

# Appendix C:

## Kachess River Bull Trout Habitat Designs *Draft Construction Specifications*

# Construction Specifications

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## PROJECT SPECIFIC SPECIFICATIONS

The following are specifications and amendments specific for the construction and completion of the Kachess River Bull Trout Habitat Design. Amendments and provision related to the state of Washington's Department of Transportation Standard Specifications are provided below as are specific criteria and specifications from the US Forest Service. Where specifications overlap, USFS specifications hold precedence.

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## WSDOT AMENDMENTS

### **Amendments to Standard Specifications and Special Provisions**

The following Amendments and Special Provisions to the Standard Specifications are made a part of this contract and supersede any conflicting provisions of the Washington Department of Transportation Standard Specifications for Road, Bridge and Municipal Construction 2022 M 41-10, and the foregoing Amendments to the Standard Specifications, as issued by the Washington State Department of Transportation (WSDOT). Each Amendment contains all current revisions to the applicable section of the Standard Specifications and may include references which do not apply to this particular project.

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## Division 1 - General requirements

### *Definitions and Terms*

#### **1-01.2(2) Items of Work and Units of Measurement**

Refer to Sheet one of the Design Plan Set

#### **1-01.3 Definitions**

All references in the Standard Specifications to the terms “State”, “Department of Transportation”, “Washington State Transportation Commission”, “Commission”, “Secretary of Transportation”, “Secretary”, “Headquarters”, and “State Treasurer” shall be revised to have equal meaning for “Contracting Agency”, “Owner”, “Owner Representative,” and “Engineer”.

All references to “State Materials Laboratory” shall be revised to read “Contracting Agency designated location”. All references to “Engineer” shall be revised to read “Contracting Officer”.

The venue of all causes of action arising from the advertisement, award, execution, and performance of the contract shall be in the Superior Court of the County where the Contracting Agency’s headquarters are located.

### *1-02 Bid Procedures and Conditions*

#### **1-02.1 Prequalification of bidders**

*This section is supplemented with the following:*

Before award of a contract, a bidder must meet at least the minimum qualifications of RCW 39.04.351(1) to be considered a responsible bidder and qualified to be awarded a project.

#### **1-02.2 Plans and Specifications**

*This section is revised with the following tables:*

After Award of the Contract, a printed version of the Plans and Specifications will be issued to the prime Contractor by the Owner without charge on the following basis:

To Prime Contractor	No. of sets	Basis of distribution
11”x17” plans and specifications	5	Furnished automatically upon award

Additional plans and specifications may be obtained from the Owner at Contractor’s expense.

#### **1-02.4 Examination of Plans, Specifications and Site of Work**

*This section is supplemented with the following:*

A mandatory Pre-Bid site walk through with representatives of the Contracting Agency will be held on the date indicated in the bid advertisement at the project site. At least one representative from the prime contractor is required to attend and sign the attendance list at this site visit. The Contracting

Agency will disregard any bids from a prime Contractor that did not have a representative attend and sign in at the Pre-Bid site walk through.

### **1-02.9 Delivery of Proposal**

*This section is revised with the following address:*

Bids are to be delivered to:

Kittitas Conservation Trust  
120 W Pennsylvania Ave, Suite 202  
Roslyn, WA 98941-0428

### **1-04.7 Differing Site Conditions (Changed Conditions)**

*This section is supplemented with the following:*

The site is a complex river and floodplain system formed by natural and manipulated watershed processes. Data from limited monitoring wells is available to the Contractor from the Contracting Agency. Available information known about the soil types and properties, surface and groundwater conditions are included in the Kachess River Bull Trout Habitat Design Project Basis of Design Report and related documents. Detailed investigation was not undertaken thus, soil and groundwater should be expected to be complex and varied across the site. The Contractor shall account for this in their bids. Variation in soils types and water conditions shall not qualify as Differing Site Conditions. It is the Contractor's responsibility to be familiar with site conditions. Contractor shall be responsible to collect additional data as required.

### **1-05.4 Conformity with and Deviations from Plans and Stakes**

*This section is supplemented with the following:*

It is the responsibility of the Contractor to verify the accuracy of all survey information provided by the Contracting Agency prior to commencing excavations or filling operations. Survey layout completed by the Contracting Agency should be considered as general guidance only. Commencement of these operations constitutes acceptance of the survey information as appropriate to meet the intent of the Contract.

#### **1-05.4(1) Submittal**

Prior to mobilization, the Owner or designated representative will install grading stakes, and elevation control points. The contractor shall be responsible for replacing damaged or missing stakes.

#### **1-05.4(2) Measurement**

No measurement will be made for "Surveying"

#### **1-05.4(3) Payment**

Survey shall be incidental to individual work items. No payment shall be made for lump sum pay item "Surveying". Replacement of damaged survey stakes shall be at Contractor's expense.

## **1-05.8 Vacant**

*Add the following Sections:*

### **1-05.8 Required Submittals**

The Contractor shall prepare and submit the following plans for approval according to the requirements for each submittal. The Contracting Officer's approval shall be required prior to commencing work related to each submittal.

- Survey Staking Plan
- Access Plan
- Staging and Stockpile Plan
- Traffic Control Plan
- Temporary Stream Crossing Plan
- Construction Sequence Plan
- Stream Diversion, Fish Rescue (Isolation), and Dewatering Plans
- Erosion, Sediment, and Dust Control Plan (ESC)
- Environmental Protection and SPCC Plan
- Earthworks Excavation, Placement, Salvage & Reuse, and Disposal Plan
- Decompaction Work Plan
- Large Wood Management Plan

#### **1-05.8(1) Construction Sequence Plans**

Prior to commencing the Work the Contractor shall prepare and submit a Construction Sequence Plan for approval by the Contracting Agency. Approval of the plan by the Contracting Agency shall not relieve the Contractor of the responsibility for full compliance with the Contract Documents. The Plan shall include, at a minimum, detailed descriptions of the following items:

- a) Methods and equipment that will be used for excavation
- b) Methods and equipment that will be used for grading and filling to achieve subgrades, grades and soils handling to achieve compaction requirements.
- c) Methods and equipment that will be used for transport and hauling of excavated materials
- d) Sequence and estimated duration of excavation activity, including anticipated cubic yards of excavated materials handled daily
- e) Means by which limits and cut depths will be checked and verified by the Contractor
- f) Plan for determining the categorization of excavated fill as reusable or non-reusable fill, plan for classification of soils types and selective handling and selective stockpiling from

excavation to final disposition of materials, including the methods for proper moisture conditioning and compaction

- g) Means by which the Contractor shall ensure that temporary stockpiles shall be located and controlled, including isolation of stockpiled soil from the environment and preventing unfiltered runoff water from entering site waters
- h) Means by which the Contractor shall ensure that sediment and soil stockpiles are protected from erosion, wind, and spillage
- i) If the Plan is judged unsatisfactory to the Contracting Agency, then it will be returned to the Contractor for amendment and resubmission. No physical work at the site shall be started until the Plan is accepted.
- k) Equipment maintenance and spill plan.
- l) Fire safety.

### **1-07.5 Environmental Regulations**

#### **1-07.5(2) State Department of Fish and Wildlife**

*Add:*

Contractor shall coordinate and cooperate with Contracting Agency for Fish Rescue prior to in water disturbance. The Contractor is responsible for isolating the construction area from the stream according to regulatory protocol and standards provided in ARBO II. Contractor will communicate with the Owner when isolation is planned to occur, to facilitate the fish rescue effort prior to construction activities at the isolated area. Contracting Agency shall provide personnel to conduct fish rescue and relocation. Contractor shall notify Contracting Agency three days prior to fish rescue needs. The Contractor shall allow up to two days for Contracting Agency to complete fish rescue in each isolated area. Contractor shall provide materials, labor and equipment as needed to isolate the fish rescue area from the construction area at no additional cost or extension of time. If fish isolation or rescue is required to be repeated at a site, it shall be at Contractor's expense.

#### **1-07.5(4) Air Quality**

*Add:*

Contractor shall control air born dust at all times through slower vehicle speeds, surfacing materials, water trucks, sprinklers or other means. Cost for dust control shall be incidental to other bid items.

### **1-07.15 Temporary Water Pollution Prevention**

#### **1-07.15(1) Spill Prevention, Control, and Countermeasures Plan**

*Replace last paragraph to read:*

All other costs associated with releases or spills, including restocking spill kits, shall be incidental to payment for SPCC Plan.

#### **1-07.16(2) Vegetation Protection and Restoration**

*Replace second sentence of first paragraph to read:*

Contractor shall install high visibility fence or individual flagging to demarcate vegetation to be saved and protected as shown in the Plans or designated by the Contracting Officer. High visibility fence or individual flagging shall be installed along the limits of disturbance shown on the Plans or as otherwise approved by the Contracting Officer. If flagging is used, it must be placed line of sight or every 25’.

#### **1-07.16(5) Payment**

*Add:*

No measurement or payment for Vegetation Protection and Restoration shall be made. Vegetation Protection and Restoration shall be incidental to the Work.

#### **1-07.16(4) Archaeological and Historical Objects**

*Revise second paragraph – replace: “Engineer” with “Archaeologist”.*

#### **1-07.22 Use of Explosives**

*Revise section to read:*

Explosives shall not be used.

#### **1-07.26 Personal Liability of Public Officers**

*Revise paragraph to read:*

Neither the Contracting Agency, Engineer, employees of Contracting Agency nor employees of Engineer shall be personally liable for any acts or failure to act in connection with the Contract, it being understood that in such matters, they are acting solely as agents of the Contracting Agency.

#### **1-08.8 Extensions of Time**

##### **1-08.8(3) Wildfire**

Partial hoot owl, Partial shutdowns, and General Shutdowns may come into effect during the operating period of this contract. For a summary of USFS Industrial Fire Precaution Levels, visit [https://www.fs.usda.gov/detail/okawen/alerts-notices/?cid=fsbdev3\\_053603](https://www.fs.usda.gov/detail/okawen/alerts-notices/?cid=fsbdev3_053603). No payment shall be made for standby time or delays resulting from natural disasters, including Industrial Fire Precaution Level work restrictions.

#### **1-08.9 Liquidated Damages**

*Revise the first paragraph to read:*

Time is of the essence of the Contract. Delays inconvenience the aquatic life, block migration of fish, obstruct fish spawning areas, and interfere with and reroute normal channel flow.

*1-09 Measurement and Payment*

**1-09.1 Measurement of Quantities**

*Revise:*

Measurement of volume by truck count shall not be allowed without prior written authorization of Contracting Agency. Volume shall be in place measure by comparison of existing topographic surface, subgrade topographic surface and finished grade topographic surface. Measured volumes shall not include expansion of excavated material nor compaction of placed material.

