

Biological and Floodplain Habitat Assessment

Sultan River Engineered Log Jams 9 and 10

Prepared for
Snohomish County Public Utilities District No. 1

Prepared by
Herrera Environmental Consultants, Inc.



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Herrera Qualifications

Established in 1980, Herrera Environmental Consultants, Inc. (Herrera) is an innovative, employee-owned, consulting firm focused on three practice areas: water, restoration, and sustainable development. The following staff authored this report and conducted field work in support of its findings. A summary of their qualifications is provided.

Danielle Rapoza, PWS

Danielle Rapoza is an ecologist with 10 years of experience in fisheries research, restoration monitoring, water quality assessment, and environmental permitting. Danielle is involved in pre- and post-restoration monitoring efforts on stream and wetland projects. Danielle is trained in biological assessments, wetland delineation, functional wetland assessment, the policy framework, and summarizing results in reports.

Credentials

- BA Planning and Environmental Policy, Western Washington University, Bellingham, 2007
- Certificate in Wetland Science and Management, University of Washington, Seattle, 2018
- WSDOT Junior Biological Assessment Author, 2026
- Certified Professional Wetland Scientist (PWS) #3410, Society of Wetland Scientists, 2021

Disclaimer

Herrera Environmental Consultants, Inc. (Herrera) has prepared this report for use by Snohomish County PUD No. 1. The results and conclusions in this report represent the professional opinion of Herrera. They are based upon examination of public domain information concerning the study area, field evaluation, and data analysis.

The work was performed according to accepted standards in the Floodplain Habitat Assessment Mitigation Draft Regional Guidance for Region 10 (Federal Emergency Management Agency [FEMA] 2011). Final determination of jurisdictional wetland, shoreline, or stream boundaries pertinent to Section 404 of the Clean Water Act is the responsibility of the Seattle District of the U.S. Army Corps of Engineers.

Introduction

This biological assessment (BA) builds upon the National Marine Fisheries Service (NMFS) Biological Opinion (BO) and the U.S. Fish and Wildlife Service (USFWS) Biological Opinion for the Federal Energy Regulatory Commission (FERC) License to Operate the Henry M. Jackson Hydroelectric Project (FERC Project No. 2157) (NMFS 2011, USFWS 2011). The proposed action, including the installation of engineered log jams (ELJs), fits within and is consistent with the overall scope, restoration framework, and conservation measures analyzed as part of the dam relicensing evaluated in those BOs. This BA is provided as an update to incorporate newly listed species and critical habitat, updated species status and baseline information, and a consolidated summary of project effects. This BA is intended to support reinitiation of informal consultation with NMFS and USFWS.

Project Area

The project is located in the Lower Sultan River subbasin within the Snohomish Watershed, in Watershed Resource Inventory Area (WRIA) 7 –Snohomish, within the northeast portion of Section 31, Township 28 North, Range 08 East of the Willamette Meridian, in Snohomish County, Washington. The project is situated within seven Snohomish County parcels on the west side of the Sultan River as shown in Figure 1: 28083100100900, 28083100101100, 28083100101200, 28083100101300, 28083100100800, 28083100101600, and 00765600099900. The project area encompasses two construction areas associated with the Sultan River and riparian area for two proposed engineered log jams (ELJs); a temporary equipment access route and staging area; and a temporary bridge crossing over Side Channel 2.

Project Description

The proposed project involves installation of two ELJs along the right bank (west side) of the Sultan River in Snohomish County, Washington. The purpose of the two proposed ELJs is to improve mainstem structural complexity and hydraulic diversity. These are further described in the *Plan for Side Channel Enhancement and Large Woody Debris Placement* (Snohomish County PUD No. 1 2011). This work represents the PUD's ongoing mitigation as a component Federal Energy Regulatory Commission license (Project No. 2157) for the Henry M. Jackson Hydroelectric Project and is intended to improve instream habitat for salmon in Sultan River watershed. The southern ELJ (9) will consist of improving and expanding a previously constructed ELJ (7) at the south end of the study area while the northern ELJ (10) will be entirely new.

Project construction and staging will utilize existing roads/paths and minimally vegetated gravel bars to the extent practicable to minimize impacts to riparian vegetation and other natural resources. No permanent wetland, stream or buffer impacts are proposed.

Construction Process

Prior to clearing and grading activities, temporary high-visibility fencing will be installed along the disturbance limits (approximately 38,840 square feet) to prevent unintended encroachment by construction activities into areas not planned for impacts. Materials will be temporarily stockpiled on site within the construction staging area at the south end, over an existing gravel bar with minimal vegetation (consisting predominantly of invasive species and moss/grass).

Establishing a construction access route and staging area will require widening an existing 10-foot-wide dirt/grass path by approximately 4 feet to accommodate equipment access to ELJ 10, incurring approximately 14,690 square feet of disturbance to vegetation including a total of 40 trees, ranging between 4 and 38 diameter breast height (dbh), which will be removed with a chainsaw. An additional 13,770-square-foot area of primarily low-quality invasive vegetation over a gravel bar will also be cleared for the staging area.

A temporary bridge will be placed over Side Channel 2 for construction access. This temporary bridge will be designed by the contractor and will span the wetted width (at a minimum) with a central pier (likely 2 ecology blocks) that will be placed near the center of the streambed. Due to the width of the existing wetted channel (approximately 80 feet across the OHWM at the access location), installation of a single, 80-foot-wide bridge may not be feasible as site access is constrained by a steep driveway with a tight switchback. Common bridge types on similar projects have included road plates and recycled rail cars, which may be utilized for this project. Before placing the ecology blocks in the streambed, block nets will be placed, and fish will be removed from between them, using agency-approved methods (described below).

Prior to beginning in-water work on the ELJs, sand and bulk bags will be delivered to the site and filled with imported or native alluvium excavated from above water levels. Bulk bags represent a temporary fill in the floodplain of approximately 226 cubic yards. An excavator will systematically place the bulk bags in an arc from the upstream bank to the downstream bank to create a coffer dam to isolate the in-water work area. Once the coffer dams are completed, fish will be removed behind them using agency-approved methods.

Excavators will be used to regrade the shoreline. Excess soil will be transported off site via dump trucks. Construction of both ELJs will result in a net cut of approximately 995 cubic yards of material below the OHWM, and a net cut of 34 cubic yards in the riparian buffer (floodplain). An excavator or backhoe with a grapple will be used to move trees and logs. ELJs, consisting of logs, rootwads, and boulders will be installed along the regraded shoreline (see plans for quantities and dimensions). Cleared trees will be incorporated into the ELJS as slash and racking. Chain will be used for lashing logs to boulders and other logs. ELJs will be backfilled with native alluvium and cobble and capped with topsoil to integrate the structures with the adjacent floodplain and support revegetation.

As shown in plans (Appendix A), the project will **temporarily impact** following areas:

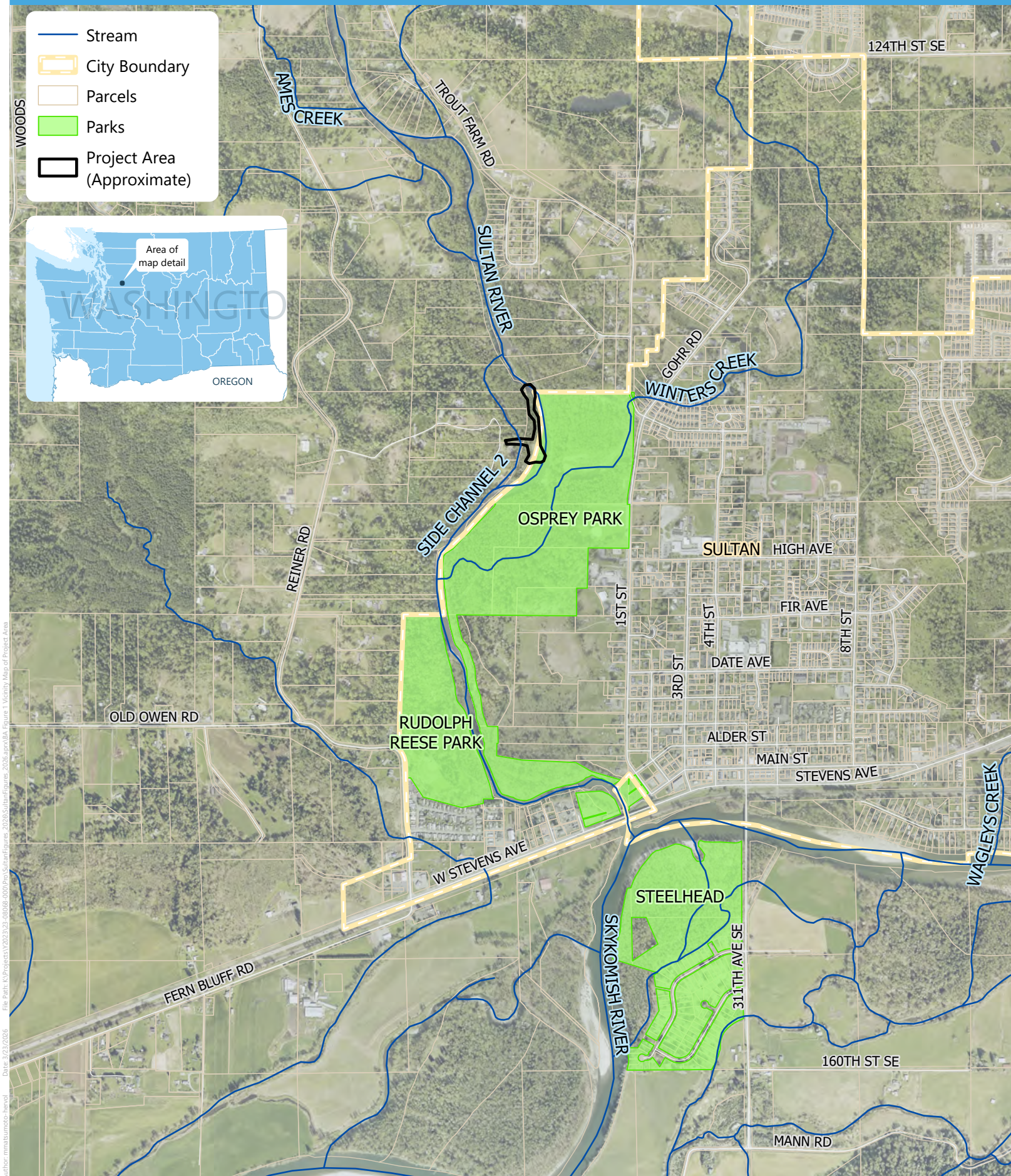
- 190 square feet of riverine wetland for placement of coffer dam
- 30 square feet of Side Channel 2 streambed for placement of the temporary bridge pier
- 10,150 square feet of river (below ordinary high water mark [OHWM]) of the Sultan River during in-water construction of ELJs
- 27,270 square feet of riparian buffer for access, staging, and construction of upland portion of ELJs

The project will **permanently impact** the following area (Appendix A):

- 1,200 square feet of riparian buffer near ELJ 10 due to a conversion of buffer to in-stream habitat at the ELJ

After construction is complete, coffer dams will be removed, and grades will be restored to baseline conditions. The temporary access bridge will be removed, and banks will be restored. All temporarily disturbed buffer and wetland areas will be restored with native vegetation or hydroseeded to a pre-disturbance condition. See Appendix B for 60% Site Plans.

Figure 1:
Vicinity Map of Project Area.



File Path: K:\Projects\2023\23-08088-000\Proj\SultanFigures_2026.aprx|BA Figure 1 Vicinity Map of Project Area
Date: 3/23/2026
Author: mmatumoto-herrera

Protection Measures

Best management practices (BMPs) will be implemented to control erosion and protect water quality throughout construction. These measures include the following:

- The work area will be confined to the designated disturbance limits as shown on plans.
- The construction entrance will be stabilized to minimize tracking of sediment.
- Temporary seeding and mulching will occur as needed to restore disturbed areas.
- Restoration of all vegetation removed will occur after construction is complete.
- All construction activities will occur in isolated work areas behind cofferdams.
- A Temporary Erosion Control and Sediment (TESC) plan will be implemented that will include silt fencing, minimized vegetation clearing, and the implementation of BMPs as outlined by Washington Department of Ecology's (Ecology) Stormwater Management Manual.
- All equipment and materials shall be operated and staged on uplands and will not operate below the ordinary high water mark (OHWM) or within wetlands.

Minimization Measures to protect listed species include the following:

- Conducting all activities during the summer, during the approved in-water work window, when flows are minimal and fish are least likely to be in the area
- Restoration of temporarily cleared areas will include replanting native shrubs, trees, and forbs, and hydroseeding
- Fish exclusion using *Recommended Fish Exclusion, Capture, Handling, and Electroshocking Protocols and Standards* which is approved by both the USFWS and NMFS (USFWS 2012)

As a reasonable and prudent measure, the NMFS BO requires all projects, including ELJ installation, to "[m]inimize incidental take from construction activities in or near watercourses." See the Terms and Conditions described in the NMFS and USFWS BOs for additional requirements.

Action Area

The action area is defined as all areas that could potentially be affected by the project and is not limited to the actual work area (project area or project footprint). Action areas are based on the estimated extent of potential construction noise, and in-stream impacts.

Terrestrial Extent of Action Area

The terrestrial extent of the action area was defined by temporary increases in noise that may result during construction from equipment operation. Background noise levels at the work area are expected to be near 45 dBA, based on Snohomish County's low rural population density (397 persons per square mile).

Construction-related in-air noise will exceed background noise levels near the work area. The three loudest pieces of construction equipment to be used for the project, including dump trucks (91 dBA), an excavator (87 dBA), and a grapple on a backhoe (87 dBA), are estimated to produce a combined maximum construction noise level of about 94 dBA as measured 50 feet from the source (WSDOT 2020). Construction noise at a vegetated site decreases approximately 7.5 dB per doubling of distance from the source. In addition, densely forested sites can reduce noise levels by about 5 dBA for every 100 feet up to a maximum of 200 feet. Using Washington State Department of Transportation (WSDOT) methodologies for assessing construction-generated noise levels and attenuation in soft (vegetated and densely forested), terrestrial construction noise will attenuate to the estimated background noise at approximately 580 feet (0.1 mile) landward of the project area (Figure 2).

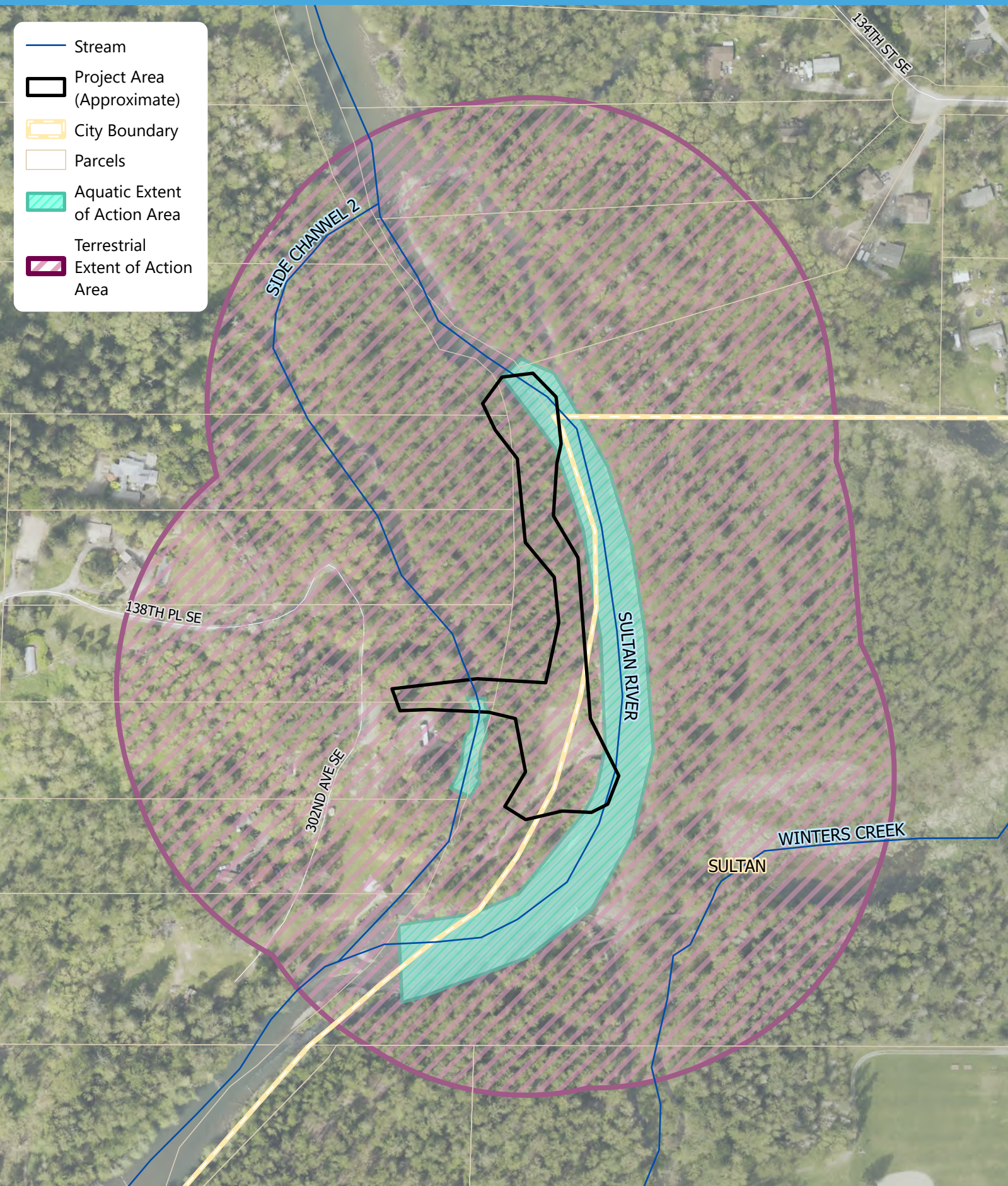
Aquatic Extent of Action Area

Project work proposed to occur in or adjacent to aquatic habitat has the potential to mobilize fine sediments. The aquatic extent of the action area applies to all in-water work areas as well as downstream areas that may be affected by increased turbidity. Under the State's Water Quality criteria for aquatic life, a temporary turbidity mixing zone is permitted, which is measured from the activity causing turbidity to a point downstream, based on flow rates (WAC 173-201A-200). There are two aquatic extents for the project:

- Sultan River mainstem – When working in waters with flows greater than 10 cubic feet per second during construction, the compliance point for turbidity should be set 200 feet.
- Side Channel 2 – When working in waters with a flow greater than 10 cubic feet per second during construction, the compliance point for turbidity should be set 200 feet.

To eliminate potential project-associated water quality effects from turbid water, stormwater BMPs will be implemented according to a TESC plan. Isolating the in-water work area will further minimize turbid discharges and limit the exposure of aquatic species. Due to work area isolation and construction BMPs describe above, water quality impacts resulting from the project are expected to be insignificant and temporary in nature.

Figure 2:
Action Area for the Sultan ELJ Project.



File Path: K:\Projects\2023\23-08088-000\Proj\Sultan\Figures, 2026.aprx\BA Figure 2 Action Area
Date: 3/23/2026
Author: mmatusmoto-henol

Habitat Assessment

This report has been prepared with reference to information retrieved from updated species lists and critical habitat compiled from the Information for Planning and Consultation (IPaC) database managed by the USFWS (Appendix B) as well as the NOAA Fisheries Species Directory (USFWS 2026a, NMFS 2026a). Additional species use and habitat information was obtained from the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) dataset (WDFW 2026a), Salmonscape (WDFW 2026b), the Statewide Integrated Fish Distribution database (WDFW and NWIFC 2024), and the Species and Habitat App (NMFS 2026b). These data sources indicate that nine listed and proposed species, and three critical habitats potentially occur in the project's action area. Herrera biologists Liliana Hansen and Danielle Rapoza visited the project area on January 27, 2026, to evaluate the potential impacts of the project.

Background Research

Documented fish species and their documented use in the action area is provided in Table 1. In addition to the fish species, WDFW maps several masked polygons in the area for Priority Habitats and Species representing one or more records of the Northwestern pond turtle (*Actinemys marmorata*), little brown bat (*Myotis lucifugus*), and Yuma myotis (*Myotis yumanensis*) (WDFW 2026a). There are no rare or sensitive plant populations mapped in the action area (WDNR 2026).

Table 1. Documented Fish Use in the Action Area.		
Fish Species	Run	Use Type
Bull trout (<i>Salvelinus confluentus</i>)	NA	Rearing
Chinook (<i>Oncorhynchus tshawytscha</i>)	Summer	Presence
	Fall	Spawning
Chum (<i>O. keta</i>)	Fall	Spawning
Coastal cutthroat (<i>O. clarki</i>)	NA	Presence
Coho (<i>O. kisutch</i>)	NA	Rearing
Pink (<i>O. gorbuscha</i>)	Odd year	Spawning
Steelhead (<i>O. mykiss</i>)	Summer	Presence
	Winter	Spawning
Rainbow trout (<i>O. mykiss</i>)	NA	Presence

Source: WDFW and NWIFC 2026, WDFW 2026a, 2026b

Protected Species and Habitat

The action area provides habitat for several species listed under the Endangered Species Act. Designated critical habitat for several of these species, as well as essential fish habitat (EFH), is also present in the action area. ESA-listed species and critical habitats potentially present in the action area are summarized in Table 2 (USFWS 2026a, 2026b; NMFS 2026a, 2026b).

Table 2. ESA-Listed Species Potentially Present in the Action Area.

Species	Population	Agency	Federal Status	Critical Habitat
Bull trout (<i>Salvelinus confluentus</i>)	Coastal-Puget Sound DPS	USFWS	Threatened	Designated, in action area
Chinook (<i>Oncorhynchus tshawytscha</i>)	Puget Sound ESU	NMFS	Threatened	Designated, in action area
Marbled murrelet (<i>Brachyramphus marmoratus</i>)	Northern California, Oregon, and Washington DPS	USFWS	Threatened	None in action area
Monarch butterfly (<i>Danaus plexippus</i>)	Western population	USFWS	Proposed Threatened	None in action area
North American wolverine (<i>Gulo gulo luscus</i>)	NA	USFWS	Threatened	None in action area
Northwestern pond turtle (<i>Actinemys marmorata</i>)	NA	USFWS	Proposed Threatened	Not designated
Steelhead trout (<i>Oncorhynchus mykiss</i>)	Puget Sound DPS	NMFS	Threatened	Designated, in action area
Suckley's cuckoo bumble bee (<i>Bombus suckleyi</i>)	NA	USFWS	Proposed Endangered	Not designated
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	Western DPS	USFWS	Threatened	None in action area

DPS = distinct population segment

ESU = evolutionary significant unit

NA = not applicable

NMFS = National Marine Fisheries Service

USFWS = US Fish and Wildlife Service

Source: USFWS 2026a, 2026b; NMFS 2026a, 2026b

Note: Gray cells indicate species and designated critical habitat that are covered in the FERC relicensing BOs (NMFS 2011, USFWS 2011).

The following species and designated critical habitats were addressed in the USFWS or NMFS BOs and are therefore not discussed further in this BA (USFWS 2011, NMFS 2011):

- Coastal-Puget Sound DPS Bull trout
- Coastal-Puget Sound DPS Bull trout designated critical habitat
- Puget Sound ESU Chinook
- Puget Sound ESU Chinook designated critical habitat
- Marbled murrelet
- Marbled murrelet designated critical habitat
- Steelhead trout

Monarch Butterfly

Monarch butterflies (*Danaus plexippus*) are uncommon in Western Washington. Monarch breeding habitat is tied to availability of nectar plants, primarily milkweed species, which rarely occur in Western Washington. The nearest overwintering habitat occurs in California (WAFWA 2019). There is no suitable habitat for monarch butterfly within the action area.

North American Wolverine

The action area is located within the current potential range of North American Wolverine. Wolverines use a variety of habitats, including alpine and sub-alpine forest, tundra, meadows, and talus fields (USFWS 2018). Key ecosystem characteristics include high elevations with persistent spring snow greater than 5 feet deep and large home range habitat areas with features such as rocky alpine areas, glacial cirque basins, and avalanche chutes used for dispersal and food sources. Wolverines are active year-round and are known for traveling great distances. Habitat modeling for wolverine in the western U.S. indicates that they are most likely to occur at high elevations, where there is steeper terrain, more snow, fewer roads, and reduced human activity, but also in proximity to high elevation talus, tree cover, and areas that have snow cover on April 1 (USFWS 2018). Maternal and natal denning habitat with relatively low levels of human development are important, although the thresholds are unknown. There are no known dens and no suitable denning habitat for wolverine within the action area.

Wolverines have been detected at high elevations in the North Cascades (Aubry et al. 2014). There may be dispersal habitat for wolverine within the action area; however, their occurrence would be rare and incidental. High elevations, steep terrain, and prolonged snowpack are not associated with the action area. Based on this evaluation, there is no suitable habitat for wolverine within the action area.

Northwestern Pond Turtle

The action area is within the potential range for the northwestern pond turtle, which was recently proposed as Threatened. Northwestern pond turtles require aquatic habitat for breeding, feeding, overwintering, and sheltering. Aquatic habitat includes underwater shelter sites (undercut banks, submerged vegetation, mud, rocks, and logs) and standing or slow-moving water. This species also requires terrestrial and emergent habitats located in close proximity to aquatic habitat for nesting, basking, and overwintering/aestivation (USFWS 2023). Upland nesting habitats can vary significantly but typically have sparse vegetation with short grasses/forbs and little canopy cover.

