Upper Mill Creek RM 17-18.5 Floodplain Improvements

Final Implementation Plan

12-1-2023

Prepared for

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

325 N. 13th Ave.
Walla Walla, WA

Prepared by

TETRA TECH

19803 North Creek Parkway
Bothell, WA

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 INTRODUCTION

This section provides background for the Phase 1 Mill Creek River Mile (RM) 17.0 to 18.5 Floodplain Improvements Design Project (project) and introduces project goals and objectives based on habitat limiting factors identified in the Walla Walla River, Mill Creek, and Coppei Creek Geomorphic Assessment (USFS 2010), the Lower Mill Creek Habitat and Passage Assessment and Strategic Action Plan (CTUIR 2017), the Reassessment Report for Walla Walla County Conservation District Mill Creek Floodplain Improvements – Phase 1 (Anderson Perry and Associates 2022), and the Walla Walla County Conservation District (WWCCD). This report is provided to document the project goals and objectives, the project implementation overview, and construction standards and special provisions. The report is organized as follows:

- Section 1.0: Introduction (this section)
- Section 2.0: Project Implementation Overview
- Section 3.0: Construction Standards and Special Provisions
- Section 4.0: References

1.1 Project Background

The project includes a 1.5-mile stretch of Mill Creek between RM 17.0 and 18.5 (Figure 1-1). The project reach is upstream of the City of Walla Walla and the U.S. Army Corps of Engineers (USACE) Mill Creek Flood Control Project. In this reach of Mill Creek, significant impacts to naturally functioning stream processes including habitat encroachment, land use modifications, altered hydrology, and altered floodplains have impacted floodplain connection, sediment dynamics, adjacent infrastructure, and fish habitat. The project design will include bioengineering techniques (i.e., engineered log jams) that incorporate natural elements like planting of stakes and seed mixes to promote growth of riparian canopy, pilot channel construction, and blind channel construction to improve protection for adjacent infrastructure to improve water quality and to maximize habitat improvements for aquatic species. The improvements will be developed through a combination of willing landowners and measurable design criteria and objectives (Section 1.2).

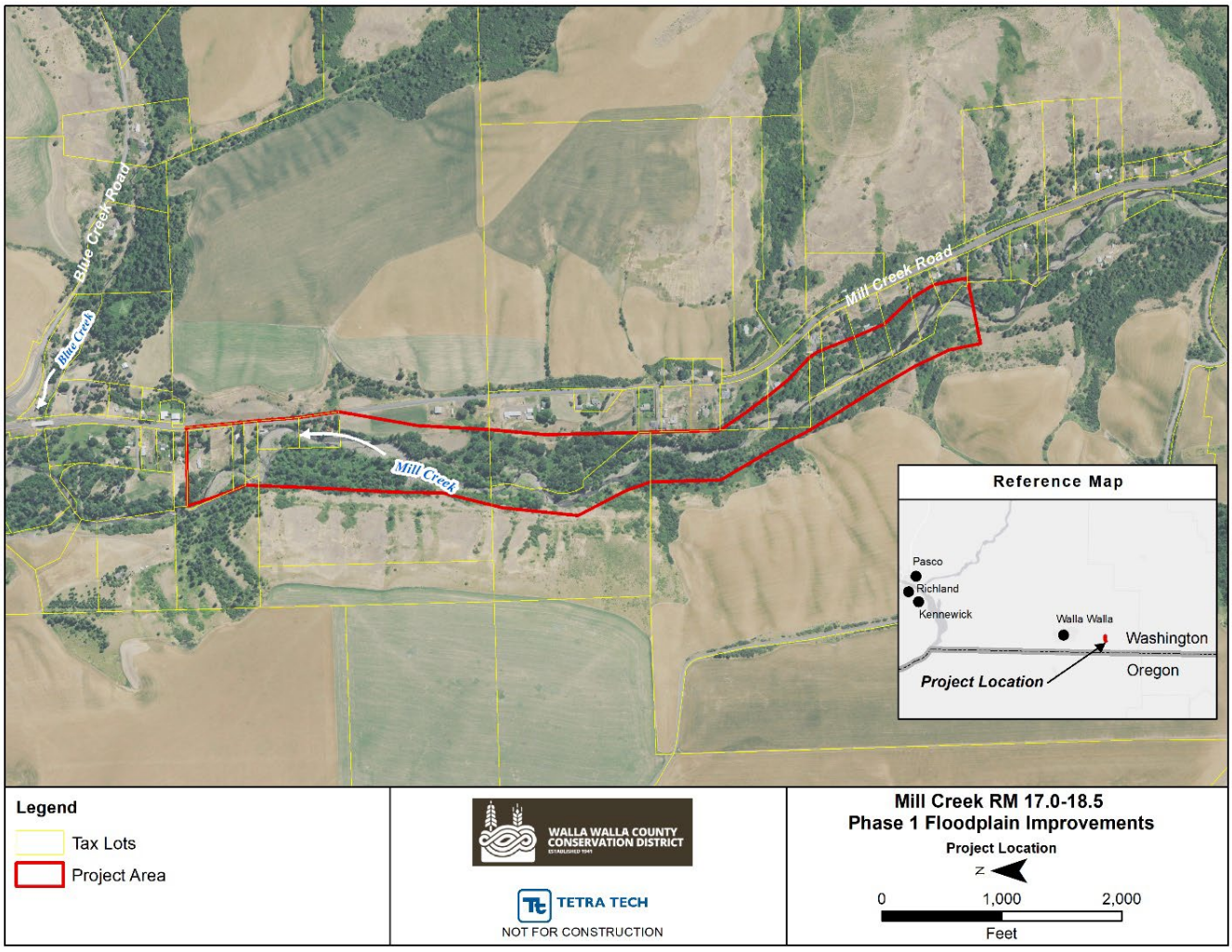


Figure 1-1. Project Location

1.2 Project Description

The project will implement a series of large wood structures, including revetments, log jams, and 22-log bank habitat structures, in conjunction with channel excavation to increase channel complexity and connection to the floodplain while providing bank protection and protection to existing infrastructure, improving in-stream and off-channel habitat quality and quantity, and increasing wood retention through a combination of willing landowners and measurable design criteria and objectives. The project design goal is to improve water quality and habitat while reducing bank erosion near vulnerable infrastructure. To meet this goal, project objectives include:

- Increase floodplain resiliency and connectivity
- Improve bank stability to protect infrastructure
- Improve instream habitat quality and quantity
- Increase in-stream and floodplain large wood

All objectives must be met in a way that includes feedback and approval from landowners in the project reach. To address the project objectives, quantifiable and repeatable metrics have been identified to guide analyses and development of the project design (Table 1-1). Table 1-2 provides a summary of design criteria for project elements, including associated risks to infrastructure or failure to perform, and compensating analyses.

Table 1-1. Summary Project Objectives, Project Metrics, and Evaluation Methods

Project Objectives	Metrics	Evaluation Methods
Increase floodplain resiliency and connectivity	Floodplain Inundation	Measure of floodplain inundation extents (acres) from hydraulic modeling results
	Floodplain Width	Measure of floodplain width from hydraulic modeling results
Improve bank stability to protect infrastructure	Unit Stream Power	Measure of unit stream power (i.e., total stream power divided by flow width)
Improve instream habitat quality and quantity	Braided Channel Ratio	Ratio of total channel length to the primary channel length (Friend and Sinha 1993)
	Channel Complexity Index	Sinuosity times the number of nodes utilized by valley distance (Brown 2002)
	Secondary Channel Length	Measure channel geometry from topographic survey and/or imagery (includes off-channel habitat)
	Pool Frequency or Spacing	Count of number of pools per channel length (Montgomery and Buffington 1995)
	Relative Habitat Abundance	Measure of pool, riffle, run, and glide habitat percent of primary channel length
Increase in-stream and floodplain large wood	Large Wood Counts	Tally the number of large wood pieces (pieces per mile; volume per mile)

Table 1-2. Project Design Components, Design Criteria, Risk Assessments, and Compensating Analyses or Measures

Design Component	Design Criteria	Risk Assessment	Compensating Analyses or Measures
In-channel Structures	• Increase habitat quantity and quality • Create channel roughness • Improve sediment sorting and retention • Log structures stable to the 100-year flow	• Risk to downstream infrastructure • Potential for deflection of flow towards channel banks resulting in increased bank erosion	• Structure stability calculations • Structure stability enhanced with pilings and ballasting alluvium • Shear stress estimates • Hydraulic analysis
Channel Form	• Where risk to infrastructure is low, channels to be designed to enable process and continued geomorphic change • Channel form and sediment routing to maintain aquatic communities • Minimization of excavation through use of pilot channels and allowing the stream to the do the work	• Risk to infrastructure • Potential for unanticipated geomorphic and/or flow changes • Impacts to existing vegetation	• Hydrologic and hydraulic analyses to ensure delivery of flows • Velocity and shear stress calculations • Minimization of impacts to existing vegetation
Infrastructure	• Maintain existing 100-year flood levels	• Risk to infrastructure • Potential for deflection of flow towards channel banks resulting in increased erosion • Potential for unanticipated geomorphic and/or flow changes	• Hydrologic and hydraulic analyses • Velocity and shear stress calculations

2.0 PROJECT IMPLEMENTATION OVERVIEW

Project implementation is to be completed in two phases. The first phase to be completed in 2024 is documented in this submittal which includes the downstream section of the project area (Figure 2-1). Construction activities will be divided between work in the floodplain and uplands and work in the wetted channel. Wood and rock material for constructing the project is the responsibility of the contractor to acquire from off-site sources. Any concrete, metal, and other debris encountered will be removed and hauled by the contractor to an approved off-site disposal location. The project design consists of the design elements shown on Figure 2-1, which are intended to increase channel complexity and floodplain connectivity, provide protection for banks and existing infrastructure, improve habitat quality and quantity, and increase availability of large wood in the reach. These design elements are described in further detail in the following sections and summarized in Table 2-1.

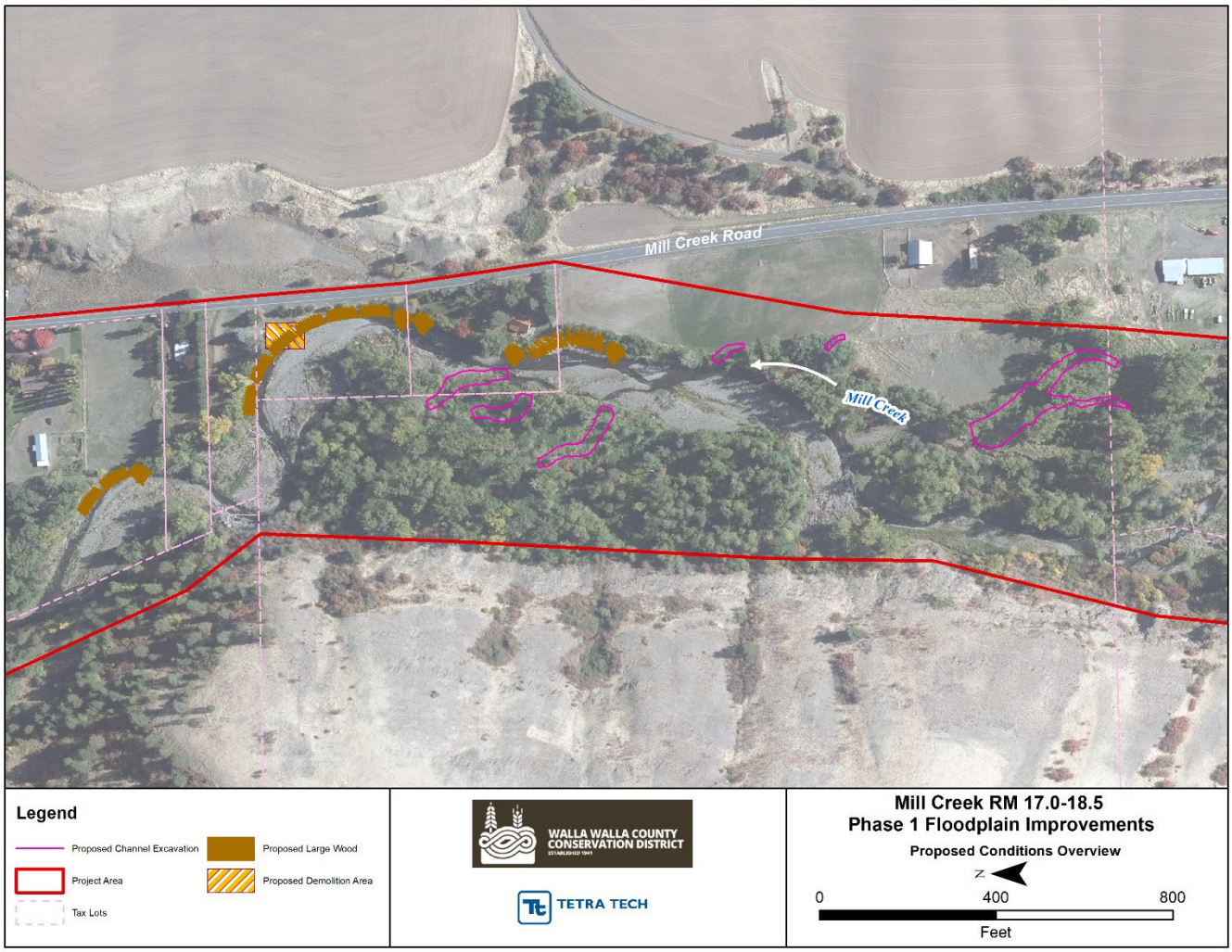


Figure 2-1. Overview of Proposed Conditions

Revetment Log Structures

A total of eight revetment log structures are proposed to provide lateral stabilization while also protecting the bank and existing infrastructure. Additional functions include recruitment and retention of large wood; creation of cover, pools, and velocity refugia; and protection of existing vegetation while promoting additional vegetation establishment. These structures are designed to maintain the existing bank toe and be stable up to the 100-year recurrence interval flow event, with stability provided by large boulders and floodplain alluvium ballast. An encapsulated soil lift will be installed on top, tying the structure into the bank and providing a medium for seeding and live stake plantings to promote vegetation establishment.

Log Jam Structures

A total of five log jam structures are proposed with the primary goal of directing flow away from eroding banks and dispersing high-energy flows into adjacent floodplains and side channels. Additional benefits include increased floodplain connectivity, recruitment and retention of large wood; creation of pool, cover, and velocity refugia; and establishment of vegetation. These structures are placed to deflect flow away from infrastructure and the banks while being stable to the 100-year recurrence interval. These structures will be buried with floodplain alluvium ballast, with additional stability provided by large boulders.

22-Log Bank Habitat Structures

A total of two 22-log bank habitat structures are proposed to provide lateral stabilization and increased roughness while also promoting floodplain habitat. Additional functions include the recruitment and retention of large wood; creation of cover, pools, and velocity refugia; and protection of existing vegetation while promoting additional vegetation establishment. These structures are located on outer meander bends where lateral stability and habitat complexity are needed, often placed in sequence to create larger large wood complexes. These structures are utilized to promote and maintain channel sinuosity, while being stable to the 100-year recurrence interval with stability being provided by floodplain alluvium ballast and additional racking in the interstitial spaces between key members.

Pilot and Drain Channels

The proposed design includes the excavation of approximately 2,100 cubic yards for pilot channels and drain channels to increase floodplain resiliency and connectivity. The purpose of the pilot channels is to provide increased channel complexity by connecting the floodplain with the mainstem of the channel in areas where flow is currently lacking. These channels will be activated at higher recurrence interval flow events and increase habitat availability by providing refugia for fish species as well as areas suitable for rearing. Drain channels will provide connection of the floodplain to the main channel to provide pathways away from sensitive areas (i.e., agricultural lands and areas with infrastructure) during higher flow events.

Table 2-1. Summary of Project Elements, Considerations, and General Design Criteria

Project Element	Considerations	Design Criteria
Revetment Log Structures	Channel Stability Floodplain Connection Infrastructure Habitat Quality and Quantity	• Structure design and placement generally follows recommendations from the Stream Habitat Restoration Guidelines (WSAHGP 2012) and the National Large Wood Manual – Assessment, Planning, Design, and Maintenance of Large Wood in Fluvial Ecosystems: Restoring Process, Functions, and Structure (USBR and USACE 2016) • Stable to the 100-year recurrence interval flow event • Boulders and floodplain alluvium ballast to provide additional stability benefits • Risk assessments following procedures in Pacific Northwest Region Resource & Technical Services Large Woody Material – Risk Based Design Guidelines (USBR 2014) • Large wood structure types and placement to provide geomorphic function and focal species habitat benefits
Log Jam Structures	Channel Stability Floodplain Connection Infrastructure Habitat Quality and Quantity	• Structure design and placement generally follows recommendations from the Stream Habitat Restoration Guidelines (WSAHGP 2012) and the National Large Wood Manual – Assessment, Planning, Design, and Maintenance of Large Wood in Fluvial Ecosystems: Restoring Process, Functions, and Structure (USBR and USACE 2016) • Stable to the 100-year recurrence interval flow event • Boulders and floodplain alluvium ballast to provide additional stability benefits • Risk assessments following procedures in Pacific Northwest Region Resource & Technical Services Large Woody Material – Risk Based Design Guidelines (USBR 2014) • Large wood structure types and placement to provide geomorphic function and focal species habitat benefits
22-Log Bank Habitat Structures	Floodplain Connection Infrastructure Habitat Quality and Quantity	• Structure design and placement generally follows recommendations from the Stream Habitat Restoration Guidelines (WSAHGP 2012) and the National Large Wood Manual – Assessment, Planning, Design, and Maintenance of Large Wood in Fluvial Ecosystems: Restoring Process, Functions, and Structure (USBR and USACE 2016) • Stable to the 100-year recurrence interval flow event • Floodplain alluvium ballast to provide additional stability benefits • Risk assessments following procedures in Pacific Northwest Region Resource & Technical Services Large Woody Material – Risk Based Design Guidelines (USBR 2014) • Large wood structure types and placement to provide geomorphic function and focal species habitat benefits
Pilot and Drain Channels	Floodplain Connection Infrastructure Habitat Quality and Quantity	• Excavate pilot and drain channels to connect floodplain to mainstem in areas where flow is lacking • Strategically locate channels where risk to infrastructure is low • Excavation to provide geomorphic function and focal species habitat benefits

2.1 Project Schedule

Construction is anticipated to occur shortly before, during, and after the 2024 in-water work window. According to Washington guidelines, the in-water work window for Mill Creek is August 1 to August 15. A proposed construction sequence to complete the project in a single year is provided below.

2.1.1 Prior to In-Water Work Window (before August 1)

- Complete pre-construction activities:
  - Construction staking, flagging of sensitive areas, contractor submittals, etc.;
  - Mobilize to site and site preparation; and
  - Install and maintain temporary erosion and sediment controls (TESC).
- Acquisition, hauling, and staging of large wood and other materials.
- Demolition and hauling of condemned infrastructure within the project area.
- Excavation of pilot and drain channels outside of ordinary high water (OHW).
- Installation of large wood structures outside of OHW.

2.1.2 In-Water Work Window (August 1 to August 15)

- Install, monitor, and maintain TESC.
- At designated work sites where fish may be present, install block nets and salvage fish (work to be completed by WWCCD), and construct elements as follows:
  - Install work area isolation and dewater work areas.
  - Prewash work areas, pump turbid water to an approved location, and monitor for turbidity.
  - Slowly reintroduce flow to the work areas, monitoring for turbidity.
  - Remove work area isolation.
  - Remove block nets.
- Complete pilot channel and drain channel excavation within OHW.
- Install revetment log structures, log jam structures, and 22-log bank habitat structures within OHW.
- Prewash work areas, pump turbid water to an approved location, and monitor to ensure no turbid water returns to the stream.
- Slowly reintroduce flow to the work areas, monitoring for turbidity.
- Remove work area isolation.
- Remove block nets.
- Remove TESC and temporary BMPs.

2.1.3 After In-Water Work Window (after August 15)

- Seed and mulch disturbed areas.
- Site clean-up and demobilization.
- Plant trees and shrubs in the fall.

2.2 Construction Materials Quantities

The implementation of the project will require earthwork, including excavation and backfill during installation of large wood structures as well as installation of revetment log structures, log jam structures, and 22-log habitat structures. A summary of the project quantities is shown in Table 2-2.

Table 2-2. Project Materials Summary

Materials	Size (Diameter)	Length	Rootwad Diameter	Quantity
Large Whole Tree with Rootward	18" min.	40' min.	4' min.	58
Large Log with Rootwad	18" min.	20'-30'	4' min.	168
Medium Whole Tree with Rootwad	16"-18"	35' min.	3' min.	15
Medium Log without Rootwad	16"-18"	12'-14'	NA	128
Medium Log without Rootwad	16"-18"	35' min.	NA	63
Racking/Slash Material (CY)	4"-10"	10' min. – 20' max.	NA	480
Racking/Slash Material (CY)	2"-10"	6"-16"	NA	230
Boulders	2.3'-4'	NA	NA	206
Ballast Spoils (CY)	NA	NA	NA	2,200
Excavation (CY)	NA	NA	NA	2,165
Seeding (acres)	NA	NA	NA	1.06
Planting (acres)	NA	NA	NA	0.14

2.3 Project Actions

To ensure integrity of the stream channel and to reduce impacts to water quality and aquatic organisms, floodplain and upland activities will be completed separately from activities in the wetted channel. Detailed descriptions of the major construction activities with reference to the corresponding drawings and construction specifications are presented below.

2.3.1 Mobilization and Construction Initiation

The project will begin with mobilization and construction initiation activities. Mobilization includes procurement, field team selection and preparation, mobilization of equipment and materials, a pre-construction meeting, and setting up the protocols for construction support, construction quality measures, and progress meetings.

Construction initiation activities will include:

- Installation of construction fencing where required;
- Installation and maintenance of construction area conservation measures and best management practices (BMPs);
- Construction and maintenance of construction access and staging areas;
- Installation and maintenance of TESC; and
- Submission and approval of all required submittals and plans.

Required pre-construction submittals and plans are incidental pay items included within other bid items. They are described in the standard specifications, special provisions of the drawings in Appendix A, and other references and are summarized in Table 2-3. Submittals are due within 10 working days prior to construction.

Table 2-3. Contractor Submittal Log

No.	Description of Submittal	Type of Submittal	Requirement Found in Specification Section	Additional Specification References
1	Schedule of Values	Schedule	01 22 20 1.02	01 33 00; 01 31 19.23 1.03
2	Construction Schedule	Schedule	01 14 20 1.02	01 33 00; 01 14 20 1.05
3	Materials Conformance and Weed-Free Certification	Certificate of Compliance	01 35 43 3.05	01 33 00; 01 35 43 2.03; 32 90 00 2.02
4	Site Access Plan	Plan	01 55 13 1.02	01 33 00; 01 56 23 3.03; 01 52 00 1.02
5	Material Storage/Staging Plan	Plan	01 55 13 1.02	01 33 00
6	Traffic Control Plan	Plan	01 55 26 1.03	01 33 00
7	Spill Prevention Countermeasures and Control Plan (SPCC)	Plan	01 35 43 1.03	01 33 00; 01 35 43 1.05
8	Stormwater Pollution Prevention Plan (SWPPP)	Plan	01 35 43 1.03	01 33 00
9	WA Department of Ecology Construction Stormwater General Permit (CSWGP)	Permit	01 35 43 1.03	01 33 00
10	Temporary Erosion and Sediment Control (TESC) Plan	Plan	01 35 43 1.03	01 33 00
11	Dewatering, Stream Diversion, and Work Area Isolation Plan	Plan	01 35 43.20	01 33 00; 31 23 19 1.02
12	Seed Mix Certification	Certificate of Compliance	32 90 00 1.02	01 33 00; 32 93 00 .02
13	Habitat Feature Material Certification (Large Wood, Boulder, and Ballast Alluvium)	Certificate of Compliance	35 49 50 1.02	01 33 00
14	As-Built Record Data and Drawings	Data and Drawings	01 78 39 1.02	01 33 00; 01 71 23 1.02

2.3.2 Work in the Floodplain and Uplands

Work in the floodplain and uplands will include acquisition, hauling, and staging of large wood, boulders, and ballast alluvium. Construction work will include any demolition of condemned infrastructure in the project area, excavation of pilot and drain channels, and installation of large wood structures that can be completed with no work in the wetted channel. Work in the floodplain will begin by clearing and grubbing (as needed) for temporary access routes and stockpile areas. Suggested access routes are shown in the Design Drawings (see Appendix A), but the contractor will confirm all routes in the field with WWCCD before construction. Ballast alluvium for the large wood structures will be obtained from suitable excavation spoils with additional clean gravels and cobble material obtained as needed meeting the requirements of Section 35 49 50 of the Specifications (Appendix B). Concrete, metal, and other debris will be removed and hauled to an approved off-site disposal location.

2.3.3 Work in the Wetted Channel

Work in the wetted channel will take place only in the in-water work period. This work will include the installation of revetment log structures, log jam structures, and 22-log bank habitat structures. Locations that will require isolation and fish salvage include areas where pools are isolated during installation of structures. Work in the wetted channel must follow dewater, bypass, and fish salvage sequences and details in the drawings in Appendix A. Any fish salvage will be conducted by WWCCD. By isolating the work area and/or blocking the upstream and downstream extents of the work area and capturing and releasing fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury to fish. The contractor will provide at least 3 calendar days' notice before dewatering or isolating any work area and should plan for delays in work, typically 2 to 24 hours, but possibly longer in some cases, in the immediate vicinity of fish salvage and dewatering. Once isolated work areas have been fish-excluded and dewatered as necessary, excavation and installation of revetment log structures, log jam structures, and 22-log bank habitat structures may begin.

Following completion of installation of revetment log structures, log jam structures, and 22-log bank habitat structures, activation of flow will be completed by pumping the turbid water to an approved floodplain location with no turbid water returns to the stream, and incrementally increasing flow to the channel over a period of hours. Pump capacity and discharge hose length shall be sufficient to dewater work areas with no turbid water returns to the stream. All pumps will be equipped with fish screens that meet National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) criteria (NMFS 2022). All pumps and generators used in or near streams will always have appropriate spill containment structures in place during use.

22-log bank habitat structures and alluvium placements within and along wetted main channel areas may be constructed without the need for fish salvage or dewatering. An excavator will be used to soft place the 22-log bank habitat structures and ballast alluvium in the wetted channel as the materials are delivered by a front-end loader or off-road haul truck.

Installation of typical large wood structures will include surface placement, and in some cases, the burial of a rootwad into the bank, or the excavation of a trench in the non-wetted floodplain or bank, installation of the whole trees without digging into the streambed, and, if needed, backfilling of the back trench with native fill, and bucket compaction. Each structure will have a unique installation procedure depending on the

complexity of the structure and interaction with other live whole trees, rootwads, boulders, and streambed cobble. Applicable special provisions for revetment log, log jam and 22-log bank habitat structure placement are included in Design Drawings (Appendix A). All specifications for anchoring or securing large wood will follow the Stream Habitat Restoration Guidelines (WSAHGP 2012) and the National Large Wood Manual – Assessment, Planning, Design, and Maintenance of Large Wood in Fluvial Ecosystems: Restoration Process, Functions, and Structure for placing large wood in streams (USBR and USACE 2016).

2.3.4 Revegetation and Clean-up

To the extent practicable, existing vegetation will be maintained on the floodplain and along the wetted channel. Whenever possible, disturbed vegetation will be transplanted during construction. Natural vegetation will be removed in clumps that preserves plant grouping, topsoil, and root systems. Vegetation clumps will be preserved, protected, and replanted to the greatest extent possible.

Following completion of all work activities, the contractor will decompact staging areas and temporary access routes. All roads will be restored to pre-project conditions by the contractor. Any construction fencing will be removed by the contractor. All disturbed areas will be permanently stabilized and seeded and/or planted with native plant species. The parties responsible for purchasing plants and seed and their installation will be verified prior to construction.

3.0 CONSTRUCTION STANDARDS AND SPECIAL PROVISIONS

Construction specifications are provided in Appendix B.

4.0 REFERENCES

Brown, A.G. 2002. Learning from the Past: Paleohydrology and Paleoecology. Freshwater Biology 47:817–829.

Friend, P. F. and Sinha, R. (1993). Braiding and Meandering Parameters. In Braided Rivers (eds. Best, J.L. and Bristow, C.S.), Geological Society Special Publications, No.75, p.105-111.

Montgomery, D.R., and J.M. Buffington. 1995. Channel-Reach Morphology in Mountain Drainage Basins. Geological Society of America Bulletin 109:596–611.

NMFS (National Marine Fisheries Service). 2022. NOAA Fisheries West Coast Region Anadromous Salmonid Passage Design Manual, NMFS, WCR, Portland, Oregon

USBR (U.S. Bureau of Reclamation). 2014. Pacific Northwest Region Resource & Technical Services Large Woody Material – Risk Based Design Guidelines. Available online at: https://www.usbr.gov/pn/fcrps/documents/lwm.pdf

USBR and U.S. Army Corps of Engineers (USACE). 2016. National Large Wood Manual. Assessment, Planning, Design, and Maintenance of Large Wood in Fluvial Ecosystems: Restoring Process, Function, and Structure

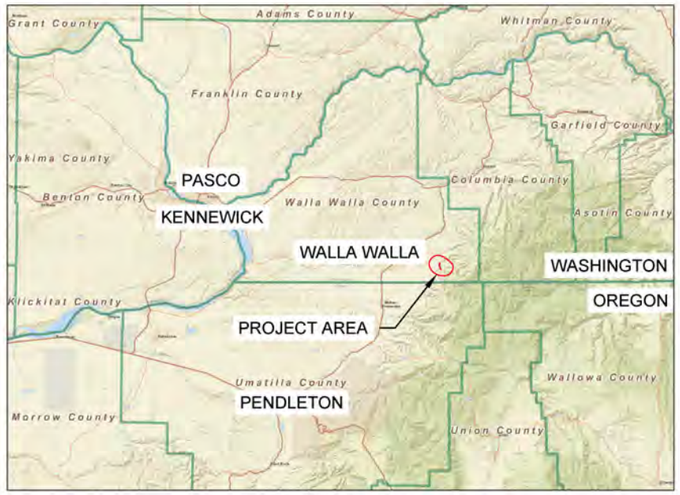
WSAHGP (Washington State Aquatic Habitat Guidelines Program). 2012. Stream Habitat Restoration Guidelines. Michelle L. Cramer, managing editor. Co-published by the Washington Departments of Fish and Wildlife, Natural Resources, Transportation and Ecology, Washington State Recreation and Conservation Office, Puget Sound Partnership, and the U.S. Fish and Wildlife Service. Olympia, Washington

APPENDIX A: DESIGN DRAWINGS

WALLA WALLA COUNTY CONSERVATION DISTRICT

PHASE 1 MILL CREEK FLOODPLAIN IMPROVEMENTS RM 17.0 - 18.5

ISSUED FOR CONSTRUCTION



LOCATION MAP

SCALE: NTS

VICINITY MAP

SCALE: NTS

SHEET LIST	
DWG #	**TITLE**
G-001	COVER SHEET
G-002	CONSERVATION MEASURES
G-003	CONSTRUCTION AND PERMITTING QUANTITIES
G-004 - G-007	BEST MANAGEMENT PRACTICES NOTES
E-101	GENERAL OVERVIEW - EXISTING CONDITIONS
C-101	GENERAL OVERVIEW - PROPOSED CONDITIONS
C-201 - C-207	PROPOSED CONDITIONS - PILOT CHANNEL PLAN, PROFILE, AND SECTIONS
C-208 - C-210	PROPOSED CONDITIONS - DRAIN CHANNEL PLAN, PROFILE, AND SECTIONS
C-211 - C-212	PROPOSED CONDITIONS - LWD
C-301 - C-303	DETAILS - LARGE WOOD
C-401	DETAILS -TESC
C-402	DETAILS - DEWATERING AND STREAM BYPASS
L-101	SITE STABILIZATION AND PLANTING PLAN

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER
EXPIRES: 06/10/2024
11/30/2023

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

COVER SHEET

DWG. NO.: G-001

CREATED: 11/30/2023

SHEET: 1 of 29

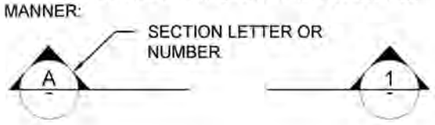
Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\ SHEET FILES\01_COVER PAGE AND NOTES.DWG
PLOT DETAIL: DEEP, ALEXA December 1, 2023 10:20 AM

ABBREVIATIONS

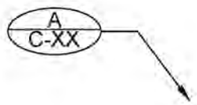
1H:1V	HORIZONTAL TO VERTICAL EXAGGERATION
%	PERCENT
Ø	DIAMETER
AC	ACRE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APP	APPROVED BY
APPROX	APPROXIMATE
BDA	BEAVER DAM ANALOGUE
BMP	BEST MANAGEMENT PRACTICE
CHK	CHECKED BY
CO	COUNTY
CP	CONTROL POINT
CY	CUBIC YARDS
D	DEPTH
DBH	DIAMETER AT BREAST HEIGHT
DIA	DIAMETER
DWG	DRAWING
DRW	DRAWN BY
EA	EACH
EG	FOR EXAMPLE (LATIN: EXEMPLI GRATIA)
ELJ	ENGINEERED LOG JAM
ENG	ENGINEERED BY
ESA	ENDANGERED SPECIES ACT
ETC	ET CETERA
EX	EXISTING
FT, '	FOOT
ID	IDENTIFICATION
IN, "	INCH
L	LENGTH
LBS	POUNDS
LiDAR	LIGHT DETECTION AND RANGING
LT	LEFT
LW	LARGE WOOD
MAX	MAXIMUM
MI	MILE
MIN	MINIMUM
MJR	MAJOR
MNR	MINOR
N/A	NOT APPLICABLE
NAVD	NORTH AMERICAN VERTICAL DATUM OF 1988
NMFS	NATIONAL MARINE FISHERIES SERVICE
NPDES	NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEMS
NTS	NOT TO SCALE
NTU	NEPHELOMETRIC TURBIDITY UNIT
OHWM	ORDINARY HIGH WATER MARK
PALS	POST-ASSISTED LOG
PCN	PRE-CONSTRUCTION NOTIFICATION
RT	RIGHT
USTA	STATION
TEMP	TEMPORARY
TESC	TEMPORARY EROSION AND SEDIMENT CONTROL
TYP	TYPICAL
USDA	UNITED STATES DEPARTMENT OF AGRICULTURE
USFS	UNITED STATES FOREST SERVICE
USFWS	UNITED STATES FISH AND WILDLIFE SERVICE
W/	WITH
WAC	WASHINGTON ADMINISTRATIVE CODE
WDFW	WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
WSE	WATER SURFACE ELEVATION

SYMBOLS

SECTIONS ARE REFERENCED IN THE FOLLOWING MANNER:



CONSTRUCTION DETAILS ARE REFERENCED IN THE FOLLOWING MANNER:



NOTES ARE REFERENCED IN THE FOLLOWING MANNER:

RECOMMENDED CONSTRUCTION SEQUENCING FOR EACH PHASE:
IN GENERAL, THE CONSTRUCTION SEQUENCE SHALL BE:

1. MOBILIZATION AND STAKING AND FLAGGING OF SENSITIVE AREAS.
2. INSTALLATION OF TEMPORARY CONSTRUCTION FENCING, TEMPORARY CONSTRUCTION ACCESS ROUTES, AND BRIDGES.
3. INSTALLATION AND MAINTENANCE OF CONSTRUCTION AREA BEST MANAGEMENT PRACTICES, CONSTRUCTION AND MAINTENANCE OF MATERIAL STORAGE AREAS.
3. SELECTIVE SITE DEMOLITION AND CLEARING AND GRUBBING.
4. BEFORE IN-WATER WORK WINDOW: FLOODPLAIN AND UPLANDS WORK.
5. IN-WATER WORK WINDOW: INSTALL NECESSARY FISH SALVATION EQUIPMENT, TEMPORARY CHANNEL CROSSINGS, WORK AREA ISOLATION AND DEWATERING, AND NECESSARY TESC.
6. REMOVE WORK AREA ISOLATION.
7. SITE RESTORATION AND REVEGETATION.
8. COMPLETE PROJECT AREA CLEANUP AND REPAIRS.

GENERAL NOTES:

1. HORIZONTAL PROJECTION: NAD83 WASHINGTON STATE PLANES, SOUTH ZONE, US FEET.
2. VERTICAL PROJECTION: NAVD88.
3. PROJECT ALIGNMENT, ELEVATION, AND STATIONING BASED ON 2021 LiDAR TOPOGRAPHIC DATA COLLECTED BY THE CONFEDERATED TRIBES OF THE UMATILLA RESERVATION AND SUPPLEMENTED BY BATHYMETRIC SURVEY DATA COLLECTED BY TETRA TECH, INC. IN JULY 2023.
4. PROPOSED PROJECT DESIGN, CONSTRUCTION ACTIVITIES, AND MATERIALS SUBJECT TO APPROVAL BY LANDOWNER.
5. AERIAL IMAGERY PROVIDED BY ANDERSON PERRY & ASSOCIATES, INC., 2021.
6. EXISTING WETLANDS AS DELINEATED IN THE FIELD BY TETRA TECH, INC. IN JULY 2023.
7. OVERHEAD POWER LINE LOCATIONS BASED ON SURVEY DATA COLLECTED BY TETRA TECH, INC. IN JULY 2023 AND APPROXIMATED FROM GOOGLE EARTH IMAGERY.

GENERAL CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL CONSTRUCT THE RESTORATION DESIGN ELEMENTS IN ACCORDANCE WITH THE PLANS STAMPED "ISSUED FOR CONSTRUCTION". THESE PLANS WILL BE PROVIDED TO THE CONTRACTOR BY THE CONTRACTING AGENCY PRIOR TO CONSTRUCTION.
2. CONTRACTOR SHALL CONTACT THE UTILITIES UNDERGROUND LOCATION CENTER 1-800-424-5555 (OR 811) BEFORE ANY EXCAVATION WORK BEGINS.
3. THE CONTRACTOR SHALL PURSUE WORK IN A CONTINUOUS AND EFFICIENT MANNER TO ENSURE TIMELY COMPLETION OF THE PROJECT.
4. ALL WORK WITHIN THE ACTIVE CHANNELS OF MILL CREEK SHALL OCCUR WITHIN THE ALLOWABLE IN-WATER WORK WINDOW (AUGUST 1 TO AUGUST 15). THE CONTRACTOR TO CONFIRM IN-WATER WORK WINDOW DATES WITH WDFW DISTRICT BIOLOGIST AND OWNER'S REPRESENTATIVE PRIOR TO BEGINNING WORK.
5. ALL CONSTRUCTION ACTIVITIES SHALL MINIMIZE DISTURBANCE TO AND MAXIMIZE RE-USE OF EXISTING RIPARIAN VEGETATION.
6. THE CONTRACTOR SHALL PROTECT ALL CONTROL POINTS DURING CONSTRUCTION ACTIVITIES AND THE CONTRACTOR WILL PLACE ADEQUATE STAKING SO THAT THE OWNER'S REPRESENTATIVE CAN VERIFY ELEVATION AS WORK ACTIVITIES ARE PROGRESSING.
7. ALL TESC MEASURES AND WORK ACTIVITIES ARE DESIGNED TO ACCOMMODATE THE EXPECTED ENVIRONMENTAL CONDITIONS AT TIME OF CONSTRUCTION (I.E., SEASONAL PRECIPITATION, SOIL MOISTURE LEVELS, GROUNDWATER LEVELS, CHANNEL FLOW, ETC.). CONTRACTOR SHALL RESTRICT WORK ACTIVITIES IF ENVIRONMENTAL CONDITIONS SIGNIFICANTLY DEVIATE FROM THE EXPECTED CONDITIONS. WORK CONDITIONS MAY DIFFER DURING CONSTRUCTION AND SHALL BE FIELD ADJUSTED TO CONFORM WITH THE GUIDELINES IN THE USFWS PROJECT PROGRAMMATIC CONTRACTORS HANDBOOK, VERSION 1.2 (USFWS 2020). ALL WORK ACTIVITIES SHALL BE SUSPENDED AT THE DISCRETION OF THE OWNER'S REPRESENTATIVE.
8. CONTRACTOR SHALL PROVIDE AN EROSION AND SEDIMENT CONTROL AND DEWATERING PLAN TO OWNER WITHIN TEN (10) BUSINESS DAYS OF NOTICE TO PROCEED.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL F CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT

ISSUED FOR CONSTRUCTION

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

GENERAL NOTES AND ABBREVIATIONS

DWG. NO.: G-002
CREATED: 11/30/2023
SHEET: 2 of 29

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\01_COVER PAGE AND NOTES.DWG
PLOT DETAILS: DEEP_ALEXA December 1, 2023 10:21 AM

CONSTRUCTION QUANTITIES		
CONSTRUCTION ITEMS	UNITS	QUANTITY
CLEARING AND GRUBBING	ACRE	1.5
EXCAVATION*	CY	2,100
SELECTIVE SITE DEMOLITION	TON	270
GENERAL FILL	CY	170
LOG W/ ROOTWAD (18"+ DBH, 20-30 FT, 4' MIN ROOTWAD)	EA	168
LOG W/O ROOTWAD (16-18" DBH, 35 FT MIN)	EA	63
LOG W/O ROOTWAD (16-18" DBH, 12-14 FT)	EA	128
WHOLE TREE (18"+ DBH, 40 FT MIN, 4' MIN ROOTWAD)	EA	58
WHOLE TREE (16-18" DBH, 35 FT MIN, 3' MIN ROOTWAD)	EA	15
SLASH / RACKING MATERIAL (4-10" DBH, 10-20 FT)	EA	480
SLASH / RACKING MATERIAL (2-10" DBH, 6-16')	CY	230
BOULDER (2.3 TO 3 FT DIAMETER)	EA	176
BOULDER (3 TO 4 FT DIAMETER)	EA	30
BALLAST (SPOILS / FLOODPLAIN ALLUVIUM)	CY	2,165
SITE STABILIZATION	ACRE	2
* ALL EARTHWORK QUANTITIES ASSUME FINAL CONSTRUCTED IN-PLACE NEATLINE OR NEAT VOLUMES AND ARE BASED ON THE FINISHED GRADE. QUANTITIES SHOWN DO NOT ACCOUNT FOR ANY MATERIAL SHRINKAGE OR EXPANSION.		

PERMITTING QUANTITIES		
PERMITTING ITEMS	UNITS	QUANTITY
EXCAVATION VOLUME BELOW OHW*	CY	1,800
EXCAVATION FOOTPRINT BELOW OHW*	SQ. FT	16,000
LARGE WOOD VOLUME BELOW OHW	CY	750
LWD STRUCTURE RACKING MATERIAL VOLUME BELOW OHW	CY	750
LWD STRUCTURE BALLAST MATERIAL (FLOODPLAIN ALLUVIUM) VOLUME BELOW OHW	CY	2,200
LWD STRUCTURE BALLAST MATERIAL (BOULDERS) VOLUME BELOW OHW	CY	55
LARGE WOOD STRUCTURE FOOTPRINT BELOW OHW	SQ. FT	42,000
TEMPORARY ISOLATION VOLUME BELOW OHW	CY	700
TEMPORARY ISOLATION FOOTPRINT BELOW OHW	SQ. FT	5,300
* ALL EARTHWORK QUANTITIES ASSUME FINAL CONSTRUCTED IN-PLACE NEATLINE OR NEAT VOLUMES AND ARE BASED ON THE FINISHED GRADE. QUANTITIES SHOWN DO NOT ACCOUNT FOR ANY MATERIAL SHRINKAGE OR EXPANSION.		

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL F CAMERON — STATE OF WASHINGTON — 55590 — REGISTERED PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

CONSTRUCTION AND PERMITTING QUANTITIES

DWG. NO.: G-003
CREATED: 11/30/2023
SHEET: 3 of 29

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\01_COVER PAGE AND NOTES.DWG
PLOT DETAILS: DEEP, ALEXA — December 1, 2023 — 10:21 AM

BEST MANAGEMENT PRACTICES APPLICABLE TO ALL ACTIONS

THE ACTIVITIES COVERED UNDER THE PROJECT PERMITS ARE INTENDED TO PROTECT AND RESTORE FISH AND WILDLIFE HABITAT WITH LONG-TERM BENEFITS TO ENDANGERED SPECES ACT (ESA)-LISTED SPECIES. THE FOLLOWING BEST MANAGEMENT PRACTICES WILL BE APPLIED TO ALL ACTIONS OF THIS PROJECT.

PROJECT DESIGN AND SITE PREPARATION.

1. STATE AND FEDERAL PERMITS.
   A. CONTRACTOR MUST OBTAIN AND IMPLEMENT THE MOST RECENT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM CONSTRUCTION STORMWATER GENERAL PERMIT OR WASHINGTON STATE EQUAL BEFORE PROJECT IMPLEMENTATION.
   B. ALL APPLICABLE TERMS AND CONDITIONS OF THE U.S. ARMY CORPS OF ENGINEERS CLEAN WATER ACT SECTION 404 AUTHORIZATION AND SECTION 401 WATER QUALITY CERTIFICATIONS WOULD BE IMPLEMENTED TO MINIMIZE PROJECT-RELATED CHANGES TO TURBIDITY AND DISSOLVED OXYGEN CONCENTRATIONS.
   C. COPIES OF ALL APPLICABLE STATE AND FEDERAL PERMITS MUST BE AVAILABLE ON SITE.
   D. RESTRICT CONSTRUCTION ACTIVITIES TO THE APPROVED WORK WINDOWS AND TIMES.
   E. IF YOU DISCOVER ANY PREVIOUSLY UNKNOWN HISTORIC, CULTURAL OR ARCHEOLOGICAL REMAINS AND ARTIFACTS WHILE ACCOMPLISHING THE ACTIVITY AUTHORIZED BY THIS PERMIT, YOU MUST IMMEDIATELY NOTIFY THE DISTRICT ENGINEER OF WHAT YOU HAVE FOUND, AND TO THE MAXIMUM EXTENT PRACTICABLE, AVOID CONSTRUCTION ACTIVITIES THAT MAY AFFECT THE REMAINS AND ARTIFACTS UNTIL THE REQUIRED COORDINATION HAS BEEN COMPLETED. THE DISTRICT ENGINEER WILL INITIATE THE FEDERAL, TRIBAL, AND STATE COORDINATION REQUIRED TO DETERMINE IF THE ITEMS OR REMAINS WARRANT A RECOVERY EFFORT OR IF THE SITE IS ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER OF HISTORIC PLACES.

