Construction Specifications

Walla Walla River Forks Floodplain Reconnection
Umatilla County, Oregon

for
Confederated Tribes of the Umatilla Indian Reservation

March 31, 2022

GeoEngineers
Earth Science + Technology

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File No. 2698-032-00

March 31, 2022

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DIVISION 2
General Site Management

SECTION 210 MOBILIZATION AND DEMOBILIZATION

Part 1 General

1.01 Scope

A. Mobilization consists of operations and preparatory work necessary to become ready to perform the work or an item of work. Mobilization includes and is not limited to:

A.01 Mobilizing equipment, personnel, supplies, and incidentals to the identified project and staging sites,

A.02 Establishment of necessary facilities for the Contractor's operation, and

A.03 Securing bonds, insurance and permits necessary to do the work as stated in the contract and/or agreement.

B. Demobilization includes the removal and transport off site of excess construction materials, equipment, personnel, and facilities that were necessary to do the work.

C. Nothing in this Section shall relieve the Contractor from full responsibility for compliance with permit requirements. Work shall not commence until Contracting Officer has approved.

1.02 Payment

A. Payment will be made at the Bid Schedule lump sum amount for the item, “Mobilization and Demobilization.”

B. Includes costs associated with all labor, materials, equipment, and permits required to perform scope.

Part 2 Products

A. Standard, incidental materials, products and equipment required to perform scope.

Part 3 Execution

A. The Contractor shall dispose of Materials and debris, including, without limitation, forms, falsework, scaffolding, and rubbish resulting from clearing, grubbing, trimming, clean-up, removal, and other Work. These Materials and debris become the property of the Contractor.

B. Where the Work has impacted existing facilities or devices, the Contractor shall restore or replace those facilities to their pre-existing condition.

END OF SECTION

SECTION 245 TEMPORARY WORK AREA ISOLATION

Part 1 General

1.01 Scope

A. Includes installation, operation, maintenance, and removal of temporary work area isolation structures during installation of wood structures, side channel inlets, and the roughened channel structure as indicated on the Drawings and as directed by the Contracting Officer.

B. Furnish, install, maintain, and operate all necessary pumping and other equipment for removal of water from the project site to keep the work site free from water as required for constructing each part of the work.

C. Includes downtime to accommodate fish removal and handling while installing work area isolations per Section 290.

D. Excludes actual physical netting and removal of fish, which will be performed by the CTUIR or other qualified fisheries professional per Section 290.

E. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. Work shall not commence until Contracting Officer has approved.

1.02 Definitions

A. Dewatering

1. Temporary damming and pumping the stream discharge within work zone isolation areas and discharging outside of the limits of work zone isolation areas.
2. Removal and control of groundwater from pores or other open spaces in soil or rock formations to allow construction activities to proceed free of water, and relief of groundwater uplift pressures.
3. Control and removal of ponding, seeping, or flowing surface water, emerging subsurface water from excavated surfaces, and from precipitation within and adjacent to excavations and construction zones using channels, ditches, gravel drains, gravel blankets, pipes, sumps, pumps and discharge lines.

B. Diversion

1. Temporary diverting flow around the isolated work area.
2. Maintaining fish-passable conditions in the diverted flow.

1.03 Payment

A. Payment will be made at the Bid Schedule total bid amount for the items, “Temporary Work Area Isolation (Side Channels and LWM)” and “Temporary Work Area Isolation (Roughened Channels).”

B. Includes costs associated with all labor, materials, equipment, and permits required to perform scope.

1.04 Submittals

A. 28 Calendar Days before beginning work in regulated work areas, submit a contractor-developed temporary water management plan (TWMP) based on either the concept plan in the Drawings or an independent plan that meets water quality and environmental guideline requirements and does not negatively affect neighboring properties or water rights.

B. Include the following minimum information in the TWMP:

   a. The sequence and schedule for dewatering and re-watering. This sequence and schedule must include when to contact the Contracting Officer prior to dewatering and re-watering.

   b. How the Work area is isolated from the active stream flow upstream, through, and downstream.

   c. How the stream flow is routed and conveyed around or through the isolated Work area.

   d. How fish passage is provided around the work area.

   e. How the isolated Work area is de-watered.

   f. How the pumped water is treated, if necessary, before it is discharged downstream.

   g. Description of all construction stages, including appropriate contact points for each stage.

   h. A list of on-site backup materials and equipment.

   i. Provide the name of the temporary water management Subcontractor (if applicable) and Contractor's superintendent, and their 24-hour contact phone number 10 Days before the pre-work meeting. If changes in the appointment of the TWM Subcontractor or Contractor's superintendent occur during the term of the Contract, provide written notice to the Contracting Officer within 5 Calendar Days of the change.

   j. Calculations of water withdrawal pump's capacity.

   k. Details of the proposed water intake screen used to isolate in-water Work area.

   l. How flows will be maintained for the irrigation withdrawals.

C. Any change to the TWMP during construction requires approval prior to implementation.

D. Obtain the Contracting Officer's written approval before beginning work in in-water work areas.

Part 2 Products

2.01 Incidentals

A. Standard, incidental materials, products and equipment required to perform scope.

2.02 Work Area Isolation Structures and Soil Plugs

A. Work Area Isolation Structures may consist of seclusion fencing, floating booms, sandbags, ecology blocks, inflatable bladders and/or other suitable means. Submit type of work area isolation structures and details pertaining to the installation, operation, maintenance, and removal of work area isolations to Contracting Officer for review and approval prior to construction.

B. Soil plugs may consist of in-situ material to block excavated channels from active flowing water.

C. Work area isolations and soil plugs shall include plastic liner or fine mesh silt fence to reduce the amount of fines entering the free-flowing portion of the river.

2.03 Dewatering

A. Pumps, pipes, associated erosion and sedimentation controls and standard incidental materials, products and equipment required to perform scope.

B. When drawing or pumping water from any stream, protect fish by equipping intakes with screens having a minimum 27 percent open area and meeting the following requirements:

   a. Perforated plate openings shall be 3/32 inch or smaller.

   b. Mesh or woven wire screen openings shall be 3/32 inch or smaller in the narrowest direction.

   c. Profile bar screen or wedge wire openings shall be 1/16 inch or smaller in the narrow direction.

C. Choose size and position of screens to meet the following criteria in Table 245-1:

TABLE 245-1

Type	Approach Velocity [1] (Ft./Sec.)	Sweeping Velocity [2] (Ft./Sec.)	Wetted Area of Screen (Sq. Ft.)	Comments
Ditch Screen	≤ 0.4	Shall exceed approach velocity	Divide max. water flow rate (cfs) by 0.4 fps	If screen is longer than 4 feet, angle 45° or less to stream flow
Screen with proven self-cleaning system	≤ 0.4	—	Divide max. water flow rate (cfs) by 0.4 fps	—
Screen with no cleaning system other than manual	≤ 0.2	—	Divide max. water flow rate (cfs) by 0.2 fps	Pump rate 1 cfs or less

Notes:

[1] Velocity perpendicular to screen face at a distance of approximately 3 inches

[2] Velocity parallel to screen

D. Provide ditch screens with a bypass system to transport fish safely and rapidly back to the stream.

Part 3 Execution

3.01 General Execution

A. Installation, operation, maintenance, and removal of work area isolation structures shall be performed in accordance with the Construction Sequencing and Dewatering Plans, the Contractor's 1200-C Permit and General Aquatic Conservation Measures included in the Drawings.

B. Said work shall commence at the downstream end of the project and proceed upstream unless otherwise approved by the Contracting Officer.

C. Temporary conveyance around the isolated work areas shall convey the minimum flows per Table 245-1. Provide backup measures to convey up to maximum flows per Table 245-2 below.

TABLE 245-2. TEMPORARY FLOW DIVERSION RATES

Channel	Minimum Diversion Flow, August 95% Exceedance (CFS[1])	Average Diversion Flow, August 50% Exceedance (CFS[1])	Maximum Diversion Flow, August 10% Exceedance (CFS[1])
Mainstem	113	141	169
North Fork	6	9	12
South Fork	108	132	157

Notes:

[1] Cubic Feet per Second

3.02 Temporary Work Area Isolation – Side Channel and LWM

A. Install a work area isolation in the stream along the bank as a work isolation structure of side channels.

B. Install a work area isolation in the stream along the bed and/or bank fully surrounding the LWM structure(s).

C. Establish and maintain temporary construction access to the stream from the bank in a manner that minimizes disturbance.

D. Remove work area isolations and soil plugs as indicated on the Drawings and after structure is constructed or channel is excavated.

3.03 Temporary Work Area Isolation – Roughened Channels

A. Construct temporary flow diversion channel(s) as shown on the drawings.

B. Install a work area isolation in the stream along the bank as a work isolation structure as shown on the drawings. Notify the Contracting Officer who will salvage fish in conformance with the HIP IV General Conservation Measures.

C. Establish and maintain temporary construction access to the stream from the bank in a manner that minimizes disturbance.

D. Construct the roughened channel within the isolated work area.

E. Return flow to the partially constructed roughened channel in conformance with the HIP IV General Conservation Measures.

F. When surface flow is fully present within the partially constructed roughened channel, isolate the other work area and complete construction of the roughened channel and irrigation intake improvements.

G. Remove work area isolations and soil plugs as indicated on the Drawings and after roughened channel is constructed.

3.04 Dewatering

A. Fish exclusion shall occur prior to pumping and dewatering. Contractor shall provide a minimum 48-hour notice to the CTUIR prior to dewatering efforts to allow the CTUIR to perform fish exclusion.

B. Pump water into the adjacent floodplain with sufficient separation from the active channel to settle sediments and turbidity of the active work zones in a manner that maintains a relatively dewatered, safe active work zone.

C. Pumps shall only be used within isolated work zones and are otherwise restricted from use within the channel.

D. Provide, maintain, and operate necessary pumps and other equipment for removal of water from the site and to keep other parts of the work free from water as required for constructing each part.

E. Accomplish dewatering by use of pumps with adequate lift capacity, screens, discharge piping, hoses and pipelines, valves, and intakes.

F. Monitor and control discharge in accordance with the HIP IV General Conservation Measures and 1200-C Permit and other project permitting requirements.