Terrestrial habitat in the action area is primarily forested and has high canopy cover. Aquatic habitat within the action area consists of fast-moving water with little submerged vegetation. For these reasons, there is no suitable habitat for northwestern pond turtle within the action area. There have been no detections of northwestern pond turtle in the Lower Sultan River watershed since 2012 (USFWS 2023).

Suckley's Cuckoo Bumblebee

Suckley's cuckoo bumblebee has historically been documented throughout western North America, overlapping with the range of one of its host species, western bumblebee (*B. occidentalis*) (USFWS 2024). This species requires sites with thermal suitability, diapause (overwintering) availability, a diversity and abundance of floral resources, suitable host colony availability (i.e., *Bombus* spp.), and habitat

connectivity (USFWS 2024). This species can be found in montane meadows and prairies, farms, woodlands, boreal forests, agricultural fields, and urban areas where it has been recorded on a number of genera of plants in the families Asteraceae (composites), Fabaceae (legumes), Rosaceae (roses), Ericaceae (heath), Plantaginaceae (plantain), and Salicaceae (willow). Habitat conversion and fragmentation are well documented throughout the range of Suckley's cuckoo bumble bee and recent observations of this species as well as bumble bee host species do occur in urban areas. However, these areas do not represent high-quality habitat. Declines of host species (i.e., *Bombus* spp.) are cited as the primary threat to this species (USFWS 2024). Primary threats to bumble bees include habitat loss, pesticide use, climate change, competition with nonnative species, and diseases such as pathogens introduced through commercial pollinators (USFWS 2024).

Based on the above analysis there is suitable habitat for this species in the action area; however, Suckley's cuckoo bumble bee has not been recorded in the United States since 2016 (USFWS 2024), and the species is highly unlikely to occur in the action area.

Yellow-billed Cuckoo

The USFWS lists the Western DPS of the yellow-billed cuckoo as a Threatened species, according to the protective provisions of the ESA. Nesting yellow-billed cuckoos of this population segment require large (50 acres or more) tracts of native broadleaf forest, most often alder, cottonwood, and willow, in arid to semi-arid landscapes (Haltermann et al. 2015, USFWS 2021).

Yellow-billed cuckoo has been extirpated as a breeder in Washington State. The surrounding riparian forest is coniferous dominant and generally does not contain the associated tree species necessary for breeding habitat; therefore, there is not suitable nesting habitat for yellow-billed cuckoo in the action area. Critical habitat for yellow-billed cuckoo, based on documented breeding, is not designated in Washington State. Since 1979, no records of this species occurring in Snohomish County near Sultan have been documented (Washington Nature Mapping Program 2023). There is no suitable habitat for yellow-billed cuckoo in the action area.

Steelhead Designated Critical Habitat

The NMFS and USFWS identify essential primary constituent elements (PCEs) as the physical and biological characteristics of occupied habitat that are essential to the conservation of the species. Critical habitat for Puget Sound DPS steelhead was designated effective January 2, 2006 and March 25, 2016 (70 FR 52630, 81 FR 9252). The primary constituent elements (PCEs) determined essential to the conservation of Pacific salmon and steelhead are: spawning habitat (PCE 1), physical habitat for rearing sites (PCE 2), unobstructed freshwater migration corridors (PCE 3), estuarine habitat (PCE 4), nearshore marine habitat (PCE 5), and offshore marine habitat (PCE 6). The full PCE text is available in the *Habitat Narrative* below. PCE #'s 1, 2, and 3 are present in the action area.

The aquatic portion of the action area in the Sultan River is designated as critical habitat for the Puget Sound DPS of steelhead (NMFS 2026b). Steelhead are well documented to migrate, rear, and spawn in the action area. Steelhead are known to spawn on the gravel bar associated with the project area. Critical habitat for steelhead was designated in 2016 after the 2011 BO was issued. Therefore, effects to steelhead designated critical habitat PCEs are analyzed below sections of this report.

Site Investigation

Herrera biologists Liliana Hansen and Danielle Rapoza visited the action area on January 27, 2026. Weather conditions during the fieldwork were fair with a daytime high temperature of 55 degrees Fahrenheit (°F). Field biologists surveyed the project area on foot, documenting habitat conditions and capturing site photographs. Additional information is available in the Critical Areas Report (Herrera 2026).

Herrera biologists observed the Sultan River and Side Channel 2 within the project area and also identified two riverine wetlands (Wetland A and B) associated with the mainstem of the river. Observed habitat conditions and photos are provided in below sections.

Habitat Narrative

The Sultan River originates upstream of the Spada Reservoir and Culmback Dam in the Mount Baker-Snoqualmie National Forest and the Morningstar Natural Resources Conservation Area. A small diversion dam, recently renovated to provide upstream fish passage, is located approximately 6.8 miles downstream of Culmback Dam (Kubo et al. 2021). The Sultan River flows south through the action area for approximately 1 mile to its confluence with the Skykomish River downstream.

Water Quality

Based on available information, there are no water bodies mapped within the action area that are listed as impaired under Washington State water quality standards (WAC 173-201A) or on the State's 303(d) list (Ecology 2026a, 2026b). Exceedances of the Washington State core summer salmonid habitat water quality criterion for water temperature (7-DADMax $\leq 16^{\circ}\text{C}$) are infrequent in the lower 9.7 miles of the Sultan River (Kubo et al. 2021, WAC 173-201A-200, Ecology 2026b). There are no areas within the Sultan River or associated tributaries where the char spawning and rearing temperature criterion (7-DADMax $\leq 12^{\circ}\text{C}$) are designated (WAC 173-201A-200, Ecology 2026b). Discrete water quality measurements collected in 2024 (April through October) in the Sultan River downstream of the powerhouse (Spada Lake Reservoir) indicate good water quality (Snohomish County Public Utility District No. 1 2025). Results ranged between 6.5 and 8.5 for pH; 0.3 and 9.8 NTU for turbidity, and 7.7 and 11.8 mg/L for dissolved oxygen.

The Sultan River watershed is relatively undeveloped with few urban inputs likely contributing to good water quality. The lower Sultan River experiences atypically low summer water temperatures as a result of bottom-withdrawal releases from the reservoir. However, riparian vegetation removal, wetland loss, sedimentation from logging, and additional private water withdrawals may be impacting summer water temperatures (USFWS 2017).

Water Quantity

The project is situated within the FEMA-mapped 100-year floodplain and regulatory floodway (FIRM 53061C1114F and 53061C1402F, effective June 19, 2020). No permanent fill is proposed within the floodplain, ensuring that construction activities will not directly impact the mapped floodplain. Placement of coffer dam to isolate the in-water work area represents a temporary fill of 226 cubic yards of material.

Approximately 1,029 cubic yards of alluvium will be excavated (net export) from the floodplain and will be transported off site to achieve 'no rise' conditions in the 100-year event.

Sultan River flows are moderated by dams which alters the natural hydrograph (USFWS 2017). Private water withdrawals may be limiting flows in the summer (USFWS 2017).

Vegetation Communities and Habitat Structures

Wetlands A and B are likely representative of other riverine wetlands present in the action area. Both wetlands were determined to be Category III, and have a riverine hydrogeomorphic class with their primary hydrology source being the main stem of the Sultan River. Both wetlands are dominated by palustrine emergent vegetation. Dominant species include reed canarygrass (*Phalaris arundinacea*), small-fruited bulrush (*Scirpus microcarpus*), soft rush (*Juncus effusus*), and slough sedge (*Carex obnupta*).



The riparian buffer consists of primarily deciduous forest with some young conifers. Dominant species include bigleaf maple (*Acer macrophyllum*), black cottonwood (*Populus balsamifera*), red alder, vine maple (*A. circinatum*), salmonberry, salal (*Gaultheria shallon*), and western swordfern (*Polystichum munitum*). Coniferous forest was dominant west of the Side Channel 2 and consisted primarily of western redcedar (*Thuja plicata*), Douglas fir (*Pseudotsuga menziesii*), salmonberry, salal, low Oregon grape (*Berberis nervosa*) and western sword fern. In addition, some riparian areas have been altered by low intensity rural development.

Vegetation in the wetland buffers are dominated by scrub-shrub species including, red alder saplings (*Alnus rubra*), salmonberry (*Rubus spectabilis*), Pacific ninebark (*Physocarpus capitatus*), red-osier dogwood (*Cornus sericea*), native willows (*Salix spp.*), and Himalayan blackberry (*Rubus armeniacus*). In addition, previously cleared areas coincide with portions of both wetland buffers. Cleared areas consist of gravel patches, as well as vegetation dominated by moss, various grasses, scotch broom (*Cytisus scoparius*), Himalayan blackberry, butterfly bush (*Buddleja davidii*), and red alder saplings.



Representative photos (left and right) of riparian forest vegetation between the Sultan River and the Side Channel 2.



Representative photo of riparian buffer west (left), and in the cleared area east (right) of the Side Channel 2.

Spawning Substrate

Substrate observed in the Sultan River was primarily large cobbles. Smaller cobbles to gravels, suitable for spawning of large-bodied salmonids, may be present in the river but were not observed in the study area due to high water and turbidity. Substrate in the Side Channel 2 was dominated by coarse to very coarse gravel with minimal embeddedness, optimal for small and large bodied salmonids including Chinook, chum, coho, pink, steelhead, and cutthroat spawning. Large hyporheic input is also known to benefit spawning habitat in Side Channel 2.



Salmonid spawning gravel in the Side Channel 2.

Floodplain Refugia

Near the northern extent of the study area, shallow water flows through exposed cobbles, and likely provides velocity refugia and rearing habitat for juvenile salmonids. Minimal naturally recruited wood was observed. Undercut banks were observed on the left bank, opposite the study area. The healthy forested riparian habitat provides shading and organic matter inputs that support stream ecological functions. Dams and historic forest practices have historically impacted natural wood recruitment, which may be limiting habitat complexity.



Deep water provides habitat for adult and juvenile salmon in the Sultan River looking downstream towards Osprey Park (left). Shallow water edge habitat provides rearing habitat for juvenile salmonids in the Sultan River, in the northern extent of the study area (right).

In Side Channel 2, undercut banks provide holding refugia for adult and juvenile fish. Large woody debris is adding to channel complexity. The dense canopy is providing thermal refugia of the channel.



Undercut banks (left), and large woody debris (right) in Side Channel 2.

Designated Critical Habitat

The 2011 NMFS BO includes an analysis of effects to proposed designated critical habitat for Chinook salmon. Steelhead critical habitat contains the same PCEs applicable to Chinook salmon designated critical habitat. NMFS examined how the project might impact possible steelhead PCEs, as estimated at that time, in order to assess likely effects on areas that could be designated as critical steelhead habitat. The action area contains PCEs supporting steelhead, including the following:

- PCE 1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation, and larval development.*

The lower Sultan River supports a relatively abundant population of spawning salmonids compared to other areas in the Snohomish-Skykomish watershed. Steelhead are documented as spawning within the action area (WDFW and NWIFC 2026, WDFW 2026a, 2026b). As stated in the NMFS (2011) BO concerning this PCE for Chinook salmon, dam operations, historical forestry practices, and runoff from urbanization in the lower portion of the watershed have reduced the quantity and quality of spawning habitat in the Sultan River. Therefore, this PCE is considered impaired in the Sultan River.

- PCE 2. Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility, water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams, and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.*

Dams and historic forest practices have historically impacted natural wood recruitment making this PCE somewhat degraded in the action area. According to the NMFS (2011) BO concerning this PCE for Chinook salmon, dam operations (at the time the BO was issued) had reduced both the amount and quality of side channel habitats and decreased floodplain connectivity. Due to this prior operation, the amount and complexity of woody debris in this reach of the river was comparatively low. However, dam operations were modified under the relicensing to create off-channel habitat, establish prescribed process flows, and revise minimum instream flow requirements. Although the dam continues to regulate river flows, current operations differ from those under the previous license. As a result of the regulated flows and prior operation, which has reduced the available woody debris, this PCE may be somewhat impaired in the Sultan River.

- PCE 3. Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.*

The NMFS BO (2011) states that “this PCE is apparently functioning at a level that supports an increasing trend in natural-origin adult spawner [Chinook] abundance over the last decade.” Although side channel habitat connectivity has improved under current dam operations, large

woody debris abundance remains relatively low due to historic operations. Cover, including riparian forest, large rocks and boulders, side channels, and undercut banks are supporting moderate functioning of this PCE in the action area. As stated in the NMFS (2011) BO regarding this PCE for Chinook salmon, available cover for migrating fish, including LWD, within this reach of the Sultan River is somewhat limited.. Consequently, this PCE is considered somewhat impaired in the Sultan River.

PCEs 4, 5, and 6 are not present in the action area.

Impact Assessment

Construction will generate temporary in-air noise and minor upland vegetation disturbance, and no underwater noise will occur. Noise and vegetation impacts are limited, minimization measures will be implemented, and no effects to terrestrial or aquatic species are expected.

As described in the NMFS and USFWS BOs, construction of ELJ structures may temporarily disturb fish through increased turbidity, sedimentation, and fish handling, especially affecting juvenile salmonids (NMFS 2011, USFWS 2011). While best management practices will minimize harm, some adverse effects cannot be fully avoided. Ultimately, LWD placement is expected to enhance habitat conditions for salmonids and their prey in the Sultan River.

Direct Effects

Fish Handling and Exclusion

Direct adverse effects to aquatic species will occur during installation of a temporary cofferdam, which will require fish exclusion, capture, handling, and relocation from the isolated in-water work area. Fish salvage activities carry an inherent risk of stress or injury to individual fish; therefore, these activities are considered adverse effects. However, fish relocation will be conducted using agency-approved methods consistent with USFWS (2012) guidance and Revised Code of Washington 77.57, and will occur during the approved August in-water work window, when salmonids are least likely to be present. Prior fish collection efforts for PUD restoration projects on the Sultan River have included rainbow trout, cutthroat trout, coho salmon, Chinook salmon, three-spined Stickleback, unidentified dace, unidentified lamprey, and unidentified sculpin.

Turbidity

Construction of the ELJs below the OHWM will occur during the in-water work window when salmonids are least likely to be present (August 1 through 31). Prior to commencing work, the in-water work area will be isolated with bulk bags and fish will be removed the in-water work zone using agency approved protocols as specified in the HPA. The placement and removal of the bulk bags may contribute to temporary increases in turbidity in the river. However, potential increases of suspended sediments associated with the project will be localized, minimized, and of short duration. The project will be

conducted in accordance with Washington State's Surface Water Quality Standards (WAC 173-201A-200) that allow for temporary occurrences of suspended sediments within a turbidity mixing zone that is defined according to measurements of stream flow at the time of construction. Based on available flow data, the compliance points for the turbidity mixing zones in the Sultan River will be located at a distance of 200 feet downstream from the in-water work areas. Any suspended sediments due to the adjacent construction activities are likely to settle out or be sufficiently diluted at distances immediately downstream from the activity.

The effects of increased suspended solids on salmonids depend on the extent, duration, timing, and frequency of exposure (Bash et al. 2001). Depending on the level of exposure, suspended sediment can cause behavioral, sublethal, and/or lethal effects (Newcombe and Jensen 1996). The typical response is avoidance of turbid areas, which can displace fish, including bull trout, from their preferred habitats. Sublethal effects include reduction in feeding rates, reduced growth rates, stress, elevated blood sugars. Water quality impacts are not likely to affect fish since prolonged exposure to turbid conditions is not anticipated as a component of the project. Any water quality impacts associated with the project are expected to be insignificant or undetectable and will be temporary in nature.

Vegetation Disturbance

Equipment access will occur via existing roads and trails. The existing access road east of Side Channel 2 will be widened for equipment access. Removal of large trees has been avoided to the extent possible. The construction staging area will be located within existing cleared area, which is now dominated by grasses, mosses, open cobble, and some shrubs including scotch broom, Himalayan blackberry, butterfly bush, and red alder saplings. Upon completion of the project, the staging area will be hydroseeded with native grasses to reduce erosion. Access areas cleared of trees and shrubs will be replanted with native trees and shrubs. To construct the ELJs, a small area of emergent wetland vegetation will be temporarily impacted, which will be restored with native wetland vegetation. Construction of the ELJ structures will disturb a portion of the riparian, primarily shrub, buffer. See *Project Description* section for areas.

A total of 40 trees will be removed, including the following:

- 13 conifers (Sitka spruce [*Picea sitchensis*], Douglas fir, and western redcedar) ranging between 4 and 13 inches dbh.
- 27 deciduous trees (red alder and black cottonwood) ranging between 4 and 20 inches dbh, with one larger cottonwood at 38 inches dbh.

After construction is complete, temporarily impacted areas, including trees, will be revegetated in-kind.

Construction Noise

The dense surrounding forest will significantly increase construction noise attenuation rates. In-air project noise will attenuate to ambient background levels at 0.1 mile from the project location. The project does not include any pile driving; therefore, no underwater noise impacts will occur. The project will require the use of several pieces of equipment (e.g., dump truck, excavator, grapple). No blasting, jackhammering, or pile driving will be needed.

Indirect Effects

Indirect effects are those caused by, or resulting from, the proposed action and are later in time but still reasonably certain to occur (50 CFR §402.02). Indirect effects could be caused by changes to ecological systems resulting in altered habitat or predator-prey relationships or anticipated changes in human activities, including changes in land use.

The indirect effects of ELJ placement are expected to occur over a localized area immediately surrounding each structure and would develop gradually through subsequent high-flow events. These effects are limited in geographic extent and magnitude and are therefore considered discountable at the action-area scale. Over the long term, the anticipated geomorphic and habitat adjustments are expected to increase channel complexity, improve rearing and refuge conditions, and provide net beneficial effects to listed species within the action area.

Fish will temporarily be excluded from accessing a relatively small area of riverine habitat during construction. These areas will be fully restored following construction, including replacement of wood structures and native alluvium. The additional wood will increase channel roughness and complexity and is expected to provide long-term habitat benefits, including improved refuge and rearing conditions. Therefore, while short-term habitat disturbance will occur, direct habitat effects are temporary and insignificant. However, the proposed action is expected to improve rearing conditions for steelhead.

Interdependent and Interrelated Actions

No additional activities would occur as a result of, or in association with, the proposed action beyond those ongoing dam operations and maintenance activities already evaluated in the prior BOs; therefore, no new interrelated or interdependent actions were identified for analysis.

Cumulative Effects

Given the limited scope of the proposed action, its temporary and localized effects, and the incorporation of avoidance and minimization measures, the project is not expected to contribute meaningfully to cumulative effects on listed species or their habitats within the action area. Ongoing and foreseeable dam operations and management activities have already been evaluated under the prior 2011 BOs, and no additional projects or stressors have been identified that would interact with the proposed action to result in cumulative effects.

Effects Determination

Effects to bull trout, Chinook salmon, steelhead, and marbled murrelet, as well as effects to designated critical habitats for bull trout, Chinook salmon, and marbled murrelet, were addressed under the previous BOs from 2011. Table 3. summarizes the effect determinations for listed and proposed species, as well as designated critical habitat, for the proposed project, in the action area, that were not evaluated in the previous analysis.

Table 3. Summary of Effect Determinations.

Species / Designated Critical Habitat	Effect Determination
Monarch butterfly	NJ
North American wolverine	NE
Northwestern pond turtle	NJ
Steelhead designated critical habitat	NLAA
Suckley's cuckoo bumblebee	NJ
Yellow-billed cuckoo	NE

NLAA = not likely to adversely affect NE = no effect

NJ = will not jeopardize the continued existence

Not Likely to Adversely Affect

The project may affect steelhead designated critical habitat because designated critical habitat including PCEs 1 through 3, are present in the project area. The project is not likely to adversely affect steelhead designated critical habitat for the following reasons:

- The temporary instream habitat disturbance associated with construction will result in short-term and localized, and will be restored following construction; therefore, effects to critical habitat PCEs are expected to be insignificant.
- Riparian vegetation disturbance will be minimal and temporary, and restoration plantings will be restored to the environmental baseline and will therefore be insignificant.
- Temporary increases in turbidity may temporarily degrade water quality during construction; however, these effects will be short-term and will be minimized through BMPs. Therefore, the increases are anticipated to be insignificant.

No Effect

The project will have no effect on wolverine, or yellow-billed cuckoo for the following reasons:

- No suitable habitat is present in the action area for these species.
- These species are unlikely to occur in the action area at any time of year; therefore, project related effects would be discountable.

No Jeopardy

The project will not jeopardize the continued existence of Monarch butterfly and Northwestern pond turtle for the following reasons:

- There is no suitable habitat in the action area for these species.

The project will not jeopardize the continued existence of Suckley's cuckoo bumblebee for the following reasons:

- This species is likely extirpated from the region and therefore unlikely to occur in the in the action area, making project effects discountable.
- Project effects are limited, temporary, and localized, and will not appreciably reduce the species' likelihood of survival or recovery.

Essential Fish Habitat Analysis

The Pacific Fishery Management Council (PFMC) has designated essential fish habitat (EFH) for the Pacific salmon fishery, federally managed ground fishes, and coastal pelagic fisheries under the Magnusen-Stevens Fishery Conservation and Management Act (MSA). EFH for Pacific salmon (including Chinook, coho [*Oncorhynchus kisutch*] and pink salmon [*Oncorhynchus gorbuscha*]), includes *"those waters and substrate necessary for salmon production to support long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem."* In freshwater, this includes all water bodies currently or historically accessible to salmon species managed under any federal fisheries management plan in Washington, Oregon, Idaho, and California. Exceptions include areas upstream of certain impassable manmade barriers, as well as longstanding, naturally impassable barriers (PFMC 2021). The Pacific Coast Salmon Fishery Management Plan (PFMC 2022) describes EFH for salmonid species. Species applicable to the action area include Chinook salmon, pink salmon (*O. gorbuscha*), and coho salmon (*O. kisutch*). Biological and habitat information for the three managed species is included in the NMFS BO (2011). In that BO, NMFS concluded that the proposed actions would adversely affect designated EFH for coho salmon and

Chinook salmon; however, this analysis did not include pink salmon. See above sections of this BA for project description, minimization measures, and additional impact analysis pertaining to EFH.

Effects on Essential Fish Habitat, Managed Species, and Associated Species

An adverse effect to EFH includes direct or indirect physical, chemical, or biological alterations or changes to: waters or substrate; species and their habitat; other ecosystem components; or quality and/or quantity of EFH (PFMC 2021). The project occurs within freshwater riverine EFH for Pacific salmon and includes in-water work and riparian disturbance associated with installation of the ELJs. Temporary adverse effects to EFH for managed species are limited to work area isolation, turbidity, and disturbance of riparian vegetation. These effects are temporary and localized, and will be minimized through implementation of construction BMPs (including TESC measures) and through restoration of riparian vegetation. All effects to managed species are expected to be insignificant or discountable. Disturbed streambed and banks will be restored following construction, and ELJ installation is expected to improve habitat complexity, native cover, and floodplain connectivity over the long term.

Associated aquatic species and salmon prey resources (e.g., aquatic invertebrates) may experience temporary disturbance within the isolated work area due to dewatering, sediment disturbance, and construction activities. These effects will be short-term and localized. Recolonization is expected to occur rapidly following restoration of streambed materials, reconnection of flow, and reestablishment of riparian vegetation. As a result, effects to associated species and prey resources are considered insignificant or discountable, with long-term conditions expected to improve as habitat complexity increases.

Cumulative Effects

The proposed action represents a short-term disturbance for the purpose of improving fish habitat and does not contribute to long-term degradation of aquatic habitat. When combined with past, present, and reasonably foreseeable actions in the watershed, the project's contribution to cumulative effects on EFH, managed species, and associated species is minor. Habitat restoration and ELJ installation are expected to provide incremental long-term benefits, offsetting localized, temporary construction-related impacts.

Essential Fish Habitat Conclusion

The prior BO analysis included actions tied to operation of the dam including modification of the hydrologic regime and temperature modification (NMFS 2011). When the ELJ installation is considered separately, it is anticipated that there will be no adverse effect to EFH. All effects to habitat would be localized, minimal, and temporary and therefore insignificant on salmon EFH. Overall, the project will have **no adverse effect** on designated EFH for Chinook, coho, and pink salmon.