Division 2 - Earthwork

*2-01 Clearing, Grubbing, and Roadside Cleanup*

**2-01.2 Disposal of Usable Material and Debris**

**2-01.2(1) Disposal Method No. 1 – Open Burning.**

*Add to section:*

No open burning shall be allowed on the project site.

**2-01.3(3) Vacant**

*Add the following Sections:*

**Disposal Method– Salvage and Reuse.**

Cleared woody material that meets the requirements for large woody material, as shown on the Plans, shall be used to construct large wood structures.

Cleared woody material that meets the requirements for slash, as shown on the Plans, shall be incorporated into the large wood structures as approved by the Contracting Officer.

**2-01.3 Construction Requirements**

**2-01.3(1) Clearing**

*Replace item number 2 with the following:*

2. Where clearing is required for access or construction, remove trees with rootwads intact and salvage as whole trees, rootwad logs, and log poles for incorporation into the work as shown on the Plans and at the direction of the Contracting Officer or as otherwise approved by the Engineer

**2-01.4 Measurement.**

*Replace section with:*

Clearing and log salvage will be paid as part of the feature or access route being installed. . Any areas cleared or grubbed beyond limits shown on the Plans without Contracting Agency's prior written authorization shall be at Contractor's expense and shall be restored at Contractor's expense.

## *2-03 Roadway Excavation and Embankment*

### **2-03.3 Construction Requirements**

*Add the following:*

Section shall include excavation and placement of soil materials for construction of side channels, large wood structures and other project features.

The Contractor shall notify the Contracting Agency at least 48 hours prior to any excavation.

The Contractor shall allow time for the Contracting Agency to provide survey control and staking.

Blasting and explosives shall not be allowed.

In the event previously unknown chemical contamination is suspected or detected during excavation, the Contractor shall immediately notify the Contracting Agency.

Removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Contracting Agency is not authorized. Unauthorized excavation performed for the convenience, fault, or operation of the Contractor beyond specified or directed excavation lines, as well as remedial work directed by the Contracting Agency, shall be at the Contractor's expense.

Locate and retain soil materials away from the drip lines of trees to remain.

The Contracting Officer reserves the right, during progress of Work, to vary slopes, grades, and dimensions of excavations from those specified on the Contract Plans.

Excavation on slopes shall proceed downward, working from the top of slope to toe of slope. As the Work progresses, it is anticipated that some slope material will slough into the cut area. The Contractor shall remove this material and make a final pass with the excavator bucket along the sections' edges when the excavation is completed to help ensure that proper grades are achieved.

The Contracting Agency does not represent that excavation performed under these Specifications can be made to or maintained at the slopes shown on the Contract Plans or described in these Specifications without excavation support. Excavations that cannot be maintained at the slopes shown on the Plans shall be sloped back to stable slopes, not to extend beyond the limits of disturbance shown on the Contract Plans, or supported using shoring, cofferdams, or other methods at no additional cost to Owner.

When completed, the average plane of grading slopes shall conform to the slopes indicated on the Contract Plans, and no point on the completed slopes shall vary from the designated plane by more than 0.25 feet measured at right angles to the slope, unless approved by the Contracting Officer.

The Contractor shall schedule a minimum of two inspection times for grading inspection by the Contracting Officer for subunits of work areas. Subunits of work areas are defined as areas isolated from other work. The first inspection shall occur when subunits are rough graded to elevations shown on the Contract Plans. The second inspection shall occur when the grading within subunits is complete

but before grading equipment has been removed from the work area. Time required to conduct inspections shall not warrant a time extension. Inspections by the Contracting Officer shall not relieve the Contractor from the responsibility of checking grades and slopes as the work progresses.

In performing the excavation, the Contractor shall pay particular attention to the conditions of issued permits and authorizations requiring the minimization of turbidity and siltation and adherence to water quality requirements.

Contractor shall execute dewatering as needed during excavation to achieve lines and grades and workable conditions.

Finish Grade areas within the limits of grading, including adjacent transition areas. Roughen the finished surface within specified areas. Roughen the finished surface within specified tolerances per the Design Plans; create meandering swales and curved slopes between points where elevations are shown on the Contract Plans, or between such points and existing grades.

Where applicable and at the discretion of the Contracting Officer, topsoil shall be replaced to match the grades and lines of the existing bank on either side of the excavation.

**2-03.3(7) Disposal of Surplus Material**

**2-03.3(7)A General**

*Add:*

Excess excavated material from required excavations not suitable for or required for backfill, embankment, and topsoil shall be placed in Staging Areas 2, 3 and 4 according to placement quantity directions defined in the Design Plans and approved Sequence and Earthworks Plans, within the delineated boundary of disturbance marked in the staging areas and approved by the Contracting Agency.

Grade spoils pile slopes to reasonably even and uniform surfaces that blend with the natural terrain with a minimum slope of 2% and maximum slope of 3 horizontal to 1 vertical (3H:1V). Contractor shall incorporate micro-topography to provide a natural aesthetic to the finished grade as approved by Contracting Agency. Spoils piles shall be seeded per the plans.

**2-03.3(7)B Haul**

*Add:*

Excess material shall be hauled to designated areas. At completion of work, remaining material shall become the property of the contractor and shall be removed from the site. Contractor shall be solely responsible for obtaining any permits and fees required for legal disposal.

**2-03.3(10) Selected Material**

*Add:*

Contractor shall selectively excavate, handle, and stockpile various native materials anticipated to include, but not limited to: topsoil, fines (sands and silts), gravel, cobble and boulders. Material removed in stripping or high in organic matter shall be stockpiled for use as topsoil and shall not be used as backfill without Contracting Officer's approval.

Segregate excavated materials based on variation of soils type, moisture content, grain size, shape, and gradation as necessary to salvage various materials required for construction indicated on the Contract Plans and described in the Specifications, or at the discretion of the Contracting Officer.

It is the responsibility of the Contractor to properly monitor and manage moisture content of the native material so that it may be reused

Stockpile areas are designated on the plans for excavated soils.

The Contractor shall not stockpile contaminated material on the Project site.

Compaction of stockpiled material shall be by construction traffic over stockpiled material.

The Contractor shall ensure that native soils excavated on site are approved by the Contracting Officer before being used as backfill or topsoil. The Contracting Agency reserves the right to reject materials that, in the opinion of the Contracting Officer, are determined to be substandard for any reason. Materials placed prior to approval of Contracting Officer which are deemed unsuitable shall be excavated and removed at Contractor's expense.

Temporary stockpiling, selective handling, multiple handling and haul shall be incidental to Excavation and LW Structures installation.

#### **2-03.3(14)C Compacting Earth Embankments**

*Add the following:*

Topsoil shall not be compacted.

Unless otherwise specified for a specific backfill or fill material, place backfill and fill materials in layers not more than 12 inches in loose depth for material compacted by heavy compaction equipment and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

Jetting, sluicing, or water settling will not be permitted as a compaction method. Material placed using an unapproved compaction method or in a condition that prohibits compaction shall be reworked as needed and re-compacted at the Contractor's expense.

Control soil compaction during construction so as to prevent over-compaction. Correct over-compaction as directed by the Contracting Officer, including ripping, re-grading, and re-compaction or over-excavation and in-kind replacement per the Contract Plans.

#### **2-03.3(14)G Backfilling**

*Add:*

When water fills an area to be backfilled, Contractor shall provide pumps to dewater backfill area and as approved by Contracting Officer. Discharge in accordance with approved Erosion and Sediment Control Plan.

Place and compact backfill as specified on Plans within and around structures and features to the depth and lines shown on the Contract Plans. Type and amount of material used for backfill, and the manner of placing material, shall be as shown on the Contract Plans, described in the Specifications and are subject to approval by the Contracting Officer.

Use suitable backfill material (per Contract Plans and Engineer approval) from material excavated from required excavations for project Work, where possible, and at the discretion of the Contracting Officer. If sufficient suitable material is not available from on-site excavations, obtain additional material from offsite sources as approved by the Contracting Officer. Approval from Contracting Agency is required for import material and contractor will be reimbursed for cost of import material.

### **2-03.4 Measurement**

*Add:*

Measurement shall be made on the per cubic yard of in-place material basis for item "Excavation" and shall include excavation, haul, selective handling, temporary stockpile, spoils placement, backfill of Large Wood (LW) Structures, compaction and moisture control.

No measurement shall be made for "Backfill". Backfill shall be incidental to the work and shall include haul from temporary stockpile, selective handling for appropriate materials, moisture control and compaction.

Volume shall be determined through design data included in the Plans or survey of existing grade, exposed subgrade and finished grade. No allowance is made for expansion of excavated materials nor compaction of placed materials. Expansion of excavated materials and compaction of placed materials shall be incidental to other bid items for purposes of handling, haul, stockpile, etc. Measurement shall not be made by truck count or weight without prior written approval of Contracting Agency.

### **2-03.5 Payment**

*Add:*

"Excavation", per cubic yard

*2-04 Haul*

### **2-04.2 Vacant**

*Add:*

### **2-04.2 Contaminated Materials**

Transportation of known or potentially contaminated materials shall be performed by properly licensed, insured, and registered waste haulers that are acceptable to the Contracting Agency and in accordance with applicable local, state, and federal regulations for transportation. Transportation contractors shall

submit documentation that demonstrates proper licensing and compliance with applicable WSDOT regulations, as well as a copy of contingency and spill control plans describing measures to be implemented in the event of spills or discharges during material handling and transporting.

## *2-09 Structure Excavation*

### **2-09.3 Construction Requirements**

*Add:*

It is possible that the Contractor may encounter previously buried large debris or riprap that extends above or below the planned excavation grades. Depending upon the factors observed, including the type of the debris and its estimated size, the Contracting Officer may or may not require its removal. Removal volume of this previously buried debris (as opposed to surficial debris) may be treated as Differing Site Conditions under this contract. Such large debris, other than riprap, shall be disposed of at an appropriate off-site location by the Contractor.

#### **2-09.3(1)D Disposal of Excavated Material**

*Add:*

Off-site haul of excavated material shall only be allowed as approved by the Contracting Agency.

#### **2-09.3(1)E Backfilling**

*Add:*

Backfill for construction of Large Wood Structures, Gully Fill, and Floodplain Routing shall be with material defined on the Plans. Backfill material shall be approved by Engineer and may require selective handling and sorting of excavated and temporarily stockpiled materials from the entire project site.