3.05 Maintenance of Irrigation Diversions

A. Maintain irrigation diversions to provide full water rights during the irrigation season, anticipated to occur through October 31.

B. Withdrawals may be via surface flow connection to the existing fish screen system or via pumps directly to the irrigation system.

C. Pumped withdrawals must be isolated from fish life and screened in compliance with the HIP IV General Conservation Measures and project permitting requirements.

D. Maintain the minimum irrigation withdrawals as identified on the Drawings.

3.06 Cleanup

A. Remove temporary pump works for dewatering in a manner that meets the requirements of the permits and as approved by the Contracting Officer.

END OF SECTION

SECTION 253 TEMPORARY CHANNEL CROSSINGS

Part 1 General

1.01 Scope

A. Temporary channel crossings consist of designing, installing, maintaining, moving, and removing systems for temporary access across the river channels in compliance with all applicable permits.

B. Install all necessary work platforms and containment Structures before beginning Work in any area that requires them. Do not remove work platforms and containment Structures in an area until all Work in that area has been accepted by the Contracting Officer.

C. Collect and dispose of accumulations of debris and waste before disassembling or moving a work platform or containment.

1.02 Payment

A. Payment will be made at the Bid Schedule total bid amount for the item, "Temporary Channel Crossing."

B. No field measurement of material placement quantities will be conducted during construction.

C. Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

D. No payment will be made for Materials on hand.

Part 2 Products

A. Provide temporary channel crossings constructed of durable materials capable of meeting all performance requirements throughout the Project.

B. The temporary crossings shall provide unimpeded fish passage in conformance with the project permits.

C. CTUIR owns a railcar bridge that might be available to the Contractor. Contractor shall confirm availability of the bridge with the Contracting Officer at the pre-bid meeting. If the bridge is available and the Contractor elects to use it, the Contractor assumes all risk for using the bridge and the costs of any repairs for damage incurred in the course of the work.

D. Previously used materials and components will not be allowed if they are bent, buckled, perforated, cut, corroded with section loss, ripped, or torn; or their usability is otherwise compromised.

Part 3 Execution

A. Install temporary channel crossings so they contain all rubble and debris. Do not allow rubble or debris to fall into waterways.

B. Install temporary channel crossings so they satisfy all the requirements of applicable permitting agencies.

C. Maintain temporary channel crossings in a safe and functional condition.

D. When temporary channel crossings are no longer needed, remove them according to ODOT 2021 Standard Specifications Section 00310. Satisfy all requirements of applicable permitting agencies during temporary channel crossing removal.

E. Restore all areas occupied by the temporary channel crossings to original condition.

END OF SECTION

SECTION 280 EROSION AND SEDIMENT CONTROL

Part 1 General

1.01 Scope

A. Controlling soil erosion by wind, water, or other means, and preventing eroded sediments and other construction-generated pollutants from moving off the Project Site in order to comply with:

   a. Applicable local, state, and federal laws, orders, regulations, and Water Quality Standards concerning control and abatement of water pollution air pollution and fish and wildlife protection.

   b. 1200 Permit or Permits applicable to the project.

B. Designate and provide a representative as the Erosion and Sediment Control Manager to:

   a. Manage and ensure proper implementation of the Erosion and Sediment Control Plan (ESCP).

   b. Accompany the contracting officer during field review of the ESCP prior to construction activities.

   c. Monitor rainfall on and in the vicinity of the Project Site.

   d. Inspect Erosion and Sediment Control materials (ESC) on active construction sites weekly for effective functioning.

   e. Inspect ESC on inactive sites every week for effective functioning.

   f. Ensure that ESC are regularly cleaned and maintained.

   g. Mobilize crews to make immediate repairs to ESC if not effectively functioning.

   h. Record actions taken to clean up significant amounts of sediment.

   i. Report potential permit violations to the Contracting Officer in a timely manner.

1.02 Payment

A. Payment will be made at the Bid Schedule lump sum amount for the item, "Environmental Controls—Permit Compliance-Best Management Practices."

B. Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified. Payment includes:

   a. Providing the Erosion and Sediment Control Manager

   b. Developing, revising, and documenting the ESCP

   c. Monitoring activities to maintain effective functioning

   d. Furnishing, stockpiling, protecting, restocking, and removing emergency materials

   e. Preparing project for a period of extended non-activity

   f. Inspecting, maintaining, and removing erosion control devices

g. Restoring, mulching, tacking, and seeding all disturbed ground, work, and storage areas not otherwise covered

C. Costs for damages and work stoppage resulting from failure to adequately implement proper environmental controls are the Contractor's responsibility.

1.03 Submittals

A. The Contractor is responsible to prepare and submit an application and all associated documents, including an ESCP for obtaining a National Pollutant Discharge Elimination System (NPDES) Stormwater Construction General Permit No. 1200.

B. The Contractor shall provide all other submittals required by the project permits for the Contractor's work on the project.

1.04 Regulatory Requirements

A. The Contracting Officer will apply for all necessary environmental permits excluding the NPDES 1200. The Contractor shall comply with all permit conditions and be responsible for notifying the Contracting Officer prior to implementing any changes, modifications, or deviations from the specifications and designs provided to the Contractor previously reviewed by permit agencies as the basis for their approval.

B. This project shall be constructed in accordance with all HIP IV General Aquatic Conservation Measures. Best management practices (BMPs) shall be incorporated into all installations, and work sites, as required, to minimize impacts to fish, wildlife and habitat in the immediate area. Contractor shall comply with all specific mitigation measures that are required on this project listed in the project environmental permits.

1.05 Contractor Violations

A. If noncompliance occurs, report noncompliance to the Contracting Officer immediately (orally), with specific information submitted in writing to the Contracting Officer within 2 calendar days.

B. Nonconformance with applicable local, state, and federal laws, orders, regulations, or Water Quality Standards may result in the Contracting Officer stopping all site activity until compliance is achieved and ensured.

C. The Contractor shall not be entitled to any extension of time, claim for damage, or additional compensation by reason of such a noncompliance work stoppage.

D. Corrective measures required to bring activities into compliance shall be at the Contractor's expense.

E. The Contractor shall be solely responsible for any and all fines, penalties or additional permit fees resulting from noncompliance with any applicable local, state and federal laws, orders, regulations or Water Quality Standards.

F. Contractor shall be responsible for damages resulting from dust or spills originating from contractor operations.

G. The Contracting Officer may stop any construction activity in violation of local, state, and federal laws. Additional expenses resulting from such a work stoppage will be responsibility of Contractor.

Part 2 Products

A. Standard, incidental materials, products and equipment required to perform scope.

B. ESC materials shall be compliant with the Oregon Department of Transportation (ODOT) "Erosion and Sediment Control" manual and the 2021 ODOT Standard Specifications.

Part 3 Execution

3.01 Installation

A. Install ESC best management practices (BMPs) as shown and according to the ESCP before clearing, grading or other land-altering activities. Ensure effective functioning of BMPs such that sediment does not leave the Project boundaries, enter drainage systems or waterways.

B. Modify BMPs so they are effective if necessary.

3.02 Work Restrictions

A. Disturbance Limits – Delineate all construction site clearing limits with high visibility markings and do not disturb areas outside of the clearing limits.

B. Perimeter Controls – Install all appropriate perimeter controls before beginning any ground-disturbing activities.

C. Wet Season Work and Temporary Work Suspension – Update the ESCP and schedule for work proposed during the wet season to ensure all appropriate controls, including ESC during work suspensions, are implemented and maintained.

3.02 Stabilization

A. Stabilize all areas disturbed within 7 days of exposure with methods that do not solely rely on germination.

B. Temporary stabilization every 14 days or more frequently as needed, a minimum of one day before expected rain events and at the end of each day during wet periods.

C. Permanent stabilization as indicated on the project seeding and planting plans.

END OF SECTION

SECTION 290 ENVIRONMENTAL PROTECTIONS

Part 1 General

1.02 Scope

A. Perform construction operations in such a manner to comply, and ensure subcontractors comply, with:

   a. Applicable local, state, and federal laws, orders, regulations, and Water Quality Standards concerning control and abatement of water pollution air pollution and fish and wildlife protection.

   b. Terms and conditions of applicable permits issued by permit issuing authority. If conflict occurs between local, state, and federal laws, regulations and requirements, the most stringent shall apply.

B. Locate staging and disposal sites as identified on the Drawings, on improved or disturbed sites such as roadways.

C. Minimize the use of water by maintaining equipment, immediately fixing water line and container leaks, ensuring water valves are turned off promptly, and using recycled water when feasible.

D. Comply with all applicable federal, state and local laws as they pertain to the storage, handling, management, transportation, disposal, and documentation of waste, hazardous waste, and hazardous substances.

   a. Clean fill becomes the property of the Contractor at the place of origin.

   b. Waste materials become the property of the Contractor at the place of origin.

   c. Woody matter shall be disposed of on site and used as slash material in the Large Woody Material structures according to the Drawings.

1.02 Payment

A. Payment will be included in the Bid Schedule item, “Environmental Controls—Permit Compliance—Best Management Practices” per Section 280.

B. Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

C. Costs for damages and work stoppage resulting from failure to adequately implement proper environmental controls are the Contractor's responsibility.

1.04 Regulatory Requirements

A. The Contracting Officer will apply for all necessary environmental permits excluding the DEQ 1200-C. The Contractor shall comply with all permit conditions and be responsible for notifying the Contracting Officer prior to implementing any changes, modifications, or deviations from the specifications and designs provided to the Contractor previously reviewed by permit agencies as the basis for their approval.

B. This project shall be constructed in accordance with all HIP IV General Aquatic Conservation Measures. BMPs shall be incorporated into all installations, and work sites, as required, to

minimize impacts to fish, wildlife, and habitat in the immediate area. Contractor shall comply with all specific mitigation measures that are required on this project listed in the project environmental permits.

1.05 Contractor Violations

A. If noncompliance occurs, report noncompliance to the Contracting Officer immediately (orally), with specific information submitted in writing to the Contracting Officer within 2 calendar days.

B. Nonconformance with applicable local, state, and federal laws, orders, regulations, or Water Quality Standards may result in the Contracting Officer stopping all site activity until compliance is achieved and ensured.