2. TIMING OF IN-WATER WORK.
   A. SEE GENERAL CONSTRUCTION NOTES ON SHEET G-002 FOR APPLICABLE IN-WATER WORK DATES.

3. SITE LAYOUT AND FLAGGING.
   A. PERMITTEES MUST CLEARLY MARK ALL CONSTRUCTION AREA BOUNDARIES BEFORE BEGINNING WORK ON PROJECTS THAT INVOLVE GRADING OR PLACEMENT OF FILL.
   B. BOUNDARY MARKERS AND/OR CONSTRUCTION FENCING MUST BE MAINTAINED AND CLEARLY VISIBLE FOR THE DURATION OF CONSTRUCTION.
   C. FLAGGING SENSITIVE AREAS - PRIOR TO CONSTRUCTION, CLEARLY MARK CRITICAL RIPARIAN VEGETATION AREAS, WETLANDS, CULTURAL AND OTHER SENSITIVE SITES TO BE AVOIDED.
   D. KNOWN HISTORIC HIGH PROBABILITY AREAS AND AVOIDANCE AREAS WILL BE APPROPRIATELY FLAGGED BY ARCHEOLOGIST PRIOR TO ANY WORK DONE ON THE SITE.

4. TEMPORARY ACCESS ROADS AND PATHS.
   A. EXISTING ROADWAYS WILL BE USED WHENEVER POSSIBLE.
   B. MINIMIZE THE NUMBER OF TEMPORARY ACCESS ROADS AND TRAVEL PATHS TO LESSEN SOIL DISTURBANCE AND COMPACTION AND IMPACTS TO VEGETATION.
   C. TEMPORARY ACCESS ROADS WILL NOT BE BUILT ON SLOPES WHERE GRADE, SOIL, OR OTHER FEATURES SUGGEST A LIKELIHOOD OF EXCESSIVE EROSION OR FAILURE.
   D. OUTSLOPE TEMPORARY ROADS AND SKID TRAILS TO AVOID SEDIMENT DELIVERY TO STREAMS AND WETLANDS AND AVOID INSTALLING TEMPORARY ROADS OR SKID TRAILS IN WETLANDS TO MEET AQUATIC CONSERVATION STRATEGY RF-2.
   E. WHEN NECESSARY, TEMPORARY ACCESS ROADS WILL BE OBLITERATED OR REVEGETATED.
   F. TEMPORARY ROADS IN WET OR FLOODED AREAS WILL BE RESTORED BY THE END OF THE APPLICABLE IN-WATER WORK PERIOD. CONSTRUCTION OF NEW PERMANENT ROADS IS NOT PERMITTED.

5. TEMPORARY CROSSINGS OF SENSITIVE AQUATIC AREAS.
   A. MINIMIZE NUMBER AND LENGTH OF STREAM CROSSINGS.
   B. SUCH CROSSINGS WILL BE AT RIGHT ANGLES AND AVOID POTENTIAL SPAWNING AREAS TO THE GREATEST EXTENT POSSIBLE.
   C. STREAM CROSSINGS SHALL NOT INCREASE THE RISK OF CHANNEL RE-ROUTING AT LOW AND HIGH-WATER CONDITIONS.
   D. AFTER PROJECT COMPLETION, TEMPORARY STREAM CROSSINGS WILL BE ABANDONED, AND THE STREAM CHANNEL AND BANKS RESTORED.
   E. PERMITTEES SHOULD AVOID AND MINIMIZE REMOVAL OF NATIVE VEGETATION (INCLUDING SUBMERGED AQUATIC VEGETATION) TO THE MAXIMUM EXTENT POSSIBLE.

6. STAGING, STORAGE, AND STOCKPILE AREAS.
   A. STAGING AREA - ESTABLISH STAGING AREAS FOR STORAGE OF VEHICLES, EQUIPMENT, AND FUELS TO MINIMIZE EROSION INTO OR CONTAMINATION OF STREAMS AND FLOODPLAINS.
      1. AVOID PUTTING STAGING AREAS AND OTHER WORK AREAS IN AREAS WHERE THERE ARE HIGH SNAG DENSITIES.
      2. AVOID PUTTING STAGING AREAS AND OTHER WORK AREAS IN AREAS WITH UNIQUE VEGETATION OR LARGE DIAMETER TREES.
      3. NO TOPOGRAPHICAL RESTRICTIONS - PLACE STAGING AREA 150 FEET OR MORE FROM ANY NATURAL WATER BODY OR WETLAND IN AREAS WHERE TOPOGRAPHY DOES NOT RESTRICT SUCH A DISTANCE.
      4. TOPOGRAPHICAL RESTRICTIONS - PLACE STAGING AREA AWAY FROM ANY NATURAL WATER BODY OR WETLAND TO THE GREATEST EXTENT POSSIBLE IN AREAS WITH HIGH TOPOGRAPHICAL RESTRICTION, SUCH AS CONSTRICTED VALLEY TYPES.
   B. STOCKPILE MATERIALS - MINIMIZE CLEARING AND GRUBBING ACTIVITIES WHEN PREPARING STAGING, PROJECT, AND/OR STOCKPILE AREAS. ANY LARGE WOOD, TOPSOIL, AND NATIVE CHANNEL MATERIAL DISPLACED BY CONSTRUCTION WILL BE STOCKPILED FOR USE DURING SITE RESTORATION. MATERIALS USED FOR IMPLEMENTATION OF AQUATIC RESTORATION CATEGORIES (E.G., LARGE WOOD, BOULDERS, FENCING MATERIAL) MAY BE STAGED WITHIN THE 100-YEAR FLOODPLAIN.
   C. DURING EXCAVATION, STOCKPILE NATIVE STREAMBED MATERIALS ABOVE THE BANKFULL ELEVATION, WHERE IT CANNOT REENTER THE STREAM, FOR LATER USE.

7. EQUIPMENT.
   A. CHOICE OF EQUIPMENT - HEAVY EQUIPMENT WILL BE COMMENSURATE WITH THE PROJECT AND OPERATED IN A MANNER THAT MINIMIZES ADVERSE EFFECTS TO THE ENVIRONMENT (E.G., MINIMALLY-SIZED, LOW-PRESSURE TIRES, MINIMAL HARD TURN PATHS FOR TRACKED VEHICLES, TEMPORARY MATS OR PLATES WITHIN WET AREAS OR SENSITIVE SOILS).
   B. FUELING AND CLEANING AND INSPECTION FOR PETROLEUM PRODUCTS AND INVASIVE WEEDS:
      1. ALL EQUIPMENT USED FOR INSTREAM WORK WILL BE CLEANED FOR PETROLEUM ACCUMULATIONS, DIRT, PLANT MATERIAL (TO PREVENT THE SPREAD OF NOXIOUS WEEDS), AND LEAKS REPAIRED PRIOR TO ENTERING THE PROJECT AREA. SUCH EQUIPMENT INCLUDES LARGE MACHINERY, STATIONARY POWER EQUIPMENT (E.G., GENERATORS, CANES), AND GAS-POWERED EQUIPMENT WITH TANKS LARGER THAN FIVE GALLONS.
      2. STORE AND FUEL EQUIPMENT IN STAGING AREAS AFTER DAILY USE.
      3. INSPECT DAILY FOR FLUID LEAKS BEFORE LEAVING THE VEHICLE STAGING AREA FOR OPERATION.
      4. THOROUGHLY CLEAN EQUIPMENT BEFORE OPERATION BELOW ORDINARY HIGH WATER OR WITHIN 50 FEET OF ANY NATURAL WATER BODY OR AREAS THAT DRAIN DIRECTLY TO STREAMS OR WETLANDS AND AS OFTEN AS NECESSARY DURING OPERATION TO REMAIN GREASE FREE.
   C. WORK FROM TOP OF BANK - TO THE EXTENT FEASIBLE, HEAVY EQUIPMENT WILL WORK FROM THE TOP OF THE BANK, UNLESS WORK INSTREAM WOULD RESULT IN LESS DAMAGE TO THE AQUATIC ECOSYSTEM.
   D. HEAVY EQUIPMENT OPERATING WITHIN AREAS DESIGNATED AS GROUND BASED WILL BE CONFINED TO OPERATING ON LANDINGS, APPROVED ROADS OR PREPARED SLASH MAT TRAILS THAT ARE AT LEAST ONE FOOT IN DEPTH AND RESULT IN NO SIGNIFICANT INCREASE IN SOIL BULK DENSITY.
   E. HEAVY EQUIPMENT USED FOR MECHANICAL TREE REMOVAL MUST BE EQUIPPED WITH A BOOM CAPABLE OF REACHING CUT TREES OR SLASH WHILE MAINTAINING CONFINEMENT TO LANDINGS, APPROVED ROADS, OR PREPARED SLASH MAT TRAILS.

8. EROSION AND POLLUTION CONTROL.
   A. TEMPORARY IMPACTS TO WATERS OF THE U.S. MUST NOT EXCEED SIX MONTHS UNLESS THE PROSPECTIVE PERMITTEE REQUESTS AND RECEIVES A WAIVER BY THE DISTRICT ENGINEER. TEMPORARY IMPACTS TO WATERS OF THE U.S. MUST BE IDENTIFIED IN THE PRE-CONSTRUCTION NOTIFICATION.
   B. ALL EPA NPDES PERMITS FOR CONSTRUCTION STORMWATER MUST ADDRESS THE MINIMUM FEDERAL EFFLUENT LIMITATION GUIDELINES FOR THE CONSTRUCTION AND DEVELOPMENT POINT SOURCE CATEGORY (REFERRED TO AS "THE C&D RULE"). THE C&D RULE FOUND IN 40 CFR 450.21 ESTABLISHES MINIMUM NPDES EFFLUENT LIMITATIONS, SUCH AS:
      1. DESIGN, INSTALL, AND MAINTAIN EFFECTIVE EROSION AND SEDIMENT CONTROLS, AND POLLUTION PREVENTION MEASURES, TO MINIMIZE THE DISCHARGE OF POLLUTANTS;
      2. STABILIZE DISTURBED AREAS IMMEDIATELY WHEN CONSTRUCTION HAS CEASED AND WILL NOT RESUME FOR MORE THAN 14 CALENDAR DAYS;
      3. PROHIBIT THE DEWATERING DISCHARGES UNLESS MANAGED BY APPROPRIATE CONTROLS; AND
      4. PROHIBIT THE DISCHARGE OF:
         4.1. WASTEWATER FROM CONCRETE WASHOUT (UNLESS MANAGED BY APPROPRIATE CONTROL), OR WASHOUT/CLEANOUT OF STUCCO, PAINT, FORM RELEASE OILS, OTHER WASTEWATER MATERIALS;
         4.2. FUELS, OILS, OR OTHER POLLUTANTS USED FOR VEHICLES; AND
         4.3. SOAPS OR SOLVENTS TO WASH VEHICLES AND EQUIPMENT.
   C. IMPLEMENT THE FOLLOWING POLLUTION AND EROSION CONTROL MEASURES:
      1. PROJECT CONTACT: IDENTIFY A PROJECT CONTACT (NAME, PHONE NUMBER, AND ADDRESS) THAT WILL BE RESPONSIBLE FOR IMPLEMENTING POLLUTION AND EROSION CONTROL MEASURES.
      2. LIST AND DESCRIBE ANY HAZARDOUS MATERIAL THAT WOULD BE USED AT THE PROJECT SITE, INCLUDING PROCEDURES FOR INVENTORY, STORAGE, HANDLING, AND MONITORING; NOTIFICATION PROCEDURES; SPECIFIC CLEAN-UP AND DISPOSAL INSTRUCTIONS FOR DIFFERENT PRODUCTS AVAILABLE ON THE SITE; PROPOSED METHODS FOR DISPOSAL OF SPILLED MATERIAL, AND EMPLOYEE TRAINING FOR SPILL CONTAINMENT.
      3. TEMPORARILY STORE ANY WASTE LIQUIDS GENERATED AT THE STAGING AREAS UNDER COVER ON AN IMPERVIOUS SURFACE, SUCH AS TARPAULINS, UNTIL SUCH TIME THEY CAN BE PROPERLY TRANSPORTED TO AND TREATED AT AN APPROVED FACILITY FOR TREATMENT OF HAZARDOUS MATERIALS.
      4. PROCEDURES BASED ON BEST MANAGEMENT PRACTICES TO CONFINE, REMOVE, AND DISPOSE OF CONSTRUCTION WASTE, INCLUDING EVERY TYPE OF DEBRIS, DISCHARGE WATER, CONCRETE, CEMENT, GROUT, WASHOUT FACILITY, WELDING SLAG, PETROLEUM PRODUCT, OR OTHER HAZARDOUS MATERIALS GENERATED, USED, OR STORED ON-SITE.
      5. BEST MANAGEMENT PRACTICES TO CONFINE VEGETATION AND SOIL DISTURBANCE TO THE MINIMUM AREA, AND MINIMUM LENGTH OF TIME, AS NECESSARY TO COMPLETE THE ACTION, AND OTHERWISE PREVENT OR MINIMIZE EROSION ASSOCIATED WITH THE ACTION AREA.
      6. NO UNCURED CONCRETE OR FORM MATERIALS WILL BE ALLOWED TO ENTER THE ACTIVE STREAM CHANNEL.
      7. STEPS TO CEASE WORK UNDER HIGH FLOWS, EXCEPT FOR EFFORTS TO AVOID OR MINIMIZE RESOURCE DAMAGE.
   D. TEMPORARY EROSION CONTROLS - PLACE SEDIMENT BARRIERS PRIOR TO CONSTRUCTION AROUND SITES WHERE SIGNIFICANT LEVELS OF EROSION MAY ENTER THE STREAM DIRECTLY OR THROUGH ROAD DITCHES.
   E. TEMPORARY EROSION CONTROLS WILL BE IN PLACE BEFORE ANY SIGNIFICANT ALTERATION OF THE ACTION SITE AND WILL BE REMOVED ONCE THE SITE HAS BEEN STABILIZED FOLLOWING CONSTRUCTION ACTIVITIES.
   F. SUITABLE MATERIAL. ANY MATERIAL OR STRUCTURE PLACED IN WATERS OF THE UNITED STATES, WHETHER TEMPORARY OR PERMANENT, SHALL BE FREE OF TOXIC POLLUTANTS IN TOXIC AMOUNTS.
   G. SHORT-TERM STABILIZATION - MEASURES MAY INCLUDE THE USE OF NON-NATIVE STERILE SEED MIX (WHEN NATIVE SEEDS ARE NOT AVAILABLE), WEED-FREE CERTIFIED STRAW, JUTE MATTING, AND OTHER SIMILAR TECHNIQUES. SHORT-TERM STABILIZATION MEASURES WILL BE MAINTAINED UNTIL PERMANENT EROSION CONTROL MEASURES ARE EFFECTIVE. STABILIZATION MEASURES WILL BE INSTIGATED WITHIN THREE DAYS OF CONSTRUCTION COMPLETION.
   H. PERMANENT EROSION CONTROL AND PLANTING BARRIER CLOTH/JUTE MATTING SHOULD BE COMPOSED OF NATURAL FIBER MATERIALS. NO PLASTICS OR SYNTHETIC MATERIALS SHOULD BE LEFT ON-SITE AFTER PROJECT COMPLETION.

9. SPILL PREVENTION, CONTROL, AND COUNTER MEASURES.
   A. PROCEDURES TO CONTAIN AND CONTROL A SPILL OF ANY HAZARDOUS MATERIAL GENERATED, USED OR STORED ON-SITE, INCLUDING NOTIFICATION OF PROPER AUTHORITIES. ENSURE THAT MATERIALS FOR EMERGENCY EROSION AND HAZARDOUS MATERIALS CONTROL ARE ON-SITE (E.G., SILT FENCE, STRAW BALES, OIL-ABSORBING FLOATING BOOM WHENEVER SURFACE WATER IS PRESENT).

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL F CANNON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER — 11/30/2023 — EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT

ISSUED FOR CONSTRUCTION

REV	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

CONSERVATION MEASURES

DWG. NO.: G-004
CREATED: 11/30/2023
SHEET: 4 of 29

10. INVASIVE SPECIES CONTROL
   A. IMPORTED GRAVEL MUST BE FREE OF INVASIVE SPECIES AND NON-NATIVE SEEDS. IF NECESSARY, WASH GRAVEL PRIOR TO PLACEMENT.
   B. CONDUCT POST-CONSTRUCTION MONITORING AND TREATMENT OR REMOVAL OF INVASIVE PLANTS UNTIL NATIVE PLANT SPECIES ARE WELL ESTABLISHED.
   C. ALL EQUIPMENT USED FOR INSTREAM WORK WILL BE CLEANED FOR DIRT AND PLANT MATERIAL (TO PREVENT THE SPREAD OF NOXIOUS WEEDS). SUCH EQUIPMENT INCLUDES LARGE MACHINERY, STATIONARY POWER EQUIPMENT(E.G., GENERATORS, CANES), AND GAS-POWERED EQUIPMENT WITH TANKS LARGER THAN FIVE GALLONS.

WORK AREA ISOLATION AND FISH SALVAGE.

1. AREA ISOLATION
   A. ISOLATE THE CONSTRUCTION AREA AND REMOVE FISH FROM A PROJECT SITE FOR PROJECTS THAT INCLUDE CONCENTRATED AND MAJOR EXCAVATION AT A SINGLE LOCATION WITHIN THE STREAM CHANNEL. THIS CONDITION WILL TYPICALLY APPLY TO THE FOLLOWING AQUATIC RESTORATION CATEGORIES: FISH PASSAGE RESTORATION; DAM, TIDE GATE, AND LEGACY STRUCTURE REMOVAL; CHANNEL RECONSTRUCTION/RELOCATION.
   B. AQUATIC LIFE MOVEMENTS. THE PERMITTEE SHALL NOT SUBSTANTIALLY DISRUPT THE NECESSARY LIFE-CYCLE MOVEMENT OF THOSE SPECIES OF AQUATIC LIFE INDIGENOUS TO THE WATERBODY, INCLUDING THOSE SPECIES THAT NORMALLY MIGRATE THROUGH THE AREA, UNLESS THE PRIMARY PURPOSE OF THE ACTIVITY IS TO TEMPORARILY IMPOUND WATER.
   C. MANAGEMENT OF WATER FLOWS. TO THE MAXIMUM EXTENT PRACTICABLE, THE ACTIVITY MUST BE DESIGNED TO MAINTAIN DOWNSTREAM FLOW CONDITIONS. FURTHERMORE, THE ACTIVITY SHALL NOT PERMANENTLY RESTRICT OR IMPEDE THE PASSAGE OF NORMAL OR EXPECTED HIGH FLOWS UNLESS THE PRIMARY PURPOSE OF THE FILL IS TO TEMPORARILY IMPOUND WATER. THE PERMITTEE SHOULD LIMIT THE WORK CONDUCTED IN WATERS OF THE UNITED STATES TO LOW-OR NO-FLOW PERIODS.

2. FISH SALVAGE.
   A. ISOLATE CAPTURE AREA:
      1. INSTALL BLOCK NETS AT UP AND DOWNSTREAM LOCATIONS OUTSIDE OF THE CONSTRUCTION ZONE TO EXCLUDE FISH FROM ENTERING THE PROJECT AREA.
      2. LEAVE NETS SECURED TO THE STREAM CHANNEL BED AND BANKS UNTIL CONSTRUCTION ACTIVITIES WITHIN THE STREAM CHANNEL ARE COMPLETE.
      3. IF BLOCK NETS OR TRAPS REMAIN IN PLACE MORE THAN ONE DAY, MONITOR THE NETS AND OR TRAPS AT LEAST ON A DAILY BASIS TO ENSURE THEY ARE SECURED TO THE BANKS AND FREE OF ORGANIC ACCUMULATION AND TO MINIMIZE FISH PREDATION IN THE TRAP.
   B. CAPTURE AND RELEASE:
      1. FISH TRAPPED WITHIN THE ISOLATED WORK AREA WILL BE CAPTURED AND RELEASED AS PRUDENT TO MINIMIZE THE RISK OF INJURY, THEN RELEASED AT A SAFE RELEASE SITE, PREFERABLY UPSTREAM OF THE ISOLATED REACH IN A POOL OR OTHER AREA THAT PROVIDES COVER AND FLOW REFUGE.
      2. COLLECT FISH IN THE BEST MANNER TO MINIMIZE POTENTIAL STRANDING AND STRESS BY SEINE OR DIP NETS AS THE AREA IS SLOWLY DEWATERED, BAITED MINNOW TRAPS PLACED OVERNIGHT, OR ELECTROFISHING (IF OTHER OPTIONS ARE INEFFECTIVE). FISH MUST BE HANDLED WITH EXTREME CARE AND KEPT IN WATER THE MAXIMUM EXTENT POSSIBLE DURING TRANSFER PROCEDURES.
      3. A HEALTHY ENVIRONMENT FOR THE STRESSED FISH SHALL BE PROVIDED - LARGE BUCKETS (FIVE-GALLON MINIMUM TO PREVENT OVERCROWDING) AND MINIMAL HANDLING OF FISH. PLACE LARGE FISH IN BUCKETS SEPARATE FROM SMALLER PREY-SIZED FISH. MONITOR WATER TEMPERATURE IN BUCKETS AND WELL-BEING OF CAPTURED FISH. IF BUCKETS ARE NOT BEING IMMEDIATELY TRANSPORTED, USE AERATORS TO MAINTAIN WATER QUALITY. AS RAPIDLY AS POSSIBLE, BUT AFTER FISH HAVE RECOVERED, RELEASE FISH.
      4. IN CASES WHERE THE STREAM IS INTERMITTENT UPSTREAM, RELEASE FISH IN DOWNSTREAM AREAS AND AWAY FROM THE INFLUENCE OF THE CONSTRUCTION. CAPTURE AND RELEASE WILL BE SUPERVISED BY A FISHERY BIOLOGIST EXPERIENCED WITH WORK AREA ISOLATION AND SAFE HANDLING OF ALL FISH.
   C. ELECTROFISHING - USE ELECTROFISHING ONLY WHERE OTHER MEANS OF FISH CAPTURE MAY NOT BE FEASIBLE OR EFFECTIVE. IF ELECTROFISHING WILL BE USED TO CAPTURE FISH FOR SALVAGE, NMFS'S ELECTROFISHING GUIDELINES WILL BE FOLLOWED.

3. DEWATERING.
   A. DEWATER CONSTRUCTION SITE:
      1. WHEN DEWATERING IS NECESSARY TO PROTECT SPECIES OR CRITICAL HABITAT, DIVERT FLOW AROUND THE CONSTRUCTION SITE WITH A COFFER DAM (BUILT WITH NON-EROSIVE MATERIALS), TAKING CARE TO NOT DEWATER DOWNSTREAM CHANNELS DURING DEWATERING.
      2. PASS FLOW AND FISH DOWNSTREAM WITH A BYPASS CULVERT OR A DIVERSION DITCH. NATURAL FIBER SEDIMENT MATS TO BE INSTALLED AT DOWNSTREAM END OF BYPASS CHANNEL TO MINIMIZE TURBIDITY DURING INITIAL WATERING UP OF BYPASS CHANNEL.
      3. DIVERSION SANDBAGS CAN BE FILLED WITH MATERIAL MINED FROM THE FLOODPLAIN AS LONG AS SUCH MATERIAL IS REPLACED AT END OF PROJECT.
      4. SMALL AMOUNTS OF INSTREAM MATERIAL CAN BE MOVED TO HELP SEAL AND SECURE DIVERSION STRUCTURES.
      5. IF ESA LISTED-FISH MAY BE PRESENT AND PUMPS ARE REQUIRED TO DEWATER, THE INTAKE MUST HAVE A FISH SCREEN(S) AND BE OPERATED IN ACCORDANCE WITH NMFS FISH SCREEN CRITERIA DESCRIBED BELOW (IN PART E.IV) OF THIS SECTION. DISSIPATE FLOW ENERGY AT THE BYPASS OUTFLOW TO PREVENT DAMAGE TO RIPARIAN VEGETATION OR STREAM CHANNEL.
      6. IF DIVERSION ALLOWS FOR DOWNSTREAM FISH PASSAGE, PLACE DIVERSION OUTLET IN A LOCATION TO PROMOTE SAFE REENTRY OF FISH INTO THE STREAM CHANNEL, PREFERABLY INTO POOL HABITAT WITH COVER.
      7. PUMP SEEPAGE WATER FROM THE DE-WATERED WORK AREA TO A TEMPORARY STORAGE AND TREATMENT SITE OR INTO UPLAND AREAS AND ALLOW WATER TO FILTER THROUGH VEGETATION PRIOR TO REENTERING THE STREAM CHANNEL.
   B. SURFACE WATER MAY BE DIVERTED TO MEET CONSTRUCTION NEEDS, BUT ONLY IF DEVELOPED SOURCES ARE UNAVAILABLE OR INADEQUATE. WHERE ESA-LISTED FISH MAY BE PRESENT, DIVERSIONS MAY NOT EXCEED 10% OF THE AVAILABLE FLOW AND FISH SCREEN(S) WILL BE INSTALLED, OPERATED, AND MAINTAINED ACCORDING TO NMFS'S FISH SCREEN CRITERIA.

4. REWATERING.
   STREAM REWATERING - UPON PROJECT COMPLETION, SLOWLY REWATER THE CONSTRUCTION SITE TO PREVENT LOSS OF SURFACE WATER DOWNSTREAM AS THE CONSTRUCTION SITE STREAMBED ABSORBS WATER AND TO PREVENT A SUDDEN RELEASE OF SUSPENDED SEDIMENT. MONITOR DOWNSTREAM DURING REWATERING TO PREVENT STRANDING OF AQUATIC ORGANISMS BELOW THE CONSTRUCTION SITE.

CONSTRUCTION AND POST CONSTRUCTION CONSERVATION MEASURES.

1. CONSTRUCTION AND DISCHARGE WATER.
   A. ALL ACTIVITIES AUTHORIZED HEREIN THAT INVOLVE A DISCHARGE OF DREDGED OR FILL MATERIAL INTO WATERS OF THE U.S. SHALL, AT ALL TIMES, REMAIN CONSISTENT WITH ALL APPLICABLE WATER QUALITY STANDARDS, EFFLUENT LIMITATIONS AND STANDARDS OF PERFORMANCE, PROHIBITIONS, PRETREATMENT STANDARDS AND MANAGEMENT PRACTICES ESTABLISHED PURSUANT TO THE CLEAN WATER ACT (P.L. 92-500; 86 STAT. 86) OR PURSUANT TO APPLICABLE STATE AND LOCAL LAW.
   B. ALL SURFACE WATERS NOT NAMED UNDER WAC 173-201A-602 ARE PROTECTED BY THE WASHINGTON STATE DEPARTMENT OF ECOLOGY IN WAC 173-201A-600 FOR DESIGNATED USES THAT INCLUDE SALMONID SPAWNING, REARING, AND MIGRATION; RECREATION; RESIDENTIAL AND AGRICULTURAL WATER SUPPLY; WILDLIFE HABITAT; AND AESTHETIC PURPOSES. WATER QUALITY STANDARDS ARE LISTED IN WAC 173-201A-200. WATER QUALITY STANDARDS ARE ESTABLISHED FOR TEMPERATURE AND TURBIDITY. THESE STANDARDS ALLOW INCREASES OVER BACKGROUND LEVELS. THE WATER QUALITY PARAMETER (WHICH HAS A WASHINGTON STATE WATER QUALITY CRITERIA) MOST LIKELY IMPACTED BY THE PROPOSED ACTIVITIES IS TURBIDITY (STREAM SEDIMENTATION). THE APPLICABLE STANDARDS FROM WAC 173-201A-200 FOR CHAR SPAWNING AND REARING OR CORE SUMMER SALMONID HABITAT STATE THAT TURBIDITY SHALL NOT EXCEED: 5 NTUS OVER BACKGROUND WHEN THE BACKGROUND IS 50 NTUS OR LESS; OR A 10 PERCENT INCREASE IN TURBIDITY WHEN THE BACKGROUND IS MORE THAN 50 NTUS.

2. TIME AND EXTENT OF DISTURBANCE.
   A. TIMELY COMPLETION
      1. MINIMIZE TIME IN WHICH HEAVY EQUIPMENT IS IN STREAM CHANNELS, RIPARIAN AREAS, AND WETLANDS.
      2. COMPLETE EARTHWORK (INCLUDING DRILLING, EXCAVATION, DREDGING, FILLING AND COMPACTING) AS QUICKLY AS POSSIBLE.
      3. DURING EXCAVATION, STOCKPILE NATIVE STREAMBED MATERIALS ABOVE THE BANK FULL ELEVATION, WHERE IT CANNOT REENTER THE STREAM, FOR LATER USE.

3. SITE RESTORATION.
   A. INITIATE REHABILITATION - UPON PROJECT COMPLETION, REHABILITATE ALL DISTURBED AREAS IN A MANNER THAT RESULTS IN SIMILAR OR BETTER THAN PRE-WORK CONDITIONS THROUGH REMOVAL OF PROJECT RELATED WASTE, SPREADING OF STOCKPILED MATERIALS (SOIL, LW, TREES, ETC.) SEEDING, OR PLANTING WITH LOCAL NATIVE SEED MIXES OR PLANTS.
   B. DECOMPACT SOILS - DECOMPACT SOIL BY SCARIFYING THE SOIL SURFACE OF ROADS AND PATHS, STREAM CROSSINGS, STAGING, AND STOCKPILE AREAS SO THAT SEEDS AND PLANTINGS CAN ROOT.
   C. REMOVAL OF TEMPORARY FILLS. TEMPORARY FILLS MUST BE REMOVED IN THEIR ENTIRETY AND THE AFFECTED AREA RETURNED TO PRE-CONSTRUCTION CONTOURS.
   D. STREAMBANK RESTORATION:
      1. WITHOUT CHANGING THE LOCATION OF THE BANK TOE, RESTORE DAMAGED STREAMBANKS TO A NATURAL SLOPE AND PROFILE SUITABLE FOR ESTABLISHMENT OF RIPARIAN VEGETATION. THIS MAY INCLUDE SLOPING UNCONSOLIDATED BANK MATERIAL TO A STABLE ANGLE OF REPOSE OR USING BENCHES IN CONSOLIDATED, COHESIVE SOILS.
      2. COMPLETE ALL SOIL REINFORCEMENT EARTHWORK AND EXCAVATION DURING DRY CONDITIONS. WHEN NECESSARY, USE SOIL LAYERS OR LIFTS STRENGTHENED WITH BIODEGRADABLE FABRICS AND PENETRABLE BY PLANT ROOTS.
      3. INCLUDE LARGE WOOD TO THE EXTENT IT WOULD NATURALLY OCCUR. IF POSSIBLE, LARGE WOOD SHOULD HAVE UNTRIMMED ROOT WADS TO PROVIDE FUNCTIONAL REFUGIA HABITAT FOR FISH. WOOD ALREADY WITHIN THE STREAM OR SUSPENDED OVER THE STREAM MAY BE REPOSITIONED TO ALLOW FOR GREATER INTERACTION WITH THE STREAM.
      4. ROCK WILL NOT BE USED FOR STREAMBANK RESTORATION, EXCEPT AS BALLAST TO STABILIZE LARGE WOOD.
      5. USE A DIVERSE ASSEMBLAGE OF VEGETATION SPECIES NATIVE TO THE ACTION AREA, INCLUDING TREES, SHRUBS, AND HERBACEOUS SPECIES. VEGETATION, SUCH AS WILLOW, SEDGE, AND RUSH MATS, MAY BE GATHERED FROM LOCAL SOURCES (FOR EXAMPLE, WITHIN THE SEED ZONE AREA), INCLUDING ABANDONED FLOODPLAINS, STREAM CHANNELS, ETC.
      6. DO NOT APPLY SURFACE FERTILIZER WITHIN 50 FEET OF ANY STREAM CHANNEL.
      7. INSTALL FENCING AS NECESSARY TO PREVENT ACCESS TO REVEGETATED SITES BY LIVESTOCK OR UNAUTHORIZED PERSONS.
      8. CONDUCT POST-CONSTRUCTION MONITORING AND TREATMENT OR REMOVAL OF INVASIVE PLANTS UNTIL NATIVE PLANT SPECIES ARE WELL ESTABLISHED.
   E. OFF-AND-SIDE-CHANNEL HABITAT RESTORATION:
      1. NATIONAL MARINE FISHERIES SERVICE HYDRO FISH PASSAGE REVIEW AND APPROVAL - WHEN A PROPOSED SIDE CHANNEL WILL CONTAIN MORE THAN 20 PERCENT OF THE BANKFULL FLOW, NATIONAL FOREST OR SCENIC AREA PERSONNEL WILL ENSURE THE ACTION IS INDIVIDUALLY REVIEWED BY THE PORTLAND OFFICE OF THE NATIONAL MARINE FISHERIES SERVICE HABITAT CONSERVATION DIVISION FOR CONSISTENCY WITH CRITERIA IN NATIONAL MARINE FISHERIES SERVICE.
      2. DATA REQUIREMENTS - DATA REQUIREMENTS AND ANALYSIS FOR OFF- AND SIDE-CHANNEL HABITAT RESTORATION INCLUDE EVIDENCE OF HISTORICAL CHANNEL LOCATION, SUCH AS LAND USE SURVEYS, HISTORICAL PHOTOGRAPHS, TOPOGRAPHIC MAPS, REMOTE SENSING INFORMATION, OR PERSONAL OBSERVATION.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL F CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER — 11/30/2023 — EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION (PLAN SHEET SIZE ANSI B (11" X 17"))	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

CONSERVATION MEASURES

DWG. NO.: G-005
CREATED: 11/30/2023
SHEET: 5 of 29

CONSTRUCTION AND POST CONSTRUCTION CONSERVATION MEASURES (CONTINUED).

3. ALLOWABLE EXCAVATION - OFF- AND SIDE-CHANNEL IMPROVEMENTS CAN INCLUDE MINOR EXCAVATION (10 PERCENT OR LESS OF VOLUME) OF NATURALLY ACCUMULATED SEDIMENT WITHIN HISTORICAL CHANNELS. THERE IS NO LIMIT TO THE AMOUNT OF EXCAVATION OF HUMAN-CREATED FILL WITHIN HISTORICAL SIDE CHANNELS AS LONG AS SUCH CHANNELS CAN BE CLEARLY IDENTIFIED THROUGH FIELD PHOTOGRAPHS, AERIAL PHOTOGRAPHS, OR BOTH. EXCAVATION DEPTH WILL NOT EXCEED THE MAXIMUM THALWEG DEPTH IN THE MAIN CHANNEL. EXCAVATED MATERIAL REMOVED FROM OFF- OR SIDE-CHANNELS SHALL BE HAULED TO AN UPLAND SITE OR SPREAD ACROSS THE ADJACENT FLOODPLAIN IN A MANNER THAT DOES NOT RESTRICT FLOODPLAIN CAPACITY.

F. SET-BACK OR REMOVAL OF EXISTING BERMS, DIKES, AND LEVEES:
   1. DESIGN ACTIONS TO RESTORE FLOODPLAIN CHARACTERISTICS--ELEVATION, WIDTH, GRADIENT, LENGTH, AND ROUGHNESS--IN A MANNER THAT CLOSELY MIMICS, TO THE EXTENT POSSIBLE, THOSE THAT WOULD NATURALLY OCCUR AT THAT STREAM AND VALLEY TYPE.
   2. TO THE EXTENT POSSIBLE, REMOVE NONNATIVE FILL MATERIAL FROM THE FLOODPLAIN TO AN UPLAND SITE.
   3. WHERE IT IS NOT POSSIBLE TO REMOVE OR SET-BACK ALL PORTIONS OF DIKES AND BERMS, OR IN AREAS WHERE EXISTING BERMS, DIKES, AND LEVEES SUPPORT ABUNDANT RIPARIAN VEGETATION, OPENINGS WILL BE CREATED WITH BREACHES. BREACHES SHALL BE EQUAL TO, OR GREATER THAN, THE ACTIVE CHANNEL WIDTH TO REDUCE THE POTENTIAL FOR CHANNEL AVULSION DURING FLOOD EVENTS. IN ADDITION TO OTHER BREACHES, THE BERM, DIKE, OR LEVEE SHALL ALWAYS BE BREACHED AT THE DOWNSTREAM END OF THE PROJECT, AT THE LOWEST ELEVATION OF THE FLOODPLAIN, OR BOTH TO ENSURE THE FLOWS WILL NATURALLY RECEDE BACK INTO THE MAIN CHANNEL THUS MINIMIZING FISH ENTRAPMENT.
   4. ELEVATIONS OF DIKE AND LEVEE SETBACKS SHALL NOT EXCEED THE ELEVATION OF REMOVED STRUCTURES.
   5. WHEN NECESSARY, LOOSEN COMPACTED SOILS ONCE OVERBURDEN MATERIAL IS REMOVED. OVERBURDEN OR FILL COMPRISED OF NATIVE MATERIALS FROM THE PROJECT AREA MAY BE USED WITHIN THE FLOODPLAIN TO CREATE SET-BACK DIKES AND FILL HUMAN-CAUSED HOLES PROVIDED FLOODPLAIN FUNCTION IS NOT IMPEDED.

4. MATERIAL PLACEMENT AND DISPOSAL
   A. USE AND DISPOSAL OF EXCESS MATERIAL.
      1. ALL CONSTRUCTION DEBRIS AND ANY OTHER MATERIAL NOT AUTHORIZED BY THE CORPS FOR PERMANENT PLACEMENT INTO WATERS OF THE UNITED STATES SHALL BE DISPOSED OF IN AN UPLAND LOCATION IN A MANNER THAT PRECLUDES IT FROM ENTERING WATERS OF THE UNITED STATES.
      2. GRAVEL CAN BE PLACED DIRECTLY INTO THE STREAM CHANNEL, AT TRIBUTARY JUNCTIONS, OR OTHER AREAS IN A MANNER THAT MIMICS NATURAL DEBRIS FLOWS AND EROSION.
      3. AUGMENTATION WILL ONLY OCCUR IN AREAS WHERE THE NATURAL SUPPLY HAS BEEN ELIMINATED, SIGNIFICANTLY REDUCED THROUGH ANTHROPOGENIC DISRUPTIONS, OR USED TO INITIATE GRAVEL ACCUMULATIONS IN CONJUNCTION WITH OTHER PROJECTS, SUCH AS SIMULATED LOG JAMS AND DEBRIS FLOWS.
      4. GRAVEL TO BE PLACED IN STREAMS SHALL BE A PROPERLY SIZED GRADATION FOR THAT STREAM, CLEAN, AND NON-ANGULAR.
      5. WHEN POSSIBLE, USE GRAVEL OF THE SAME LITHOLOGY AS FOUND IN THE WATERSHED. REFERENCE THE STREAM SIMULATION: AN ECOLOGICAL APPROACH TO PROVIDING PASSAGE FOR AQUATIC ORGANISMS AT ROAD-STREAM CROSSINGS (USDA-FOREST SERVICE 2008) TO DETERMINE GRAVEL SIZES APPROPRIATE FOR THE STREAM.
      6. GRAVEL CAN BE MINED FROM THE FLOODPLAIN AT ELEVATIONS ABOVE BANKFULL, BUT NOT IN A MANNER THAT WOULD CAUSE STRANDING DURING FUTURE FLOOD EVENTS.
      7. CRUSHED ROCK IS NOT PERMITTED. AFTER GRAVEL PLACEMENT IN AREAS ACCESSIBLE TO HIGHER STREAM FLOW, ALLOW THE STREAM TO NATURALLY SORT AND DISTRIBUTE THE MATERIAL.
      8. DO NOT PLACE GRAVEL DIRECTLY ON BARS AND RIFFLES THAT ARE KNOWN SPAWNING AREAS, WHICH MAY CAUSE FISH TO SPAWN ON THE UNSORTED AND UNSTABLE GRAVEL, THUS POTENTIALLY RESULTING IN REDD DESTRUCTION. IMPORTED GRAVEL MUST BE FREE OF INVASIVE SPECIES AND NON-NATIVE SEEDS. IF NECESSARY, WASH GRAVEL PRIOR TO PLACEMENT.

5. REVEGETATION.
   A. THE PERMITTEE MUST REVEGETATE DISTURBED AREAS WITH NATIVE PLANT SPECIES SUFFICIENT IN NUMBER, SPACING, AND DIVERSITY TO RESTORE AFFECTED FUNCTIONS. A MAINTENANCE AND MONITORING PLAN COMMENSURATE WITH THE IMPACTS MAY BE REQUIRED. REVEGETATION MUST BEGIN AS SOON AS SITE CONDITIONS ALLOW WITHIN THE SAME GROWING SEASON AS THE DISTURBANCE UNLESS THE SCHEDULE IS APPROVED BY THE CORPS OF ENGINEERS.
   B. NATIVE PLANTS REMOVED FROM WATERS OF THE U.S. FOR PROJECT CONSTRUCTION SHOULD BE STOCKPILED AND USED FOR REVEGETATION WHEN FEASIBLE.
   C. TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES MUST BE REMOVED AS SOON AS THE AREA HAS ESTABLISHED VEGETATION SUFFICIENT TO CONTROL EROSION AND SEDIMENT.
      1. NATURAL FIBER EROSION CONTROL MATERIALS ARE RECOMMENDED FOR SHORT TERM EROSION CONTROL.
      2. WHERE PERMANENT EROSION CONTROL/PLANTING MATTING IS REQUIRED, MATERIALS MUST BE NATURAL FIBER COMPOSITION ONLY (NO PLASTICS/SYNTHETIC MATERIAL).
   D. REPLANT EACH AREA REQUIRING REVEGETATION PRIOR TO OR AT THE BEGINNING OF THE FIRST GROWING SEASON FOLLOWING CONSTRUCTION.
      1. ACHIEVE RE-ESTABLISHMENT OF VEGETATION IN DISTURBED AREAS TO AT LEAST 70% OF PRE-PROJECT LEVELS WITHIN THREE YEARS.
      2. USE AN APPROPRIATE MIX OF SPECIES THAT WILL ACHIEVE ESTABLISHMENT AND EROSION CONTROL OBJECTIVES, PREFERABLY FORB, GRASS, SHRUB, OR TREE SPECIES NATIVE TO THE PROJECT AREA OR REGION AND APPROPRIATE TO THE SITE. BARRIERS WILL BE INSTALLED AS NECESSARY TO PREVENT ACCESS TO REVEGETATED SITES BY LIVESTOCK OR UNAUTHORIZED PERSONS.
   E. ALL RIPARIAN PLANTINGS SHALL FOLLOW FOREST SERVICE DIRECTION DESCRIBED IN THE REGIONAL LETTER TO UNITS, USE OF NATIVE AND NONNATIVE PLANTS ON NATIONAL FORESTS AND GRASSLANDS MAY 2006 (FINAL DRAFT), AND/OR BLM INSTRUCTION MEMORANDUM NO. OR-2001-014, POLICY ON THE USE OF NATIVE SPECIES PLANT MATERIAL.

