-depth at the background monitoring location.

Frequency of Monitoring:

- The contractor will monitor for turbidity daily, every four hours, during daylight hours only, for concrete work or other potential turbidity-generating work. No monitoring will occur before sunrise or after sunset unless authorized by the Corps.
- Turbidity monitoring will correspond with (1) slack tide and (2) strong ebb or flood tidal conditions to the extent that these times adequately reflect periods of concrete work or other potential turbidity-generating work, and occur during daylight hours.
- The contractor will operate construction equipment for at least one hour prior to the collection of water quality samples for turbidity monitoring to ensure samples are reflective of turbidity conditions during active operations.
- The contractor will continuously monitor for pH during concrete work and curing, except as restricted below. The contractor will provide a water quality meter (HydroLab or similar).
- Monitoring will occur during daylight hours if the water quality meter is deployed from a boat. The Corps will approve night monitoring if work or curing takes place at night.

Sampling Approach:

- The contractor will establish water quality conditions according to the following:
  - The contractor will measure turbidity and pH with a meter (HydroLab or similar), under the conditions described above to ensure readings and observations are reflective of active periods of concrete work and curing, and during other potentially turbidity-generating work.
  - The contractor will verify the calibration of the meter and calibrate as necessary with standardized samples prior to the start of each day's monitoring, per the manufacturer's specifications.
  - The contractor will take samples at mid-depth of the water column.
- The POC for turbidity for a temporary area of mixing will be at a radius of 150 feet from the activity causing the turbidity.
- The State of Washington water quality standards do not specify a POC for pH so the Corps has determined that the contractor will monitor pH near the point of concrete work and curing that takes place behind the temporary cofferdam and any discharge of water, if applicable (e.g., from the cofferdam and/or a treatment container).
- Monitoring points will be at the turbidity background monitoring point, at the turbidity POC (a 150-foot radius from the activity), and as close to the concrete work as possible for pH monitoring.
- Samples taken by the contractor at the POC will be adjusted within the depth range to target the turbidity plume which will be tracked visually. If no distinct turbidity plume can be identified within the depth range, the samples will be taken at the mid-depth.
- The contractor will compare turbidity samples taken at the POC to background levels at mid-depth to determine compliance with water quality standards.
- The contractor will take continuous samples for pH as close to the concrete work as possible

(i.e., behind the cofferdam) and at any discharge of water, if applicable (e.g., from the cofferdam and/or a treatment container). These samples will serve as the pH POC to determine if a change of 0.2 units or more occurs.

- Upon completion of each day monitoring turbidity and/or pH, the contractor will send the monitoring data report daily to the Corps within 24 hours of completion of the monitoring activity.
  - If there are exceedances in water quality, the contractor will continue monitoring following the steps listed in "Exceedances and Exceedances Protocol."
- The contractor will continue to monitor and record (written) daily visual turbidity monitoring at the POC during construction. At any point, if visual monitoring indicates a turbidity plume, the contractor will take a reading with a meter to confirm/verify if an exceedance has occurred. If an exceedance is confirmed/verified through monitoring with a meter, the exceedance protocol listed below will be followed.

Monitoring Locations:

- The contractor will take samples at mid-depth of the water column.
- The POC for turbidity will be at a radius of 150 feet from the activity causing the turbidity.
- The State of Washington water quality standards do not specify a POC for pH, so the Corps has determined that the contractor will monitor pH just outside the temporary cofferdam, which is near the point of concrete work and curing that takes place behind the cofferdam, and at any discharge point of water, if applicable.
- The contractor will use monitoring points at the turbidity background monitoring point, at the turbidity monitoring POC (which is 150-foot radius from the activity), and near the point of concrete work and curing that takes place behind the temporary cofferdam; constant visual monitoring for petroleum sheen will be conducted across the entire project area,.
- The contractor will adjust samples taken at the turbidity POC to the depth range to target any turbidity plume, which will be tracked visually. If no distinct turbidity plume can be identified within the depth range, the contractor will take samples at the mid-depth.
- The contractor will compare turbidity samples taken at the POC to turbidity background levels at mid-depth to determine compliance with water quality standards.

Exceedances and Exceedance Protocol:

- If measurements taken at the POC location show recorded turbidity is greater than 5 NTU over background where the background is less than 50 NTU, or if more than a 10 percent increase in turbidity when the background turbidity is more than 50 NTU, the contractor will immediately notify the Corps and, assuming construction continues, will continue to monitor per the exceedance protocol below.
- The contractor will be responsible for immediately notifying the Corps' Project Engineer and Project Biologist of any exceedance of the turbidity or pH standard, or of any visible petroleum sheen.
- If measurements taken at the pH monitoring location(s) show recorded pH has varied more than 0.2 units from the background, which will be within the range of 7.0 to 8.5, the contractor will immediately notify the Corps and, assuming construction continues, will continue to monitor per the exceedance protocol below. Water behind the cofferdam that varies more than 0.2 units from background will not be discharged to surface waters; instead, this water will be collected and treated so that the pH standard is not exceeded before being discharged.

- In response to a pH exceedance, work will stop so that water can be collected from behind the cofferdam and treated. The work stoppage will be coordinated so that it can be done safely for the contractor without releasing concrete into the water column, and without compromising previously poured concrete.

Step 1: Verification of the problem

- If monitoring indicates an exceedance in turbidity or pH levels, the contractor will immediately take another series of samples (top, mid-depth, and bottom of water column, if outside the cofferdam) in the same location.
- If the exceedance still exists ('strike one'), then the contractor must take another series of samples at the background station at the same time as the POC or as close in time as possible to samples taken at the POC to determine if the exceedance is caused by the construction activities or by a change in background conditions (for example due to a heavy rainfall event).
- If monitoring indicates a petroleum sheen in the project area, the contractor must locate the source of the sheen, deploy oil-absorbent materials, and notify the Corps' Project Manager or Project Biologist by telephone as soon as possible. The Corps will notify Ecology of any spills of petroleum products or chemicals within 24 hours.
- The contractor must notify the Corps' Project Manager or Project Biologist by telephone as soon as possible after there has been a measured turbidity or pH exceedance. The Corps will notify Ecology of any exceedance within 24 hours.
- The Corps will then verify with the contractor that a measured exceedance occurred and request that best management practices (BMPs; listed at the end of this document), as appropriate and applicable, be implemented by the construction contractor to reduce turbidity and return pH to within acceptable limits. The BMP for a pH exceedance is to collect and treat the water so that the pH limit is not exceeded prior to discharge.

Step 2: Increased monitoring

- If a pH exceedance is recorded, the contractor will begin capturing and treating the cofferdam discharge water to return it to a pH within 0.2 units of background. The contractor will continue to monitor the water inside the cofferdam and water to be discharged after treatment.
- The contractor will take another sample no more than one (1) hour after the turbidity exceedance is recorded to verify the construction activities operation has been altered to reduce the exceedance to within acceptable limits.
- If the second sample, taken 1 hour later, still shows a turbidity exceedance ('strike two'), the contractor must immediately notify the Corps' Contracting Office, Project Manager, or Project Biologist by phone that there is still a measured exceedance.
- The Corps will review BMPs in place and request that all BMPs possible be implemented to reduce turbidity within acceptable limits. The BMP for a pH exceedance is to immediately begin to collect and treat the water so that the pH limit is not exceeded prior to discharge.
- Finally, the contractor will take a third sample no more than two (2) hours after the first turbidity exceedance is recorded.
- If the contractor deploys oil-absorbent materials for a petroleum sheen, the Corps' Project Manager or Project Biologist must be notified by telephone by the contractor as soon as possible after there has been a visible sheen. The contractor will monitor the project area to confirm the source of the sheen was eliminated and that the oil control measures are

working.

Step 3: Stop construction activities

- If the third sample, taken two (2) hours later, still shows a turbidity exceedance ('strike three'), the contractor will immediately notify the Corps' Contracting Office, Project Manager or Project Biologist and the Corps will order the contractor to stop work.
- If a petroleum sheen source is not located or is not controlled by oil-absorbent materials, or if the sheen is coming from upstream, the contractor will immediately notify the Corps' Contracting Office, Project Manager, or Project Biologist and the Corps will order the contractor to stop work. The Corps will notify Ecology of the situation.

Step 4: Continued sampling until compliance is achieved

- After the contractor has stopped work, the contractor will collect samples at hourly intervals until turbidity and pH levels in discharge water and/or in the large lock return to within acceptable limits. The contractor should identify any source of petroleum creating a sheen and controlled with oil-absorbent materials.
- Once compliance has again been achieved, the contractor will resume work upon the direction of the appropriate Corps official.
- The Corps' Project Manager or Project Biologist will notify Ecology that work has resumed.
- The normal schedule of water quality sampling will resume as per specific requirements above.

Step 5: Reporting

- The Corps' Contracting Officer, Project Manager or Project Biologist will report any exceedances and/or shutdowns to Ecology to fednotification@ecy.wa.gov within 24 hours, referencing the project name, project location, project contact, and project phone number, activity, and monitoring results.
- The contractor will document any shutdowns with an incident report to the Corps, which will be transmitted to Ecology by email within two working days of the incident.
- The contractor will prepare the incident report, which will document any exceedances and will include the date, time, location, activity, water quality data collected, the nature of the event, name of person collecting the data, names of persons notified of the exceedance, summary of how the exceedance was resolved according to the above protocol such as what corrective action taken and/or planned, steps to be taken to prevent a recurrence, and any other pertinent information.
- Incident reports will be transmitted to the Corps' Contracting Officer, Project Manager or Project Biologist within 24 hours of the exceedance.
- The Corps will submit water quality monitoring data to Ecology on a weekly basis.
- The contractor and the Corps will evaluate potential new BMPs in addition to those listed below.

Responsibility and Communication Plan:

- ❖ The Corps will notify Ecology at least 10 days prior to start of work and at least seven days within project completion.
- ❖ The Corps will oversee turbidity and pH monitoring conducted by the contractor.
- ❖ The Corps will be responsible for coordinating with Ecology and submitting the Turbidity and pH Monitoring Reports and data provided by the contractor.

- The Corps will notify Ecology within 24 hours if an exceedance occurs.
- The Project Manager and Contracting Officer will coordinate with the contractor.
- The contractor will use the Corps-provided Sampling Form unless otherwise approved by the Corps.
- The contractor will provide turbidity and pH monitoring data to the Corps daily.
- The contractor will notify the Corps within 30 minutes of a confirmed exceedance and follow required notifications per exceedance protocols.
- The contractor will provide a contractor Point of Contact to the Corps.
- The Corps Points of Contact for turbidity and pH monitoring will be the Project Engineer (to be identified); Stephanie McKenna, Project Manager (206-764-6081); and Katie Whitlock, Project Biologist/Environmental Coordinator (206-764-3576).
- The Ecology Point of Contact is Rebekah Padgett, Federal Permit Coordinator, (425-365-6571; Rebekah.Padgett@ecy.wa.gov).
- The Corps will send official reporting of any incidents to the Ecology Point of Contact (Rebekah.Padgett@ecy.wa.gov) AND to the fednotification@ecy.wa.gov inbox.
- Work causing distressed or dying fish, or discharges of oil, fuel, or chemicals into state waters or onto land with a potential for entry into state waters, is prohibited. The Locks Project Biologist/Environmental Compliance Coordinator is responsible for spill reporting and response. If such work, conditions, or discharges occur, the Corps will notify Ecology and immediately take the following actions:
  - The Corps will notify the contractor to cease operations at the location of the non-compliance.
  - The contractor and Corps will assess the cause of the water quality problem and the contractor will take appropriate measures to correct the problem and/or prevent further environmental damage.
  - In the event of a discharge of oil, fuel, or chemicals into state waters, or onto land with a potential for entry into state waters, the contractor will begin containment and cleanup efforts immediately to be completed as soon as possible, taking precedence over normal work. Cleanup will include proper disposal of any spilled material and used cleanup materials.
  - The Corps will immediately notify Ecology's Regional Spill Response Office at 206-594-0000 and the Washington State Department of Fish and Wildlife at 800-258-5990 with the nature and details of the problem, any actions taken to correct the problem, and any proposed changes in operation to prevent further problems. Additional reporting information is available online: https://ecology.wa.gov/Footer/Report-an-environmental-issue/Report-a-spill.
  - The Corps will immediately notify the National Response Center at 1-800-424-8802 for actual spills to water only.
  - The Corps will notify Ecology's Regional Spill Response Office at 206-594-0000 immediately if chemical containers (e.g., drums) are discovered on site or any conditions present indicating disposal or burial of chemicals on site that may impact surface water or ground water.

General Best Management Practices (BMPs) for Water Quality

- Vegetable oil will be used in machinery stationed on a boat or barge.
- The contractor will not refuel equipment such as generators and forklifts in the project area (i.e., the lock chamber) and spill containment trays will be used during refueling. The contractor will

refuel vessels offsite in accordance with applicable regulations.

- The contractor will prevent any petroleum products, chemicals, or other toxic or deleterious materials from construction equipment and vehicles from entering the water.
- The contractor will regularly check fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. for leaks, and will maintain and store materials properly to prevent spills. The contractor will provide a schedule for these checks.
- The contractor will contain wash water resulting from wash down of equipment or work areas for proper disposal and will not discharge wash water into state waters unless authorized through a state discharge permit.
- The contractor will maintain equipment that enters the surface water to prevent any visible sheen from petroleum products appearing on the water.
- There will be no discharge of oil, fuels, or chemicals to surface waters, or onto land where there is a potential for reentry into surface waters.
- The contractor will not discharge cleaning solvents or chemicals used for tools or equipment cleaning to ground or surface waters.
- The contractor will be required to submit a spill prevention control and countermeasures (SPCC) plan prior to the commencement of any construction activities, including spills of concrete. The SPCC plan will identify and recognize potential spill sources at the site, outline best management practices and secondary containment, delineate responsive actions in the event of a spill or release, and identify notification and reporting procedures. Implementation of the SPCC plan will minimize the effect of construction activities on the quality of surrounding waters.
- The contractor will be required to submit a stormwater pollution prevention plan (SWPPP) prior to construction using best management practices pursuant to the most recent City of Seattle Stormwater Manual dated August 2017 (https://web6.seattle.gov/DPD/DirRulesViewer/Rule.aspx?id=17-2017) to control stormwater impacts during construction.
- A spill containment kit, including oil-absorbent materials, will be kept on site during construction in the event of a spill or if any oil product is observed in the water. If a spill was to occur, work will be stopped immediately, steps will be taken to contain the material, and appropriate agency notifications will be made.

BMPs specific to the control of pH and turbidity

- Water to be discharged from the temporary cofferdam must meet water quality standards; otherwise, the contractor will collect and treat water before discharging to the waterway.
- The contractor will allow concrete to cure before rewatering the area.
- The contractor will regularly check all equipment from the source of concrete to placement locations (including hoses, hose clamps, drums, secondary containment berms, pans, and other containment, transfer valves, fittings, forms, grout bags, etc.) for leaks on land and in water, and will maintain and store materials properly to prevent spills. The contractor will provide a schedule for these checks.
- The contractor will monitor for visual turbidity plumes and discharge during in-water work. If turbidity is identified, turbidity monitoring and pH monitoring locations will be adjusted to capture the plume (as described in “Sampling Approach” above).
- The contractor will use secondary containment for all equipment on land and on boats or barges with the potential to discharge a pollutant. This includes mechanical equipment, concrete pumping or mixing equipment, etc.

- The contractor will identify all concrete washout locations. Washout on site will not be allowed to enter water or be dumped on land, and will not be within 50 feet of storm drains, open ditches, or waterbodies. The contractor will contain washout in leak-proof containers for proper recycling, treatment, and/or disposal. If washout is disposed of at a municipal wastewater treatment plant, the contractor will contact the plant so that any pretreatment requirements can be followed.
- The contractor will capture and contain concrete process water and waste. Discharge of concrete process water or waste materials to the ground or surface waters will not be allowed.
- All material that is removed from the water (concrete blocks, material lifted from scoured areas, etc.) will not be returned to the water. The contractor will properly contain material with a berm, pan, or other structure when on a boat and on land so that materials and water associated with materials cannot return to the water.
- The contractor will establish transfer locations to move materials removed from the large lock (e.g., concrete removed from the lock wall) to land for disposal to confine any accidental spillage and prevent the release of materials back into the water. The contractor will clean up any spilled materials immediately. The SWPPP submitted by the contractor will describe applicable BMPs at the transfer location.
- The contractor will clean equipment prior to construction so that it is free of external petroleum-based products while used around the waters of the state. The contractor will remove accumulation of soils or debris from the drive mechanisms (wheels, tires, tracks, etc.) and the undercarriage of equipment prior to its use.
- The contractor will retrieve any debris generated during construction with a skiff and net. Retrieval will occur at slack tide or when current velocity is low.
- The Contractor will prepare, and submit for approval to the Corps, a Cofferdam Discharge Plan at least 30 days prior to start of in-water work. At a minimum, the Discharge Plan will include:
  - Description of all permanent or temporary cofferdam systems to be utilized;
  - Descriptions of systems for management, treatment, and discharge/disposal of discharged water and solids, water pumped from cofferdams and any process water from concrete or grout activities. This includes capacity of the systems and appropriateness of the selected treatment technology for the pollutants of concern (turbidity, pH, and petroleum);
  - Monitoring plan for post-treatment effluent to ensure treatment system effectiveness. The plan will include parameters of concern, frequency of testing, and reporting;
  - Identify contingencies that will be implemented to handle discharge water if it does not meet standards for discharge to surface waters (e.g., stop work and collect discharge).

Sampling Form for In-Water Work

Cover Page

Please refer to the Water Quality Monitoring Plan (WQMP) for detailed instructions. Important WQMP details include the following:

- Use a new sampling form each day.
- Use this sampling form unless otherwise approved by the U.S. Army Corps of Engineers.
- Sheen presence should be constantly monitored for and reported immediately. Any source of petroleum creating a sheen must be identified, controlled with oil-absorbent materials, and reported as described in the WQMP.
- Turbidity is measured at mid-depth of the water column or within a visible plume (this depth will change with the tide)
    - Turbidity point of compliance is one hundred fifty feet from the turbidity-causing activity.
    - Turbidity readings 150 feet from the construction activity should be < 5 nephelometric turbidity units (NTU) over a background of ≤ 50 NTU or < 10% over a background of ≥ 50 NTU.
- pH is monitored outside of the cofferdam (if applicable) and as close to concrete work as possible.
    - pH should be 7.0 to 8.5 with a human-caused variation of less than 0.2 units.