C. The Contractor shall not be entitled to any extension of time, claim for damage, or additional compensation by reason of such a noncompliance work stoppage.

D. Corrective measures required to bring activities into compliance shall be at the Contractor's expense.

E. The Contractor shall be solely responsible for any and all fines, penalties or additional permit fees resulting from noncompliance with any applicable local, state and federal laws, orders, regulations or Water Quality Standards.

F. Contractor shall be responsible for damages resulting from dust or spills originating from contractor operations.

G. The Contracting Officer may stop any construction activity in violation of local, state, and federal laws. Additional expenses resulting from such a work stoppage will be responsibility of Contractor.

Part 2 Products

A. Standard, incidental materials, products and equipment required to perform scope.

Part 3 Execution

3.01 Pollution Controls

A. Control pollutants by use of sediment and erosion controls, wastewater and stormwater management controls, construction site management practices, and other controls including State and local control requirements as included in the NPDES 1200 Permit. The 1200 Permit shall include a detailed description of the following:

   a. Construction Site Management

   b. Construction equipment

   c. Sediment and erosion controls measures and practices.

B. Follow the most stringent of noise restrictions whether in permits, State or local regulations including ODOT Section 00290.30.

3.02 Preservation and Restoration

A. Preserve and restore native soil materials for site rehabilitation.

B. If materials are moved, damaged or destroyed, replace them with a functional equivalent during site rehabilitation.

C. Restore temporary construction access to original contours a as approved by the Contracting Officer.

3.03 Protection of Wildlife and Wildlife Habitat

A. Comply with the laws of the Oregon Department of Fish and Wildlife, NOAA Fisheries, and the U.S. Fish and Wildlife Service. Conduct operations to avoid any hazards to the safety and propagation of wildlife.

B. Comply with and require that all the Contractor's employees, agents, and Subcontractors on the Project Site comply with the following:

   a. Clean Water Act Section 404

   b. ORS 196.800 to ORS 196.990

   c. ORS 390.805 to ORS 390.925

C. Contractor shall immediately cease operation if a sick, injured, or dead specimen of a threatened or endangered species is found in association with project activities. Care shall be taken in handling and storage of dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The handling of threatened or endangered species shall be done in accordance with applicable environmental permits.

D. Comply with all laws governing preservation of cultural resources as depicted in the project cultural resource report and determinations.

3.03 Waste, Hazardous Waste, and Hazardous Substances

A. Comply with all applicable federal, State, and local Laws as they pertain to the storage, handling, management, transportation, disposal, and documentation of waste, hazardous waste, and hazardous substances.

B. Store fuel according to the current edition of the International Fire Code and all applicable federal, State, and local Laws. If total fuel and petroleum storage, in containers 55 gallons or larger, exceeds 1,320 gallons, comply with the applicable spill prevention control and countermeasures (SPCC) requirements of 40 CFR 112. If applicable, submit the professional engineer-stamped SPCC plan, 10 days before the preconstruction conference. Comply with the plan and keep a copy on site and readily available. The SPCC plan may be combined with the Pollution Control Plan.

C. Dispose of waste at an energy recovery facility with a DEQ or LRAPA Stationary Source Permit, at a permitted landfill, or at other waste disposal facilities as required depending on the type of waste.

D. If, during construction, unanticipated hazardous substances are discovered that threaten the health and safety of workers, the public, or the environment, do the following:

   a. Immediately remove all affected employees and secure the area to prevent access.

   b. Notify the Contracting Officer immediately and provide written notification within 24 hours, setting forth a description of the hazardous substances encountered.

E. The Contracting Officer will attempt to resolve the unanticipated situation expeditiously.

3.04 Protection of Cultural Resources

A. Comply with all Laws governing preservation of cultural resources. Cultural resources may include, but are not limited to, dwellings, bridges, trails, fossils, and artifacts.

B. If cultural resources are encountered on the project area or in material sources, do the following:

   a. Immediately discontinue operations or move to another area of the project site or material source.

   b. Protect the cultural resource from disturbance or damage.

   c. Notify the Contracting Officer.

C. If cultural resources are encountered on the Project area or in material sources, the Contracting Officer will do the following:

   a. Arrange immediate investigations.

   b. Arrange for disposition of the cultural resources.

   c. Notify the Contractor when to begin or resume construction operations in the affected area.

3.04 Protection of Sensitive Cultural Sites

A. Comply with and require that all the Contractor's employees, agents, and Subcontractors on the Project Site comply with all Laws applicable to the preservation and protection of sensitive cultural sites. The existence of any sensitive cultural sites affecting the project, and the mandatory preservation and protection measures applicable to the sites, are determined according to the Laws including, but not limited to, the following:

   a. National Historic Preservation Act (NHPA) of 1966, Section 106, codified in 36 CFR Part 800 (Protection of Historic Properties).

   b. ORS 97.740 to ORS 97.760, ORS 97.990(5), and ORS 97.990(6) (Indian Graves and Protected Objects).

   c. ORS 358.905 to ORS 358.955 (Archaeological Objects and Sites).

   d. ORS 390.235 to ORS 390.240 (Archaeological Sites and Historical Material).

B. Ensure protection for sensitive cultural sites according to the following:

   a. Except as authorized by the Contracting Officer for the purpose of installing or maintaining approved sensitive cultural site protective measures, keep all persons, equipment, and materials off known sensitive cultural sites.

   b. Install all sensitive cultural site protection required by the drawings prior to staging Equipment or starting Work near the sites.

   c. Instruct all Contractor and Subcontractor personnel to regard the locations of these sites and their contents as confidential.

C. The Contracting Officer has the authority to bar from the project any person entering a protected site other than for the purpose of installing or maintaining protective measures.

END OF SECTION

DIVISION 3
Site Work

SECTION 310 REMOVAL OF STRUCTURES

Part 1 General

1.01 Scope

A. Excavation and removal of existing irrigation delivery pipe.

B. Temporary stockpiling and legal disposal of unsuitable, undesirable cleared material per section 290.

C. Preserve and protect vegetation outside clearing limits shown on the drawings and as directed by Contracting Officer.

D. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. Work shall not commence until Contracting Officer has approved.

1.02 Payment

A. Payment will be included in the Bid Schedule items, “South Fork Irrigation Diversion—24" pipe” and “South Fork Irrigation Diversion—18" pipe.”

B. Includes costs associated with all labor, materials, equipment, and permits required to perform scope.

Part 2 Products

A. Standard, incidental materials, products and equipment required to perform scope.

Part 3 Execution

3.01 Removal of Structures

A. Excavate cover over materials prior to removal. Limit disturbance to the greatest extent possible to protect existing vegetation.

B. Remove irrigation drainpipe.

C. Remove existing deleterious bank stabilization materials including car bodies, concrete rubble and other elements identified by the Contracting Officer.

A. Equipment used to execute removal from the river channel shall enter after temporary work area isolation and erosion control measures are in place.

3.02 Restoration

A. Restore areas of structural removal, excavation and disturbance as indicated in Section 330 “Fill in Place (Stream Channel),” “Fill in Place (Floodplain),” Section 1030 “Permanent Seeding, Fertilizing and Mulching” and Section 1040 “Planting.”

END OF SECTION

SECTION 320 CLEARING, GRUBBING, STOCKPILE AND DISPOSAL

Part 1 General

1.01 Scope

A. Clearing, grubbing, stockpile and disposal of trees, snags, logs, stumps, brush, shrubs, and rubbish from designated areas as instructed by Contracting Officer.

B. Legally dispose of unsuitable, undesirable cleared material.

C. Avoid injuring vegetation or other natural materials outside grading limits shown on the drawings and as directed by Contracting Officer. Confine operations that may injure vegetation or other natural materials to the work area, or to areas that have already been cleared.

D. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. Work shall not commence until Contracting Officer has approved.

1.02 Payment

A. Payment will be made at the Bid Schedule total bid amount for the item, "Clearing, Grubbing, Stockpile and Disposal."

B. No field measurement or related unit cost of cleared acreage will be conducted or awarded during or after construction.

C. Includes costs associated with all labor, materials, equipment, and permits required to perform scope.

D. No separate or additional payment will be made for work zone fencing.

Part 2 Products

A. Standard, incidental materials, products and equipment required to perform scope.

Part 3 Execution

3.01 Clearing

A. Remove trees, shrubs, brush, stumps, roots, rootwads, downed timber, branches, grass, weeds, vegetation, rubbish, riprap, rocks, and other objectionable material.

B. Woody matter shall be disposed of on site and used as slash material in the Large Woody Material structures according to the Drawings.

C. Trees with roots shall be knocked over with rootwads attached using an excavator or other suitable means and be removed, replanted, or disposed of as directed by the Contracting Officer.

3.02 Grubbing

A. Grubbing is defined as removal of stumps, roots, vegetative matter, and other unsuitable materials.

B. Grub around surfaces to be under proposed fill; areas to be excavated; and surfaces to be regraded.

C. Perform grubbing in advance of topsoil stripping, excavation, and grading operations.

3.03 Salvage Stockpiling

A. As shown or directed, salvage and stockpile plants, rocks, down timber, and other natural materials for use in site restoration. Do not salvage material dominated by weedy species, as directed. If shown, salvage conifer trees that are greater than 18-inch-diameter at breast height (DBH) with root wad intact. Store salvaged material in a clean and dry place until site restoration, or as directed.

B. Create separate stockpiles for materials to be reused and materials to be disposed. Stockpiled material shall be organized in similar piles and in a fashion and location that enables efficient reuse and/or disposal of stockpiled materials.

END OF SECTION

SECTION 330 EXCAVATION AND DISPOSAL

Part 1 General

1.01 Scope

A. Excavate proposed channels and remove levee to the lines, grades, and cross sections shown on drawings and as directed by Contracting Officer.

B. Sort and screen stream channel excavation material for potential reuse in side channel inlets per Section 1091. The CTUIR makes no guarantee or representation by implication or otherwise, that any material available on the Project site is suitable for incorporation into any portion of the Project. No material will be considered unsuitable on the sole basis that special or additional processing or handling is required to make it suitable for incorporation into the project.

C. Placement of suitable material excavated from levee and side channel inlets in permanent disposal area as shown on the Drawings.

