Meacham Creek RM 10-11
In-Stream Design & Construction Oversight

100% Implementation Plan

Prepared for:

Confederated Tribes of the Umatilla Indian Reservation
Fisheries Program-Umatilla River Basin
Department of Natural Resources
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Preface

This report provides the 100% Implementation Plan for proposed restoration actions on an approximately one-mile-long reach of Meacham Creek, a tributary to the Umatilla River in northeastern Oregon. The design has been developed by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and its contractor (Tetra Tech, Inc.) in partnership with the United States Department of Agriculture, Forest Service (USFS). Proposed actions will occur exclusively on Umatilla National Forest land. The project has been designed to qualify for streamlined, programmatic permitting coverage. National Environmental Policy Act (NEPA) review will include the use of the USFS Umatilla National Forest Aquatic Restoration Environmental Assessment (EA) (USFS 2018); Endangered Species Act (ESA) authorization will be covered under the Aquatic Restoration Biological Opinion (ARBO II) (NMFS and USFWS 2013); Clean Water Act (CWA) authorization will be covered by the U.S. Army Corps of Engineers Portland District Regional General Permit 4 (RGP-4) and the Oregon Department of State Lands (ODSL) general permit for the USFS (GP-42104-RF). This report includes information about the proposed actions necessary to demonstrate the incorporation of appropriate ARBO II design criteria and conservation measures, and to facilitate permitting reviews and approvals.

The design process established by contract, and as amended based on collaboration with CTUIR and USFS, includes the following steps and review junctures:

- 15 Percent Conceptual Design (Tetra Tech 2021a);
- Preliminary (60 percent) Design Report and Drawings (Tetra Tech 2021b);
- Draft-final (90 percent) Implementation Plan and Drawings (Tetra Tech 2023); and
- Final (100 percent) Implementation Plan and Drawings (this submittal).

1. Introduction

The CTUIR have contracted Tetra Tech, Inc. (Tetra Tech) to provide engineering services for the Meacham Creek River Mile (RM) 10-11 In-Stream Design and Construction Oversight project (Project). This submittal includes the following items to support construction of the Project:

- Implementation Plan (this document);
- Attachment 1: Design Drawings;
- Attachment 2: Construction Specifications; and
- Attachment 3: Aquatic Restoration Biological Opinion (ARBO II) Conservation Measures.

Section 1 (this section) of the Implementation Plan describes the Project. Section 2 provides an overview of construction implementation, including the schedule, materials, and actions. Section 3 provides an overview of Construction Specifications, and Section 4 lists references cited.

PROJECT LOCATION

The 114,000-acre Meacham Creek Watershed (Hydrologic Unit Code 1707010302) is in northeast Oregon, twenty-three miles east of Pendleton, in Umatilla County, Oregon. Meacham Creek is a 37-mile-long major tributary of the Umatilla River that drains portions of the Blue Mountains starting at approximately 3,600 feet above sea level, and flowing northerly, entering the Umatilla River near RM 79 at an elevation of approximately 1,800 feet.

The Project area encompasses 105 acres of channel, streambank, and floodplain habitats between RM 9.1 and RM 10.1 on Meacham Creek (**Figure 1-1**), just downstream of the confluence of Camp Creek in T01N, R33E, in portions of sections 5 and 8, Umatilla County, Oregon. The Project area is located on USFS land, but directly abuts privately held parcels. In addition, the Union Pacific Railroad (UPRR) railway runs down the east edge of the valley and parallel to the river corridor.

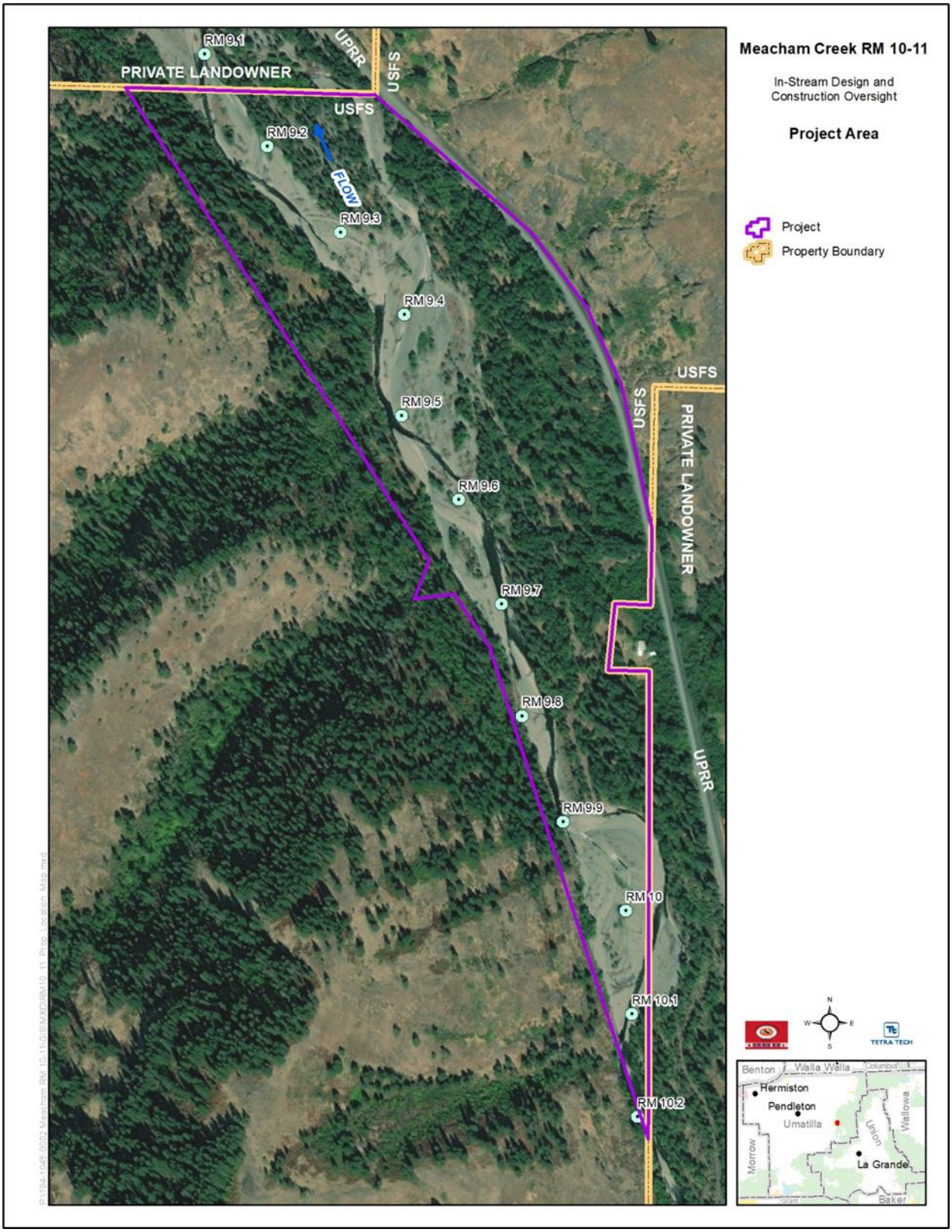

Figure 1-1. Project Area

1.1 PROJECT DESCRIPTION

The goals of the Project are to improve instream habitat for Endangered Species Act (ESA)-listed and non-listed fish, benefit channel morphology and instream processes, increase floodplain connectivity, and protect existing infrastructure along Meacham Creek. These will be achieved though restoration actions and conservation measures that align with those identified in the ARBO II (NMFS and USFWS 2013). These proposed restoration actions and conservation measures for Meacham Creek include:

- Installation of Large Woody Material (LWM);
- Off- and Side-Channel Restoration; Streambank Restoration;
- Set-back or Removal of Existing Berms, Dikes, and Levees;
- Gravel Augmentation;
- Road and Trail Erosion Control and Decommissioning;
- Non-native Invasive Plant Control; and
- Revegetation.

The areal extent of disturbance is 105 acres. Construction is anticipated to be completed in 2024. According to Oregon Department of Fish and Wildlife (ODFW) guidelines (ODFW 2023), the in-water work window is July 1 to August 15 for Meacham Creek. A proposed construction sequence is provided below. Potential impacts include temporary turbidity releases to the stream, minor impacts to fish populations from fish salvage activities, spills from construction equipment, colonization of disturbed ground by invasive vegetation, short-term disturbances for landowners which may include noise and dust, and damage to existing vegetation along designated access routes. Overall impacts to all work areas will be minimized through incorporation of ARBO II conservation measures (NMFS and USFWS 2013) and best management practices (BMPs), as well as site-specific actions described in Section 3.2.

2. Project Implementation Overview

The Project design includes excavation and fill of the channel and floodplain, installation of LWM, and gravel augmentation within the existing channel and floodplain.

Specifically, these actions will result in:

- Excavation of 11,500 cubic yards (CY) of floodplain alluvium to remove existing levees, berms, and spur dikes;
- Fill of 11,500 CY of excavation materials will be relocated and shaped into seven gravel augmentations in floodplain areas;
- Installation of LWM, including 32 LWM structures (12 Log Accumulation Jam structures, nine Right/Left Log structures, 11 Channel Bleed through structures as shown on sheets C-301 to C-303 of Drawings in Attachment 1);
- Road decommissioning and hardened surfaces decompaction; and
- Seeding of native grasses.

2.1 PROJECT SCHEDULE

This Implementation Plan assumes that the Project will be constructed continuously in a single year, with all work completed within the timeframe of May 1 and November 30, or as directed in the contract documents. Although it is planned to be constructed in a single year, the CTUIR may elect to construct the Project in discrete phases. These phases may include, but are not limited to:

- Acquisition and staging of rock and woody materials;
- Site clearing, grubbing, and temporary access;
- Partial or full excavation of berms, levees, and spur dikes;
- Installation of LWM structures;
- Placement of gravel augmentation fill; and
- Site stabilization.

2.1.1 Construction Sequence

A proposed construction sequence is provided below.

- Floodplain and Uplands Work: Before in-water work window (prior to July 1)
    - Construction staking, flagging of sensitive areas, contractor submittals, etc.;
    - Mobilize to site and site preparation;
    - Clear and grub proposed temporary access roads;
    - Install and monitor temporary erosion and sediment controls (TESC);

- Separate and stockpile earth, rock, and woody materials in the staging area, or areas, directed by the Owner's Representative or Engineer for future use;
- Excavate spur dike, sort angular material, use excavated area for staging and access routes.;
- Excavate berms and levees and use excavated material for gravel augmentation in areas above the Ordinary High Water Mark (OHWM) and do not require installation of temporary crossings; and
- Construct floodplain LWM structures.

- Active Channel: July 1 – October 31
  - Install block nets and salvage fish (work to be completed by CTUIR);
  - Install temporary bridges or fish-excluded crossings of the wetted channel as directed by Owner's Representative or Engineer;
  - Install and monitor TESC;
  - Install work area isolation and dewater work areas. Pump turbid water to an approved location and monitor to ensure no turbid water returns to the stream;
  - Excavate berms and levees and use excavated material for gravel augmentation areas;
  - Construct wetted channel LWM structures where temporary bridges or fish-excluded crossings in the wetted channel are required;
  - Remove temporary bridges or fish-excluded crossings in the wetted channel;
  - Conduct final grading and shaping of gravel augmentation outside of wetted areas;
  - Grade and subsoil compacted temporary access roads to a minimum depth of 18 inches with clod sixes no greater than 8 inches;
  - Remove work area isolation;
  - Remove block nets; and
  - Remove TESC.
- After In-Water Work Window: After October 31
  - Complete any excavation and fill remaining above OHWM;
  - Stabilize site (seeding, mulching, and planting);
  - Site cleanup, any identified repairs, and demobilization;

- Revegetate Project area as shown on planting plan (see Sheet L-101 of Drawings for details); and
- Complete plantings in the fall (to be completed by CTUIR).

2.2 CONSTRUCTION MATERIAL QUANTITIES

The implementation of the Project will require earthwork and adding LWM to the stream. A summary of the Project earthwork quantities is shown in **Table 2-1**. The use of native fill and the balance of earthwork quantities are intended to avoid the need to import or export material. A summary of the Project rock materials is shown in **Table 2-2**. A summary of the Project LWM materials is shown in **Table 2-3**. Ballast boulder rock and wood materials will be imported from an off-site source.

Table 2-1. Project Earthwork Summary

Item	Unit	Quantity
Excavation – Berms, Levees, and Spur Dikes	CY	11,500
Fill – Gravel Augmentation	CY	11,500

CY = cubic yard

Table 2-2. Project Rock Materials Summary

Item	Unit	Quantity
2 — 3-Foot Ballast Boulder	EA	72

EA = each

Table 2-3. Project Large Woody Materials Summary

Large Wood Material	Size (Diameter)	Length	Rootwad (Diameter)	Unit	Quantity
Whole Tree w/ Rootwad	24″ min.	40′ min.	6′ min.	EA	24
Whole Tree w/ Rootwad	18″ min.	35′ min.	4′ min.	EA	179
Logs w/o Rootwads or Branches	18″ min.	35′ min.	–	EA	36
Slash/Racking	2-10″	6-16′	–	CY	660

min. = minimum
″ = inches
′ = feet

Project earthwork quantities are neatline quantities and represent direct measurements between existing and proposed grades. Contractor will take into account the earthwork activities that involve existing grade excavation, loose volume in trucks and/or stockpiles, and compacted in-place proposed grades. Per Federal Highway Administration criteria, the typical range of combined shrink and swell factors for heavy excavation is approximately 15 percent shrink to 5 percent swell (FHWA 2021), which is within the expected variation in the bid items, as specified in Section 01 22 20 MEASUREMENT AND PAYMENT in Attachment 2.

2.3 PROJECT ACTIVITIES

To ensure integrity of the stream channel and to reduce impacts to water quality and aquatic organisms, all work below the OHWM will be performed between July 1st and October 31st, the in-water work window for Meacham Creek within the Project area. Descriptions of primary construction activities with references to corresponding drawings and 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, pre-construction meeting, and establishing protocols for construction support, construction quality control measures, and progress meetings.

Construction initiation activities include:

- Installation of construction area BMPs;
- Construction of access and staging areas;
- Installation of TESC; and
- Submission and approval of all required submittals and plans.

Throughout the Project duration, all BMPs, access and staging areas, and TESC will be maintained to function as intended and in accordance with Construction Specifications (Attachment 2).

Preconstruction staking is required and will be conducted by the Engineer, or design firm representative. This staking effort will include the construction points shown on the Design Drawings and assumes that the construction contractor will have on-site survey capability and/or GPS-enabled equipment.

Required pre-construction submittals and plans are incidental pay items included within other bid items. They are described in the Construction Specifications (see Section 01 33 00 Submittal Procedures in Attachment 2) and are summarized in **Table 2-4**.

Table 2-4. Contractor Submittal Log

Log No.	Description of Submittal	Type of Submittal	Requirement found in Specification No.	Additional Specification References
1	Submittal Schedule	Schedule	Section 01 33 00 1.02	
2	Construction Schedule	Schedule	Section 01 33 00 3.01	Specifications Section 01 14 20 1.02 and 1.05; Implementation Plan Section 2.1
3	Contract schedule of values	Schedule	Section 01 33 00 3.01	
4	Weed-free Material Source Certification	Material Certification	Section 01 33 00 3.01	Specifications Sections 01 35 43 2.03 and 3.05; Specifications Section 32 90 00 2.01
5	Spill Prevention Countermeasures and Control (SPCC) Plan	Plan	Section 01 33 00 3.01	Specifications Section 01 35 43 1.03; Implementation Plan Section 3.2
6	Oregon Department of Environmental Quality (ODEQ) 1200-C Permit	Permit	Section 01 33 00 3.01	Specifications Section 01 35 43 1.02
7	Stormwater Pollution Prevention Plan (SWPPP), with Oregon Department of State Lands 1200-C Permit and Supporting Materials	Plan; Permit	Section 01 33 00 3.01	Specifications Section 01 35 43 1.03
8	Erosion and Sediment Control (ESC) Plan	Plan	Section 01 33 00 3.01	ARBO II General Aquatic Conservation Measures; Specifications Section 01 35 43 1.03; Implementation Plan Section 3.2
9	Storm Contingency Plan	Plan	Section 01 33 00 3.01	Specifications Section 01 35 43 1.02
10	Material Storage/Staging Plan	Plan	Section 01 33 00 3.01	Specifications Section 01 35 43 1.04 F.1; Implementation Plan Section 3.1
11	Dewatering and Work Area Isolation Plan	Plan	Section 01 33 00 3.01	ARBO II General Aquatic Conservation Measures; Specifications Sections 01 35 43 1.05 H.1, 01 35 43 1.02, and 31 23 19 1.02
12	Excavation Plan	Plan	Section 01 33 00 3.01	Specifications Section 31 23 00
13	LWM, Boulder, Streambed, and Grade Stabilization Material	Material Compliance	Section 01 33 00 3.01	Specifications Section 35 49 50 Implementation Plan Section 2
14	Seed Certification	Material Certification	Section 01 33 00 3.01	Specifications Section 32 90 00 Implementation Plan Sections 2 and 3
15	Surveyor Credentials	Credential	Section 01 33 00 3.01	Specifications Section 01 71 23 1.02
16	Oregon Department of Forestry (ODF) Notification of Operation	Notice	Section 01 33 00 3.01	Specifications Section 01 35 43 1.03
17	Temporary Bridge Crossing Design	Plan	Section 01 33 00 3.01	ARBO II General Aquatic Conservation Measures; Specifications Section 01 55 13 2.03
18	Final Record Drawings	Drawings	Section 01 33 00 3.01	Specifications Sections 01 71 23 and 01 78 39

2.3.2 Work in the Floodplain and Uplands

Work in the uplands will include LWM acquisition, hauling, and staging; and berms, levee, and dike excavation with no work below OHWM.

Work in the floodplain will begin by clearing and grubbing for temporary access routes, stockpile and staging areas, dike excavation areas, and the installation of temporary crossings. Suggested access routes are shown in the Design Drawings (Attachment 1 Sheet C-001), but the contractor will confirm all routes in the field with the Owner's Representative and the landowner before construction. All material excavated from the floodplain will be placed as designated in the Design Drawings. Concrete, metal, and other debris will be removed and hauled to an approved off-site disposal facility.

LWM structures that do not require work below the OHWM will be constructed (Attachment 1 Sheets C-101, C-103, C-105, C-107 to C-108, and C-110). Some LWM will be surface-placed, and other LWM will be excavated and backfilled with floodplain excavation spoils.

2.3.3 Work in the Wetted Channel

Work in the wetted channel (defined as the area below OHWM) will only take place during the in-water work period of July 1st to August 15th. This will include berm, levee, and spur dike excavation and gravel augmentation fill and the installation of the remaining LWM structures.

Work in the wetted channel must follow dewater, bypass, fish and freshwater mussel salvage sequences, and details in the Design Drawings (Attachment 1, Sheet C-403), the Construction Specifications in Attachment 2, and the ARBO II Conservation Measures (Attachment 3). Fish and mussel salvage must be conducted by the CTUIR, or other qualified fish biologists. The work area must be isolated at the upstream and downstream extents of the LWM structure locations. Mussels and fish must be captured from isolated areas via trapping, seining, electrofishing, or other methods to minimize risk of injury to animals. The contractor will provide at least three days advance notice prior to dewatering or isolating any work area. Further, the contractor must coordinate with the Owner's Representative or Engineer regarding the timing and duration of LWM structure placements that are in the immediate vicinity of fish and mussel salvage operations.

Construction of LWM structures in the wetted channel will occur simultaneously with excavation and fill activities. Woody materials must be delivered to structure sites by a front-end loader or off-road haul truck. At the same time, an excavator will be used to construct LWM structures in the wetted channel. Installation of a typical structure includes excavation

of a trench in the floodplain or bank, placement of the log or other woody material within the trench, followed by backfilling the excavated area with earthen materials excavated during trenching. The backfilled area must be bucket compacted with an excavator. Some structures contain surface wood placement where no trench is required. Each structure will have a unique installation procedure depending on the complexity of the structure and interaction with other logs, racking materials, rootwads, and ballast (see Attachment 1, Sheets C-301 to C-303, and Attachment 2, Section 35 01 60 Stream Restoration and Section 35 49 50 LWM and Channel Structures). All specifications for anchoring and securing large wood will follow the Oregon Department of Forestry (ODF) and ODFW manual for placing large wood in streams (ODFW and ODF, 2010).

Rewatering steps include pre-washing areas of channel excavation, pumping the turbid water to an approved floodplain location ensuring that no turbid water returns to the river, and incrementally increasing flow in the channel over a period of hours. Pump capacity and discharge hose length will be sufficient to dewater work areas. All pumps must be equipped with fish screens that meet National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) criteria (NMFS 2023). All pumps and generators used must be equipped with secondary spill containment; no equipment fueling shall take place over or within 150 feet of the Meacham Creek stream channel, delineated wetlands, and aquatic resources.

All material placed in the channel as part of gravel augmentation will be placed and compacted in lifts. Fines will be washed in for each lift until voids within the placed matrix are minimized such that ponding occurs with little to no percolation losses to keep the introduced water on the surface and avoid the river going subsurface.

2.3.4 Revegetation and Cleanup

To the extent practicable, existing vegetation must be maintained. If necessary and as directed by the Owner's Representative or Engineer, vegetation will be removed by the contractor in clumps that preserve plant groupings, topsoil, and root systems. Vegetation clumps will be preserved, protected, and replanted as directed.

Following completion of all work activities, the contractor will decompact staging areas, access routes, and all other compacted areas to a minimum depth of 18 inches and a clod size no larger than 8 inches. All disturbed will be seeded per Section 32 90 00 Seeding to stabilize disturbed soils. Further site stabilization will occur via plantings with native riparian plants, performed by the CTUIR.

3. Construction Specifications

3.1 STAGING AND STOCKPILE AREAS

Access to the site will be from the UPRR service road. No new permanent access roads will be constructed, and all temporary access routes must be approved by the Owner's Representative or Engineer. To minimize disturbance and associated environmental impacts, construction vehicles will avoid concentrations of thick vegetation and other sensitive areas as defined by the CTUIR. Construction staging are allowed in designated areas, as indicated in the Design Drawings, Attachment 1 (Sheet C-001 to C-003). All temporary staging, storing, or maintenance of equipment will be more than 150 feet from any natural water body or wetland, and if fueling or maintenance must be performed near any natural water body or wetland, it will be conducted using secondary containment to capture potential fuel spills as described in the Construction Specifications, Attachment 2 (Section 01 35 43 Environmental Protection).

3.2 TESC, BMP IMPLEMENTATION, AND PERMANENT SITE STABILIZATION

TESC measures are included in the Construction Specifications in Attachment 2 (Section 01 35 43 Environmental Protection). The minimum measures that must be installed are indicated in the Design Drawings in Attachment 1 (Sheet G-003, C-400 to C-401). The contractor is responsible for installing additional controls to prevent any sediment and sediment-laden water from leaving the construction site. Additionally, it is the contractor's responsibility to comply with all ARBO II terms and conditions and conservation measures (Attachment 3), including:

- General Aquatic Conservation Measures;
- Pollution and Erosion Control Measures;
- Site Preparation;
    - Flagging sensitive areas;
    - Staging area;
    - Temporary erosion controls;
    - Stockpile materials;
    - Hazard trees;
- Heavy Equipment Use;

  - Choice of equipment;
  - Fueling and cleaning and inspection for petroleum products and invasive weeds;
  - Temporary access roads;
  - Stream crossings;
  - Work from top of bank;
  - Timely completion;
- Turbidity Monitoring;
- Work Area Isolation, Surface Water Withdrawals, and Fish Capture and Release; and
- Site Restoration.

The general environmental protection measures and BMPs to be implemented are outlined below:

- All in-water work will be limited to the in-water work period (July 1 to August 15).
- Fish and freshwater mussel removal and relocation will be conducted by the CTUIR or other qualified fish biologists in accordance with NMFS and ODFW fish salvage guidelines.
- The contractor will secure the Project area at the end of every workday in an effort to stabilize the work area to minimize impacts in case a high-water event occurs.
- The contractor will be required to prepare and implement an Erosion and Sediment Control Plan to keep sediment from entering the wetted channel during rain events.
- The contractor will be required to prepare an emergency spill containment kit, to be always located on the construction site, and prepare a Spill Prevention, Control, and Countermeasures (SPCC) Plan addressing prevention and cleanup of accidental spills. The SPCC Plan will agree with all conservation measures and BMPs included in this Implementation Plan.
- TESC measures, which may include fiber wattles, straw bales, silt fences, jute matting, wood fiber mulch and soil binder, or geotextiles and geosynthetic fabric, will be in place before any significant alteration of the Project site and appropriately installed downslope of Project activity until permanent site stabilization is complete.
  - If there is a potential for eroded sediment to enter the stream, sediment barriers swill be installed and maintained for the duration of Project implementation.

- Soil stabilization utilizing wood fiber mulch and tackifier (hydro-applied) may be used to reduce erosion of bare soil if the materials are noxious weed-free and nontoxic to aquatic and terrestrial animals, soil microorganisms, and vegetation.
- Sediment will be removed from erosion control BMPs once it has reached one-third of the exposed height of the BMP.
- The work area will be well isolated from surface waters of the river using temporary cofferdams constructed with bulk bags filled with washed gravel, plastic sheeting and sandbags, or similar materials.
- Once the site is stabilized following construction, TESC BMPs will be removed.
- Materials for emergency erosion control will be available at the work site, including a supply of sediment control materials and an oil-absorbing floating boom whenever surface water is present.

- Machinery used in the Project area will be clean, well-maintained, in good operating condition, and inspected daily for leaks. All equipment used in and adjacent to the stream channel and live water will use biodegradable lubricants and fluids.
- Parking machinery, equipment, and vehicles in areas that are infested with noxious weeds will be avoided to the extent possible. Workers will check under vehicles and equipment before leaving the area and remove any plants or plant parts that may become lodged in the carriages. Workers will also check clothing and tools for weed seeds. If noxious weed plants or seeds are found during inspections, they will be incinerated at an approved location.
- The clearing limits associated with site access and construction will be marked with flagging in the field prior to vegetation removal and other construction activities to minimize disturbance to riparian vegetation and avoid disturbance to sensitive habitats.
- The contractor will minimize alteration or disturbance of streambanks and existing riparian vegetation. This will be done by revegetating banks that are disturbed during construction, covering all land areas that will be left undisturbed for more than seven days with an approved soil covering practice (e.g., seeding, mulching, plastic covering, crushed rock) whether at final grade or not, and marking in the field clearing limits associated with site access and construction.

- Contact water from work activities and water removed from within the work area will be routed to an area approved by the Owner's Representative or Engineer to allow removal of fine sediment and other contaminants prior to being discharged to the stream.
- All construction staging and any machinery maintenance involving potential contaminants (e.g., fuel, oil, hydraulic fluid, etc.) must occur at an approved site at least 150 feet away from the wetted channel and only in designated areas. Hazardous spill clean-up materials and trained operators will be located on-site.
- Within the Project area, the necessary equipment will be maintained to pump out the work site if flows enter any construction area. The pump will be screened to prevent fish from entering the system. Pump screens will be designed in accordance with NMFS (2023) standards to avoid juvenile fish impingement or entrainment. Screen maintenance will be adequate to prevent injury or entrainment of juvenile fish. The screen will remain in place if the diversion or isolated work area is in place.
- Dewatering of isolated work areas will be done in a way that will not degrade water quality or cause fish or freshwater mussel stranding. Coordination with CTUIR will be necessary to ensure that fish and freshwater mussel salvage are completed prior to dewatering activities. If freshwater mussel bed locations are identified, three days advance notice will be needed for any salvage and relocation effort. The contractor should anticipate that fish and freshwater mussel salvage and transfer may be necessary wherever these species are encountered during construction.

3.3 DEMOBILIZATION AND CLEAN-UP SCHEDULE

Demobilization will occur once work activities are completed and all work has been found to be acceptable by the Owner's Representative or Engineer. Equipment will be transported off the site and returned to the vendors as applicable. Unused materials will be returned to the supplier or transported off-site to a location approved by Owner's Representative or Engineer. Demobilization and final site cleanup are scheduled prior to December 1st in the year of construction.