#### **2-09.3(3)D Shoring and Cofferdams**

*Add:*

Cofferdams shall conform to the requirements shown on the Plans and provided in the Permits.

See Section 8-26 (this document) for additional requirements on cofferdams.

## **Division 6 - Structures**

### **6-05.3(9) Pile Driving Equipment**

*Replace with:*

Pile driving equipment shall be vibratory side grip type drivers. Vibratory pile driver shall meet or exceeded the capabilities of these commercially available side grip drivers; HMC Movax Sonic Side Grip SP 80, Grizzly MultiGrip MG-90, RaMeC SGV 80, or equal with Contracting Officers approval. Installation by hammer pile driver, or vibratory plate compactor shall not be allowed.

## Division 8 - Miscellaneous Construction

### *8-01 Erosion Control and Water Pollution Control*

#### **8-01.3(1)A Submittals**

*Add:*

Prior to mobilization, the Contractor shall submit an Erosion and Sediment Control (ESC) Plan for the Contracting Officer's approval. The plan shall build off the requirements and details shown on the Plans; and shall comply with all applicable permits and regulations.

#### **8-01.4 Measurement**

*Revise to:*

Measurement of Erosion Control and Water Pollution Control work shall be lump sum, percent complete.

#### **8-01.5 Payment**

*Revise to:*

Lump Sum as percent complete, with a minimum of 15% withheld until notice of substantial completion.

### *8-02 Roadside Restoration*

#### **8.02.1 Description**

*Add:*

This work also includes soil decompaction in work areas and along temporary access routes.

#### **8-02.3(2)D Vacant**

*Add the following Section:*

#### **8-02.3(2)D Decompaction Work Plan**

The Contractor shall submit a Decompaction Work Plan for the Contracting Officer's approval. The plan shall describe the sequence, methods, and equipment to be used for site decompaction and comply with USFS Specifications for ML1 and ML3 roads of the US Department of Transportation, Standard Specifications for Construction of Roads and Bridges on Federal Highway Project, FP-14.

### **8-02.3(4) Topsoil**

*Add:*

Topsoil utilized in project construction shall be Topsoil Type A as specified below:

Topsoil: shall consist of friable surface soil reasonably free of grass, roots, weeds, sticks, stones, or other foreign materials.

- a. The topsoil shall consist of sandy loam, with soil particles within the following percentages: clay; 0-25; silt; 25-50; sand; 50-70; decomposed organic matter; 5-10. The clay content is optional.
- b. The soil shall have a soil acidity range between a pH 6.0 to pH 8.0. The soil salinity shall not exceed 3 millimhos per centimeter at 25oC (as described by USDA Circular No. 982).
- c. The Contractor shall notify the Engineer of the source of topsoil not less than 10 days prior to excavation.

The subsoil where topsoil is to be placed shall be tilled to a depth of 1 foot. Topsoil shall be evenly spread over the specified area to the depth shown in the plans, and shall be incorporated with subsoil to a depth of 1 foot.

### **8-02.3(8) Planting**

*Revise as follows:*

#### **1. Non-Irrigated Plant Material**

East of the summit of the Cascade Range – July 1 to November 1.

Avoiding equipment passage on established access route on the dry channel bed during periods of time when the channel is wetted.

### **8-02.4 Measurement**

*Add:*

Plants shall be measured by the acres of plant installation performed at the densities and quantities indicated on the construction plans.

### **8-02.5 Payment**

*Add:*

Payment for streambank plants shall be 80 percent of the unit Contract price per acre for contracted plants at the completion of the initial planting.

Payment shall be increased to 100 percent after November 15<sup>th</sup> of the year installed based on the actual acreage of healthy vigorous plants, as determined by the Contracting Officer, limited to plan quantity.

### **8-02.3(17) Vacant**

*Add the following Section:*

### **8-02.3(17) Surface Decompaction**

Work areas and temporary access routes shall be decompacted following excavation or fill, final grading of the floodplain, temporary bridge abutment removal, and temporary access route material removal. The surface shall be ripped or scarified to increase soil pore space and improve soil structure for site revegetation. Decompaction ridge and furrows shall align perpendicularly to anticipated direction of stream and overland flows. Decompact areas prior to application of seed, straw mulch or wattles and slash. See specifications in USFS Specifications for ML1 and ML3 road decommission in section 211 of the US Dept of Transportation, Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-14.

### **8-02.4 Measurement**

*Add:*

Decompaction shall be paid as percent complete of the lump sum relative to the total area to be decompacted.

*8-26 Vacant.*

*Add the following Section:*

### **8-26 Diversion**

#### **8-26.1 Description**

Furnish, install, maintain and operate all necessary cofferdams to route stream flows around work areas. Diversion shall isolate work area from active stream flows and prevent entry of turbidity from work areas into flowing channel, wetlands of other natural or surface water areas. Contractor shall coordinate with fish rescue and removal operations to be completed by Contracting Agency from areas behind cofferdam.

Limited geologic or groundwater information is available at the site. The Contractor shall make his/her own investigations and shall determine the extent and difficulty of removal of water from excavations.

Surface and ground water is expected to be encountered in portions of the proposed Work along the waterway and locations along the floodplain.

The Contractor shall install an approved temporary fish-exclusion fence, provided by the owner, to keep fish out of the Work area. Additional and/or other measures may be necessary to meet construction permit conditions.

The Contractor shall coordinate Work with the Contracting Agency and its authorized agents and representatives to allow for the timely and proper rescue and recovery efforts of fish within the confines of the Work.

Fish rescue and recovery will be completed by the Contracting Agency and/or its authorized agents and representatives. See USFS Specification (this document)

Should the diversion be removed or breached before the Work is completed, fish rescue and recovery shall be repeated at Contractor's expense.

## **8-26.2 Materials**

The Contractor shall provide all required materials for the project, unless otherwise specified.

Alternate cofferdam methods and materials may require approval from permitting agencies, the Contracting Officer makes no guarantee that alternate methods requiring permit modifications or amendments will be approved.

## **8-26.3 Submittals**

### **8-26.3(1) Stream Diversion Plan**

The Contractor shall submit a Stream Diversion and Fish Isolation Plan to the Contracting Agency for approval prior to implementation. The implementation of the Stream Diversion Plan shall be sufficient to bypass stream flows around work areas and to protect the work in progress.

The Stream Diversion Plan described herein is intended to provide a baseline of effort for diversion activity and does not ensure that the standards established by any applicable permits or required performance criteria will be met.

The Contractor shall use the included plan or an alternate arrangement of their own design to ensure satisfactory performance and that the requirements of all applicable regulations and permits are met. The Contractor's Stream Diversion Plan shall detail the Contractor's chosen method of diversion and shall include:

- i. A narrative of the diversion method to be used and provisions for repairs to failure of diversion facilities.
- ii. A complete list of equipment, materials and materials data sheets to be used and a schedule for their delivery and installation at the site.
- iii. Location of diversion and discharge facilities.
- iv. Method to protect against erosion at the discharge location.
- v. Provisions for addressing circumstances resulting from overtopping of diversion works due to wet weather conditions.

### **8-26.3(1)a Fish Salvage and Rescue Coordination**

The Stream Diversion Plan shall include provisions for coordination of fish rescue with the Contracting Agency that complies with applicable permits and regulations. Plan shall include a narrative of schedule, coordination with Contracting Agency for fish rescue and materials and methods to conduct ongoing fish rescue. Fish salvage and rescue will be provided by the Contracting Agency. Salvage of fish in the work site will be conducted immediately prior to in-stream operations. Contractor is responsible for communicating and coordinating with Contracting Agency to prepare stream diversion and dewatering with fish rescue. Diversion and dewatering operations, including any in-stream work or operations that create stream turbidity, shall not commence until fish salvage is completed. Following initial fish rescue, Contractor shall be responsible for fish rescue during construction activities.

#### **8-26.4 Construction Requirements**

The contractor shall isolate the work area from the waterway by installing cofferdams or other approved isolation technique per the plans. The isolated work area shall be sufficient to construct the work without modification to the extent, location, dimension, or orientation of the work. No turbidity from construction activities shall enter the flowing channel, wetlands or other natural or surface water areas. Cofferdams shown on the plans are a suggested method. Contractor shall determine own method and include cofferdam and diversion details in the Stream Diversion Plan for review and approval.

The Contractor shall provide all equipment and materials necessary for stream diversion. The Contractor shall have on hand, at all times, sufficient materials, pumping equipment and machinery in good working condition and shall have available, at all times, competent workers for the operation of the pumping equipment. Adequate standby equipment shall be kept available at all times to ensure efficient diversions and maintenance of diversion operations during power failure.

The Contractor shall discharge diverted water to floodplain and upland areas in a suitable manner without damage to adjacent property or to the channel bed or banks. No turbid water shall be allowed to drain away from work completed or under construction or be discharged from the site. The turbidity levels upstream and downstream of the project will be monitored by Contracting Agency personnel throughout the duration of the project. Measurements shall be recorded and reported to the Contractor and the Washington Department of Ecology. Turbidity shall meet Washington Department of Ecology (WDOE) Regulations to comply with permitting requirements. Turbidity in excess of WDOE Regulations may require operations to be shut down as directed by the Contracting Officer.

The fish rescue will take place prior to construction. See Section 8-26.3(1)a. The Contractor shall coordinate the fish rescue with the Contracting Officer. The Contractor shall provide minimum 3 days advance notice to the Contracting Officer before each cofferdam installation date. The Contractor shall understand that cofferdam installation requires coordination with the Contracting Agency and only after the Contracting Agency has completed fish rescue can the cofferdams be completed.

At the point of diversion return, the Contractor shall provide energy dissipation measures if necessary to prevent erosion.

#### **8-26.5 Measurement**

Measurement for all labor, equipment and materials associated with diversion of stream flows including operation, maintenance, and removal and disposal of materials shall be measured as lump sum for item, "Stream Diversion".

#### **8-26.6 Payment**

Payment for all labor, equipment and materials associated with diversion of stream flows including operation, maintenance, and removal and disposal of materials shall be measured as lump sum for item, "Stream Diversion, Fish Isolation, and Dewater".

#### *8-27 Vacant.*

*Add the following Section:*

## **8-27 Dewatering**

### **8-27.1 Description**

Groundwater may be encountered in portions of the proposed Work along the waterway and locations along the floodplain.

The work consists of furnishing, monitoring, operating, maintaining, and removing pumps, and installation of control of water BMPs for removal of water and groundwater from the various parts of the Work and for maintaining the footprint elevations and other parts of the Work free from water as required for constructing each part of the Work. All water control shall meet the appropriate construction permit conditions and requirements. Contractor shall provide size and number of pumps as required to execute diversion, dewatering and other work.

