

Seattle City Light Newhalem Penstock

Executive Summary of Engineering Evaluation/Cost Analysis

INTRODUCTION AND PURPOSE

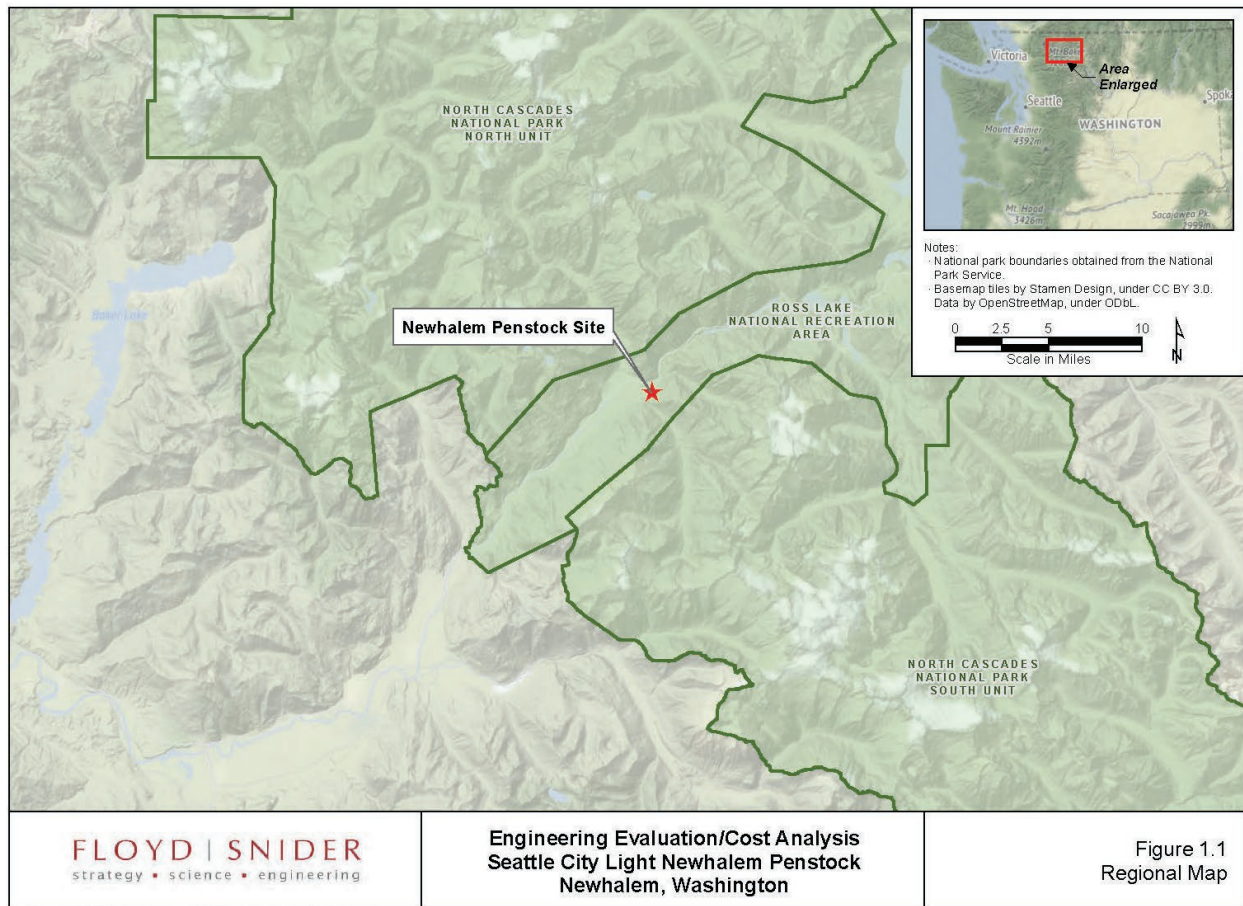
This Executive Summary provides stand-alone documentation of the information contained in the Engineering Evaluation/Cost Analysis Report (EE/CA) so that the content and findings of the EE/CA can be understood without having to read the entirety of the document. This summary and the EE/CA report was prepared by Floyd|Snider for Seattle City Light to submit to the National Park Service.