4. References

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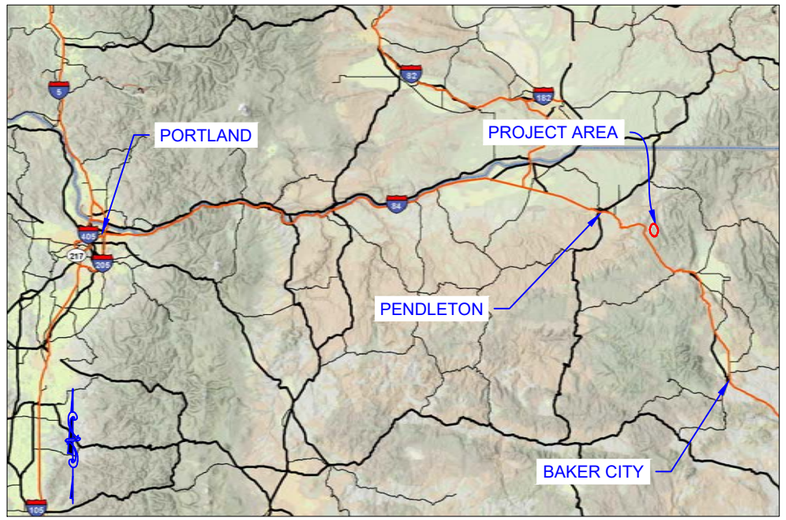
ATTACHMENT 1
DESIGN DRAWINGS

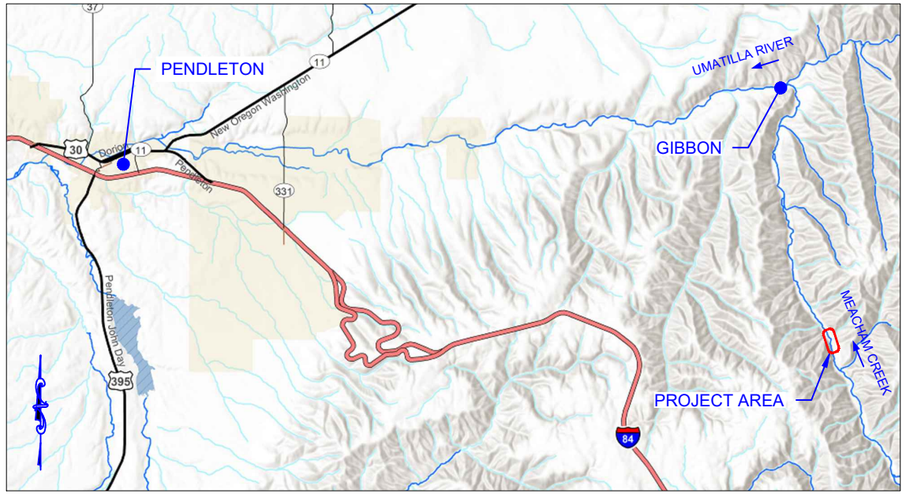
CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION

MEACHAM CREEK RM 10 TO 11

IN-STREAM DESIGN & CONSTRUCTION OVERSIGHT



LOCATION MAP
SCALE: NTS



VICINITY MAP
SCALE: NTS

DRAWING INDEX	
DWG #	TITLE
GENERAL	
G-001	COVER SHEET
G-002	GENERAL NOTES: ABBREVIATIONS, CONSTRUCTION NOTES, AND GENERAL NOTES
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C-400 - C-401	EROSION AND SEDIMENT CONTROLS
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C-403	FISH SALVAGE AND DEWATERING PLAN AND NOTES
L-101	REVEGETATION PLAN

PROJECT CONSTRUCTION QUANTITIES		
CONSTRUCTION ITEMS	**UNITS**	**TOTAL**
LEVEE AND SPUR EXCAVATION	CY	11,500
GRAVEL AUGMENTATION	CY	11,500
WHOLE TREE (24 IN. MIN. DBH, 40 FT. MIN., 6-FT. MIN. ROOTWAD)	EA	24
MEDIUM TREE (18 IN. MIN. DBH, 35 FT. MIN., 4-FT. MIN. ROOTWAD)	EA	179
MEDIUM LOG, NO BRANCHES OR ROOTWAD (18 IN. MIN. DBH, 35-FT. MIN.)	EA	36
RACKING (4-10 IN. DBH, 8-16 FT.)	EA	660
BOULDER (2-3 FT. DIAMETER)	EA	72

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REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JEREMY S. ANDREWS
JUL. 12, 2016
EXPIRES: 12/31/2025
12/28/2023

ISSUED FOR CONSTRUCTION

CTUIR - WALLA WALLA - UMATILLA
CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
Treaty of 1855

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

CTUIR
MEACHAM CREEK RM 10 TO 11

COVER SHEET

DWG. NO.: G-001
CREATED: 12/04/2023
SHEET 1 of 27

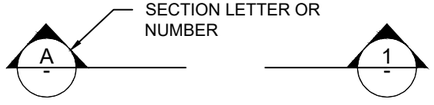
Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN_SHEET FILES\01_COVER SHEET.DWG
PLOT DETAILS: ANDREWS, JEREMY December 26, 2023 9:15 AM

ABBREVIATIONS

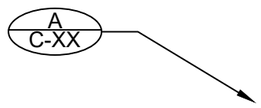
1H:1V	HORIZONTAL TO VERTICAL EXAGGERATION	LT	LEFT
AC	ACRE	LWM	LARGE WOODY MATERIAL
APP	APPROVED BY	LWS	LARGE WOOD STRUCTURES
APPROX	APPROXIMATE	M	METER
ARBO	AQUATIC RESTORATION BIOLOGICAL OPINION	MAX	MAXIMUM
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	MI	MILE
		MIN	MINIMUM
BMPs	BEST MANAGEMENT PRACTICES	MISC	MISCELLANEOUS
CHK	CHECKED BY	MJR	MAJOR
CO	COUNTY	MNR	MINOR
CP	CONTROL POINT	N/A	NOT APPLICABLE
CTUIR	CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION	NAD	NORTH AMERICAN DATUM OF 1983
		NAVD	NORTH AMERICAN VERTICAL DATUM OF 1988
CU IN	CUBIC INCH	NEPA	NATIONAL ENVIRONMENTAL POLICY ACT
CWA	CLEAN WATER ACT	NMFS	NATIONAL MARINE FISHERIES SERVICE
CY	CUBIC YARDS	NTS	NOT TO SCALE
D	DEPTH	NTU	NEPHELOMETRIC TURBIDITY UNIT
DBH	DIAMETER AT BREAST HEIGHT	OBL	OBLIGATE WETLAND
DIA	DIAMETER	ODEQ	OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
DWG	DRAWING		
DRW	DRAWN BY	ODFW	OREGON DEPARTMENT OF FISH AND WILDLIFE
EA	EACH	ODOT	OREGON DEPARTMENT OF TRANSPORTATION
EG	FOR EXAMPLE (LATIN: EXEMPLI GRATIA)	OHWM	ORDINARY HIGH WATER MARK
ENG	ENGINEERED BY	PAL	POST ASSISTED LOG STRUCTURE
EQIV	EQUIVALENT	PRO	PROPOSED
ETC	ET CETERA	PSF	POUNDS PER SQUARE FOOT
EX	EXISTING	RCG	REED CANARYGRASS
FAC	FACULTATIVE	RT	RIGHT
FACU	FACULTATIVE UPLAND	STA	STATION
FACW	FACULTATIVE WETLAND	SF	SQUARE FEET
FT, '	FOOT	TEMP	TEMPORARY
ID	IDENTIFICATION	TESC	TEMPORARY EROSION AND SEDIMENT CONTROL
IE	THAT IS (LATIN: ID EST)	TYP	TYPICAL
IN, "	INCH	UPL	OBLIGATE UPLAND
L	LENGTH	USACE	UNITED STATES ARMY CORPS OF ENGINEERS
LBS	POUNDS	USFS	UNITED STATES FOREST SERVICE
LiDAR	LIGHT DETECTION AND RANGING	USFWS	UNITED STATES FISH AND WILDLIFE SERVICE
LF	LINEAR FEET	W/	WITH
LS	LUMP SUM	WSE	WATER SURFACE ELEVATION
		XS	CROSS SECTION
		YR	YEAR

SYMBOLS

SECTIONS ARE REFERENCED IN THE FOLLOWING MANNER:



CONSTRUCTION SHEETS ARE REFERENCED IN THE FOLLOWING MANNER:



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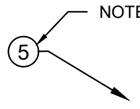

CONSTRUCTION SEQUENCING FOR EACH PHASE:

1. INSTALLATION AND MAINTENANCE OF TRAFFIC CONTROL MEASURES.
2. INSTALLATION AND MAINTENANCE OF TESC.
3. INSTALLATION AND MAINTENANCE OF TEMPORARY CONSTRUCTION AREA BMPS, FENCING, ACCESS ROUTES, AND MATERIAL STORAGE AREAS.
4. HAUL AND STAGE CONSTRUCTION MATERIALS.
5. CLEARING AND GRUBBING WITHIN PROJECT AREA LIMITS.
6. EXCAVATE LEVEE AND SPUR DIKES, PLACE GRAVEL AUGMENTATION, AND INSTALL ALL FLOODPLAIN LARGE WOOD STRUCTURES ABOVE OHWM.
7. INSTALLATION AND MAINTENANCE OF WORK AREA ISOLATION AND FISH SALVAGE MEASURES
8. EXCAVATE LEVEE AND SPUR DIKES, PLACE GRAVEL AUGMENTATION, AND INSTALL ALL FLOODPLAIN LARGE WOOD STRUCTURES BELOW OHWM.
9. REMOVE WORK AREA ISOLATION AND FISH SALVAGE MEASURES.
10. STABILIZE SITE, SEED, AND PLANT.
11. REMOVE ALL TEMPORARY CONSTRUCTION CONTROLS AND MEASURES.
12. COMPLETE PROJECT AREA CLEANUP AND REPAIRS.

GENERAL NOTES:

1. HORIZONTAL PROJECTION: NAD83 OREGON STATE PLANES, NORTH ZONE, INTERNATIONAL FEET.
2. VERTICAL PROJECTION: NAVD88.
3. PROJECT ALIGNMENT, ELEVATION, AND STATIONING BASED ON 2020 LiDAR TOPOGRAPHIC DATA AND SUPPLEMENTED BY BATHYMETRIC SURVEY CONDUCTED BY TETRA TECH IN JUNE 2021.
4. PROPOSED PROJECT DESIGN, CONSTRUCTION ACTIVITIES, AND MATERIALS SUBJECT TO APPROVAL BY LANDOWNER.
5. AERIAL IMAGERY PROVIDED BY UNITED STATES DEPARTMENT OF AGRICULTURE NATIONAL AGRICULTURE IMAGERY PROGRAM, UMATILLA COUNTY, 2020.

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 CHANNEL SHALL OCCUR WITHIN THE ALLOWABLE IN-WATER WORK WINDOW BASED ON PUBLISHED ODFW GUIDELINES (JULY 1 - AUGUST 15).
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.
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 LATEST GUIDELINES IN THE AQUATIC RESTORATION BIOLOGICAL OPINION II - GENERAL AQUATIC CONSERVATION MEASURES (USFW/NMFS 2013). 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) DAYS OF NOTICE TO PROCEED.
9. AREAS SHOWN ON THE PLANS AND AREAS IDENTIFIED IN THE FIELD SHALL BE DECOMPACTED AS FOLLOWS: ANY HARDENED ROAD SEGMENT, TEMPORARY ACCESS ROAD, OR SURFACE AREA SHALL BE DECOMPACTED TO PROMOTE WATER FILTRATION AND ESTABLISH VEGETATION. THE WORK SHALL CONSIST OF LOOSENING ALL THE SOIL IN THE EXISTING ROADBED OR AREA TO A DEPTH OF 18 INCHES (MIN) AND CLOD SIZE NO LARGER THAN 8-INCHES.
10. ALL EARTHWORK QUANTITIES ASSUME FINAL CONSTRUCTED IN-PLACE NEATLINE OR NEAT VOLUMES AND ARE BASED ON FINISHED GRADES. QUANTITIES SHOWN DO NOT ACCOUNT FOR MATERIAL SHRINKAGE OR EXPANSION.

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REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JUL 12, 2016 JEREMY S. ANDREWS 12/28/2023
EXPIRES: 12/31/2025

ISSUED FOR CONSTRUCTION

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		PLAN SHEET SIZE ANSI B (11" X 17")				
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CTUIR
MEACHAM CREEK RM 10 TO 11

GENERAL NOTES AND ABBREVIATIONS

DWG. NO.: G-002
CREATED: 12/04/2023
SHEET 2 of 27

Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN\SHEET FILES\01_COVER SHEET.DWG
PLOT DETAILS: ANDREWS, JEREMY December 28, 2023 9:15 AM

BEST MANAGEMENT PRACTICES (BMPs):

1. THE PROJECT WILL BE PERMITTED THROUGH THE USFWS AND NMFS ARBO II PROGRAMMATIC PERMITTING PROCESS AND HAS RECEIVED A NATIONWIDE 401 WATER QUALITY CERTIFICATION FROM ODEQ. AS REQUIRED IN THE ODEQ 2021 WATER QUALITY CERTIFICATION TEMPLATE, THE CONTRACTOR WILL BE REQUIRED TO IMPLEMENT BEST MANAGEMENT PRACTICES (BMPS) FOR EROSION AND SEDIMENT CONTROL AND SPILL PREVENTION, INCLUDING BUT NOT LIMITED TO:
   - 1.1. SEQUENCING OF WORK TO MINIMIZE IN-WATER DISTURBANCE AND DURATION.
   - 1.2. UTILIZING ADAPTIVE MANAGEMENT TO IMPLEMENT AND MONITOR EROSION AND SEDIMENT MEASURES (E.G., STRAW WATTLES), INCLUDING MAINTAINING STOCKPILES OF MEASURES ON SITE.
   - 1.3. UTILIZING BUCKET CONTROL TO MINIMIZE TURBIDITY.
   - 1.4. MAINTAINING WORK AREA ISOLATION WITH TEMPORARY COFFERDAMS, FLOATING SILT CURTAIN, AND/OR EARTHEN PLUGS.
   - 1.5. 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.
   - 1.6. STABILIZATION OF ALL DISTURBED SURFACES WITH MULCH, SEEDING, AND PLANTING.
   - 1.7. 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.
2. APPROPRIATE BMPs SHALL BE IMPLEMENTED TO MINIMIZE TURBIDITY DURING IN-WATER WORK. MONITORING WILL BE CONDUCTED BY THE CTUIR IN COMPLIANCE WITH THE REQUIREMENTS OF THE PROJECTS PROGRAMMATIC PERMIT, INCLUDING BACKGROUND AND COMPLIANCE POINT MONITORING EVERY TWO HOURS, MAINTAINING DAILY LOGS, AND REPORTING EXCEEDANCES. IF MONITORING OBSERVES TURBIDITY LEVELS ABOVE BACKGROUND LEVELS, BMPS WILL BE MODIFIED, AND WORK STOPPAGES MAY OCCUR AS SPECIFIED IN THE TEMPLATE. THE 80% DESIGN SPECIFICATIONS WILL INCLUDE THIS SPECIFIC TURBIDITY MONITORING LANGUAGE. ANY ACTIVITY THAT CAUSES TURBIDITY TO EXCEED 10% ABOVE NATURAL STREAM TURBIDITY IS PROHIBITED EXCEPT AS SPECIFICALLY PROVIDED BELOW:
   - 2.1. TURBIDITY MONITORING SHALL BE CONDUCTED AND RECORDED AS DESCRIBED BELOW. MONITORING MUST OCCUR AT 2 HOUR INTERVALS EACH DAY DURING DAYLIGHT HOURS WHEN IN-WATER WORK IS BEING CONDUCTED. A PROPERLY CALIBRATED TURBIDIMETER IS REQUIRED UNLESS ANOTHER MONITORING METHOD IS PROPOSED AND AUTHORIZED BY ODEQ.
     - 2.1.1. A TURBIDITY MEASUREMENT SHALL BE RECORDED EVERY 2 HOURS DURING IN-WATER WORK AT AN UNDISTURBED AREA. A BACKGROUND LOCATION SHALL BE ESTABLISHED AT A REPRESENTATIVE LOCATION APPROXIMATELY 100 FEET UPCURRENT OF THE IN WATER ACTIVITY UNLESS OTHERWISE AUTHORIZED BY ODEQ. THE BACKGROUND TURBIDITY, LOCATION, DATE, TIDAL STAGE (IF APPLICABLE), AND TIME MUST BE RECORDED IMMEDIATELY PRIOR TO MONITORING DOWNCURRENT AT THE COMPLIANCE POINT DESCRIBED BELOW.
     - 2.1.2. MONITORING SHALL OCCUR EVERY 2 HOURS. A COMPLIANCE LOCATION SHALL BE ESTABLISHED AT A REPRESENTATIVE LOCATION APPROXIMATELY 100 FEET DOWNCURRENT FROM THE DISTURBANCE AT APPROXIMATELY MID-DEPTH OF THE WATERBODY AND WITHIN ANY VISIBLE PLUME. THE TURBIDITY, LOCATION, DATE, TIDAL STAGE (IF APPLICABLE) AND TIME MUST BE RECORDED FOR EACH MEASUREMENT.
   - 2.2. TURBIDITY MONITORING RESULTS SHALL BE COMPARED FROM THE COMPLIANCE POINTS TO THE REPRESENTATIVE BACKGROUND LEVELS TAKEN DURING EACH TWO-HOUR MONITORING INTERVAL. PURSUANT TO OAR 340-041-0036, SHORT TERM EXCEEDANCES OF THE TURBIDITY WATER QUALITY STANDARD ARE ALLOWED AS FOLLOWS:

MONITORING WITH A TURBIDMETER EVERY 2 HOURS	
TURBIDITY LEVEL	RESTRICTIONS TO DURATION OF ACTIVITY
0 TO 4 NTU ABOVE BACKGROUND	NO RESTRICTIONS
5 TO 29 NTU ABOVE BACKGROUND	WORK MAY CONTINUE MAXIMUM OF 4 HOURS. IF TURBIDITY REMAINS 5-29 NTU ABOVE BACKGROUND, STOP WORK AND MODIFY BMPs. WORK MAY RESUME WHEN NTU IS 0-4 ABOVE BACKGROUND.
30 TO 49 NTU ABOVE BACKGROUND	WORK MAY CONTINUE MAXIMUM OF 2 HOURS. IF TURBIDITY REMAINS 30-49 NTU ABOVE BACKGROUND, STOP WORK AND MODIFY BMPs. WORK MAY RESUME WHEN NTU IS 0-4 ABOVE BACKGROUND.
50 NTU OR MORE ABOVE BACKGROUND	STOP WORK IMMEDIATELY AND INFORM ODEQ

   - 2.3. 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 ODEQ, USACE, NMFS, USFWS, AND ODFW UPON REQUEST.
   - 2.4. THE CONTRACTOR SHALL IMPLEMENT THE FOLLOWING BMPS, UNLESS OTHERWISE ACCEPTED BY ODEQ:
     - 2.4.1. SEQUENCE/PHASING OF WORK – THE CONTRACTOR SHALL SCHEDULE WORK ACTIVITIES SO AS TO MINIMIZE IN-WATER DISTURBANCE AND DURATION OF IN-WATER DISTURBANCES;
     - 2.4.2. 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;
     - 2.4.3. THE CONTRACTOR SHALL LIMIT THE NUMBER AND LOCATION OF STREAM-CROSSING EVENTS. ESTABLISH TEMPORARY CROSSING SITES AS NECESSARY IN THE LEAST SENSITIVE AREAS AND AMEND THESE CROSSING SITES WITH CLEAN GRAVEL OR OTHER TEMPORARY METHODS AS APPROPRIATE;
     - 2.4.4. MACHINERY MAY NOT BE DRIVEN INTO THE FLOWING CHANNEL, UNLESS AUTHORIZED BY ODEQ; AND
     - 2.4.5. 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.

FISH SALVAGE:

1. A FISH SALVAGE PLAN SHOULD BE DEVELOPED PRIOR TO ANY IN-WATER WORK ACTIVITIES THAT INCLUDES THE FOLLOWING MEASURES:
   - 1.1. PRIOR TO ANY INSTREAM WORK, MEASURES SHOULD BE TAKEN TO ISOLATE THE WORK AREA (E.G. BLOCK NETS) AND EXCLUDE FISH FROM ENTERING. IN-WATER WORK AREAS SHOULD BE ISOLATED BY COFFERDAMS.
   - 1.2. FISH SALVAGE BY A QUALIFIED AND PERMITTED BIOLOGIST SHALL OCCUR PRIOR TO INITIATION OF CONSTRUCTION ACTIVITIES. THE DIRECTING BIOLOGIST WILL WORK WITH THE APPROPRIATE CONSTRUCTION PERSONNEL TO PLAN THE STAGING AND SEQUENCE FOR WORK AREA ISOLATION, FISH CAPTURE AND REMOVAL, AND DEWATERING.
   - 1.3. 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.
   - 1.4. WHERE THE AREA TO BE ISOLATED IS LARGE, DEEP, FLOW VOLUMES OR VELOCITIES ARE HIGH, AND/OR CONDITIONS ARE NOT CONDUCIVE TO EASY FISH CAPTURE, IT MAY BE NECESSARY TO COMMENCE WITH DEWATERING IN CONJUNCTION WITH FISH CAPTURE AND REMOVAL.
   - 1.5. DEWATERING OF THE WORK AREA SHOULD OCCUR SLOWLY AND THE SITE SHOULD 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.
   - 1.6. 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.
   - 1.7. ELECTROFISHING SHOULD BE PERFORMED ONLY WHEN OTHER METHODS OF FISH CAPTURE AND REMOVAL HAVE PROVEN IMPRACTICABLE OR INEFFECTIVE AT REMOVING ALL FISH. THE DIRECTING BIOLOGIST SHOULD 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).
   - 1.8. ENSURE THAT WATER QUALITY CONDITIONS, INCLUDING DISSOLVED OXYGEN LEVELS, WITHIN FISH TRANSPORT SYSTEMS (E.G., BUCKETS) ARE SUFFICIENT TO PROMOTE FISH RECOVERY. HOLDING TIME SHOULD BE MINIMIZED AND COLD CLEAN WATER SHOULD BE USED FOR HOLDING AND TRANSFER. CAPTURED FISH SHOULD BE RETURNED TO THE CONNECTED WATERBODY AT A SAFE AND SUITABLE LOCATION.
   - 1.9. REPORT THE SALVAGE EFFORT RESULTS USING THE ONLINE REPORTING SYSTEM BY DECEMBER 31 OF THE YEAR(S) IN WHICH FISH SALVAGE WAS PERFORMED, SUBMIT THIS FORM TO THE ODFW DISTRICT BIOLOGIST.
2. SCREENING OF PUMPS SHALL BE CONSISTENT WITH NMFS ANADROMOUS SALMONID FRY CRITERIA (NMFS 2011) FOR OPEN SPACING AND VELOCITY TO PREVENT ENTRAINMENT OF AQUATIC SPECIES.

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REGISTERED PROFESSIONAL ENGINEER 91398PE OREGON JUL 12, 2006 JEREMY S. ANDREWS EXPIRES: 12/31/2025
12/31/2023

ISSUED FOR CONSTRUCTION

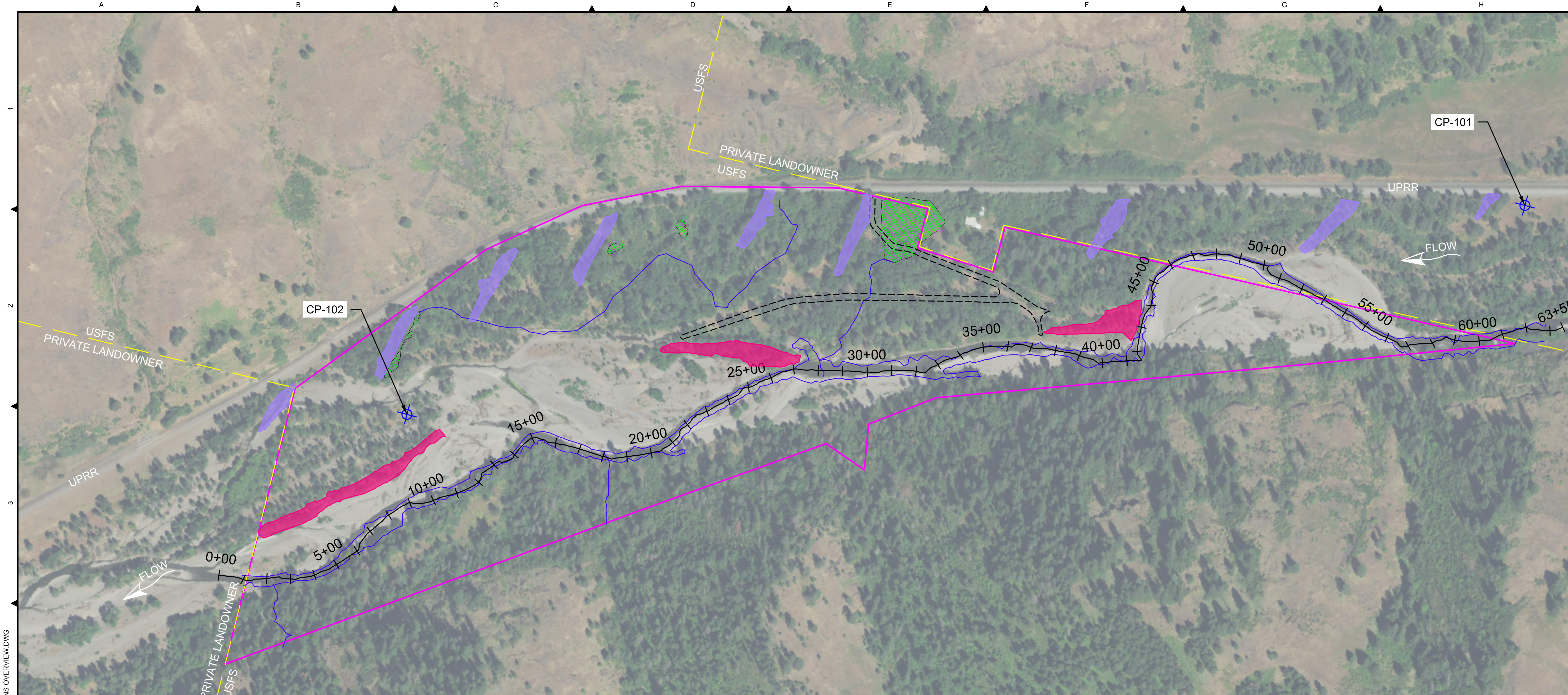
CAYUSE - WALLA WALLA - UMATILLA CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

CTUIR
MEACHAM CREEK RM 10 TO 11

BEST MANAGEMENT PRACTICES NOTES

DWG. NO.: G-003
CREATED: 12/04/2023
SHEET 3 of 27



SURVEY CONTROL POINTS				
POINT #	ELEVATION	NORTHING	EASTING	DESCRIPTION
101	2217.57	705707.85	8758288.42	CONTROL POINT
102	2165.91	709870.76	8756295.26	CONTROL POINT

LEGEND:
- USFS BOUNDARY
- PROJECT BOUNDARY
- OHWM
- EXISTING DELINEATED WETLANDS
- EXISTING ACCESS ROADS
- MEACHAM CREEK THALWEG
- CONTROL POINTS
- EXISTING LEVEE
- EXISTING SPUR DIKE

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REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JUL. 12, 2016 JEREMY S. ANDREWS
12/26/2023
EXPIRES: 12/31/2025

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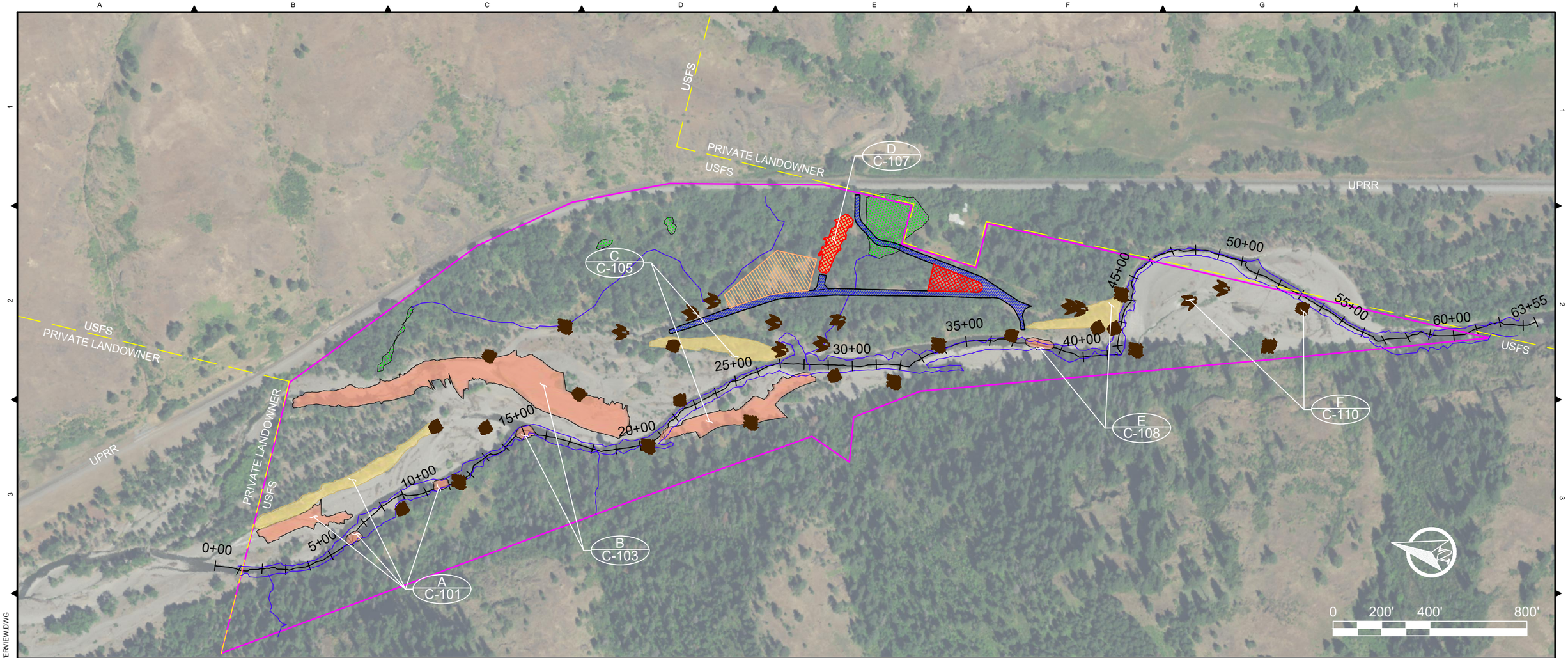
CTUIR
MEACHAM CREEK RM 10 TO 11

EXISTING CONDITIONS OVERVIEW

DWG. NO.: E-001
CREATED: 12/04/2023
SHEET 4 of 27

Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN\SHEET FILES\02_EXISTING CONDITIONS OVERVIEW.DWG
PLOT DETAILS: ANDREWS, JEREMY December 26, 2023 9:20 AM



NOTES:

1. LWM SHALL BE PLACED IN FLOODPLAIN, AREAS ADJACENT TO MEACHAM CREEK WETTED CHANNEL, AND ALL ACCESS ROUTES WITHIN THE 2-YEAR FLOWS AREA AS DIRECTED BY OWNER.
2. BOULDERS ENCOUNTERED IN LEVEE AND SPUR DIKE EXCAVATION SHALL BE PLACED IN EXISTING AND PROPOSED LWM STRUCTURES AS DIRECTED BY OWNER. ANGULAR NON-ALLUVIUM MATERIAL ENCOUNTERED DURING PROJECT EXCAVATION SHALL BE SEPARATED AND PLACED OUTSIDE THE FLOODPLAIN AS DIRECTED BY OWNER AND PER SPECIFICATION SECTION 31 23 00.
3. ALL LEVEE EXCAVATION SHALL CONFORM TO THE FLOODPLAIN GRADING DETAILS ON SHEET C-402, SPECIFICATION SECTION 31 23 00 OF THE PROJECT SPECIFICATIONS, AND AS DIRECTED IN THE FIELD.
4. ALL SPUR EXCAVATION SHALL CONFORM TO SPECIFICATION SECTION 31 23 00 OF THE PROJECT SPECIFICATIONS.
5. DECOMPACT AREAS SHOWN ON THIS SHEET OF PLANS, PER GENERAL CONSTRUCTION NOTE 9, AND AS DIRECTED BY OWNER.