6. TREE REMOVAL
   A. HAZARD TREES - WHERE APPROPRIATE, INCLUDE HAZARD TREE REMOVAL (AMOUNT AND TYPE) IN PROJECT DESIGN.
      1. FELL HAZARD TREES WHEN THEY POSE A SAFETY RISK.
      2. IF POSSIBLE, FELL HAZARD TREES WITHIN RIPARIAN AREAS TOWARD A STREAM.
      3. KEEP FELLED TREES ON SITE WHEN NEEDED TO MEET COARSE LW OBJECTIVES.
   B. LIVE CONIFERS AND OTHER TREES CAN BE FELLED OR PULLED/PUSHED OVER IN A NORTHWEST FOREST PLAN, RIPARIAN RESERVE, OR PACFISH/INFISH RIPARIAN HABITAT CONSERVATION AREAS, AND UPLAND AREAS (E.G., LATE SUCCESSIONAL RESERVES OR ADAPTIVE MANAGEMENT AREAS FOR NORTHERN SPOTTED OWL AND MARBLED MURRELET CRITICAL HABITAT) FOR IN-CHANNEL LW PLACEMENT ONLY WHEN CONIFERS AND TREES ARE FULLY STOCKED.
   C. TREE FELLING SHALL NOT CREATE EXCESSIVE STREAMBANK EROSION OR INCREASE THE LIKELIHOOD OF CHANNEL AVULSION DURING HIGH FLOWS.
   D. DANGER TREES AND TREES KILLED THROUGH FIRE, INSECTS, DISEASE, BLOW-DOWN AND OTHER MEANS CAN BE FELLED AND USED FOR IN-CHANNEL PLACEMENT REGARDLESS OF LIVE-TREE STOCKING LEVELS.
   E. TREES MAY BE REMOVED BY CABLE, GROUND-BASED EQUIPMENT, HORSES, OR HELICOPTERS.
   F. TREES MAY BE FELLED OR PUSHED/PULLED DIRECTLY INTO A STREAM OR FLOODPLAIN.
   G. TREES MAY BE STOCKPILED AT DESIGNATED STAGING AREAS.
   H. IDENTIFIED TREES ARE MARKED AND WILL MEET THE DESIGN CRITERIA. THE CONTRACTOR WILL DO ITS BEST TO STICK TO IDENTIFIED SKID TRAILS AND MINIMIZE SURROUNDING TREE DAMAGE WHEN FELLING THE TREES.
   I. DURING ROOTWAD REMOVAL, MINIMIZE SOIL DISTURBANCE.
      1. USFS WILL DETERMINE WHEN SOIL MOISTURE IS CONDUCIVE TO MINIMIZE SOIL DISTURBANCE DURING ROOTWAD HARVEST. SOIL CONDITIONS ARE NOT EXPECTED TO BE APPROPRIATE UNTIL JUNE 1.
      2. ONLY EXCAVATE THE AREA NECESSARY FOR REMOVAL AROUND THE ROOTS.
      3. IF PULLING THE ROOTWAD WITH A FELLER-BUNCHER, CARE SHALL BE EXERCISED TO LIMIT SOIL DETACHMENT.
      4. POST REMOVAL, SHAKE THE TREE TO MINIMIZE OFF-SITE SOIL LOSS. RETURN THE AREA TO THE PRE-DISTURBANCE TOPOGRAPHY, IF NEEDED, WITH HAND TOOLS.
      5. DURING THE PROCESS, CARE SHALL BE TAKEN TO NOT COMPACT THE AREA WHERE THE ROOT WAD WAS HARVESTED.
      6. DO NOT DISTURB OR COMPACT THE SURROUNDING SOIL. RETAIN OR ENHANCE GROUND COVER WHERE POSSIBLE.
   J. TO PROTECT AGAINST SOIL DISPLACEMENT, PARTIAL SUSPENSION WHILE YARDING THROUGH THE HARVEST AREA IS REQUIRED.
   K. ALL DISTURBED AREAS MUST BE RESTORED TO MEET WFP COVER REQUIREMENTS. THIS INCLUDES THE PLACEMENT OF SLASH AND SEEDING OF MAJOR SKID TRAILS, LANDINGS, AND TEMPORARY ROADS. ROOTWAD HARVESTED AREAS MUST BE RESTORED WITH SEEDING, MULCHING, OR SLASH COVER.
   L. IN TIMBER HARVEST AREAS, MECHANICAL DECOMPACTION (RIPPING, SUBSOILING, ETC.) WOULD OCCUR WITHIN RIPARIAN RESERVES ONLY WHEN DETERMINED TO BE BENEFICIAL BY A HYDROLOGIST OR SOIL SCIENTIST.
   M. OUTSIDE OF RIPARIAN RESERVES, MECHANICAL DECOMPACTION IS REQUIRED ON LANDINGS, MAJOR SKID TRAILS AND TEMPORARY ROADS. SEEDING AND SLASH COVER IS ALSO REQUIRED IN THESE AREAS
   N. NO TIMBER HARVEST ACTIVITIES SHALL OCCUR ON SLOPES EXCEEDING 30% WITHOUT THE AUTHORIZATION OF THE DISTRICT SOIL SCIENTIST OR HYDROLOGIST.
   O. A WILDLIFE BIOLOGIST MUST BE FULLY INVOLVED IN ALL TREE-REMOVAL PLANNING EFFORTS AND BE INVOLVED IN MAKING DECISIONS ON WHETHER INDIVIDUAL TREES ARE SUITABLE FOR NESTING OR HAVE OTHER IMPORTANT LISTED BIRD HABITAT VALUE.
   P. TREES CAN BE REMOVED TO A LEVEL NOT LESS THAN A RELATIVE DENSITY OF APPROXIMATELY 35, WHICH IS CONSIDERED AS FULLY OCCUPYING A SITE. THIS EQUATES TO APPROXIMATELY 60 TREES PER ACRE IN THE OVERSTORY AND A TREE SPACING AVERAGING 26 FEET. ADDITIONALLY, 40 PERCENT CANOPY COVER WOULD BE MAINTAINED IN NORTHERN SPOTTED OWL OR MARBLED MURRELET CRITICAL HABITAT WITHIN 300 FEET OF OCCUPIED OR UNSURVEY MURRELET NESTING STRUCTURE AND WHEN DISPERSAL HABITAT IS LIMITED IN THE AREA.
   Q. THE PROJECT MANAGER FOR AN AQUATIC RESTORATION ACTION PLANNED UNDER THIS PROJECT ENVIRONMENTAL ASSESSMENT WILL COORDINATE WITH AN ACTION-AGENCY WILDLIFE BIOLOGIST IN TREE REMOVAL PLANNING EFFORTS.
   R. IN NORTHERN SPOTTED OWL AND MARBLED MURRELET HABITAT, MEET THE FOLLOWING REQUIREMENTS: THE FOLLOWING PROJECT DESIGN CRITERIA APPLIES TO TREE REMOVAL WITHIN THE RANGE OF MARBLED MURRELETS AND THE NORTHERN SPOTTED OWL IN DOUGLAS-FIR DOMINATED STANDS LESS THAN 80 YEARS OLD THAT ARE NOT FUNCTIONING AS FORAGING HABITAT WITHIN A SPOTTED OWL HOME RANGE NOR DO THEY CONTAIN MURRELET NESTING STRUCTURE. IT DOES NOT APPLY TO TREE SELECTION IN OLDER STANDS OR HARDWOOD-DOMINATED STANDS UNLESS STATED OTHERWISE. THE PURPOSE OF THESE CRITERIA IS TO ENSURE THERE WOULD BE NO REMOVAL OR ADVERSE MODIFICATION OF SUITABLE HABITAT FOR MARBLED MURRELET OR NORTHERN SPOTTED OWL.
      1. A WILDLIFE BIOLOGIST MUST BE FULLY INVOLVED IN ALL TREE-REMOVAL PLANNING EFFORTS AND BE INVOLVED IN MAKING DECISIONS ON WHETHER INDIVIDUAL TREES ARE SUITABLE FOR NESTING OR HAVE OTHER IMPORTANT LISTED BIRD HABITAT VALUE.
      2. TREES CAN BE REMOVED TO A LEVEL NOT LESS THAN A RELATIVE DENSITY OF APPROXIMATELY 35, WHICH IS CONSIDERED AS FULLY OCCUPYING A SITE.
      3. THIS EQUATES TO APPROXIMATELY 60 TREES PER ACRE IN THE OVERSTORY AND A TREE SPACING AVERAGING 26 FEET.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL F. CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER — 11/30/2023 — EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT

ISSUED FOR CONSTRUCTION

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17"): REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

CONSERVATION MEASURES

DWG. NO.: G-006
CREATED: 11/30/2023
SHEET: 6 of 29

CONSTRUCTION AND POST CONSTRUCTION CONSERVATION MEASURES (CONTINUED).

4. ADDITIONALLY, 40 PERCENT CANOPY COVER WOULD BE MAINTAINED IN NORTHERN SPOTTED OWL OR MARBLED MURRELET CRITICAL HABITAT WITHIN 300 FEET OF OCCUPIED OR UNSURVEYED MURRELET NESTING STRUCTURE AND WHEN DISPERSAL HABITAT IS LIMITED IN THE AREA.TREES TO BE REMOVED CAN BE LIVE, HAZARD TREES, OR TREES KILLED THROUGH FIRE, INSECTS, DISEASE, BLOWDOWN, AND OTHER MEANS. DOWN TREES AND SNAGS SHOULD ONLY BE REMOVED IF THE STAND WILL RETAIN NORTHWEST FOREST PLAN STANDARDS POST REMOVAL.
5. TREES MAY BE REMOVED BY CABLE, GROUND-BASED EQUIPMENT, HORSES, OR HELICOPTERS. THEY MAY BE FELLED OR PUSHED OR PULLED DIRECTLY INTO A STREAM. TREES MAY BE STOCKPILED FOR FUTURE IN-STREAM RESTORATION PROJECTS.
6. TREE SPECIES REMOVED SHOULD BE RELATIVELY COMMON IN THE STAND (NOT MINOR TREE SPECIES).
7. SNAGS AND TREES WITH BROAD, DEEP CROWNS ("WOLF" TREES), DAMAGED TOPS, OR OTHER ABNORMALITIES THAT MAY PROVIDE A VALUABLE WILDLIFE HABITAT COMPONENT SHOULD BE RESERVED.
8. NO GAPS (OPENINGS) GREATER THAN 0.5 ACRE WILL BE CREATED IN SPOTTED OWL CRITICAL HABITAT. NO GAPS GREATER THAN ¼ ACRE WILL BE CREATED IN MURRELET CRITICAL HABITAT. NO GAPS SHALL BE CREATED IN RIPARIAN RESERVES THAT CONTAIN FEDERALLY LISTED FISH HABITAT.

7. ENGINEERED LOG JAM DESIGN

A. FOR ELJS THAT OCCUPY >25% OF THE BANKFULL AREA, THE ACTION AGENCIES WILL ENSURE THAT THE ACTION IS INDIVIDUALLY REVIEWED AND APPROVED BY NMFS FOR CONSISTENCY WITH CRITERIA IN *ANADROMOUS SALMONID PASSAGE FACILITY DESIGN.*
B. ELJS WILL BE PATTERNED, TO THE GREATEST DEGREE POSSIBLE, AFTER STABLE NATURAL LOG JAMS.
C. GRADE CONTROL ELJS ARE DESIGNED TO ARREST CHANNEL DOWN-CUTTING OR INCISION BY PROVIDING A GRADE CONTROL THAT RETAINS SEDIMENT, LOWERS STREAM ENERGY, AND INCREASES WATER ELEVATIONS TO RECONNECT FLOODPLAIN HABITAT AND DIFFUSE DOWNSTREAM FLOOD PEAKS.
D. STABILIZING OR KEY PIECES OF LW THAT WILL BE RELIED ON TO PROVIDE STREAMBANK STABILITY OR REDIRECT FLOWS MUST BE INTACT AND SOLID (LITTLE DECAY). IF POSSIBLE, ACQUIRE LW WITH UNTRIMMED ROOTWADS TO PROVIDE FUNCTIONAL REFUGIA HABITAT FOR FISH.
E. WHEN AVAILABLE, TREES WITH ROOTWADS ATTACHED SHOULD BE A MINIMUM LENGTH OF 1.5 TIMES THE BANKFULL CHANNEL WIDTH, WHILE LOGS WITHOUT ROOTWADS SHOULD BE A MINIMUM OF 2.0 TIMES THE BANKFULL WIDTH.
F. THE PARTIAL BURIAL OF LW AND BOULDERS MAY CONSTITUTE THE DOMINANT MEANS OF PLACEMENT, AND KEY BOULDERS (FOOTINGS) OR LW CAN BE BURIED INTO THE STREAM BANK OR CHANNEL.
G. ANGLE AND OFFSET - THE LW PORTIONS OF ENGINEERED LOG JAM STRUCTURES SHOULD BE ORIENTED SUCH THAT THE FORCE OF WATER UPON THE LW INCREASES STABILITY. IF A ROOTWAD IS LEFT EXPOSED TO THE FLOW, THE BOLE PLACED INTO THE STREAMBANK SHOULD BE ORIENTED DOWNSTREAM PARALLEL TO THE FLOW DIRECTION SO THE PRESSURE ON THE ROOTWAD PUSHES THE BOLE INTO THE STREAMBANK AND BED. WOOD MEMBERS THAT ARE ORIENTED PARALLEL TO FLOW ARE MORE STABLE THAN MEMBERS ORIENTED AT 45 OR 90 DEGREES TO THE FLOW.
H. IF LW ANCHORING IS REQUIRED, A VARIETY OF METHODS MAY BE USED. THESE INCLUDE BUTTRESSING THE WOOD BETWEEN RIPARIAN TREES, THE USE OF MANILA, SISAL OR OTHER BIODEGRADABLE ROPES FOR LASHING CONNECTIONS. IF HYDRAULIC CONDITIONS WARRANT THE USE OF STRUCTURAL CONNECTIONS, REBAR PINNING OR BOLTED CONNECTIONS MAY BE USED. ROCK MAY BE USED FOR BALLAST BUT IS LIMITED TO THAT NEEDED TO ANCHOR THE LW.
I. STRUCTURE TYPES SHALL SIMULATE DISTURBANCE EVENTS TO THE GREATEST DEGREE POSSIBLE AND INCLUDE, BUT ARE NOT LIMITED TO, LOG JAMS, DEBRIS FLOWS, WIND-THROW, AND TREE BREAKAGE.
J. PROJECTS CAN INCLUDE GRADE CONTROL AND BANK STABILIZATION STRUCTURES, WHILE SIZE AND CONFIGURATION OF SUCH STRUCTURES WILL BE COMMENSURATE WITH SCALE OF PROJECT SITE AND HYDRAULIC FORCES.
K. PLACE LARGE WOOD AND BOULDERS IN AREAS WHERE THEY WOULD NATURALLY OCCUR AND IN A MANNER CONSISTENT WITH CHANNEL, VALLEY, AND FOREST TYPE. FOR EXAMPLE, BOULDER PLACEMENT MAY NOT BE APPROPRIATE IN LOW-GRADIENT MEADOW STREAMS.
L. THE SIZE OR SHAPE OF LARGE WOOD AND BOULDER STRUCTURES MUST BE WITHIN THE RANGE OF NATURAL VARIABILITY OF A GIVEN LOCATION AND SHOULD NOT BLOCK PASSAGE OF FISH AND OTHER AQUATIC ORGANISMS.
M. THE PARTIAL BURIAL OF LARGE WOOD AND BOULDERS IS PERMITTED AND MAY CONSTITUTE THE DOMINANT MEANS OF PLACEMENT. THIS APPLIES TO ALL STREAM SYSTEMS BUT MORE SO FOR LARGER STREAM SYSTEMS WHERE USE OF ADJACENT RIPARIAN TREES OR CHANNEL FEATURES IS NOT FEASIBLE OR DOES NOT PROVIDE THE FULL STABILITY DESIRED.
N. LARGE WOOD INCLUDES WHOLE CONIFER AND HARDWOOD TREES, LOGS, AND ROOTWADS. LARGE WOOD SIZE (DIAMETER AND LENGTH) SHOULD ACCOUNT FOR BANKFULL WIDTH AND STREAM DISCHARGE RATES. WHEN AVAILABLE, TREES WITH ROOTWADS SHOULD BE A MINIMUM OF 1.5 TIMES BANKFULL CHANNEL WIDTH, WHILE LOGS WITHOUT ROOTWADS SHOULD BE A MINIMUM OF 2.0 TIMES BANKFULL WIDTH.
O. STRUCTURES MAY PARTIALLY OR COMPLETELY SPAN STREAM CHANNELS OR BE POSITIONED ALONG STREAM BANKS.
P. STABILIZING OR KEY PIECES OF LARGE WOOD MUST BE INTACT, HARD, WITH LITTLE DECAY, AND, IF POSSIBLE, HAVE ROOTWADS (UNTRIMMED) TO PROVIDE FUNCTIONAL REFUGIA HABITAT FOR FISH. CONSIDER ORIENTING KEY PIECES SUCH THAT THE HYDRAULIC FORCES UPON THE LARGE WOOD INCREASE STABILITY.
Q. ANCHORING LARGE WOOD - ANCHORING ALTERNATIVES MAY BE USED IN PREFERENTIAL ORDER:
   1. USE OF ADEQUATE SIZED WOOD SUFFICIENT FOR STABILITY.
   2. ORIENT AND PLACE WOOD IN SUCH A WAY THAT MOVEMENT IS LIMITED.
   3. BALLAST (GRAVEL, ROCK, OR BOTH) TO INCREASE THE MASS OF THE STRUCTURE TO RESIST MOVEMENT.
   4. USE OF LARGE BOULDERS AS ANCHOR POINTS FOR THE LARGE WOOD.
   5. PIN LARGE WOOD WITH REBAR TO LARGE ROCKS TO INCREASE ITS WEIGHT FOR STREAMS THAT ARE ENTRENCHED (ROSGEN F, G, A, AND POTENTIALLY B) OR FOR OTHER STREAMS WITH VERY LOW WIDTH- TO-DEPTH RATIOS (LESS THAN 12), AN ADDITIONAL 60 PERCENT BALLAST WEIGHT MAY BE NECESSARY DUE TO GREATER FLOW DEPTHS AND HIGHER VELOCITIES.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL E CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER
EXPIRES: 09/16/2024
11/30/2023

WALLA WALLA COUNTY CONSERVATION DISTRICT

ISSUED FOR CONSTRUCTION

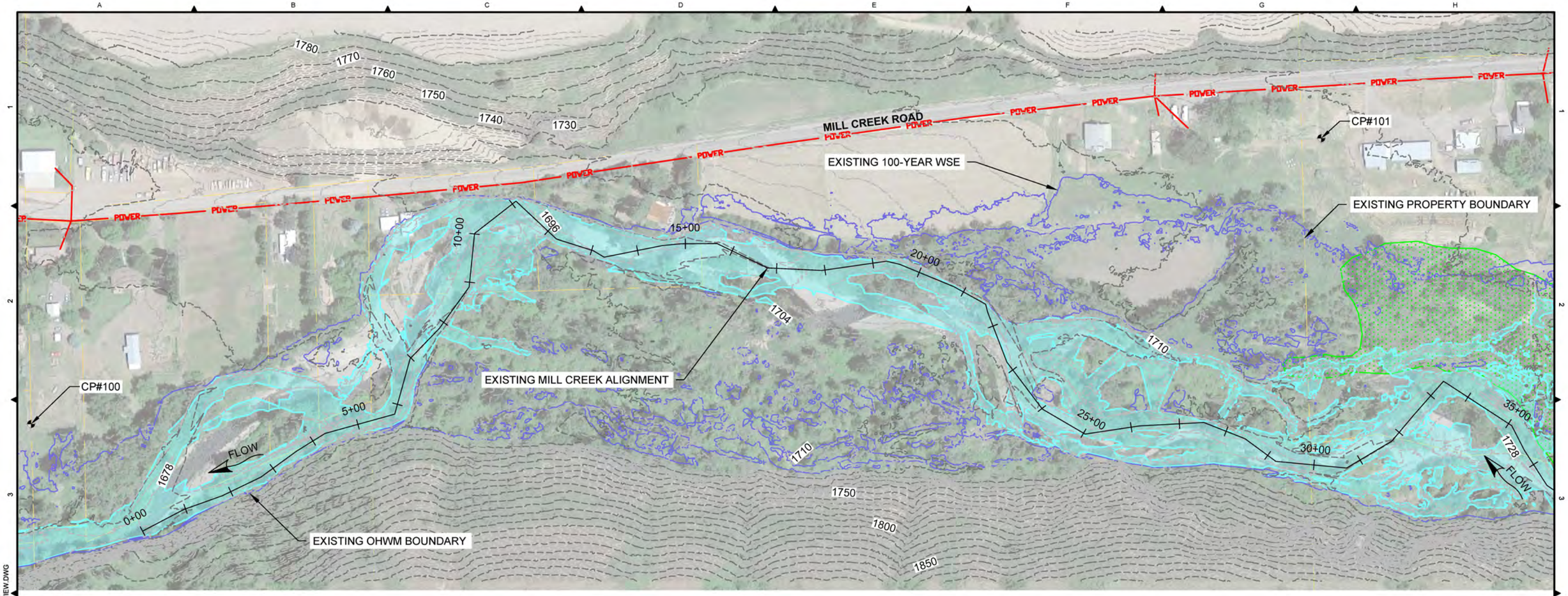
PLAN SHEET SIZE ANSI B (11" X 17")

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

CONSERVATION MEASURES

DWG. NO: G-007
CREATED: 11/30/2023
SHEET: 7 of 29



MILL CREEK CONTROL POINTS				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
100	272739.43	2235885.50	1685.82	CP
101	270074.69	2236475.57	1728.33	CP
102	268688.65	2236522.46	1751.30	CP

NOTES:
1. ACCESS VIA MILL CREEK ROAD.
2. CP-102 NOT SHOWN IN OVERVIEW EXTENTS.

LEGEND:

- 10' EXISTING CONTOUR
- 2' EXISTING CONTOUR
- EXISTING ALIGNMENT
- EXISTING OVERHEAD POWERLINE
- EXISTING ROAD
- PROPERTY BOUNDARY
- EXISTING 100-YEAR WSE
- EXISTING OHWM
- EXISTING DELINEATED WETLANDS
- SURVEYED CONTROL POINT

0' 100' 200' 400'

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER — 11/30/2023 — EXPIRES: 06/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

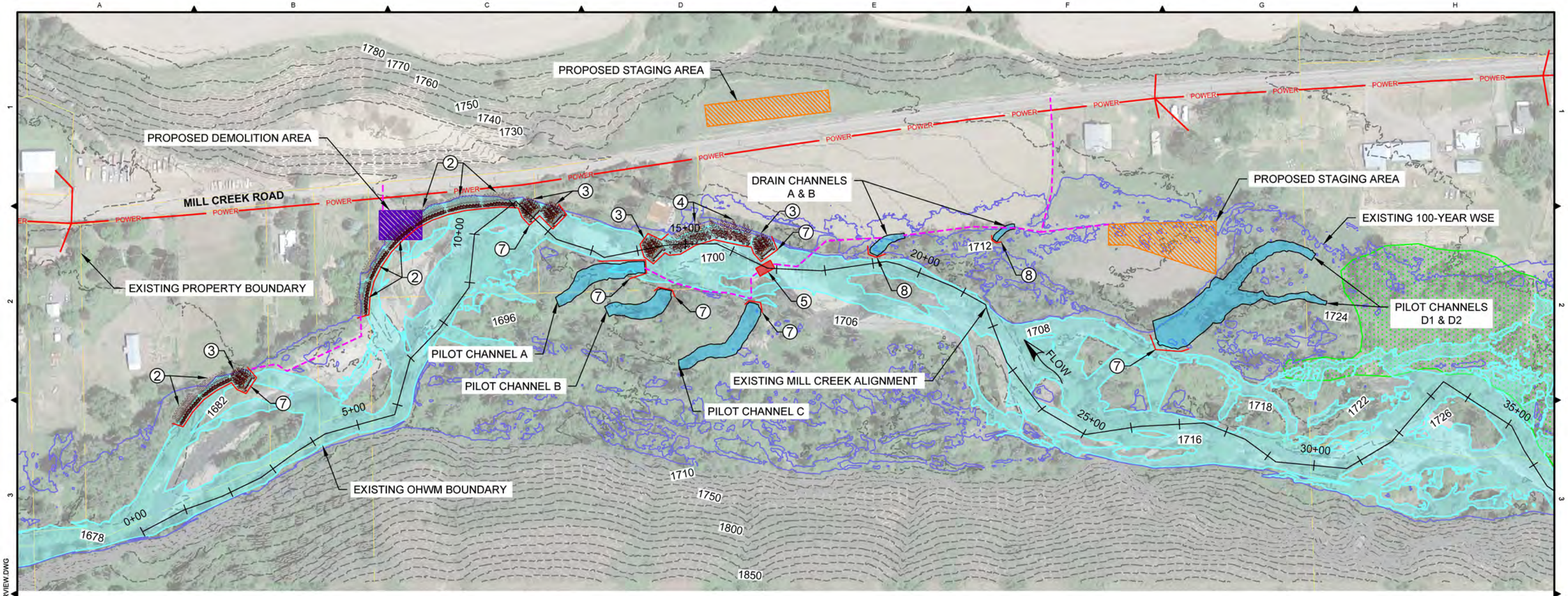
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

GENERAL OVERVIEW
EXISTING CONDITIONS

DWG. NO.: E-101
CREATED: 11/30/2023
SHEET: 8 of 29

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\02_EXISTING OVERVIEW.DWG
PLOT DETAILS: DEEP, ALEXA — December 1, 2023 — 10:25 AM



LEGEND:

- 10' EXISTING CONTOUR
- 2' EXISTING CONTOUR
- EXISTING ALIGNMENT
- EXISTING OVERHEAD POWERLINE
- EXISTING ROAD
- PROPERTY BOUNDARY
- EXISTING 100-YEAR WSE
- EXISTING OHWM
- EXISTING DELINEATED WETLANDS
- PROPOSED ACCESS ROUTE
- PROPOSED EROSION CONTROLS
- PROPOSED DEMOLITION AREA
- PROPOSED STAGING AREA
- PROPOSED TEMPORARY CROSSING
- PROPOSED EXCAVATION
- PROPOSED LARGE WOOD

NOTES:

1. SITE ACCESS VIA MILL CREEK ROAD AND TEMPORARY ACCESS ROUTES THROUGH PRIVATE PROPERTY SUBJECT TO LANDOWNER AGREEMENT.
2. PROPOSED REVETMENT LOG STRUCTURE - SEE SHEETS C-301 TO C-302 FOR DETAILS.
3. PROPOSED LOG JAM STRUCTURE - SEE SHEET C-303 FOR DETAILS.
4. PROPOSED 22-LOG BANK HABITAT STRUCTURE - SEE SHEET C-304 FOR DETAILS.
5. PROPOSED TEMPORARY CROSSING - SEE SHEET C-401 FOR DETAILS.
6. CONTRACTOR SHALL IMPLEMENT AND MAINTAIN TEMPORARY TRAFFIC CONTROL THROUGHOUT CONSTRUCTION.
7. INSTALL TEMPORARY COFFERDAMS TO ISOLATE AND DEWATER AREAS. SEE SHEETS C-401 TO C-402 FOR DETAILS.
8. INSTALL SILT FENCE OR EQUIVALENT. SEE DETAILS ON SHEET C-401.

0' 100' 200' 400'

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

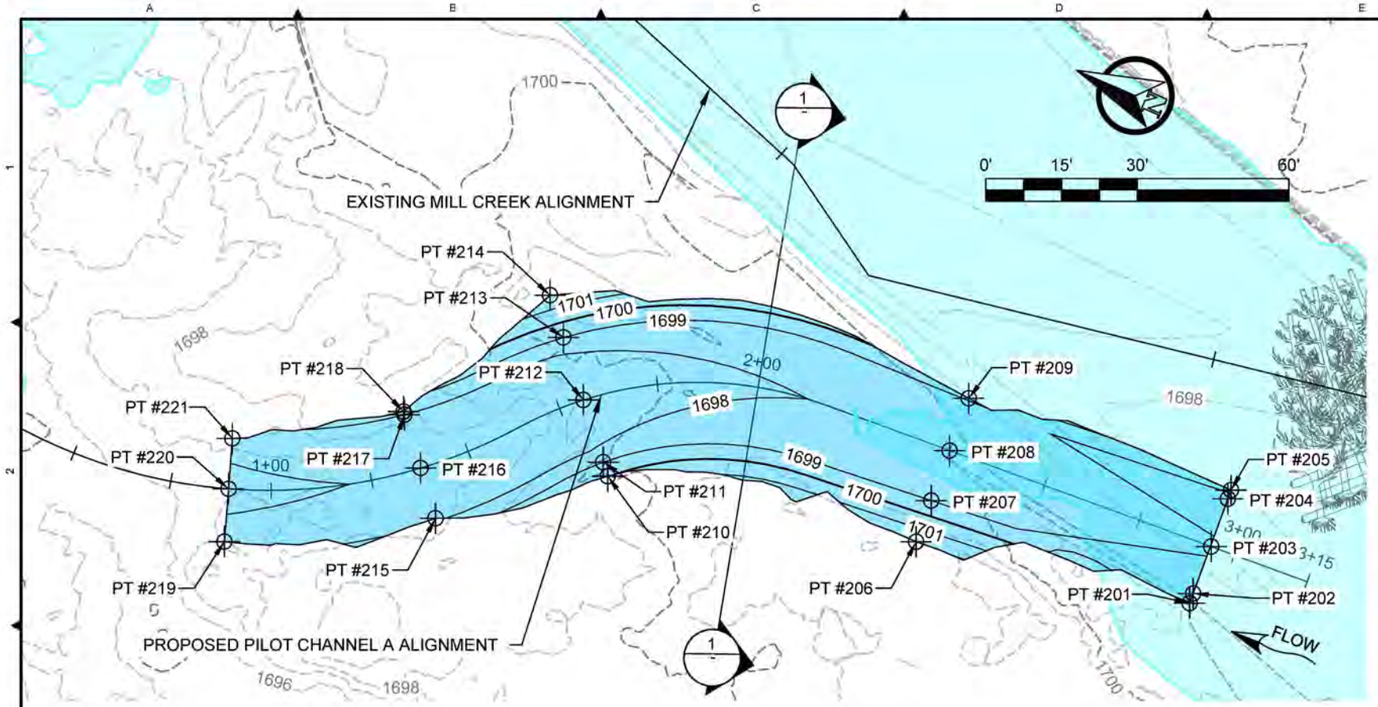
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

GENERAL OVERVIEW
PROPOSED CONDITIONS

DWG. NO.: C-101
CREATED: 11/30/2023
SHEET: 9 of 29

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\03_PROPOSED OVERVIEW.DWG
PLOT DETAILS: DEEP, ALEXA December 1, 2023 10:28 AM

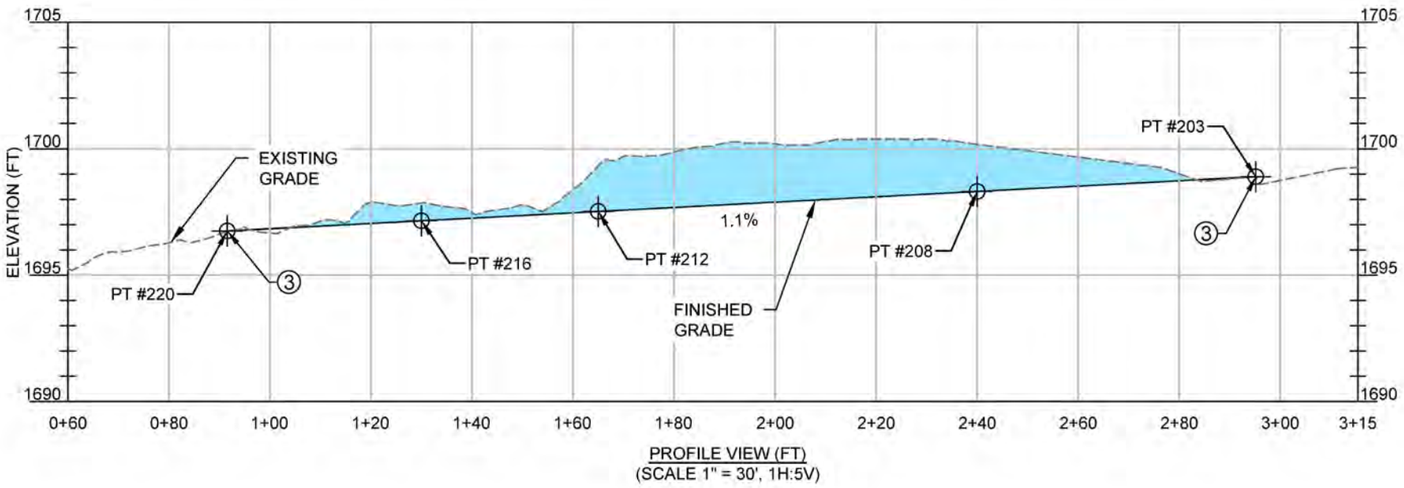


NOTES:

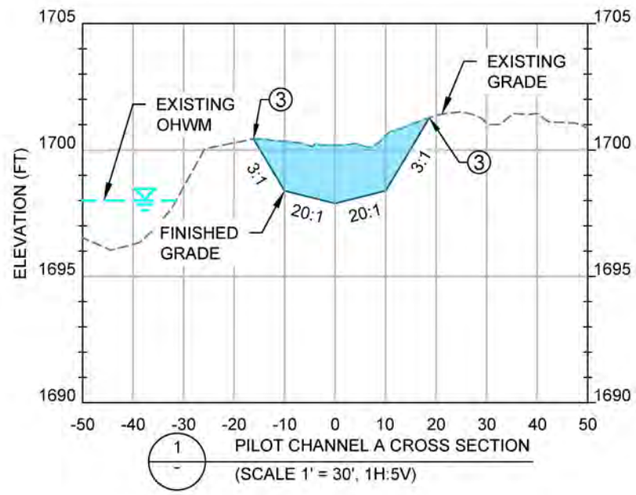
1. INSTALL COFFERDAMS AND WATER BYPASS MEASURES AT UPSTREAM AND DOWNSTREAM LIMITS OF DISTURBANCE TO ISOLATE AND DEWATER EARTHWORK AREAS, SEE SHEET C-402. FISH SALVAGE SHALL BE PERFORMED BY A QUALIFIED FISH BIOLOGIST, REWATER WORK AREAS UPON COMPLETION. SEE SHEET C-402 FOR DETAILS.
2. EXCAVATE PILOT CHANNEL TO THE EXTENTS AND ELEVATIONS SHOWN ON THE PLANS.
3. DAYLIGHT PROPOSED CHANNEL FILL TO MATCH EXISTING GRADE.

LEGEND

- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- EXISTING OHWM
- PROPOSED CHANNEL ALIGNMENT
- PROPOSED CHANNEL EXCAVATION
- PROPOSED 1' CONTOUR
- PROPOSED 5' CONTOUR
- PROPOSED CONSTRUCTION POINT
- PROPOSED LWD



PROFILE VIEW (FT)
(SCALE 1" = 30', 1H:5V)



1 / - PILOT CHANNEL A CROSS SECTION
(SCALE 1' = 30', 1H:5V)

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 06/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

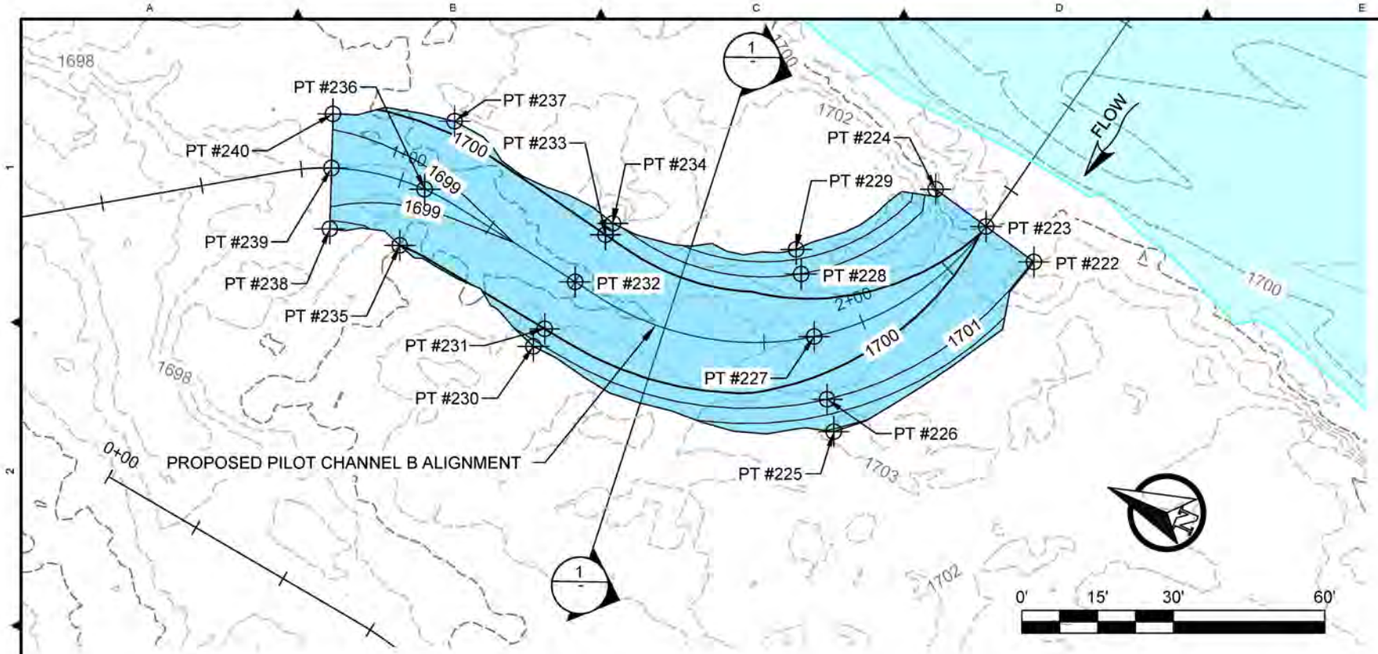
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A.	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

PROPOSED CONDITIONS
PILOT CHANNEL A

DWG. NO.: C-201
CREATED: 11/30/2023
SHEET: 10 of 29

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\04_PROPOSED CONDITIONS_PILOT CHANNELS.DWG
PLOT DETAILS: DEEP_ALEXA December 1, 2023 10:37 AM

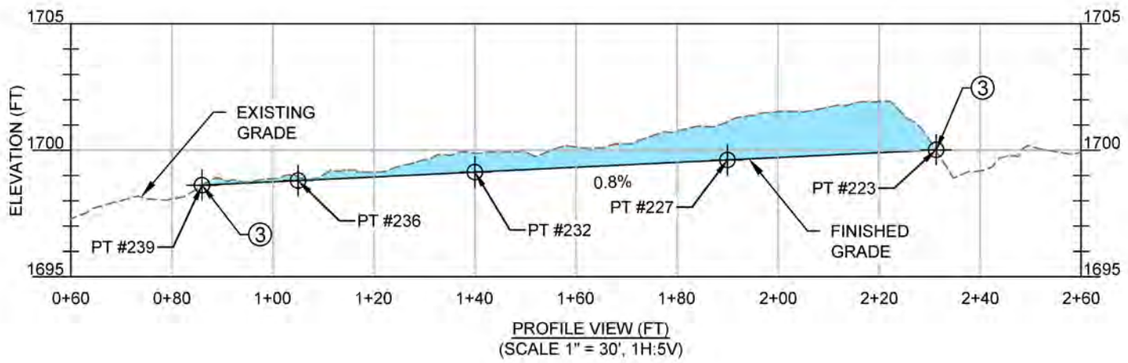


NOTES:

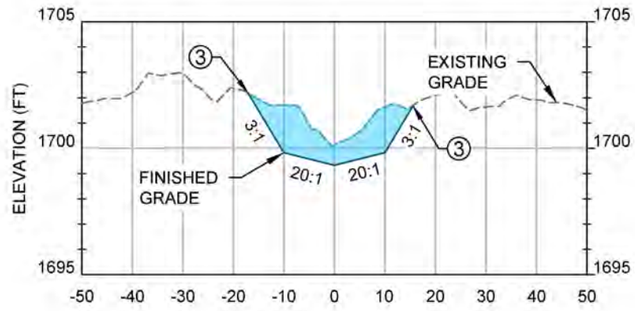
1. INSTALL COFFERDAMS AND WATER BYPASS MEASURES AT UPSTREAM AND DOWNSTREAM LIMITS OF DISTURBANCE TO ISOLATE AND DEWATER EARTHWORK AREAS, SEE SHEET C-402. FISH SALVAGE SHALL BE PERFORMED BY A QUALIFIED FISH BIOLOGIST, REWATER WORK AREAS UPON COMPLETION. SEE SHEET C-402 FOR DETAILS.
2. EXCAVATE PILOT CHANNEL TO THE EXTENTS AND ELEVATIONS SHOWN ON THE PLANS.
3. DAYLIGHT PROPOSED CHANNEL FILL TO MATCH EXISTING GRADE.

LEGEND

- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- EXISTING OHWM
- PROPOSED CHANNEL ALIGNMENT
- PROPOSED CHANNEL EXCAVATION
- PROPOSED 1' CONTOUR
- PROPOSED 5' CONTOUR
- PROPOSED CONSTRUCTION POINT



PROFILE VIEW (FT)
(SCALE 1" = 30', 1H:5V)



1/- PILOT CHANNEL B CROSS SECTION
(SCALE 1' = 30', 1H:5V)

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

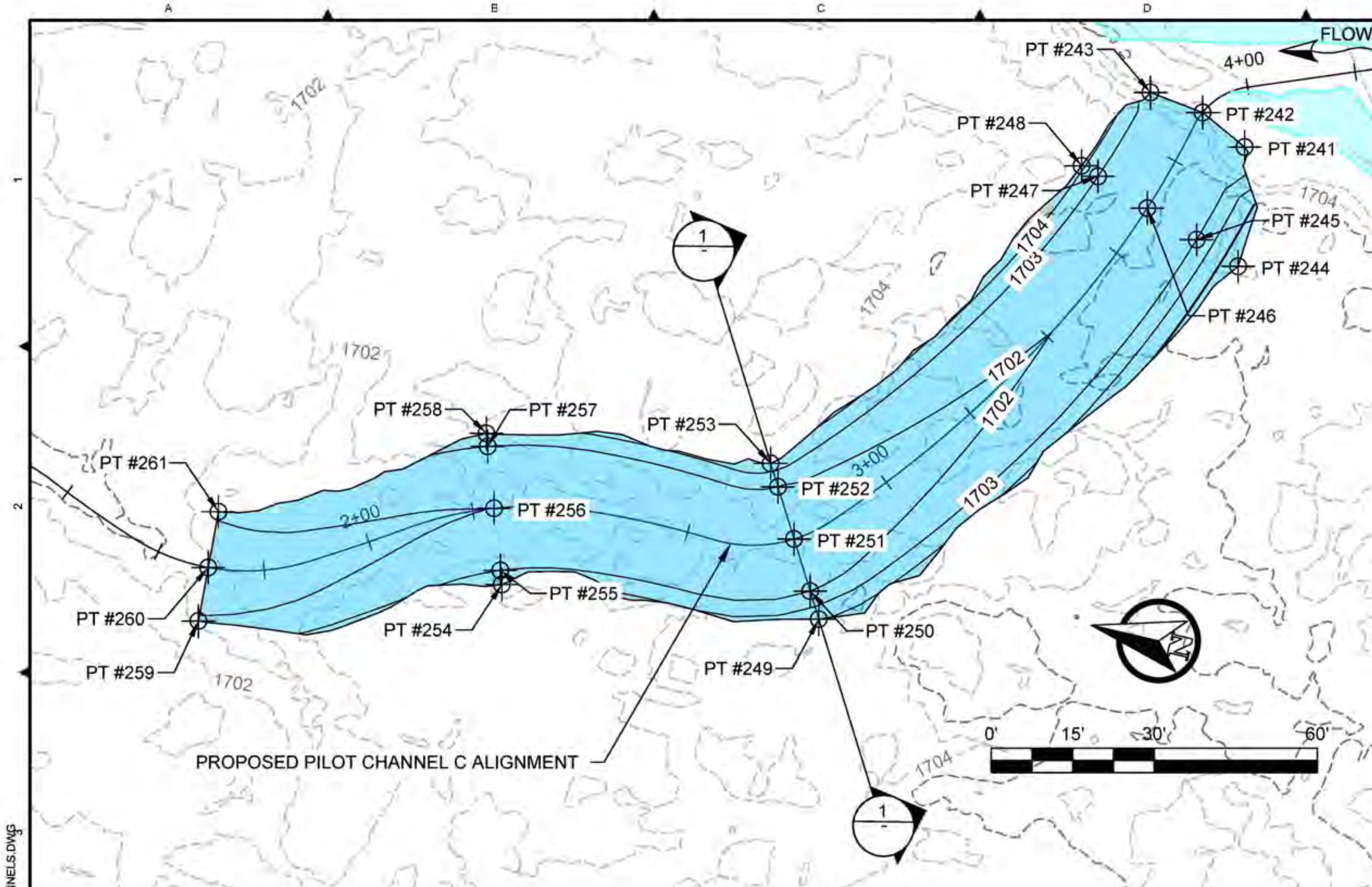
ISSUED FOR CONSTRUCTION

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
A.	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM
17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

PROPOSED CONDITIONS
PILOT CHANNEL B

DWG. NO.: C-202
CREATED: 11/30/2023
SHEET: 11 of 29

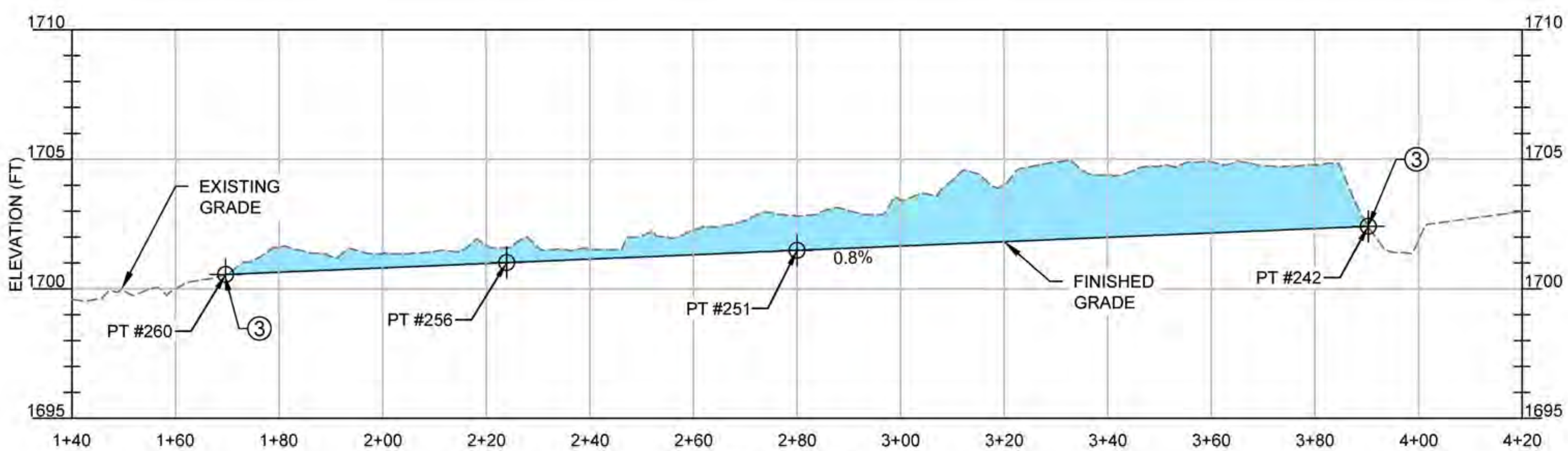


NOTES:

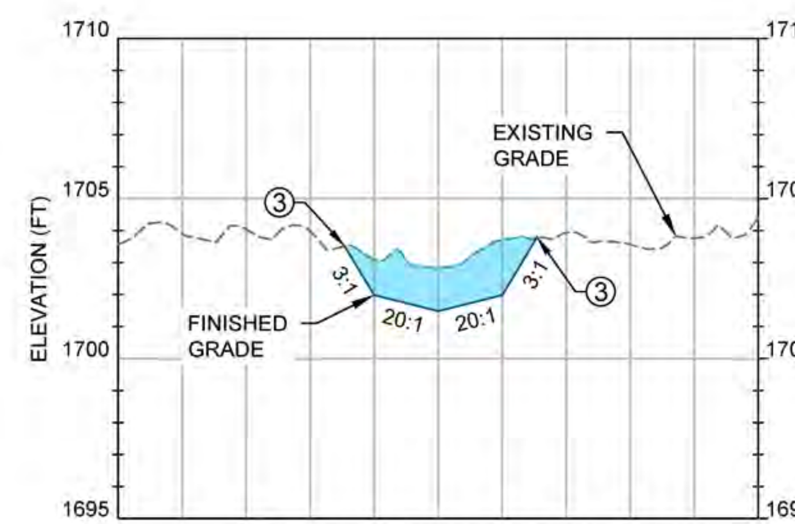
1. INSTALL COFFERDAMS AND WATER BYPASS MEASURES AT UPSTREAM AND DOWNSTREAM LIMITS OF DISTURBANCE TO ISOLATE AND DEWATER EARTHWORK AREAS, SEE SHEET C-402. FISH SALVAGE SHALL BE PERFORMED BY A QUALIFIED FISH BIOLOGIST, REWATER WORK AREAS UPON COMPLETION. SEE SHEET C-402 FOR DETAILS.
2. EXCAVATE PILOT CHANNEL TO THE EXTENTS AND ELEVATIONS SHOWN ON THE PLANS.
3. DAYLIGHT PROPOSED CHANNEL FILL TO MATCH EXISTING GRADE.