Sampling Form for In-Water Work

Date:_____Project:_____

Name of Person Sampling: _____

Date of last calibration for Turbidity Meter: _____

Date of last calibration for pH meter: _____

Activity Start Time: _____ Activity Stop Time: _____

Turbidity Meter and/or pH Meter Location(s) **Identify if this is a background or compliance point.**	**Time**	**Turbidity (NTU)**	**pH**	**Sheen observed at any point today? (Y/N)**	**Notes (Compare to background turbidity as applicable, weather, construction activities at the time, if equipment is working properly, action taken to identify or stop sheen as applicable)**

Turbidity Meter and/or pH Meter Location(s) Identify if this is a background or compliance point.	Time	Turbidity (NTU)	pH	Sheen observed at any point today? (Y/N)	Notes (Compare to background turbidity as applicable, weather, construction activities at the time, if equipment is working properly, action taken to identify or stop sheen as applicable)

Hiram M. Chittenden Locks Large Lock Center Gate Project

Lake Washington Ship Canal, King County, Washington

Appendix C – Public Comments and Response

April 2022

US Army Corps of Engineers®
Seattle District

From:	Adam Osbekoff
To:	Whitlock, Kaitlin E CIV USARMY CENWS (US)
Cc:	Steven Moses
Subject:	[URL Verdict: Neutral][Non-DoD Source] RE: Hiram M. Chittenden Locks Large Lock Center Gate Project Notice of Availability
Date:	Wednesday, January 19, 2022 11:09:53 AM

Hello Kaitlin

The Snoqualmie Tribe [Tribe] is a federally recognized sovereign Indian Tribe. We were signatory to the Treaty of Point Elliott of 1855; we reserved certain rights and privileges and ceded certain lands to the United States. As a signatory to the Treaty of Point Elliot, the Tribe specifically reserved among other things, the right to fish at usual and accustomed areas and the "privilege of hunting and gathering roots and berries on open and unclaimed lands" off-reservation throughout the modern-day state of Washington.

Thank you for the opportunity to review and comment. Based on the information provided and our understanding of the project and its APE we have no substantive comments to offer at this time. However, please be aware that if the scope of the project or the parameters for defining the APE change we reserve the right to modify our current position.

Thank you

Adam Osbekoff

From: Whitlock, Kaitlin E CIV USARMY CENWS (US) [mailto:Kaitlin.E.Whitlock@usace.army.mil]
Sent: Wednesday, January 12, 2022 4:59 PM
To: Whitlock, Kaitlin E CIV USARMY CENWS (US) <Kaitlin.E.Whitlock@usace.army.mil>
Cc: McKenna, Stephanie Ann CIV USARMY CENWS (USA) <Stephanie.A.Mckenna@usace.army.mil>
Subject: Hiram M. Chittenden Locks Large Lock Center Gate Project Notice of Availability

Good afternoon,

Interested parties are hereby notified that the U.S. Army Corps of Engineers, Seattle District (USACE) has prepared, pursuant to the National Environmental Policy Act (NEPA), a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the proposed replacement of the large lock center gate (LLCG) at the Hiram M. Chittenden Locks in Seattle, King County, Washington. The LLCG replacement is intended to address wear and corrosion of the over 100-year-old gate, in addition to the presence of confined workspaces within the gate that pose safety risks during inspection and repair. The purpose of this Notice is to solicit comments from interested persons, groups, and agencies on the USACE proposed action under NEPA.

USACE has posted the public notice, draft EA with appendices, and draft FONSI at http://www.nws.usace.army.mil/Missions/Environmental/Environmental-Documents/ under "Hiram M. Chittenden Locks Large Lock Center Gate Project." The purpose of the public notice is to solicit comments from interested persons, groups, and agencies on the USACE proposed action under

NEPA. The public comment period is from January 12 through February 11.

Written comments may be submitted to this office, ATTN: CENWS-PMP, P.O. Box 3755, Seattle, WA, 98124-3755, or to Kaitlin.e.whitlock@usace.army.mil. The Corps will consider all submissions received in the public comment period through February 11, 2022.

For more information on the Planning, Environmental, and Cultural Resources Branch, please visit http://www.nws.usace.army.mil/Missions/Environmental/EnvironmentalResources.aspx.

Katie Whitlock
Planning, Environmental, and Cultural Resources Branch
U.S. Army Corps of Engineers, Seattle District
Kaitlin.E.Whitlock@usace.army.mil
206-764-3576

Lake Washington/Cedar/Sammamish (WRIA 8) Watershed
201 South Jackson Street, Suite 5600
Seattle, WA 98104-3855

February 2, 2022

Katie Whitlock
Planning, Environmental, and Cultural Resources Branch
U.S. Army Corps of Engineers, Seattle District

RE: Comments on draft Environmental Assessment and Finding of No Significant Impact for proposed Hiram M. Chittenden Lock Large Lock Center Gate Project

Dear Ms. Whitlock:

Thank you for the opportunity to provide comments on the draft Environmental Assessment and Finding of No Significant Impact for the proposed Hiram M. Chittenden Lock Large Lock Center Gate Project (project). The Hiram M. Chittenden Locks (Locks) are essential to salmon recovery efforts in the Lake Washington/Cedar/Sammamish Watershed (WRIA 8). Ensuring effective passage through the Locks for migrating salmon populations is critical to the success of recovery efforts and investment in habitat restoration the upper watershed.

Salmon recovery in WRIA 8 is comprised of a partnership among 28 local governments and representatives from businesses, community groups, concerned citizens, and state and federal agencies, including the Army Corps of Engineers (Corps), working collaboratively since 2000 to recover Chinook salmon, listed as Threatened under the Endangered Species Act (ESA). WRIA 8 guides implementation of the *WRIA 8 Chinook Salmon Conservation Plan* (WRIA 8 Plan) including habitat goals and recovery actions that support long-term, sustainable, and harvestable runs of Chinook salmon in the watershed. The WRIA 8 Plan is approved by the National Oceanic and Atmospheric Administration (NOAA) as a component of the *Puget Sound Salmon Recovery Plan*. Although Chinook salmon are our primary focus, many of our objectives are intended to benefit other salmonids including coho, sockeye, and steelhead.

WRIA 8 strongly supports the Corps' efforts to seek funding and implement critical Locks infrastructure repairs to facilities that are beyond their engineered lifespan or failing, including upgrades to several facilities important for effective fish passage. The large lock provides important fish passage for migrating salmon, and we were glad to support Congressional funding in 2018 to replace the large lock filling culvert valves and machinery. Replacement of the large lock center gate will further upgrade the Locks and ensure the facility can continue to operate safely and improve fish passage conditions for migrating salmon.

In implementing this project, WRIA 8 supports the Corps avoiding and minimizing all impacts to salmon populations that migrate through the Locks, particularly ESA-listed Chinook salmon. We appreciate the Corps' identified conservation measures for this project, including:

- Scheduling in-water work to avoid timing of migrating salmon populations.

- Planning for construction during daylight hours to avoid night work and limit use of artificial light at night, which can alter salmon behavior and increase predation impacts. To avoid impacts to juvenile salmon and the aquatic environment, it is important to follow lighting best management practices (BMPs), including relevant provisions in the City of Seattle's shoreline master program, when night work is necessary.
- Monitoring and managing water quality impacts, including turbidity.

In addition to these measures, we encourage the Corps to avoid and minimize all project actions that could exacerbate predation impacts on juvenile and adult salmon.

Thank you again for the opportunity to comment on the proposed project to replace the large lock center gate at the Hiram M. Chittenden Locks. We appreciate the Corps' ongoing partnership in recovering salmon in WRIA 8, and we strongly support the Corps' Seattle District in developing, updating, and annually requesting funds to implement the comprehensive suite of prioritized Locks and Lake Washington Ship Canal facility improvement projects, which will improve fish passage and salmon survival. We look forward to continued coordination with the Corps to improve salmon survival and migration through the Locks and Ship Canal and enhance education and outreach programing to raise public awareness of salmon as an important natural and cultural resource.

Sincerely,

Jason Mulvihill-Kuntz
Salmon Recovery Manager
Lake Washington/Cedar/Sammamish Watershed (WRIA 8)

Cc: Col. Alexander Bullock, U.S. Army Corps of Engineers Seattle District Commander
John Stokes, Chair, WRIA 8 Salmon Recovery Council and City of Bellevue Councilmember
Vanessa Kritzer, Vice Chair, WRIA 8 Salmon Recovery Council and City of Redmond Councilmember
WRIA 8 Salmon Recovery Council members

Commenter: The Snoqualmie Tribe.

Response: Thank you for your review.

Commenter: Water Resources Area Inventory (WRIA) 8.

Response: Thank you for expressing support for the Large Lock Center Gate (LLCG) project and providing the comment, “In addition to these measures, we encourage the Corps to avoid and minimize all project actions that could exacerbate predation impacts on juvenile and adult salmon.” The in-water work window (October 15-February 15) and keeping other passage routes such as the fish ladder and small lock open during construction are intended to avoid and minimize the potential for predation impacts on salmonids during the LLCG project.

Hiram M. Chittenden Locks Large Lock Center Gate Project

Lake Washington Ship Canal, King County, Washington

Appendix D– Finding of No Significant Impact

April 2022

US Army Corps of Engineers®
Seattle District

FINDING OF NO SIGNIFICANT IMPACT (FONSI)
Hiram M. Chittenden Locks Large Lock Center Gate Project
King County, Washington

The U.S. Army Corps of Engineers, Seattle District (USACE) has conducted an environmental analysis in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended. The final Environmental Assessment (EA) dated January 2022 for the Hiram M. Chittenden Locks (Locks) Large Lock Center Gate Project addresses efficient navigation through the large lock and routine visual maintenance inspections of the large lock center gate (LLCG) at the Locks in Seattle, King County, Washington.

The final EA, incorporated herein by reference, evaluated various alternatives to maintain efficient navigation through the large lock and facilitate safe routine visual maintenance inspections of the LLCG. There is one Federal action analyzed in the EA summarized below.

Proposed Action: The preferred alternative is Alternative 3, Replace LLCG, which replaces the LLCG with a single-skin miter gate that meets current safety design standards and allows visual inspections without requiring entry into confined spaces.

Alternatives: In addition to a "no action" plan, two alternatives were evaluated. The alternatives included rehabilitate the LLCG (Section 2.2) and replace the LLCG (Section 2.3). The rehabilitate the LLCG alternative did not meet the purpose and need because it does not meet current safety standards and was not carried forward for detailed analysis. For all alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the recommended plan are listed in Table 1:

Table 1: Summary of Potential Effects of the Proposed Action

	Insignificant effects	Insignificant effects as a result of mitigation	Resource unaffected by action
Aesthetics	☒	☐	☐
Air quality	☒	☐	☐
Aquatic resources/wetlands	☒	☐	☐
Invasive species	☐	☐	☒
Fish and wildlife habitat	☒	☐	☐
Threatened/Endangered species/critical habitat	☐	☒	☐
Historic properties	☐	☒	☐
Other cultural resources	☒	☐	☐
Floodplains	☐	☐	☒
Hazardous, toxic and radioactive waste	☐	☐	☒

	Insignificant effects	Insignificant effects as a result of mitigation	Resource unaffected by action
Hydrology and geomorphology	☐	☐	☒
Land use	☐	☐	☒
Navigation	☐	☒	☐
Noise levels	☒	☐	☐
Public infrastructure	☒	☐	☐
Recreation	☐	☒	☐
Socioeconomics	☒	☐	☐
Environmental justice	☐	☐	☒
Soils	☐	☐	☒
Tribal trust resources	☒	☐	☐
Water quality	☐	☒	☐
Climate change	☐	☐	☒

Impact Minimization: All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Best management practices (BMPs) as detailed in the EA will be implemented, if appropriate, to minimize impacts. Sections 2.3.3 and 2.3.4 of the final EA lists BMPs and conservation measures related to Endangered Species Act (ESA)-listed species and water quality. This includes scheduling the in-water work window between 15 October and 15 February to avoid migrating ESA-listed salmon and monitoring for turbidity and pH changes during construction. The USACE will require the contractor to submit a spill prevention and countermeasures plan to prevent deleterious materials from entering the water. Further, the scheduling of the large lock closure (Section 2.3.2) considers the importance of minimizing disruption to navigation such that each lock closure within the in-water work window will be limited to 30 days with a navigation period of at least 15 consecutive days. Impact to recreation is mitigated by keeping the small lock open and maintaining public access across the Locks.

Mitigation: The recommended plan will result in unavoidable adverse impacts to the Lake Washington Ship Canal (LWSC) Historic District as there would be 100 percent loss of the original LLCG. To mitigate for these unavoidable adverse impacts, the USACE developed a Memorandum of Agreement (MOA) that documents the adverse effect (see Compliance part “e” below; Sections 3.7 and 7.7 of the final EA).

Public Review: Public review of the draft EA and FONSI was completed 11 February 2022. All comments submitted during the public review period are addressed in the final EA and FONSI (Appendix C of the final EA).

Treaty Tribes: The Muckleshoot Indian Tribe and the Suquamish Indian Tribe were contacted regarding the LLCG project and the USACE will continue to coordinate throughout the project to meet Tribal trust obligations. The Suquamish Indian Tribe expressed concerns with the in-water work window overlapping with the Tribal coho salmon fishery that takes place annually as early as mid-September and could extend to early November. It is expected that up to 10,000 adult coho salmon will pass the Locks on their annual migration. The USACE supplied additional project information and discussed construction logistics with the Suquamish Indian Tribe to avoid and minimize effects to the coho salmon fishery. Further coordination and consultation with both Tribes will occur throughout the construction effort.

Compliance:

a. Endangered Species Act:

The National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), and the U.S. Fish and Wildlife Service (USFWS) are responsible for implementing the ESA of 1973. The USACE evaluated potential effects to endangered species in a Biological Assessment (BA) and determined that the proposed action would have minor and discountable effects from in-water noise and disturbance, lock dewatering, and potentially degraded water quality, in a limited area. Coordination with the USFWS and NMFS was initiated through the submission of the BA on 15 December 2021. The USACE received a letter of concurrence from USFWS 14 March 2022 and from NMFS 15 March 2022, which accepted the USACE-proposed BMPs and conservation measures.

b. Manguson-Stevens Fishery Conservation and Management Act:

The BA contained the USACE determination that the proposed action will not adversely affect Essential Fish Habitat (EFH) for federally managed fish species in Washington waters. NMFS concluded the action would not adversely affect EFH, thus, consultation under the MSA is not required for this action.

c. Coastal Zone Management Act:

The USACE determined that the proposed project is consistent to the maximum extent practicable with the enforceable policies of the Washington State Coastal Zone Management Program. The USACE prepared a Coastal Zone Management Act (CZMA) Consistency Determination outlining this determination for concurrence of the Washington Department of Ecology (Ecology). The USACE submitted the CZMA Consistency Determination to Ecology 14 January 2022. Ecology requested a 15-day extension for their decision as provided for in CFR 930.41(b) in order to complete the public comment process, which extended the 60-day review period ending 15 March 2022 to 30 March 2022. Ecology requested an additional extension 29 March 2022, until 14 April 2022. USACE received Ecology’s concurrence 12 April 2022.

d. Clean Water Act:

Pursuant to both Section 404 of the CWA (33 USC 1344(f)(1)(b)) and Federal Regulations 33 CFR 323.4(a)(2), the USACE has determined that the proposed project falls within an exemption since the activity falls within the parameters of

maintenance. Therefore, the repair does not require a Section 404(b)(1) evaluation or Section 401 certification.

e. National Historic Preservation Act:

On 12 May 2021, the USACE initiated consultation with the State Historic Preservation Officer (SHPO) and affected tribes with an area of potential effect (APE) letter. On 14 May 2021, SHPO concurred with the APE. On 21 May 2021, the USACE sent the determination and findings letter to the SHPO, documenting the USACE finding of adverse effect to the LWSC Historic District by the demolition and replacement of the original center gate of the large lock. On 27 May 2021, USACE and SHPO staff had a teleconference to discuss the project. SHPO staff requested additional information regarding the APE, location of center gate in relation to the large lock and the demolition plan for the concrete surrounding the center gate on either side of the large lock. On 15 June 2021, the USACE sent a letter with the revised APE, and provided the additional information as requested. On 22 June 2021, the SHPO concurred with the revised APE and the USACE determination that the demolition and replacement of the original LLCG is an adverse effect. On 14 June 2021, letters were sent to the following identified consulting parties: City of Seattle Historic Preservation Program, Friends of the Ballard Locks, King County Historic Preservation Program, Historic Seattle, Muckleshoot Indian Tribe, and the Suquamish Indian Tribe. All consulting parties have declined to participate in the development of the MOA. The MOA was signed 11 November 2021 for the mitigation of the adverse effect this project will have on the LWSC Historic District.

f. Other Significant Environmental Compliance:

All applicable environmental laws have been considered and coordination with appropriate agencies and officials has been completed.

Finding: All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on the analysis presented in the EA, which has incorporated or referenced the best information available; the reviews by other Federal, State and local agencies, Tribes; input of the public; and the review by my staff, it is my determination that the recommended plan will not cause significant effects on the quality of the human environment. Therefore, preparation of an Environmental Impact Statement is not required.

