

to allow natural fish migration out of the isolated areas, seining of the channel and ultimately electro-shocking. Contractor shall coordinate with the Contracting Officer to develop and agree upon flow reduction timings and rates during the switch of water into and out of bypass channels.

15. If the Contractor attempts to construct a portion of the project without fully dewatering the site, and is unable to construct the item as shown on the Drawings to the satisfaction of the Contracting Officer, the Contractor shall receive no additional compensation for removing the unacceptable work and replacing it with a correctly constructed work, and shall receive no additional compensation for dewatering performed at that location during subsequent attempts to perform the work in question.

1.3 – SUBMITTALS

Submit a Cofferdam and Flow Diversion Plan and a Dewatering plan in accordance with the Submittal specification. The Cofferdam and Flow Diversion Plan and Dewatering Plan shall be submitted by the Contractor within ten (10) days of receiving notice to proceed. The Contractor shall work closely with the Contracting Officer to determine feasibility given staff availability for fish salvage. The Cofferdam and Flow Diversion Plan shall meet HIP III Conservation Measures and be in accordance with the Drawings and Specifications.

1. Cofferdam and Flow Diversion Plan

- Show details of proposed methods for providing temporary isolation of surface water during construction activities at each location requiring isolation with a cofferdam. Detailed and specific drawings shall be provided for each separate work area requiring cofferdam installation. Include proposed material used to construct cofferdam. If bulk bags or other gravel filled bags are proposed, material to be used to fill bags shall be identified. Bags filled with granular soils material shall use material that is naturally rounded rock with a similar gradation as the existing creek bed material, with no fines.
- Show details of proposed methods to temporarily block all flow in the creek and divert flow at each location requiring flow diversion dams to divert flow and allow work in the existing creek channel. Detailed and specific drawings shall be provided for each flow diversion dam. Include proposed methods and materials used to construct flow diversion dam. If bulk bags or other gravel filled bags are proposed, material to be used to fill bags shall be identified. Bags filled with granular soils material shall use material that is naturally rounded rock with a similar gradation as the existing creek bed material, with no fines.
- Contractor shall include anticipated timing for construction of all cofferdams and flow diversion dams to be used for isolating all work areas in the Cofferdam and Flow Diversion Plan.

2. Dewatering Plan

- Show proposed method for removal of water from within work zones to meet minimum requirements for construction. Include details related to pump intake location, pump capacity, and pump discharge location.
 - Review and approval of the Dewatering Plan by the Contracting Agency shall not relieve the Contractor from full responsibility for the adequacy of dewatering work if the proposed plan is not successful at dewatering the site.

1.4 - COFFERDAM AND FLOW DIVERSION PLAN

ZONE 1 - Irrigation Diversion Dewatering & Work Sequencing Plan - Contractor may adjust this plan as needed to facilitate construction as long as all turbidity, fish salvage and HIP III conservation measures are met. Any deviations from this plan shall be preapproved by the Engineer and Sponsor.

1. Place coffer dams at existing inlet of side channel and at proposed inlet of side channel.
2. Coordinate fish salvage efforts with the Sponsor. Salvage fish out of existing side channel.
3. Place coffer dam at downstream limits of proposed side channel.
4. Excavate new diversion channel. Strip and stockpile sod and top soil.
5. Place gravels, topsoil and wetland sod from new diversion channel into the old channel starting at the upstream end and progressing downstream to the location of the upstream end of the alcove per the Drawings. Continue placement of gravels, topsoil, and wetland sod until material runs out leaving an alcove (unfilled portion of the existing side channel) with bank locations as shown in the Drawings or as directed by the Contracting Officer.
6. Treat bank edges where new channel crosses the old channel as specified on the Drawings
7. Remove cofferdams (downstream and old inlet first) and re-water new irrigation diversion per HIP III Conservation Measures

ZONE 2 - Bypass Channel I Dewatering & Work Sequencing Plan - Contractor may adjust this plan as needed to facilitate construction, as long as all turbidity, fish salvage and HIP III conservation measures are met. Any deviations from this plan shall be preapproved by the Engineer and Sponsor.

1. Excavate Channel 1 from 33+50 to 37+50. Strip wetland sod and stockpile for bank fill areas. Strip and sort topsoil and gravels for channel fill areas.
2. Place cofferdams at upstream and downstream end of bypass channel to enable construction of those connections. Fish salvage these isolations.

