



Lostine River Poley-Allen Fish Passage

COMPLETION REPORT

June 01, 2022 – May 31, 2024

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INTRODUCTION/BACKGROUND INFORMATION

The project site is located at a privately-owned irrigation diversion dam on the Lostine River approximately 1 mile south of the town of Lostine, Oregon (RM 4.8), and includes the mainstem Lostine River and the Poley-Allen irrigation diversion dam and intake (Figure 1). Prior to restoring the diversion, the structure was an upstream passage barrier for ESA listed spring Chinook Salmon, steelhead and Bull Trout. Through the implemented modifications to the existing channel spanning concrete sill and concrete abutment, roughened channel installation downstream of the sill, and LWM placement in the adjacent side channel, this project will maximize year-round fish passage and diversify fish habitat for all life history stages of Bull Trout, steelhead, and Chinook Salmon, while maintaining access to irrigation water for current water rights holders.

Project partners included the Grande Ronde Model Watershed and BPA.

Project History

The upper Lostine River has been a major focus area for restoration in the Wallowa basin since the early 2000s. With several Lostine irrigation diversions having recently been restored, Poley-Allen represented one of the largest outstanding anthropogenic barriers to ESA listed salmonids (spring/summer Chinook, steelhead, and Bull Trout), as well as reintroduced coho, Pacific lamprey, and rainbow trout in the system. An ongoing long-term radio telemetry study conducted by the Tribe showed adult spring/summer Chinook passage at Poley-Allen posed a significant delay compared to an unobstructed section of the Lostine River during summer low-flow conditions. Remediation of the Poley-Allen diversion will open up more than 10 miles of spawning and rearing habitat, most on protected federal lands located upstream.

A total of 11 ditches appropriate water from the Lostine. Low flows and high summer water temperatures, largely a result of irrigation withdrawals, affect juvenile rearing and adult spawning. Low summer flows and physical passage barriers - especially in the Lostine River, Bear Creek, Hurricane Creek, and the upper Wallowa River – limit adult access to spawning areas and juvenile access to quality rearing habitat (NMFS 2017, p. 235).

The Poley-Allen diversion channel-spanning concrete sill and the channel downstream created significant profile discontinuity (Figure 2). Downstream of the sill, the streambed was armored

and there were three locations where boulder steps created water surface elevation drops that exceeded one vertical foot during low flow and were fish passage barriers. One boulder step was approximately 10 feet downstream of the sill and another was approximately 60 feet downstream of sill (Figure 3). The third boulder step existed within the main channel, approximately 120 feet downstream of the sill. A low-flow fish passage channel was located on the west side of the sill and was adjacent to and connected with the irrigation diversion entrance. The passage channel did not appear to be functioning well and likely was not able to reliably pass fish during low flows. Due to the orientation of the passage channel, passing fish were encouraged into the apparent velocity refugia of the irrigation forebay, ultimately entraining fish in the irrigation system. The concrete abutment and riprap scour protection that existed on the right (eastern) bank at and near the sill limited floodplain connectivity in this location.

The high-flow side channel that extends approximately 570 feet on the right (eastern) side of the main channel lacked complex structure such as Large Woody Material (LWM) and, as a result, low velocity juvenile rearing areas were sparse but potential for restoring them was high.

The ESA Recovery Plan for Snake River Spring/Summer Chinook & Steelhead cites limited fish passage and reduced habitat quantity and diversity among the primary habitat-related limiting factors for the Lostine/Wallowa Rivers spring Chinook population (National Marine Fisheries Service, 2017).

The Grande Ronde Subbasin Plan recommends setting objectives for the following attributes: channel condition, riparian function, sediment reduction, low flows, temperature, and passage barriers (Nowak, 2004).

The Wallowa Atlas identifies WLL-3 (Lower Lostine: Forest boundary to the mouth) as a Tier 1 and is among the highest priorities for restoration in Wallowa County (Bonneville Power Administration, 2019).

By eliminating this partial passage barrier, adult Chinook will experience reduced migration travel times through this stretch of the Lostine River when temperatures are highest and flows are lowest. Through improving habitat conditions in the side channel adjacent to the diversion, juvenile salmonids will have additional rearing area, providing cover, greater feeding opportunities, and velocity refuge during higher flows. Through passage and habitat restoration

through this reach, greater habitat connectivity will be achieved for all life stages of salmonids and aquatic species.

The goal of this project is to restore fish passage through the Poley-Allen diversion structure while maintaining a minimum water surface elevation upstream of the diversion structure sufficient for the delivery of legal irrigation withdraws for the associated landowners.

The objectives of this project include:

- Implement a 150 feet long roughened channel engineered streambed material design suitable for passage of juvenile and adult Bull Trout, steelhead, and spring/summer Chinook Salmon during periods of migration that achieve Oregon Department of Fish and Wildlife (ODFW) and National Marine Fisheries Service (NMFS) fish passage criteria to the greatest extent practical by 2023.
- 2. Modify existing channel spanning concrete sill and concrete abutment to an elevation suitable for fish passage that maintains access and use of irrigation water for water rights holders and irrigators by 2023.
- 3. Install a series of LWM structures within the side channel east of the diversion structure to increase channel complexity, channel stability, and create diverse fish habitat by 2023.



Figure 1. Poley-Allen Diversion project vicinity map.



Figure 2. Pre-implementation photo taken from west bank looking across the Poley-Allen diversion concrete sill and at the east concrete abutment, taken September 2022.



Figure 3. Pre-implementation photo of the Lostine River channel immediately downstream of the Poley-Allen diversion, taken September 2022.

DISCUSSION OF WORK COMPLETED

Implementation of this project converted the previously existing weir structures to a roughened channel restoring unimpeded access to approximately 8 miles of habitat upstream. Engineering and design for the project was substantiated by the success of similar projects upstream on the Lostine river including those constructed at Sheep Ridge diversion in 2016, and the City of Lostine diversion in 2012, as well as downstream at Tulley-Hill diversion in 2017.

The following specific restoration actions were developed and implemented to address limiting factors relevant to the project reach:

Following work isolation and fish salvage (Figure 4 and 5), the existing concrete diversion sill was modified through the pouring of concrete lifts. These lifts were poured between the

outermost (east and west) stanchion gaps, toward the mid channel stanchion gap, in descending order from 12", to 8", to 4" lifts (10:1 slope) (Figure 6). The stanchion gap in the center of the sill was left at the original elevation to create a low-flow slot. Each concrete lift was capped with ³/₄" thick angle iron welded metal plates (Figure 10), which were predrilled, bolted, and epoxied in place to protect the new concrete veneers from erosion. Additionally, the river right (eastern) concrete abutment was sawcut to match the elevation of the top of the board slots on the sill to reduce flow constriction and increase stream stability. Final diversion construction will result in maximized fish passage through the year for all life history stages of Bull Trout, steelhead, and Chinook salmon, while maintaining access to irrigation water for current water rights holders.

775 CY of material from the main channel and eastern bank was excavated and 651 CY of imported roughened channel substrate material was placed and washed in along 210 feet of river channel below the irrigation diversion (Figure 7 and 9). 200 24"-48" habitat boulders were placed throughout the roughened channel (Figure 8) for a finished longitudinal slope of 4.9% (Figure 11). Boulders within the roughened channel will result in increased hydraulic complexity and roughness.

20 LWM structures were installed in three different configurations (Type A, B and C) within the side channel east of the diversion structure to improve channel complexity, channel stability, and fish habitat (Figure 12).



Figure 4. From west bank (headgate) looking east across the existing sill and 6" pump the contractor set to begin isolation and dewatering in preparation for channel work and sill retrofit, taken on October 10.



Figure 5. Multi agency fish salvage effort to remove/relocate fish located in and around preexisting large aggregate boulder weirs downstream of sill during isolation and dewatering, October 11.



Figure 6. Concrete sill post-concrete pour showing outer-to-inner descending veneer lifts and low flow notch in center, October 15.



Figure 7. From west bank looking across at concrete sawcut abutment on west bank. Under the supervision of the engineer, the contractor is shown adding fines and watering in the finished grade of the first ~15' of roughened channel downstream of the sill, October 13.



Figure 8. Under the direction of the C.O. and engineer, the contractor set the 24"-48" boulders on top of the subgrade for the third section of roughened channel below the sill, October 13.



Figure 9. Contractor washing in, then checking finished grade, on the completed third section of roughened channel, October 14.



Figure 10. Contractor installing second to last ³/₄" steel sill plate, October 17.



Figure 11. The contractor completing final touches on roughened channel work under the observation of GeoEngineers and NPT representatives, October 17.



Figure 12. Looking upstream at side channel as contractor installs large wood structures, October 18.

Contract Objectives

1. Coordination – NPT was the primary project sponsor, coordinating funding, environmental compliance oversight, and communication with stakeholders.

2. Design & Engineering – NPT contracted GeoEngineers for design engineering complete with construction specification, cost estimate, bid schedule, and construction oversight (see Appendix D for Final Design Drawings).

3. Environmental compliance – ESA Section 7 Consultation was completed through the HIP programmatic, covering consultation for both U.S. Fish & Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). NPT contracted with GeoEngineers to complete removal/fill permit applications. The first deliverable was biological clearance for the project as stated in the letter of concurrence from both NMFS and USFWS complete with terms and

conditions of project construction. The second deliverable was removal/fill permits from both Oregon Department of State Lands (DSL) and Army Corps of Engineers (Corps) complete with terms and conditions of project construction. A cultural resources survey was conducted by NPT archeologist's and consultation was completed fall, 2022.

NPT staff conducted fish salvage operations to remove/relocated fish from isolated work areas – see Appendix B for Fish Salvage Data.

Leading up to, during, and following construction, the contractor adhered to all permit and HIP programmatic required conservation measures.

4. Contracting – NPT contracted with BPA and OWEB for all project implementation funds (see Appendix A for Project Funding). Northwest Watershed Restoration won the construction bid through a standard competitive RFP process.