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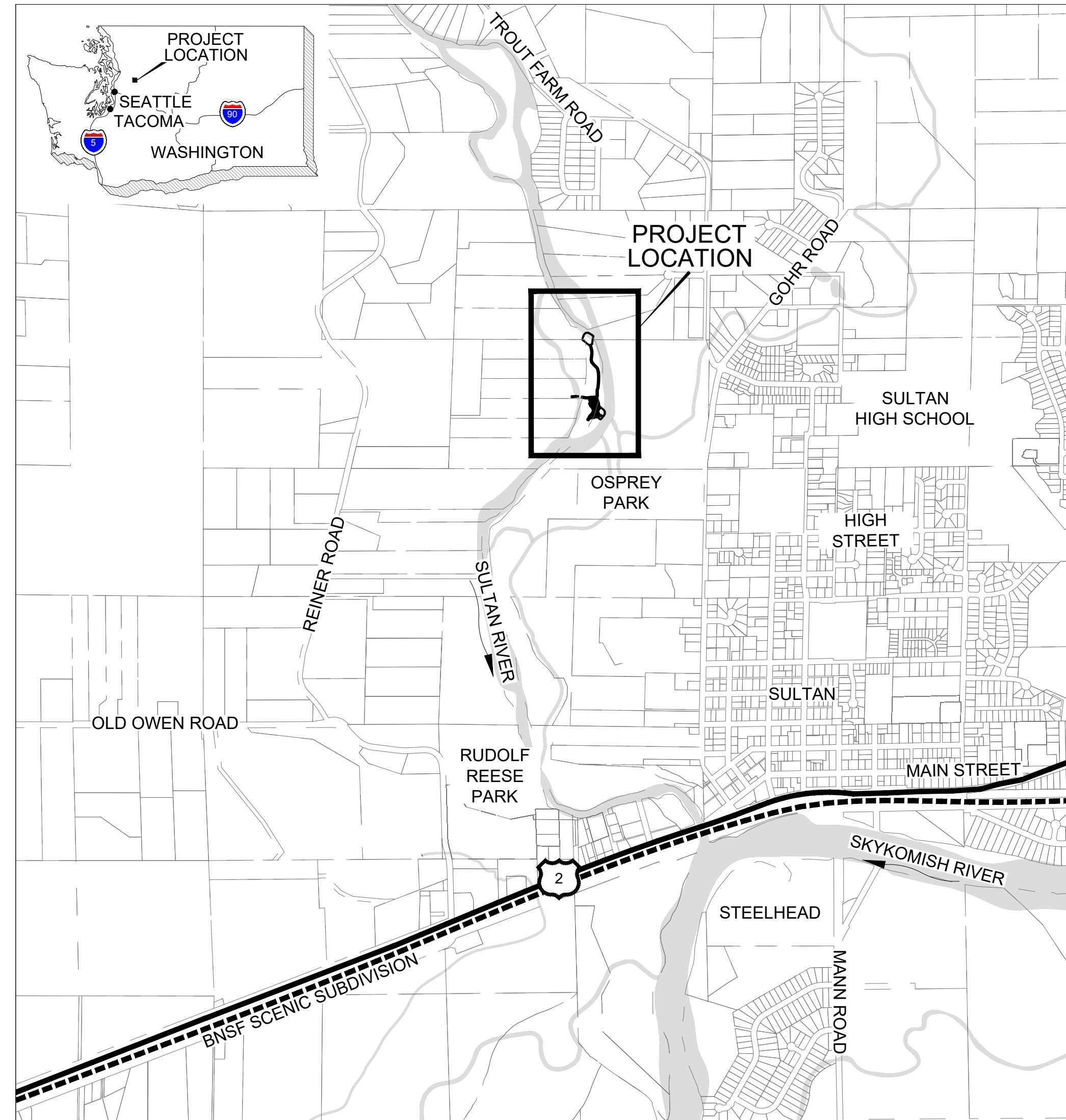
Appendix A

Project Plans

SULTAN RIVER

ENGINEERED LOG JAM 9 & 10 PROJECT

PERMIT LEVEL DESIGN



VICINITY MAP

Sheet List Table

Sheet Number	Sheet Title
01	COVER SHEET
02	EXISTING SITE PLAN
03	PROPOSED SITE PLAN
04	TEMPORARY WETLAND AND BUFFER IMPACTS
05	WETLAND AND BUFFER RESTORATION AREAS
06	ELJ 9
07	ELJ 9 LAYERING PLAN
08	ELJ 10
09	ELJ 10 LAYERING PLAN
10	LAYERING DETAILS
11	PLANTING SCHEDULE, NOTES AND DETAILS

DISTRICT PROJECT LEAD:

SNOHOMISH COUNTY PUD NO. 1
KYLE LEGARE
P.O. BOX 1107
EVERETT, WA 98206-1107

(425) 783-1841
KJLEGARE@SNOPUD.COM

ENGINEER:

SHANNON & WILSON
GUS KAYS, P.E.
400 N 34TH ST
SEATTLE, WA 98103

(206) 695-6941
GUS.KAYS@SHANWIL.COM

REFERENCE NO:

APPLICANT:

ADJACENT PROPERTY OWNERS:

SNOHOMISH COUNTY PUD #1

SEE JARPA 5H

LOCATION:

LAT/LONG:

DATE:
SHEET:

NEAR 138TH PLACE SE

47.8730 N / -121.8254 W

JUNE 2026
01 OF 11

PROPOSED PROJECT:

IN:

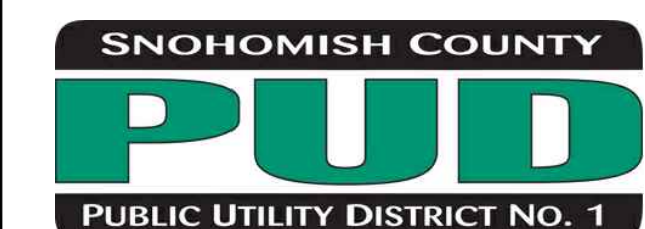
NEAR:
COUNTY:
STATE:

CONSTRUCT 2 ELJS

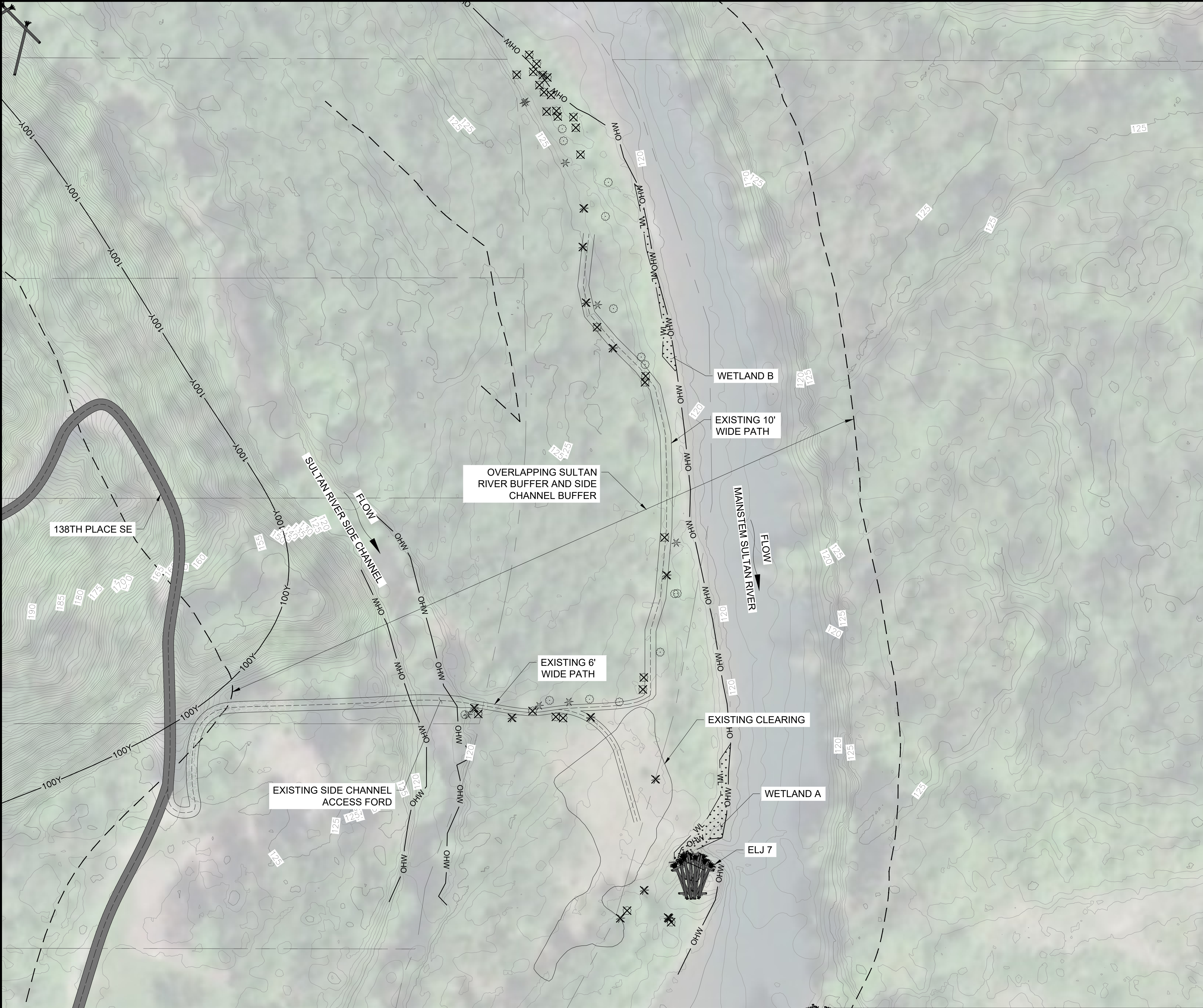
SULTAN RIVER, SULTAN RIVER SIDE
CHANNEL 2, WETLAND A

SULTAN
SNOHOMISH
WASHINGTON

SHANNON & WILSON



SNOHOMISH PUBLIC UTILITIES DISTRICT NO. 1
ATTN: MANAGER OF NATURAL RESOURCES
P.O. BOX 1107, EVERETT, WA 98201
PHONE: 425-783-1841



GENERAL NOTES:

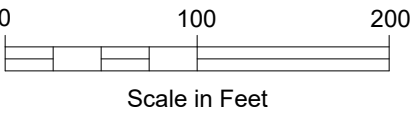
- 1. CONTOURS ARE DERIVED FROM LIDAR AND DO NOT REFLECT BELOW WATER ELEVATIONS.
- 2. WETLANDS AND OHW LINES PROVIDED BY HERRERA INC.
- 3. ALL UPLANDS AND WETLANDS WITHIN THE 100-YEAR FLOODPLAIN ARE DESIGNATED AS RURAL CONSERVANCY SHORELINE.
- 4. TREE LOCATIONS ARE APPROXIMATE.

LEGEND:

	EXISTING CONTOURS
	PARCEL BOUNDARY
	PROPOSED CONSTRUCTION ACCESS ROAD
	EXISTING ROAD
	EXISTING DRIVEWAY
	WETLAND BOUNDARY
	ORDINARY HIGH WATER
	150' STREAM BUFFER
	FEMA 100-YEAR FLOODPLAIN
	SILT FENCE
	CONIFER TREE
	DECIDUOUS TREE
	CONIFER TREE TO BE REMOVED
	DECIDUOUS TREE TO BE REMOVED

TREE REMOVAL INVENTORY:

TYPE	TREE SIZE			
	< 9"	9 - 15"	15 - 21"	> 21"
DECIDUOUS	14	10	0	0
CONIFER	9	4	2	1



SHANNON & WILSON



SNOHOMISH PUBLIC UTILITIES DISTRICT NO. 1
ATTN: MANAGER OF NATURAL RESOURCES
P.O. BOX 1107, EVERETT, WA 98201
PHONE: 425-783-1841

EXISTING SITE PLAN

C-02

REFERENCE NO:
APPLICANT: SNOHOMISH COUNTY PUD #1
PROPOSED PROJECT: CONSTRUCT 2 ELJS
LOCATION: NEAR 138TH PLACE SE

SHEET: 02 OF 11 DATE: JUNE 2026



GENERAL NOTES:

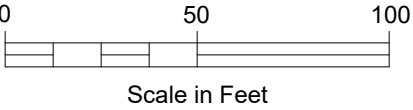
- 1. ACCESS TO ELJ 9 TO FOLLOW EXISTING PRIMITIVE ACCESS ROUTE.
- 2. ACCESS CORRIDOR TO ELJ 10 IS APPROXIMATE AND SHALL BE ALIGNED TO MINIMIZE TREE AND BUFFER DISTURBANCE. WHERE POSSIBLE ACCESS SHALL BE ALIGNED ALONG COBBLE BAR BANKS.
- 3. ACCESS ROUTE SHALL BE MARKED IN THE FIELD PRIOR TO GROUND DISTURBANCE.
- 4. CONTOURS ARE DERIVED FROM LIDAR AND DO NOT REFLECT BELOW WATER ELEVATIONS.
- 5. TEMPORARY BRIDGE SHALL SPAN THE WETTED WIDTH FOR THE CONSTRUCTION PERIOD. REVIEW FORECASTS AND REMOVE TEMPORARY BRIDGE / BULK BAGS IF HIGH FLOWS THAT WOULD INUNDATE OR DAMAGE THESE FACILITIES ARE ANTICIPATED WITHIN 48 HOURS. ANY MODIFICATIONS TO THE BANK SHALL BE OUTSIDE OF THE WETTED WIDTH AND RESTORED TO MATCH THE EXISTING SIDE CHANNEL FORD. IF TEMPORARY BRIDGE INSTALLATION REQUIRES GRADING OF THE EXISTING FORD, SILT FENCE OR STRAW WATTLES SHALL BE INSTALLED TO PROTECT WATER QUALITY.

LEGEND:

- EXISTING CONTOURS
- PARCEL BOUNDARY
- PROPOSED CONSTRUCTION ACCESS ROAD
- EXISTING ROAD
- EXISTING DRIVEWAY
- STAGING AREA
- WETLAND BOUNDARY
- ORDINARY HIGH WATER
- SILT FENCE
- HIGH VISIBILITY FENCE
- 150' STREAM BUFFER
- FEMA 100-YEAR FLOODPLAIN
- BULK BAG ISOLATION DAM
- CONIFER TREE
- DECIDUOUS TREE
- CONIFER TREE TO BE REMOVED
- DECIDUOUS TREE TO BE REMOVED

CUT AND FILL VOLUME:

	WETLAND A	RIVER	BUFFER	
CUT	0	1453	127	CY
TEMPORARY FILL (BULK BAGS AND ECOLOGY BLOCKS)	5	216	5	CY
PERMANENT FILL (BACKFILL AND LWM)	0	458	93	CY



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SNOHOMISH PUBLIC UTILITIES DISTRICT NO. 1
ATTN: MANAGER OF NATURAL RESOURCES
P.O. BOX 1107, EVERETT, WA 98201
PHONE: 425-783-1841

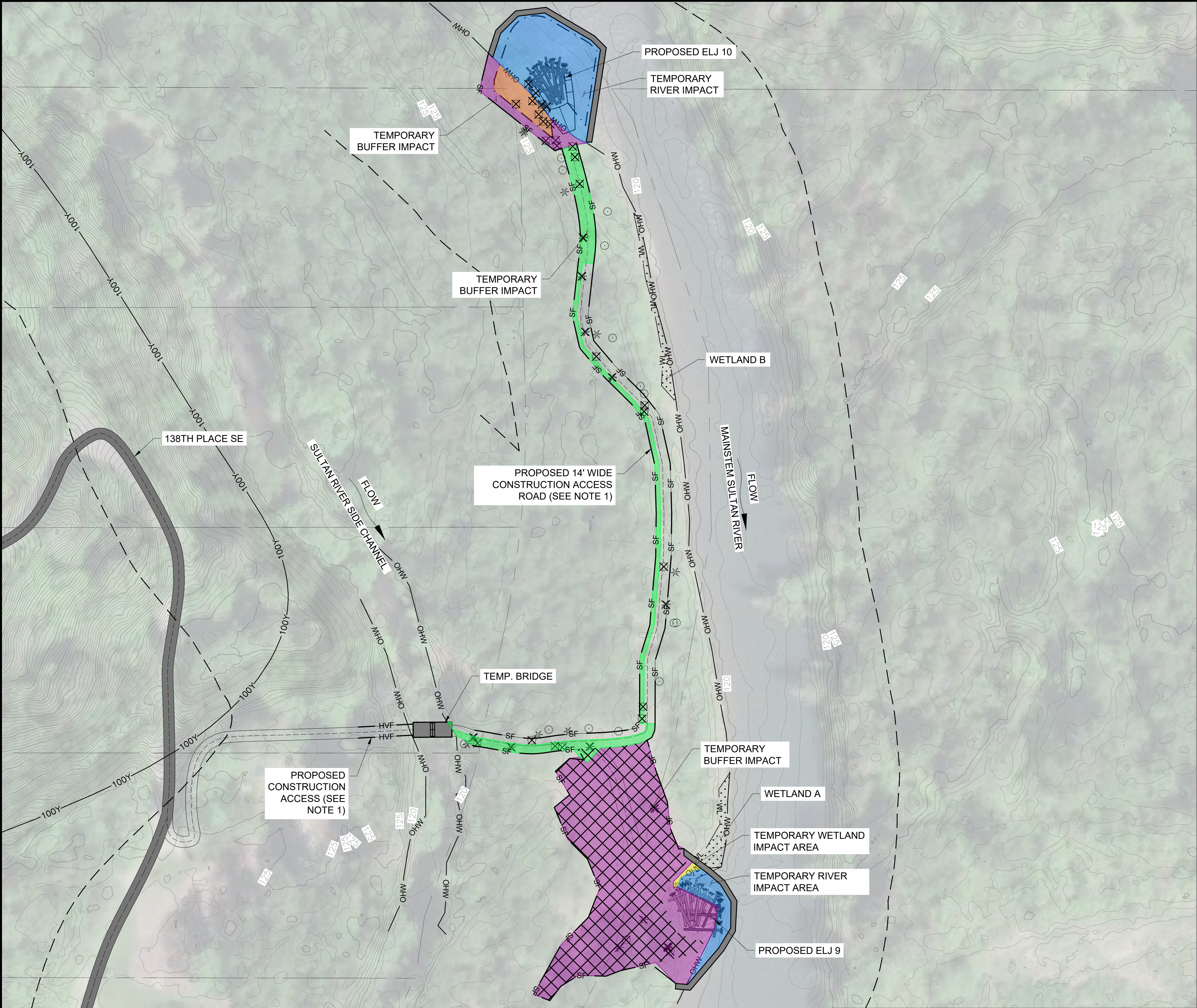
PROPOSED SITE PLAN

C-03

REFERENCE NO:
APPLICANT:
PROPOSED PROJECT:
LOCATION:

SNOHOMISH COUNTY PUD #1
CONSTRUCT 2 ELJS
NEAR 138TH PLACE SE

SHEET: 03 OF 11 DATE: JUNE 2026

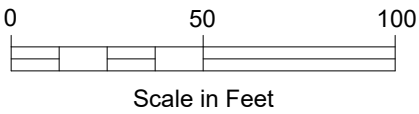


GENERAL NOTES:

1. ACCESS TO ELJ 9 TO FOLLOW EXISTING PRIMITIVE ACCESS ROUTE. EXISTING ROUTE TO BE WIDENED TO 14' FOR CONSTRUCTION DURATION AND RESTORED TO 10' WIDTH POST CONSTRUCTION OF ELJ 9.
2. ACCESS TO ELJ 10 SHALL MINIMIZE DISTURBANCE AND TREE REMOVAL. WHERE POSSIBLE ACCESS SHALL BE ALIGNED ALONG COBBLE BAR BANKS.
3. ACCESS ROUTE SHALL BE MARKED IN THE FIELD PRIOR TO GROUND DISTURBANCE.
4. CONTOURS ARE DERIVED FROM LIDAR AND DO NOT REFLECT BELOW WATER ELEVATIONS.
5. REVIEW FORECASTS AND REMOVE TEMPORARY BRIDGE / BULK BAGS IF HIGH FLOWS ARE ANTICIPATED WITHIN 48 HOURS. ANY MODIFICATIONS TO THE BANK SHALL BE RESTORED.

LEGEND:

	EXISTING CONTOURS
	PARCEL BOUNDARY
	PROPOSED CONSTRUCTION ACCESS ROAD
	EXISTING ROAD
	EXISTING DRIVEWAY
	STAGING AREA
	WETLAND BOUNDARY
	ORDINARY HIGH WATER
	SILT FENCE
	HIGH VISIBILITY FENCE
	150' STREAM BUFFER
	FEMA 100-YEAR FLOODPLAIN
	BULK BAG ISOLATION DAM
	TEMPORARY RIVER IMPACT
	TEMPORARY BUFFER IMPACT
	TEMPORARY BUFFER IMPACT (ROAD)
	TEMPORARY WETLAND IMPACT
	BUFFER TO RIVER CONVERSION
	CONIFER TREE
	DECIDUOUS TREE
	CONIFER TREE TO BE REMOVED
	DECIDUOUS TREE TO BE REMOVED



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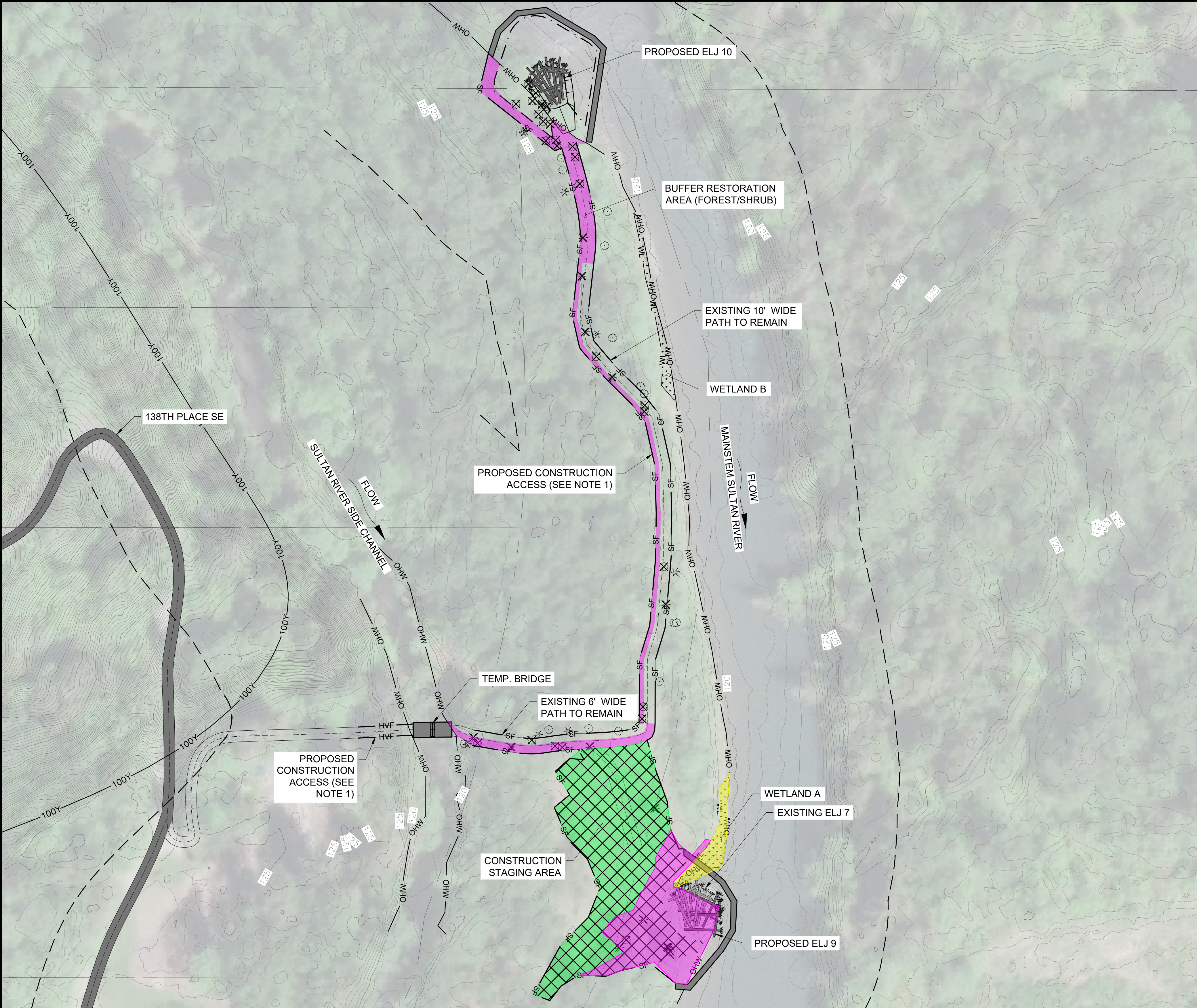


SNOHOMISH PUBLIC UTILITIES DISTRICT NO. 1
ATTN: MANAGER OF NATURAL RESOURCES
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PHONE: 425-783-1841

TEMPORARY WETLAND AND BUFFER IMPACTS C-04

REFERENCE NO:
APPLICANT: SNOHOMISH COUNTY PUD #1
PROPOSED PROJECT: CONSTRUCT 2 ELJS
LOCATION: NEAR 138TH PLACE SE

SHEET: 04 OF 11 DATE: JUNE 2026

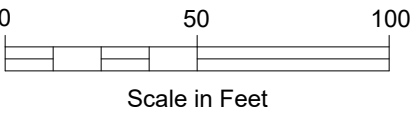


GENERAL NOTES:

- 1. ACCESS TO ELJ 9 TO GENERALLY FOLLOW EXISTING PRIMITIVE ACCESS ROUTE EXCEPT WHERE REALIGNMENT RESULTS IN REDUCED CLEARING.
- 2. ACCESS TO ELJ 10 SHALL MINIMIZE DISTURBANCE AND TREE REMOVAL. WHERE POSSIBLE ACCESS SHALL BE ALIGNED ALONG COBBLE BAR BANKS.
- 3. AVOID DISTURBING EXISTING NATIVE VEGETATION, TO THE EXTENT FEASIBLE, DURING PLANTING. FIELD FIT PLANTINGS WITHIN THE EXISTING WETLAND AND ADJACENT BUFFER AREAS WHERE NATIVE VEGETATION IS ABSENT.