3. Excavate Bypass Channel I – Upstream 100’ – Strip and stock pile all materials for reclamation. Lower bypass channel - Strip wetland sod and stockpile for bank fill areas. Strip and sort topsoil and gravels to use in channel fill areas. Place riffles, any necessary gravel streambed material and boulder clusters to provide channel roughness and allow juvenile fish passage upstream.
4. Pre-wash entire dewatering channel per HIP III Conservation Measures.
 - a) This includes pumping of pre-wash water out to an approved disposal area.
5. Remove downstream cofferdam.
6. Partially remove upstream connection cofferdam and begin cofferdam construction at inlet in the main channel. Divert flows down bypass channel per HIP III Conservation Measures and coordinate fish salvage in dewatered channel with the Sponsor.
7. Install backwater cofferdam at downstream end.
8. Strip borrow source and stockpile sod and topsoil for reclamation
9. Place bank fill, install edge treatments, log structures and willow clumps, excavate pools/thalweg, plant willows, place wetland sod, seed bare soil in the isolated work area
10. Remove cofferdams and re-water the new river channel from per HIP III Conservation Measures
11. Reclaim Bypass Channel I – PARTIAL RECLAMATION/ALCOVE
 - a) Install upstream bank treatment as specified in the Drawings
 - b) Backfill a minimum of 100 liner feet at the upstream most extent by placing native fill in 12” lifts and compact to 85% relative compaction.
 - c) Back fill to 1’ below existing floodplain grade, replace topsoil and wetland sod to match existing conditions.
 - d) Taper downstream end of filled bypass channel at a 10:1 slope.
 - e) Press edges of remaining alcove down with the back of the excavator bucket to smooth rough edges.

ZONE 3 - Bypass Channel II Dewatering & Work Sequencing Plan - Contractor may adjust this plan as needed to facilitate construction, as long as all turbidity, fish salvage and HIP III conservation measures are met. Any deviations from this plan shall be preapproved by the Engineer and Sponsor.

1. Place cofferdams at upstream and downstream connections of bypass channel.
2. Excavate Bypass Channel II –Strip and stock pile all materials for reclamation. Place riffles, any necessary streambed material, and boulder clusters to provide channel roughness and provide upstream juvenile fish passage.
3. Pre-wash entire dewatering channel per HIP III Conservation Measures.

1. This includes pumping of pre-wash water out to an approved disposal area.
4. Remove downstream cofferdam.
5. Partially remove upstream connection cofferdam and begin cofferdam construction at inlet in the main channel. Divert flows down bypass channel per HIP III Conservation Measures and coordinate fish salvage in dewatered channel with the Sponsor.
6. Install backwater cofferdam at downstream end.
7. Excavate Channel 1 from 38+00 to 40+00. Strip wetland sod and stockpile for bank fill areas. Strip and sort topsoil and gravels for channel fill areas.
8. Place bank fill, install edge treatments, log structures and willow clumps, excavate pools/thalweg, plant willows, place wetland sod, seed bare soil in the isolated work area
9. Remove cofferdams and re-water the new river channel from per HIP III Conservation Measures
10. Reclaim Bypass Channel II – FULL RECLAMATION
 - a) Install bank treatments as specified in the Drawings
 - b) Backfill entire channel by placing native fill in 12" lifts and compact to 85% relative compaction.
 - c) Back fill to 1' below existing floodplain grade, replace topsoil and wetland sod to match existing conditions.

ZONE 4 - Bypass Channel III - Dewatering & Work Sequencing Plan - Contractor may adjust this plan as needed to facilitate construction, as long as all turbidity, fish salvage and HIP III conservation measures are met. Any deviations from this plan shall be preapproved by the Engineer and Sponsor.

1. Place cofferdams at upstream and downstream connections of bypass channel.
2. Excavate Bypass Channel III –Strip and stock pile all materials for reclamation. Place boulder clusters to provide channel roughness.
3. Pre-wash entire dewatering channel per HIP III Conservation Measures.
 - (1) This includes pumping of pre-wash water out to an approved disposal area.
4. Remove downstream cofferdam.
5. Partially remove upstream connection cofferdam and begin cofferdam construction at inlet in the main channel. Divert flows down bypass channel per HIP III Conservation Measures and coordinate fish salvage in dewatered channel with the Sponsor.
6. Install backwater cofferdam at downstream end.