### **8-27.2 Materials**

Contractor shall provide minimum one, or more as needed, pumps capable of dewatering the work area and discharging the water to a suitable location. Contractor shall provide discharge hoses, booster pumps, and related equipment as needed to discharge water to suitable location.

Environmental protection measures such as straw bales, perforated pipe for discharge flow distributors, geotextiles, filter bags, or other means of controlling water and turbidity. No turbidity shall be allowed to enter the flowing channel, wetlands of other natural or surface water areas. Subsurface flow of turbid waters through soils and reemergence of turbid water in surface waters shall not be allowed.

### **8-27.3 Submittals**

#### **8-27.3(1) Dewatering Plan** – (See also Section USFS Dewatering Criteria – next section)

Prior to commencement of construction, the Contractor shall submit a Dewatering Plan to the Contracting Officer for approval. The Contractor shall be responsible for implementing a Dewatering Plan that satisfies the requirements of all applicable permits and USFS specifications (this document). The plan shall be sufficient to protect the work in progress and facilitate the work by maintaining a generally dry work environment.

Dewatering methods included on the Contract Plans and described herein are intended to provide a baseline of effort for dewatering activity and does not ensure that the standards established by any applicable permits or required performance criteria will be met.

This Plan shall include a narrative of the dewatering methods to be used including control of discharge water and sediment. Narrative shall include provisions for repairs in case of failure to maintain continuous dewatering,

- i. A complete list of equipment and materials to be used and stored on-site,
- ii. A schedule for the arrival of materials and construction of these systems.
- iii. A list of pumps by size and number to be on site. A plan to mobilize and operate additional pumps as needed to achieve the required dewatering.

- iv. An approvable plan shall provide for treatment of water pumped from within the immediate work area, protection from erosion of discharge and monitoring and maintenance of pumped water discharge facilities.

#### **8-27.4 Construction Requirements**

Construction water shall be pumped away from work areas and be infiltrated into the ground and without entering the waterway or wetlands. If infiltration becomes an ineffective means to control turbidity, additional and alternative methods, such as pumping into above ground silting basins, filtration geotextile fabric or other methods as needed shall be required at the contractor's expense.

The Contractor shall provide all equipment and materials necessary for dewatering. The Contractor shall have on hand, at all times, sufficient pumping and other equipment and machinery in good working condition and shall have available, at all times, competent workers for the operation of the pumping equipment. Adequate standby equipment shall be kept available to ensure efficient operation and maintenance of diversions during power failure.

Dewatering shall commence when water is first encountered, and shall be continuous until water can be allowed to rise in accordance with the following provisions and any other requirements of the Specifications:

The Contractor shall maintain the water level below the working level within excavations in the active work area to provide a dry active construction work area. The active work area shall be defined as the area where work is being completed, including excavation, grade and elevation checking, large wood placement, backfill, and related activities.

The Contractor shall be fully responsible and liable for all damages that may result from failure to adequately keep any excavation dewatered.

Water resulting from dewatering activity shall be discharged in accordance with the provisions of the approved Contractor's Dewatering Plan and Erosion Control Plan. The Contractor shall discharge outside the work area in a suitable manner without damage to adjacent property or to the channel bed or banks. No turbid water shall be allowed to drain away from work completed or under construction or be discharged from the site. The turbidity levels upstream and downstream of the project will be monitored by Contracting Agency personnel throughout the duration of the project. Measurements shall be recorded and reported to the Contractor and the Washington Department of Ecology per permitting requirements. Turbidity in excess of WDOE Regulations may require operations to be shut down as directed by the Contracting Officer.

#### **8-27.5 Measurement**

Measurement for all labor, equipment and materials associated with dewatering of work areas including operation, maintenance, turbidity control, fish rescue and removal and disposal of materials shall be measured as lump sum for item, "Dewatering".

### **8-27.5 Payment**

Payment for all labor, equipment and materials associated with dewatering of work areas including operation, maintenance, fish rescue and removal and disposal of materials shall be measured as lump sum for item, "Stream Diversion, Fish Isolation, and Dewater".

### **8-27 Vacant.**

*Add the following Section:*

#### *8-27 Temporary Access Bridge and Tributary Crossing*

##### **8-27.1a Temporary Access Bridge Description.**

Contractor shall provide a temporary access bridge with temporary approaches and abutments to access work areas. All temporary facilities shall be removed at completion of work.

##### **8-27.2a Materials.**

Temporary bridge abutment, deck and approach.

##### **8-27.3a Submittals**

Contractor shall submit a Temporary Access Bridge Plan that details bridge components; installation, maintenance, removal; equipment and operations required for placement and removal; analysis that bridge system has sufficient strength to bear construction loads; narrative of preventative and maintenance measures to prevent spillage from bridge into creek and measures to minimize disturbance. Contractor shall provide narrative of how temporary bridge components and installation; maintenance and removal comply with applicable permit requirements and conditions.

##### **8-27.4a Construction Requirements.**

Contractor shall install and maintain temporary bridge to span channel and convey live Kachess Creek flows per the elevation minimum provided in the Design Plans.

Contractor shall configure bridge and maintain BMPs as needed to prevent spillage into the stream channel.

Contractor shall provide temporary abutments to maintain minimum elevation of bridge low chord elevation of 3-ft above average streambed elevation, as shown on Contract Plans. Contractor shall provide bridge of sufficient span to maintain minimum clear span and safely bear anticipated construction loading and pass anticipated flows during construction with a minimum 1-ft freeboard, as shown on Contract Plans.

Contractor shall remove temporary bridge, abutments and approaches at completion of work. Removal of the bridge, abutments and approaches shall be completed without entry of equipment or materials into flowing water.

If any standing water occurs within temporary abutments, the area shall be isolated with block nets and defished prior to placing any materials.

**8-27.5a Measurement.**

Measurement for temporary bridge deck, abutments and approaches including materials, equipment and labor shall be lump sum for item “Temporary Access Bridge”.

**8-27.6a Payment.**

Payment for temporary bridge deck, abutments and approaches including materials, equipment and labor shall be lump sum for item “Temporary Access Bridge”.

**8-27.1b Temporary Tributary Crossing.**

Contractor shall provide a temporary tributary crossing to access Staging Area 1. All temporary facilities shall be removed at completion of work.

**8-27.2b Materials.**

Steel plate, logs, and slash.

**8-27.3b Submittals**

Contractor shall submit a Temporary Tributary Crossing Plan that details crossing components; installation, maintenance, removal; equipment and operations required for placement and removal; analysis that crossing has sufficient strength to bear construction loads; narrative of preventative and maintenance measures to prevent spillage from crossing into the tributary and measures to minimize disturbance. Contractor shall provide narrative of how temporary crossing components and installation; maintenance and removal comply with applicable permit requirements and conditions.

**8-27.4b Construction Requirements.**

Contractor shall install and maintain temporary crossing to span small tributary at existing floodplain surface elevation.

Contractor shall configure crossing and maintain BMPs as needed to prevent spillage into the small tributary

Contractor shall provide sufficiently sized (length, width, and thickness) steel plate to maintain crossing elevation at floodplain surface elevation, as shown on Contract Plans. Contractor shall provide crossing of sufficient span to maintain minimum clear span and safely bear anticipated construction loading, as shown on Contract Plans.

Contractor shall remove steel plate at completion of work and leave in place logs and slash to minimize disturbance to the small tributary. Removal shall be completed without entry of equipment or materials into flowing water.

**8-27.5b Measurement.**

Measurement for temporary crossing including materials, equipment and labor shall be lump sum for item “Temporary Tributary Crossing”.

**8-27.6b Payment.**

Payment for temporary crossing including materials, equipment and labor shall be lump sum for item “Temporary Tributary Crossing”.

*8-28 Vacant.*

*Add the following Section:*

**8-28 Large Wood Structures and Flood Plain Roughness**

**8-28.1 Description**

Furnish all materials, equipment, and labor necessary to install the large woody materials (LWM) members included in the various structures and features as indicated on the Contract Plans and as described in the Specifications.

The Contracting Agency will provide a portion of the quantity of large wood and stockpile them in the temporary on-site staging area 3 or 4. The Contractor shall be responsible for the care and installation of the large woody materials once the large woody materials are in Contractor’s possession. Possession of the large woody materials is assumed once the Contractor and Contracting Officer have conducted an inspection and inventory of large woody materials with the Owner and Owner Representative to review, inspect, and confer the suitability of the LWM furnished by the Contracting Agency. If the provided wood is deemed unsuitable, it is the responsibility of the Contracting Agency to acquire suitable LWM. Contractor shall be responsible for hauling of large woody material from the staging area to the installation location.

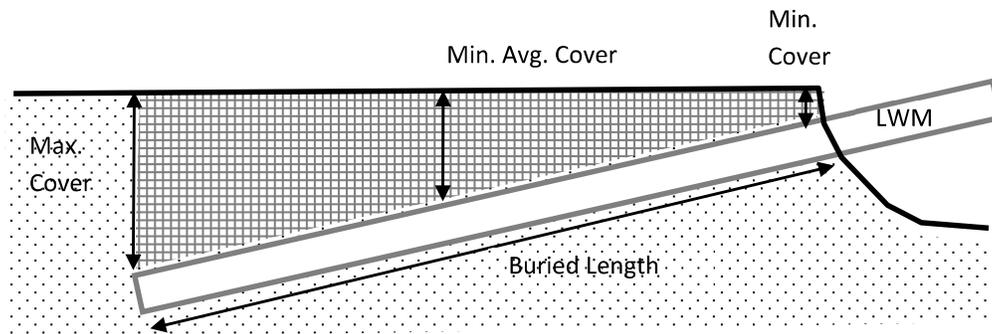
Remaining log numbers shall be sourced from on site within limits of disturbance by the Contractor. Care shall be taken when salvaging materials to optimize the production of large wood material that meets the specifications. Contractor shall transport the full quantity of large woody materials to be used in the Contract.

Contractor will follow all guidelines and permits defined by Contracting Agency, including USFS specifications for salvaging large wood from on site (ADD Reference if available in Final Specs).

**8-31.1(1) Definitions**

Footprint Elevation      The design elevation for the bottom – subgrade – of a proposed structure as noted on the Contract Plans.

Minimum Average      The minimum average cover depth is measured halfway along the buried length of a log.



## 8-31.2 Materials.

### 8-31.2(1) Large Woody Materials

Large woody materials (LWM) are required on multiple structures, as indicated on the Contract Plans and shall include the following.