LEGEND

- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- EXISTING OHWM
- PROPOSED CHANNEL ALIGNMENT
- PROPOSED CHANNEL EXCAVATION
- PROPOSED 1' CONTOUR
- PROPOSED 5' CONTOUR
- PROPOSED CONSTRUCTION POINT



PROFILE VIEW (FT)
(SCALE 1" = 30', 1H:5V)



PILOT CHANNEL C CROSS SECTION
(SCALE 1' = 30', 1H:5V)

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P CAMERON, STATE OF WASHINGTON, 55550, REGISTERED PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 06/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

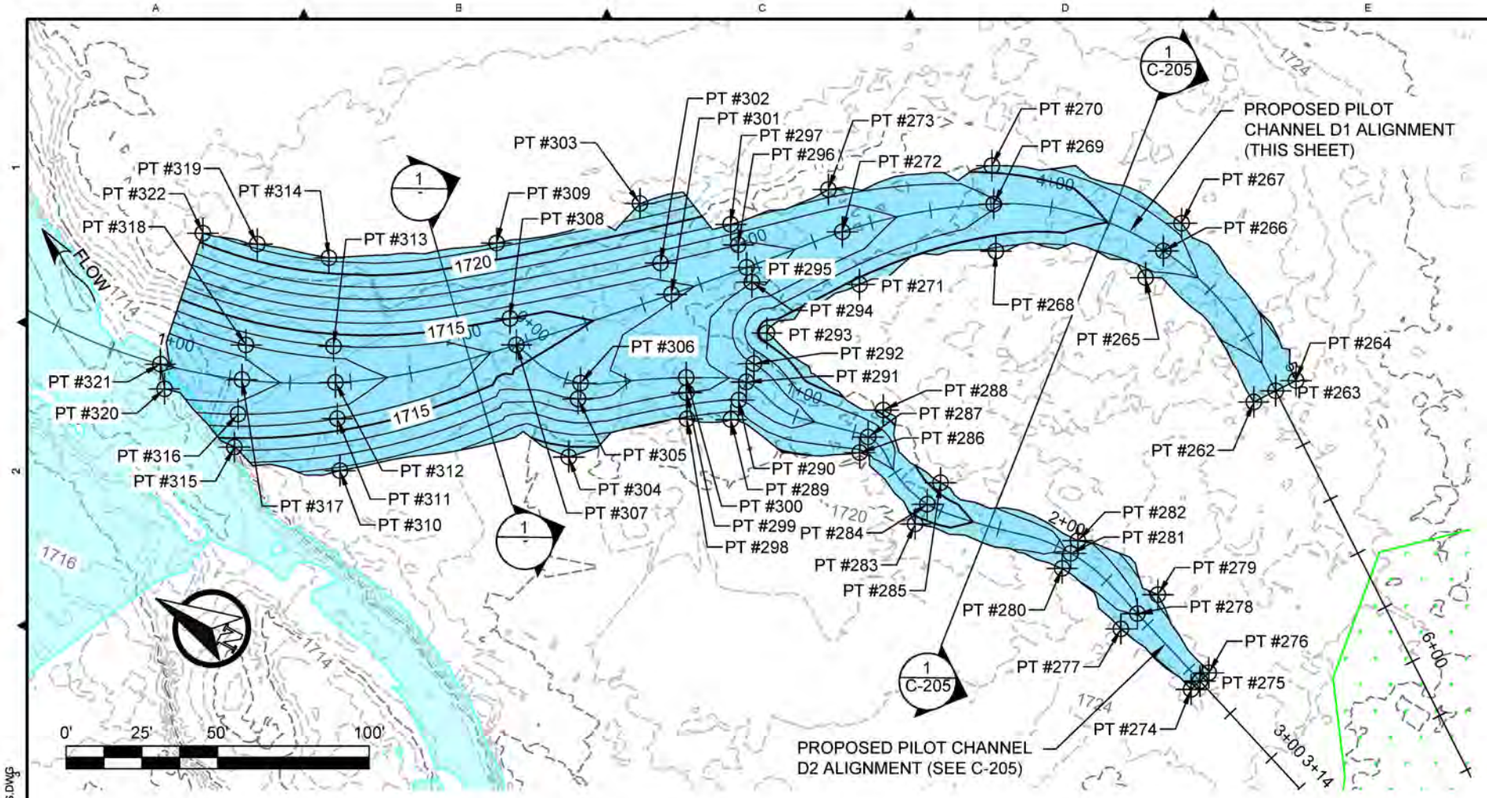
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

PROPOSED CONDITIONS
PILOT CHANNEL C

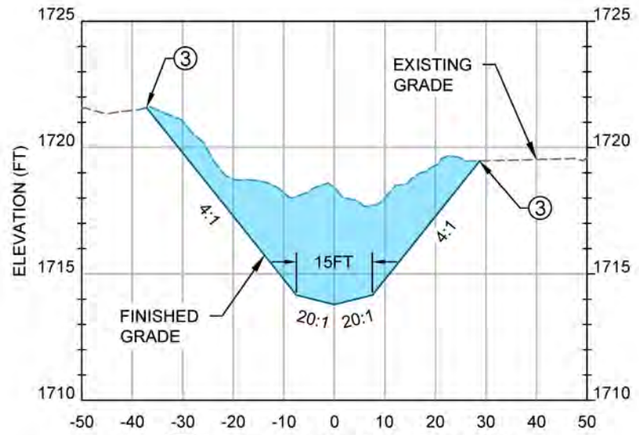
DWG. NO.: C-203
CREATED: 11/30/2023
SHEET: 12 of 29

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\04_PROPOSED CONDITIONS_PILOT CHANNELS.DWG
PLOT DETAILS, DEEP, ALEXA December 1, 2023 10:38 AM

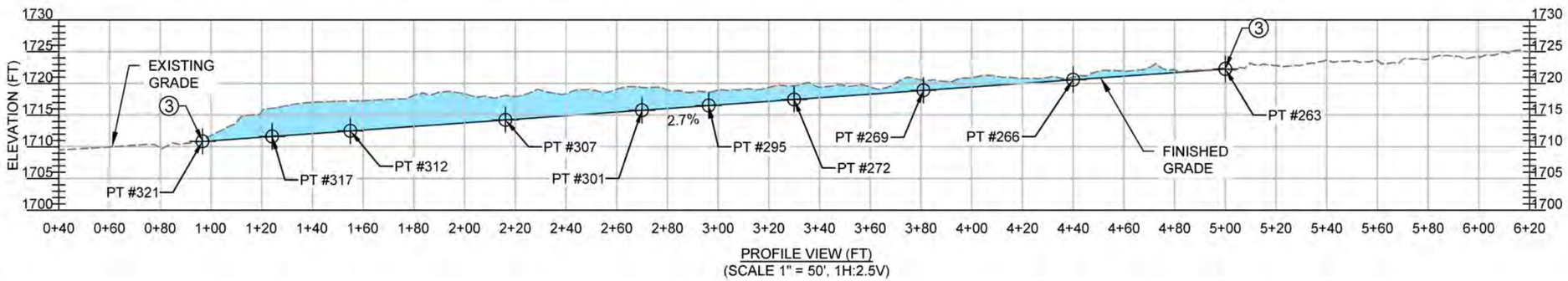


NOTES:

1. INSTALL COFFERDAMS AND WATER BYPASS MEASURES AT UPSTREAM AND DOWNSTREAM LIMITS OF DISTURBANCE TO ISOLATE AND DEWATER EARTHWORK AREAS, SEE SHEET C-402. FISH SALVAGE SHALL BE PERFORMED BY A QUALIFIED FISH BIOLOGIST, REWATER WORK AREAS UPON COMPLETION. SEE SHEET C-402 FOR DETAILS.
2. EXCAVATE PILOT CHANNEL TO THE EXTENTS AND ELEVATIONS SHOWN ON THE PLANS.
3. DAYLIGHT PROPOSED CHANNEL FILL TO MATCH EXISTING GRADE.



1 - PILOT CHANNEL D1 CROSS SECTION
(SCALE 1' = 30', 1H:5V)



PROFILE VIEW (FT)
(SCALE 1" = 50', 1H:2.5V)

LEGEND

- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- EXISTING OHWM
- PROPOSED CHANNEL ALIGNMENT
- PROPOSED CHANNEL EXCAVATION
- PROPOSED 1' CONTOUR
- PROPOSED 5' CONTOUR
- EXISTING DELINEATATED WETLANDS
- PROPOSED CONSTRUCTION POINT

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

ISSUED FOR CONSTRUCTION

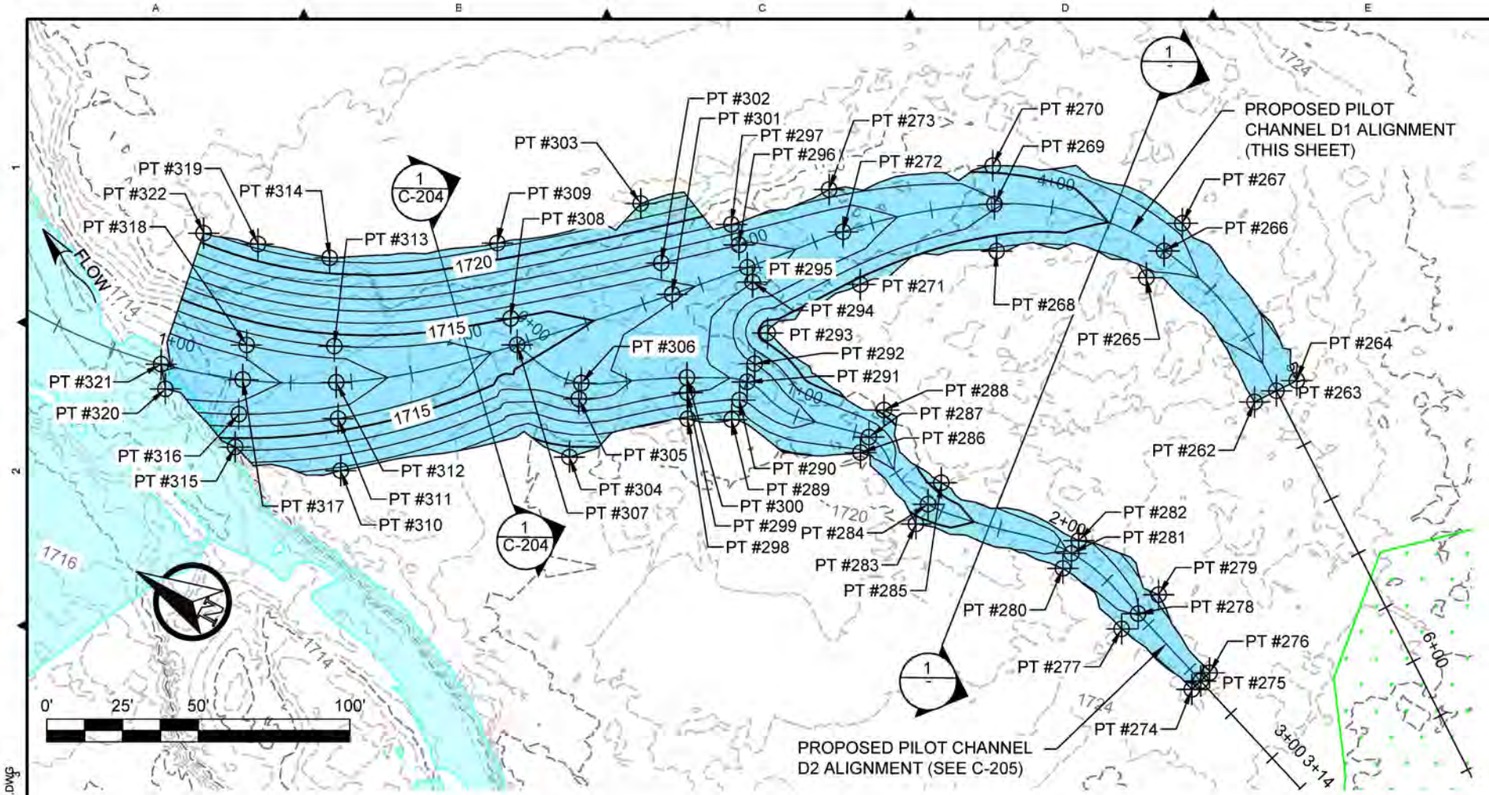
PLAN SHEET SIZE ANSI B (11" X 17")						
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

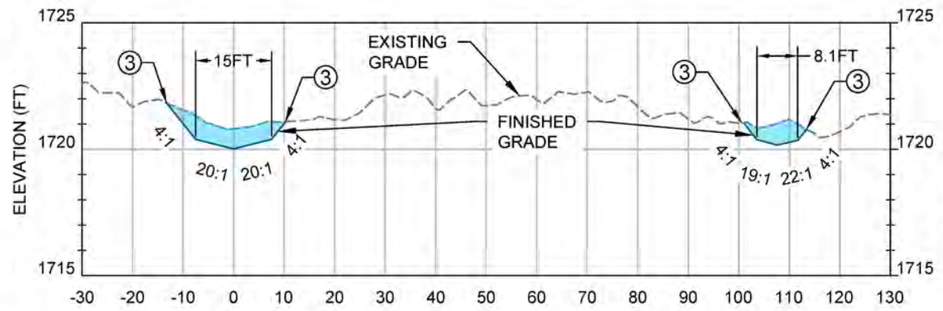
PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

PROPOSED CONDITIONS
PILOT CHANNELS D1 & D2

DWG. NO.: C-204
CREATED: 11/30/2023
SHEET: 13 of 29

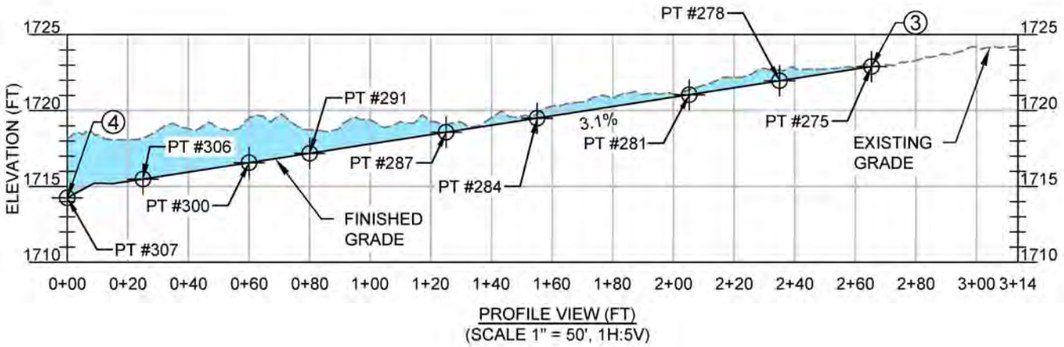
Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\04_PROPOSED CONDITIONS_PILOT CHANNELS.DWG
PLOT DETAILS: DEEP, ALEXA December 1, 2023 10:39 AM





1 — PILOT CHANNELS D1 & D2 CROSS SECTION
(SCALE 1' = 30', 1H:5V)

NOTES:
1. INSTALL COFFERDAMS AND WATER BYPASS MEASURES AT UPSTREAM AND DOWNSTREAM LIMITS OF DISTURBANCE TO ISOLATE AND DEWATER EARTHWORK AREAS, SEE SHEET C-402. FISH SALVAGE SHALL BE PERFORMED BY A QUALIFIED FISH BIOLOGIST, REWATER WORK AREAS UPON COMPLETION. SEE SHEET C-402 FOR DETAILS.
2. EXCAVATE PILOT CHANNEL TO THE EXTENTS AND ELEVATIONS SHOWN ON THE PLANS.
3. DAYLIGHT PROPOSED CHANNEL FILL TO MATCH EXISTING GRADE.
4. TIE INTO PILOT CHANNEL D1 ALIGNMENT (SEE SHEET C-204).



PROFILE VIEW (FT)
(SCALE 1" = 50', 1H:5V)

LEGEND
- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- EXISTING OHWM
- PROPOSED CHANNEL ALIGNMENT
- PROPOSED CHANNEL EXCAVATION
- PROPOSED 1' CONTOUR
- PROPOSED 5' CONTOUR
- EXISTING DELINEATATED WETLANDS
- PROPOSED CONSTRUCTION POINT

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 06/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM
17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

PROPOSED CONDITIONS
PILOT CHANNELS D1 & D2

DWG. NO.: C-205
CREATED: 11/30/2023
SHEET: 14 of 29

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\04_PROPOSED CONDITIONS_PILOT CHANNELS_PILOT DETAILS_DEEP_ALEXA December 1, 2023 10:39 AM

CONSTRUCTION POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
201	271470.8FT	2236198.3FT	1700.1FT	DAYLIGHT
202	271471.0FT	2236200.3FT	1699.4FT	TOE
203	271471.7FT	2236210.3FT	1698.9FT	CENTERLINE
204	271472.7FT	2236220.2FT	1699.4FT	TOE
205	271472.9FT	2236222.0FT	1698.8FT	DAYLIGHT
206	271525.0FT	2236186.4FT	1701.9FT	DAYLIGHT
207	271525.8FT	2236195.1FT	1699.0FT	TOE
208	271526.7FT	2236205.6FT	1698.3FT	CENTERLINE
209	271527.6FT	2236216.6FT	1699.2FT	DAYLIGHT
210	271585.9FT	2236172.4FT	1700.0FT	DAYLIGHT
211	271587.8FT	2236174.5FT	1699.0FT	TOE
212	271596.6FT	2236184.0FT	1697.5FT	CENTERLINE
213	271605.4FT	2236193.5FT	1699.0FT	TOE
214	271611.3FT	2236200.0FT	1701.9FT	DAYLIGHT
215	271613.2FT	2236150.4FT	1697.8FT	DAYLIGHT
216	271620.1FT	2236158.2FT	1697.2FT	CENTERLINE
217	271627.5FT	2236166.4FT	1698.0FT	TOE
218	271627.9FT	2236166.9FT	1698.2FT	DAYLIGHT
219	271649.2FT	2236128.6FT	1697.1FT	DAYLIGHT
220	271652.8FT	2236138.4FT	1696.7FT	CENTERLINE
221	271656.4FT	2236147.8FT	1697.3FT	DAYLIGHT
222	271416.6FT	2236161.3FT	1701.1FT	DAYLIGHT
223	271428.2FT	2236163.6FT	1700.0FT	CENTERLINE
224	271440.3FT	2236166.1FT	1699.7FT	DAYLIGHT
225	271438.4FT	2236114.1FT	1703.2FT	DAYLIGHT
226	271442.3FT	2236119.4FT	1701.0FT	TOE
227	271449.8FT	2236129.5FT	1699.6FT	CENTERLINE
228	271457.4FT	2236139.6FT	1701.0FT	TOE
229	271460.3FT	2236143.6FT	1702.7FT	DAYLIGHT
230	271499.4FT	2236104.3FT	1701.4FT	DAYLIGHT

CONSTRUCTION POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
231	271498.8FT	2236108.3FT	1700.0FT	TOE
232	271497.3FT	2236119.3FT	1699.1FT	CENTERLINE
233	271495.8FT	2236130.3FT	1700.0FT	TOE
234	271495.4FT	2236133.0FT	1700.9FT	DAYLIGHT
235	271531.8FT	2236111.2FT	1700.0FT	DAYLIGHT
236	271532.0FT	2236123.3FT	1698.8FT	CENTERLINE
237	271532.3FT	2236138.0FT	1700.9FT	DAYLIGHT
238	271545.7FT	2236108.3FT	1698.5FT	DAYLIGHT
239	271550.5FT	2236119.3FT	1698.6FT	CENTERLINE
240	271554.7FT	2236129.1FT	1699.4FT	DAYLIGHT
241	271237.3FT	2236132.3FT	1702.9FT	DAYLIGHT
242	271246.4FT	2236136.4FT	1702.4FT	CENTERLINE
243	271256.7FT	2236137.5FT	1702.9FT	DAYLIGHT
244	271232.8FT	2236110.9FT	1706.0FT	DAYLIGHT
245	271241.5FT	2236113.6FT	1703.0FT	TOE
246	271251.7FT	2236116.9FT	1702.2FT	CENTERLINE
247	271262.0FT	2236120.1FT	1703.0FT	TOE
248	271265.4FT	2236121.2FT	1704.2FT	DAYLIGHT
249	271290.5FT	2236028.2FT	1703.8FT	DAYLIGHT
250	271293.4FT	2236032.8FT	1702.0FT	TOE
251	271298.7FT	2236041.3FT	1701.5FT	CENTERLINE
252	271304.1FT	2236049.8FT	1702.0FT	TOE
253	271306.5FT	2236053.6FT	1703.5FT	DAYLIGHT
254	271348.5FT	2236019.3FT	1702.9FT	DAYLIGHT
255	271349.4FT	2236021.7FT	1702.0FT	TOE
256	271353.5FT	2236032.4FT	1701.0FT	CENTERLINE
257	271357.6FT	2236043.2FT	1702.0FT	TOE
258	271358.4FT	2236045.4FT	1702.8FT	DAYLIGHT
259	271400.7FT	2235998.3FT	1701.1FT	DAYLIGHT
260	271401.5FT	2236008.3FT	1700.6FT	CENTERLINE

CONSTRUCTION POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
261	271402.3FT	2236018.7FT	1701.2FT	DAYLIGHT
262	270094.8FT	2236224.3FT	1722.8FT	DAYLIGHT
263	270090.3FT	2236231.1FT	1722.3FT	CENTERLINE
264	270086.2FT	2236237.4FT	1722.7FT	DAYLIGHT
265	270146.1FT	2236241.9FT	1721.7FT	DAYLIGHT
266	270145.5FT	2236252.5FT	1720.6FT	CENTERLINE
267	270144.8FT	2236263.4FT	1721.8FT	DAYLIGHT
268	270193.3FT	2236224.8FT	1721.3FT	DAYLIGHT
269	270201.7FT	2236237.9FT	1718.9FT	CENTERLINE
270	270208.5FT	2236248.5FT	1720.6FT	DAYLIGHT
271	270226.8FT	2236192.8FT	1720.5FT	DAYLIGHT
272	270240.4FT	2236205.0FT	1717.5FT	CENTERLINE
273	270251.3FT	2236214.7FT	1719.6FT	DAYLIGHT
274	270065.3FT	2236131.9FT	1723.1FT	DAYLIGHT
275	270064.1FT	2236135.7FT	1722.9FT	CENTERLINE
276	270062.9FT	2236139.5FT	1723.1FT	DAYLIGHT
277	270095.3FT	2236137.5FT	1723.0FT	DAYLIGHT
278	270093.1FT	2236144.6FT	1722.0FT	CENTERLINE
279	270090.4FT	2236153.4FT	1723.5FT	DAYLIGHT
280	270122.1FT	2236145.1FT	1721.7FT	DAYLIGHT
281	270122.1FT	2236150.9FT	1721.0FT	CENTERLINE
282	270122.1FT	2236155.7FT	1721.5FT	DAYLIGHT
283	270171.4FT	2236133.6FT	1720.6FT	DAYLIGHT
284	270171.2FT	2236141.2FT	1719.5FT	CENTERLINE
285	270170.9FT	2236149.6FT	1720.8FT	DAYLIGHT
286	270199.0FT	2236144.9FT	1719.2FT	DAYLIGHT
287	270199.1FT	2236150.7FT	1718.6FT	CENTERLINE
288	270199.3FT	2236160.9FT	1720.3FT	DAYLIGHT
289	270241.2FT	2236133.0FT	1719.8FT	DAYLIGHT
290	270242.2FT	2236139.9FT	1718.0FT	TOE

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL F CAMERON — STATE OF WASHINGTON — 55590 — REGISTERED PROFESSIONAL ENGINEER — 11/30/2023 — EXPIRES: 09/15/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM
17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

CONSTRUCTION POINTS
PILOT CHANNELS

DWG. NO.: C-206
CREATED: 11/30/2023
SHEET: 15 of 29

CONSTRUCTION POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
291	270243.1FT	2236146.3FT	1717.2FT	CENTERLINE
292	270243.9FT	2236152.7FT	1718.0FT	TOE
293	270245.2FT	2236163.6FT	1720.7FT	DAYLIGHT
294	270257.9FT	2236175.7FT	1717.0FT	TOE
295	270261.8FT	2236179.0FT	1716.5FT	CENTERLINE
296	270267.9FT	2236184.1FT	1717.0FT	TOE
297	270273.5FT	2236188.7FT	1718.8FT	DAYLIGHT
298	270253.9FT	2236126.0FT	1719.2FT	DAYLIGHT
299	270258.4FT	2236133.4FT	1717.0FT	TOE
300	270260.9FT	2236137.6FT	1716.6FT	CENTERLINE
301	270278.9FT	2236158.9FT	1715.8FT	CENTERLINE
302	270287.1FT	2236166.1FT	1717.0FT	TOE
303	270302.8FT	2236179.7FT	1722.2FT	DAYLIGHT
304	270281.4FT	2236095.6FT	1720.9FT	DAYLIGHT
305	270288.4FT	2236113.7FT	1716.0FT	TOE
306	270290.3FT	2236118.6FT	1715.5FT	CENTERLINE
307	270314.8FT	2236118.9FT	1714.2FT	CENTERLINE
308	270321.0FT	2236125.4FT	1715.0FT	TOE
309	270337.3FT	2236144.7FT	1721.4FT	DAYLIGHT
310	270344.5FT	2236053.9FT	1718.3FT	DAYLIGHT
311	270353.9FT	2236068.4FT	1714.0FT	TOE
312	270360.4FT	2236078.4FT	1712.5FT	CENTERLINE
313	270366.9FT	2236088.4FT	1714.0FT	TOE
314	270382.8FT	2236112.8FT	1721.3FT	DAYLIGHT
315	270378.6FT	2236043.3FT	1715.7FT	DAYLIGHT
316	270383.0FT	2236053.3FT	1713.0FT	TOE
317	270387.5FT	2236063.8FT	1711.6FT	CENTERLINE
318	270392.1FT	2236074.2FT	1713.0FT	TOE
319	270405.5FT	2236104.9FT	1721.4FT	DAYLIGHT
320	270408.1FT	2236048.4FT	1711.3FT	DAYLIGHT

CONSTRUCTION POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
321	270413.4FT	2236054.7FT	1710.9FT	CENTERLINE
322	270422.9FT	2236099.1FT	1720.8FT	DAYLIGHT

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL F CAMERON — STATE OF WASHINGTON — 55590 — REGISTERED PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT

ISSUED FOR CONSTRUCTION

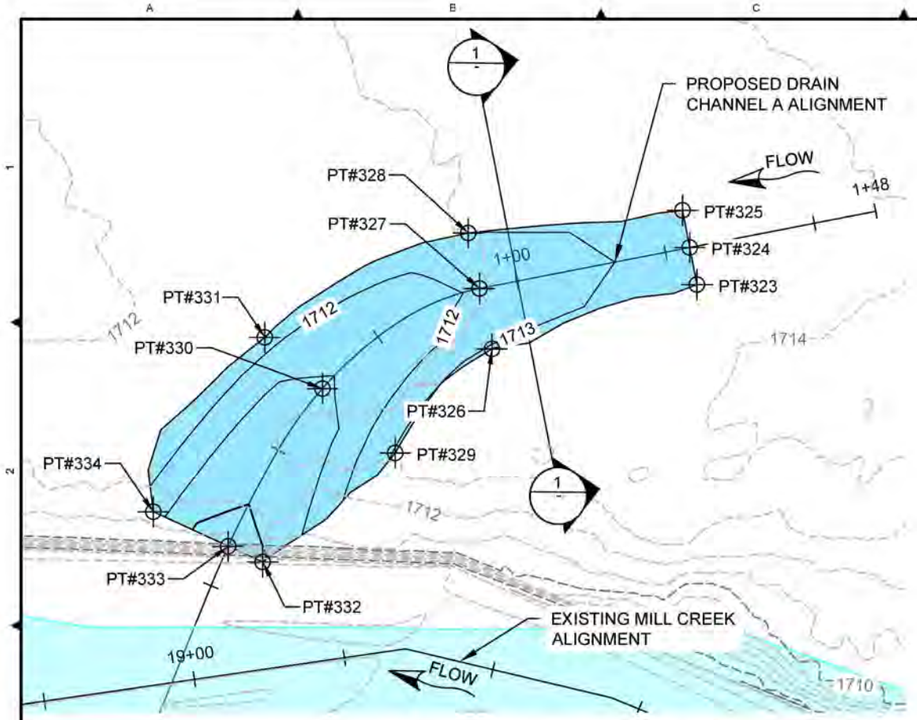
REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

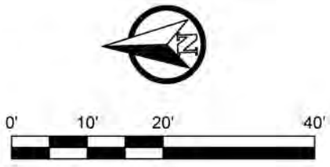
PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM
17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

CONSTRUCTION POINTS
PILOT CHANNELS

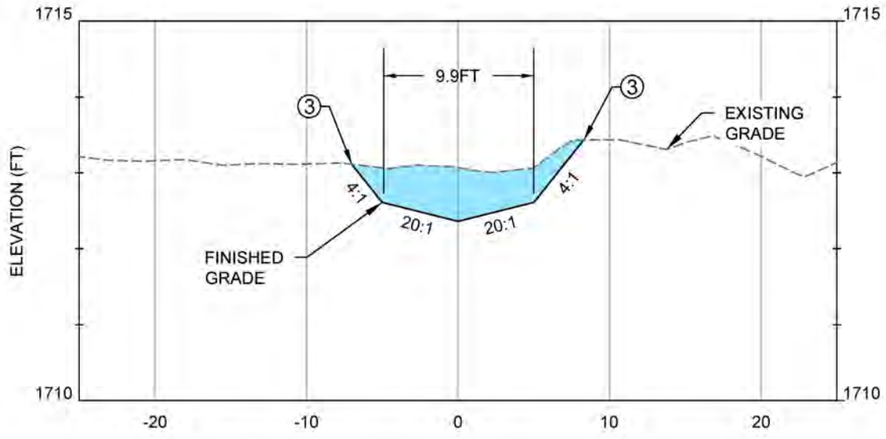
DWG. NO.: C-207
CREATED: 11/30/2023
SHEET: 16 of 29

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\04_PROPOSED CONDITIONS_PILOT CHANNELS.DWG
PILOT DETAILS_DEEP_ALEXA December 1, 2023 10:39 AM

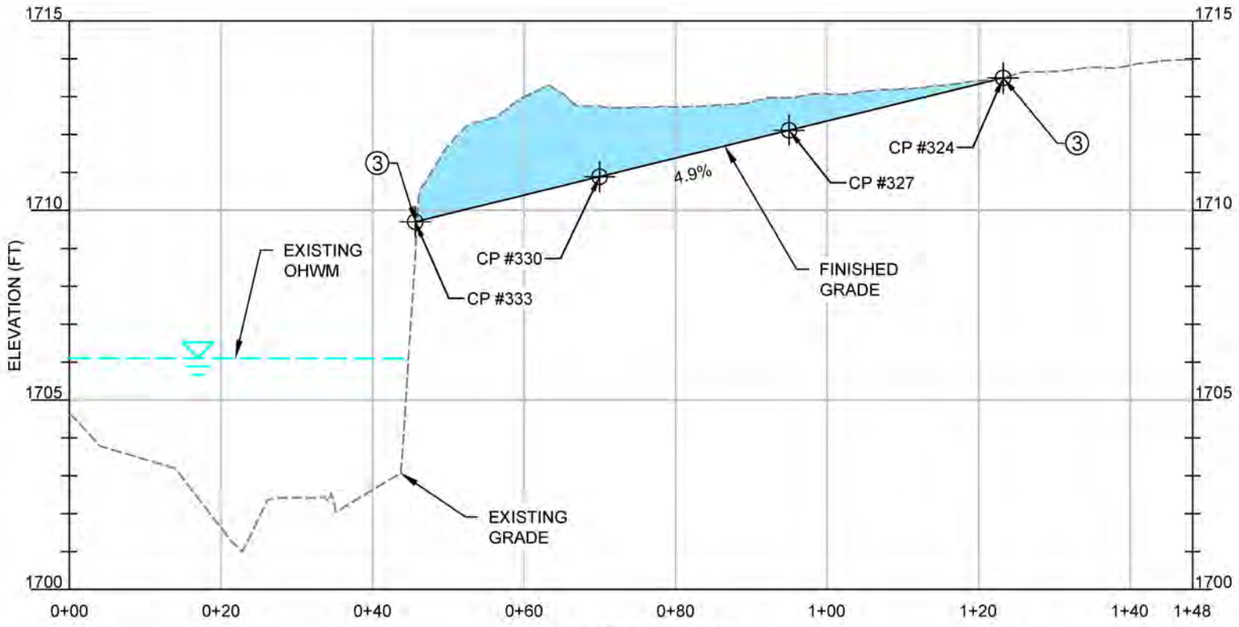




LEGEND
- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- EXISTING OHWM
- PROPOSED CHANNEL ALIGNMENT
- PROPOSED CHANNEL EXCAVATION
- PROPOSED 1' CONTOUR
- PROPOSED 5' CONTOUR
- PROPOSED CONSTRUCTION POINT
- PROPOSED LWD



1 / - DRAIN CHANNEL A CROSS SECTION
(SCALE 1' = 10', 1H:5V)



PROFILE VIEW (FT)
(SCALE 1" = 20', 1H:5V)

NOTES:
1. INSTALL COFFERDAMS AND WATER BYPASS MEASURES AT UPSTREAM AND DOWNSTREAM LIMITS OF DISTURBANCE TO ISOLATE AND DEWATER EARTHWORK AREAS, SEE SHEET C-402. FISH SALVAGE SHALL BE PERFORMED BY A QUALIFIED FISH BIOLOGIST, REWATER WORK AREAS UPON COMPLETION. SEE SHEET C-402 FOR DETAILS.
2. EXCAVATE DRAIN CHANNEL TO THE EXTENTS AND ELEVATIONS SHOWN ON THE PLANS.
3. DAYLIGHT PROPOSED CHANNEL FILL TO MATCH EXISTING GRADE.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER — 11/30/2023 — EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT — ESTABLISHED 1941

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

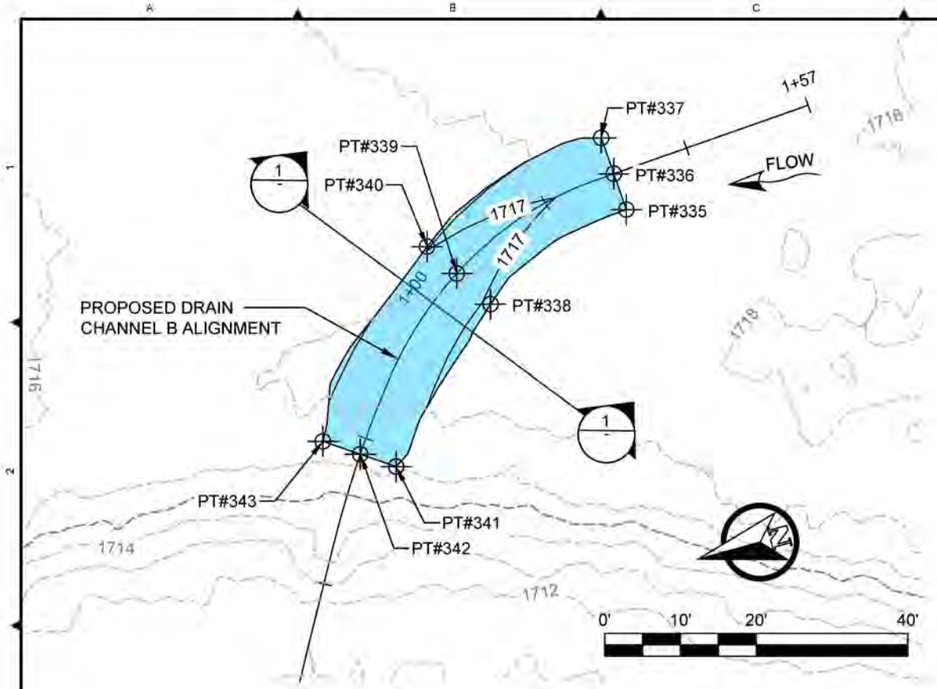
PLAN SHEET SIZE ANSI B (11" X 17")

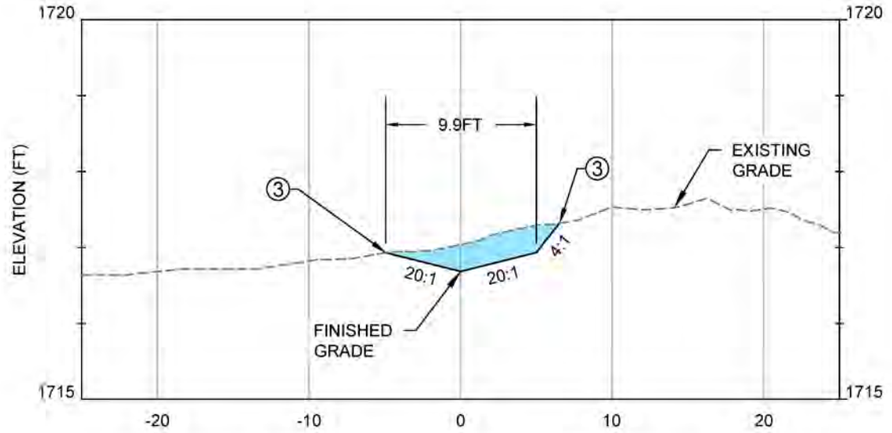
PHASE 1 MILL CREEK FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

PROPOSED CONDITIONS
DRAIN CHANNEL A

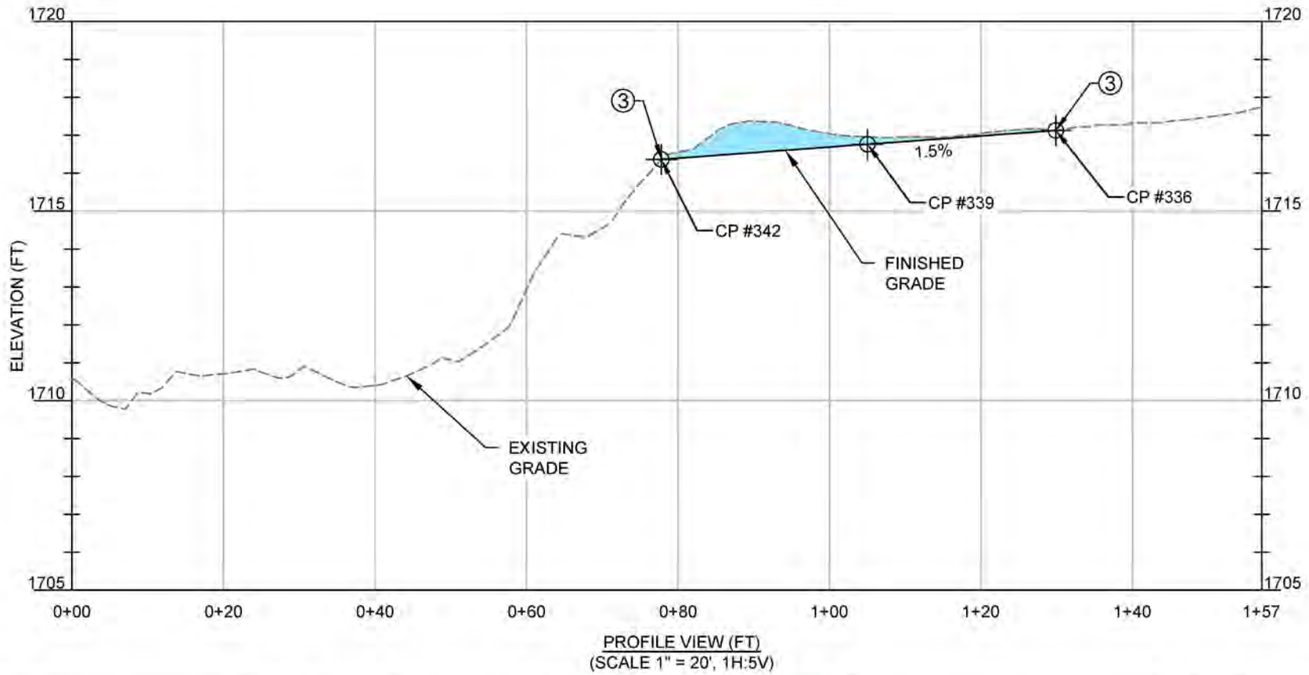
DWG. NO.: C-208
CREATED: 11/30/2023
SHEET: 17 of 29

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\05_PROPOSED CONDITIONS_DRAIN CHANNELS.DWG
PLOT DETAILS: DEEP_ALEXA December 1, 2023 10:48 AM





1 / - DRAIN CHANNEL B CROSS SECTION
(SCALE 1' = 10', 1H:5V)



PROFILE VIEW (FT)
(SCALE 1" = 20', 1H:5V)

NOTES:
1. INSTALL COFFERDAMS AND WATER BYPASS MEASURES AT UPSTREAM AND DOWNSTREAM LIMITS OF DISTURBANCE TO ISOLATE AND DEWATER EARTHWORK AREAS, SEE SHEET C-402. FISH SALVAGE SHALL BE PERFORMED BY A QUALIFIED FISH BIOLOGIST, REWATER WORK AREAS UPON COMPLETION. SEE SHEET C-402 FOR DETAILS.
2. EXCAVATE DRAIN CHANNEL TO THE EXTENTS AND ELEVATIONS SHOWN ON THE PLANS.
3. DAYLIGHT PROPOSED CHANNEL FILL TO MATCH EXISTING GRADE.