7. Place bank fill, install edge treatments, log structures and willow clumps, excavate pools/thalweg, plant willows, place wetland sod, seed bare soil in the isolated work area
8. Remove cofferdams and re-water the new river channel per HIP III Conservation Measures.
9. Reclaim Bypass Channel III - FULL RECLAMATION
 - a) Install upstream bank treatment as specified in the Drawings
 - b) Backfill a minimum by placing native fill in 12" lifts and compact to 85% relative compaction.
 - c) Back fill to 1' below existing floodplain grade, replace topsoil and wetland sod to match existing conditions.

ZONE 5 - Upper Channel (50+00 to 61+00) Dewatering & Work Sequencing Plan - Contractor may adjust this plan as needed to facilitate construction, as long as all turbidity, fish salvage and HIP III conservation measures are met. Any deviations from this plan shall be preapproved by the Engineer and Sponsor.

1. Isolate individual work areas using cofferdams. Coordinate fish salvage in local isolation zones with the Sponsor.
2. Place bank fill or post line willow weave fences, install edge treatments, log structures and willow clumps, excavate pools/thalweg, plant willows, place wetland sod, seed bare soil in the isolated work area.
3. Remove cofferdams.
4. Place cofferdams cutting off north split flow channel (Upstream first, downstream last). Coordinate fish salvage in dewatered channel with the Sponsor.
5. Place bank fill or post line willow weave fences, install edge treatments, log structures and willow clumps, excavate pools/thalweg, plant willows, place wetland sod, seed bare soil in the isolated work area.
6. Remove cofferdams and re-water the new river channel per HIP III Conservation Measures.
7. Place cofferdams cutting off south split flow channel (Upstream first, downstream last). Coordinate fish salvage in dewatered channel with the Sponsor.
8. Place bank fill, install edge treatments, log structures and willow clumps, excavate pools/thalweg, plant willows, place wetland sod, seed bare soil in the isolated work area.
9. Remove cofferdams and re-water the new river channel per HIP III Conservation Measures.

1.5 - DEWATERING PLAN

1. Provide, maintain, and operate necessary pumps and other equipment for removal of water from excavations for LWM structure placement such that water remaining in the work area while construction activities are performed shall be no deeper than the diameter of the log(s) in the lowest layer of the structure.
2. Provide, maintain, and operate necessary pumps and other equipment for removal of water from channel excavations such that the Contracting Officer can easily measure the finished elevation of the channel bed.
3. Discharge locations from dewatering pumps shall be identified in coordination with the Contracting Officer. Discharge locations and methods shall be selected such that water quality standards are maintained, no erosion of topsoil takes place, land owner activities are not adversely affected, and no regulatory agency permit conditions are violated.

SECTION 2 – EARTHWORK

2.1 - WORK INCLUDED

1. Excavation, rough grading, and final grading of new channels, side channels, and pools.
2. Re-shaping of existing channel (bank fill areas).
3. Excavation for and backfill of wood habitat structures.
4. Excavation of material source areas for bank fill.

2.2 - MATERIALS

1. Native Material – Material meeting the following criteria:
 - Located within the excavation and grading limits
 - Free of rocks larger than 4 inches
 - Relatively free of roots and other organic matter, ashes, cinders, concrete, trash, debris, and other deleterious materials.
 - Acceptable to the Contracting Officer for use during backfill, excavation and embankment work activities.
2. Coarse Gravel – Material meeting the following criteria:
 - Sourced onsite from within the excavation and grading limits or imported.
 - Well graded from gravel to cobble sized material ranging from ½ inch to 6-inch particle sizes and no more than 20 percent by weight passing the No. 200 sieve size and maximum particle size of 12 inches.
3. Topsoil – Material meeting the following criteria:
 - Sourced onsite from within the excavation and grading limits.
 - Consists of clay, silt, sand and gravel material (2-inch maximum dimension).
 - Generally free of larger gravel, cobbles, and boulders.
 - Free from foreign matter, hazardous or toxic substances, and deleterious material that may be harmful to plant growth or may hinder grading, planting or maintenance.
4. Boulders – Material meeting the following criteria:

- Sourced onsite from within the excavation and grading limits or imported.
- Rounded or semi-rounded boulders 12 to 24-inches in diameter.
- The smallest axis shall not measure 1/3 or less of the largest axis measurement.