D. Haul and disposal of unsuitable material excavated from levee per Section 290.

E. The term "earthwork" will be used as a general term to designate the work included within the scope of this section.

F. Provide operator and equipment necessary for contingency grading adjustments as requested by the Contracting Officer.

E. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. Work shall not commence until Contracting Officer has approved.

1.02 Payment

A. Payment will be made at the Bid Schedule total bid amount for the items, “Excavation—Levee Removal and Side Channel Inlets,” “Excavation—Side Channel Grading,” and “Excavation—Remove Levee Armoring,” and “Place Excavated Levee Material—Dispose on Site,” and “Contingency Grading.”

B. No field measurement of excavated and stockpiled material quantities will be conducted during construction.

C. Includes costs associated with all labor, materials, equipment, and permits required to perform scope.

D. Includes cost for sorting and screening material to be used for “Place Streambed Material—Side Channel Inlets” per Section 1091.

Part 2 Products

A. Standard, incidental materials, products and equipment required to perform scope.

B. All equipment operating below the ordinary high water mark shall use biodegradable fluids and be cleaned of invasive species in conformance with the project permits and HIP IV General Conservation Measures.

Part 3 Execution

3.01 General Execution

A. Perform all operations involved in excavating, hauling, and placing of earthwork materials so no damage or detriment to the completed or partially completed work results. At all times provide sufficient drainage of completed or partially completed earthwork to prevent damage or loss due to rainfall, surface water or any other cause.

B. In all cases, take proper precautions to ensure that embankment construction and filling do not move, endanger, or cause undue strain or stress to any Structure or adjacent ground.

C. Remove and dispose of abandoned pipes and miscellaneous matter encountered in the work as a part of the earthwork, unless otherwise specified.

   a. Remove ends of remaining abandoned pipe or portions of other miscellaneous matter remaining exposed in slopes or at Subgrade after excavation work to at least 2 feet back of the finished slope.

   b. Place a watertight cap or plug in the inlet ends of remaining abandoned pipes. Leave outlet ends open. Place free-draining cover material and/or take other measures as directed to allow for free passage of drainage at remaining outlet ends. Shape and finish the affected area so no evidence of their existence is apparent upon completion of the Work.

D. Immediately before completing the earthwork:

   a. Blend the tops of cutbanks with the adjacent terrain.

   b. Remove all litter, debris, and obstructions.

3.02 Place Excavated Levee Materials in Permanent Disposal Area

A. Place material in dewatered or otherwise dry conditions in 12-inch loose lifts.

B. Compaction of placed material shall be accomplished with machine tracking.

C. On-site soils may become unworkable because of excess moisture content. To reduce moisture content, some disking and drying of the on-site soils may be required.

3.03 Contingency Grading

A. Prior to demobilization from the site and prior to removal of any temporary crossings, the Contracting Officer may elect to have the Contractor perform some fine grading adjustments including and not limited to side channel grading, LWM structures, bioengineered bank treatments, and low-flow paths.

B. The Contractor shall notify the Contracting Officer at least 48 hours prior to removing any temporary crossings or demobilizing from the site.

C. The Contracting Officer will provide the scope of the Contingency Grading in writing to the Contractor for review prior to commencement of the work.

D. The assumed level of effort for the contingency grading is not to exceed ten (10) hours of operating a single excavator or dozer.

END OF SECTION

DIVISION 4
Drainage

SECTION 405 TRENCH EXCAVATION, BEDDING, AND BACKFILL

Part 1 General

1.01 Scope

A. Excavating trenches, constructing trench foundations, and placing bedding, pipe zone material and backfill.

B. Trench excavation does not include earthwork covered under any other Section, or any earthwork that may be specifically included and provided for other Pay Items of the Contract. Dispose of excess excavated materials and perform other matters not covered in this Section according to Section 330.

1.02 Payment

A. Payment will be included in the Bid Schedule items, “South Fork Irrigation Diversion—24" pipe” and “South Fork Irrigation Diversion—18" pipe” per Section 445.

B. No separate or additional payment will be made for:

   a. Trench excavation

   b. Trench backfill

   c. Trench protection

   d. Pipe bedding

   e. Pipe zone material

   f. Dewatering

Part 2 Products

A. Materials may be native or imported, as specified.

B. Where additional excavation is required due to groundwater or other unstable conditions so that the native material cannot support the pipe, furnish one of the following materials for trench foundation:

   a. Selected general backfill conforming to ODOT 2021 Standard Specifications Section 00330.13.

   b. Selected granular backfill conforming to ODOT 2021 Standard Specifications Section 00330.14.

   c. Selected stone backfill conforming to ODOT 2021 Standard Specifications Section 00330.15.

   d. Other approved material.

C. If groundwater is present in the bedding zone, use 3/4" - 0 Aggregate bedding.

D. If groundwater is not present, and unless otherwise specified, furnish one of the following materials for bedding the pipe:

   a. Commercially available 3/4" - 0 Aggregate.

b. Reasonably well-graded, from maximum size to dust, sand with 100 percent passing the 3/8-inch sieve.

c. Commercially available 3/8" - 0 or No. 10 - 0 sand.

E. For flexible pipes, backfill the pipe zone with bedding material.

F. For rigid pipes, unless otherwise directed, furnish either:

a. 1" - 0 or 3/4" - 0 base Aggregate conforming to 02630.10, or

b. Commercially available 1" - 0 or 3/4" - 0 Aggregate.

G. Furnish the following materials where shown or required for trench backfill:

a. Class A Backfill—Use native or common material that, in the opinion of the Contracting Officer, meets the characteristics required for the specific surface loading or other criteria of the backfill zone.

b. Class B Backfill—Use Granular Material consisting of gravel or crushed Rock meeting the requirements of ODOT 2021 Standard Specifications Section 00641. Designated size shall be 1" - 0 or 3/4" - 0.

c. Class C Backfill—Use clean sand with no particle size larger than 1/4 inch.

d. Class D Backfill—Use pit run or bar run material, well-graded from coarse to fine. The maximum dimension shall be 3 inches.

Part 3 Execution

3.01 General Execution

A. Excavate trenches to the lines, depths, grades and Cross Sections shown on the Drawings or as established. Variations will be allowed only when necessary to ensure firm foundations and when such variations will not be detrimental to the Work.

B. Limit the length of open trench to 100 feet, or as allowed. Related resurfacing shall be completed within 800 feet of the open trench limit.

C. Keep the trench width at the ground surface to the minimum necessary to install the pipe in a safe manner, but not less than 24 inches. In all cases, make trenches of sufficient width to allow for shoring and to permit proper jointing of the pipe and backfilling of material along the sides of the pipe. Refer to the Drawings for minimum trench widths for various diameter pipes. Make excavations for manholes and other structures wide enough to provide a minimum of 12 inches between the structure surface and the sides of the excavation. Keep the top of the trench within permit limits.

D. Excavate trenches to the lines and grades shown or established, with proper allowance for pipe thickness, pipe bedding and foundation stabilization. Place pipe bedding on a firm, undisturbed, foundation, true to grade. If the trench is excavated below grade without authorization, restore to grade with material of the type specified for pipe bedding at no additional cost to the CTUIR. Place the material over the full width of the trench, in compacted layers not exceeding 6 inches.

E. Place excavated material at locations and in such a manner that it does not create a hazard to pedestrian or vehicular traffic or interfere with the function of existing drainage facilities.

F. Make arrangements for and dispose of all excess material not required elsewhere on the project in an approved manner, at no additional cost to the CTUIR, and according to Section 290.

G. Provide the materials, labor and Equipment necessary to protect trenches at all times. Provide safe working conditions in the trench and protect the work, existing property, utilities, and the public. The method of protection shall be according to the Contractor's design. The Contractor may elect to use any combination of shoring, overbreak, tunneling, boring, sliding trench shields or other methods of accomplishing the Work, provided the method meets with the approval of the Contracting Officer and complies with all applicable local, state, and federal safety codes. The Contractor shall be responsible for damages resulting from improper removal of shoring or from failure to shore.

H. Remove and dispose of existing abandoned pipe, structures, and other facilities as necessary to construct the trench according to Section 310.

3.02 Trench Dewatering

A. Promptly remove and dispose of all water entering the trench during the time the trench is being prepared for the pipe laying, during the laying of the pipe and until the backfill at the pipe zone has been completed. Dispose of the water in an approved manner without damage to adjacent property.

B. Control groundwater to prevent softening of the bottom of excavations or formation of "quick" conditions or "boils." Design and operate dewatering systems to prevent removal of the natural Soils and so that the groundwater level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property.

C. When dewatering near a river, lake, or stream, conform to the requirements of Section 290 and Section 00280. When the presence of water or other conditions in the excavated area would be detrimental to the purpose of the work, obtain approval of the Contracting Officer for the temporary measures required to correct or care for the condition.

3.03 Trench Foundation

A. Make the full length and width of completed trench bottoms firm. Do not place bedding material before the trench foundation is inspected and approved. If bell and spigot pipe is used, recess the trench bottom to accommodate the bell.

B. When, in the judgment of the Contracting Officer, the existing material in the bottom of the trench is unsuitable for supporting the pipe, excavate below grade, as directed. Replace the excavated material with imported trench foundation material. Place the trench foundation material in 6-inch layers and compact except compact selected stone backfill material in 12-inch layers. Bring the trench foundation material to the elevation established.

3.04 Trench Bedding

A. Spread the bedding smoothly to the proper grade so that the pipe is uniformly supported along the barrel. Excavate bell holes at each joint to permit proper assembly and inspection of the joint.

B. Bedding under the pipe shall provide a firm, unyielding support along the entire pipe length.

3.05 Pipe Zone

A. Place the materials in the pipe zone in layers not greater than 6 inches thick and in a manner that equalizes pressure on the Structure and minimizes stress. Before placing backfill material, condition, aerate, or wet the material so that the moisture content of each layer is within minus 4 percent to plus 2 percent of optimum moisture content.

B. As required under the haunches of pipe and in areas not accessible to mechanical tampers or to testing, compact with hand methods to ensure intimate contact between the backfill material and the pipe or Structure. Place backfill material between corrugations when the pipe product is manufactured with external corrugations. Provide thorough compaction.