LEGEND:

- PROJECT BOUNDARY
- USFS BOUNDARY
- OHWM
- EXISTING DELINEATED WETLANDS
- MEACHAM CREEK THALWEG
- PROPOSED EXCAVATION
- PROPOSED GRAVEL AUGMENTATION
- PROPOSED LWM
- PROPOSED DECOMPACTION
- PROPOSED TEMPORARY EQUIPMENT STAGING
- PROPOSED TEMPORARY NATURAL MATERIALS STAGING

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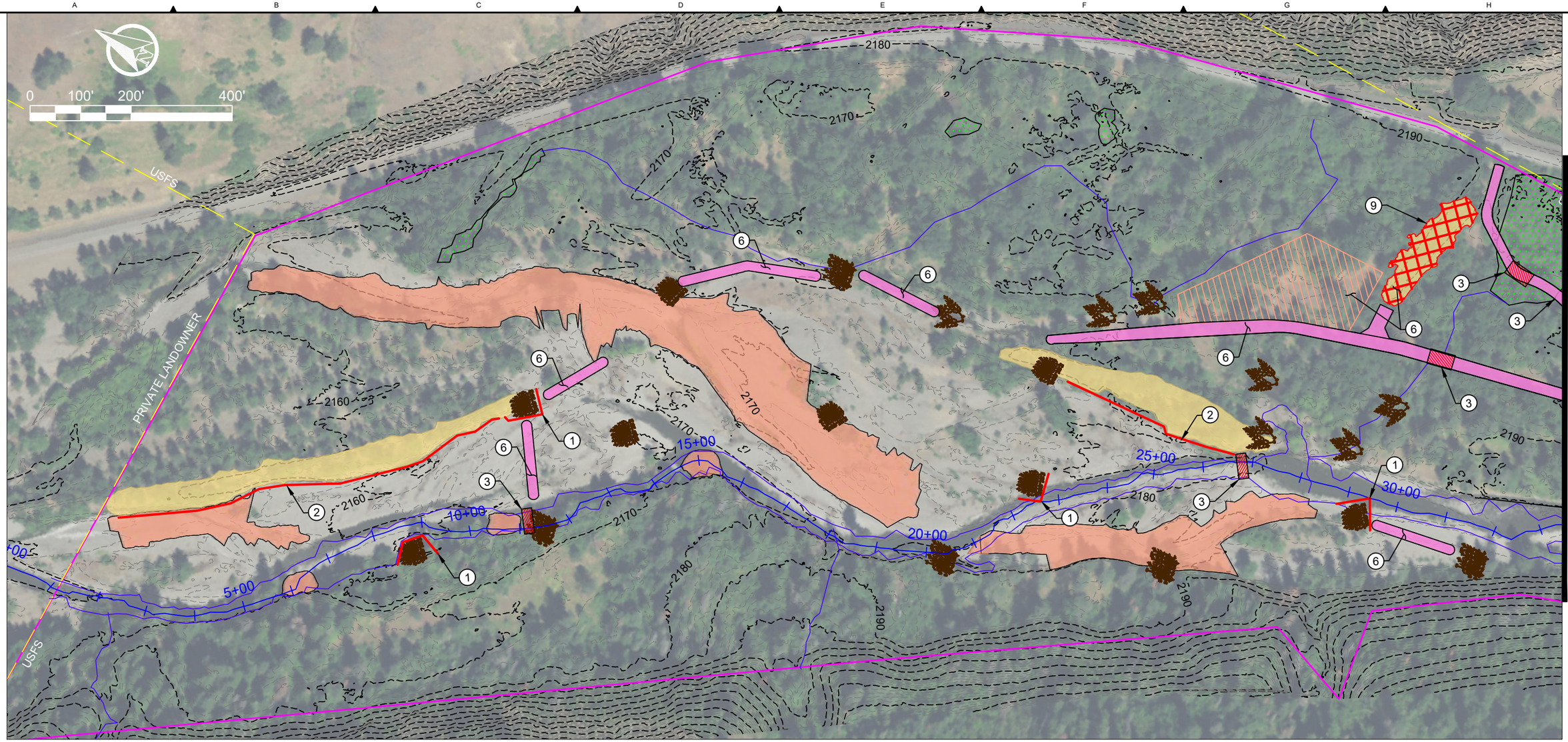
CTUIR
MEACHAM CREEK RM 10 TO 11

PROPOSED CONDITIONS OVERVIEW

DWG. NO.: C-001
CREATED: 12/04/2023
SHEET 5 of 27

Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN\SHEET FILES\03_PROPOSED CONDITIONS OVERVIEW.DWG
PLOT DETAILS: ANDREWS, JEREMY December 26, 2023 8:22 AM



NOTES:

1. INSTALL COFFERDAM PER EROSION AND SEDIMENT CONTROL DETAILS ON SHEET C-400.
2. INSTALL SILT FENCE OR EQUIVALENT PER EROSION AND SEDIMENT CONTROL DETAILS ON SHEET C-400.
3. INSTALL TEMPORARY CONSTRUCTION BRIDGE OR EQUIVALENT PER EROSION AND SEDIMENT CONTROL DETAILS ON SHEET C-401.
4. TEMPORARY STREAM CROSSING LOCATIONS SHALL BE APPROVED BY THE OWNER PRIOR TO USE.
5. THE NUMBER OF STREAM CROSSINGS WITH CONSTRUCTION EQUIPMENT SHALL BE MINIMIZED TO THE EXTENT PRACTICAL.
6. TEMPORARY STAGING AREAS AND ACCESS ROUTES SHOWN ON PLANS SHALL BE CONFIRMED BY OWNER PRIOR TO BEGINNING CONSTRUCTION.
7. TEMPORARY ACCESS ROUTES SHALL BE CONSTRUCTED PER DETAIL ON SHEET C-401 AND SECTION 01 55 13 OF THE PROJECT SPECIFICATIONS.
8. ALL EXISTING VEGETATION TO BE PROTECTED SHALL BE DELINEATED BY OWNER PRIOR TO COMMENCEMENT OF CONSTRUCTION AND SHALL BE DELINEATED BY FLAGGING. CONTRACTOR TO VERIFY DELINEATED VEGETATION PRIOR TO COMMENCEMENT OF ALL EARTHWORK.
9. EXCAVATION AREA TO BE USED AS TEMPORARY STAGING AND HAUL ROUTE AS NEEDED AND SHALL BE CONFIRMED WITH OWNER.

LEGEND:

- USFS BOUNDARY
- PROJECT BOUNDARY
- EXISTING CONTOUR - MAJOR 10FT
- EXISTING CONTOUR - MINOR 2FT
- OHWM
- EXISTING DELINEATED WETLANDS
- MEACHAM CREEK THALWEG
- PROPOSED ACCESS ROUTE
- PROPOSED EROSION CONTROLS
- PROPOSED EXCAVATION
- PROPOSED GRAVEL AUGMENTATION
- PROPOSED LWM
- PROPOSED TEMPORARY CROSSING
- PROPOSED TEMPORARY EQUIPMENT STAGING
- PROPOSED TEMPORARY NATURAL MATERIALS STAGING

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REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JEREMY S. ANDREWS JUL. 12, 2016
12/28/2023
EXPIRES: 12/31/2025

ISSUED FOR CONSTRUCTION

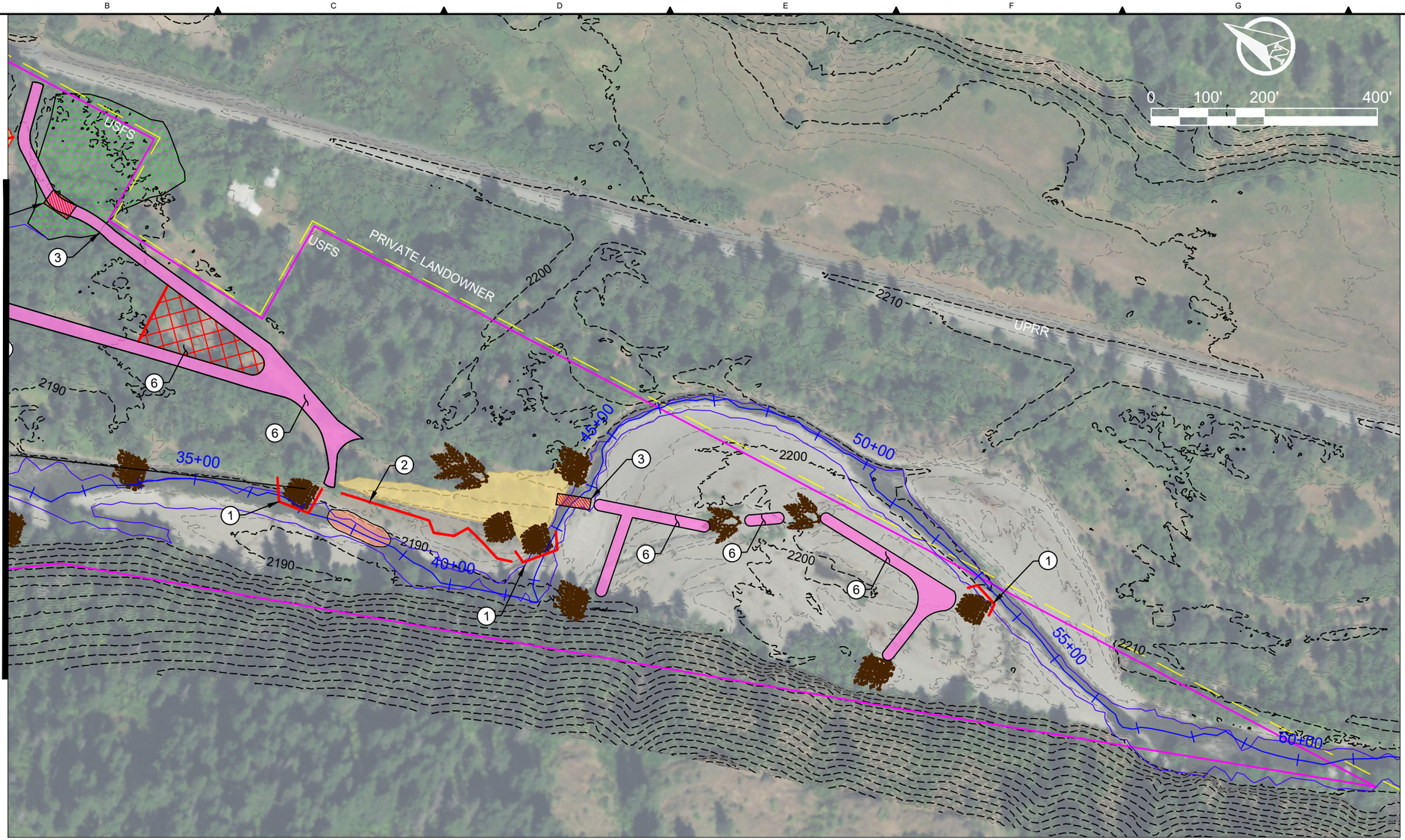
REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

CTUIR
MEACHAM CREEK RM 10 TO 11

PROPOSED CONDITIONS ACCESS ROUTES AND BMPS

DWG. NO.: C-002
CREATED: 12/04/2023
SHEET 6 of 27

Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN_SHEET FILES\04_PROPOSED CONDITIONS ACESS BMPS.DWG
PLOT DETAILS: ANDREWS, JEREMY December 26, 2023 9:26 AM



SEE SHEET C-002

NOTES:

1. INSTALL COFFERDAM PER EROSION AND SEDIMENT CONTROL DETAILS ON SHEET C-400.
2. INSTALL SILT FENCE OR EQUIVALENT PER EROSION AND SEDIMENT CONTROL DETAILS ON SHEET C-400.
3. INSTALL TEMPORARY CONSTRUCTION BRIDGE OR EQUIVALENT PER EROSION AND SEDIMENT CONTROL DETAILS ON SHEET C-401.
4. TEMPORARY STREAM CROSSING LOCATIONS SHALL BE APPROVED BY THE OWNER PRIOR TO USE.
5. THE NUMBER OF STREAM CROSSINGS WITH CONSTRUCTION EQUIPMENT SHALL BE MINIMIZED TO THE EXTENT PRACTICAL.
6. TEMPORARY STAGING AREAS AND ACCESS ROUTES SHOWN ON PLANS SHALL BE CONFIRMED BY OWNER PRIOR TO BEGINNING CONSTRUCTION.
7. TEMPORARY ACCESS ROUTES SHALL BE CONSTRUCTED PER DETAIL ON SHEET C-401 AND SECTION 01 55 13 OF THE PROJECT SPECIFICATIONS.
8. ALL EXISTING VEGETATION TO PROTECT SHALL BE DELINEATED BY OWNER PRIOR TO COMMENCEMENT OF CONSTRUCTION AND SHALL BE DELINEATED BY FLAGGING. CONTRACTOR TO VERIFY DELINEATED VEGETATION PRIOR TO COMMENCEMENT OF ALL EARTHWORK.

LEGEND:

- USFS BOUNDARY
- PROJECT BOUNDARY
- EXISTING CONTOUR - MAJOR 10FT
- EXISTING CONTOUR - MINOR 2FT
- OHWM
- EXISTING DELINEATED WETLANDS
- MEACHAM CREEK THALWEG
- PROPOSED ACCESS ROUTE
- PROPOSED EROSION CONTROLS
- PROPOSED EXCAVATION
- PROPOSED GRAVEL AUGMENTATION
- PROPOSED LWM
- PROPOSED TEMPORARY CROSSING
- PROPOSED TEMPORARY EQUIPMENT STAGING
- PROPOSED TEMPORARY NATURAL MATERIALS STAGING

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REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JEREMY S. ANDREWS JUL 12 2016
12/12/2023
Jeremy Andrews
EXPIRES: 12/31/2025

ISSUED FOR CONSTRUCTION

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

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

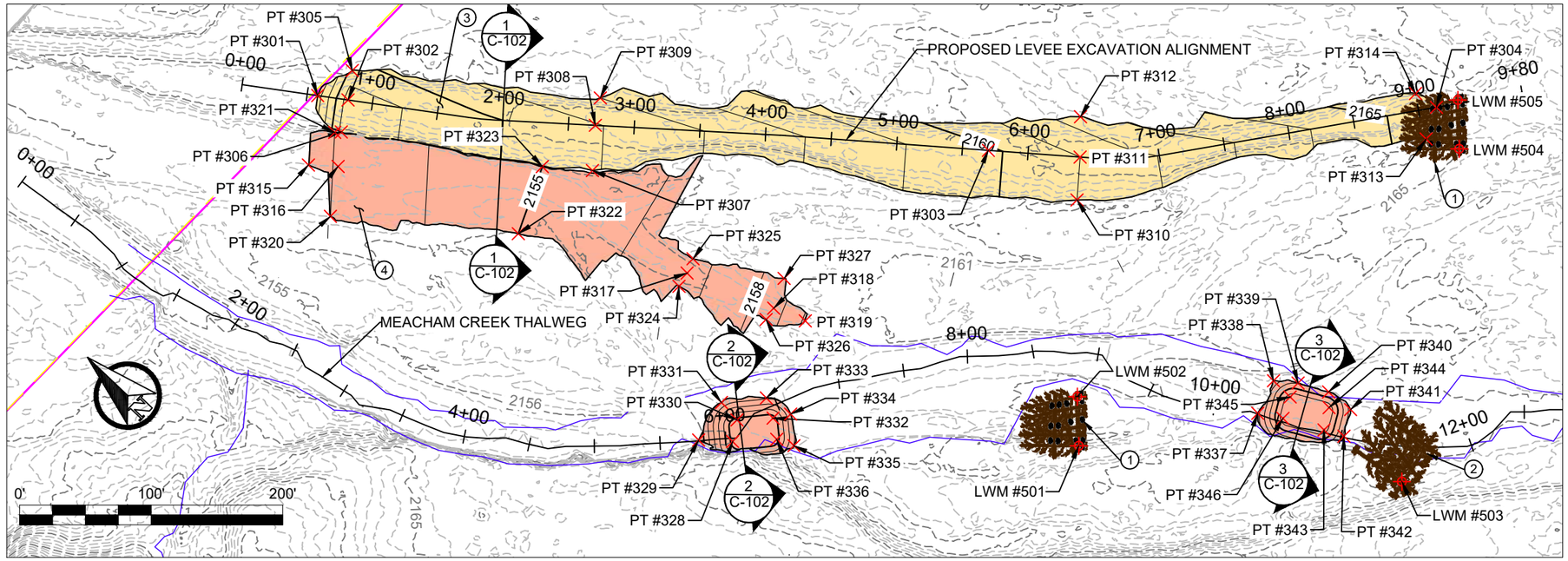
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

CTUIR
MEACHAM CREEK RM 10 TO 11

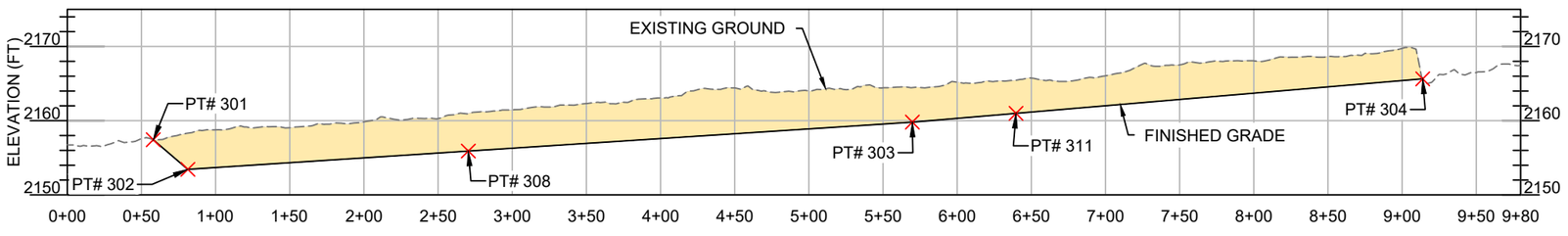
PROPOSED CONDITIONS ACCESS ROUTES AND BMPS

DWG. NO.: C-003
CREATED: 12/04/2023
SHEET 7 of 27

Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN\SHEET FILES\04_PROPOSED CONDITIONS ACCESS BMPS.DWG
PLOT DETAILS: ANDREWS, JEREMY December 26, 2023 9:28 AM



A / C-001 — LEVEE EXCAVATION, GRAVEL AUGMENTATION, AND LWM - STA. 2+00 TO STA. 13+00
PLAN DETAIL



LEVEE EXCAVATION ALIGNMENT PROFILE VIEW (FT)
(SCALE 1" = 100', 1H:5V)

NOTES:
1. LOG ACCUMULATION JAM STRUCTURE. SEE SHEET C-301 FOR DETAILS.
2. RIGHT/LEFT LOG STRUCTURE. SEE SHEET C-302 FOR DETAILS.
3. LEVEE EXCAVATION TO THE EXTENTS SHOWN ON THE PLANS. SEE SHEET C-102 FOR GRADING DETAILS.
4. PLACE EXCAVATED AND SEPARATED SPUR AND LEVEE MATERIAL AS NON-COMPACTED GRAVEL AUGMENTATION AS SHOWN ON THE PLANS AND PER SPECIFICATION SECTION 31 23 00. GRAVEL AUGMENTATION SHALL AVOID IMPACTING MATURE VEGETATION AND FINAL EXTENTS SHALL BE VERIFIED IN THE FIELD WITH THE OWNER'S REPRESENTATIVE. SEE SHEET C-102 FOR GRADING DETAILS.
5. SEE SHEET C-111 FOR EARTHWORK CONSTRUCTION POINT TABLE.
6. SEE SHEET C-112 FOR LWM CONSTRUCTION POINT TABLE.

LEGEND:
- EXISTING CONTOUR - MAJOR 5FT
- EXISTING CONTOUR - MINOR 1FT
- EXISTING PROJECT BOUNDARY
- USFS BOUNDARY
- MEACHAM CREEK THALWEG
- OHWM
- PROPOSED EXCAVATION
- PROPOSED GRAVEL AUGMENTATION
- PROPOSED LWM
- CONSTRUCTION POINT (PT# XXX)
- LWM CONSTRUCTION POINT (LWM# XXX)

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REGISTERED PROFESSIONAL ENGINEER — 91392PE — OREGON — JUL 12, 2016 — JEREMY S. ANDREWS — EXPIRES: 12/31/2025
12/20/2023

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

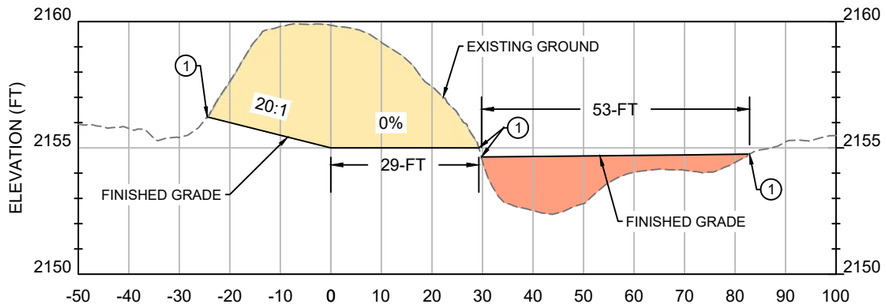
PLAN SHEET SIZE ANSI B (11" X 17")

CTUIR
MEACHAM CREEK RM 10 TO 11

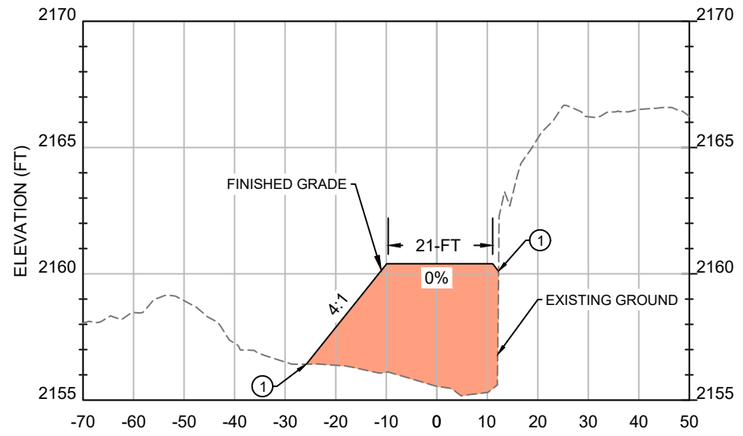
PROPOSED CONDITIONS
STA. 2+00 TO STA. 13+00

DWG. NO.: C-101
CREATED: 12/04/2023
SHEET: 8 of 27

Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN\SHEET FILES\05_PROPOSED_EXCAVATION_STA (2-13).DWG
PLOT DETAILS: ANDREWS, JEREMY December 26, 2023 9:29 AM



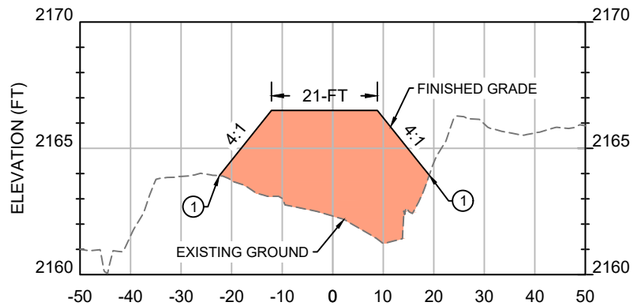
1 / C-101 LEVEE EXCAVATION AND GRAVEL AUGMENTATION SECTION VIEW
SCALE 1"=30' 1H:5V



2 / C-101 GRAVEL AUGMENTATION SECTION VIEW
SCALE 1"=30' 1H:5V

LEGEND:
- EXISTING GROUND
- FINISHED GRADE
- PROPOSED EXCEDVATION
- PROPOSED GRAVEL AUGMENTATION

NOTES:
1. DAYLIGHT FINISHED GRADE TO EXISTING GROUND.
2. GRAVEL AUGMENTATION SHALL AVOID IMPACTING MATURE VEGETATION AND FINAL EXTENTS SHALL BE VERIFIED IN THE FIELD WITH OWNER'S REPRESENTATIVE.



3 / C-101 GRAVEL AUGMENTATION SECTION VIEW
SCALE 1"=30' 1H:5V

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REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JUL 12, 2016 JEREMY S. ANDREWS
12/04/2023
EXPIRES: 12/31/2025

ISSUED FOR CONSTRUCTION

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION — Treaty of 1855

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

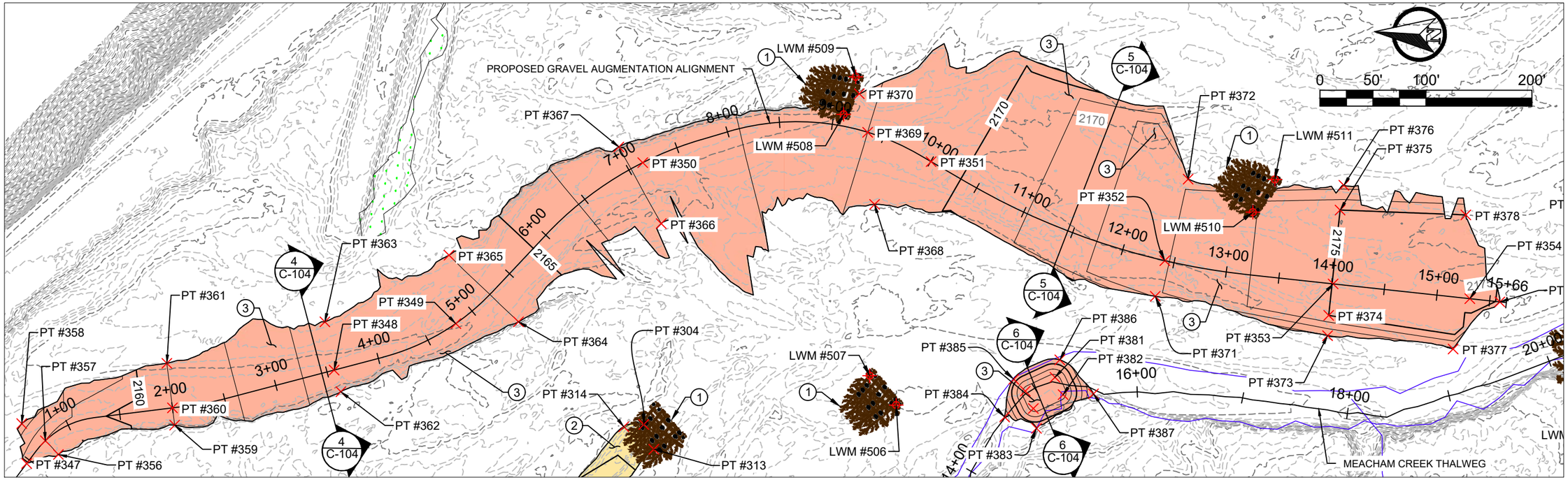
PLAN SHEET SIZE ANSI B (11" X 17")

CTUIR
MEACHAM CREEK RM 10 TO 11

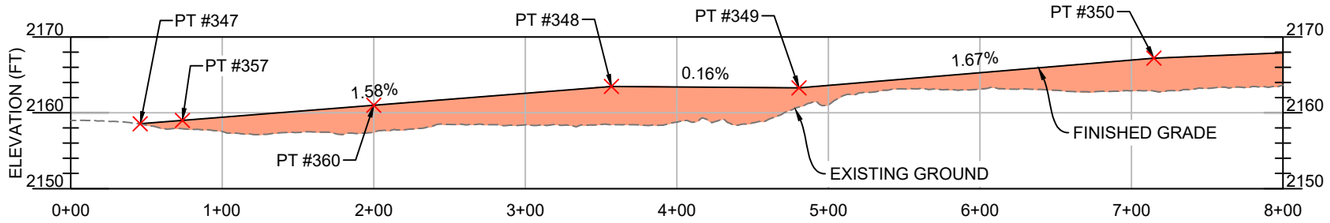
PROPOSED CONDITIONS
STA. 2+00 TO STA. 13+00

DWG. NO.: C-102
CREATED: 12/04/2023
SHEET 9 of 27

Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN\ SHEET FILES\05_PROPOSED_EXCAVATION_STA (2-13).DWG
PLOT DETAIL: S. ANDREWS, JEREMY ---- December 26, 2023 9:29 AM



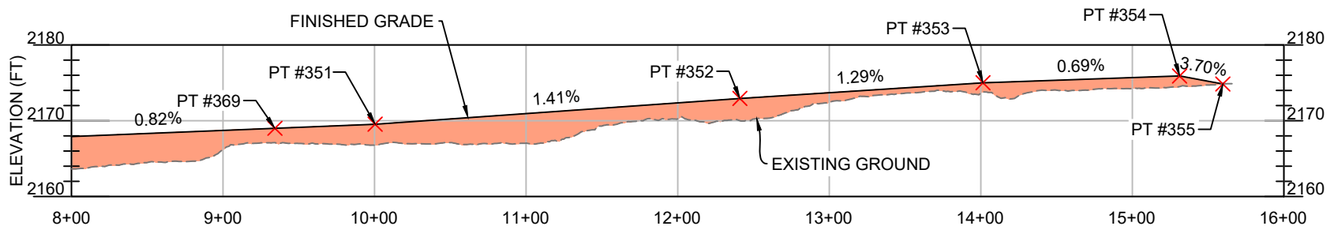
B / C-001 LEVEE EXCAVATION, GRAVEL AUGMENTATION, AND LWM - STA. 13+00 TO STA. 20+00
PLAN DETAIL



GRAVEL AUGMENTATION ALIGNMENT PROFILE VIEW (FT)
(SCALE 1" = 100', 1H:5V)

LEGEND:
- EXISTING CONTOUR - MAJOR 5FT
- EXISTING CONTOUR - MINOR 1FT
- OHWM
- EXISTING DELINEATED WETLANDS
- MEACHAM CREEK THALWEG
- PROPOSED EXCAVATION
- PROPOSED GRAVEL AUGMENTATION
- PROPOSED LWM
- CONSTRUCTION POINT (PT #XXX)
- LWM CONSTRUCTION POINT (LWD #XXX)

NOTES:
1. LOG ACCUMULATION JAM STRUCTURE. SEE SHEET C-301 FOR DETAILS.
2. LEVEE EXCAVATION TO THE EXTENTS SHOWN ON THE PLANS. SEE SHEET C-102 FOR GRADING DETAILS.
3. PLACE EXCAVATED AND SEPARATED SPUR AND LEVEE MATERIAL AS NON-COMPACTED GRAVEL AUGMENTATION AS SHOWN ON THE PLANS AND PER SPECIFICATION SECTION 31 23 00. GRAVEL AUGMENTATION SHALL AVOID IMPACTING MATURE VEGETATION AND FINAL EXTENTS SHALL BE VERIFIED IN THE FIELD WITH OWNER'S REPRESENTATIVE. SEE SHEET C-104 FOR GRADING DETAILS.
4. DECOMPACT ALL ACCESS ROUTES TO A DEPTH OF 18 INCHES MIN. AND A CLOD SIZE NO LARGER THAN 8 INCHES. DO NOT DECOMPACT WET AREAS.
5. SEE SHEET C-111 FOR EARTHWORK CONSTRUCTION POINT TABLE.
6. SEE SHEET C-112 FOR LWM CONSTRUCTION POINT TABLE.