This Executive Summary contains a summary of the site description including investigation results and an updated conceptual site model (CSM) based on the investigation results. A summary of the risk assessment and of applicable or relevant and appropriate requirements (ARARs) is also included along with a discussion of the No Action alternative proposed for the site.

The Seattle City Light (City Light) Newhalem Penstock Site (Site) is located within the Ross Lake National Recreation Area (Figure 1), also known as the North Cascades National Park Service Complex (NOCA), in the state of Washington and is owned by the United States and managed by the National Park Service (NPS). The Site is being investigated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). NPS is the lead agency under CERCLA and is authorized to respond as the lead agency to a release or threatened release of hazardous substances, or a release or threatened release of any pollutant or contaminant that may present an imminent and substantial danger to public health or the environment, on NPS-managed land.

Preparation of this EE/CA fulfills the CERCLA requirement of Section 300.415(b)(4)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan, commonly called the National Contingency Plan or NCP, to conduct investigations and other studies to characterize the nature and extent of a release or threat of release, determine if response is necessary to protect public health or welfare or the environment, and evaluate response alternatives. Based on preliminary investigations at the Site, NPS determined that Site conditions warranted additional response to evaluate the release or threatened release of hazardous substances and that a non-time-critical removal action may be appropriate at the Site.

The EE/CA report has been prepared in accordance with an EE/CA Approval Memorandum for the Site, signed on December 19, 2017, by Martha Lee, Acting Regional Director, NPS Pacific West Region, which directs City Light to prepare an EE/CA for the Site. This EE/CA is intended to comply with NPS EE/CA guidance (NPS 2019a); CERCLA Section 104(b) and the NCP, 40 CFR Section 300.415(b)(4)(i); the U.S. Environmental Protection Agency (USEPA) Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA (USEPA 1993a); and the U.S.



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Figure 1. Map showing the location of the Newhalem Penstock Site within the state of Washington and Ross Lake National Recreation Area.

Department of the Interior Environmental Compliance Memorandum 10-1 (USDOI 2018).

The purpose of the EE/CA is to document the release, nature, and extent of hazardous substances at the Site; evaluate potential risks to human and ecological receptors; and provide a framework for evaluating potential removal action alternatives. The EE/CA identifies removal action objectives (RAOs) and analyzes the effectiveness, implementability, and cost of the removal action alternative used to satisfy the RAOs.

SITE DESCRIPTION, INVESTIGATION RESULTS, AND CONCEPTUAL SITE MODEL

The Site is located within Ross Lake National Recreation Area, in NOCA. The Site is in a lowland region of NOCA, on the south side of the Skagit River, directly across the river from Newhalem in Whatcom County, Washington. The Site is approximately 1.5 acres and consists of an exposed penstock that is approximately 904 feet in length and rests aboveground on cast-in-place concrete supports (Figures 2 and 3).