5. Construction Management – Following delivery/staging of substrate, rock, and boulder material and large wood on site, all materials were inspected and approved by NPT. On 10/4, GeoEngineer's sub-contractor RSI, surveyed in/staked the project in preparation for construction. The contractor mobilized equipment on site from 10/9-10/10. On 10/11-10/12 concrete subcontractors formed and poured concrete lifts on sill, and saw cut rive right (east side) concrete abutment. All diversion sill/abutment retrofitting, roughened channel work, wood placement, the initial seeding and mulching, and site rehabilitation/demobilization was completed by 10/19 under the direct observation of GeoEngineers representatives and/or NPT project staff. Final seeding, mulching, and site rehab was completed on 10/31.

A fencing sub-contractor has been paid by the contractor and is scheduled to complete the reconstruction, and relocation of on-site fencing on both river right and river left, including the resetting/replacement of one gate, per specifications agreed to by the landowner. NPT will pay the contractor the final payment upon completion of this final deliverable.

LESSONS LEARNED & ADAPTIVE MANAGEMENT

Lessons Learned

What Did and Did Not Work

Overall, the project was a success with only minor setbacks. Due to their extensive experience, Northwest Watershed Restoration was thorough and consistent in their application of the engineered designs. The contractor was also extremely patient and composed with both NPT and GeoEngineers staff while awaiting streambed material delivery and the resolution of other issues that caused slight delays in construction.

Lesson Learned

Several errors were made by the engineer, which resulted in some on the ground delays during construction.

The following mistakes were made by the engineer:

- underestimate of imported/fill material
- incorrect finished grade elevations

The underestimate of fill material resulted in a minor delay while waiting for the additional 379 CY of streambed sediment, 50 CY of 12"-18" rock, and 50 boulders to be delivered.

The delivery of incorrect finish grade elevations for the roughened channel also resulted in minor delays. However, if either of these mishaps went undetected, the resulting channel would have likely not functioned as designed and could have created major issues for fish passage and/or irrigation water withdrawals. The material quantity underestimate was a result of CAD modeling, while the erroneous elevation files were a result of a failure to update files following a final design revision.

Unfortunately, these types of mistakes are difficult to catch by either the project sponsor or construction contractor - although, in this case, the contractor warned of quantity underestimates during the bid process. These inaccuracies, in combination with past experiences the sponsor has had with this particular engineering firm related to a lack of attention to detail, will be taken into consideration in future design bids. If hired again, additional proof of QA/QC will be required of the engineer.

Exchange of Information

Although the irrigation ditch president, ditch secretary, and landowner were all informed of the original proposed selected alternative and agreed to a partial removal (saw cutting) of the concrete sill and complete removal of the east abutment, other irrigators on the ditch later opposed these alterations. These objections were not discovered until the sponsor began soliciting for construction bids, well after the final designs and permits were completed. This resulted in a withdrawal of the bid solicitation, multiple meetings with irrigators to gain consensus/approval, a revision of the final designs, a 3-month delay in construction, and additional design costs to the sponsor. Even though the irrigators on the ditch were not landowners directly impacted by project construction, in the future, it will be in our best interest to coordination and communication more with all affected water right holders. This includes providing water users an opportunity to review and give input on irrigation diversion restoration designs much earlier in the design development process.

Related to information exchange with the public and other natural resource partners, to date NPT staff has presented the results of implementation to the Wallowa County Natural Resources Advisory Committee (NRAC). A similar presentation will potentially be given to the Wallowa Atlas Implementation Team. Several on-the-ground project tours showing natural resource partners and/or funders the completed project will also likely occur.

Adaptive Management

Applying Lessons Learned: Past Work Practices

This project was the third irrigation diversion restoration project sponsored or co-sponsored by the Nez Perce Tribe on the Lostine River, therefore past experience and lessons learned largely contributed to its successful completion. Prior lessons learned by the project sponsor that helped with successful implementation include but are not limited to, working through a variety of design and landowner challenges, budgeting for adequate engineer construction observation time to enable field fitting as needed, construction bid evaluations and contractor selection, etc.

Applying Lessons Learned: Other Projects

Through monthly Wallowa Atlas Implementation Team meetings and other similar discussions with restoration practitioner partners, we are continually learning from not only our own growing implementation experience, but also other project implementer's experiences and lessons learned on similar and often even larger scale projects. We are not only talking to and learning from other restoration practitioners within Wallowa County but have also coordinated with and attended project tours with partners conducting large scale habitat projects in Union County (NE OR) and in the Tucannon River drainage in (SE WA). This extended coordination has resulted in much shared on-the-ground knowledge from various partners.

RM&E Adjustments

In addition to standard photo point documentation, we look forward to continuing to utilize data obtained from the RM&E that has been collected in our project area. This has been useful in putting forward projects and evaluating work completed from a biological standpoint, rooted in science. The data produced by the Lostine River adult Chinook radio telemetry study will provide a comparison of passage duration at this diversion pre- and post-restoration, much like it has for three other restored diversion on the Lostine River (Table 1).

				Median Passage	
Restoration Site		Before/After	Success Rate (%)	Duration (minutes)	n
City of Lostine	Treatment	Before	0.92	41.6	18
		After	0.97	11.9	141
	Control	Before	1.00	1.7	13
		After	1.00	1.8	139
		Effect Size	0.05	-29.8	
Sheep Ridge	Treatment	Before	0.97	31.8	66
		After	1.00	8.6	116
	Control	Before	1.00	2.0	77
		After	1.00	2.4	140
		Effect Size	0.03	-23.6	
Tulley Hill	Treatment	Before	0.85	21.4	235
		After	1.00	7.9	140
	Control	Before	1.00	1.8	138
		After	1.00	2.1	126
		Effect Size	0.15	-13.8	

Table 1. Descriptive statistics and effect sizes for BACI restoration evaluations (Vatland & Rumelhart, 2023). n = number of upstream passage attempts for each group.

Anticipated Future Critical Landmarks and Challenges

Until the newly constructed project experiences high flows in spring 2024 and subsequent low flows in summer 2024, project staff have yet to see all aspects of this restoration function as intended. Observations made during site visits in the spring and late summer, paired with telemetry data and irrigator feedback will ultimately indicate how the newly restored diversion functions at both water delivery and fish passage. As with all the formerly implemented irrigation diversion fish passage improvements, the integrity of this structure will not be truly tested until it is proven to function as designed at a range of high and low flow conditions.

REFERENCES

- Bonneville Power Administration. (2019). *Wallowa Atlas Implementation Guidelines*. Portland: Bonneville Power Administration.
- National Marine Fisheries Service. (2017). ESA Recovery Plan for Northeast Oregon Snake River Spring and Summer Chinook Salmon and Snake River Steelhead Populations.
 Portland, Oregon: National Marine Fisheries Service.
- Nowak, M. (2004). *Grande Ronde Subbasin Plan*. Portland, Oregon: Northwest Power and Conservation Council.
- Vatland, S., & Rumelhart, R. (2023). Monitoring Spring/Summer Chinook Salmon Spawning Migration in the Lostine River, Oregon: Summary Report of Radio Telemetry Tracking from 2008 through 2021.

APPENDICES

Appendix A: Project Funding

Construction:

Implementation funding sources include:

- 1. BPA = \$189,911 (Cash)
- 2. OWEB = \$215,477 (Cash)
- 3. NPT = \$38,214 (In-Kind)
 - Total secured contribution = $\frac{443,602}{5000}$

Funding Source	Cash Amount Contributed	Amount Spent
BPA	\$189,911	\$152,958
OWEB	\$215,477	\$215,477
NPT (In-Kind)	\$0	\$38,214
Total		\$406,649

Technical Assistance:

Design funding sources include:

- 1. BPA = \$10,373 (Cash)
- 2. RLF =\$90,000 (Cash)
- 3. NPT Project Management & Travel = \$7,807 (In-Kind)
 - Total = $\frac{108,180}{108,180}$

Funding Source	Cash Amount Contributed	Amount Spent
BPA	\$10,373	\$10,373
RLF	\$90,000	\$61,580.50
NPT (In-Kind)	\$0	\$7,807
Total		\$79,760.50

Project Grand Total Technical Assistance and Construction = <u>\$486,409.50</u>.

Appendix B: Fish Salvage Data

Fish Salvage Data Collection: Lostine River - Poley-Allen Fish Passage Project 10/10/23 - 10/18/23									
Type of take	Coho	Chinook	Steelhead	Bull Trout	Dace	Sculpin	Lampre y Ammocoe te s		
Number Captured	21	205	407	0	8	530	0		
Number Injured	0	0	0	0	0	0	0		
Number Killed	0	21	21	0	0	21	0		
Type of take	Interior Columbia Basin	Bull Trout							
Number of salmonids Captured	633	0							
Number of salmonids Injured	0	0							
Number of salmonids Killed	42	0							

Appendix C: Pre and Post Implementation Photos and Map

Poley-Allen Fish Passage Project –

Map and Pre & Post Project Photo Points

Photo Point Map





Photo Point 1: (Top: taken 9/27/22, Bottom: taken 11/1/23)







Photo Point 3: (Top: taken 9/27/22, Bottom: taken 11/1/23)



Photo Point 4: (Top: taken 9/27/22, Bottom: taken 11/1/23)





Photo Point 5: (Top: taken 9/27/22, Bottom: taken 11/1/23)

Photo Point 6: (Top: taken 9/27/22, Bottom: taken 11/1/23)



Appendix D: Final Design Drawings



GENERAL NOTES:

- 1. THESE DESIGNS AND DRAWINGS HAVE BEEN PREPARED FOR THE EXCLUSIVE USE OF THE NEZ PERCE TRIBE (NPT) AND THEIR AUTHORIZED AGENTS. NO OTHER PARTY MAY RELY ON THE PRODUCT OF OUR SERVICES UNLESS GEOENGINEERS INC. (GEOENGINEERS) AGREES IN WRITING IN ADVANCE OF SUCH USE.
- 2. THE DRAWINGS CONTAINED WITHIN SHOULD NOT BE APPLIED FOR ANY PURPOSE OR PROJECT EXCEPT THE LOSTINE RIVER POLEY ALLEN FISH PASSAGE AS SHOWN IN THE PROJECT AREA LOCATED ON DRAWING 1.1.
- 3 THESE DESIGNS AND DRAWINGS ARE COPYRIGHTED BY GEOENGINEERS. INC. ANY USE, ALTERATION, DELETION, OR EDITING OF THIS DOCUMENT WITHOUT EXPLICIT WRITTEN PERMISSION FROM GEOENGINEERS, INC. IS STRICTLY PROHIBITED. ANY OTHER UNAUTHORIZED USE OF THIS DOCUMENT IS PROHIBITED.
- NPT IS ADVISED TO OBTAIN THE NECESSARY PERMITS AND APPROVALS 4. FROM ALL APPROPRIATE REGULATORY AGENCIES (LOCAL, STATE, AND FEDERAL) PRIOR TO CONSTRUCTION.
- GEOMORPHIC CONDITIONS CAN CHANGE AND THESE DESIGNS ARE 5. BASED ON CONDITIONS THAT EXISTED AT THE TIME THE DESIGN WAS PERFORMED. THE RESULTS OF THESE DESIGNS MAY BE AFFECTED BY THE PASSAGE OF TIME, BY MANMADE EVENTS SUCH AS CONSTRUCTION ON OR ADJACENT TO THE SITE, OR BY NATURAL EVENTS SUCH AS FLOODS, EARTHQUAKES, SLOPE INSTABILITY OR GROUNDWATER FLUCTUATIONS. ALWAYS CONTACT GEOENGINEERS BEFORE APPLYING THESE DESIGNS TO DETERMINE IF THEY REMAIN APPLICABLE.
- ALL RIVERS, STREAMS, ROCKS AND FISH PASSAGE STRUCTURES ARE 6. POTENTIALLY DANGEROUS. THESE PROPOSED IMPROVEMENTS ARE INTENDED TO ADDRESS FISH PASSAGE CONSTRAINTS. THESE STRUCTURES ARE INHERENTLY DANGEROUS TO PEOPLE IN OR AROUND THEM. NPT AND THE PROPERTY OWNER SHOULD ADDRESS SAFETY CONCERNS APPROPRIATELY.
- 7. POTENTIAL REGULATORY CHANGES TO FLOOD ELEVATIONS AND FLOOD EXTENTS RESULTING FROM THE PROPOSED ENHANCEMENTS HAVE NOT BEEN ADDRESSED BY GEOENGINEERS AS PART OF THIS PROJECT.
- IN GENERAL, THE PROPOSED ENHANCEMENTS ARE INTENDED TO RESULT 8. IN MORE STABLE STREAMBEDS, BANKS AND FLOODPLAINS, HOWEVER, CHANNEL EROSION, CHANNEL MIGRATION AND/OR AVULSIONS CAN BE EXPECTED TO OCCUR OVER TIME. THESE CHANNEL PROCESSES ARE NATURAL AND APPROPRIATE FOR THESE STREAM SYSTEMS.
- DESIGN SPECIFICS FOR STRUCTURES SHALL BE CONFIRMED AND/OR 9 VERIFIED BY A QUALIFIED ENGINEER PRIOR TO OR DURING CONSTRUCTION AT EACH PROPOSED STRUCTURE LOCATION.
- 10. THESE FIGURES WERE ORIGINALLY PRODUCED IN COLOR.

CONSTRUCTION NOTES:

- 1. ALL CONTRACTORS WORKING WITHIN THE PROJECT BOUNDARIES ARE RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE SAFETY LAWS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL BARRICADES, SAFETY DEVICES AND CONTROL OF TRAFFIC WITHIN AND AROUND THE CONSTRUCTION AREA.
- 2. ALL MATERIAL AND WORKMANSHIP FURNISHED ON OR FOR THE PROJECT MUST MEET THE MINIMUM REQUIREMENTS OF PROJECT PERMITS, APPROVING AGENCIES, SPECIFICATIONS AS SET FORTH HEREIN, OR WHICHEVER IS MORE RESTRICTIVE.
- ALL FEDERAL, STATE AND LOCAL PERMITS SHALL BE OBTAINED BY THE CLIENT PRIOR TO CONSTRUCTION ACTIVITY COMMENCEMENT.
- THE CONTRACTOR SHALL INSTALL AND MAINTAIN APPROPRIATE EROSION AND SEDIMENT CONTROL DEVICES THROUGHOUT THE WHOLE PROJECT SITE, INCLUDING THOSE ASSOCIATED WITH CONSTRUCTION ACCESS, STAGING AND STOCKPILE AREAS THROUGHOUT THE PROJECT'S CONSTRUCTION PERIOD. TEMPORARY CONSTRUCTION AND PERMANENT EROSION CONTROL MEASURES SHALL BE DESIGNED, CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
- CONSTRUCTION ACTIVITY SHALL BE LIMITED TO THE CONSTRUCTION AREAS AND ACCESS ROUTES TO MINIMIZE DISTURBANCE OF THE EXISTING VEGETATION AND LANDSCAPE. ALL PUBLIC AND PRIVATE PROPERTY EITHER INSIDE OR OUTSIDE THE CONSTRUCTION LIMITS IMPACTED BY CONSTRUCTION SHALL BE RESTORED TO A CONDITION EQUAL TO OR BETTER THAN THAT WHICH EXISTED PRIOR TO THE CONSTRUCTION. NO CONSTRUCTION-RELATED MATERIALS, DEBRIS, GARBAGE, EQUIPMENT, FUEL, PROVISIONS OF ANY KIND SHALL REMAIN ON SITE AFTER CONSTRUCTION. NO STOCKPILES OR EXCAVATIONS ARE TO REMAIN AFTER CONSTRUCTION UNLESS AUTHORIZED BY NPT. THE SITE WILL BE GRADED TO APPEAR NATURAL AND CONFORM TO THE NATURAL TOPOGRAPHY.
- CONSTRUCTION SHALL MINIMIZE DISTURBANCE TO, AND MAXIMIZE REUSE OF, EXISTING 6. **RIPARIAN VEGETATION TO REMAIN AND SALVAGE.**
- ONLY APPROPRIATE APPROVED NATIVE RIPARIAN VEGETATION SHALL BE USED FOR 7. CUTTINGS AND TRANSPLANTING. VEGETATION CUTTING, TRANSPLANTING, PLANTING AND IRRIGATION SHALL BE MANAGED BY AN APPROPRIATE PROFESSIONAL.
- CONSTRUCTION RECORDS AND AS-BUILT INFORMATION SHALL BE ACCURATELY RECORDED BY THE CONTRACTOR AND SUPPLIED TO THE OWNER AND GEOENGINEERS, REFERENCE AND MONITORING. SUBMITTAL OF RECORD INFORMATION IS A CONDITION OF FINAL ACCEPTANCE.
- 9. THIS DESIGN HAS BEEN PERFORMED AND THESE PLANS HAVE BEEN PREPARED WITH THE EXPRESS UNDERSTANDING THAT GEOENGINEERS WILL BE ON-SITE DURING CONSTRUCTION TO HELP THE CONTRACT INTERPRET THE DESIGN PLANS AND INTENT.
- 10. THE CONTRACTOR IS RESPONSIBLE FOR COMPLETING TURBIDITY MONITORING AS INDICATED IN THE BONNEVILLE POWER ADMINISTRATION HIP GUIDELINES. MEASURE BASELINE DATA APPROXIMATELY 100 FEET UPSTREAM OF THE PROPOSED DISTURBANCE USING A TURBIDIMETER. RECORD READINGS ON THE STANDARD PROJECT COMPLETION FORM. MEASURE TURBIDITY APPROXIMATELY 50 FEET DOWNSTREAM OF THE DISTURBANCE AREA EVERY 2 HOURS WHILE WORK IS BEING IMPLEMENTED.

Item Description	Units	No. of Units
Mobilization and Demobilization	LS	1
Pollution Control	LS	1
Sawcut Sill Abutment	LS	1
Clearing, Grubbing, Stockpile and Disposal	AC	1
Excavation and Stockpile	CY	775
Earthfill - Stockpiled Material	CY	444
Earthfill - Stockpiled Habitat Boulders	CY	233
Earthfill - Imported Habitat Boulders	CY	211
Earthfill - Imported Streambed Sediment	CY	222
Concrete Repair	CY	8
Work Zone Isolation and Dewatering	LS	1
Large Woody Material Structures	EA	20
Permanent Seeding, Fertilizing and Mulching	AC	1
Planting	EA	260

LEGEND (EXISTING)

	EXISTING MAJOR (5-FT
	EXISTING MINOR (1-FT
	LOSTINE RIVER ALIGN
	PARCEL BOUNDARY
,,	EXISTING IRRIGATION
	EXISTING SIDE CHANN
	EXISTING APPROXIMAT
	EXISTING APPROXIMAT
8	SURVEY BENCHMARK
~ ~~	FLOW DIRECTION

CROSS SECTION	
	X
RAWING LOCATION	

STRUCTURES. BOULDERS WITHIN THE ROUGHENED CHANNEL WILL INCREASE HYDRAULIC COMPLEXITY AND ROUGHNESS.

OBJECTIVES

VISION

GOAL

RIGHTS HOLDERS.

1. DEVELOP AND SELECT FISH PASSAGE DESIGN FOR JUVENILE AND ADULT BULL TROUT, STEELHEAD AND SPRING CHINOOK SALMON DURING PERIODS OF MIGRATION THAT ACHIEVE OREGON DEPARTMENT OF FISH AND WILDLIFE (ODFW) AND NATIONAL MARINE FISHERIES SERVICE (NMFS) FISH PASSAGE CRITERIA TO THE GREATEST EXTENT PRACTICAL.

MAXIMIZE FISH PASSAGE AT THE POLEY ALLEN DIVERSION FOR ALL LIFE HISTORY STAGES OF BULL TROUT, STEELHEAD, AND CHINOOK SLAMON, WHILE MAINTAINING ACCESS TO IRRIGATION WATER FOR CURRENT WATER

PROMOTE NATURAL RIVER AND FLOODPLAIN CONDITIONS WHILE MAINTAINING IRRIGATION ACCESS THROUGH CONSTRUCTION OF A ROUGHENED CHANNEL WITH BANK STABILIZATION PROVIDED BY LARGE WOODY MATERIAL

2. DEVELOP FISH PASSAGE DESIGNS THAT MAINTAIN ACCESS AND USE OF IRRIGATION WATER FOR WATER RIGHTS HOLDERS AND IRRIGATORS.