C. Ponding or jetting will not be allowed within the pipe zone.

3.06 Trench Backfilling

A. Backfill the trench above the pipe zone in successive Lifts. Do not allow the backfill to free-fall into the trench until at least 3 feet of cover is provided over the top of the pipe. Modify the method of compaction as necessary to protect the pipe.

B. Where trenches cross lawns, garden areas, pastures, cultivated fields or other areas on which Topsoil exists, remove the Topsoil to a minimum 12-inch depth and place the material in a stockpile. Do not mix the Topsoil with other excavated material. After the trench has been backfilled, replace the Topsoil.

C. In lieu of stockpiling the Topsoil, approved imported Topsoil may be substituted, to a depth specified or approved, at no additional cost to the CTUIR.

D. Maintain the finished grade of the Topsoil level with the area adjacent to the trench until final acceptance by the Contracting Officer, and repair damage to adjacent Topsoil caused by the Contractor's operations. Remove all Rock, gravel, Clay and other foreign materials from the surface. Regrade and add Topsoil as required.

END OF SECTION

SECTION 445 IRRIGATION PIPE

Part 1 General

1.01 Scope

A. Acquisition, stockpile, and placement of solid-wall Polyvinyl chloride (PVC) irrigation delivery pipe, which includes furnishing and constructing joints and connections to other drainage Structures or systems, as necessary, for complete installation.

B. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. Work shall not commence until Contracting Officer has approved.

1.02 Payment

A. Payment will be made at the Bid Schedule total bid amount for the items, “South Fork Irrigation Diversion—24" pipe” and “South Fork Irrigation Diversion—18" pipe.”

B. No field measurement of material placement quantities will be conducted during construction.

C. Includes costs associated with all labor, materials, equipment, and permits required to perform scope.

Part 2 Products

2.01 Incidentals

A. Standard, incidental materials, products and equipment required to perform scope.

2.02 Pipe

A. Provide solid-wall Polyvinyl Chloride Pipe (AWWA C905 DR 26, 115 psi stiffness) of the diameters shown on the drawings meeting the requirements of ODOT 2021 Standard Specifications Section 02415.50

B. The Contractor may substitute stronger, larger, and higher quality material at any installation site, provided the substitution is approved and is made at no additional cost to the CTUIR.

C. The nominal size of pipe will be determined according to AASHTO tolerances for pipe dimensions for the appropriate kind or class of pipe.

D. The manufacturer or fabricator shall furnish appropriate certification, based on the manufacturer's quality control tests, that the materials used in the production of the pipe meet the Specifications. Materials and strength shall be as specified for the particular kind of pipe and fittings required.

E. Use flexible elastomeric gasket joints on all pipes and fittings. Furnish caps or plugs with each fitting, outlet or stub as required, with the same type of gasket or joint as the pipe.

Part 3 Execution

3.01 General Execution

A. Excavate trench, prepare bedding, pipe zone material and trench backfill, and dispose of excavated material according to Section 00405.

B. The CTUIR will establish centerline and grade control of the pipe alignment prior to the start of construction.

C. Do not vary from established line and grade by more than 1/32 inch per inch of pipe diameter (e.g., 1/16 for a 24-inch pipe).

D. Variance shall not exceed 1/2 inch, subject to the following limitations:

   a. The variation does not result in a level or reverse sloping invert.

   b. The variation in the invert elevation between adjoining ends of pipe, due to non-concentricity of joining surface and pipe interior surfaces, does not exceed 1/64 inch per inch of pipe diameter, or 1/2 inch maximum.

E. Inspect the pipe and fittings prior to lowering into the trench to ensure no cracked, broken or otherwise defective materials are used. Clean the ends of the pipe thoroughly, remove foreign matter and dirt from the inside of the pipe, and keep the pipe clean during laying and joining.

3.02 Laying Pipe

A. Begin pipe laying at the downstream end of the pipeline with the lower segment of the pipe in contact with the shaped bedding throughout its full length.

B. Lay pipe proceeding upgrade with spigot ends in the direction of flow. Assemble joints according to the recommendations of the manufacturer for the type of joint used. The trench bottom shall form a continuous and uniform bearing and support for the pipe at every point between joints.

C. Prevent excavated or other foreign material from getting into the pipe. Plug or close off pipes that are stubbed off for future connection. When cutting or machining of the pipe is necessary, use only the tools and methods recommended by the pipe manufacturer. All field joints shall:

   a. Provide equal or greater strength than the adjoining pipe.

   b. Fit close and tight.

   c. Provide a smooth and uniform interior surface.

   d. Secure and hold adjoining sections to each other.

   e. Fasten securely to adjoining Structures and special sections.

D. Install PVC pipe and fittings according to the manufacturer's recommendations.

E. Cut the pipe in a neat manner, at right angles to the axis of the pipe, and dress the cut end.

F. After the pipe is laid and joined, and before any backfilling over it, the installation will be inspected. Take up and relay or replace any pipe found to be out of alignment, unduly settled, or damaged.

END OF SECTION

SECTION 470 IRRIGATION HEADWALL, HEADGATE, AND FISH SCREEN

Part 1 General

1.01 Scope

A. Acquisition, stockpile, and placement of headwall and headgate as shown on the Drawings. Construct the headwall of Commercial Grade Concrete, corrugated metal, or other material, with necessary frames, covers, gratings, and other fittings and hardware. The term "concrete" refers to Commercial Grade Concrete.

B. Acquisition, stockpile, and placement of fish screen as shown on the Drawings. Construct the headwall of Commercial Grade Concrete, corrugated metal, or other material, with necessary frames, covers, gratings, and other fittings and hardware. The term "concrete" refers to Commercial Grade Concrete.

C. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. Work shall not commence until Contracting Officer has approved.

1.02 Payment

A. Payment will be made at the Bid Schedule total bid amount for the items, “South Fork Irrigation Diversion—Install Headwall and Headgate,” and “South Fork Irrigation Diversion—Install Fish Screen.”

B. No field measurement of material placement quantities will be conducted during construction.

C. Includes costs associated with all labor, materials, equipment, and permits required to perform scope. No separate or additional payment will be made for:

   a. Earthwork not covered as trench or ditch excavation

   b. Pipe connections

   c. Rock backfill

   d. Aggregate base backfill

   e. Acceptance testing

Part 2 Products

A. Furnish materials meeting the requirements of the following ODOT 2021 Standard Specifications sections:

Commercial Grade Concrete 00440
Joint Material 02440.40, 02440.50, 02440.60
Metal Frames and Grates 02450.30
Precast Concrete Headwall 02450
Reinforcement 02510.10, 02510.40

B. Furnish pipe and fittings as specified and conforming to the applicable portions of Section 00445.

C. All components and connecting hardware shall be non-galvanized.

Part 3 Execution

3.01 General Execution

A. Excavate trench, prepare bedding, pipe zone material and trench backfill, and dispose of excavated material according to Section 405. When specified, or as directed, remove unstable material that will not support the headwall or other Structure, excavate below grade, and backfill with trench foundation stabilization material according to Section 405.

B. Carefully place the headwall on the prepared bedding so as to be fully and uniformly supported at true grade and alignment.

C. Carefully place the fish screen on the prepared bedding so as to be fully and uniformly supported at true grade and alignment.

D. Construct the inverts to match that of the irrigation pipe. During construction divert existing flows of water away from new concrete or mortar surfaces to prevent damage to the fresh concrete or mortar until the initial set has been achieved.

E. Upon completion, clean each Structure of accumulated silt, debris or foreign matter of any kind and keep clean until final acceptance of the Work

F. Install headgate according to manufacturer's instructions.

3.02 Pipe Connections

A. Place connecting pipe at the required alignment and grade. Set the connecting pipe through the full thickness of the wall flush with the inner face of the wall. Ensure that pipe connections to the Structure are completely watertight. Connect pipe to headgate according to the manufacturer's recommendations.

B. Grout concrete pipe connections to headwall so they are watertight, using non-shrink grout conforming to ODOT 2021 Standard Specifications section 02440.50. When grouted into the headwall section, the pipe section shall not extend more than 18 inches outside the headwall. If an approved flexible connection for concrete pipe is provided at the headwall, full or partial pipe sections may be stubbed into the headwall as required.

C. Connect flexible pipe to headwall using an adapter specifically manufactured for the intended service. Flexible pipe adapters are required to be watertight after installation. Follow the manufacturer's recommendations. Do not use field-fabricated water stops or improvised adapters. Adapters requiring the use of grout for installation shall be anchored and finished using non-shrink grout conforming to ODOT 2021 Standard Specifications section 02440.50.

3.03 Grates, Frames, Covers and Fittings

A. Set metal frames for headwall on full non-shrink grout beds to prevent infiltration of surface water or groundwater between the frame and the concrete of the headwall. If concrete is to be poured around the frames, coat the portion of the frame that will contact the concrete with hot asphalt before placing the concrete.

B. Set frames, covers, and grates true to the locations and grades established. Clean bearing surfaces and provide uniform contact. Secure all fastenings.

END OF SECTION

SECTION 490 WORK ON EXISTING FISH SCREEN STRUCTURES

Part 1 General

1.01 Scope

A. Connect new irrigation pipe to existing conveyance network downstream of existing fish screen location.

B. Installation and backfill shall be performed as indicated on the Drawings.

C. Includes the design and installation of shoring if necessary.

D. Install flow measurement device on fish screen structures.

E. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. Work shall not commence until Contracting Officer has approved.

1.02 Payment

A. Payment will be made the Bid Schedule total bid amount for the item, "North Fork & South Fork Irrigation Diversions - Install Flow Measurement Device on Fish Screens."

B. No field measurement of material placement quantities will be conducted during construction.

C. Includes costs associated with all labor, materials, equipment, and permits required to perform scope.

D. Includes costs associated with excavation, backfill, and connections of new pipes to existing structures.

E. No separate or additional payment will be made for:

   a. Earthwork

   b. Backfill

   c. Protective coatings

   d. Replacement of manhole or similar structure backfill

   e. Base drains

   f. Connections

   g. Structure abandonment

   h. Removing and disposing of existing structures and pipe

   i. Bypass pumping

F. The Contractor shall repair or replace the existing fish screen structure if it is damaged during the work.

Part 2 Products

2.01 Flow Measurement Device

A. The stilling well shall consist of schedule-40 PVC with a minimum 2-inch nominal diameter. The stilling well shall have a locking cap and be secured to the fish screen structure with concrete screws and metal straps.