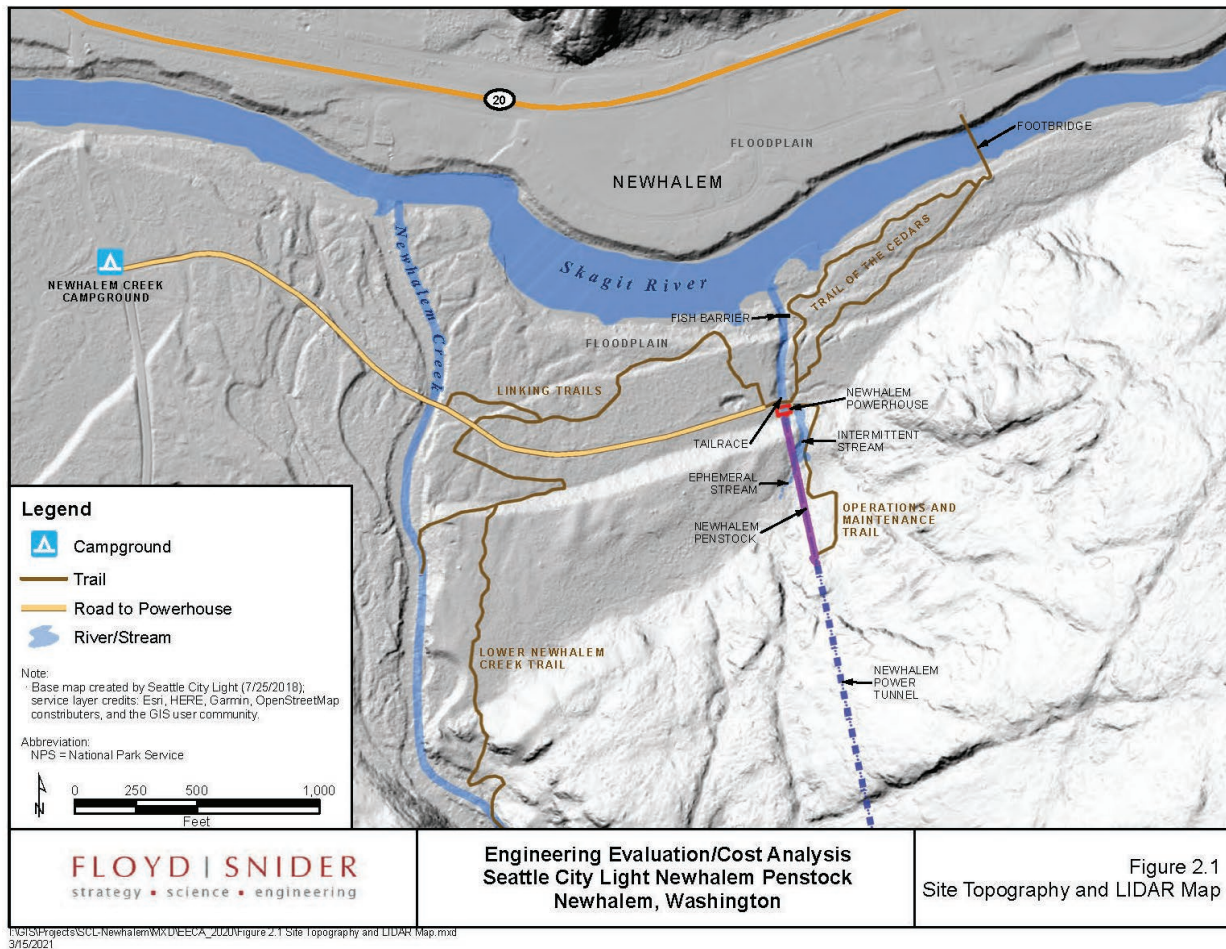


Figure 2. Map showing the topography and local geographic setting of the Newhalem Penstock site.

The penstock is part of the Newhalem Creek Hydroelectric Facility project, operated by City Light under a Federal Energy Regulatory Commission (FERC) license. The penstock was originally constructed by City Light in the 1920s as part of the power plant used during construction of the Gorge Dam and conveys water to the Newhalem Powerhouse for power generation. In January 2022, City Light filed a license surrender application with the Federal Energy Regulatory Commission (FERC) to decommission the Newhalem Creek Hydroelectric Project. The details of the decommissioning process are under consideration. Decommissioning the project will not change the current land use aside from operation of the penstock.

Historical records indicate the penstock was painted several times throughout its history and may have been coated with lead paint. Before the penstock was repainted, the historical paint coatings were tested at the Site in 2009 using an x-ray fluorescence (XRF) spectrometer, a field instrument that measures metals concentrations of in situ media. Detectable lead concentrations were documented with the XRF spectrometer in approximately half of the samples collected (RGA 2009). The penstock was then repainted to encapsulate the historical paint coatings.



Figure 3. Photo looking downslope along the penstock.

Historically, the aboveground portion of the penstock rested on 56 creosote-treated wood frame supports, or saddles, with bases of wood, concrete, or stone. Several of these saddles were damaged in the August 2015 wildfire (the Goodell Fire), and temporary supports were installed at four saddle locations as an emergency project to prevent the penstock from being damaged by buckling.