LEGEND
- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- EXISTING OHWM
- PROPOSED CHANNEL ALIGNMENT
- PROPOSED CHANNEL EXCAVATION
- PROPOSED 1' CONTOUR
- PROPOSED 5' CONTOUR
- PROPOSED CONSTRUCTION POINT

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P. CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER — 11/30/2023 — EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1947

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")						
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM
17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

PROPOSED CONDITIONS
DRAIN CHANNEL B

DWG. NO.: C-209
CREATED: 11/30/2023
SHEET: 18 of 29

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\ SHEET FILES\05_PROPOSED CONDITIONS_DRAIN CHANNELS.DWG
PLOT DETAILS: DEEP, ALEXA December 1, 2023 10:48 AM

CONSTRUCTION POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
323	270934.4FT	2236270.0FT	1713.7FT	DAYLIGHT
324	270935.4FT	2236274.9FT	1713.5FT	CENTERLINE
325	270936.3FT	2236279.8FT	1713.7FT	DAYLIGHT
326	270961.5FT	2236261.5FT	1713.1FT	DAYLIGHT
327	270963.1FT	2236269.5FT	1712.1FT	CENTERLINE
328	270964.6FT	2236276.8FT	1713.0FT	DAYLIGHT
329	270974.2FT	2236247.8FT	1713.1FT	DAYLIGHT

CONSTRUCTION POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
330	270983.8FT	2236256.3FT	1710.9FT	CENTERLINE
331	270991.5FT	2236263.0FT	1712.4FT	DAYLIGHT
332	270991.7FT	2236233.4FT	1709.9FT	DAYLIGHT
333	270996.3FT	2236235.5FT	1709.7FT	CENTERLINE
334	271006.2FT	2236240.1FT	1711.4FT	DAYLIGHT
335	270707.3FT	2236288.5FT	1717.4FT	DAYLIGHT
336	270707.8FT	2236293.5FT	1717.1FT	CENTERLINE

CONSTRUCTION POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
337	270708.3FT	2236298.5FT	1717.4FT	DAYLIGHT
338	270727.7FT	2236280.7FT	1717.3FT	DAYLIGHT
339	270731.1FT	2236285.6FT	1716.8FT	CENTERLINE
340	270734.0FT	2236290.0FT	1716.9FT	DAYLIGHT
341	270744.9FT	2236262.8FT	1716.6FT	DAYLIGHT
342	270749.1FT	2236265.5FT	1716.4FT	CENTERLINE
343	270753.5FT	2236268.3FT	1716.6FT	DAYLIGHT

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL F CAMERON
STATE OF WASHINGTON
55550
REGISTERED
PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 09/15/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

CONSTRUCTION POINTS
DRAIN CHANNELS

DWG. NO.: C-210
CREATED: 11/30/2023
SHEET: 19 of 29

MILL CREEK ROAD

LWD #401
LWD #402
LWD #403
LWD #404
LWD #405
LWD #406
LWD #407
LWD #408
LWD #409
LWD #410
LWD #411
LWD #412
LWD #413
LWD #414
LWD #415
LWD #416
LWD #417
LWD #418
LWD #419
LWD #420
LWD #421
LWD #422
LWD #423
LWD #424
LWD #425
LWD #426
LWD #427
LWD #428

EXISTING MILL CREEK ALIGNMENT

PROPOSED PILOT CHANNEL A (SEE SHEET C-201)

PROPOSED PILOT CHANNEL B (SEE SHEET C-202)

PROPOSED PILOT CHANNEL C (SEE SHEET C-203)

5+00
10+00
15+00

FLOW

1680 1682 1690 1692 1696 1698 1700 1702 1704 1710 1730 1750 1770 1790 1810

N

0' 40' 80' 160'

LEGEND
- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR
- EXISTING OHWM
- PROPOSED CHANNEL ALIGNMENT
- PROPOSED CHANNEL EXCAVATION
- PROPOSED 1' CONTOUR
- PROPOSED 5' CONTOUR
- PROPOSED LWD CONSTRUCTION POINT
- PROPOSED LWD

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\06_PROPOSED CONDITIONS_LWD.DWG
PLOT DETAILS: DEEP_ALEXA December 1, 2023 10:55 AM

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 06/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

PROPOSED CONDITIONS
LWD

DWG. NO.: C-211
CREATED: 11/30/2023
SHEET: 20 of 29

CONSTRUCTION POINT TABLE			
POINT #	NORTHING	EASTING	DESCRIPTION
401	272430.8FT	2235888.6FT	REVETMENT
402	272392.6FT	2235939.8FT	REVETMENT
403	272385.3FT	2235946.0FT	REVETMENT
404	272330.7FT	2235979.0FT	REVETMENT
405	272299.6FT	2235954.1FT	LOG JAM
406	272281.1FT	2235984.3FT	LOG JAM
407	272050.0FT	2236114.7FT	REVETMENT
408	272042.3FT	2236178.1FT	REVETMENT
409	272039.3FT	2236187.5FT	REVETMENT
410	272005.7FT	2236241.9FT	REVETMENT
411	271999.8FT	2236249.3FT	REVETMENT
412	271952.9FT	2236292.8FT	REVETMENT
413	271944.3FT	2236298.2FT	REVETMENT
414	271886.5FT	2236325.5FT	REVETMENT

CONSTRUCTION POINT TABLE			
POINT #	NORTHING	EASTING	DESCRIPTION
415	271876.6FT	2236328.1FT	REVETMENT
416	271813.6FT	2236338.4FT	REVETMENT
417	271803.4FT	2236338.6FT	REVETMENT
418	271739.5FT	2236340.5FT	REVETMENT
419	271710.9FT	2236303.7FT	LOG JAM
420	271685.8FT	2236329.8FT	LOG JAM
421	271663.7FT	2236294.5FT	LOG JAM
422	271638.7FT	2236320.8FT	LOG JAM
423	271457.1FT	2236223.2FT	LOG JAM
424	271432.2FT	2236249.3FT	LOG JAM
425	271374.2FT	2236257.9FT	22-LOG
426	271296.0FT	2236268.6FT	22-LOG
427	271233.0FT	2236228.2FT	LOG JAM
428	271205.3FT	2236250.6FT	LOG JAM

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL F CAMERON — STATE OF WASHINGTON — 55590 — REGISTERED PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

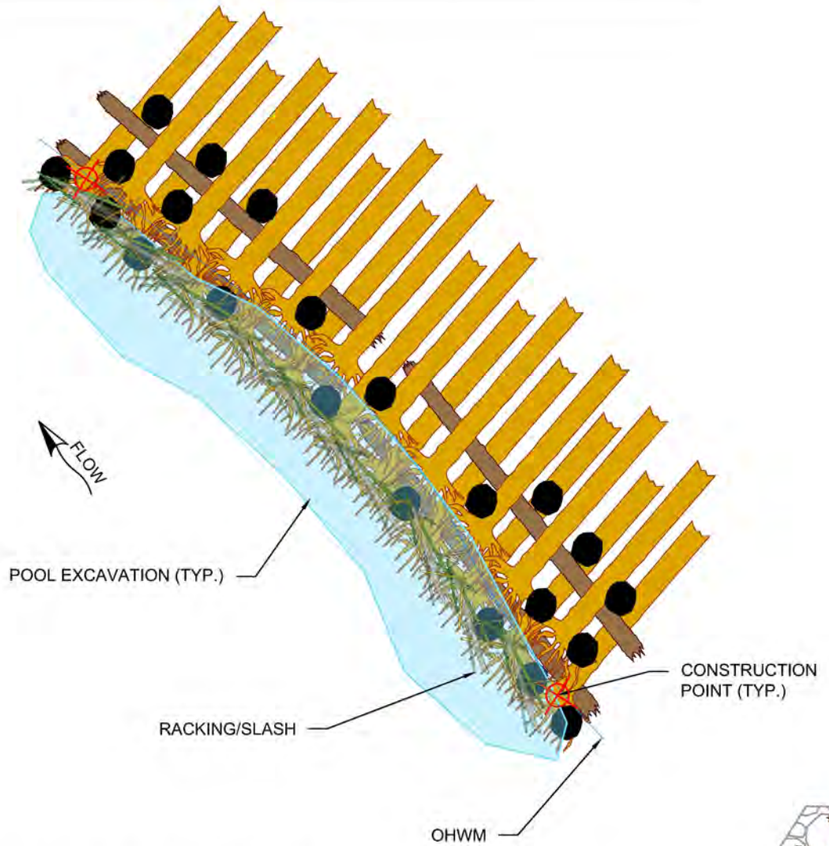
PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM
17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

CONSTRUCTION POINTS
LWD

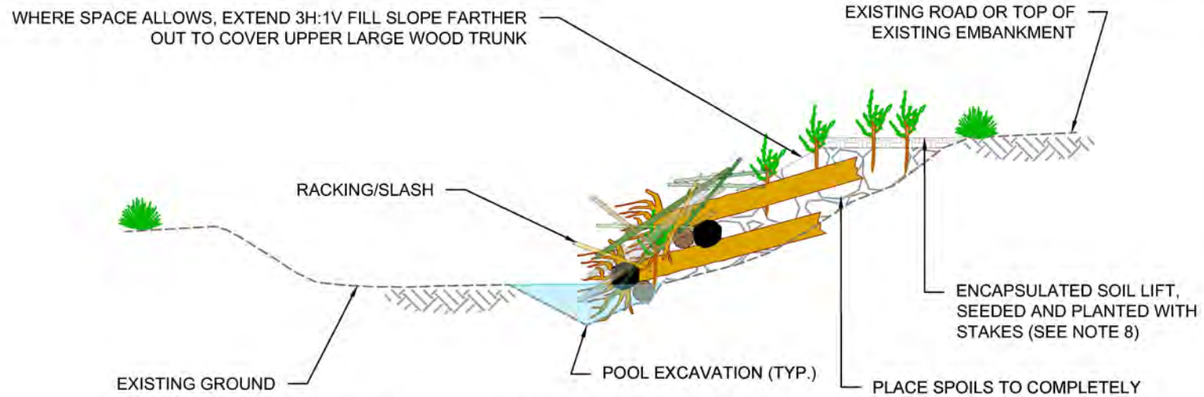
DWG. NO.: C-212
CREATED: 11/30/2023
SHEET: 21 of 29

CONSTRUCTION QUANTITIES:

COMPONENT	DESCRIPTION	QUANTITY
LOG WITH ROOTWAD	LARGE (18"+ DBH, 20-30 FT,4' MIN ROOTWAD)	21
LOG WITHOUT ROOTWAD	MEDIUM (16-18" DBH, 12-14 FT)	16
	MEDIUM (16-18" DBH, 35' MIN FT)	4
RACKING/SLASH	MISC. (4-10" DBH, 10 FT MIN, 20 FT MAX)	60
BOULDER	2 TO 3 FT DIA	22
BALLAST	SPOILS/FLOODPLAIN ALLUVIUM	155 CY



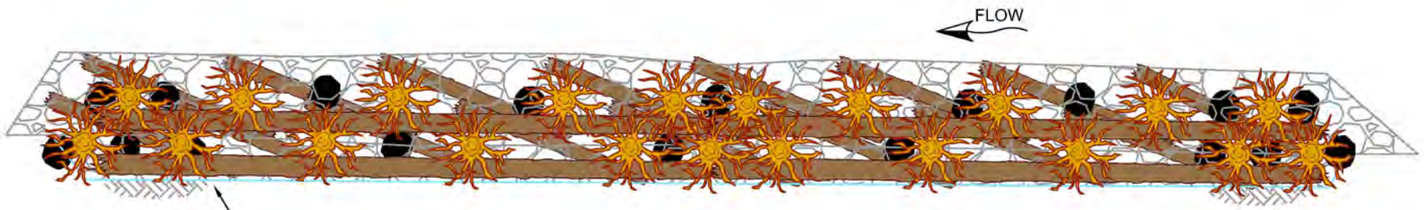
REVETMENT LOG STRUCTURE - PLAN VIEW



REVETMENT LOG STRUCTURE - SECTION VIEW

REVETMENT LOG STRUCTURE NOTES:

1. INSTALL TEMPORARY COFFERDAM UPSTREAM OF STRUCTURE WHEN NEEDED.
2. FISH SALVAGE TO BE DONE BY QUALIFIED FISH BIOLOGIST.
3. SEE SHEET C-402 FOR REVETMENT LOG STRUCTURE CONSTRUCTION SEQUENCE.
4. SUITABLE SPOILS FROM EXCAVATION SHALL BE USED TO BACKFILL STRUCTURE AS CONSTRUCTION ADVANCES. MATERIAL SHALL BE COMPACTED WITH EXCAVATOR BUCKET. ADDITIONAL ALLUVIAL FLOODPLAIN MATERIAL MAY BE NEEDED TO BURY STRUCTURE AS SHOWN. BALLAST MATERIAL INCIDENTAL TO STRUCTURE COST.
5. RACKING/SLASH MAY BE ADDED TO FRONT OF STRUCTURE WHEN AVAILABLE.
6. EXCAVATE MINIMUM 2-FOOT DEPTH POOLS AROUND REVETMENT STRUCTURES.
7. OHWM WITH RESPECT TO STRUCTURE LOCATION IS A TYPICAL REPRESENTATION AND MAY VARY AT EACH STRUCTURE LOCATION. FINAL CONFIGURATION OF STRUCTURE SHALL BE AS DIRECTED IN FIELD.
8. INSTALL ENCAPSULATED SOIL LIFT ON TOP OF REVETMENT AND SEED (COST INCIDENTAL TO STRUCTURE). NATIVE VEGETATION AND LIVE STAKES TO BE PLANTED BY OTHERS.
9. RACKING/SLASH MAY CONSIST OF TOPS AND LIMBS OF WHOLE TREES, AND/OR SMALL WHOLE TREES WITH ROOTWADS.



REVETMENT LOG STRUCTURE - SECTION VIEW (FRONT)

Not to Scale

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

ADEL F CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER — 11/30/2023 — EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT — ESTABLISHED 1941

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

LWD DETAILS
REVETMENT LOG STRUCTURE

DWG. NO.: C-301
CREATED: 11/30/2023
SHEET: 22 of 29

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN SHEET FILES\07_DETAILS LWD STRUCTURES.DWG
PLOT DETAILS: DEEP, ALEXA — December 1, 2023 — 11:00 AM

1

2

3

4

5

6

16

17

18

19

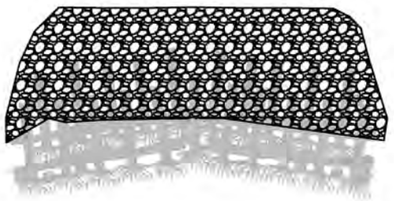
7 — 15 → FOR STEPS 7 -15, REPEAT LOG PLACEMENT AS SHOWN ON STEPS 2-6.

20

21

30

31



32

22 — 29 → FOR STEPS 22 -29, REPEAT LOG PLACEMENT AS SHOWN ON STEPS 18-21.

Not to Scale

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER
12/01/2023
EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

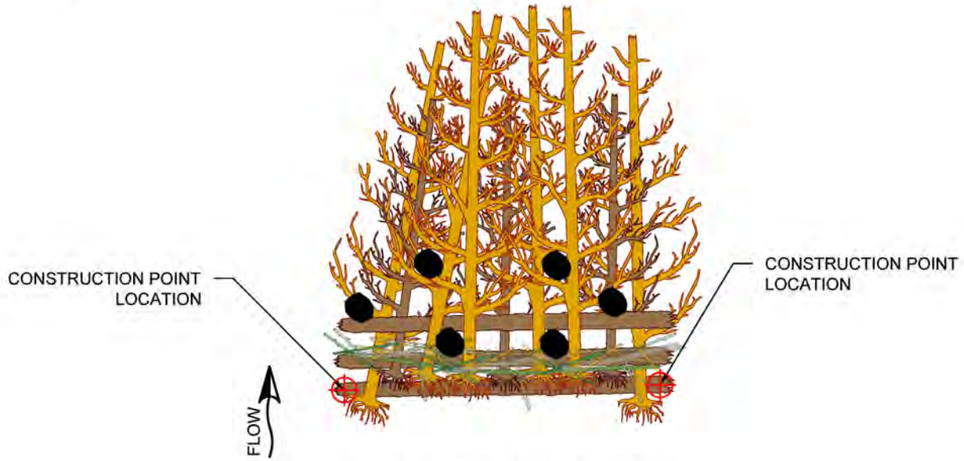
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A.	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM
17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

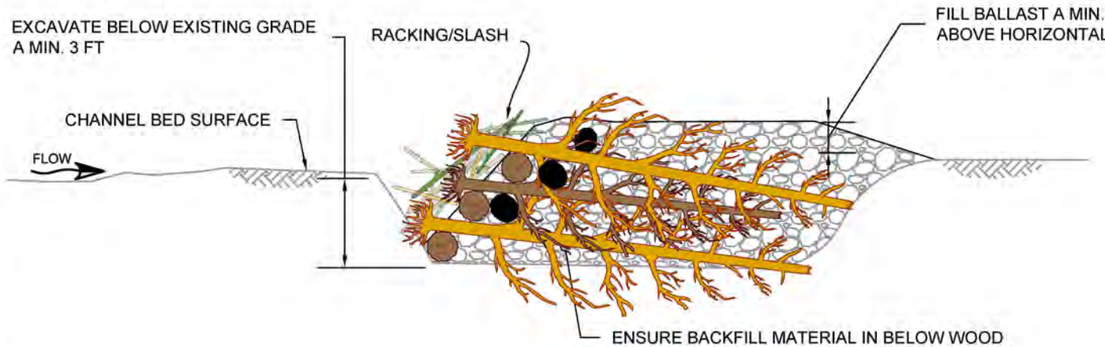
LWD DETAILS
REVETMENT LOG STRUCTURE

DWG. NO.: C-302
CREATED: 11/30/2023
SHEET: 23 of 29

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\07_DETAILS LWD STRUCTURES.DWG
PLOT DETAILS: DEEP, ALEXA — December 1, 2023 — 11:00 AM



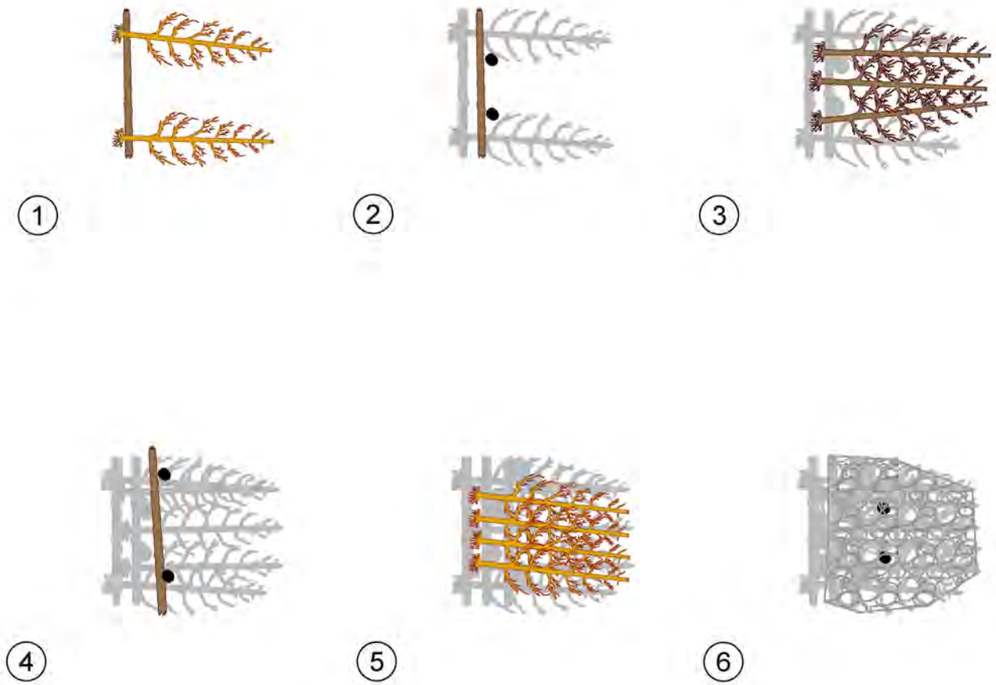
LOG JAM STRUCTURE - PLAN VIEW



LOG JAM STRUCTURE - SECTION VIEW

CONSTRUCTION QUANTITIES:

COMPONENT	DESCRIPTION	QUANTITY
WHOLE TREE	LARGE (18"+ DBH, 40' MIN, 4' MIN ROOTWAD)	6
	MEDIUM (16-18" DBH, 35' MIN, 3' MIN ROOTWAD)	3
LOG WITH OPTIONAL ROOTWAD	MEDIUM (16-18" DBH, 35' MIN, OPTIONAL 3' MIN ROOTWAD)	3
BOULDER	3 TO 4 FT DIA.	6
SLASH/RACKING MATERIAL	MISC. (2-10" DBH, 6-16')	30 CY
BALLAST	SPOILS/FLOODPLAIN ALLUVIUM	135 CY



LOG JAM STRUCTURE - LOG PLACEMENT SEQUENCING

LOG JAM STRUCTURE NOTES:

1. INSTALL TEMPORARY COFFERDAM UPSTREAM OF STRUCTURE WHEN NEEDED.
2. FISH SALVAGE TO BE DONE BY QUALIFIED FISH BIOLOGIST.
3. A QUANTITY OF 6 ROCKS (3-4 FT DIA) SHALL BE USED IN STRUCTURE CONSTRUCTION.
4. EXCAVATE TRENCH TO COMPLETELY BURY BOTTOM LAYER OF STRUCTURE.
5. PLACE SMALLER DIAMETER LOGS WITH ROOTWADS ON BOTTOM LAYER OF STRUCTURE.
6. LOGS PLACED IN SEQUENCE #1, #2, AND #4 DO NOT REQUIRE BRANCHES, ROOTWADS ARE OPTIONAL.
7. LOGS PLACED IN SEQUENCE #1, #3, AND #5 SHALL HAVE BRANCHES AND ROOTWADS ATTACHED.
8. RISER LOG PLACED IN SEQUENCE #2 AND #6 SHALL BE PLACED AT BACK OF STRUCTURE AND PUSHED FORWARD INTO PLACE
9. PLACE LARGEST DIAMETER LOGS IN SEQUENCE #5.
10. SPOILS FROM EXCAVATION SHALL BE USED TO BACKFILL STRUCTURE AS CONSTRUCTION PROGRESSES. MATERIAL SHALL BE COMPACTED WITH EXCAVATOR BUCKET.
11. RACKING/SLASH MAY BE ADDED TO FRONT OF STRUCTURE WHEN AVAILABLE.
12. BURY STRUCTURE A MINIMUM OF 2 FT ABOVE HORIZONTAL LOG PLACED IN SEQUENCE #4. ADDITIONAL BACKFILL MAY BE NEEDED TO BURY STRUCTURE AS SHOWN.
13. 15 TO 25 WILLOW STAKES WILL BE PLANTED BY OTHERS TO COMPLETE CONSTRUCTION OF THE STRUCTURE. .
14. EXPOSED ENDS OF LOGS SHALL BE BEAVER CUT.

Not to Scale

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL F CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER — 11/30/2023 — EXPIRES: 06/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT — ESTABLISHED 1947

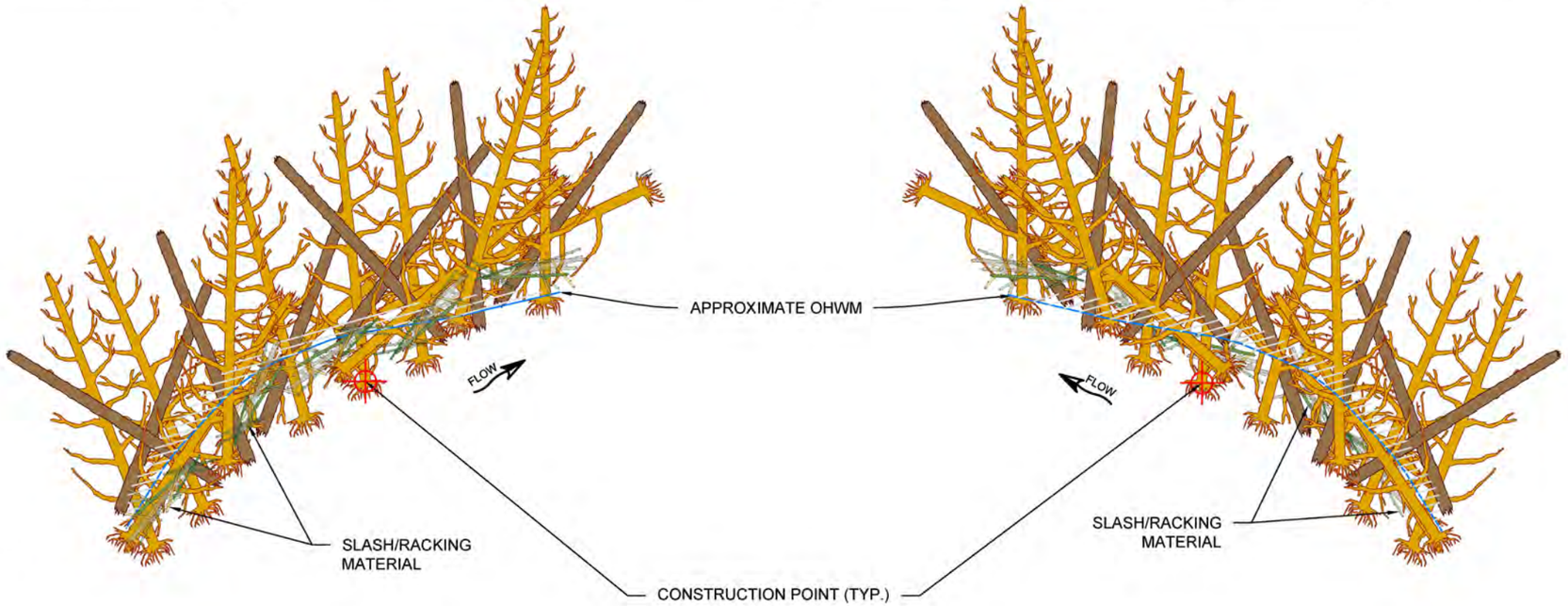
ISSUED FOR CONSTRUCTION

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

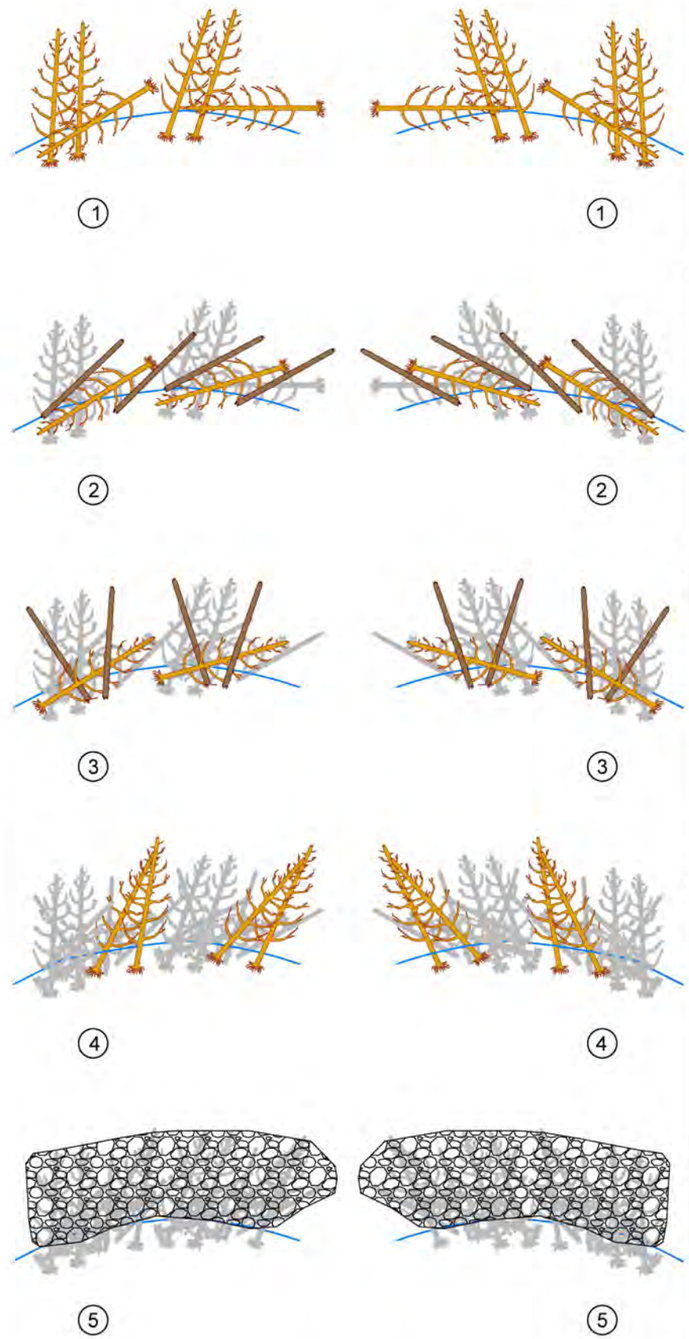
PHASE 1 MILL CREEK FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

LWD DETAILS
LOG JAM STRUCTURE

DWG. NO.: C-303
CREATED: 11/30/2023
SHEET: 24 of 29



22-LOG BANK HABITAT STRUCTURE - PLAN VIEWS

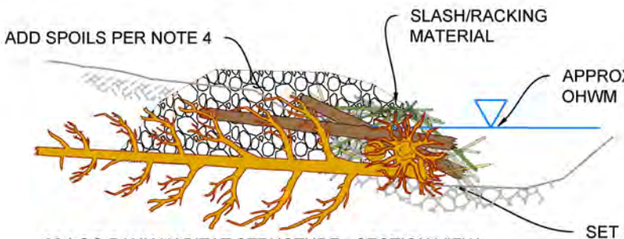


22-LOG BANK HABITAT STRUCTURE NOTES:

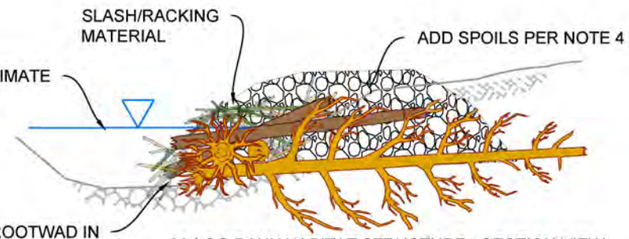
1. INSTALL TEMPORARY COFFERDAM TO ISOLATE WORK AREA.
2. FISH SALVAGE TO BE SUPERVISED BY QUALIFIED FISH BIOLOGIST.
3. PARTIAL BURIAL OF TREES WILL BE REQUIRED. DETERMINATION WILL BE MADE IN THE FIELD AND AS DIRECTED BY ENGINEER OR OWNER'S REPRESENTATIVE.
4. ANY SPOILS FROM EXCAVATION SHALL BE USED TO BACKFILL STRUCTURE AS CONSTRUCTION PROGRESSES OR AS DIRECTED IN THE FIELD BY ENGINNER OR OWNER'S REPRESENTATIVE. MATERIAL SHALL BE COMPACTED WITH EXCAVATOR BUCKET.
5. APPROXIMATE OHWM WITH RESPECT TO STRUCTURE LOCATION IS A TYPICAL REPRESENTATION AND MAY VARY AT EACH STRUCTURE LOCATION. FINAL CONFIGURATION OF STRUCTURE SHALL BE AS DIRECTED IN FIELD.
6. ADD SLASH/RACKING MATERIAL TO HELP STABILIZE KEY MEMBERS AND FILL INTERSTITIAL SPACE. RACKING MATERIAL MAY CONSIST OF TOPS AND LIMBS OF WHOLE TREES CLEARED EXISTING TREE VEGETATION, AND/OR SMALL WHOLE TREES WITH ROOTWADS.

CONSTRUCTION QUANTITIES:

COMPONENT	DESCRIPTION	QUANTITY
WHOLE TREE	LARGE (18"+ DBH, 40' MIN, 4' MIN ROOTWAD)	14
LOG WITHOUT ROOTWAD	MEDIUM (16-18" DBH, 35' MIN)	8
SLASH/RACKING MATERIAL	MISC. (2-10" DBH, 6-16')	40 CY
BALLAST	SPOILS/FLOODPLAIN ALLUVIUM	125 CY



22-LOG BANK HABITAT STRUCTURE - SECTION VIEW



22-LOG BANK HABITAT STRUCTURE - SECTION VIEW

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 06/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

ISSUED FOR CONSTRUCTION

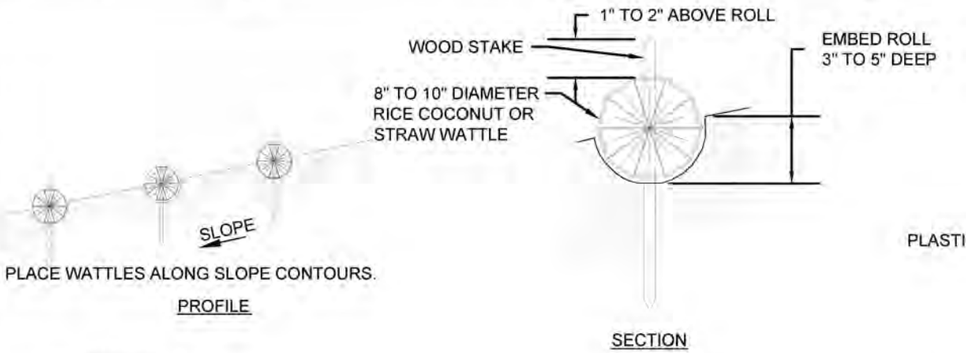
PLAN SHEET SIZE ANSI B (11" X 17")

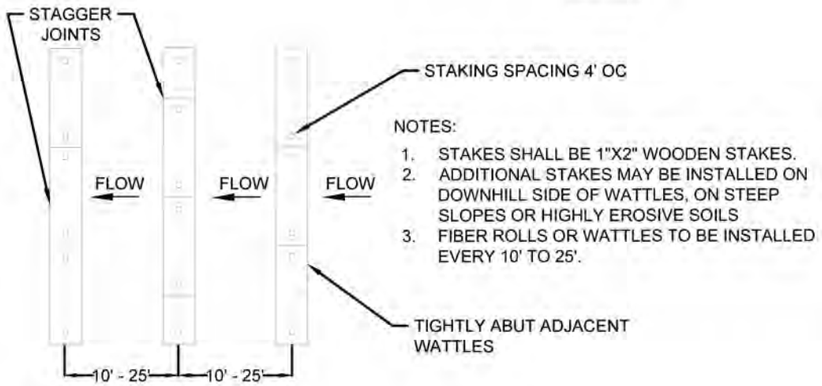
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532
LWD DETAILS
22-LOG BANK HABITAT STRUCTURE

DWG. NO.: C-304
CREATED: 11/30/2023
SHEET: 25 of 29

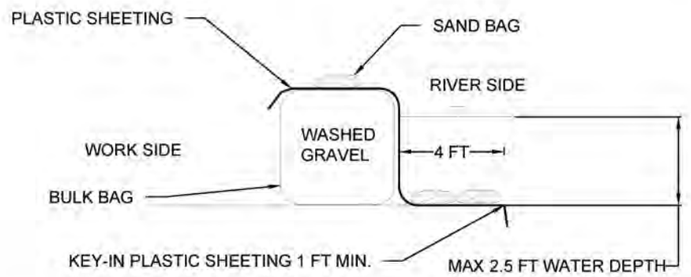
Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\07_DETAILS LWD STRUCTURES.DWG
PLOT DETAILS: DEEP_ALEXA December 1, 2023 11:00 AM





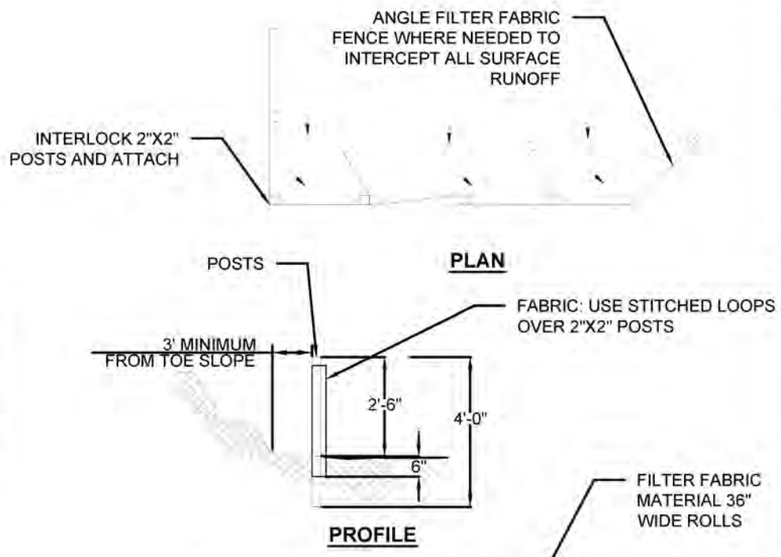
NOTES:
1. STAKES SHALL BE 1"X2" WOODEN STAKES.
2. ADDITIONAL STAKES MAY BE INSTALLED ON DOWNHILL SIDE OF WATTLES, ON STEEP SLOPES OR HIGHLY EROSIVE SOILS
3. FIBER ROLLS OR WATTLES TO BE INSTALLED EVERY 10' TO 25'.

FIBER ROLLS/WATTLES - TYPICAL DETAIL
NTS



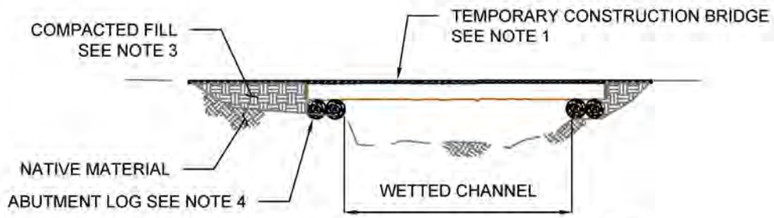
TEMPORARY COFFERDAM SECTION TYPICAL DETAIL
NTS

COFFERDAM NOTES:
1. ALL WORK IN CHANNEL SHALL ONLY OCCUR IN THE ALLOWABLE IN-WATER WORK WINDOW.
2. IN-WATER WORK AREAS SHALL BE ISOLATED BY COFFERDAMS.
3. ISOLATED AREAS REQUIRE FISH SALVAGE ACTIVITIES PRIOR TO THE INITIATION OF CONSTRUCTION.
4. FISH SALVAGE TO BE PERFORMED BY QUALIFIED FISH BIOLOGIST.
5. FILL BULK BAG WITH WASHED GRAVEL.
6. SAND BAGS, ECO-BLOCKS, OR SIMILAR MAY BE SUBSTITUTED FOR WASHED GRAVEL BULK BAGS.



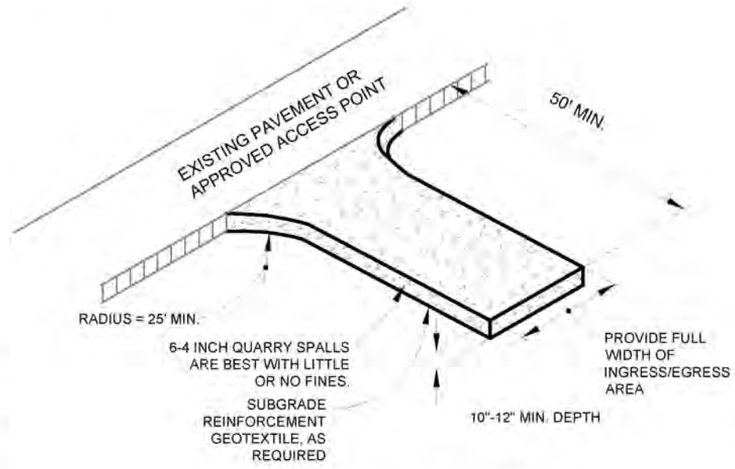
TEMPORARY SILT FENCE TYPICAL DETAIL
NTS

SILT FENCE NOTES:
1. SEDIMENT FENCE SHALL BE INSTALLED ON A LINE OF EQUAL ELEVATION.
2. BOTTOM EDGE OF SEDIMENT FENCE SHALL BE BURIED MIN 6".
3. POSTS MAY BE 2"X2" FIR, PINE OR STEEL.
4. POSTS TO BE INSTALLED ON UPHILL SIDE OF SLOPE.
5. COMPACT BOTH SIDES OF FILTER FABRIC TRENCH.
6. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION REACHES 1/3 OF THE MEASURE HEIGHT. SEDIMENT SHALL BE DISPOSED OF TO AN AREA THAT CAN BE PERMANENTLY STABILIZED.



TEMPORARY CONSTRUCTION BRIDGE TYPICAL DETAIL

TEMPORARY CONSTRUCTION BRIDGE NOTES:
1. PLACE TEMPORARY CONSTRUCTION BRIDGE. CONTRACTOR TO COORDINATE TEMPORARY BRIDGE DIMENSIONS, MATERIAL SIZE, AND LOCATION WITH OWNER'S REPRESENTATIVE.
2. BRIDGE MATERIALS AND INSTALLATION SHALL BE COMPLIANT WITH HIP III TERMS AND CONDITIONS.
3. COMPACTED FILL MAY BE REQUIRED OUTSIDE OF TEMPORARY CONSTRUCTION BRIDGE TO PROVIDE SMOOTH TRANSITION FROM BRIDGE TO EXISTING GROUND. (SHOWN IN SECTION DETAIL).
4. SILL LOGS SHALL BE MINIMUM OF TWO LOGS PER ABUTMENT SIMILAR IN SIZE AND SHAPE, AND BE PLACED ON FIRM AND UNYIELDING NATIVE SOIL.
5. AFTER COMPLETION OF WORK AND REMOVAL OF BRIDGE, SUBSOIL SHALL BE RIPPED TO PROVIDE SUITABLE SURFACE FOR PLANTING.



VEHICLE ENTRANCE - TYPICAL DETAIL
NTS

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

LORI F. CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER — 11/30/2023 — EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1947

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

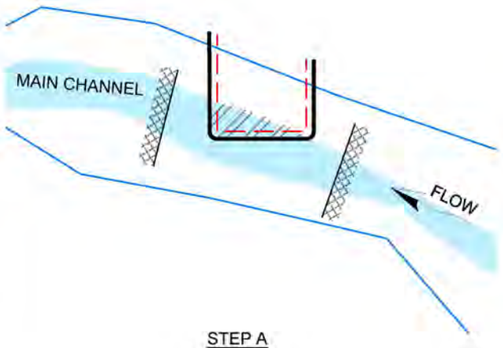
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

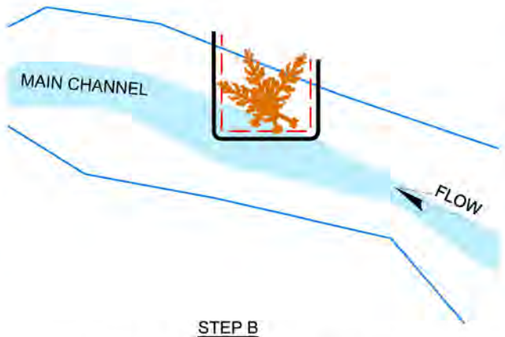
DETAILS
TESC

DWG. NO.: C-401
CREATED: 11/30/2023
SHEET: 26 of 29

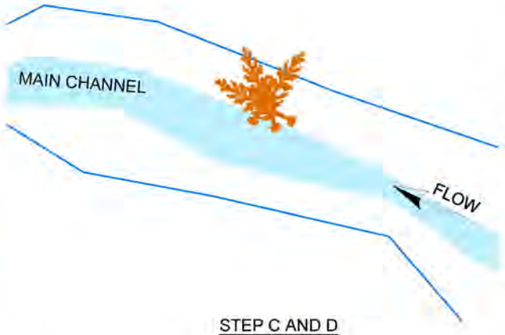
Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18 5 DESIGN\100% DESIGN\SHEET FILES\08_DETAILS TESC.DWG
PLOT DETAILS: DEEP, ALEXA December 1, 2023 11:03 AM



STEP A



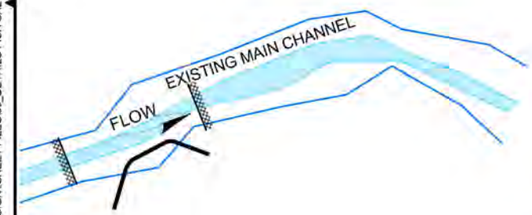
STEP B



STEP C AND D

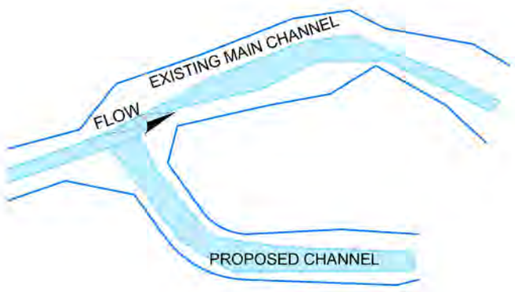
LARGE WOOD INSTALLATION WITH LOCAL ISOLATION (TYP.)
(NOT TO SCALE)

LEGEND:
- TOP OF BANK
- LOW FLOW LINE
- FISH BLOCK NET
- GRADING LIMITS
- COFFER DAM
- P PUMP



STEP A

STEP B AND C



STEP D

PROPOSED CHANNEL (TYP.)
(NTS)

GENERAL FISH SALVAGE AND DEWATERING STEPS

CONSTRUCTION SHALL OCCUR IN THE FOLLOWING GENERAL STEPS, WHICH CORRESPOND TO THE STEPS SHOWN ON THIS PLAN SHEET AND IN ACCORDANCE WITH DEPARTMENT OF ECOLOGY GUIDELINES.

A) ISOLATION AND SALVAGE:

ESTABLISH LIMITS OF EXCAVATION, STAGING AREAS AND ACCESS ROADS. INSTALL AND MAINTAIN EROSION AND SEDIMENT CONTROL MEASURES. ESTABLISH WORK AREA ISOLATION AS SHOWN ON THIS SHEET. INSTALL BLOCK NETS (SECURED TO STREAM CHANNEL BED AND BANKS) AT UP AND DOWNSTREAM LOCATIONS OUTSIDE OF THE CONSTRUCTION ZONE TO EXCLUDE FISH FROM ENTERING THE PROJECT AREA.FISH TRAPPED WITHIN THE ISOLATED WORK AREA WILL BE CAPTURED AND RELEASED AS PRUDENT TO MINIMIZE THE RISK OF INJURY.

B) DEWATERING AND INSTALLATION:

INSTALL COFFERDAM AND DEWATER ISOLATED WORK AREA. ALL ISOLATION WORK AND DEWATERING ACTIVITIES SHALL BE IN ACCORDANCE WITH DEPARTMENT OF ECOLOGY GUIDELINES. EXCAVATE AND INSTALL LARGE WOOD STRUCTURES AND CHANNEL EXCAVATION AS SHOWN ON THE THE CONSTRUCTION PLAN SHEETS AND IN ACCORDANCE WITH PROJECT SPECIFICATIONS. IF ESA LISTED-FISH MAY BE PRESENT AND PUMPS ARE REQUIRED TO DEWATER, THE INTAKE MUST HAVE A FISH SCREEN AND BE OPERATED IN ACCORDANCE WITH NMFS FISH SCREEN CRITERIA. PASS FLOW AND FISH DOWNSTREAM WITH A BY-PASS CULVERT OR A DIVERSION DITCH. PLACE DIVERSION OUTLET IN A LOCATION TO PROMOTE SAFE REENTRY OF FISH INTO THE STREAM CHANNEL AND NATURAL FIBER SEDIMENT MATS TO BE INSTALLED AT DOWNSTREAM END.

C) REWATERING:

WHEN NECESSARY, PERFORM STAGED REWATERING PROCESS WITH THE RECENTLY EXCAVATED CHANNEL. PREWASH EXCAVATED CHANNEL AND DETAIN AND RELEASE TURBID WATER TO THE FLOODPLAIN RATHER THAN FISH BEARING WATER. SLOWLY REWATER THE CONSTRUCTION SITE TO PREVENT LOSS OF SURFACE WATER DOWNSTREAM AND PREVENT A SUDDEN RELEASE OF SUSPENDED SEDIMENT.

D) SITE RESTORATION:

STREAMBANKS AND DISTURBED AREAS SHALL BE RESTORED AS NECESSARY USING ONSITE NATIVE MATERIAL AND ALL PROJECT WASTE MATERIAL REMOVED.

GENERAL FISH SALVAGE NOTES:

1. PROPOSED PROJECT DESIGN, CONSTRUCTION ACTIVITIES, AND MATERIALS SUBJECT TO APPROVAL BY OWNER.
2. CONTRACTOR TO PROVIDE EROSION AND SEDIMENT CONTROL PLAN PER PROJECT PLAN AND SPECIFICATIONS.
3. CONTRACTOR TO PROVIDE DEWATERING PLAN PER PROJECT PLANS AND SPECIFICATIONS.
4. THE CONTRACTOR SHALL CONSTRUCT THE RESTORATION DESIGN ELEMENTS IN ACCORDANCE WITH THE PLANS STAMPED "ISSUED FOR CONSTRUCTION" AS PROVIDED TO THE CONTRACTOR BY THE OWNER PRIOR TO CONSTRUCTION.
5. ALL WORK WITHIN THE ACTIVE CHANNEL SHALL OCCUR WITHIN THE ALLOWABLE FISH WINDOW. ALL CONSTRUCTION ACTIVITIES SHALL MINIMIZE DISTURBANCE TO AND MAXIMIZE RE-USE OF EXISTING RIPARIAN VEGETATION.
6. ALL TEMPORARY ACCESS ROUTES SHALL BE LAID OUT TO MINIMIZE DISTURBANCE TO EXISTING VEGETATION AND FINAL LOCATION WILL BE VERIFIED BY OWNER.
7. ALL EROSION CONTROL MEASURES ARE TO INDICATE WHAT IS EXPECTED IN SIMILAR GEOMORPHIC CONDITIONS. CHANNEL CONDITIONS MAY DIFFER DURING CONSTRUCTION AND FIELD ADJUSTMENT SHALL BE COORDINATED WITH PROJECT OWNER AND SHALL CONFORM TO DEPARTMENT OF ECOLOGY GUIDELINES.
8. OWNER SHALL BE RESPONSIBLE FOR FISH SALVAGE EFFORTS.
9. CONSTRUCTION WORK IN THE IMMEDIATE VICINITY OF FISH SALVAGE EFFORTS SHALL BE DELAYED (TYPICALLY 2 TO 24 HOURS) DURING SALVAGE. DELAYS MAY BE LONGER IN SOME CASES.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P. CAMERON
STATE OF WASHINGTON
55550
REGISTERED
PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 08/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

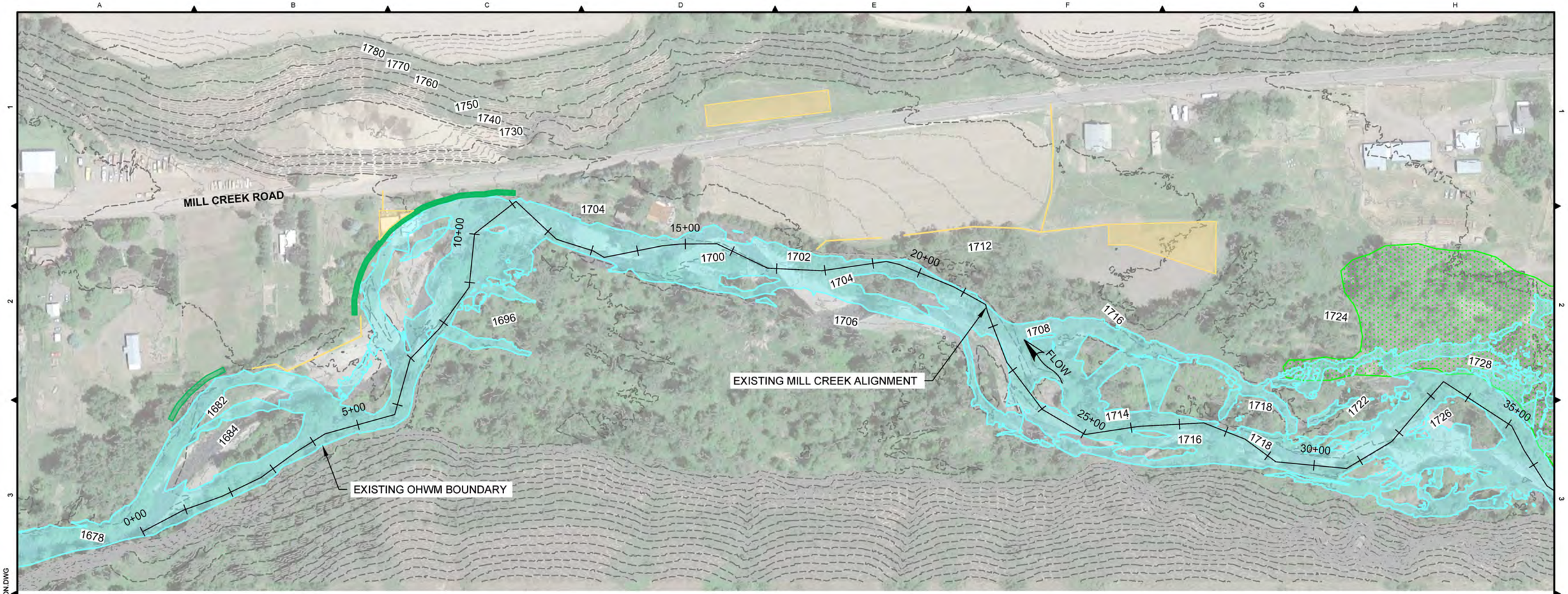
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

DETAILS
FISH SALVAGE, DEWATERING, AND REWATERING

DWG. NO.: C-402
CREATED: 11/30/2023
SHEET: 27 of 29

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\09_DETAILS FISH SALVAGE AND DEWATER.DWG
PLOT DETAILS_DEEP_ALEXA December 1, 2023 11:04 AM



LEGEND:

- 10' EXISTING CONTOUR
- 2' EXISTING CONTOUR
- EXISTING ALIGNMENT
- EXISTING ROAD
- EXISTING OHWM
- EXISTING DELINEATED WETLANDS
- PROPOSED SEEDING
- PROPOSED PLANTING

NOTES:

1. SEE L-102 FOR PLANTING AND SEEDING SPECIFICATIONS AND QUANTITIES.

0' 100' 200' 400'

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL P CAMERON — STATE OF WASHINGTON — 55550 — REGISTERED PROFESSIONAL ENGINEER
11/30/2023
EXPIRES: 06/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PLAN SHEET SIZE ANSI B (11" X 17")

PHASE 1 MILL CREEK
FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

SITE STABILIZATION

DWG. NO.: L-101
CREATED: 11/30/2023
SHEET: 28 of 29

Z:\PROJECTS\194-1359-0003 WWCCD PHASE 1 MILL CREEK RM 17-18.5 DESIGN\100% DESIGN\SHEET FILES\10_SITE STABILIZATION.DWG
PLOT DETAILS: DEEP, ALEXA December 1, 2023 11:17 AM

RIPARIAN								
ACRES: 0.14								
GROWTH HABIT	**SCIENTIFIC NAME**	**COMMON NAME**	**INDICATOR STATUS***	**PERCENT COMPOSITION**	**PROPAGATION METHOD**	**SPACING (FT O.C.)**	**DENSITY PER ACRE**	**QUANTITY**
SHRUB	*SALIX EXIGUA*	COYOTE WILLOW	FACW	50	LIVE STAKES	5	871	122
	SALIX BOOTHII	BOOTH'S WILLOW	FACW	20	LIVE STAKES	5	348	49
	SALIX PROLIXA	MACKENZIE'S WILLOW	OBL	20	LIVE STAKES	5	348	49
	CORNUS ALBA	RED-OSIER DOGWOOD	FACW	10	LIVE STAKES**	5	174	24
HERBACEOUS	*CAREX NEBRASCENSIS (SEE NOTE 1)*	NEBRASKA SEDGE	OBL	20	PLUG	3	620	87
	CAREX UTRICULATA	NORTHWEST TERRITORY SEDGE	OBL	20	PLUG	3	620	87
	JUNCUS BALTICUS	BALTIC RUSH	FACW	20	PLUG	3	620	87
	JUNCUS ENSIFOLIUS	DAGGER-LEAF RUSH	FACW	20	PLUG	3	620	87
	GLYCERIA GRANDIS (SEE NOTE 1)	AMERICAN MANNAGRASS	OBL	20	PLUG	3	620	87

* INDICATOR STATUS BASED ON USACE 2020 NATIONAL WETLAND PLANT LIST (LICHVAR ET AL. 2020); INDICATOR STATUS FOR THE WESTERN MOUNTAINS, VALLEYS, AND COAST REGION.