2 May 2022
Date

Xander L Bullock
ALEXANDER “XANDER” L. BULLOCK
COL, Corps of Engineers
Commanding

Hiram M. Chittenden Locks Large Lock Center Gate Project

Lake Washington Ship Canal, King County, Washington

Appendix E – ESA Section 7 Consultation Documentation

April 2022

US Army Corps of Engineers®
Seattle District

DEPARTMENT OF THE ARMY
U.S ARMY CORPS OF ENGINEERS, SEATTLE DISTRICT
4735 EAST MARGINAL WAY SOUTH BLDG 1202
SEATTLE, WA 98134-2388

December 15, 2021

Planning, Environmental, and Cultural Resources Branch

Mr. Kim Kratz
Assistant Regional Administrator
Oregon and Washington Coastal Area Office
National Marine Fisheries Service
1201 NE Lloyd Blvd. Suite 1100
Portland, OR 97232

Dear Mr. Kratz:

The Seattle District, U.S. Army Corps of Engineers (Corps) has identified a need to replace the large lock center gate (LLCG) and small lock emergency closure system (SLECS) at the Hiram M. Chittenden Locks (Locks) at the Lake Washington Ship Canal (LWSC). The Corps proposes to begin LLCG construction no earlier than fall 2022, with in-water work occurring October 15-February 15 over a timeframe of up to four years to complete the project. The purpose of the LLCG replacement is to maintain efficient navigation through the large lock and facilitate routine visual maintenance inspections of the LLCG. The SLECS is used to prevent uncontrolled downstream flow and loss of the LWSC reservoir due to gate failure. The Corps requests to initiate informal consultation with your agency pursuant to Section 7 of the Endangered Species Act (ESA) of 1973 (16 U.S.C § 1531 et seq.), as amended.

The center gate, commissioned in 1917, is over 100 years old. The center gate is used by pedestrians and staff to cross the large lock and allows for half lockages during operation. Separating the large lock chamber in half during vessel passage reduces the time it takes to empty and fill the chamber, which uses less water and is faster than using the whole chamber. Most importantly, the center gate provides redundancy for the large lock by allowing vessel transit in half the lock if either the upstream or downstream gates were to malfunction.

The gate's design does not meet current safety design standards and has exceeded its functional lifespan. A recent inspection showed the gate has excessive corrosion and wear. In addition, the two leaves of the center gate are a double skin design with internal buoyancy chambers. The double skin design presents a major challenge for inspections because the interior components of the gate cannot be visually inspected without staff entering the chambers, which are considered a confined space and a high hazard workspace. The inability of maintenance staff to thoroughly inspect the condition of the gates, and the difficulty of performing maintenance within the inner chambers, creates a potential for gate failure without advance warning. Depending on the type of

failure, loss of LLCG function would have negative consequences to navigation, and the upstream communities that rely on the large lock for transportation through unexpected and potentially indefinite large lock closures or delays.

The existing SLECS consists of stoplogs and a crane located near the small lock's upstream gate. Installation requires the use of divers in rapidly flowing water, which presents dangerous conditions for divers. The Corps proposes to replace the multi-stoplog system with a single-piece bulkhead to remove the need for divers to assist installation. A crane capable of lifting the bulkhead would replace the existing SLECS crane. The SLECS project would take approximately 30 days to complete with in-water work occurring October 15-February 15 or during the typical small lock maintenance dewatering in March.

As required by Section 7(c) of the ESA, the Corps prepared a Biological Assessment (enclosed) to evaluate the impacts of the proposed project on listed species, including Puget Sound (PS) Chinook salmon (*Oncorhynchus tshawytscha*), PS steelhead (*O. mykiss*), and Southern Resident killer whale (SRKW; *Orcinus orca*), as well as designated critical habitat for PS Chinook salmon and SRKW. The Corps proposes to initiate informal consultation pursuant to Section 7 of the ESA, as amended, and requests your concurrence with our determination of effects (may affect, but not likely to adversely affect) for all fish species and critical habitat in the action area. The Corps determined that the proposed project has no effect on the SRKW; however, the project may affect, but is not likely to adversely affect SRKW critical habitat.

If you have any questions or wish to discuss project details, please contact Ms. Katie Whitlock, the Environmental Coordinator for this project, at (206) 764-3576 or kaitlin.e.whitlock@usace.army.mil, or Mr. Fred Goetz, the Seattle District ESA Coordinator, at (206) 764-3515 or frederick.a.goetz@usace.army.mil. I may also be contacted at (206) 764-6761 or laura.a.boerner@usace.army.mil.

Sincerely,

BOERNER.LAURA.A.1251907443

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Date: 2021.12.15 09:55:45 -08'00'

Encl.

Laura A. Boerner, LG, LHG
Chief, Planning, Environmental, and
Cultural Resources Branch

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
7600 Sand Point Way
Seattle, WA 98115-6349

Refer to NMFS No:
WCRO-2021-03198

March 15, 2022

Laura Boerner, Planning Chief
Environmental and Cultural Resources Branch
Corps of Engineers, Seattle District
Post Office Box 3755
Seattle, Washington 98124-3755

Re: Endangered Species Act Section 7 Informal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Consultation for the U.S. Army Corps of Engineers' (USACE) proposed replacement of the large lock center gate and the small lock emergency closure system at the Hiram M. Chittenden Locks in Seattle, King County, Washington, Sixth Field HUCs: 171100120400 – Lake Washington Ship Canal and 171100191200 – Puget Sound.

Dear Ms. Boerner:

This letter responds to your December 15, 2021, request for concurrence from the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Endangered Species Act (ESA) for the subject action. Your request, which included a detailed biological assessment of the action qualified for our expedited review and concurrence because it met our screening criteria and contained all required information on the proposed action and its potential effects to listed species and designated critical habitat.

The project includes two components: 1. Replacement of the large lock center gate (LLCG); and 2. Replacement of the small lock emergency closure system (SLECS). All in-water work for both components would be done from construction barges and from the concrete monoliths of the locks. For the LLCG, all in-water work would be completed between October 15 and February 15 during any of the expected 2 to 4 construction seasons. The planned 4 weeks of work for the SLECS replacement would occur between October 15 and February 15, or during the annual small lock routine maintenance period in March.

The planned in-water work windows avoid the typical migration seasons for juvenile and adult Chinook salmon, and most of the typical migration seasons for steelhead, which are so rare in the watershed that their presence at the locks during the work windows is considered discountable.

The new SLECS bulkhead would be seasonally stored partially submerged alongside the small lock's concrete monolith, but stored out of the water between April 15 and July 30 to eliminate its potential to provide predator habitat during the May through July emigration season for juvenile Chinook salmon.

Based on our knowledge, expertise, and the materials you provided, we concur with your conclusions that the proposed action is not likely to adversely affect the NMFS ESA-listed species and designated critical habitats that occur in the action area.

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554A complete record of this consultation is on file electronically at the Oregon-Washington Coastal Area Office. Reinitiation of consultation is required and shall be requested by the USACE or by the NMFS, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (2) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this concurrence letter; or if (3) a new species is listed or critical habitat designated that may be affected by the identified action.

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The NMFS also reviewed the proposed action for potential effects on essential fish habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). This review was pursuant to section 305(b) of the MSA, implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation. In this case, NMFS concluded the action would not adversely affect EFH, thus, consultation under the MSA is not required for this action.

Please direct questions regarding this letter to Donald Hubner at the Oregon-Washington Coastal office at Donald.Hubner@noaa.gov or 206-526-4359.

Sincerely,

Elizabeth Babcock

Elizabeth L. Babcock
Branch Chief, North Puget Sound
Oregon Washington Coastal Area Office

cc: Katie Whitlock, COE
Fred Goetz, COE

DEPARTMENT OF THE ARMY
U.S ARMY CORPS OF ENGINEERS, SEATTLE DISTRICT
4735 EAST MARGINAL WAY SOUTH BLDG 1202
SEATTLE, WA 98134-2388

December 15, 2021

Planning, Environmental, and Cultural Resources Branch

Mr. Brad Thompson
State Supervisor
U.S. Fish and Wildlife Service
Washington Fish and Wildlife Office
510 Desmond Drive SE, Suite 102
Lacey, WA 98503

Dear Mr. Thompson:

The Seattle District, U.S. Army Corps of Engineers (Corps) has identified a need to replace the large lock center gate (LLCG) and small lock emergency closure system (SLECS) at the Hiram M. Chittenden Locks (Locks) at the Lake Washington Ship Canal (LWSC). The Corps proposes to begin LLCG construction no earlier than fall 2022, with in-water work occurring October 15-February 15 over a timeframe of up to four years to complete the project. The purpose of the LLCG replacement is to maintain efficient navigation through the large lock and facilitate routine visual maintenance inspections of the LLCG. The SLECS is used to prevent uncontrolled downstream flow and loss of the LWSC reservoir due to gate failure. The Corps accordingly requests to initiate informal consultation with your agency pursuant to Section 7 of the Endangered Species Act (ESA) of 1973 (16 U.S.C § 1531 et seq.), as amended.

The center gate, commissioned in 1917, is over 100 years old. The center gate is used by pedestrians and staff to cross the large lock and allows for half lockages during operation. Separating the large lock chamber in half during vessel passage reduces the time it takes to empty and fill the chamber, which uses less water and is faster than using the whole chamber. Most importantly, the center gate provides redundancy for the large lock by allowing vessel transit in half the lock if either the upstream or downstream gates were to malfunction.

The gate's design does not meet current safety design standards and has exceeded its functional lifespan. A recent inspection showed the gate has excessive corrosion and wear. In addition, the two leaves of the center gate are a double skin design with internal buoyancy chambers. The double skin design presents a major challenge for inspections because the interior components of the gate cannot be visually inspected without staff entering the chambers, which are considered a confined space and a high hazard workspace. The inability of maintenance staff to thoroughly inspect the condition of the gates, and the difficulty of performing maintenance within the inner chambers, creates a potential for gate failure without advance warning. Depending on the type of

failure, loss of LLCG function would have negative consequences to navigation, and the upstream communities that rely on the large lock for transportation through unexpected and potentially indefinite large lock closures or delays.

The existing SLECS consists of stoplogs and a crane located near the small lock's upstream gate. Installation requires the use of divers in rapidly flowing water, which presents dangerous conditions for divers. The Corps proposes to replace the multi-stoplog system with a single-piece bulkhead to remove the need for divers to assist installation. A crane capable of lifting the bulkhead would replace the existing SLECS crane. The SLECS project would take approximately 30 days to complete with in-water work occurring October 15-February 15 or during the typical small lock maintenance dewatering in March.

As required by Section 7(c) of the ESA, the Corps prepared a Biological Assessment (enclosed) to evaluate the impacts of the project on listed species, including bull trout (*Salvelinus confluentus*) and designated bull trout critical habitat. The Corps proposes to initiate informal consultation pursuant to Section 7 of the ESA, as amended, and requests your concurrence with our determination of effects (may affect, but not likely to adversely affect) for bull trout and their critical habitat.

If you have any questions or wish to discuss project details, please contact Ms. Katie Whitlock, the Environmental Coordinator for this project, at (206) 764-3576 or kaitlin.e.whitlock@usace.army.mil, or Mr. Fred Goetz, the Seattle District ESA Coordinator, at (206) 764-3515 or frederick.a.goetz@usace.army.mil. I may also be contacted at (206) 764-6761 or laura.a.boerner@usace.army.mil.

Sincerely,

BOERNER.LAURA.A.1251907443

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Date: 2021.12.15 09:52:13 -08'00'

Encl.

Laura A. Boerner, LG, LHG
Chief, Planning, Environmental, and
Cultural Resources Branch

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Washington Fish and Wildlife Office
510 Desmond Dr. S.E., Suite 102
Lacey, Washington 98503

In Reply Refer To:
2022-0016053
xRef. 01EWFW00-2022-I-0364

Laura Boerner
Planning, Environmental, and Cultural Resources Branch
U.S. Army Corps of Engineers, Seattle District
Attn: K. Whitlock, F. Goetz
4735 E. Marginal Way South, Building 1202
Seattle, Washington 98134-2388

Dear Ms. Boerner:

Subject: Lake Washington Ship Canal, Large Lock Center Gate and Small Lock Emergency Closure Replacement

This letter is in response to your December 15, 2021, request for our concurrence with your determination that the proposed action in Seattle, King, County, Washington, "may affect, but is not likely to adversely affect" federally listed species. We received your letter, Biological Assessment, and other supplemental materials providing information in support of "may affect, not likely to adversely affect" determinations, on December 15, 2021.

Project Description:

The Hiram M. Chittenden Locks connect the marine waters of Puget Sound with the fresh waters of Salmon Bay for commercial and recreational boat traffic, and consist of two locks (small and large), a spillway, and fish ladder. This project will replace components at the two locks – the Lake Washington Ship Canal Large Lock Center Gate (LLCG) and the Small Lock Emergency Closure System (SLECS). The LLCG is a double-skinned gate with internal buoyancy chambers, built in 1917. Recent inspections have discovered excessive corrosion and wear; and, due to gate design, repairs cannot be safely made. The gate will be replaced with a single-skinned, horizontally framed miter gate of similar size, and will include replacement of the associated hardware components (pintle bearing, quoin blocks, and gate anchorages). Gate replacement will require the use of a gantry crane and temporary cofferdams for up to 90 days.

The SLECS consists of five stackable metal barrier sections (stoplogs) that are placed and removed by a mounted crane. The stoplog structure and associated crane will be replaced by a single-piece bulkhead, a larger crane, and two storage brackets. These repairs will require up to

30 days and will also require the use of cofferdams. For both lock maintenance repairs, all work will be completed between October 15 and February 15, with any additional work occurring during the annual maintenance dewatering period (March; SLESC only). During all activities, the fish ladder will remain open and operable.

Specifically, you requested informal consultation pursuant to section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.) (ESA) for the federally listed species and critical habitat identified below.

- Bull trout (*Salvelinus confluentus*)
- Designated bull trout critical habitat

The U.S. Army Corps of Engineers has determined that the action will have "no effect" on additional listed species and designated critical habitat that are known to occur in King County. The determination of "no effect" to listed resources rests with the action agency. The U.S. Fish and Wildlife Service (Service) has no regulatory or statutory authority for concurring with "no effect" determinations, and no consultation with the Service is required. We recommend that the action agency document their analyses on effects to listed species, and maintain that documentation as part of the project file.

Sufficient information has been provided to determine the effects of the proposed action and to conclude whether it would adversely affect federally listed species and/or designated critical habitat. Our concurrence is based on information provided by the action agency, best available science, and complete and successful implementation of the conservation measures included by the action agency.

EFFECTS TO BULL TROUT

Temporary Exposures and Effects

Exposures are extremely unlikely (discountable) because of the following:

- The action is located in the Lake Washington Ship Canal where, at present, bull trout occurrence is rare and exposure to this action is extremely unlikely.
- The action will occur during a time of year (October 15 to February 15) when few, if any, bull trout are present in the action area. For the SLECS, additional activities may occur during the regularly scheduled annual maintenance dewatering period (typically March).
- It is extremely unlikely that bull trout will be entrained in cofferdams or handled.

Effects to Bull Trout Habitat and Prey

With successful implementation of the conservation measures included by the action agency as part of the proposed action, we expect that the effects of the action will not measurably degrade or diminish habitat functions or prey resources in the action area. Therefore, effects from the action are considered insignificant.

Construction activities will have temporary impacts to habitat that supports the species and/or their prey. However, activities will occur in an artificially-created, highly urbanized ship canal, and fish passage will be maintained through the ladder at all times. Drawdowns and cofferdams will temporarily reduce the amount of available habitat, but that habitat is already severely degraded.

EFFECTS TO DESIGNATED BULL TROUT CRITICAL HABITAT

The final revised rule designating bull trout critical habitat (75 FR 63898 [October 18, 2010]) identifies nine Primary Constituent Elements (PCEs) essential for the conservation of the species. The 2010 designation of critical habitat for bull trout uses the term PCE. The new critical habitat regulations (81 FR 7214) replace this term with physical or biological features (PBFs). This shift in terminology does not change the approach used in conducting our analyses, whether the original designation identified PCEs, PBFs, or essential features. In this letter, the term PCE is synonymous with PBF or essential features of critical habitat.

The following PCEs are in the action area. Of the PCEs present, some will not be affected by the proposed action.

PCE 2: *Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.*

- The action may temporarily introduce an impediment or barrier within migration habitat. However, the action will not preclude bull trout movement through the area, either during or after construction, and any effects will be temporary. The migration habitat will not be permanently altered, destroyed, or degraded. Fish passage will be maintained through the ladder at all times.

PCE 3: *An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.*

- The action will have no effect on this PCE.

PCE 4: *Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.*

- The action will maintain degraded habitat conditions, by continuing to preclude and/or degrade natural shoreline/riparian processes, but will not result in further declines in shoreline complexity.

PCE 7: *A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.*

- The action will maintain the regulated state of the hydrograph for this waterbody, but will not further alter the hydrograph.

PCE 8: *Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.*

- The action may impact water quantity and/or quality. However, the effects will be temporary; components of the project design include actions to avoid, reduce, or compensate for the effects; and/or we would be unable to measure, detect, or evaluate the effects.

CONCLUSION

This concludes consultation pursuant to the regulations implementing the ESA (50 CFR 402.13). Our review and concurrence with your effect determinations is based on implementation of the project as described. It is the responsibility of the federal action agency to ensure that the projects they authorize or carry out are in compliance with the regulatory permit and ESA. If a permittee or the federal action agency deviates from the measures outlined in a permit or project description, the federal action agency has the obligation to reinitiate consultation and comply with section 7(d).

This project should be re-analyzed and re-initiation may be necessary if 1) new information reveals effects of the action that may affect listed species or critical habitat in a manner, or to an extent, not considered in this consultation, 2) if the action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this consultation, and/or 3) a new species is listed or critical habitat is designated that may be affected by this project.