To comply with FERC dam safety guidelines, City Light began preparation for a support saddle replacement project, which included soil sampling in the immediate vicinity of the penstock. This work was completed in 2014 (Hart Crowser 2014) to investigate potential soil contamination associated with the structure. Prior to performing the saddle replacement work, City Light conducted additional sampling in 2015 (Floyd|Snider 2016) to further evaluate the extent of soil contamination and determine proper handling of soil to be removed by the saddle replacement work. Samples were also collected in 2016 from the wood saddles to determine the specific type of preservatives in the wood.

Results of the soil sampling indicated that soil in the vicinity of the penstock contained elevated concentrations of metals greater than project screening levels (SLs). Samples collected from the wood saddles indicated the use of coal-tar creosote preservative, and soil sampling also indicated the presence of polycyclic aromatic hydrocarbons (PAHs) at concentrations exceeding project SLs in soils within approximately 3 inches of the wood saddles. In 2016 and 2017, in response to these findings and as part of the penstock saddle replacement project, a total of 171 tons of contaminated soil were removed from the Site. The soil removal was completed as a Time-Critical Removal Action (TCRA) under the NPS Action Memorandum (NPS 2016a) and Administrative Settlement Agreement and Order on Consent (ASAOC; NPS 2019b). All subsequent Site investigations and removal actions related to the TCRA were performed under the 2016 Action Memorandum and ASAOC.

Following completion of the TCRA, NPS determined that Site conditions warranted additional response to evaluate the release or threatened release of hazardous substances and that a non-time-critical removal action may be appropriate at the Site as specified in 40 CFR Section 300.415(b). This determination was formalized in an EE/CA Approval Memorandum, signed on December 19, 2017, by Martha Lee, Acting Regional Director, NPS Pacific West Region, and included in the Administrative Record for the Site.

In 2018, additional investigation was performed to delineate the remaining lateral and vertical extent of metals and PAH contamination in the soil in the vicinity of the penstock and collect data for the EE/CA.

The CSM summarizes the current understanding of how chemical contaminants have been released to the environment, have migrated, and may result in exposure to human and ecological receptors (see Figure 4 for a simple graphic illustration). The presumed mechanism for metals contamination to soil is degradation of the historical paint coatings over time (i.e., flaking and chipping). PAH contamination in soil is presumed to result from creosote-treated

wood used to construct the historical penstock support saddles that were removed in 2017. The CSM considers several migration pathways including transport via ephemeral and intermittent streams, groundwater, and air and pathways for chemical exposure to human and ecological receptors via ingestion, dermal contact, and inhalation.

RISK ASSESSMENT SUMMARY

A Site-specific baseline human health risk assessment (HHRA) and an ecological risk assessment, including both a screening-level ecological risk assessment (SLERA) and baseline ecological risk assessment (BERA), were completed for chemicals determined to be contaminants of potential concern (COPCs).

Human Health

The baseline HHRA was prepared according to USEPA guidance on conducting HHRAs at CERCLA sites (USEPA 1989). COPCs were identified using a tiered process based on frequency of detection and a comparison of site soil data to SLs, referred to as COPC Selection SLs. The Human Health COPC Selection SLs are the minimum of the USEPA Regional Screening Levels (RSLs; target cancer risk [TR] = 10^{-6} target hazard quotient [HQ] = 0.1) and Model Toxics Control Act (MTCA) Method A SLs, or the MTCA Method B SL if a MTCA Method A SL was not available. COPCs identified in the HHRA include two metals (arsenic and lead), bis(2-chloroethyl)ether, five PAH compounds, and a calculated carcinogenic polycyclic aromatic hydrocarbon (cPAH) toxic equivalent (TEQ).

The populations that could contact Site-related contaminants include site workers and site visitors (e.g., hikers and tribal members). Two adult site worker scenarios were developed, one to represent NPS or City Light employees conducting routine maintenance or inspection activities around the penstock and the second to represent construction workers that may engage in ground-disturbing activities at or near the penstock. A site visitor scenario was evaluated for both adults and children. In addition, a hypothetical residential exposure scenario was evaluated.