GRAVEL AUGMENTATION ALIGNMENT PROFILE VIEW (FT)
(SCALE 1" = 100', 1H:5V)

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REGISTERED PROFESSIONAL ENGINEER 91397PE OREGON JULY 12, 2016 JEREMY S. ANDREWS
12/12/2023
EXPIRES: 12/31/2025

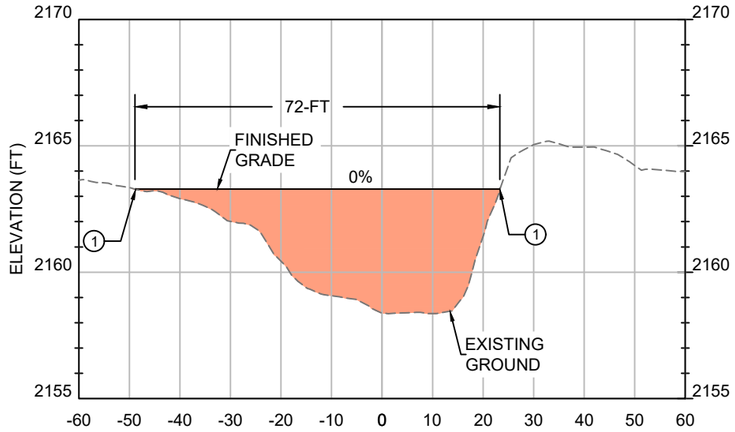
ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

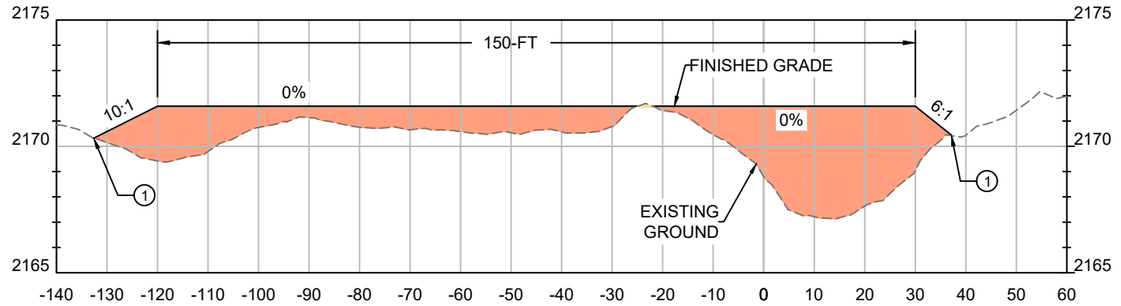
CTUIR
MEACHAM CREEK RM 10 TO 11

PROPOSED CONDITIONS
STA. 13+00 TO STA. 20+00

DWG. NO.: C-103
CREATED: 12/04/2023
SHEET 10 of 27



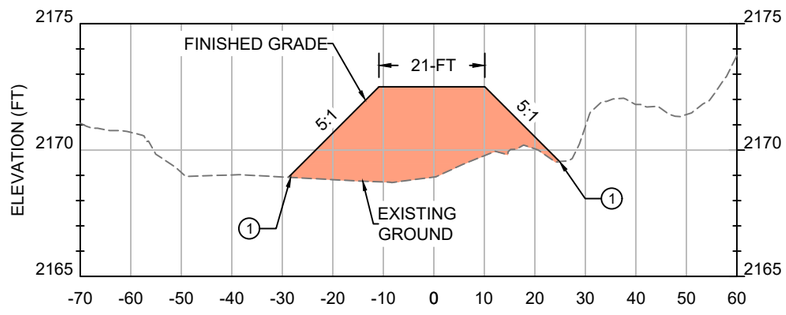
4 C-103 GRAVEL AUGMENTATION SECTION VIEW
SCALE 1"=30' 1H:5V



5 C-103 GRAVEL AUGMENTATION SECTION VIEW
SCALE 1"=30' 1H:5V

NOTES:
1. DAYLIGHT FINISHED GRADE TO EXISTING GROUND.
2. GRAVEL AUGMENTATION SHALL AVOID IMPACTING MATURE VEGETATION AND FINAL EXTENTS SHALL BE VERIFIED IN THE FIELD WITH OWNER'S REPRESENTATIVE.

LEGEND:
- EXISTING GROUND
- FINISHED GRADE
- PROPOSED GRAVEL AUGMENTATION



6 C-103 GRAVEL AUGMENTATION SECTION VIEW
SCALE 1"=30' 1H:5V

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REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JUL 12, 2016 JEREMY S. ANDREWS 12/28/2023
EXPIRES: 12/31/2025

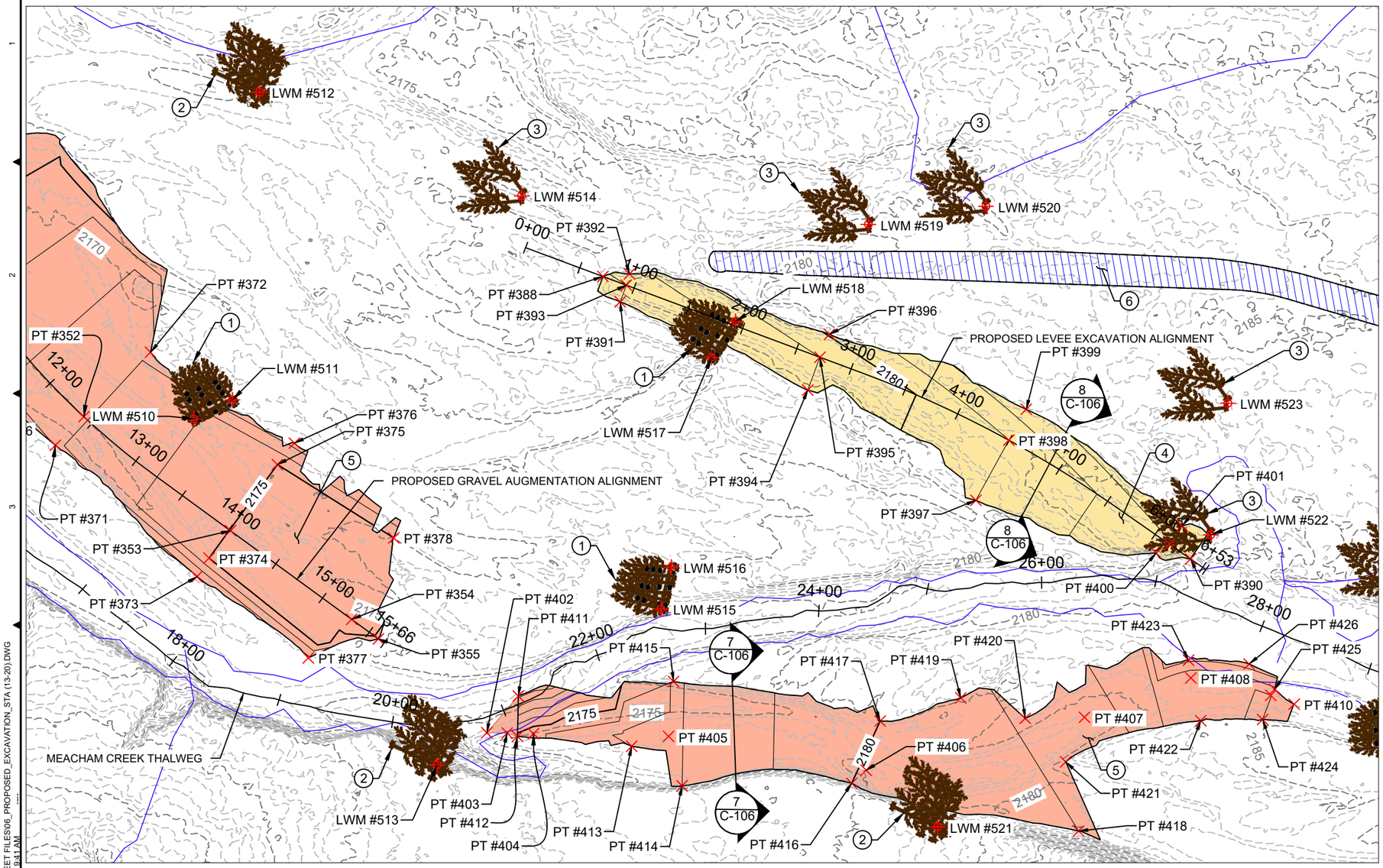
ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

CTUIR
MEACHAM CREEK RM 10 TO 11

PROPOSED CONDITIONS
STA. 13+00 TO STA. 20+00

DWG. NO.: C-104
CREATED: 12/04/2023
SHEET 11 of 27



0 50' 100' 200'

NOTES:

1. LOG ACCUMULATION JAM STRUCTURE. SEE SHEET C-301 FOR DETAILS.
2. RIGHT/LEFT LOG STRUCTURE. SEE SHEET C-302 FOR DETAILS.
3. CHANNEL BLEED THROUGH STRUCTURE. SEE SHEET C-303 FOR DETAILS.
4. LEVEE EXCAVATION TO THE EXTENTS SHOWN ON THE PLANS. SEE SHEET C-106 FOR GRADING DETAILS.
5. PLACE EXCAVATED AND SEPARATED SPUR AND LEVEE MATERIAL AS NON-COMPACTED GRAVEL AUGMENTATION AS SHOWN ON THE PLANS AND PER SPECIFICATION SECTION 31 23 00. GRAVEL AUGMENTATION SHALL AVOID IMPACTING MATURE VEGETATION AND FINAL EXTENTS SHALL BE VERIFIED IN THE FIELD WITH OWNER'S REPRESENTATIVE. SEE SHEET C-106 FOR GRADING DETAILS.
6. DECOMPACT TO A DEPTH OF 18 INCHES MIN. AND A CLOD SIZE NO LARGER THAN 8 INCHES. DO NOT DECOMPACT WET AREAS.
7. SEE SHEET C-111 FOR EARTHWORK CONSTRUCTION POINT TABLE.
8. SEE SHEET C-112 FOR LWM CONSTRUCTION POINT TABLE.

LEGEND:

- EXISTING CONTOUR - MAJOR 5FT
- EXISTING CONTOUR - MINOR 1FT
- OHWM
- MEACHAM CREEK THALWEG
- PROPOSED EXCAVATION
- PROPOSED GRAVEL AUGMENTATION
- PROPOSED LWM
- PROPOSED DECOMPACTION
- CONSTRUCTION POINT (PT #XXX)
- LWM CONSTRUCTION POINT (LWM #XXX)

C / C-001 — LEVEE EXCAVATION, GRAVEL AUGMENTATION, AND LWM - STA. 20+00 TO STA. 28+00 PLAN DETAIL

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REGISTERED PROFESSIONAL ENGINEER 91398 OREGON JEREMY S. ANDREWS 12/04/2023 EXPIRES: 12/31/2025

ISSUED FOR CONSTRUCTION

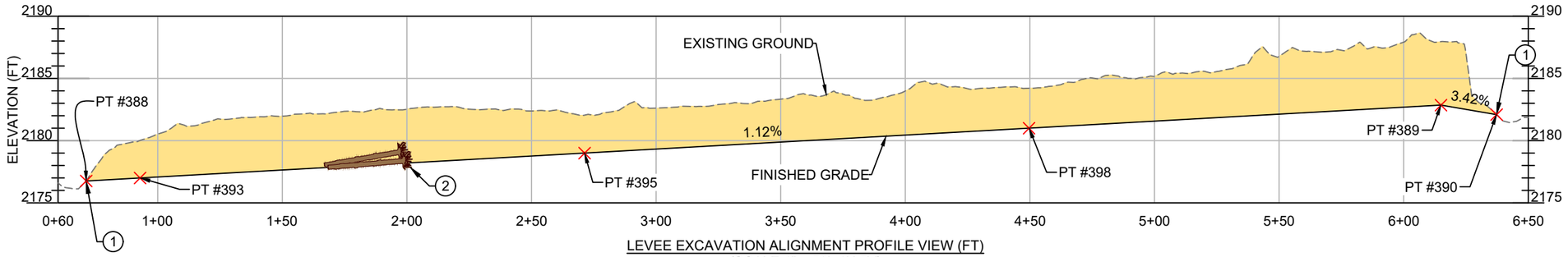
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

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

CTUIR
MEACHAM CREEK RM 10 TO 11

PROPOSED CONDITIONS
STA. 20+00 TO STA. 28+00

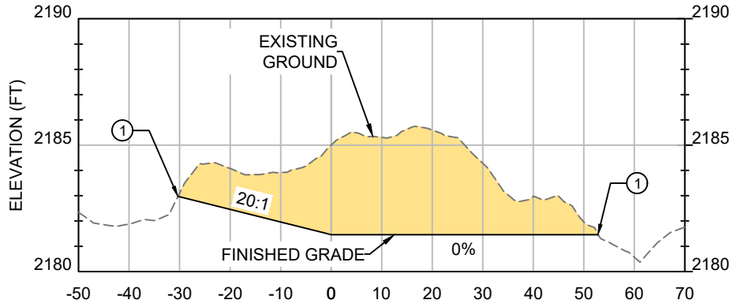
DWG. NO.: C-105
CREATED: 12/04/2023
SHEET 12 of 27



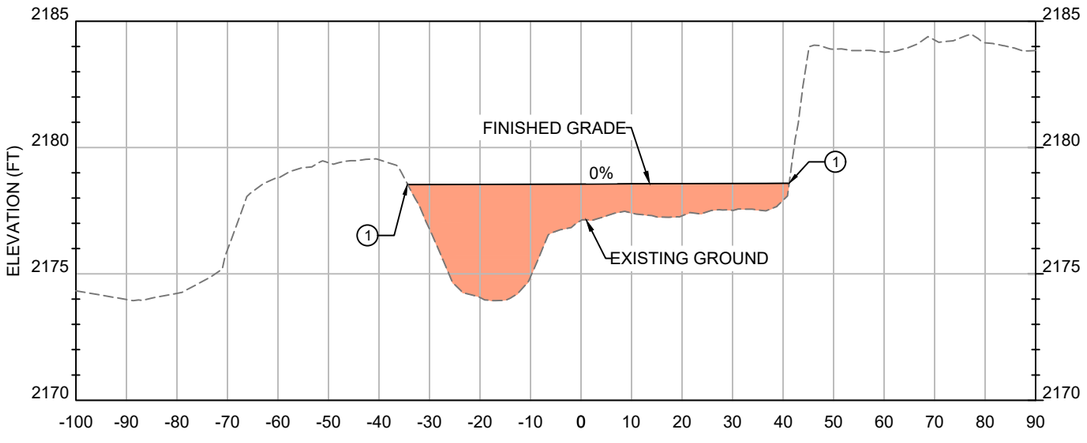
LEVEE EXCAVATION ALIGNMENT PROFILE VIEW (FT)
(SCALE 1" = 50', 1H:5V)

LEGEND:
- EXISTING GROUND
- FINISHED GRADE
- PROPOSED EXCAVATION
- PROPOSED GRAVEL AUGMENTATION
- PROPOSED LWM
- CONSTRUCTION POINT (PT #XXX)

NOTES:
1. DAYLIGHT FINISHED GRADE TO EXISTING GROUND.
2. LOG ACCUMULATION JAM STRUCTURE. SEE SHEET C-301 FOR DETAILS.
3. GRAVEL AUGMENTATION SHALL AVOID IMPACTING MATURE VEGETATION AND FINAL EXTENTS SHALL BE VERIFIED IN THE FIELD WITH OWNER'S REPRESENTATIVE.



8 / C-105 — LEVEE EXCAVATION SECTION VIEW
SCALE 1"=30' 1H:5V



7 / C-105 — GRAVEL AUGMENTATION SECTION VIEW
SCALE 1"=30' 1H:5V

TETRA TECH
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Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JAN. 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2025
12/04/2023

ISSUED FOR CONSTRUCTION

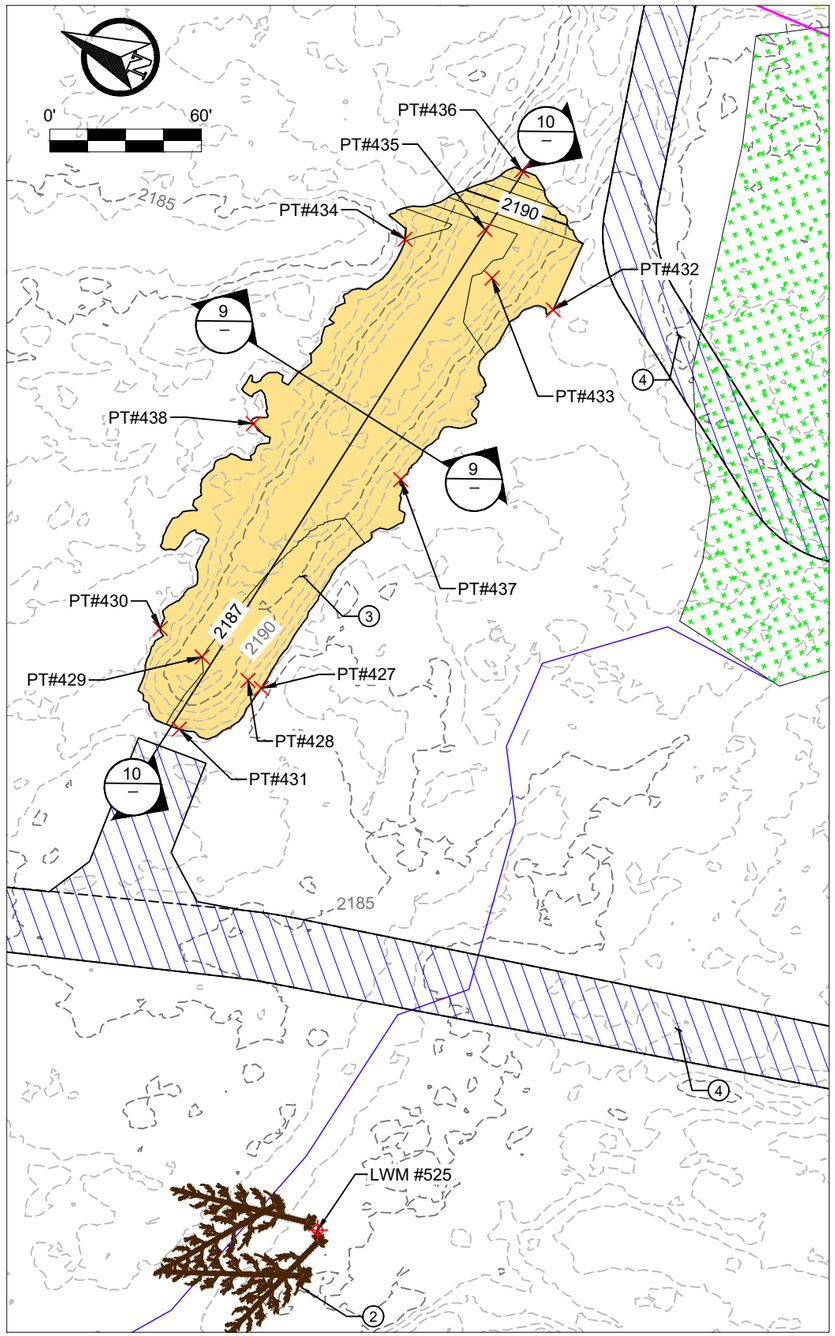
CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION — CAYUSE · WALLA WALLA · UMATILLA — Treaty of 1855

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

CTUIR
MEACHAM CREEK RM 10 TO 11

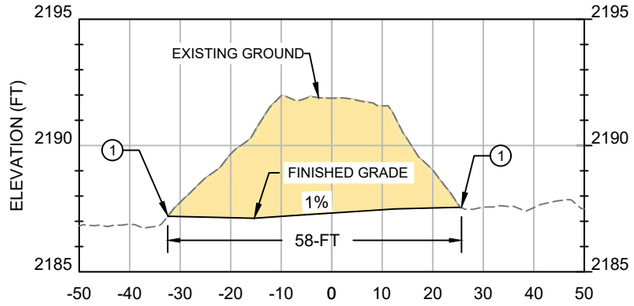
PROPOSED CONDITIONS
STA. 20+00 TO STA. 28+00

DWG. NO.: C-106
CREATED: 12/04/2023
SHEET: 13 of 27

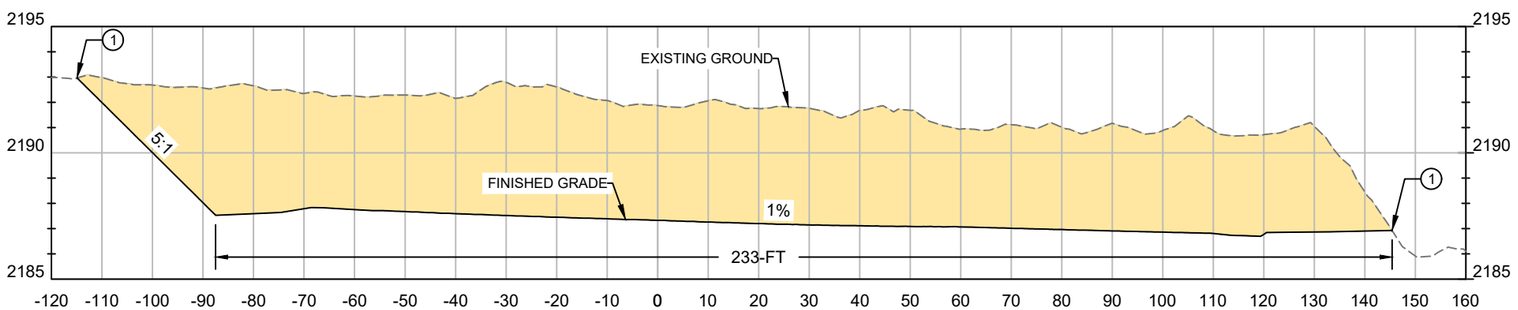


D
C-001
SPUR DIKE EXCAVATION - STA. 28+00 TO STA. 32+00
PLAN DETAIL

LEGEND:
- EXISTING CONTOUR - MAJOR 5FT
- EXISTING CONTOUR - MINOR 1FT
- PROJECT BOUNDARY
- EXISTING DELINEATED WETLAND
- OHWM
- PROPOSED EXCAVATION
- PROPOSED DECOMPACTION
- PROPOSED LWM
- CONSTRUCTION POINT (PT #XXX)
- LWM CONSTRUCTION POINT (LWD #XXX)



9
–
SPUR DIKE EXCAVATION SECTION VIEW
SCALE 1"=30' 1H:5V



10
–
SPUR DIKE EXCAVATION SECTION VIEW
SCALE 1"=30' 1H:5V

NOTES:
1. DAYLIGHT FINISHED GRADE TO EXISTING GROUND.
2. CHANNEL BLEED THROUGH STRUCTURE. SEE SHEET C-303 FOR DETAILS.
3. SPUR DIKE EXCAVATION TO THE EXTENTS SHOWN ON THE PLANS. DO NOT USE ANGULAR MATERIAL FOR PROPOSED GRAVEL AUGMENTATION. SEE THIS SHEET FOR GRADING DETAILS.
4. DECOMPACT TO A DEPTH OF 18 INCHES MIN. AND A CLOD SIZE NO LARGER THAN 8 INCHES. DO NOT DECOMPACT WET AREAS.
5. SEE SHEET C-111 FOR EARTHWORK CONSTRUCTION POINT TABLE.
6. SEE SHEET C-112 FOR LWM CONSTRUCTION POINT TABLE.

TETRA TECH
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19803 North Creek Parkway
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Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JULY 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2025
12/12/2023

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

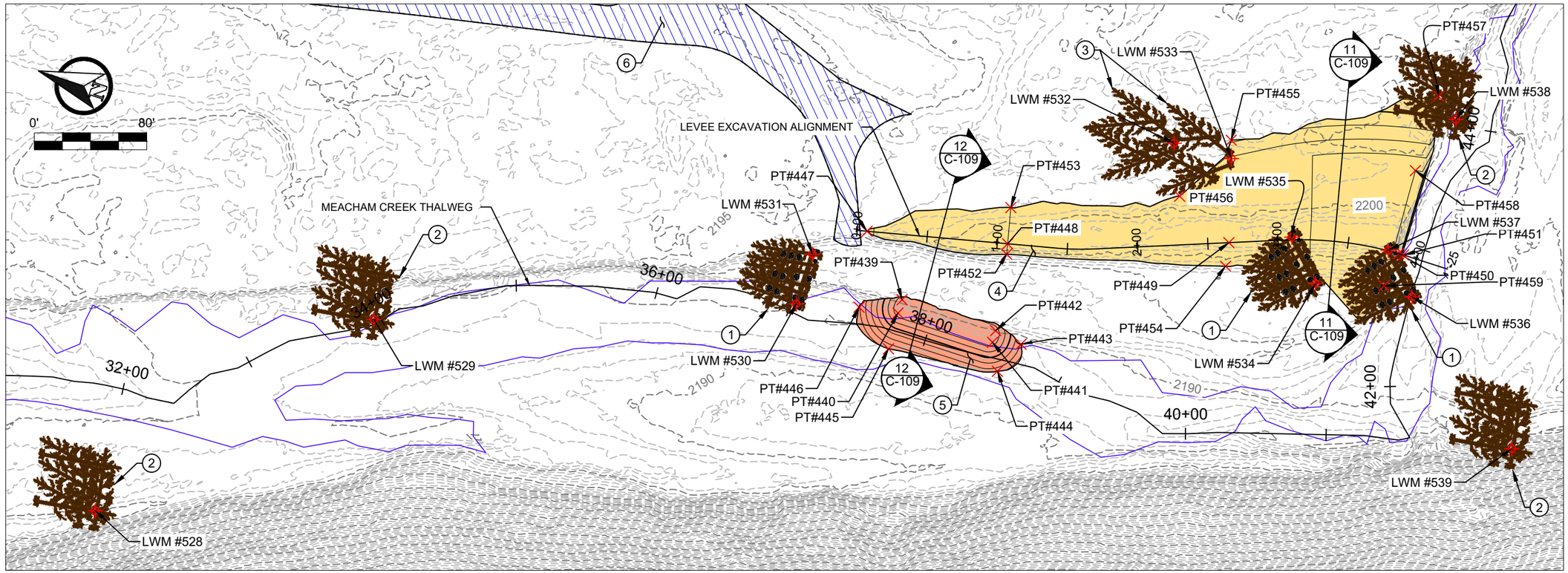
PLAN SHEET SIZE ANSI B (11" X 17")

CTUIR
MEACHAM CREEK RM 10 TO 11

PROPOSED CONDITIONS
STA. 28+00 TO STA. 32+00

DWG. NO.: C-107
CREATED: 12/04/2023
SHEET 14 of 27

Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN_SHEET FILES\08_PROPOSED_EXCAVATION_STA (28-32).DWG
PLOT DETAILS: ANDREWS, JEREMY December 26, 2023 9:48 AM



E
C-001

LEVEE EXCAVATION, GRAVEL AUGMENTATION, AND LWM - STA. 32+00 TO STA. 44+00
PLAN DETAIL

LEGEND:
- EXISTING CONTOUR - MAJOR 5FT
- EXISTING CONTOUR - MINOR 1FT
- OHWM
- MEACHAM CREEK THALWEG
- PROPOSED EXCAVATION
- PROPOSED GRAVEL AUGMENTATION
- PROPOSED LWM
- PROPOSED DECOMPACTION
- CONSTRUCTION POINT (PT #XXX)
- LWM CONSTRUCTION POINT (LWD #XXX)

NOTES:
1. LOG ACCUMULATION JAM STRUCTURE. SEE SHEET C-301 FOR DETAILS.
2. RIGHT/LEFT LOG STRUCTURE. SEE SHEET C-302 FOR DETAILS.
3. CHANNEL BLEED THROUGH STRUCTURE. SEE SHEET C-303 FOR DETAILS.
4. LEVEE EXCAVATION TO THE EXTENTS SHOWN ON THE PLANS. SEE SHEET C-109 FOR GRADING DETAILS.
5. PLACE EXCAVATED AND SEPARATED SPUR AND LEVEE MATERIAL AS NON-COMPACTED GRAVEL AUGMENTATION AS SHOWN ON THE PLANS AND PER SPECIFICATION SECTION 31 23 00. GRAVEL AUGMENTATION WILL AVOID IMPACTING MATURE VEGETATION AND FINAL EXTENTS WILL BE VERIFIED IN THE FIELD WITH OWNER'S REPRESENTATIVE. SEE SHEET C-109 FOR GRADING DETAILS.
6. DECOMPACT TO A DEPTH OF 18 INCHES MIN. AND A CLOD SIZE NO LARGER THAN 8 INCHES. DO NOT DECOMPACT WET AREAS.
7. SEE SHEET C-111 FOR EARTHWORK CONSTRUCTION POINT TABLE.
8. SEE SHEET C-112 FOR LWM CONSTRUCTION POINT TABLE.