This letter constitutes a complete response by the Service to your request for informal consultation. A record of this consultation is on file at the Washington Fish and Wildlife Office, in Lacey, Washington. If you have any questions about this letter or our shared responsibilities under the ESA, please contact Mitchell Dennis (mitchell_dennis@fws.gov)

Sincerely,

THOMAS MCREYNOLDS

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Brad Thompson, State Supervisor
Washington Fish and Wildlife Office

Hiram M. Chittenden Locks Large Lock Center Gate Project

Lake Washington Ship Canal, King County, Washington

Appendix F – Coastal Zone Management Act Consistency Determination and Concurrence

April 2022

US Army Corps of Engineers®
Seattle District

DEPARTMENT OF THE ARMY
U.S ARMY CORPS OF ENGINEERS, SEATTLE DISTRICT
4735 EAST MARGINAL WAY SOUTH BLDG 1202
SEATTLE, WA 98134-2388

January 10, 2022

Planning, Environmental and Cultural Resources Branch

401/CZM Federal Permit Coordinator
Shorelands & Environmental Assistance Program
Washington Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

Dear 401/CZM Federal Permit Coordinator:

The U.S. Army Corps of Engineers, Seattle District (USACE) proposes to replace the large lock center gate (LLCG) at the Hiram M. Chittenden Locks. The purpose of the LLCG replacement project is to maintain efficient navigation through the large lock at the Lake Washington Ship Canal and facilitate routine visual maintenance inspections of the LLCG.

The center gate is referred to as a miter gate because it has two leaves that swing out from the walls and meet in the center of the lock at an angle (miter). The center gate is used by pedestrians and staff to cross the large lock and allows for half lockages during operation. Dividing the large lock chamber in half during vessel passage reduces the time it takes to empty and fill the chamber, which uses less water and is faster than using the whole chamber. Most importantly, the center gate provides redundancy for the large lock by allowing vessel transit in half the lock if either the upstream or downstream gates were to malfunction.

The center gate, commissioned in 1917, is over 100 years old. The gate's design does not meet current design standards and has exceeded its functional lifespan (i.e., the time the gate operates before extensive maintenance is required or design standards change). Recent inspection shows the gate has excessive corrosion and wear. In addition, the two leaves of the center gate are a double-skin design with internal buoyancy chambers. The double skin design presents a major challenge for inspections because the interior components of the gate cannot be visually inspected without staff entering the chambers, which are considered a confined space and a high hazard workspace. Activities such as welding to repair portions of the gate can't be done in a confined space due to the potential for a fire in the buoyancy chamber that could jeopardize lives of workers. The inability of maintenance staff to safely and thoroughly inspect the condition of the gates and the difficulty of performing maintenance within the inner chambers create a potential for gate failure without advance warning. Depending on the type of failure, loss of LLCG function could have

negative consequences for navigation and the upstream communities that rely on the large lock for transportation through unexpected and potentially indefinite large lock closures or delays.

The Corps is requesting Coastal Zone Management (CZM) consistency concurrence from the Washington State Department of Ecology for the LLCG replacement (enclosed). Pursuant to the Shoreline Management Act of 1972 (RCW 90.58), the Corps finds this proposal consistent to the maximum extent practicable with the State of Washington Shoreline Management Program, as well as with the other CZM enforceable policies.

Thank you for your attention to this matter. If you have any questions or need additional information, please contact Ms. Katie Whitlock at Kaitlin.E.Whitlock@usace.army.mil or at 206-764-3576.

Sincerely,

Laura A. Boerner, LG, LHG
Chief, Planning, Environmental & Cultural Resources Branch

Enclosure

CENWS-PMP **January 2022**

COASTAL ZONE MANAGEMENT ACT CONSISTENCY DETERMINATION

Lake Washington Ship Canal Large Lock Center Gate (LLCG) Project

Seattle, Washington

US Army Corps of Engineers®
Seattle District

Introduction. The Coastal Zone Management Act (CZMA) of 1972, as amended, requires Federal agencies to carry out their activities in a manner which is consistent to the maximum extent practicable with the enforceable policies of the approved state Coastal Zone Management (CZM) Programs. The Shoreline Management Act of 1972 (SMA; RCW 90.58) is the core of Washington's CZM Program. Primary responsibility for the implementation of the SMA is assigned to the local government.

According to 15 CFR Ch. IX § 930.30, the Federal Government is directed to ensure "that all Federal agency activities including development projects affecting any coastal use or resource will be undertaken in a manner consistent to the maximum extent practicable with the enforceable policies of approved management programs." The Large Lock Center Gate (LLCG) replacement project will occur on Federal Government property which is outside the coastal zone per section 304(1) of the CZMA. However, effects of the project will extend beyond Federal Government property to the coastal zone which necessitates a determination of consistency with the Washington CZM Program. The coastal zone affected is governed by the city of Seattle Shoreline Master Program (SMP), which was updated in 2021. This determination of consistency with the Washington CZM Program is based on review of applicable sections of the State of Washington Shoreline Management Act and policies and standards of the city of Seattle Shoreline Master Program. The repairs are activities undertaken by a Federal agency; the following constitutes a Federal consistency determination with the enforceable policies of the Washington CZM Program.

The U.S. Army Corps of Engineers, Seattle District (USACE) proposes to replace the LLCG. The purpose of the LLCG replacement project is to maintain efficient navigation through the large lock at the Lake Washington Ship Canal (LWSC) and facilitate routine visual maintenance inspections of the LLCG. The center gate is referred to as a miter gate because it has two leaves that swing out from the walls and meet in the center of the lock at an angle (miter). The center gate is used by pedestrians and staff to cross the large lock and allows for half lockages during operation. Dividing the large lock chamber in half during vessel passage reduces the time it takes to empty and fill the chamber, which uses less water and is faster than using the whole chamber. Most importantly, the center gate provides redundancy for the large lock by allowing vessel transit in half the lock if either the upstream or downstream gates were to malfunction.

The center gate, commissioned in 1917, is over 100 years old. The gate's design does not meet current design standards and has exceeded its functional lifespan (i.e., the time the gate operates before extensive maintenance is required or design standards change). Recent inspection shows the gate has excessive corrosion and wear. In addition, the two leaves of the center gate are a double-skin design with internal buoyancy chambers. The double skin design presents a major challenge for inspections because the interior components of the gate cannot be visually inspected without staff entering the chambers, which are considered a confined space and a high hazard workspace. Activities such as welding to repair portions of the gate can't be done in a confined space due to the potential for a fire in the buoyancy chamber that could jeopardize lives of workers. The inability of maintenance staff to safely and thoroughly

inspect the condition of the gates and the difficulty of performing maintenance within the inner chambers create a potential for gate failure without advance warning. Depending on the type of failure, loss of LLCG function could have negative consequences for navigation and the upstream communities that rely on the large lock for transportation through unexpected and potentially indefinite large lock closures or delays.

Proposed Repair Activities. This project replaces the center gate and associated components with modern equipment. Gate replacement will necessitate redesign of the associated components like the pintle bearing, quoin blocks, and gate anchorages (Figure 1). The new LLCG will have the same dimensions as the existing gate. The single sided skin plate design will allow access to all members for inspection and potential maintenance.

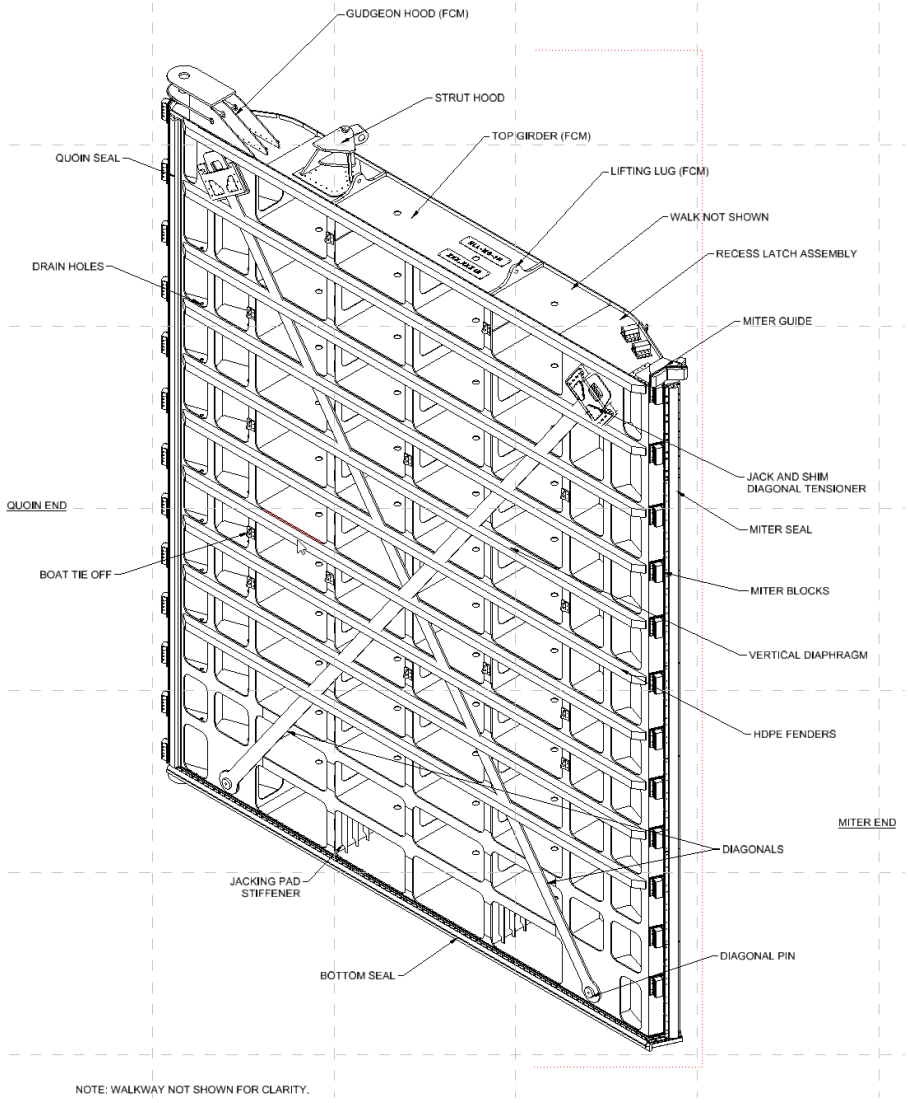

Figure 1. Replacement LLCG.

There could be up to three dewaterings during the in-water work window (between October 15 and February 15, which is about 124 days total); each dewatering event will not exceed 30

consecutive days. The importance of minimizing disruption to navigation will be considered as the project progresses. Between each dewatering, there will be a navigation passage period of at least 15 consecutive days. For example, about 90 days is the maximum number of days the large lock will be closed during the in-water work window if there are three dewatering events of 30 days each followed by a navigation passage period of 15 days. Dewatering will not begin before October 15 or continue after February 15, and will follow protocols for stranded fish (i.e., prompt removal by biologists using aerated buckets to minimize stress and handling time).

Construction may use temporary cofferdams combined with work in the dry when the large lock is dewatered. While a temporary cofferdam is installed, the large lock will be open to navigation each day when workers are not within the cofferdam. Only one cofferdam will be used at a time. The contractor may be able to complete construction without temporary cofferdams by just working during the large lock annual dewatering events. Most likely, a combination of work behind temporary cofferdams and dewatering events of the large lock will be used.

Removal of the center gate is anticipated to occur prior to work on the adjacent lock walls. The exact construction method and associated schedule are not known until a contractor is chosen and a construction methodology is proposed and approved. Once finalized, a Notice to Mariners will be published alerting vessel operators to large lock closures and restrictions, in addition to other public communications on the USACE website, Locks Facebook page, and at stakeholder meetings. A summary of proposed actions (Table 1) appears below.

Table 1. Summary of Proposed Actions for the LLCG Replacement.

Action	**Summary**
Staging	Existing developed areas at USACE LWSC to stage equipment and materials.
Construction Access	Personnel, equipment, and materials will be transferred from the staging area and loaded on to a barge or directly transferred to the project area by walking over the lock gates. Any barge used will be tethered to USACE structures.
Construction Methods	Work will take place behind a temporary cofferdam or in the dewatered large lock. Divers may assist with cofferdam installation. A barge may deliver materials and a land-based or barge-mounted crane will facilitate construction. LLCG fabrication will occur at an off-site location. Construction activities to replace the concrete and gate appurtenances may involve drilling, sawing, grinding, hammering, compressed air or water, and power tool use, but are not limited to these methods. Any of the available methods might generate loud noise, percussive noise, concrete dust, sparks, and a small amount of contained water laden with concrete particles. Discharge of water that may contain materials such as concrete will be managed to comply with water quality requirements. To replace the center gate anchorage connection castings at the top of the wall, concrete

Action	Summary
	will be removed and replaced using similar techniques but can be performed from the top of the wall. Areas needing new concrete may have a form placed to contain and shape the concrete as it cures. The concrete will be fully cured before contacting water. During concrete work, uncured concrete will not be allowed to enter the water and monitoring will take place to avoid impacts to water quality.
Construction Duration	Initial site preparation and staging of materials may begin prior to in-water work. Two to four years of intermittent construction. In-water activities will not occur outside of October 15-February 15. Annual large lock maintenance will coincide with dewatering for construction so additional dewatering will not be needed for maintenance.

Construction activities are divided into several work periods. This allows the large lock to remain open to navigation during certain construction events when it is safe to do so and to minimize impacts to navigation. These work periods are classified as restriction, closure, and passage:

- Navigation **Restriction** Periods: Navigation use of the lock chamber will be prohibited while workers are inside a cofferdam to allow safe work inside the temporary structure. At a minimum, vessels will be allowed to transit the lock chamber from 5:00 pm to 6:00 am, with a width restriction in place for vessels smaller than 65 feet to avoid potential collision with the temporary cofferdam.
- Navigation **Closure** Periods: No vessels would use the large lock chamber. At this time, the total duration of any given closure will not exceed 30 days, with at least 15 days between outages. Generally, navigation closure periods would be longer, up to 30 days, if cofferdams and navigation restriction periods are not used. The final duration of closure periods will be determined by USACE based on contractor proposals and feedback from the maritime community and the public.
- Navigation **Passage** Periods: Normal navigation would be allowed.

If used, a temporary cofferdam will be placed in the large lock, secured to the lock wall, and dewatered with pumps; then construction activities will be performed in the dry. A typical localized cofferdam will be a three-sided, open-bottom cofferdam that will bolt to the lock wall, similar to the example in Figure 2. Highly compressible neoprene seals will slow flow between the cofferdam and the wall, allowing maintenance pumping to maintain the area in the dry. Sandbags can also be placed inside the cofferdam at the base to manage water. Divers may assist with installation if it occurs while the lock is fully watered. If temporary cofferdams are not used, Navigation Restriction Periods will not be needed. There will be Navigation Closure Periods for removal and installation of the LLCG or other construction activities.

Figure 2. Localized cofferdam example.

Fender systems would be provided, installed, maintained, and removed by the contractor. The contractor would install fenders in the LLCG recesses on either lock wall at the end of the in-water work period to reduce the risk of damage to new or existing features during navigation passage until the following in-water work period. The fender system can be installed in the wet or the dry and may require dive operations if installed in the wet. The fender system would be removed from the miter gate recesses, likely by crane, when construction is needed. After completion of the work within localized cofferdams, but prior to the installation of the new gate leaves, fender systems would be installed in both gate recesses.

Depending on when a contract is awarded, the earliest construction could begin is fall 2022. To complete the work within required in-water work period (October 15-February 15), minimize impacts to navigation, and ensure the large lock will be ready for customary use, multiple work shifts may be required, including 24 hours a day, as well as seven days per week.

Consistency Review. The CZMA requires states to identify "Enforceable Policies." Washington's authorities and their implementing regulations contain the state CZM Program's enforceable policies:

- The State Water Pollution Control Act
- The Washington State Clean Air Act
- The State Shoreline Management Act (SMA)

The Marine Spatial Plan for Washington Waters and the Ocean Resources Management Act are not applicable to this project because the proposed action does not occur in a county that is adjacent to the Pacific Ocean. There would be no significant long-term impacts to coastal or marine resources or uses of the Pacific Ocean as a result of this project. The Energy Facility Site Evaluation Council law is not applicable because the project is not an energy facility that requires a permit.

State of Washington Water Pollution Control Act (WPCA). The WPCA outlines the public policy of the state of Washington to maintain the highest possible standards to insure the purity of all waters of the state consistent with public health and public enjoyment thereof, the propagation and protection of wild life, birds, game, fish and other aquatic life, and the industrial development of the state, and to that end require the use of all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the state of Washington. It works in concert with the Federal Clean Water Act (CWA) to ensure that waters of the U.S. and Washington State are protected.

Even though the USACE does not issue Section 404 permits to itself for its Civil Works activities, the USACE must comply with the substantive requirements of Section 404 and 401 under the CWA. Pursuant to both Section 404 of the CWA (33 USC 1344(f)(1)(b)) and Federal Regulations 33 CFR 323.4(a)(2), the proposed activity falls within an exemption since the activity falls within the parameters of maintenance. Therefore, the repair does not require a Section 404(b)(1) evaluation or Section 401 certification.

The LLCG replacement is limited to maintenance of an existing serviceable dam and does not propose to change the scope, character, or size of the original fill design, so the discharge of fill material into Waters of the United States (U.S.) is exempt. This is because 33 USC 1344(f)(1)(B) provides that discharge of material "for the purpose of maintenance, including urgent reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, groins, riprap, breakwaters, causeways, and bridge abutments or approaches, and transportation structures" is exempt from regulation as fill. In addition, use of materials such as concrete that do not contain toxic pollutants as listed under Section 307 of the CWA is consistent with the maintenance described in the exemption.

The LLCG replacement will be conducted within the existing footprint of the large lock as constructed in 1916. The components of the work include replacing infill concrete from 1916 in the lock wall and replacing the LLCG and associated components connected to the lock wall. To facilitate the work that is wholly inside the lock chamber, the repair may use a cofferdam with sandbags or other material inside to prevent leaks. This work will not change the character, scope, or size of the structure from the original fill design. New fill will conform to the original configuration and size of the original fill of the lock wall. Only as much concrete as is necessary for an adequate repair will be applied, and overfilling will be avoided to maintain a similar profile to the surrounding structure. USACE considers modern concrete formulations as analogous to the 1916 concrete used in the initial construction of the large lock chamber.

Best Management Practices (BMPs; Attachment A) will be employed to prevent pollutants from entering into Waters of the U.S. The proposed action will employ appropriate BMPs to conform with the WPCA to protect Waters of Washington State. Regular monitoring of turbidity and pH according to the water quality monitoring plan (Attachment A) in waters adjacent to the cofferdam will be conducted during concrete work behind a temporary cofferdam, particularly if a turbidity plume is spotted, and during activities that could generate turbidity such as cutting concrete.