LEGEND:

	EXISTING CONTOURS
	PARCEL BOUNDARY
	PROPOSED CONSTRUCTION ACCESS ROAD
	EXISTING ROAD
	EXISTING DRIVEWAY
	STAGING AREA
	WETLAND BOUNDARY
	ORDINARY HIGH WATER
	SILT FENCE
	HIGH VISIBILITY FENCE
	150' STREAM BUFFER
	FEMA 100-YEAR FLOODPLAIN
	BULK BAG ISOLATION DAM
	BUFFER RESTORATION AREA (FOREST/SHRUB)
	BUFFER RESTORATION AREA (HYDROSEED)
	WETLAND RESTORATION AREA
	CONIFER TREE
	DECIDUOUS TREE
	CONIFER TREE TO BE REMOVED
	DECIDUOUS TREE TO BE REMOVED



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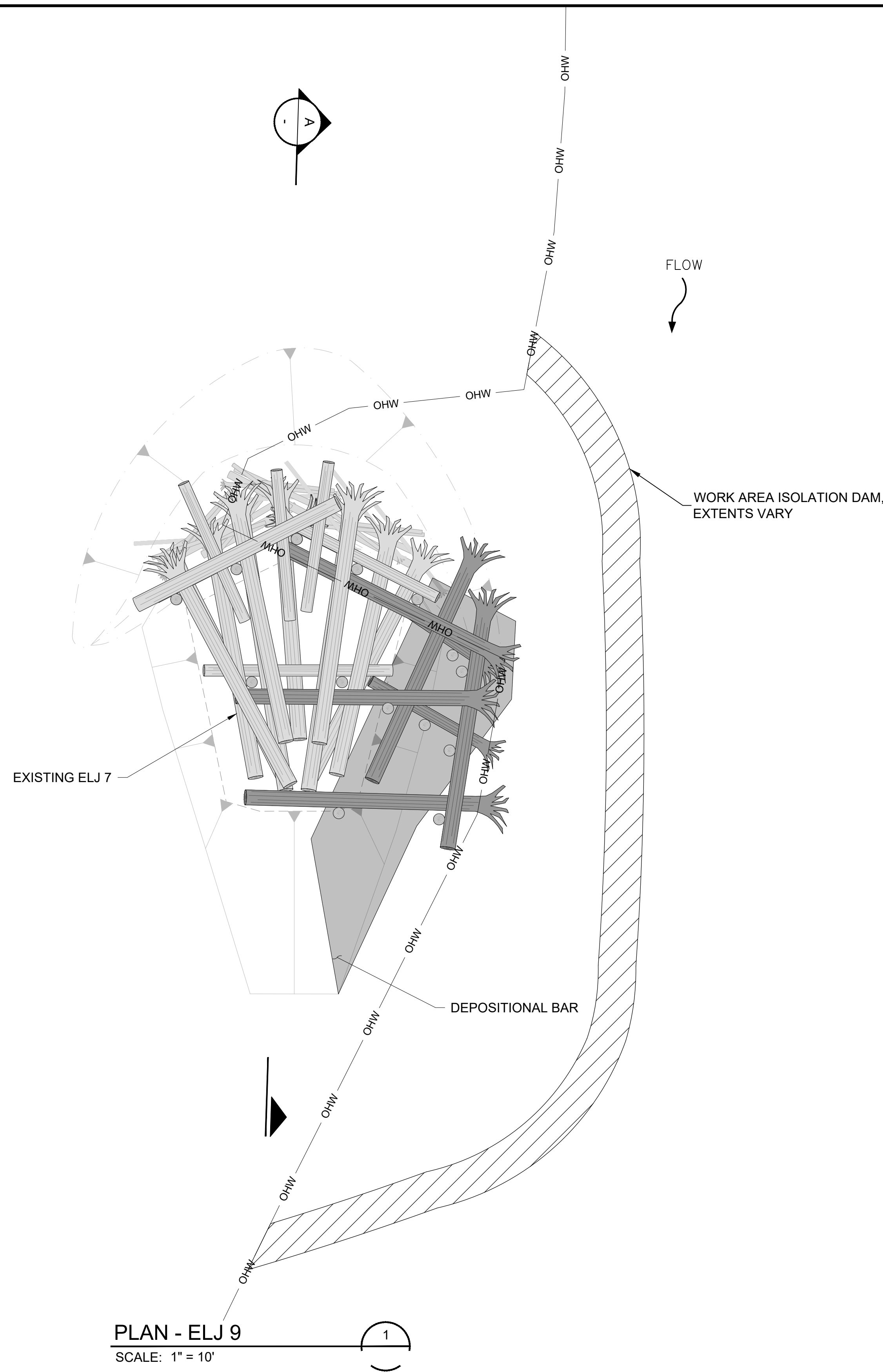


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WETLAND AND BUFFER RESTORATION AREAS C-05

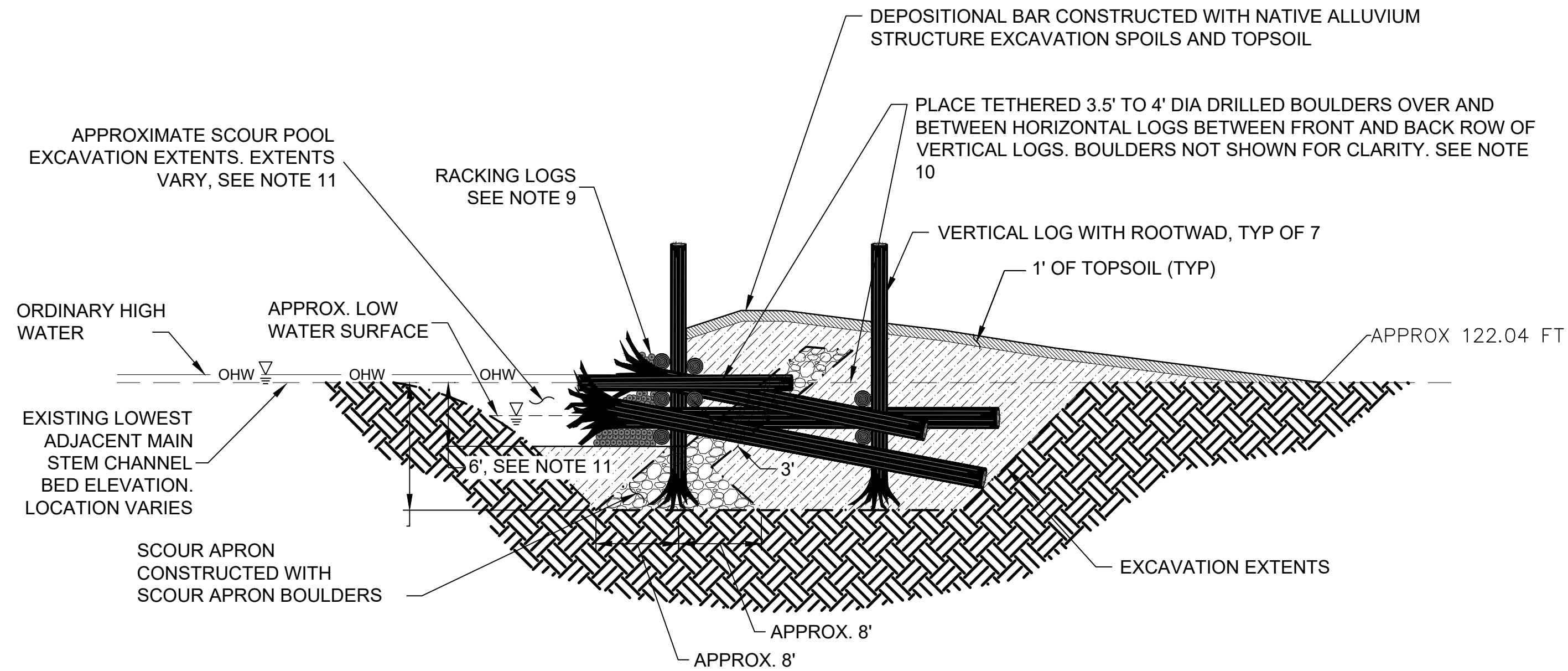
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APPLICANT: SNOHOMISH COUNTY PUD #1
PROPOSED PROJECT: CONSTRUCT 2 ELJS
LOCATION: NEAR 138TH PLACE SE

SHEET: 05 OF 11 DATE: JUNE 2026



GENERAL NOTES:

1. PLANT DEPOSITIONAL BAR, SEE PLANTING PLAN.
2. DEPOSITIONAL BAR EXTENTS VARY.
3. EXISTING DEPOSITIONAL BAR AND TOP LAYERS OF EXISTING LOGS MAY REQUIRE REMOVAL AND REARRANGEMENT DURING CONSTRUCTION OF ELJ 9.
4. RACKING PLACEMENT SHALL BE COORDINATED WITH LOG LAYER PLACEMENT AND SLASH PLACEMENT TO ENSURE RACKING MEMBERS AND SLASH EXTEND THROUGH RACKING MATERIAL.
5. CAP DEPOSITIONAL BAR WITH 1' OF GRUBBED OR IMPORTED TOP SOIL TO THE EXTENTS SHOWN ON PLANS.
6. EXISTING WOODY DEBRIS SHALL BE CLEARED AND STOCKPILED FOR USE AS RACKING OR SLASH AS SUITABLE.
7. EXCAVATION SPOILS SHALL BE STOCKPILED TO ALLOW LOG LAYER PLACEMENT AND CONSTRUCTION ACCESS.
8. ACCOUNT FOR TEMPORARY EXCAVATION EXTENTS WHEN LOCATION WORK AREA ISOLATION.
9. RACKING LOGS SHOWN IN THE SECTION SHALL BE INSTALLED WITH APPROXIMATELY 1/3 OF THE LOGS ON THE UPSTREAM FACE OF THE ELJ AND PERPENDICULAR TO THE FLOW, 1/3 PARALLEL TO THE FLOW AND EXTENDING INTO THE CORE OF THE STRUCTURE AND 1/3 PLACED IN RANDOM ORIENTATIONS. PLACEMENT SHALL PRODUCE AN INTERLOCKING/WOVEN EFFECT BETWEEN THE LOG MEMBERS, RACKING, AND SLASH WITH MINIMIZED VOIDS.
10. PLACE TETHERED BOULDERS AS SHOWN ON STRUCTURE LAYERING PLAN, SHEET 07.
11. SCOUR POOL EXTENTS WILL VARY FOR EACH STRUCTURE.
12. DEPTH TO TOE OF EXCAVATION SHALL BE MEASURED FROM THE ADJACENT MAINSTEM CHANNEL BOTTOM



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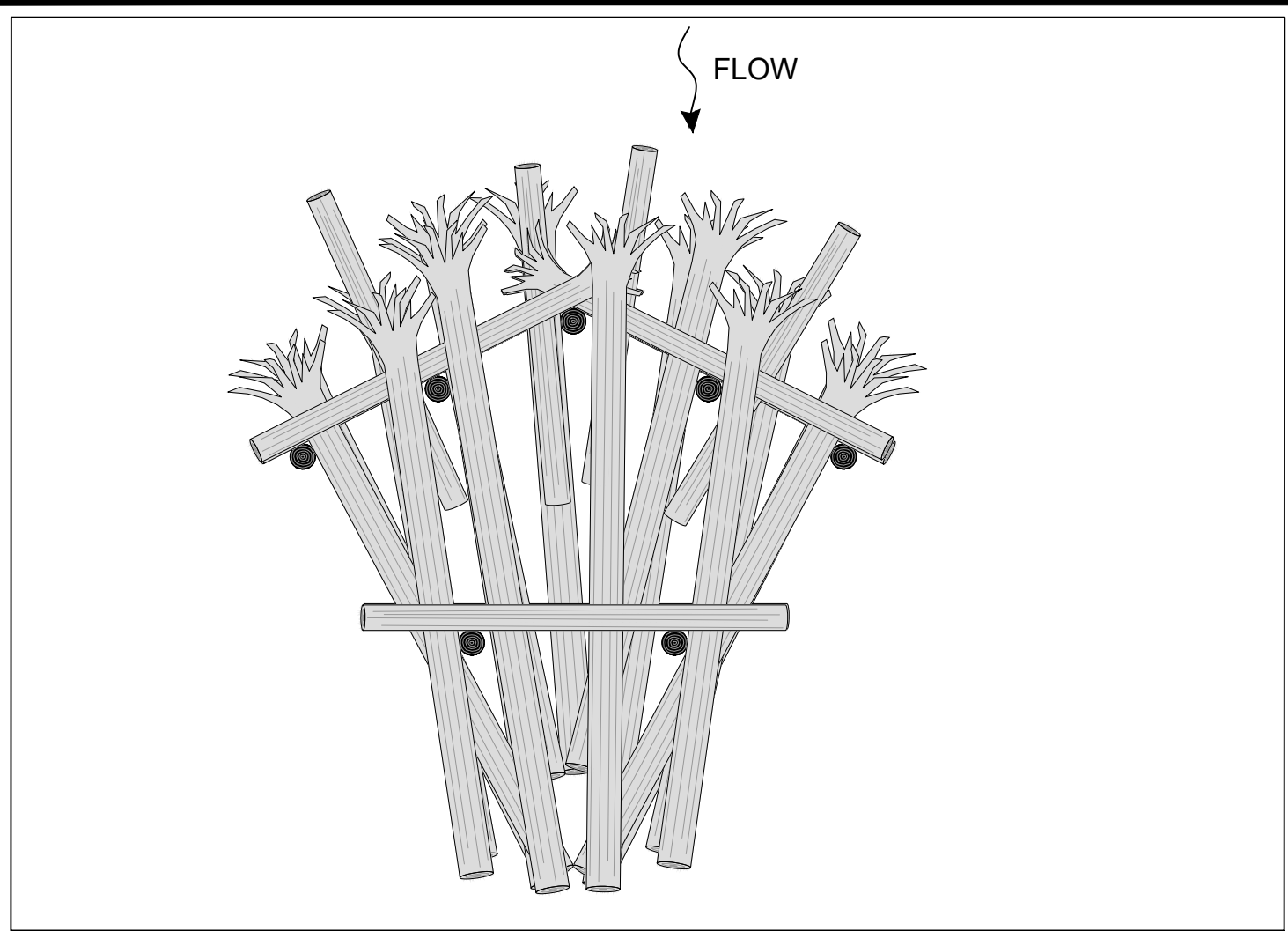
SNOHOMISH PUBLIC UTILITIES DISTRICT NO. 1
ATTN: MANAGER OF NATURAL RESOURCES
P.O. BOX 1107, EVERETT, WA 98201
PHONE: 425-783-1841