2.3 - SITE CLEARING

1. Prepare site only after adequate erosion and sediment controls are in place.
2. Identify/mark the limits of clearing and obtain Contracting Officer approval prior to clearing any vegetation.
3. After clearing limits have been approved by the Contracting Officer, remove vegetation and other debris within the clearing limits.
4. Remove rubbish, trash, car bodies, and junk from within clearing limits from the Project Site and dispose of at an approved disposal site.
5. Burning of debris onsite will not be allowed.

2.4 – GENERAL EXCAVATION AND FILL

1. No soil subsurface data is available for this project. The Contractor shall be responsible for any necessary subsurface investigations as they relate to this project.
2. Excavate according to the lines and grades shown on the Drawings, or by field clarification by the Contracting Officer or Engineer. No excavation or fill shall be performed outside designated areas on the Drawings.
3. Perform operations so that the excavations will yield as much suitable material for construction as practicable including separation and segregation of suitable materials from waste materials. Reuse excavated material where it meets the specified requirements for fill at a given location.
4. Fill and backfill to contours, elevations and dimensions indicated. Do not place fill over frozen or excessively wet areas.
 - a. Material excavated when frozen or when air temperature is less than 32°F shall not be used as fill or backfill until material completely thaws.
 - b. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.
5. Place fill in horizontal lifts extending the full width and length of the areas shown. Lift thickness shall not exceed 12". Distribute fill material in a manner that will prevent the development of voids, pockets and/or poorly mixed material.
6. The combined excavation and placing operations should be such that the fill materials will be mixed and blended sufficiently to provide the most homogeneous section and best practical degree of compaction and stability.
7. A smooth transition shall be graded around all structures and between proposed and existing grades.

8. Contractor may obtain extra material, or replace unsuitable stream material, from the borrow areas as shown on the Drawings, at the Contractor's discretion to achieve the project objectives in the timeliest manner. Fill areas depicted on the plans can be constructed with native material from the channel excavations or the borrow source, if it meets the grading specifications outlined on the Drawings. Material may be stockpiled, sorted, and stored in the staging and stockpile areas shown on the Drawings.
9. The project was designed to balance cut and fill quantities. The contractor is responsible for balancing quantities within the site such that the fill grades are met, Bypass channel II and III are restored to existing grades and all ruts are reclaimed.
10. Backfill material shall be placed in 12-inch lifts, and compacted thoroughly. No testing of compacted density will be performed; acceptance will be by the Contracting Officer observing fill placement and compaction effort. The intent of compaction will be to achieve approximately 85% relative density.

2.5 – FINISH GRADING

1. Finish grading shall be within ± 0.50 feet Horizontal and ± 0.10 feet Vertical of the locations and elevations shown on the Drawings and construction stakes.
2. Finished grades shall be flush with adjacent surfaces unless otherwise indicated.
3. Compaction of finished surface is not required where the finished channel surface is achieved through excavation only. Compaction using equipment tracks and/or the excavator bucket is required where the finished floodplain or channel surface is achieved by the placement of fill. Fill and backfill areas shall be compacted to a minimum 85% relative density of material.
4. Finish grading shall be inspected and approved by the Engineer prior to rewatering. The Engineer will flag areas that should be adjusted and review with the contractor. The contractor is responsible for making all adjustments prior to rewatering per HIP III conservation measures.

2.6 – BORROW SOURCE RECLAMATION

1. At completion of channel construction/excavation, Contractor shall slope borrow source edges to 5:1 and prep for seeding.
2. If fill material is placed in the borrow pit to achieve the desired slope, place in (1) foot maximum lifts and compact using mechanical compaction equipment or multiple passes with tracked equipment.
3. All fill material shall have had suitable time to drain and dry out prior to placement in the borrow areas.

2.7 – CONSTRUCTION OF BANK AND CHANNEL FILL

1. At locations where the channel requires fill to create the shape and topography shown on the Drawings, the Contractor shall place excavated or borrow source material in one (1) foot maximum lifts and compact using mechanical methods, not limited to, but including the excavator bucket or by walking over area with tracked equipment.
2. Fill to create the shape and topography shown in the Drawings can come from channel excavations, or the borrow area depicted in the drawings, whichever is more suitable. Fill for the bank fill areas shall be well graded and predominantly fine sandy loam or gravelly sandy loam. To meet the grading tolerances, all fill placed in the upper 0.25 feet shall contain predominantly material $\leq 2''$. Fill in this upper zone should not be constructed from large cobbles ($>4''$ material). The larger material ($> 4''$) shall be reserved for the subgrade fill in areas up to 0.25 feet from the finish grades.