B. Furnish a USGS Style A or Style C staff gage plate a minimum of 3.33 feet in length. The staff gage plate shall have elevations marked to the tenth of a foot.

C. Furnish a Wi-Fi-enabled data monitoring system (Onset RX3000 or equivalent) and water level sensor with built-in barometric correction (Onset MX2001-04-S or approved equivalent).

Part 3 Execution

3.01 Flow Measurement Device

A. Cut the stilling well to length so that it is offset 3-inches from the floor of the fish screen structure. Affix the stilling well to the fish screen structure.

B. Affix the data staff gage plate to the fish screen structure adjacent to the stilling well with the bottom of the gage plate resting on the floor of the fish screen structure.

C. Affix the data monitoring system to the fish screen structure in a lockable enclosure.

D. Suspend the water level sensor in the stilling well by affixing vinyl-coated wire (fishing line) to the interior eye of the locking cap and the cap on the water level sensor using swivel hooks. Measure the line such that the end of the water level sensor is suspended one inch above the bottom of the stilling well.

END OF SECTION

SECTION 495 TRENCH RESURFACING

Part 1 General

1.01 Scope

A. Resurfacing pipe trenches, including rock surfacing, topsoil, landscaping, and other features removed or damaged during pipe trenching operations.

B. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. Work shall not commence until Contracting Officer has approved.

1.02 Payment

A. Payment will be included in the Bid Schedule items, “South Fork Irrigation Diversion—24" pipe” and “South Fork Irrigation Diversion—18" pipe” per Section 445.

Part 2 Products

A. Furnish trench resurfacing materials that match existing material removed from pipe trenches.

Part 3 Execution

A. Place Topsoil according to Sections 00405 and 01040.

B. Place landscaping according to the requirements of Section 01040.

END OF SECTION

DIVISION 10
Channel Enhancement and Revegetation

SECTION 1030 PERMANENT SEEDING, FERTILIZING, MULCHING AND WEED CONTROL

Part 1 General

1.01 Scope

A. Seeding

a. Include furnishing all labor, equipment, and materials to establish ground cover as noted on the Drawings and in the plant list. Any substantive variance to this specification, due to unforeseen conditions encountered on the site, weather conditions, plant availability, other construction activities, etc. must be approved by the Contracting Officer.

b. Excludes irrigation.

c. Areas disturbed by construction shall be seeded.

d. Contractor may use either straw mulch or hydroseed mulch. The Contracting Officer shall approve type of mulch and application method prior to use.

B. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. Work shall not commence until Contracting Officer has approved.

1.02 Definitions

A. Certified Seed—A grass or legume seed named variety that has been reviewed and accepted into the Oregon Certified Seed program. Currently certified seed is individually sold in bags with a blue-colored Oregon Certification Tag, thus the name commonly used for such seed is "blue tag stock."

B. Establishment Period—A period when planting Work has been performed and initially accepted, and there is a Contract requirement to care for the planted areas in some way until the period ends.

C. Native Plant (existing)—A variety of plant species occurring in its natural habitat without direct or indirect human actions.

D. Noxious Weed—All weed designated by the Oregon State Weed Board as injurious to public health, agriculture, recreation, wildlife, or all public or private property. The Oregon Department of Agriculture (ODA) will be the authority in determination of noxious weed species.

E. Pure Live Seed (PLS)—The amount of living seed in the total quantity of seed when non-viable seed or non-seed material is excluded.

F. Riparian—Related to the bank, shore, or water-influenced areas of a watercourse or water body.

G. Sensitive Areas—Defined areas such as Wetlands, natural water and riparian resources, special environmental zones, or where certain activities are restricted such as the use of chemicals.

H. Specified Weeds—All noxious weeds as defined above, and all plant species identified in the Special Provisions or on the Plans as a species to be removed.

I. Waters of the State—See ORS 468B.005 for "Waters of the State" definition.

J. Weed—A plant that is undesirable where it is growing.

K. Weed Free—For these Specifications, "Weed Free" is defined as the following maximum amount of living weeds per square yard:

   a. Zero "Type A" or "Type T" Noxious Weeds

   b. One "Type B" Noxious Weed

   c. One of each non-noxious weed listed in the Special Provisions

L. The ODA Noxious Weed Policy and Classification System lists Type "A," "B," and "T" Noxious Weeds.

M. Weed Management Area (WMA)—A defined project area with specified weeds to remove, including areas where weeds begin growing because of Project-associated ground disturbance. A WMA may be the entire Project Site or any portion, including material source and disposal sites as shown.

1.03 Payment

A. Payment will be made at the Bid Schedule total bid amount for the item “Seeding.”

B. No field measurement of seeding acreage quantities will be conducted during construction.

C. Includes costs associated with all labor, materials, equipment, and permits required to perform scope.

1.03 Submittals

A. Submit certification before application of pesticide Work begins, that when chemical weed control is used, that each applicator possesses an Oregon Commercial Pesticide Applicator's License held in the individual's name. Submit a certification each time a new applicator begins application Work on the Project.

B. Submit seed, mulch, and pesticide product information prior to arrival of materials on site.

Part 2 Products

2.01 Seed

A. CTUIR will provide the seed to the Contractor for application.

   a. Seed shall conform to the standards for “Certified” grade seed or better.

   b. Seed shall be labeled in accordance with the state laws and the U.S. Department of Agriculture rules and regulations under the Federal Seed Act in effect on the date of invitations for offers. Bag tag figures are evidence of purity and germination. No seed will be accepted with a test date of more than nine months before the delivery date to the site.

   c. Seed that has become wet, moldy, or otherwise damaged in transit or storage will not be accepted. The percent of noxious weed seed allowable shall be as defined in the current State laws relating to agricultural seeds. Each type of seed shall be delivered in separate sealed containers and fully tagged unless exception is granted in writing by the Contracting Officer.

   d. All seed shall conform to the current rules and regulations of the State of Oregon and shall be from the latest crop available. It shall meet or exceed the standard for purity and germination listed below.

1. Purity: 85 percent minimum.
2. Germination:
    a. 85 percent minimum.
    b. Germination test less than one year old at time of seeding.
    c. Uniform mixture as recommended for the area by local Extension Service or another approved source and as approved by the Contracting Officer.

B. Seeding Rate—As specified by the seed supplier based on seed mix.

2.02 Straw Mulch Material

A. Straw mulch for non-hydroseeding applications from bentgrass, bluegrass, fescue, or ryegrass singly or in combination. Cereal grain straw from barley, oat or wheat may be allowed upon approval of the Contracting Officer. Provide straw that is not moldy, caked, decayed or of otherwise low quality. Submit certification from the Supplier that the straw is free of noxious weed seeds or plant parts. Acceptable documentation is any one of the following:

    a. The straw source is an "Oregon Certified Seed" field.
    b. The straw is certified by a recognized program accepted by the Oregon Department of Agriculture as being weed free.
    c. Seed lab test results of seed harvested from the straw meet minimum Oregon Certified Seed quality for weed seed content.

2.03 Water and Hydroseeding

A. Water shall be the responsibility of Contractor, unless otherwise noted. Water shall not contain elements toxic to plant life.

B. Use of a broadcast spreader for spreading seed capable of uniformly distributing the material at the Manufacturer's specified rate for that product.

C. Hydromulch from Cellulose, Wood, or Straw Fiber—Cellulose fiber produced from virgin wood, straw, or paper fiber product from the QPL. Furnish wood or straw mulch processed so the fibers remain uniformly suspended under agitation in water and the fibers have moisture absorption and percolation properties. Ship hydromulch in packages of uniform weight, ± 5 percent, and labeled with the manufacturer's name and air-dry weight. Include enough green dye tracer so applied mulch is easily visible.

2.04 Pesticides

A. Submit proposed pesticides and receive approval before using.

B. Submit a copy of the manufacturer's federal registered label and, if requested, a Material Safety Data Sheet.

C. The CTUIR reserves the right to restrict chemicals from being used on sensitive areas.

Part 3 Execution

3.01 Date of Seeding

A. Areas disturbed by construction will be seeded at the end of the project prior to the onset of cold weather. Contracting Officer shall approve seeding dates.

B. Seeding dates shall be selected to maximize growth. Seeding shall only be completed from August 15 until December 1, preferably between October and November, or as directed by the Contracting Officer.

3.02 Seedbed Preparation and Treatment

A. Areas to be treated shall be dressed to a smooth, firm surface. On sites where equipment can operate on slopes safely, the seedbed shall be adequately loosened (4 to 6 inches deep) and smoothed. Where equipment cannot operate safely, the seedbed shall be prepared by hand methods by scarifying to provide a roughened soil surface so that broadcast seed will remain in place.

B. If seeding is to be accomplished immediately following construction operations, seedbed preparation may not be required, as approved by the Contracting Officer, except on a compacted, polished, or freshly cut soil surface.

C. Seedbed preparation shall be discontinued when soil moisture conditions are not suitable for the preparation of a satisfactory seedbed as determined by the Contracting Officer.

3.03 Seeding, Mulching and Stabilizing

A. All seeding operations shall be performed in such a manner that the seed is applied in the specified quantities uniformly in the designated areas. Unless otherwise specified, seeding shall be accomplished within two days after final grading is completed and approved.

B. Long-fibered mulch (wood and/or straw) with an appropriate tackifier to form a bonded fiber matrix applied at a rate of 3,000 pounds/acre is preferred.

C. Seeding shall not commence until Contracting Officer has accepted the condition of the prepared areas.

D. Seeding operations shall not be permitted when wind velocities exceed 15 miles per hour.

E. 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.

3.04 Acceptance

A. Contractor retains all ownership and responsibility for seeding until written acceptance by Contracting Officer. Contracting Officer will accept the seeding when:

   a. The application or installation is complete;

   b. Documentation is complete;

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

   d. The required written seed certification documents have been received by Contracting Officer.