ELJ 9

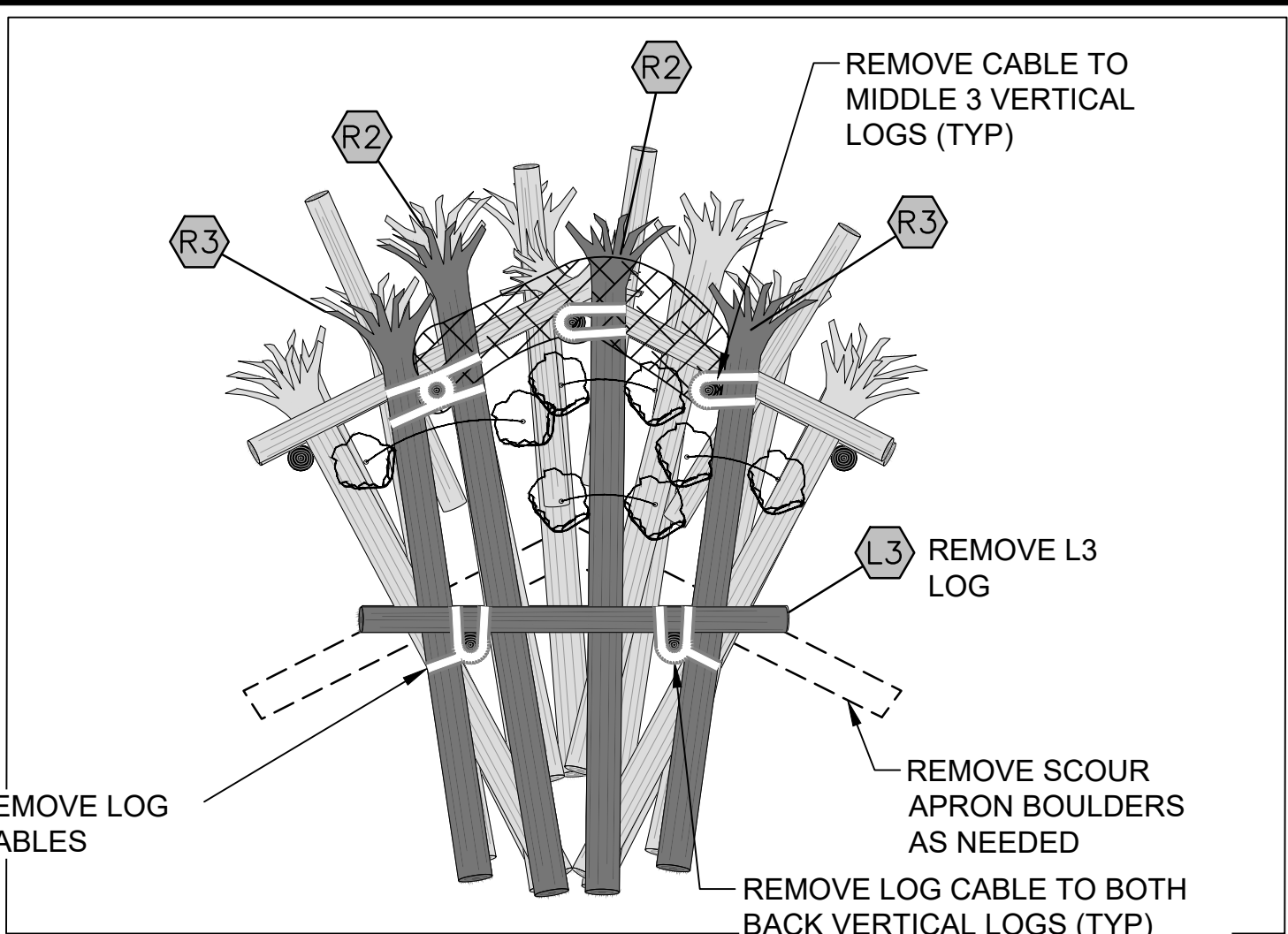
C-06

REFERENCE NO:
APPLICANT: SNOHOMISH COUNTY PUD #1
PROPOSED PROJECT: CONSTRUCT 2 ELJS
LOCATION: NEAR 138TH PLACE SE

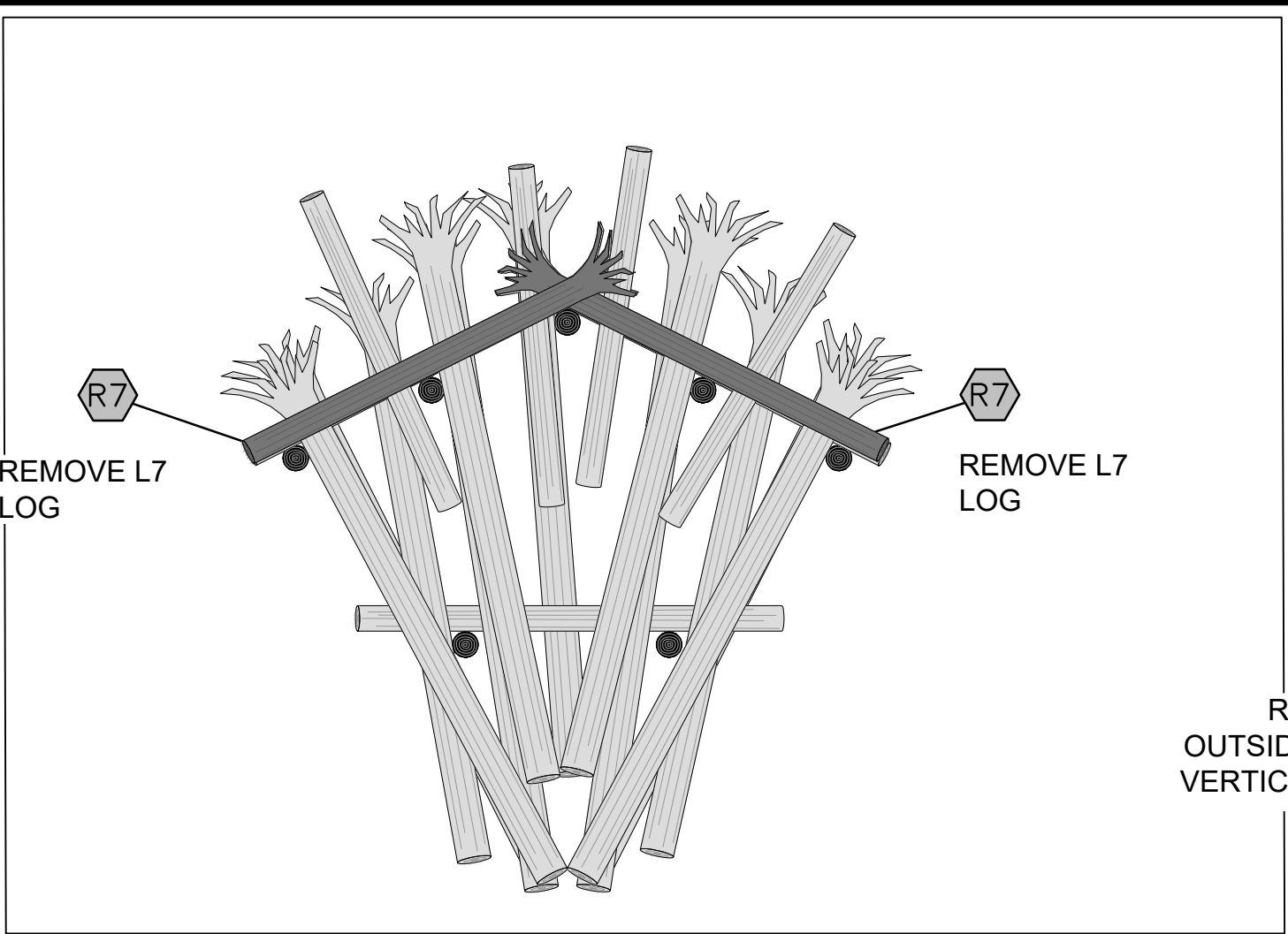
SHEET: 06 OF 11 DATE: JUNE 2026



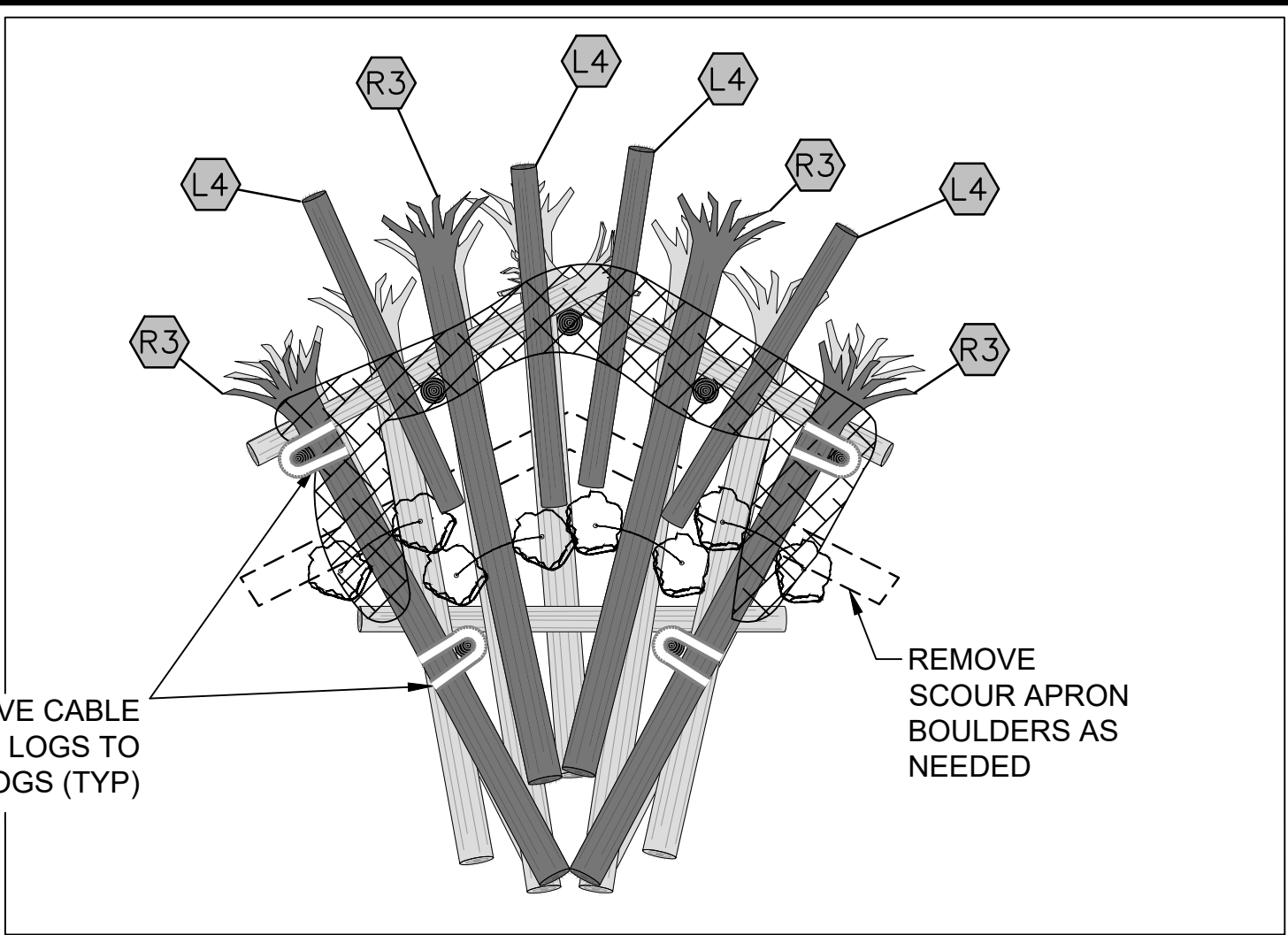
EXISTING



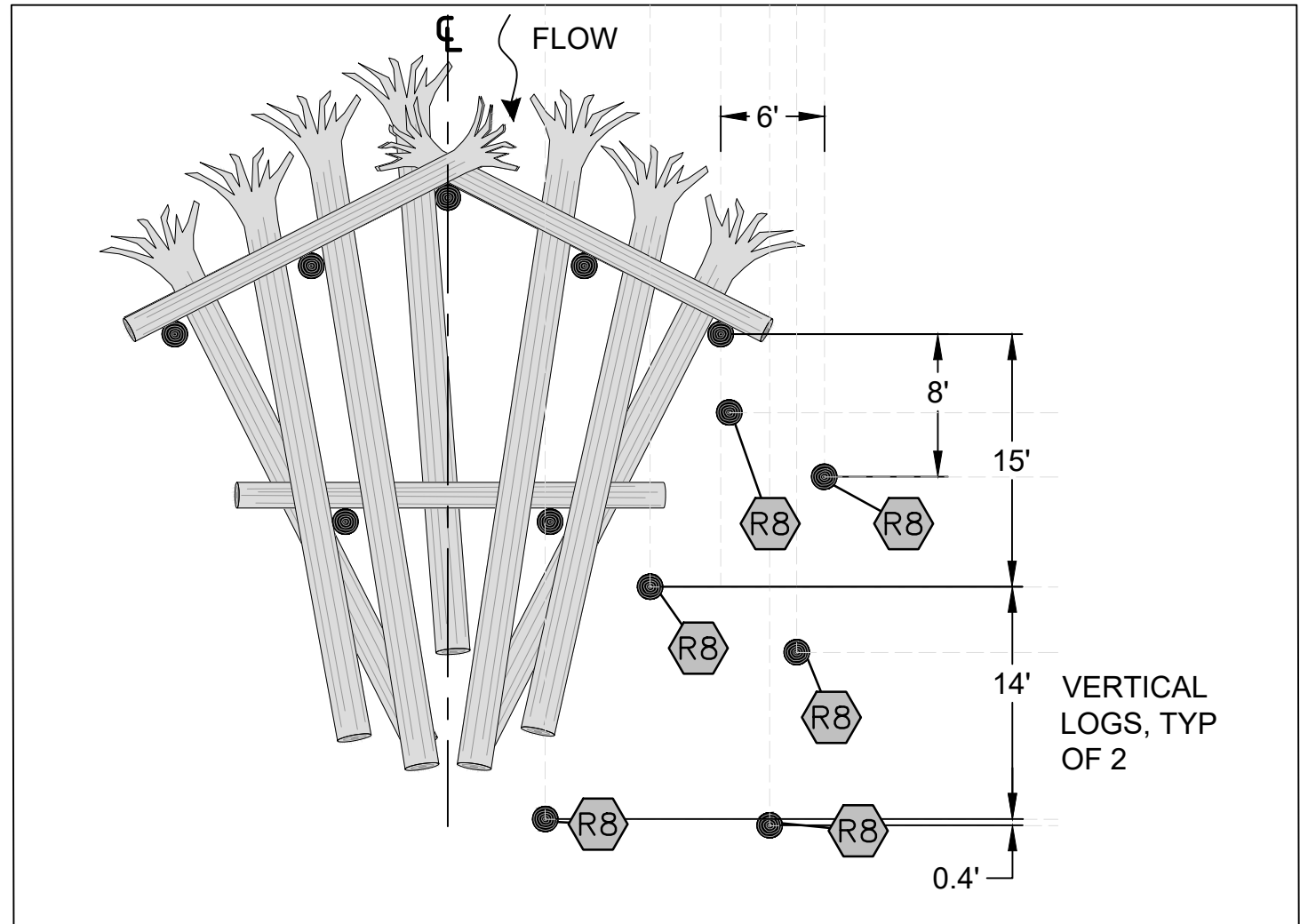
DEMO 1



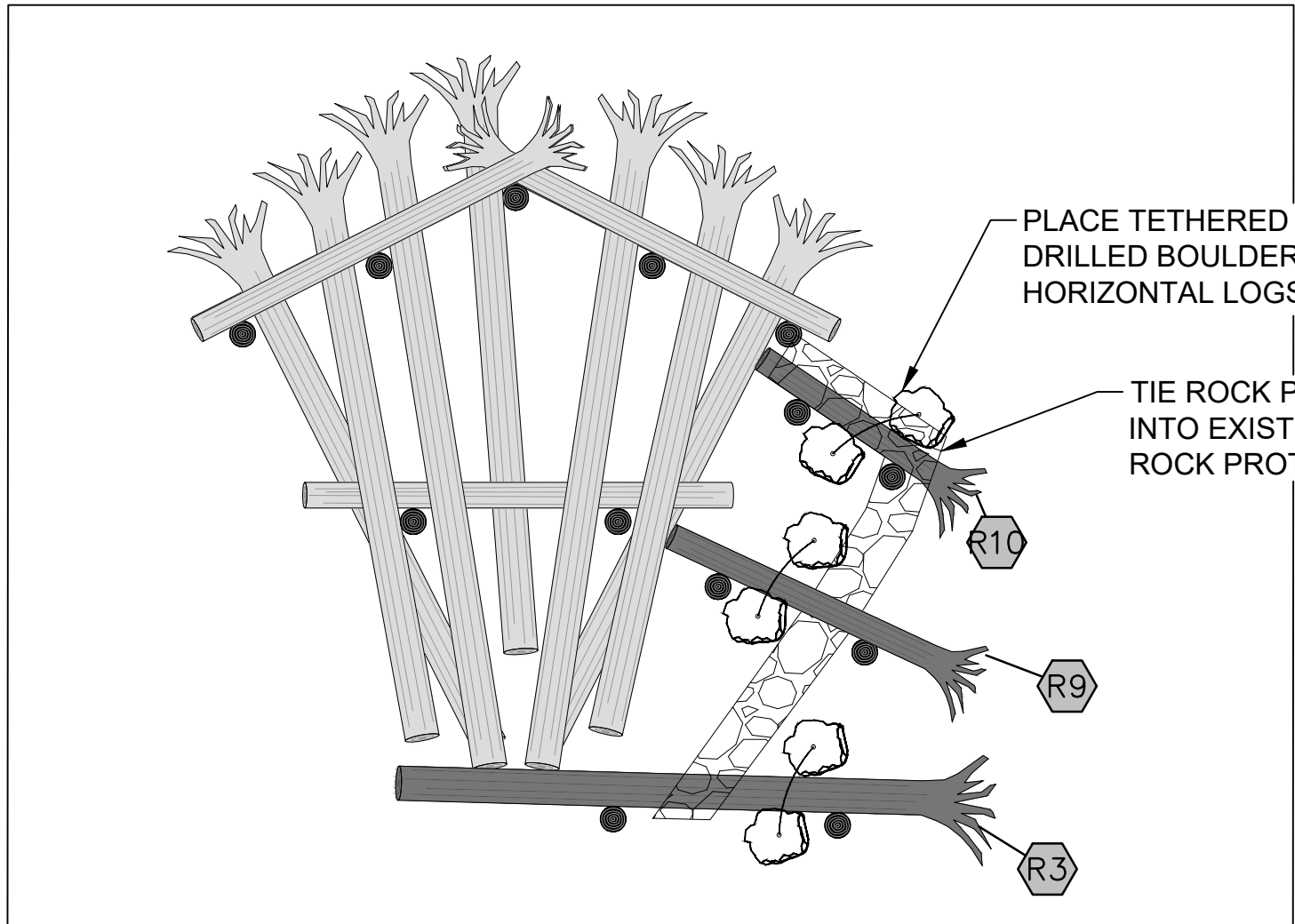
DEMO 2



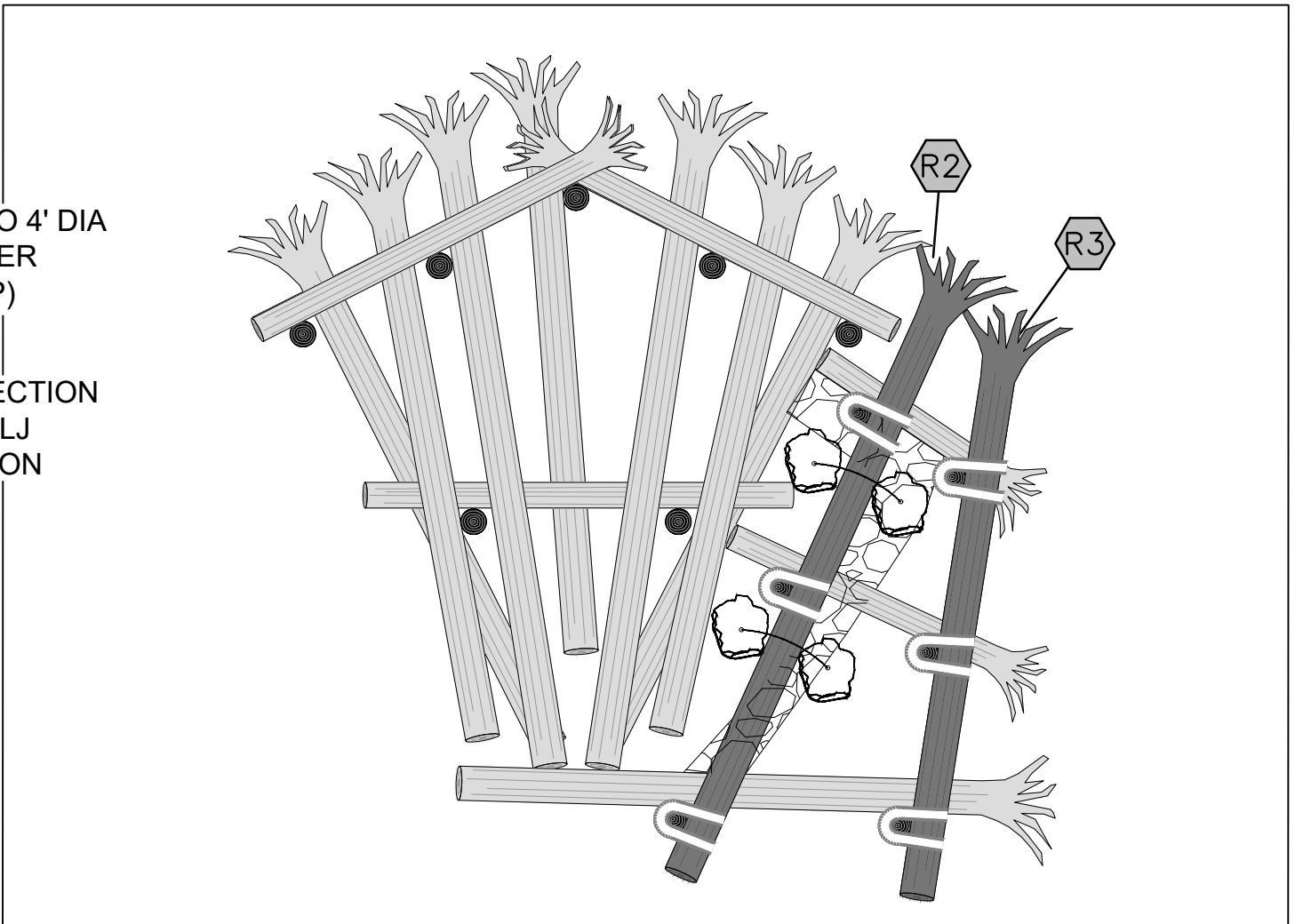
DEMO 3



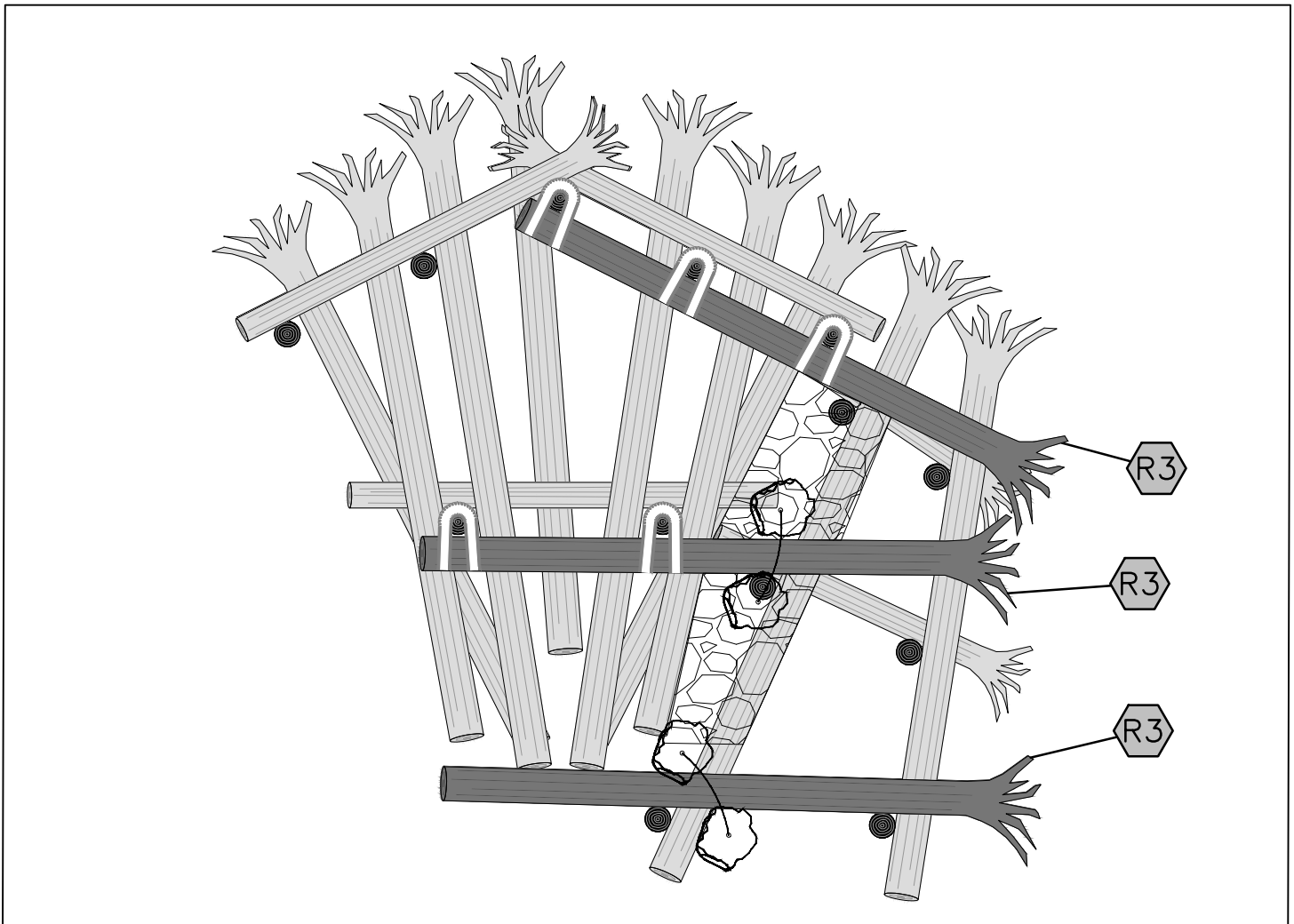
RECONSTRUCTION LAYER 1



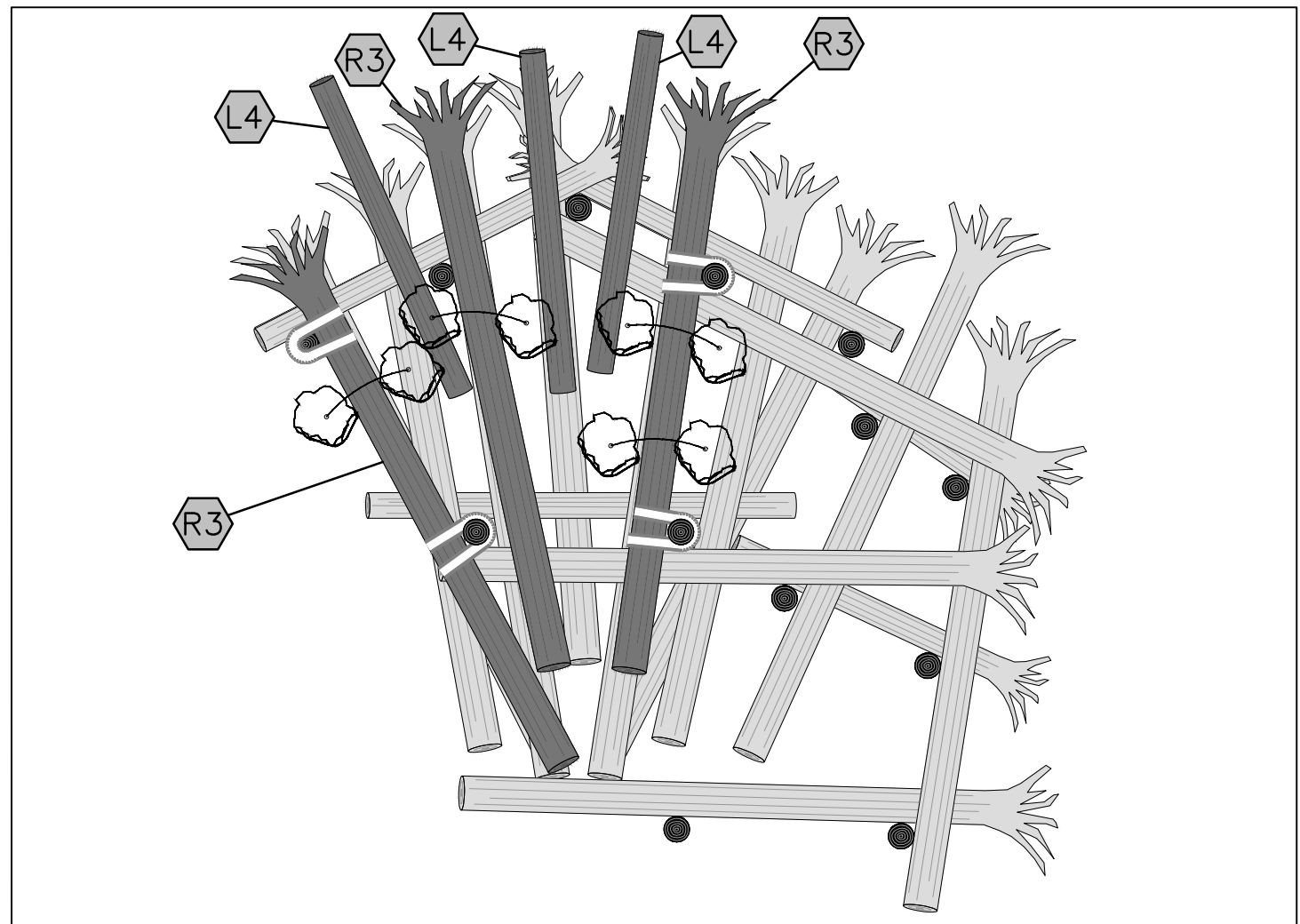
RECONSTRUCTION LAYER 2



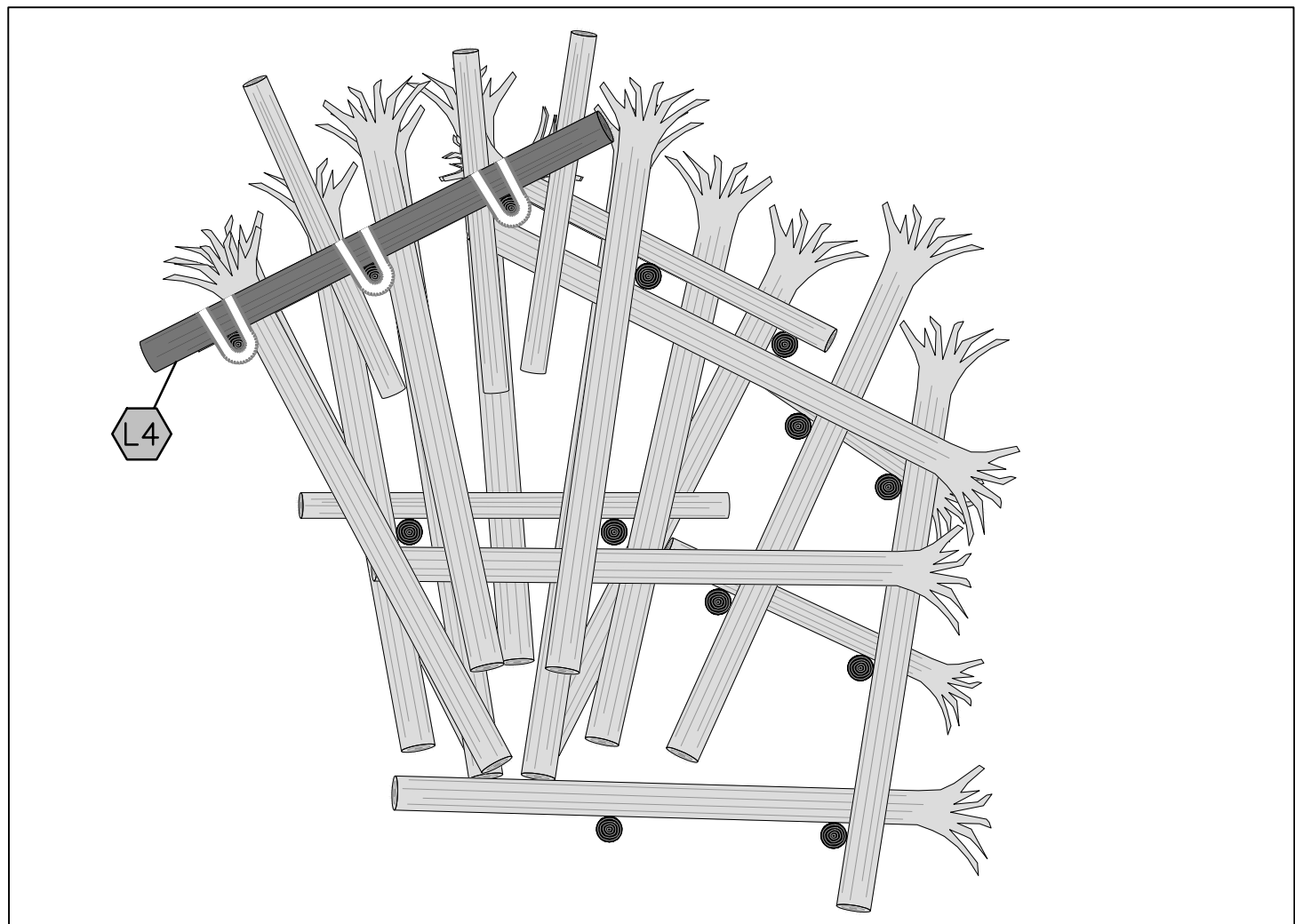
RECONSTRUCTION LAYER 3



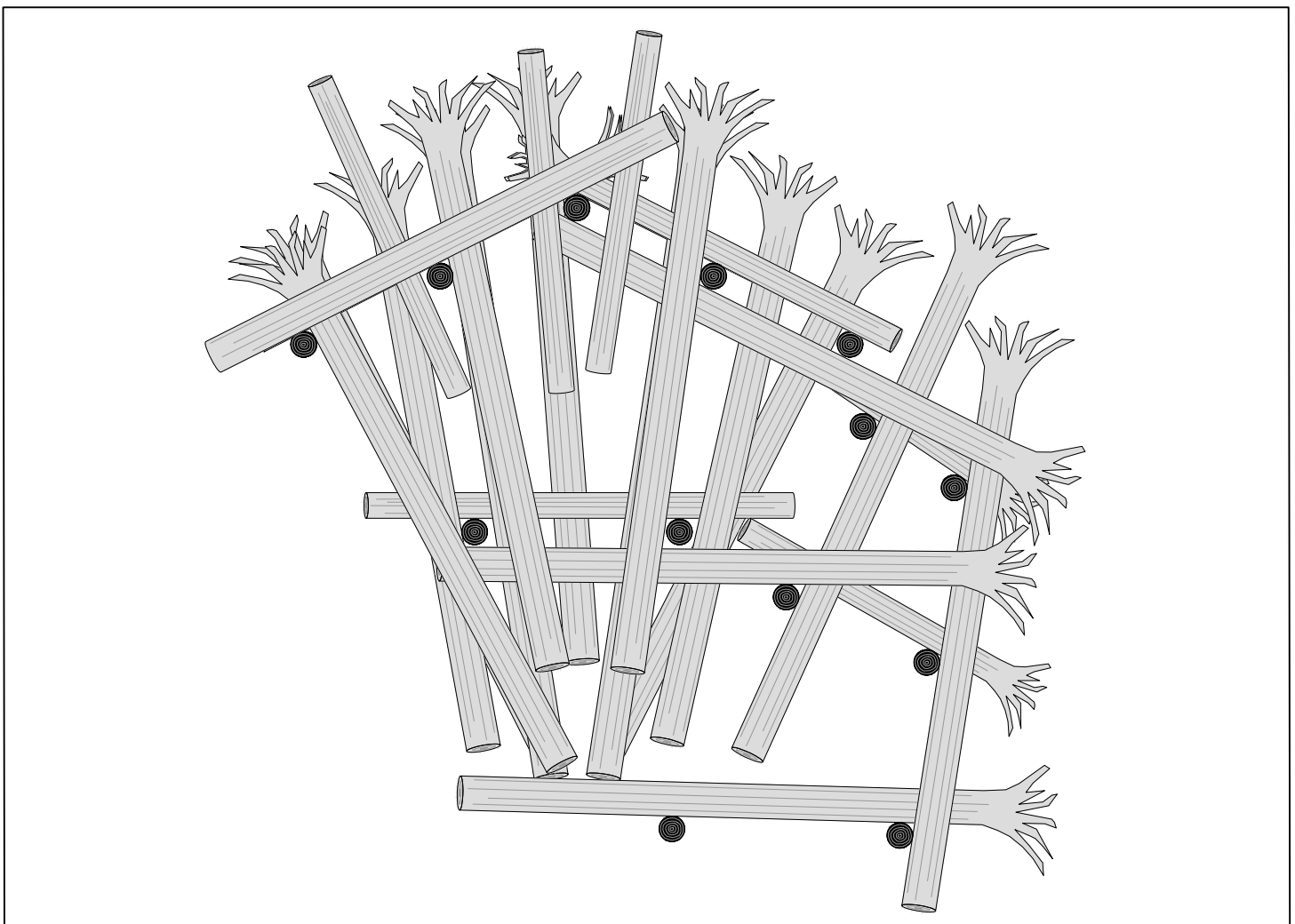
RECONSTRUCTION LAYER 4



RECONSTRUCTION LAYER 5



RECONSTRUCTION LAYER 6



COMPLETE

GENERAL NOTES:

1. SEE SHEET 09 FOR GENERAL NOTES
2. PROJECT REPRESENTATIVE WILL ASSESS THE CONDITION OF THE REMOVED EXISTING LOGS AND REPLACE WITH IMPORTED LOGS WHEN THE LOG CONDITIONS ARE DETERMINED TO BE UNSATISFACTORY.