3. PROVIDE A SUSTAINABLE, PERMITTABLE, AND EASILY MAINTAINED PROPOSED CONDITION AT A REASONABLE COST.

3 C		DV		DESIGNED BY: AKAA	f	1			
	O. DATE	DOC		DESIGNED BT. AKIVI		PREPARED FOR:		ALL PEACE	LOS
	1 03/21/2023	RSC	MODIFIED CONCRETE SILL	DRAWN BY: AKM/SCY	GEOENCINEEDS	1.	NEZ PERCE	1000	11
	2 07/07/2023	RSC	MODIFIED CONCRETE SILL	APPROVED BY: RSC	GEULNGINEERS /		TRIBE		
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T) CONTOUR LINE T) CONTOUR LINE MENT

DITCH IEL TE OHW (1.5-YR) TE 100-YR



LEGEND (PROPOSED)

PROPOSED MAJOR (10-FT) CONTOUR LINE PROPOSED MINOR (2-FT) CONTOUR LINE ETTER: EXCAVATION LIMITS PROPOSED ROUGHENED CHANNEL TEMPORARY CONSTRUCTION ACCESS TEMPORARY CONSTRUCTION STAGING **DEMOLITION LIMITS** - - - TEMPORARY STREAM ISOLATION PROJECT DISTURBANCE LIMITS TEMPORARY STOCKPILING LOCATION PROPOSED WILLOW STAKES PROPOSED NATIVE SEED MIX LWM - TYPE A - ROOTWAD → LWM - TYPE B - WHOLE TREE LWM - TYPE C - SWEEPER LWM - TYPE D - BANK ROOTWAD



DRAWING LOCATION CALLOUT

	1	
	Steel 7	PROFES NVE 2313PE
		REGON . 12, 2012 S. CARINE DEC. 31, 2023
		BE0: 01, 2020
OSTINE RIVER POLEY ALLEN FISH PASSAG WALLOWA COUNTY, OREGON	ĴΕ	DRAWING NUMBER:
AL NOTES, QUANTITIES AND LE	GENDS	1.2 SHEET: 2 OF 19









	DO LOSTINE RI	PPPO VER EXEMPORARY WORK CONE ISOLATION DISTURE	STING SIDE CHANNEL			PROPOSED ROUGHENED CHANNEL
	NO. DATE BY 1 03/21/2023 RSC	ISSUE / DESCRIPTION MODIFIED CONCRETE SILL	DESIGNED BY: AKM DRAWN BY: AKM/SCY	C C C C C C C C C C C C C C C C C C C	PREPARED FOR:	
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2			DATE: 7/12/23	WWW.GEOENGINEERS.COM	Alemental A	

START STATION	START NORTHING (FT)	START EASTING (FT)	LINE/CHORD DIRECTION	CURVE RADIUS	LENGTH	END STATION
0+00	673842.1	8990465.7	S37° 28' 46.13"W		117.9	1+18
1+18	673748.5	8990394.0	S35° 34' 27.55"W		61.3	1+79
1+79	673698.7	8990358.3	\$35° 02' 11.39"W		70.7	2+50
2+50	673640.8	8990317.7	\$32° 05' 43.40"W		43.0	2+93
2+93	673604.4	8990294.9	S25° 20' 03.31"W	50	11.8	3+05
3+05	673593.7	8990289.8	S18° 34' 23.21"W		4.1	3+09
3+09	673589.8	8990288.5	S09° 41' 38.18"W	15	4.6	3+13
3+13	673585.2	8990287.7	S00° 48' 53.15"W		61.7	3+75

			32-8-F	LOSTINE RIVER		B B B B B B B B B B B B B B B B B B B	/ /5 3+50 //	3+00	2,50
	1 AL		5-7	I WM TYPE A - ROOTWAD (TYP		57757			
	1.0				" A THE TAL	A A JA	N.		
	34/ -7-		2		LWM TYPE B - WHOLE T	TREE (TYP.)		E 3	3434
	× A1 A2	5 0	- All And			Contract D	- HA ATY	- fro	L.
T.			CA4	THE NEW YORK			PROPOS	ED ROUGHENED	
	AB		B1	-+ <u>(</u> B2)	- filler		\$_1 \	0	A CONTRACT
		i i	~ 1		B3	A Company of			
No.			Z. M.		B4	T	~/	Y	
	WORK ZONE ISOL	ATION (TYP.)		S A S F			1 C1		
				APPROX. EXCAVAT	ION	A6	B6	B7	
STRUCTURE #	STRUCTURE ID	NORTHING	EASTING	-	Carlos in	1-1-1-5		A7	
1	Al	673235.99	8990383.02						
2	A2	673239.06	8990385.25	-		EXISTING SIDE CHANNEL THALWE	G		and a start of the
3	A3	6/3238.6/	8990395.33	PROJECT DI	STURBANCE				
4	A4	673307.38	8990397.56			//////////////////////////////////////			SWEEPER LOGS
5	AS	673405.99	8990418.84						
6	A0 A7	673491.30	8990443.02	-			0 20	40	
/	A7	673597.98	8990450.08	-			NO OF		
8	A8	673634.47	8990443.10	-	STRUCTURE TYPE	STRUCTURE DESCRIPTION	STRUCTURES	LOG TYPE 1	LOG TYPE 2
9	A9	673727.04	8990446.25	-	Α	ROOTWAD	10	1	
10	AIU	073734.53	8990444.64	-	В	WHOLE TREE	9		
11	81	673289.23	8990403.81		C		1	10	2
12	B2	673330.30	8990403.10			TOTAL	20	10	2
13	B3	673403.74	8990413.82				LWM SCHE	DULE	
14	B4	673424.76	8990425.33		and the second second				
15	B5	673482.34	8990436.60	-	LOG TYPE	LENGTH (FT)	MIN. DIA (IN)	MAX. DIA (IN)	AVG. DIA (IN)
16	B6	673555.74	8990446.65	in the second second	1	30	12	18	15.0
17	B7	673602.09	8990448.45	_	2	30	9	12	10.5
18	B8	673681.22	8990440.06	-	3	30	12	18	15.0
19	B9	673697.47	8990442.73	_					
20	C1	673542.45	8990443.42				LOG SIZING	TABLE	
ST	RUCTURE ST	AKING TAB	<u>SLE</u>						
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	LOSTINE	PHA DIVER	ASE 2 WATER O O O D D D D D D D D D D D D D	RBANCE LIMITS	TING SIDE CHANNEL		
e 13				A A AL	Contraction of the second		
				C. Al	Carlos Cland Barder		LOSTINE RIVER ROAD
CON	ISTRUCTIO	ON SE	QUENCING AND DEWATERING GENERAL NOTES				
ALL	IN-WATER	R WOR (1 Si Pi Ti	RK SHALL OCCUR BETWEEN JULY 15 - AUGUST 15 OR AS OTI 1.1) ACCESS SITE FROM LOSTINE RIVER ROAD. (1.2) ESTABLI SITE AS SHOWN. TEMPORARY ACCESS ROUTES SHALL MINIM PRIVATE LAND OWNERS PROPERTY. PRIVATE ROADS MUST BE TIMES. (1.3) ROADS SHALL BE RESTORED TO EXISTING COND PROJECT	HERWISE SPECIFIED IN SH TEMPORARY ACCES ZE DISTURBANCE TO N E CLEAR OF ALL CONST ITION OR BETTER PRIO	ENVIRONMENTAL PERMITS. SS ROUTES THROUGHOUT THE ATIVE VEGETATION AND THE RUCTION DEBRIS AT ALL R TO COMPLETION OF THE	0 30 60 SCALE IN FEET	
	8	(2 SI	2.1) ESTABLISH STAGING AND STOCKPILE LOCATIONS AS SH SHALL OCCUR AT A MINIMUM OF 150 FEET FROM THE EDGE (CONTROLS AROUND STAGING AREAS AND STABILITE ANY TEM	OWN. ALL FUEL STORA OF WATER. (2.2) INSTAI IPORARY STOCKPILES	GE AND REFUELING ACTIVES LL PERIMETER SEDIMENT		
	9 10	(3 W C W T (4 D	3.1) ISOLATE WORK ZONE FOR CONSTRUCTION OF LARGE WO WITHIN THE SIDE CHANNEL PRIOR TO DEWATERING. (3.3) DE CONTINUOUS DOWNSTREAM PASSAGE THROUGH THE DURAT WITHIN THE WORK AREA SHALL BE PUMPED OUT AND DISCH URBIDITY. 4.1) EXCAVATE EXISTING MATERIAL FOR LARGE WOODY MATI DRAWINGS.	DOD STRUCTURES. (3.2 WATER THE SIDE CHAN ION OF ISOLATION. AFT ARGED IN AN UPLAND ERIAL STRUCTURES AS	E) CONDUCT FISH SALVAGE NEL AND ALLOW FOR ER FISH SALVAGE WATER LOCATION TO AVOID EXCESS INDICATED ON THE DESIGN		
	(11)	(5	5.1) CONSTRUCT LARGE WOOD STRUCTURES PER DRAWING	6 4.1 THROUGH 3.3.			
	12	(6 Pi Al T(6.1) RESTORE DISTURBED AREAS WITHIN THE FLOODPLAIN O PLAN ON DRAWING 7.1. (6.2) STABILIZE WITH NATIVE SEED M AND LOG STRUCTURE INSTALLATION IS COMPLETE. RESTORE TO EXISTING CONDITIONS OR BETTER.	RADING LIMITS ACCOF	RDING TO THE REVEGETATION AFTER CHANNEL EXCAVATION & WITHIN PRIVATE PROPERTY		
NO. 1	DATE 03/21/2023	BY RSC	ISSUE / DESCRIPTION MODIFIED CONCRETE SILL	DESIGNED BY: AKM DRAWN BY:AKM/SCY	Grafue	PREPARED FOR:	A LAND
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	0.5 - 1.5 INCH DIAMETER	8-	
4			
2-3 FT STAKE	4-6 IN		
TOTAL LENGTH	FINISH GRADE		- 3/4 LENGTH STAKE BELOW FINISH GRADE, 1/4 LENGTH ABOVE GRADE
	PRE-DRILL HOLE USING REBAR SECTIONS SMALLER THAN 0.5 - 1.5 INCH DIAMETER OF STAKE		
1			

TYPICAL WILLOW STAKE DETAIL

Seed Mix Inclue	des Approx	cim	
Species	Size		
Annual Ryegrass	Seed		
Idaho Fescue	Seed		
Blue Wildrye	Seed		
Mountain Brome	Seed		

SEEDING NOTES:

1) THE SEED MIX IS SUGGESTED BASED ON PAST WORK BUT CAN BE SUBSTITUTED WITH SIMILAR MIX AND WILL BE PROVIDED BY THE NEZ PERCE TRIBE.