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LICENSED PROFESSIONAL ENGINEER
9139275
OREGON
JUL. 12, 2006
JEREMY S. ANDREWS
EXPIRES: 12/31/2025
12/12/2023

ISSUED FOR CONSTRUCTION

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
CAYUSE - WALLA WALLA - UMATILLA
Treaty of 1855

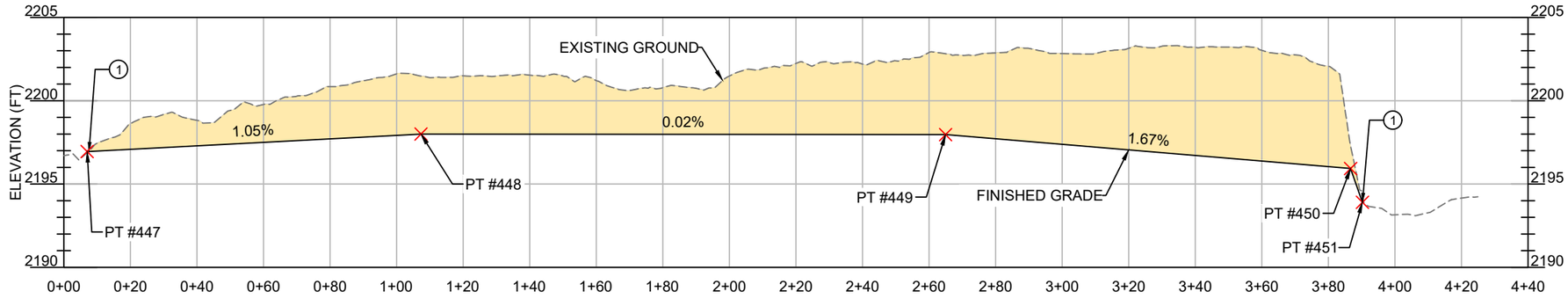
REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

CTUIR
MEACHAM CREEK RM 10 TO 11

PROPOSED CONDITIONS
STA. 32+00 TO STA. 60+00

DWG. NO.: C-108
CREATED: 12/04/2023
SHEET 15 of 27

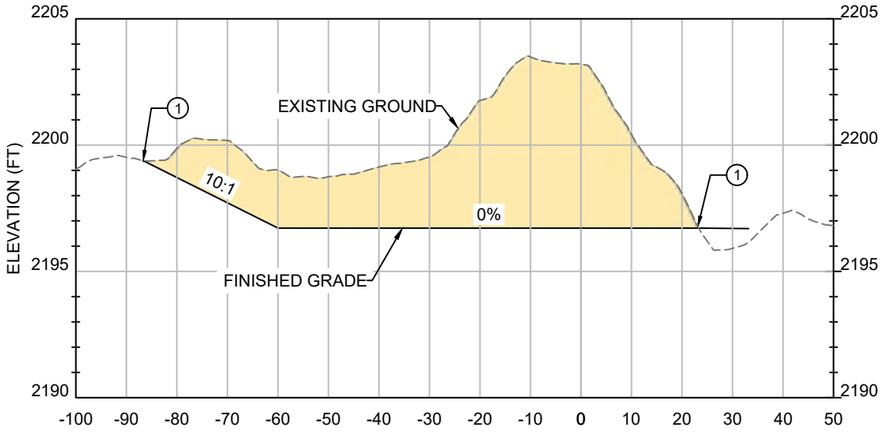
Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN\SHEET FILES\09_PROPOSED_EXCAVATION_STA (32-60).DWG
PLOT DETAILS: ANDREWS, JEREMY December 28, 2023 9:52 AM



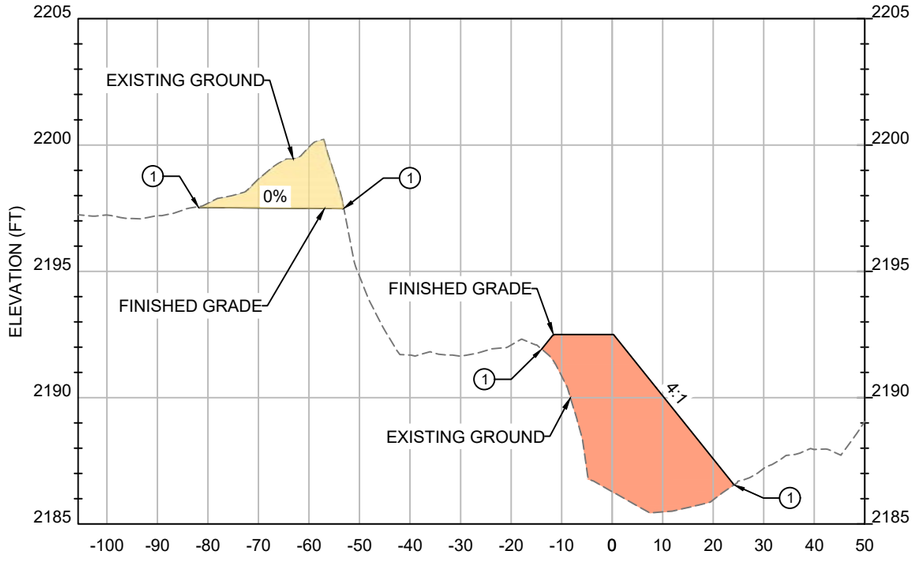
LEVEE EXCAVATION ALIGNMENT PROFILE VIEW (FT)
(SCALE 1" = 40', 1H:5V)

LEGEND:
- EXISTING GROUND
- FINISHED GRADE
- PROPOSED EXCAVATION
- PROPOSED GRAVEL AUGMENTATION
- CONSTRUCTION POINT (PT #XXX)

NOTES:
1. DAYLIGHT FINISHED GRADE TO EXISTING GROUND.
2. GRAVEL AUGMENTATION WILL AVOID IMPACTING MATURE VEGETATION AND FINAL EXTENTS WILL BE VERIFIED IN THE FIELD WITH OWNER'S REPRESENTATIVE.
3. SEE SHEET C-111 FOR EARTHWORK CONSTRUCTION POINT TABLE.



11 / C-108 LEVEE EXCAVATION SECTION VIEW
SCALE 1"=30' 1H:5V



12 / C-108 GRAVEL AUGMENTATION SECTION VIEW
SCALE 1"=30' 1H:5V

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REGISTERED PROFESSIONAL ENGINEER 91397 OREGON JULY 12, 2016 JEREMY S. ANDREWS
12/20/2023
EXPIRES: 12/31/2025

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

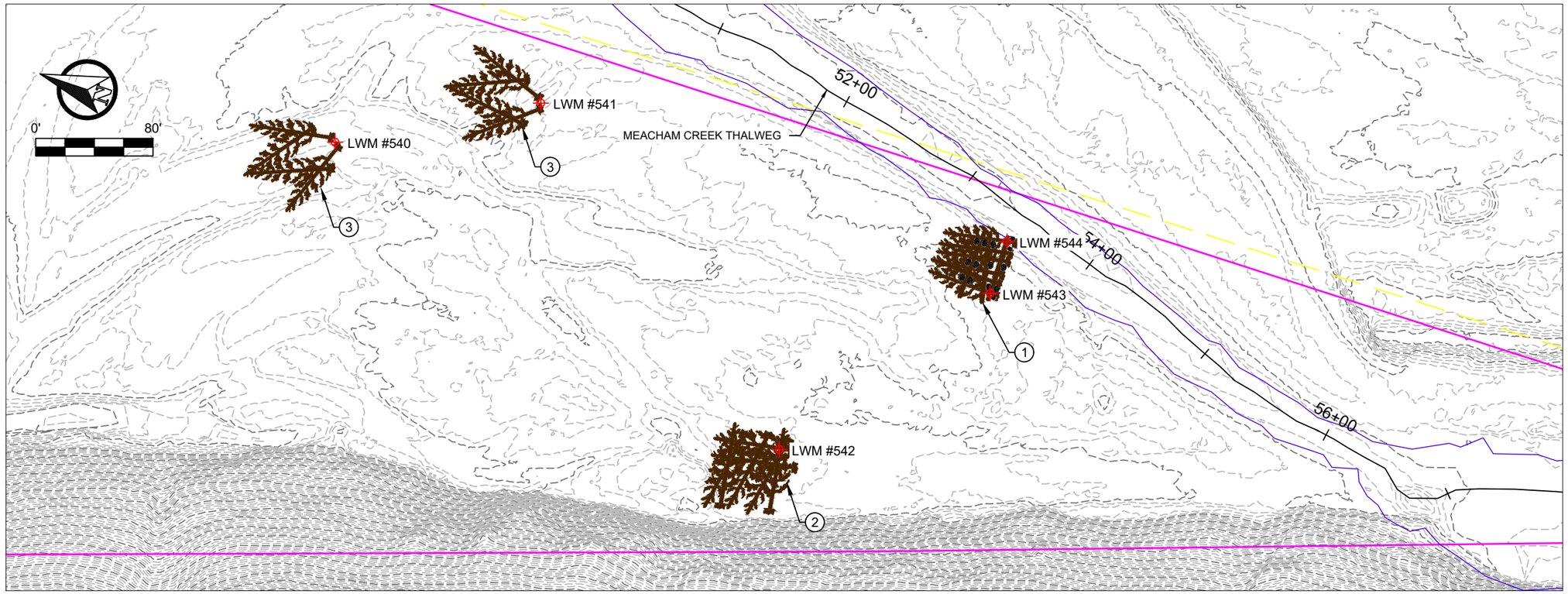
PLAN SHEET SIZE ANSI B (11" X 17")

CTUIR
MEACHAM CREEK RM 10 TO 11

PROPOSED CONDITIONS
STA. 32+00 TO STA. 60+00

DWG. NO.: C-109
CREATED: 12/04/2023
SHEET 16 of 27

Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN\SHEET FILES\09_PROPOSED_EXCAVATION_STA (32-60).DWG
PLOT DETAILS: ANDREWS, JEREMY December 26, 2023 9:52 AM



F
C-001

LWM - STA. 44+00 TO STA. 60+00
PLAN DETAIL

NOTES:

1. LOG ACCUMULATION JAM STRUCTURE. SEE SHEET C-301 FOR DETAILS.
2. RIGHT/LEFT LOG STRUCTURE. SEE SHEET C-302 FOR DETAILS.
3. CHANNEL BLEED THROUGH STRUCTURE. SEE SHEET C-303 FOR DETAILS.
4. SEE SHEET C-112 FOR LWM CONSTRUCTION POINT TABLE.

LEGEND:

- EXISTING CONTOUR - MAJOR 5FT
- EXISTING CONTOUR - MINOR 1FT
- PROJECT BOUNDARY
- PROPERTY BOUNDARY
- MEACHAM CREEK THALWEG
- OHWM
- PROPOSED LWM
- LWM CONSTRUCTION POINT (LWM #XXX)

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REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2025
12/12/2023

ISSUED FOR CONSTRUCTION

CTUIR - WALLA WALLA - CAYUSE
CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
Treaty of 1855

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

CTUIR
MEACHAM CREEK RM 10 TO 11

PROPOSED CONDITIONS
STA. 32+00 TO STA. 60+00

DWG. NO.: C-110
CREATED: 12/04/2023
SHEET 17 of 27

Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN\SHEET FILES\09_PROPOSED_EXCAVATION_STA (32-60).DWG
PLOT DETAILS: ANDREWS, JEREMY December 26, 2023 9:52 AM

CONSTRUCTION POINT TABLE

Point #	Elevation	Northing	Easting	Description
301	2157.43	710326.35	8755672.48	DAYLIGHT
302	2153.45	710307.71	8755686.41	EXCV. LEVEE
303	2159.82	709936.50	8756003.50	EXCV. LEVEE
304	2165.64	709718.81	8756267.41	DAYLIGHT
305	2154.58	710321.22	8755704.50	DAYLIGHT
306	2153.73	710294.18	8755665.62	DAYLIGHT
307	2155.91	710138.46	8755779.83	DAYLIGHT
308	2155.92	710161.19	8755805.70	EXCV. LEVEE
309	2157.00	710173.21	8755823.07	DAYLIGHT
310	2161.00	709862.22	8756024.44	DAYLIGHT
311	2161.00	709883.60	8756049.19	EXCV. LEVEE
312	2162.50	709905.05	8756071.07	DAYLIGHT
313	2165.44	709707.37	8756244.88	DAYLIGHT
314	2166.06	709737.42	8756263.58	DAYLIGHT
315	2152.14	710294.06	8755630.21	DAYLIGHT
316	2153.18	710277.31	8755645.33	GRVL. FILL
317	2156.60	710032.50	8755775.65	GRVL. FILL
318	2158.44	709967.09	8755803.40	GRVL. FILL

CONSTRUCTION POINT TABLE

Point #	Elevation	Northing	Easting	Description
319	2156.86	709943.26	8755813.51	DAYLIGHT
320	2153.00	710254.67	8755614.45	DAYLIGHT
321	2153.00	710297.44	8755661.82	DAYLIGHT
322	2155.00	710144.35	8755706.15	DAYLIGHT
323	2155.00	710167.44	8755755.03	DAYLIGHT
324	2156.59	710029.77	8755764.19	DAYLIGHT
325	2156.60	710036.98	8755786.56	DAYLIGHT
326	2158.38	709965.14	8755793.17	DAYLIGHT
327	2158.41	709977.49	8755824.95	DAYLIGHT
328	2160.40	709917.55	8755709.66	TOP
329	2154.00	709936.60	8755692.15	TOE
330	2160.40	709926.78	8755723.61	TOP
331	2156.14	709944.55	8755724.61	TOE
332	2160.40	709908.40	8755743.95	TOP
333	2156.81	709922.85	8755751.18	TOE
334	2157.16	709901.07	8755755.60	TOE
335	2156.92	709882.38	8755740.40	TOE
336	2160.40	709895.00	8755734.55	TOP

CONSTRUCTION POINT TABLE

Point #	Elevation	Northing	Easting	Description
337	2161.70	709650.49	8756007.05	TOE
338	2162.13	709659.53	8756032.95	TOE
339	2163.88	709645.09	8756044.94	TOE
340	2164.00	709623.89	8756056.60	TOE
341	2162.59	709602.60	8756058.95	TOE
342	2162.67	709591.81	8756041.04	TOE
343	2166.50	709605.94	8756033.67	TOP
344	2166.50	709615.24	8756048.47	TOP
345	2166.50	709641.83	8756033.24	TOP
346	2166.50	709634.19	8756017.91	TOP
347	2158.56	710295.66	8756179.87	DAYLIGHT
348	2163.48	710014.36	8756293.04	GRVL. FILL
349	2163.29	709903.79	8756346.74	GRVL. FILL
350	2167.21	709741.37	8756513.51	GRVL. FILL
351	2169.54	709470.41	8756538.16	GRVL. FILL
352	2172.94	709242.54	8756464.24	GRVL. FILL
353	2175.01	709082.42	8756456.24	GRVL. FILL
354	2175.91	708952.74	8756453.61	GRVL. FILL

CONSTRUCTION POINT TABLE

Point #	Elevation	Northing	Easting	Description
355	2174.85	708924.19	8756453.03	DAYLIGHT
356	2159.00	710266.58	8756190.96	DAYLIGHT
357	2159.00	710280.00	8756202.83	GRVL. FILL
358	2156.50	710303.60	8756217.02	TOE
359	2161.00	710159.76	8756228.14	DAYLIGHT
360	2161.00	710163.23	8756244.24	GRVL. FILL
361	2161.00	710172.16	8756285.65	DAYLIGHT
362	2163.48	710006.23	8756273.20	DAYLIGHT
363	2163.48	710027.03	8756337.63	DAYLIGHT
364	2164.00	709844.99	8756353.58	DAYLIGHT
365	2164.00	709915.87	8756410.55	DAYLIGHT
366	2167.00	709718.93	8756457.72	DAYLIGHT
367	2167.00	709765.10	8756526.32	DAYLIGHT
368	2169.29	709520.00	8756493.30	DAYLIGHT
369	2169.00	709532.45	8756560.60	GRVL. FILL
370	2168.87	709543.50	8756596.20	DAYLIGHT
371	2172.12	709248.60	8756429.94	DAYLIGHT
372	2172.01	709227.36	8756542.87	DAYLIGHT

CONSTRUCTION POINT TABLE

Point #	Elevation	Northing	Easting	Description
373	2171.94	709083.42	8756407.06	DAYLIGHT
374	2175.00	709084.00	8756426.27	TOP
375	2175.00	709081.97	8756526.25	TOP
376	2172.64	709080.52	8756549.90	DAYLIGHT
377	2172.80	708964.31	8756404.86	DAYLIGHT
378	2175.00	708963.37	8756532.06	DAYLIGHT
379	2172.50	709353.97	8756314.41	TOP
380	2172.50	709362.96	8756330.07	TOP
381	2172.50	709336.20	8756345.50	TOP
382	2172.49	709327.17	8756329.83	TOP
383	2168.81	709349.38	8756296.00	TOE
384	2167.20	709380.26	8756304.06	TOE
385	2169.44	709374.79	8756340.33	TOE
386	2169.08	709333.12	8756362.30	TOE
387	2166.83	709298.68	8756333.16	TOE
388	2176.76	708944.83	8756820.58	DAYLIGHT
389	2182.85	708411.52	8756911.81	EXCV. LEVEE
390	2182.09	708389.19	8756911.88	DAYLIGHT

CONSTRUCTION POINT TABLE

Point #	Elevation	Northing	Easting	Description
391	2177.00	708920.05	8756811.22	DAYLIGHT
392	2177.49	708927.29	8756835.51	DAYLIGHT
393	2177.00	708923.90	8756826.03	EXCV. LEVEE
394	2179.00	708743.69	8756841.73	DAYLIGHT
395	2179.00	708751.29	8756870.94	EXCV. LEVEE
396	2180.08	708755.88	8756891.91	DAYLIGHT
397	2181.00	708570.13	8756846.97	DAYLIGHT
398	2181.00	708576.59	8756905.87	EXCV. LEVEE
399	2182.54	708579.58	8756936.35	DAYLIGHT
400	2182.80	708416.42	8756899.04	DAYLIGHT
401	2183.82	708411.58	8756931.23	DAYLIGHT
402	2171.75	708801.05	8756440.35	DAYLIGHT
403	2174.50	708786.42	8756450.16	GRVL. FILL
404	2175.81	708767.55	8756462.81	GRVL. FILL
405	2177.84	708670.67	8756527.79	GRVL. FILL
406	2180.08	708514.08	8756601.70	GRVL. FILL
407	2181.34	708385.81	8756747.34	GRVL. FILL
408	2183.86	708330.07	8756827.84	GRVL. FILL

CONSTRUCTION POINT TABLE

Point #	Elevation	Northing	Easting	Description
409	2184.03	708264.92	8756855.07	GRVL. FILL
410	2183.05	708243.97	8756860.48	DAYLIGHT
411	2170.83	708796.92	8756481.93	DAYLIGHT
412	2175.02	708777.49	8756452.97	DAYLIGHT
413	2177.01	708691.79	8756502.53	DAYLIGHT
414	2178.00	708636.56	8756499.48	DAYLIGHT
415	2177.88	708694.28	8756569.02	DAYLIGHT
416	2180.00	708517.77	8756585.25	DAYLIGHT
417	2180.00	708528.54	8756643.46	DAYLIGHT
418	2181.00	708333.64	8756663.96	DAYLIGHT
419	2180.83	708482.97	8756699.76	DAYLIGHT
420	2181.07	708427.27	8756717.20	DAYLIGHT
421	2181.13	708377.03	8756706.51	DAYLIGHT
422	2183.89	708301.88	8756802.53	DAYLIGHT
423	2181.83	708340.48	8756839.22	DAYLIGHT
424	2184.00	708258.70	8756834.02	DAYLIGHT
425	2183.18	708265.17	8756861.34	DAYLIGHT
426	2181.49	708295.75	8756866.54	DAYLIGHT

CONSTRUCTION POINT TABLE

Point #	Elevation	Northing	Easting	Description
427	2186.08	708304.09	8757313.92	DAYLIGHT
428	2186.05	708310.19	8757314.57	EXCV. SPUR
429	2187.00	708330.58	8757315.32	EXCV. SPUR
430	2187.10	708350.31	8757318.50	DAYLIGHT
431	2186.81	708326.70	8757285.57	DAYLIGHT
432	2188.00	708262.69	8757498.57	DAYLIGHT
433	2188.17	708289.97	8757499.72	EXCV. SPUR
434	2187.04	708327.66	8757499.12	DAYLIGHT
435	2187.50	708300.66	8757516.00	EXCV. SPUR
436	2192.96	708297.20	8757543.32	DAYLIGHT
437	2187.36	708288.96	8757412.17	DAYLIGHT
438	2187.28	708351.17	8757407.58	DAYLIGHT
439	2192.49	707421.23	8757248.42	TOP
440	2192.50	707420.70	8757238.47	TOP
441	2192.50	707350.45	8757241.92	TOP
442	2192.49	707351.18	8757250.53	TOP
443	2187.86	707330.97	8757247.63	TOE
444	2187.36	707340.12	8757223.75	TOE

CONSTRUCTION POINT TABLE

Point #	Elevation	Northing	Easting	Description
445	2186.16	707418.33	8757212.33	TOE
446	2185.82	707448.19	8757232.94	TOE
447	2196.95	707461.28	8757285.63	DAYLIGHT
448	2198.00	707364.33	8757311.43	EXCV. LEVEE
449	2197.97	707216.73	8757366.02	EXCV. LEVEE
450	2195.93	707100.64	8757400.04	EXCV. LEVEE
451	2193.91	707097.09	8757400.26	DAYLIGHT
452	2198.00	707362.42	8757304.26	DAYLIGHT
453	2198.00	707370.99	8757336.44	DAYLIGHT
454	2197.96	707213.21	8757349.45	DAYLIGHT
455	2199.16	707240.12	8757435.07	DAYLIGHT
456	2197.97	707260.94	8757385.05	DAYLIGHT
457	2201.51	707112.33	8757514.86	DAYLIGHT
458	2196.00	707109.65	8757459.53	EXCV. LEVEE
459	2196.00	707102.57	8757374.95	EXCV. LEVE

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REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JULY 12, 2016 JEREMY S. ANDREWS
12/12/2023
EXPIRES: 12/31/2025

ISSUED FOR CONSTRUCTION

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

CTUIR
MEACHAM CREEK RM 10 TO 11

CONSTRUCTION POINT TABLES
EARTHWORK

DWG. NO.: C-111
CREATED: 12/04/2023
SHEET 18 of 27

CONSTRUCTION POINT TABLE			
POINT #	NORTHING	EASTING	LWM STRUCTURE
501	709729.1FT	8755893.4FT	LOG ACCUMULATION JAM
502	709756.4FT	8755919.0FT	LOG ACCUMULATION JAM
503	709536.4FT	8756047.8FT	RIGHT/LEFT LOG
504	709684.3FT	8756257.3FT	LOG ACCUMULATION JAM
505	709711.2FT	8756282.9FT	LOG ACCUMULATION JAM
506	709483.1FT	8756306.3FT	LOG ACCUMULATION JAM
507	709510.5FT	8756331.8FT	LOG ACCUMULATION JAM
508	709556.5FT	8756575.5FT	LOG ACCUMULATION JAM
509	709548.1FT	8756611.8FT	LOG ACCUMULATION JAM
510	709163.8FT	8756517.1FT	LOG ACCUMULATION JAM
511	709145.8FT	8756549.7FT	LOG ACCUMULATION JAM
512	709279.0FT	8756780.8FT	RIGHT/LEFT LOG
513	708820.1FT	8756393.0FT	RIGHT/LEFT LOG
514	709042.2FT	8756837.3FT	CHANNEL BLEED THROUGH
515	708739.0FT	8756614.2FT	LOG ACCUMULATION JAM
516	708752.5FT	8756648.9FT	LOG ACCUMULATION JAM
517	708827.9FT	8756817.2FT	LOG ACCUMULATION JAM
518	708828.8FT	8756854.6FT	LOG ACCUMULATION JAM

CONSTRUCTION POINT TABLE			
POINT #	NORTHING	EASTING	LWM STRUCTURE
519	708782.8FT	8756988.9FT	CHANNEL BLEED THROUGH
520	708708.6FT	8757059.9FT	CHANNEL BLEED THROUGH
521	708435.4FT	8756597.1FT	RIGHT/LEFT LOG
522	708386.7FT	8756939.0FT	CHANNEL BLEED THROUGH
523	708439.8FT	8757040.6FT	CHANNEL BLEED THROUGH
524	708226.1FT	8757005.6FT	CHANNEL BLEED THROUGH
525	708193.2FT	8757129.0FT	CHANNEL BLEED THROUGH
526	708147.2FT	8756884.7FT	LOG ACCUMULATION JAM
527	708172.1FT	8756912.3FT	LOG ACCUMULATION JAM
528	707908.9FT	8756911.2FT	RIGHT/LEFT LOG
529	707769.4FT	8757106.7FT	RIGHT/LEFT LOG
530	707490.9FT	8757220.0FT	LOG ACCUMULATION JAM
531	707492.2FT	8757257.1FT	LOG ACCUMULATION JAM
532	707277.5FT	8757419.1FT	CHANNEL BLEED THROUGH
533	707235.5FT	8757422.8FT	CHANNEL BLEED THROUGH
534	707148.9FT	8757359.7FT	LOG ACCUMULATION JAM
535	707176.1FT	8757385.0FT	LOG ACCUMULATION JAM
536	707081.2FT	8757374.4FT	LOG ACCUMULATION JAM

CONSTRUCTION POINT TABLE			
POINT #	NORTHING	EASTING	LWM STRUCTURE
537	707108.4FT	8757399.7FT	LOG ACCUMULATION JAM
538	707095.0FT	8757503.6FT	RIGHT/LEFT LOG
539	706977.6FT	8757297.1FT	RIGHT/LEFT LOG
540	706813.4FT	8757582.0FT	CHANNEL BLEED THROUGH
541	706690.8FT	8757655.0FT	CHANNEL BLEED THROUGH
542	706457.2FT	8757488.6FT	RIGHT/LEFT LOG
543	706358.5FT	8757637.9FT	LOG ACCUMULATION JAM
544	706359.8FT	8757675.0FT	LOG ACCUMULATION JAM

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REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL 12, 2016
JEREMY S. ANDREWS
12/20/2023
EXPIRES: 12/31/2025

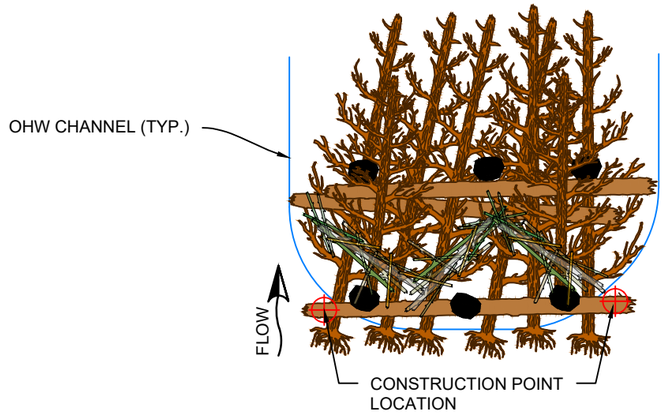
ISSUED FOR CONSTRUCTION

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

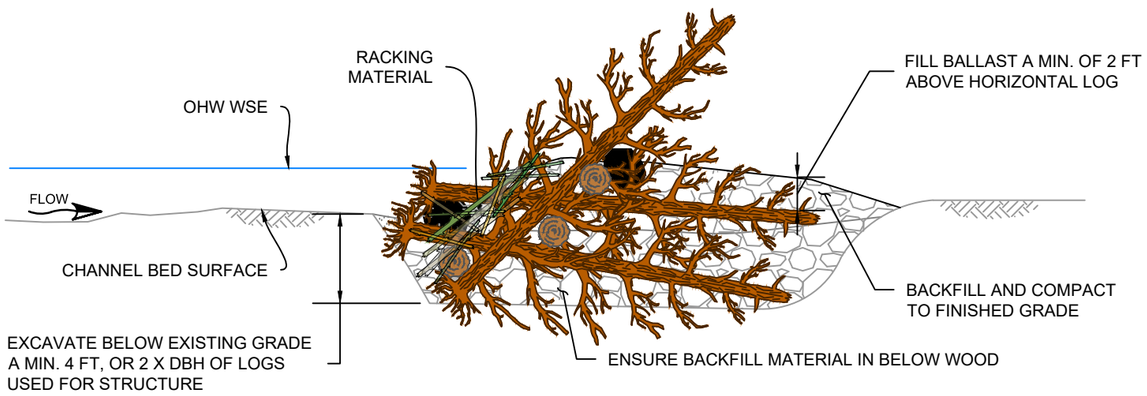
CTUIR
MEACHAM CREEK RM 10 TO 11

CONSTRUCTION POINT TABLES
LWM

DWG. NO.: C-112
CREATED: 12/04/2023
SHEET 19 of 27



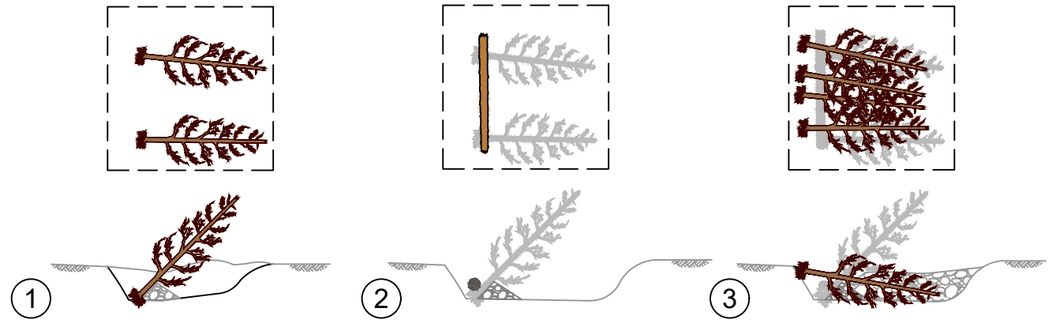
LOG ACCUMULATION JAM STRUCTURE - PLAN VIEW

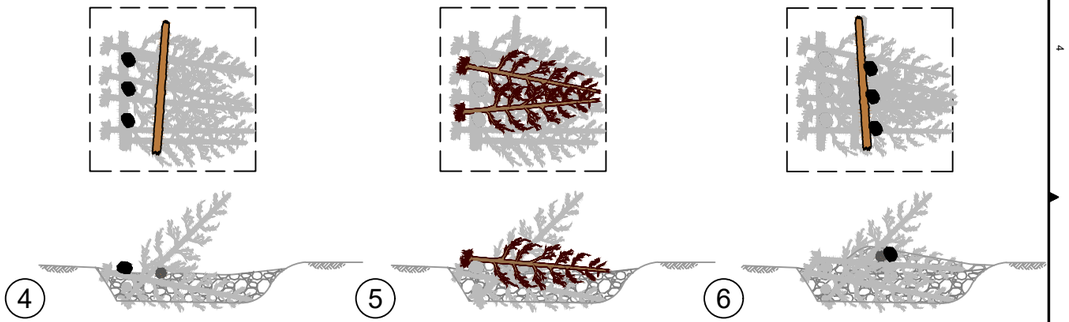


LOG ACCUMULATION JAM STRUCTURE - SECTION VIEW

CONSTRUCTION QUANTITIES:

COMPONENT	DESCRIPTION	QUANTITY
WHOLE TREE WITH ROOTWAD	LARGE (24" MIN DBH, 40' MIN, 6' MIN ROOTWAD)	2
	MEDIUM (18" MIN DBH, 35' MIN, 4' MIN ROOTWAD)	6
LOGS WITHOUT ROOTWAD	MEDIUM (18" MIN DBH, 35' MIN)	3
RACKING MATERIAL	MISC. (4-10" DBH, 10 FT MIN, 20 FT MAX)	30
BOULDER	2 TO 3 FT DIA.	6
BALLAST	SPOILS/FLOODPLAIN ALLUVIUM	70 CY





LOG ACCUMULATION JAM STRUCTURE - LOG PLACEMENT SEQUENCING

LWM NOTES:

1. INSTALL TEMPORARY COFFERDAM UPSTREAM OF STRUCTURE WHEN NEEDED.
2. FISH SALVAGE TO BE DONE BY QUALIFIED FISH BIOLOGIST. CONSTRUCTION WORK IN THE IMMEDIATE VICINITY OF SALVAGE EFFORTS WILL BE DELAYED (TYPICALLY 2 TO 24 HOURS) DURING SALVAGE. DELAYS MAY BE LONGER IN SOME CASES. SEE C-403 FOR FISH SALVAGE DETAILS.
3. A QUANTITY OF 6 ROCKS (24" TO 36" DIA.) SHALL BE USED IN STRUCTURE CONSTRUCTION.
4. EXCAVATE TRENCH TO COMPLETELY BURY BOTTOM LAYER OF STRUCTURE. EXCAVATE UPSTREAM PORTION OF TRENCH TO PROVIDE ELEVATED TIPS OF LOGS IN SEQUENCE #1 WHEN ROOTWADS ARE PLACED IN TRENCH.
5. PLACE SMALLER DIAMETER LOGS WITH ROOTWADS ON BOTTOM LAYER OF STRUCTURE.
6. LOGS PLACED IN SEQUENCE #2, #4, AND #6 DO NOT REQUIRE BRANCHES.
7. LOGS PLACED IN SEQUENCE #1, #3, AND #5 SHALL HAVE BRANCHES ATTACHED.
8. RISER LOG PLACED IN SEQUENCE #4 AND #6 SHALL BE PLACED AT BACK OF STRUCTURE AND PUSHED FORWARD INTO PLACE TO FURTHER ELEVATE TIPS OF LOGS IN SEQUENCE #1.
9. PLACE LARGEST DIAMETER LOGS ON TOP PORTION OF STRUCTURE.
10. SPOILS FROM EXCAVATION SHALL BE USED TO BACKFILL STRUCTURE AS CONSTRUCTION PROGRESSES. MATERIAL SHALL BE COMPACTED WITH EXCAVATOR BUCKET. ALL EARTHWORK ASSOCIATED WITH INSTALLATION OF STRUCTURE IS INCIDENTAL TO STRUCTURE COST.
11. RACKING MATERIAL MAY BE ADDED TO FRONT OF STRUCTURE WHEN AVAILABLE.
12. BURY STRUCTURE A MINIMUM OF 2 FT. ADDITIONAL BACKFILL MAY BE NEEDED TO BURY STRUCTURE AS SHOWN.
13. PLANT 15 TO 25 WILLOW STAKES IN STRUCTURE TO COMPLETE CONSTRUCTION. OWNER SHALL BE RESPONSIBLE FOR HARVESTING AND PLANTING WILLOW STAKES.