2.8 – CHANNEL EXCAVATION, POOLS & ALCOVES

1. At locations where the channel requires excavation to create the channel, pools or alcoves, Contractor shall excavate to the dimensions and side slopes specified on the Drawings.
2. A smooth transition shall be graded between all riffles, pools, alcoves, and glides. Tailout slopes shall be as shown in the Drawings.
3. Pool and alcove side slopes shall be 1.5 Horizontal:1 Vertical or the angle of repose.
4. The native material underlying the channel at all excavations shall be left in place. Imported fill is not necessary in these locations.

2.9 - BANK TREATMENT A - INSIDE

1. Place GEOCOIR 700 erosion control fabric on the existing grade 2' from the desired fill edge, place C125BN erosion control fabric directly on top of the GEOCOIR 700 to retain fines, place fill in 1' maximum lifts and compact using the excavator bucket until the desired elevation and a 2:1 slope is achieved. Broadcast riparian seed mix onto the edge and wrap the C125BN and GEOCOIR 700 to cover the exposed edge, trench 1' of the fabric into the compacted fill. Stake with 18'' wooden stakes, 2.5' apart on a diamond pattern.
2. Finish backfilling channel fill area with compacted fill in 1' maximum lifts. Prep the top 0.25' to meet the seed bed specification by removing all stones and dirt clods greater than 2'' and raking a smooth seed bed consisting of loose soil.
3. Place salvaged wetland sod according to the drawings with the excavator and press down with the excavator bucket.
4. Broadcast seed bare soil according to the seeding specifications.

2.10 - BANK TREATMENT B - OUTSIDE

1. Place GEOCOIR 700 erosion control fabric on the existing grade 2' from the desired fill edge, place C125BN erosion control fabric directly on top of the GEOCOIR 700 to retain fines, place fill in 1' maximum lifts and compact using the excavator bucket until the desired elevation and a 2:1 slope is achieved. Broadcast riparian seed mix onto the edge and wrap the C125BN and GEOCOIR 700 to cover the exposed edge, trench 1' of the fabric into the compacted fill. Stake with 18" wooden stakes, 2.5' apart on a diamond pattern.
2. Plant either a DR-30 or 5-gallon native willow on a 5' spacing directly behind the trenched erosion control fabric at an angle to encourage overhanging branches. Potted willows will be supplied by the Sponsor.
3. Finish backfilling point bar with compacted fill in 1' maximum lifts. Prep the top 0.25' to meet the seed bed specification by removing all stones and dirt clods greater than 2" and raking a smooth seed bed consisting of loose soil.
4. Place salvaged wetland sod according to the drawings with the excavator and press down with the excavator bucket.
5. Plant native 5-gallon willows adjacent to the existing bank at a 5' staggered spacing from the first row of willows.
6. Broadcast seed bare soil according to the seeding specifications.

2.11 - BANK TREATMENT C - TOEWOOD

1. Install foundation logs that serve as footers for the root wad logs as directed in the Drawings or by the Contracting Officer. Foundation logs are angled in the downstream direction, 20-30 degrees off the bank alignment. Dewater the work site sufficiently so that the logs do not float during install or use a counter weight to counter the buoyancy before upper layers can be placed. Place fill around and up to the top of the foundation logs.
2. Cantilever logs with root wads over foundation logs. Root wads should be oriented in upstream direction and roughly perpendicular to the velocity vector direction.
3. Install woody slash layer in zone between logs with root wads. Slash material shall be built up to the elevation that matches the top of the root wad logs. After slash is installed, place a shallow layer of river alluvium composed of a mixture of sand, gravel and cobble to fill in the gaps of the slash material.
4. Install face logs over layer of root wad logs and slash filler material. Face logs are installed in the downstream direction, 20-30 degrees off the bank alignment. Place a shallow layer of backfill around the face logs up to the elevation of the top of logs.
5. Finish backfilling bank with compacted fill in 1' maximum lifts. Prep the top 0.25' to meet the seed bed specification by removing all stones and dirt clods greater than 2" and raking a smooth seed bed consisting of loose soil.