END OF SECTION

SECTION 1040 PLANTING

Part 1 General

1.01 Scope

A. Planting shall be completed by the Contractor.

B. Work in this section consists of furnishing all labor, equipment, and materials to establish trees, shrubs, and hardwood cuttings as noted on the Drawings. Any substantive variance to this specification due to unforeseen conditions encountered on the site, weather conditions, plant availability, other construction activities, etc. must be approved by Contracting Officer.

C. Areas outside the limit of disturbance to be protected from damage. Any disturbance of trees, shrubs, or wetland areas outside the limit of disturbance shown on the Drawings to be restored.

1.03 Delivery Inspection, Storage and Handling

A. The Contractor shall provide all planting equipment, hand tools, bags, and other necessary tools to perform planting and quality control. Heavy equipment utilized will be subject to an inspection prior to entry to the project site to ensure that it is clean and free of noxious weed seeds. Hand planting tools shall be long enough and wide enough to accommodate planting the specified size of native plants in a satisfactory manner. Planting bags shall be deep enough and in a condition to provide for the care and protection of the native plants.

B. During shipping, plants shall be packed to provide protection against climate extreme, breakage and drying. Proper ventilation and prevention of damage to bark, branches, and root systems, must be ensured.

C. Plants shall be delivered as close to planting locations as possible. Plants in storage must be protected against any condition that is detrimental to their continued health and vigor.

D. Contractor shall take precautions to keep roots and stems moist during the planting operation and throughout the period that plants are stored on-site. Shipping containers containing native plants shall be opened only in full shade and shall not be exposed to direct sunlight.

E. Plant materials shall not be handled by the trunk, limbs, or foliage but only by the container, ball, box or other protective structure. Plants shall have durable, legible labels stating correct scientific name and size. Ten percent of container grown plants in individual pots shall be labeled. Plants supplied in flats, rack, boxes, bags, or bundles shall have one label per group.

F. Native plants are to be planted or prepared without further root or top pruning or culling. If pruning or culling appears necessary, or if mold, dry roots, evidence of injury or drying is seen, the condition shall immediately be reported to the Contracting Officer.

G. Contractor shall coordinate the delivery schedule with the Contracting Officer.

H. Plants will be inspected on-site by a Contracting Agency representative and possibly rejected for not meeting specification. Rejected plants must be removed immediately from site or red-tagged and removed as soon as possible. Rejected plants shall not be installed at the site.

1.04 Payment

A. Payment will be made at the Bid Schedule total bid amount for the items, “Planting” and “Willow Trench.”

B. No field measurement of material placement quantities will be conducted during construction.

C. Includes costs associated with all labor, materials, equipment and permits required to perform scope.

Part 2 Products

2.01 Incidentals

A. Standard, incidental materials, products and equipment required to perform scope.

2.02 Plant Materials

A. Plants shall be nursery grown in accordance with good horticultural practices under climatic conditions similar to or more severe than those of the project site within northeastern Oregon or as directed by the contracting officer.

B. Plants shall be true to species and variety or subspecies. No cultivars or named varieties shall be used.

C. Plant species and size shall conform to those listed in the Drawings or those supplied by CTUIR.

D. Container-Grown Plant Material:

   a. Containers shall include plastic pots, trays, or tubes (plugs).

   b. Plant material shall be grown in a container over time sufficient for new fibrous roots to have developed throughout the container and for the root mass to retain its shape and hold together when removed from the container.

   c. Plants must be true to container size and shall be grown in the specified container size for a period of no less than one growing season prior to delivery. Plants shall not be excessively root-bound.

E. Live Stakes:

   a. Cutting stock shall be gathered during the dormant period and installed within 7 calendar days of harvest or as authorized by the contracting officer. Cuttings shall not be gathered if temperatures are below 32°F (0°C).

   b. Cuttings shall be protected from sun, wind, freezing, drying or injury before and during planting. Cuttings shall be stored upright in water immediately after harvesting up until they are installed. Stored material shall be examined frequently for signs of disease and planted before dormant bud development.

   c. Cuttings shall be a minimum of 24 inches long (as specified in the plant lists) making the bottom cut slanted and below a dormant bud, and the top cut straight, ½ to 1 inch above a dormant bud. The diameter of pieces reserved for planting shall not be less than ½ inch thick.

   d. Cuttings shall be installed such that stems intercept groundwater during low-water periods.

F. Deciduous Trees

   a. Plants shall be of typical form for the specified species. Height of branching shall bear a relationship to the size and species of tree specified and with the crown in good balance with the trunk. The trees shall not be “poled” or the leader removed.

G. Deciduous Shrubs

   a. Plants shall be of typical form for the specified species. Acceptable plant material shall be well shaped, with sufficient well-spaced side branches, and recognized by the trade as typical for the species grown in the region of the project.

H. Coniferous Trees

   a. Plants shall be of typical form for the specified species. Coniferous trees shall not be “poled” or the leader removed.

Part 3 Execution

3.01 Planting Time and Conditions

A. Deciduous plant material shall be installed from October 15 to November 30.

B. Evergreen plant material shall be installed from October 15 to November 30.

C. Cutting plant material shall be gathered and installed from October 15 to November 30.

D. When drought, excessive moisture, frozen ground, expected freezing air temperatures or other unsatisfactory conditions prevail, planting installation shall be discontinued or as otherwise directed by the contracting officer.

3.02 Willow Trench Planting

A. Trenches shall be up to 18 inches wide and deep enough to intercept shallow groundwater during low-flow conditions and at least 18 inches deep, as indicated on the Drawings.

B. When obstructions below ground affect the work, Contractor shall propose adjustments to plant material location, type of plant and planting method for review and approval by the Owner’s Representative.

C. Materials excavated shall be stockpiled on the side of the trench away from the stream.

D. All plant material shall be set plumb and held in position until sufficient soil has been firmly placed around the stem. The base of the plant shall be level with the surrounding ground.

E. Trenches shall be backfilled by hand to minimize root/stem damage and to limit air pockets near the roots.

F. All plantings shall be watered immediately after backfilling, until saturated.

3.03 Planting

A. Plant layout shall be done as indicated on the Drawings.

B. When obstructions below ground affect the work, CTUIR to propose adjustments to plant material location, type of plant and planting method.

C. Plant pits for container plant material shall be dug to a depth equal to the height of the root mass as measured from the base of the root mass to the base of the plant trunk. Plant pits for bare-root plant material shall be dug to a depth equal to the height of the root system. All plant pits shall be dug at least twice as wide as the root mass or root system to allow for root expansion. The sides of planting pits to be roughened to encourage root spread.

D. All plant material to be set plumb and held in position until sufficient soil has been firmly placed around root system or ball. The base of the plant to be level with the surrounding ground.

E. Containerized plants shall be removed from their containers and the root mass gently loosened to prevent root-bound conditions.

   a. The base of containerized plants to be set at the same grade as the surrounding soil; no roots should be exposed after planting. The base of containerized plants shall not be buried deeper than final grade.

   b. Prior to setting the plant in the pit, a maximum one fourth depth of the root mass, measured from the bottom, to be spread apart to promote new root growth. Do not compact soil around plant.

   c. Water each plant thoroughly after installed, ensuring the roots become saturated. the Contractor may add soil as necessary to replace any fill that settles below final grading during watering.

F. For cuttings, prepare a pilot hole into the soil with rebar (slightly smaller diameter than cutting) if cutting cannot be easily installed into the ground. Cuttings shall be inserted, angled end down 18 inches below ground leaving a minimum of 1-foot above ground and a minimum of one to two dormant buds above ground.

G. All plantings to be watered immediately after backfilling until saturated.

3.04 Maintenance and Irrigation/Watering

A. Plant material installed in the initial phase of planting to be maintained in a healthy growing condition during installation. Installed plants shall be maintained to foster establishment.

B. The site shall be maintained by CTUIR for 12 months after planting is finished. Maintenance of plant material to include straightening plant material, pruning dead or broken branch tips; watering; eradicating weeds, insects and disease; documenting and control of invasive species; control of planted grasses to prevent competition with planted trees; and removing and replacing installed plants that are unhealthy and/or have been physically damaged beyond full recovery. Maintenance will also include removal of litter or other coarse material that inhibits growth and establishment of installed plants.

C. At least one site visit will occur within two weeks of planting to make any adjustments to plant material. Additional visits may be required for watering and plant replacement.

D. The plant material will be watered as necessary to prevent desiccation and to maintain an adequate supply of moisture within the root zone, until the end of November. An adequate supply of moisture is estimated to be the equivalent of 0.5-inch absorbed water per week, delivered in the form of rain or augmented by watering. Runoff, puddling and wilting from the watering operations to be prevented. Watering of other adjacent areas or existing plant material to be prevented.

E. Noxious weeds and persistent non-native plants that inhibit growth and establishment of installed vegetation may be removed by hand. Invasive species in the restored areas may be controlled. Spring and fall inventories for invasive species to be taken for the 12-month period following restoration. Planted grasses to be controlled such that they do not compete with the planted trees.

F. When settling occurs to the backfill soil mixture, additional backfill soil to be added to the plant pit or plant bed until the backfill level is equal to the surrounding grade. Serious settling that affects the setting of the plant in relation to the maximum depth at which it was grown requires replanting.

G. A tree will be considered unhealthy or dead when the main leader has died back, or 25 percent or more of the branches have died. A shrub will be considered unhealthy or dead when 25 percent or more of the plant has died. Herbaceous plants shall be considered unhealthy or dead when the crown has not produced leaves or shoots during the growing season, or when the crown appears dried or decayed. Unhealthy or dead plant material to be replaced prior to the following growing season.

END OF SECTION

SECTION 1091 STREAMBED MATERIALS

Part 1 General

1.01 Scope

A. Import streambed material required beyond the excavated and screened material identified in Section 330 "Excavation—Side Channel Inlets" and Section 1092 "South Fork Irrigation Diversion—Roughened Channel."

B. Stockpile streambed material on site.

C. Installation of Streambed Materials in side channel inlets as shown on the Drawings.

D. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. Work shall not commence until Contracting Officer has approved.

1.02 Payment

A. Payment will be made at the Bid Schedule total bid amount for the item, "Place Streambed Material—Side Channel Inlets."