Contracting Agency supplied LWM will be stockpiled near or at the project site. At project commencement, stockpiled LWM shall be inspected by Contracting Officer, Engineer and Contractor. LWM deemed to not meet specifications shall be removed from the inventory. Contractor shall take responsibility for remaining inventory and shall haul and install per Plans. Contractor shall source LWM to offset unsuitable materials removed from the Contracting Agency's inventory and shall be compensated per Differing Conditions.

#### 8-31.2(1)A Rootwad Log may also be referred to as Log with Rootwad; these terms shall be considered synonymous.

Rootwad Log may also be referred to as Log with Rootwad; these terms shall be considered synonymous. Log with Rootwad large woody material that includes an intact rootwad mass connected to a portion of the bole of the tree. Log with Rootwad log is typically produced by removing an entire tree including the rootwad mass from the ground, removing the limbs, and cutting the log to a specified length. Include an intact rootwad mass consisting of roots fibers ranging in size down to a diameter of 1 inch or less.

Shall be sourced from coniferous species native to the Cascade Range of Washington State, such as Douglas Fir, Western Red Cedar, and Ponderosa Pine; other conifer species may be used with prior approval of the Contracting Agency.

Shall conform to the dimensions as indicated on the Contract Plans for the particular structure.

Shall have a DBH within the range shown on the Contract Plans. Bark thickness shall not be included in dimension.

Shall have a maximum diameter taper of 1 inch diameter per 10-foot length, or as approved by the Engineer.

Shall be from sound stock and appropriate for structural constructions. The trunk of the logs shall be reasonably straight and uniform and free of excessive bends, bulges, and limbs that will impede the placement of additional logs in the applicable structure. Logs exhibiting breakage, rot, splitting, holes, pest infestation, foreign objects/finishes, vandalism, burn, and other damages are not allowed and may be rejected by the Contracting Agency – replacement shall be at Contractor’s expense.

Limbs shall be trimmed within 12 inches of the face of the log, unless otherwise approved by the Engineer. Trimming of limbs does not include the root mass.

Rootwad masses shall conform to the dimensions as indicated on the Contract Plans for the particular structure and as approved by Contracting Agency. In general, the rootwad masses shall be no smaller than: 1) diameter three times the log diameter measured at breast height, and 2) length two times the log diameter measured at breast height.

Rootwad masses shall be reasonably uniform and full; rootwad logs with asymmetrical rootwad masses may be rejected by the Contracting Agency.

#### **8-31.2(1)B Log Poles**

Log Poles may also be referred to as Log without Rootwad, Vertical Piles, or Racking Logs; these terms shall be considered synonymous.

Log pole: Large woody material consisting of a tree bole with the rootwad and limbs removed. Log poles may include bark and are untreated. Do not include an intact rootwad mass.

Shall be sourced from coniferous species native to the Cascade Range of Washington State, such as Douglas Fir, Western Red Cedar, and Ponderosa Pine; other conifer species may be used as approved by the Contracting Agency.

Shall conform to the dimensions as indicated on the Contract Plans for the particular structure.

Shall have a diameter within the range indicated on the Contract Plans, measured 3 feet from the butt cut (larger) end and at the midpoint of the log length (cut end to cut end). Bark thickness shall not be included in dimension.

Shall have a maximum diameter taper of 1 inch diameter per 10-foot length, or as otherwise approved by the Engineer.

Shall be sound stock and appropriate for structural constructions. The trunk of the logs shall be reasonably straight and uniform, and free of excessive bends, bulges, and limbs that will impede the placement of additional logs in the applicable structure. Logs exhibiting breakage, rot, splitting, holes, pest infestation, foreign objects and finishes, vandalism, burn, and other damages are not allowed may be rejected by the Contracting Agency – replacement shall be at Contractor’s expense.

Limbs shall be trimmed within 12 inches of the face of the log, unless otherwise approved by the Engineer.

#### **8-31.2(1)C Vertical Log**

Vertical Logs may also be referred to as Vertical Piles, Vertical Snags, or Pilings; these terms shall be considered synonymous.

Shall meet specifications for log poles. With the following exceptions: limbs shall be removed flush to the bole surface, diameter shall not exceed 16inches, nor be less than 12inches. Vertical Snags may include bark but the bark thickness is not included in the diameter measurement. Vertical Logs are untreated.

#### **8-31.2(1)D Whole Trees**

Whole trees: Large woody material consisting of a whole tree; including the rootwad mass, bole and intact limbs. Whole trees include bark and are untreated.

Shall be identified for removal and salvaged from on site as approved by Contracting Officer. Contractor shall take only those trees identified for removal.

#### **8-31.2(1)E Trees Tops**

Tree tops: Large woody material consisting of the top portion of tree including the branch structure and some length of trunk below as approved by Engineer.

Shall be salvaged from trees identified for removal on site as approved by Contracting Officer.

#### **8-31.2(2) Contracting Agency Supplied Inventory**

The Contracting Agency will provide a portion of the quantity of large wood and stockpiled them in a temporary on-site staging area along the main temporary access route as indicated on the Plans. The Contracting Agency will provide an inventory of the LWM materials to be provided (size and species) and identify which staging area they will be stored. **NOTE: THIS SHOULD BE PROVIDED AND INCLUDED HERE PRIOR TO DOCUMENTS BEING PUT OUT TO BID**

#### **8-31.3 Submittals**

Contractor shall submit a Large Wood Management Plan for source, stockpile, handling, protection and installation of large woody material (LWM). Plan shall include list of equipment to be used and methods and best practices to meet the special handling requirements.

#### **8-31.4 Construction Requirements**

##### **8-31.4(1) Quality Assurance**

Large woody materials furnished by the Contracting Agency shall be inspected and inventoried by the Contracting Officer and Contractor.

Materials that do not meet the requirements indicated on the Contract Plans and described in the Specifications shall be rejected, unless otherwise approved by the Engineer.

Following the inspection and acceptance as suitable, the Contractor shall be responsible for the care, and management and handling of the approved inventory of large woody material.

#### **8-31.4(2) Delivery, Storage, and Handling**

The Contractor shall store large woody materials, harvested from on site or acquired otherwise during the project, within the designated staging and/or stockpile areas indicated on the Contract Plans and as described in the Specifications, or as approved by the Contracting Agency.

The Contractor shall protect the large woody materials from theft and damage from fire, breakage during handling, vandalism, and other means that result in the large woody materials not meeting the requirements indicated on the Contract Plans and as described in the Specifications.

The Contractor shall replace, at no additional cost to the Contracting Agency, members of large woody materials that are damaged during handling or placement that had met the requirements indicated on the Contract Plans and as described in the Specifications that are damaged during handling or placement by Contractor.

The Contractor is responsible for notifying the Contracting Agency if the total quantity of large woody materials is not available to complete the Work.

The Contractor shall handle the large woody material with equipment appropriate for the task. Handling shall not damage the large woody material – special care shall be given to protection of rootwads.

The Contractor shall place large woody material into position using appropriate equipment and methods, and shall not drop large woody material into position.

Handling and moving large woody material shall not damage existing features or landscapes.

Contractor shall replace at own expense LWM damaged during handling and installation.

#### **8-31.4(3) Installation**

Construction shall include placement of LWM as shown on the Contract Plans and approved by Contracting Officer.

Contracting Officer shall review and approve subgrade lines and grades created during excavation.

Contractor shall backfill the structures using the soils types shown on the Contract Plans. Gravel/cobble /boulder material may be salvaged from onsite if available and determined by Contracting Officer to meet specification. Import of additional material may be required at no additional cost.

Backfill shall be installed concurrent with LWM and compacted as specified on the Plans.

Test installations of vertical snags shall be driven and tested as shown on the Contract Plans. Vibratory pile driver shall meet requirements in Section 6-05.3(9). Contractor shall assist Contracting Officer with pull out testing of vertical snags as shown on the Contract Plans and shall be an incidental item to large

wood structure installation. If vibratory pile driver installation of test vertical snags is successful, installation of the remaining vertical logs shall be completed as indicated on the plans, and prior to further backfill.

If vibratory driving is unable to advance vertical logs into the ground to the depth shown on the Plans, the Contracting Officer – at their sole discretion – may allow an alternate vertical log installation method.

### **8-31.5 Measurement.**

Large woody materials will be measured based upon the number of structures constructed as shown on the Plans and accepted in accordance with the Specifications. Materials, equipment, labor and placement of slash, installation and testing of vertical snags, excavation and backfill shall be incidental. Measurement shall be made per each of the following completed structures:

Mid Channel Large Wood structure (MCLW): Each

Bank Buried Large Wood structure (BBLW): Each

Bar Roughness Areas (BRA): Each

Whole Tree Placement (WTLW)

Inlet Apex Jam Large Wood structure (IALW)

Gravel Retention Habitat Large Wood (GRHLW)

Helicopter Placed Large Wood (HeliLW)

Habitat Large Wood (HLW)

Floodplain Roughness Snag Forest (FRSF)

Magic Creek Routing Large Wood (MCRLW)

### **8-31.6 Payment**

Payment shall be made per each of the completed LW Structures as a lump sum for each structure.

## USFS SPECIFICATION AND DESIGN CRITERIA

For

UPPER KACHESS RIVER RESTORATION PROJECT  
Construction Activities  
05/04/2021

### Project-Specific Design Criteria

- All sapling and trees to be removed shall be approved and clearly marked.
- All removed vegetation shall be incorporated into log jam and floodplain roughness structures. If excess vegetation material needs disposal outside of channel work, it shall be distributed on the floodplain.
- Trees removed within clearing limits may be removed whole with roots intact and utilized in the side channel construction or in mainstem work.
- Remove soil from roots of salvaged trees before placement in the waterway.
- All trees not marked for removal shall be preserved and undisturbed. Construction activity shall not debark or damage live trees.
- Keep heavy equipment disturbance out of drip line of all preserved existing trees.
- All equipment, materials and personnel shall remain within the limits of disturbance.
- The contractor shall keep the work areas in a neat and clean condition free of debris and litter for the duration of the project.
- Temporary access routes in areas prone to inundation during the in-water work window shall be decommissioned before the end of the in-water work window.
- In areas where some equipment (e.g., lowboys, crew trucks, logging trucks) is not needed beyond locations such as staging areas the temp roads should only be constructed to a standard sufficient to pass the necessary equipment.
- Access routes in reach 2 and 3 (dry river bottom) will be identified by the project manager to minimize impacts to the river bottom and banks and limit crossings.
- When vegetation removal is required, vegetation shall be cut to ground level (not grubbed).
- The decommissioning of improved system roads and temporary access roads will be done per USFS specifications for m11 and m13 road decommission in section 211 of the US Dept of Transportation, standard specifications for construction of roads and bridges on federal highway projects, FP-14.