** USE LIVE STAKES IF AVAILABLE; IF NOT AVAILABLE, SUBSTITUTE WITH CONTAINER GROWN PLANTS.

PLANTING NOTES:
1. PLANT OBLIGATE SPECIES (S. PROLIXA, C. NEBRASCENSIS, C. ULTRICULATA, AND G. GRANDIS) CLOSEST TO CHANNEL.
2. INTERMIX THE REST OF THE SPECIES THROUGHOUT BANK ZONE.

SEEDING NOTES:
1. CONTRACTOR TO APPLY SEED MIXES ABOVE IN DISTURBED PROJECT AREAS AS DIRECTED BY OWNER'S REPRESENTATIVE. DISTURBED AREAS TO ACCESS THE WORK FOR THE PROJECT AREA SHALL NOT EXCEED 2 ACRES.
2. BANK, OVERBANK, AND TRANSITION ZONES WILL BE SEEDED WITH THE RIPARIAN SEED MIX; THE TOE ZONE WILL NOT BE SEEDED.
3. THE UPLAND ZONE WILL BE SEEDED WITH THE UPLAND SEED MIX; IT WILL NOT BE PLANTED IN ADDITION TO SEEDING.
4. SEEDS SHALL BE APPLIED TO BARE SOIL AND MAY BE APPLIED BY DRILL OR BROADCAST.
5. SEED AT APPROXIMATELY 30 LBS/ACRE; FINAL QUANTITY OF SEED MIX WILL DEPEND ON TOTAL AREA SEEDED PER DIRECTION OF OWNER'S REPRESENTATIVE..
6. AFTER SEEDING, DRAG WITH HARROW OR OTHER SUITABLE IMPLEMENT TO COVER SEED TO A DEPTH OF 1/4 TO 1/2 INCH.
7. UPLAND ZONE WILL BE MULCHED FOLLOWING APPLICATION OF SEED.
8. ALL SEED MIXES SHALL BE CERTIFIED WEED-FREE.

SEED MIX		
ACRES: 1.06		
QUANTITY: 32 LBS*		
SCIENTIFIC NAME	**COMMON NAME**	**PERCENT COMPOSITION**
LEYMUS CINEREUS	GREAT BASIN WILDRYE	25
PSEUDOROEGNERIA SPICATA	BLUEBUNCH WHEATGRASS	25
ELYMUS ELYMOIDES	SQUIRRELTAIL	10
FESTUCA IDAHOENSIS	IDAHO FESCUE	10
KOELERIA MACRANTHA	PRAIRIE JUNEGRASS	10
ACHILLEA MILLEFOLIUM	YARROW	10
LUPINUS POLYPHYLLUS	BIGLEAF LUPINE	10

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

JOEL F. CAMERON — STATE OF WASHINGTON — 55590 — REGISTERED PROFESSIONAL ENGINEER — 11/30/2023 — EXPIRES: 09/10/2024

WALLA WALLA COUNTY CONSERVATION DISTRICT

ISSUED FOR CONSTRUCTION

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	11/30/23	ISSUED FOR CONSTRUCTION	AD	AD	JA/CM	CR

PHASE 1 MILL CREEK FLOODPLAIN IMPROVEMENTS DESIGN RM 17.0 - 18.5
NWS-2023-___ 45.0547, -118.1532

SITE STABILIZATION

DWG. NO.: L-102
CREATED: 11/30/2023
SHEET: 29 of 29

APPENDIX B: CONSTRUCTION SPECIFICATIONS

Upper Mill Creek RM 17-18.5 Floodplain Improvements

Final Construction Specifications

12-1-2023

Prepared for

WALLA WALLA COUNTY CONSERVATION DISTRICT
ESTABLISHED 1941

325 N. 13th Ave.
Walla Walla, WA

Prepared by

TETRA TECH

19803 North Creek Parkway
Bothell, WA

TABLE OF CONTENTS

Section No. Title Page

SECTION 01 11 00
SUMMARY OF WORK

PART 1 GENERAL

1.01 DESCRIPTION

A. This section provides a brief narrative summary of the contract work. The 1.5-mile-long Project reach is located along Mill Creek between River Miles (RMs) 17.0 to 18.5. The Project reach is upstream of the City of Walla Walla and the U.S. Army Corps of Engineers (USACE) Mill Creek Flood Control Project. The Project includes demolition and removal of impacted infrastructure; implementation of a series of large wood structures including revetments, log jams and 22-log bank habitat structures, and channel excavation. Construction shall take place both in the active channel and outside of it and requires work area isolation, including channel dewatering, fish transfer, and channel rewatering. Construction access requires temporary stream crossings, including temporary bridges, as well as temporary access routes and staging areas. Upon construction completion, disturbed areas within the Project area shall be decompacted and revegetated to stabilize disturbed conditions. The Contractor shall provide all labor, equipment, supervision, transportation, operating supplies, and incidentals to perform all work necessary on the areas specified herein. All aspects of the work shall be performed in an organized and systematic manner to assure that services are performed in a timely matter and comply with the technical specifications.

B. The project shall be sequenced based on the allowable In-Water Work Window (August 1 to August 15), and shall follow the general order below:

1. Prior to In-Water Work Window (before August 1)

    a. Complete pre-construction activities:

        - Construction staking, flagging of sensitive areas, contractor submittals, etc.
        - Mobilize to site and site preparation.
        - Install and maintain temporary erosion and sediment control (TESC) and temporary stormwater pollution prevention plan (SWPPP) best management practices (BMPs).

    b. Acquisition, hauling, and staging of large wood and other materials.

    c. Demolition and hauling of condemned infrastructure within the Project area.

    d. Excavation of pilot and drain channels outside of ordinary high water (OHW).

    e. Installation of revetment log structures, log jam structures, and 22-log bank habitat structures outside of OHW.

2. In-Water Work Window (August 1 to August 15)

    a. Install, monitor, and maintain TESC and sediment control BMPs.

    b. At designated work sites where fish may be present, install block nets and salvage fish (work to be completed by WWCCD), and construct elements as follows:

        - Install work area isolation and dewater work areas.
        - Prewash work areas, pump turbid water to an approved location, and

monitor for turbidity.
- Slowly reintroduce flow to the work areas, monitoring for turbidity.
- Remove work area isolation.
- Remove block nets.

c. Complete pilot channel and drain channel excavation within OHW.
d. Install revetment log structures, log jam structures, and 22-log bank habitat structures within OHW.
e. Prewash work areas, pump turbid water to an approved location, and monitor to ensure no turbid water returns to the stream.
f. Slowly reintroduce flow to the work areas, monitoring for turbidity.
g. Remove work area isolation.
h. Remove block nets.
i. Remove TESC and temporary SWPPP BMPs.

3. After In-Water Work Window (After August 15)

a. Seed and mulch disturbed areas.
b. Site clean-up and demobilization.
c. Plant trees and shrubs in the fall.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. Contract Documents shall herein be defined as the following:

Implementation Plan
Design Drawings
Technical Specifications
Construction Contract with either the Owner or Owner's Representative

B. The Contractor is advised that the contract work shall consist of the following:

Mobilization to and Demobilization from Project Site
Clearing and Grubbing within Project Area
Installation of Temporary Construction Fencing
Installation of Temporary Construction Bridges
Installation of Temporary Construction Access Routes
Installation and Maintenance of Construction Area BMPs
Construction and Maintenance of Material Storage Areas
Excavation of Pilot and Drain Channels
Installation of Floodplain and In-stream Structures
Finish Grading of Floodplain and Decompaction of Compacted Access Routes and Staging Areas
Site Restoration and Revegetation
Complete Project Area Cleanup and Repairs

Additionally, erosion control measures must be executed to the highest construction industry standards – great care must be taken to prevent excavated soil material from

entering the stream system. To ensure integrity of the stream channel and to reduce impacts to water quality and aquatic organisms, floodplain activities shall be completed separately from activities in the wetted channel. Activities in the floodplain shall occur before August 1st and after August 15th, whereas work in the wetted channel, or that requires crossing the wetted channel shall occur during the applicable In-Water Work window (August 1 to August 15). No in-stream work shall be conducted outside of this period. The Contractor shall notify the Owner in writing 10 working days before beginning any work activities.

C. For all construction activities, including those within the above listed in-stream work window, the Contractor shall be responsible for potential turbidity and sediment transport within and downstream of the physical limits of the project.

D. The Contractor shall not perform any work that is not defined in the Contract Documents without formal review and written approval by the Owner's Representative.

1.03 CONTROL OF WORK

A. Authority of Owner's Representative

1. The Owner's Representative has the authority to observe, test, inspect, approve, and accept the work. The Owner's Representative decides all questions about the quality and acceptability of materials, work performed, work progress, Contract interpretations, and acceptable Contract fulfillment. The Owner's Representative has the authority to enforce and make effective these decisions.

2. The Owner's Representative acts as a referee in all questions arising under the terms of the Contract. The Owner's Representative decisions shall be final and binding.

3. The Owner's Representative may pursue actions against the Contractor, including, but not limited to, the withholding of estimates and suspending the work, for noncompliance of the Contract.

4 The Owner's Representative may suspend the work without suspending working day charges for noncompliance of the Contract.

B. Review of Contract Documents and Field Conditions by Contractor

1. The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the Owner and shall at once report to the Owner's Representative errors, inconsistencies, or omissions discovered. If the Contractor performs any construction activity knowing or should have known it involves an error, inconsistency, or omission in the Contract Documents without such notice to the Owner's Representative, the Contractor shall assume full responsibility for such performance and shall bear the full costs for correction.

2. The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies, or omissions discovered shall be reported to the Owner's

Representative immediately.

3. The Contractor shall perform the Work in accordance with the Contract Documents and submittals approved pursuant to Section 01 33 00.

C. Supervision and Construction Procedures

1. The Contractor shall supervise and direct the Work using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work under the Contract, unless Contract Documents give other specific instructions concerning these matters.

2. The Contractor shall be responsible to the Owner and/or Owner's Representative for acts and omissions of the Contractor's employees, Subcontractors, and their agents and employees, and other persons performing portions of the Work under a contract with the Contractor.

3. The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Owner's Representative in the administration of the Contract, or by tests, inspections, or approvals required or performed by persons other than the Contractor.

4 The Contractor shall be responsible for inspection of portions of Work already performed under this Contract to determine that such portions are in proper condition to receive subsequent Work.

D. Owners Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven (7)-calendar day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may after such seven- day period, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case, an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Owner's Representative's additional services and expenses made necessary by such default, neglect, or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior review and confirmation by the Owner's Representative. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SUMMARY OF WORK

SECTION 01 14 00
WORK RESTRICTIONS

PART 1 GENERAL

1.01 DESCRIPTION

A. This section provides general Work Restrictions that shall be observed by the Contractor during performance of work for the duration of the Contract.

1.02 CONDUCT OF WORK

A. Restricted Work Periods

1. Completion of the in-stream components of the project shall be restricted to following period:

- Mill Creek August 1 to August 15

2. Contractor to coordinate in-stream work window with Washington Department of Fish and Wildlife (WDFW) district biologist before beginning work.

B. Restricted Work Areas

1. Completion of work adjacent to or on private property shall require coordination with the affected landowners. The Owner or Owner's Representative shall be the point-of-contact for communication with the landowners. Contractor shall obtain approval from the Owner or Owner's Representative before initiating communication with the landowners.

2. The Contractor and Owner's Representative shall coordinate the Project work schedule in order to notify stakeholders of when the work activities adjacent to or on the Project site is scheduled to occur.

1.03 TEMPORARY TRAFFIC CONTROL

A. Restricted Work Periods

1. Completion of the in-stream components of the project shall be restricted to following period:

- Mill Creek August 1 to August 15

2. Contractor to coordinate in-stream work window with WDFW district biologist before beginning work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF WORK RESTRICTIONS

SECTION 01 14 13
ACCESS TO SITE

PART 1 GENERAL

1.01 DESCRIPTION

A. This section describes the location of the project site, and the access routes the Contractor shall use during performance of work for the duration of the Contract.

1.02 CONDUCT OF WORK

A. Location of Project Work Site

1. Overall location of the project site is shown on the Drawings.

B. Directions to Project Work Site

1. From Walla Walla, take Highway 12 E toward Lewison/Airport. Turn Right onto Interchange Road and continue for approximately 0.1 miles. Turn left onto Mill Creek Road and continue for approximately 6.5 miles. The Project will be on the Right.

C. Restricted Access Areas

1. The project site is located on private property. All work and access to the property shall be coordinated with the Walla Walla County Conservation District (WWCCD). Access points shall be as shown on the Drawings and through direct coordination with Owner's Representative.

1.03 TEMPORARY TRAFFIC CONTROL

A. If required, this work consists of controlling and protecting public traffic adjacent to and within the project

1. Accommodate traffic according to Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD), approved traffic control plan, and this section. Perform work in a manner that ensures safety and convenience of the public. Keep existing roads open to all traffic during improvement work and maintain them in a condition that shall adequately accommodate traffic. Delays may not exceed 20 minutes at any one time followed by an open period of no less than 15 minutes. Accommodate public traffic on roads adjacent to and within the Project until the Project is accepted.

2. Submit traffic control plan to the Owner's Representative at least 10 calendar days prior to intended use. Perform no work that interferes or conflicts with traffic or existing access to the roadway surface until a traffic control plan has been approved.

3. Post construction signs and traffic control devices in conformance with MUTCD. All required signs shall be in place and approved prior to beginning work on project.

4. If the Contractor agrees in writing to allow public traffic to use a new road being constructed prior to completion, it shall be considered an existing road for traffic

control purposes.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 TEMPORARY TRAFFIC CONTROL

A. Install and maintain temporary traffic control devices adjacent to and within the project as required by the approved traffic control plan and the MUTCD. Install and maintain traffic control devices as follows:

1. Furnish and install traffic control devices before the start of construction operations.

2. All detours outside of clearing limits shall be approved in writing by the Contracting Officer as part of the traffic control plan.

3. Install only those traffic control devices needed for completing the Work.

4. Relocate temporary traffic control devices as necessary.

5. Remove devices that no longer apply to the existing conditions.

6. Immediately replace any device that is lost, stolen, destroyed, or inoperative.

7. Keep temporary traffic control devices clean.

8. Maintain traffic control devices during temporary closure period(s) when hauling trees along or crossing public roadways. Appropriate barricades and signs shall be erected and maintained as designated in the traffic control plan.

9. Remove all temporary traffic control devices upon contract completion or when approved.

10. When required, use flaggers certified by the American Traffic Safety Services Association, the National Safety Council, the International Municipal Signal Association, a state agency, or other acceptable organization. Perform the work described under MUTCD Part 6. Use type III, VII, VIII, or IX retroreflective sheeting on flagger paddles. Do not use flags. Flaggers must wear high visibility safety apparel as required by MUTCD 6E.02.

END OF ACCESS TO SITE

SECTION 01 14 20
SITE-SPECIFIC REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION

A. This section provides general Site-Specific Requirements that shall be observed by the Contractor during performance of work for the duration of the Contract.

1.02 CONDUCT OF WORK

A. Coordination

1. Coordination with agencies, other on-site Contractors, and Owner shall generally be made by Contractor through the Owner's Representative as expressed in the Contract Documents to assist Contractor with performance of the work with a minimum of interference and inconvenience. Contractor shall access the Project site at locations identified on the Drawings and by direct coordination with Owner's Representative management staff.

2. The project site is located on private property. All work and access to the property shall be coordinated with WWCCD.

B. Schedule

1. The Contractor shall propose work hours based on the Contractor's construction schedule to ensure completion of all in-stream work within the allowed in-water work window. The Contractor shall propose extended workdays and/or weekend work, if necessary, to meet the time constraints of the appropriate year in-water work period. Before work begins, the Contractor shall prepare and submit a construction schedule for the Project. The Contractor shall not begin any work until the construction schedule is approved by the Owner's Representative. The proposed construction schedule may not be approved if the Owner's Representative is not available to be on site during the proposed work hours.

1.03 GENERAL ACCESS REQUIREMENTS

A. The project site area is closely monitored by private landowners and Owner's Representatives. Contractor's personnel working at the site may be asked for appropriate identification. A list of all employees for the Contractor, suppliers, and vendor Representatives shall be provided to the Owner's Representative.

B. Irregular or Non-Routine Access

1. Access on an irregular basis and during other than established working hours shall require prior approval by Owner's Representative.

C. Maintenance of Access

1. Contractor shall not obstruct or interfere with access by others to existing facilities

adjacent to the Project site during the work under this Contract.

D. Vehicle Parking

1. Contractor's vehicles shall only park in approved areas as described by Owner or Owner's Representative.

1.04 COORDINATION AND COOPERATION WITH OTHER CONTRACTORS

A. Work by others may be performed in the vicinity of or adjacent to the Project site in concurrence with the scheduled performance of the Work under these Contract Documents. Contractor shall coordinate construction work with Owner's Representative.

1.05 CONSTRUCTION SCHEDULE REQUIREMENTS

A. Workflow

1. The Work shall be planned, scheduled, and performed to complete the Work within the requirements of these Contract Documents and the requirements of appropriate Federal, State, and local agencies. Contractor shall prepare and maintain a construction schedule. Work shall be completed within the timeframe as directed by the Owner.

B. Sequence of Work

1. Construction sequencing shall generally follow the sequence outlined in Section 01 11 00 Summary of Work.

1.06 PROTECTION OF PROPERTY

A. Contractor shall protect all property within or in the vicinity of the work site. Contractor shall ensure that property is not removed, damaged, destroyed, or prevented from its normal use unless so designated in the Contract Documents. All property adjacent to the work shall be protected, including, but not limited to, protection from construction-generated dust, debris, water, and vibration. Property includes land, utilities, trees, shrubs, landscaping, markers and monuments, natural features, monitoring wells, buildings, structures, signs, fences, site and drainage improvements, and other improvements, whether shown on the Drawings or not. No work shall be conducted in any wetlands, vegetation protection areas, or other restricted areas unless coordinated with and approved by the Owner's Representative.

B. Contractor shall confine operations to within the areas designated in the contract documents, and prevent the depositing of rocks, excavated materials, stumps, or other debris outside of these limits. Contractor shall retrieve material which falls outside of these limits and dispose of, or incorporate in the work, as directed by the Owner's Representative. Contractor shall preserve the scenic and natural environment along this construction project.

C. Contractor shall not allow objectionable material to enter any stream, river, lake, or other body of water. Contractor shall retrieve material which falls in these areas and dispose of, or incorporate in the work, and repair damage to vegetation or structures outside the project limits.

D. Contractor shall not operate equipment or otherwise disturb the natural vegetation and soil beyond the construction limits.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SITE-SPECIFIC REQUIREMENTS

SECTION 01 22 20
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 DESCRIPTION

A. The Bid Items described in this Section are intended to encompass all work necessary to construct the proposed conditions shown on the Contract Drawings and described in the Specifications. It is the responsibility of the Contractor to make a thorough investigation of the Contract Drawings and Specifications, and the Site, to determine the scope of work for all Bid Items.

B. Payment shall be made based on the quantities of work as measured in accordance with specified methods of measurement and the prices stipulated by the Owner. All other items of work shown on the Contract Drawings or required by Specifications shall be considered incidental to the items listed. This method of payment shall constitute complete compensation for all work shown on the Contract Drawings and provided in the Specifications or other Subcontract documents, and for all costs of accepting the general risks, liabilities and obligations expressed or implied.

1.02 SCHEDULE OF VALUES

A. Contractor shall prepare and submit a schedule of values at the kickoff meeting for each contracted phase corresponding to the project specification sections and any other major work items to be used as a basis for monthly pay requests. The construction quantities in the schedule of values shall be updated weekly and verified and signed off by both the Contractor and the Owner's Representative.

B. Contractor shall provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Specification table of contents. Provide multiple line items for subcontract amounts, where appropriate. Provide breakdown of costs by contracted phases.

C. The quantity to be paid is the quantity shown in the Schedule of Values per phase. The contract quantity shall be adjusted for authorized changes that affect the quantity or for errors made in computing this quantity. If there is evidence that a quantity specified as a contract quantity is incorrect, the Contractor shall submit calculations, drawings, or other evidence indicating why the quantity is in error and request, in writing, that the quantity be adjusted. The Owner reserves the right to review all Contractor submitted actual quantity measurements for review and payment.

D. Contractor shall submit copies of the schedule of values to Owner's Representative at earliest possible date, but no later than 15 calendar days before the date scheduled for submittal of initial pay request.

1.03 PAY REQUESTS

A. Each pay request shall be consistent with previous applications and payments as certified by Owner's Representative and paid for by Owner.

B. It shall be the Contractor's responsibility to prepare a monthly estimate of the percentage of work accomplished on each line item of the approved schedule of values. This estimate shall be submitted to the Owner's Representative each month as part of the pay request for review not later than the date established at pre-construction conference. The weekly construction quantities updated in the schedule of values that are updated weekly and verified and signed off by the Contractor and the Owner's Representative shall be used as the basis of the estimate. Owner's Representative shall verify all measurements and monthly estimate and provide for approval to the Owner within 30 calendar days of receiving monthly estimate.

1.04 DESCRIPTION OF BID ITEMS

A. This is a lump sum bid with lump sum and unit price pay items; therefore, the total lump sum price and all lump sum and unit price pay items submitted with the bid shall constitute full compensation for furnishing all labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, test and reports, and shall include all Contractor costs, overhead, and profit needed to perform all work required for each of the lump sum and unit price items, which shall be completed by phase, with each phase contracted separately. Seeding and planting shown in the plan set details for large wood structures shall be incidental to the lump sum payment for each large wood structure.

B. Contract quantities shall be adjusted only when the variation in the bid items and actual work is of 15 percent or more.

C. Contractor shall give a price per hour for unforeseen work that is encountered during the contract performance and not included in the other sub-items. Hourly work must be authorized in advance by the Owner. The Owner does not guarantee that any hourly work shall be ordered and reserves the right to reduce or eliminate entirely the work under these items with no adjustment in contract unit price.

D. Mobilization: Payment shall be made for mobilization in a lump sum per phase. When 10 percent of the original contract amount is earned from other bid items, 100 percent of the mobilization item may be paid.

E. Payment for lump sum bid items may be made in accordance with the verified monthly estimate of percentage of work accomplished (see 1.03.B above).

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF MEASUREMENT AND PAYMENT

SECTION 01 25 10
CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 DESCRIPTION

A. This section describes the process and procedures to be followed by the Contractor and Owner's Representative in the event a contract modification is required during project implementation.

B. A contract modification is defined as a change order or amendment to the original Contract Documents to add costs to the construction contract for expanding the scope of work or to subtract costs to the construction contract for reducing the scope of work.

1.02 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall keep a copy of the Contract Documents and bid sheet at the construction site during the entire implementation period.

B. During each weekly progress meeting, the Contractor shall provide a summary of work completed to date, a summary of work to be completed in the next week, and a summary of work to be completed within the next month.

C. During the discussion of work to be completed in the next week and next month provided by the Contractor during the weekly progress meeting, any work activities not included in the current Contract Documents shall be identified by the Contractor.

D. After the activities not included in the current Contract Documents have been identified by the Contractor, the Contractor shall, within seven (7) calendar days, prepare a description of the additional work required and an itemized cost to complete the additional work.

E. The Contractor shall submit the description of work and itemized costs to the Owner's Representative for review.

F. The Contractor shall not proceed with any work not defined in the Contract Documents without review and written approval by the Owner's Representative.

1.03 OWNER'S REPRESENTATIVE REVIEW

A. Upon receipt of the description of additional work and itemized costs, the Owner's Representative shall complete a review of the materials.

B. Review of the submitted materials shall be completed by the Owner's Representative within seven (7) calendar days from the date of submittal.

C. If, during the review of the submitted materials, the Owner's Representative has questions or requires additional information to complete their review, they shall contact the Contractor within seven (7) calendar days from the date of the submittal.

D. A response to the Contractor's submittal by the Owner's Representative shall be required within seven (7) calendar days from the date of the submittal.

1.04 OWNER'S REPRESENTATIVE APPROVAL

A. After the Owner's Representative has reviewed the Contractor's submittal and verifies that the work included in the submittal is not included in the current scope of work, the Owner's Representative shall approve the submittal.

B. After the submittal has been approved, the Owner's Representative shall complete a change order or contract amendment to cover the work items in the submittal.

C. Any change order or contract amendment shall be completed by the Owner and ready for signature within 21 calendar days from the date of the submittal.

D. Adhering to the time schedule described above is necessary to keep the project implementation on schedule and prevent the Contractor from completing a critical component of the project.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF CONTRACT MODIFICATION PROCEDURES

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 GENERAL

1.01 DESCRIPTION

A. This section describes the process and procedures to be followed by the Contractor, Owner's Representative, and Owner for the preparation, submittal, and payment of monthly invoices for completed construction work.

B. During the pre-construction meeting, the Owner's Representative shall identify the monthly submittal date for invoices to be submitted by the Contractor. This date shall account for submittal, review, approval, and payment processing time to expedite payments to the Contractor.

1.02 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall keep a copy of the construction implementation spreadsheet at the construction site during the entire implementation period. This spreadsheet shall show daily progress on schedule of value line items.

B. During each weekly progress meeting, the Contractor shall provide a summary of work completed during the prior week and a total since the last invoice period.

C. At the weekly progress meeting immediately before the monthly submittal date, the Contractor shall present a draft invoice to the Owner's Representative. This draft invoice shall show the percentage complete of schedule of value items included in the payment request.

D. The total percent complete shown on the draft invoice shall be supported by the construction implementation spreadsheet submitted with the draft invoice.

1.03 OWNER'S REPRESENTATIVE'S REVIEW

A. During the weekly progress meetings, the total percentage of work completed recorded by the Owner's Representative and Contractor shall be reconciled and approved.

B. Upon verification of the total percent complete, Owner's Representative shall sign an invoice approval form and forward the invoice to the Owner's Accounts Payable Section.

C. The Owner's Accounts Payable Section shall have two (2) working days to review and approve or reject the invoice.

1.04 OWNER'S REPRESENTATIVE APPROVAL

A. The Owner's Representative shall be expected to attend and participate in the Weekly Progress Meetings and keep current on the project implementation activities.

B. Upon receipt of the approved invoice from the Owner's Representative, the Owner's Accounts Payable Section shall review the submitted invoice and construction implementation spreadsheet.

C. The Owner's Accounts Payable Section shall have two (2) working days to review and approve or reject the invoice after receipt from the Owner's Representative.

D. After approval, the Owner's Representative shall prepare all necessary administrative forms to initiate payment processing within the Owner's Accounts Payable Section.

E. The Owner's Representative shall have three (3) working days to prepare the necessary administrative forms and secure signatures to initiate the payment process.

1.05 PAYMENT PROCESSING

A. Upon submittal of the administrative forms and Contractor invoice, payment processing shall follow the standard operating procedures of the Owner's Accounts Payable Section.

B. If payment has not been received by the Contractor within four (4) working days of the estimated payment date defined in Section 1.01 B., the Owner's Representative shall contact the Owner's Accounts Payable Section to determine the reason for the delay.

C. The Owner's Representative shall make every effort possible to resolve any issues that are holding up payment to the Contractor as quickly as possible.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF PAYMENT PROCEDURES

SECTION 01 31 19.13
PRE-CONSTRUCTION MEETING

PART 1 GENERAL

1.01 DESCRIPTION

A. Not more than five (5) calendar days after a Notice to Proceed has been issued to the Contractor, but earlier if practicable, a mandatory pre-construction meeting shall be scheduled by the Owner's Representative. This meeting shall occur not less than ten (10) calendar days prior to work commencing.

B. The Owner's Representative shall preside at the pre-construction meeting.

C. Present to represent the Contractor shall be at least the Project Superintendent, a representative with full contract authority to speak for each of their principal subcontractors, and other representatives as he/she may deem appropriate.

D. The Owner's Representative and other invited parties shall be present as required.

E. Proceedings of the meeting shall be recorded and distributed to interested parties.

1.02 AGENDA

A. Both Owner's Representative and Contractor shall be prepared to speak to the following:

1. Name and Field Address of Job Superintendent
2. Emergency Phone and/or operator
3. Date of Construction Start
4. Date of Notice to Proceed
5. Notification of Utilities, Concerned Fire, Police, Schools, etc.
6. Coordination with other Contractors
7. Permits: County, City, all Government Agencies as required
8. Inspector: name, authority
9. Field office (location)
10. Submittals
11. Responsibility for lines and grades
12. Periodic progress payments including date for submittal
13. Construction Progress Schedule (bar graph or C.P.M.)

14. Safety Requirements and Special Hazards
15. Insurance and Bonds
16. Traffic Control
17. Construction Signs
18. Drawings revised to conform to construction records
19. Beneficial Occupancy
20. Retention of Contract Records
21. Guarantees and Warranties
22. Testing
23. Progress Meetings
24. Complaint Procedure
25. Job Photos
26. Other Matters Concerning Construction

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF PRE-CONSTRUCTION MEETING

SECTION 01 31 19.23
PROGRESS MEETINGS

PART 1 GENERAL

1.01 DESCRIPTION

A. Weekly Progress Meetings shall be held at the job site during construction.

B. The Owner's Representative shall preside at Progress Meetings.

C. Proceedings of meeting shall be recorded and distributed to interested parties.

1.02 MEETINGS

A. Meetings other than Weekly Progress Meetings (if required) shall be scheduled each week at mutually agreed times.

B. Location of meetings: As designated during preconstruction conference.

C. Attendance:

1. Owner's Representative

2. Contractor

3. Other Contractors (if any)

4. Subcontractors as pertinent to agenda

5. Safety Representative (Optional)

6. Representatives of Governmental or other Regulatory Agencies (Optional)

1.03 MINIMUM MEETING AGENDA

A. Review and approve minutes of previous meeting.

B. Review work progress since last meeting.

C. Note field observations, problems, and decisions.

D. Identify problems which impede planned progress.

E. Identify potential ways to increase construction efficiencies.

F. Develop corrective measures and procedures to regain planned schedule.

G. Revise Construction Schedule as indicated.

H. Plan progress during next work period.

I. Coordinate projected progress with other Contractors.

J. Review submittal schedules, expedite as required to maintain schedule.

K. Maintaining of quality and work standards.

L. Review proposed changes for:

1. Effect on Construction Schedule

2. Effect on Schedule of Values

3. Effect on Completion Date

M. Complete other current business.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF PROGRESS MEETINGS

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 DESCRIPTION

A. This Section includes specifications for the general requirements and procedures for preparing and submitting construction information and data for information and review. Other requirements for submittals are specified under applicable Sections of the Specifications.

B. Submittals are as specified throughout the Contract Documents and may not be included in this specification.

1.02 SUBMITTAL REQUIREMENTS

A. Schedule of Submittals: Within ten (10) calendar days after the effective date of Notice to Proceed, Contractor shall submit a completed submittal schedule and list of products for all items requiring Owner's Representative's review, as follows:

1. Work Plan, Shop Drawing, or other Submittal identification including description of the item. Include name of manufacturer, trade name, and model number, if applicable.

2. Specification section references.

3. Intended submission/resubmission date(s).

4. Order release date.

5. Lead time to delivery/anticipated delivery date(s).

6. Highlight items that require expedited review to meet the project schedule and are on the critical path.

B. These schedules shall be presented in a form that is readily reproducible and shall be updated and sent to Owner's Representative on a bi-weekly basis (twice per month). Identify all submittals that are required by the Contract Documents and determine the date on which each submittal shall be submitted.

C. Professional Seal Required: Submittals involving engineering expertise, such as excavation support structures, and load calculations, shall be sealed and signed by a Professional Engineer, currently registered in the State of Washington, for the discipline involved.

D. Review Stamp and Action Block Space: Include a 5-inch square blank space, in the lower right corner, just above the title block, in which Engineer may indicate the action taken.

E. Review Period:

1. Prepare submittals sufficiently in advance so that review may be given before commencement of related work.

2. Allow ten (10) calendar days after receipt by Owner's Representative for review of each submittal.

3. Contractor shall be responsible for determining whether or not certain submittals require longer review periods. Where longer review periods are required, Contractor shall schedule the Work accordingly, so that the Work and construction schedules are not adversely impacted.

F. Submittal Delivery: Ship submittals prepaid or deliver by hand directly to Owner's Representative.

G. Transmittal Form: Accompany submittals with the transmittal forms provided by Owner's Representative.

H. Changes in Reviewed Submittals: Changes in reviewed submittals shall not be permitted unless those approved submittals with changes have been resubmitted and reviewed, in the same manner as the original submittal.

I. Supplemental Submittals: Supplemental submittals initiated by Contractor for consideration of corrective procedures shall contain sufficient data for review. Make supplemental submittals in the same manner as initial submittals.

J. Incomplete submittal packages shall be returned without review.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. Contractor's Review:

1. Each submittal shall be reviewed, stamped, and signed as reviewed and approved by Contractor prior to submission.

2. If the submittal is designated to be sent to Owner's Representative for information, approval by the designated approval authority shall take place before submission to Owner's Representative.

3. Contractor shall coordinate each submittal with the requirements of the Work, placing particular emphasis upon ensuring that each submittal of one trade is compatible with other submittals of that trade and with the submittals of other trades. Ensure submittal is complete with all relevant data required for review.

4. Review of drawings and associated calculations by Engineer shall not relieve Contractor from the responsibility for errors or omissions in the drawings and associated calculations, or from deviations from the Contract Documents, unless submittals containing such deviations were submitted to Engineer and the deviations were specifically called to the attention of Engineer in the letter of transmittal and approved by Engineer as a Contract change.

5. Contractor's liability in case of deviations in the submittals from the requirements of the Contract Documents is not relieved by Engineer's review of submittals containing deviations, unless Engineer expressly approves the deviations by issuing a Change

Order.

6. Contractor shall be responsible for the correctness of the drawings, for shop fits and field connections, and for the results obtained by the use of such drawings.

B. Submittal Quantities: Unless noted otherwise, Contractor shall submit three copies of all submittals. Where permits and licenses and other such documents are obtained in Owner's name, submit the original and five copies.

C. Distribution of Submittals after Review: Distribute prints or copies of reviewed submittals, bearing Engineer's or designated approval authority's stamp and signature, to affected and concerned subcontractors, suppliers, and fabricators; and to affected and concerned members of Contractor's workforce.

D. Maintain at the site of the work a complete, up-to-date, organized file of all past and current submittals including an index and locating system which identifies the status of each submittal:

1. Assign a sequential number to each submittal.

2. Assign a revision number, using an alphanumeric sequence (e.g., 15, 15A, 15B, etc.) to all resubmittals.

1.04 ENGINEER'S REVIEW

A. Submittals shall be reviewed for conformance with requirements of the Contract Documents. Review of a separate item shall not constitute review of an assembly in which the item functions. Review shall not relieve Contractor from Contractor's responsibility for accuracy of submittals, for conformity of submittals to requirements of Contract Documents, for compatibility of described product with contiguous products and the rest of the system, or for prosecution and completion of the Contract in accordance with the Contract Documents.

B. Engineer shall indicate their reviews of submittals and the action taken by means of their review stamp. The review stamp shall be affixed by Engineer, the action block shall be marked, and the stamp shall be signed and dated.

C. The review-stamp action-block marks shall have the following meanings:

1. The mark NO EXCEPTIONS TAKEN means that every illustration and description appear to conform to the respective requirements of the Contract Documents; that fabrication, assembly, manufacture, installation, application, and erection of the illustrated and described product may proceed; and that the submittal need not be resubmitted.

2. The mark EXCEPTIONS AS NOTED - RESUBMISSION NOT REQUIRED means that every illustration and description appear to conform to the respective requirements of the Contract Documents upon incorporation of the reviewer's corrections, and that fabrication, assembly, manufacture, installation, application, and erection of the illustrated and described product may proceed. Submittals so marked need not be resubmitted unless Contractor challenges the reviewer's exception.

3. The mark EXCEPTIONS AS NOTED - RESUBMISSION REQUIRED means that every illustration and description appear to conform to the respective requirements of the Contract Documents, and that fabrication, assembly, manufacture, installation, application, and erection of the illustrated and described product may proceed after incorporation of the reviewer's corrections and verification by Engineer that the reviewer's corrections have been properly incorporated in the submittal. Resubmission is also required if Contractor challenges the reviewer's corrections.

4. The mark REJECTED means that the submittal is deficient to the degree that the reviewer cannot correct the submittal with a reasonable degree of effort, has not made a thorough review of the submittal, and that the submittal needs revision and is to be corrected and resubmitted.

D. Contractor shall attend meetings as requested by Owner's Representative to address issues related to the review of submittals.

E. Owner's Representative shall return submittals to Contractor within ten (10) calendar days after submittals have been received.

F. Contractor shall include ten (10) calendar days in its schedule for Owner and other parties to review submittals and re-submittals.

G. No schedule extensions shall be permitted for poorly prepared, incomplete, or inaccurate submittals.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL PROCEDURES

A. Contractor's submittal schedule shall include the following submittals.

1. Schedule of Values

2. Construction schedule

3. Weed-free material source certification

4. Site Access Plan

5. Material Storage/Staging Plan

6. Traffic Control Plan

7. Spill Prevention, Control, and Countermeasures (SPCC) Plan

8. Stormwater Pollution Prevention Plan (SWPPP)

9. Washington Department of Ecology Construction Stormwater General Permit (CSWGP)

10. Temporary Erosion and Sediment Control (TESC) Plan

11. Dewatering, Stream Diversion, and Work Area Isolation Plan
12. Seed Mix Certification
13. Habitat Feature Material Certification (Large Wood, Ballast Alluvium, Boulders,)
14. Surveyor Credentials
15. As-Built Record Data and Drawings

END OF SUBMITTAL PROCEDURES

SECTION 01 35 43
ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.01 DESCRIPTION

A. This section describes Environmental Protection work required to minimize environmental pollution and damage resulting from Contractor's operations during construction.

1.02 GENERAL REQUIREMENTS

A. Contractor shall perform the work, minimizing environmental pollution and damage as the result of construction operations, in accordance with these Drawings and Specifications and applicable local, state, and federal laws. Environmental pollution and damage are the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to all life; affect other species of importance to humankind; or degrade the utility of the environment for aesthetic, cultural and/or historical purposes. The control of environmental pollution and damage requires consideration of land, water, and air, and includes management of visual aesthetics, noise, solid waste, as well as other pollutants. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract. Contractor shall ensure compliance with this section by Subcontractors.

B. Permits

1. Contractor shall be responsible for obtaining a Washington Department of Ecology Construction Stormwater General Permit (CSWGP). Contractor shall obtain all needed certifications and licenses as required by state and local jurisdictions. Contractor shall cooperate with WWCCD and maintain compliance with all applicable permit requirements for the Project.

2. Contractor shall keep copies off all contract documentation, permits, and approved submittals onsite during all construction activities and available for inspection.

C. Notification

1. Owner’s Representative shall notify Contractor in writing of any observed noncompliance with the previously mentioned federal, state, or local laws or regulations, permits, and other elements of the environmental protection specifications. Contractor shall, after receipt of such notice, inform Owner’s Representative of proposed corrective action and take such action when approved. If Contractor fails to comply promptly, Owner’s Representative may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted, or costs or damages allowed to Contractor for any such suspensions. Failure of Owner’s Representative to notify Contractor of noncompliance does not relieve Contractor of full responsibility of maintaining compliance conditions and work methods.

1.03 SUBMITTALS

A. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

1. SWPPP, Washington Department of Ecology Construction Stormwater General Permit (CSWGP), and TESC Plan

a. The Contractor shall secure the project area at the end of every workday to stabilize the project area to minimize impacts in case a high-water storm event occurs. The Contractor shall be required to prepare and implement the SWPPP to keep sediment from entering the channel during rain events.

b. Contractor shall submit a SWPPP, CSWGP Permit, and all TESC Plans within ten (10) calendar days of Notice to Proceed. All erosion control plans shall be approved before work can begin. Plan shall be consistent with the requirements and meet the satisfaction of Owner's Representative.

c. TESC Plans shall include all measures necessary to protect resources and improvements. This shall include:

(1) The construction activities and sequence of implementation relating to specific erosion control measures.

(2) The location and type of permanent controls to be implemented during construction.

(3) The location and type of temporary controls to be implemented during construction.

(4) Detailed dewatering plan.

(5) Description of monitoring plan.

2. SPCC Plan

a. Contractor shall submit an SPCC Plan within ten (10) calendar days of Notice to Proceed. The SPCC Plan shall meet all applicable U.S. Environmental Protection Agency (EPA) requirements, must be certified by a registered professional engineer, and shall include safe mobile fueling of equipment procedures, including inventory, storage, and handling. The Plan shall describe secondary containment procedures to be used during mobile fueling to protect nearby wetlands and other surface water bodies. Plan shall be consistent with the requirements and meet the satisfaction of Owner's Representative.

b. The Contractor shall be required to prepare an emergency spill containment kit, to be always located on the construction site, and prepare an SPCC Plan, addressing prevention and cleanup of accidental spills. If a spill of petroleum product shall occur in water, Contractor shall immediately notify the Owner's Representative and appropriate state agencies.

1.04 LAND RESOURCES

A. Contractor shall confine all activities to areas defined by the Drawings and Specifications. Prior to the beginning of any construction, Contractor shall identify the land resources to be preserved within the work area. Except in areas indicated on the Drawings or specified to be cleared, Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, wetlands, and landforms without permission. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized by the Owner's Representative. Where such emergency use is permitted, Contractor shall always provide effective protection for land and vegetation resources as defined in the following subparagraphs. Stone, earth, or other material displaced into uncleared areas shall be carefully removed and properly disposed of by Contractor at no additional cost to the Owner.

B. Work Area Limits

1. Prior to construction, Contractor shall mark the areas that are not to be disturbed under this contract, as identified on the Drawings and by Owner's Representative during the pre-construction meeting. Isolated areas within the general work area which are to be saved and protected shall also be marked or fenced. Monuments and markers not scheduled for abandonment on the Drawings and Specifications shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, the markers shall be visible. Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

C. Landscape

1. Trees, shrubs, vines, grasses, landforms, wetlands, and other landscape features indicated and defined on the Drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques.

D. Unprotected Erodible Soils

1. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils. Clearing of such areas shall progress in reasonably sized increments as needed to use the developed areas as approved by Owner's Representative.

E. Disturbed Areas

1. Contractor shall effectively prevent erosion and control sedimentation through approved methods, which shall be included in the TESC Plan, including, but not limited to, the following:

a. Retardation of runoff and prevention of runoff channelization. Runoff from the construction site or from storms shall be retarded by means of site perimeter silt fencing, straw wattles, fiber rolls, straw bales, and the preservation of a vegetated buffer area around the site, and by any measures required by area-wide Drawings under the Clean Water Act. Straw mulch, wood chips, plastic sheeting, rolled erosion control products (i.e., erosion control blankets or mats), mid-slope

sediment fences, fiber rolls, or wattles shall also be employed for temporary soil stabilization if an area is to remain unworked for longer than one week.

b. Erosion and sedimentation control devices. Contractor shall install temporary erosion and sedimentation control features as indicated on the Drawings or directed by the Owner's Representative. Erosion and sedimentation control devices shall be checked daily and maintained throughout the duration of the project to prevent sediments from entering the stream channel. Temporary erosion and sedimentation control devices indicated on the Drawings are typical, Contractor shall implement TESC to meet all regulatory requirements.

c. Cleanup of roadways. Contractor shall maintain roads and parking areas traveled by construction equipment free of debris, tracked mud, and spillage. Cleanup of roadways shall be performed daily at a minimum. Any damage to public roadways caused by Contractor's equipment shall be restored at Contractor's expense.