B. No field measurement of material placement quantities will be conducted during construction.

C. Includes costs associated with all labor, materials, equipment, and permits required to perform scope.

Part 2 Products

2.01 General

A. Standard, incidental materials, products and equipment required to perform scope.

B. Aggregates from quarries, ledge rock, and talus slopes are not acceptable for these applications.

2.02 Streambed Sediment

A. Streambed sediment shall meet the following requirements for grading when placed in hauling vehicles for delivery to the project or during manufacture and placement into temporary stockpile. Alternate gradations may be used if proposed by the Contractor and accepted by the Engineer. The exact point of acceptance will be determined by the Engineer.

Sieve Size	Percent Passing (by weight)
2½″	99–100
2″	65–95
1″	50–85
No. 4	26–44
No. 40	16 max.
No. 200	5.0–9.0

B. The portion of sediment retained on No. 4 sieve shall not contain more than 0.2 percent wood waste.

2.03 Streambed Cobbles

A. Streambed cobbles shall have a well-graded distribution of cobble sizes and conform to one or more of the following gradings as shown in the Drawings:

Percent Passing					
Approximate Size[1]	4″ Cobbles	6″ Cobbles	8″ Cobbles	10″ Cobbles	12″ Cobbles
12″					99–100
10″				99–100	70–90
8″			99–100	70–90	
6″		99–100	70–90		
5″		70–90			30–60
4″	99–100			30–60	
3″	70–90		30–60		
2″		30–60			
1½″	20–50				
¾″	10 max.	10 max.	10 max.	10 max.	10 max.

Notes:

[1] Approximate Size can be determined by taking the average dimension of the three axes of the rock, Length, Width, and Thickness, by use of the following calculation:

$$\frac{Length + Width + Thickness}{3} = Approximate\ Size$$

Length is the longest axis, width is the second longest axis, and thickness is the shortest axis.

B. The grading of the cobbles shall be determined by the Engineer by visual inspection of the load before it is dumped into place, or, if so ordered by the Engineer, by dumping individual loads on a flat surface and sorting and measuring the individual rocks contained in the load.

Part 3 Execution

A. Import and store streambed materials in stockpile areas previously approved by the Contracting Officer.

B. Place streambed material in side channel inlets in dewatered or otherwise dry conditions in 12-inch loose lifts.

END OF SECTION

SECTION 1092 ROUGHENED CHANNELS

Part 1 General

1.01 Scope

A. Isolate roughened channel work area per Sections 245 and 290 as shown in the Drawings.

B. Excavate roughened channel to the lines, grades, and cross sections shown on drawings and as directed by Contracting Officer.

C. Sort and screen stream channel excavation material for potential reuse in roughened channels. The CTUIR makes no guarantee or representation by implication or otherwise, that any material available on the Project site is suitable for incorporation into any portion of the Project. No material will be considered unsuitable on the sole basis that special or additional processing or handling is required to make it suitable for incorporation into the project.

D. Place excess suitable material (excluding large, angular rocks) excavated from roughened channels in permanent disposal area as shown on the Drawings.

E. Import streambed boulders and streambed material required beyond the excavated and screened material and stockpile on site.

F. Install roughened channel materials under dewatered or otherwise dry channel conditions.

G. Restore areas of streambanks beyond roughened channel limits disturbed during construction to pre-existing grades using bioengineering methods as approved by the Contracting Officer.

H. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. Work shall not commence until Contracting Officer has approved.

1.02 Payment

A. Payment will be made at the Bid Schedule total bid amount for the items, “North Fork Irrigation Diversion—Roughened Channel and Berm” and “South Fork Irrigation Diversion—Roughened Channel.”

B. No field measurement of material placement quantities will be conducted during construction.

C. Includes costs associated with all labor, materials, equipment, and permits required to perform scope.

D. No separate or additional payment will be made for:

   a. Excavation.

   b. Sorting and screening of materials.

   c. On-site disposal or haul.

   d. Bio-engineering bank restoration.

Part 2 Products

2.01 General

A. Standard, incidental materials, products and equipment required to perform scope.

B. Aggregates from quarries, ledge rock, and talus slopes are not acceptable for these applications.

C. Streambed sediment and streambed cobble shall conform to the requirements of Section 1091.

2.02 Streambed Boulders

A. Streambed boulders shall be hard, sound, and durable material, free from seams, cracks, and other defects tending to destroy its resistance to weather.

B. Streambed boulders sizes are approximately as follows, see Drawings for sizes specified:

Rock Size[1]	Approximate Size
One Man	12″–18″
Two Man	18″–28″
Three Man	28″–36″
Four Man	36″–48″
Five Man	48″–54″
Six Man	54″–60″

Notes:

[1] Approximate Size can be determined by taking the average dimension of the three axes of the rock Length, Width, and Thickness, by use of the following calculation:

$$\frac{Length + Width + Thickness}{3} = Approximate\ Size$$

Length is the longest axis, Width is the second longest axis, and Thickness is the shortest axis.

Part 3 Execution

3.01 General Execution

A. Import and store boulders and streambed material on site in stockpile areas previously approved by the Contracting Officer.

B. Place boulders with approximately 30 percent of their diameter exposed above the streambed surface as shown in the drawings.

C. Placement of streambed boulders will coincide with placement of the roughened channel material. Place boulders and then place the remaining engineered streambed material in 12-inch lifts.

END OF SECTION

SECTION 1093 LARGE WOODY MATERIAL

Part 1 General

1.01 Scope

A. Installation of large woody material (LWM) structures in the river, as well as in the banks of the river and side channels, as indicated on the Drawings and as directed by the Contracting Officer.

B. Includes excavation and stockpiling.

C. Excavation shall be performed in accordance with Sections 280 and 290, "Erosion and Sediment Control and Environmental Protections."

D. Installation shall be performed under dewatered or otherwise dry channel conditions for the main channel and side channels.

E. Includes the procurement of wood materials.

F. Includes procurement and placement of racking materials and slash materials.

G. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. Work shall not commence until Contracting Officer has approved.

1.02 Payment

A. Payment will be made at the Bid Schedule total bid amount for the items, "LWM Structure - _____."

B. No field measurement of material placement quantities will be conducted during construction.

C. Includes costs associated with all labor, materials, equipment, and permits required to perform scope.

D. Includes costs associated with excavation, backfill and bank restoration.

Part 2 Products

2.01 Incidentals

A. Standard, incidental materials, products and equipment required to perform scope.

2.02 Whole Trees

A. Whole trees shall be imported for use in log structures. Whole trees include branches, limbs, treetops, and rootwads. Whole tree dimensions, including diameter at breast height, length and rootwad diameter are included in table 1093-1, below. 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.

TABLE 01093-1. WHOLE TREE DIMENSIONS

Whole Tree Size	Min. Length (ft)	Diameter at Breast Height (DBH) (inches)	Rootwad Diameter (ft)
Large	50	16 to 21	4.0 to 5.0
Medium	40	12 to 16	3.0 to 4.0
Small	35	8 to 12	2.5 to 3.0

B. All trees shall 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.

C. When harvested, whole trees shall be excavated to retain the entire rootwad. Harvested trees shall 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. Soil lodged around the roots shall be displaced to the extent practical without destroying the integrity of the roots. Contractor shall not cut limbs flush to the bole, except where needed to allow for legal and safe transport.

D. 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 in the large wood structure drawings or specifications. Racking and slash material must be fresh (green) and flexible, not dry and brittle.

E. During transport to the site and staging, whole trees shall be handled with care to minimize breakage. All limbs and branches broken during harvest and transport shall be also delivered to the project and can be delivered separate from the trees. This material may be used for racking or slash, dependent on size. Racking and slash material must be fresh (green) and flexible, not dry and brittle. Trees shall be handled with care to keep logs, branches and root mass intact and to minimize breakage and damage to the tree bole.

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. Acceptable conifer species include Ponderosa Pine (*Pinus ponderosa*) and Douglas Fir (*Pseudotsuga menziesii*). Additional conifer species shall be reviewed and may be accepted by the Contracting Officer.

H. Whole trees shall be processed into Log Types A, B, C, D, and E. The log type sizes, and number of the trees/wood for the proposed structures shall be in accordance with those set forth in the Drawings.

I. All harvested trees and logs are subject to inspection by Owner's Representative or Engineer. Upon delivery, Owner's Representative reserves the right to reject any trees or logs failing to meet the specifications and requirements herein.

J. Slash materials may be sourced on site or imported.

K. Acceptable vertical piles shall be coniferous species (Douglas fir and ponderosa pine) and shall meet the diameter and length identified on the Drawings.

2.03 Rope Connections

A. Rope shall be a 1.5-inch biodegradable manila rope.

B. Staples shall be non-galvanized steel.

Part 3 Execution

A. Imported whole 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.

B. Process whole trees into the following components:

   a. Rootwads: Log Types A, B, and C are the rootwad end of the whole log. Log types vary by diameter at breast height and length. See log schedule in plans for quantities and diameters.

   b. Tree tops: Log Types D and E are the tops of trees. Log Type D are the tops of large whole trees. Log Type E can be the tops of Small, Medium or Large whole trees. See log schedule in plans for quantities and diameters.

C. LWM Structures shall be installed as indicated above, on the Drawings and/or as guided by the Contracting Officer or their designated representative. LWM Structure installation requires on-site guidance by the Contracting Officer or their designated representative.

D. Members shall be installed in trenches, rather than in wholesale bank excavation, to the extent possible, to promote greater resistance to flow.

C. Piles shall be installed to the depth indicated on the Drawings in conformance with the HIP IV General Conservation Measures. Perform a pull test shall on one pile (min.) per structure using a force gauge. A minimum of 2,500 pounds of resistance must be achieved for each pile tested before the LWM structure is accepted. Submit record of pull tests to Contracting Officer.

E. Racking members can be installed in and amongst the larger trees/logs.

F. Structures shall be backfilled and compacted as each layer is installed, where there are multiple layers. The backfill will consist of the material excavated from the receiving hole and shall be compacted with construction equipment. Excess excavated material shall be removed from structure location and either placed on Project site at locations indicated on the Drawings and approved by the Contracting Officer. Structures shall be constructed, backfilled, and graded to appear natural.

END OF SECTION

GeoEngineers