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REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JUL 12, 2016 JEREMY S. ANDREWS
12/20/2023
Jeremy Andrews
EXPIRES: 12/31/2025

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

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

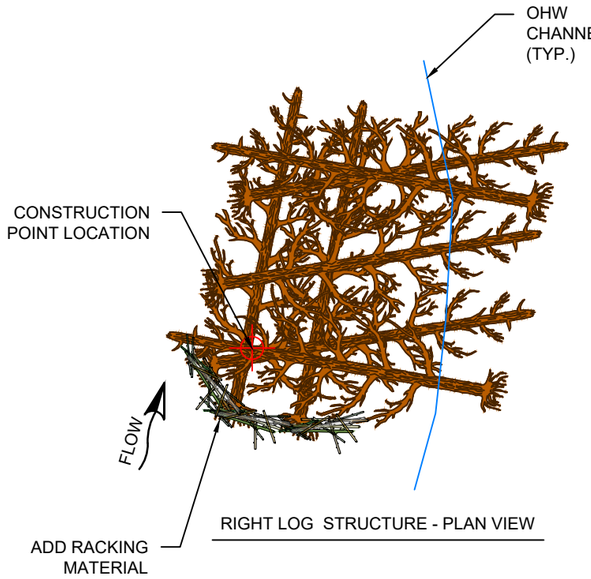
CTUIR
MEACHAM CREEK RM 10 TO 11

DETAILS

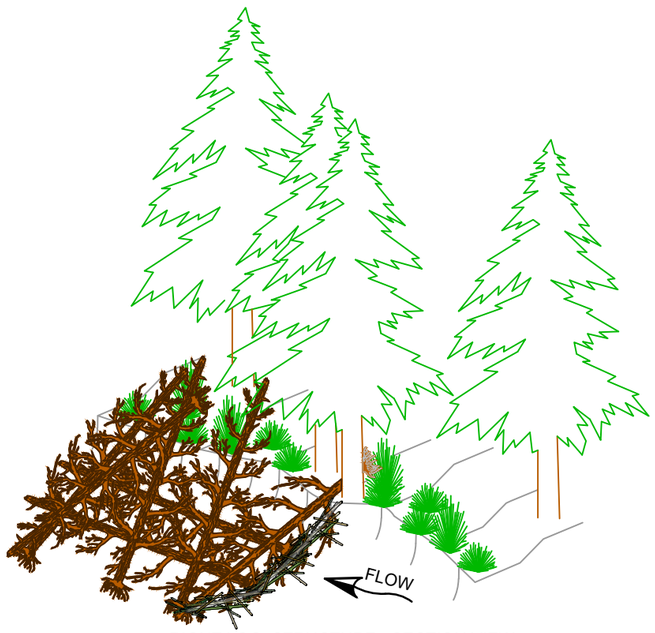
LARGE WOOD STRUCTURE CONSTRUCTION

DWG. NO.: C-301
CREATED: 12/04/2023
SHEET 20 of 27

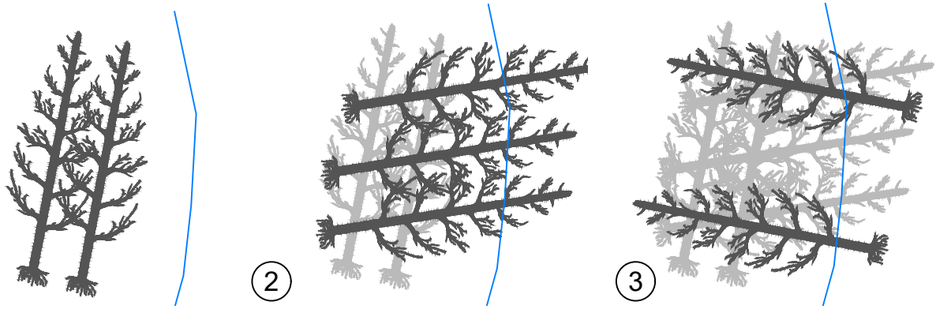
Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN_SHEET FILES\12_LWD DETAIL SHEETS.DWG
PLOT DETAILS: ANDREWS, JEREMY December 26, 2023 9:55 AM



RIGHT LOG STRUCTURE - PLAN VIEW



RIGHT LOG STRUCTURE - SECTION VIEW



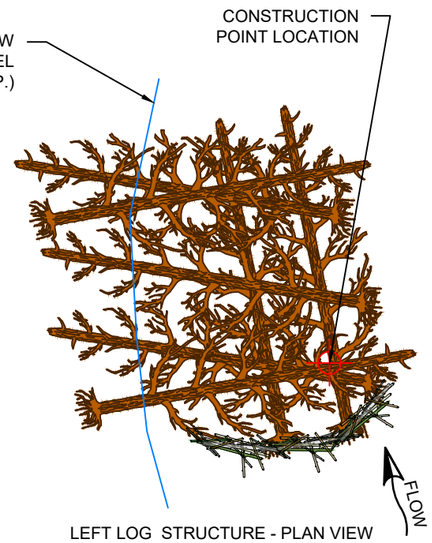
RIGHT LOG STRUCTURE - LOG PLACEMENT SEQUENCING

LWD NOTES:

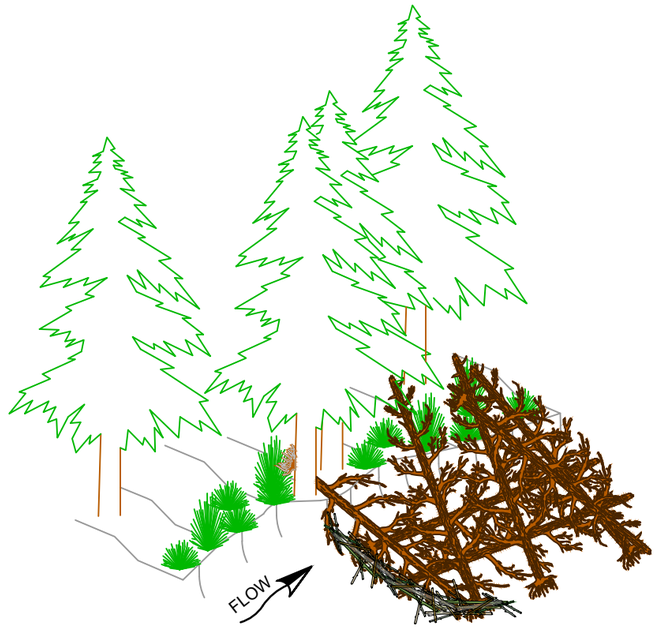
1. ALL LOGS IN STRUCTURE SHALL BE SURFACE-PLACED.
2. ROOTWAD OF LOGS IN SEQUENCE #3 SHALL BE INTERTWINED IN STANDING TREES ON BANK.
3. RACKING MATERIAL MAY BE ADDED TO FRONT OF STRUCTURE WHEN AVAILABLE.
4. FINAL CONFIGURATION OF STRUCTURE SHALL BE AS DIRECTED BY OWNER.
5. OHW LOCATION WITH RESPECT TO STRUCTURE ORIENTATION IS A TYPICAL REPRESENTATION AND WILL VARY AT EACH STRUCTURE LOCATION.

CONSTRUCTION QUANTITIES:

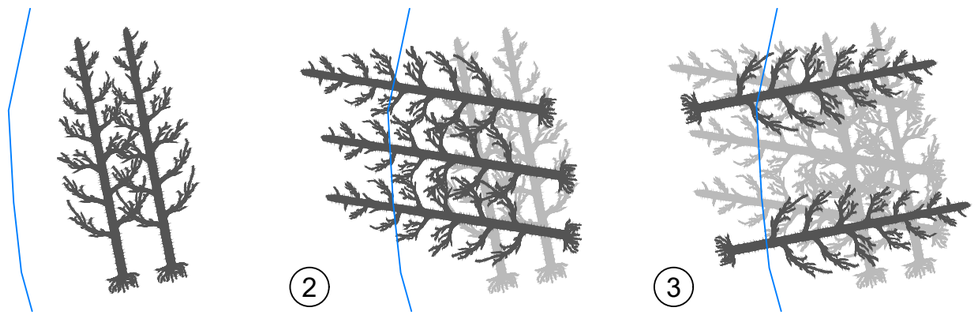
COMPONENT	DESCRIPTION	QUANTITY
WHOLE TREE WITH ROOTWAD	MEDIUM (18" MIN DBH, 35 FT MIN, 4 FT MIN ROOTWAD)	7
RACKING MATERIAL	MISC. (4-10" DBH, 8 FT MIN,16 FT MAX)	15



LEFT LOG STRUCTURE - PLAN VIEW



LEFT LOG STRUCTURE - SECTION VIEW



LEFT LOG STRUCTURE - LOG PLACEMENT SEQUENCING

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REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JEREMY S. ANDREWS JUL. 12, 2016
12/12/2023
Jeremy Andrews
EXPIRES: 12/31/2025

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

CTUIR
MEACHAM CREEK RM 10 TO 11

DETAILS

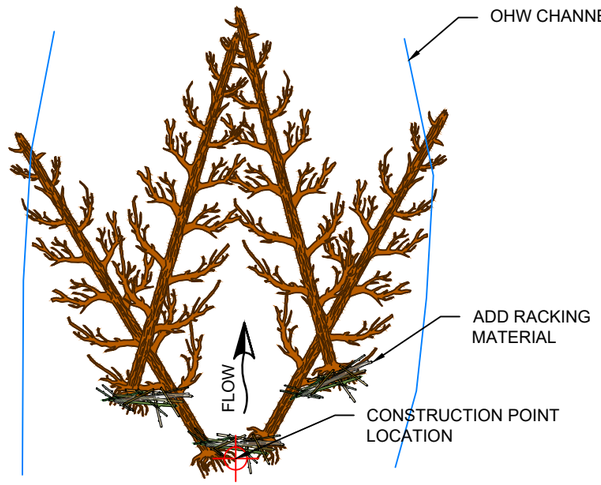
LARGE WOOD STRUCTURE CONSTRUCTION

DWG. NO.: C-302

CREATED: 12/04/2023

SHEET 21 of 27

Z:\PROJECTS\194-10450002 MEACHAM RM 10-11\100% DESIGN\SHEET FILES\12_LWD DETAIL SHEETS.DWG
PLOT DETAILS: ANDREWS, JEREMY December 26, 2023 9:55 AM



CHANNEL BLEED THROUGH STRUCTURE- PLAN VIEW

LWD NOTES:

1. ALL LOGS IN STRUCTURE SHALL BE SURFACE-PLACED.
2. RACKING MATERIAL MAY BE ADDED TO FRONT OF STRUCTURE WHEN AVAILABLE.
3. FINAL CONFIGURATION OF STRUCTURE SHALL BE AS DIRECTED BY OWNER.
4. BANKFULL LOCATION WITH RESPECT TO STRUCTURE LOCATION IS A TYPICAL REPRESENTATION AND WILL VARY AT EACH STRUCTURE LOCATION.

CONSTRUCTION QUANTITIES:

COMPONENT	DESCRIPTION	QUANTITY
WHOLE TREE WITH ROOTWAD	MEDIUM (18"+ DBH, 35 FT MIN, 4 FT MIN ROOTWAD)	4
RACKING MATERIAL	MISC. (4-10" DBH, 8 FT MIN,16 FT MAX)	15

CHANNEL BLEED THROUGH STRUCTURE - LOG PLACEMENT SEQUENCING

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LICENSED PROFESSIONAL ENGINEER 91392PE OREGON JUL. 12, 2016 JEREMY S. ANDREWS 12/28/2023
EXPIRES: 12/31/2025

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

CTUIR
MEACHAM CREEK RM 10 TO 11

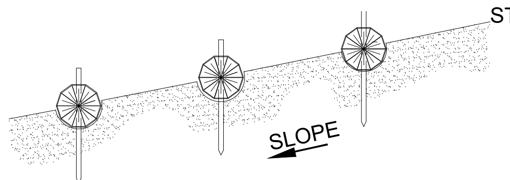
DETAILS

LARGE WOOD STRUCTURE CONSTRUCTION

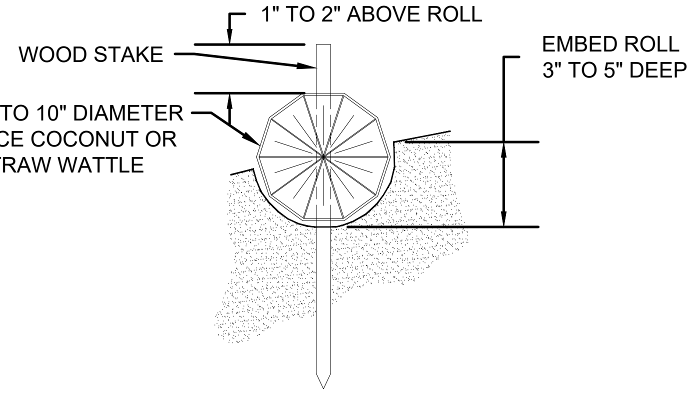
DWG. NO.: C-303

CREATED: 12/04/2023

SHEET 22 of 27



PROFILE



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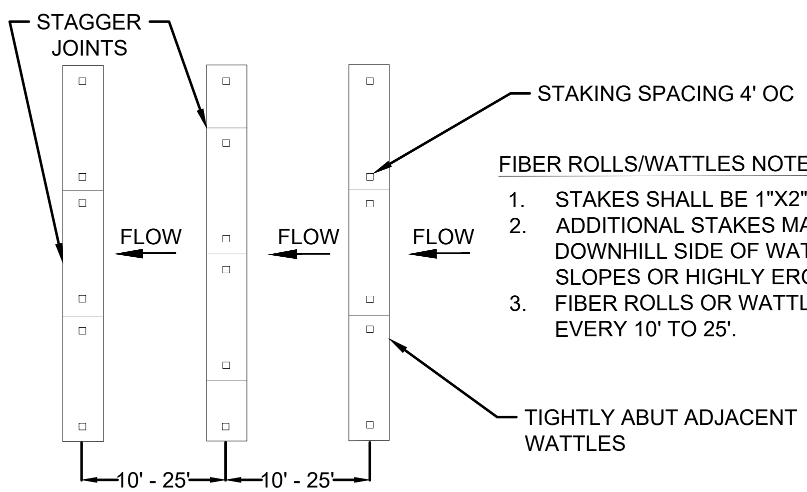
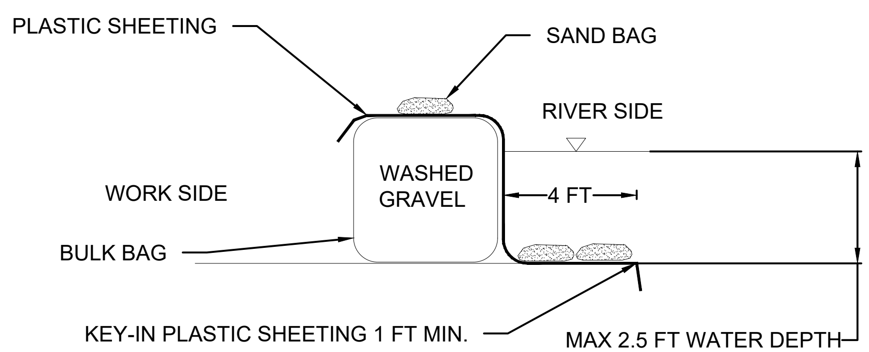


FIBER ROLLS/WATTLES NOTES:

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'.

PLAN VIEW

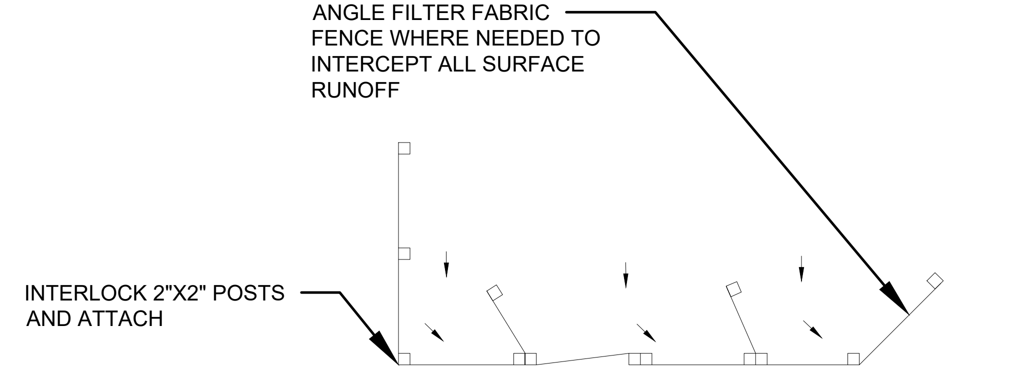
FIBER ROLLS/WATTLES - TYPICAL DETAIL
NTS



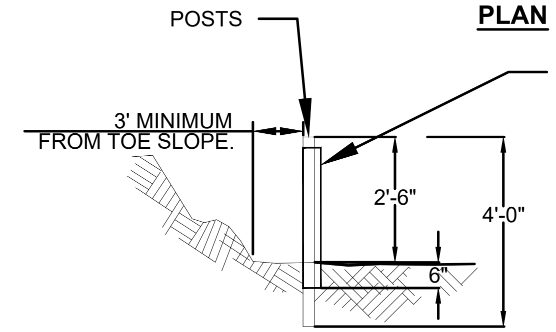
TEMPORARY COFFERDAM SECTION TYPICAL DETAIL
NTS

COFFERDAM NOTES:

1. ALL WORK IN CHANNEL SHALL ONLY OCCUR WITH APPLICABLE 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 BAG.



PLAN



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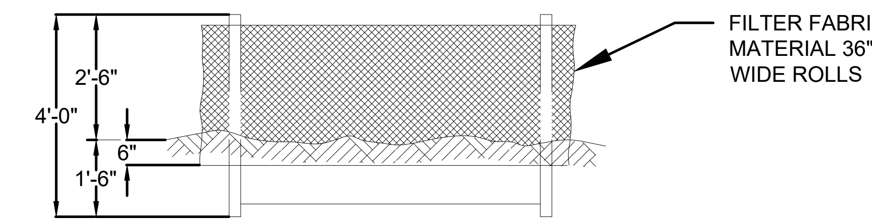

TEMPORARY SILT FENCE TYPICAL DETAIL
NTS

SEDIMENT 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.

Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN\SHEET FILES\13_DETAILS_TESC.DWG
PLOT DETAILS: ANDREWS, JEREMY December 26, 2023 10:06 AM

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REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JUL 12, 2016 JEREMY S. ANDREWS 12/26/2023
EXPIRES: 12/31/2025

ISSUED FOR CONSTRUCTION

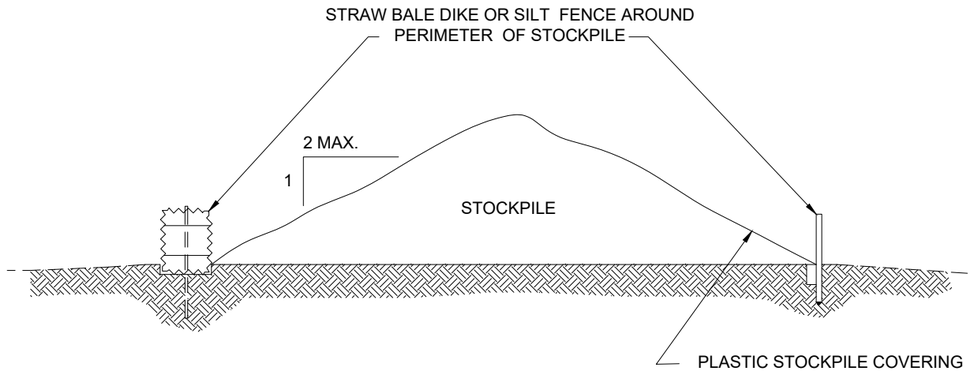
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

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

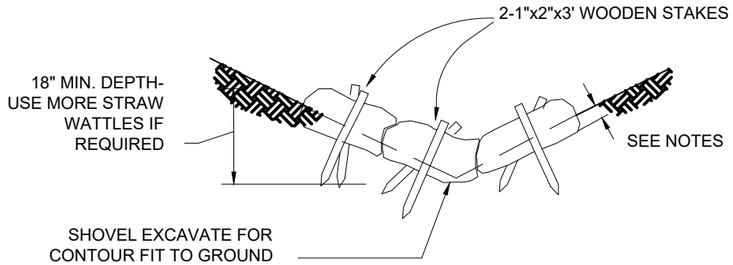
CTUIR
MEACHAM CREEK RM 10 TO 11

DETAILS
TESC

DWG. NO.: C-400
CREATED: 12/04/2023
SHEET 23 of 27

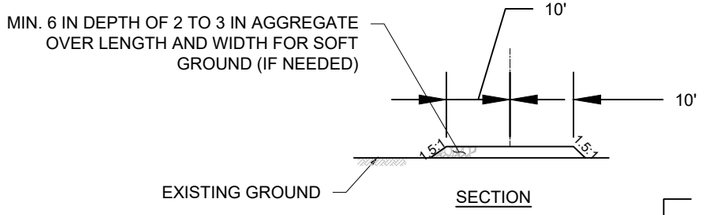


TYPICAL SOIL STOCKPILE
NTS



NOTES:
1. INSTALL STRAW WATTLES ACROSS SWALES AT 50' O.C. AS NEEDED ONLY DURING CLEARING, GRUBBING, AND REMEDIAL GRADING AND PRIOR TO CONSTRUCTING FINAL COVER LINER
2. EMBED STRAW WATTLE 3 INCHES BELOW GROUND SURFACE
3. DRIVE STAKES MINIMUM 12" INTO GROUND SURFACE

TYPICAL STRAW WATTLE SEDIMENT BARRIER
NTS



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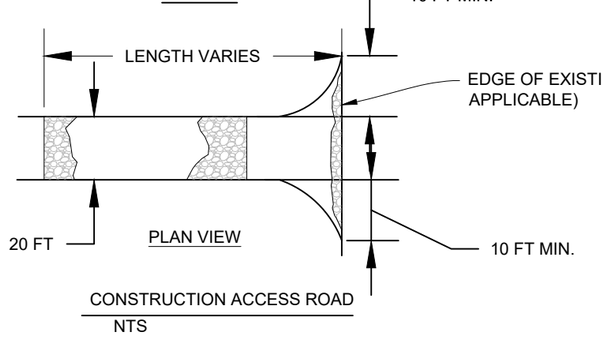
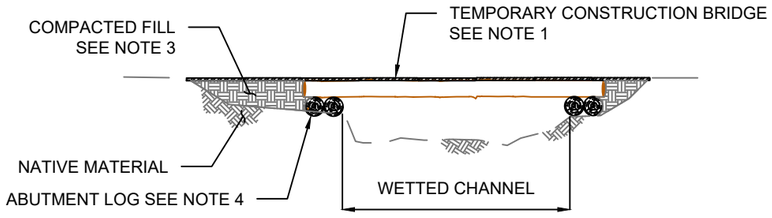


PLAN VIEW

CONSTRUCTION ACCESS ROAD
NTS

CONSTRUCTION ACCESS ROAD NOTES:

1. ACCESS ROAD TO BE BUILT OVER EXISTING GROUND. PLACEMENT OF ROCK TO BE DETERMINED IN THE FIELD IF SOFT GROUND CONDITIONS ARE ENCOUNTERED.



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 MOST RECENT ARBO II 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.

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91392PE
OREGON
JUL 12, 2016
JEREMY S. ANDREWS
12/12/2023
EXPIRES: 12/31/2025

ISSUED FOR CONSTRUCTION

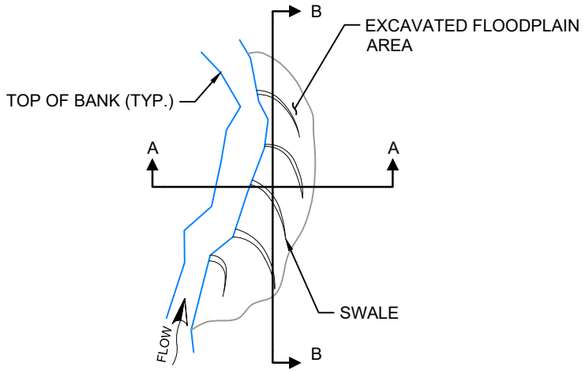
CAYUSE - WALLA WALLA - UMATILLA CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

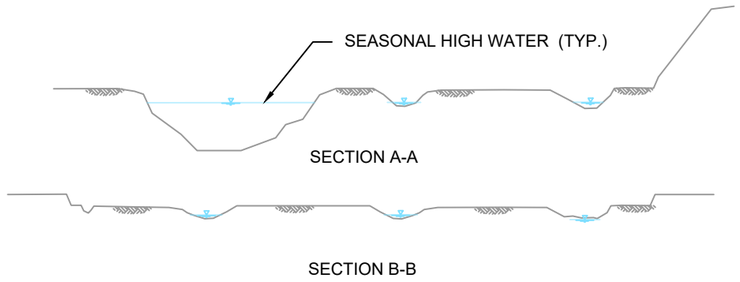
REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

CTUIR
MEACHAM CREEK RM 10 TO 11

DETAILS
TESC

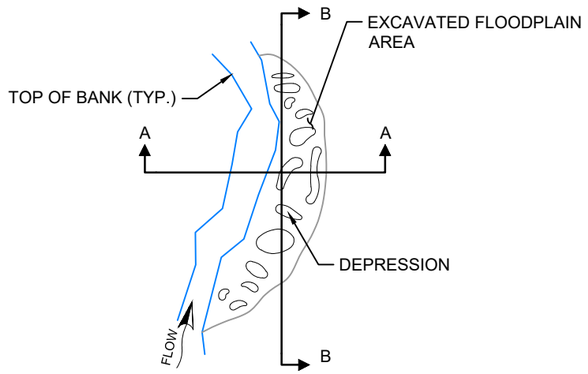
DWG. NO.: C-401
CREATED: 12/04/2023
SHEET 24 of 27

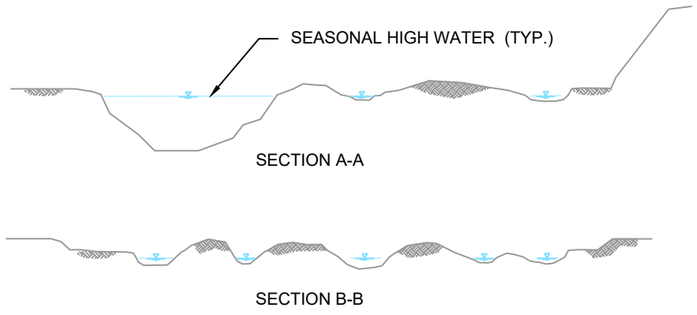




TYPICAL EXCAVATED FLOODPLAIN RETURN SWALE

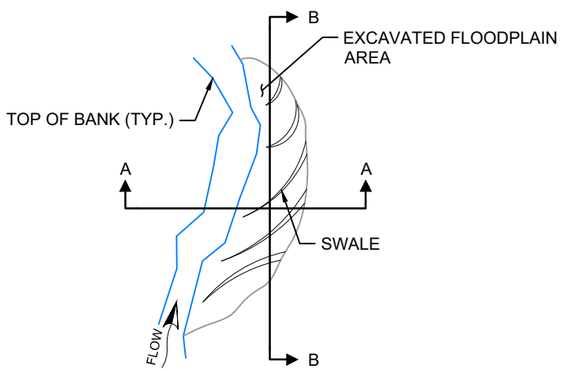
NTS

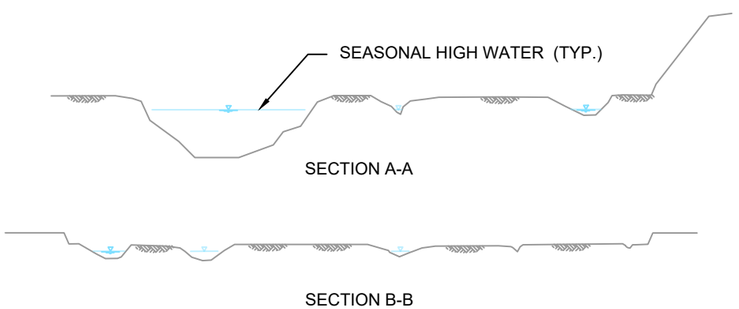




TYPICAL EXCAVATED FLOODPLAIN DEPRESSIONS AND MOUNDING

NTS





TYPICAL EXCAVATED FLOODPLAIN DISPERSE SWALE

NTS

NOTES:

1. LOCATION, ORIENTATION, AND SIZE OF SWALES AND DEPRESSIONS FOR FLOODPLAIN GRADING SHALL BE AS DIRECTED BY THE OWNER'S REPRESENTATIVE.
2. IN GENERAL, FLOODPLAIN RETURN SWALE GRADING SHALL BE USED IN LOCATIONS WHERE EXCAVATION OCCURS ON THE OUTSIDE BEND OF THE WETTED CHANNEL.
3. IN GENERAL, FLOODPLAIN DISPERSE SWALE GRADING SHALL BE USED IN LOCATIONS WHERE EXCAVATION OCCURS IN STRAIGHT CHANNEL SECTIONS.
4. IN GENERAL, FLOODPLAIN DEPRESSIONS AND MOUNDING GRADING SHALL BE USED IN LOCATIONS WHERE EXCAVATION OCCURS ON THE INSIDE BEND OF THE WETTED CHANNEL.
5. ALTHOUGH THE GENERAL GRADING LOCATIONS ARE DEFINED ABOVE, FINAL FLOODPLAIN GRADING TYPES SHALL BE DETERMINED BY THE OWNER'S REPRESENTATIVE AT EACH GRADING LOCATION.
6. TYPICAL DRAWINGS SHOW ONLY PROPOSED SURFACE FOR CLARITY.
7. INTENT OF FLOODPLAIN GRADING IS TO ENHANCE FLOODPLAIN CONNECTIVITY.
8. ALL FLOODPLAIN GRADING SHALL MATCH EXISTING NATURAL TOPOGRAPHY.