6. Place salvaged wetland sod according to the drawings and press down with the excavator bucket.
7. Broadcast seed bare soil according to the seeding specifications.

SECTION 3 – WOOD HABITAT STRUCTURES

3.1 – INSTALLING WOOD STRUCTURES

1. All logs shall be moved onsite a minimum number of times to prevent damage to logs and rootwads.
2. Logs with rootwads shall be handled, when moved, in a manner that preserves rootwad structure and roots intact. When moving logs with rootwads, the Contractor shall avoid grabbing the rootwad end of the logs to manipulate them.
3. Full trees with branches and tree tops with branches shall be handled with care to minimize damage to branches; transportation, handling and placement with specialized equipment is recommended.
4. Logs with rootwads that were acceptable at the time of delivery but were damaged by the Contractor during storage, staging or handling on the Project Site may be rejected by the Contracting Officer prior to installation. Rejected logs shall be replaced with acceptable logs by the Contractor at no cost to the Contracting Agency. Rejected logs may be removed from the site or incorporated into project work as directed by the Contracting Officer.
5. All cut ends of logs, including the cut end of logs with rootwads and both ends of logs without rootwads, shall be marred if the cut end is exposed after construction is complete. Marred ends shall resemble a log that was broken by natural processes such as broken during a wind storm. Cut ends of logs that are buried do not need to be marred.
6. The Engineer shall supervise the installation of the wood habitat structures to insure proper installation. The Contractor may proceed with unsupervised installation of the rest of the structures, once the Engineer has signed off that they are properly trained.
7. All structures shall be placed as shown on the Drawings. Each type of structure has specific methods of construction in the various layers. The Contractor shall pay careful attention to the type and orientation shown on the Drawings.
8. All structures shall be secured as specified. Duckbills, cables, rebar and other unnatural materials are not permitted.
9. Piles can either be over excavated or driven to the specified depth with a vibratory pile driver or other means as not to reduce the integrity of the pile.

3.2 – POST LINE WILLOW WEAVE FENCES

1. The purpose of the post line willow weave fences is to encourage the entrapment of fine sediment and the formation of a natural point bar. These structures may be installed in

the “wet” with an excavator operating from the bank to pound in the posts. The remaining structure shall be built with hand crews.

2. Willow stakes used shall range between 1/2” to 3” in diameter and have a minimum length of 8’. If the minimum length is unavailable onsite, Contractor may either propose an offsite collection site or decrease the pile spacing to ensure that a minimum of 2’ of each stake overlaps with the posts. A range of diameters is desired to minimize porosity of the fence. Stakes may be either live or dead and can be collected from willows within the project area. When harvesting, no more than 20% of a single plant shall be taken from any one live plant.
3. Posts shall be 3” diameter, 6’ length untreated fence posts installed on 3’ spacing. Pre-drill holes in each post 6” from the top of a diameter sufficient to thread ¼” manila rope.
4. Place posts with the excavator as depicted on the Drawings.
5. Weave willow stakes such that each stake is firmly in place and extends a minimum of 2’ beyond the piles. Use a mix of small and large diameter stakes to minimize porosity of fence. Alternate weave directions of each installed willow stake, firmly press down and install filler branches in voids.
6. Secure willow stakes in place with ¼” manila rope threaded through the fence posts.

3.3 – WILLOW CLUMPS

1. The purpose of the willow clumps to encourage the entrapment of fine sediment and the formation of a natural bars and/or islands OR as additional bank armoring in areas where scour is anticipated.
2. Willow clumps shall consist of a native willow and its rootball harvested from the project area a minimum of 30’ from the existing and proposed water’s edge. Willow clumps encountered when performing new channel excavations may also be used.
3. Posts shall be 3” diameter, 6’ length untreated fence posts. Pre-drill holes in each post 6” from the top of a diameter sufficient to thread ¼” manila rope.
4. Place willow clumps with the rootball facing upstream and secure with two posts as depicted on the Drawings. If clump appears to be buoyant, secure in place with ¼” manila rope.
5. Reclaim willow clump holes with borrow source material to existing grade and broadcast seed with riparian seed mix according to the seeding specifications.