2) INSTALL CUTTINGS BETWEEN APPROXIMATELY 1.5 AND 3.0 VERTICAL FEET ABOVE THE TOE OF SLOPE. CONFIRM STEMS INTERCEPT SHALLOW GROUNDWATER AT LOW FLOW CONDITIONS.

		Willow Trer	nch Planting			
	Total Toronak	Stake	e Size			
Species	Length (ft)	Length (ft.) (Min)	Diameter (inch) (Min/Max)	Spacing (ft.)	Quantity	
Willow (Salix sp.)-Floodplain	260	4	0.5/1.5	1	260	

NO. DATE BY ISSUE / DESCRIPTION 1 03/21/2023 RSC MODIFIED CONCRETE SI DESIGNED BY: AKM PREPARED FOR: GEOENGINEERS / MODIFIED CONCRETE SILL DRAWN BY: AKM/SCY NEZ PERCE TRIBE 2 07/07/2023 RSC MODIFIED CONCRETE SILL APPROVED BY: RSC 3 **REVISION NO.:** -DATE: 7/12/23 WWW.GEOENGINEERS.COM

ately 0.8 Acres							
Ibs/acre Quantity							
8.0							
2.4							
8.0							
9.6							

ſ	HIP 4 GENERAL AQUATIC CONSERVATION MEASURES APPLICABLE TO ALL ACTIONS		1)	TEMPORARY STREAM CROSSINGS.	A) WORK WILL BE SEQ
	THE ACTIVITIES COVERED UNDER THE HIP IV ARE INTENDED TO PROTECT AND RESTORE	FISH AND WILDLIFE	A)	EXISTING STREAM CROSSINGS WILL BE PREFERENTIALLY USED WHENEVER REASONABLE, AND THE	EROSION.
	HABITAT WITH LONG-TERM BENEFITS TO ESA-LISTED SPECIES. TO MINIMIZE THESE SHOR	RT-TERM ADVERSE	NOM B)	DER OF TEINFURART STREAM URUSSINGS WILL BE MINIMIZED. TEMPORARY BRIDGES AND CUI VERTS WILL BE INSTALLED TO ALLOW FOR FOLLIDMENT AND VEHICLE	CALCIUM CHLORIDE SALTS
	EFFECTS AND MAKE THEM PREDICTABLE FOR THE PURPOSES OF PROGRAMMATIC ANALY	ISIS, BPA WILL	CROS	SING OVER PERENNIAL STREAMS DURING CONSTRUCTION. TREATED WOOD SHALL NOT BE USED ON	STREAM CHANNEL AND WI
	CONSERVATION MEASURES (DEVELOPED IN COORDINATION WITH USEWS AND NMES).	LLOWING GENERAL	TEM	PORARY BRIDGE CROSSINGS OR IN LOCATIONS IN CONTACT WITH OR OVER WATER.	STREAMS. APPLICATIONS (
ł			C)	EQUIPMENT AND VEHICLES WILL CROSS THE STREAM IN THE WET ONLY WHERE:	SQUARE YARD OF ROAD SU
			I.	THE STREAMBED IS BEDROCK; OR	C) APPLICATION OF DU
L	1) STATE AND FEDERAL PERMITS. ALL APPLICABLE REGULATORY PERMITS AND OFFICIAL	PROJECT	11.	MATS OR OFF-SITE LOGS ARE PLACED IN THE STREAM AND USED AS A CROSSING.	THE DUST ABATEMENT MA
	AUTHORIZATIONS WILL BE OBTAINED BEFORE PROJECT IMPLEMENTATION. THESE PERMI	NACT NATIONAL	D)	VEHICLES AND MACHINERY WILL CROSS STREAMS AT RIGHT ANGLES TO THE MAIN CHANNEL	A WATERBODY OR STREAM
	HISTORIC PRESERVATION ACT. AND THE APPROPRIATE STATE AGENCY REMOVAL AND FIL	L PERMIT. USACE		THE LOCATION OF THE TEMPODARY OROSSING WILL AVOID AREAS THAT MAY INCREASE THE DISK OF	SLOPES ARE STEEP).
	CLEAN WATER ACT (CWA) 404 PERMITS, AND CWA SECTION 401 WATER QUALITY CERTIFI	CATIONS.	CHAN	INEL COCATION OF THE TEMPORARY CROSSING WILL AVOID AREAS THAT MAY INCREASE THE RISK OF	D) SPILL CONTAINMEN
	2) TIMING OF IN-WATER WORK, APPROPRIATE STATE (OREGON DEPARTMENT OF FISH AN	D WILDLIFE (ODFW).	F)	POTENTIAL SPAWNING HABITAT (I.E., POOL TAILOUTS) AND POOLS WILL BE AVOIDED TO THE MAXIMUM	CHEMICALS.
	GUIDELINES FOR TIMING OF IN-WATER WORK WINDOWS (IWWW) WILL BE FOLLOWED.		EXTE	NT POSSIBLE.	11) SPILL DEEVENTION
	A) BULL TROUT - WHILE UTILIZING THE APPROPRIATE STATE DESIGNATED IN-WATER WOR	K PERIOD WILL	G)	NO STREAM CROSSINGS WILL OCCUR AT ACTIVE SPAWNING SITES, WHEN HOLDING ADULT LISTED FISH	INCREASES THE RISK FOR
	LESSEN THE RISK TO BULL TROUT, THIS ALONE MAY NOT BE SUFFICIENT TO ADEQUATELY	PROTECT LOCAL	AREI	PRESENT, OR WHEN EGGS OR ALEVINS ARE IN THE GRAVEL. THE APPROPRIATE STATE FISH AND WILDLIFE	CONTAMINANTS INTO THE
	AREAS BECAUSE EGGS. ALEVIN, AND FRY ARE IN THE SUBSTRATE OR CLOSELY ASSOCIAT	TED HABITATS NEARING		AFTER PROJECT COMPLETION TEMPORARY STREAM CROSSINGS WILL BE OBLITERATED AND THE	CONCRETE AND FORM MAT
	YEAR ROUND. SOME AREAS MAY NOT HAVE DESIGNATED IN-WATER WORK WINDOWS FO	R BULL TROUT OR IF	STRE	AM CHANNEL AND BANKS RESTORED.	FOOD ORGANISMS AND FS
	THEY DO, THEY MAY CONFLICT WITH WORK WINDOWS FOR SALMON AND STEELHEAD. IF	THIS IS THE CASE, OF	7)	STAGING, STORAGE, AND STOCKPILE AREAS.	MEASURES:
	IF PROPOSED WORK IS TO OCCUR WITHIN BULL TROUT SPAWNING AND REARING HABITA	TS, PROJECT	A)	STAGING AREAS (USED FOR CONSTRUCTION EQUIPMENT STORAGE, VEHICLE STORAGE, FUELING,	A) A DESCRIPTION OF H
	IMPLEMENTATION MEASURES ARE CONSIDERED AND AN APPROPRIATE IN-WATER WORK	WINDOW IS BEING	SERV	(ICING, AND HAZARDOUS MATERIAL STORAGE) WILL BE 150 FEET OR MORE FROM ANY NATURAL WATER	AND HANDLING PROCEDUR
	USED TO MINIMIZE PROJECT EFFECTS.		PRFC	OR WEITAND, OR ON AN ADJACENT, ESTABLISHED ROAD AREA IN A LOCATION AND MANNER THAT WILL.	B) WRITTEN PROCEDUI
	B) LAMPREY - THE PROJECT SPONSOR AND/OR THEIR CONTRACTORS WILL AVOID WORKIN	NG IN STREAM OR	B)	NATURAL MATERIALS USED FOR IMPLEMENTATION OF AQUATIC RESTORATION, SUCH AS LARGE WOOD.	THE WORK SITE.
	RIVER CHANNELS THAT CONTAIN PACIFIC LAMPREY FROM MARCH 1 TO JULY 1 IN LOW TO	MID ELEVATION	GRAV	EL, AND BOULDERS, MAY BE STAGED WITHIN THE 100-YEAR FLOODPLAIN.	THE TYPES AND OUANTITY
	REACHES (<5,000 FEET). IN HIGH ELEVATION REACHES (>5,000 FEET), THE PROJECT SPO WORKING IN STREAM OR RIVER CHANNELS FROM MARCH 1 TO ALIGUIST 1. IF FITHER TIM	INSOR WILL AVOID	C)	ANY LARGE WOOD, TOPSOIL, AND NATIVE CHANNEL MATERIAL DISPLACED BY CONSTRUCTION WILL BE	SITE.
	INCOMPATIBLE WITH OTHER OBJECTIVES. THE AREA WILL BE SURVEYED FOR NESTS AND	LAMPREY PRESENCE	STOC	KPILED FOR USE DURING SITE RESTORATION AT A SPECIFICALLY IDENTIFIED AND FLAGGED AREA.	D) WORKERS WILL BE
	AND AVOIDED IF POSSIBLE. IF LAMPREYS ARE KNOWN TO EXIST, THE PROJECT SPONSOR	WILL UTILIZE	D)	ANY MATERIAL NOT USED IN RESTORATION, AND NOT NATIVE TO THE FLOODPLAIN, WILL BE REMOVED	LOCATION OF SPILL CONTA
	DEWATERING AND SALVAGE PROCEDURES OUTLINED IN US FISH AND WILDLIFE SERVICE	BEST MANAGEMENT	P)	LOCATION OUTSIDE OF THE 100-YEAR FLOODPLAIN FOR DISPUSAL.	E) ANY WASTE LIQUIDS
	PRACTICES TO MINIMIZE ADVERSE EFFECTS TO PACIFIC LAMPREY (2010).		MAIN	TAINED IN A MANNER THAT MINIMIZES ADVERSE EFFECTS ON THE ENVIRONMENT (E.G.,	OF AT A FACILITY THAT IS A
1	C) EXCEPTIONS TO ODFW, WDFW, MFWP, OR IDFG IN-WATER WORK WINDOWS WILL BE R THE VARIANCE PROCESS (PAGE 2)	EQUESTED THROUGH	MINI	MALLY-SIZED, LOW PRESSURE TIRES; MINIMAL HARD-TURN PATHS FOR TRACKED VEHICLES; TEMPORARY	12) INVASIVE SPECIES C