Washington Clean Air Act. Washington Administrative Codes WAC 173.400 through 173.495 were reviewed to ensure the project will comply with the Washington State Clean Air Act. Additionally, the project will comply with the adopted Federal rules. Section 176 of the Clean Air Act, 42 USC 7506(c), prohibits Federal agencies from approving any action that does not conform to an approved state or Federal implementation plan. Activities during the project will have short-term localized effects to air quality. There will be a temporary increase in emissions during equipment operation. Construction will occur in a maintenance area. The area was previously a non-attainment area for carbon monoxide (CO). The 20-year maintenance period for CO ended in 2016. The impact to air quality is anticipated to be minor due to the small area of construction (< 1 acre) and the type of equipment used (e.g., generators, power tools, intermittent crane and barge use). The small area of construction and the nature of the work will limit the impact to air quality, which is expected to be well below the *de minimis* threshold of 100 tons per year of CO or PM10. Under 40 CFR 93.153(c)(2)(iv), conformity determinations are not required for Federal maintenance and repair activities where the increase in emissions associated with the activity falls below the *de minimis* level.

State of Washington Shoreline Management Program. The Washington State Department of Ecology enforces the following policies under the State Shoreline Management Act.

- WAC 173-15: Oil and Natural Gas Exploration Permits: This project does not include the exploration of oil or natural gas; and therefore, the regulation does not apply to the proposed action.
- WAC 173-18: Rivers within Shoreline jurisdiction: The project is not located at the mouth of a river; therefore, the regulation does not apply to the proposed action.
- WAC 173-20: Lakes within Shoreline jurisdiction: This project does not include shoreline adjacent to a lake; therefore, the regulation does not apply to the proposed action.
- WAC 173-22: Shorelines of the State: The project does occur within a Shoreline of the State. The project is consistent to the maximum extent practicable with the local Shoreline Master Plan (SMP) requirements for the local shoreline designation. Please refer to Local Shoreline Master Program below.

This project falls within the description of an activity exempted from the permit process as outlined in WAC 173-27-040(2)(b), “Normal maintenance or repair of existing structures.” Replacement of existing structures is a common method of repair for lock gates, the new

components are comparable to the original structure, and the replacement does not cause substantial adverse effects to shoreline resources or environment. Furthermore, the CZMA does not require Federal agencies to obtain local permits. However, the USACE has demonstrated consistency to the maximum extent practicable with the Seattle SMP and all applicable policies and regulations for shorelines of the state.

The Washington SMA, Revised Code of Washington (RCW) Chapter 90.58 is the core authority of Washington's Coastal Zone Management Program. This chapter enunciates the following state policy:

- To provide for the management of the shorelines of the state by planning for and fostering all reasonable and appropriate uses.
- To ensure the development of shorelines in manner that promotes and enhances the public interest while allowing only limited reduction of rights of the public in the navigable waters.
- To protect against adverse effects to the public health, the land and its vegetation and wildlife, and the waters of the state and their aquatic life, while protecting generally public rights of navigation and corollary rights.

The proposed activities are consistent with this broad statement of policy. The proposed action will support the continued use of the large lock. The project is in the public interest due to the structure's role in maintaining LWSC water levels and providing migratory fish passage, and will not change the rights of navigation.

Local Shoreline Master Program. The Seattle Shoreline Master Program (SMP; 2021) constitutes the policies and regulations governing development and uses in and adjacent to marine and freshwater shorelines as defined in Seattle Municipal Code Chapter 23.60A [https://www.municode.com/library/wa/seattle/codes/municipal_code?nodeId=TIT23LAUSCO_SUBTITLE_IIILAUSRE_CH23.60ASESHMAPRRE].

Following the procedures as detailed at Seattle Municipal Code 23.60A.062, this document provides information for a determination of consistency. The following outlines pertinent sections of the city of Seattle SMP that apply to and implement the SMA. The USACE consistency determinations are located below the relevant code in ***bold italics***.

<u>23.60A.002 - Title and purpose</u>

A. This Chapter 23.60A shall be known as the "Seattle Shoreline Master Program Regulations."

B. It is the purpose of this Chapter 23.60A to implement the policy and provisions of the Shoreline Management Act and the Shoreline Goals and Policies of the Seattle Comprehensive Plan, as well as the City's interest in the public health, safety and welfare, by regulating development, uses and shoreline modifications of the shorelines of the City in order to:

1. Protect the ecological functions of the shoreline areas;

2. Encourage water-dependent uses;

3. Provide for maximum public access to, and enjoyment of the shorelines of the City; and

4. Preserve, enhance, and increase views of the water.

Consistent. The LLCG project will not alter the ecological function at the large lock and will maintain the use of the large lock. The LLCG project will maintain the Locks facilities so that public access for enjoyment of the shoreline and views of the water may continue.

23.60A.020 C– Permits and Exceptions

The following substantial developments are exempt from obtaining a shoreline substantial development permit from the Director:

1. "Normal maintenance" or repair of existing structures or developments, including damage by accident, fire or elements.

a. "Normal maintenance" means those usual acts to prevent a decline, lapse or cessation from a lawfully established state comparable to its original condition, including but not limited to its size, shape, configuration, location, and external appearance, within a reasonable period after decay or partial destruction, except where repair causes substantial adverse effects to shoreline resources or environment.

Consistent. The LLCG project will maintain the Federal structures at the Locks at their present location. The LLCG project will be designed and constructed to be a similar size, shape, configuration, location, and external appearance of the existing structure. LLCG project method is normal maintenance or repair. The LLCG project will prevent a decline in the functionality or operation of the large lock. With the use of BMPs listed in the draft EA, no adverse effects to shoreline resources or the environment are anticipated.

23.60A.152 - General development

All developments, shoreline modifications, including land disturbing activity, and uses are subject to the following general development standards, whether they are located on dry land, overwater or in setbacks:

A. All shoreline developments, shoreline modifications, and uses shall be located, designed, constructed and managed to achieve no net loss of ecological functions. No net loss of ecological functions shall be achieved by applying the standards set out in this Chapter 23.60A, including applying mitigation sequencing pursuant to Section 23.60A.158.

Consistent. The LLCG project will maintain the Locks structures in their present location. Repairs will be designed, constructed and managed to achieve no net loss of ecological functions. Mitigation sequencing to avoid and minimize impacts using best management practices (BMPs) will be implemented according to Section 23.60A.158 B.1.a-b.

B. All shoreline development, shoreline modifications, and uses shall be located, designed, constructed, and managed to avoid, or if that is infeasible, to minimize to the maximum extent feasible, adverse impacts or interference with beneficial natural shoreline processes such as water circulation, littoral drift, sand movement, or erosion.

Consistent. The LLCG project will maintain the functionality and operation of the large lock. Therefore, no changes in shoreline processes will occur over the status quo.

C. All shoreline developments, shoreline modifications, and uses shall be located, designed, constructed, and managed to prevent the need for shoreline defense and stabilization measures and flood protection works such as bulkheads, other bank stabilization, fills, levees, dikes, groins, jetties, dredging, or substantial site regrades to the extent feasible except as allowed in Section 23.60A.188.

Consistent. The proposed project does not require shoreline stabilization, only repairs to the existing structures.

D. All new shoreline development and uses shall be sited and designed to avoid or, if that is infeasible, to minimize to the maximum extent feasible the need for new and maintenance dredging.

Not Applicable. No new development will occur. This is a repair of an existing structure according to WAC 173-27-040(2)(b). The current usage of the large lock will not change. The proposed repairs do not require new or maintenance dredging.

E. All shoreline developments, shoreline modifications, and uses shall be located, designed, constructed, and managed in a manner that minimizes adverse impacts to surrounding land and water uses in the Shoreline District and is compatible with the affected area in the Shoreline District.

Consistent. The proposed project will have no adverse impacts to the surrounding land and water uses. The purpose of the project is to maintain the large lock within the existing footprint. Closure of the large lock will be coordinated with a Notice to Mariners and to the public.

F. All shoreline developments, shoreline modifications, and uses shall be located, constructed, operated, and managed to protect public health and safety.

Consistent. The proposed repairs are designed to address structural concerns of the LLCG. The project has been designed to minimize any effects to public health and safety to the maximum extent practicable.

G. Disturbance areas and land clearing shall be limited to the minimum necessary for development. Any surface disturbed or cleared of vegetation and not to be used for development shall be planted with native vegetation, except that pre-disturbance landscaped areas containing non-native vegetation located outside the shoreline setback may be re-landscaped using non-native, noninvasive vegetation pursuant to Section 23.60A.190.

Not Applicable. No land clearing is proposed.

H. All shoreline developments, shoreline modifications, and uses shall use best management practices pursuant to DR 16-2009, Construction Stormwater Control Technical Requirements, to control impacts during construction.

Consistent. The contractor will provide a stormwater pollution prevention plan (SWPPP) using best management practices pursuant to the most recent City of Seattle Stormwater Manual dated August 2017 (https://web6.seattle.gov/DPD/DirRulesViewer/Rule.aspx?id=17-2017) to control impacts during construction to the USACE for approval.

I. All shoreline developments, shoreline modifications, and uses shall be located, designed, constructed, operated and managed to: protect the quality and quantity of surface and ground water on and adjacent to the development lot by using best management practices as follows:

1. Keep all material on the property appropriately stored, and maintain all structures, machinery, and materials on the property to prevent the entry of debris and waste materials into any water body.

2. Pave and/or berm drum storage areas, and control fugitive dust to prevent contamination of land or water.

3. Minimize the impervious surface on the site, and use permeable surfacing where practicable, except where other required state or federal permits prohibit such actions.

4. Use other control measures as appropriate, including but not limited to bioretention, rainwater harvesting, downspout dispersion, filters, catch basins, and planted buffers.

Consistent. Construction materials will be properly stored and secured to prevent the entry of debris and waste materials into any water body, and secondary containment will be used as needed around materials and machinery. There will be no impervious surfaces created. Please see Attachment A for a complete list of BMPs.

J. All in-water and over-water structures shall be designed, located, constructed, and managed to avoid adverse impacts to aquatic habitat, such as increased salmonid predator habitat and adverse impacts due to shading, to the maximum extent feasible and to limit construction to the times of the year when construction will have the least impact on migrating salmonids as set by WDFW and the USACE.

Consistent. The project involves replacement of an existing in-water structure with no design changes. There are no over-water structures. In-water work will take place October 15-February 15 as coordinated with the National Marine Fisheries Service and U.S. Fish and Wildlife Service to avoid impacts to migrating salmonids.

K. Durable, non-toxic components are the first priority for in-water and over-water structures and shall be used unless it is unreasonable. Treated wood and other material shall be the least toxic according to industry standards. Treated wood used shall be applied and used in accordance with the American Wood Preserver Association (AWPA) standards for aquatic use.

Wood treated with pentachlorophenol, creosote, chromate copper arsenate (CCA), or comparably toxic compounds is prohibited for decking or piling.

Consistent. Concrete will be placed in the dewatered lock chamber or behind a cofferdam to prevent contact between uncured concrete and surface waters. Concrete will be allowed to cure prior to removing the cofferdam or rewatering the lock chamber.

L. Creosote piles

1. Creosote treated piles may be repaired if:

a. the piling is under a structure that is not being replaced; or

b. fewer than 50 percent of the existing piles are in need of repair under a structure that is being replaced.

2. "Sleeving" shall be the repair method used unless another method provides better protection of ecological functions.

3. Creosote treated piles in need of repair must be replaced if under a structure that is being replaced and 50 percent or more of the number of piles are proposed to be repaired, if reasonable.

Not Applicable. The project involves the LLCG only and will have no piles.

M. Replaced covered moorage and new and replaced boat sheds shall be designed to provide the maximum ambient light to reach the water. Designs shall:

1. Minimize sides of the structures; and

2. Provide light transmitting roofing and side material to the maximum extent feasible.

Not Applicable. The project does not involve covered moorage or boat sheds.

N. Light transmitting features are required to be installed for all new and replaced piers and floats, over-water boat repair facilities and similar structures to the maximum extent feasible. When determining feasibility of light transmitting features for nonresidential piers and floats see subsection 23.60A.187.E.6.

Not applicable. The project involves replacement of the LLCG with a similar structure that does not increase the footprint. The LLCG project will not install any piers, floats, over-water boat repair facilities, or similar structures.

O. Tires are prohibited as part of above or below water structures or where tires could potentially come in contact with the water (e.g., floatation, fenders, hinges). During maintenance of structures using tires, existing tires shall be removed or replaced with nontoxic material.

Not Applicable. The project will not use or replace any tires.

P. All foam material, whether used for floatation or for any other purpose, shall be encapsulated within a shell that prevents breakup or loss of the foam material into the water and that is not readily subject to damage by ultraviolet radiation or abrasion. During maintenance of structures using foam, existing un-encapsulated foam material shall be removed or replaced with material meeting the standards of this subsection 23.60A.152.P.

Not Applicable. The project will not use or replace any foam material.

Q. Artificial night lighting shall first be avoided. If that is infeasible, lighting should minimize night light impacts on the aquatic environment by focusing the light on the pier surface, using shades that minimize illumination of the surrounding environment and using lights that minimize penetration into the water, to the maximum extent feasible, considering the activities that occur at the site at night.

Consistent. LLCG work is expected to occur during daylight hours. If work occurs at night, then lighting for safety of workers will be required and will be minimized to the extent feasible to conduct the work safely. Directional lighting will be used to focus light on the work area and minimize illuminating surrounding areas and penetration into adjacent water bodies.

R. The release of oil, chemicals, solid waste, untreated effluents, or other hazardous materials onto or into the water is prohibited. Best management practices shall be employed for the safe handling of these materials to prevent them from entering the water. Equipment for the transportation, storage, handling or application of such materials shall be maintained in a safe and leak-proof condition. If there is evidence of leakage, the further use of such equipment shall be suspended until the cause has been completely corrected. Best management practices shall be employed for prompt and effective clean-up of any spills that occur. A spill prevention and response plan to meet the above requirements may be required by the Director prior to issuance of a permit unless the Director has determined that it is reasonable to provide the plan prior to commencement of construction.

Consistent. The proposed project conforms to the above provisions. BMPs will be implemented during the proposed project. The USACE will require the contractor to provide a Spill Prevention and Response Plan.

S. Facilities, equipment and established procedures for the containment, recovery and mitigation of spilled petroleum products shall be provided at recreational marinas, commercial marinas, vessel repair facilities, marine service stations and any use regularly servicing vessels that have petroleum product capacities of 10,500 gallons or more. A third party may provide the containment and clean-up of spills if a containment boom, capable of containing a spill from the largest vessel, is available on site and personnel are trained to deploy containment booms around vessels moored at the site.

Consistent. BMPs to prevent and contain petroleum product spills from vessels used in the repair (e.g., barges and work boats) will be implemented (Attachment A).

T. Construction and repair work shall use best management practices to prevent the entry of debris and other waste materials into any water body. No over-water or in-water application of paint, preservative treatment, or other chemical compounds is permitted, except in accordance with best management practices. Any cleaning, sanding, cutting of treated wood, or resurfacing operation occurring over-water or in-water shall employ tarpaulins securely affixed above the water line to prevent material from entering the water. Prior to removing the tarpaulins, the accumulated contents shall be removed by vacuuming or an equivalent method that prevents material from entering the water.

Consistent. The proposed action does not involve over-water or in-water application of paint, preservative treatment, or other chemical compounds, or cleaning, sanding, cutting of treated wood, or resurfacing operations on site. Concrete removed from the lock wall during the course of the project will be disposed of properly offsite. BMPs will prevent turbidity or pH exceedances of State water quality standards during work behind temporary cofferdams.

U. Construction staging areas shall be as far from the OHW mark as reasonable. For projects involving concrete, a concrete truck chute cleanout area shall be established to contain wet concrete. All inlets and catch basins shall be protected from fresh concrete, paving, paint stripping and other high-risk pollution generating activities during construction.

Consistent. Appropriate staging areas will be provided by the USACE on previously developed property. The staging areas will be as far from the OHW mark as reasonable, but the configuration and location of the Locks limits the total potential staging area distance from the OHW mark. BMPs (Attachment A) will prevent introduction of concrete or other materials generated during the project into inlets and catch basins.

V. If at any time project-related activities cause a fish kill, the permittee shall stop all work relating to the fish kill and immediately notify the Department of Planning and Development, WDFW, and Ecology.

Consistent. In the event of any fish kill, all work will stop, and the contractor will notify all parties named above as well as the project manager for USACE. This is a notification process only.

W. Navigation channels shall be kept free of hazardous or obstructing development or uses.

Consistent. Navigation channels will be kept free of hazardous or obstructing development. Temporary navigation restrictions and closures will be necessary for the LLCG project, but the durations will be as short as possible to minimize disruption to boaters. The small lock will be available during large lock navigation restrictions and closures. A Notice to Mariners will be used to alert the public when exact restriction and closure dates are known.

X. On waterfront lots uses that are not water-dependent shall be designed and located on the shoreline to encourage efficient use of the shoreline and to allow for water-dependent uses. Design considerations may include additional setbacks from all or a portion of the water's edge, joint use of piers and wharves with water-related or water-dependent uses, development of

the lot with a mixture of water-related and water-dependent uses, or other means of ensuring continued efficient use of the shoreline by water-dependent uses.

Not applicable.

Y. All open areas used for boat storage are required to be screened with natural existing vegetated buffers or planted landscaped areas except for lots with a dry land lot depth of less than 35 feet and areas within the UG, UI and UM Environments. Screening shall include a 5 foot wide landscaping strip with native evergreen plantings at least 3 feet tall. The screening shall be located outside any required sight triangle. The requirement for screening may be waived or modified by the Director to address traffic safety.

Not applicable. The project does not involve areas used for boat storage.