F. Contractor Facilities and Work Areas

1. Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the Drawings or as directed by the Owner's Representative. Temporary movement or relocation of Contractor's facilities shall be made only when approved by the Owner's Representative. Borrow areas, if required, shall be managed to minimize erosion and to prevent sediment from entering nearby waters. Spoil areas shall be managed and controlled to limit spoil intrusion into areas designated on the Drawings and to prevent erosion of soil or sediment from entering nearby waters. Spoil areas shall only be developed with written approval of Owner's Representative. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas from despoilment.

1.05 WATER RESOURCES

A. Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters. Monitoring of active streams, wetlands, and tributaries affected by construction shall be Contractor's responsibility.

B. If at any time because of project activities fish are observed in distress, a fish kill occurs, or water quality problems develop (including equipment leaks or spills), operations shall cease, and the Owner's Representative shall be notified immediately, and the following agency shall be contacted:

Washington Department of Fish and Wildlife Eastern Region 1; Contact: 509-892-1001.

C. The discharge or release of oil or petroleum hydrocarbons into or on the surface of waters of the state is prohibited. If visible oil sheen is observed beyond the limits of the construction activity, then all appropriate actions to stop, contain, and cleanup the oil shall be taken.

D. Mobile Equipment Fueling

1. Contractor shall service all equipment only in the areas approved by the Owner's

Representative. No mobile equipment fueling shall take place over or within 150 feet of stream channels or wetlands. All equipment fueling shall be conducted using secondary containment to capture potential fuel spills. All mobile equipment fueling locations shall be pre-approved by the Owner's Representative.

2. Fuel hoses, oil drums, oil or fuel transfer valves and fittings, and all other equipment, etc., shall be checked daily for drips or leaks, and shall be maintained and stored properly to prevent spills into state waters.

3. All vehicles carrying fuel shall have specific equipment and materials needed to contain or clean up any incidental spills at the project site.

4. All pumps and generators used in or near streams shall always have appropriate spill containment structures and/or absorbent pads in place during use.

E. Equipment used for this project shall be well maintained and, to the maximum extent possible, prevented from leaking petroleum-based products that could result in environmental contamination.

1. Synthetic hydraulics - hydraulic oil in the track-mounted excavators that are utilized during construction must meet or exceed stringent acute aquatic toxicity (L-50), which is inherently biodegradable. Example: Chevron Clarity or equivalent. (Note: Compliance with specification may be tested by Owner's Representative).

2. All equipment used for instream work shall be cleaned of external oil, grease, dirt, and mud, prior to arriving at the project site. All equipment shall be inspected by the Owner's Representative before unloading at the site. Any leaks or accumulations of grease shall be corrected before entering streams or areas that drain directly into waterways.

3. All equipment shall be fueled outside of stream-adjacent riparian areas and wetland areas. Specific fueling areas may be approved and designated by the Owner's Representative. When not in use, vehicles and fueling equipment shall be stored in a designated staging area. The staging area shall be in an area that shall not deliver fuel, oil, etc. to streams.

4. Oil-absorbing floating booms, and other equipment such as pads and absorbent "peanuts" appropriate for the size of the stream, shall be available on-site during all phases of construction. For small streams with few pools or slack water, booms may not be effective. Use pads and straw bales to anchor booms if necessary. Booms shall be placed in a location that facilitates an immediate response to potential petroleum leakage.

F. The Contractor is solely responsible for all spills or leaks that occur during the performance of this contract. The Contractor must clean up spills or leaks in a manner that complies with Federal, state, and local laws and regulations and to the satisfaction of Owner's Representative. Any spills resulting in a detectable sheen on water shall be reported to Owner's Representative, the EPA National Response Center (1-800-424-8802) and Washington State Department of Ecology (Ecology) reporting line (1-800-645-7911). Any

spills shall be reported to Ecology and cleanup shall be initiated within 24 hours of the spill. When available, provide copies of all spill related clean up and closure documentation and correspondence from regulatory agencies.

G. Washing Water

1. Contractor shall ensure that wash water containing oils, grease, or other hazardous materials resulting from wash down of equipment or working areas shall be contained for proper disposal or treatment and shall not be directly discharged into state waters, storm drains, or any part of the project site.

H. Diversion Operations

1. Construction operations for dewatering and rewatering shall be always controlled. Contractor shall be responsible for limiting the impacts of water turbidity and contaminants known to be present at the site on habitat for wildlife and on water quality for discharge and downstream use.

2. Contractor shall construct and maintain cofferdams as necessary and as shown on the Drawings to divert and de-water fish isolation areas for all work activities within the wetted channel. Water removed from within the isolated work area shall be routed to an area to an area approved by the Owner's Representative to allow removal of fine sediment and other contaminants. The existing flow downstream from the project area shall be maintained throughout construction. The diversion and dewatering shall remain in place until in-stream restoration work is complete, and Owner's Representative approves removal of the system.

3. Rewatering of the isolated work area shall occur slowly and under the direct supervision/approval of the Owner's Representative. This process shall occur over sufficient time as to prevent excessive turbidity downstream of the work area.

I. Fish and Wildlife

1. Contractor shall minimize interference with, disturbance to, and damage of fish and wildlife. Both resident and anadromous fish are present within the project limits.

J. No excavated material shall be placed in the channel bottom that would divert the stream and cause erosion.

1.06 AIR RESOURCES

A. Equipment operation and activities or processes performed by Contractor in accomplishing the specified construction shall be in accordance with the State of Washington air quality rules and all Federal emission and performance laws and standards. Ambient air quality standards set by the EPA shall be maintained. Monitoring of air quality shall be Contractor's responsibility. All air areas affected by the construction activities shall be monitored by Contractor.

B. Particulates

1. Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials shall be always controlled, including weekends, holidays, and hours when work is not in progress. Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from airborne particulates which would cause the air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type or other methods shall be permitted to control particulates in the work area if approved by the Owner's Representative. Sprinkling, to be efficient, must be repeated to always keep the disturbed area damp. Contractor must have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs.

C. Hydrocarbons and Carbon Monoxide

1. Hydrocarbons and carbon monoxide emissions from equipment shall be always controlled to Federal and State allowable limits.

D. Sound Intrusions

1. Contractor shall keep construction activities under surveillance and controlled to minimize environment damage by noise, in accordance with all applicable Federal, State, and local regulations.

1.07 WASTE DISPOSAL

A. Solid Wastes

1. Solid wastes shall be placed in containers that are emptied on a regular schedule. Handling and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste shall become co-mingled with solid waste. Contractor shall transport solid waste, including clearing debris, off Owner-controlled property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal.

B. Hazardous Materials Used by Contractor

1. Contractor shall take sufficient measures to prevent spillage of any materials of construction containing hazardous and toxic materials during operations (i.e., hydraulic fluid, ethylene glycol, etc.) and shall collect any such spilled materials in suitable containers, observing compatibility. Contractor shall inform Owner's Representative of any hazardous waste generated during construction and request direction from Owner regarding proper transport and disposal. Spills of hazardous or toxic materials shall be immediately reported to Owner's Representative and Owner. Cleanup and cleanup costs due to spills shall be Contractor's responsibility.

C. Burning

1. Burning shall not be permitted.

1.08 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

A. The Owner shall provide an Archaeological Inadvertent Discovery Plan (IDP). If cultural artifacts are identified during the work, Contractor shall follow the steps identified in the IDP. These steps include stopping all work in the vicinity of the find and taking precautions to preserve all such resources as they existed at the time they were first pointed out until an investigation can be completed. Contractor shall provide and install protection for these resources and be responsible for their preservation during the life of the contract. If during excavation or other construction activities any previously unidentified or unanticipated resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rocks or coral alignments, paving's, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, Contractor shall immediately notify the Owner's Representative. While waiting for instructions Contractor shall record, report, and preserve the finds in accordance with the National Historic Preservation Act and 43 Code of Federal Regulations Subtitle A Part 7, Protection of Archeological Resources.

1.09 FIRE CONTROL

A. The Contractor shall immediately extinguish, without expense to Owner, all fires on or in the vicinity of the project which are caused by Contractor's employees, whether set directly or indirectly because of Contractor operations. The Contractor may be held liable for all damages and costs of additional labor, subsistence, equipment, supplies, and transportation resulting from fires set or caused by the Contractor's employees or resulting from contract operations.

B. At all times during closed fire season period, as specified by State law, the Contractor shall comply with each of the following provisions to the extent applicable to the Contractor's operation under the contract.

1. Fire Tools. The Contractor shall provide for each employee in the contract area at least one approved hand tool of a type appropriate in the contract area, such as shovel, pulaski, or axe. Tools required and furnished under (2) and (4) below, shall count toward fulfillment of the above requirement.

2. Fire Extinguishers and Tools on Mobile or Stationary Equipment. Each unit of powered equipment used in connection with this contract, including automobiles, trucks, tractors, etc., shall be equipped with serviceable tools and fire extinguishers as follows:

    a. One - fire extinguisher, dry chemical type of not less than 2-1/2 pound capacity with a 4 BC or higher rating.

    b. One - shovel, round point #0 lady or equal.

    c. One - axe, 2 pounds or over, 26-inch minimum length, or one pulaski.

    d. One - water container (at least 1-gallon capacity), not required with stationary

equipment.

3. Spark Arresters. Each internal combustion engine shall be provided with a spark arrester or spark-arresting device.

4. Power saws. For each power saw used in connection with this contract, the following shall be provided:

   a. One - shovel, round point #0 lady or equal. Shovel must be immediately available for use.

   b. One - Fire extinguisher, containing not less than 8 ounces of extinguisher fluid, or a dry chemical powder-type of not less than 1-pound capacity. The extinguisher must be immediately accessible to the saw operator at all times.

5. Smoking. Smoking shall not be permitted within the contract area except on surfaced or dirt roads, at staging areas, within closed vehicles, or at other posted places, and shall never be allowed while working or traveling on foot.

6. Welding. Welding or use of cutting torches shall be permitted only in areas that have been cleared or are free of all material capable of carrying fire. Flammable debris and vegetation must be removed from within a minimum of ten (10) feet radius of all welding and cutting torch operations. A shovel and a 5-gallon standard backpack water container (filled) with handpump attached shall be immediately available for use in the event of a fire start.

1.10 POST-CONSTRUCTION CLEANUP

A. Contractor shall clean up all areas used for construction.

1.11 RESTORATION OF LANDSCAPE DAMAGE

A. Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work areas.

1.12 TRAINING OF CONTRACTOR PERSONNEL

A. Contractor shall advise their personnel regarding all pertinent phases of environmental protection required in the Contract Documents. The training shall include methods of detecting and avoiding pollution, proper fueling techniques at this site, familiarization with pollution standards, both statutory and contractual, and installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental pollution control.

PART 2 PRODUCTS

2.01 FILTER FABRIC FENCE

A. Geotextile

1. Manufacturer’s fabric specifications must be submitted for approval and must be available on-site.

2. Geotextile shall be a woven monofilament or non-woven fabric. Slit-film fabric shall not be used.

3. Apparent opening size (AOS), American Society for Testing and Materials [ASTM] D-4751): 100

4. Water permittivity (ASTM D-4491): 0.02 sec-1 minimum

5. Grab tensile strength (ASTM D-4632): 100 pounds minimum

6. Grab tensile elongation (ASTM D-4632): 30 percent maximum

7. Ultraviolet resistance (ASTM D-4355): 70 percent minimum

B. Posts: 2- by 4-inch wood or steel fence posts

C. Wire Mesh Backing: 14 gauge with 2-inch by 2-inch square openings

2.02 SANDBAGS

A. Sandbags shall be burlap or polypropylene and filled to a minimum weight of 30 pounds.

2.03 EROSION CONTROL BALES, WATTLES, LOGS, AND ROLLS

A. Furnish straw bales tied with either commercial quality baling wire or string. Conform to the following:

1. Furnish certified weed free (native grass seed) straw that is free from mold or other objectionable material. Furnish straw in an air-dry condition suitable for placing with mulch blower equipment.

2. Approximate length 3.5 feet; Shape rectangular; approximate mass 70 pounds

B. Furnish fiber wattles, logs, or rolls of curled excelsior fiber rolled into a cylindrical shape and encased in seamless photodegradable tubular netting. Conform to the following:

1. Diameter 12 inches min.; Mass 3 pounds per foot min.

C. Furnish straw wattles that are manufactured from weed free straw and wrapped in tubular photodegradable plastic netting made from 85% high density polyethylene, 14% ethyl vinyl acetate and 1% color for ultraviolet (UV) inhibition. Conform to the following:

1. Diameter 9 inches minimum; Netting strand thickness 0.030 inches; Netting knot thickness 0.055 inches; Mass of netting 0.315 to 0.385 ounces per foot

D. Mulch shall be air-dried, well-seasoned, and free of undesirable seeds, noxious weeds, and all other material detrimental to plant life.

PART 3 EXECUTION

3.01 BEST MANAGEMENT PRACTICES (BMPs)

A. The Contractor shall be required to implement BMPs for erosion and sediment control and spill prevention, including, but not limited to:

   1. Sequencing of work to minimize in-water disturbance and duration.

   2. Utilizing adaptive management to implement and monitor erosion and sediment measures (e.g., straw wattles), including maintaining stockpiles of measures on site.

   3. Utilizing bucket control to minimize turbidity.

   4. Maintaining work area isolation with temporary cofferdams, floating silt curtain, and/or earthen plugs.

   5. Staged rewatering of newly constructed channels, with pumping of turbid water to an approved upland location with no turbid water returns to the river, with pumps screened to meet NMFS criteria.

   6. Stabilization of all disturbed surfaces with mulch, seeding, and planting.

   7. Minimization of stream crossing events. All crossings of flowing waterways shall be by using a single-span temporary bridge, with abutments outside of the wetted channel. In order to set the temporary bridge, it may be necessary for an excavator to make a single wet crossing. In the event that this is required, qualified fish biologists would first survey the stream to confirm there are no redds, and then would fish-exclude the crossing. No other wet crossings would occur.

B. Appropriate BMPs shall be implemented to minimize turbidity during in-water work.

C. Turbidity monitoring shall be conducted in compliance with the requirements of the environmental permits, including background and compliance point monitoring every two hours, maintaining daily logs; and reporting exceedances.

D. If monitoring observes turbidity levels above background levels, BMPs shall be modified, and work stoppages may occur as specified in the template.

E. Any activity that causes turbidity to exceed five (5) nephelometric turbidity units (NTUs) over background when the background is 50 NTU or less; or a 10 percent increase in turbidity when the background is more than 50 NTUs is prohibited except as specifically provided below:

   1. Turbidity monitoring shall be conducted and recorded as described below. A properly calibrated turbidimeter is required unless another monitoring method is proposed and authorized by the permitting agency.

   2. The Contractor shall record all turbidity monitoring required by subsections (a) and (b) above in daily logs. The daily logs must include calibration documentation; background NTUs; compliance point NTUs; comparison of the points in NTUs; location; date; time; and tidal stage (if applicable) for each reading. Additionally, a narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions. The Contractor must make available copies of daily logs

for turbidity monitoring to agencies upon request.

3. The Contractor shall implement the following BMPs, unless otherwise accepted:

   a. Sequence/Phasing of Work – The Contractor shall schedule work activities so as to minimize in-water disturbance and duration of in-water disturbances;

   b. Bucket Control – All in-stream digging passes by excavation machinery and placement of fill in-stream using a bucket must be completed so as to minimize turbidity. All practicable techniques such as employing an experienced equipment operator, not dumping partial or full buckets of material back into the wetted stream, adjusting the volume, speed, or both of the load, or using a closed-lipped environmental bucket must be implemented;

   c. The Contractor shall limit the number and location of stream-crossing events. Establish temporary crossings as necessary in the least sensitive areas and amend these crossing sites with clean gravel or other temporary methods as appropriate.

   d. Machinery may not be driven into the flowing channel, unless authorized; and

   e. Excavated material must be placed so that it is isolated from the water edge or wetlands, and not placed where it could re-enter waters of the state uncontrolled.

3.02 PERIMETER FILTER FABRIC FENCES

A. Construction

1. Install prior to other land-disturbing activities.

2. Silt fence trench: minimum 8 inches wide by 6 inches deep; backfill trench with compacted native soil.

3. Fence posts: Maximum separation, 6 feet.

4. Posts: Drive minimum 18 inches into ground.

5. Fabric: Staple to posts per manufacturer's recommendations.

6. Fence: Wire mesh backing.

7. Alignment: As described on Drawings.

8. Fence ends: Extend upslope perpendicular to the contour for a distance of at least 6-feet to inhibit flow around the end of the fence.

9. Fence sections: Overlap at least 10 feet.

B. Maintenance

1. Inspection: Daily. Repair damage immediately.

2. Sediment removal: If sediment is evident, remove the trapped sediment. Remove accumulated sediment at least daily.

3. Photo-degraded or damaged fabric: Replace.

4. Final site stabilization: Remove fence.

3.03 EROSION CONTROL BALES, WATTLES, LOGS, AND ROLLS

A. Application

1. Prepare the slope before the installation procedure is started.

2. Shallow gullies shall be smoothed as work progresses.

3. Dig small trenches across the slope on contour, to place rolls in. The trench shall be deep enough to accommodate half the thickness of the roll. When the soil is loose and uncompacted, the trench shall be deep enough to bury the roll 1/3 of its thickness to account for settlement.

4. It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.

5. Start building trenches and installing rolls from the bottom of the slope and work up.

6. Construct trenches at contour intervals 25-30 feet (8-10 meters) apart depending on the steepness of the slope. The steeper the slope, the closer together the trenches shall be.

7. Lay the roll along the trenches fitting it snugly against the soil. Make sure no gaps exist between the soil and the straw wattle.

8. Use a straight bar to drive holes through the roll and into the soil for the willow or wooden stakes.

9. Drive the stake through the prepared hole, and into the soil. Leave only 1 or 2 inches (25 or 51 millimeters) of the stake exposed above roll.

10. Install stakes at least every 4 feet (1.2 meters) apart along the length of the wattle. Additional stakes may be driven on the downslope side of the trenches on highly erosive or very steep slopes.

B. Maintenance

1. Inspect the rolls and the slopes after rain events and at the frequencies as established in the SWPPP. Make sure the rolls are in contact with the soil.

2. Repair any rills or gullies promptly.

3. Reseed or replant vegetation if necessary, until the slope is stabilized.

3.04 STRAW MULCH

A. Application

1. Apply straw mulch to all disturbed areas that remain unworked for longer than one week.

2. Apply mulch at a rate of 3 tons per acre (3 bales per 1,000 square foot, or 3 inches thick).

3. Secure mulch to soil: “Crimp” straw into soil by operating tracked vehicle, disc, or straw crimping equipment parallel to slope (up and down slope).

B. Maintenance

1. Stockpiled straw: have available on-site sufficient straw to replace 10 percent of covered area.

2. Inspect straw mulch: after each rainfall event, repair by replacing straw and re-crimping.

3.05 NOXIOUS WEED CONTROL

A. Noxious weeds are defined in the Revised Code of Washington (RCW), Section 17.10.010 as plants that are highly destructive, competitive, or difficult to control by cultural or chemical practices when established. To prevent the potential spread of noxious weeds into work areas, Contractor shall be required to use weed-free equipment. The following is considered proof of weed-free equipment:

1. The Contractor shall be required to clean all equipment prior to entry onto Project lands. This cleaning shall remove all dirt, animal and plant parts and material that could carry invasive species seeds or parts into the work area. Only clean equipment inspected by the Owner’s Representative shall be allowed to operate within the work area. The inspection shall be pre-arranged by the Contractor and shall occur prior to entering the work area. All subsequent move-ins of equipment shall be treated in the same manner as initial move-in.

2. For the purpose of item (1) above, equipment includes: hand tools, power tools, vehicles, all-terrain vehicle (ATV)/utility task vehicle (UTV), pickup trucks, dump trucks, excavators, and all other heavy equipment.

B. Straw/hay bales and mulch shall be certified as “weed free”. The source field shall be inspected and certified by the county extension agent from the county that the straw/hay is grown. Each shipment into the work area shall be accompanied by a certification tag stating that it is weed free.

C. Prior to delivery of any environmental protection materials to the Project, Contractor shall provide and submit certificates of “weed free” hay bales, coir fabric, tackifer, etc. The submittal shall be approved prior to delivery of the material to the Project.

END OF ENVIRONMENTAL PROTECTION

SECTION 01 35 43.20
CARE AND DIVERSION OF WATER

PART 1 GENERAL

1.01 DESCRIPTION

A. This section describes the dewatering, treatment, discharge, and/or diversion of any water that might be required for performance of contract work. The work includes care and any necessary diversion of water in the vicinity of excavated banks, seepage into excavations, and water potentially generated by Contractor's project construction methods.

1.02 SUBMITTALS

A. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

1. Construction Dewatering, Stream Diversion, and Work Area Isolation Plan

a. Contractor shall submit a Dewatering, Stream Diversion, and Work Area Isolation Plan with shop drawings showing design details and layout for the Construction Dewatering, Stream Diversion, and Work Area Isolation. and procedures for operation including water storage, treatment, and discharge. These shop drawings shall be submitted within ten (10) calendar days following Notice to Proceed.

2. Storm Contingency Plan

a. Contractor shall submit, within ten (10) calendar days of Notice to Proceed, a Storm Contingency Plan. The Storm Contingency Plan shall detail actions to be taken in the event of an unexpected storm that could cause stormwater to collect and leave the work area.

B. Fish Passage

1. Both resident and anadromous fish utilize the project extents. Due to the in-stream work period restrictions, no provisions for fish passage are required beyond those discussed throughout this document and on the Drawings.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF CARE AND DIVERSION OF WATER

SECTION 01 52 00
TEMPORARY CONSTRUCTION FACILITIES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Construction Equipment Parking

1. Contractor shall identify a location within the project work area as an equipment parking area for daily parking and receive approval by the Owner's Representative. This area shall also be used for equipment fueling and daily maintenance and shall meet all criteria listed in Section 01 35 43 ENVIRONMENTAL PROTECTION Subsection 1.05 D, Mobile Equipment Fueling. No daily fueling or maintenance shall be completed outside this designated area.

B. Employee Parking

1. Contractor employees shall park privately owned vehicles in an area designated by the Owner's Representative. This area shall be within reasonable walking distance of the construction site.

1.02 SUBMITTALS

A. Contractor shall prepare and submit a Site Access Plan showing locations of any temporary construction facilities throughout the duration of the Project.

B. Contractor shall prepare and submit a Material Storage/Staging Plan indicating where materials shall be delivered to the Project, and any intermediate staging areas require prior to installation of the proposed materials.

1.03 AVAILABILITY AND USE OF UTILITY SERVICES

A. Temporary Water and Electricity

1. No municipal water or electricity is available at the project site. Contractor shall arrange for drinking water, potable water, and power at the project site as needed and coordinate these needs with the Owner's Representative at the pre-construction meeting.

B. Sanitation

1. Contractor shall provide and maintain within the construction area field-type sanitary facilities. The number of sanitary facilities shall be matched to the maximum number of personnel working at the site as required by Federal, State, and local codes and regulations. Sanitary facilities shall be equipped with a hand-washing station.

2. Contractor shall keep trash in covered containers to be emptied routinely.

1.04 CONTRACTOR'S TEMPORARY FACILITIES

A. Contractor shall maintain and protect traffic and parked vehicles on all affected roads and

parking lots during the construction period, except as otherwise specifically directed by the Owner's Representative. Measures for notification, any required hauling permits, the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public and Owner's personnel shall be protected from damage to person and property. Contractor's traffic on roads selected for hauling material to and from the Site shall interfere as little as possible with public traffic. Contractor shall investigate the adequacy of existing roads and parking lots and the allowable load limit on these roads and parking lots. Contractor shall be responsible for the repair of any damage to roads and parking lots caused by construction operations.

B. Barricades

1. Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to areas such as roads or parking areas is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible, and with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

1.05 CONTRACTOR'S TEMPORARY FACILITIES

A. Administrative Field Offices

1. Contractor shall provide and maintain administrative field office facilities within the construction area as directed by the Owner's Representative.

2. The Contractor shall provide a clean, watertight field office with heat, electric lighting, equipped with drawing rack and drawing display table, all weather automobile access, and parking in a central location on the job site for the use of the Owner's Representative if so directed. The field office shall provide space for project meetings, with table and chairs to accommodate the appropriate number of persons. The Contractor shall provide access to the field office during normal working hours and other times to be specified by the Owner's Representative. The Contractor shall pay all costs to set up the office, supply materials, supply electricity, provide weekly janitorial service, and maintenance for the duration of the project. The Contractor shall not use the field office for the storage of any material, equipment, tools, or supplies.

B. Appearance of Trailers

1. Trailers used by Contractor for administrative or material storage purposes shall present a clean and neat exterior appearance and shall be in a state of good repair.

C. Security Provisions

1. Adequate outside security lighting shall be provided at Contractor's temporary facilities as needed. Contractor shall be responsible for the security of its own equipment.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF TEMPORARY CONSTRUCTION FACILITIES

SECTION 01 55 13
TEMPORARY ACCESS ROADS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work in this section consists of the installation and removal of temporary access roads into the project work areas. Location of temporary access roads shall be field fit as directed to protect existing vegetation to the extent practical.

1.02 SUBMITTALS

A. Contractor shall submit a Site Access Plan showing the proposed location and construction techniques to install the access road based on the Drawings. This plan shall be developed in consideration of the proposed equipment weights, intended uses, and durations of use . to ensure the location and construction will support the equipment and anticipated loads over the proposed usage period of the road.

PART 2 PRODUCTS

2.01 FILTER FABRIC

A. Installation of a filter fabric between the native soil and rock road surface may be required in places to keep the materials separate and ease the removal of the rock. If used, filter fabric shall be Mirafi 160N or approved equal that meets AASHTO M288 Class 2 geotextiles for separation and subsurface drainage.

2.02 ROCK FOR ACCESS ROADS

A. Rock used for the access roads shall be free of soil and other extraneous materials. Materials used for the road construction shall be either quarry spalls or larger crushed rock.

2.03 TEMPORARY BRIDGES

A. Temporary construction bridges are required at locations as shown on Drawings.

B. Contractor shall submit proposed bridge configuration to Owner’s Representative for approval at least a week in advance of installation.

PART 3 EXECUTION

3.01 SITE PREPARATION

A. Site clearing and fence removal shall be completed within Section 31 10 00 SITE CLEARING and Section 01 56 23 TEMPORARY FENCING.

3.02 PRELIMINARY GRADING

A. Once the temporary road alignments have been approved by the Owner’s Representative, preliminary grading can be completed. All materials removed during the preliminary grading shall be placed to the side of the temporary roads for use during site restoration upon completion of the project.

B. Outslope temporary roads and skid trails to avoid sediment delivery to streams and wetlands and avoid installing temporary roads or skid trails in wetland to meet Aquatic Conservation Strategy RF-2.

3.03 ROAD INSTALLATION

A. Upon completion of the preliminary grading, filter fabric may need to be installed on the temporary roads to ease removal of access road rock. Quarry spalls or large crushed rock shall then be placed on the filter fabric to complete the access pad.

B. Compaction of the temporary roads shall be completed using a dozer to spread the rock material, dump trucks delivering additional material, or an excavator after the rock is installed.

C. Estimated length of temporary construction access roads shall vary during each phase of the project depending on the site conditions.

3.04 TEMPORARY BRIDGE INSTALLATION

A. Bridges to be installed at the locations shown on the Drawings.

B. Bridges to be installed over active flowing water in the stream channel.

C. Bridges to be installed on temporary concrete abutments or on a firm substrate.

3.04 ROAD MAINTENANCE

A. During the use of the temporary access roads, if additional materials are needed to maintain the roads, these materials shall be of the same type that were used to originally construct the roads and pads.

3.05 ROAD REMOVAL

A. Upon completion of the construction, the temporary access roads shall be removed.

B. The Contractor shall remove the quarry spalls or larger crushed rock and haul this material to an off-site location. In addition, all filter fabric used shall be removed and hauled to an off-site location. It is the Contractor's responsibility to remove all the filter fabric and rock from the temporary roads.

C. All compacted access roads shall be subsoiled/scarified during Closeout.

3.06 SITE DECOMPACTION AND REGRADING

A. After the filter blanket and rock have been removed from the temporary road alignment, these sites shall be evaluated for the degree of compaction by the Owner's Representative to make sure the disturbed areas shall be restored to original conditions to the greatest extent practical for re-establishment of native vegetation.

B. Subsoiling/decompaction to a minimum depth of 18 inches shall be required to restore heavily compacted subgrade. Subsoiling shall be performed with a dozer ripper, subsoiling grabble rake (SGR) or subsoiling excavator bucket (SEB) and shall leave no clumps larger

than 8 inches in diameter when finished. Subsoiling during Closeout shall be approved by the Owner's Representative.

C. After the filter blanket and rock have been removed from the temporary road alignment, these sites shall be regraded using the materials set aside during the preliminary grading. Finished grade along the road shall be as close to the original grade as possible.

3.07 SITE REVEGETATION

A. Revegetation and seeding shall meet the requirements of Section 32 90 00 SEEDING and Section 32 93 00 PLANTING.

END OF TEMPORARY ACCESS ROADS

SECTION 01 55 26
TRAFFIC CONTROL

PART 1 GENERAL

1.01 DESCRIPTION

A. Work in this section consists of providing temporary traffic control to accommodate all types of public traffic, including vehicles, bicyclists, and pedestrians (including pedestrians with disabilities). The Contractor, utilizing contractor labor and contractor-provided equipment and materials, shall plan, manage, supervise, and perform all temporary traffic control activities needed to support the Work of the Contract.

1.02 REFERENCES

A. Washington State Department of Transportation (WSDOT) Plan Sheet Library, Section TC - Work Zone Typical Traffic Control Plans (TCPs) (most recent version).

1.03 SUBMITTALS

A. Contractor shall prepare and submit a Traffic Control Plan for approval ten (10) working days before the preconstruction meeting. The Traffic Control Plan shall include the following:

- Itemization of signs, including type, size, shape, color and location;
- Channelization (e.g., cones, barrels, barricades);
- Flagging and location(s);
- Lighting;
- Communication;
- Road closures and time of road closures;
- Special traffic patterns (e.g., pilot cars, one-way traffic lanes, detours);
- Signs during non-work hours;
- Designated entrances to the Project area;
- Map and descriptions of the anticipated routes;
- Description of the anticipated haul equipment;
- Traffic control measures for all public roads, haul routes, and site access points;
- Locations of all signs, markers, barricades, and other traffic control devices to be used; and
- Routing of any detours required.

PART 2 PRODUCTS

2.01 MATERIALS

A. Materials shall meet the requirements of the WSDOT Work Zone Typical Traffic Control Plans (TCPs) for all temporary traffic control measures listed in the Traffic Control Plan.

B. Furnish temporary signs meeting the requirements of the "Acceptable" category shown in the American Traffic Safety Services Association (ATSSA) "Quality Standards For Work Zone Traffic Control Devices" handbook.

C. Plastic drums shall include retroreflective drum sheeting, meeting the requirements of ASTM D 4956 Type III or Type IV.

PART 3 EXECUTION

3.01 TEMPORARY TRAFFIC CONTROL PLAN

A. The Contractor shall execute the approved Traffic Control Plan to the extent practicable.

B. The Contractor shall provide flaggers and all other personnel required for labor for traffic control activities. The Contractor shall perform all procedures necessary to support the Contract Work. Unless otherwise permitted by the Contract or approved by the Owner's Representative, the Contractor shall keep all existing pedestrian routes and access points (including sidewalks, paths, and crosswalks) open and clear at all times.

C. The Contractor shall provide signs and other traffic control devices. The Contractor shall erect and maintain all construction signs, warning signs, detour signs, and other traffic control devices necessary to always warn and protect the public from injury or damage because of the Contractor's operations, which may occur on or adjacent to roads, sidewalks, or paths.

D. No Work shall be done on or adjacent to any Traveled Way until all necessary signs and traffic control devices are in place. The traffic control resources and activities described shall be used for the safety of the public, of the Contractor's employees, and of the Owner's and Owner's Representative's personnel and to facilitate the movement of the traveling public.

E. Upon failure of the Contractor to immediately provide flaggers; erect, maintain, and remove signs; or provide, erect, maintain, and remove other traffic control devices when ordered to do so by the Owner's Representative, the Owner may, without further notice to the Contractor or the Surety, perform any of the above and deduct all the costs from the Contractor's payments.

F. The Contractor shall be responsible for providing adequate labor, sufficient signs, and other traffic control devices, and for performing traffic control procedures always needed for the protection of the Work and the public regardless of whether or not the labor, devices or procedures have been ordered by the Owner, furnished by the Owner, or paid for by the Owner.

G. Wherever possible when performing Contract Work, the Contractor's equipment shall follow normal and legal traffic movements. The Contractor's ingress and egress of the Work area shall be accomplished with as little disruption to traffic as possible. Traffic control devices shall be removed by picking up the devices in a reverse sequence to that used for installation. This may require moving backwards through the work zone. When located behind a barrier or at other locations shown on the approved traffic control plan, equipment may operate in a direction opposite to adjacent traffic.

H. The Contractor is advised that the Owner may have entered into operating agreements with one or more law enforcement organizations for cooperative activities. Under such agreements, at the sole discretion of the Owner, law enforcement personnel may enter the

work zone for enforcement purposes and may participate in the Contractor's traffic control activities. Nothing in this Contract is intended to create an entitlement, on the part of the Contractor, to the services or participation of the law enforcement organization.

END OF TRAFFIC CONTROL

SECTION 01 56 23
TEMPORARY FENCING

PART 1 GENERAL

1.01 DESCRIPTION

A. Work in this section also consists of installing temporary construction fencing around the project work sites during the project.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify the location of the required construction access to the stream channel for the construction equipment needed to construct the improvements shown on the Drawings.

3.02 EXISTING CONDITIONS

A. Provide, erect, and maintain temporary construction fencing around the construction site to keep livestock out of the project work areas if required.

3.03 CONSTRUCTION FENCE LAYOUT

A. Location of the construction fences shall be in accordance with the approved Site Access Plan submittal.

3.04 CONSTRUCTION FENCE INSTALLATION

A. Installation of the construction fence shall be completed before the major components of the project implementation begin.

B. During the construction period, the construction fence shall be maintained in good condition to define the work areas of the project.

3.05 CONSTRUCTION FENCE REMOVAL

A. At the end of construction activities, the construction fence shall be removed and hauled off-site by the Contractor.

END OF TEMPORARY FENCING

SECTION 01 71 23
FIELD SURVEYING

PART 1 GENERAL

1.01 DESCRIPTION

A. Work described herein for Field Surveying may be selected for contract separately from the remainder of the specifications. Owner's Representative to determine Contractor for described work.

B. Contractor shall provide all materials, items, operations, or methods specified, listed, or scheduled on the Drawings or in the Specifications, including all materials, labor, equipment, and incidentals necessary and required to conduct proper surveys required to stake and layout the work, based on the Drawings and CAD files provided by the Owner's Representative.

C. Contractor shall perform surveys for layout of the work and to document final construction for "Record" Drawings.

1.02 SUBMITTALS

A. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

1. Survey Data for Record Drawings

a. Within 14 calendar days of final acceptance, Contractor shall furnish Owner's Representative field survey data documenting the completed construction.

1.03 QUALITY CONTROL

A. All survey, layout, and related work shall be performed to the satisfaction of Owner's Representative.

1.04 PROJECT RECORD DOCUMENTS

A. Upon completion of the work, Contractor shall submit Field Record Documents to Owner's Representative under the provisions of Section 01 78 39 RECORD DRAWINGS.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Contractor shall exercise care during the execution of the work to minimize any disturbance to the landscape in the areas surrounding the work site.

B. Contractor shall have onsite survey and grade control capacity such as total station, GPS, and/or GPS enabled construction equipment.

C. Pre-paint the top 2 inches of all stakes and lath, or mark them with plastic flagging. Do not use aerosol spray paints. Use designated colors for paint or flagging. Mark all stakes with a

stake pencil that leaves a legible imprint, or with waterproof ink.

3.02 INSPECTION

A. Contractor shall verify locations of existing site reference and survey control points prior to starting work. Contractor shall promptly notify Owner's Representative of any discrepancies discovered. Contractor shall also verify layouts periodically during construction.

3.03 SURVEY REFERENCE POINTS

A. Survey reference points have been established by prior contract at the site. Contractor shall locate and verify the accuracy of three of these reference points for coordinate location and elevations prior to using them for work performed at the site. If any discrepancies exist in the location of the existing benchmarks, Contractor shall notify Owner's Representative prior to performing any site layout activities. Contractor may install additional reference points for their convenience at locations approved by Owner's Representative. No payment shall be made for any additional permanent site control installed by Contractor beyond that specified and permitted herein. Contractor shall protect survey control points prior to starting site work and preserve permanent reference points during construction. Contractor shall not relocate site reference points without prior written approval from Owner's Representative.

B. Contractor shall promptly report to Owner's Representative the loss, damage, or destruction of any reference point or relocation required because of changes in grades or other reasons. Contractor shall replace dislocated survey control points based on original survey control at no additional cost to Owner. Replacement of dislocated survey control points shall be done by a licensed land surveyor in the State of Washington. Survey accuracy used to relocate disturbed control points shall be equal to or better than that used to set the original control.

C. Contractor shall be responsible for the accuracy of all surveys performed with their forces, including those of their subcontractors. Any work performed not conforming to the lines, grades, elevations, and locations indicated on the Contract Drawings due to survey error shall be the responsibility of Contractor, and Contractor shall repair or relocate such work to its proper location at no additional cost to Owner.

3.04 SURVEY REQUIREMENTS

A. Contractor shall reference survey and site reference points to the provided control monuments and record locations of survey control points, with horizontal and vertical data, on Project Record Documents. Record Drawings shall include the bare earth of all grading activities and location of all installed structures to the tolerances described herein.

B. Contractor shall with their own forces obtain working or construction lines or grades as needed.

C. All control surveys for elevation shall be +0.1 foot and, for horizontal, control angles shall be to the nearest 20 seconds +10 seconds, and measured distances shall be to +0.1 foot. All measurement surveys for elevation shall be to the nearest 0.1-foot +0.05 foot and for horizontal distances shall be to +0.1 foot.

D. Contractor shall provide all materials as required to properly perform the surveys, including, but not limited to, instruments, tapes, rods, measures, mounts and tripods, stakes and hubs, nails, ribbons, other reference markers, and all else as required. All material shall be of good professional quality and in first-class condition.

E. All lasers, transits, and other instruments shall be calibrated and maintained in accurate calibration throughout the execution of the work. A copy of the recent calibration of all instruments shall be required and available to the Owner's Representative.

F. Contractor shall furnish all materials and accessories (i.e., grade markers, stakes, pins, spikes, etc.) required for the proper location of grade points and line.

G. All marks given shall be carefully preserved and, if destroyed or removed without Owner's Representative's approval, they shall be reset, if necessary, at Contractor's expense.

H. Upon completion of surveys for control points, channel location, structure location, fencing location, access roads and embankment, the Contractor's Surveyor shall notify the Owner's Representative for review of the survey. Upon review and approval of the survey by the Owner's Representative, the Contractor shall be notified to proceed with implementation.

3.05 SURVEY OF COMPLETED EXCAVATION

A. At the completion of excavation in all areas, Contractor shall survey the extents, elevations, grade breaks, and daylight points of all excavation areas using a grid at a minimum of 25-foot centers plus key grade breaks, to document the final configuration.

3.06 SURVEY OF COMPLETED CONSTRUCTION

A. At the completion of restoration in all areas, Contractor shall survey the floodplain, backfill, river and creek beds and banks, using a grid at a minimum of 25-foot centers plus key grade breaks, to document the final configuration and all major structures (such as large wood structures, etc.) in the river, creeks, or floodplain.

3.07 PAYMENT AS AN INCIDENTAL

A. The cost to Contractor of all work and delays occasioned by giving lines and grades, or making other necessary measurements, shall be considered as having been included in the lump sum price for the work.

END OF FIELD SURVEYING

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 DESCRIPTION

A. This section describes the process and procedures to be followed by the Contractor, Owner's Representative, and Owner for the review and acceptance of work during implementation.

B. Review and acceptance of work shall be completed when needed during and at the end of construction, including for as directed and hourly work.

C. Review and acceptance of work shall be completed for the completion of earthwork, large wood structures, floodplain enhancements, or other distinct stand-alone project feature shown on the Drawings.

D. A Record of Review and Acceptance of work shall be kept by both the Contractor and Owner's Representative at the project site.

1.02 CONTRACTOR'S RESPONSIBILITIES

A. During the weekly construction meetings, the Contractor shall provide a summary of work completed and work under way at each of the work sites, including as directed and hourly work.

B. The Contractor shall communicate with the Owner's Representative on the status of work completion at each of the work sites.

C. As work approaches completion at each work site, the Contractor shall request the Owner's Representative to review the work and prepare a punch-list of tasks to be completed at each site.

D. Upon receipt of the punch-list, the Contractor shall complete each of the tasks identified by the Owner's Representative.

E. Work on the tasks shall continue until the Owner's Representative accepts the completed work.

1.03 OWNER'S REPRESENTATIVE REVIEW AND APPROVAL

A. Upon receiving a request from the Contractor, the Owner's Representative shall prepare a punch-list of tasks to complete work at each of the work sites.

B. The Owner's Representative shall update the completion punch-list regularly to assist the Contractor in completing the work in an efficient manner. This shall occur at a minimum of twice per week, or more frequently if the task dictates more immediate action.

C. Upon completion of the tasks included on the punch-list, the Owner's Representative shall approve the work and sign the Record of Review and Acceptance.

D. The Owner's Representative shall be expected to participate in the Weekly Progress Meetings and keep current on the project implementation activities.

E. Upon receipt of the request from the Contractor for an on-site review of the completed work, the Owner's Representative shall schedule a time to be on-site to complete the review.

F. After the completion of the review, the Owner's Representative shall have the option to approve, approve with conditions, or reject the work completed.

1.04 PROJECT APPROVALS

A. Project approvals shall be completed at the end of construction.

B. Upon project approval by the Owner's Representative, the construction work shall be accepted by the Owner's Representative.

1.05 PROJECT CLEANUP AND REPAIRS

A. Cleanup and repair of work area shall be completed when needed during and at the end of construction.

B. The Contractor is expected to keep the project work area clean and prevent the accumulation of trash and debris. Placement of a dumpster at the project trailer with regularly scheduled pickups shall be arranged by the Contractor.

C. Additional cleanup and repair activities shall include, but are not limited to, road and fence repairs, general maintenance, staging area cleanup and maintenance, and construction trailer maintenance.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF CLOSEOUT PROCEDURES

SECTION 01 78 39
RECORD DRAWINGS

PART 1 GENERAL

1.01 DESCRIPTION

A. Field Record Drawings.

1. Field Record Drawings for each phase shall be completed and submitted to Owner's Representative, within 14 calendar days of final acceptance. All Drawings from the original Contract Drawings set shall be included, including the drawings where no changes were made. Owner's Representative shall review all field record drawings for accuracy and clarity. The Field Record Drawings shall be returned to Contractor if corrections are necessary. Contractor shall make all corrections and shall return the Field Record Drawings within 7 calendar days of receipt.

1.02 SUBMITTALS

A. Field Record Drawings shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 FIELD RECORD DRAWINGS

A. Contractor shall keep at the construction site two complete sets of full-size prints of the Contract Drawings, reproduced at Contractor expense, one for Contractor's use, one for Owner's Representative. During construction, both sets of prints shall be marked to show all deviations in actual construction from the Contract Drawings. Green shall be used to indicate all additions and red shall be used to indicate all deletions. The drawings shall show the following information, but not be limited thereto:

1. The locations and description of any structures, pipelines, utility lines and other installations of any kind or description known to exist within the construction area and not previously shown on the Contract Drawings. The location includes dimensions and/or survey coordinates for permanent features.

2. The location, orientation, topography, and grade of all stream restoration features installed or affected as part of the project construction.

3. All changes or modifications from the original design and from the last inspection.

B. Where Contract Drawings or Specifications allow options, only the option used in the construction shall be shown on the record drawings. The option not used shall be deleted.

C. These deviations shall be shown in the same general detail utilized in the Contract Drawings. Marking of the prints shall be pursued continuously during construction to keep them up to date. The resulting field-marked prints and data shall be referred to and marked as "Field Record Drawings," and shall be used for no other purpose. They shall be made available for inspection by Owner's Representative whenever requested during

construction and shall be jointly inspected for accuracy and completeness by Owner's Representative and a responsible Representative of Contractor prior to submission of each monthly pay estimate. Failure to keep the Field Record Drawings current shall be sufficient justification to withhold 10 percent of the final payment until satisfactory drawings are received.

3.02 PAYMENT

A. All costs incurred by Contractor in the preparation and furnishing of Field Record Drawings shall be included in the contract price and no separate measurement or payment shall be made for this work. Approval and acceptance of the Field Record Drawings shall be accomplished before final payment is made to Contractor.

END OF RECORD DRAWINGS

SECTION 31 10 00
SITE CLEARING

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Work specified in this section includes, but is not necessarily limited to, the following:

1. Removing materials from the site and delivering salvaged items to the Owner.

2. Removing designated trees and protecting from harm any trees or other objects selected to remain by Owner's Representative.

3. Do not cut vegetation less than 3 feet in height and less than 3 inches in diameter that is within the clearing limits but beyond the excavation/fill areas that does not interfere with the installation of project features or sight distance along the road unless otherwise designated.

1.02 HISTORICAL ITEMS

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value that may be encountered during site preparation shall remain the Owner's. Upon such discovery or find, Contractor shall immediately notify Owner's Representative. While waiting for instructions Contractor shall record, report, and preserve the finds in accordance with the National Historic Preservation Act and 43 Code of Federal Regulations Subtitle A Part 7, Protection of Archeological Resources.

B. Items designated for attention of Owner if discovered shall be handled as described in Section 01 35 43 ENVIRONMENTAL PROTECTION.

1.03 HISTORICAL ITEMS

A. Submit:

1. Procedures and operational sequence for review and acceptance by the Owner's Representative include:

a. Permits for transport and disposal of debris as required.

2. As-built drawings and records in accordance with Section 01 78 39 RECORD DRAWINGS.

1.04 DIMENSIONS AND LAYOUT

A. The Contractor may be responsible for installing construction fence around the construction area and resetting fencing to accommodate changes in the construction area.

B. All work, materials, methods, and personnel shall be subject to approval by the Owner's Representative prior to commencing construction and on a continuous basis throughout construction.