Soil is the only environmental medium that people accessing the Site could reasonably be expected to encounter on an ongoing basis. For most people, soil exposures are likely to be primarily surficial in nature (i.e., 0 to 0.5 feet below ground surface [bgs]). For construction workers, soil exposures could occur to the maximum depth studied (3.25 feet bgs), depending upon the type of future construction activity. The intermittent and ephemeral streams are dry during portions of the year and in many areas become vegetated and accumulate organic material such that their beds become more characteristic of soil than sediment. Exposure to stream sediment was, therefore, presumed to be minor due to the low residence times of these streams and was not evaluated separately from exposure to soil.

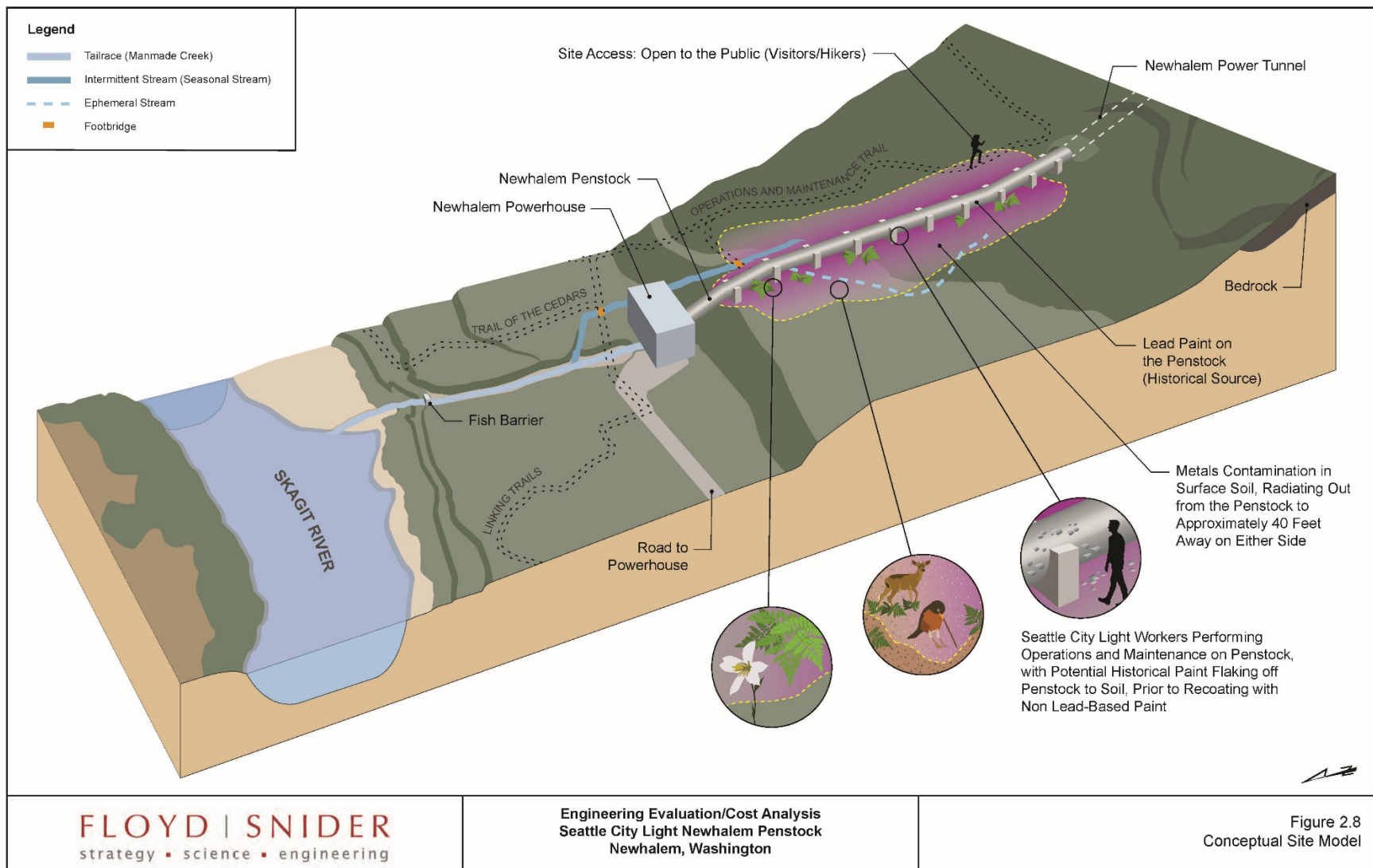


Figure 4. A diagram showing the Conceptual Site Model for the Newhalem Penstock site.