<u>23.60A.172 - Applicable standards for shoreline modifications</u>

A. All shoreline modifications are subject to the standards set out in Subchapter III of this Chapter 23.60A.

B. Any proposed shoreline modification located on state-owned aquatic lands must provide evidence of notification to DNR prior to obtaining authorization from the Director.

C. All shoreline modifications are prohibited except as allowed, allowed as a special use, or allowed as a shoreline conditional use in this Section 23.60A.172 and Table A for 23.60A.172. If Table A for 23.60A.172 lists a shoreline modification in association with a specific use or other shoreline modification, that use or shoreline modification must be allowed, allowed as a special use, or allowed as a shoreline conditional use in the shoreline environment for which the shoreline modification is proposed.

Excerpt from Table A for 23.60A.172 Applicable standards for shoreline modifications

	Shoreline Modification	Shoreline Environments									
		CM	CN	CP	CR	CW	UC	UG	UH	UI	UM	UR
7.	Fill 7.a through 7.j are required to demonstrate that alternatives to fill are infeasible.											
7.d.	Necessary to support a water dependent use.	CU	CU	X	CU	CU	CU	CU	CU	CU	CU	CU

Shoreline Environment Abbreviations: Conservancy Management (CM); Conservancy Navigation (CN); Conservancy Preservation (CP); Conservancy Recreation (CR); Conservancy Waterway (CW); Urban Commercial (UC); Urban General (UG); Urban Harborfront (UH); Urban Industrial (UI); Urban Maritime (UM); Urban Residential (UR).

Key: Shoreline Conditional Use (CU) and Prohibited (X).

Consistent. Subchapter III (General Provisions) includes 23.60A.090 to 23.60A.220, and the applicable sections are included in this consistency determination. The project will take place on federally owned property. This project falls under 7.d., fill necessary to support a water dependent use that meets the additional criteria in Section 23.60A.184 (see next section), and is a conditional use (CU) in Conservancy Management (CM) shoreline environment. An alternative to the proposed action is infeasible because the purpose of the project is to maintain the structure and function of the large lock, which is a water-dependent use.

23.60A.184 - Standards for fill

A. In shoreline environments where fill is allowed or allowed as a special use or a shoreline conditional use it shall comply with the standards in Section 23.60A.172 [above] and in this Section 23.60A.184.

B. Fill materials shall be of a quality that will not cause degradation of water or sediment quality.

C. Solid waste, refuse, and debris shall not be placed in the water or on shorelands.

Consistent. Fill materials (concrete) will be non-toxic and appropriate for marine uses. Concrete will have contact with water only after curing. Water quality monitoring for turbidity and pH will be performed. Only fill needed for the proposed action will be placed in the water; solid waste, refuse, and debris will be disposed of properly.

D. Fills shall be designed, located, constructed, and managed to ensure stability of slopes created including the provision of vegetation, retaining walls, or other mechanisms for erosion prevention.

Not applicable.

E. Dredged material not meeting the federal Environmental Protection Agency and Ecology criteria for open-water disposal may be used for fill in the water or shorelands if the applicant demonstrates that:

1. The fill meets the criteria for fill in Section 23.60A.172 and this Section 23.60A.184;

2. Either the area in which the fill material is placed has the same level of the same contaminant or the material is placed in a manner that it will not be a source of contaminants in an area cleaner than the proposed fill material;

3. The fill can be placed in the water or on the land without long-term adverse impacts to water quality, sediment quality, aquatic life, or human health, provided that if the fill is dredged material, placement of the material also complies with Section 23.60A.182; and

4. If classified by the state or federal government as problem or hazardous waste, any required federal Environmental Protection Agency and Ecology approval is obtained.

Not Applicable. Dredged material will not be used for fill.

F. Fill shall not result in the creation of dry land except where necessary for transportation projects of statewide significance, as part of ecological restoration and enhancement, beach nourishment, mitigation, or where necessary to repair pocket erosion as allowed in subsection 23.60A.184.G.

G. Fill that creates dry land that is necessary to repair pocket erosion between adjacent revetments is required to meet the standards of this Section 23.60A.184 and the following standards:

1. The repair of the erosion pocket is necessary to protect water-dependent or water-related uses;

2. The erosion pocket does not exceed 20 feet in length or 100 feet of shoreline, as measured between adjacent revetments;

3. The erosion pocket is in an area characterized by continuous revetments abutting and extending in both directions along the shoreline away from the erosion pocket;

4. The fill will not appreciably increase interference with a system of beach accretion and erosion; and 5. The fill does not extend beyond a line subtended between the adjacent revetments.

Not Applicable. The proposed LLCG project will not create dry land.

H. Fill incidental to the repair or replacement of existing shoreline stabilization measures pursuant to Section 23.60A.020 and subsection 23.60A.188.F including, but not limited to, the replacement of riprap, or the replacement of a bulkhead directly in front of an existing bulkhead, as allowed in Section 23.60A.020, does not require approval as fill under this Section 23.60A.184, provided that the fill is the minimum necessary to accommodate the repair or replacement, the repair or replacement has been approved and pursuant to Section 23.60A.158.

Not Applicable. The proposed action is not incidental to the repair or replacement of existing shoreline stabilization measures pursuant to Section 23.60A.020 and subsection 23.60A.188.F.

I. In applying mitigation sequencing pursuant to Section 23.60A.158, potential adverse impacts to be addressed include, but are not limited to: total water surface reduction; navigation restriction; impediment to water flow and circulation; reduction of water quality; disturbance of fish runs and other biological communities; and loss or modification of upland or shallow water vegetation functions and habitat and the adverse impacts of riprap migrating off-site and the impacts of the riprap at the off-site locations that are not retrieved as allowed pursuant to subsection 23.60A.184.H.

Consistent. BMPs (Attachment A) will be implemented to avoid and minimize reduction of water quality, disturbance of fish runs and other biological communities, and other potential

adverse effects. Reduction of total water surface, navigation restriction, and loss or modification of vegetation functions and habitat are not expected because the proposed action will only maintain the LLCG. No riprap will be used.

23.60A.220 - Environments established

A. Shoreline environment locations

1. The shoreline environments set out in subsection 23.60A.220.C and the boundaries of these environments are established on the Official Land Use Map as authorized in Chapter 23.32.

2. Any undesignated shorelines are designated Conservancy Preservation.

3. Submerged lands seaward of the Outer Harbor Line, Construction Limit Line or other navigational boundary that are not specifically designated or shown on the Official Land Use Map shall be designated Conservancy Navigation.

B. Submerged Lands

1. On Puget Sound, Lake Washington and Green Lake, submerged lands shall be designated as shoreline environments that preserve them for ecological functions and public or recreational purposes.

2. On Elliott Bay, Lake Union, the Ship Canal, and the Duwamish River, submerged lands shall be designated as shoreline environments that balance preservation of ecological functions and a mix of public, recreational, industrial, and commercial purposes. In these areas; the environmental designation given to submerged lands is generally the same as the abutting waterfront dry land and extends to the outer Harbor Line, Construction Limit Line, or other navigational boundary.

3. Where the shoreline environment designation on submerged land is different from the shoreline environment designation of the adjacent dry land, the environment boundary is the OHW mark in freshwater environments and mean higher high water in saltwater environments.

C. For the purpose of this Chapter 23.60A, the Shoreline District is divided into 11 environments.

D. The purpose and locational criteria for each shoreline environment are as follows:

1. Conservancy Management (CM) Environment

a. Purpose. The purpose of the CM Environment is to provide for water-dependent infrastructure, such as navigational locks, that provide a substantial public benefit, and recreational facilities, such as marinas and parks. Development allowed in the CM Environment can be managed to preserve ecological functions and typically provide public access.

b. Locational Criteria

1) Dry or submerged land that is generally owned by a public agency and developed with a major infrastructure or a recreational facility, including navigation locks and marinas;

2) Public and private parks; or

3) Areas of medium to high intensity development that are surrounded by areas of less intense development such that they may require active management to protect ecological functions.

Consistent. The USACE acknowledges the city of Seattle's designated shoreline environments and that work is proposed adjacent to land designated as a Conservancy Management (CM) environment. The proposed project is to repair the LLCG and maintain the use of the large lock, and is consistent with maintenance of water-dependent infrastructure (navigational locks) that provides a substantial public benefit for navigation and recreational use. The action would not change the existing land use at or any development adjacent to the project area. Applicable BMPs and conservation measures (Attachment A and draft environmental assessment) such as the in-water work window to avoid impacts to salmonids will be employed to avoid and minimize negative effects to ecological functions.

Subchapter V: - The Conservancy Management (CM) Environment

23.60A.222 - Applicable standards in the CM Environment

All uses and development in the CM Environment, including shoreline modifications, are subject to the standards set out in Subchapter III of this Chapter 23.60A and to the following standards for the CM Environment.

Consistent. Subchapter III (General Provisions) consists of Sections 23.60A.090 to 23.60A.220, and the applicable sections are included in this consistency determination.

Part 1 - Uses
23.60A.224 - Uses in the CM Environment

A. Use regulations

1. All uses are allowed, allowed as a special use, allowed as a shoreline conditional use, or prohibited pursuant to Section 23.60A.090, this Section 23.60A.224, and Table A for 23.60A.224. Use categories and subcategories cover all uses in that category and subcategory except when a subcategory of that use is specifically shown in Table A for 23.60A.224.

2. If Table A for 23.60A.224 or the text of Section 23.60A.224 states that a use is required to be water-dependent or water-related, a use that does not have the required attribute is prohibited.

3. Regulations for specific shoreline modifications are set out in Sections 23.60A.172 through 23.60A.190.

Consistent. The proposed LLCG project is for the maintenance of water-dependent structures in accordance with A.3, regulations for specific shoreline modifications (Standards for fill; 23.60A.184, as covered above).

Part 2 - Development Standards
23.60A.228 - Height in the CM Environment
23.60A.230 - Lot coverage in the CM Environment
23.60A.232 - Shoreline setbacks in the CM Environment
23.60A.234 - View corridors in the CM Environment
23.60A.236 - Regulated public access in the CM Environment

Consistent. The proposed LLCG project does not change the height, lot coverage, shoreline setback, or view corridor of the project area or USACE structures. For the safety of the public, access will be limited during construction, but the project will maintain long-term public access by replacing the LLCG and maintaining the functionality of the large lock.

Conclusion. Based on the above evaluation, the USACE has determined that the proposed LLCG project is consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of Washington State, including the enforceable policies as specified in the local planning documents for the city of Seattle that are incorporated in the approved programs. The action is, therefore, consistent with the State of Washington's CZM Program to the maximum extent practicable.

Water Quality Monitoring Plan

Hiram M. Chittenden Locks
Large Lock Center Gate Replacement
April 2022

Constituents Monitored:

The Hiram M. Chittenden Locks (Locks) large lock center gate (LLCG) Replacement project area is located in Shilshole Bay, which is designated as "Extraordinary Quality" (WAC 173-201A-612, Table 612). The project area contains extraordinary quality salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

The proposed project requires the following water quality monitoring parameters pursuant to Public Notice of Availability CENWS-PMP-21-06 Seattle, WA for WAC 173- 201A-210. The contractor will conduct all work in a manner that does not exceed applicable turbidity standards beyond the limits established in WAC 173-201A200(1)(e)(i) or applicable pH standards beyond the limits established in WAC 173-201A(200)(1)(g):

- Turbidity applicable criteria:
  - Point of Compliance (POC) is 150 feet down-current of any in-water activity (i.e., work behind temporary cofferdams).
  - Turbidity readings at the POC will not exceed 5 NTU (nephelometric turbidity units) over background when the background is 50 NTU or less, or a 10 percent increase in turbidity when the background turbidity is more than 50 NTU (per WAC 173-201A200(1)(e)(i)).
  - Visual turbidity anywhere at or past the POC from the activity will be considered a possible exceedance of the standard and will be verified through measured turbidity sampling.
- pH applicable criteria:
  - The State of Washington water quality standards do not specify a POC for pH so the U.S. Army Corps of Engineers (Corps) has determined that the pH will be monitored near the point of concrete work and curing that takes place behind the temporary cofferdam (i.e., any water within the cofferdam) and any discharge.
  - pH readings must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.2 units (per WAC 173-201A(200)(1)(g)).
- Petroleum Sheen:
  - Visual monitoring throughout the project area for the duration of construction during all in- and over-water work.

Background Conditions:

- The contractor will take background measurements of turbidity outside of the area of influence of the in-water work using a water quality meter (HydroLab or similar) as close as possible in time to the start of concrete work and potential turbidity generating activities such as installing a temporary cofferdam. Background measurements will coincide as close as possible in time with each measurement taken at the POC. Determination of background water quality conditions will be made according to the following:
  - The contractor will calibrate the water quality meter with standardized samples prior to the start of each day's monitoring, per the manufacturer's specifications.

- The contractor will collect samples in the large lock at a location that will accurately represent background conditions. The contractor will determine the precise location that accurately represents background levels to acquire the samples.
- The contractor will collect samples at mid-depth at the background monitoring location.

Frequency of Monitoring:

- The contractor will monitor for turbidity daily, every four hours, during daylight hours only, for concrete work or other potential turbidity-generating work. No monitoring will occur before sunrise or after sunset unless authorized by the Corps.
- Turbidity monitoring will correspond with (1) slack tide and (2) strong ebb or flood tidal conditions to the extent that these times adequately reflect periods of concrete work or other potential turbidity-generating work, and occur during daylight hours.
- The contractor will operate construction equipment for at least one hour prior to the collection of water quality samples for turbidity monitoring to ensure samples are reflective of turbidity conditions during active operations.
- The contractor will continuously monitor for pH during concrete work and curing, except as restricted below. The contractor will provide a water quality meter (HydroLab or similar).
- Monitoring will occur during daylight hours if the water quality meter is deployed from a boat. The Corps will approve night monitoring if work or curing takes place at night.

Sampling Approach:

- The contractor will establish water quality conditions according to the following:
  - The contractor will measure turbidity and pH with a meter (HydroLab or similar), under the conditions described above to ensure readings and observations are reflective of active periods of concrete work and curing, and during other potentially turbidity-generating work.
  - The contractor will verify the calibration of the meter and calibrate as necessary with standardized samples prior to the start of each day's monitoring, per the manufacturer's specifications.
  - The contractor will take samples at mid-depth of the water column.
- The POC for turbidity for a temporary area of mixing will be at a radius of 150 feet from the activity causing the turbidity.
- The State of Washington water quality standards do not specify a POC for pH so the Corps has determined that the contractor will monitor pH near the point of concrete work and curing that takes place behind the temporary cofferdam and any discharge of water, if applicable (e.g., from the cofferdam and/or a treatment container).
- Monitoring points will be at the turbidity background monitoring point, at the turbidity POC (a 150-foot radius from the activity), and as close to the concrete work as possible for pH monitoring.
- Samples taken by the contractor at the POC will be adjusted within the depth range to target the turbidity plume which will be tracked visually. If no distinct turbidity plume can be identified within the depth range, the samples will be taken at the mid-depth.
- The contractor will compare turbidity samples taken at the POC to background levels at mid-depth to determine compliance with water quality standards.
- The contractor will take continuous samples for pH as close to the concrete work as possible

(i.e., behind the cofferdam) and at any discharge of water, if applicable (e.g., from the cofferdam and/or a treatment container). These samples will serve as the pH POC to determine if a change of 0.2 units or more occurs.

- Upon completion of each day monitoring turbidity and/or pH, the contractor will send the monitoring data report daily to the Corps within 24 hours of completion of the monitoring activity.
  - If there are exceedances in water quality, the contractor will continue monitoring following the steps listed in "Exceedances and Exceedances Protocol."
- The contractor will continue to monitor and record (written) daily visual turbidity monitoring at the POC during construction. At any point, if visual monitoring indicates a turbidity plume, the contractor will take a reading with a meter to confirm/verify if an exceedance has occurred. If an exceedance is confirmed/verified through monitoring with a meter, the exceedance protocol listed below will be followed.

Monitoring Locations:

- The contractor will take samples at mid-depth of the water column.
- The POC for turbidity will be at a radius of 150 feet from the activity causing the turbidity.
- The State of Washington water quality standards do not specify a POC for pH, so the Corps has determined that the contractor will monitor pH just outside the temporary cofferdam, which is near the point of concrete work and curing that takes place behind the cofferdam, and at any discharge point of water, if applicable.
- The contractor will use monitoring points at the turbidity background monitoring point, at the turbidity monitoring POC (which is 150-foot radius from the activity), and near the point of concrete work and curing that takes place behind the temporary cofferdam; constant visual monitoring for petroleum sheen will be conducted across the entire project area,.
- The contractor will adjust samples taken at the turbidity POC to the depth range to target any turbidity plume, which will be tracked visually. If no distinct turbidity plume can be identified within the depth range, the contractor will take samples at the mid-depth.
- The contractor will compare turbidity samples taken at the POC to turbidity background levels at mid-depth to determine compliance with water quality standards.

Exceedances and Exceedance Protocol:

- If measurements taken at the POC location show recorded turbidity is greater than 5 NTU over background where the background is less than 50 NTU, or if more than a 10 percent increase in turbidity when the background turbidity is more than 50 NTU, the contractor will immediately notify the Corps and, assuming construction continues, will continue to monitor per the exceedance protocol below.
- The contractor will be responsible for immediately notifying the Corps' Project Engineer and Project Biologist of any exceedance of the turbidity or pH standard, or of any visible petroleum sheen.
- If measurements taken at the pH monitoring location(s) show recorded pH has varied more than 0.2 units from the background, which will be within the range of 7.0 to 8.5, the contractor will immediately notify the Corps and, assuming construction continues, will continue to monitor per the exceedance protocol below. Water behind the cofferdam that varies more than 0.2 units from background will not be discharged to surface waters; instead, this water will be collected and treated so that the pH standard is not exceeded before being discharged.

- In response to a pH exceedance, work will stop so that water can be collected from behind the cofferdam and treated. The work stoppage will be coordinated so that it can be done safely for the contractor without releasing concrete into the water column, and without compromising previously poured concrete.