C. The Contractor is responsible for preserving all benchmarks and stakes and replacing any

that are displaced or missing as a result of the Contractor's operations.

D. The Contractor shall be responsible for locating all underground utilities prior to beginning any excavation or underground demolition.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. This section describes the requirements for site clearing and grubbing. Construction schedule constraints in performing various portions of the work are provided in Section 01 14 20 SITE-SPECIFIC REQUIREMENTS.

B. Contractor to mark the clearing limits with flagging or tags on trees to be left standing, or on lath. Make markings intervisible, and no more than 90 feet apart.

C. After establishing clearing limits, move construction stakes outside the clearing limits and mark stakes with horizontal offset distance.

3.02 EROSION/POLLUTION CONTROL

A. Required erosion/pollution control facilities in accordance with Sections 01 35 43.20 CARE AND DIVERSION OF WATER and Section 01 35 43 ENVIRONMENTAL PROTECTION shall be in place prior to beginning the work of this Section.

3.03 EXISTING CONDITIONS

A. Protection of Facilities

1. Provide, erect, and maintain temporary construction fencing around the construction area as shown on the Drawings.

2. Control construction traffic entering and leaving construction access gates to protect property.

B. Protection of Existing Improvements:

1. Provide, erect and maintain barricades, coverings, or other types of protection necessary to prevent damage to existing trees, fences, structures or buildings. Restore any improvements damaged by this work to their original condition, as acceptable to the Owner’s Representative.

3.04 TREE AND SHRUB PROTECTION

A. General:

1. Include barricades and/or fencing and other protection for trees indicated on the Drawings or directed by the Owner’s Representative to be saved and protected.

2. Maintain existing grade within root protection zone of trees to the edge of the dripline

unless otherwise indicated.

3. Grubbing shall be performed by cutting the vegetation at ground level while keeping the roots to the extent possible.

3.05 SITE WORK

A. Sprinkle debris with water as necessary to limit dust to lowest practicable level. Do not use excessive water which may cause flooding, contaminated runoff, or icing.

B. Existing utility lines within the project area shall remain in operation throughout the duration of the construction period. Protect and support all lines and meters from damage and movement.

C. Existing utility lines, structures, and meters serving other properties shall remain in operation throughout the duration of the construction period. Protect and support all lines and meters from damage and movement.

D. In the event the Contractor encounters utility lines not shown on the Drawings or otherwise indicated to be saved, removed, or abandoned, the location of such lines shall be marked in the field and the Owner's Representative or Engineer notified.

3.06 CLEARING LIMITS

A. Limits of disturbance for the construction activities are shown on the Drawings.

B. Construction fences and/or temporary erosion control shall be installed prior to the beginning of site clearing for each construction period.

C. All shrubs and other wood material shall be collected and stockpiled for use later in the project.

3.07 DEMOLITION

A. Temporary erosion and sedimentation control features shall be in place before demolition.

B. Demolished material shall be treated as salvaged item.

3.08 SALVAGED ITEM

A. Carefully dismantle and remove salvaged items.

1. The Contractor shall deliver any salvaged items to an approved location designated by the Owner's Representative.

3.09 STOCKPILING OF MATERIALS

A. The Contractor should have sufficient area on-site to stockpile logs for large wood structures for later use in the project.

B. If additional stockpile areas are required to complete the project on schedule, the

Contractor shall arrange off-site stockpile areas. No additional payments shall be made for stockpiling excavated materials off-site.

C. Reusable materials shall be carefully segregated into material sizes defined in Section 3.06.

3.10 DISPOSAL OF MATERIALS

A. Refuse and non-organic trash resulting from site clearing and grubbing shall be disposed of by the Contractor in a manner consistent with all government regulations.

1. No burning permitted.

2. Do not leave refuse material on the project site, shoved onto abutting private properties, or buried in embankments or trenches on the project site.

3. Do not deposit debris in streams, bodies of water, roads, or upon private property except by written consent of the private property Owner.

4. Maintain haul routes clean and free of debris resulting from work of this Section.

5. All small trees, limbs, branches, bark, and needles shall be buried during backfilling activities.

3.11 CLEAN-UP

A. Upon completion of the work of this Section, remove all rubbish, trash, and debris resulting from operations.

B. Remove equipment and tools; leave the site in a neat and orderly condition acceptable to the Owner's Representative.

END OF SITE CLEARING

SECTION 31 23 00
EXCAVATION AND FILL

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This work consists of excavating pilot channels and drain channels, hauling, and placement of excavated spoils as large wood structure ballast. This work includes sloping, shaping, decompaction, and finishing earthen and rocky material.

1.02 JOB CONDITIONS

A. Environmental requirements: Construction shall progress only when weather conditions shall not detrimentally affect the quality of the finished earthwork. If the atmospheric temperature falls below 35 degrees Fahrenheit in the shade, protect from freezing earthwork or soils-in-cut which require compaction to a specified degree.

B. Protection of adjacent work and existing facilities is the responsibility of the Contractor and must be accomplished. Where open cuts are used in lieu of shoring, the excavation slopes should be made to the angle judged safe by the Contractor's designated competent person responsible for excavations and trenches. Regardless, temporary cuts shall be no steeper than 1 vertical to 1 horizontal and meet all applicable OSHA regulations. Permanent slopes shall be as shown on the Drawings and in no case be steeper than 1 vertical to 2 horizontal. Cover exposed slopes if erosion or riling threatens.

C. Allowable instream work period is August 1 to August 15. All in-channel work activities must be completed within this period due to spawning and incubation periods of summer steelhead trout, spring Chinook salmon, and bull trout in Mill Creek. Extensions of the in-channel work period may be granted under certain conditions by the WDFW District Office, but the Contractor shall not expect an extension due to scheduling conflicts.

1.03 DEFINITIONS

A. Excavation: Area or material removed to provide a suitable base for improvement as shown on the Drawings.

B. Unsuitable excavated material: excavated soil heavy laden with fines and organic material such as peat, decomposing vegetation, soft organic clay, and silts and are completely devoid of sands, gravel, and cobble.

PART 2 PRODUCTS

2.01 CONTROL OF MATERIAL

A. All material (e.g., soil, gravel, sand, borrow, aggregate, etc.) incorporated into the work shall be weed-free. The Owner's Representative may request written documentation of methods used to determine the weed-free status of any and all materials furnished by the contractor. Contractor-provided expertise and methods to establish weed-free status must be appropriate for the weeds of concern in the local area. The following applies to this contract:

PART 3 EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. This section describes the requirements for excavation and backfilling. Construction schedule constraints in performing various portions of the work are provided in Section 01 14 20 SITE-SPECIFIC REQUIREMENTS.

B. Refer to Section 31 23 19 CHANNEL DEWATERING, FISH TRANSFER, AND CHANNEL REWATERING for specifications on work area isolation, fish and freshwater mussel salvage, dewatering, and rewatering.

3.02 PROTECTION OF ADJACENT WORK

A. Protection of adjacent work, utilities and other improvements must be accomplished. Properly slope cuts to provide stability. Temporary cuts should be no steeper than one vertical to one horizontal. Permanent slopes should be no steeper than one vertical to two horizontal. Cover exposed slopes if erosion or raveling threatens.

3.03 EQUIPMENT

A. Construction of the large wood structures, floodplain excavation, loading and hauling material to stockpiles, and backfilling the large wood structures will require numerous types of heavy equipment. This equipment will include, but is not limited to, medium to large excavators with bucket thumb, front end loaders, off-road dump trucks, and dozers with 6-way blade.

B. The Contractor shall have onsite survey and grade control capacity such as total station, GPS, and/or GPS enabled construction equipment.

3.04 EXCAVATION BELOW EXISTING GRADE

A. Unless otherwise specified, any appropriate method of excavation within the work limits shown may be employed which, in the opinion of the Contractor, is considered best, and meets applicable safety standards. The Contractor shall take whatever precautions are necessary to maintain the undisturbed state of the natural soils at and below the bottom of the excavation.

B. Should the excavation be carried below the lines and grades indicated on the drawings or specified herein because of the Contractor's operations, the Contractor shall refill such excavated space to the proper elevation as directed by the Owner’s Representative or Engineer. Should foundation materials be disturbed or loosened because of the Contractor's operations, they shall be removed and the space refilled as directed at no additional cost to the Owner.

C. Rock Excavation is defined as the removal of all material which by actual demonstration, cannot, in the Engineer or Owner’s Representative's judgment, be reasonably excavated with equipment used for common earthwork and equipped with rippers or similar approved equipment. If bedrock is encountered that cannot be removed using the common earthwork equipment or equipment with minimum 125 Horsepower, the grading plan shall be adjusted as approved by the Owner’s Representative at no additional cost. The term

Rock Excavation shall be understood to indicate a method of removal and not a geological formation.

3.05 CONTROL OF WATER

A. The Contractor shall follow guidelines contained in Sections 01 35 43 ENVIRONMENTAL PROTECTION 01 35 43.20 CARE AND DIVERSION OF WATER during all excavation and backfill operations.

B. The Contractor is responsible for complying with all permit conditions related to water in the stream, stormwater, and dust control during the excavation and backfill operations.

3.06 DUST CONTROL

A. The Contractor shall be responsible for providing control of airborne dust and particulates from the work areas. Visible dust shall be limited by water, dust palliative, or other approved methods.

B. If water is used for dust abatement, it must be brought in by the Contractor from an outside source. Water may not be used directly from Mill Creek without prior, written consent of the Owner's Representative.

3.07 EXCAVATED MATERIAL STOCKPILES

A. Excavated material stockpile areas are identified in the Drawings as staging areas.

B. Additional location of the excavated material stockpile sites are to be determined by Owner's Representative.

C. Contractor shall be responsible for managing the volume, shape, and weather protection for each of the stockpile sites.

D. The Contractor is responsible for keeping the stockpiled material protected to prevent any major erosion off the piles.

E. In the event that sufficient room to store the anticipated excavated volume of material is not available in the identified stockpile sites, the Contractor can propose additional stockpile sites within the project area. Any new stockpile site must be approved by the Owner's Representative prior to use by the Contractor.

3.08 LARGE WOOD STRUCTURE BACKFILL

A. Large wood structure backfill material shall be sourced from Mill Creek floodplain alluvium and properly sized, clean, and non-angular.

3.09 PILOT CHANNEL AND DRAIN CHANNEL EXCAVATION

A. Excavate pilot and drain channels to the lines and grades shown on the Drawings. Isolate work per section 01 35 43.20, if necessary. Excavation shall begin at the downstream end to prevent working in accumulated seepage flow in the pilot or drain channel. Dimensions of

each side channel are shown on the Drawings.

3.10 TEMPORARY ACCESS ROAD DECOMMISSIONING/FLOODPLAIN DECOMPACTION

A. Demolish and decompact the temporary access road sections identified in the Drawings by restoring to approximate original ground contours. Remove any piping or structures, if found, and all associated fill material, down to “natural ground”. Finish slopes to provide gradual transitions in slope adjustments without noticeable breaks.

B. Any hardened road segment or surface area identified on the Drawings, or as directed in the field, shall be decompacted to promote water infiltration and establish vegetation. This work shall consist of loosening all of the soil in the existing roadbed or staging area to a depth of 18 inches (minimum) and a clod size no larger than 8 inches or as shown on the plans. Contractor shall notify Owner’s Representative of decompaction method no less than one (1) week prior to decompaction. All roadway materials shall be removed from the downhill side of the road and placed on the uphill or cut side of the road. The roadway fill material shall be excavated down to the natural hillslope material. The sides of the road prism shall be blended to match the natural ground elevation to avoid trapping water. The excavation shall match the existing slope and contours of the local existing grade.

C. Place available slash and wood material on the recontoured area, arranged to facilitate later clump planting of vegetation during revegetation as directed by the Owner’s Representative.

3.11 FINAL GRADING AND CLEAN-UP

A. All irregularities shall be made smooth except for natural surface roughness, washouts shall be filled, and slopes made uniform, slightly rounded at top and bottom.

B. When final surfaces have been established, the Contractor shall protect the surfaces from erosion, raveling or any type of degradation.

C. Temporary access roads shall be subsoiled/scarified during closeout.

D. Place available slash and wood material on the recontoured area, arranged to facilitate later clump planting of vegetation during revegetation as directed by the Owner’s Representative.

E. When work is completed, the Contractor shall place all surplus material including stumps, trees, and brush, in the floodplain. The Contractor shall leave the premises in condition acceptable to the Owner’s Representative.

3.12 TESTING

A. Testing for compaction is not required.

END OF EXCAVATION AND FILL

SECTION 31 23 19
CHANNEL DEWATERING, FISH TRANSFER, AND CHANNEL REWATERING

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Work in this section consists of the installation of temporary crossings, and construction of in-channel wood structures.

1.02 SUBMITTALS

A. The Contractor shall submit a Dewatering, Stream Diversion, and Work Area Isolation Plan for pre-approval to the Owner no more than ten (10) working days following notice to proceed. Within the submittal, the Contractor shall provide a list of materials and equipment proposed for use during this component of the work. In addition, the Contractor shall submit the Manufacturer's data on a bypass pipe, if deemed necessary, for use during the project.

PART 2 PRODUCTS

2.01 DIVERSION STRUCTURE

A. The Contractor shall use a sandbag/stone streamflow diversion structure or a side-channel to re-route or dewater the portion of stream for in-water construction, with fish isolated from the installation of the diversion structure, as shown in the Design Drawings.

B. The Contractor shall provide material for in-stream temporary diversion measures such as block nets, silt fencing, floating booms, sandbags, and/or other suitable means. In-stream temporary diversion shall be implemented at locations and at a duration only if approved by the Owner's Representative. The structure shall include plastic liner or fine mesh silt fence to reduce the amount of fines entering the free-flowing portion of the river. Block net mesh sizes and other diversion materials shall be in accordance with the National Marine Fisheries Service (NMFS) standards.

PART 3 EXECUTION

3.01 GENERAL

A. All channel dewatering systems shall be approved by the Owner's Representative, installed, and operational before any work in the channel can begin.

B. All in-stream activities must be completed after the channel has been diverted and all fish can pass through the diverted stream channel.

C. Refer to Notes in the Drawings if any fish salvage operation is required. Construction work in the immediate vicinity of fish salvage shall be delayed, typically for 2 to 24 hours but longer in some cases.

D. Turbid water or sediment must not be released into the channel downstream.

E. If any bypass pumping is approved by the Owner's Representative, the Contractor shall also provide pumps, hoses, and personnel as backup to the temporary stream flow bypass

system in the event the system becomes non-operational or as may be required during construction when flow rates in the existing channel exceed the design capacity of the gravity bypass. Pumps and hoses may also be used to pump seepage flow through the cofferdam into the bypass pipeline to keep water out of the work area. Any pumping operation shall use a fish screen that is in accordance with NMFS standards. Pump intake screens shall be sized to prevent fish from being entrained into the pump intake or from being impinged on the intake screen. The screen face shall be oriented parallel to flow for best screening performance. The screen shall be designed and used such that it can be submerged with at least one-screen-height-clearance above and below the screen. Turbid water shall be discharged to an approved area with sufficient capacity to allow for slow infiltration and remain disconnected from active flow channel. The Contractor shall always monitor pumping operation.

F. Construction shall be phased to minimize in water disturbance time and multiple disturbance and isolation events. Any dewatering shall be conducted slowly to allow species to naturally migrate out of the area and allow time for fish to be salvaged.

G. Minimize the area to be dewatered.

H. Install water bypass channels that result in similar water temperature and quality being re-introduced to stream channels downstream.

I. Minimize dredging or disturbing of existing stream sediment.

3.02 FISH TRANSFER

A. Refer to the Notes in the Drawings if fish transfer is deemed necessary.

B. Fish salvage operations shall be conducted by Owner staff and their partners, not the Contractor. Contractor shall provide at least three (3) calendar days advance notice before dewatering or isolating any work area. Dewatering and rewatering shall be done in carefully controlled stages as expressed in the Design Drawings for the purpose of inducing volitional movement out of the work area and of salvaging fish. Close coordination shall be necessary with the Owner's Representative during this operation. Dewatering shall take place as early in the morning as possible. No work shall occur within the surrounding area until the fish salvage effort is complete. Construction work in the immediate vicinity of fish salvage shall be delayed, typically for 2 to 24 hours but longer in some cases.

C. A Fish Salvage Plan shall be developed prior to any in-water work activities that includes the following measures:

1. Prior to any instream work, measures shall be taken to isolate the work area (e.g., block nets) and exclude fish from entering. In-water work areas shall be isolated by cofferdams.

2. Fish salvaged by a qualified and permitted biologist shall occur prior to initiation of construction activities. The Directing Biologist shall work with the appropriate construction personnel to plan the staging and sequence for work area isolation, fish capture and removal, and dewatering.

3. Where the area to be isolated is small, shallow, and/or conditions are conducive to fish capture, it may be possible to isolate the work area and remove all fish life prior to dewatering.

4. Where the area to be isolated is large, deep, flow volumes or velocities are high, and/or conditions are not conducive for easy fish capture, it may be necessary to commence with dewatering in conjunction with fish capture and removal.

5. Dewatering of the work area shall occur slowly and the site shall be monitored during dewatering for stranded organisms. In many instances where gradual dewatering is staged in conjunction with fish capture and removal, it is appropriate to delay installation of the downstream block net(s) until after fish have been given sufficient time to move downstream by their own volition.

6. Fish salvage may utilize trapping, seining, or electrofishing techniques. To minimize the risk of injury, the preferred order of collection techniques is trapping/seining followed by electrofishing.

7. Electrofishing shall be performed only when other methods of fish capture and removal have proven impracticable or ineffective at removing all fish. The Directing Biologist shall ensure that attempts to seine and/or net fish always precede the use of electrofishing equipment. If electrofishing equipment is used to capture fish, comply with NMFS Electrofishing Guidelines (NMFS 2000).

8. Ensure that water quality conditions, including dissolved oxygen levels, with fish transport systems (e.g., buckets) are sufficient to promote fish recovery. Holding time shall be minimized and cold clean water shall be used for holding and transfer. Captured fish shall be returned to the connected waterbody at a safe and suitable location.

D. Screening of pumps shall be consistent with NOAA Fisheries West Coast Region Anadromous Salmonid Passage Design Manual (NMFS 2022) for open spacing and velocity to prevent entrainment of aquatic species.

3.03 CHANNEL REWATERING

A. Upon project completion, the construction site shall be slowly re-watered, including pre-washing the newly excavated channel and pumping the turbid water to an approved floodplain location with no turbid water returns to the river, and incrementally increasing flow in the new channel over a period of hours to prevent loss of surface flow downstream and to prevent a sudden increase in stream turbidity. During re-watering, the site shall be monitored to prevent stranding of aquatic organisms below the construction site. Rewatering shall be completed under the direct supervision of the Owner's Representative. Refer to the Notes in the Drawings.

END OF CHANNEL DEWATERING, FISH TRANSFER, AND CHANNEL REWATERING

SECTION 32 90 00
SEEDING

PART 1 GENERAL

1.01 DESCRIPTION

A. Work described herein for Seeding may be selected for contract separately from the remainder of the specifications or Owner may elect to self-perform this task.

B. Work in this section consists of furnishing all labor, equipment, and materials to establish ground cover and grass as noted on the Drawings. Any substantive variance to this specification due to unforeseen conditions encountered on the site, weather conditions, seed availability, other construction activities, etc. must be approved by the Owner's Representative.

C. Areas outside the limit of disturbance shall be protected from damage by the Contractor. Any disturbance of trees, shrubs, grass, ground cover, or wetland areas outside the limit of disturbance shown on the Drawings shall be restored by the Contractor.

1.02 SUBMITTALS

The following submittals are required if the Contractor is to perform seeding.

A. Prior to use on the site, Contractor shall submit to Owner's Representative certification of the seed mix as defined in the State of Washington Administrative Code (WAC) 16-302-330 through 16-302-385. Prior to use on the site, Contractor shall furnish to Owner's Representative a statement signed by the Manufacturer certifying that each lot of seed has been tested by a recognized seed testing laboratory within six months of the date of delivery to the site.

PART 2 PRODUCTS

2.01 SEED

A. The seed mixture shall be as indicated on the Contract Drawings. Seed shall be weed-free and true to species and variety or subspecies. No cultivars or named varieties shall be used.

C. Seed that has become wet, moldy, or otherwise damaged in transit or storage shall not be accepted.

D. Seeding shall occur in the proposed planting areas shown in the Contract Drawings, and in any disturbed areas.

E. The rate of application shall be 18 pounds pure live seed per acre; if broadcast, rate of application shall be 30 pounds blown-on certified weed-free, straw at 75 percent cover (60 pound bale per 880 square feet); if hydroseeding, 20 pounds per acre.

F. The ground to be seeded shall be free of large clods or rocks, roots and other material that may interfere with the work and subsequent maintenance operations. Hand picking may be required. Seeding shall not commence until Owner's Representative has accepted the condition of the prepared areas.

2.02 TACKIFIER

A. Tackifier shall be used as a tie-down for the seed mixture if hydroseeding is used to apply seed.

B. Tackifier shall be derived from natural organic plant sources containing no growth or germination inhibiting materials. Tackifier shall hydrate in water and readily blend with other slurry materials. Tackifier shall be noxious weed free and nontoxic to aquatic and terrestrial animals, soil microorganisms, and vegetation.

C. Apply tackifier at the Manufacturer's recommended rate.

2.03 FERTILIZER

A. Fertilizer shall not be used on this project.

2.04 WATER

A. Water shall be the responsibility of the Contractor, unless otherwise noted. Water shall not contain elements toxic to plant life.

2.05 SEEDING APPARATUS

A. Broadcast (whirlwind or end gate seeders), hydroseeding, or drill seeding apparatus may be used for seeding. A substitute method must be approved in writing by the Owner's Representative prior to seeding.

B. Use of a hydroseeding device for spreading seed and tackifier shall be capable of uniformly distributing the material at the Manufacturer's specified rate for that product.

2.06 EROSION CONTROL MATTING

A. Use of any Rolled Erosion Control Product to control erosion or protect young plants shall conform to Section 01 35 43 ENVIRONMENTAL PROTECTION.

B. Grade areas to be seeded to achieve the finished grades and grading drainage patterns indicated on the Drawings. Grading shall be accomplished in accordance with the requirements of Section 35 01 60 STREAM RESTORATION and Section 01 52 00 TEMPORARY CONSTRUCTION FACILITIES. Blend new surfaces to existing areas.

C. The ground to be seeded shall be free of large clods or rocks, roots and other material that may interfere with the work and subsequent maintenance operations. Hand picking may be required.

D. The Rolled Erosion Control Product shall be installed in accordance with the requirements of Section 01 35 43 ENVIRONMENTAL PROTECTION.

E. Seeding shall not commence until Owner's Representative or Engineer has accepted the condition of the prepared areas.

PART 3 EXECUTION

3.01 APPLICATION

A. Weather Limitations:

1. Seeding operations shall not be permitted when wind velocities exceed 15 miles per hour.

2. Seed shall be sown when the risk of fall germination has passed. No seeding shall be done when the ground is unduly wet, or otherwise not in a tillable condition; and

3. Seeding shall preferably occur between November and December or as directed by Owner's Representative. Seeding at other times of the year shall only be completed with written permission from Owner's Representative.

B. Broadcasting:

1. Broadcast seed using whirlwind or end gate seeders. Substitute method shall be approved by an Owner's Representative prior to seeding.

C. Hydroseeding

1. Seed shall be added to water and thoroughly mixed at the rates specified.

2. The seed and water shall be thoroughly mixed to produce a homogeneous slurry.

3. While the soil is still loose and moist, the seed and water slurry shall be uniformly broadcast under pressure over the nominated area at a rate of 15 pounds per acre for upland seed and 4 pounds per acre for riparian seed using a hydroseeding apparatus.

4. Carefully regulate the flow rate and go over the area twice, applying half the seed with each application. The first application shall be from east to west and the second from north to south to ensure uniformity.

D. Drill Seeding

1. Drill seed using a range seed (grassland) drill. Substitute method shall be approved by an Owner's Representative prior to seeding.

2. Ensure drill is properly calibrated prior to seeding to ensure proper planting depth.

3. Apply half the seed mix with each application. The first application shall be from east to west and the second from north to south to ensure uniformity.

E. Maintenance

1. Maintain the seeded areas in a satisfactory condition until final acceptance by Owner's Representative.

2. Maintenance shall include:

a. Watering vegetated areas where the establishment of the seed mix does not appear

to be developing satisfactorily; and

b. Filling and leveling where erosion has washed an area away.

3. If in the opinion of the Owner's Representative, repeat seeding or repair is necessary due to Contractor's negligence, carelessness, or failure to provide maintenance, then the work shall be at Contractor's sole expense.

4. Repeat seeding or repair required due to factors determined by Owner's Representative to be beyond the control of Contractor shall be paid for under the appropriate contract pay items.

3.02 RESPONSIBILITIES AND ACCEPTANCE OF WORK

A. Contractor retains all ownership and responsibility for seeding until written acceptance by Owner's Representative.

B. Owner's Representative shall accept the seeding when:

1. The application or installation is complete.

2. Verification of the adequacy of all repairs, including associated vegetation, is complete; and

3. The required written seed certification documents have been received by Owner's Representative.

END OF SEEDING

SECTION 32 93 00
PLANTING

PART 1 GENERAL

1.01 DESCRIPTION

A. Work described herein for planting shall be conducted by the Contractor following completion of all other work activities.

B. All planting during construction activities shall be completed by Contractor, as directed by the Owner's Representative.

C. Work in this section consists of furnishing all labor, equipment, and materials to plant trees, shrubs, hardwood cuttings, and herbaceous vegetation as noted on the Drawings and in the plant list. Any substantive variance to this specification due to unforeseen conditions encountered on the site, weather conditions, plant availability, other construction activities, etc. must be approved by Owner's Representative.

D. Areas outside the limit of disturbance shall be protected from damage by Contractor. Any disturbance of trees, shrubs, or wetland areas outside the limit of disturbance shown on the Drawings shall be restored by Contractor.

1.02 SUBMITTALS

The following submittals are required if the Contractor is to perform planting.

A. Proposed Plant Sources

1. Within ten (10) calendar days after award of the contract, submit a complete list of plant materials proposed to be provided demonstrating conformance with the requirements specified. Include the names and address of all nurseries.

B. Product Certificates

1. Plant Materials List – Submit documentation at least ten (10) calendar days prior to start of work under this section that plant materials have been ordered. Arrange procedure for inspection of plant material at time of submission.

2. Have copies of vendor's invoices or packing slips for all plants on site during installation. Invoice or packing slip shall list species by scientific name, quantity, and date delivered. Submit invoices or packing slips at time of planting.

C. Maintenance Record

1. Submit record of maintenance work performed, quantity of plant losses, and replacements, and diagnosis of unhealthy plant material.

1.03 DELIVERY, INSPECTION, STORAGE, AND HANDLING

The following are required if the Contractor is to perform planting.

A. Notification

1. Contractor must notify Owner's Representative 48 hours or more in advance of deliveries to arrange for inspection.

B. Plant Materials

1. Transportation: During shipping, plants shall be packed to provide protection against climate extreme, breakage and drying. Proper ventilation and prevention of damage to bark, branches, and root systems, must be ensured.

2. Scheduling and Storage: Plants shall be delivered as close to planting as possible. If there is unavoidable delay, Contractor shall be provided compensation of the added expense of storing plants, either on or off-site, unless Contractor is the cause of delay. Plants in storage must be protected against any condition that is detrimental to their continued health and vigor.

3. Handling: Plant materials shall not be handled by the trunk, limbs, or foliage but only by the container, ball, box, or other protective structure.

4. Labels: Plants shall have durable, legible labels stating correct scientific name and size. Ten percent of container grown plants in individual pots shall be labeled. Plants supplied in flats, rack, boxes, bags, or bundles shall have one label per group.

C. Inspection

1. Plants shall be subject to inspection and approval for conformance to specifications at time of delivery on-site. Approval of plant materials at any time shall not impair the subsequent right to inspection and rejection during progress of the work.

2. Plants inspected on site and rejected for not meeting specification must be removed immediately from site or red-tagged and removed as soon as possible.

1.04 WARRANTY

A. Installed plant material shall have a warranty for plant growth to be in a vigorous growing condition for a minimum 12-month period after initial planting. A minimum 12-month calendar time period for the warranty of plant growth shall be provided regardless of the contract time period. When plant material is determined to be unhealthy in accordance with Section 3.07 PLANT ESTABLISHMENT PERIOD, it shall be replaced once under this warranty.

PART 2 PRODUCTS

2.01 PLANT MATERIAL

A. Plant Material Classification

1. Plants shall be nursery grown in accordance with good horticultural practices under climatic conditions similar to those of the Project site within Eastern Washington.

2. Plants shall be true to species and variety or subspecies. No cultivars or named varieties shall be used.

B. Plant List:

1. The plant materials shall be as shown on the Contract Drawings.

C. Growing Conditions

1. Plant material shall be native to the region and well suited to the growing conditions of the Project site. Plant material shall be grown under climatic conditions similar to those at the Project site within Eastern Washington.

a. Container-Grown Plant Material

1) Containers shall include plastic 10 cubic inch and 27 cubic inch containers. Plant material shall be grown in a container over time sufficient for new fibrous roots to have developed throughout the container and for the root mass to retain its shape and hold together when removed from the container. Plants shall not be excessively root-bound.

b. Live Stakes

1) Live stake selection and installation shall be as described on the drawings.

c. Deciduous Trees

1) Plants shall be of typical form for the specified species. Height of branching shall bear a relationship to the size and species of tree specified and with the crown in good balance with the trunk. The trees shall not be “poled”, or the leader removed.

2) Single stem: The trunk shall have a persistent main leader.

d. Deciduous Shrubs

1) Plants shall be of typical form for the specified species. Acceptable plant material shall be well shaped, with sufficient well-spaced side branches, and recognized by the trade as typical for the species grown in the region of the Project.

D. Plant Material Size

1. Plant material shall be furnished in sizes indicated by the Contract Drawings.

2.02 WATER

A. Unless otherwise directed, water used for watering plants shall be the responsibility of the Contractor. Water shall not contain elements toxic to plant life.

PART 3 EXECUTION

3.01 INSTALLING PLANT MATERIAL TIME AND CONDITIONS

A. Deciduous Plant Material Time

1. Deciduous plant material shall be installed from October 1 to November 15.

B. Evergreen Plant Material Time

1. Evergreen plant material shall be installed from October 1 to November 15.

C. Cutting Plant Material Time

1. Cutting plant material shall be gathered when dormant, placed in cold storage, and installed from October 1 to November 15.

D. Weather Restrictions

1. No planting shall be allowed in one inch or more of snow or in soil frozen to a depth of more than one inch. The Owner's Representatives shall make the final decision as to what constitutes unsatisfactory weather conditions.

3.02 SITE PREPARATION

A. Topsoil shall be preserved, protected, and placed in Wetland, Riparian Floodplain, and Upland Planting Zones prior to planting and seeding efforts.

1. Layout

a. Final plant spacing and layout shall be determined by the Owner's Representative before planting. The Owner's Representative shall stake planting zone boundaries.

B. Protecting Existing Vegetation

1. Existing trees, shrubs, and other plants that are to be preserved shall be fenced off or otherwise barricaded along the dripline to protect them during planting operations.

3.03 EXCAVATION

A. Obstructions Below Ground

1. When obstructions below ground affect the work, adjustments to plant material location, type of plant, and planting method shall be done by the Owner's Representative.

B. Plant Pits

1. Depth of plant pits shall be as described on the Drawings.

3.04 INSTALLATION

A. Setting Plant Material

1. Plant material shall be set as described on the Drawings.

B. Composition

1. Contractor shall install plantings species with a mosaic pattern with same species clustered together while achieving a natural composition appearance to the extent possible. Contractor shall coordinate planting composition with Owner's Representative prior to installing plantings.

C. Cuttings

1. Selection and installation of live stakes (cuttings) shall be as described on the Drawings.

2. To plant cutting, prepare a pilot hole in the soil with round metal or rebar (slightly smaller diameter than cutting) if cutting cannot be easily installed into the ground. Cuttings shall be inserted, angled end down 18 inches below ground leaving 6 inches above ground, or a minimum of one to two dormant buds above ground.

D. Watering

1. The Contractor shall be responsible for watering plants immediately following planting and during the plant establishment period.

3.05 MAINTENANCE DURING PLANTING OPERATION

A. Plant material installed in the initial phase of planting shall be maintained in a healthy growing condition during installation. Installed plants shall be maintained to foster establishment and growth. The maintenance includes adjusting plant position to counteract settling.

3.06 RESTORATION AND CLEANUP

A. Restoration

1. Turf areas, access roads, and facilities that have been damaged from the planting operation shall be restored to original condition.

B. Cleanup

1. Contractor shall cleanup site following planting as described on the Drawings.

2. Excess and waste material generated from within the project limits shown on the drawings shall be disposed offsite or as by directed by Owner.

3.07 PLANT ESTABLISHMENT PERIOD

A. Commencement

1. Upon completion of the last day of the planting operation, the plant establishment period for maintaining installed plant material in a healthy growing condition shall commence and shall be in effect for a minimum of 12 months. Written calendar time period shall be furnished for the plant establishment period. When there is more than

one plant establishment period due to plantings that occur at separate times, the boundaries of the planted area covered by each period shall be recorded and provided to the Owner's Representative. The plant establishment period shall be modified for inclement weather shut down periods, or for separate completion dates for different areas.

B. Maintenance During Establishment Period

1. The site shall be maintained for 12 months after planting is finished. Maintenance of plant material shall include replanting any plants that have frost heaved during the first winter following planting. Maintenance shall also include removal of litter or other coarse material that inhibits growth and establishment of installed plants.

2. At least one site visit shall occur within two weeks of planting to make any adjustments to plant material and at least one spring site visit shall occur to determine the extent of winter frost heaving. Additional visits may be required for plant replacement.

    a. Watering Plant Material

        1) The plant material shall be watered as necessary to prevent desiccation and to maintain an adequate supply of moisture within the root zone, until the end of September. An adequate supply of moisture is estimated to be the equivalent of 0.5-inch absorbed water per week, delivered in the form of rain or augmented by watering. Runoff, puddling and wilting from the watering operations shall be prevented. Watering of other adjacent areas or existing plant material shall be prevented.

    b. Weeding

        1) Noxious weeds and persistent non-native plants that inhibit growth and establishment of installed vegetation shall be removed by hand or other method approved by Owner's Representative. Invasive species in the restored areas shall be controlled as directed by the Owner. Spring and fall inventories for invasive species shall be taken for the 12-month period following restoration. Planted grasses shall be controlled such that they do not compete with the planted trees.

    c. Plant Pit Settling

        1) When settling occurs to the backfill soil mixture, additional backfill soil shall be added to the plant pit or plant bed until the backfill level is equal to the surrounding grade. Serious settling that affects the setting of the plant in relation to the maximum depth at which it was grown requires replanting in accordance with Section 3.04 - INSTALLATION.

    d. Maintenance Record

        1) Contractor shall report site status and maintenance actions to the Owner's Representative after each site visit for the duration of the establishment period.

A record shall be furnished describing the maintenance work performed, the quantity of plant losses, and the quantity of replacements made on each site visit.

C. Unhealthy Plant Material

1. A tree shall be considered unhealthy or dead when the main leader has died back, or 25 percent or more of the branches have died. A shrub shall be considered unhealthy or dead when 25 percent or more of the plant has died. Herbaceous plants shall be considered unhealthy or dead when the crown has not produced leaves or shoots during the growing season, or when the crown appears dried or decayed. Contractor shall determine the cause for unhealthy plant material and shall provide recommendations for replacement. Unhealthy or dead plant material shall be replaced prior to the following growing season.

D. Replacement Plant Material

1. Unless otherwise directed, plant material shall be provided for replacement in accordance with Section 2.01 - PLANT MATERIAL. Replacement plant material shall be installed in accordance with Section 3.04 - INSTALLATION, and recommendations in Section 3.07 - PLANT ESTABLISHMENT PERIOD. Plant material shall be replaced in accordance with Section 1.04 - WARRANTY. An extended plant establishment period shall not be required for replacement plant material.

END OF PLANTING

SECTION 35 01 60
STREAM RESTORATION

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Work under this section consists of the improvements included in the restoration of Mill Creek stream channels and descriptions of the stream structures and ancillary materials required to complete the restoration.

B. Stream restoration components include additions of large wood structures (Section 35 49 50 LARGE WOOD AND CHANNEL STRUCTURES) in the floodplain and channels (Section 31 22 00 EXCAVATION AND FILL).

PART 2 PRODUCTS (NOT USED)

2.01 LARGE WOOD MATERIAL

A. The Contractor shall utilize the large wood material logs of the type shown on the Drawings and as specified herein. See Section 35 49 50 LARGE WOOD AND CHANNEL STRUCTURES for specifications.

PART 3 EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. Refer to Section 31 22 00 EXCAVATION AND FILL for specifications on excavation of channels and floodplain areas and backfill of large wood structures. Refer to Section 35 49 50 LOG AND CHANNEL STRUCTURES for specifications of large wood structures. Construction schedule constraints in performing various portions of the work are provided in Section 01 14 20 SITE-SPECIFIC REQUIREMENTS.

B. Refer to Section 31 23 19 CHANNEL DEWATERING, FISH TRANSFER, AND CHANNEL REWATERING for specifications on work area isolation, fish salvage, dewatering, and rewatering..

END OF STREAM RESTORATION

SECTION 35 49 50
LARGE WOOD AND CHANNEL STRUCTURES

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Work under this section consists of the habitat features included in the restoration of Mill Creek stream channels and floodplains. This section includes descriptions of the in-stream and floodplain structures and ancillary materials required to complete the improvements on the Contract Drawings or as directed in the field by the Owner's Representative.

1.02 SUBMITTALS

A. For the following materials, certificates of compliance guaranteeing conformance with specifications shall be submitted at least ten (10) working days prior to delivery to the site:

1. Large Wood

2. Boulders

3. Ballast Alluvium (Streambed Sediment and Streambed Cobbles)

PART 2 PRODUCTS

2.01 LARGE WOOD

A. The Owner requires whole trees and logs for use in this restoration project for promoting fish habitat. This includes limbs, treetops, and rootwads. Harvested trees are to be pushed over after loosening the soils around the tree roots to maximize rootwad size and minimize handling damage to the tree roots and bole. Whole trees shall be excavated to retain the entire rootwad, with minimum rootwad diameters as shown on the Contract Drawings. Soil lodged around the roots shall be displaced to the extent practical without destroying the integrity of the roots. Trees must be handled with care to remain as intact as possible, and Contractor shall avoid excess handling of the rootwads to minimize breakage. Tree branches shall be retained intact with minimal breakage during transport and placement.

B. All treetops, limbs, and other woody material created from the harvest and loading of the trees are also to be delivered to the Project. These materials may be used for racking and slash. Racking and slash material must be fresh (green) and flexible, not dry and brittle.

C. Large wood shall be conifers and must be of high quality, green, sound, and free of checks and defects that would affect structural integrity or accelerate decay. Trees shall not comprise rotten or punk wood. The following species, in order of preference, are acceptable: ponderosa pine, grand fir, and Douglas-fir or western larch. Western larch (tamarack) may also be used for large wood structures that do not require trees with limbs (e.g., logs used for the engineered habitat structure).

D. All trees must be alive when harvested. Signs of light scorching are acceptable on large trees if confined only to the outer bark. Dead, dried out, or brittle trees are not acceptable.

E. Acceptable trees may have defects such as crooks, multiple forks, bends, etc., if the tree is

alive (green) when harvested and as long as minimum stem and top diameters and lengths are still met. These defects shall not affect the structural integrity of the tree, and trees that end up broken during transportation or handling because of these defects may be rejected by the Owner's Representative. The maximum percentage of trees with these types of irregularities shall be no more than 30 percent in any size class.

F. Any trees that naturally exceed the required minimum length may be shortened so long as they meet the minimum length for each size class. Leaving trees longer than the minimum length is also acceptable. Trees requiring shortening be must be snapped or broken off rather than cut with a chainsaw for a more natural appearance. Breaking trees in this manner must not result in splintering or weakening of the treetop.

G. Furnished large wood shall meet the dimensions shown on the Drawings. Diameter of all furnished large wood shall be measured as the standard diameter breast height (DBH), which shall be measured at 4.5 feet from the ground surface elevation, parallel to the slope. Trees shall be marked in a manner that specifies size class. Markings shall be visible around the whole tree at any one point, and can be accomplished using tree marking paint, chalk, or similar.

H. Large wood must be handled to avoid damage to rootwads, stems, and limbs at all stages of the harvest, delivery, and installation process. Limbs that are broken off the trees are required for delivery to the staging site but may be hauled separately. Limbs on juniper trees may require cutting to allow transportation but leaving limb stabs of at least 18 inches is preferable.

I. Contractors shall not cut limbs flush to the bole, except where needed to allow for legal and safe transport.

J. Owner's Representative may ask to inspect trees to be harvested prior to contract award.

K. Upon delivery, the Owner's Representative reserves the right to reject any trees or logs failing to meet the specifications and requirements noted above.

2.02 BALLAST ALLUVIUM

Ballast alluvium shall consist of a blend of approximately 60% Streambed Cobbles and 40% Streambed Sediment. The primary material for ballast alluvium is Streambed Cobbles, with Streambed Sediment used to fill Streambed Cobble voids and to seal the final surface.

A. Streambed Cobble

1. The primary material for ballast alluvium is streambed cobble. Streambed cobbles shall be clean, naturally occurring, water-rounded gravel material. Streambed cobbles shall have a well-graded distribution of cobble sizes and conform to the gradation in Table 2.02-1:

TABLE 2.02-1 STREAMBED COBBLE	
Approximate Size	**Percent Passing**
7 inches	99-100
5 inches	70-90
2 inches	30-60
¾ inch	10 max

2. The Contractor shall provide a certificate of compliance from the streambed cobbles supplier guaranteeing that the material supplied meets the streambed cobbles specifications for this specific Project.

B. Streambed Sediment:

1. Floodplain alluvium ballast material shall also consist of finer material sealing the voids and final surface. Streambed sediment shall be clean, naturally occurring, water-rounded gravel material. Streambed sediment shall have a well-graded distribution of aggregate sizes and conform to the grading in Table 2.02-2:

TABLE 2.02-2 STREAMBED SEDIMENT	
Approximate Size	**Percent Passing**
2½ inches	99-100
2 inches	65-95
1 inch	50-85
No. 4	26-44
No. 40	16 max.
No. 200	5.0-9.0

2. The Contractor shall provide a certificate of compliance from the streambed sediment supplier guaranteeing that the material supplied meets the streambed sediment specifications for this specific Project.

2.03 BOULDERS

A. Boulders include large rocks (i.e., ballast rocks) placed in the large wood structures to create habitat features, and to provide ballast for large wood structures. See Drawings for number required and approximate location.

B. Boulders shall be hard, sound, and durable. They shall be free from segregation, seams, cracks, and other defects tending to destroy resistance to weather. All Boulders shall be sub-angular or round in shape and come from a rock quarry close to the project site or from an alluvial source. Imported boulders shall conform to the soundness requirements specified in Table 2.03-1 and size requirements in Table 2.03-2. Nominal diameters refer to the intermediate axis of the boulder. Use of on-site boulders to be determined by the Owner's Representative or Engineer

C. Excavated and cleaned riprap from onsite may be used in place of any boulders where size and weight requirements are satisfied.

TABLE 2.03-1 BOULDER SOUNDNESS REQUIREMENTS		
Test	**Standard**	**Value**
Specific Gravity	ASTM C-127	Min. 2.65
Soundness	AASHTO T104 (5.2.2)	Not greater than 5% loss
Accelerated Expansion	CRD-C-148	Not greater than 15% breakdown
Absorption	ASTM C-127	Not greater than 2%
L.A. Abrasion	ASTM C-131	Max. 20% loss @ 500 rev.

TABLE 2.03-2 BOULDER SIZE REQUIREMENTS		
Boulder Type	**Nominal Diameter (feet)**	**Average Weight (lbs)**
LWM Ballast Boulder (Revetment Log Structures)s	2.3 – 3.0	1,100 – 2,300
LWM Ballast Boulder (Log Jam Structures)	3.0 – 4.0	2,300 – 5,500

PART 3 EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. The materials used for construction shall be as specified in PART 2 PRODUCTS. Construction schedule constraints in performing various portions of the work are provided in Section 01 14 20 SITE-SPECIFIC REQUIREMENTS.

B. Refer to Section 31 23 19 CHANNEL DEWATERING, FISH TRANSFER, AND CHANNEL REWATERING for specifications on work area isolation, fish salvage, dewatering, and rewatering

3.02 IN-STREAM AND FLOODPLAIN LARGE WOOD STRUCTURES

A. In-stream and floodplain large wood structures include engineered Revetment Log Structures, Log Jam Structures, and 22-Log Bank Habitat Structures.

B. The overall plan form of all wood structures shall be constructed as shown on the Drawings or as directed in the field by the Owner's Representative.

C. Refer to the Drawings for sequence and specified dimensions of logs, logs with rootwads, whole trees, racking, and slash to be installed.

D. Refer to the Drawings for the Revetment Log Structure, Log Jam Structure, and 22-Log Bank Habitat Structure installation procedures.

F. Excavation spoils from trenching or ballast alluvium shall be placed at the locations and quantities shown in the Contract Drawings for stability.

G. Orientation and placement of the logs shall be adjusted depending on the type of structure being installed.

H. Excavated material from installation trenches shall be used as backfill and compacted around the structure to provide required ballast volume. Compaction shall be completed using the excavator bucket to a firm and unyielding surface. Finish grade shall be blended into the surrounding floodplain.

3.03 BALLAST ALUVIUM

A. Ballast alluvium shall be placed in layers 6 inches or less. Place or rearrange individual streambed cobbles to obtain a uniformly dense, compact, low permeability mass. Fill voids by machine or hand tamping before placing the next lift.

B. Fill all voids during placement of streambed cobbles with streambed sediment. Use water pressure, metal tamping rods, and similar hand-operated equipment to force material into all surfaces and subsurface voids, and between individual rocks.

C. Placed and compacted ballast alluvium shall be a uniform and dense blend of streambed cobbles and streambed sediment absent of voids. Sufficient compaction of ballast alluvium shall be verified via a deflection test. The deflection test shall confirm that under the full weight of a minimum 22,000-lb class excavator flat bucket surface deflection is less than 2 inches.

3.04 LARGE WOOD STRUCTURE BOULDERS

A. The overall plan form of all boulders shall be constructed as shown on the Drawings and as directed by Owner's representative.

B. Installation of the boulders shall occur at locations shown on the Drawings.

C. Excavated material shall be backfilled and compacted around the boulders if necessary. Compaction shall be completed using the excavator bucket to a firm and unyielding surface.

D. Refer to the Drawings for large wood structure sequencing and placement of boulders.

END OF LARGE WOOD AND CHANNEL STRUCTURES