Surface water features at the Site include an ephemeral stream and an intermittent stream. Because the impacts to surface water from soil are expected to be minimal due to the small size of the Site and low residence time of surface water in the streams, and minimal exposure due to the small size of the streams and lack of Site recreational opportunities, risks to people from potentially encountering contaminants in this water are expected to be much lower than risks from soil exposure. Therefore, this exposure medium and the associated exposure pathways were not evaluated quantitatively.

Contaminants in soil may migrate to shallow groundwater, which may re-emerge as surface water or could potentially migrate to the Skagit River. Like surface water, impacts to groundwater re-emerging as surface water are expected to be minimal and human contact is expected to be limited; therefore, this pathway was not quantified in the risk assessment. There is one potable well in the area, located approximately 0.25 miles upriver, on the opposite (north) side of the Skagit River from the Site, which the town of Newhalem uses for its domestic water supply. Based on topography and predominant hydrologic conditions, it is not possible for Site contaminants to migrate to the well used for drinking water; therefore, this pathway was determined to be incomplete.

Risk characterization is conducted to quantify the significance of chemicals in the environment in terms of their potential to cause adverse health effects. NPS generally considers cancer risks exceeding 10^{-6} or non-cancer risks exceeding a hazard index (HI) of 1 to be unacceptable. For exposures to soil, there were no exposure scenarios for any receptor populations that resulted in non-cancer hazards greater than acceptable levels. Additionally, none of the cancer risks for the visitor or worker scenarios exceeded 1×10^{-6} . Cancer risks for the hypothetical adult and child resident scenarios were 1×10^{-5} and 3×10^{-5} , respectively. Residential use is not an expected future site use; however, at the request of NPS, the results for the hypothetical residential scenario were presented for information purposes and were not used in the designation of COPCs as contaminants of concern (COCs).

Based on these results, none of the COPCs were designated as COCs for protection of human health. These results indicate Site soil does not pose unacceptable risk to people under current and expected future site use.

Ecological Risk

An ecological risk assessment (both a SLERA and a BERA) includes the following components: problem formulation, exposure and effects assessment, and risk characterization (including an uncertainty analysis). The objective of the SLERA is to identify and document conditions that may warrant further evaluation (i.e., potential unacceptable risk) and to identify contaminants of potential ecological concern (COPECs). In the BERA, risk estimates from the SLERA were further refined by using a more appropriate estimate of exposure (the exposure point concentration [EPC]) and comparing species-specific estimated exposure doses to toxicity reference values for select receptors of concern.

Surface water features at the Site include only ephemeral and intermittent streams; a fish barrier near the terminus of the powerhouse tail race prevents access to these streams by fish from the Skagit River. Although amphibians are present at the Site and may be exposed to sediments in the intermittent and ephemeral stream channels, exposure of amphibians is comparatively minor due to the small size of the stream channels and the seasonal nature of the streams. Therefore, the ecological risk assessment focused on plants, soil invertebrates, birds, and mammals.

The primary medium of concern for ecological receptors is soil, both surface (0 to 0.5 feet bgs) and subsurface (greater than 0.5 feet bgs). The primary exposure pathway for birds and mammals is incidental ingestion of soil in or on food items while feeding or digging, and the primary exposure pathway for terrestrial plants and soil invertebrates is direct contact with soil. Birds and mammals may also experience direct contact (i.e., dermal exposure) to soil and surface water, may ingest surface water, and may inhale airborne dust. However, these exposure pathways are usually considered to be minor compared to exposures from ingestion (USEPA 2005) and were not evaluated in this ecological risk assessment.