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REGISTERED PROFESSIONAL ENGINEER 91397PE OREGON JUL 12, 2016 JEREMY S. ANDREWS
12/12/2023
Jeremy Andrews
EXPIRES: 12/31/2025

ISSUED FOR CONSTRUCTION

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

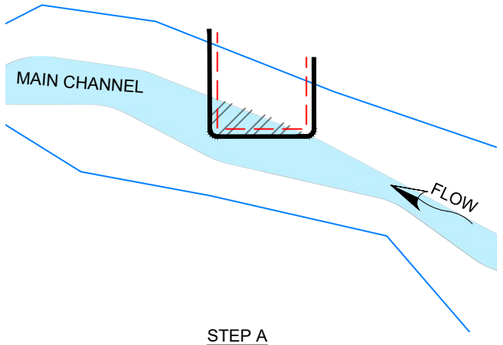
CTUIR
MEACHAM CREEK RM 10 TO 11

DETAILS
FLOODPLAIN TOPOGRAPHICAL FEATURES

DWG. NO.: C-402

CREATED: 12/04/2023

SHEET 25 of 27



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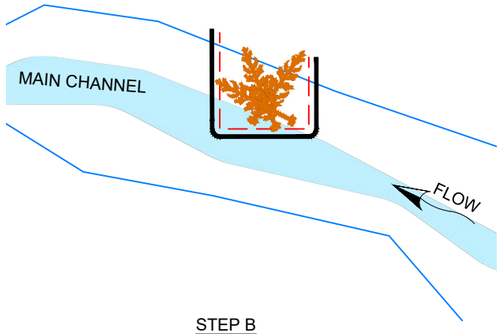

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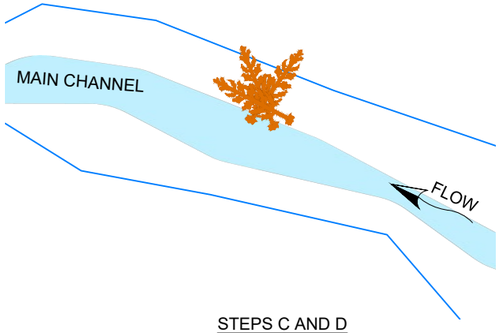
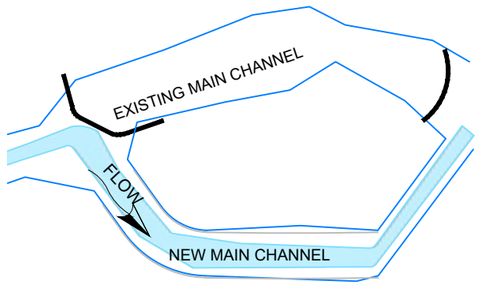


STEPS C AND D

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



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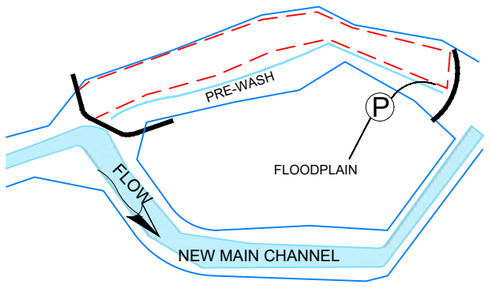
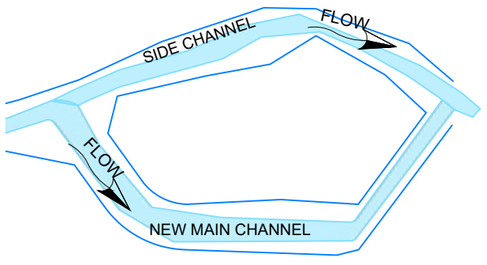


STEPS B AND C



STEP D

PROPOSED SIDE CHANNEL FILL (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 LATEST ARBO II 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.

B) DEWATERING AND INSTALLATION:

INSTALL COFFERDAM AND DEWATER ISOLATED WORK AREA. ALL ISOLATION WORK AND DEWATERING ACTIVITIES SHALL BE IN ACCORDANCE WITH ARBO II GUIDELINES. EXCAVATE AND INSTALL LARGE WOOD STRUCTURES AND CHANNEL EXCAVATION AS SHOWN ON THE THE CONSTRUCTION PLAN SHEETS AND IN ACCORDANCE WITH PROJECT SPECIFICATIONS.

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.

D) SITE RESTORATION:

STREAMBANKS AND DISTURBED AREAS SHALL BE RESTORED AS NECESSARY USING ONSITE NATIVE MATERIAL AND ALL PROJECT WASTE MATERIAL SHALL BE 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 (JULY 1 - AUGUST 15). 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 HIP IV 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.

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

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REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2025
12/28/2023

ISSUED FOR CONSTRUCTION

CAYUSE · WALLA WALLA · UMATILLA
CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
Treaty of 1855

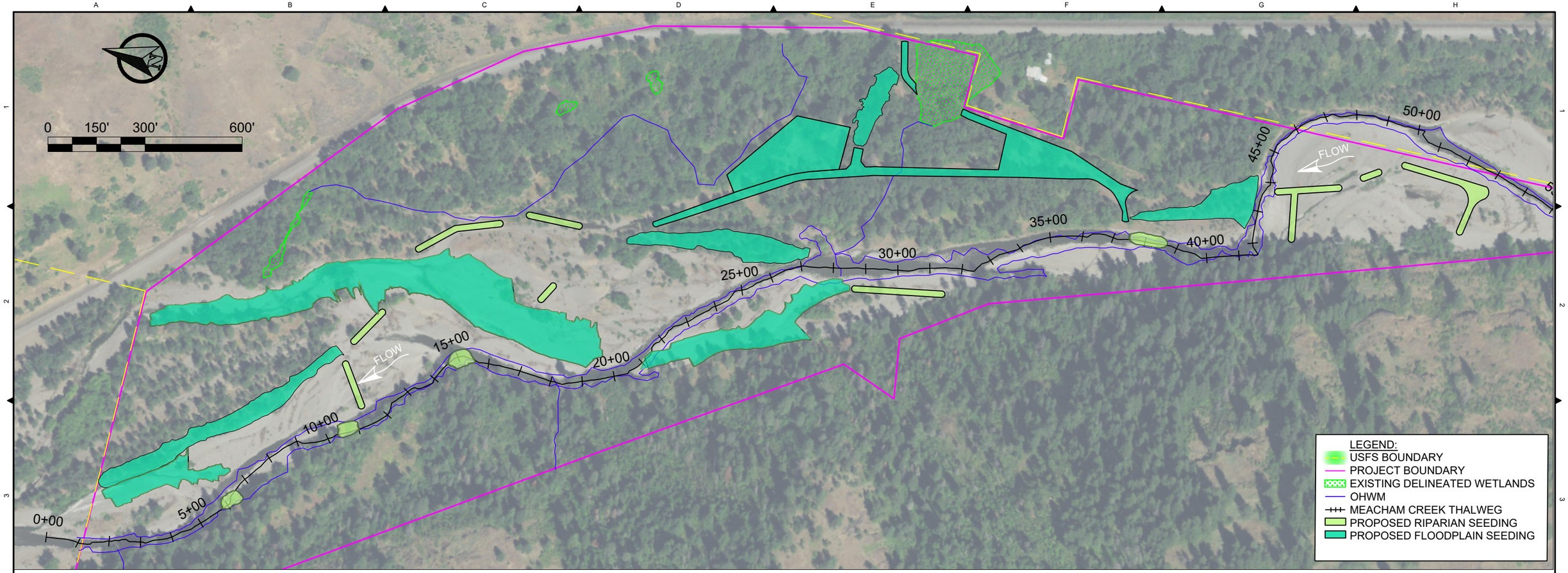
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

CTUIR
MEACHAM CREEK RM 10 TO 11

DETAILS
FISH SALVAGE, DEWATERING, AND REWATERING

DWG. NO.: C-403
CREATED: 12/04/2023
SHEET: 26 of 27

Z:\PROJECTS\194-1045-0002 MEACHAM RM 10-11\100% DESIGN_SHEET FILES\15_FISH SALVAGE DEWATERING & REWATERING.DWG
PLOT DETAILS: ANDREWS, JEREMY December 26, 2023 10:10 AM



FLOODPLAIN ZONE MIX		
ACRES: 9.6		
QUANTITY: 288 LBS*		
COMMON NAME	**SCIENTIFIC NAME**	**COMPOSITION (% OF MIX)**
BASIN WILDRYE	*LEYMUS CINEREUS*	30
IDAHO FESCUE	*FESTUCA IDAHOENSIS*	20
SANDBERG BLUEGRASS	*POA SECUNDA*	15
PRAIRIE JUNEGRASS	*KOELERIA MACRANTHA*	15
BLUEBUNCH WHEATGRASS	*PSEUDOROEGNERIA SPICATA*	15
MOUNTAIN BROME	*BROMUS MARGINATUS*	5
*QUANTITY BASED ON 30 LBS SEED PER ACRE		

RIPARIAN ZONE MIX		
ACRES: 1.2		
QUANTITY: 36 LBS*		
COMMON NAME	**SCIENTIFIC NAME**	**COMPOSITION (% OF MIX)**
BASIN WILDRYE	*LEYMUS CINEREUS*	40
IDAHO FESCUE	*FESTUCA IDAHOENSIS*	40
MOUNTAIN BROME	*BROMUS MARGINATUS*	15
TUFTED HAIRGRASS	*DESCHAMPSIA CESPITOSA*	5
*QUANTITY BASED ON 30 LBS SEED PER ACRE		

SEED MIX DESCRIPTION:
SEED MIX, COMPOSED OF NATIVE SPECIES, SHALL BE USED ON BARE SOIL IN SELECTED AREAS OF THE RIPARIAN PLANTING ZONES AS NEEDED/DESIRED FOR EROSION CONTROL.

SEEDING NOTES:
1. SEED AT APPROXIMATELY 30 LBS/ACRE; FINAL QUANTITY OF SEED MIX PER ACRE WILL DEPEND ON SPECIES COMPOSITION AND SITE CONDITIONS.
2. SPECIES TO BE USED FOR SEED MIX(ES) AND FINAL COMPOSITION SHOULD BE CHOSEN BASED ON SITE SPECIFIC DESIGN AND CONDITIONS (E.G. SLOPE, WIDTH OF PLANTING ZONE, MOISTURE AVAILABILITY).
3. RIPARIAN AND FLOODPLAIN ZONES WILL BE SEEDED WITH THE RIPARIAN SEED MIX; THE WETLAND ZONE WILL NOT BE SEEDED.
4. SEEDS SHALL BE APPLIED TO BARE SOIL AND MAY BE APPLIED BY DRILL OR BROADCAST.
5. RIPARIAN ZONE WILL BE MULCHED FOLLOWING APPLICATION OF SEED IF SEED IS BROADCAST APPLIED.
6. ALL SEED MIXES SHALL BE CERTIFIED WEED-FREE.

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OREGON
JUL. 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2025
12/31/2023

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
A	12/04/23	100% Implementation Plan	AD	JA	CM	CJ

CTUIR
MEACHAM CREEK RM 10 TO 11

DETAILS
REVEGETATION PLAN

DWG. NO.: L-101
CREATED: 12/04/2023
SHEET 27 of 27

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PLOT DETAILS: ANDREWS, JEREMY December 26, 2023 10:12 AM

ATTACHMENT 2
CONSTRUCTION SPECIFICATIONS

Meacham Creek RM 10 to 11 In-stream Design and Construction Oversight Project

Attachment 2

Construction Specifications

100% Implementation Plan

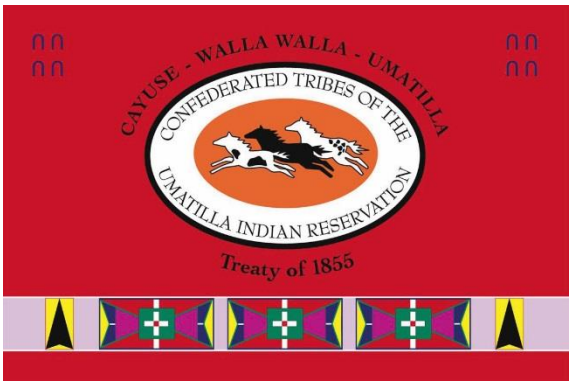
Prepared for:

Confederated Tribes of the Umatilla Indian Reservation
Fisheries Program-Umatilla River Basin
Department of Natural Resources
46411 Timíne Way
Pendleton, OR 97801

Prepared by:

19803 North Creek Parkway
Bothell, WA 98011
Tel 425-482-7600 Fax 425-482-7652

December 2023



CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION

MEACHAM CREEK RM 10 TO 11 IN-STREAM DESIGN AND CONSTRUCTION OVERSIGHT PROJECT

CONSTRUCTION SPECIFICATIONS

100% Implementation Plan

Submittal To:

Confederated Tribes of the Umatilla Indian Reservation
Department of Natural Resources
46411 Timíne Way
Pendleton, Oregon 97801

Prepared By:

Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, WA 98011

December 2023

TABLE OF CONTENTS

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 project is located on Meacham Creek upstream of its confluence with the Umatilla River from river mile (RM) 9.1 to RM 10.1 on lands owned by the United States Forest Service (USFS). This contract work consists of removing and modifying levees and spur dikes that are impacting geomorphic and hydrologic process, decompaction of floodplains, gravel augmentation, and adding large woody material (LWM) to improve habitat complexity to benefit the production of summer steelhead trout, spring Chinook salmon, and bull trout. Construction shall require isolating work areas from water and fish. Construction access shall require temporary stream crossings, including temporary bridges. Upon completion of construction, disturbed areas within the project area shall be decompacted and revegetated to stabilize the disturbed areas.

   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.

   This summary does not provide the technical detail of the work activities, but describes the work as a whole, providing overall perspective to the separate tasks. This section shall be used in conjunction with all the other sections and the Drawings to establish the total work requirements.

B. The project was designed in accordance with the National Oceanic and Atmospheric Administration (NOAA) and the National Marine Fisheries Service (NMFS) Aquatic Restoration Biological Opinion (ARBO II). Refer to the ARBO II General Aquatic Conservation Measures.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

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

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

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

   Clearing and Grubbing within Project Area
   Installation of Temporary Construction Access Routes
   Installation of Temporary Construction Bridges
   Installation and Maintenance of Construction Area BMPs
   Construction and Maintenance of Material Storage Areas

Levee and Spur Dike Excavation
Gravel Augmentation Placement
Decompaction and Floodplain Topography
Installation of Floodplain and Instream Structures
Decompaction of Compacted Access Routes and Staging Areas
Installation of Revegetation Materials by Confederated Tribes of the Umatilla Indian Reservation (CTUIR)
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 between May and November, whereas work in the wetted channel, or that requires crossing the wetted channel, shall occur between July 1st and August 15th, during the Oregon Department of Fish and Wildlife (ODFW) in-water work period. No instream work shall be conducted between May and June 30 or between August 16 and November. The Contractor shall notify the CTUIR in writing 10 business 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 (7) day calendar 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 instream components of the project shall be restricted to the period of July 1 to August 15 during the construction period.

B. Restricted Work Areas

1. Completion of work adjacent to or on private property shall require coordination with the affected landowners.

2. The Contractor and CTUIR shall coordinate the project work schedule in order to notify landowners and stakeholders of when the work activities adjacent to or on the private property shall occur.

3. The Contractor and CTUIR shall coordinate the project work schedule in order to notify the UPRR of when work shall occur adjacent to the existing UPRR line that runs along the south perimeter of the project area.

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 the intersection of Mission Road and Market Road, drive 1.6 miles east on Mission Road to the intersection of Cayuse Road, then turn left on Cayuse Road and drive 16.8 miles east to the intersection of Meacham Creek Road. Once at Meacham Creek Road, turn right onto the road and drive 100 yards south along the railroad tracks to the UPRR gate. The Project begins approximately 9.0 miles up the UPRR access road (Meacham Creek Road).

C. Restricted Access Areas

1. Access on the Meacham Creek Road is restricted to UPRR personnel, local ranchers, the CTUIR, and USFS personnel. Permission to access is granted by the UPRR to the CTUIR. With permission of the UPRR, the Contractor shall make arrangements for access on the Meacham Creek Road. Final site access details shall be provided by CTUIR to the Contractor following discussions with the UPRR.

2. No camping shall be permitted on the project site or on CTUIR land. Camping may be possible on USFS land by prior arrangement with the USFS.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

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 or Engineer 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 USFS lands. All activities shall be coordinated with ongoing activities and not interfere with these activities except with written approval of the Owner's Representative or Engineer.

B. Work Hours

1. The Contractor shall propose work hours based on the Contractor's construction schedule to ensure completion of all instream work no later than August 15. 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 of time. The Contractor's proposed work schedule shall be subject to Owner's Representative or Engineer's approval. Proposed work schedule may not be approved if the Owner's Representative or Engineer is not available to be on site during the proposed work hours.

1.03 GENERAL ACCESS REQUIREMENTS

A. The project area is closely monitored by Owner's personnel. 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 or Engineer.

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 or Engineer.

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's staff.

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 or Engineer.

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 of May 1 and November 30, expected to be 2024, or as directed in the Contract Documents.

B. Construction Sequence

1. Floodplain Work: May – November
   - Clear and grub proposed temporary access roads.
   - Separate and stockpile in the staging area or areas directed by Owner's Representative or Engineer, earth, rock, and woody materials for future use.
   - Excavate levees and spur dikes.
   - Gravel augmentation placement outside active channel
   - Decompact and floodplain topography
   - Construct floodplain LWM structures.
   - Revegetate decompacted floodplains and all disturbed areas.

2. Active Channel: July 1 – August 15
   - Install temporary bridges or fish-excluded crossings of the wetted channel as directed by Owner's Representative or Engineer.
   - Install work area isolation measures for in-stream LWM structures.
   - Conduct fish salvage, if needed, to remove any stranded fish where necessary as directed by Owner's Representative or Engineer.
   - Gravel augmentation placement inside active channel
   - Construct in-stream LWM structures where temporary bridges or fish-excluded crossings in the wetted channel are required.

- Remove temporary bridges or fish-excluded crossings in the wetted channel, final grading and shaping of terrace areas, and grade and subsoil compacted temporary access roads.

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 be 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, site and drainage improvements, and other improvements, whether shown on the Drawings or not. No work shall be conducted in any wetlands or vegetation protection areas shown on the Drawings and restricted areas unless coordinated with and approved by the Owner's Representative or Engineer.

B. Contractor shall confine operations to within the clearing limits or other 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. 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 correspond with those listed on the Bid Form. Additional bid items requiring no further description may also be included on the form. 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 each bid item.

B. Payment shall be made based on the quantities of work as measured in accordance with specified methods of measurement and the prices stipulated in the Bid Form and only for those items listed on the Bid Form. 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 CONTRACT SCHEDULE OF VALUES

A. Contractor shall prepare and submit a contract 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 contract 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 Items. 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 CTUIR reserves the right to review all Contractor submitted actual quantity measurements for review and payment.

D. Contractor shall submit copies of the contract schedule of values to Owner's Representative at earliest possible date, but no later than 14 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 as updated weekly in the schedule of values 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 on the bid form shall constitute full compensation for furnishing all labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests 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..

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 CTUIR. The CTUIR 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. 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 103.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 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 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 construction contract 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 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 his/her 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 not 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 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 CTUIR Accounts Payable Section.

C. The CTUIR Accounts Payable Section shall have 2 workings 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 CTUIR Accounts Payable Section shall review the submitted invoice and construction implementation spreadsheet.

C. The CTUIR Accounts Payable Section shall have two (2) business 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 CTUIR Accounts Payable Section.

E. The Owner's Representative shall have three (3) business 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 CTUIR Accounts Payable Section.

B. If payment has not been received by the Contractor within four (4) business days of the estimated payment date defined in Section 1.01 B., the Owner's Representative shall contact the CTUIR 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.

D. In the event that payment is not received by the Contractor within 30 calendar days of the estimated payment date, the Contractor shall be allowed to charge interest on the outstanding balance. This interest charge shall not be part of the overall construction cost included in the construction contract.

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) business 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 or Engineer. This meeting shall occur not less than 10 business days prior to work commencing.

B. The Owner's Representative or Engineer 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 his 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: 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 or Engineer 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 time.

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

C. Attendance:

1. Owner's Representative

2. Engineer

3. Contractor

4. Other Contractors (if any)

5. Subcontractors as pertinent to agenda

6. Safety Representative (Optional)

7. 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 10 business 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 or Engineer'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 or Engineer 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 Oregon, 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 10 business days after receipt by Owner's Representative or Engineer 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 or Engineer.

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

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 or Engineer for information, approval by the designated approval authority shall take place before submission to Owner's Representative or Engineer.

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 (3) copies of all submittals. Where permits and licenses and other such documents are obtained in Owner's name, submit the original and five (5) 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 its reviews of submittals and the action taken by means of its 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 or Engineer to address issues related to the review of submittals.

E. Owner's Representative or Engineer shall return submittals to Contractor within 10 business days after submittals have been received.

F. Contractor shall include 10 business 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. Submittal Schedule

2. Construction Schedule

3. Contract Schedule of Values

4. Weed-free material source certification

5. Spill Prevention Countermeasures and Control (SPCC) Plan

6. Oregon Department of Environmental Quality (ODEQ) 1200-C Permit

7. Stormwater Pollution Prevention Plan (SWPPP), with Oregon Department of State Lands 1200-C Permit and Supporting Materials

8. Erosion and Sediment Control (ESC) Plan

9. Storm Contingency Plan
10. Material Storage/Staging Plan
11. Dewatering, Stream Diversion, and Work Area Isolation Plan
12. Excavation Plan
13. LWM, Boulder, Streambed, and Grade Stabilization Material
14. Seed Certification
15. Surveyor credentials
16. Oregon Department of Forestry (ODF) Notification of Operation
17. Temporary Bridge Crossing Design
18. Final Record 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. The Owner shall obtain permits for Section 7 of the Endangered Species Act, Section 106 of the National Historic Preservation Act, Sections 401 and 404 of the Clean Water Act, and Oregon Department of State Lands Removal-Fill.

2. Contractor shall be responsible for complying with all permit requirements. Contractor shall be responsible for obtaining all other permits as may be required including Oregon Department of Environmental Quality (ODEQ) 1200-C Permit and the Oregon Department of Forestry (ODF) Permit to Use Fire or Power-Driven Machinery. Contractor shall obtain all needed certifications and licenses as required by state and local jurisdictions.

C. Notification

1. Owner’s Representative or Engineer 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 or Engineer of proposed corrective action and take such action when approved. If Contractor fails to comply promptly, Owner’s Representative or Engineer 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 or Engineer 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, ODEQ 1200-C Permit, and ESC Plan

a. The Contractor shall secure the project area at the end of every workday in an effort 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, ODEQ 1200-C Permit, and all ESC Plans within 14 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.

c. ESC 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 10 business 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.

b. The Contractor shall be required to prepare an emergency spill containment kit, to be located on the construction site, and prepare a SPCC Plan, addressing prevention and cleanup of accidental spills. If a spill of petroleum

product should occur in water, Contractor shall immediately notify the Owner's Representative and appropriate state agencies.

3. ODF Notification of operation

    a. The Contractor shall file a Notification of Operation or Permit to Use Fire or Power-Driven Machinery with the ODF before starting the work.

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 or Engineer. Where such emergency use is permitted, Contractor shall provide effective protection for land and vegetation resources at all times 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 or Engineer 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 or Engineer.

E. Disturbed Areas

1. Contractor shall effectively prevent erosion and control sedimentation through approved methods, which shall be included in the ESC 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 1 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 or Engineer. 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.

    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 Contractors 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 or Engineer. 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 as a result 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, the Owner's Representative and Engineer shall be notified immediately, and the following agency shall be contacted:

Oregon Department of Fish and Wildlife; Contact: 503-947-6002 and 800-452-0311.

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 the Meacham Creek stream channel, delineated wetlands, and aquatic resources. 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 have appropriate spill containment structures and/or absorbent pads in place at all times 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. All equipment fueling shall be conducted using secondary containment to capture potential fuel spills. 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 the Owner's Representative. Any spills resulting in a detectable sheen on water shall be reported to the EPA National Response Center (1-800-424-8802). Any spills over 25 gallons shall be reported to the ODEQ 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 controlled at all times. 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 instream restoration work is complete, and Owner's Representative or Engineer 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 in the project reach on Meacham Creek.

2. Oregon Administrative Rules (OAR) Chapter 340, Division 41 for additional water quality standards and related regulations (OAR 340-041-0036) states that limited duration activities necessary to address an emergency or to accommodate essential dredging, construction, or other legitimate activities and which cause the standard to be exceeded may be authorized provided all practicable turbidity

control techniques have been applied. Based on this OAR, the Owner shall get clearance to exceed State's water quality standards through a permit or certification authorized under terms of section 401 or 404 (Permits and Licenses, Federal Water Pollution Control Act) or OAR 14l-085-0100 et seq. (Removal and Fill Permits, Division of State Lands), with limitations and conditions governing the activity set forth in the permit or certificate.

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 Oregon 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 controlled at all times, 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 keep the disturbed area damp at all times. 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 controlled to Federal and State allowable limits at all times.

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 and Engineer. 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. No archeological sites within Contractor's work area have been identified. If identified during the course of the work, Contractor shall take precautions to preserve all such resources as they existed at the time they were first pointed out. 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, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, Contractor shall immediately notify Engineer and 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 the CTUIR or USFS, all fires on or in the vicinity of the project which are caused by Contractor's employees, whether set directly or indirectly as a result 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 his operation under the contract.

1. Fire Tools. The Contractor shall provide for each employee in the contract area at least one approved handtool 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:

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

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

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

   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:

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

   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 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 his 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 following the ODEQ Water Quality Certification Template or as

required by other 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 10% above natural stream turbidity is prohibited except as specifically provided below:

1. Turbidity monitoring shall be conducted and recorded as described below. Monitoring must occur at two-hour intervals each day during daylight hours when in-water work is being conducted. A properly calibrated turbidimeter is required unless another monitoring method is proposed and authorized by the permitting agency.

   a. A turbidity measurement shall be recorded every 2 hours during in-water work at an undisturbed area. A background location shall be established at a representative location approximately 100 feet up current of the in-water activity unless otherwise authorized. The background turbidity, location, date, tidal stage (if applicable), and time must be recorded immediately prior to monitoring downcurrent at the compliance point described below.

   b. Monitoring shall occur every 2 hours. A compliance location shall be established at a representative location approximately 100 feet downcurrent from the disturbance at approximately mid-depth of the water body and within any visible plume. The turbidity, location, date, tidal stage (if applicable), and time must be recorded for each measurement.

   c. Turbidity monitoring results shall be compared from the compliance points to the representative background levels taken during each two-hour monitoring interval. Pursuant to OAR 340-041-0036, short term exceedances of the water quality standard are allowed as follows:

TABLE 3.01-1
MONITORING WITH A TURBIDIMETER EVERY 2 HOURS

Turbidity Level	Restrictions to Duration of Activity
0 to 4 NTU above background	No restrictions
5 to 29 NTU above background	Work may continue maximum of 4 hours. If turbidity remains 5-29 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-4 above background.
30 to 49 NTU above background	Work may continue maximum of 2 hours. If turbidity remains 30-49 above background, stop work and modify BMPs. Work may resume when NTU is 0-4 above background.
50 NTU or more above background	Stop work immediately and inform ODEQ.

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 nephelometric turbidity units (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. Erosion Control Plan

B. 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 because the ground shall settle.

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 shallow 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. Disturbed areas that shall remain unworked for longer than one (1) week

2. Rate: 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 (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. In order 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 CTUIR and USFS 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 CTUIR or 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), dump trucks, excavators, and all other heavy equipment.

B. Straw/hay bales 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. The Contractor shall furnish the CTUIR with a statement of certification prior to unloading the bales.

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.

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 10 business days following Notice to Proceed.

2. Storm Contingency Plan

a. Contractor shall submit, within 10 business 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 reach of Meacham Creek. Due to the instream 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. Contractor employee parking shall not interfere with existing and established parking requirements.

1.02 SUBMITTALS

A. None.

1.03 AVAILABILITY AND USE OF UTILITY SERVICES

A. Temporary Water and Electricity

1. No municipal water or electricity shall be 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.

1.04 PROTECTION AND MAINTENANCE OF TRAFFIC

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 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 or Engineer 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 or Engineer. 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 plan showing the proposed location and construction techniques to install the access road based on the Drawings. This plan shall be developed using the equipment weights and proposed usage to ensure the location and construction shall 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 140NL or approved equal.

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 or Engineer 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 or Engineer, 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.

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 total length of temporary construction access roads shall be approximately 5,550 feet. Length of the individual construction access roads shall vary 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 to completely span above active flowing water in the stream channel.

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

3.05 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.

3.06 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 Contractors responsibility to remove all of the filter fabric and rock from the temporary roads.

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

3.07 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 are 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 or Engineer.

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.

3.08 SITE REVEGETATION

A. Revegetation along the regraded road alignments shall be completed by the Owner and in Section 32 90 00 SEEDING.

END OF TEMPORARY ACCESS ROADS

SECTION 01 56 23
TEMPORARY FENCING

PART 1 GENERAL

1.01 DESCRIPTION

A. Work in this section consists of removing and replacing the 4-strand barbed wire fence along the UPRR maintenance road to facilitate construction activities in the stream channel. Existing 4-strand barbed wire fence and gates removed prior to construction must be saved and set aside for installation after construction is completed.

B. Work in this section also consists of installing the 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. Identify the sections of fencing and gates to be removed during the construction period.

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 FENCE AND GATE REMOVAL

A. Fence sections and gates identified for removal shall be removed in a manner that minimizes damage to the fencing material and gates. Fence posts identified for removal shall be removed and stored as stated in Section 3.04.

3.04 REMOVED FENCING AND GATES

A. After the fencing and gates have been removed, all materials shall be stored on site during the construction period. Location of the storage area is to be determined in the field by the Engineer, Owner's Representative, and Contractor. Stored fencing and gates shall not be damaged during the installation of the channel improvements.

3.05 REINSTALLATION OF FENCE

A. Upon completion of the channel improvements, all posts, fence sections, and gates shall be reinstalled in their former locations. After the posts have been reinstalled, all fencing, and gates shall be reinstalled.