	2) CONTAMINANTS, THE DROJECT SPONSOD WILL COMPLETE A SITE ASSESSMENT WITH .		MATS	OR PLATES WITHIN WET AREAS OR ON SENSITIVE SOILS). ALL VEHICLES AND OTHER MECHANIZED	OF INVASIVE PLANTS AND M
	5) CONTAMINANTS. THE PROJECT SPONSOR WILL COMPLETE A SITE ASSESSMENT WITH T	ATION FOR ANY	EQUI	PMENT WILL BE:	A) PRIOR TO ENTERING
	ACTION THAT INVOLVES EXCAVATION OF MORE THAN 20 CUBIC YARDS OF MATERIAL:		A) ANY I	STORED, FUELED, AND MAINTAINED IN A VEHICLE STAGING AREA PLACED 150 FEET OR MORE FROM VATURAL WATER BODY OR WETLAND OR ON AN ADJACENT, ESTABLISHED ROAD AREA	FULLY DRY, AND INSPECTE
	A) A REVIEW OF AVAILABLE RECORDS, SUCH AS FORMER SITE USE, BUILDING PLANS, AND	D RECORDS OF ANY	B)	REFUELED IN A VEHICLE STAGING AREA PLACED 150 FEET OR MORE FROM A NATURAL WATERBODY OR	R) WATERCRAFT WADE
	PRIOR CONTAMINATION EVENTS;		WETL	AND, OR IN AN ISOLATED HARD ZONE, SUCH AS A PAVED PARKING LOT OR ADJACENT, ESTABLISHED	INSPECTED FOR AQUATIC IN
1	B) A SITE VISIT TO INSPECT THE AREAS USED FOR VARIOUS INDUSTRIAL PROCESSES AND	THE CONDITION OF	ROAD	(THIS MEASURE APPLIES ONLY TO GAS-POWERED EQUIPMENT WITH TANKS LARGER THAN 5 GALLONS).	C) WADING BOOTS WIT
	C) INTERVIEWS WITH KNOWLEDGEARLE PEOPLE SLICH AS SITE OWNERS, OPERATORS, AL			BIODEGRADABLE LUBRICANTS AND FLUIDS SHALL BE USED ON EQUIPMENT OPERATING IN AND	TRANSFER OF INVASIVE SP
	NEIGHBORS, OR LOCAL GOVERNMENT OFFICIALS; AND	10 00001 ANTO,		INSPECTED DAILY FOR FILLID LEAKS REFORE LEAVING THE VEHICLE STAGING AREA FOR OPERATION	
	D) A SUMMARY, STORED WITH THE PROJECT FILE THAT INCLUDES AN ASSESSMENT OF TH	HE LIKELIHOOD THAT	WITH	IN 150 FEET OF ANY NATURAL WATER BODY OR WETLAND; AND	
	CONTAMINANTS ARE PRESENT AT THE SITE, BASED ON ITEMS 4(A) THROUGH 4(C).		E)	THOROUGHLY CLEANED BEFORE OPERATION BELOW ORDINARY HIGH WATER, AND AS OFTEN AS	
	4) SITE LAYOUT AND FLAGGING. PRIOR TO CONSTRUCTION. THE ACTION AREA WILL BE CL	EARLY FLAGGED TO	NECE	SSARY DURING OPERATION, TO REMAIN GREASE FREE.	
Ľ.	A) SENSITIVE RESOLIDCE AREAS SLICH AS AREAS RELOW ORDINARY HIGH WATER SDAWL		9) COM	EROSION CONTROL. EROSION CONTROL MEASURES WILL BE PREPARED AND CARRIED OUT,	
Ľ.	SPRINGS, AND WETLANDS;	NING AREAS,		TEMPORATE IN SCOPE WITH THE ACTION, THAT MAY INCLUDE THE FULLOWING:	
	B) EQUIPMENT ENTRY AND EXIT POINTS;		i.	TEMPORARY EROSION CONTROLS.	
	C) ROAD AND STREAM CROSSING ALIGNMENTS;		ALTE	RATION OF THE ACTION SITE AND APPROPRIATELY INSTALLED DOWNSLOPE OF PROJECT ACTIVITY WITHIN	
1	D) STAGING, STORAGE, AND STOCKPILE AREAS; AND		THE F	RIPARIAN BUFFER AREA UNTIL SITE REHABILITATION IS COMPLETE.	
	E) NO-SPRAY AREAS AND BUFFERS.		II.	IF THERE IS A POTENTIAL FOR ERODED SEDIMENT TO ENTER THE STREAM, SEDIMENT BARRIERS	
	5) TEMPORARY ACCESS ROADS AND PATHS.		WILL		
с. ж	A) EXISTING ACCESS ROADS AND PATHS WILL BE PREFERENTIALLY USED WHENEVER REA NUMBER AND LENGTH OF TEMPORARY ACCESS DOADS AND DATHS THROUGH DIDADIAN	ASONABLE, AND THE	MATT	ING, WOOD FIBER MULCH AND SOIL BINDER, OR GEOTEXTILES AND GEOSYNTHETIC FABRIC.	
	FLOODPLAINS WILL BE MINIMIZED TO LESSEN SOIL DISTURBANCE AND COMPACTION. AN	D IMPACTS TO	IV.	SOIL STABILIZATION UTILIZING WOOD FIBER MULCH AND TACKIFIER (HYDRO-APPLIED) MAY BE USED TO	
1	VEGETATION.		REDU	CE EROSION OF BARE SOIL IF THE MATERIALS ARE NOXIOUS WEED FREE AND NONTOXIC TO AQUATIC	
	B) TEMPORARY ACCESS ROADS AND PATHS WILL NOT BE BUILT ON SLOPES WHERE GRAD	DE, SOIL, OR OTHER	AND	IERRESTRIAL ANIMALS, SOIL MICROORGANISMS, AND VEGETATION.	
	FEATURES SUGGEST A LIKELIHOOD OF EXCESSIVE EROSION OR FAILURE. IF SLOPES ARE S	STEEPER THAN 30%,	V. HEIGI	SEDIMENT WILL BE REMOVED FROM EROSION CONTROLS ONCE IT HAS REACHED 1/3 OF THE EXPOSED)
	C) THE REMOVAL OF RIPARIAN VEGETATION DURING CONSTRUCTION OF TEMPODARY ACC	ESS ROADS WILL DE	VI.	ONCE THE SITE IS STABILIZED AFTER CONSTRUCTION. TEMPORARY FROSION CONTROL MEASURES	
	MINIMIZED. WHEN TEMPORARY VEGETATION REMOVAL IS REQUIRED. VEGETATION WILL F	BE CUT AT GROUND	WILL	BE REMOVED.	
	LEVEL (NOT GRUBBED).		B)	EMERGENCY EROSION CONTROLS. THE FOLLOWING MATERIALS FOR EMERGENCY EROSION CONTROL	
	D) AT PROJECT COMPLETION, ALL TEMPORARY ACCESS ROADS AND PATHS WILL BE C	BLITERATED, AND	WILL	BE AVAILABLE AT THE WORK SITE:	
	THE SUIL WILL BE STABILIZED AND REVEGETATED. ROAD AND PATH OBLITERATION REFER		I. 11	A SUPPLY OF SEDIMENT CONTROL MATERIALS; AND	
	PULLING THE FILL MATERIAL ONTO THE RUNNING SURFACE. AND RESHAPING TO MATCH	THE ORIGINAL	10)	AN UIL-ADSUKBING FLUATING BUUM WHENEVER SUKFACE WATER IS PRESENT.	
1	CONTOUR.		MEAS	URES BY CONSIDERING SOIL TYPE, EQUIPMENT USAGE, PREVAILING WIND DIRECTION. AND THE EFFECTS	
0	E) TEMPORARY ROADS AND PATHS IN WET AREAS OR AREAS PRONE TO FLOODING W	ILL BE OBLITERATED	CAUS	ED BY OTHER EROSION AND SEDIMENT CONTROL MEASURES. IN ADDITION, THE FOLLOWING CRITERIA	
	BY THE END OF THE IN-WATER WORK WINDOW.	·	WILL	BE FOLLOWED:	
	0. DATE BY ISSUE / DESCRIPTION	DESIGNED BY: AKM			
, K	1 03/21/2023 RSC MODIFIED CONCRETE SILL	DRAWN BY: AKM/SCY	1		LUST
-	2 07/07/2023 RSC MODIFIED CONCRETE SILL	APPROVED BY: RSC	(
-		REVISION NO.: -		WWW GEOENGINEEDS COM	HIP IV - GI

UENCED AND SCHEDULED TO REDUCE EXPOSED BARE SOIL SUBJECT TO WIND

ADDITIVES AND STABILIZATION CHEMICALS (TYPICALLY MAGNESIUM CHLORIDE, , OR LIGNINSULFONATE) WILL NOT BE APPLIED WITHIN 25 FEET OF WATER OR A VILL BE APPLIED SO AS TO MINIMIZE THE LIKELIHOOD THAT THEY WILL ENTER OF LIGNINSULFONATE WILL BE LIMITED TO A MAXIMUM RATE OF 0.5 GALLONS PER URFACE, ASSUMING A 50:50 (LIGNINSULFONATE TO WATER) SOLUTION. UST ABATEMENT CHEMICALS WILL BE AVOIDED DURING OR JUST BEFORE WET M CROSSINGS OR OTHER AREAS THAT COULD RESULT IN UNFILTERED DELIVERY OF ATERIALS TO A WATERBODY (TYPICALLY THESE WOULD BE AREAS WITHIN 25 FEET OF M CHANNEL; DISTANCES MAY BE GREATER WHERE VEGETATION IS SPARSE OR

IT EQUIPMENT WILL BE AVAILABLE DURING APPLICATION OF DUST ABATEMENT

PRODUCTS WILL NOT BE USED FOR DUST ABATEMENT.