- Servicing and hazardous material storage shall be on an adjacent, established staging areas in a location and manner that will preclude erosion into or contamination of the stream or floodplain. Equipment when not in use will be located 150 ft or more from any natural water body or wetland, or parked in established staging areas.
- Excavated materials shall be stockpiled neatly in an approved location within the stockpile and staging area. Excess material shall be hauled to designated areas. At completion of work, remaining material shall become the property of the contractor and shall be removed from the site. Contractor shall be solely responsible for obtaining any permits and fees required for legal disposal.
- Natural materials used for implementation of aquatic restoration, such as large wood, slash, and gravel may be staged within the 100-year floodplain. Topsoil will be staged outside the floodplain.
- Any large wood, topsoil, and native channel material displaced by construction shall be stockpiled for use during site restoration at a specifically identified and flagged area. Any material not used in restoration, and not native to the floodplain, shall be removed to a location outside of the 100-year floodplain for disposal.
- Mechanized equipment and vehicles shall be selected, operated, and maintained in a manner that minimizes adverse effects on the environment (e.g., minimally-sized, low pressure tires; minimal hard-turn paths for tracked vehicles; temporary mats or plates within wet areas or on sensitive soils). All vehicles and other mechanized equipment shall be:
  - stored, fueled, refueled, and maintained in a vehicle staging area placed 150 ft or more from any natural water body or wetland
  - biodegradable lubricants and fluids shall be used in equipment operating in and adjacent to the stream channel and live water
  - inspected daily for fluid leaks before leaving the vehicle staging area for operation within 150 ft of any natural water body or wetland
  - thoroughly cleaned before operation below ordinary high water, and as often as necessary during operation, to remain grease free
- The boundaries of the clearing limits shall be clearly flagged in the field prior to construction. During the construction period, no disturbance beyond the flagged clearing limits shall be permitted. The flagging shall be maintained for the duration of construction.
- From May 1 through September 30, all exposed soils shall be protected from erosion by mulching, plastic sheeting, hydroseed covering, or other approved measures within three days of grading. From October 1 through April 30, all exposed soils must be protected within two days of grading. Soils shall be stabilized before a work shutdown, holiday, or weekend if needed based on the weather forecast. Soil stockpiles must be stabilized and protected with sediment trapping measures. Mulch as soon as practical all disturbed areas not receiving other permanent stabilization measures. Hay, straw, and mulch used on site must be 99.9% weed-free.

- Design, construct, and phase cut and fill slopes in a manner that will minimize erosion. Reduce slope velocities on disturbed slopes by providing temporary barriers.
- All temporary erosion and sedimentation control measures shall be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment shall be removed from the site or incorporated into finished grading. Disturbed soil areas resulting from removal shall be permanently stabilized using mulch and seeding.
- Avoid soil-disturbing actions during periods of heavy rain or wet soils. Operate heavy equipment within unit boundaries only when soil moisture is below the plastic limit, soil moisture exceeds the plastic limit if the soil can be rolled into 3mm threads without breaking or crumbling.
- The contractor shall control dust for the duration of the project. Control measures shall be in accordance with applicable regulations.
- The following measures will be followed to avoid introduction of invasive plants and noxious weeds into project areas:
  - Prior to entering the site, all vehicles and equipment will be power washed, allowed to fully dry, and inspected to make sure no plants, soil, or other organic material adheres to the surface.
  - Watercraft, waders, boots, and any other gear to be used in or near water will be inspected for aquatic invasive species.
  - Wading boots with felt soles are not to be used due to their propensity for aiding in the transfer of invasive species.
- Contractor shall perform construction dewatering in such a manner as to avoid the release of turbid or sediment-laden water in order to prevent contamination or increase turbidity of surface waters. Excavation of dewatering sumps beyond limits shown shall be at no additional cost. Sediment laden water may be pumped to an upland discharge location and allowed to sheet flow through existing vegetation before infiltrating into the ground. If this method is not sufficient to prevent return of turbid water to surface waters or sensitive floodplain areas, a 'dirt-bag' or sediment retention structure may be required as necessary to comply with laws and permit requirements at no additional cost.
- Contractor shall provide, operate, and maintain number and size of pumps as necessary to achieve dewatering needs. At a minimum, contractor shall provide a 6" dri-prime diesel powered pump and a portable 2" pump. Additional pumps and of different capacities may be required at contractor's expense.
- Contractor shall gain owner's approval of discharge location prior to operating pumps.
  - A. The esc facilities shown on this plan are the minimum requirements for anticipated site conditions. During the construction period, these esc facilities shall be upgraded as needed

at no additional cost for unexpected storm events and to ensure that sediment and sediment-laden water do not leave the site.

- B. The esc facilities shall be inspected daily by the contractor and maintained as necessary to ensure their continued functioning.
- C. The esc facilities on inactive sites shall be inspected and maintained a minimum of once a month or within the 24 hours following a storm event.
- D. Stabilized construction entrances and additional measures may be required and shall be maintained for the duration of the project.

### **Spill prevention, control, and counter measures –**

The use of mechanized machinery increases the risk for accidental spills of fuel, lubricants, hydraulic fluid, or other contaminants into the riparian zone or directly into the water. The contractor shall adhere to the following measures:

A description of hazardous materials that will be used, including inventory, storage, and handling procedures will be available on-site.

Written procedures for notifying environmental response agencies will be posted at the work site.

Spill containment kits (including instructions for cleanup and disposal) adequate for the types and quantity of hazardous materials used at the site will be available at the work site.

Workers will be trained in spill containment procedures and will be informed of the location of spill containment kits.

Any waste liquids generated at the staging areas will be temporarily stored under an impervious cover, such as a tarpaulin, until they can be properly transported to and disposed of at a facility that is approved for receipt of hazardous materials.

Biodegradable hydraulic fluids shall be used in any vehicle that will be operated near the water.

All facilities shall be inspected, maintained, and repaired as needed to assure continued performance of their intended function. All facilities shall be inspected daily and within 24 hours after any storm event greater than 0.5 inches of rain per 24 hour period and after events exceeding 2 hours duration.

Weekly reports summarizing the scope of inspections, the personnel conducting the inspection, the date(s) of the inspection, major observations relating to the implementation of the contractor's erosion and sediment control plan, and actions taken as a result of these inspections shall be prepared and retained on site by the contractor. In addition, a record of the following dates shall be included in the reports:

1. When major grading activities occur,
2. Dates of rainfall events either exceeding 2 hours duration or more than 0.5 inches/24 hours,
3. When construction activities temporarily or permanently cease on site, or on a portion of the site,

4. When stabilization measures are initiated for portions of the site. Esc records shall be made available to the owner and owner's representative on request and shall be provided for review and approval prior to application for payment.

### **Skid Trails:**

Skidding activities shall be limited to periods when soil moisture level is normally dry, soils are frozen, or there is sufficient snow cover to protect soils from compaction. Operate heavy equipment within unit boundaries only when soil moisture is below the plastic limit, soil moisture exceeds the plastic limit if the soil can be rolled into 3mm threads without breaking or crumbling.

- i. Designated skid trails within Riparian Reserves will be minimized.
- ii. No skid trail crossings of perennial or fish bearing streams will occur.
- iii. Avoid damage to residual trees during skidding and locate skid trails to reduce basal wound damage to trees.
- iv. Skidding directly down dry wash draws shall be prohibited.
- v. Skid trail widths shall not exceed a width of 15 feet. Skid trail disturbance which results in exposed mineral soil accompanied with visible track or tire rut impressions shall be restored through decompaction, grubbing, or scarifying and re-vegetation with native seed.
- vi. The leading ends of all logs shall be suspended above the ground during skidding inhaul to landings or stream placement work areas.
- vii. Under site specific conditions, forestry staff will consult with fisheries/hydrology staff when proposing to locate skid trail crossings of intermittent streams, if a stream crossing could significantly reduce temporary road construction or side slope disturbance to access vegetation treatment units.
- viii. To treat a harvest unit between stream channel buffers, skid trail crossings of intermittent streams could occur on ground that is  $\leq 3$  percent slope. Within 100 feet of the stream channel, the skid trail will have a slash mat of branches/slash laid down at least 2 feet deep, and logs will be stacked parallel with the stream channel to make a crossing platform.
- ix. No standing trees will be cut/removed for skid trail crossings. Skid trail stream crossings will not be located closer than 0.5 mile of ESA listed fish and/or Critical Habitat. The stream channel and streambanks will be protected by laying trees and logs for the equipment to drive on parallel to the stream channel.
- x. If landing areas outside of those identified in the project designs need to be cleared, the locations of the landings shall be agreed upon prior to their construction. The size of landings shall not exceed that needed for efficient skidding and working operations.
- xi. Landing areas that have been cleared of vegetation shall be restored through decompaction, grubbing, or scarifying and re-vegetation with native seed.

xii. Place barriers at the Forest Service System Road 4600 where it leaves the current trailhead at the end of each day to prevent off-road use and further disturbance.

xiii. Heavy equipment operating within areas designated as ground based will be confined to operating on designated skid trails, landings, approved roads, or prepared slash mat trails that are at least one foot in depth and result in no significant increase in soil bulk density.

## ARBO II Criteria

### Work Area Isolation & Fish Capture and Release

Isolate the construction area and remove fish from a project site for projects that include concentrated and major excavation at a single location within the stream channel. This condition will typically apply to the following aquatic restoration categories: Fish Passage Restoration; Dam, Tidegate, and Legacy Structure Removal; Channel Reconstruction/Relocation.

#### 1. Isolate Capture Area –

Install block nets at up and downstream locations outside of the construction zone and leave in a secured position to exclude fish from entering the project area. Leave nets secured to the stream channel bed and banks until construction activities within the stream channel are complete. If block nets or traps remain in place more than one day, monitor the nets and or traps at least on a daily basis to ensure they are secured to the banks and free of organic accumulation and to minimize fish predation in the trap.

#### 2. Capture and release –

Fish trapped within the isolated work area will be captured and released as prudent to minimize the risk of injury, then released at a safe release site, preferably upstream of the isolated reach in a pool or other area that provides cover and flow refuge. Collect fish by seine or dip nets as the area is slowly dewatered, and minnow traps will be in place overnight. Fish must be handled with extreme care and kept in water the maximum extent possible during transfer procedures. A healthy environment for the stressed fish shall be provided—large buckets (five-gallon minimum to prevent overcrowding) and minimal handling of fish. Place large fish in buckets separate from smaller prey-sized fish. Monitor water temperature in buckets and well-being of captured fish. If buckets are not being immediately transported, use aerators to maintain water quality. As rapidly as possible (especially for temperature-sensitive bull trout), but after fish have recovered, release fish. In cases where the stream is intermittent upstream, release fish in downstream areas and away from the influence of the construction. Capture and release will be supervised by a fishery biologist experienced with work area isolation and safe handling of all fish.