In the SLERA, COPECs were identified using a tiered process based on detection frequency and a comparison of site data to ecological screening values (ESVs), referred to as the SLERA COPEC Selection ESVs. The ESVs used for each chemical was the minimum SLERA COPEC Selection ESV among the plant, invertebrate, bird, and mammal ESVs included in *NPS Protocol for the Selection and Use of Ecological Screening Values for Non-Radiological Analytes* (NPS 2018). COPECs identified in the SLERA included metals (arsenic, cadmium, chromium, copper, lead, mercury, and zinc), three PAHs and total high molecular weight PAHs, and bis(2-ethylhexyl) phthalate. The COPECs were then evaluated in a refined SLERA. HQs were calculated by dividing the maximum concentration for each COPEC by the Refined ESVs. COPECs with HQs greater than 1, indicating the potential to cause harmful effects, were further evaluated in a BERA.

In the BERA, risk estimates from the SLERA were further refined by using a more appropriate estimate of exposure (the EPC) and comparing species-specific estimated exposure doses to toxicity reference values (TRVs) for receptors of concern. The detailed BERA conducted for this Site also incorporated Site-specific bioaccumulation factors. In the BERA, none of the geometric mean HQs were greater than 1 for birds or mammals and the plant and invertebrate HQs were less than or equal to 1.

Based on the results from the BERA, none of the COPECs were designated as contaminants of ecological concern (CECs). These results indicate Site soil does not pose unacceptable risk to ecological receptors.

IDENTIFICATION AND ANALYSIS OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The identification of Applicable or Relevant and Appropriate Requirements (ARARs) is a prerequisite to evaluating and selecting a cleanup action (USEPA 1992b). “Under circumstances where the non-time-critical removal action is expected to be the first and final action at the site, the selected removal action must satisfy all adopted ARARs” (USDOJ 2018). If a “no action” alternative is selected following the evaluation of alternatives, ARARs must still be met by this alternative. Other factors to be considered (TBC) are non-promulgated criteria, advisories, guidance, and proposed standards issued by federal or state governments.

There are four basic criteria that define ARARs (NPS 2015c; USEPA 1988). ARARs are (1) substantive rather than administrative, (2) applicable or relevant and appropriate, (3) promulgated, and (4) categorized as either chemical-, location-, or action-specific. ARARs and TBC factors identified for the Site are listed as follows.

- **Chemical-specific ARARs** address specific hazardous substances and are typically health- or risk-based numerical values that cleanups must achieve.
- **Location-specific ARARs** must be achieved because of the specific location of the release and the related response action (e.g., requirements that address the conduct of activities in sensitive areas such as national parks, floodplains, wetlands, and locations where endangered species or significant cultural resources are present). Location-specific ARARs often focus on protecting resources in a specific area. Therefore, NPS-specific ARARs generally fall within this category.
- **Action-specific ARARs** are typically technology or activity-based requirements or limitations on actions conducted to respond to the release of specific hazardous substances. Action-specific ARARs generally prescribe how a selected alternative must be implemented rather than what alternative may be selected.

NPS has identified ARARs and TBCs for the Site. Other agencies, including Washington Department of Ecology, were given the opportunity to provide input about ARARs and TBCs for the Site.

REMOVAL ACTION OBJECTIVES AND PRELIMINARY REMOVAL GOALS

Removal action objectives (RAOs) define what the removal action is intended to accomplish. The RAOs for this EE/CA are as follows:

- Prevent unacceptable risks to people and ecological receptors from exposure to Site contaminants in soil.
- Maintain the full enjoyment and utilization of park resources consistent with NPS mandates and policies.
- Attain all federal and state ARARs and consider TBCs.

The EE/CA risk assessment indicates that, following the TCRA, there is no remaining unacceptable risk to people or ecological receptors at the Site. Based on these results, and consequent compliance with ARARs, the RAOs for the Site have been met and no further actions are necessary for the Site. Because there is no remaining unacceptable risk to people or ecological receptors at the Site, and contaminants of concern (COCs) and contaminants of ecological concern (CECs) were not identified, preliminary removal goals and Removal Action Goals were not developed for this Site.

The overarching objective of the TCRA was also to protect against unacceptable risks to people and ecological receptors posed by the Site. A summary of the TCRA activities in light of this objective is provided. A total of 171 tons of contaminated soil were removed from the Site in 2016 and 2017 as part of the penstock saddle replacement project and TCRA. The TCRA was conducted in response to the findings from Site assessment activities that indicated that soil concentrations of lead, arsenic, and PAHs beneath and in close proximity to the penstock exceeded MTCA cleanup levels for unrestricted land use. In the NPS Action Memorandum dated August 22, 2016, NPS approved and authorized the removal and disposal of contaminated soil excavated as part of the replacement of deteriorated wooden saddles along the penstock (NPS 2016a).