CONTROL, AND COUNTER MEASURES. THE USE OF MECHANIZED MACHINERY ACCIDENTAL SPILLS OF FUEL, LUBRICANTS, HYDRAULIC FLUID, OR OTHER RIPARIAN ZONE OR DIRECTLY INTO THE WATER. ADDITIONALLY, UNCURED TERIALS ADJACENT TO THE ACTIVE STREAM CHANNEL MAY RESULT IN ACCIDENTAL FER. THESE CONTAMINANTS CAN DEGRADE HABITAT, AND INJURE OR KILL AQUATIC SA-LISTED SPECIES. THE PROJECT SPONSOR WILL ADHERE TO THE FOLLOWING

HAZARDOUS MATERIALS THAT WILL BE USED, INCLUDING INVENTORY, STORAGE, RES WILL BE AVAILABLE ON-SITE.

IRES FOR NOTIFYING ENVIRONMENTAL RESPONSE AGENCIES WILL BE POSTED AT

NT KITS (INCLUDING INSTRUCTIONS FOR CLEANUP AND DISPOSAL) ADEQUATE FOR OF HAZARDOUS MATERIALS USED AT THE SITE WILL BE AVAILABLE AT THE WORK

TRAINED IN SPILL CONTAINMENT PROCEDURES AND WILL BE INFORMED OF THE AINMENT KITS.

GENERATED AT THE STAGING AREAS WILL BE TEMPORARILY STORED UNDER AN AS A TARPAULIN, UNTIL THEY CAN BE PROPERLY TRANSPORTED TO AND DISPOSED PPROVED FOR RECEIPT OF HAZARDOUS MATERIALS.

CONTROL. THE FOLLOWING MEASURES WILL BE FOLLOWED TO AVOID INTRODUCTION NOXIOUS WEEDS INTO PROJECT AREAS:

G THE SITE, ALL VEHICLES AND EQUIPMENT WILL BE POWER WASHED, ALLOWED TO ED TO MAKE SURE NO PLANTS, SOIL, OR OTHER ORGANIC MATERIAL ADHERES TO

ERS, BOOTS, AND ANY OTHER GEAR TO BE USED IN OR NEAR WATER WILL BE INVASIVE SPECIES.

TH FELT SOLES ARE NOT TO BE USED DUE TO THEIR PROPENSITY FOR AIDING IN THE PECIES.

WORK AREA ISOLATION & FISH SALVAGE.

ANY WORK AREA WITHIN THE WETTED CHANNEL WILL BE ISOLATED FROM THE ACTIVE STREAM WHENEVER ESA-LISTED FISH ARE REASONABLY CERTAIN TO BE PRESENT, OR IF THE WORK AREA IS LESS THAN 300-FEET UPSTREAM FROM KNOWN SPAWNING HABITATS. WHEN WORK AREA ISOLATION IS REQUIRED, DESIGN PLANS WILL INCLUDE ALL ISOLATION ELEMENTS, FISH RELEASE AREAS, AND, WHEN A PUMP IS USED TO DEWATER THE ISOLATION AREA AND FISH ARE PRESENT, A FISH SCREEN THAT MEETS NMFS'S FISH SCREEN CRITERIA (NMFS 2011, OR MOST CURRENT). WORK AREA ISOLATION AND FISH CAPTURE ACTIVITIES WILL OCCUR DURING PERIODS OF THE COOLEST AIR AND WATER TEMPERATURES POSSIBLE, NORMALLY EARLY IN THE MORNING VERSUS LATE IN THE DAY, AND DURING CONDITIONS APPROPRIATE TO MINIMIZE STRESS AND DEATH OF SPECIES PRESENT.

- NATIONAL MARINE FISHERIES SERVICE. 2011. ANADROMOUS SALMONID PASSAGE FACILITY DESIGN. NORTHWEST REGION. AVAILABLE ONLINE AT: http://www.nwr.noaa.gov/salmon-hydropower/ferc/upload/fish-passage-design.pd - U.S. FISH AND WILDLIFE SERVICE. 2010. BEST MANAGEMENT PRACTICES TO MINIMIZE ADVERSE EFFECTS TO PACIFIC LAMPREY

HTTP://WWW.FWS.GOV/PACIFIC/FISHERIES/SPHABCON/LAMPREY/PDF/BEST%20MANAGEMENT%20PRACTICES%20FOR%20PACIFIC% 20LAMPREY%20APRIL%202010%20VERSION.PDF

FOR SALVAGE OPERATIONS IN KNOWN BULL TROUT SPAWNING AND REARING HABITAT, ELECTROFISHING SHALL ONLY OCCUR FROM MAY 1 TO JULY 31. NO ELECTROFISHING WILL OCCUR IN ANY BULL TROUT OCCUPIED HABITAT AFTER AUGUST 15. BULL TROUT ARE VERY TEMPERATURE SENSITIVE AND GENERALLY SHOULD NOT BE ELECTROSHOCKED OR OTHERWISE HANDLED WHEN TEMPERATURES EXCEED 15 DEGREES CELSIUS. SALVAGE ACTIVITIES SHOULD TAKE PLACE DURING PERIODS OF THE COOLEST AIR AND WATER TEMPERATURES POSSIBLE, NORMALLY EARLY IN THE MORNING VERSUS LATE IN THE DAY, AND DURING CONDITIONS APPROPRIATE TO MINIMIZE STRESS TO FISH SPECIES PRESENT.

SALVAGE OPERATIONS WILL FOLLOW THE ORDERING, METHODOLOGIES, AND CONSERVATION MEASURES SPECIFIED BELOW IN STEPS 1 THROUGH 6. STEPS 1 AND 2 WILL BE IMPLEMENTED FOR ALL PROJECTS WHERE WORK AREA ISOLATION IS NECESSARY ACCORDING TO CONDITIONS ABOVE. ELECTROFISHING (STEP 3) CAN BE IMPLEMENTED TO ENSURE ALL FISH HAVE BEEN REMOVED FOLLOWING STEPS 1 AND 2, OR WHEN OTHER MEANS OF FISH CAPTURE MAY NOT BE FEASIBLE OR EFFECTIVE. DEWATERING AND REWATERING (STEPS 4 AND 5) WILL BE IMPLEMENTED UNLESS WETTED IN-STREAM WORK IS DEEMED TO BE MINIMALLY HARMFUL TO FISH, AND IS BENEFICIAL TO OTHER AOUATIC SPECIES. DEWATERING WILL NOT BE CONDUCTED IN AREAS KNOWN TO BE OCCUPIED BY LAMPREY. UNLESS LAMPREYS ARE SALVAGED USING GUIDANCE SET FORTH IN US FISH AND WILDLIFE SERVICE (2010)3.

1) ISOLATE.

A) BLOCK NETS WILL BE INSTALLED AT UPSTREAM AND DOWNSTREAM LOCATIONS AND MAINTAINED IN A SECURED POSITION TO EXCLUDE FISH FROM ENTERING THE PROJECT AREA.

B) BLOCK NETS WILL BE SECURED TO THE STREAM CHANNEL BED AND BANKS UNTIL FISH CAPTURE AND TRANSPORT ACTIVITIES ARE COMPLETE. BLOCK NETS MAY BE LEFT IN PLACE FOR THE DURATION OF THE PROJECT TO EXCLUDE FISH

C) IF BLOCK NETS REMAIN IN PLACE MORE THAN ONE DAY, THE NETS WILL BE MONITORED AT LEAST DAILY TO ENSURE THEY ARE SECURED TO THE BANKS AND FREE OF ORGANIC ACCUMULATION. IF THE PROJECT IS WITHIN BULL TROUT SPAWNING AND REARING HABITAT, THE BLOCK NETS MUST BE CHECKED EVERY FOUR HOURS FOR FISH IMPINGEMENT ON THE NET. LESS FREQUENT INTERVALS MUST BE APPROVED THROUGH A VARIANCE REQUEST. D) NETS WILL BE MONITORED HOURLY ANYTIME THERE IS INSTREAM DISTURBANCE.

2) SALVAGE. AS DESCRIBED BELOW, FISH TRAPPED WITHIN THE ISOLATED WORK AREA WILL BE CAPTURED TO MINIMIZE THE RISK OF INJURY, THEN RELEASED AT A SAFE SITE:

A) REMOVE AS MANY FISH AS POSSIBLE PRIOR TO DEWATERING.

B) DURING DEWATERING, ANY REMAINING FISH WILL BE COLLECTED BY HAND OR DIP NETS.

C) SEINES WITH A MESH SIZE TO ENSURE CAPTURE OF THE RESIDING ESA-LISTED FISH WILL BE USED. D) MINNOW TRAPS WILL BE LEFT IN PLACE OVERNIGHT AND USED IN CONJUNCTION WITH SEINING. E) IF BUCKETS ARE USED TO TRANSPORT FISH:

I. THE TIME FISH ARE IN A TRANSPORT BUCKET WILL BE LIMITED, AND WILL BE RELEASED AS QUICKLY AS POSSIBLE:

II. THE NUMBER OF FISH WITHIN A BUCKET WILL BE LIMITED BASED ON SIZE, AND FISH WILL BE OF RELATIVELY COMPARABLE SIZE TO MINIMIZE PREDATION;

III. AERATORS FOR BUCKETS WILL BE USED OR THE BUCKET WATER WILL BE FREQUENTLY CHANGED WITH COLD CLEAR WATER AT 15 MINUTE OR MORE FREQUENT INTERVALS.