### **3. Electrofishing –**

Use electrofishing only where other means of fish capture may not be feasible or effective. If electrofishing will be used to capture fish for salvage, NMFS' electrofishing guidelines will be followed (NMFS 2000 - <http://www.nwr.noaa.gov/ESA-Salmon-Regulations-Permits/4d-Rules/upload/electro2000.pdf>). Those guidelines are available from the NMFS Northwest Region, Protected Resources Division in Portland, Oregon.

- a. Reasonable effort should be made to avoid handling fish in warm water temperatures, such as conducting fish evacuation first thing in the morning, when the water temperature would likely be coolest. No electrofishing should occur when water temperatures are above 18°C or are expected to rise above this temperature prior to concluding the fish capture.
- b. If fish are observed spawning during the in-water work period, electrofishing shall not be conducted in the vicinity of spawning adult fish or active redds.
- c. Only Direct Current (DC) or Pulsed Direct Current (PDC) shall be used.
- d. Conductivity <100, use voltage ranges from 900 to 1100. Conductivity from 100 to 300, use voltage ranges from 500 to 800. Conductivity greater than 300, use voltage to 400.
- e. Begin electrofishing with minimum pulse width and recommended voltage and then gradually increase to the point where fish are immobilized and captured. Turn off current once fish are immobilized.
- f. Do not allow fish to come into contact with anode. Do not electrofish an area for an extended period of time. Remove fish immediately from water and handle as described below. Dark bands on the fish indicate injury, suggesting a reduction in voltage and pulse width and longer recovery time.
- g. If mortality is occurring during salvage, immediately discontinue salvage operations (unless this would result in additional fish mortality), reevaluate the current procedures, and adjust or postpone procedures to reduce mortality.

### **4. Dewater Construction Site –**

When dewatering is necessary to protect species and/or critical habitat, divert flow around the construction site with a coffer dam (built with non-erosive materials) and an associated pump, a by-pass culvert, or a water-proof lined diversion ditch. Diversion sandbags can be filled with material mined from the floodplain as long as such material is replaced at end of project. Small amounts of instream material can be moved to help seal and secure diversion structures. Pumps must have fish screens and be operated in accordance with NMFS fish screen criteria described in part 5 of this section. Dissipate flow energy at the bypass outflow to prevent damage to riparian vegetation or stream channel. If diversion allows for downstream fish passage, place diversion outlet in a location to promote safe reentry of fish into the stream channel, preferably into pool habitat with cover. When necessary, pump seepage water from the de-watered work area to a temporary storage and treatment site or into upland areas and allow water to filter through vegetation prior to reentering the stream channel.

## **5. Fish screens for Dewatering**

**a. NMFS Hydro Fish Passage Review and Approve** – When using Fish screens for surface water that is diverted by gravity or by pumping at a rate that exceeds 3 cfs, the BLM, FS and BIA will ensure that the action is individually reviewed by the Portland office of the NMFS' Habitat Conservation Division for consistency with criteria in *NOAA Fisheries Anadromous Salmonid Passage Facility Design* (NMFS 2011), located at: <http://www.nwr.noaa.gov/Salmon-Hydropower/FERC/upload/Fish-Passage-Design.pdf> Refer to section "F" of this chapter.

**c.** All other diversions will have a fish screen that meets the following specifications: (a) An automated cleaning device with a minimum effective surface area of 2.5 square feet per cfs, and a nominal maximum approach velocity of 0.4 feet per second (fps), or no automated cleaning device, a minimum effective surface area of 1 square foot per cfs, and a nominal maximum approach rate of 0.2 fps; and (b) a round or square screen mesh that is no larger than 2.38 mm (0.094") in the narrow dimension, or any other shape that is no larger than 1.75 mm (0.069") in the narrow dimension.

**d.** Each fish screen will be installed, operated, and maintained according to NMFS' fish screen criteria (NMFS 2011, or most recent version). NMFS fish screen criteria applies to federally listed salmonid species under their jurisdiction as well as bull trout, Oregon chub, shortnose sucker, Lahontan cutthroat trout, Lost River sucker, Modoc sucker, and Warner sucker under FWS jurisdiction.

## **6. Stream Re-watering –**

Upon project completion, slowly re-water the construction site to prevent loss of surface water downstream as the construction site streambed absorbs water and to prevent a sudden increase in stream turbidity. Monitor downstream during re-watering to prevent stranding of aquatic organisms below the construction site.

## **7. Salvage Notice –**

NOTICE: If a sick, injured, or dead specimen of a threatened or endangered species is found in the project area, the finder must notify NMFS through the contact person identified in the transmittal letter for this opinion, or through the NMFS Office of Law Enforcement at 1-800-853-1964, and follow any instructions. If the proposed action may worsen the fish's condition before NMFS can be contacted, the finder should attempt to move the fish to a suitable location near the capture site while keeping the fish in the water and reducing its stress as much as possible. Do not disturb the fish after it has been moved. If the fish is dead, or dies while being captured or moved, report the following information: (a) NMFS consultation number; (b) the date, time, and location of discovery; (c) a brief description of circumstances and any information that may show the cause of death; and (d) photographs of the fish and where it was found. The NMFS also suggests that the finder coordinate with local biologists to recover any tags or other relevant research information. If the specimen is not needed by local biologists for tag recovery or by NMFS for analysis, the specimen should be returned to the water in which it was found, or otherwise discarded.

## **Large Wood Placement**

includes large wood (LW) placement, engineered logjams (ELJs), and tree removal for LW projects. Such activities will occur in areas where channel structure is lacking due to past stream cleaning (LW

removal), riparian timber harvest, and in areas where natural gravel supplies are low due to anthropogenic disruptions. These projects will occur in stream channels and adjacent floodplains to increase channel stability, rearing habitat, pool formation, spawning gravel deposition, channel complexity, hiding cover, low velocity areas, and floodplain function. Equipment such as helicopters, excavators, dump trucks, front-end loaders, full-suspension yarders, and similar equipment may be used to implement projects.

### **1. Large Wood Projects**

- i. Place LW in areas where they would naturally occur and in a manner that closely mimic natural accumulations for that particular stream type.
- ii. Structure types shall simulate disturbance events to the greatest degree possible and include, but are not limited to, log jams, debris flows, wind-throw, and tree breakage.
- iii. No limits are to be placed on the size or shape of structures as long as such structures are within the range of natural variability of a given location and do not block fish passage.
- iv. Projects can include grade control and bank stabilization structures, while size and configuration of such structures will be commensurate with scale of project site and hydraulic forces.
- v. The partial burial of LW is permitted and may constitute the dominant means of placement. This applies to all stream systems but more so for larger stream systems where use of adjacent riparian trees or channel features is not feasible or does not provide the full stability desired.
- vi. LW includes whole conifer and hardwood trees, logs, and rootwads. LW size (diameter and length) should account for bankfull width and stream discharge rates. When available, trees with rootwads should be a minimum of 1.5x bankfull channel width, while logs without rootwads should be a minimum of 2.0 x bankfull width.
- vii. Structures may partially or completely span stream channels or be positioned along stream banks.
- viii. Stabilizing or key pieces of LW must be intact, hard, with little decay, and if possible have root wads (untrimmed) to provide functional refugia habitat for fish. Consider orienting key pieces such that the hydraulic forces upon the large wood increases stability
- ix. Anchoring Large Wood – Anchoring alternatives may be used in preferential order:
  - (a) use of adequately sized wood sufficient for stability
  - (b) orient and place wood in such a way that movement is limited
  - (c) ballast (gravel and/or rock) to increase the mass of the structure to resist movement
  - (d) use of large boulders as anchor points for the LW

### **2. Engineered Logjams (ELJs) –**

are structures designed to redirect flow and change scour and deposition patterns. To the extent practical, they are patterned after stable natural log jams and can be either unanchored or anchored in place using rebar, rock, or piles. Engineered log jams create a hydraulic shadow, a low-velocity zone downstream that allows sediment to settle out. Scour holes develop adjacent to the log jam. While

providing valuable fish and wildlife habitat they also redirect flow and can provide stability to a streambank or downstream gravel bar.

ii. ELJs will be patterned, to the greatest degree possible, after stable natural log jams.

iv. Stabilizing or key pieces of LW that will be relied on to provide streambank stability or redirect flows must be intact, solid (little decay). If possible, acquire LW with untrimmed rootwads to provide functional refugia habitat for fish.

v. When available, trees with rootwads attached should be a minimum length of 1.5 times the bankfull channel width, while logs without rootwads should be a minimum of 2.0 times the bankfull width.

vi. The partial burial of LW may constitute the dominant means of placement, and key LW can be buried into the stream bank or channel

vii. Angle and Offset – The LW portions of engineered log jam structures should be oriented such that the forces upon the large wood increases stability. If a rootwad is left exposed to the flow, the bole placed into the streambank should be oriented downstream parallel to the flow direction so the pressure on the rootwad pushes the bole into the streambank and bed. Wood members that are oriented parallel to flow are more stable than members oriented at 45 or 90 degrees to the flow.

viii. If LW anchoring is required, a variety of methods may be used. These include buttressing the wood between riparian trees, the use of manila, sisal or other biodegradable ropes for lashing connections. If hydraulic conditions warrant use of structural connections, such as rebar pinning or bolted connections, may be used. Rock may be used for ballast but is limited to that needed to anchor the LW.

### **3. Tree Removal for LW Projects**

i. Live conifers and other trees can be felled or pulled/pushed over in the RR, RHCA, and upland areas (e.g., LSR, AMA, NSO/MaMu CH) for in-channel large wood placement only when conifers and trees are fully stocked. Tree felling shall not create excessive stream bank erosion or increase the likelihood of channel avulsion during high flows.

ii. Danger trees and trees killed through fire, insects, disease, blow-down and other means can be felled and used for in-channel placement regardless of live-tree stocking levels.

iii. Trees may be removed by cable, ground-based equipment, horses or helicopters.

iv. Trees may be felled or pushed/pulled directly into a stream and/or floodplain.

v. Trees may be stock piled for future instream restoration projects.

vi. The project manager for an aquatic restoration action under ARBA II will coordinate with an action-agency wildlife biologist in tree-removal planning efforts.

vii. In Northern Spotted Owl (NSO) and Marbled Murrelet (MAMU) habitat, meet the following requirements:

(a) PDC listed in II. H. 2. b. and c.