Step 1: Verification of the problem

- If monitoring indicates an exceedance in turbidity or pH levels, the contractor will immediately take another series of samples (top, mid-depth, and bottom of water column, if outside the cofferdam) in the same location.
- If the exceedance still exists ('strike one'), then the contractor must take another series of samples at the background station at the same time as the POC or as close in time as possible to samples taken at the POC to determine if the exceedance is caused by the construction activities or by a change in background conditions (for example due to a heavy rainfall event).
- If monitoring indicates a petroleum sheen in the project area, the contractor must locate the source of the sheen, deploy oil-absorbent materials, and notify the Corps' Project Manager or Project Biologist by telephone as soon as possible. The Corps will notify Ecology of any spills of petroleum products or chemicals within 24 hours.
- The contractor must notify the Corps' Project Manager or Project Biologist by telephone as soon as possible after there has been a measured turbidity or pH exceedance. The Corps will notify Ecology of any exceedance within 24 hours.
- The Corps will then verify with the contractor that a measured exceedance occurred and request that best management practices (BMPs; listed at the end of this document), as appropriate and applicable, be implemented by the construction contractor to reduce turbidity and return pH to within acceptable limits. The BMP for a pH exceedance is to collect and treat the water so that the pH limit is not exceeded prior to discharge.

Step 2: Increased monitoring

- If a pH exceedance is recorded, the contractor will begin capturing and treating the cofferdam discharge water to return it to a pH within 0.2 units of background. The contractor will continue to monitor the water inside the cofferdam and water to be discharged after treatment.
- The contractor will take another sample no more than one (1) hour after the turbidity exceedance is recorded to verify the construction activities operation has been altered to reduce the exceedance to within acceptable limits.
- If the second sample, taken 1 hour later, still shows a turbidity exceedance ('strike two'), the contractor must immediately notify the Corps' Contracting Office, Project Manager, or Project Biologist by phone that there is still a measured exceedance.
- The Corps will review BMPs in place and request that all BMPs possible be implemented to reduce turbidity within acceptable limits. The BMP for a pH exceedance is to immediately begin to collect and treat the water so that the pH limit is not exceeded prior to discharge.
- Finally, the contractor will take a third sample no more than two (2) hours after the first turbidity exceedance is recorded.
- If the contractor deploys oil-absorbent materials for a petroleum sheen, the Corps' Project Manager or Project Biologist must be notified by telephone by the contractor as soon as possible after there has been a visible sheen. The contractor will monitor the project area to confirm the source of the sheen was eliminated and that the oil control measures are

working.

Step 3: Stop construction activities

- If the third sample, taken two (2) hours later, still shows a turbidity exceedance ('strike three'), the contractor will immediately notify the Corps' Contracting Office, Project Manager or Project Biologist and the Corps will order the contractor to stop work.
- If a petroleum sheen source is not located or is not controlled by oil-absorbent materials, or if the sheen is coming from upstream, the contractor will immediately notify the Corps' Contracting Office, Project Manager, or Project Biologist and the Corps will order the contractor to stop work. The Corps will notify Ecology of the situation.

Step 4: Continued sampling until compliance is achieved

- After the contractor has stopped work, the contractor will collect samples at hourly intervals until turbidity and pH levels in discharge water and/or in the large lock return to within acceptable limits. The contractor should identify any source of petroleum creating a sheen and controlled with oil-absorbent materials.
- Once compliance has again been achieved, the contractor will resume work upon the direction of the appropriate Corps official.
- The Corps' Project Manager or Project Biologist will notify Ecology that work has resumed.
- The normal schedule of water quality sampling will resume as per specific requirements above.

Step 5: Reporting

- The Corps' Contracting Officer, Project Manager or Project Biologist will report any exceedances and/or shutdowns to Ecology to fednotification@ecy.wa.gov within 24 hours, referencing the project name, project location, project contact, and project phone number, activity, and monitoring results.
- The contractor will document any shutdowns with an incident report to the Corps, which will be transmitted to Ecology by email within two working days of the incident.
- The contractor will prepare the incident report, which will document any exceedances and will include the date, time, location, activity, water quality data collected, the nature of the event, name of person collecting the data, names of persons notified of the exceedance, summary of how the exceedance was resolved according to the above protocol such as what corrective action taken and/or planned, steps to be taken to prevent a recurrence, and any other pertinent information.
- Incident reports will be transmitted to the Corps' Contracting Officer, Project Manager or Project Biologist within 24 hours of the exceedance.
- The Corps will submit water quality monitoring data to Ecology on a weekly basis.
- The contractor and the Corps will evaluate potential new BMPs in addition to those listed below.

Responsibility and Communication Plan:

- ❖ The Corps will notify Ecology at least 10 days prior to start of work and at least seven days within project completion.
- ❖ The Corps will oversee turbidity and pH monitoring conducted by the contractor.
- ❖ The Corps will be responsible for coordinating with Ecology and submitting the Turbidity and pH Monitoring Reports and data provided by the contractor.

- The Corps will notify Ecology within 24 hours if an exceedance occurs.
- The Project Manager and Contracting Officer will coordinate with the contractor.
- The contractor will use the Corps-provided Sampling Form unless otherwise approved by the Corps.
- The contractor will provide turbidity and pH monitoring data to the Corps daily.
- The contractor will notify the Corps within 30 minutes of a confirmed exceedance and follow required notifications per exceedance protocols.
- The contractor will provide a contractor Point of Contact to the Corps.
- The Corps Points of Contact for turbidity and pH monitoring will be the Project Engineer (to be identified); Stephanie McKenna, Project Manager (206-764-6081); and Katie Whitlock, Project Biologist/Environmental Coordinator (206-764-3576).
- The Ecology Point of Contact is Rebekah Padgett, Federal Permit Coordinator, (425-365-6571; Rebekah.Padgett@ecy.wa.gov).
- The Corps will send official reporting of any incidents to the Ecology Point of Contact (Rebekah.Padgett@ecy.wa.gov) AND to the fednotification@ecy.wa.gov inbox.
- Work causing distressed or dying fish, or discharges of oil, fuel, or chemicals into state waters or onto land with a potential for entry into state waters, is prohibited. The Locks Project Biologist/Environmental Compliance Coordinator is responsible for spill reporting and response. If such work, conditions, or discharges occur, the Corps will notify Ecology and immediately take the following actions:
  - The Corps will notify the contractor to cease operations at the location of the non-compliance.
  - The contractor and Corps will assess the cause of the water quality problem and the contractor will take appropriate measures to correct the problem and/or prevent further environmental damage.
  - In the event of a discharge of oil, fuel, or chemicals into state waters, or onto land with a potential for entry into state waters, the contractor will begin containment and cleanup efforts immediately to be completed as soon as possible, taking precedence over normal work. Cleanup will include proper disposal of any spilled material and used cleanup materials.
  - The Corps will immediately notify Ecology's Regional Spill Response Office at 206-594-0000 and the Washington State Department of Fish and Wildlife at 800-258-5990 with the nature and details of the problem, any actions taken to correct the problem, and any proposed changes in operation to prevent further problems. Additional reporting information is available online: https://ecology.wa.gov/Footer/Report-an-environmental-issue/Report-a-spill.
  - The Corps will immediately notify the National Response Center at 1-800-424-8802 for actual spills to water only.
  - The Corps will notify Ecology's Regional Spill Response Office at 206-594-0000 immediately if chemical containers (e.g., drums) are discovered on site or any conditions present indicating disposal or burial of chemicals on site that may impact surface water or ground water.

General Best Management Practices (BMPs) for Water Quality

- Vegetable oil will be used in machinery stationed on a boat or barge.
- The contractor will not refuel equipment such as generators and forklifts in the project area (i.e., the lock chamber) and spill containment trays will be used during refueling. The contractor will

refuel vessels offsite in accordance with applicable regulations.

- The contractor will prevent any petroleum products, chemicals, or other toxic or deleterious materials from construction equipment and vehicles from entering the water.
- The contractor will regularly check fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. for leaks, and will maintain and store materials properly to prevent spills. The contractor will provide a schedule for these checks.
- The contractor will contain wash water resulting from wash down of equipment or work areas for proper disposal and will not discharge wash water into state waters unless authorized through a state discharge permit.
- The contractor will maintain equipment that enters the surface water to prevent any visible sheen from petroleum products appearing on the water.
- There will be no discharge of oil, fuels, or chemicals to surface waters, or onto land where there is a potential for reentry into surface waters.
- The contractor will not discharge cleaning solvents or chemicals used for tools or equipment cleaning to ground or surface waters.
- The contractor will be required to submit a spill prevention control and countermeasures (SPCC) plan prior to the commencement of any construction activities, including spills of concrete. The SPCC plan will identify and recognize potential spill sources at the site, outline best management practices and secondary containment, delineate responsive actions in the event of a spill or release, and identify notification and reporting procedures. Implementation of the SPCC plan will minimize the effect of construction activities on the quality of surrounding waters.
- The contractor will be required to submit a stormwater pollution prevention plan (SWPPP) prior to construction using best management practices pursuant to the most recent City of Seattle Stormwater Manual dated August 2017 (https://web6.seattle.gov/DPD/DirRulesViewer/Rule.aspx?id=17-2017) to control stormwater impacts during construction.
- A spill containment kit, including oil-absorbent materials, will be kept on site during construction in the event of a spill or if any oil product is observed in the water. If a spill was to occur, work will be stopped immediately, steps will be taken to contain the material, and appropriate agency notifications will be made.

BMPs specific to the control of pH and turbidity

- Water to be discharged from the temporary cofferdam must meet water quality standards; otherwise, the contractor will collect and treat water before discharging to the waterway.
- The contractor will allow concrete to cure before rewatering the area.
- The contractor will regularly check all equipment from the source of concrete to placement locations (including hoses, hose clamps, drums, secondary containment berms, pans, and other containment, transfer valves, fittings, forms, grout bags, etc.) for leaks on land and in water, and will maintain and store materials properly to prevent spills. The contractor will provide a schedule for these checks.
- The contractor will monitor for visual turbidity plumes and discharge during in-water work. If turbidity is identified, turbidity monitoring and pH monitoring locations will be adjusted to capture the plume (as described in “Sampling Approach” above).
- The contractor will use secondary containment for all equipment on land and on boats or barges with the potential to discharge a pollutant. This includes mechanical equipment, concrete pumping or mixing equipment, etc.

- The contractor will identify all concrete washout locations. Washout on site will not be allowed to enter water or be dumped on land, and will not be within 50 feet of storm drains, open ditches, or waterbodies. The contractor will contain washout in leak-proof containers for proper recycling, treatment, and/or disposal. If washout is disposed of at a municipal wastewater treatment plant, the contractor will contact the plant so that any pretreatment requirements can be followed.
- The contractor will capture and contain concrete process water and waste. Discharge of concrete process water or waste materials to the ground or surface waters will not be allowed.
- All material that is removed from the water (concrete blocks, material lifted from scoured areas, etc.) will not be returned to the water. The contractor will properly contain material with a berm, pan, or other structure when on a boat and on land so that materials and water associated with materials cannot return to the water.
- The contractor will establish transfer locations to move materials removed from the large lock (e.g., concrete removed from the lock wall) to land for disposal to confine any accidental spillage and prevent the release of materials back into the water. The contractor will clean up any spilled materials immediately. The SWPPP submitted by the contractor will describe applicable BMPs at the transfer location.
- The contractor will clean equipment prior to construction so that it is free of external petroleum-based products while used around the waters of the state. The contractor will remove accumulation of soils or debris from the drive mechanisms (wheels, tires, tracks, etc.) and the undercarriage of equipment prior to its use.
- The contractor will retrieve any debris generated during construction with a skiff and net. Retrieval will occur at slack tide or when current velocity is low.
- The Contractor will prepare, and submit for approval to the Corps, a Cofferdam Discharge Plan at least 30 days prior to start of in-water work. At a minimum, the Discharge Plan will include:
  - Description of all permanent or temporary cofferdam systems to be utilized;
  - Descriptions of systems for management, treatment, and discharge/disposal of discharged water and solids, water pumped from cofferdams and any process water from concrete or grout activities. This includes capacity of the systems and appropriateness of the selected treatment technology for the pollutants of concern (turbidity, pH, and petroleum);
  - Monitoring plan for post-treatment effluent to ensure treatment system effectiveness. The plan will include parameters of concern, frequency of testing, and reporting;
  - Identify contingencies that will be implemented to handle discharge water if it does not meet standards for discharge to surface waters (e.g., stop work and collect discharge).

Sampling Form for In-Water Work

Cover Page

Please refer to the Water Quality Monitoring Plan (WQMP) for detailed instructions. Important WQMP details include the following:

- Use a new sampling form each day.
- Use this sampling form unless otherwise approved by the U.S. Army Corps of Engineers.
- Sheen presence should be constantly monitored for and reported immediately. Any source of petroleum creating a sheen must be identified, controlled with oil-absorbent materials, and reported as described in the WQMP.
- Turbidity is measured at mid-depth of the water column or within a visible plume (this depth will change with the tide)
    - Turbidity point of compliance is one hundred fifty feet from the turbidity-causing activity.
    - Turbidity readings 150 feet from the construction activity should be < 5 nephelometric turbidity units (NTU) over a background of ≤ 50 NTU or < 10% over a background of ≥ 50 NTU.
- pH is monitored outside of the cofferdam (if applicable) and as close to concrete work as possible.
    - pH should be 7.0 to 8.5 with a human-caused variation of less than 0.2 units.

Sampling Form for In-Water Work

Date:_____Project:_____

Name of Person Sampling: _____

Date of last calibration for Turbidity Meter: _____

Date of last calibration for pH meter: _____

Activity Start Time: _____ Activity Stop Time: _____

Turbidity Meter and/or pH Meter Location(s) **Identify if this is a background or compliance point.**	**Time**	**Turbidity (NTU)**	**pH**	**Sheen observed at any point today? (Y/N)**	**Notes (Compare to background turbidity as applicable, weather, construction activities at the time, if equipment is working properly, action taken to identify or stop sheen as applicable)**

Turbidity Meter and/or pH Meter Location(s) Identify if this is a background or compliance point.	Time	Turbidity (NTU)	pH	Sheen observed at any point today? (Y/N)	Notes (Compare to background turbidity as applicable, weather, construction activities at the time, if equipment is working properly, action taken to identify or stop sheen as applicable)

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

April 12, 2022

Chief Laura Boerner
Environmental and Cultural Resources Branch
U.S. Army Corps of Engineers, Seattle District
P.O. Box 3755
Seattle, WA 98124-3755

RE: Coastal Zone Management Federal Consistency for the U.S. Army Corps of Engineers Project: Large Lock Center Gate (LLCG) at the Hiram M. Chittenden Locks, Seattle, Washington

Dear Laura Boerner:

On January 14, 2022, the Army Corps of Engineers, Seattle District's (Corps) submitted a Consistency Determination (CD) with the Washington State Coastal Zone Management Program (CZMP). The Department of Ecology (Ecology) requested a 15-day extension until March 30, 2022 and then another extension on March 29, 2022 until April 14, 2022.

The proposed federal activity includes replacement of the center gate and associated components of the Large Lock with modern equipment. Gate replacement will necessitate redesign of the associated components like the pintle bearing, quoin blocks, and gate anchorages. The new LLCG will have the same dimensions as the existing gate. The single sided skin plate design will allow access to all members for inspection and potential maintenance.

Pursuant to Section 307(c) (3) of the Coastal Zone Management Act of 1972 as amended, Ecology concurs with Corps consistency determination that the proposed work is consistent with Washington's CZMP.

If you have any questions regarding Ecology's consistency determination please contact Loree' Randall at (360) 485-2796.

YOUR RIGHT TO APPEAL

You have a right to appeal this decision to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this decision. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001 (2).

To appeal you must do all of the following within 30 days of the date of receipt of this decision:

- File your appeal and a copy of this decision with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

- Serve a copy of your appeal and this decision on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503 **Pollution Control Hearings Board** 1111 Israel RD SW STE 301 Tumwater, WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Sincerely,

Brenden McFarland, Section Manager
Environmental Review and Transportation Section
Shorelands and Environmental Assistance Program

E-cc: Kaitlin Whitlock, USACE
Rebekah Padgett, Ecology
Maria Sandercock, Ecology
Loree' Randall, Ecology
ECYREFEDPERMITS -138677

Hiram M. Chittenden Locks Large Lock Center Gate Project

Lake Washington Ship Canal, King County, Washington

Appendix G – Example Tribal Environmental Coordination Letter

April 2022

US Army Corps of Engineers®
Seattle District

DEPARTMENT OF THE ARMY
U.S ARMY CORPS OF ENGINEERS, SEATTLE DISTRICT
4735 EAST MARGINAL WAY SOUTH BLDG 1202
SEATTLE, WA 98134-2388

October 13, 2021

Planning, Environmental, and Cultural Resources Branch

[redacted]

Subject: Tribal Notification and Review for Hiram M. Chittenden Locks Large Lock Center Gate (LLCG) Project in King County, Washington

Dear [redacted]

The U.S. Army Corps of Engineers, Seattle District (USACE) proposes to rehabilitate or replace the large lock center gates (LLCG) at the Hiram M. Chittenden Locks (Locks) to address wear and design issues. This letter is intended to provide notification ahead of the National Environmental Policy Act (NEPA) public notice and to request review and comments from the [redacted] as USACE moves forward with planning and designing this action.

The LLCG, commissioned in 1917, is over 100 years old. The center gate is used to divide the large lock chamber into two smaller chambers. This configuration allows for quicker and more water efficient lockings, and it provides redundancy for the large lock by allowing vessel transit in half the lock if either the upstream or downstream gates were to malfunction. The center gate is also used by pedestrians and staff to cross the large lock chamber, as it is the quickest route across the facility.

The LLCG does not meet current design standards and has exceeded its functional lifespan. Recent inspection shows the gate has excessive corrosion and wear. In addition, the two leaves (i.e., two halves of the gate that swing towards the middle of the lock to close) of the LLCG are a double skin design with internal buoyancy chambers. The double skin design presents a major challenge for inspections because the interior components of the gate cannot be visually inspected without staff entering the chambers, which are confined spaces and high hazard workspaces. The inability of maintenance staff to thoroughly inspect the condition of the gates, and the difficulty of performing maintenance within the inner chambers, creates a potential for gate failure without advance warning. Depending on the type of failure, loss of LLCG function would have negative impacts on navigation and to upstream communities from unexpected and potentially indefinite large lock closures or delays. The purpose of this project is to

maintain efficient navigation through the large lock and facilitate routine visual maintenance inspections of the LLCG.