During the saddle replacement work, contaminated soil was excavated, resulting in the removal of approximately 40% of the soil beneath the penstock between the powerhouse and the adit. The results of the risk assessment indicate the TCRA removal work was successful in reducing risk to people and ecological receptors to acceptable levels.

IDENTIFICATION OF REMOVAL ACTION ALTERNATIVES

Following the TCRA and based on the results of the risk assessment, the Site currently poses no unacceptable risk to people or ecological receptors and RAOs have been met; therefore, an additional removal action is not required. Consistent with the NCP and CERCLA guidance, a No Action alternative is the only alternative retained. Under the No Action alternative, no additional removal of soil or maintenance would be performed.

Seattle City Light currently monitors conditions at the Site. Vegetation and invasive species are monitored twice per year to ensure the area disturbed by the August 2015 wildfire (the Goodell Fire) and TCRA activities is being revegetated by native plants, and Seattle City Light staff periodically check the powerhouse tailrace for accumulation of rocks and sediment from Newhalem Creek to confirm that they have not accumulated to levels that would overtop the fish barrier located at the outlet of the tailrace.

COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

The No Action alternative was analyzed using the following evaluation criteria: effectiveness, implementability, and cost. The effectiveness of the alternative was evaluated by the alternative's protectiveness of human health and the environment; attainment of ARARs;

reduction of toxicity, mobility, or volume through treatment; long-term effectiveness and permanence; and short-term effectiveness. The implementability criterion addresses the technical feasibility of implementing the response (including availability of services and materials), the administrative feasibility, and state and community acceptance. The cost criterion addresses the total cost of implementing the response.

The results of the risk assessment presented in Section 3.0 of the full EE/CA report indicate that, following the TCRA, there is no unacceptable risk to people or ecological receptors at the Site. Therefore, continuation of current environmental conditions under the No Action alternative is protective of human health and the environment, complies with ARARs, and is protective of short- and long-term public health and the community. Because no additional activities would be required, the No Action alternative is technically feasible and no permits would be required. There are no costs associated with the No Action alternative.

RECOMMENDED REMOVAL ACTION ALTERNATIVE

Based on the results of the risk assessment, and the comparative analysis evaluation criteria, the No Action alternative is recommended. The No Action alternative would effectively protect human health and the environment over the short- and long-term, would be in compliance with ARARs, and would be implementable at no cost.

Because no additional removal activities are needed, there is no associated interruption or limitation to the use of the Site by workers or recreational users. The No Action alternative would also protect and preserve the NOCA natural resources, conditions, and values over the long term and would enable park managers to manage the park in such a manner as to achieve the purposes for which the park was established (NPS 2015b).

City Light currently monitors conditions at the Site. Regrowth of native vegetation and invasive species are monitored twice per year at the Site, and non-native and invasive plants are removed manually. City Light also periodically checks the powerhouse tailrace for accumulation of rocks and sediment from Newhalem Creek, the source of the flow through the penstock to the tailrace, to confirm that they have not accumulated to levels that would overtop the fish barrier located at the outlet of the tailrace. To supplement the current monitoring activities, NPS has requested that City Light include monitoring for signs of erosion and migration of sediment to the tailrace. City Light will coordinate with NPS to prepare a Monitoring Plan to document the monitoring activities and the monitoring schedule. Monitoring activities are expected to continue for 5 years, or as defined in the Monitoring Plan.

This EE/CA and the Administrative Record supporting this EE/CA will be made available for public comment for 30 days. After the public comment period, the EE/CA will be finalized and entered into the Administrative Record and an Action Memorandum will be issued by NPS. The Action Memorandum, as the decision document, will summarize the need for additional action (if any), identify the selected alternative, provide the rationale for the selected alternative, and

address significant comments received from the public, including those received from other jurisdictions (e.g., states, tribes, USEPA).

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