(b) The following Project Design Criteria applies to tree removal within the range of marbled murrelets (MAMU) and the northern spotted owl (NSO) in Douglas-fir dominated stands less than 80 years old that are not functioning as foraging habitat within a spotted owl home range nor do they contain murrelet nesting structure. It does not apply to tree selection in older stands or hardwood-dominated stands unless stated otherwise. The purpose of these criteria is to ensure that there would be no removal or adverse modification of suitable habitat for MAMU or NSO.

(i) A wildlife biologist must be fully involved in all tree-removal planning efforts, and be involved in making decisions on whether individual trees are suitable for nesting or have other important listed bird habitat value.

(ii) Trees can be removed to a level not less than a Relative Density (RD) of approximately 35, which is considered as fully occupying a site. This equates to approximately 60 trees per acre in the overstory and a tree spacing averaging 26 feet. Additionally, 40% canopy cover would be maintained when in NSO or MAMU CH, when within 300 feet of occupied or unsurveyed murrelet nesting structure, and when dispersal habitat is limited in the area.

(iii) Trees to be removed can be live, hazard trees, or killed through fire, insects, disease, blow down and other means. Down trees and snags should only be removed if the stand will retain NWFP standards post removal.

(iv) Trees may be removed by cable, ground-based equipment, horses or helicopters, felled or pushed/pulled directly into a stream. Trees may be stock piled for future instream restoration projects.

(v) Tree species removed should be relatively common in the stand (i.e., not "minor" tree species).

(vi) Snags and trees with broad, deep crowns ("wolf" trees), damaged tops or other abnormalities that may provide a valuable wildlife habitat component should be reserved.

(vii) No gaps (openings) greater than 0.25 acre will be created in spotted owl CH. No gaps greater than ¼ acre will be created in murrelet CH. No gaps shall be created in Riparian Reserves that contain ESA-listed fish habitat.

(viii) The following Project Design Criteria applies to tree removal within the range of MAMU and the NSO in Douglas-fir dominated stands greater than 80 years old or that are functioning as foraging habitat within a NSO home range, and/or do contain MAMU nesting structure.

(a) Individual trees or small groups of trees should come from the periphery of permanent openings (roads etc.) or from the periphery of non-permanent openings (e.g., plantations, along recent clear-cuts etc.). Groups of trees greater than 4 trees shall 1) not be within MAMU suitable stands or stands buffering (300 ft.) MM suitable stands, 2) not be buffering (300 ft.) individual trees with MAMU nesting structure. A minimum distance of one potential tree height feet should be maintained between individual or group removals.

(b) Trees up to 36" dbh may be felled in any stands with agreement from a wildlife biologist that the trees are not providing MAMU nesting structures or providing cover for nest sites. No known NSO nest trees or alternate nest trees are to be removed. Potential NSO nest trees may only be removed in

limited instances when it is confirmed with the wildlife biologist that nest trees will not be limited in the stand post removal.

(c) In order to minimize the creation of canopy gaps or edges, groups of adjacent trees selected should not create openings greater than ¼ acre within 0.5 miles of MAMU occupied habitat or when within murrelet CH. Within NSO CH, stands greater than 80 years old or within stands providing foraging habitat to NSO home ranges, gaps will be restricted to 0.5-acre openings or less. Gaps shall not be created in Riparian Reserves where ESA-listed fish occur.

### Off- and Side-Channel Habitat Restoration

projects will be implemented to reconnect historic side-channels with floodplains by removing off-channel fill and plugs. Furthermore, new side-channels and alcoves can be constructed in geomorphic settings that will accommodate such features. This activity category typically applies to areas where side channels, alcoves, and other backwater habitats have been filled or blocked from the main channel, disconnecting them from most if not all flow events. These project types will increase habitat diversity and complexity, improve flow heterogeneity, provide long-term nutrient storage and substrate for aquatic macroinvertebrates, moderate flow disturbances, increase retention of leaf litter, and provide refuge for fish during high flows. Equipment such as excavators, bull dozers, dump trucks, front-end loaders, and similar equipment may be used to implement projects.

#### 1. Data Requirements –

Data requirements and analysis for off- and side-channel habitat restoration include evidence of historical channel location, such as land use surveys, historical photographs, topographic maps, remote sensing information, or personal observation.

#### 2. Allowable Excavation –

Off- and side-channel improvements can include minor excavation (< 10% of volume) of naturally accumulated sediment within historical channels. There is no limit as to the amount of excavation of anthropogenic fill within historic side channels as long as such channels can be clearly identified through field and/or aerial photographs. Excavation depth will not exceed the maximum thalweg depth in the main channel. Excavated material removed from off- or side-channels shall be hauled to an upland site or spread across the adjacent floodplain in a manner that does not restrict floodplain capacity.

### Set-back or Removal of Existing Berms, Dikes, and Levees

will be conducted to reconnect historic fresh-water deltas to inundation, stream channels with floodplains, and historic estuaries to tidal influence as a means to increase habitat diversity and complexity, moderate flow disturbances, and provide refuge for fish during high flows. Other restored ecological functions include overland flow during flood events, dissipation of flood energy, increased water storage to augment low flows, sediment and debris deposition, growth of riparian vegetation, nutrient cycling, and development of side channels and alcoves. Such projects will take place where estuaries and floodplains have been disconnected from adjacent rivers through drain pipes and anthropogenic fill. Equipment such as excavators, bull dozers, dump trucks, front-end loaders, and similar equipment may be used to implement projects.

## Floodplains and Freshwater Deltas

- i. Design actions to restore floodplain characteristics—elevation, width, gradient, length, and roughness—in a manner that closely mimics, to the extent possible, those that would naturally occur at that stream and valley type.
- iii. To the extent possible, remove nonnative fill material from the floodplain to an upland site.
- iv. Where it is not possible to remove or set-back all portions of dikes and berms, or in areas where existing berms, dikes, and levees support abundant riparian vegetation, openings will be created with breaches. Breaches shall be equal to or greater than the active channel width to reduce the potential for channel avulsion during flood events. In addition to other breaches, the berm, dike, or levee shall always be breached at the downstream end of the project and/or at the lowest elevation of the floodplain to ensure the flows will naturally recede back into the main channel thus minimizing fish entrapment.
- v. Elevations of dike/levee setbacks shall not exceed the elevation of removed structures
- vi. When necessary, loosen compacted soils once overburden material is removed. Overburden or fill comprised of native materials, which originated from the project area, may be used within the floodplain to create set-back dikes and fill anthropogenic holes provided that floodplain function is not impeded.

## Reduction/Relocation of Recreation Impacts –

Intended to close, better control, or relocate recreation infrastructure and use along streams and within riparian areas. This includes removal, improvement, or relocation of infrastructure associated with designated campgrounds, dispersed camp sites, day-use sites, foot trails, and off-road vehicle (ORV) roads/trails in riparian areas. The primary purpose is to eliminate or reduce recreational impacts to restore riparian areas and vegetation, improve bank stability, and reduce sedimentation into adjacent streams. Equipment such as excavators, bull dozers, dump trucks, front-end loaders, and similar equipment may be used to implement projects.

- a. Design remedial actions to restore floodplain characteristics—elevation, width, gradient, length, and roughness—in a manner that closely mimics, to the extent possible, those that would naturally occur at that stream and valley type.
- b. To the extent possible, non-native fill material shall be removed from the floodplain to an upland site.
- c. Overburden or fill comprised of native materials, which originated from the project area, can be used to reshape the floodplain, placed in small mounds on the floodplain, used to fill anthropogenic holes, buried on site, and/or disposed into upland areas.
- d. For recreation relocation projects—such as campgrounds, horse corrals, ORV trails—move current facilities out of the riparian area or as far away from the stream as possible.
- e. Consider de-compaction of soils and vegetation planting once overburden material is removed.
- f. Place barriers—boulders, fences, gates, etc.—outside of the bankfull width and across traffic routes to prevent ORV access into and across streams.

## Road and Trail Erosion Control and Decommissioning-

Includes hydrologically closing or decommissioning roads and trails, including culvert removal in perennial and intermittent streams; removing, installing or upgrading cross-drainage culverts; upgrading culverts on non-fish-bearing streams; constructing water bars and dips; reshaping road prisms; vegetating fill and cut slopes; removing and stabilizing of side-cast materials; grading or resurfacing roads that have been improved for aquatic restoration with gravel, bark chips, or other permeable materials; contour shaping of the road or trail base; removing road fill to native soils; soil stabilization and tilling compacted surfaces to reestablish native vegetation. This category also includes programmatic/public notice road closures under FS and BLM/BIA equivalent Travel and Access Management Plans. Such actions will target priority roads that contribute sediment to streams, block fish passage, and/or disrupt floodplain and riparian functions. Equipment such as excavators, bull dozers, dump trucks, front-end loaders, and similar equipment may be used to implement projects.

### **1. Road Decommissioning and Stormproofing**

- i. For road decommissioning and hydrologic closure projects within riparian areas, recontour the affected area to mimic natural floodplain contours and gradient to the extent possible.
- ii. When obliterating or removing segments immediately adjacent to a stream, consider using sediment control barriers between the project and stream.
- iii. Dispose of slide and waste material in stable sites out of the flood-prone area. Native material may be used to restore natural or near-natural contours.
- iv. Drainage features used for stormproofing and treatment projects should be spaced as to hydrologically disconnect road surface runoff from stream channels. If grading and resurfacing is required, use gravel, bark, or other permeable materials for resurfacing.
- v. Minimize disturbance of existing vegetation in ditches and at stream crossings.
- vi. Conduct activities during dry-field conditions (generally May 15 to October 15) when the soil is more resistant to compaction and soil moisture is low.
- vii. When removing a culvert from a first or second order, non-fishing bearing stream, project specialists shall determine if culvert removal should include stream isolation and rerouting in project design. Culvert removal on fish bearing streams shall adhere to the measures described in the Fish Passage Restoration activity category.
- viii. For culvert removal projects, restore natural drainage patterns and channel morphology. Evaluate channel incision risk and construct in-channel grade control structures when necessary.

### **2. Road Relocation**

- i. When a road is decommissioned in a floodplain and future vehicle access through the area is still required, relocate the road as far as practical away from the stream.

ii. The relocation will not increase the drainage network and will be constructed to hydrologically disconnect it from the stream network to the extent practical. New cross drains shall discharge to stable areas where the outflow will quickly infiltrate the soil and not develop a channel to a stream.

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