In accordance with NEPA, the USACE is preparing an Environmental Assessment (EA) in 2021 to evaluate the environmental effects of the proposed LLCG project beginning as early as Fall 2022. The EA describing the alternatives and anticipated effects will be circulated to solicit comments from interested persons, groups, tribes, and agencies on the proposed action under NEPA. We would like to offer the [redacted] the opportunity to review the proposed alternatives and solicit your input regarding tribal resources considerations prior to release of the EA.

The EA will contain an analysis of two action alternatives compared to taking an alternative of no action. Several action alternatives related to gate design were also considered but removed from further evaluation. In-water work would occur October 15 -February 15 for the project duration, which is up to four years of intermittent work while the LLCG is being rehabilitated or assembled. The in-water work window minimizes overlap with adult salmon migration and avoids the typical juvenile smolt outmigration period. Following is a summary of the alternatives that will be evaluated in the EA.

In Alternative 1 (No Action), there would be no repair to the gate or associated components; wear, corrosion, and deterioration of the system would continue unchecked on the LLCG, which is beyond its functional lifespan. Should the gate or its components fail, and the gate leaves could not be moved to the side of the lock chamber into recesses on each wall, the large lock would be closed indefinitely until repairs can be made or the center gate removed from the lock. There is no known duration for a lock outage for emergency repairs or gate removal. It is anticipated that the required mobilization and repair time would severely disrupt navigation and the maritime industry in Seattle. In addition, as discussed above the current gate design does not allow inspection and maintenance within the confined spaces of the buoyancy chambers and increases the risk of losing the redundancy of the large lock gates. This alternative does not meet the purpose and need because it does not reliably or efficiently maintain navigation and the LLCG would remain difficult to visually inspect; therefore, this is not an acceptable alternative but is carried forward for comparison purposes.

Under Alternative 2 (Rehabilitate Center Gate), rehabilitation of the gates and associated components would be performed to fix components that are experiencing deterioration. The two gate leaves would be removed, likely by crane or floated out of the lock chamber and taken to an offsite facility for rehabilitation. Upon completion, the leaves would be returned to the lock and reinstalled. Alternative 2 takes less

construction time than Alternative 3 because the gate connections to the lock wall would not require modification (Table 1, enclosed). Alternative 2 does not meet the purpose or need because it does not meet current safety standards and the LLCG would remain hazardous to visually inspect; therefore, this is not an acceptable alternative.

Alternative 3 (Replace Center Gate) would maintain the functional integrity of the LLCG by replacing and modernizing the center gate and associated components connecting the gate to the lock walls. This alternative replaces the center gate and associated components with modern equipment designed to have a lifespan of 100 years or more. Other gate types from the double-skinned gate design were considered and, following existing project research and modelling during design, a single-skinned, horizontally framed miter gate was selected due to several factors: gate weight, complexity of constructing a new gate, long-term maintenance, and cost (Figure 1). Gate replacement would necessitate redesign and installation of the associated gate connections to the lock wall. Alternative 3 meets the purpose and need by maintaining reliable and efficient navigation through the large lock, meeting current design standards, and allowing visual inspections without requiring entry into confined spaces.

Construction would be completed with lock outages while dewatering and/or with temporary cofferdam use. Large lock outages would be timed approximately when the large lock is dewatered annually in the fall for maintenance and within the in-water work window. Each dewatering event would not exceed 30 consecutive days. Timing of outages will consider the importance of minimizing disruption to navigation. Between each dewatering there would be a navigation period of at least 15 consecutive days. Based on those parameters it is estimated there could be one to three outages per year between October 15 and February 15. Due to construction scheduling, there could be up to 90 consecutive days of temporary cofferdam use on either side of the large lock chamber with only one cofferdam used at one time.

Given in-water work window constraints and gate fabrication time frames, the total project duration is estimated to take about four years to complete. Construction would occur intermittently over this duration to accommodate in-water work windows and navigation needs. Construction activities for the use of cofferdams and dewatering events are divided into several work periods to allow the large lock to remain open to navigation during certain construction events when it is safe, and to minimize impacts to navigation (Table 2, enclosed). These work periods are classified as:

- Navigation **Restriction** Periods: Navigation use of the lock chamber would be prohibited while workers are inside the cofferdam to allow safe work inside the temporary structure. At a minimum, vessels would be allowed to transit the lock

chamber from 5:00 pm to 6:00 am, with a width restriction to vessels smaller than 65 feet in place to avoid potential collision with the temporary cofferdam.

- Navigation **Closure** Periods: No vessels may use the large lock chamber. At this time, the total duration of any given closure is not anticipated to exceed 30 days, with at least 15 days between outages. The final duration would be determined by USACE based on feedback from the Maritime community and the public, and contractor proposals.
- Navigation **Passage** Periods: Normal navigation is allowed.

If used, a temporary cofferdam would be placed on one large lock wall, secured to the lock wall, dewatered with pumps, and then construction activities performed in the dry (Figure 2 through Figure 4). Divers may assist with installation if it occurs while the lock is fully watered. If temporary cofferdams are not used, Navigation Restriction Periods would not be needed. If temporary cofferdams are used, in addition to the Navigation Restriction Periods, there would be a need for Navigation Closure Periods for removal and installation of the LLCG. Water quality will be monitored for turbidity and pH during construction behind a temporary cofferdam.

Construction duration would depend on construction methods selected by the contractor; however, constraints for lock outages and cofferdams would be required as articulated in contracting documents. The exact construction method and associated schedule are not known until a contractor is chosen. Once finalized, a Notice to Mariners would be published alerting vessel operators to large lock closures and restrictions, in addition to other public communications on the USACE website, Locks Facebook page, and stakeholder meetings. The USACE would notify the Tribe of construction schedule developments as part of ongoing project coordination.

To complete the work within required in-water work period (October 15-February 15), minimize impacts to navigation, and assure the large lock ready for customary use, multiple work shifts may be required, including 24 hours a day, as well as seven days per week. All construction activities would comply with local noise and light ordinances and noise variances would be obtained as needed. An example construction schedule appears below incorporating either a combination of closures/cofferdams or just closures (Table 2, enclosed).

USACE is requesting comments on the proposed Locks LLCG project. We are interested in your comments and will fully consider any comments we receive. A copy of this letter has been sent to [redacted], Natural Resources Director and [redacted], Assistant Director of Harvest Management Division. To reply with comments or to request any additional information about this project, please contact Ms. Katie Whitlock at (206) 764-3576 or kaitlin.e.whitlock@usace.army.mil. For assistance with general information regarding tribal coordination, or to schedule a Government-to-Government meeting, please contact Ms. Lori Morris at (206) 764-3625 or frances.morris@usace.army.mil.

Sincerely,

Enclosure

Laura A. Boerner, LG, LHG
Chief, Planning, Environmental & Cultural Resources Branch

References

McDowell Group. 2017. Economic impacts of the Chittenden Locks. Prepared for Lake Washington Ship Canal Users Group. June 2017. Online at: https://www.mcdowellgroup.net/wp-content/uploads/2017/06/ballard-locks economic-impacts.pdf. Accessed May 24, 2021.

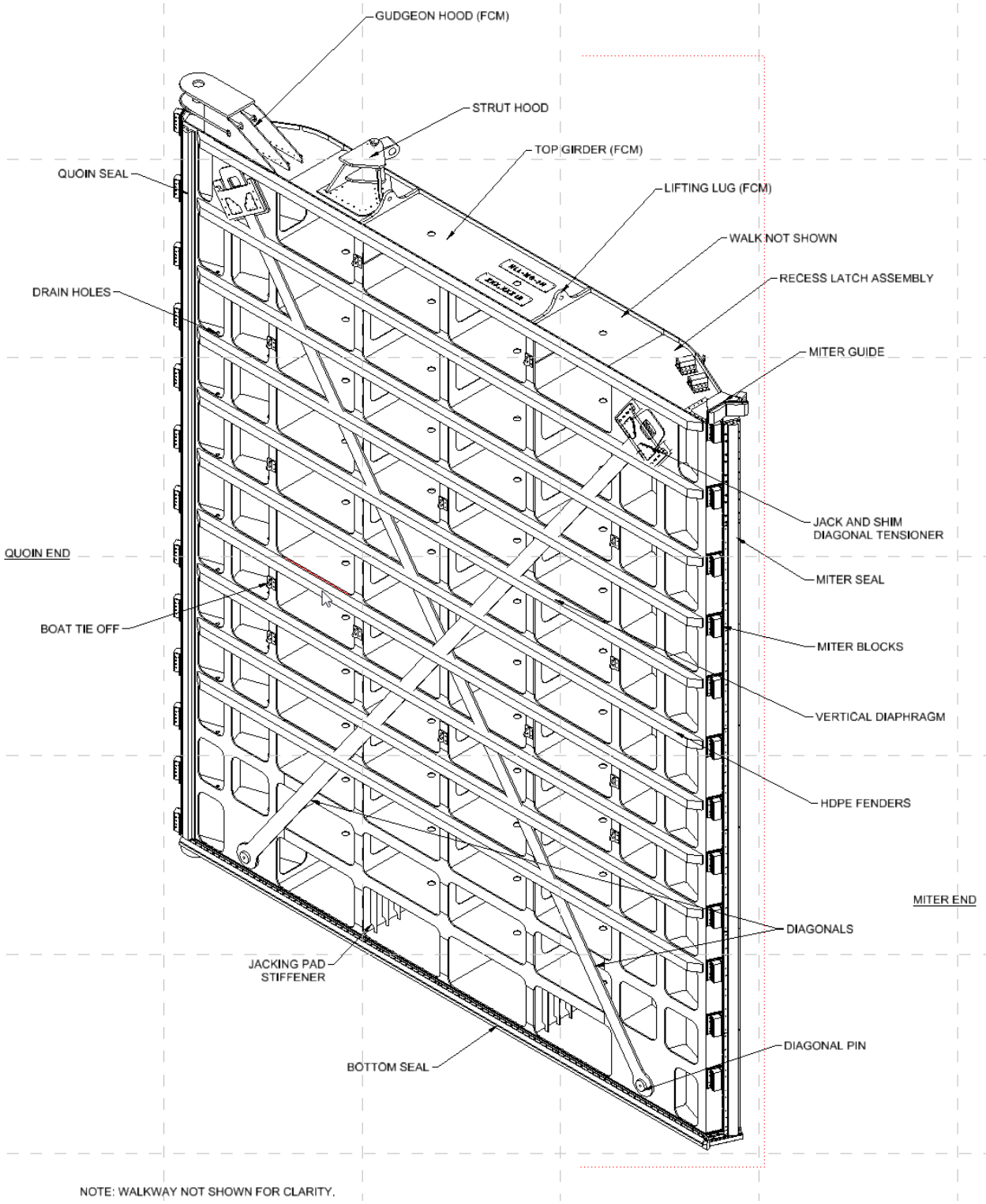

Figure 1. Replacement gate designed for Alternative 3.

Figure 2. Localized cofferdam example.

Figure 3. Example of an installed localized cofferdam.

Figure 4. Example of the inside of a localized cofferdam.

Table 1. Example schedule of proposed Alternative 2 (Repair Center Gate) work periods. All durations are approximate.

Construction Activities	Construction Activities and Potential Work Period(s)
Modify the existing center miter gates by installing hardware connections to allow removal of the gates, as necessary. The following work would be performed: a. Remove gate leaves b. Install fender system in both gate recesses	Navigation **Closure** Period 2023 Approximate Duration: 15 days (October 15-February 15) Work in lock is unrestricted. The large lock would be closed to vessels.
The following work would be performed at an off-site location: Rehabilitation of the center miter gates	Navigation **Passage** Period 2023 Approximate Duration: 2 years Unrestricted navigation.
The following work would be performed: a. Remove fender system from miter gate recesses b. Install rehabilitated gate leaves	Navigation **Closure** Period 2025 Approximate Duration: 15 days (October 15-February 15) Work is unrestricted. The large lock would be closed to vessels.

Table 2. Example schedule of proposed Alternative 3 (Replace Center Gate) construction with temporary cofferdams and large lock dewaterings. All durations are approximate.

Construction Activities	Construction Activities and Potential Work Period(s)
Modify the existing center miter gates by installing hardware connections to allow removal of the gates via crane, if necessary. Erect a heavy lift crane over the large lock, if necessary, and remove the existing gate leaves. Once the gate leaves are removed, the work would happen in a fully dewatered lock chamber, within a localized cofferdam, or a combination of both. A cofferdam can be installed while the large lock is dewatered or in water, which requires diver assistance. If	Navigation **Closure** and/or **Restriction** Periods 2023 (In-water work window 2023-2024) A combination of the following closures and/or restrictions may be needed for multiple combinations of dewatering and/or temporary cofferdam use. **Closure** Period Duration: Multiple 30-day dewaterings with at least 15 days of navigation in between each outage

Construction Activities	Construction Activities and Potential Work Period(s)
used, a cofferdam would be installed on the wall where gate appurtenance work (quoin, pintle, etc.) is scheduled to be performed during this in-water work period. A cofferdam could remain in place for up to 90 consecutive days, and then be removed. Fender systems would be installed in the miter gate recesses at the end of the in-water work period to reduce the risk of damage to new or existing features during navigation passage until the following in-water work period. The crane would be disassembled. All equipment and materials, except the localized cofferdam, would be removed from the large lock chamber to allow navigation with a width restriction 5:00 pm to 6:00 am. Navigation with a width restriction would be allowed if workers are not inside the cofferdam.	Unrestricted work daily. The large lock routine annual maintenance dewatering event would be part of this closure period. Dewatering includes time for USACE to perform the dewatering (approximately 3 days) and rewatering (approximately 2 days) of the large lock. **Restriction** Period Duration: Up to 90 days of work behind a temporary cofferdam Unrestricted work from 7:00 am to 5:00 pm daily Navigation is allowed in the Large Lock from 5:00 pm to 6:00 am, with a width restriction (65 feet), when workers are inside the cofferdam.
All equipment and materials would be removed from the Large Lock to allow unrestricted navigation traffic without a width restriction through the Large Lock.	Navigation **Passage** Period 2024 Duration: Falls between 2023 and 2024 in-water work windows, which are October 15-February 15 of each year. Unrestricted Navigation.
The fender system would be removed, likely by crane, so construction can occur. Construction would take place while the large lock is dewatered, within a localized cofferdam, or a combination of both. If a cofferdam is used, it would separate the work area from the water. then A cofferdam can be installed while the large lock is dewatered or in water, which requires diver assistance. A temporary cofferdam could remain in place for up to 90 consecutive days. Fender systems would be re-installed	Navigation **Closure** and/or **Restriction** Period 2024 (In-water work window 2024-2025) A combination of the following closures and/or restrictions may be needed. **Closure** Period Duration: Multiple 30-day dewaterings with at least 15 days of navigation in between each outage. The large lock would be closed to vessels during the

Construction Activities	Construction Activities and Potential Work Period(s)
at the end of the in-water work period to reduce the risk of damage to new or existing features during navigation passage until the following in-water work period. All equipment and materials, except the localized cofferdam, would be removed from the Large Lock to allow navigation with a width restriction 5:00 pm to 6:00 am.	Navigation Closure Period. Unrestricted work daily. The large lock routine annual maintenance dewatering event would be part of this closure period. This period includes time for USACE to perform the dewatering (approximately 3 days) and rewatering (approximately 2 days) of the large lock. **Restriction** Period Duration: Up to 90 days of work behind a temporary cofferdam (if used). Unrestricted work from 7:00 am to 5:00 pm daily. Navigation would be allowed in the Large Lock from 5:00 pm to 6:00 am, with a width restriction (65 feet).
All equipment and materials would be removed from the Large Lock to allow unrestricted navigation traffic without a width restriction through the Large Lock.	Navigation **Passage** Period 2025 Duration: Falls between 2024 and 2025 in-water work windows, which is October 15-February 15 of each year. Unrestricted Navigation.
Complete any work from the previous closure and/or restriction periods that may not have been completed. Re-install the fender system on both sides of the lock wall. The fender system can be installed in the wet or the dry and would require dive operations if installed in the wet. Fender system would remain in place until the gates are delivered and ready for installation during the next in-water work period.	Navigation **Closure** Period 2025 (In-water work window 2025-2026) Duration: Multiple 30-day dewaterings with at least 15 days of navigation in between each outage Unrestricted work would occur during the Navigation Closure Period. This includes time for USACE to perform the dewatering (approximately 3 days) and rewatering (approximately 2 days) of the large lock.
All equipment and materials would be removed from the Large Lock to allow	Navigation **Passage** Period 2026

Construction Activities	Construction Activities and Potential Work Period(s)
unrestricted navigation traffic without a width restriction through the Large Lock.	Duration: Falls between 2025 and 2026 in-water work windows, which is October 15-February 15 of each year. Unrestricted Navigation.
LLCG delivery would occur and be ready for installation. All testing (e.g., fit and function of the LLCG and controls) associated with LLCG would be completed during this period. Erect a heavy lift crane. Remove the fenders from both sides of the large lock miter gate recesses in the wet. Install the gates with the large lock fully watered and connect the gate anchorages and machinery to the new miter gate leaves. The lock chamber would be dewatered to perform miter gate sill work and adjust/commission the LLCG. The crane would be removed from service to prepare the lock chamber for rewatering and normal customary use of the lock. All equipment would be removed from the large lock and the chamber would be rewatered.	Navigation **Closure** Period 2026 (In-water work window 2026-2027) Duration: Multiple 30-day dewaterings with at least 15 days of navigation in between each outage Unrestricted work daily. This closure period includes the annual large lock dewatering maintenance. This includes time for USACE to perform the dewatering (approx. 3 days) and rewatering (approx. 2 days) of the large lock. After this closure period, the gates would be fully functional, and no further construction would be needed.