3.4 – OVERHANGING WILLOW TRANSPLANTS

1. The purpose of the overhanging willow transplants is to provide cover for juvenile Chinook and Steelhead fry in zones where optimal velocities are anticipated. These structures should be installed in the dry below the anticipated low flow July water line.
2. Given the timing of transplanting, these willows are not expected to regenerate.

3. Willow transplants shall consist of a native willow and its rootball harvested from the project area a minimum of 30' from the existing water's edge. Willow transplants encountered when performing new channel excavations may also be used.
4. Excavate approximately 1' below the anticipated July water line and stock pile native topsoil and sod. Place willow transplant with the rootball in the bank and the branches overhanging the anticipated water's edge. Place a minimum of 1' of alluvium on top of the transplant to secure and replace native top soil and sod.
5. Reclaim willow transplant holes with borrow source material to existing grade and broadcast seed with riparian seed mix according to the seeding specifications.

PART III – PLANTING & RECLAMATION

SECTION 1 – GENERAL REQUIREMENTS

1.1 - WORK INCLUDED

Work includes but is not limited to:

1. Storage and care of nursery-grown plants
2. Planting containerized plants
3. Removal of all plastic plant labels
4. Seeding to all riparian areas depicted in the drawings
5. Dormant seeding all access routes, staging areas, and other disturbed areas
6. Assisting the Sponsor with the installation of a temporary irrigation system to irrigate all new plant materials in the riparian areas as directed by the Contracting Officer (materials will be provided).

1.2 – PLANT SELECTION & CARE

1. The contractor shall furnish a written list of the proposed sources of all nursery stock at least 30 days prior to the material delivery to the Contracting Officer for approval.
2. Substitutions of plant materials will not be permitted unless authorized in writing by the Contracting Officer. Upon submission of proof that the specified plant is not reasonably obtainable, a change order may be procured, providing for use of the nearest equivalent size or variety of plant having the same essential characteristics.
3. All plant materials, shipments and deliveries shall comply with state and federal laws and regulations governing inspection, shipping, selling and handling of plant stock. For any shipments out of state, a certificate of inspection for injurious insects, plant diseases, and other plant pests will accompany each shipment or delivery of plant and seed material.
4. All plants shall be mature, healthy, vigorous, well branched, densely foliated and free of disease and insects. All plants shall have healthy, well-developed root systems and shall be free from physical damage or other conditions that would prevent thriving growth.
5. Immediately upon delivery and until installation, plant material shall be shaded, watered and protected from browse to ensure that the plants remain alive and healthy.
6. All plants shall be labeled by plant name. Labels shall be attached securely to all plants and/or containers when delivered and removed when planted.

SECTION 2 – TRANSPLANTED/SALVAGED WETLAND SOD

2.1 – GENERAL INFORMATION

1. Salvaged Wetland Sod shall consist of primarily sedges and rushes and harvested from Bypass Channel I and new channel excavations.

2. Salvaged Wetland Sod shall be stockpiled within the borrow sources, the dewatered zones or the stockpile area designated on the plans.
3. When placing Salvaged Wetland sod on the fill areas, first line the edge treatments with approximately 3' width, then place pockets of Salvaged Wetland Sod throughout the fill area to encourage establishment.
4. Wherever feasible, Contractor shall take care to minimize the number of times the sod is handled and make every attempt to plant it with the root side down.

SECTION 3 – CONTAINER PLANTS

3.1 – NURSERY GROWN WILLOWS

1. All nursery grown willows will be obtained and supplied by the Sponsor.
2. Plant according to locations and spacing specified in the Drawings for the individual edge/fill treatments.
3. Containers shall be separated from the plant immediately before planting to prevent desiccation of the roots.
4. To plant, dig a vertical hole (by hand, excavator or auger) twice as deep and wide as the container, plant vertically and backfill with floodplain soils first and topsoil second. All backfill shall be, at a minimum, 30% loam and free of particles greater than 2". Backfill uniformly around each plant to maximize root to soil contact and eliminate all air pockets.
5. Care shall be taken to avoid "J-Rooting," do not force plant roots into too small/shallow of a hole and cause the roots to curve back around towards the surface.
6. Two types of soil amendments, each from Reforestation Technologies International (rti) are required for all container plantings. The use of any other amendment shall only be allowed after prior approval by the Contracting Officer. One application of rti - bio pak and one application of rti - endo ecto shall be used in each plant hole.
7. Remove all plastic plant labels after installation.
8. Water in with buckets immediately after installation and maintain bucket watering until irrigation system is up and running.
9. Irrigate all potted plants immediately after planting and continue through September.