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SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT NO. 1

SNOHOMISH PUBLIC UTILITIES DISTRICT NO. 1
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PHONE: 425-783-1841

ELJ 9 LAYERING PLAN

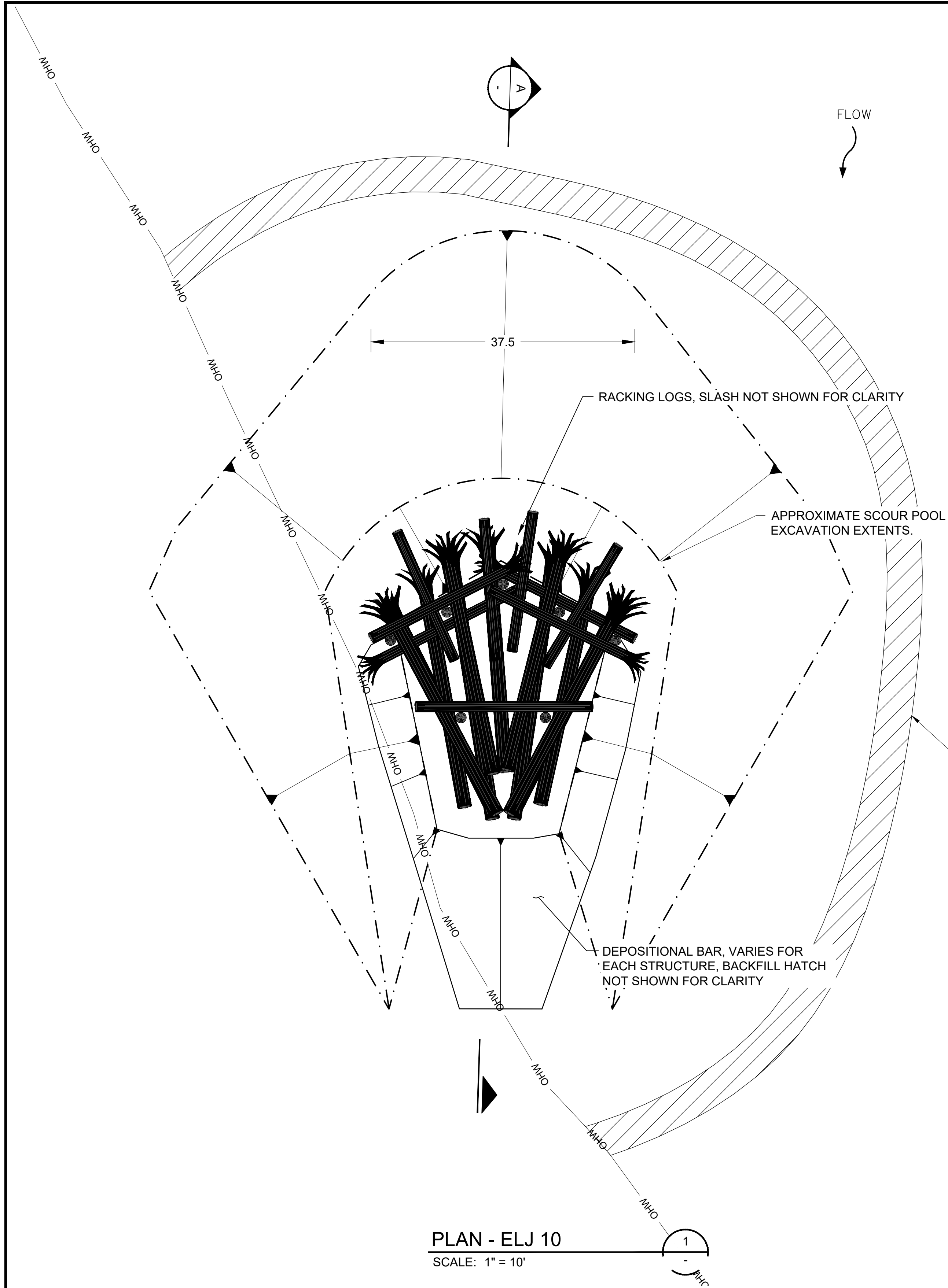
C-07

REFERENCE NO:
APPLICANT:
PROPOSED PROJECT:
LOCATION:

SNOHOMISH COUNTY PUD #1
CONSTRUCT 2 ELJS
NEAR 138TH PLACE SE

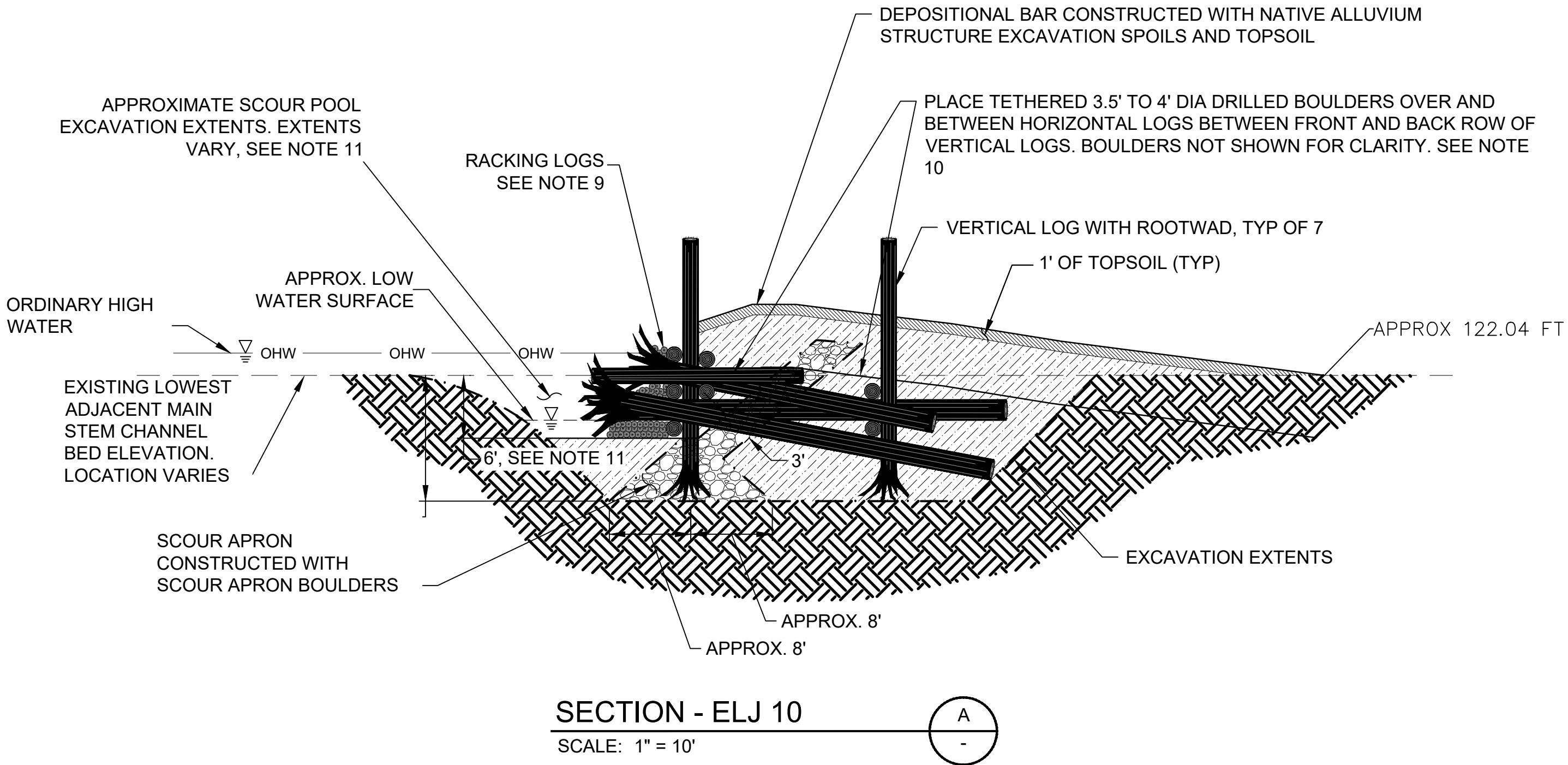
SHEET: 07 OF 11

DATE: JUNE 2026



GENERAL NOTES:

1. PLANT DEPOSITIONAL BAR, SEE PLANTING PLAN.
2. DEPOSITIONAL BAR EXTENTS VARY.
3. CONTRACTOR SHALL IDENTIFY FINAL GRADING EXTENTS 3 DAYS PRIOR TO COMPLETION OF GRADING ACTIVITIES.
4. RACKING PLACEMENT SHALL BE COORDINATED WITH LOG LAYER PLACEMENT AND SLASH PLACEMENT TO ENSURE RACKING MEMBERS AND SLASH EXTEND THROUGH RACKING MATERIAL.
5. CAP DEPOSITIONAL BAR WITH 1' OF GRUBBED OR IMPORTED TOP SOIL TO THE EXTENTS SHOWN ON PLANS.
6. EXISTING WOODY DEBRIS SHALL BE CLEARED AND STOCKPILED FOR USE AS RACKING OR SLASH AS SUITABLE.
7. EXCAVATION SPOILS SHALL BE STOCKPILED TO ALLOW LOG LAYER PLACEMENT AND CONSTRUCTION ACCESS.
8. CONTRACTOR SHALL USE SHORING OR EXTRA EXCAVATION AS REQUIRED FOR LOCAL SOIL CONDITIONS ENCOUNTERED. SHORING EXTENTS MAY VARY DEPENDING ON CONSTRUCTION TECHNIQUES USED AND LOCAL SOIL PROPERTIES ENCOUNTERED.
9. RACKING LOGS SHOWN IN THE SECTION SHALL BE INSTALLED WITH APPROXIMATELY 1/3 OF THE LOGS ON THE UPSTREAM FACE OF THE ELJ AND PERPENDICULAR TO THE FLOW, 1/3 PARALLEL TO THE FLOW AND EXTENDING INTO THE CORE OF THE STRUCTURE AND 1/3 PLACED IN RANDOM ORIENTATIONS. PLACEMENT SHALL PRODUCE AN INTERLOCKING/WOVEN EFFECT BETWEEN THE LOG MEMBERS, RACKING, AND SLASH WITH MINIMIZED VOIDS.
10. PLACE TETHERED BOULDERS AS SHOWN ON STRUCTURE LAYERING PLAN, SHEET 09.
11. SCOUR POOL EXTENTS WILL VARY.
12. DEPTH TO TOE OF EXCAVATION SHALL BE MEASURED FROM THE ADJACENT MAINSTEM CHANNEL BOTTOM



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ELJ 10

C-08

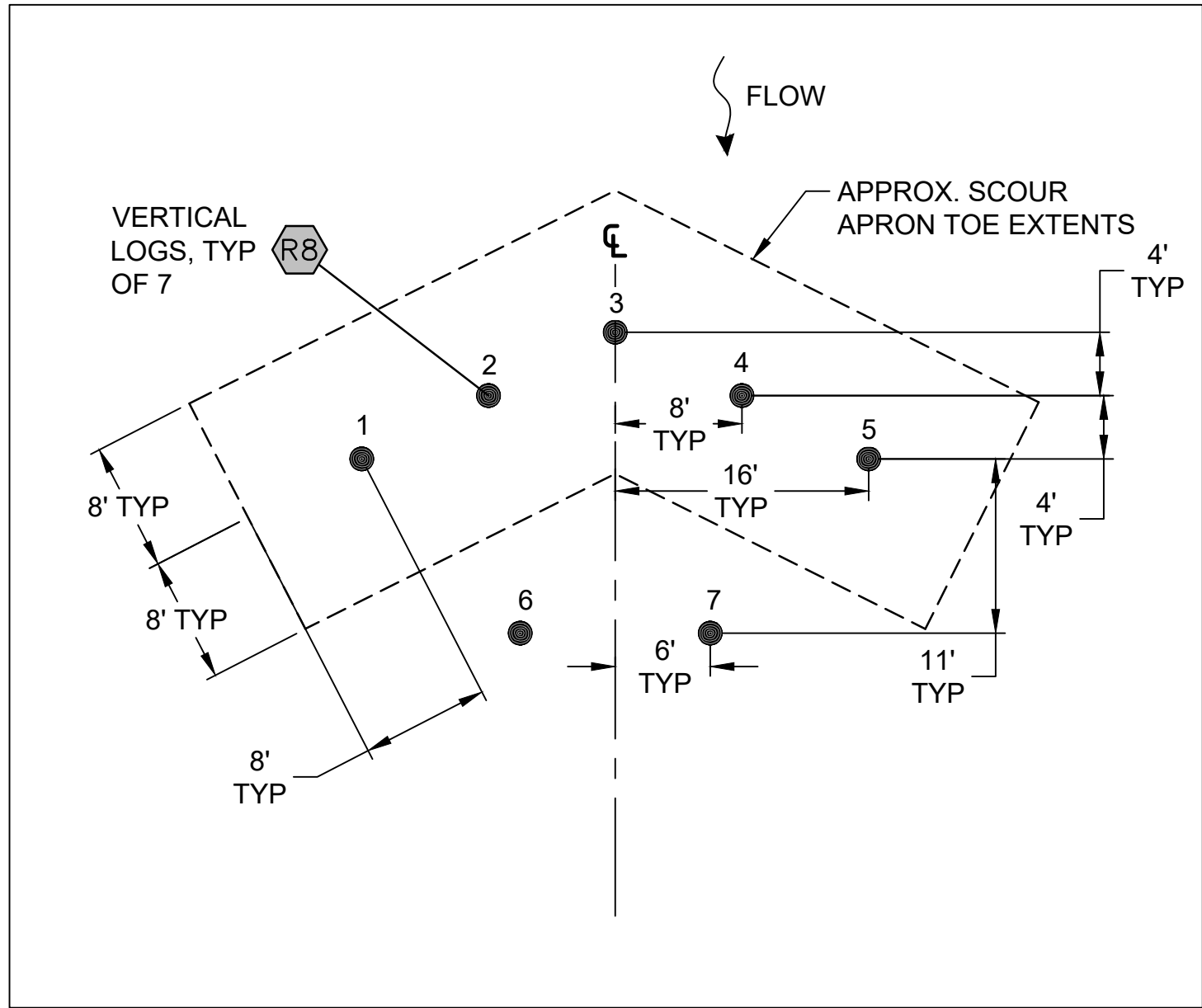


SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
SNOHOMISH PUBLIC UTILITIES DISTRICT NO. 1
ATTN: MANAGER OF NATURAL RESOURCES
P.O. BOX 1107, EVERETT, WA 98201
PHONE: 425-783-1841

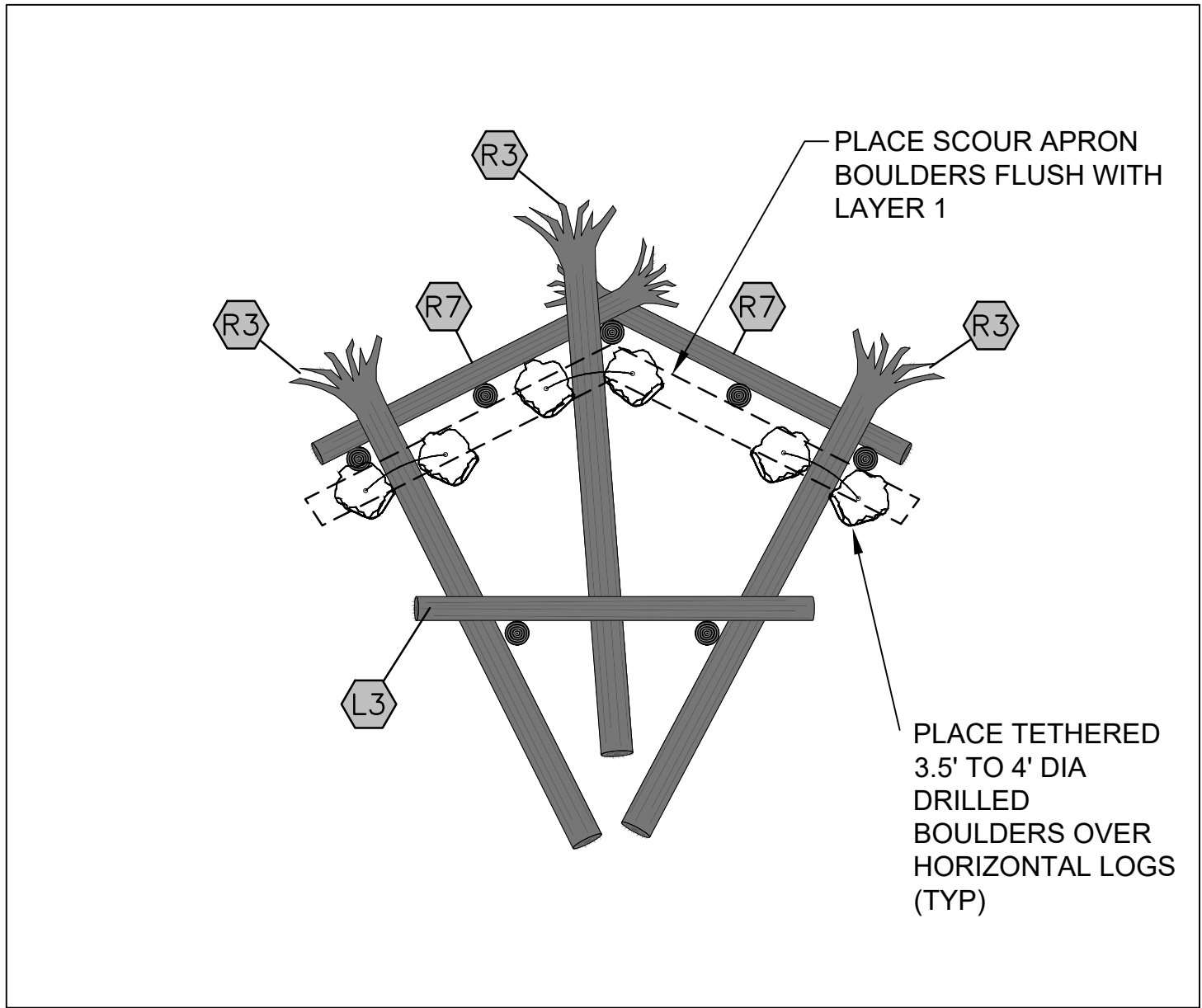
REFERENCE NO:
APPLICANT:
PROPOSED PROJECT:
LOCATION:

SNOHOMISH COUNTY PUD #1
CONSTRUCT 2 ELJS
NEAR 138TH PLACE SE

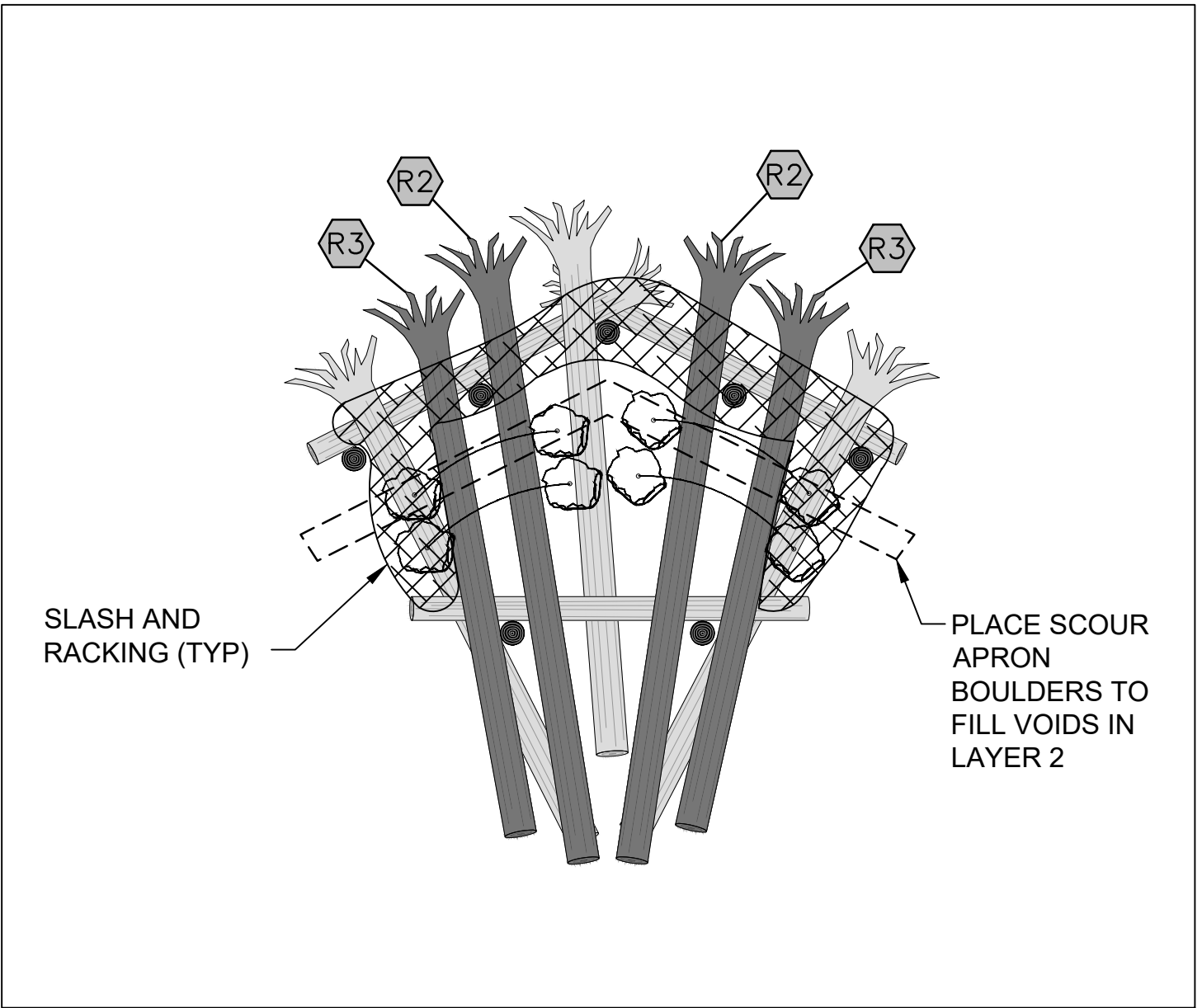
SHEET: 08 OF 11
DATE: JUNE 2026



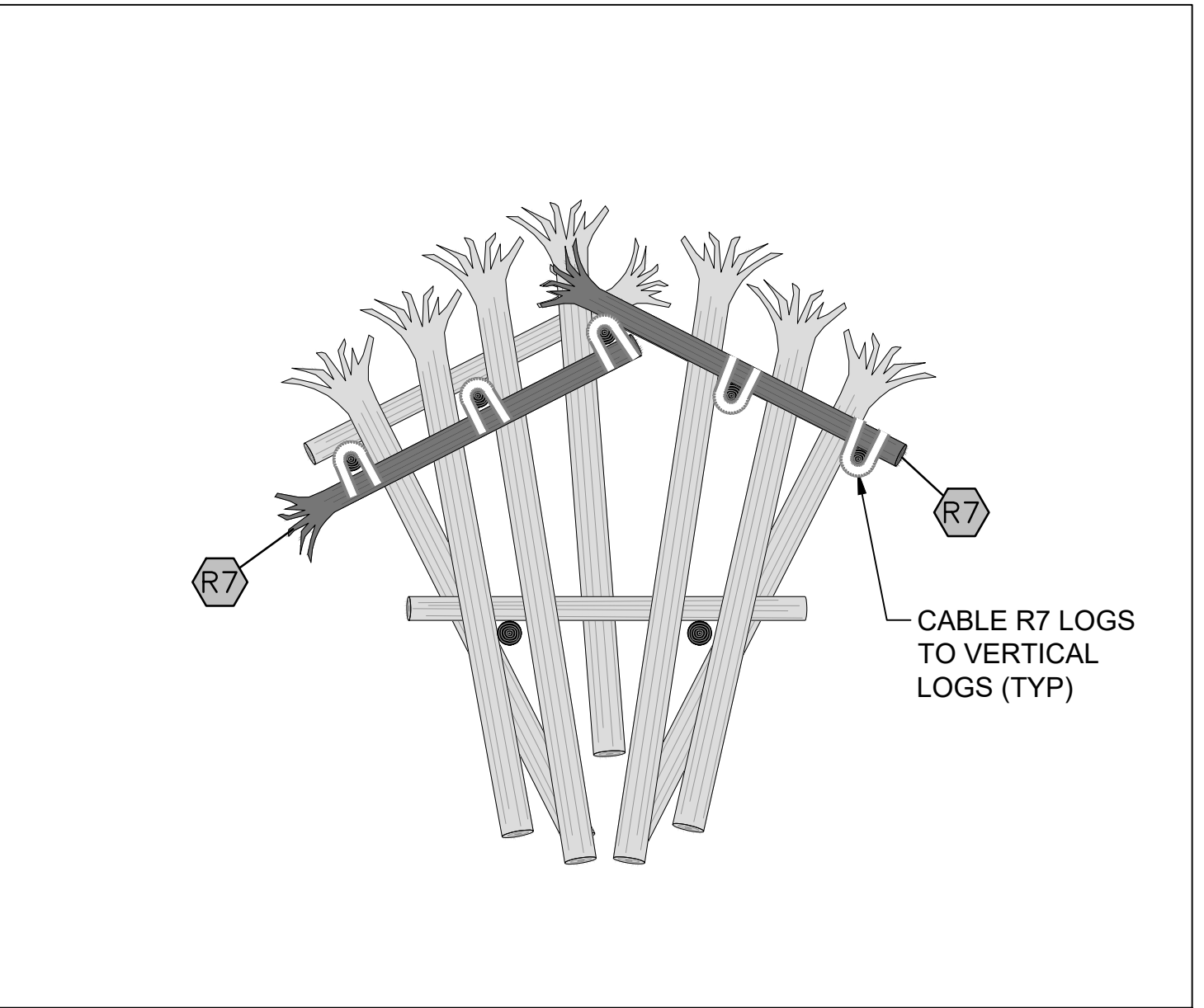
VERTICAL LOGS AND SCOUR APRON



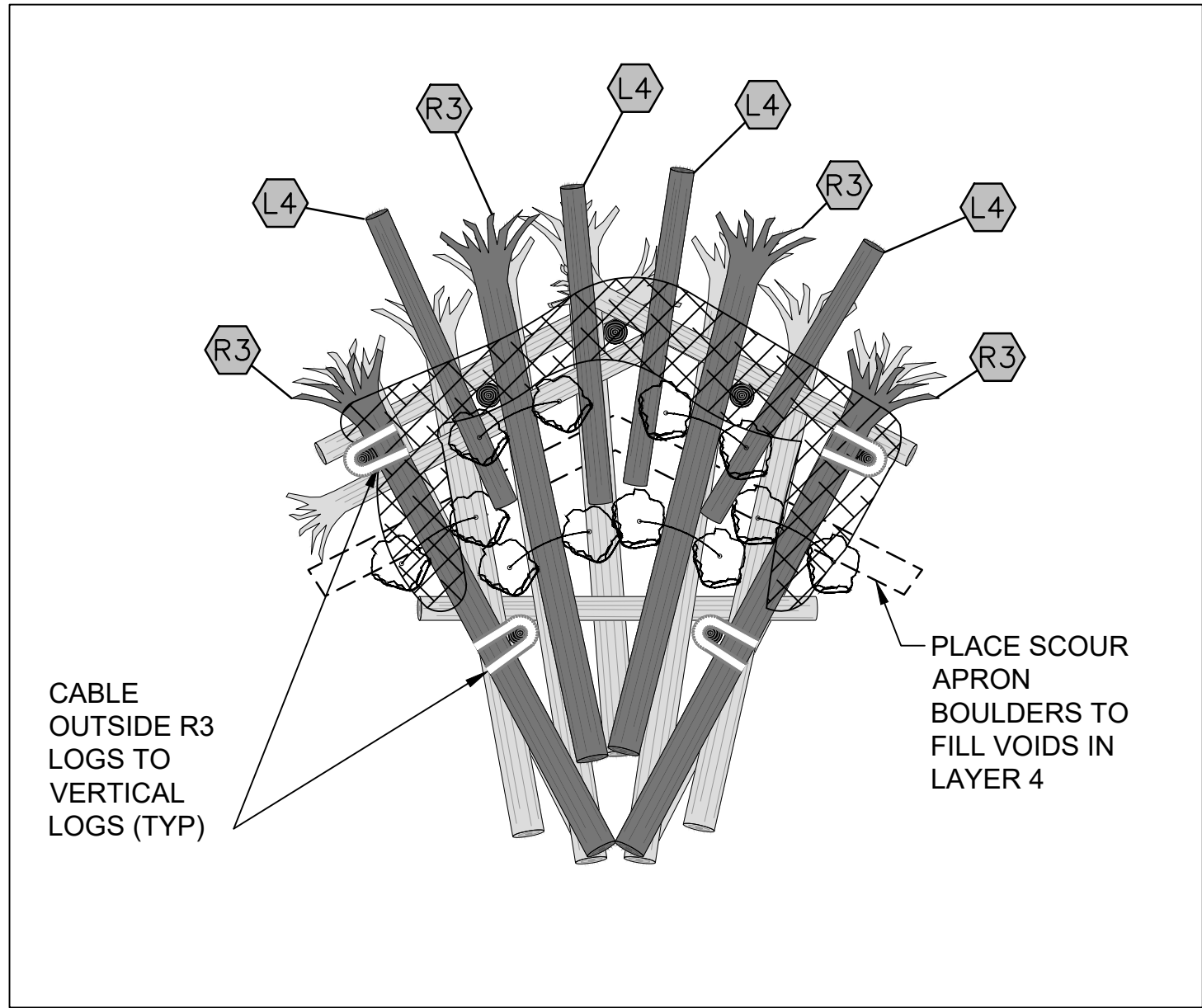
LAYER 1



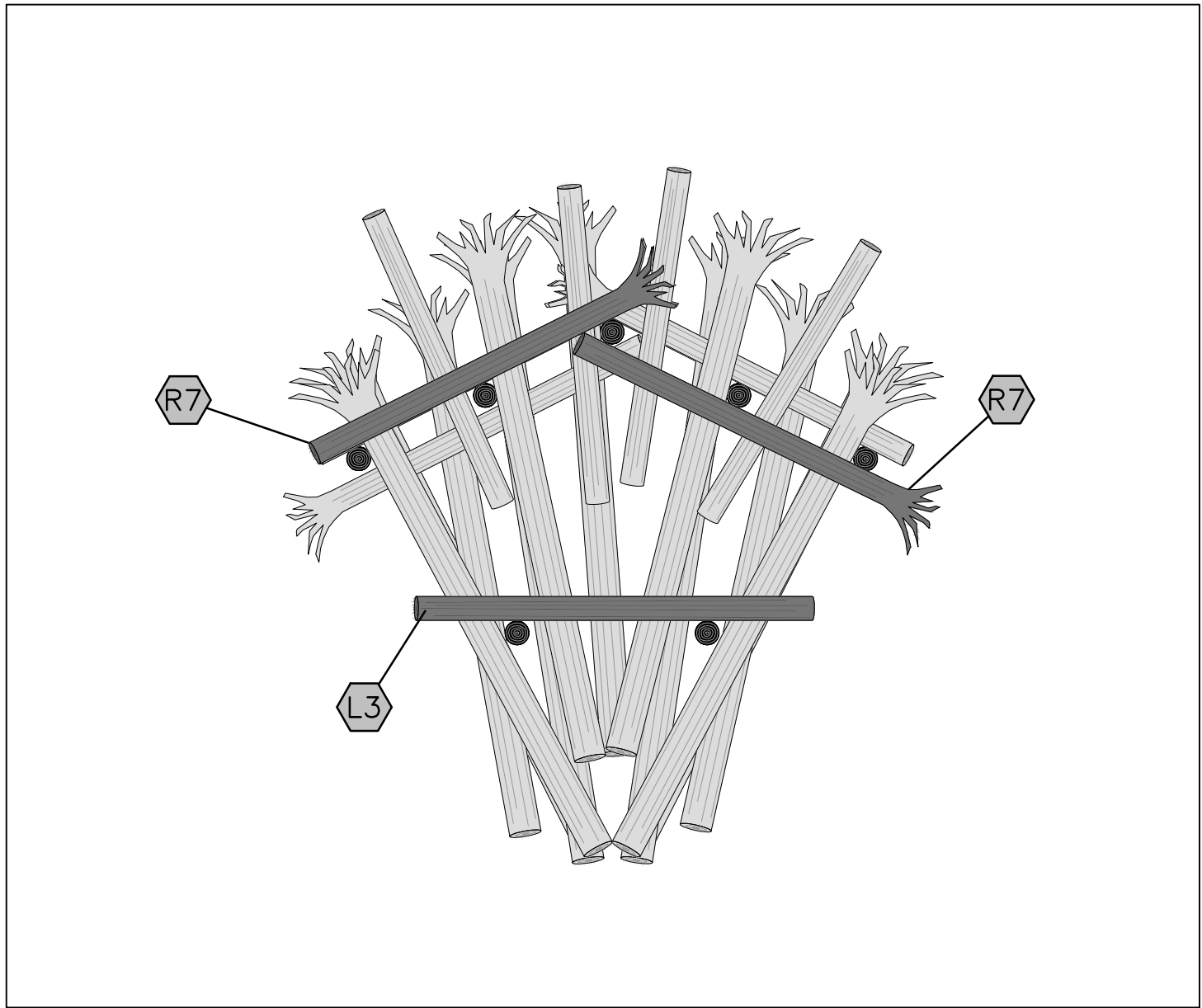
LAYER 2



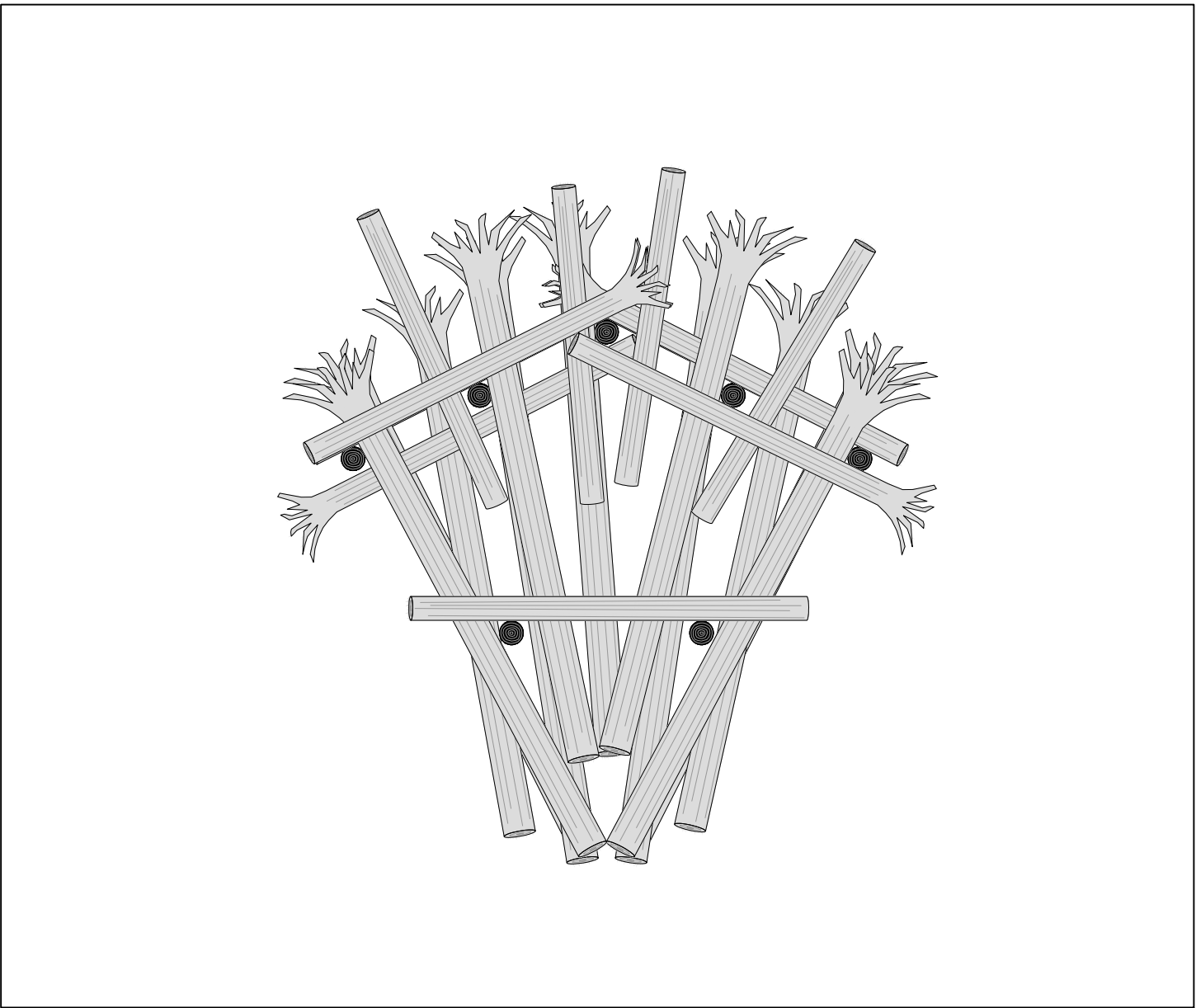
LAYER 3



LAYER 4



LAYER 5



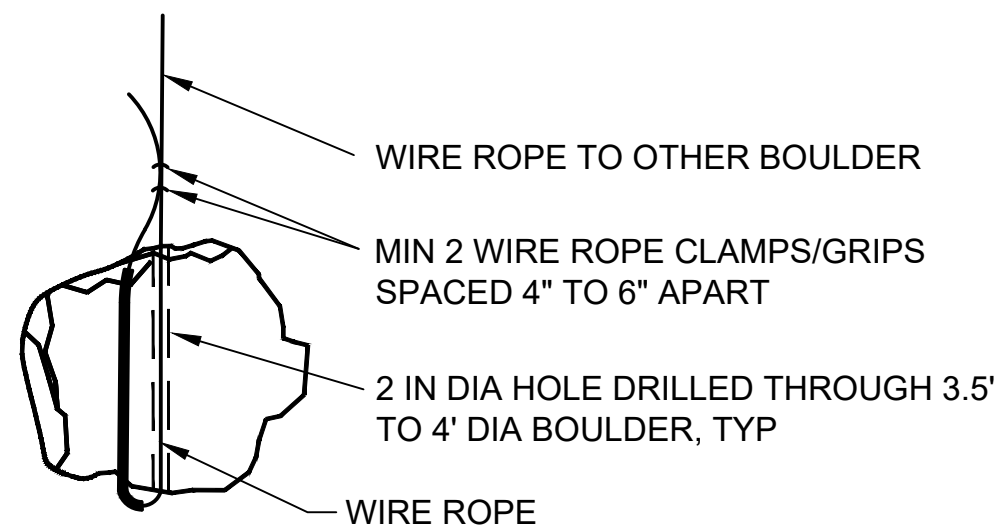
COMPLETE

GENERAL NOTES:

- ENGINEER SHALL STAKE 1) LOCATION OF TWO VERTICAL LOGS, OR 2) OFFSETS FOR TWO VERTICAL LOGS IF LOCATION IS NOT ACCESSIBLE. STAKES SHALL INDICATE WHICH PILE THE STAKE REFERS TO. CONTRACTOR SHALL CONFIRM LOCATION OF VERTICAL LOGS WITH ENGINEER PRIOR TO BEGINNING ELJ CONSTRUCTION ACTIVITIES.
- LOG MATERIALS SHALL BE PLACED AT THE LOCATIONS, ELEVATIONS AND ORIENTATIONS SPECIFIED ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER. TRIM LOGS TO FIT AS REQUIRED.
- PLACE SLASH OVER AND BETWEEN KEY LOGS AND PILES AS SHOWN FOR EACH LAYER FOLLOWING PLACEMENT OF KEY LOGS AND RACKING LOGS. PLACE APPROXIMATELY 2' TO 3' OF NATIVE ALLUVIUM OVER 1/2 THE WIDTH OF SLASH TO SECURE IN PLACE SUCH THAT SLASH IS VISIBLE FOLLOWING CONSTRUCTION. COORDINATE WITH ENGINEER PRIOR TO PLACING RACKING AND SLASH.
- CABLE VERTICAL LOGS AT CONTACT POINTS. CABLE LASHING SYSTEM SHALL BE PUT IN TENSION TO 1/4 OF ITS WORKING LOAD LIMIT AND MAINTAINED DURING CABLE CLAMPING.
- LOCATION OF TETHERED BOULDERS SHOWN IS APPROXIMATE AND WILL VARY BASED ON ROCK SIZE AND LOG DIAMETER. PLACE TETHERED BOULDERS AS CLOSE TO LOCATION SHOWN ON THESE LAYERING PLANS, OR AS DIRECTED BY THE ENGINEER IF THEIR LOCATION DIFFERS SIGNIFICANTLY THAN AS SHOWN. ENGINEER TO APPROVE OF FINAL LOCATION.
- WIRE ROPE LENGTH REQUIRED WILL VARY BASED ON LOG SIZES USED.

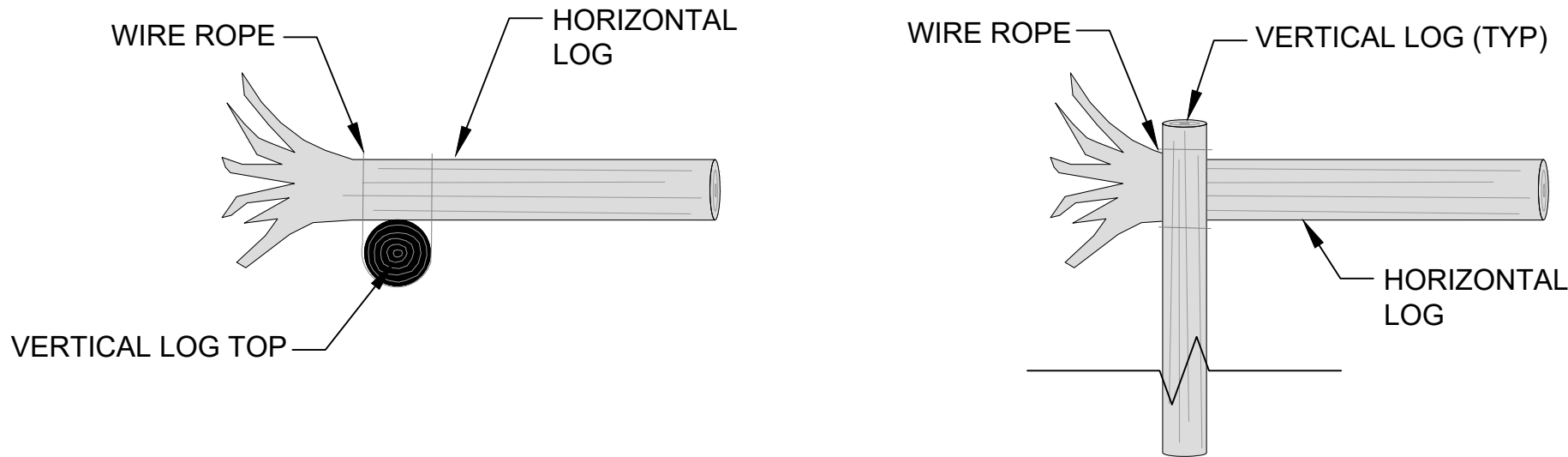
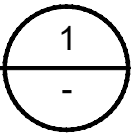


	ELJ 10 LAYERING PLAN		C-09
SNOHOMISH PUBLIC UTILITIES DISTRICT NO. 1 ATTN: MANAGER OF NATURAL RESOURCES P.O. BOX 1107, EVERETT, WA 98201 PHONE: 425-783-1841	REFERENCE NO: APPLICANT: PROPOSED PROJECT: LOCATION:		SNOHOMISH COUNTY PUD #1 CONSTRUCT 2 ELJS NEAR 138TH PLACE SE
	SHEET:	09 OF 11	DATE: JUNE 2026



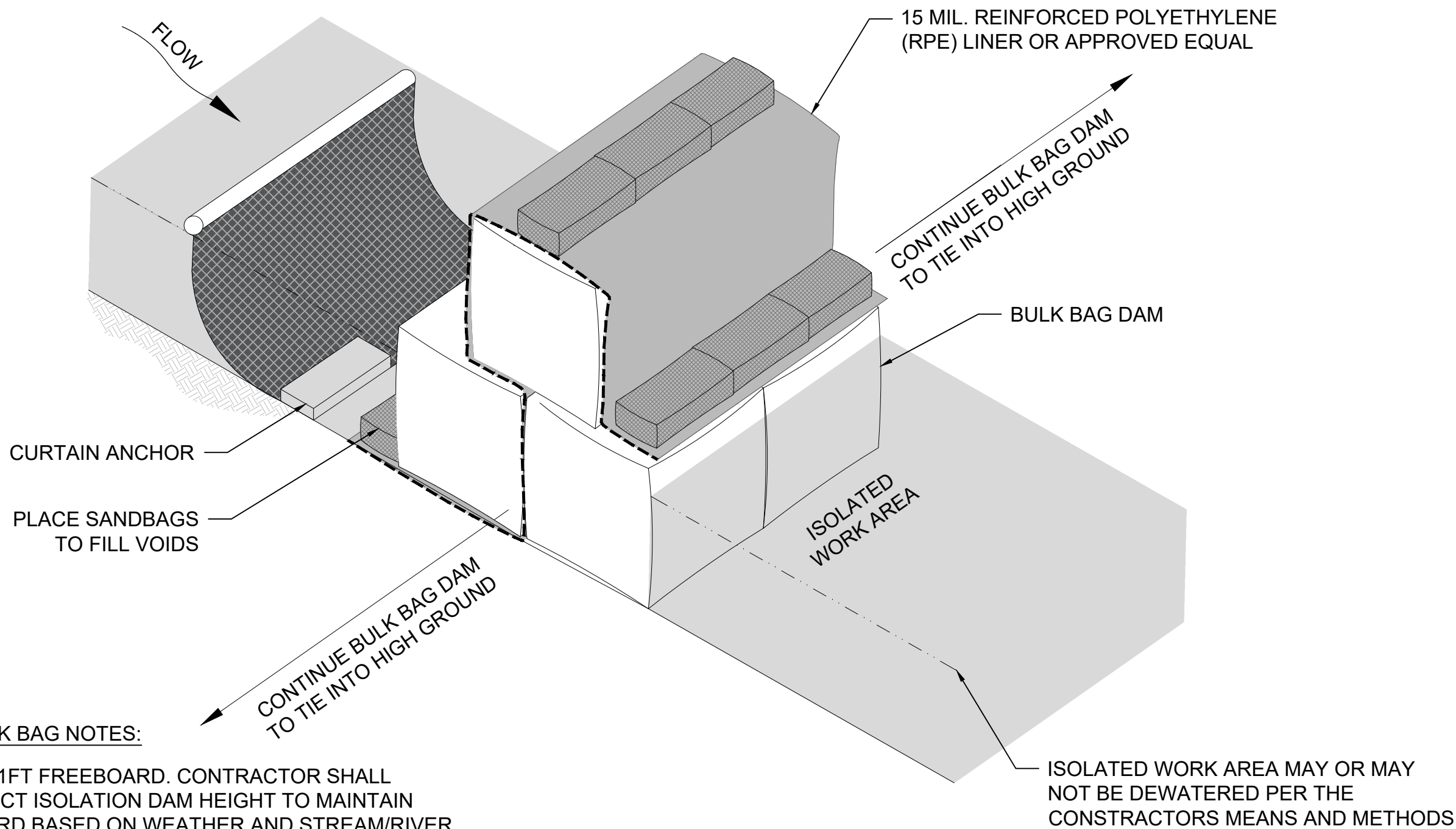
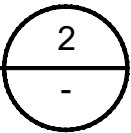
DETAIL - TETHERED 3.5' TO 4' DIA
DRILLED BOULDER

SCALE: NTS



DETAIL - LASHING

SCALE: NTS

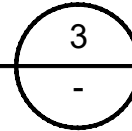


STACKED BULK BAG NOTES:

1. MINIMUM 1FT FREEBOARD. CONTRACTOR SHALL CONSTRUCT ISOLATION DAM HEIGHT TO MAINTAIN FREEBOARD BASED ON WEATHER AND STREAM/RIVER FORECASTS AND PER MEANS AND METHODS.