IV. BUCKETS WILL BE KEPT IN SHADED AREAS OR WILL BE COVERED BY A CANOPY IN EXPOSED AREAS. V. DEAD FISH WILL NOT BE STORED IN TRANSPORT BUCKETS, BUT WILL BE LEFT ON THE STREAM BANK TO AVOID MORTALITY COUNTING ERRORS.

F) AS RAPIDLY AS POSSIBLE (ESPECIALLY FOR TEMPERATURE-SENSITIVE BULL TROUT), FISH WILL BE RELEASED IN AN AREA THAT PROVIDES ADEQUATE COVER AND FLOW REFUGE. UPSTREAM RELEASE IS GENERALLY PREFERRED, BUT FISH RELEASED DOWNSTREAM WILL BE SUFFICIENTLY OUTSIDE OF THE INFLUENCE OF CONSTRUCTION.

SALVAGE WILL BE SUPERVISED BY A QUALIFIED FISHERIES BIOLOGIST EXPERIENCED WITH WORK AREA G) ISOLATION AND COMPETENT TO ENSURE THE SAFE HANDLING OF ALL FISH.

ELECTROFISHING. ELECTROFISHING WILL BE USED ONLY AFTER OTHER SALVAGE METHODS HAVE BEEN EMPLOYED OR WHEN OTHER MEANS OF FISH CAPTURE ARE DETERMINED TO NOT BE FEASIBLE OR EFFECTIVE. IF ELECTROFISHING WILL BE USED TO CAPTURE FISH FOR SALVAGE, THE SALVAGE OPERATION WILL BE LED BY AN EXPERIENCED FISHERIES BIOLOGIST AND THE FOLLOWING GUIDELINES WILL BE FOLLOWED:

A) THE NMFS'S ELECTROFISHING GUIDELINES (NMFS 2000).

ONLY DIRECT CURRENT (DC) OR PULSED DIRECT CURRENT (PDC) WILL BE USED AND CONDUCTIVITY MUST BE B)

TESTED.

I.

IF CONDUCTIVITY IS LESS THAN 100 MS, VOLTAGE RANGES FROM 900 TO 1100 WILL BE USED.

FOR CONDUCTIVITY RANGES BETWEEN 100 TO 300 MS, VOLTAGE RANGES WILL BE 500 TO 800.

Ш. FOR CONDUCTIVITY GREATER THAN 300 MS, VOLTAGE WILL BE LESS THAN 400.

ELECTROFISHING WILL BEGIN WITH A MINIMUM PULSE WIDTH AND RECOMMENDED VOLTAGE AND THEN C) GRADUALLY INCREASE TO THE POINT WHERE FISH ARE IMMOBILIZED.

D) THE ANODE WILL NOT INTENTIONALLY CONTACT FISH.

ELECTROFISHING SHALL NOT BE CONDUCTED WHEN THE WATER CONDITIONS ARE TURBID AND VISIBILITY IS E) POOR. THIS CONDITION MAY BE EXPERIENCED WHEN THE SAMPLER CANNOT SEE THE STREAM BOTTOM IN ONE FOOT OF WATER.

IF MORTALITY OR OBVIOUS INJURY (DEFINED AS DARK BANDS ON THE BODY, SPINAL DEFORMATIONS, F) DE-SCALING OF 25% OR MORE OF BODY, AND TORPIDITY OR INABILITY TO MAINTAIN UPRIGHT ATTITUDE AFTER SUFFICIENT RECOVERY TIME) OCCURS DURING ELECTROFISHING, OPERATIONS WILL BE IMMEDIATELY DISCONTINUED, MACHINE SETTINGS, WATER TEMPERATURE AND CONDUCTIVITY CHECKED, AND PROCEDURES ADJUSTED OR ELECTROFISHING POSTPONED TO REDUCE MORTALITY.

DEWATER. DEWATERING, WHEN NECESSARY, WILL BE CONDUCTED OVER A SUFFICIENT PERIOD OF TIME TO ALLOW SPECIES TO NATURALLY MIGRATE OUT OF THE WORK AREA AND WILL BE LIMITED TO THE SHORTEST LINEAR EXTENT PRACTICABLE.

DIVERSION AROUND THE CONSTRUCTION SITE MAY BE ACCOMPLISHED WITH A COFFER DAM AND A BY-PASS CULVERT OR PIPE, OR A LINED, NON-ERODIBLE DIVERSION DITCH. WHERE GRAVITY FEED IS NOT POSSIBLE, A PUMP MAY BE USED, BUT MUST BE OPERATED IN SUCH A WAY AS TO AVOID REPETITIVE DEWATERING AND REWATERING OF THE SITE. IMPOUNDMENT BEHIND THE COFFERDAM MUST OCCUR SLOWLY THROUGH THE TRANSITION, WHILE CONSTANT FLOW IS DELIVERED TO THE DOWNSTREAM REACHES.

ALL PUMPS WILL HAVE FISH SCREENS TO AVOID JUVENILE FISH IMPINGEMENT OR ENTRAINMENT, AND WILL BE OPERATED IN ACCORDANCE WITH NMFS'S CURRENT FISH SCREEN CRITERIA (NMFS 20114, OR MOST RECENT VERSION). IF THE PUMPING RATE EXCEEDS 3 CUBIC FEET SECOND (CFS), A NMFS HYDRO FISH PASSAGE REVIEW WILL BE NECESSARY.

DISSIPATION OF FLOW ENERGY AT THE BYPASS OUTFLOW WILL BE PROVIDED TO PREVENT DAMAGE TO C) **RIPARIAN VEGETATION OR STREAM CHANNEL**

D) SAFE REENTRY OF FISH INTO THE STREAM CHANNEL WILL BE PROVIDED, PREFERABLY INTO POOL HABITAT WITH COVER, IF THE DIVERSION ALLOWS FOR DOWNSTREAM FISH PASSAGE.

SEEPAGE WATER WILL BE PUMPED TO A TEMPORARY STORAGE AND TREATMENT SITE OR INTO UPLAND AREAS TO ALLOW WATER TO PERCOLATE THROUGH SOIL OR TO FILTER THROUGH VEGETATION PRIOR TO REENTERING THE STREAM CHANNEL.

4 NATIONAL MARINE FISHERIES SERVICE. 2011. ANADROMOUS SALMONID PASSAGE FACILITY DESIGN. NORTHWEST REGION. AVAILABLE ONLINE AT:

HTTP://WWW.NWR.NOAA.GOV/SALMON-HYDROPOWER/FERC/UPLOAD/FISH-PASSAGE-DESIGN.PDF

SALVAGE NOTICE. MONITORING AND RECORDING OF FISH PRESENCE, HANDLING, AND MORTALITY MUST OCCUR DURING THE DURATION OF THE ISOLATION, SALVAGE, ELECTROFISHING, DEWATERING, AND REWATERING OPERATIONS. ONCE OPERATIONS ARE COMPLETED, A SALVAGE REPORT WILL DOCUMENT PROCEDURES USED, ANY FISH INJURIES OR DEATHS (INCLUDING NUMBERS OF FISH AFFECTED), AND CAUSES OF ANY DEATHS.

CONSTRUCTION AND POST-CONSTRUCTION CONSERVATION MEASURES.

1) FISH PASSAGE. FISH PASSAGE WILL BE PROVIDED FOR ANY ADULT OR JUVENILE FISH LIKELY TO BE PRESENT IN THE ACTION AREA DURING CONSTRUCTION, UNLESS PASSAGE DID NOT EXIST BEFORE CONSTRUCTION OR THE STREAM IS NATURALLY IMPASSABLE AT THE TIME OF CONSTRUCTION. IF THE PROVISION OF TEMPORARY FISH PASSAGE DURING CONSTRUCTION WILL INCREASE NEGATIVE EFFECTS ON AQUATIC SPECIES OF INTEREST OR THEIR HABITAT, A VARIANCE CAN BE REQUESTED FROM THE NMFS BRANCH CHIEF AND THE FWS FIELD OFFICE SUPERVISOR. PERTINENT INFORMATION, SUCH AS THE SPECIES AFFECTED, LENGTH OF STREAM REACH AFFECTED, PROPOSED TIME FOR THE PASSAGE BARRIER, AND ALTERNATIVESCONSIDERED, WILL BE INCLUDED IN THE VARIANCE REOUEST.

2) CONSTRUCTION AND DISCHARGE WATER

A) SURFACE WATER MAY BE DIVERTED TO MEET CONSTRUCTION NEEDS, BUT ONLY IF DEVELOPED SOURCES ARE UNAVAILABLE OR INADEOUATE.

B) DIVERSIONS WILL NOT EXCEED 10% OF THE AVAILABLE FLOW.

ALL CONSTRUCTION DISCHARGE WATER WILL BE COLLECTED AND TREATED USING THE BEST AVAILABLE TECHNOLOGY APPLICABLE TO SITE CONDITIONS.

TREATMENTS TO REMOVE DEBRIS, NUTRIENTS, SEDIMENT, PETROLEUM HYDROCARBONS, METALS AND OTHER POLLUTANTS LIKELY TO BE PRESENT WILL BE PROVIDED.

NO	. DATE	BY	ISSUE / DESCRIPTION	DESIGNED	BY: AKM		PREPARED FOR			
1	03/21/2023	RSC	MODIFIED CONCRETE SILL	DRAWN BY	AKM/SCY	Cho Evening C	THE ARE TOR	NEZ PERCE	talo"	
2	07/07/2023	RSC	MODIFIED CONCRETE SILL	APPROVED	BY: RSC	GEOENGINEERS / //	and a state of the second s	TRIBE		
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2				DATE:	7/12/23	WWW.GEOENGINEERS.COM			ARANERILS.	1

Appendix E: As-Built Drawings

NO.	DATE	BY	ISSUE / DESCRIPTION	DESIGNED	D BY:	AKM
1	03/21/2023	RSC	MODIFIED CONCRETE SILL	DRAWN B	Y:AKN	1/SCY
2	07/07/2023	RSC	MODIFIED CONCRETE SILL	APPROVE	D BY:	RSC
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1	03/21/2023	RSC	MODIFIED CONCRETE SILL	DRAWN BY: AKM/SCY
2	07/07/2023	RSC	MODIFIED CONCRETE SILL	APPROVED BY: RSC
				REVISION NO .:
				DATE: 12/22/23