SECTION 4 – SEEDING

4.1 – GENERAL INFORMATION

1. The anticipated areas requiring seeding are 0.1 acres of upland seeding and 4.6 acres of riparian seeding.
2. The Contractor is required to provide enough seed to broadcast 120% of the anticipated areas. All leftover seed will become property of the Sponsor.

3. Seed all bank and channel fill areas during construction. All additional construction access and borrow source areas shall be dormant seeded in the fall dormant period, approximately Nov 1 -15. Any blank areas within the bank and channel fill zones that did not germinate should be reseeded during the fall dormant period.
4. The sage upland mix shall be used to reclaim all construction access and staging areas outside of the riparian area, seed all other disturbed areas outside of the main channel with the riparian mix.
5. All disturbed areas shall be prepped and seeded to the following specification. The seed bed shall be prepped by removing all stones and dirt clods greater than 2" and raking a smooth seed bed consisting of loose soil no less than 2" deep.
6. All areas shall be hand seeded or ATV seeded using the following steps:
 - a. Rake/harrow to prep seed bed
 - b. Broadcast seed evenly across the area to be seeded at twice the rate of drilling
 - c. Rake/harrow seed into the seed bed
 - d. Roll seeded areas with a hand roller or cultipacker

2.2 – SEED MIXES

Lemhi- Fayle Upland Seed Mix

Common Name	Scientific Name	PLS lbs/ac
Low Sage Brush	<i>Artemisia arbuscula</i>	0.28
Great Basin Wildrye	<i>Elymus cinereus</i>	4.02
Blue Wildrye	<i>Elymus glauca</i>	3.88
Canada Wildrye	<i>Elymus canadensis</i>	0.1
Bluebunch Wheatgrass	<i>Agropyron spicatum</i>	4.46
Indian Ricegrass	<i>Achnatherum hymenoides</i>	3.7
Saltgrass	<i>Distichilis spicata</i>	0.22
Mountain Brome	<i>Bromud marginatus</i>	1.54
TOTAL	Broadcasted on Prepped Seed Bed w/ no clumps>2", Raked, Rolled	18.2

Lemhi – Fayle Riparian Seed Mix

Common Name	Scientific Name	PLS lbs/ac
Blue Wildrye	<i>Elymus glaucus</i>	4.46
Bluejoint Reedgrass	<i>Calamagrostis canadensis</i>	1
Tufted Hairgrass	<i>Deschampsia caespitosa</i>	1
Fowl mannagrass	<i>Glyceria elata</i>	1.2
American mannagrass	<i>Glyceria grandis</i>	1.5
Arctic Rush	<i>Juncus arcticus</i>	0.5
Nebraska Sedge	<i>Carex nebrascensis</i>	2
Woods Rose	<i>Rosa woodsii</i>	1
TOTAL	Broadcasted on Prepped Seed Bed w/ no clumps>2", Raked, Rolled	12.66

SECTION 5 – IRRIGATION

1. Contractor is responsible for assisting the Sponsor with the installation of the temporary irrigation system as directed by the Contracting Officer.
2. All materials, hoses, sprinklers and pumps used for irrigation will be provided by the Sponsor.

SECTION 7 – PLANT PROTECTION

7.1 - FENCING

1. Construct fencing around naturally regenerating willow areas to protect new shoots from ungulate browse.
2. Construct fence with 10-foot metal T-posts on 10 foot centers. Brace corners. Attach 7.5-foot-tall heavy duty plastic deer mesh to the T-posts according to the deer mesh manufacturer's specifications OR 7-foot welded wire.
3. Ensure that there is no gap between the fencing and ground surface.
4. Contractor shall work with the Contracting Officer to identify sections of fencing that may need to be removed during high flows. Work with the Contracting Officer to identify these zones and solutions for highwater.
5. This is a temporary exclusion fence; the Sponsor will remove this fence in 3-5 years depending on plant maturity. All fencing materials will become property of the Sponsor.

7.2 – PLANT SKYDD

1. Apply Plant Skydd rodent and deer repellent to all potted willows according to the manufacturers recommendation.
2. Apply twice per season for a minimum of three years – at the beginning of the season and just before winter.