3.06 CONSTRUCTION FENCE LAYOUT

A. Location of the construction fences are shown on the Drawings for the project.

3.07 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.

3.08 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 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 or Engineer.

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. Surveyor Credentials for the State of Oregon.

2. Survey Data for Record Drawings

a. Within 14 calendar days of final acceptance, Contractor shall furnish Owner's Representative or Engineer 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 or Engineer.

1.04 PROJECT RECORD DOCUMENTS

A. Upon completion of the work, Contractor shall submit Field Record Documents to Owner's Representative or Engineer 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.

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 or Engineer 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 (3) 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 or Engineer prior to performing any site layout activities. Contractor may install additional reference points for his/her convenience at locations approved by Owner's Representative or Engineer. 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 or Engineer.

B. Contractor shall promptly report to Owner's Representative or Engineer 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 Oregon. 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 his forces, including those of his 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 its 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 Engineer and Owner.

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 Engineer's or 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 or Engineer for review of the survey. Upon review and approval of the survey by the Owner's Representative or Engineer, the Contractor shall be notified to proceed with implementation.

3.05 SURVEY OF COMPLETED EXCAVATION

A. At the completion of excavation and fill in all areas, Contractor shall survey the extents, elevations, grade breaks, and daylight points of all excavation and fill 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, creek bed and banks, using a grid at a minimum of 25-foot centers plus key grade breaks, to document the final configuration, access road to remain in place, and all major structures (such as boulders and/or large woody debris) in the creek 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, Engineer, 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, LWM structures, and channel features as shown on the Drawings.

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

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

1.03 ENGINEER'S 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 or Engineer shall approve the work and sign the Record of Review and Acceptance.

D. As work approaches completion of individual components, the Engineer shall notify the Owner's Representative on project activities and request an on-site review of the work.

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 request from the Engineer 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.

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

D. When the Owner's Representative approves with conditions or rejects the completed work, the Owner's Representative shall have two (2) working days to prepare a punch-list of items to be completed prior to approval. This punch-list shall be submitted to the Contractor and the Engineer.

1.05 PROJECT APPROVALS

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

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

1.06 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 shall be completed and submitted to Owner's Representative or Engineer, 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 or Engineer 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 seven (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 (2) complete sets of full-size prints of the Contract Drawings, reproduced at Contractor expense, one for Contractor's use, one for Owner's Representative or Engineer. During construction, both sets of prints shall be marked to show all deviations in actual construction from the Contract Drawings. The color green shall be used to indicate all additions and red 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 actually 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 or Engineer whenever requested during construction and shall be jointly inspected for accuracy and completeness by Owner’s Representative or Engineer 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

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 CTUIR.

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

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 USFS's and adjacent property. Upon such discovery or find, Contractor shall immediately notify Engineer and 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 CTUIR if discovered shall be handled as described in Section 01 35 43 ENVIRONMENTAL PROTECTION.

1.03 SUBMITTALS

A. Submit:

1. Procedures and operational sequence for review and acceptance by the Owner's Representative or Engineer 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 shall 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 or Engineer 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.

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 or Engineer.

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 or Engineer 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. Construction fences and clearing limits for the construction activities are shown on the Drawings.

B. Construction fences and temporary erosion control shall be installed prior to the beginning of site clearing for each construction period.

C. All trees removed within the clearing limits shall be sorted and stockpiled into the following size categories:

1. Diameter 18 inches or greater.

2. Diameter 4 to 10 inches.

3. Diameter less than 4 inches.

D. 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 ITEMS

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 shall have sufficient area on-site to stockpile large woody material 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 may be buried during backfilling activities upon approval of the Owner's Representative. Otherwise, such material will be removed off USFS property and disposed of at an approved facility.

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 or Engineer.

END OF SITE CLEARING

SECTION 31 23 00
EXCAVATION AND FILL

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This Section covers earthwork for new main channel, old main channel, new wetlands, and terrace fill and compaction.

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 shall 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 shall be July 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 Meacham Creek. Extensions of the in-channel work period may be granted under certain conditions by the ODFW 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.

B. Gravel Augmentation: Gravel material shall be from floodplain excavation, free of organic and other unsuitable material, and matching lithology found in the watershed. Gravel augmentation relates to the proposed gravel augmentation locations indicated on the Drawings.

C. 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.

1.04 REFERENCES

A. Oregon Department of Transportation (ODOT) Standard Specifications for Construction 2021 or most current.

1. Section 00330 – Earthwork

2. Section 00330.12 – Borrow Material

3. Section 00330.41 - Excavations

4. Section 00330.42 – Embankment, Fills, and Backfills

PART 2 PRODUCTS (NOT USED)

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 shall be no steeper than one vertical to one horizontal. Permanent slopes shall be no steeper than one vertical to two horizontal. Cover exposed slopes if erosion or raveling threatens.

3.03 EQUIPMENT

A. Construction of the LWM structures, floodplain excavation, loading and hauling material to stockpiles, and backfilling the gravel augmentation locations shall require numerous types of heavy equipment. This equipment shall 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. Construction of the LWM structures, floodplain excavation, loading and hauling material to stockpiles, and backfilling the gravel augmentation locations shall require the Contractor to 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 Engineer or 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's 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 Meacham 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 or Engineer.

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 or Engineer prior to use by the Contractor.

3.08 GRAVEL AUGMENTATION

A. Gravel augmentation material shall be clean, non-angular, and sourced from Meacham Creek floodplain alluvium levees or spur dikes at locations shown on the drawings.

B. Placement of suitable gravel material for gravel augmentation shall be to the locations and dimensions shown on the Drawings.

C. Gravel augmentation placement shall initiate gravel accumulations, mimic natural streambed sediment sorting and transport in conjunction with log jams and other in-stream project elements.

3.09 TEMPORARY ACCESS ROAD DECOMISSIONING/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. 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.

D. Refer to the ARBO II General Aquatic Conservation Measures for additional requirements.

3.10 FINAL GRADING AND CLEAN-UP

A. All irregularities shall be made smooth except for natural surface roughness, washouts shall be filled, slopes made uniform, slightly rounded at top and bottom, and the entire area of the fill compacted and completed to the required lines, grades and cross-sections within 1/10th-foot above or below the established grade.

B. When final surfaces have been established, the Contractor shall protect the surfaces from erosion, raveling or any type of degradation, especially on surfaces that shall be lined.

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. Refer to the ARBO II General Aquatic Conservation Measures for additional requirements.

F. 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 or Engineer.

3.11 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 and removal of a streamflow diversion systems to isolate the stream channel during the installation of temporary crossings and construction of channel LWM structures.

1.02 SUBMITTALS

A. 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.

B. The Contractor shall submit a dewatering and work area isolation plan for pre-approval to CTUIR at least 10 business days prior to beginning work.

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 Drawings and as expressed in the ARBO II General Aquatic Conservation Measures.

B. The Contractor shall provide material for instream temporary diversion measures such as block nets, silt fencing, floating booms, sandbags, and/or other suitable means. Instream temporary diversion shall be implemented at locations and at a duration only if approved by Engineer or 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 standards and as expressed in the ARBO II General Aquatic Conservation Measures.

PART 3 EXECUTION

3.01 GENERAL

A. All channel dewatering system shall be approved by the owner, installed, and operational before any work in the channel can begin.

B. All instream activities must be completed after the channel has been diverted and all fish can pass through the diverted stream channel.

C. Refer to the ARBO II General Aquatic Conservation Measures 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 Engineer or Owner's Representative, the Contractor shall also provide pumps with adequate pump capacity, hoses, and personnel as backup to the temporary stream flow bypass system in the event the system becomes non-operational, as may be required during construction when flow rates in the existing channel exceed the design capacity of the gravity bypass, or to maintain a dry work area when installing LWM structures. 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. 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 monitor pumping operation at all times.

   Any pumping operation shall use a fish screen that is in accordance with the National Marine Fisheries Service 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.

F. Upon removal of the temporary stream diversion, the disturbed area shall be re-graded to match surrounding topography and reseeded, if needed, as specified in Section 32 90 00 SEEDING.

3.02 FISH TRANSFER

A. Refer to the ARBO II General Aquatic Conservation Measures if fish transfer is deemed necessary.

B. Fish salvage operations shall be conducted by CTUIR 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 Drawings and in the ARBO II General Aquatic Conservation Measures 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.

3.03 CHANNEL REWATERING

A. Upon activating the new main channel, the new main channel shall be slowly re-watered, including pre-washing and pumping the turbid water to an approved floodplain location with no turbid water returns to the creek, and incrementally increasing flow in the new main 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 ARBO II General Aquatic Conservation Measures.

END OF CHANNEL DEWATERING, FISH TRANSFER, AND CHANNEL REWATERING

SECTION 32 90 00
SEEDING

PART 1 GENERAL

1.01 DESCRIPTION

A. 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.

B. Areas outside the limit of disturbance shall be protected from damage by 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

A. Prior to use on the site, Contractor shall submit to Owner's Representative or Engineer certification of the seed mix as outlined by the State of Oregon Department of Agriculture "Rules for Seed Certification."

PART 2 PRODUCTS

2.01 SEED

A. Seed mix shall conform to the standards for "Certified" grade seed or better as outlined by the State of Oregon Department of Agriculture "Rules for Seed Certification." Mulch and seed mix must be certified as weed-free. The county extension agent or soils scientist shall be consulted for approval of seed mixes and sources of certified weed-free mulch.

B. Seed mix shall be obtained from local sources to ensure plants are adapted to local climate and soil chemistry.

C. The seed mix and rate of application shall be as indicated in Table 2.01-1 and Table 2.01-2.

D. The rate of application shall be 30 pounds pure live seed per acre.

E. Seed that has become wet, moldy, or otherwise damaged in transit or storage shall not be accepted.

F. Seeding shall occur in areas shown on the Drawings.

TABLE 2.01-1 RIPARIAN AND UPLAND SEED MIX AND COMPOSITION		
(COMMON NAME	**SCIENTIFIC NAME**	**COMPOSITION (% OF MIX)**
Basin wildrye	*Leymus cinereus*	30
Idaho Fescue	*Festuca idahoensis*	20
Sandberg Bluegrass	*Poa secunda*	15
Prairie Junegrass	*Koeleria macrantha*	15
Bluebunch Wheatgrass	*Pseudoroegneria spicata*	15
Mountain Brome	*Bromus marginatus*	5

TABLE 2.01-2 WETLAND SEED MIX AND COMPOSITION		
COMMON NAME	**SCIENTIFIC NAME**	**COMPOSITION (% OF MIX)**
Basin wildrye	*Leymus cinereus*	40
Idaho fescue	*Festuca idahoensis*	40
Mountain brome	*Bromus marginatus*	15
Tufted hairgrass	*Deschampsia cespitosa*	5

2.02 TACKIFIER

A. Tackifier shall be used as a tie-down for the seed mixture.

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 Contractor, unless otherwise noted. Water shall not contain elements toxic to plant life.

2.05 HYDROSEEDING APPARATUS

A. 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 only when the soil is moist and in proper condition to induce growth. No seeding shall be done when the ground is unduly wet, or otherwise not in a tillable condition; and

3. Seeding shall only be completed from August 15 until December 1, preferably between October and November 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 or Engineer.

B. 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 30 pounds per acre 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.

C. Watering:

1. Newly seeded areas shall not be watered to force seed germination, but only to sustain growth.

2. Vegetated areas shall be watered so as to provide optimum growth conditions for the establishment of the seed mix species.

3. Start watering within five (5) calendar days after completing the seeded area, or once the seeds have germinated.

4. Run-off and puddling shall be prevented.

D. Maintenance

1. Maintain the seeded areas in a satisfactory condition until final acceptance by Owner's Representative or Engineer.

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 or Engineer, repeat hydroseeding 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 hydroseeding or repair required due to factors determined by Owner's Representative or Engineer to be beyond the control of Contractor shall be paid for under the appropriate contract pay items.

3.02 RESPONSIBILTIES AND ACCEPTANCE OF WORK

A. Contractor retains all ownership and responsibility for seeding until written acceptance by Owner's Representative or Engineer.

B. Owner's Representative or Engineer shall accept the seeding when:

1. The application or installation is complete;

2. Documentation is complete;

3. Verification of the adequacy of all repairs, including associated vegetation, is complete; and

4. The required written seed certification documents have been received by Owner's Representative or Engineer.

END OF SEEDING

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 the Meacham Creek stream channel and descriptions of the stream structures and ancillary materials required to complete the restoration.

B. Stream restoration components include additions of LWM (Section 35 49 50 LWM AND CHANNEL STRUCTURES) in the floodplain and new and existing mainstream channels (Section 31 22 00 EXCAVATION AND FILL).

PART 2 PRODUCTS

2.01 LARGE WOODY 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 LWM 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 and fill of channels and floodplain areas. Refer to Section 35 49 50 LWM AND CHANNEL STRUCTURES for specifications of large wood material 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
LWM AND CHANNEL STRUCTURES

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Work under this section consists of the rock and log habitat structures included in the new channel and old channel fill. This section includes descriptions of the stream structures and ancillary materials required to complete the improvements.

1.02 SUBMITTALS

A. For the following materials, documentation demonstrating compliance with specifications shall be submitted at least 14 calendar days prior to delivery to the site:

1. Large whole tree with rootwad

2. Medium whole tree with rootwad

3. Log without rootwad

4. Boulders

1.03 REFERENCES

A. ODOT Standard Specifications for Construction 2021 or most current.

PART 2 PRODUCTS

2.01 LARGE WOODY MATERIAL

A. The CTUIR requires whole trees 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 root wad size and minimize handling damage to the tree roots and bole. Whole trees shall be excavated to retain the entire rootwad, with rootwad diameters meeting the specifications shown in Table 2.01 (see below). 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 contractors shall avoid excess handling of the rootwads to minimize breakage. Tree branches shall be retained intact with minimal breakage during transport and placement. These are critical details to the contract, and contractors shall include details of the methods used to achieve the desired results.

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 slash/racking as may be called for on the LWM construction drawings or specifications. Racking and slash material must be fresh (green) and flexible, not dry and brittle.

C. Contractor must obtain their own sources for trees. Whole trees 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 be comprised of rotten or punk

wood. The following species, in order of preference, are acceptable: Spruce, Grand or White fir, Douglas fir, Lodgepole pine, Ponderosa pine, and juniper. Juniper trees must be from a dense stand that promoted height instead of limb development. Juniper trees need to have a minimum stem diameter of six inches at the top and still meet minimum length requirements. Junipers must not have excessive thick limbs, but rather shall only have smaller limbs from being grown in a shaded forest stand environment. Western larch (tamarack) may also be used for LWM structures that do not require trees with limbs (e.g., buried footer logs for the Log Accumulation Jam Structure). Bidders must identify the species on the bid form, and if mixed species are to be provided then the percentage of each species shall be identified.

D. In some cases, whole trees may be harvested near the project site, such as those that must be removed for site access. In those cases, trees must be obtained from outside of the immediate work area and must not be removed from areas within 100 feet of a stream channel.

E. All trees must be alive when harvested with the following exception. 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.

F. 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 as a result of these defects may be rejected by Owner's Representative or Engineer. The maximum percentage of trees with these types of irregularities shall be no more than 30 percent in any size class.

G. Whole tree and log specifications are as follows:

TABLE 2.01 TREE SIZE REQUIREMENTS			
Tree Type	**Minimum DBH[1/] (inches)**	**Minimum Length (feet)**	**Minimum Rootwad Diameter (feet)**
Large Whole tree with rootwad	24	40	6
Medium Whole tree with rootwad	18	35	4
Log without rootwad or branches	18	35	n/a
Slash/Racking material	4-10	6-16	n/a

[1/] DBH = Diameter at Breast Height, measured at 4.5 feet above the ground and with bark intact. If the tree splits into multiple trunks below that point the trunk is measured at its narrowest point beneath the split.
Note: Stem diameters at the top end for whole trees is a minimum of 8 inches (6 inches for Juniper) for all size classes.

H. 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 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.

I. Trees shall be marked in a manner that specifies length. Markings shall be visible around the whole tree at any one point, and can be accomplished using tree marking paint, chalk, or similar.

J. Trees must be handled to avoid damage to rootwads, stems, and limbs at all stages of the harvest and delivery 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.

K. Contractor shall not cut limbs flush to the bole, except where needed to allow for legal and safe transport.

L. All harvested trees and logs are subject to inspection by Owner's Representative or Engineer.

M. Upon delivery, Owner's Representative reserves the right to reject any trees or logs failing to meet the specifications and requirements herein.

2.02 BOULDERS

A. Boulders include large rocks (i.e., ballast rocks) placed in the LWM structures to create habitat features, and to provide ballast for LWM 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 2.02-1 and size requirements in Table 2.02-2. 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 2.02-1
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 2.02-2
BOULDER SIZE REQUIREMENTS

Boulder Type	Nominal Diameter (feet)	Average Weight (lbs)
LWM Ballast Boulders	2.0 - 3.0	700 - 2,300

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 FLOODPLAIN AND CHANNEL LWM STRUCTURES

A. Floodplain and instream LWM structures include Log Accumulation Jam, Right and Left Log, and Channel Bleed Through structures.

B. Installation of LWM structures shall occur at locations shown on the Drawings.

C. Installation of right and left log structures shall be as directed in the field by Engineer or Owner's Representative.

C. Refer to the Drawings for sequence and specified dimensions of whole trees with rootwads and branches and logs without rootwads or branches to be installed.

D. Orientation and placement of the LWM shall be adjusted depending on the type of structure being installed.

E. 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 LWM 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 or Engineer.

B. Installation of the boulders shall occur at locations shown on the Drawings.

C. Excavated material 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 LWM structure sequencing and placement of boulders.

END OF LOG AND CHANNEL STRUCTURES

ATTACHMENT 3
ARBO II CONSERVATION MEASURES

consistent with the effects and beneficial outcomes described under in this opinion. Further, the RRT can propose new actions to the Level 2 Team, accompanied by a consistency document, for inclusion into ARBO II. The consistency document shall include the following:

a. Project type, description.
b. Ecological process and disruption being addressed.
c. Benefits to ESA-listed species.
d. How the project is consistent with effects specified in ARBO II.
e. List conservation measures and PDC to be used that are not included in this opinion.

1.3.2 General Aquatic Conservation Measures

10. Technical Skill and Planning Requirements

a. Ensure that an experienced fisheries biologist or hydrologist is involved in the design of all projects covered by this opinion. The experience should be commensurate with technical requirements of a project.
b. Planning and design includes field evaluations and site-specific surveys, which may include reference-reach evaluations that describe the appropriate geomorphic context in which to implement the project. Planning and design involves appropriate expertise from staff or experienced technicians (*e.g.*, fisheries biologist, hydrologist, geomorphologist, wildlife biologist, botanist, engineer, silviculturist, fire/fuels specialists).
c. The project fisheries biologist/hydrologist will ensure that project design criteria are incorporated into implementation contracts. If a biologist or hydrologist is not the Contracting Officer Representative, then the biologist or hydrologist must regularly coordinate with the project Contracting Officer Representative to ensure the project design criteria and conservation measures are being followed.

11. Climate Change – Consider climate change information, such as predictive hydrographs for a given watershed or region, when designing projects covered by this opinion.

12. In-water Work Period – Follow the appropriate state (ODFW 2008; WDFW 2010) or most recent guidelines for timing of in-water work. If work occurs in occupied Oregon chub habitat, in-water work will not occur between June 1 and August 15. In those few instances when projects will be implemented in California, Idaho, or Nevada, follow appropriate state guidelines. The Action Agencies will request exceptions to in-water work windows through Level 1 NMFS or USFWS representatives as well as essential state agencies. [10] For National Forests in the state of Washington, the Forest Service will work with Washington Department of Fish and Wildlife (WDFW) to determine in-water work periods, using the process contained in the 2012 Memorandum of Understanding between the WDFW and USDA-Forest Service, Pacific Northwest Region regarding hydraulic projects conducted by the Forest Service (WDFW and USDA-Forest Service 2012).

[10] At NMFS, branch chiefs will have the authority to approve variances.

13. **Fish Passage –** Fish passage will be provided for any adult or juvenile fish likely to be present in the action area during construction, unless passage did not exist before construction, stream isolation and dewatering is required during project implementation, or where the stream reach is naturally impassible at the time of construction. After construction, adult and juvenile passage that meets NMFS's fish passage criteria (NMFS 2011e) will be provided for the life of the structure.

14. **Site Assessment for Contaminants** – In developed or previously developed sites, such as areas with past dredge mines, or sites with known or suspected contamination, a site assessment for contaminants will be conducted on projects that involve excavation of >20 cubic yards of material. The action agencies will complete a site assessment to identify the type, quantity, and extent of any potential contamination. The level of detail and resources committed to such an assessment will be commensurate with the level and type of past or current development at the site. The assessment may include the following:
    a. Review of readily available records, such as former site use, building plans, records of any prior contamination events.
    b. Site visit to observe the areas used for various industrial processes and the condition of the property.
    c. Interviews with knowledgeable people, such as site owners, operators, occupants, neighbors, local government officials, *etc.*
    d. Report that includes an assessment of the likelihood that contaminants are present at the site.

15. **Pollution and Erosion Control Measures** – Implement the following pollution and erosion control measures:
    a. Project Contact: Identify a project contact (name, phone number, an address) that will be responsible for implementing pollution and erosion control measures.
    b. 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.
    c. 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.
    d. 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.
    e. 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 onsite (*e.g.*, silt fence, straw bales, oil-absorbing floating boom whenever surface water is present).

f. 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.
g. No uncured concrete or form materials will be allowed to enter the active stream channel.
h. Steps to cease work under high flows, except for efforts to avoid or minimize resource damage.

16. Site Preparation

a. **Flagging sensitive areas** – Prior to construction, clearly mark critical riparian vegetation areas, wetlands, and other sensitive sites to minimize ground disturbance.
b. **Staging area** – Establish staging areas for storage of vehicles, equipment, and fuels to minimize erosion into or contamination of streams and floodplains.
    i. 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.
    ii. 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.
c. **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. 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.
d. **Stockpile materials** – Minimize clearing and grubbing activities when preparing staging, project, and or stockpile areas. Any LW, 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.,* LW, boulders, fencing material) may be staged within the 100-year floodplain.
e. **Hazard trees** – Where appropriate, include hazard tree removal (amount and type) in project design. Fell hazard trees when they pose a safety risk. If possible, fell hazard trees within riparian areas towards a stream. Keep felled trees on site when needed to meet coarse LW objectives.

17. Heavy Equipment Use

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**
    i. 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.

ii. Store and fuel equipment in staging areas after daily use.

iii. Inspect daily for fluid leaks before leaving the vehicle staging area for operation.

iv. 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. **Temporary access roads** – Existing roadways will be used whenever possible. Minimize the number of temporary access roads and travel paths to lessen soil disturbance and compaction and impacts to vegetation. Temporary access roads will not be built on slopes where grade, soil, or other features suggest a likelihood of excessive erosion or failure. When necessary, temporary access roads will be obliterated or revegetated. 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.

d. **Stream crossings** – Minimize number and length of stream crossings. Such crossings will be at right angles and avoid potential spawning areas to the greatest extent possible. Stream crossings shall not increase the risk of channel re-routing at low and high water conditions. After project completion, temporary stream crossings will be abandoned and the stream channel and banks restored.

e. **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.

f. **Timely completion** – Minimize time in which heavy equipment is in stream channels, riparian areas, and wetlands. Complete earthwork (including drilling, excavation, dredging, filling and compacting) as quickly as possible. During excavation, stockpile native streambed materials above the bankfull elevation, where it cannot reenter the stream, for later use.

18. 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. **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.

c. **Revegetation** – Replant each area requiring revegetation prior to or at the beginning of the first growing season following construction. Achieve re-establishment of vegetation in disturbed areas to at least 70% of pre-project levels within three years. 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.

d. **Planting manuals** – 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.

e. **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.

19. Monitoring – Monitoring will be conducted by Action Agency staff, as appropriate for that project, during and after a project to track effects and compliance with this opinion.

a. **Implementation**

i. Visually monitor during project implementation to ensure effects are not greater (amount, extent) than anticipated and to contact Level 1 representatives if problems arise.

ii. Fix any problems that arise during project implementation.

iii. Regular biologist/hydrologist coordination if biologist/hydrologist is not always on site to ensure contractor is following all stipulations.

b. **401 Certification** – To minimize short-term degradation to water quality during project implementation, follow current 401 Certification provisions of the Federal Clean Water Act for maintenance or water quality standards described by the following: Oregon Department of Environmental Quality (Oregon BLM, Forest Service, and BIA); Washington Department of Ecology (Washington BLM); and the Memorandum of Understanding between the Washington Department of Fish and Wildlife and Forest Service regarding Hydraulic Projects Conducted by Forest Service, Pacific Northwest Region (WDFW and USDA-Forest Service 2012); California, Idaho, or Nevada 401 Certification protocols (BLM and Forest Service).

c. **Post project** – A post-project review shall be conducted after winter and spring high flows.

i. For each project, conduct a walk through/visual observation to determine if there are post-project affects that were not considered during consultation. For fish passage and revegetation projects, monitor in the following manner:

ii. Fish Passage Projects – Note any problems with channel scour or bedload deposition, substrate, discontinuous flow, vegetation establishment, or invasive plant infestation.

iii. Revegetation – For all plant treatment projects, including site restoration, monitor for and remove invasive plants until native plants become established.

iv. In cases where remedial action is required, such actions are permitted without additional consultation if they use relevant PDC and aquatic

conservation measures and the effects of the action categories are not exceeded.

20. Work Area Isolation, Surface Water Withdrawals, and Fish Capture and Release – 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, Tidegate, and Legacy Structure Removal; Channel Reconstruction/Relocation.

a. **Isolate capture area** – Install block nets at up and downstream locations outside of the construction zone to exclude fish from entering the project area. Leave nets secured to the stream channel bed and banks until construction activities within the stream channel are complete. 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** – 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. 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. 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. 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 (NMFS 2000).[11]

    i. Reasonable effort should be made to avoid handling fish in warm water temperatures, such as conducting fish evacuation first thing in the morning, when the water temperature would likely be coolest. No electrofishing should occur when water temperatures are above 18ºC or are expected to rise above this temperature prior to concluding the fish capture.

[11] *Anadromous Salmonid Passage Facility Design* guidelines are available from the NMFS Northwest Region, Protected Resources Division in Portland, Oregon. (http://www.nwr.noaa.gov/ESA-Salmon-Regulations-Permits/4d-Rules/upload/electro2000.pdf).

ii. If fish are observed spawning during the in-water work period, electrofishing shall not be conducted in the vicinity of spawning fish or active redds.
iii. Only Direct Current (DC) or Pulsed Direct Current shall be used.
iv. Conductivity <100, use voltage ranges from 900 to 1100. Conductivity from 100 to 300, use voltage ranges from 500 to 800. Conductivity greater than 300, use voltage to 400.
v. Begin electrofishing with minimum pulse width and recommended voltage and then gradually increase to the point where fish are immobilized and captured. Turn off current once fish are immobilized.
vi. Do not allow fish to come into contact with anode. Do not electrofish an area for an extended period of time. Remove fish immediately from water and handle as described above (PDC 20b). Dark bands on the fish indicate injury, suggesting a reduction in voltage and pulse width and longer recovery time.
vii. If mortality is occurring during salvage, immediately discontinue salvage operations (unless this would result in additional fish mortality), reevaluate the current procedures, and adjust or postpone procedures to reduce mortality.

d. **Dewater construction site** –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. Pass flow and fish downstream with a by-pass culvert or a water-proof lined diversion ditch. Diversion sandbags can be filled with material mined from the floodplain as long as such material is replaced at end of project. Small amounts of instream material can be moved to help seal and secure diversion structures. 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. 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. 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.[12]

e. **Surface water withdrawals**
i. 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 (NMFS 2011e).
ii. For the dewatering of a work site to remove or install culverts, bridge abutments *etc.*, if ESA-listed fish may be present, a fish screen that meets

[12] To the extent possible, incorporate measures to protect lamprey. For instructions on how to dewater areas occupied by lamprey, see Best Management Practices to Minimize Adverse Effects to Pacific Lamprey, *Entosphenus tridentatus* (2010).

criteria specified by NMFS (2011e) must be used on the intake to avoid juvenile fish entrainment. If ESA-listed salmon, steelhead, eulachon, or green sturgeon may be present, the Action Agencies will ensure that the fish screen design is reviewed and approved by NMFS for consistency with NMFS (2011e) criteria if the diversion (gravity or pump) is at a rate greater than 3 cfs. NMFS approved fish screens have the following specifications: a) An automated cleaning device with a minimum effective surface area of 2.5 square feet per cfs, and a nominal maximum approach velocity of 0.4 feet per second (fps), or no automated cleaning device, a minimum effective surface area of 1 square foot per cfs, and a nominal maximum approach rate of 0.2 fps; and b) a round or square screen mesh that is no larger than 2.38 mm (0.094 inches) in the narrow dimension, or any other shape that is no larger than 1.75 mm (0.069 inches) in the narrow dimension.

f. **Stream re-watering** – Upon project completion, slowly re-water 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 re-watering to prevent stranding of aquatic organisms below the construction site.

1.3.3 Project Design Criteria for Aquatic Restoration Activity Categories

The 20 aquatic restoration activity categories will be designed and implemented to help restore watershed processes. These projects will improve channel dimensions and stability, sediment transport and deposition, and riparian, wetland, floodplain and hydrologic functions, as well as water quality. As such, these improvements will help address limiting factors—related to spawning, rearing, migration, and more—for ESA-listed and other native fish species. Aquatic habitat restoration and enhancement projects are conducted within stream channels, adjacent riparian/floodplain areas, wetlands, and uplands. Work may be accomplished using manual labor, hand tools (chainsaws, tree planting tools, augers, shovels, and more), all-terrain vehicles, flat-bed trucks, and heavy equipment (backhoes, excavators, bulldozers, front-end loaders, dump trucks, winch machinery, cable yarding, *etc.*). Helicopters will be used for many LW and salmon carcass placement projects.

21. **Fish Passage Restoration** includes the following: total removal of culverts or bridges, or replacing culverts or bridges with properly sized culverts and bridges, replacing a damaged culvert or bridge, and resetting an existing culvert that was improperly installed or damaged; stabilizing and providing passage over headcuts; removing, constructing (including relocations), repairing, or maintaining fish ladders; and constructing or replacing fish screens for irrigation diversions. Such projects will take place where fish passage has been partially or completely eliminated through road construction, stream degradation, creation of small dams and weirs, and irrigation diversions. Equipment such as excavators, bull dozers, dump trucks, front-end loaders, and similar equipment may be used to implement projects.

a. **Stream Simulation Culvert and Bridge Projects –** All road-stream crossing structures shall simulate stream channel conditions per *Stream Simulation:*