DETAIL - STACKED BULK BAG

SCALE: NTS

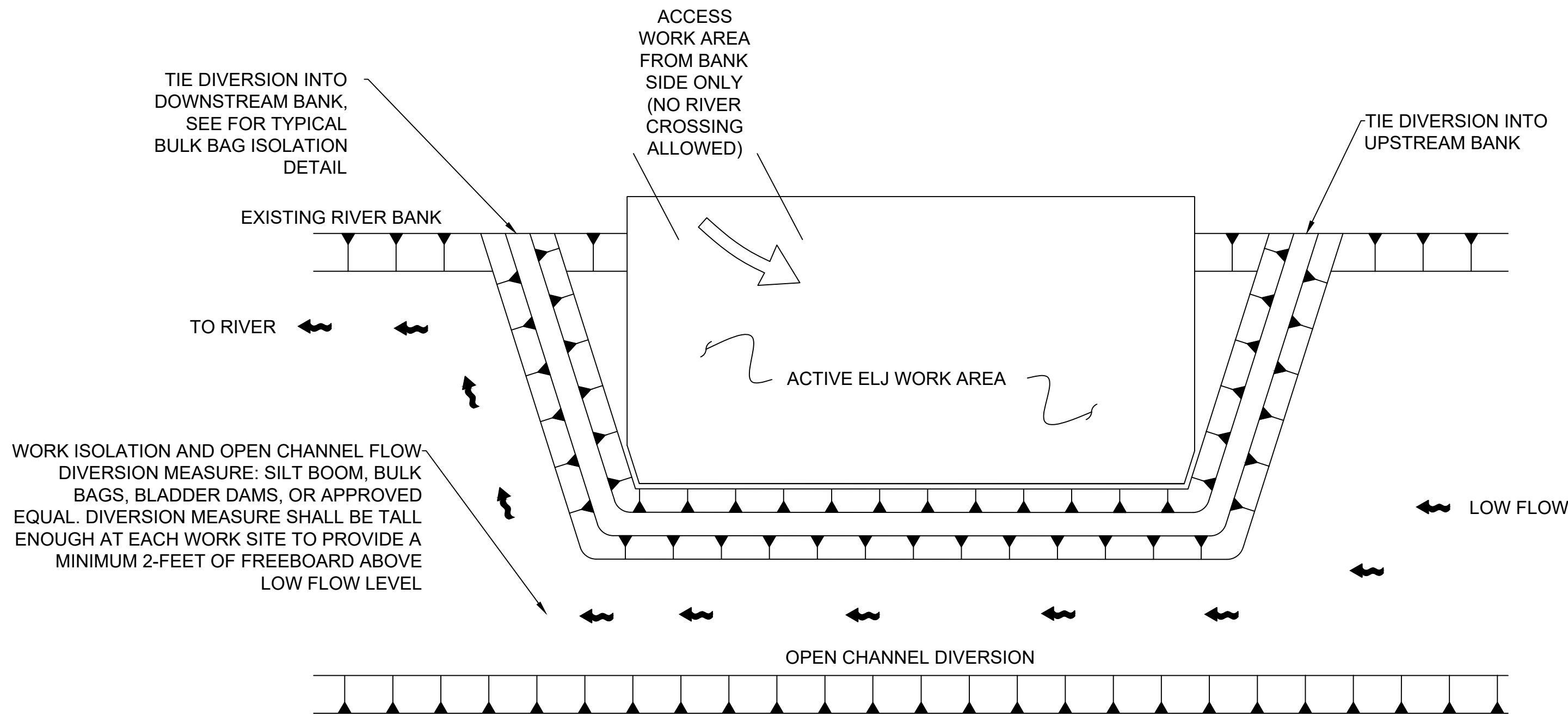


LOG SCHEDULE - ELJ 9:

LOG TYPE	MINIMUM DIAMETER (IN)	LENGTH (FT)	ROOTWAD	TOTAL QTY PER ELJ
R2	24+	40	YES	3
R3	24+	35	YES	14
R7	12-24	25	YES	2
R8	18-24	25	YES	6
R9	18-24	20	YES	1
R10	18-24	15	YES	1
L3	16-24	25	NO	1
L4	16-24	20	NO	8
RACKING	4-16	15-30	OPTIONAL	60
SLASH				120 CY

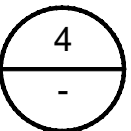
LOG SCHEDULE - ELJ 10:

LOG TYPE	MINIMUM DIAMETER (IN)	LENGTH (FT)	ROOTWAD	TOTAL QTY PER ELJ
R2	24+	40	YES	2
R3	24+	35	YES	9
R7	12-24	25	YES	6
R8	18-24	25	YES	7
L3	16-24	25	NO	2
L4	16-24	20	NO	4
RACKING	4-16	15-30	OPTIONAL	60
SLASH				120 CY



DETAIL - ELJ WORK AREA ISOLATION SCHEMATIC

SCALE: NTS



ELJ WORK AREA ISOLATION NOTES:

1. DIVERSION OF WATER AND HANDLING OF STREAM FLOW WILL BE REQUIRED DURING CONSTRUCTION. THE PLANS ON THIS DRAWING SHOW A SUGGESTED METHOD FOR THE CONTRACTOR TO ROUTE WATER AROUND THE WORK SITE. ACTUAL SITE CONDITIONS MAY REQUIRE ADJUSTMENTS TO THE PLANS SHOWN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEVELOPING AND SUBMITTING A TEMPORARY STREAM FLOW DIVERSION PLAN TO ALLOW CONSTRUCTION TO BE PERFORMED IN THE DRY.
2. THE ACTUAL DIVERSION PLAN (BY THE CONTRACTOR) SHALL BE DESIGNED TO ALLOW PASSAGE OF STREAM FLOW WITHOUT OVERTOPPING THE UPSTREAM DAM. THE CONTRACTOR SHALL CHOOSE THE LEVEL OF PROTECTION.
3. ANY DAMAGE TO THE WORK RESULTING FROM FAILURE OR INADEQUACY OF THE DIVERSION SYSTEM SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADDITIONAL PAYMENT FOR COSTS ASSOCIATED WITH FAILURE OF THE DIVERSION SYSTEM.

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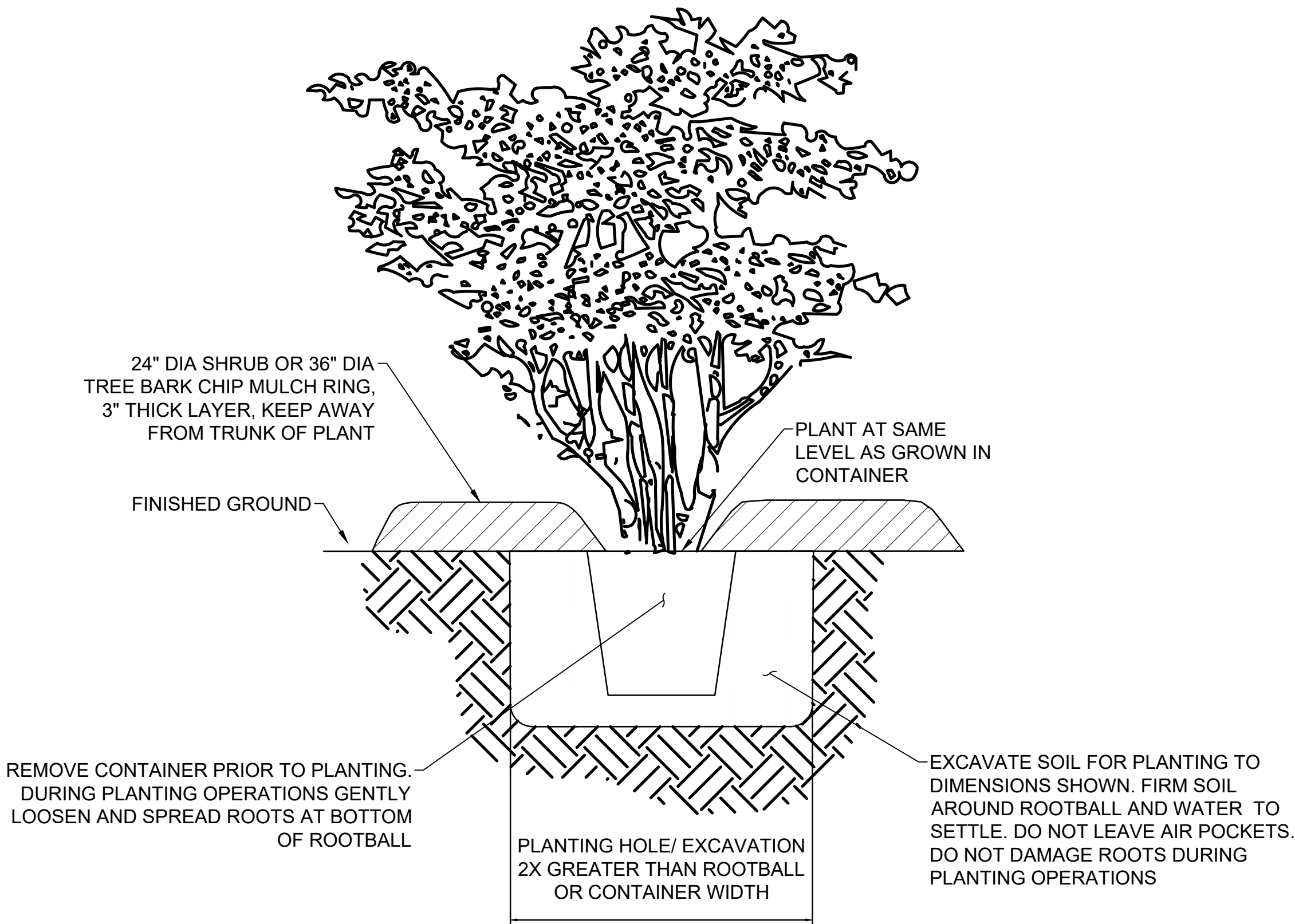
LAYERING DETAILS

C-10

REFERENCE NO:
APPLICANT:
PROPOSED PROJECT:
LOCATION:

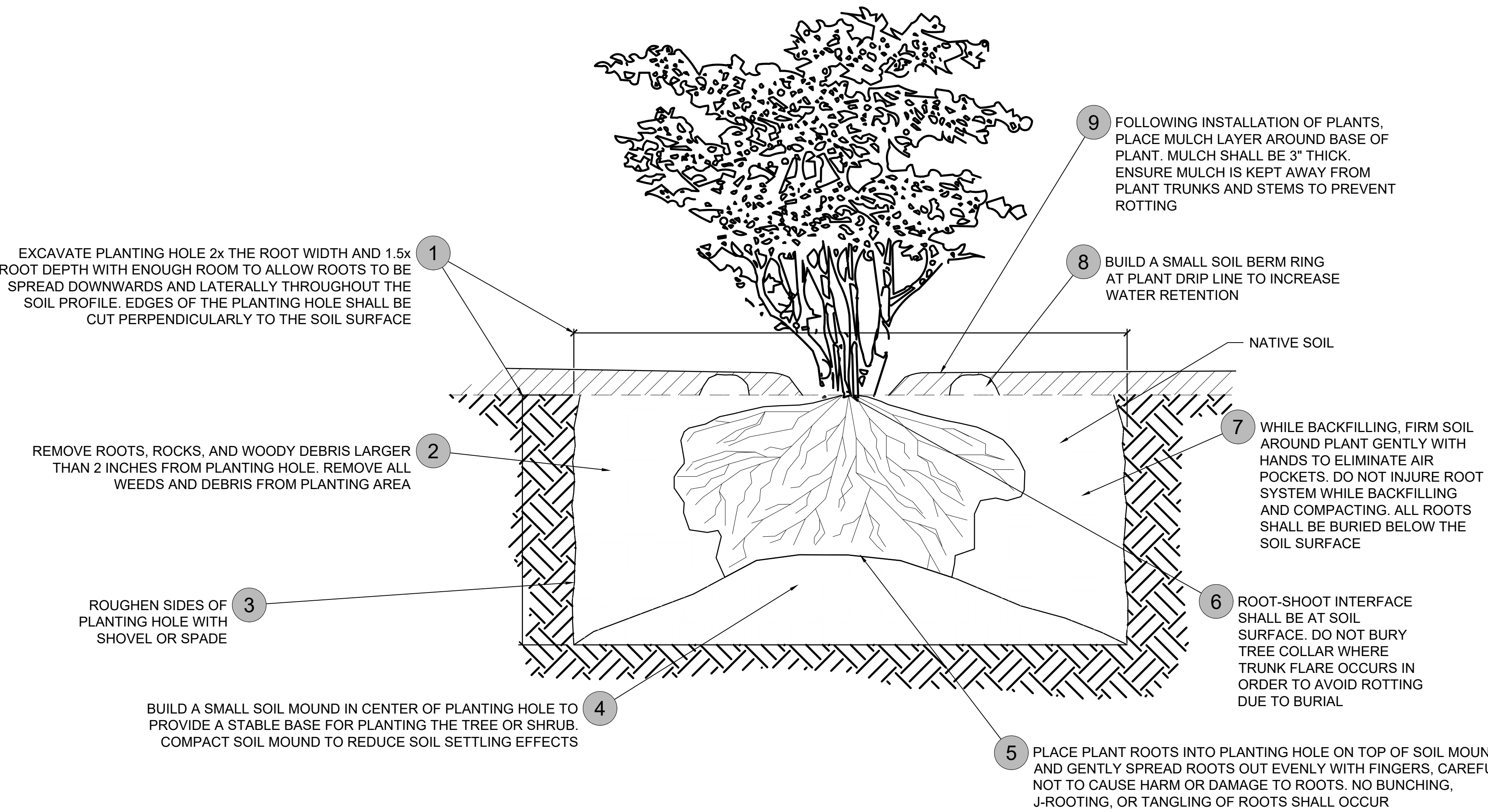
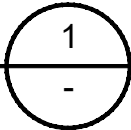
SNOHOMISH COUNTY PUD #1
CONSTRUCT 2 ELJS
NEAR 138TH PLACE SE

SHEET: 10 OF 11
DATE: JUNE 2026



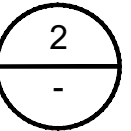
DETAIL - CONTAINER TREE AND SHRUB PLANTING

SCALE: NTS



DETAIL - BARE ROOT TREE OR SHRUB PLANTING

SCALE: NTS



PLANTING NOTES:

- REFER TO CRITICAL AREAS REPORT AND MITIGATION PLAN (HERRERA 2026) FOR LIST OF TOTAL PLANT SPECIES, SPACING, AND QUANTITIES.
- REMOVE ALL NON-NATIVE/INVASIVE SPECIES WITHIN THE PLANTING AREAS. REMOVE BLACKBERRY ROOTBALLS. DISPOSE OFFSITE.
- DECOMPACT THE PLANTING AREAS WHERE HEAVY EQUIPMENT WAS UTILIZED.
- INSTALL CONTAINER PLANTS BETWEEN FALL AND EARLY SPRING. BAREROOT STOCK MUST BE INSTALLED IN THE WINTER.
- KEEP BAREROOT PLANTS SHADED, COOL AND COVERED AT ALL TIMES PRIOR TO PLANTING. INSTALL LIVE STAKES DURING THE WINTER DORMANT SEASON.
- DO NOT INSTALL PLANTS BELOW THE ORDINARY HIGH WATER MARK.
- FLAG ALL INSTALLED PLANTS WITH BRIGHTLY-COLORED FLAGGING.

PLANT SPECIES, SIZE, AND SPACING FOR WETLAND AND RIPARIAN BUFFER

WETLAND - 1,310 SQUARE FEET

SPECIES	SIZE	ON-CENTER SPACING
RED-OSIER DOGWOOD (CORNUS SERICEA)	4 FOOT LIVE STAKE	2 FEET
SITKA WILLOW (SALIX SITCHENSIS)	4 FOOT LIVE STAKE	2 FEET
SLOUGH SEDGE (CAREX OBNUPTA)	9 INCH PLUG	1 FOOT

RIPARIAN BUFFER - 13,580 SQUARE FEET

SPECIES	SIZE	ON-CENTER SPACING
SITKA SPRUCE (PICEA SITCHENSIS)	2-GALLON POT	15 FEET
WESTERN REDCEDAR (THUJA PLICATA)	2-GALLON POT	15 FEET
BLACK COTTONWOOD (POPULUS BALSAMIFERA)	2-GALLON POT	15 FEET
BIG-LEAF MAPLE (ACER MACROPHYLLUM)	2-GALLON POT	15 FEET
RED ALDER (ALNUS RUBRA)	2-GALLON POT	15 FEET
VINE MAPLE (ACER CIRCINATUM)	1-GALLON POT	15 FEET
OCEAN SPRAY (HOLODISCUS DISCOLOR)	1-GALLON POT	6 FEET
OSOBERRY (OEMLERIA CERASIFORMIS)	1-GALLON POT	6 FEET
SALMONBERRY (RUBUS SPECTABILIS)	18-36" BARE ROOT STOCK	6 FEET
NOOTKA ROSE (ROSA NUTKANA)	18-36" BARE ROOT STOCK	6 FEET
COMMON SNOWBERRY (SYMPHORICARPOS ALBUS)	18-36" BARE ROOT STOCK	6 FEET
THIMBLEBERRY (RUBUS PARVIFLORUS)	18-36" BARE ROOT STOCK	6 FEET

HYDROSEEDING MIX FOR STAGING AREA IN BUFFER

SPECIES	%PLS OF MIX
YARROW (ACHILLIA MILLEFOLIUM)	20
SPIKE BENTGRASS (AGROSTIS EXARATE)	15
CALIFORNIA BROME (BROMUS CARINATUS)	10
TUFTED HAIRGRASS (DESCHAMPSIA CAESPITOSA)	5
BLUE WILDRYE (ELYMUS GLAUCUS)	15
NATIVE RED FESCUE (FESTUCA RUBRA VAR. RUBRA)	15
MEADOW BARLEY (HORDEUM BRACHYANTHERUM)	15
STERILE POCO BARLEY (HORDEUM VULGARE VAR.POCO)	5

SHANNON & WILSON



SNOHOMISH PUBLIC UTILITIES DISTRICT NO. 1
ATTN: MANAGER OF NATURAL RESOURCES
P.O. BOX 1107, EVERETT, WA 98201
PHONE: 425-783-1841

PLANTING SCHEDULE, NOTES AND DETAILS

C-11

REFERENCE NO:
APPLICANT:
PROPOSED PROJECT:
LOCATION:

SNOHOMISH COUNTY PUD #1
CONSTRUCT 2 ELJS
NEAR 138TH PLACE SE

SHEET: 11 OF 11
DATE: JUNE 2026

Appendix B

IPaC Resources List

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Snohomish County, Washington



Local office

Washington Fish And Wildlife Office

☎ (360) 753-9440

📠 (360) 753-9405

1009 College St Se

Ste 215

Lacey, WA 98503-1249

<https://www.fws.gov/office/washington-fish-and-wildlife>

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
North American Wolverine <i>Gulo gulo luscus</i> Wherever found	Threatened

This species only needs to be considered if the following condition applies:

- Species may be present based on transient occurrence as it moves through or too suitable habitat. Effects should be considered to species and projects should consult with the Service, however, depending on the project, consultation may not be necessary.

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/5123>

Birds

NAME	STATUS
Marbled Murrelet <i>Brachyramphus marmoratus</i>	Threatened

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

<https://ecos.fws.gov/ecp/species/4467>

Yellow-billed Cuckoo <i>Coccyzus americanus</i>	Threatened
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There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

<https://ecos.fws.gov/ecp/species/3911>

Reptiles

NAME	STATUS
Northwestern Pond Turtle <i>Actinemys marmorata</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1111	Proposed Threatened

Fishes

NAME	STATUS
Bull Trout <i>Salvelinus confluentus</i> There is final critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/8212	Threatened

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> Wherever found There is proposed critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/9743	Proposed Threatened
Suckley's Cuckoo Bumble Bee <i>Bombus suckleyi</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10885	Proposed Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Bull Trout <i>Salvelinus confluentus</i> https://ecos.fws.gov/ecp/species/8212#crithab	Final

Bald & Golden Eagles

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act ² and the Migratory Bird Treaty Act (MBTA) ¹. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

There are Bald Eagles and/or Golden Eagles in your [project](#) area.

Measures for Proactively Minimizing Eagle Impacts

For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the [National Bald Eagle Management Guidelines](#). You may employ the timing and activity-specific distance recommendations in this document when designing your project/activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to [Bald Eagle Nesting and Sensitivity to Human Activity](#).

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional [Migratory Bird Office](#) or [Ecological Services Field Office](#).

If disturbance or take of eagles cannot be avoided, an [incidental take permit](#) may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the [Do I Need A Permit Tool](#). For assistance making this determination for golden eagles, please consult with the appropriate Regional [Migratory Bird Office](#) or [Ecological Services Field Office](#).

Ensure Your Eagle List is Accurate and Complete

If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the [Supplemental Information on Migratory Birds and Eagles](#), to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

Review the FAQs

The FAQs below provide important additional information and resources.

NAME

Bald Eagle *Haliaeetus leucocephalus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

BREEDING SEASON

Breeds Mar 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read ["Supplemental Information on Migratory Birds and Eagles"](#), specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

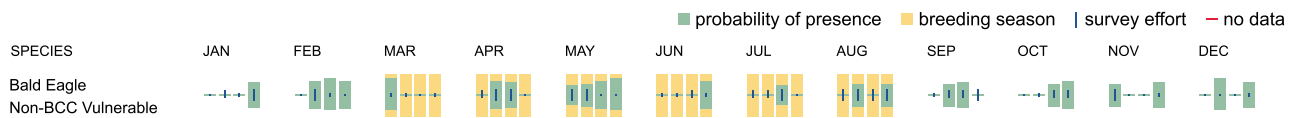
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle ([Bald and Golden Eagle Protection Act](#) requirements may apply).

Proper interpretation and use of your eagle report

On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the [RAIL Tool](#) and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:

The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Migratory birds

The Migratory Bird Treaty Act (MBTA) ¹ prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>

- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

Measures for Proactively Minimizing Migratory Bird Impacts

Your IPaC Migratory Bird list showcases [birds of concern](#), including [Birds of Conservation Concern \(BCC\)](#), in your project location. This is not a comprehensive list of all birds found in your project area. However, you can help proactively minimize significant impacts to all birds at your project location by implementing the measures in the [Nationwide avoidance and minimization measures for birds](#) document, and any other project-specific avoidance and minimization measures suggested at the link [Measures for avoiding and minimizing impacts to birds](#) for the birds of concern on your list below.

Ensure Your Migratory Bird List is Accurate and Complete

If your project area is in a poorly surveyed area, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the [Supplemental Information on Migratory Birds and Eagles document](#), to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

Review the FAQs

The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Mar 1 to Aug 31
Black Swift <i>Cypseloides niger</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8878	Breeds Jun 15 to Sep 10
California Gull <i>Larus californicus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 1 to Jul 31
Chestnut-backed Chickadee <i>Poecile rufescens rufescens</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 1 to Jul 31
Evening Grosbeak <i>Coccothraustes vespertinus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Olive-sided Flycatcher <i>Contopus cooperi</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Rufous Hummingbird <i>Selasphorus rufus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8002	Breeds Apr 15 to Jul 15

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read ["Supplemental Information on Migratory Birds and Eagles"](#), specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (🟡)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

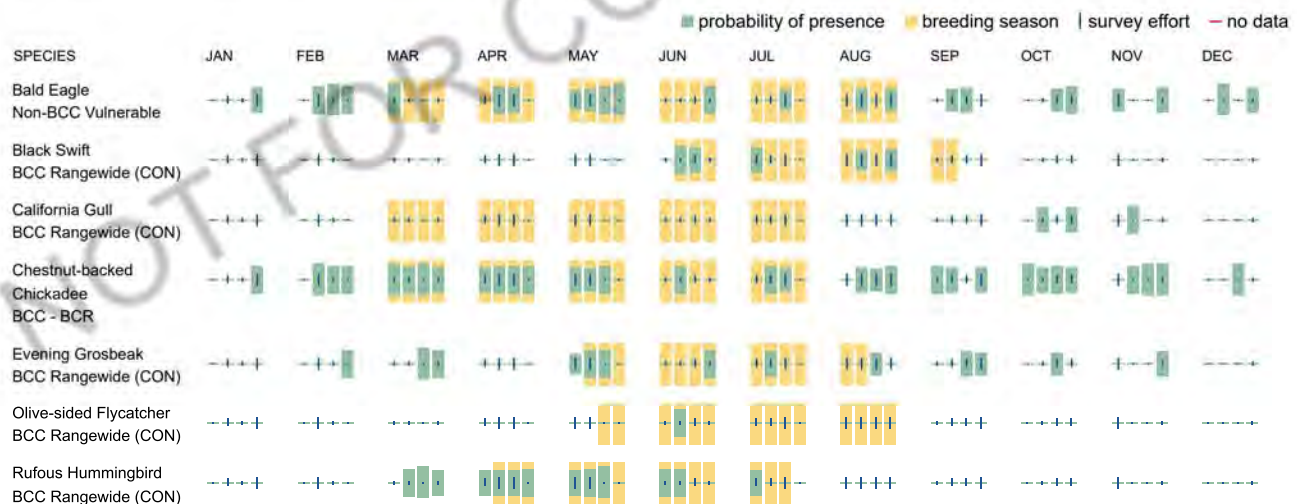
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Avoidance & Minimization Measures for Birds](#) describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of [Birds of Conservation Concern \(BCC\)](#), and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the [Bald and Golden Eagle Protection Act](#) and those species marked as "Vulnerable". See the FAQ "What are the levels of concern for migratory birds?" for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle ([Bald and Golden Eagle Protection Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the [RAIL Tool](#) and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Bald and Golden Eagle Protection Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ "Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:

The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.05/0.25 = 0.2$; at week 20 it is $0.05/0.25 = 0.2$.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the [NWI map](#) to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and

nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION