Request for Clean Water Act
Section 401 Water Quality Certification
Washington State Department of Ecology
Phone: (360) 407-6076 or E-mail: ecyrefedpermits@ecy.wa.gov

AGENCY USE ONLY
Date Received: 12/22/2023
Aquatics ID No.: 143178
Team: HQ
Valid Request: 12/22/2023

This Section 401 Water Quality Certification (WQC) Request form identifies information needed in order to review and process a Section 401 WQC Request. Please see Department of Ecology's (Ecology) webpage for more information about the Section 401 WQC Request process.

Submit this Section 401 WQC Request form along with a Joint Aquatic Resources Permit Application (JARPA) and supporting information[1] to ecyrefedpermits@ecy.wa.gov and copy the federal permitting agency.

A. Federal Permit or License Reference Number, if known: NWS-2023-974

Department of Ecology (Ecology) Aquatics ID Number, if known: _____

Project Name: SF Toutle Lower Brownell Restoration **County:** Cowlitz

B. Project Proponent Name: Brice Crayne - LCFEG

C. Documentation showing that the Pre-Filing Meeting Request was submitted at least 30 days prior to submitting this Section 401 WQC Request. Attach either of the following:

☐ E-mail acknowledgement of receipt from Ecology
■ Copy of previously submitted Pre-Filing Meeting Request Form

D. A completed, signed, and dated JARPA should be submitted with this form.

Did you attach a JARPA? ■ Yes ☐ No

E. The following is a list of documents needed for Ecology's WQC review, along with a brief explanation. Depending on the project, additional information may be requested.

Please let us know what information you are submitting with this WQC request form.

Required for all projects:

1. State Environmental Policy Act (SEPA) determination and/or checklist:
   ☐ Final SEPA determination attached
   ☐ SEPA determination pending
   ■ Exempt from SEPA (see SEPA Guidance) Project is currently under HRPP review
   ☐ SEPA is not required (e.g., federal agency projects)

[1] To submit documents over 25MB, e-mail ecyrefedpermits@ecy.wa.gov to request a secure link.

To request an ADA accommodation, contact Ecology by phone at (360) 407-6076 or email at ecyrefedpermits@ecy.wa.gov, or visit https://ecology.wa.gov/accessibility.
For Relay Service or TTY call 711 or 877-833-6341.

Si necesita este formulario en español, por favor, llámenos a (360) 407-6076
o envíenos un correo electrónico a: ecyrefedpermits@ecy.wa.gov

2. Project drawings attached:
   - ☒ Vicinity map
   - ☒ Plan view
   - ☒ Cross-section(s)
   - ☒ Plan set
   - ☐ Other:_____

3. Best management practices and construction methodology, provided in the attached:
   - ☒ JARPA
   - ☒ Water Quality Monitoring and Protection Plan (WQMPP)
   - ☒ Project drawings, sheets:_____
   - ☐ Mitigation Plan pages: N/a - see JARPA 7f and 8c
   - ☒ Other document(s): Appendix A, Appendix B, Extended Area of Mixing

   Notes:
   - This is needed for in-water work (below ordinary high water mark), including wetlands.
   - Describe best management practices to be implemented to protect water quality.
   - Describe construction sequencing and methodology.

4. Water quality monitoring, provided in the attached:
   - ☐ Water Quality Monitoring Plan (WQMP).
   - ☒ Water Quality Monitoring and Protection Plan (WQMPP is similar to WQMP, but includes best management practices).
   - ☒ Other (please identify location, such as JARPA, Part 8): JARPA, Part 8

   Notes:
   - Include language in the plans that allows Ecology to review and approve all substantive changes to a plan prior to implementation.
   - A plan is needed when conducting work in a waterbody (e.g., creek, ditch, river, lake, pond, marine, estuarine).
   - Include water quality parameters such as turbidity, oil sheen, pH (e.g., poured in-place concrete, concrete demolition), etc.
   - See State Water Quality Standards for Surface Waters (Chapter 173-201A-200 or -210 WAC)
   - If needed, templates are available.

Required depending on the project type:

5. Erosion and sediment control for upland work (above ordinary high water mark) that addresses stormwater during construction and long-term:

   This information is included in the attached:
   - ☐ JARPA
   - ☒ Project drawings, sheets: Sheet 17
   - ☐ Stormwater Pollution Prevention Plan, pages:_____
   - ☐ Mitigation Plan, pages:_____
   - ☐ Other document(s): _____

6. Wetland report, including the attached:
   - ☐ Wetland delineation report
   - ☐ Delineation data sheets
   - ☐ Wetland rating forms

   There are no wetlands within the project area; see Part 7 of JARPA.

Notes:

- Needed when there is a discharge (dewatering, excavation or fill) to wetlands.
- Report needs to include both a wetland delineation and rating.
- Include delineation data sheets and rating forms.
- For more information see wetland delineation resources and hiring a qualified wetland professional.
- Include language in the plans that allows Ecology to review and approve all substantive changes to a plan prior to implementation.

7. Mitigation, avoidance and minimization
   - ☐ Wetland avoidance and minimization checklist
   - ☐ Other aquatic resource avoidance and minimization demonstration
   - ☐ Mitigation Plan
   - ☒ Other: JARPA part 7

   Notes:

   - Wetland avoidance and minimization webpage.

8. Mitigation plan, provided in the attached:
   - ☐ Riparian Planting and Monitoring Plan (Needed when riparian vegetation is removed or modified)
   - ☐ Wetland or stream/other aquatic resource Mitigation Plan
   - ☐ Wetland Mitigation Bank Use Plan (use when proposing mitigation bank use)
   - ☐ In-Lieu Fee (ILF) Use Plan (use when proposing ILF mitigation)
   - ☒ Project drawings, sheets: sheet 18
   - ☐ Other: _____

   Notes:

   - Needed to offset impacts to wetland, stream, marine, or other aquatic habitat.
   - Include language in the plans that allows Ecology to review and approve all substantive changes to a plan prior to implementation.
   - For more information, see wetland compensatory mitigation.

9. Dredging
   - ☐ Dredging Plan attached
   - ☐ Suitability Determination attached

   Notes:

   - Needed when sediments will be dredged for maintenance, navigation, or other purposes.
   - Covers in-water disposal and sediment anti-degradation.
   - Dredging Plan should include dredge footprint and depth, dredge type, best management. practices, disposal plan, off-loading plan for upland disposal, etc.
   - Include language in the plans that allows Ecology to review and approve all substantive changes to a plan prior to implementation.
   - For informationon suitability determinations, see Dredged Material Management Office.

10. Dewatering
    - ☒ Dewatering Plan attached

    Notes:

    - Needed for complex in-water work or management of excavated/dredged material.

- Include language in the plans that allows Ecology to review and approve all substantive changes to a plan prior to implementation.
- May also be required for some excavation projects.

F. Required Certification Statements:

The project proponent hereby certifies that all information contained herein is true, accurate, and complete, to the best of my knowledge and belief.

Initial BC

The project proponent hereby requests that the certifying authority review and take action on this CWA 401 certification request within the applicable reasonable period of time.

Initial BC

Signature: Brice Crayne Digitally signed by Brice Crayne DN: C=US, OU=Project Manager, O=Lower Columbia Fish Enhancement Group, CN=Brice Crayne, E=bricecrayne@outlook.com Reason: I attest to the accuracy and integrity of this document Location: 11018 NE 51st Street, Vancouver, WA 98682 Date: 2023.12.22 12:13:32 -08'00' Foxit PhantomPDF Version: 10.1.1 Date: 2023-12-22

Print Name: Brice Crayne

WASHINGTON STATE
Joint Aquatic Resources Permit Application (JARPA) Form[1,2] [help]

USE BLACK OR BLUE INK TO ENTER ANSWERS IN THE WHITE SPACES BELOW.

US Army Corps of Engineers • Seattle District

AGENCY USE ONLY

Date received: 12/22/2023 edoc Rec'd WQC Request Form

Agency reference #: _____

Tax Parcel #(s): _____

Part 1–Project Identification

1. Project Name (A name for your project that you create. Examples: Smith's Dock or Seabrook Lane Development) [help]
SF Toutle Lower Brownell Reach Restoration

Part 2–Applicant

The person and/or organization responsible for the project. [help]

2a. Name (Last, First, Middle)			
Crayne, Brice D			
2b. Organization (If applicable)			
Lower Columbia Fish Enhancement Group			
2c. Mailing Address (Street or PO Box)			
11018 NE 51st Cir			
2d. City, State, Zip			
Vancouver, WA 98682			
2e. Phone (1)	**2e.** Phone (1)	**2g.** Fax	**2h.** E-mail
(360) 904-7922	(360) 904-7922		bricecrayne@outlook.com

[1]Additional forms may be required for the following permits:
- If your project may qualify for Department of the Army authorization through a Regional General Permit (RGP), contact the U.S. Army Corps of Engineers for application information (206) 764-3495.
- Not all cities and counties accept the JARPA for their local Shoreline permits. If you need a Shoreline permit, contact the appropriate city or county government to make sure they accept the JARPA.

[2]To access an online JARPA form with [help] screens, go to http://www.epermitting.wa.gov/site/alias__resourcecenter/jarpa_jarpa_form/9984/jarpa_form.aspx.

For other help, contact the Governor's Office for Regulatory Innovation and Assistance at (800) 917-0043 or help@oria.wa.gov.

Part 3–Authorized Agent or Contact

Person authorized to represent the applicant about the project. (Note: Authorized agent(s) must sign 11b of this application.) [help]

3a. Name (Last, First, Middle)			
Smayda, Tom			
3b. Organization (If applicable)			
Smayda Environmental Associates, Inc.			
3c. Mailing Address (Street or PO Box)			
139 NE 61st Street			
3d. City, State, Zip			
Seattle, WA 98115			
3e. Phone (1)	**3f.** Phone (2)	**3g.** Fax	**3h.** E-mail
206-369-2854			tomsmayda@aol.com

Part 4–Property Owner(s)

Contact information for people or organizations owning the property(ies) where the project will occur. Consider both **upland and aquatic** ownership because the upland owners may not own the adjacent aquatic land. [help]

☐ Same as applicant. (Skip to Part 5.)

☐ Repair or maintenance activities on existing rights-of-way or easements. (Skip to Part 5.)

☐ There are multiple upland property owners. Complete the section below and fill out JARPA Attachment A for each additional property owner.

☐ Your project is on Department of Natural Resources (DNR)-managed aquatic lands. If you don't know, contact the DNR at (360) 902-1100 to determine aquatic land ownership. If yes, complete JARPA Attachment E to apply for the Aquatic Use Authorization.

4a. Name (Last, First, Middle)			
Ridgway, Jennifer			
4b. Organization (If applicable)			
Weyerhaeuser Timber Holdings			
4c. Mailing Address (Street or PO Box)			
PO Box 190, 500 Burma Rd			
4d. City, State, Zip			
Castle Rock, WA 98661			
4e. Phone (1)	**4f.** Phone (2)	**4g.** Fax	**4h.** E-mail
360-274-3040			jennifer.ridgway@wy.com

Part 5–Project Location(s)

Identifying information about the property or properties where the project will occur. [help]

☐ There are multiple project locations (e.g. linear projects). Complete the section below and use JARPA Attachment B for each additional project location.

5a. Indicate the type of ownership of the property. (Check all that apply.) [help]

☒ Private
☐ Federal
☐ Publicly owned (state, county, city, special districts like schools, ports, etc.)
☐ Tribal
☐ Department of Natural Resources (DNR) – managed aquatic lands (Complete JARPA Attachment E)

5b. Street Address (Cannot be a PO Box. If there is no address, provide other location information in 5p.) [help]

No address

5c. City, State, Zip (If the project is not in a city or town, provide the name of the nearest city or town.) [help]

Toutle, WA 98649

5d. County [help]

Cowlitz

5e. Provide the section, township, and range for the project location. [help]

¼ Section	Section	Township	Range
E1/4	2	9N	1E

5f. Provide the latitude and longitude of the project location. [help]

- Example: 47.03922 N lat. / -122.89142 W long. (Use decimal degrees - NAD 83)

46.292571 N lat. / -122.638744 W long.

5g. List the tax parcel number(s) for the project location. [help]

- The local county assessor's office can provide this information.

EE0201001

5h. Contact information for all adjoining property owners. (If you need more space, use JARPA Attachment C.) [help]

Name	Mailing Address	Tax Parcel # (if known)
Weyerhaeuser owns all adjacent parcels		

5i. List all wetlands on or adjacent to the project location. [help]

There is a beaver pond and wetland east of the project site on top of the adjacent lahar terrace that is part of the unnamed tributary we call Trib A. There is a narrow band of riverine wetland conditions in the side channel that is along the right bank wall.

5j. List all waterbodies (other than wetlands) on or adjacent to the project location. [help]

SF Toutle River
5k. Is any part of the project area within a 100-year floodplain? [help]
☒ Yes ☐ No ☐ Don't know
5l. Briefly describe the vegetation and habitat conditions on the property. [help]
The project is located in the SF Toutle floodplain. The floodplain was filled with a lahar deposit during the 1980 eruption of Mount St. Helens. Since 1980, the SF Toutle River has eroded into the lahar deposit, creating a floodplain that is inset within the broader valley. There are logging roads on either side of the valley on the lahar terrace or upland above the terrace. The lahar terrace is dominated by scotch broom with lots of barren ground and patches of alder, lodgepole pine, Douglas fir, ocean spray, kinnikinnick, and cottonwood. The inset floodplain has multiple river channels that activate at various flow levels with water flowing across the entire floodplain during the 100 year flood. A flood in December 2015 largely reset the vegetation in the active floodplain due to a lack in large woody debris. The 1980 event scalped the entire SF Toutle watershed riparian zone from the valley and the river has been slow to re-establish a floodplain forest that will contribute large, key pieces necessary to provide structure and quasi-stable hard points that allow floodplain forests to get established. Until structure and a functional riparian forest is re-established, the river will continue to reset the floodplain every 10-15 years during large flood events, limiting vegetation and associated habitat.
5m. Describe how the property is currently used. [help]
The project is located along a public access corridor that provides recreational fishing and swimming opportunities within Weyerhaeuser's St. Helens Tree forest.
5n. Describe how the adjacent properties are currently used. [help]
All adjacent properties are commercial tree farm. The nearest residential property is about 2 miles downstream.
5o. Describe the structures (above and below ground) on the property, including their purpose(s) and current condition. [help]
The 4100 road is the mainline logging road connecting all forest lands uphill of this site to the paved roads downhill from the site. It runs parallel to the SF Toutle River on the river right lahar terrace and upland zones. On river right about half way through the project area, there is an active scar in the bank that is less than 70 feet from the edge of the 4100 road. Active erosion has washed out a road culvert and threatens the road. This project will load up the toe of this scar with wood to create more natural conditions and keep the thalweg off the toe and reduce future channel migration towards the 4100 road. The 4701 road is a dead-end, spur logging road that is used by recreationalists with an annual Weyerhaeuser access pass. They camp at the end of the road. This road is not used for log transport. The road is also used by Cowlitz Game and Anglers and WDFW to maintain a fish acclimation facility located at the downstream end of the project area. The facility was built decades ago and is need of maintenance. The project aims to have no impact on the facility. The 4700 road bridge is located about 0.55 miles upstream of the top of this project reach. The next bridge downstream is the abandoned Weyerhaeuser railroad bridge near RM3.5 and then the S Toutle Road bridge near RM1.5. This project covers RM 6.75 to 7.5.
5p. Provide driving directions from the closest highway to the project location, and attach a map. [help]
From I-5 take exit #49 (Castle Rock Exit). Head east on Spirit Lake Highway (SR 504) toward Toutle/Mt. St. Helens. Go approximately 10.5 miles on SR 504. Soon after passing Toutle Lake High School, turn right onto South Toutle Road (opposite Chevron station). After 2.5 miles, take a slight right onto a mainline gravel road (unlabeled 4100 Rd.). After 3.5 miles take a right on the 4700 road. Key access is required to go through the Weyerhaeuser gate. Turn right on the 4701 (back downstream) and follow it for 0.5 miles to the top of the project area.

Part 6–Project Description

6a. Briefly summarize the overall project. You can provide more detail in 6b. [help]

This project initiates restoration activities in the Brownell Reach of the SF Toutle River (RM 6.5 to 8.5) which was designed through SRFB #18-1409 and #21-1061. The project will address natural processes to benefit ESA-listed Chinook, coho, and steelhead as well as resident and anadromous lamprey, trout, and a dozen other coldwater fish species inventoried in the reach. This project finalized the design to install instream and floodplain woody materials as well as jumpstart riparian and upland plant succession. The project will install shorter term instream and off-channel habitat structures as well as island-forming structures aimed at jumpstarting the establishment of mature floodplain forests in the immediate project reach. The intent is to benefit fish, vegetation and beaver by adding woody material.

6b. Describe the purpose of the project and why you want or need to perform it. [help]

Please see the complete design report.

Landowners who lived in the Toutle watershed since the early 1900s told stories of "drifts" of logs in the SF Toutle that were 40-50' tall and 400-500 yards long. They claim that these were pulled out of the river and burned. While the SF Toutle didn't have any known splash dams, the process of stream cleaning and subsequent wood salvaging post-eruption drastically reduced in-river wood. Even so, some of these "drifts" are reforming in the Brownell reach upstream of this segment (see 46.276096, -122.631443 on Google Earth). These natural jams are longer than they are wide and are created over time and during large events when wood can gradually stack up and become superelevated above the ordinary high water mark making them relatively stable for decades. In the example provided, the 2006 image in Google Earth shows an island at this location that continued to recruit wood until the large 2015 flood when it formed a "drift." The island-forming jams (IFJs) in the plans are meant to mimic this natural process, creating the foundation for drifts to form and recruit new wood, to benefit aquatic life and habitat value.

This project covers the lower 3,125' of the Brownell Creek reach of the SF Toutle River (SFT) and over 4,100' of the riparian zone. In this segment of the reach, the SFT floodplain tapers down from about 500' wide down to 170' and transitions from a multi-thread channel to a single thread channel. For the first half of the segment, the floodplain tilts towards river left as it has since at least 1990 with occasional secondary channels occupying the right bank (see Figure 14 in design report). Halfway down the segment, at the end of an 1,100' glide the river has built a bar that naturally splits the flows. Here we plan to install an island-forming jam to accentuate this natural process and help a floodplain forest get established on the bar. Downstream of the bar the floodplain narrows. Here, the channel has flip-flopped across the floodplain back and forth since 1990 occupying both toes and the middle of the floodplain. While this is a relatively natural process upstream of a constriction, adding structure here can reduce channel migration in harmony with natural processes.

In addition to a single IFJ installed at the head of the midpoint bar, this project will install channel roughness structures (simple and complex), side channel roughness structures, floodplain roughness wood, and a few beaver dam analogues. Vertical wood piling, boulders, deadman, and partial burial will be used for ballast to meet permit obligations. Other wood will be unballasted where safe and permitted.

We will also pre-excavate some pools and dispose of the materials in a natural manner on top of wood debris to provide ballast, to mimic natural bars, and to help raise the water table floodplain wide. This strategy is designed to accomplish some of the similar goals as a "Stage-0" restoration site without the disturbance associated with grading the floodplain down. We will source some channel fill materials from the floodplain such as where the volume of wood placement produces surplus sediment.

Primary species include Fall Chinook, coho, and winter steelhead. Fall Chinook return from August to October and primarily spawn in main channels of the SFT wherever they find suitable substrate, depth, and flow, and especially where they find upwelling. In this segment, there are wall-based channels on river right and a geomorphic control at the bottom of the segment which generally suggest this is a gaining reach with abundant upwelling that would attract Chinook for spawning. While finalizing the designs, LCFEG will utilize a Flir thermal imaging camera to identify cold-water upwelling sources where we will concentrate woody structures that sort sediments, create moderate scour, and provide cover and spawning habitat for adult Chinook at these thermal refugia.

Coho and steelhead both prefer tributary habitat for spawning but will spawn in secondary channels of the SFT. Snorkel surveys in this reach show that juvenile coho and steelhead are most abundant at underwater

structures and are rarely found more than 3' away from roots, rocks, woody debris, and other similar areas of refuge. To benefit these species and emerging Chinook, we plan to activate secondary channels and install woody and brushy instream structures to create long swaths (75-150') of margin cover, flush out fine sediments, sort coarse sediments, and provide dependable spawning habitat and plant establishment

6c. Indicate the project category. (Check all that apply) [help]

☐ Commercial ☐ Residential ☐ Institutional ☐ Transportation ☐ Recreational
☐ Maintenance ☒ Environmental Enhancement

6d. Indicate the major elements of your project. (Check all that apply) [help]

☐ Aquaculture	☐ Culvert	☐ Float	☐ Retaining Wall (upland)
☐ Bank Stabilization	☐ Dam / Weir	☐ Floating Home	☐ Road
☐ Boat House	☐ Dike / Levee / Jetty	☐ Geotechnical Survey	☐ Scientific Measurement Device
☐ Boat Launch	☐ Ditch	☐ Land Clearing	☐ Stairs
☐ Boat Lift	☐ Dock / Pier	☐ Marina / Moorage	☐ Stormwater facility
☐ Bridge	☐ Dredging	☐ Mining	☐ Swimming Pool
☐ Bulkhead	☐ Fence	☐ Outfall Structure	☐ Utility Line
☐ Buoy	☐ Ferry Terminal	☐ Piling/Dolphin	
☐ Channel Modification	☐ Fishway	☐ Raft	

☒ Other: Habitat enhancement

6e. Describe how you plan to construct each project element checked in 6d. Include specific construction methods and equipment to be used. [help]

- Identify where each element will occur in relation to the nearest waterbody.
- Indicate which activities are within the 100-year floodplain.

Activities above the 100-year floodplain:

- Wood is currently staged on the terrace on the left bank adjacent to the 4701 road.
- Two temporary access routes to the floodplain will be created off the left bank terrace down into the 100-year floodplain. These routes will be restored following construction.

Activities below the 100-year floodplain:

- Most of the area within the 100-year floodplain is hard and dry during the construction time period. Carefully chosen routes across the floodplain will minimize damage to plants and animals.
- Wood will be carried to structure sites using ground-based heavy equipment; no wood will be dragged across fish-bearing waterways.
- To minimize negative short-term construction-related impacts, we created a **Water Diversion and Fish Salvage Plan (Appendix A)**. We hosted a site visit on 10/25/2023 with WDFW and USACE to inspect the project area and review the 60% draft Water Diversion and Fish Salvage Plan. After this site visit and based on Agency input, the plan was updated to 90% and will be again reviewed on site with permitting agencies including NOAA and Ecology on 12/5/2023. This plan includes construction sequencing and construction considerations for fish, lamprey, and water quality.
- A primary access route will be established on dry bars from STA02+00 to STA33+00 based on site conditions during construction and will require multiple stream crossings. Stream crossings will be done in the wet without the use of temporary bridges. Crossings will be located in shallow riffles where there is minimal fish use. There is precedent for this strategy in the SF Toutle where the substrate is coarse, the water is shallow, and activities don't create water quality concerns. The primary access route will be used to stage wood for structure building.
- Secondary access routes will be created off the primary access route and may require ingress to wet areas. The Contractor will not be allowed to track up- and down the river channel. They will be restricted to tracking to the worksites, completing construction activities, and then returning to dry ground before accessing the next structure site. This should limit impacts to lamprey and other aquatic organisms. While some areas will be isolated prior to structure building, other areas will require building structures with fish present. In these areas, equipment may need to place logs on the channel surface to stand on while working to distribute weight and reduce impacts.
- Structure building will be completed using a variety of techniques. Each Worksite identified in Appendix A identifies specific "Construction considerations for fish, lamprey, and water quality." The Plans also provides objectives for specific reaches of the project by Station number that correspond with Appendix A.
  - Worksite 1 (STA0+00 to 10+00 left bank side channel): This site will be dry during construction, allowing us to pre-dig pools and partially burry wood in places without concerns about impacts to water quality. We will investigate excavated materials for lamprey ammocoetes and relocate these fish if they are found. If they are found in abundance, we will use pilings for ballast instead of burial. See the full description of activities in Appendix A; sheet 4.
  - Worksite 2 (STA0+00 to 35+00 right bank of the valley): Part of constructing this worksite includes diverting the SF Toutle River to the left bank of the valley including through Worksite 1. See the full description of activities in Appendix A; sheet 5. Site isolation will allow for removal of old rebar and concrete (relics of the 1980 eruption) as well as pre-excavation of pools in the channel without concerns about hurting ESA-listed species. All ESA-listed fish will be removed from the worksites in accord with the Fish Salvage Plan (Appendix A) before any heavy equipment will begin working.
  - Worksite 3 (STA09+00 to 30+00 left bank of the valley): This worksite construction includes redirecting the SF Toutle River from the left bank to the right bank. See the full description of activities in Appendix A; sheets 6-7. Once the worksite is isolated, we can build a series of large structures in the existing left bank that will create deeper pools, encourage aggradation of the left bank, narrow the left bank channel to maintain pools and create more edge habitat, and activate the right bank of the floodplain. These activities will include manually digging pools; placing the LWD, deadman, pilings, and whole willow trees; and grading out excavated materials to cover the wood, planted trees, and to

physically lift the channel to match the mid-floodplain elevation to create more of an anastomosing channel network instead of a single, broad channel with little complexity.

- During structure building, we'll be digging trenches in the floodplain to partially bury wood for ballast and longevity. While we have trenches open, and are deep enough to encounter water, we'll be planting whole willows and plant communities that are being pre-grown in mulch and organic matter in one cubic yard bulk bags. This component of the project was funded by Dept. of Ecology through their nonpoint water quality program. Since the in-water work window is during the summer, it is difficult to successfully transplant whole willows due to low humidity levels that lead to desiccation. By growing the plant communities in bulk bags, we can transplant them without exposing the roots. The bulk bags will be carried to the trench, the bottom of the bag will be cut to drop the plant material and organic matter into the trench, and then the bulk bag will be removed from the site.
- Temporary water diversions will be necessary to protect ESA-listed species. See Sheet 14 for details and a full description. The contractor will work with the project sponsor to adjust flows each work day to maintain a healthy environment for lamprey and other aquatic life in the sediment without overtly breaking the water quality standard. It is likely that the water quality standard will be broken at times in order to protect these species.

6f. What are the anticipated start and end dates for project construction? (Month/Year) [help]

- If the project will be constructed in phases or stages, use JARPA Attachment D to list the start and end dates of each phase or stage.

Start Date: 6/1/2024 End Date: 10/1/2024 ☐ See JARPA Attachment D

We are requesting the longest allowed permit length to allow for future project maintenance.

6g. Fair market value of the project, including materials, labor, machine rentals, etc. [help]

$911,881

6h. Will any portion of the project receive federal funding? [help]

- **If yes**, list each agency providing funds.

☒ Yes ☐ No ☐ Don't know

NMFS PCSRF

Part 7–Wetlands: Impacts and Mitigation

☒ Check here if there are wetlands or wetland buffers on or adjacent to the project area.
(If there are none, skip to Part 8.) [help]

7a. Describe how the project has been designed to avoid and minimize adverse impacts to wetlands. [help]

☐ Not applicable

The project does not include any work on the right bank (east) lahar terrace where there is a beaver complex and permanent wetland. We will avoid areas that are already functioning well.

The project area includes working within the inset floodplain of the SF Toutle River. This area floods regularly and the wetland communities in the active floodplain are transitory, narrow, wall-based riverine wetlands. We will avoid digging or tracking through these areas. Instead, we seek to enhance and expand the size of these areas by increasing water flows, which can be accomplished without heavy equipment entering this wet area. Wood will be placed in these areas to improve the existing winter rearing habitat for coho and steelhead. There will be a net increase in this type of habitat after project completion. The project goals include increasing the acreage of winter rearing habitat including slow velocity, riverine wetlands. We can accomplish this using methods that avoid these sensitive areas.

7b. Will the project impact wetlands? [help]

☐ Yes ☒ No ☐ Don't know (The project will benefit wetlands)

7c. Will the project impact wetland buffers? [help]

☐ Yes ☒ No ☐ Don't know

7d. Has a wetland delineation report been prepared? [help]

- **If Yes**, submit the report, including data sheets, with the JARPA package.

☐ Yes ☒ No

7e. Have the wetlands been rated using the Western Washington or Eastern Washington Wetland Rating System? [help]

- **If Yes**, submit the wetland rating forms and figures with the JARPA package.

☐ Yes ☒ No ☐ Don't know

7f. Have you prepared a mitigation plan to compensate for any adverse impacts to wetlands? [help]

- **If Yes**, submit the plan with the JARPA package and answer 7g.
- **If No, or Not applicable**, explain below why a mitigation plan should not be required.

☐ Yes ☒ No ☐ Don't know

The project is self-mitigating.

7g. Summarize what the mitigation plan is meant to accomplish, and describe how a watershed approach was used to design the plan. [help]

The project is self-mitigating.

7h. Use the table below to list the type and rating of each wetland impacted, the extent and duration of the impact, and the type and amount of mitigation proposed. Or if you are submitting a mitigation plan with a similar table, you can state (below) where we can find this information in the plan. [help]

Activity (fill, drain, excavate, flood, etc.)	Wetland Name[1]	Wetland type and rating category[2]	Impact area (sq. ft. or Acres)	Duration of impact[3]	Proposed mitigation type[4]	Wetland mitigation area (sq. ft. or acres)
N/a						

[1] If no official name for the wetland exists, create a unique name (such as "Wetland 1"). The name should be consistent with other project documents, such as a wetland delineation report.
[2] Ecology wetland category based on current Western Washington or Eastern Washington Wetland Rating System. Provide the wetland rating forms with the JARPA package.
[3] Indicate the days, months or years the wetland will be measurably impacted by the activity. Enter "permanent" if applicable.
[4] Creation (C), Re-establishment/Rehabilitation (R), Enhancement (E), Preservation (P), Mitigation Bank/In-lieu fee (B)

Page number(s) for similar information in the mitigation plan, if available: N/a

7i. For all filling activities identified in 7h, describe the source and nature of the fill material, the amount in cubic yards that will be used, and how and where it will be placed into the wetland. [help]

N/a

7j. For all excavating activities identified in 7h, describe the excavation method, type and amount of material in cubic yards you will remove, and where the material will be disposed. [help]

N/a

Part 8–Waterbodies (other than wetlands): Impacts and Mitigation

In Part 8, "waterbodies" refers to non-wetland waterbodies. (See Part 7 for information related to wetlands.) [help]

☒ Check here if there are waterbodies on or adjacent to the project area. (If there are none, skip to Part 9.)

8a. Describe how the project is designed to avoid and minimize adverse impacts to the aquatic environment. [help]

☐ Not applicable

The three greatest threats from these projects are direct killing of fish or macroinvertebrates with equipment, direct killing of fish or macroinvertebrates due to water quality contamination (turbidity, oil, temperature, etc.), or direct killing of fish or macroinvertebrates due to dewatering of large areas causing stranding and desiccation. To address these concerns we will do the following:

- We will establish primary access routes that are on dry ground or across bars at strategic locations where there is minimal fish use. Secondary access routes will be created as spurs off the primary routes; these will be direct lines across water to specific structure sites. Even when a site is isolated and fish have been removed, we won't allow the contractor to track freely in the wet work area. We will continue to keep them isolated to the structure sites to minimize damage to lamprey and other macroinvertebrates and to limit water quality issues.
- We will create water bypasses and remove ESA-listed fish from work areas. The bypasses will not completely dewater the work areas because that would kill lamprey and other macroinvertebrates that live in the sediment. We will maintain enough flow through the work areas to protect these subsurface species. This may result in temporarily breaking the turbidity water quality standard periodically over the coarse of the project.
- Equipment refueling and greasing will occur on the terrace top on dry ground to avoid any spills reaching the water. These designated re-fueling locations are at upland locations hundreds of feet from flowing water. Each excavator working in the floodplain will be outfitted with a spill kit mounted on it for immediately addressing any leaks that may occur. Bio-oil will be used instead of petroleum oil.
- We will be utilizing pilings and partial burial to minimize the amount of metal hardware. We will use limited quantities of hardware including chain, threaded rod, nuts, washers, and potentially cable and cable clamps, and continue to explore possibilities to use less.
- The project will remove concrete and rebar still present since the 1980 eruption.
- The project will stop bank erosion on the right bank from STA13+00 to STA16+00 which is contributing thousands of cubic yards of sand fine sediments and threatening the 4100 road.
- Access routes coming off the left bank lahar will be decommissioned and covered with mulch to reduce sediment delivery down the ramps into the floodplain, and seeded if required by permit.

Other threats include unnecessary removal of riparian vegetation, disruption of hyporheic flow paths, or channel filling with coarse, permeable material causing the stream to go subterranean. To address these concerns, we plan to do the following:

- To minimize cut and fill, we propose a strategic channel building strategy at three locations: 1. We will install a set of roughness structures at the bottom of the project reach (STA 100-300 on Sheet 5 of the Drawings). These will raise the riverbed and water level to increase water availability within the left bank side channel and vegetated island, enhance the pool at STA 400, and increase sediment storage. 2. An Island Forming Jam will be installed at STA 1600-1800 to raise the bed, protect the island, braid the flow, and reduce roadside erosion that is underway along the right bank. 3. A Constructed Side Channel at STA 2600-3000 will help direct flow to the flood plain and right bank side channels to enhance conditions for fish, vegetation, and beaver, and promote sediment storage. In addition to considerable sediment storage, this structure and the associated jams are expected to lift the water surface. These three features, combined with other in-river roughness elements, are intended to provide significant environmental benefit without grading material off the adjacent floodplain. While our project is aiming for a Stage-8 response (see *Stream Evolution Model Integrating Habitat and Ecosystem Benefits* by Cluer and Thorne, 2013), we aren't using the same techniques used in similar projects on US Forest Service lands in Oregon at Deer Creek or the SF Mackenzie. This is because Stage0/8 projects are an end goal condition, not the strategy, and so we are proposing substantially less cut and fill than at some other locations. The reason we're not grading the floodplain in a Stage 0 way is that the SF Toutle is only moderately incised and has an abundant sediment load that can be captured; and we believe that with a targeted approach we can roughen the channel and floodplain with woody material and minor grading to increse sediment aggradation and allow the river water level to lift starting with the first storm following construction. This approach

maintains hyporheic flow paths and vegetation complexes, reducing non-target impacts. To accomplish this, we propose to cut one starter channel and use some of that material in the river with woody material, but do not propose to completely reset the whole floodplain.

- We will minimize digging where there is existing vegetation. In fact, we will be building floodplain roughness structures upstream of existing vegetation in attempt to protect them from high velocities and scour. One of the goals of island forming structures is to promote natural processes so that thick blankets of sand deposit onto gravel bars to support vegetation.
- Any fill material we place in the channel will be coming directly from the channel we excavated it from. Thus, we don't have to develop a fill mix. We don't plan on importing or exporting any fill, it will be balanced within the project area.

8b. Will your project impact a waterbody or the area around a waterbody? [help]

☒ Yes ☐ No

8c. Have you prepared a mitigation plan to compensate for the project's adverse impacts to non-wetland waterbodies? [help]

- **If Yes**, submit the plan with the JARPA package and answer 8d.
- **If No, or Not applicable,** explain below why a mitigation plan should not be required.

☐ Yes ☒ No ☐ Don't know

The project is self-mitigating. We have 16,000 container stock growing in our native plant nurseries that will be planted at the site after construction to jumpstart riparian recovery.

8d. Summarize what the mitigation plan is meant to accomplish. Describe how a watershed approach was used to design the plan.

- If you already completed 7g you do not need to restate your answer here. [help]

LCFEG is working on a watershed scale on restoring the SF Toutle River. We've completed projects at RM 0.0 at the confluence with the NF Toutle, RM1.5 to 2.5 along the Steelhead Landing development and SFT Johnson Creek reach, and up in the headwaters in four tributaries (Bear, Harrington, Little Cow Springs, and Little Cow Creek) from RM 19 to 21.

This project is the first of multiple phases in what we're referring to as the Brownell Reach that covers RM 6.5 to 8.5.

We're also actively finalizing the first phase of implementation of the STHD project (pronounced "steelhead" for the Southfork Toutle Headwaters Design). The STHD project was completed in 2020 and covers 17 miles and 550 acres in the headwaters valley of the SF Toutle. The first phase covers 2.8 miles and 140 acres from RM 19 to 21.8.

In addition to our work in the SF Toutle, we're also jumpstarting recovery of the Green River with a 4-mile project near Shultz Creek and a 4-mile project in the NF Toutle Bear Creek. LCFEG is working with watershed partners including Weyerhaeuser, LCFRB, Ecology, WA DNR, and WDFW on a Toutle watershed restoration strategy.

8e. Summarize impact(s) to each waterbody in the table below. [help]

Activity (clear, dredge, fill, pile drive, etc.)	Waterbody name[1]	Impact location[2]	Duration of impact[3]	Amount of material (cubic yards) to be placed in or removed from waterbody	Area (sq. ft. or linear ft.) of waterbody directly affected
Digging pre-excavated pools and redistributing sediments	SF Toutle River	Below 100 year flood elevation	Until the river redistributes it	1150 cu yd	15,500 sq ft
LWD	SF Toutle River	Below 100 year flood elevation	15-100 years	2800 cu yd	30,000 sq ft
Containerized plants	SF Toutle River	Floodplain and upland zones with in the Riparian Management Zone	20-1000 years depending on species	8000 0.26 gal. pots (10.3 CY) + 8000 0.8 gal. pots (31.7 CY) + 175 1-CY bulk bags (175 CY) = 217 total cubic yards	45 acres of floodplain and terrace top over 4500 linear feet of the SF Toutle River

[1] If no official name for the waterbody exists, create a unique name (such as "Stream 1") The name should be consistent with other documents provided.
[2] Indicate whether the impact will occur in or adjacent to the waterbody. If adjacent, provide the distance between the impact and the waterbody and indicate whether the impact will occur within the 100-year flood plain.
[3] Indicate the days, months or years the waterbody will be measurably impacted by the work. Enter "permanent" if applicable.

8f. For all activities identified in 8e, describe the source and nature of the fill material, amount (in cubic yards) you will use, and how and where it will be placed into the waterbody. [help]

Digging pre-excavated pools and redistributing sediments – The Plans show multiple pre-excavated pools. Pool excavation will only occur in areas isolated with bypasses. These pools will range in size from 50 square feet and 4 cubic yards to 2000 square feet and 300 cubic yards. At these sites, we plan to dig pools and trenches to seat the wood below the existing floodplain elevation. This action elongates the life of the wood, provides ballast for the wood, and puts the wood in the water where the fish can use it for cover. Excavated materials will be redistributed within 100 feet of where they were removed with no net change in sediment taken from or disposed of in the floodplain.

LWD – LWD was sourced from Vancouver, Battle Ground, Ridgefield, Scappoose, and donated materials from Weyerhaeuser from nearby timber harvests. Cubic yardage was estimated based on the average size of each size class.

Containerized plants – About 16,000 containerized plants are being grown by LCFEG through our partnerships with Clark Conservation District. The plants are currently located at our Toutle Lake Highschool nursery and our Battle Ground nursery at the Center for Agriculture, Science, and Environmental Education. Plant propagation associated with these projects offers an opportunity to give students hands-on learning opportunities. Another 175 containerized plants are being grown by Natural Recovery at their Kalama nursery. These are being grown in bulk bags filled with a combination of aged bark and sawdust, diatomaceous earth, dirt, and other organic matter that was custom blended for this project. The bags were filled about ¾ with the custom mix before whole willow trees were placed into the bags and they were topped with fir sawdust for weed control and to retain moisture. Last, additional rooted cuttings, bare root stock, and some container stock were planted into the bags to create a community of riparian plants within each bulk bag. LCFEG is calling these Riparian Plant Pods. The total cubic yardage includes all plants.

8g. For all excavating or dredging activities identified in 8e, describe the method for excavating or dredging, type and amount of material you will remove, and where the material will be disposed. [help]

Digging pre-excavated pools and redistributing sediments; LWD; Containerized Plants – Exact sequencing will be up to the contractor. Sequencing below assumes the bypass has already been installed and fish have been removed. Generally, the sequencing will include:

- Excavating pool and using excavated sediments to create a berm that isolates the excavation area from the surface flow. As described in Appendix A, some surface water will be allowed to flow through isolated areas to protect lamprey and macroinvertebrates. While the surface flow will be minimal, site isolation will help keep turbid waters from flowing downstream. Not all pre-excavated pools will be located in areas with surface water; in these areas, excavated materials will simply be piled aside.
- Once excavation of the pool is complete, trenches will be excavated for the key piece boles.
- Once all excavation is complete, wood will be placed into the structure under direct supervision by the project manager or engineer. Wood will be layered into the structure with a base of smaller material and slash followed by key pieces and then pilings.
- Before back filling the trenches, we will install 1-cubic yard containerized plant stock grown in bulk bags.
- With plants and wood installed, the structure will be buried at an elevation that matches the mid-floodplain elevation. By matching the elevation of the floodplain, we mimic an established anastomosing channel network where there are multiple channels active at low flow periods with more edge habitat, more miles of stream, and more confluences/difluences that are biological hot spots.

8h. Have you prepared a Water Quality Monitoring Plan (WQMP) for all in-water work (below ordinary high water), over water work or discharges to waters of the state?

☐ Yes ☒ No

If NO describe the monitoring that you will be conducting including parameters, equipment and locations, or explain why monitoring will not be necessary. [help]
First, it should be taken into consideration that the fish native to the SF Toutle River have adapted to high turbidity loads following the 1980 eruption. Summer turbidity levels remain low in the SF Toutle but come fall, the first rain events of the year can bring significant turbidity levels into the surface water. This is an annual occurrence, and these fish are adapted to temporary pulses of high turbidity moreso than other regional rivers. Next, please review Sheet 17 of the Plans that discuss Temporary Erosion Control measures and Sheet 14 for Temporary Push-up Dam instructions. The Water Diversion and Fish Salvage Plan (Appendix A) was prepared to plan for addressing water quality concerns. This plan shows how each worksite will be isolated to help protect aquatic life. Worksites 2 and 3 both require river diversions and isolation of work zones to reduce the amount of turbid water flowing into fish-bearing waters. Appendix A also shows "mixing areas" at the downstream end of the worksites; see Sheets 5 and 7. Due to the limited amount of flow going through the isolated worksites, we don't anticipate a lot of flow going into these mixing areas. However, we have to maintain some flow through the isolated worksites in order to protect lamprey and macroinvertebrates. Most workdays will not include digging in the channel, which is the greatest source of turbidity. However, in order to adequately address the habitat needs for large adult salmon (Chinook salmon in particular), we are pre-excavating pools. On days we are working near the mixing zones, when the turbidity has less time to settle out before it reaches the mixing zone, we may break the water quality standard. The contractor will be responsible for adhering to Sheet 17 erosion control measures. Alternative actions that the contractor can utilize include (1) pumping turbid water from the isolated work areas out of the floodplain before it reaches the mixing areas, (2) stopping turbidity-creating activities until waters clear, (3) other mechanisms that the contractor shall get pre-approved with LCFEG and the engineer before mobilization. To evaluate the contractor's compliance, LCFEG will have staff examining the mixing areas and isolated worksites. LCFEG staff will stage buckets and fish nets incrementally along the isolated worksites and will monitor these wet areas for distressed critters. We will communicate with the contractor about adjusting flows through the bypasses to protect aquatic life. We will also increase flow through the bypasses overnight and over the weekends when there won't be staff available to monitor.

Part 9–Additional Information

Any additional information you can provide helps the reviewer(s) understand your project. Complete as much of this section as you can. It is ok if you cannot answer a question.

9a. If you have already worked with any government agencies on this project, list them below. [help]

Agency Name	Contact Name	Phone	Most Recent Date of Contact
Dept. of Ecology	Meghan Tait	mtai461@ecy.wa.gov	Email correspondence November 2023
Dept. of Ecology	Penny Kelley	pkel461@ecy.wa.gov	Site visit 12/5/23
Dept. of Ecology	Casey Vaughn	cvau461@ecy.wa.gov	Site visit scheduled for 12/5/23, virtual meeting 12/18/23, email corr. 12/20/23
NOAA	Amy Kocourek	amy.kocourek@noaa.gov	Site visit 12/5/23 and virtual meeting 12/18/23

USACE	Brad Johnson	503-278-1845	10/25/2023 site visit
WDFW	Monica Blanchard	360-490-0097	Site visit 12/5/23 and virtual meeting 12/18/23
WDFW	George Fornes	360-623-0651	10/25/2023 site visit, virtual meeting 12/18/23
WDFW	Rian Sallee		10/25/2023 site visit
Cowlitz County	Adam Trimble	360-577-1052	10/25/2023 site visit
WA DNR	Scott Hancock	360-608-9294	10/25/2023 site visit

9b. Are any of the wetlands or waterbodies identified in Part 7 or Part 8 of this JARPA on the Washington Department of Ecology's 303(d) List? [help]

- **If Yes,** list the parameter(s) below.
- If you don't know, use Washington Department of Ecology's Water Quality Assessment tools at: https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-improvement/Assessment-of-state-waters-303d.

☒ Yes ☐ No

The SF Toutle is 303(d) listed for water temperature; see listing ID 72849

9c. What U.S. Geological Survey Hydrological Unit Code (HUC) is the project in? [help]

- Go to https://water.usgs.gov/GIS/huc.html to help identify the HUC.

Lower Cowlitz Watershed – 17080005

9d. What Water Resource Inventory Area Number (WRIA #) is the project in? [help]

- Go to https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-availability/Watershed-look-up to find the WRIA #.

26-Cowlitz

9e. Will the in-water construction work comply with the State of Washington water quality standards for turbidity? [help]

- Go to https://ecology.wa.gov/Water-Shorelines/Water-quality/Freshwater/Surface-water-quality-standards/Criteria for the standards.

☐ Yes ☒ No ☐ Not applicable

Please see the Water Quality Monitoring and Protection Plan and Extended Area of Mixing attached.

9f. If the project is within the jurisdiction of the Shoreline Management Act, what is the local shoreline environment designation? [help]

- If you don't know, contact the local planning department.
- For more information, go to: https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Shoreline-coastal-planning/Shoreline-laws-rules-and-cases.

☐ Urban ☐ Natural ☒ Aquatic ☐ Conservancy ☐ Other: _____

9g. What is the Washington Department of Natural Resources Water Type? [help]

- Go to http://www.dnr.wa.gov/forest-practices-water-typing for the Forest Practices Water Typing System.

☐ Shoreline ☒ Fish ☐ Non-Fish Perennial ☐ Non-Fish Seasonal

9h. Will this project be designed to meet the Washington Department of Ecology's most current stormwater manual? [help]

- **If No,** provide the name of the manual your project is designed to meet.

- **If No**, provide the name of the manual your project is designed to meet.

☐ Yes ☒ No

Name of manual: N/a

9i. Does the project site have known contaminated sediment? [help]

- **If Yes**, please describe below.

☐ Yes ☒ No

The only contaminants known are the chunks of concrete and rebar that will be removed as part of the project.

9j. If you know what the property was used for in the past, describe below. [help]

The property has been used for commercial forestry and recreational fishing/swimming/boating opportunities.

9k. Has a cultural resource (archaeological) survey been performed on the project area? [help]

- **If Yes**, attach it to your JARPA package.

☐ Yes ☒ No

The entire project area is located within the footprint of the 1980 lahar flows associated with the eruption of Mount St. Helens. Thus, there are no work areas, surfaces, or structures that are older than 50 years old.

Please see our attached Inadvertent Discovery Plan.

9l. Name each species listed under the federal Endangered Species Act that occurs in the vicinity of the project area or might be affected by the proposed work. [help]

Federal ESA Status of Threatened:
Toutle Fall (Tule) Chinook
Lower Cowlitz Fall (Tule) Chinook
Cowlitz Fall Chum
Cowlitz Summer Chum
North Fork Toutle Coho
South Fork Toutle Coho
Lower Cowlitz Coho
North Fork Toutle Winter Steelhead
South Fork Toutle Winter Steelhead
Lower Cowlitz Winter Steelhead

9m. Name each species or habitat on the Washington Department of Fish and Wildlife's Priority Habitats and Species List that might be affected by the proposed work. [help]

Coho	Oncorhynchus kisutch	Occurrence
Cutthroat	Oncorhynchus clarki	Occurrence
Fall Chinook	Oncorhynchus tshawytscha	Occurrence/Migration/ Breeding Area
Fall Chum	Oncorhynchus keta	Occurrence/Migration
Western Toad	Anaxyrus boreas	Occurrence/Migration/ Breeding Area
RIVERINE UPPER PERENNIAL	Null	Aquatic Habitat
Rainbow Trout	Oncorhynchus mykiss	Occurrence/Migration
Resident Coastal Cutthroat	Oncorhynchus clarki	Occurrence/Migration
Spring Chinook	Oncorhynchus tshawytscha	Occurrence/Migration
Steelhead	Oncorhynchus mykiss	Occurrence
Summer Steelhead	Oncorhynchus mykiss	Occurrence/Migration
Winter Steelhead	Oncorhynchus mykiss	Breeding Area

Part 10–SEPA Compliance and Permits

Use the resources and checklist below to identify the permits you are applying for.

- Online Project Questionnaire at http://apps.oria.wa.gov/opas/.
- Governor's Office for Regulatory Innovation and Assistance at (800) 917-0043 or help@oria.wa.gov.
- For a list of addresses to send your JARPA to, click on agency addresses for completed JARPA.

10a. Compliance with the State Environmental Policy Act (SEPA). (Check all that apply.) [help]

- For more information about SEPA, go to https://ecology.wa.gov/regulations-permits/SEPA-environmental-review.

☐ A copy of the SEPA determination or letter of exemption is included with this application.

☐ A SEPA determination is pending with _____ (lead agency). The expected decision date is _____.

☐ I am applying for a Fish Habitat Enhancement Exemption. (Check the box below in 10b.) [help]

☒ This project is exempt (choose type of exemption below).

☐ Categorical Exemption. Under what section of the SEPA administrative code (WAC) is it exempt? _____

☒ Other: HRPP

☐ SEPA is pre-empted by federal law.

10b. Indicate the permits you are applying for. (Check all that apply.) [help]

LOCAL GOVERNMENT

Local Government Shoreline permits:

☐ Substantial Development ☐ Conditional Use ☐ Variance

☒ Shoreline Exemption Type (explain): WDFW HRPP

Other City/County permits:

☐ Floodplain Development Permit ☐ Critical Areas Ordinance

STATE GOVERNMENT

Washington Department of Fish and Wildlife:

☒ Hydraulic Project Approval (HPA) ☐ Fish Habitat Enhancement Exemption – Attach Exemption Form

Washington Department of Natural Resources:

☐ Aquatic Use Authorization

Complete JARPA Attachment E and submit a check for $25 payable to the Washington Department of Natural Resources. **Do not send cash.**

Washington Department of Ecology:

☒ Section 401 Water Quality Certification

☐ Authorization to impact waters of the state, including wetlands (Check this box if the proposed impacts are to waters not subject to the federal Clean Water Act)

FEDERAL AND TRIBAL GOVERNMENT

United States Department of the Army (U.S. Army Corps of Engineers):

☒ Section 404 (discharges into waters of the U.S.) ☐ Section 10 (work in navigable waters)

United States Coast Guard:

For projects or bridges over waters of the United States, contact the U.S. Coast Guard at:

☐ Bridge Permit: D13-SMB-D13-BRIDGES@uscg.mil

☐ Private Aids to Navigation (or other non-bridge permits): D13-SMB-D13-PATON@uscg.mil

United States Environmental Protection Agency:

☐ Section 401 Water Quality Certification (discharges into waters of the U.S.) on tribal lands where tribes do not have treatment as a state (TAS)

Tribal Permits: (Check with the tribe to see if there are other tribal permits, e.g., Tribal Environmental Protection Act, Shoreline Permits, Hydraulic Project Permits, or other in addition to CWA Section 401 WQC)

☐ Section 401 Water Quality Certification (discharges into waters of the U.S.) where the tribe has treatment as a state (TAS).

Part 11–Authorizing Signatures

Signatures are required before submitting the JARPA package. The JARPA package includes the JARPA form, project plans, photos, etc. [help]

11a. Applicant Signature (required) [help]

I certify that to the best of my knowledge and belief, the information provided in this application is true, complete, and accurate. I also certify that I have the authority to carry out the proposed activities, and I agree to start work only after I have received all necessary permits.

I hereby authorize the agent named in Part 3 of this application to act on my behalf in matters related to this application. BC (initial)

By initialing here, I state that I have the authority to grant access to the property. I also give my consent to the permitting agencies entering the property where the project is located to inspect the project site or any work related to the project. BC (initial)

Brice Crayne		11/22/2023
Applicant Printed Name	Applicant Signature	Date

11b. Authorized Agent Signature [help]

I certify that to the best of my knowledge and belief, the information provided in this application is true, complete, and accurate. I also certify that I have the authority to carry out the proposed activities and I agree to start work only after all necessary permits have been issued.

Tom Smayda	Tom Smayda	11/20/2023
Authorized Agent Printed Name	Authorized Agent Signature	Date

11c. Property Owner Signature (if not applicant) [help]

Not required if project is on existing rights-of-way or easements (provide copy of easement with JARPA).

I consent to the permitting agencies entering the property where the project is located to inspect the project site or any work. These inspections shall occur at reasonable times and, if practical, with prior notice to the landowner.

Jennifer Ridgway	Jennifer Ridgway	12/20/23
Property Owner Printed Name	Property Owner Signature	Date

18 U.S.C §1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious, or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than 5 years or both.

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA publication number: ORIA-16-011 rev. 09/2018

Salmon Recovery Funding Project
21-1061

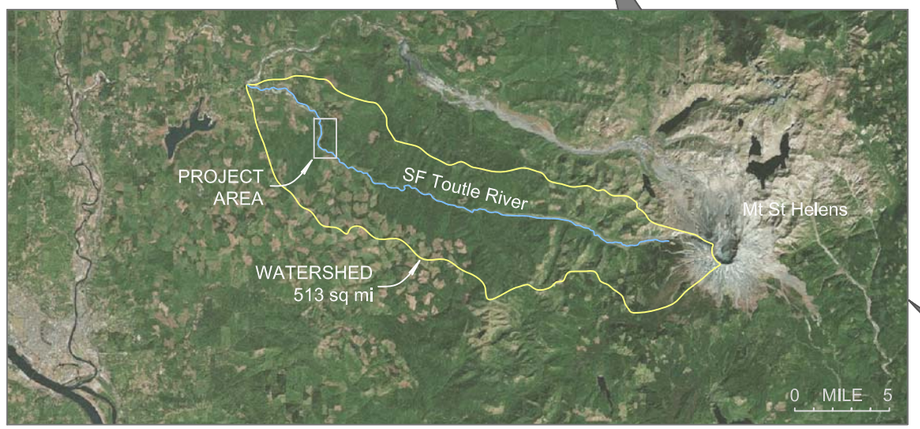
SF TOUTLE RIVER AT BROWNELL CREEK

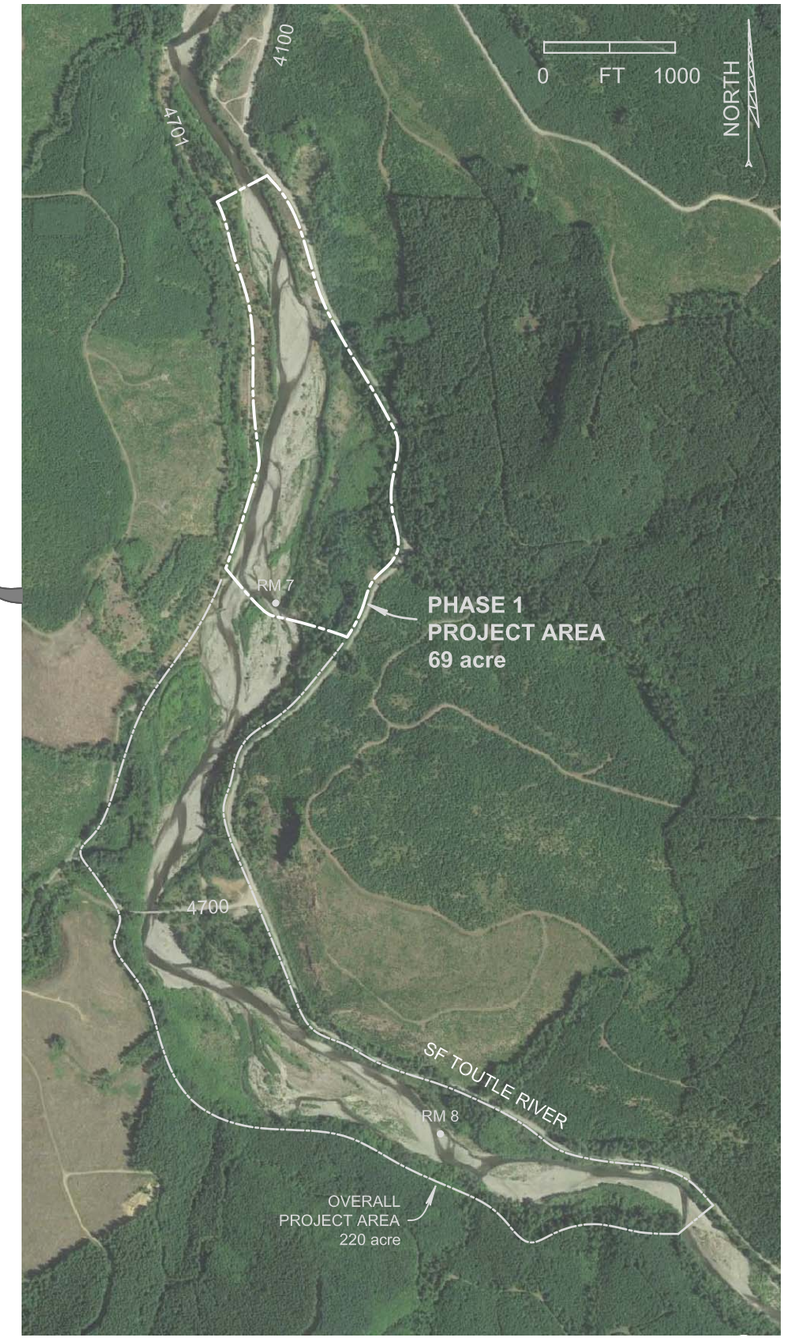
PHASE 1 - RM 6.5 to 7.1

PROJECT LOCATION

4100 ROAD, COWLITZ COUNTY, WA
S1, 2, 11 & 12 T9N R1E
46.2814° N, -122.6426° W

I-5 EXIT 49
US 504 EAST 10.4 MILES
RIGHT ON S TOUTLE RD 2.6 MILES
RIGHT ON 4100 RD 4.5 MILES
RIGHT ON 4700 RD TO STAGING AREA





LOWER COLUMBIA FISH ENHANCEMENT GROUP
11018 NE 51st CIRCLE
VANCOUVER, WA 98682
360-882-6671
BRICE CRAYNE, PROJECT MANAGER

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
5525 S 11TH STREET
RIDGEFIELD, WA 98642
360-906-6731
CONTACT: GEORGE FORNES
AREA HABITAT BIOLOGIST

SMAYDA ENVIRONMENTAL ASSOCIATES, INC.
civil engineering and biological science
139 NE 61ST STREET
SEATTLE, WA 98115
TOM SMAYDA, P.E. 206-369-2854

T. J. SMAYDA
STATE OF WASHINGTON
29719
REGISTERED
PROFESSIONAL ENGINEER

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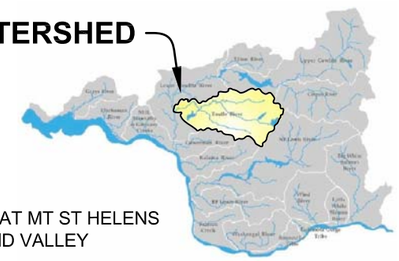
90% draft

Novermber 14, 2023

TOUTLE RIVER WATERSHED

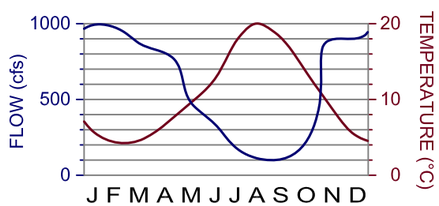


WATERSHED = 513 SQ MI
HIGHEST ELEVATION = 8336 FT AT MT ST HELENS
PRECIPITATION = 61 IN/YR AT KID VALLEY

SF TOUTLE RM 6 DESIGN FLOW RATES (cfs)

100-YR	17,000
10-YR	11,000
2-YR	6,000
Winter Base	200
7d-10yr Low	60

SF TOUTLE AVERAGE FLOW AND WATER TEMPERATURE



SF TOUTLE WATER QUALITY MEETS CRITERIA (WAC 173-201A-200) FOR CORE SUMMER SALMONID HABITAT EXCEPT DURING SUMMER 2009 WHEN THE 7-D MEAN DAILY MAXIMUM TEMPERATURE EXCEEDED THE 16°C CRITERION DURING 85 OF 92 DAYS (92%) WITH A MAXIMUM OF 26.4°C FOR THE 7 DAY PERIOD CENTERED ON 7-30-2009.

GENERAL NOTES

1. CREEK AND LOG ALIGNMENT MAY BE FIELD ADJUSTED BY THE ENGINEER TO TAKE ADVANTAGE OF EXISTING SOILS AND PLANTS.
2. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL WORK.
3. THE HORIZONTAL AND VERTICAL LOCATIONS OF EXISTING FEATURES PROVIDED ON THIS SET OF PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY EXACT LOCATIONS TO PROTECT AND UTILIZE SITE FEATURES. THE CONTRACTOR SHALL ENSURE THAT THE NEW LOG JAMS ARE CONSTRUCTED AT THE PROPER ELEVATION AND USING THE CORRECT AMOUNT OF MATERIALS TO CREATE NEW POOLS AND TAILOUTS.
4. THESE DRAWINGS AND THE IDEAS AND DESIGNS INCORPORATED HEREIN ARE NOT TO BE USED, IN WHOLE OR IN PART, WITHOUT THE WRITTEN AUTHORIZATION OF SMAYDA ENVIRONMENTAL ASSOCIATES, INC.
5. PROPOSED LOG JAM LOCATIONS SHALL BE FLAGGED BY LCFEG. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE POSITIONS OF THESE FLAGS AND SHALL CONSTRUCT THE NEW LOG JAMS RELATIVE TO THE POSITIONS OF THE FLAGS.
6. A COPY OF THESE PLANS MUST BE ON THE JOB SITE AT ALL TIMES DURING CONSTRUCTION.
7. BEFORE ANY CONSTRUCTION OR DEVELOPMENT ACTIVITY, A PRECONSTRUCTION MEETING MUST BE HELD BETWEEN THE ENGINEER, CONTRACTOR AND LCFEG. CONSTRUCTION ROUTES ACROSS THE PROPERTY SHALL BE RESOLVED.
8. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL CALL THE UNDERGROUND UTILITIES LOCATION CENTER AT 1-800-424-5555 FOR UTILITY LOCATIONS (WATER, SANITARY SEWER, STORM SEWER, GAS, POWER, TELEPHONE, AND TELEVISION).
9. CONSTRUCTION NOISE SHALL BE LIMITED IN ACCORDANCE WITH COWLITZ COUNTY CODE; NORMALLY, THIS IS 7 A.M. TO 10 P.M. ON WEEKDAYS AND 9 A.M. TO 10 P.M. ON WEEKENDS.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACTOR. ANY WORK WITHIN THE TRAVELED RIGHT-OF-WAY THAT MAY INTERRUPT NORMAL TRAFFIC FLOW SHALL REQUIRE AT LEAST ONE FLAGGER FOR EACH LANE OF TRAFFIC AFFECTED. SECTION 1-07.23, "TRAFFIC CONTROL," OF THE WSDOT STANDARD SPECIFICATIONS SHALL APPLY IN ITS ENTIRETY.
11. WASTE OR RUBBLE THAT IS ENCOUNTERED OR GENERATED SHALL BE HAULED OFFSITE FOR DISPOSAL AT A LANDFILL OR OTHER APPROPRIATE LOCATION. WASTE MATERIALS MAY BE TEMPORARILY STOCKPILED IN THE STAGING AREA UNTIL DISPOSAL.
12. AN ON-SITE ENGINEER SHALL BE PROVIDED BY LCFEG TO ASSIST WITH THE INTERPRETATION OF DESIGN PLANS AND TO COLLABORATE WITH THE CONTRACTOR DURING CONSTRUCTION.

PROJECT DATUM AND MAPPING NOTES

BASE MAPS WERE CREATED FROM FIELD DATA, GOOGLE EARTH HISTORICAL IMAGERY, OCTOBER 2007 LIDAR (WATERSHED SCIENCES, 2007), AND JULY 2019 MOTION-TO-STRUCTURE DATA (LOWER COLUMBIA ESTUARY PARTNERSHIP, 2019). SITE INSPECTIONS OCCURED JANUARY 3, JULY 1 & 2, AND NOVEMBER 19 & 20, 2019. CHANNEL ALIGNMENT DIFFER IN THE LIDAR MAP, THE AERIAL PHOTO, AND DURING THE INSPECTION. RIVER ALIGNMENT DURING CONSTRUCTION WILL PROBABLY ALSO DIFFER. MAPPING AND ELEVATIONS ARE SUITABLE FOR PROJECT PURPOSES ONLY. STRUCTURE LOCATIONS AND ELEVATIONS WILL BE SET BY EYE DURING CONSTRUCTION TO TAKE ADVANTAGE OF THEN-CURRENT CONDITIONS. ORDINARY HIGH WATER AND 100-YEAR PEAK WATER LEVELS WERE ESTIMATED USING ALL OF THE ABOVE SOURCES TO EVALUATE ECOLOGICAL FUNCTIONING. PEAK WATER LEVELS WERE NOT DETERMINED FOR FLOOD-RISK EVALUATION.

STANDARD SPECIFICATIONS

STREAM HABITAT RESTORATION GUIDELINES, FINAL. 2012. WASHINGTON STATE AQUATIC HABITAT GUIDELINES PROGRAM, WDFW.

SUGGESTED CONSTRUCTION SEQUENCE

1. DEVELOP TEMPORARY ACCESS ROUTE TO THE STAGING AREA.
2. FURNISH PROJECT MATERIALS TO THE STAGING AREA.
3. CONSTRUCT IMPROVEMENTS.
4. RESTORE AND ABANDON THE TEMPORARY ACCESS ROUTE.
5. INSTALL NATIVE PLANTS THROUGHOUT THE PROJECT AREA.
6. PERFORM ADDITIONAL PLANTING AND MAINTENANCE IN THE PROJECT AREA AS A SEPARATE PROJECT.

PROJECT INTENT

THE PROJECT IS INTENDED TO IMPROVE CONDITIONS FOR CHINOOK AND COHO SALMON, STEELHEAD TROUT, BEAVER, AND NATIVE PLANTS BY INCREASING HABITAT SUITABILITY. WOOD WILL BE INSTALLED TO CREATE SMALL AND MEDIUM SIZED LOGJAMS PATTERNED AFTER NATURAL JAMS AND AFTER OTHER SUCCESSFUL JAMS PREVIOUSLY INSTALLED BY LCFEG IN THE TOUTLE. THE JAMS WILL INCREASE THE NUMBER AND SIZE OF POOLS, INCREASE RIVER BED STABILITY AT SPAWNING LOCATIONS, AND IMPROVE PLANT ESTABLISHMENT. THE INSTALLED WOODY MATERIAL WILL HELP RETAIN RIVER SEDIMENT, RAISE WATER LEVEL, AND PROMOTE MULTIPLE RIVER CHANNELS AND SIDE-CHANNELS. NATIVE PLANTS WILL BE INSTALLED DURING AND AFTER CONSTRUCTION.

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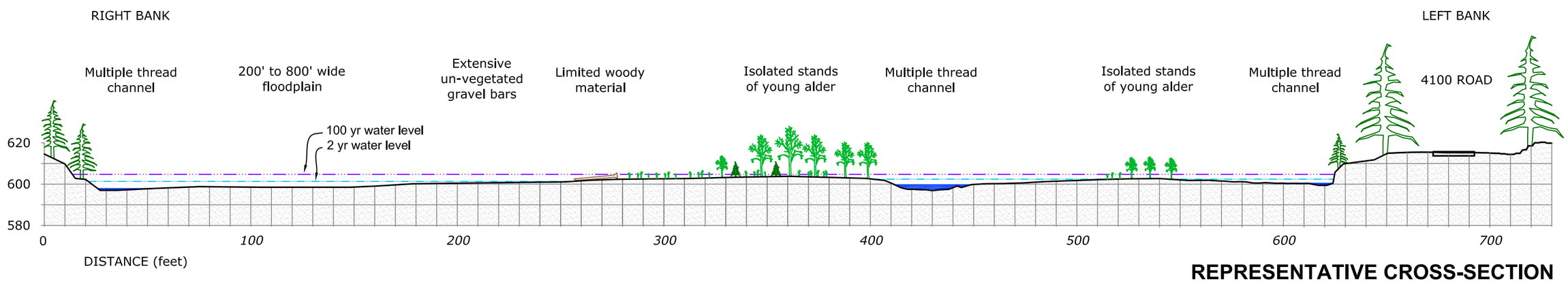


REPRESENTATIVE CROSS-SECTION

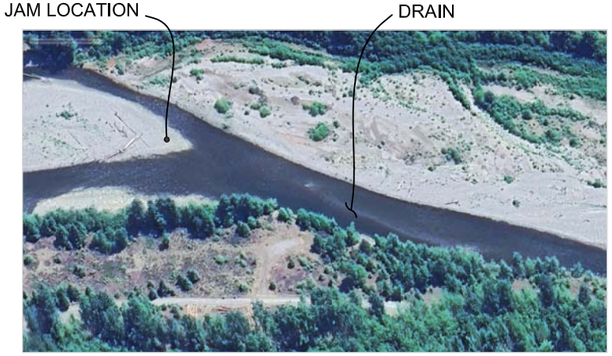


FIGURE 1. CURTAIN DRAIN
The top photo shows the existing 400' long curtain drain in the project area that provides good fish habitat with a left bank pool. Following installation of the proposed island forming jam, the curtain drain is expected to grow in size as indicated in the lower photo of a similar Skagit River feature. This increase in sediment storage will tend to raise the river bed and increase resilience to drought.

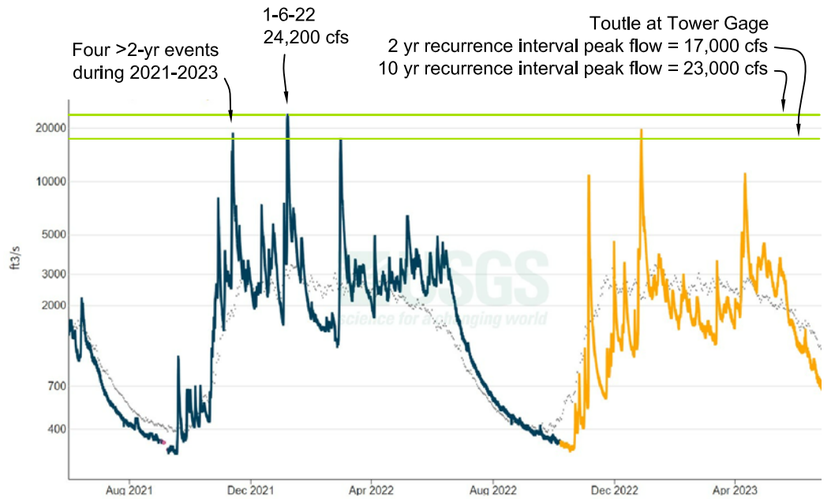
FIGURE 2. ISLAND FORMING JAM
Other Pacific Northwest rivers, such as the Skagit and Hoh above, have much more woody material than the Toutle River. Salvage logging removed most wood from the Toutle after the 1980 Mt St Helens eruption. Create Island Forming Jams to resemble the above to increase water surface elevations, gravel retention, and fish habitat values.

FIGURE 3. FLOODPLAIN ROUGHNESS
Woody material is relatively abundant in other rivers, such as shown here in the Skagit and Hoh, but sparse in the Toutle. The project will add wood throughout the floodplan in the patterns shown above to help correct the deficit. Added wood will promote vegetation, store gravels, raise water levels, and help establish side channels to benefit fish.

PROJECT OBJECTIVES

1. CREATE CONDITIONS THAT BENEFIT CHINOOK AND COHO SALMON, STEELHEAD TROUT, BEAVER, AND NATIVE PLANTS.
2. RETAIN RIVER SEDIMENT, RAISE WATER LEVEL, AND PROMOTE MULTI-THREADED CHANNELS AND SIDE-CHANNELS.
3. ADD WOODY MATERIALS TO BENEFIT FISH, VEGETATION AND BEAVER.
4. INCREASE THE NUMBER AND SIZE OF POOLS AND INCREASE WOODY MATERIALS IN POOLS AND NEAR OVERHANGING VEGETATION.
5. INCREASE RIVER BED STABILITY AT SPAWNING LOCATIONS
6. IMPROVE NATIVE PLANT ESTABLISHMENT.
7. CREATE CONDITIONS THAT LOOK AND FUNCTION NATURALLY.
8. CREATE JAMS STABLE ENOUGH TO CATCH WOOD FROM UPRIVER.

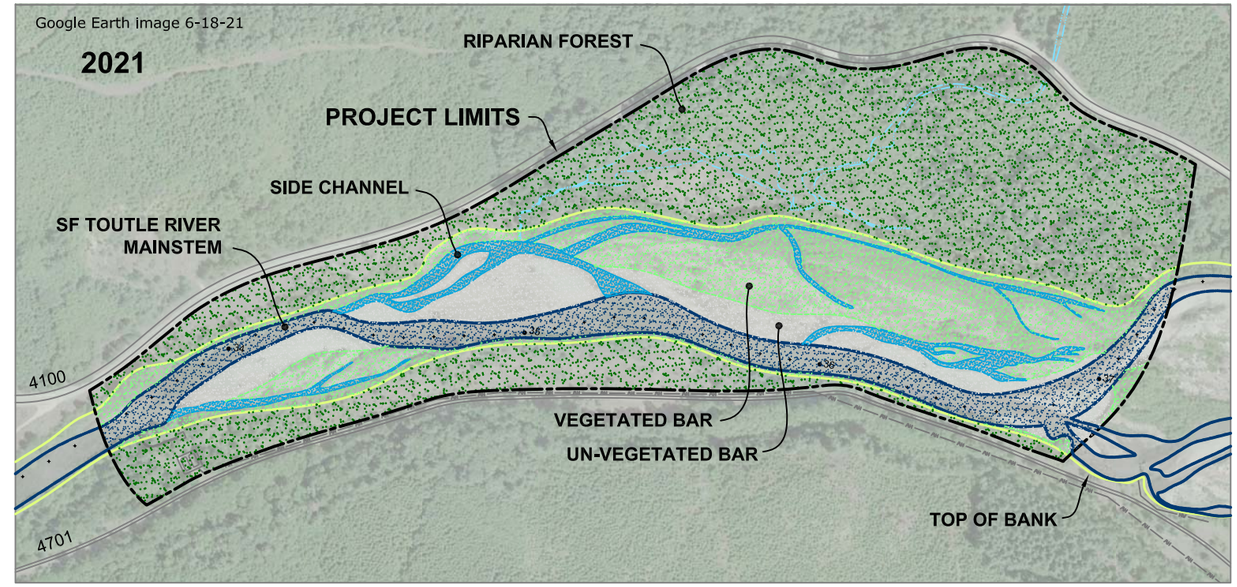
SMAYDA ENVIRONMENTAL ASSOCIATES, INC.	LOWER COLUMBIA FISH ENHANCEMENT GROUP	90% 11-14-2023	SF TOUTLE RIVER NEAR BROWNELL CREEK - PHASE I	**OBJECTIVES**	SHEET 3 OF 18

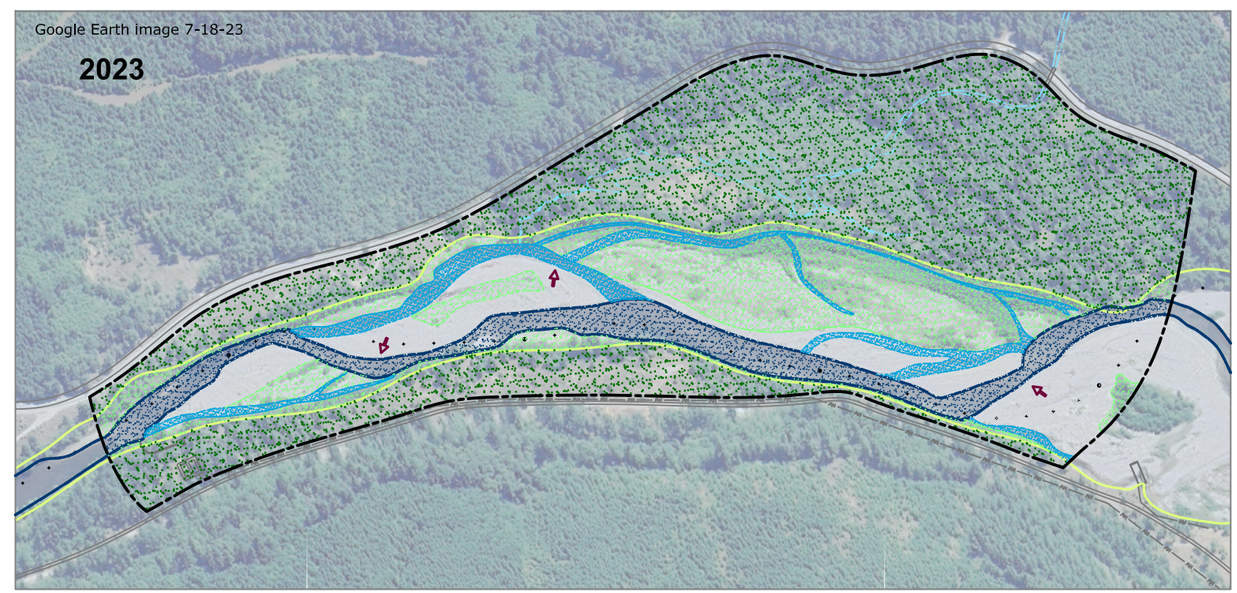


TOUTLE FLOW 2021 - 2023

Three 2-year and one 10-year peak flow events occurred between the two photos.

Three 2-year and one 10-year peak flow events occurred between the two photos. As a result, some lateral migration of the river and habitat acreage shifted as shown in the Tables and Figures below.





2021 HABITAT AREA

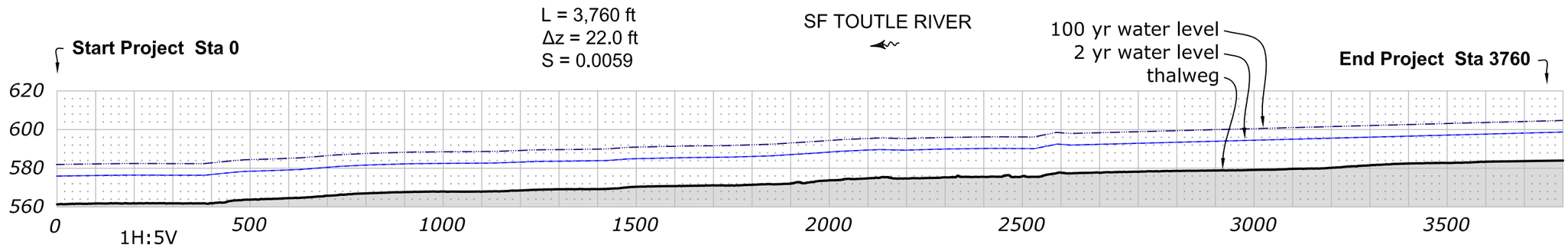
	Area *acre*	Length *feet*	Average Width *feet*
Project Limits	68.8	3,900	770
Riparian Forest	37.2	-	-
Vegetated Gravel Bar	13.9	-	-
Un-Vegetated Gravel Bar	7.0	-	-
Side Channels and Overflow Routes	3.1	7,400	18
Mainstem Base Flow Channel	7.7	3,900	86
Top of Bank	31.8	3,900	355

2023 HABITAT AREA

	Area *acre*	Length *feet*	Average Width *feet*
Project Limits	68.8	3,900	770
Riparian Forest	37.2	-	-
Vegetated Gravel Bar	12.5	-	-
Un-Vegetated Gravel Bar	8.9	-	-
Side Channels and Overflow Routes	3.7	7,200	22
Mainstem Base Flow Channel	6.5	3,800	73
Top of Bank	31.8	3,900	355

CONCLUSIONS

1. The floodplain is not in equilibrium and the river migrates from side to side.
2. Considerable gravel moves down river like a series of large dunes.
3. Vegetation is becoming more and more robust.
4. in-river woody material is severely lacking.
5. Braided flow is observed to support more fish than single-thread channels.
6. Temperature exceedances occur, otherwise water quality is exceptional.
7. Vigorous hyporheic exchange allows turbid flood water to quickly clear, but during low summer flow uniform water temperatures indicate little exchange.

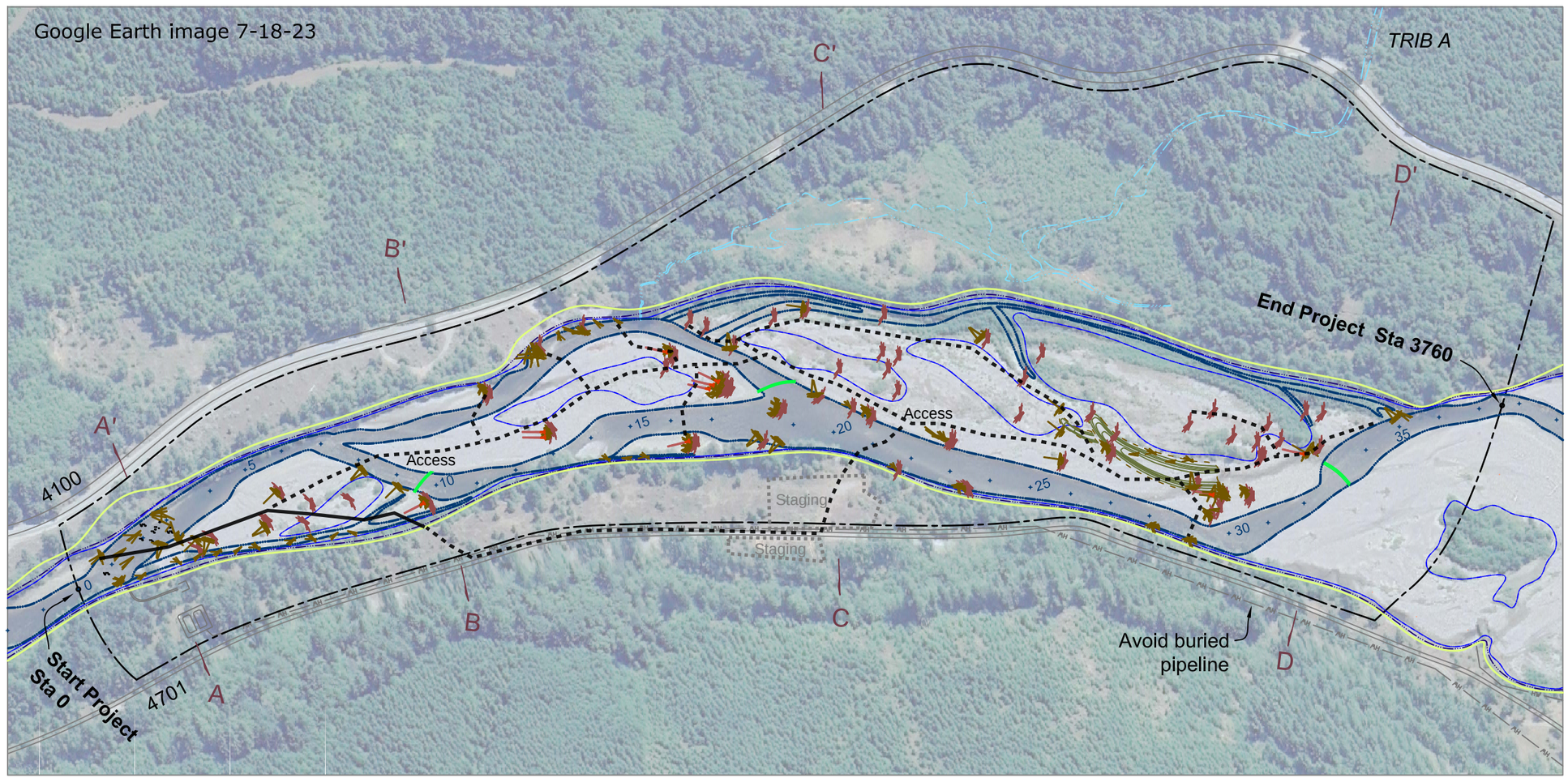


KEY

- Project Limits
- 10 Station (in hundreds)
- Top of Bank
- 100 yr water level
- 2 yr water level
- Base flow
- A A' Cross-Sections

PROPOSED

- Key pieces
- Fixed wood
- Loose wood
- Boulders
- Cut
- Temporary dams



T. J. SMAYDA
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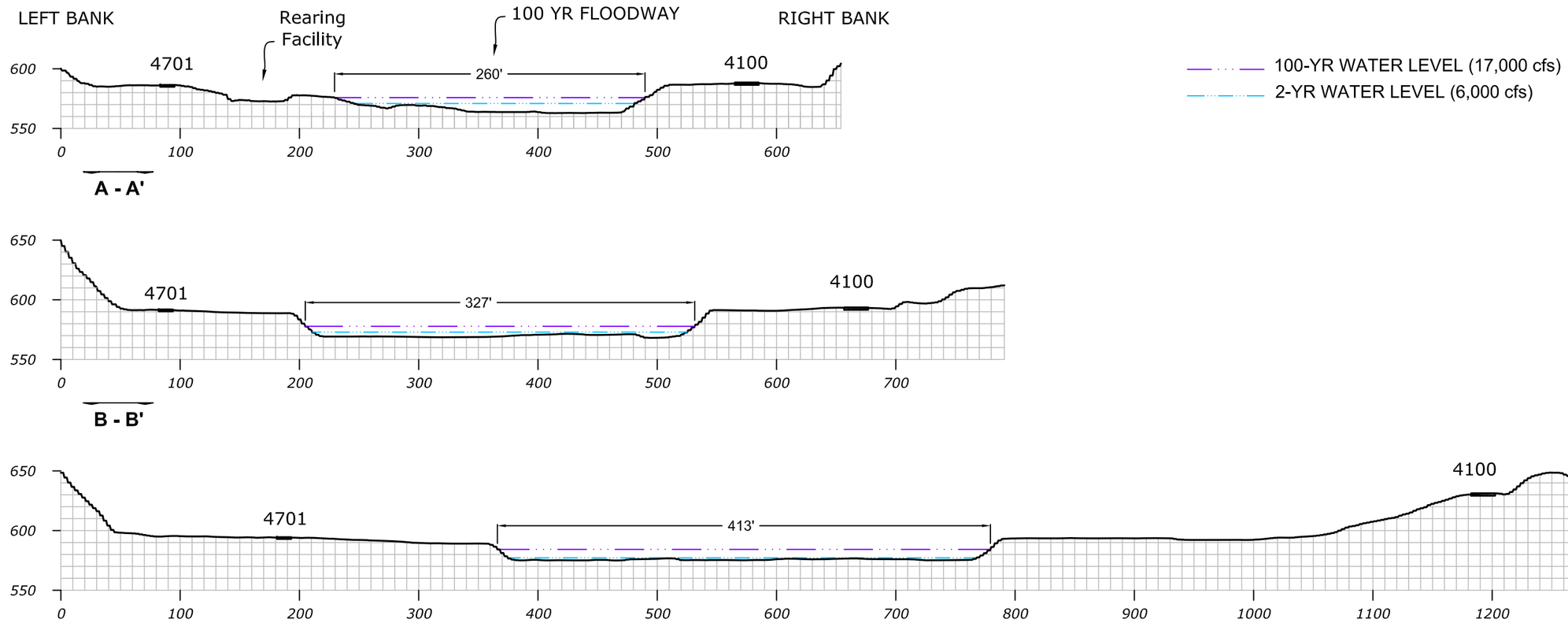
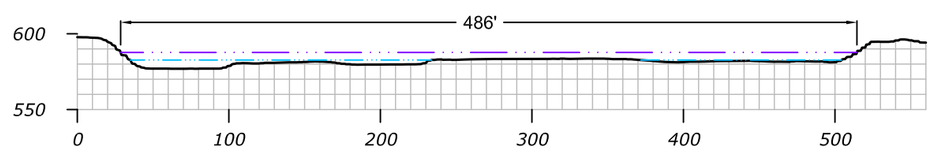


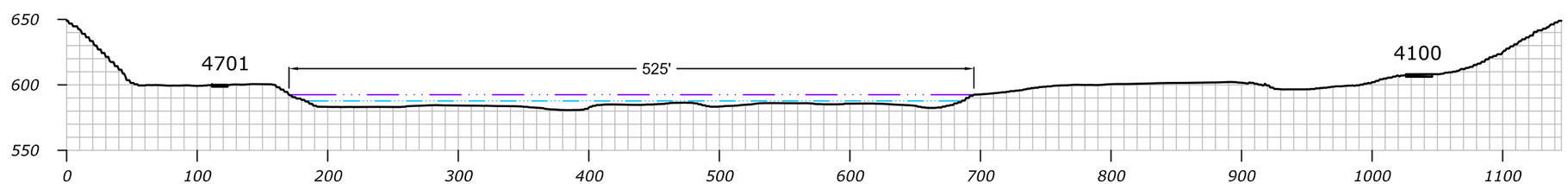
A - A'

B - B'

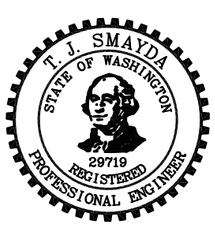
C - C'



D - D'



E - E'



SMAYDA ENVIRONMENTAL ASSOCIATES, INC.	LOWER COLUMBIA FISH ENHANCEMENT GROUP	90% DRAFT 11-14-2023	SF TOUTLE RIVER NEAR BROWNELL CREEK - PHASE I **CROSS SECTIONS**	SHEET 6 OF 18

STATION 0 - 1200 OBJECTIVES

1. THE RIVER FLOODPLAIN NARROWS IN THIS REACH AND FLOW BECOMES MORE CONFINED AND POWERFUL. INCREASE ROUGHNESS AT THIS BOTTLENECK.
2. INSTALL CLUSTERED SMALL STRUCTURES AND BOULDERS TO ROUGHEN THE CHANNEL AND PROMOTE GRAVEL AGGREDATION WITH LOCALIZED AREAS OF SCOUR TO CREATE A PATTERN OF HABITAT FEATURES.
3. STABILIZE WOODY MATERIALS WITH PILES AND BOULDERS RATHER THAN BURIAL TO MINIMIZE DIGGING AND ELIMINATE REQUIREMENT FOR TEMPORARY DIVERSION DAMS.
4. INSTALL HABITAT WOOD INTO THE EXISTING SIDE CHANNEL TO INCREASE POOL VOLUME AND HABITAT BENEFIT.
5. MANAGE RIPARIAN AREAS BY OBSERVATION AND PASSIVE RESTORATION COMBINED WITH LIMITED UNDERPLANTING, WEEDING AND LITTER PATROL.
6. INSTALL 8 CONTAINERIZED PLANTS ON RIGHT BANK BAR TO THE RIGHT OF STATION 1000.

T. J. SMAYDA
STATE OF WASHINGTON
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1000 RIVER STATION

A' A CROSS SECTION

2 YR WATER LEVEL

100 YR WATER LEVEL

Key pieces

Fixed wood with pools

Loose wood

Boulders

Cut

Temporary dams

ACTIVITY LIST

18	SMALL STRUCTURES
1	MEDIUM STRUCTURE WITH KEY LOG
5	BOULDER CLUSTERS
10	SIDE CHANNEL STRUCTURES
10	CLUSTERS OF LOOSE WOOD
20	PRE-EXCAVATED POOLS

QUANTITIES

320	LOOSE WOOD
90	FIXED WOOD
1	KEY WOOD
90	PILES
30	IMPORTED BOULDERS
20	RELOCATED BOULDERS
70'	TEMPORARY DAM

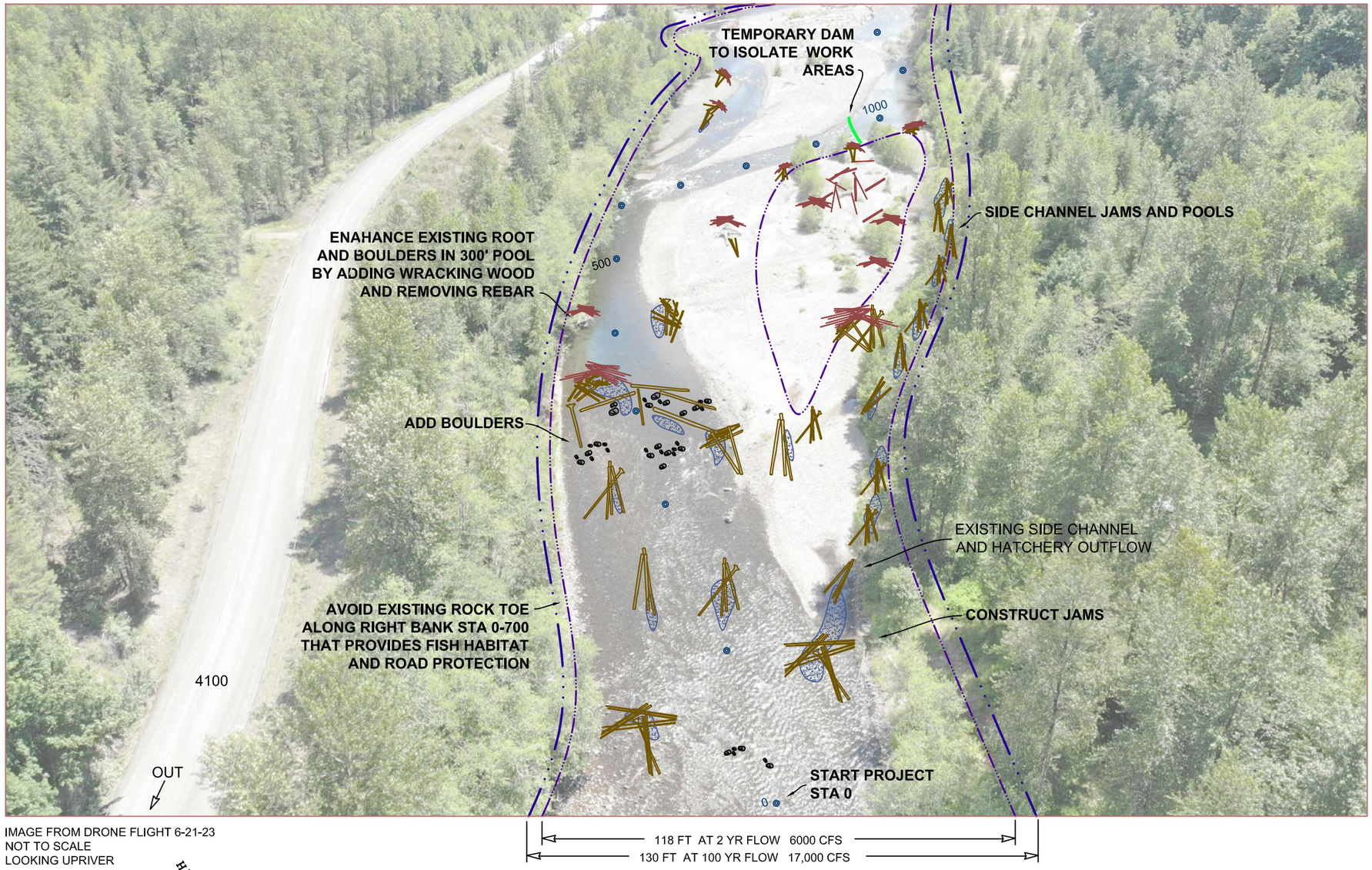

IMAGE FROM DRONE FLIGHT 6-21-23
NOT TO SCALE
LOOKING UPRIVER

NORTH

SMAYDA ENVIRONMENTAL ASSOCIATES, INC.

LOWER COLUMBIA FISH ENHANCEMENT

90% draft

11-14-2023

SF TOUTLE RIVER AT BROWNELL - PHASE 1

OBLIQUE 1
STATION 0 - 1200

SHEET 7 OF 18

STATION 1200 - 2000 OBJECTIVES

1. MAINTAIN NETWORK OF BRAIDED FLOWS.
2. PROTECT RIGHT BANK FROM ADDITIONAL SCOUR THAT THREATENS THE 4100 ROAD.
3. INSTALL ISLAND FORMING JAM AND ASSOCIATED SMALLER JAMS TO PROTECT CENTRAL ISLAND.
4. INSTALL CLUSTERED SMALL STRUCTURES AND LOOSE WOOD TO ROUGHEN THE CHANNEL AND FLOODPLAIN TO BENEFIT VEGETATION AND HABITAT FEATURES.
5. STABILIZE WOODY MATERIALS WITH PILES IN THE LOW FLOW CHANNEL AND WITH A COMBINATION OF PILES AND PARTIAL BURIAL AT LOCATIONS THAT ARE ABOVE THE WATER LEVEL DURING CONSTRUCTION.
6. INSTALL TEMPORARY DAM TO FACILITATE CONSTRUCTION ALONG TOE OF SCOUR.
7. INSTALL HABITAT WOOD INTO THE EXISTING SIDE CHANNEL TO INCREASE POOL VOLUME AND HABITAT BENEFIT.

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1000 RIVER STATION

A' A CROSS SECTION

2 YR WATER LEVEL

100 YR WATER LEVEL

Key pieces

Fixed wood with pools

Loose wood

Boulders

Cut

Temporary dams

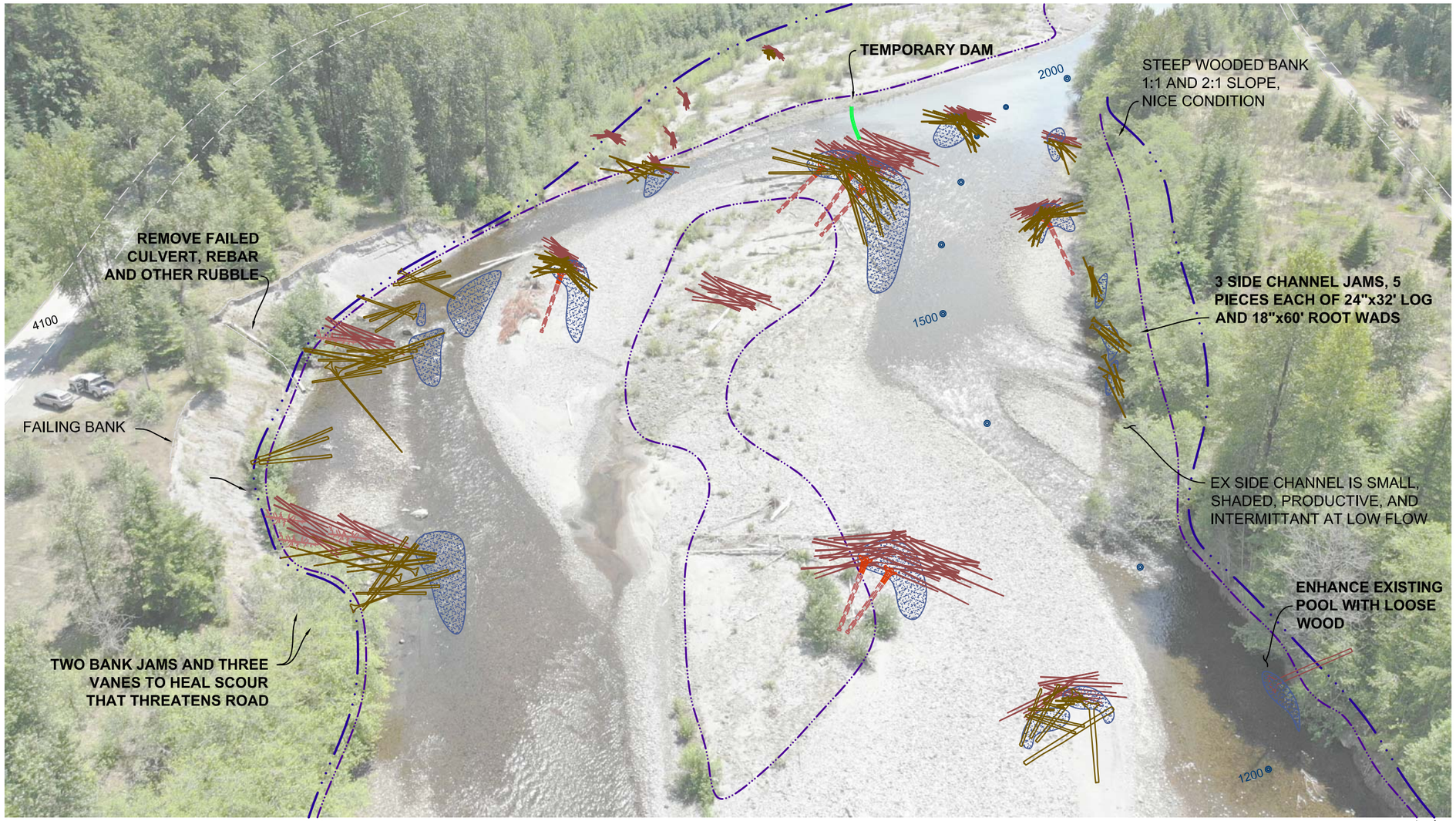

IMAGE FROM DRONE FLIGHT 6-21-23
NOT TO SCALE
LOOKING UPRIVER

NORTH

ACTIVITY LIST

4	MEDIUM STRUCTURES
2	MEDIUM STRUCTURES WITH KEY LOGS
1	ISLAND FORMING JAM WITH KEY LOGS
2	BANK STABILIZATION STRUCTURES
4	SIDE CHANNEL STRUCTURES
8	CLUSTERS OF LOOSE WOOD
1	TEMPORARY DAM
5	PRE-EXCAVATED POOLS

QUANTITIES

340	LOOSE WOOD
140	FIXED WOOD
7	KEY WOOD
160	PILES
76'	TEMPORARY DAM

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90% draft

11-14-2023

SF TOUTLE RIVER AT BROWNELL - PHASE 1

OBLIQUE 2 STATION 1200 - 2000

STATION 2000 - 2500 OBJECTIVES

1. ADD SMALL STRUCTURES ALONG BOTH BANKS TO INCREASE SINUOSITY, REDUCE WIDTH, AND INCREASE DEPTH OF POOLS.
2. PROTECT AND ENHANCE THE EXISTING CURTAIN DRAIN.
3. ADD CONSIDERABLE WOODY MATERIAL TO RIGHT BANK FLOODPLAIN IN ANTICIPATION OF INCREASED FREQUENCY AND DURATION OF FLOW.
4. INSTALL CLUSTERED SMALL STRUCTURES AND LOOSE WOOD TO ROUGHEN THE CHANNEL AND FLOODPLAIN TO BENEFIT VEGETATION AND HABITAT FEATURES.
5. STABILIZE WOODY MATERIALS WITH PILES AND WITH A COMBINATION OF PILES AND PARTIAL BURIAL.

NOTES
SEE THE "WATER DIVERSION AND FISH SALVAGE PLAN"

T. J. SMAYDA
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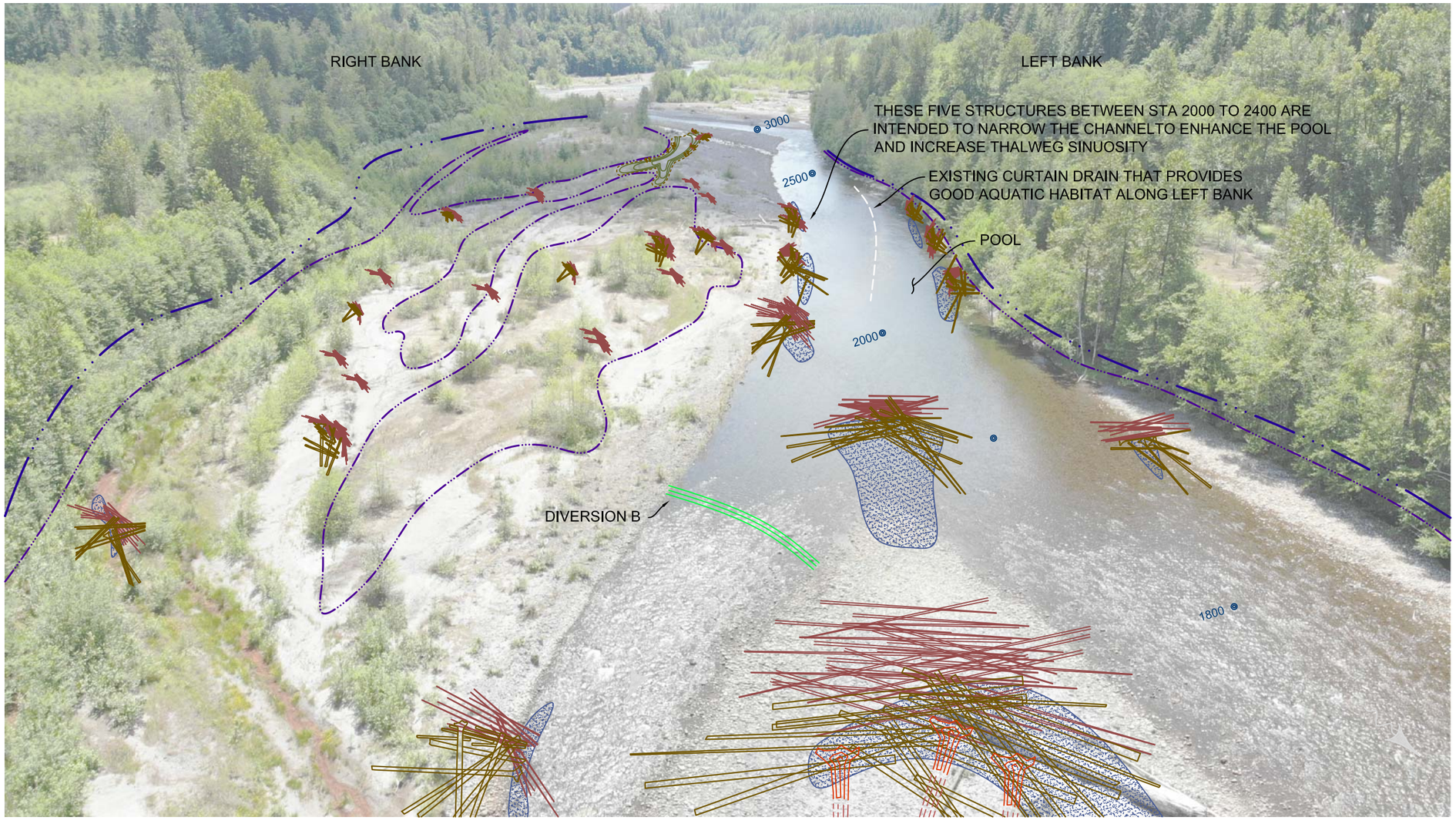
1000 RIVER STATION
A' A CROSS SECTION
2 YR WATER LEVEL
100 YR WATER LEVEL
Key pieces
Fixed wood with pools
Loose wood
Boulders
Cut
Temporary dams



2 YR FLOODPLAIN 402 FT AT 6000 CFS
100 YR FLOODPLAIN 416 FT AT 17,000 CFS

ACTIVITY LIST

10	SMALL STRUCTURES
2	MEDIUM STRUCTURE
3	SIDE CHANNEL STRUCTURES
12	CLUSTERS OF LOOSE WOOD

QUANTITIES

240	LOOSE WOOD
80	FIXED WOOD
60	PILES
10	PRE-EXCAVATED POOLS

NORTH

IMAGE FROM DRONE FLIGHT 6-21-23
NOT TO SCALE
LOOKING UPRIVER

SMAYDA ENVIRONMENTAL ASSOCIATES, INC.

LOWER COLUMBIA FISH ENHANCEMENT

90% draft

11-14-2023

SF TOUTLE RIVER AT BROWNELL - PHASE 1

OBLIQUE 3
STATION 2000 - 2500

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1000 RIVER STATION

A' A CROSS SECTION

2 YR WATER LEVEL

100 YR WATER LEVEL

Key pieces

Fixed wood with pools

Loose wood

Boulders

Cut

Temporary dams

STATION 2500 - 3000 OBJECTIVES

1. ADD SMALL STRUCTURES ALONG BOTH BANKS TO INCREASE SINUOSITY, REDUCE WIDTH, AND INCREASE DEPTH OF POOLS.
2. ADD CONSIDERABLE WOODY MATERIAL TO RIGHT BANK FLOODPLAIN IN ANTICIPATION OF INCREASED FREQUENCY AND DURATION OF FLOW.
3. INSTALL CLUSTERED SMALL STRUCTURES AND LOOSE WOOD TO ROUGHEN THE CHANNEL AND FLOODPLAIN TO BENEFIT VEGETATION AND HABITAT FEATURES.
4. STABILIZE WOODY MATERIALS WITH PILES AND WITH A COMBINATION OF PILES AND PARTIAL BURIAL.

STATION 2500 - 3000:

ACTIVITY LIST		QUANTITIES	
14	SMALL STRUCTURES		
1	MEDIUM STRUCTURE WITH KEY LOG	300	LOOSE WOOD
4	MEDIUM STRUCTURES	150	FIXED WOOD
5	SIDE CHANNEL STRUCTURES	1	KEY WOOD
20	CLUSTERS OF LOOSE WOOD	150	PILES
1	CONSTRUCTED CHANNEL	2500 cu yd	CUT/FILL
5	PRE-EXCAVATED POOLS		

FLOODPLAIN AND SIDE-CHANNEL ACTIVATION SPECIFICATION

DESCRIPTION

THIS WORK IS TO EXCAVATE A CHANNEL THROUGH RIVER SEDIMENT AND USE THE MATERIAL TO FILL A PORTION OF THE RIVER IN ORDER TO INCREASE SINUOSITY AND REDIRECT THE FLOW TO AN EXTENSIVE FLOODPLAIN AREA, FROM WHERE THE RIVER WILL COMBINE WITH LOOSE WOOD AND CREATE ITS OWN CHANNEL. FIXED AND LOOSE WOOD WILL BE ADDED.

INTENT

THE GOAL TO REPLACE A THOUSAND-FOOT-LONG RIFFLE THAT HAS RELATIVELY LOW FISH HABITAT VALUE, WITH A MEANDERING SHAPE THAT INCLUDES POOLS AND TAILOUTS WITH WOODY MATERIAL. THE WORK IS INTENDED TO INCREASE SINUOSITY, POOLS AND TAILOUTS, RAISE WATER LEVELS, RETAIN RIVER SEDIMENT, AND RE-ENGAGE THE FLOODPLAIN TO PROVIDE IMMEDIATE AND LONG TERM FISH ENHANCEMENT BENEFIT. THIS LOCATION IS SELECTED BECAUSE FLOODPLAIN RE-ENGAGEMENT CAN BE ACCOMPLISHED WITH RELATIVELY LITTLE EXCAVATION AND A SUBSTANTIAL AREA OF FLOODPLAIN IS ACCESSED WHILE PROTECTING SENSITIVE AREAS THAT ALREADY HAVE GOOD HABITAT VALUE.

MATERIALS

RIVER SEDIMENT TO BE RELOCATED COMBINED WITH WOODY MATERIAL, INCLUDING WHOLE TREES, LOGS, ROOTS, TREE TOPS AND SLASH, WHICH WILL BE INSTALLED FIXED IN POSITION BY PARTIAL BURIAL AND OTHER WOOD SHALL BE LOOSELY PLACED TO MOVE WITH THE SEDMENT.

CONSTRUCTION

WOOD INSTALLATION WILL FOLLOW THE DIRECTION OF LCFEG FIELD CREW TO TAKE ADVANTAGE OF THEN-CURRENT CONDITIONS.

IMAGE FROM DRONE FLIGHT 6-21-23
NOT TO SCALE
LOOKING UPRIVER

NORTH

SMAYDA ENVIRONMENTAL ASSOCIATES, INC.

LOWER COLUMBIA FISH ENHANCEMENT

90% draft

11-14-2023

SF TOUTLE RIVER AT BROWNELL - PHASE 1

OBLIQUE 4
STATION 2500 - 3000

STATION 3000 - 3500 OBJECTIVES

1. A PERCHED RIVER FLOODPLAIN ON THE RIGHT BANK IS TO BE RE-ENGAGED WITH MORE FREQUENT FLOW AND PERMANENT SIDE-CHANNEL FLOW BY RAISING THE RIVER BED ON THE LEFT BANK WITH ADDITION OF WOODY MATERIALS.
2. INSTALL CONTAINERIZED PLANTS IN WET LOCATIONS OF THE FLOODPLAIN.
3. COMPLETE FLOODPLAIN SHAPING WITH A PROPOSED SIDE CHANNEL TO ATTRACT FLOW, AND USE THE GENERATED RIVER SEDIMENT WITHIN THE RIVER CHANNEL TO RAISE THE BED ELEVATION.
4. STABILIZE WOODY MATERIALS WITH PILES AND BURIAL.
5. INSTALL HABITAT WOOD INTO THE EXISTING SIDE CHANNEL AND ACROSS THE FLOODPLAIN TO INCREASE VEGETATION SUCCESS AND PROVIDE HABITAT BENEFIT.
6. RELOCATE SOME BOULDERS ALONG THE LEFT BANK TO IMPROVE FISH HABITAT.

PROJECT TOTALS
STATION 0 - 3760

QUANTITIES

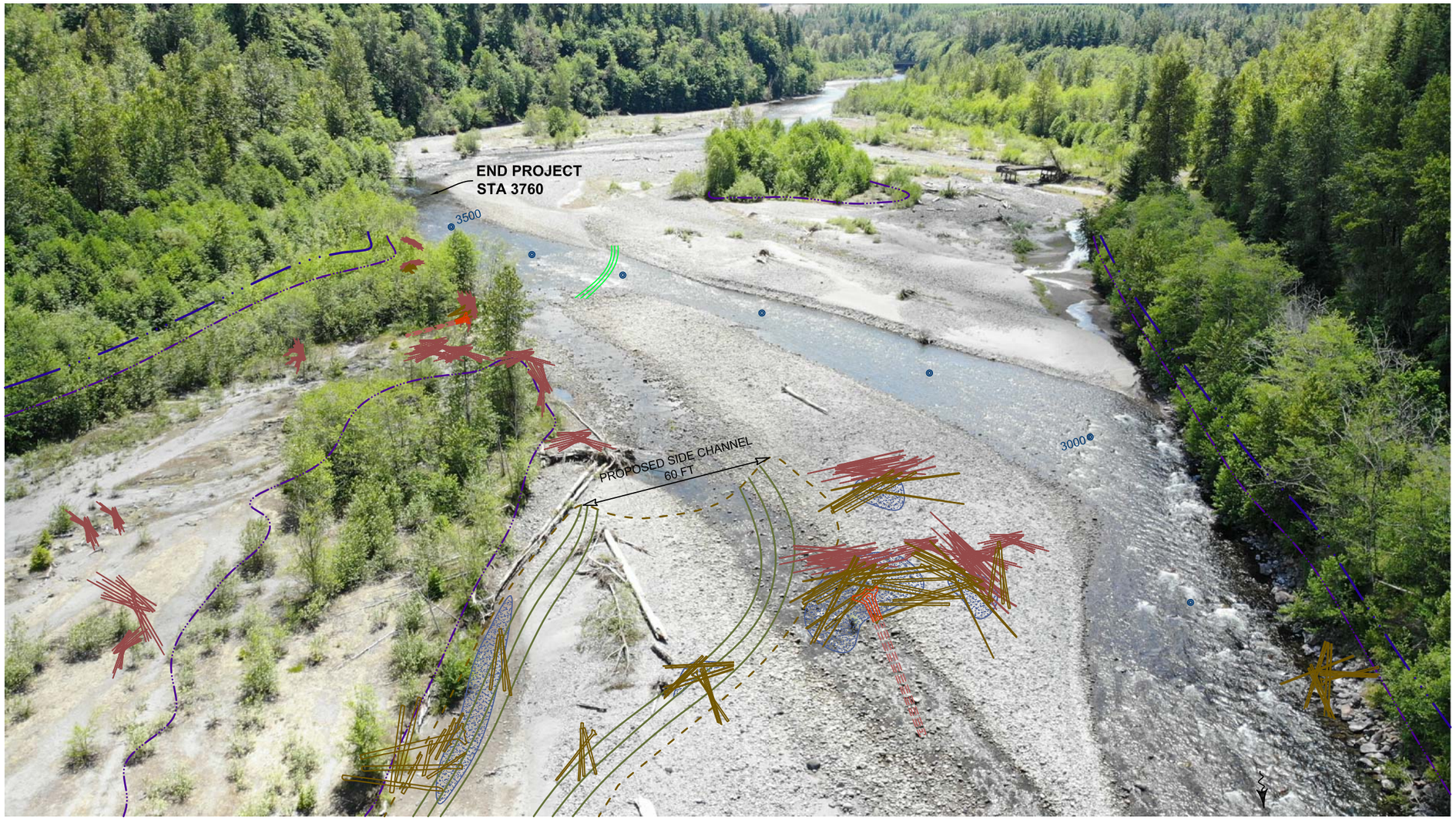
1350	LOOSE WOOD
500	FIXED WOOD
10	KEY WOOD
520	PILES
30	IMPORTED BOULDERS
20	RELOCATED BOULDERS
2500 cu yd	CUT/FILL
148'	TEMPORARY DAMS

ACTIVITY LIST

46	SMALL STRUCTURES
12	MEDIUM STRUCTURE
8	MEDIUM STRUCTURES WITH KEY LOGS
1	ISLAND FORMING JAM WITH KEY LOGS
2	BANK STABILIZATION STRUCTURES
22	SIDE CHANNEL STRUCTURES
50	CLUSTERS OF LOOSE WOOD
1	BOULDER PLACEMENT
3	TEMPORARY DAMS
40	PRE-EXCAVATED POOLS

T. J. SMAYDA
STATE OF WASHINGTON
29719
REGISTERED
PROFESSIONAL ENGINEER

1000 RIVER STATION
A' A CROSS SECTION
2 YR WATER LEVEL
100 YR WATER LEVEL
Key pieces
Fixed wood with pools
Loose wood
Boulders
Cut
Temporary dams



STATION 3000 - 3500:

ACTIVITY LIST

3	SMALL STRUCTURES
2	MEDIUM STRUCTRES
1	MEDIUM STRUCTURE WITH KEY LOG
8	CLUSTERS OF LOOSE WOOD
1	TEMPORARY DAM
5	PRE-EXCAVATED POOLS

QUANTITIES

120	LOOSE WOOD
60	FIXED WOOD
1	KEY LOG
60	PILES
72'	DAM

NORTH

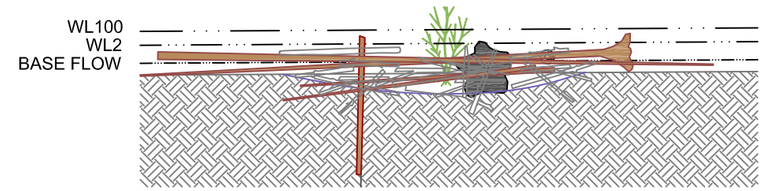
IMAGE FROM DRONE FLIGHT 6-21-23
NOT TO SCALE
LOOKING UPRIVER

SMAYDA ENVIRONMENTAL ASSOCIATES, INC.
LOWER COLUMBIA FISH ENHANCEMENT

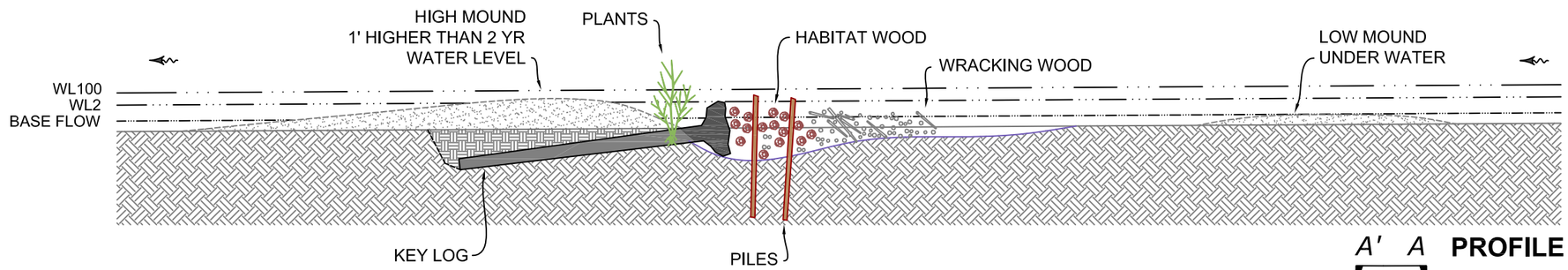
90% draft
11-14-2023

SF TOUTLE RIVER AT BROWNELL - PHASE 1
OBLIQUE 5
STATION 3000 - 3500

SHEET 11 OF 18



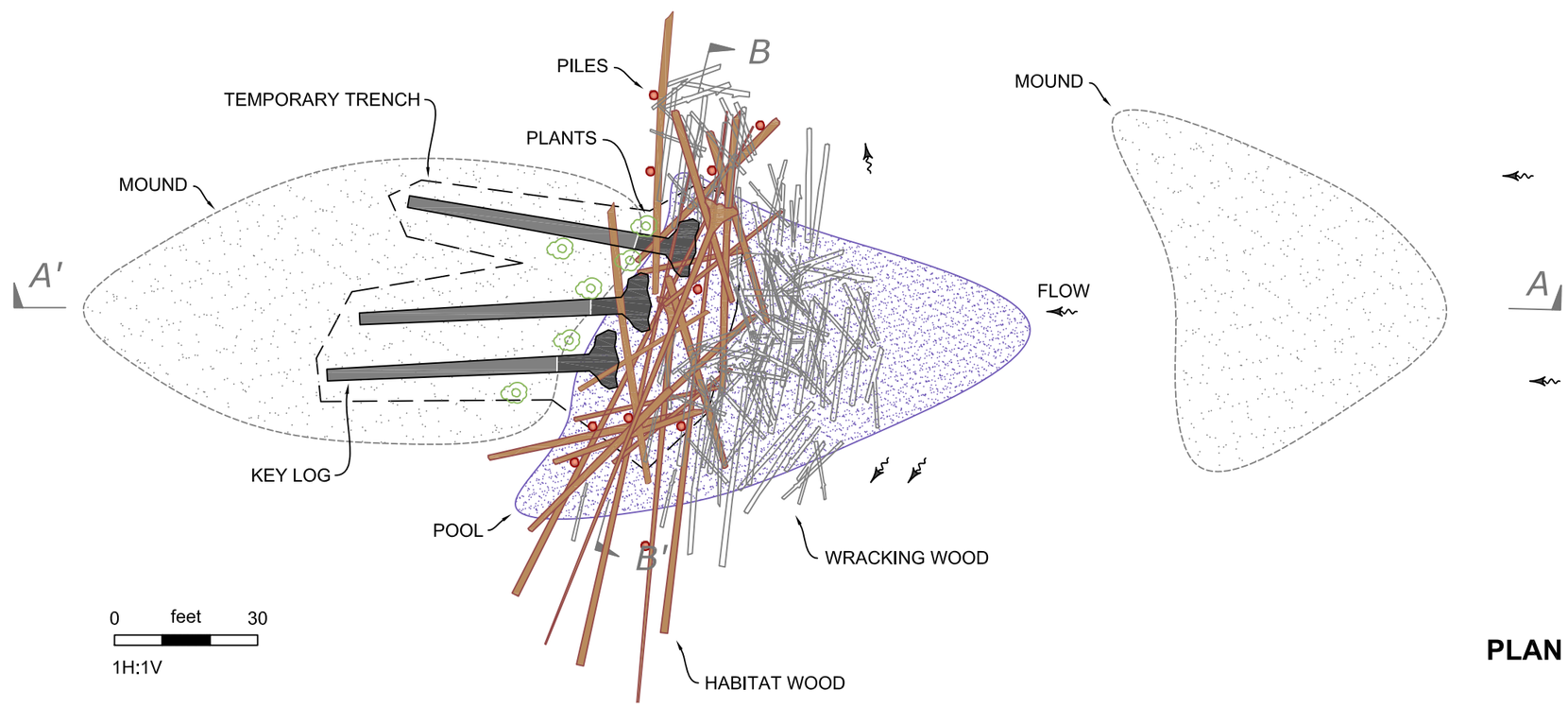
B′ B **CROSS SECTION**



A′ A **PROFILE**

ISLAND FORMING JAM NOTES

1. THIS WORK IS TO CONSIST OF CONSTRUCTING LOG JAMS AT THE UPSTREAM ENDS OF ISLANDS TO IMPROVE VEGETATED HABITAT BY DIVERTING HIGH FLOWS AROUND AND PROMOTING SEDIMENT DEPOSITION.
2. EACH STRUCTURE SHALL CONTAIN AN AVERAGE OF 3 KEY LOGS, 40 PIECES OF HABITAT WOOD AND 10 PILES, PLUS WRACKING WOOD, AND SHALL EXTEND 3 TO 4 FEET ABOVE THE RIVER BED.
3. STABILITY WILL BE ACCOMPLISHED BY PARTIAL BURIAL AND PILES.
4. KEY LOGS AND OTHER WOOD WILL BE INSTALLED IN TRENCHES THAT WILL REACH THE WATER TABLE. ADD TRANSPLANTED PLANTS FROM THE PROJECT VICINITY AND LIVE STAKES TO THESE WET AREAS PRIOR TO BACKFILLING. ADDITIONAL POST-CONSTRUCTION PLANTING WILL ALSO OCCUR.
5. THE STRUCTURES SHALL BE STABLE ENOUGH TO ACCUMULATE ADDITIONAL DRIFT WOOD AND GROW IN SIZE.
6. FOLLOW INSTALLATION METHODS AND DETAILS ON SHEETS 13 - 17.



PLAN

SMAYDA ENVIRONMENTAL ASSOCIATES, INC. / LOWER COLUMBIA FISH ENHANCEMENT	90% draft 11-14-23	SF TOUTLE RIVER AT BROWNELL - PHASE 1 **ISLAND FORMING JAM**	SHEET 12 OF 18

CHANNEL ROUGHNESS STRUCTURES

DESCRIPTION

THIS WORK TO CONSIST OF CONSTRUCTING ECHANNEL ROUGHNESS STRUCTURES SECURED WITH PILES, DEADMEN, AND PARTIAL BURIAL. THESE SPECIFICATIONS PERTAIN TO ISLAND FORMING JAMS, CHANNEL ROUGHNESS STRUCTURES, AND SIDE CHANNEL ROUGHNESS STRUCTURES, AND ANY INSTALLATION OF WOOD WHERE ANCHORING IS NECESSARY

THE AVERAGE CHANNEL AND SIDE CHANNEL ROUGHNESS STRUCTURES SHALL CONTAIN 10 PIECES OF LWD AND 8 PILES, AND SHALL EXTEND 2 TO 6 FEET ABOVE THE RIVER BED, AND WITH 20 CU YD OF EXCAVATION AND PLACEMENT TO CREATE POOL AND TAILOUT.

ISLAND FORMING JAMS SHALL BE BUILT AS A COLLECTION OF SMALL LWD STRUCTURES THAT EXTEND TALLER AND AS SHOWN ON SHEET 8, WITH AN AVERAGE OF 80 PIECES OF LWD AND 40 PILES, AND SHALL EXTEND 10 TO 15 FEET ABOVE THE RIVER BED.

MATERIALS

VARIOUS TYPES OF WOODY MATERIAL ARE REQUIRED. CONFER WITH LCFEG PRIOR TO PROCUREMENT:

BIG LOGS SHALL BE IMPORTED FROM OFFSITE, 24" TO 48" DIA. AND 35' TO 50' LONG. THESE MAY BE ANY SPECIES AND ANY STAGE OF DECAY, AT LEAST 80% OF WHICH SHALL BE CONIFER, AND MAY BE BENT, WARPED, CRACKED, TWISTED OR CONTAIN ANY OTHER STRUCTURAL DEFECT THAT MIGHT REDUCE THEIR VALUE AS SAW LOGS.

WRACKING WOOD SHALL BE IMPORTED FROM OFFSITE, 8" TO 16" DIA. AND 30' TO 45' LONG. THESE MAY BE ANY SPECIES AND ANY STAGE OF DECAY, AT LEAST 70% OF WHICH SHALL BE CONIFER, AND MAY BE BENT, WARPED, CRACKED, TWISTED OR CONTAIN ANY OTHER STRUCTURAL DEFECT THAT MIGHT REDUCE THEIR VALUE AS SAW LOGS.

LOGS WITH ROOTS SHALL BE IMPORTED FROM OFFSITE, 16" DIA. AND 30' TO 45' LONG WITH ROOT WAD. THESE SHALL BE CONIFER, AND SHALL BE SOUND.

STUMPS SHALL BE 6' TO 15' DIAMETER AT ROOTED END AND FOUND ONSITE IN GRAVEL BARS DURING CONSTRUCTION.

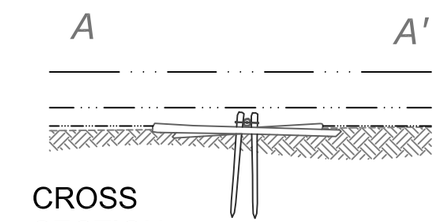
SLASH SHALL BE VARIOUS SIZES, SALVAGED FROM GRAVEL BAR, AND AT LEAST 200 POUNDS EACH.

CONSTRUCTION

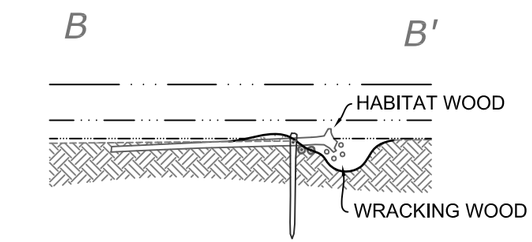
EXCAVATE POOL AREA IF ANY. INSTALL PILES AND PLACE WOODY MATERIAL PER FIELD ENGINEER. PLACE BOULDERS IF ANY. SMOOTH EXCAVATED GRAVEL TO CREATE NATURALISTIC SHAPE. PERFORM ANY NECESSAY PLANTING, TRANSPLANTING AND WEEDING.

ROUGHNESS STRUCTURE NOTES

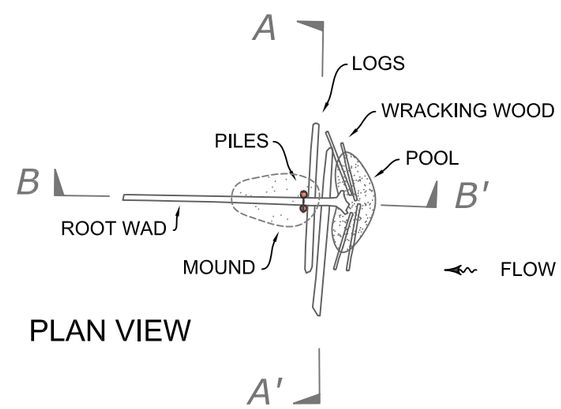
1. SIMPLE CHANNEL ROUGHNESS STRUCTURES SHALL CONTAIN AN AVERAGE OF 10 PIECES OF LWD AND 5 PILES, PLUS WRACKING WOOD, AND SHALL EXTEND 2 TO 6 FEET ABOVE THE RIVER BED.
2. THE MORE COMPLEX CHANNEL ROUGHNESS STRUCTURES SHALL BE BUILT AS A COLLECTION OF SIMPLE ROUGHNESS STRUCTURES, WITH AN AVERAGE OF 30 PIECES OF LWD AND 20 PILES, AND SHALL EXTEND 3 TO 8 FEET ABOVE THE RIVER BED.
3. ISLAND FORMING JAMS SHALL BE BUILT AS SHOWN ON SHEET 7, WITH AN AVERAGE OF 200 PIECES OF LWD AND 50 PILES, AND SHALL EXTEND 8 TO 16 FEET ABOVE THE RIVER BED.



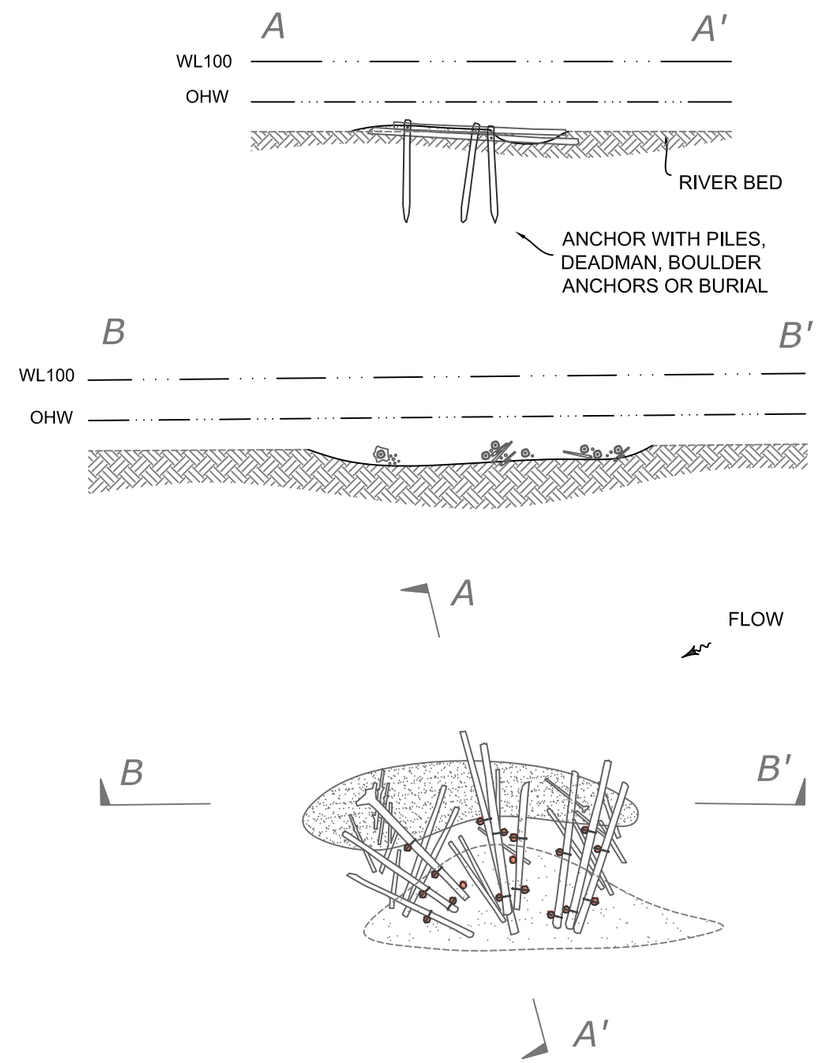
CROSS SECTION



PROFILE



PLAN VIEW

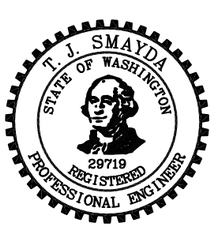


SMALL

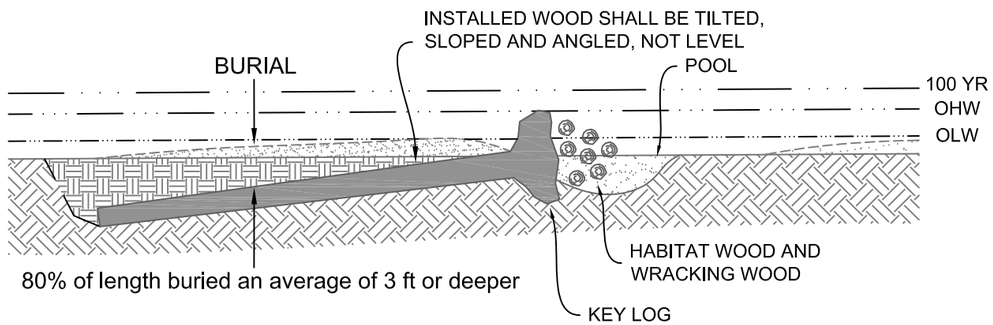
MEDIUM

CHANNEL ROUGHNESS STRUCTURE DETAIL

NOTES: THESE STRUCTURES AS DRAWN ARE STABILIZED PRIMARILY WITH PILES. ALTERNATE INSTALLATION ALLOWS FOR STABILIZATION BY PARTIAL BURIAL AND/OR WITH BOULDER AND DEADMAN ANCHORS. INSTALLATION BY PARTIAL BURIAL IS PREFERRED AT LOCATIONS WHERE RAISING THE RIVER BED IS AN OBJECTIVE. EXCAVATION FOR WOOD INSTALLATION AND POOL FORMATION IS INCIDENTIAL, AND NOT INCLUDED IN CUT-AND-FILL QUANTITIES.

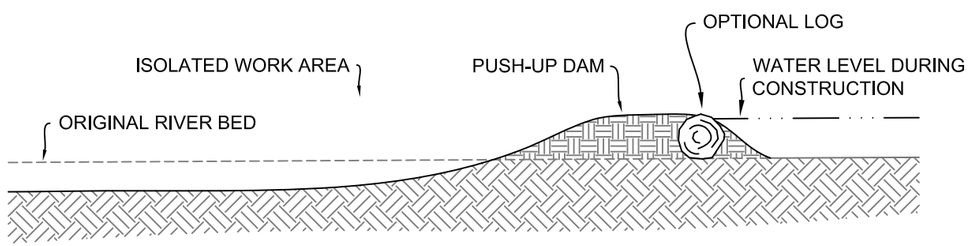


SMAYDA ENVIRONMENTAL ASSOCIATES, INC. / LOWER COLUMBIA FISH ENHANCEMENT	90% draft 11-14-23	SF TOUTLE RIVER AT BROWNELL - PHASE 1 **CHANNEL ROUGHNESS STRUCTURES**	SHEET 13 OF 18



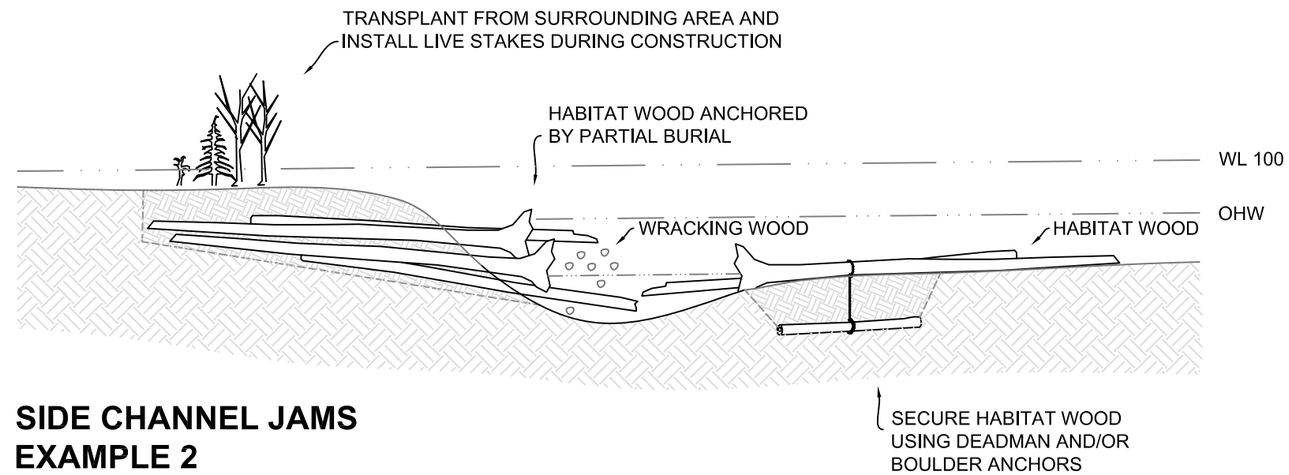
KEY LOG INSTALLATION BY PARTIAL BURIAL

KEY LOGS SHALL BE INSTALLED IN TRENCHES AND COVERED WITH A MINIMUM OF 3 FT OF RIVER SEDIMENT ON AVERAGE OVER 80% OF THE LOG. THE KEY PIECES SHALL BE ON THE ORDER OF 50 FT LONG AND 40 INCHES IN DIAMETER, SO THAT 40 FT OF THE LOG SHALL HAVE AND AVERAGE COVER OF 3 FT. LOGS SHALL SLOPE UPWARD WITH THE ROOT END EXPOSED AT THE UPSTREAM END. BACKFILL TRENCH WITH NATIVE SOIL. IN ALL CASES THE EXTENT OF BURIAL AS SHOWN ABOVE SHALL BE COMPLETED. ADDITIONAL ANCHORING MAY BE NECESSARY AT LOCATIONS WITH ANTICIPATED SCOUR. THE INTENT IS TO PROVIDE AN STABILE POINTING THE RIVER THAT WILL HAVE THE STRENGTH TO ACCUMULATE CONSIDERABLE ADDITIONAL UNANCHORED WOOD. STRUCTURES USING KEY LOGS MAY ALSO INCLUDE ADDITIONAL ANCHORING OF PILES AND BURIED ANCHORS.

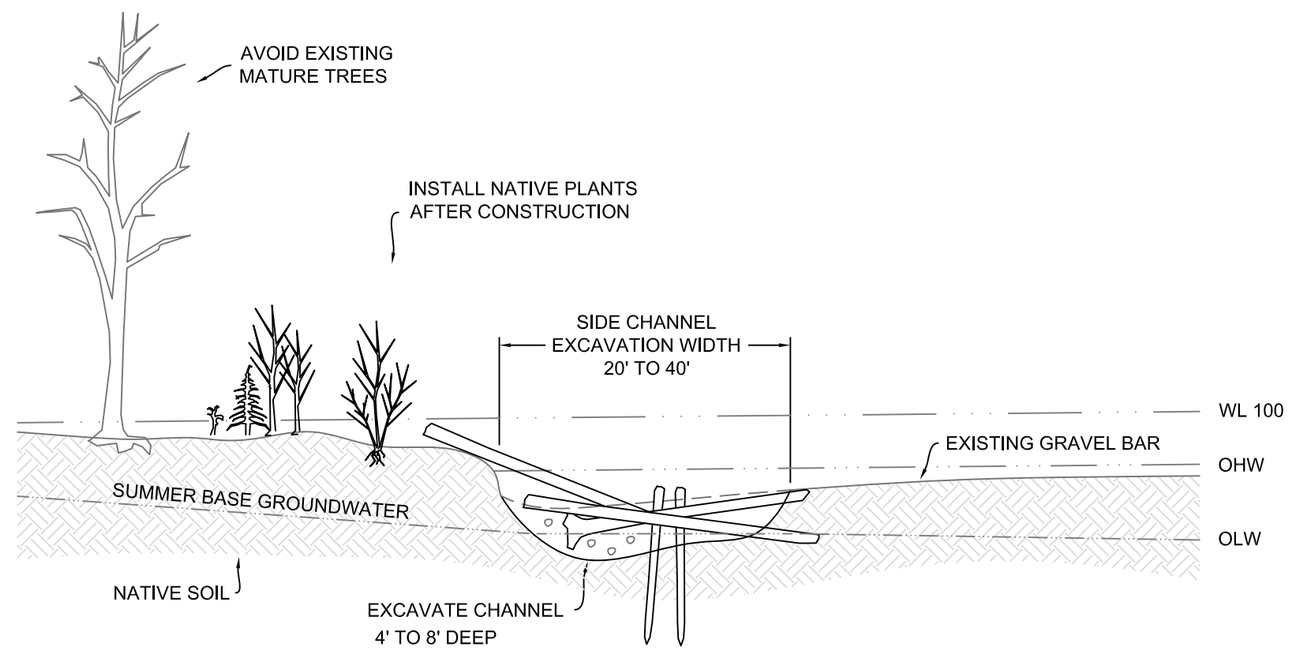


TEMPORARY PUSH-UP DAM TO ISOLATE WORK AREAS

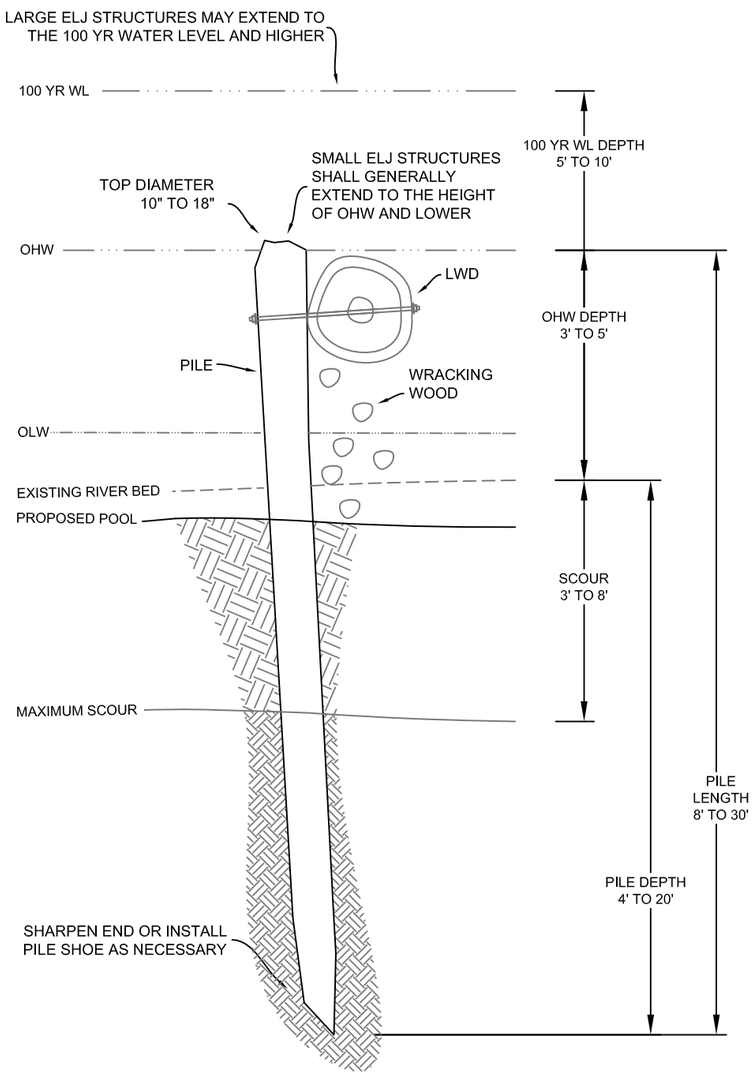
WORK ZONES MAY BE ISOLATED FROM FLOWING WATER WITH PUSH-UP DAMS OF RIVER SEDIMENT THAT ARE PUSHED IN AN UP-RIVER DIRECTION TO DIRECT MOST WATER AWAY FROM CONSTRUCTION AREAS. AFTER CONSTRUCTION IS COMPLETE, DISASSEMBLE THE DAMS BY SMOOTHING IN AN UP-RIVER DIRECTION. THE INTENT IS FOR THE WORK AREAS TO REMAIN WET ENOUGH TO SUPPORT LAMPREY AND OTHER SUBSURFACE ORGANISMS DURING THE CONSTRUCTION PERIOD. THE WIDTH AND HEIGHT OF THE DAMS SHALL BE ADJUSTED TO PREVENT EXCESS WATER FROM INFILTRATING INTO THE WORK ZONE. SEDIMENT CONTROL PUMPS MAY BE NECESSARY AT THE DOWNSTREAM EXTENT OF THE WORK ZONE TO DIRECT TURBID WATER TO A GRAVEL BAR FOR INFILTRATION.



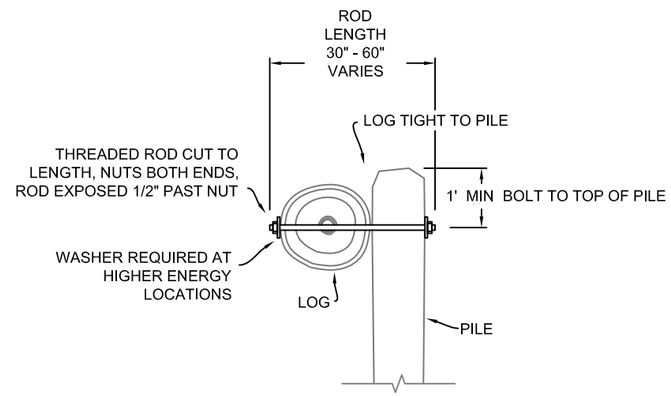
SIDE CHANNEL JAMS EXAMPLE 2



SIDE CHANNEL JAM EXAMPLE 1



PILE INSTALLATION DEPTHS



DESCRIPTION

THIS WORK TO CONSIST OF BORING HOLES AND BOLTING LOGS TO PILES USING THREADED ROD AND HEAVY HEX NUTS TO ANCHOR THE LOGS IN PLACE.

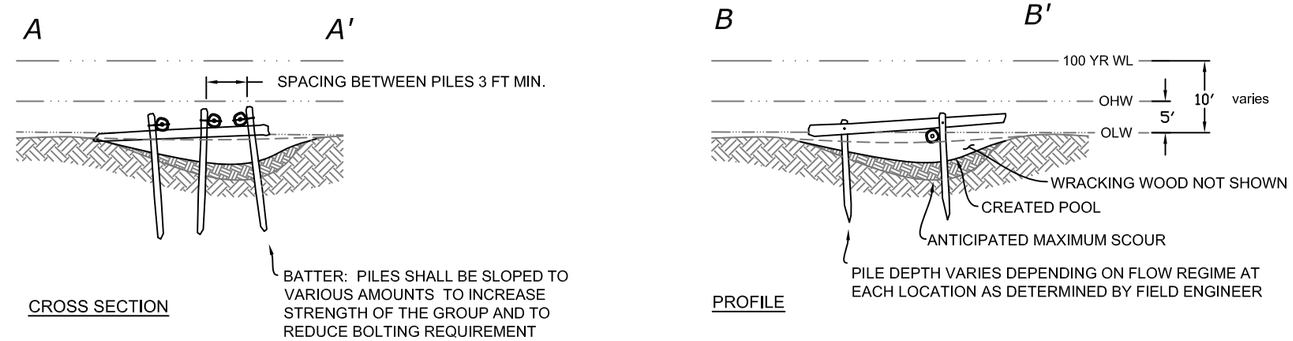
MATERIALS

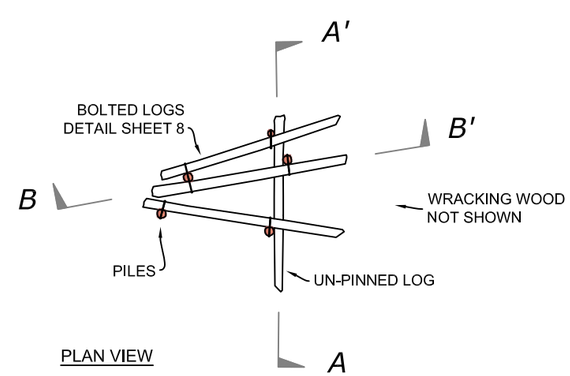
THREADED ROD SHALL BE GALVANIZED 1-1/4" ALL-THREAD OBTAINED IN 10' OR 12' LENGTHS AND CUT TO FIT IN THE FIELD. NUTS SHALL BE GALVANIZED HEAVY HEX NUTS. WASHERS SHALL BE GALVANIZED MALLEABLE IRON WASHERS OR GALVANIZED STEEL PLATE WASHERS. THE ROD SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/ASME STANDARD B18.2.1-1981, GRADE B, AMERICAN STEEL. ANY OTHER STEEL COMPONENTS SHALL COMPLY WITH ASTM A36.

CONSTRUCTION

DRILL 1-1/4" HOLE THROUGH LOG AND PILE. CUT ROD TO LENGTH. DRIVE THREADED ROD THROUGH. NUTS SHALL BE TIGHTENED TO COMPRESS, BUT NOT CRUSH, WOOD FIBERS. PEEN ROD ENDS TO PREVENT NUT REMOVAL. WASHERS SHALL BE USED WHERE SHOWN ON THE PLANS.

BOLTING DETAIL





DESCRIPTION

THIS WORK TO CONSIST OF INSTALLING TIMBER FRICTION PILES INTO RIVER SEDIIMENT USING A VIBRATORY PILE DRIVER AT THE BROWNELL CREEK REACH OF THE SF TOUTLE RIVER. SOME PILES SHALL BE BOLTED TO LOGS TO RESIST BUOYANT FORCES AND LATERAL FORCES. OTHER LOGS WILL NOT BE BOLTED, AND WILL BE ORIENTED TO ACCOMODATE LATERAL FORCES.

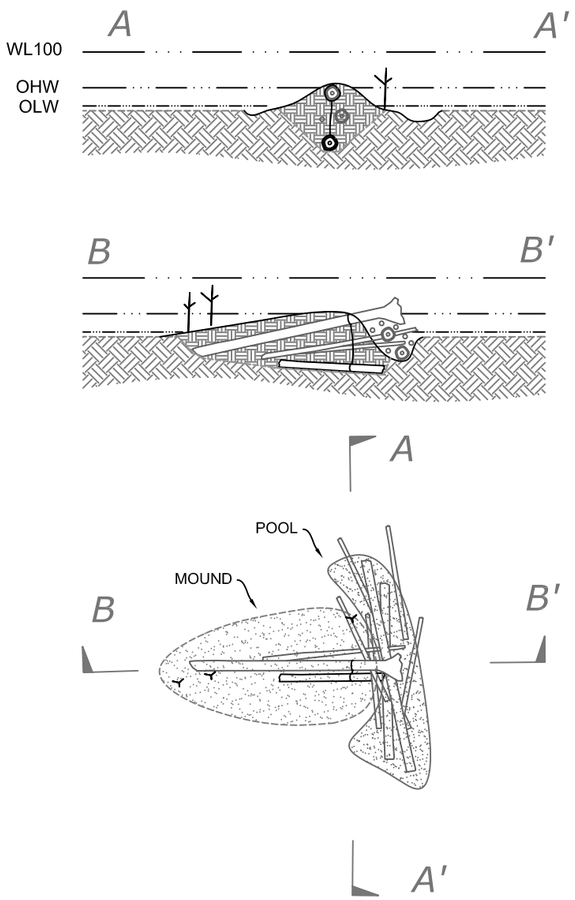
MATERIALS

ROUND TIMBER PILES SHALL BE DOUGLAS FIR AND SHALL CONFORM TO ASTM D 25, UNUSED, CLEAN PEELED, UNIFORMLY TAPERED, ONE PIECE FROM BUTT TO TIP.

CONSTRUCTION

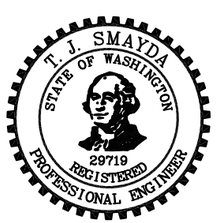
DRIVE TIMBER PILES TO ACHIEVE SPECIFIED PENETRATION. EXCAVATE POOL, IF ANY, PRIOR TO INSTALLATION. INVESTIGATE SUDDEN DECREASES IN PILE DRIVING RESISTANCE, AS IT MAY INDICATE PILE BREAKAGE.

PILE INSTALLATION DETAIL



EXAMPLE OF A ROUGHNESS STRUCTURE WITH A DEADMAN ANCHOR

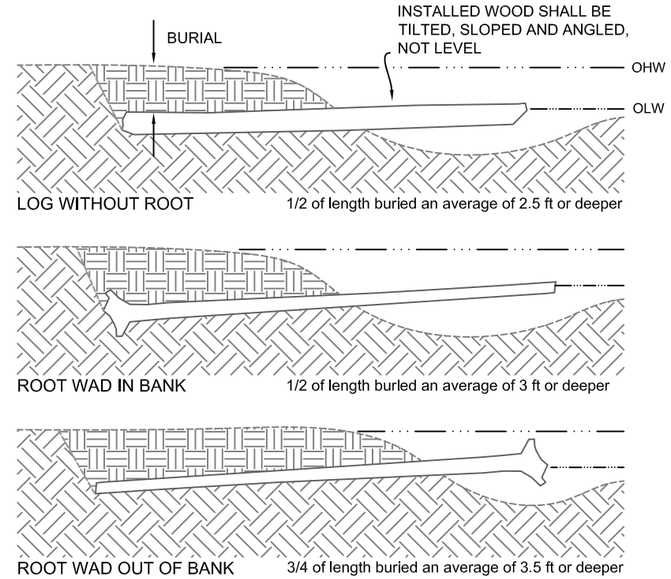
THIS EXAMPLE SHOWS A ROOTWAD AND A LOG SECURED BY A DEADMAN PLUS PARTIAL BURIAL. NOTE THAT PILES, BOULDER ANCHORS, PARTIAL BURIAL, AND DEADMAN ANCHORS MAY BE INTERCHANGEABLY USED TO SECURE WOODY MATERIALS.

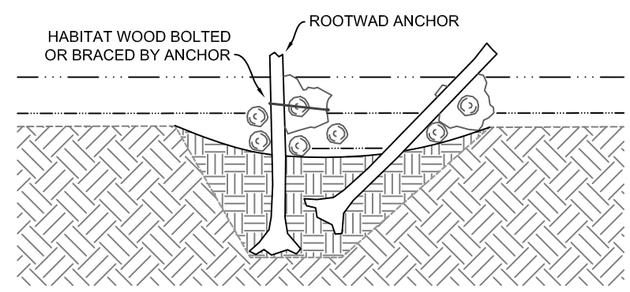


NOTES

INSTALLED WOOD SHALL BE TILTED, SLOPED AND ANGLED. IT SHALL NOT BE LEVEL, OR PARALLEL OR PERPENDICULAR TO THE FLOW DIRECTION. SKEWED WOOD IS MORE STABLE AND CAN PROVIDE BETTER HABITAT.

ANCHORING BY BURIAL AND PILES SHALL BE ACCOMPLISHED AT LOCATIONS WHERE REQUIRED FOR IMMEDIATE HABITAT BENEFIT, AND AS NECESSARY TO COMPLY WITH PERMIT CONDITIONS.





BURIED ROOT WADS TO ANCHOR HABITAT WOOD

PARTIAL BURIAL

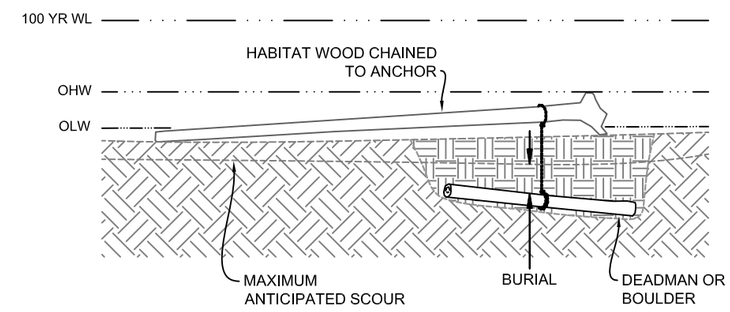
THE INTENT IS TO INSTALL WOOD THAT CREATES HYDRAULIC CONDITIONS THAT FISH FAVOR BY CREATING LOCALIZED SCOUR HOLES AND DEPOSITIONAL AREAS. BURIED WOOD SHALL BE INSTALLED IN TRENCHES, EXCAVATED JUST LARGE ENOUGH TO ACCEPT THE WOOD, AND WITH ADJACENT VEGETATION LEFT INTACT. LOGS SHALL BE SKEWED TO THE CHANNEL AND NOT LEVEL. BACKFILL TRENCH WITH NATIVE SOIL. IN ALL CASES THE EXTENT OF BURIAL AS SHOWN ABOVE SHALL BE COMPLETED. ADDITIONAL ANCHORING MAY BE NECESSARY AT LOCATIONS WITH ANTICIPATED SCOUR, AS DIRECTED BY THE FIELD ENGINEER. TRENCH DEPTHS MAY ROUTINELY BE IN EXCESS OF 4 FEET DEEP. NO PERSON SHALL BE ALLOWED NEAR OR IN ANY TRENCH AND THE TRENCH IS TO BE FILLED IMMEDIATELY AFTER EXCAVATION.

ANCHOR AND WOOD BUOYANT FORCES

These forces are for the purposes of this project only. The depths of embedment and cover are measured from the depth of maximum scour. Maximum scour ranges from 3 to 8 ft and shall be determined in the field by project engineer for each installation. Hold down force shall exceed buoyant forces by a factor of 1.7 to 2.2 or more. All habitat wood shall be so anchored, but wracking wood does not require anchoring.

HABITAT WOOD	SIZE	BUOYANT FORCE (LB)
ROOT WAD	80' x 36", 9' ROOT	19,636
ROOT WAD	50' x 24", 6' ROOT	5764
ROOT WAD	40' x 22", 4' ROOT	3276
LOG	50' x 60"	20,030
LOG	40' x 32"	4558
LOG	36' x 24"	2307
LOG	32' x 20"	1424
LOG	28' x 16"	798
LOG	20' x 16"	570

ANCHOR	SIZE	HOLD DOWN FORCE (LB)
PILE	8' EMBEDMENT, 14"	5,000
PILE	12' EMBEDMENT, 14"	8,000
PILE	15' EMBEDMENT, 14"	10,000
DEADMAN	1 FT COVER, 10'x12"	346
DEADMAN	2 FT COVER, 10'x12"	1,800
DEADMAN	3 FT COVER, 10'x12"	3,180
DEADMAN	4 FT COVER, 10'x12"	4,910
BURIED ROOTWAD	5 FT COVER, 5 FT ROOT	5,500



DEADMAN AND BOULDER ANCHORS

BURIED LOGS AND/OR BOULDERS CAN BE CHAINED TO SECURE HABITAT WOOD. GREATER BURIAL PROVIDES GREATER ANCHORING. DEADMAN SHALL BE DOUGLAS FIR LOGS 16 TO 24 FT LONG AND 12 TO 24 INCHES DIAMETER. BOULDERS SHALL BE SOUND 3-MAN TO 6-MAN, ROUNDED AND SUB-ROUNDED VOLCANIC ROCK, 2' TO 5' IN DIAMETER, AND 2000 TO 12,000 POUNDS THAT EXIST NEAR ONSITE AND/OR ARE IMPORTED. BURY WITH 3 TO 6 FT OF COVER BENEATH THE MAXIMUM ANTICIPATED SCOUR DEPTH. CONNECT TO HABITAT WOOD WITH CHAIN. CHAIN SHALL BE 1/2" GRADE 43 HIGH TEST STEEL. SHACKLES SHALL BE 1/2" STEEL FORGED ANCHOR SHACKLES w/ SCREW PIN OR APPROVED EQUAL.

EROSION CONTROL SEED MIX

If temporary erosion control seeding is necessary to comply with Washington Department of Ecology requirements, the following mix will be used:

Common Name	Scientific Name	Percent by Weight
Regreen	Triticum hybrid	58
Columbia brome	Bromus vulgaris	25
Austrian winter peas (Inoculated)	Pisum sativum ssp. sativum var. arvense	17

Application rate: 87 lbs per acre. Alternates, upon LCFEG approval, include a native mix by Silver Falls, an elk forage mix, or 100% creeping red fescue.

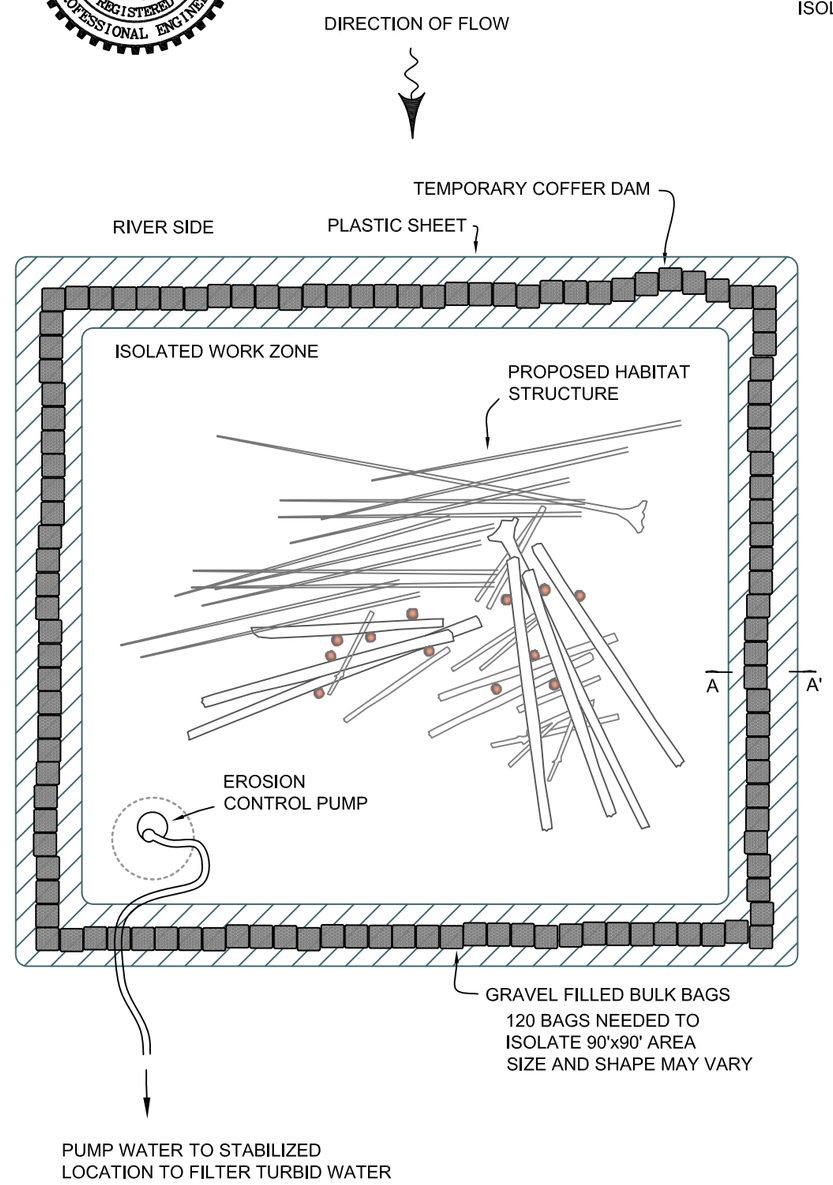
TEMPORARY EROSION CONTROL NOTES

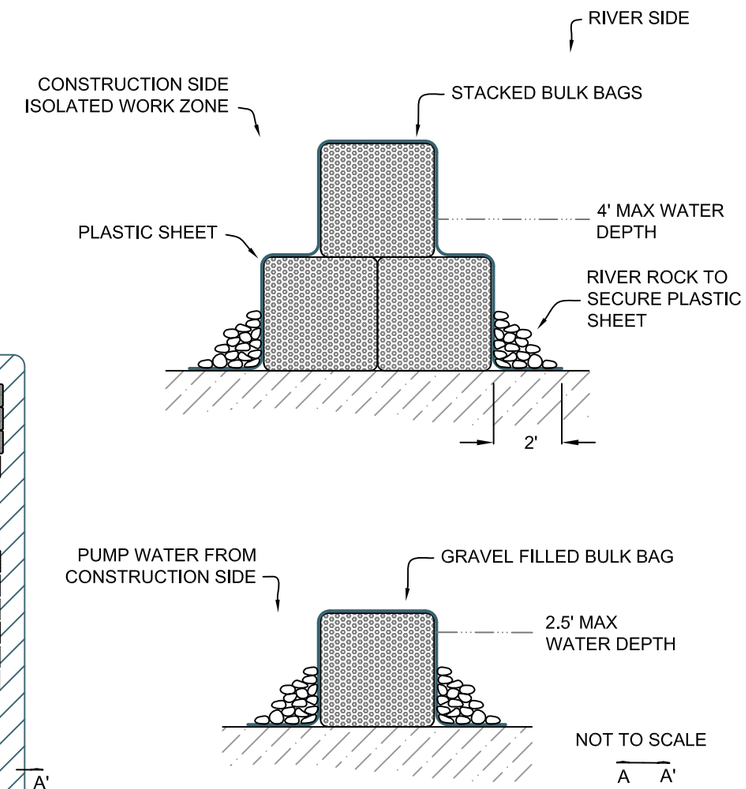
1. IF SEDIMENT LADEN WATER IN EXCESS OF WATER QUALITY STANDARDS LEAVES THE SITE, THEN EROSION CONTROL MEASURES ARE INADEQUATE AND ADDITIONAL CONTROL FACILITIES AND/OR MAINTENACE MUST BE IMPLEMENTED.
2. NO MORE AREA SHALL BE DISTURBED EACH DAY THAN CAN BE STABILIZED BY THE END OF THE WORKING DAY.
3. SOIL EXPOSURE SHALL BE MINIMIZED BY COVERING WITH STRAW, VEGETATION, MATTING, MULCHING OR OTHER BMP. DUST PRODUCING SURFACES SHALL BE SPRINKLED TO CONTROL DUST. PAVED STREETS SHALL BE SWEPT DAILY DURING CONSTRUCTION.
4. CONSTRUCTION ACCESS SHALL BE LIMITED TO ONE ROUTE, IF POSSIBLE. ACCESS POINTS SHALL BE STABILIZED WITH QUARRY SPALL OR STRAW TO MINIMIZE TRACKING OF SOILS AND DEBRIS ONTO PUBLIC ROADS.
5. ALL STREAM FLOW SHALL BE DIVERTED AROUND THE WORK AREAS, AS FEASIBLE. THE DIVERSION OUTFALL AREA SHALL BE PROTECTED BY SECURING THE PIPE END, GRAVEL FILLED BAGS, AND PROVIDING ENERGY DISSIPATION TO THE SATISFACTION OF THE FIELD ENGINEER. MINIMIZE DEWATERING OF THE WORK AREA TO PREVENT STRANDING OF FISH AND OTHER AQUATIC LIFE.
6. PROPERTIES LOCATED DOWNSTREAM SHALL BE PROTECTED FROM EROSION, AND SHALL BE PROTECTED FROM EXCESSIVE SEDIMENT ACCUMULATION FROM THE PROJECT SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF EXCESSIVE SEDIMENT THAT ACCUMULATES ON DOWNSTREAM LOCATIONS.
7. REMOVAL OF ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE DONE AFTER THE WORKING AREA IS STABILIZED OR AS DIRECTED BY THE FIELD ENGINEER.
8. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED DAILY.
9. THE ANTICIPATED PEAK FLOW FOR THE CONSTRUCTION PERIOD IS APPROXIMATELY 6000 CFS.
10. A STABILIZED CONSTRUCTION ENTRANCE SHALL BE PROVIDED AND MAINTAINED AT EACH TRUCK AND EQUIPMENT ACCESS POINT TO PUBLIC ROADWAY.
11. THE CONTRACTOR SHALL UTILIZE WHATEVER MEANS NECESSARY, SUCH AS STEEL PLATES OR MATTING, TO PROTECT THE EXISTING ROAD AND ADJACENT PROPERTY FROM DAMAGE. ALL DAMAGE SHALL BE REPAIRED TO THE SATISFACTION OF THE COUNTY. COST FOR PROTECTION AND RESTORATION SHALL BE INCIDENTAL AND INCLUDED IN OTHER ITEMS OF WORK.

EROSION CONTROL SUPPLIES

THE FOLLOWING SUPPLIES SHALL BE AVAILABLE TO THE SITE WITHIN 8 HOURS :

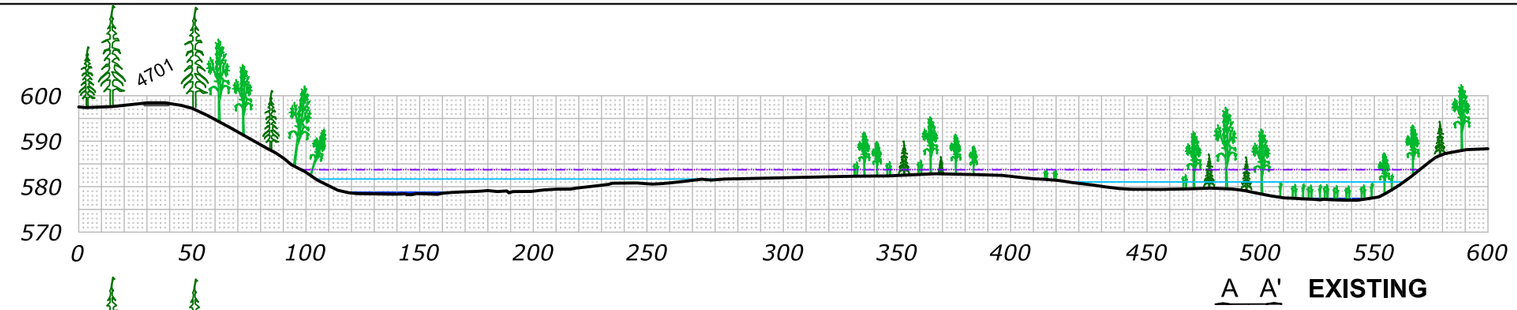
- 200 FT SILT FENCE
- 50 STAKES
- 2 TRASH PUMPS WITH 200' OF OUTLET HOSE
- CREEK BYPASS SUPPLIES
- FISH BLOCK NET
- CHECK DAM SUPPLIES
- 10 BALES STRAW
- 30 POUNDS EROSION CONTROL SEED MIX



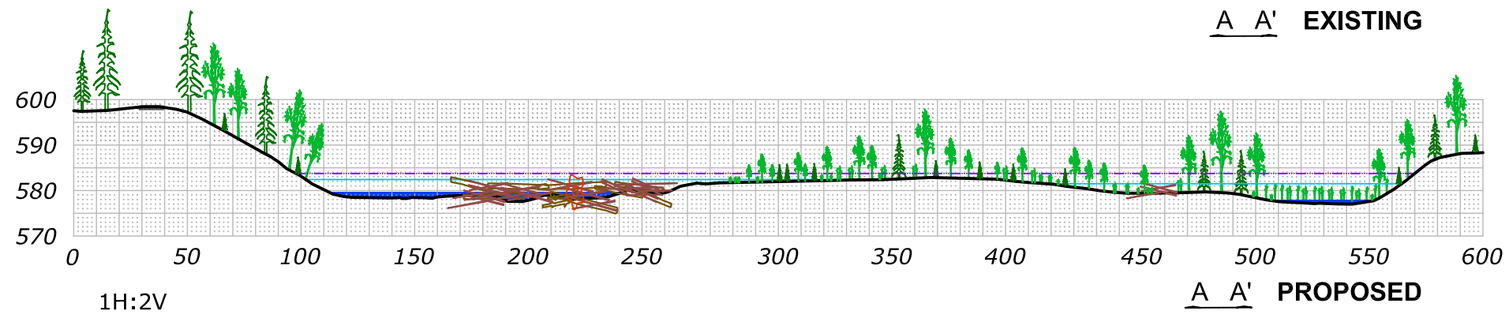


TEMPORARY COFFER DAM

1. COFFERDAMS SHALL BE USED TO ISOLATE WORK AREAS FROM FLOWING WATER TO MEET PERMIT REQUIREMENTS.
2. CONSTRUCT WITH BULK BAGS FILLED WITH RIVER SEDIMENT, SET SIDE-BY-SIDE, AND STACKED AS NECESSARY. SEAL THE DAM WITH PLASTIC SHEETS TO SEPARATE CONSTRUCTION AREAS FROM THE RIVER.
3. COMPLETE ALL REQUIRED FISH EXCLUSION.
4. THE BULK BAGS SHALL BE 1-CUBIC- YARD POLYPROPYLENE BAGS WITH OPEN TOP, FLAT BOTTOM AND FOUR LIFT LOOPS. PLASTIC SHEET SHALL BE 6-MIL MINIMUM THICKNESS AND 12' MINIMUM WIDTH.
5. PUMPING SHALL BE SUFFICIENT TO PREVENT TURBID WATER FROM SEEPING OUT OF THE ENCLOSURE INTO THE RIVER. DISCHARGE THE PUMPED WATER TO A LOCATION THAT IS STABILIZED TO PREVENT EXCESSIVE SCOUR AND THAT PROVIDES FILTRATION OF THE TURBID WATER PRIOR TO ITS RETURN TO THE RIVER.
6. ALTERNATE COFFER DAM MATERIALS AND METHODS MAY BE ALLOWED BY LCFEG, BUT SHALL NOT BE IMPLEMENTED WITHOUT PRIOR APPROVAL BY LCFEG. CONTRACTOR SHALL PROVIDE DETAILS IN WRITING PRIOR TO APPROVAL.
7. AVOID TEMPORARY DAMS AND DEWATERING WHERE ALLOWED.



A A' EXISTING



A A' PROPOSED

PLANTING AREAS

Monitoring, planting, weeding, interplanting, and passive restoration shall be completed in accord with the LCFEG planting plan. Two planting areas exist:

1. **RIPARIAN FOREST** **37.2 ACRE**
2. **VEGETATED BAR** **10.3 ACRE**

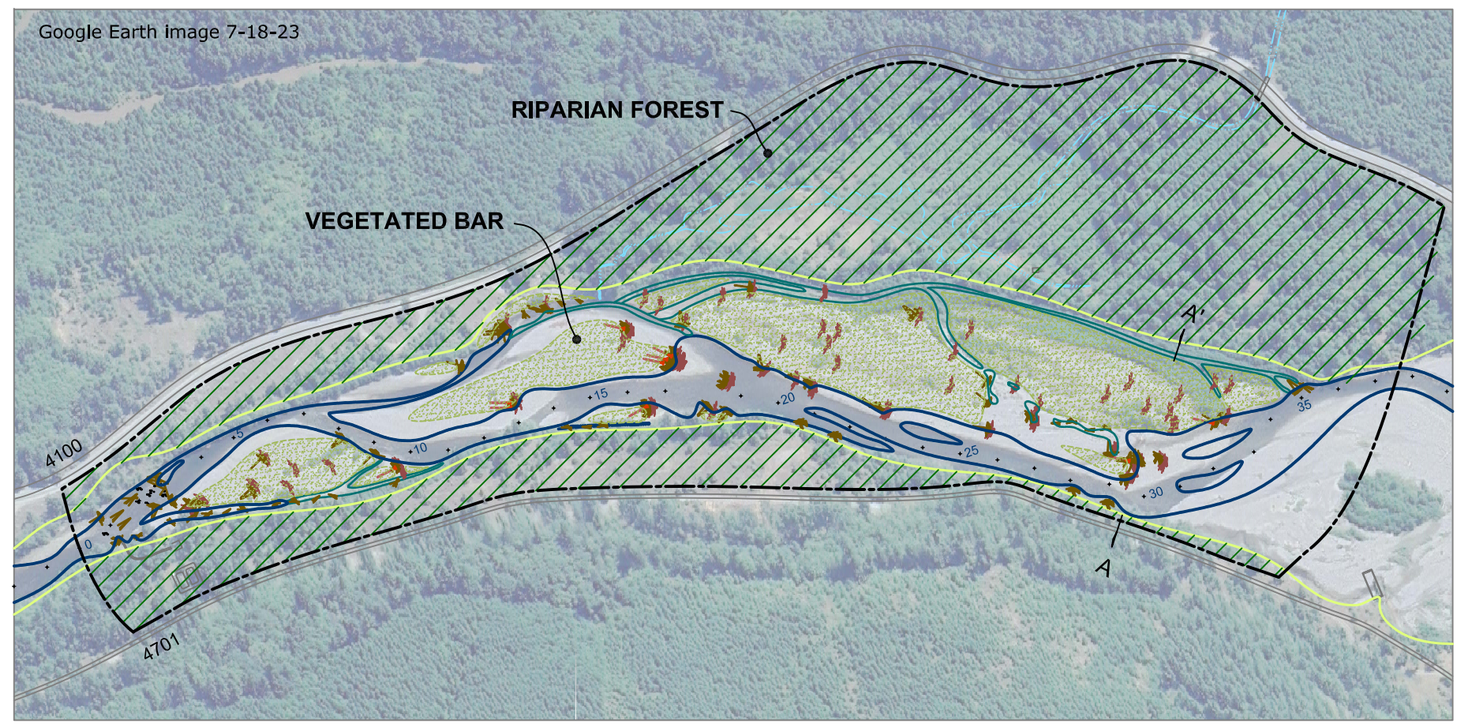
The riparian forest is well vegetated with trees, shrubs and forbs. It requires less activity than the vegetated bar areas that are now partly vegetated and partly exposed gravel.

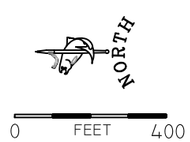
PLANTING DURING CONSTRUCTION

1. Transplants from immediate vicinity as part of LWD installation.
2. Take advantage of log installation trenches to deeply install plants, live stakes and plant pods. This vegetation will help stabilize woody structures.
3. If plant pods are installed, remove non-biodegradable portions of the bags from the site, cut open sides and bottom of bags to allow unrestrained root growth. Store in river or damp location prior to installation.
4. Seed and stabilize construction access routes.
5. Pull Scots broom near woody material installation sites.

PLANTING FOLLOWING CONSTRUCTION

1. Monitoring, planting, weeding, interplanting, and passive restoration shall be completed in accord with the LCFEG planting plan.
2. Planting includes native plant installation, weed removal, litter patrol and site monitoring and assessment.





PLANTING PLAN

T. J. SMAYDA
STATE OF WASHINGTON
29719
REGISTERED
PROFESSIONAL ENGINEER

SMAYDA ENVIRONMENTAL ASSOCIATES, INC.	LOWER COLUMBIA FISH ENHANCEMENT GROUP	90% 11-14-2023	SF TOUTLE RIVER NEAR BROWNELL CREEK - PHASE I **PLANTING**	SHEET 18 OF 18

12-21-2023

RE: SF TOUTLE LOWER BROWNELL RESTORATION

To whom it may concern,

The Lower Columbia RFEG is sponsoring this SRFB-funded project (project #21-1061). This project initiates restoration activities in the Brownell Reach of the SF Toutle River (RM 6.5 to 8.5) which was designed through SRFB #18-1409. The project will address natural processes to benefit ESA-listed Chinook, coho, and steelhead as well as resident and anadromous lamprey, trout, and a dozen other cold water fish species inventoried in the reach.

This project will install shorter term instream and off-channel habitat structures as well as island-forming structures aimed at jumpstarting the establishment of mature floodplain forests in the immediate project reach. Over 16,000 native plants for the project are being grown in an educational setting in partnership with local high schools.

The Toutle River was denuded in May 1980 by a lahar and it is still struggling to recover. LCFEG is working on a watershed approach to jumpstart natural recovery of the river by addressing its chronic wood supply shortage. We're currently planning for 2025 construction in the headwaters valley of the SF Toutle River near RM19-21 (SRFB 22-1074) and intend to ricochet our attention from the headwaters valley to the lower response reach over the coming decade for a multifaceted approach to address key limiting factors for all freshwater life stages of these ESA-listed species.

Past instream fish habitat projects completed in the SF Toutle floodplain have not required full cultural resource assessments. The May 1980 eruption of Mount St. Helens and associated lahar that swept down the SF Toutle valley buried the valley in tens of feet of ash, sand, rock, and boulders creating a new floodplain surface. We are actively working with DAHP to determine if any cultural assessment work is necessary. We will share that information as it becomes available.

Thank you for your assistance on these important projects!

Sincerely,

Brice Crayne
Restoration Program Manager
Lower Columbia RFEG
11018 NE 51st Circle
Vancouver, WA 98682
360-904-7922