

Construction Specifications

Lostine River Poley-Allen Fish Passage Design
Lostine, Oregon

for
Nez Perce Tribe

July 20, 2023



GEOENGINEERS 
Earth Science + Technology

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File No. 0571-021-01

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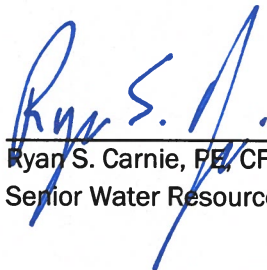
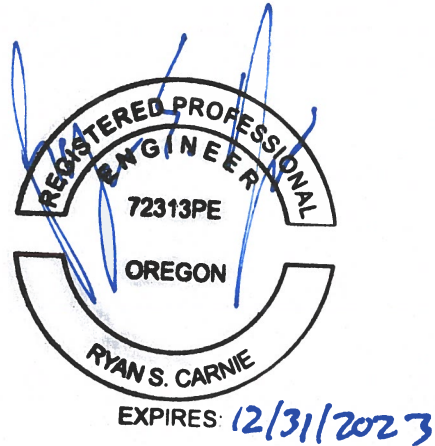
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DIVISION 2
Construction Specifications

1.0 MOBILIZATION AND DEMOBILIZATION

1.1. Scope

- A. The work consists of the mobilization and demobilization of the Contractor's forces and equipment necessary for performing the work required under the contract. It does not include mobilization and demobilization for specific items of work for which payment is provided elsewhere in the contract. Mobilization will not be considered as work in fulfilling the contract requirements for commencement of work.
- B. Nothing in this Section shall relieve the Contractor from full responsibility for compliance with permit requirements. Work shall not commence until the Contracting Officer has approved.

1.2. Equipment and Material

- A. Mobilization shall include all activities and associated costs for transportation of Contractor's personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary general facilities for the Contractor's operations at the site; premiums paid for performance and payment bonds including coinsurance and reinsurance agreements as applicable; and other items specified in these specifications.
- B. Demobilization shall include all activities and costs for transportation of personnel, equipment, and supplies not required or included in the contract from the site; including the disassembly, removal, and site cleanup of offices, buildings, and other facilities assembled on the site specifically for this contract.
- C. This work includes mobilization and demobilization required by the contract at the time of award. If additional mobilization and demobilization activities and costs are required during the performance of the contract as a result of changed, deleted, or added items of work for which the Contractor is entitled to an adjustment in contract price, compensation for such costs will be included in the price adjustment for the item or items of work changed or added.

1.3. Payment

- A. Payment will be made as the work proceeds, after presentation of paid invoices or documentation of direct costs by the Contractor showing specific mobilization and demobilization costs and supporting evidence of the charges of suppliers, subcontractors, and others. When the total of such payments is less than the lump sum contract price, the balance remaining will be included in the final contract payment. Payment of the lump sum contract price for mobilization and demobilization will constitute full compensation for completion of the work.
- B. Payment will not be made under this item for the purchase costs of materials having a residual value, the purchase costs of materials to be incorporated in the project, or the purchase costs of operating supplies.

1.4. Items of Work and Construction Details

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

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

END OF SECTION

2.0 POLLUTION CONTROL

2.1. Scope

- A. The work consists of installing measures or performing work to control erosion and minimize the production of sediment and other pollutants to water and air from construction activities.

2.2. Materials

- A. All material furnished shall meet the requirements of the material specifications listed in part 2.9 of this specification.

2.3. Erosion and Sediment Control Measures and Works

- A. Staging of earthwork activities—The excavation and moving of soil materials shall be scheduled to minimize the size of areas disturbed and unprotected from erosion for the shortest reasonable time.
- B. Seeding—Seeding to protect disturbed areas shall occur as soon as reasonably possible following completion of that earthwork activity.
- C. Mulching—Mulching to provide temporary protection of the soil surface from erosion.
- D. Diversions—Diversions to divert water from work areas and to collect water from work areas for treatment and safe disposition. They are temporary and shall be removed and the area restored to its near original condition when the diversions are no longer required or when permanent measures are installed.
- E. Sediment basins—Sediment basins collect, settle, and eliminate sediment from eroding areas from impacting properties and streams below the construction site(s). These basins are temporary and shall be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.
- F. Sediment filters—Straw bale filters or geotextile sediment fences trap sediment from areas of limited runoff. Sediment filters shall be properly anchored to prevent erosion under or around them. These filters are temporary and shall be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.
- G. Waterways—Waterways for the safe disposal of runoff from fields, diversions, and other structures or measures. These works are temporary and shall be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.
- H. Other—Additional protection measures as specified in part 2.9 of this specification or required by Federal, State, or local government.
- I. Costs for damages and work stoppage resulting from failure to adequately implement proper environmental controls are the Contractor's responsibility.

2.4. Chemical Pollution

- A. Portable toilets, equipment refueling, overnight storage and equipment maintenance activities shall be located a minimum of 150 feet from the ordinary high water mark of the river.

- B. If any of the activities listed in Part 2.4, Section A of these specifications are located within 150 feet of the ordinary high water mark, the Contractor shall provide watertight tanks or barrels or construct a sump sealed with plastic sheets to collect and temporarily contain chemical pollutants, such as drained lubricating or transmission fluids, grease, soaps, concrete mixer wash water, or asphalt, produced as a by-product of the construction activities.
- C. Pollutants shall be disposed of in accordance with appropriate State and Federal regulations. At the completion of the construction work, tanks, barrels, and sumps shall be removed and the area restored to its original condition as specified in part 2.9 of this specification. Sump removal shall be conducted without causing pollution. At the completion of construction activities, facilities shall be disposed of without causing pollution as specified in part 2.9 of this specification.

2.5. Air Pollution

- A. The burning of brush or slash and the disposal of other materials shall adhere to state and local regulations.
- B. Fire prevention measures shall be taken to prevent the start or spread of wildfires that may result from project activities. Firebreaks or guards shall be constructed and maintained at locations shown on the drawings.
- C. All public access or haul roads used by the Contractor during construction of the project shall be sprinkled or otherwise treated to fully suppress dust. All dust control methods shall ensure safe construction operations at all times. If chemical dust suppressants are applied, the material shall be a commercially available product specifically designed for dust suppression and the application shall follow manufacturer's requirements and recommendations. A copy of the product data sheet and manufacturer's recommended application procedures shall be provided to the Engineer 5 working days before the first application.

2.6. Maintenance, Removal, and Restoration

- A. All pollution control measures, and temporary works shall be adequately maintained in a functional condition for the duration of the construction period. All temporary measures shall be removed, and the site restored to near its original condition.

2.7. Measurement and Payment

- A. For items of work for which lump-sum prices are established in the contract, payment is made as the work proceeds and supported by invoices presented by the Contractor that reflect actual costs. If the total of all progress payments is less than the lump sum contract price for this item, the balance remaining for this item will be included in the final contract payment. Payment of the lump sum contract price will constitute full compensation for completion of the work.
- B. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items, and the items to which they are made subsidiary, are identified in part 2.9 of this specification.
- C. Permanent Seeding, fertilizing, mulching, and planting shall be paid under items Permanent Seeding, Fertilizing, and Mulching and Planting.

2.8. Contractor Violations

- A. If noncompliance occurs, report noncompliance to the Contracting Officer immediately (orally), with specific information submitted in writing within 2 calendar days.
- B. Nonconformance with applicable local, state, and federal laws, orders, regulations, or Water Quality Standards may result in the Contracting Officer stopping all site activity until compliance is ensured.
- C. The Contractor shall not be entitled to any extension of time, claim for damage, or additional compensation by reason of such a work stoppage.
- D. Corrective measures required to bring activities into compliance shall be at the Contractor's expense.
- E. The Contractor shall be solely responsible for all fines, penalties or additional permit fees resulting from non-compliance with any applicable local, state, and federal laws, orders, regulations, or Water Quality Standards.
- F. Contractor shall be responsible for damages resulting from dust or spills originating from contractor operations.
- G. The Contracting Officer may stop any construction activity in violation of local, state, and federal laws and additional expenses resulting from work stoppage will be the responsibility of Contractor.

2.9. Items of Work and Construction Details

- A. Preparation of a Stormwater Pollution Prevention Plan (SWPPP) including a site plan depicting the Erosion and Sediment Control Plan (ESCP) and submit for a Construction General Permit
- B. Designate and provide a representative as the Erosion and Sediment Control Manager to:
 - 1. Manage and ensure proper implementation of the Erosion and ESCP.
 - 2. Accompany the contracting officer during field review of the ESCP prior to construction activities.
 - 3. Monitor rainfall on and in the vicinity of the Project Site.
 - 4. Inspect Erosion and Sediment Control materials (ESC) on active construction sites weekly for effective functioning.
 - 5. Inspect ESC on inactive sites every week for effective functioning.
 - 6. Ensure that ESC BMPs are regularly cleaned and maintained.
 - 7. Mobilize crews to make immediate repairs to ESC if not effectively functioning.
 - 8. Record actions taken to clean up significant amounts of sediment.
 - 9. Report potential permit violations to the Contracting Officer in a timely manner.
- C. Disturbance Limits—Delineate all construction site clearing limits with high visibility markings and do not disturb areas outside of the clearing limits.
- D. Perimeter Controls—Install all appropriate perimeter controls before beginning any ground-disturbing activities.

- E. Wet Season Work and Temporary Work Suspension—Update the ESCP and schedule for work proposed during the wet season to ensure all appropriate controls, including ESC during work suspensions, are implemented, and maintained.
- F. Install ESC best management practices (BMPs) as shown and according to the SWPPP before clearing, grading or other land-altering activities. Ensure effective functioning of BMPs such that sediment does not leave the Project boundaries, enter drainage systems or waterways.
- G. Modify BMPs so they are effective if necessary and update the SWPPP, as necessary.
- H. Stabilize all areas disturbed within 7 days of exposure with methods that do not solely rely on germination.
- I. Temporary stabilization every 14 days or more frequently as needed, a minimum of 1 day before expected rain events and at the end of each day during wet periods.
- J. Permanent stabilization as indicated on the project seeding and planting Drawings.
- K. The Contractor shall prepare and submit the Stormwater Pollution Prevention Plan (SWPPP) under the Construction Stormwater General Permit. The Contractor shall submit a copy of the SWPPP and the Notice of Intent (NOI) to the Contracting Officer and permit issuing authority. Failure to accept all or part of any SWPPP will not make NPT liable to the Contractor for any Work delays.
- L. The Contractor shall provide a schedule for SWPPP implementation and incorporate it into the Contractor's progress schedule. The Contractor's SWPPP shall conform to all requirements of the current edition of the Idaho Department of Environmental Quality's (IDEQ) *Catalog of Stormwater Best Management Practices for Idaho Cities and Counties*. The SWPPP shall include an ESCP that covers all areas that may be affected inside and outside the limits of the project (including all Contracting Agency provided sources, disposal sites, and haul roads, and all nearby land, streams, and other bodies of water).

END OF SECTION

3.0 SAW CUT SILL ABUTMENT AND REMOVAL

3.1. Scope

- A. The work shall consist of saw cutting the existing concrete abutment of the concrete sill as shown on the design drawings.
- B. The work shall consist of the removal and disposal of concrete structures from the designated areas.

3.2. Marking

- A. Each structure or structure part to be removed will be marked with stakes, flags, paint, or other suitable method.

3.3. Removal

- A. All structures designated for removal in the contract shall be removed to the specified extent and depth.

3.4. Disposal of Refuse Materials

- A. Refuse materials resulting from structure removal shall be disposed of in a manner and at locations specified in section 3.6 of this specification or in an acceptable manner and at locations approved by the contracting officer.

3.5. Measurement and Payment

- A. Payment for structure removal is made at the contract lump sum price. Such payment will constitute full compensation for all labor, equipment, tools, applicable permits, and associated fees for burning and disposal of refuse, and all other items necessary and incidental to the completion of the work.
- B. Compensation for any item of work described in the contract, but not listed as a contract line item number in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and items to which they are made subsidiary are identified in section 3.6 of this specification.

3.6. Items of Work and Construction Details

- A. Make a saw cut along the perimeter of the area where concrete is to be removed to reduce edge spalling and to provide a sound edge surface against which the abutment wall is to be removed.
- B. Use water-wash equipment to remove sawing slurry from the saw cut area before it dries.
- C. Reinforcing metal bars may be present in the abutment and the contractor shall use a chipping hammer to remove concrete near the existing rebar, if necessary. Care shall be taken not to vibrate the reinforcement or otherwise cause damage to its bond to the remaining concrete adjacent to the repair area.
- D. If saw cutting reveals rebar, cut back a minimum of 2 inches below the saw cut surface of the abutment, remove 2 inches of rebar, and backfill the cut back void with an epoxy resin.

- E. Any material not identified in the Drawings or in these specifications as the Contracting Agency property will become the property of the Contractor and shall be removed from the project.
- F. The Contractor shall arrange to dispose of waste at no expense to the Contracting Agency and the disposal shall meet state and local regulations.
- G. The Contractor shall submit a working drawing of the concrete sill abutment sawcut and demolition plan.
- H. The concrete sill abutment sawcut and demolition plan shall show all equipment, sequence of operations, and details required to complete the work, including containment, collection, and disposal of all debris. The plan shall show all stages of demolition.
- I. Care shall be taken in saw cutting and removing concrete to prevent damage to portions of the existing structure which are to remain.
- J. Explosives shall not be used for concrete sill removal.

END OF SECTION

4.0 CLEARING, GRUBBING, STOCKPILE AND DISPOSAL

4.1. Scope

- A. The work consists of clearing and grubbing and disposal of trees, snags, logs, brush, stumps, shrubs, and rubbish from the designated areas.

4.2. Protection of Existing Vegetation

- A. Trees and other vegetation designated to remain undisturbed shall be protected from damage throughout the duration of the construction period. Any damages resulting from the Contractor's operations or neglect shall be repaired by the Contractor.
- B. Earth fill, stockpiling of materials, vehicular parking, and excessive foot or vehicular traffic shall not be allowed within the drip line of vegetation designated to remain in place. Vegetation damaged by any of these, or similar actions shall be replaced with viable vegetation of the same species, similar condition, and like size unless otherwise approved by the contracting officer.
- C. Any cuts, skins, scrapes, or bruises to the bark of the vegetation shall be carefully trimmed and local nursery accepted procedures used to seal damaged bark.
- D. Any limbs or branches 0.5 inch or larger in diameter that are broken, severed, or otherwise seriously damaged during construction shall be cut off at the base of the damaged limb or branch flush with the adjacent limb or tree trunk. All roots 1-inch or larger in diameter that are cut, broken, or otherwise severed during construction operations shall have the end smoothly cut perpendicular to the root. Roots exposed during excavation or other operations shall be covered with moist earth or backfilled as soon as possible to prevent the roots from drying out.

4.3. Marking

- A. The limits of the area(s) to be cleared and grubbed will be marked by stakes, flags, tree markings, or other suitable methods. Trees to be left standing and uninjured will be designated by special markings placed on the trunk about 6 feet above the ground surface.

4.4. Clearing and Grubbing

- A. All trees not marked for preservation and all snags, logs, brush, stumps, shrubs, rubbish, and similar materials shall be cleared from within the limits of the designated areas. Unless otherwise specified, all stumps, roots, and root clusters that have a diameter of 1 inch or larger shall be grubbed out to a depth of at least 2 feet below subgrade for concrete structures and 1 foot below the ground surface at embankment sites and other designated areas.

4.5. Disposal

- A. All materials cleared and grubbed from the designated areas shall be disposed of at locations shown on the drawings or in a manner specified in section 4.7. The Contractor is responsible for complying with all local rules and regulations and the payment of all fees that may result from disposal at locations away from the project site.

4.6. Measurement and Payment

- A. For items of work for which specific unit prices are established in the contract, the cleared and grubbed area is measured to the nearest 0.1 acre. Payment for clearing and grubbing is made for the total area within the designated limits at the contract unit price. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.
- B. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 4.7.

4.7. Items of Work and Construction Details

- A. Remove trees, shrubs, brush, stumps, roots, rootwads, downed timber, branches, grass, weeds, vegetation, rubbish, riprap, rocks, and other objectionable material.
- B. Woody matter shall be disposed of on site and used as slash material in the Large Woody Material structures according to the Drawings.
- C. Trees with roots shall be knocked over with rootwads attached using an excavator or other suitable means and be removed, replanted, or disposed of as directed by the Contracting Officer.
- D. As shown or directed, salvage and stockpile plants, rocks, down timber, and other natural materials for use in site restoration.
- E. Legally dispose of unsuitable, undesirable cleared material.
- F. Grub around surfaces to be under proposed fill; areas to be excavated; and surfaces to be regraded.
- G. Perform grubbing in advance of topsoil stripping, excavation, and grading operations.

END OF SECTION

5.0 EXCAVATION AND STOCKPILE

5.1. Scope

- A. The work shall consist of the excavation required by the drawings and specifications and disposal of the excavated materials.

5.2. Classification

- A. Excavation is classified as common excavation, rock excavation, or unclassified excavation in accordance with the following definitions or is designated as unclassified.
- B. Common excavation is defined as the excavation of all materials that can be excavated, transported, and unloaded using heavy ripping equipment and wheel tractor-scraper with pusher tractors or that can be excavated and dumped into place or loaded onto hauling equipment by excavators having a rated capacity of 1 cubic yard or larger and equipped with attachments (shovel, bucket, backhoe, dragline, or clam shell) appropriate to the material type, character, and nature of the materials.
- C. Rock excavation is defined as the excavation of all hard, compacted, or cemented materials that require blasting or the use of ripping and excavating equipment larger than defined for common excavation. The excavation and removal of isolated boulders or rock fragments larger than 1 cubic yard encountered in materials otherwise conforming to the definition of common excavation shall be classified as rock excavation. The presence of isolated boulders or rock fragments larger than 1 cubic yard is not in itself sufficient cause to change the classification of the surrounding material.
- D. For these classifications, the following definitions shall apply:
- E. Heavy ripping equipment is a rear-mounted, heavy duty, single-tooth, ripping attachment mounted on a track type tractor having a power rating of at least 250 flywheel horsepower unless otherwise specified in section 5.10.
- F. Wheel tractor-scraper is a self-loading (not elevating) and unloading scraper having a struck bowl capacity of at least 12 cubic yards.
- G. A pusher tractor is a track type tractor having a power rating of at least 250 flywheel horsepower equipped with appropriate attachments.
- H. Unclassified excavation is defined as the excavation of all materials encountered, including rock materials, regardless of their nature or the way they are removed.

5.3. Unclassified Excavation

- A. Excavation designated as unclassified excavation shall include all materials encountered regardless of their nature or the way they are removed. When excavation is unclassified, none of the definitions or classifications stated in Section 5.2, Classification, shall apply.

5.4. Blasting

- A. Blasting is prohibited as a means of extraction.

5.5. Use of Excavated Material

- A. Method 1—To the extent they are needed, all suitable material from the specified excavations shall be used in the construction of the required permanent earthfill or rockfill. The suitability of material for specific purposes is determined by the Engineer. The Contractor shall not waste or otherwise dispose of suitable excavated material.
- B. Method 2—Suitable material from the specified excavations may be used in the construction of required earth fill or rock fill. The suitability of material for specific purposes is determined by the Engineer.

5.6. Disposal of Waste Materials

- A. Method 1—All surplus or unsuitable excavated materials are designated as waste and shall be disposed of at the locations shown on the drawings.
- B. Method 2—All surplus or unsuitable excavated materials are designated as waste and shall be disposed of by the Contractor at sites of his own choosing away from the site of the work. The disposal shall be in an environmentally acceptable manner that does not violate local rules and regulations.

5.7. Excavation Limits

- A. Excavations shall comply with OSHA Construction Industry Standards (29CFR Part 1926) Subpart P, Excavations, Trenching, and Shoring. All excavations shall be completed and maintained in a safe and stable condition throughout the total construction phase. Structure and trench excavations shall be completed to the specified elevations and to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work. Excavations outside the lines and limits shown on the drawings or specified herein required to meet safety requirements shall be the responsibility of the Contractor in constructing and maintaining a safe and stable excavation.

5.8. Excavated Material

- A. When the quantities of suitable material obtained from specified excavations are insufficient to construct the specified earth fills and earth backfills, additional material shall be obtained from the designated excavated areas. The extent and depth of excavated pits within the limits of the designated excavated areas shall be as specified in section 5.10 or as approved by the Engineer.
- B. Excavated pits shall be excavated and finally dressed to blend with the existing topography and sloped to prevent ponding and to provide drainage.

5.9. Overexcavation

- A. Excavation in earth beyond the specified lines and grades shall be corrected by filling the resulting voids with approved, compacted earth fill. The exception to this is that if the earth is to become the subgrade for riprap, rockfill, sand or gravel bedding, or drain fill, the voids may be filled with material conforming to the specifications for the riprap, rockfill, bedding, or drain fill. Before correcting an overexcavation condition, the Contractor shall review the planned corrective action with the Engineer and obtain approval of the corrective measures.

5.10. Measurement and Payment

- A. For items of work for which specific unit prices are established in the contract, the volume of each type and class of excavation within the specified pay limits is measured and computed to the nearest cubic yard by the method of average cross-sectional end areas or by methods outlined in section 5.11 of this specification. Regardless of quantities excavated, the measurement for payment is made to the specified pay limits except that excavation outside the specified lines and grades directed by the Engineer to remove unsuitable material is included. Excavation required because unsuitable conditions result from the Contractor's improper construction operations, as determined by the Engineer, is not included for measurement and payment.
- B. The following provisions apply to all methods of measurement and payment.

Payment for each type and class of excavation is made at the contract unit price for that type and class of excavation. Such payment will constitute full compensation for all labor, materials, equipment, and all other items necessary and incidental to the performance of the work except that extra payment for backfilling overexcavation will be made in accordance with the following provisions.

Payment for backfilling overexcavation, as specified in section 5.8 of this specification, is made only if the excavation outside specified lines and grades is directed by the Engineer to remove unsuitable material and if the unsuitable condition is not a result of the Contractor's improper construction operations as determined by the Engineer.

Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 5.11 of this specification.

5.11. Items of Work and Construction Details

- A. Excavate proposed channel and floodplain to the lines, grades, and cross sections shown on drawings and as directed by Contracting Officer.
- B. Perform all operations involved in excavating, hauling, and placing of earthwork materials so no damage or detriment to the completed or partially completed work results. At all times provide sufficient drainage of completed or partially completed earthwork to prevent damage or loss due to rainfall, surface water or any other cause.
- C. The NPT makes no guarantee or representation by implication or otherwise, that any material available on the Project site is suitable for incorporation into any portion of the Project. No material will be considered unsuitable on the sole basis that special or additional processing or handling is required to make it suitable for incorporation into the project.
- C. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. Work shall not commence until the Contracting Officer has approved.
- D. In all cases, take proper precautions to ensure that embankment construction and filling do not move, endanger, or cause undue strain or stress to any Structure or adjacent ground.

END OF SECTION

6.0 EARTHFILL - STOCKPILED MATERIAL

6.1. Scope

- A. The work consists of the construction of a roughened channel and adjacent channel banks using stockpiled material from Item 5, Excavation and Stockpile and combined with materials defined in Item 7, Earthfill—Stockpiled Habitat Boulders, Item 8, Earthfill—Imported Habitat Boulders and Item 9, Earthfill—Imported Streambed Sediment.
- B. Earthfill is composed of natural earth materials that can be placed and compacted by construction equipment operated in a conventional manner.
- C. Earth backfill is composed of natural earth material placed and compacted by hand tamping, manually directed power tampers, or vibrating plates, or their equivalent and testing to confirm water is not penetrating the constructed surface.

6.2. Material

- A. All earthfill stockpiled material shall be obtained from required on site excavations. The selection, blending, routing, and disposition of material in the various fills shall be subject to approval by the Engineer or the contracting officer.
- B. Fill materials shall contain no frozen soil, sod, brush, roots, or other perishable material. Rock particles larger than the maximum size specified for each type of fill shall be removed prior to compacting the fill.
- C. The types of material used in the various fills shall be as listed and described in the specifications and drawings.

6.3. Subgrade Preparation

- A. The subgrade for earthfill shall be stripped to remove vegetation and other unsuitable material or shall be excavated as specified.
- B. Except as otherwise specified, earth subgrade surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill or otherwise acceptably scored and loosened to a minimum depth of 2 inches. The moisture content of the loosened material shall be controlled as specified for the earthfill, and the surface material of the subgrade shall be compacted and bonded with the first layer of earthfill as specified for subsequent layers of earthfill.
- C. Earth abutment surfaces shall be free of loose, uncompacted earth more than 2 inches in depth normal to the slope and shall be at such a moisture content that the earthfill can be compacted against them to produce a good bond between the fill and the abutments.
- D. Rock subgrade and abutment surfaces shall be cleared of all loose material by hand or other effective means and shall be free of standing water when fill is placed upon them. Occasional rock outcrops in subgrade for earthfill, except in dams and other structures designed to restrain the movement of water, shall not require special treatment if they do not interfere with compaction of the subgrade and initial layers of the fill or the bond between the subgrade and the fill.
- E. Subgrade and abutment surfaces shall be no steeper than one horizontal to one vertical unless otherwise specified. Test pits or other cavities shall be filled with compacted earthfill conforming to the specifications for the earth- fill to be placed upon the subgrade.

6.4. Placement

- A. Earthfill shall not be placed upon a frozen surface nor shall snow, ice, or frozen material be incorporated in the earthfill matrix.
- B. Earthfill shall be placed in approximately horizontal layers. The thickness of each layer before compaction shall not exceed 12 inches. Materials placed by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness before being compacted.
- C. Hand compacted earth backfill shall be placed in layers whose thickness before compaction does not exceed the maximum thickness specified for layers of earth backfill compacted by manually directed power tampers.
- D. Placement of imported streambed sediment within the riverbed shall follow procedures identified in Item 9—Earthfill—Imported Streambed Sediment.
- E. Earthfill and earth backfill adjacent to existing irrigation facilities shall be placed to meet the following additional requirements:
 - a. The distribution of materials throughout each zone shall be essentially uniform, and the earthfill shall be free from lenses, pockets, streaks, or layers of material differing substantially in texture, moisture content, or gradation from the surrounding material.
 - b. The surface of each layer shall be scarified parallel to the axis of the fill to a depth of not less than 2 inches before the next layer is placed.
 - c. The top surface of embankments shall be maintained approximately level during construction with two exceptions: A crown or cross-slope of about 2 percent shall be maintained to ensure effective drainage, or as otherwise specified for drainfill or sectional zones.
 - d. Embankments shall be constructed so that the slope of the bonding surfaces between embankment in place and embankment to be placed is not steeper than 3 feet horizontal to 1 foot vertical. The bonding surface of the embankment in place shall be stripped of all material not meeting the requirements of this specification and shall be scarified, moistened, and recompactd when the new earthfill is placed against it. This ensures a good bond with the new earthfill and obtains the specified moisture content and density at the contact of the in place and new earthfills.

6.5. Control of Moisture Content

- A. During placement and compaction of earthfill and earth backfill, the moisture content of the material being placed shall be maintained to minimize voids and minimize settling.
- B. Water may be applied by sprinkling the material after placement on the earthfill with each horizontal lift, if necessary
- C. Material that is too wet when deposited on the earthfill shall either be removed or be dried to the specified moisture content prior to compaction.
- D. If the top surface of the preceding layer of compacted earthfill or a subgrade or abutment surface in the zone of contact with the earthfill becomes too dry to permit suitable bond, it shall be

moistened by sprinkling to an acceptable moisture content before placement of the next layer of earthfill.

6.6. Compaction

- A. Earth backfill adjacent to structures shall be compacted to a density equivalent to that of the surrounding in-place earth material or adjacent required earthfill or earth backfill. Compaction shall be accomplished by hand tamping or manually directed power tampers, plate vibrators, walk-behind, miniature, or self-propelled rollers. Unless otherwise specified heavy equipment including backhoe mounted power tampers or vibrating compactors and manually directed vibrating rollers shall not be operated within 3 feet of the existing irrigation intake structure. Towed or self-propelled vibrating rollers shall not be operated within 5 feet of the irrigation intake structure. Compaction by means of drop weights operating from a crane or hoist is not permitted.

6.7. Reworking or Removal and Replacement of Defective Earthfill

- A. Earthfill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content or otherwise not conforming to the requirements of the specifications shall be reworked to meet the requirements or removed and replaced by acceptable earthfill. The replacement earthfill and the subgrade, abutment, and earthfill surfaces upon which it is placed shall conform to all requirements of this specification for subgrade preparation, approval, placement, moisture control, and compaction.

6.8. Testing

- A. During the work, the Contractor shall perform quality control tests, as applicable, to identify earthfill and earth backfill materials conform to the requirements of this specification.
- B. Testing of the constructed riverbed's ability to convey water without subsurface conveyance shall follow procedures identified in Item 9—Earthfill—Imported Streambed Sediment.

6.9. Measurement and Payment

- A. No field measurement of material placement quantities will be conducted during construction.
- B. Payment for each earthfill type is made at the contract bid price for that earthfill. Such payment will constitute full compensation for all labor, material, equipment, and all other items necessary and incidental to the performance of the work.
- C. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 6.10 of this specification.

6.10. Items of Work and Construction Details

- A. Stockpiled material shall be placed to the lines and grades shown on the Drawings and in such a way as to prevent material segregation. Stockpiled material shall be placed in lifts no thicker than 12 inches.
- B. Stockpiled material shall be combined with stockpiled habitat boulders, imported habitat boulders, and imported streambed sediment in proposed roughened channel.

- C. Placement of stockpiled material within the proposed channel shall be completed to ensure that low stream flows are conveyed above the finished channel. Refer to Item 9, Earthfill—Imported Streambed Sediments, for testing and approval procedures.
- D. Habitat Boulders shall be placed according to Item 7, Earthfill—Stockpiled Habitat Boulders and Item 8, Earthfill—Imported Habitat Boulders.

END OF SECTION

7.0 EARTHFILL - STOCKPILED HABITAT BOULDERS

7.1. Scope

- A. The work consists of the construction of a roughened channel and adjacent channel banks using stockpiled material from Item 5, Excavation and Stockpile and combined with materials defined in Item 6, Earthfill—Stockpiled Material, Item 8, Earthfill—Imported Habitat Boulders and Item 9, Earthfill—Imported Streambed Sediment.
- B. Reference Item 6, Earthfill—Stockpiled Material for scope items.
- C. Stockpiled habitat boulders shall be screened from excavated material and meet the size and quality criteria identified in Section 7.2.

7.2. Material

- A. Stockpiled Habitat Boulders shall comply with materials as described in Item 6—Earthfill—Stockpiled Material in addition to the following.
 - a. Stockpiled Habitat Boulders shall be hard, sound, and durable material, free from seams, cracks, and other defects tending to destroy its resistance to weather.
 - b. Stockpiled Habitat Boulders shall be rounded to sub angular in shape with the thickness axis greater than 60 percent of the length axis.
 - c. Stockpiled Habitat Boulders greater than 12 inches in size by averaging the three dimensions of the rock's axis.

7.3. Subgrade Preparation

- A. Reference Item 6, Earthfill—Stockpiled Material for subgrade preparation.

7.4. Placement

- A. Reference Item 6, Earthfill—Stockpiled Material for habitat boulder placement specifications.
- B. Place stockpiled habitat boulders greater than 28 inches in diameter on top of excavated subgrade and then place stockpiled material in 12-inch lifts. Place imported streambed sediment as described in Item 9, Earthfill—Imported Streambed Sediments.

7.5. Measurement and Payment

- A. No field measurement of material placement quantities will be conducted during construction.
- B. Payment for each earthfill type is made at the contract bid price for that earthfill. Such payment will constitute full compensation for all labor, material, equipment, and all other items necessary and incidental to the performance of the work.
- C. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 7.6 of this specification.

7.6. Items of Work and Construction Details

- A. Stockpiled material shall be placed to the lines and grades shown on the Drawings and in such a way as to prevent material segregation. Stockpiled material shall be placed in lifts no thicker than 12 inches.
- B. Stockpiled habitat boulders shall be combined with stockpiled material, imported habitat boulders, and imported streambed sediment in the proposed roughened channel matrix as shown on the Drawings.
- C. Placement of stockpiled habitat boulders within the proposed channel shall be completed to ensure that low stream flows are conveyed above the finished channel. Refer to Item 9, Earthfill—Imported Streambed Sediments, for testing and approval procedures.
- D. Habitat Boulders shall be placed according to Items 6, 8 and 9.

END OF SECTION

8.0 EARTHFILL - IMPORTED HABITAT BOULDERS

8.1. Scope

- A. The work consists of the construction of a roughened channel and adjacent channel banks using imported habitat boulders as defined in this item and combined with materials defined in Item 6, Earthfill—Stockpiled Material, Item 7, Earthfill—Stockpiled Habitat Boulders and Item 9, Earthfill—Imported Streambed Sediment.
- B. Reference Item 6, Earthfill—Stockpiled Material for scope items.
- C. Imported habitat boulders shall be screened from excavated material and meet the size and quality criteria identified in Section 8.2.

8.2. Material

- A. Imported habitat boulders shall comply with materials as described in Item 6—Earthfill—Stockpiled Material in addition to the following.
 - a. Imported habitat boulders shall be hard, sound, and durable material, free from seams, cracks, and other defects tending to destroy its resistance to weather.
 - b. Imported habitat boulders shall be rounded to sub angular in shape with the thickness axis greater than 60 percent of the length axis.
 - c. Imported habitat boulders shall be between 28 inches and 48 inches in size by averaging the three dimensions of the rock's axis.
- B. At least 30 days before rock is delivered from other than designated sources, the Contractor shall designate in writing the source from which rock material will be obtained and provide information satisfactory to the contracting officer that the material meets contract requirements. The Contractor shall provide the contracting officer's technical representative free access to the source for the purpose of obtaining samples for testing. The size and grading of the rock shall be as specified in this section.

8.3. Subgrade Preparation

- A. Reference Item 6, Earthfill—Stockpiled Material for subgrade preparation.

8.4. Placement

- A. Reference Item 6, Earthfill—Stockpiled Material for habitat boulder placement specifications.
- B. Place stockpiled habitat boulders greater than 28 inches in diameter on top of excavated subgrade and then place stockpiled material in 12-inch lifts. Place imported streambed sediment as described in Item 9, Earthfill—Imported Streambed Sediments.

8.5. Measurement and Payment

- A. No field measurement of material placement quantities will be conducted during construction.
- B. Payment for each earthfill type is made at the contract bid price for that earthfill. Such payment will constitute full compensation for all labor, material, equipment, and all other items necessary and incidental to the performance of the work.

- C. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 8.6 of this specification.

8.6. Items of Work and Construction Details

- A. Imported habitat boulders shall be placed to the lines and grades shown on the Drawings and in such a way as to prevent material segregation. Stockpiled material shall be placed in lifts no thicker than 12 inches within the voids of the imported habitat boulders.
- B. Imported habitat boulders shall be combined with stockpiled material, stockpiled habitat boulders, and imported streambed sediment in the proposed roughened channel matrix.
- C. Placement of imported habitat boulders within the proposed channel shall be completed to ensure that low stream flows are conveyed above the finished channel. Refer to Item 9, Earthfill—Imported Streambed Sediments, for testing and approval procedures.
- D. Imported habitat boulders shall be placed according to Items 6, 7 and 9.

END OF SECTION

9.0 EARTHFILL - IMPORTED STREAMBED SEDIMENT

9.1. Scope

- A. The work consists of the construction of a roughened channel and adjacent channel banks using stockpiled material from Item 5, Excavation and Stockpile and combined with materials defined in Item 6, Earthfill—Stockpiled Material, Item 7, Earthfill—Stockpiled Habitat Boulders, and Item 8, Earthfill—Imported Habitat Boulders.
- B. Earthfill is composed of natural earth materials that can be placed and compacted by construction equipment operated in a conventional manner.
- C. Earth backfill is composed of natural earth material placed and compacted by hand tamping, manually directed power tampers, or vibrating plates, or their equivalent and testing to confirm water is not penetrating the constructed surface.

9.2. Material

- A. Imported streambed sediment shall comply with materials as described in Item 6—Earthfill—Stockpiled Material in addition to the following.
 - a. Imported streambed sediment shall meet the following gradation:

Sieve Size	Percent Passing
2 ½"	99-100
2"	65-95
1"	50-85
No. 4	26-44
No. 40	16 max.
No. 200	5.0-9.0

- B. At least 30 days before the sediment is delivered from other than designated sources, the Contractor shall submit a maximum density curve of the proposed gradation. The Contractor shall provide the contracting officer's technical representative free access to the source for the purpose of obtaining samples for testing. The size and grading of the sediment shall be as specified in this section.

9.3. Subgrade Preparation

- A. Reference Item 6, Earthfill—Stockpiled Material for subgrade preparation.

9.4. Placement

- A. Reference Item 6, Earthfill—Stockpiled Material for habitat boulder placement specifications.
- B. Place imported streambed sediment in approximately 1-inch-thick layers on top of each 12-inch lift to fill voids.

9.5. Testing

- A. The Contractor shall test the placement of imported streambed sediment over each lift in 75-foot channel lengths. Testing procedures shall include providing water at an approximate rate of 38 cfs for a visual inspection that there is no perceivable difference in the flow from the upstream application to the downstream limits of the test section. The Contractor shall apply the flow rate to the stream channel for visual acceptance by the Engineer or the contracting officer.

9.6. Measurement and Payment

- A. No field measurement of material placement quantities will be conducted during construction.
- B. Payment for each earthfill type is made at the contract bid price for that earthfill. Such payment will constitute full compensation for all labor, material, equipment, and all other items necessary and incidental to the performance of the work.
- C. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 9.7 of this specification.

9.7. Items of Work and Construction Details

- A. Imported streambed sediment shall be combined with stockpiled material, stockpiled habitat boulders, and imported habitat boulders in the proposed roughened channel.
- B. Imported streambed sediment shall be placed according to Item 6, Earthfill—Stockpiled Material, Item 7, Earthfill—Stockpiled Habitat Boulders and Item 8, Earthfill—Imported Habitat Boulders.

END OF SECTION

10.0 CONCRETE OVERLAY

10.1. Scope

- A. The work shall consist of concrete surface and face preparation; forming; and furnishing, placing, finishing, and curing concrete overlay material as required to modify the elevation of the existing concrete sill as shown on the Drawings and as designated this specification.

10.2. Material

- A. Aggregates shall conform to the requirements of Material Specification 522, Aggregates for Portland Cement Concrete, unless otherwise specified. The grading of coarse aggregates shall be as specified in Material Specification 522.
- B. Portland cement shall conform to the requirements of Material Specification 531, Portland Cement, for the specified type. Only one brand of any type of cement shall be used in any single overlay.
- B. Water used in mixing and curing of the concrete overlay shall be clean and free from injurious amounts of oil, salt, acid, alkali, organic matter, or other deleterious substances.
- C. Fly ash shall conform to the requirements of Material Specification 532, Supplementary Cementitious Materials.
- D. Air-entraining admixtures shall conform to the requirements of Material Specification 533, Chemical Admixtures for Concrete. If air-entraining cement is used, any additional air-entraining admixture shall be the same type as that in the cement.
- E. Chemical admixtures for water-reducing, retarding, or water-reducing and retarding shall conform to the requirements of Material Specification 533, Chemical Admixtures for Concrete.
- F. Curing compounds shall conform to the requirements of Material Specification 534, Concrete Curing Compound.
- G. Proprietary concrete repair material shall be subject to review and approval of the engineer before use. The material shall meet all specified salient features for overlay material and not react detrimentally with the existing concrete or associated member of the structure being overlaid.
- H. Surface concrete overlay material shall be a material that consists essentially of a binding medium of portland cement and water that will meet all the specified salient features for overlay material and not react detrimentally with the existing concrete or associated members of the structure being overlaid. This may be, but is not limited to, a conventional concrete mix with or without admixtures, shotcrete, preplaced aggregate concrete, or grout.

10.3. Preparation of Areas to Be Overlain

- A. All concrete sill surfaces as shown on the Drawings shall be covered to the thickness indicated. The final extent of surface preparation shall be determined by the contract authority or the engineer during observation.
- B. Where reinforcement is encountered, the concrete directly in contact with the sides of the reinforcement shall be removed to provide at least a 2-inch clear distance between the reinforcement and the in place concrete.

- C. Before the concrete overlay material is placed, all oil and grease shall be steam or solvent cleaned from all reinforcement and surfaces to which the overlay material is required to bond. If solvent cleaning is used, solvents and solvent residue shall not impair the repair material or its bonding strengths.
- D. After removal of all oil and grease, the reinforcement shall be cleaned to remove any loose, flaky rust, mill scale, and other coatings or foreign substances that would impair bonding of the overlay material to the reinforcement. The prepared surface shall be cleaned by high pressure water jets or compressed air jetting with water to remove all loose particles and dust. The surface shall be free of chips, sawdust, debris, free water, ice, snow, or other harmful substances or coatings.

10.4. Disposal

- A. Unless otherwise specified, all concrete and other debris resulting from the overlay works shall be removed from the site and disposed of at location(s) of the contractor's selection. The contractor is responsible for complying with all local, State, and Federal regulations pertaining to the disposal of such waste.

10.5. Selection of Concrete Overlay Material

- A. Only one brand of proprietary concrete overlay material shall be used in any single overlay operation unless compatibility between brands can be proven with actual test or performance data.
- B. A conventional concrete mix to be used as a replacement concrete overlay material shall be ready-mix concrete that meets all the specified salient features for overlay material and conforms to ASTM C 94. Option A from section 5 of ASTM C 94 shall apply.
- C. The contractor is responsible for the selection and correct application of the concrete overlay material. At least 14 days before installation, the contractor shall provide the engineer for approval all technical data for the overlay material. The technical data shall include the design mix and test results to verify satisfactory conformance to the salient feature requirements. If a proprietary material is used, the manufacturer's recommended preparation, use, and installation specifications shall also be submitted 14 days before installation. Concrete overlay material shall not be placed before approval.
- D. Concrete overlay material shall have the following salient features:
 - a. Be a cementitious material that after hardening will remain stable in wet and moist environments and will not dissolve in water.
 - b. A 28-day compressive strength of 4,000 pounds per square inch or greater when tested according to ASTM C 39, unless otherwise specified.
 - c. Bond strength of the overlay material shall be tested in accordance with ASTM C 882 procedures for type V material and shall have the minimum strength of 1,100 pounds per square inch at 28 days unless otherwise specified.
 - d. Shall be suitable for application at the minimum temperature of 55 degrees Fahrenheit.
 - e. Shall not contain chlorides, gypsum, added lime, or high alumina cement. Shall be noncombustible both before and after cure.
 - f. The color shall be concrete gray unless otherwise specified.

- g. Shall not produce a vapor barrier material and shall be thermally compatible with concrete.
 - h. Shall have a freeze-thaw resistance equal to or greater than 4,000 pounds per square inch, air-entrained concrete designed for severe exposure conditions according to ACI Standard Practice 211.1, unless otherwise specified.
 - i. Shall exhibit no shrinkage at 28 days and no more than 0.4 percent expansion at 3, 14, or 28 days after placement when tested according to the procedures in Corps of Engineers Specification for Non-shrink Grout, CRD-C 621.
- E. Additional site specific requirements for materials are defined in section 10.8.

10.6. Handling and Measurement of Material

- A. Whenever these conditions exist or when climatic conditions are such that the temperature of the concrete overlay material may reasonably be expected to exceed 90 degrees Fahrenheit at the time of delivery to the work site or during the placement operations, the following provisions shall apply:
 - a. The contractor shall maintain the temperature of the concrete overlay material below 90 degrees Fahrenheit during mixing, conveying, and placing.
 - b. The exposed concrete overlay material surface that tends to dry or set too rapidly shall be continuously moistened using fog sprays or other suitable means to maintain adequate moisture during the period between placement and finishing and following finishing. Water shall not be sprinkled or added directly to the surface of the concrete overlay before or during finishing.
 - c. Finishing of slabs and other exposed or non-formed surfaces shall be started as soon as the condition of the concrete overlay material allows and shall be completed without delay.
 - d. The formed surface shall be kept completely and continuously moist for the duration of the curing period or until the application of the curing compound is completed.
 - e. Concrete overlay material surface, especially flat work placed with large surface areas, shall be covered with wet burlap or other similar material as soon as the concrete overlay material has sufficiently hardened and shall be kept continuously moist for at least 24 hours for the initial curing period. This protective method shall be continued for the required curing period or until the application of curing compound is completed.
 - f. Moist curing may be discontinued before the end of the curing period if white, or other color selected in section 10.8, pigmented curing compound is applied immediately.
 - g. Under extreme conditions of high ambient temperature, high concrete temperature, low relative humidity, wind velocity, and exposure to solar radiation, the engineer may:
 - i. Restrict placement to the most favorable time of day.
 - ii. Restrict the depth of layers to assure coverage of the previous layer while it will still respond readily to vibration.
 - iii. Suspend placement until conditions improve.
 - iv. Require removal of forms, overlay, and patching; and reapplication of wet curing by small areas at a time.

10.7. Measurement and payment

- A. Concrete overlay volume is determined by computing the volume to the nearest 0.1 cubic yard between the neatness shown on the drawings and the approved pay limit.
- B. Payment for concrete overlay is made at the contract unit price for the item. The payment for overlay constitutes full compensation for all labor, material, equipment, transportation, tools, forms, false work, bracing, and all other items necessary and incidental to the completion of the overlay work.
- C. Overlay material required to fill voids outside the neatness or pay limits not directed or approved by the engineer and resulting from excessive removal by the contractor, damages caused by the contractor's activities, or improper construction operations as determined by the contracting officer is not measured nor paid for under this item.

END OF SECTION

11.0 STEEL REINFORCEMENT PLATING

11.1. Scope

- A. The work consists of furnishing, fabricating, and installing metalwork, including the metal parts and fasteners of the concrete overlay structures.

11.2. Material

- A. Unless otherwise specified, material shall conform to the requirements of Material Specification 581, Metal. Steel shall be structural quality unless otherwise specified. Castings shall be thoroughly cleaned and subjected to careful inspection before installation. Finished surfaces shall be smooth and true to assure proper fit.
- B. Galvanizing shall not be allowed.
- C. Epoxy bonding agents used to secure bolts to drilled holes in existing concrete shall be two-component Type 1 epoxy resin-base systems that meet the requirements of ASTM C881.

11.3. Installation

- A. The contractor shall drill bolt holes in the existing concrete sill aligned with the holes in the metal plates used for securing the plates a minimum of 7 days after pouring overlay concrete.
- B. As installation progresses the work shall be securely bolted as shown on the Drawings. The contractor shall furnish such installation assisting bolts, nuts, and washers as may be required.
- C. Any field welding shall be performed in conformance to the requirements for shop fabrication except those that expressly apply to shop conditions only.

11.4. Protective coatings

- A. No galvanizing of overlay plates or bolts is allowed.

11.5. Measurement and payment

- A. The work is not measured. Payment for furnishing, fabricating, and installing each item of metalwork is made at the contract price for that item. Such payment constitutes full compensation for all labor, equipment, material, and all other items necessary and incidental to the completion of the work including connectors and appurtenances, such as rivets, bolts, nuts, pins, studs, washers, hangers, and weld metal.
- B. Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary.

END OF SECTION

12.0 WORK ZONE ISOLATION AND DEWATERING

12.1. Scope

- A. The work consists of the removal of surface water and groundwater as necessary to perform the construction required by the contract in accordance with the specifications. It shall include: (1) constructing, installing, building, and maintaining all necessary temporary water containment facilities, channels, and diversions; (2) furnishing, installing, and operating all necessary pumps, piping, and other facilities and equipment; and (3) removing all such temporary works and equipment after their intended function is no longer required.

12.2. Diverting Lostine River

- A. The Contractor shall install, maintain, and operate all cofferdams, channels, flumes, sumps, and all other temporary diversion and protective works needed to divert streamflow and other surface water through or around the construction site. Control of surface water shall be continuous during the period that damage to construction work could occur. Unless otherwise specified and/or approved, the diversion outlet shall be in the same drainageway that the water would have reached before being diverted.
- B. The Contractor shall furnish the contracting officer, in writing, a proposed plan for diverting surface water before beginning any construction activities for which a diversion is required, unless waived in section 10.8 of this specification. Acceptance of this plan or the waiving of the plan requirement will not relieve the Contractor of the responsibilities related to this activity during the process of completing the work as specified.

12.3. Dewatering the Construction Site

- A. Foundations, cutoff trenches, and all other parts of the construction site shall be dewatered and kept free of standing water and muddy conditions as necessary for the proper execution of the work. The Contractor shall furnish, install, operate, and maintain all drains, sumps, pumps, casings, well points, and all other equipment required to properly dewater the site as specified. Dewatering systems that cause a loss of soil fines from the foundation areas will not be permitted.
- B. The Contractor shall furnish the contracting officer, in writing, a proposed plan for dewatering before commencing with any construction activity for which dewatering may be required, unless waived in section 10.8 of this specification. Acceptance of this plan or the waiving of the plan requirement will not relieve the Contractor of the responsibilities for completing the specified work.

12.4. Dewatering Excavated Areas

- A. The Contractor shall maintain all excavated areas free of surface water or otherwise provide for timely and effective removal of surface and subsurface water that accumulates within the excavated area, unless waived in section 10.8 of this specification. Excavated material shall be processed as necessary to achieve proper and uniform moisture content at the time of placement.

12.5. Erosion and Pollution Control

- A. Removal of water from the construction site, including the excavated areas, shall be accomplished so that erosion and the transporting of sediment and other pollutants are minimized. Dewatering activities shall be accomplished in a manner that the water table water quality is not altered.

Pollution control activities shall not conflict with the requirements of the state of Oregon Department of Environmental Quality 1200-C permit, or the Bonneville Power Administration's General Aquatic Conservation Measures shown on the Drawings.

12.6. Removal of Temporary Works

- A. When temporary works are no longer needed, the Contractor shall remove and return the area to a condition similar to that which existed before construction. Areas where temporary works are located shall be graded for slightly appearance with no obstruction to natural surface waterflows or the proper functioning and access to the works of improvement installed. The Contractor shall exercise extreme care during the removal stages to minimize the loss of soil sediment and debris that was trapped during construction.
- B. Pipes, casings, and any other material used to dewater the site shall be removed from temporary wells. The wells shall be filled to ground level with clean gravel or other suitable material approved by the contracting officer. The Contractor shall exercise extreme care to prevent pollution of the ground water by these actions.

12.7. Measurement and Payment

- A. Items of work listed in the bid schedule for removal of water, diverting surface water, and dewatering construction sites and excavated areas are paid for at the contract lump sum prices. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.
- B. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the contract line item to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 10.8 of this specification.

12.8. Items of Work and Construction Details

- A. Installation, operation, maintenance, and removal of diversion structures shall be performed in accordance with the Phase 1 and Phase 2 Construction Access, Staging, and Sequencing Plans and General Aquatic Conservation Measures included in the Drawings. Said work shall commence at the downstream end of the project and proceed upstream unless otherwise approved by the Contracting Officer.
- B. Install a diversion structure within the Lostine River designed to divert up to 531 cfs, the 25 percent exceedance flow in the month of July. Diversion structure is intended to isolate the existing main channel and to meter water into the existing side channel during the first phase of construction. It is not intended to fully dry up construction zones.
- C. Establish and maintain temporary construction access to the stream from the bank in a manner that minimizes disturbance.
- D. Meter flows into the newly constructed main channel as indicated on the Drawings unless otherwise instructed by the Contracting Officer.
- E. Relocate the diversion structure from the main channel to the inlet of the existing side channel for prior to temporary excavation for the large woody material placement within the side channel.

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

END OF SECTION

13.0 LARGE WOODY MATERIAL STRUCTURES

13.1. Scope

- A. Installation of large woody material (LWM) structures in the side channel as indicated on the Drawings and as directed by the Contracting Officer.
- B. Includes excavation, temporary stockpiling, and backfilling.
- C. Includes the procurement of wood materials.
- D. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. Work shall not commence until the Contracting Officer has approved.

13.2. Material

- A. The type, size, and number of the trees/wood for the proposed structures shall be in accordance with those set forth in the Drawings.
- B. All trees shall be alive when harvested with the following exception. Signs of light scorching are acceptable on large trees if confined only to the outer bark. Dead, dried out, or brittle trees are not acceptable.
- C. When harvested, whole trees shall be excavated to retain the entire rootwad. Harvested trees shall be pushed over after loosening the soils around the tree roots to maximize root wad size and minimize handling damage to the tree roots and bole. Soil lodged around the roots shall be displaced to the extent practical without destroying the integrity of the roots. The contractor shall not cut limbs flush to the bole, except where needed to allow for legal and safe transport.
- D. All treetops, limbs, and other woody material created from the harvest and loading of the trees are also to be delivered to the project. These materials may be used for slash/racking as may be called for in the large wood structure drawings or specifications. Racking and slash material must be fresh (green) and flexible, not dry and brittle.
- E. During transport to the site and staging, whole trees shall be handled with care to minimize breakage. All limbs and branches broken during harvest and transport shall also be delivered to the project and can be delivered separate from the trees. This material may be used for racking or slash, depending on size. Racking and slash material must be fresh (green) and flexible, not dry and brittle. Trees shall be handled with care to keep logs, branches, and root mass intact and to minimize breakage and damage to the tree bole.
- F. All harvested trees and logs are subject to inspection by Owner's Representative or Engineer. Upon delivery, Owner's Representative reserves the right to reject any trees or logs failing to meet the specifications and requirements herein.
- G. Acceptable conifer species for each LWM structure type include Ponderosa Pine (*Pinus ponderosa*) and Douglas Fir (*Pseudotsuga menziesii*). Additional conifer species shall be reviewed and may be accepted by the Contracting Officer.
- H. Rootwads shall be attached for the structures as indicated on the Drawings. Rootwads shall be a minimum of two times the diameter at breast height (DBH) of the tree.
- I. Slash materials may be sourced on site or imported.

13.3. Excavation and Subgrade Preparation

- A. Installation shall be performed under dewatered or otherwise dry channel conditions.
- B. LWM Structures shall be installed as indicated above, on the Drawings and/or as guided by the Contracting Officer or their designated representative. LWM Structure installation requires on-site guidance by the Contracting Officer or their designated representative.
- C. Members shall be installed in trenches, rather than in wholesale bank excavation, to the extent possible, to promote greater resistance to flow.
- D. Racking members can be installed in and amongst the larger trees/logs.
- E. Structures shall be backfilled and compacted as each layer is installed, where there are multiple layers. The backfill will consist of the material excavated from the receiving hole and shall be compacted with construction equipment. Excess excavated material shall be removed from the structure location and either placed on Project site at locations indicated on the Drawings and approved by the Contracting Officer. Structures shall be constructed, backfilled, and graded to appear natural.

13.4. Measurement and Payment

- A. Payment will be made per installed LWM structure at the rate identified the Bid Schedule for the items, "Large Woody Material Structures."
- B. The Contracting Officer will confirm completed LWM structure installation.
- C. Includes costs associated with all labor, materials, equipment, and permits required to perform scope.
- D. Includes costs associated with excavation, backfill and bank restoration.

END OF SECTION

14.0 PERMANENT SEEDING, FERTILIZING AND MULCHING

14.1. Scope

- A. The work consists of preparing the area for treatment; furnishing and placing seed, sprigs, mulch, fertilizer, inoculant, lime, and other soil amendments; and anchoring mulch in designated areas as specified.

14.2. Material

- A. Seed—All seed shall conform to the current rules and regulations of the state where it is being used and shall be from the latest crop available. It shall meet or exceed the standard for purity and germination listed in section 12.7.
- B. Seed shall be labeled in accordance with the state laws and the U.S. Department of Agriculture rules and regulations under the Federal Seed Act in effect on the date of invitations for bids. Bag tag figures are evidence of purity and germination. No seed will be accepted with a test date of more than 9 months before the delivery date to the site.
- C. Seed that has become wet, moldy, or otherwise damaged in transit or storage will not be accepted. The percentage of noxious weed seed allowable shall be as defined in the current State laws relating to agricultural seeds. Each type of seed shall be delivered in separate sealed containers and fully tagged unless an exception is granted in writing by the contracting officer.
- D. **Fertilizer**—Unless otherwise specified, the fertilizer shall be a commercial grade fertilizer. It shall meet the standard for grade and quality specified by State law. Where fertilizer is furnished from bulk storage, the Contractor shall furnish a supplier's certification of analysis and weight. When required by the contract, a representative sample of the fertilizer shall be furnished to the contracting officer for chemical analysis.
- E. **Inoculants**—The inoculant for treating legume seeds shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the species and shall not be used later than the date indicated on the container or as otherwise specified. A mixing medium, as recommended by the manufacturer, shall be used to bond the inoculant to the seed. Two times the amount of the inoculant recommended by the manufacturer shall be used except four times the amount shall be used when seed is applied using a hydraulic seeder. Seed shall be sown within 24 hours of treatment and shall not remain in the hydraulic seeder longer than 4 hours.
- F. **Straw mulch material**—Straw mulch shall consist of wheat, barley, oat or rye straw, hay, grass cut from native grasses, or other plants. The mulch material shall be air-dry, reasonably light in color, and shall not be musty, moldy, caked, or otherwise of low quality. The use of mulch that contains noxious weeds is not permitted. The Contractor shall provide a method satisfactory to the contracting officer for determining weight of mulch furnished.

14.3. Seeding Mixtures, Sod, Sprigs, and Dates of Planting

- A. The application rate per acre for seed mixtures, sprigs, or sod and date of seeding or planting shall be as shown on the plans or as specified in section 12.7.

14.4. Seedbed Preparation and Treatment

- A. Areas to be treated shall be dressed to a smooth, firm surface. On sites where equipment can operate on slopes safely, the seedbed shall be adequately loosened (4 to 6 inches deep) and smoothed. Depending on soil and moisture conditions, disking or cultivating, or both, may be necessary to properly prepare a seedbed. Where equipment cannot operate safely, the seedbed shall be prepared by hand methods by scarifying to provide a roughened soil surface so that broadcast seed will remain in place.
- B. If seeding is to be accomplished immediately following construction operations, seedbed preparation may not be required except on a compacted, polished, or freshly cut soil surface.
- C. Rocks larger than 6 inches in diameter, trash, weeds, and other debris that will interfere with seeding or maintenance operations shall be removed or disposed of as specified in Item 5, Excavation and Stockpile.
- D. Seedbed preparation shall be discontinued when soil moisture conditions are not suitable for the preparation of a satisfactory seedbed as determined by the contracting officer's technical representative (COTR).

14.5. Seeding, Sprigging, Fertilizing, Mulching, and Stabilizing

- A. All seeding or sprigging operations shall be performed in such a manner that the seed or sprigs are applied in the specified quantities uniformly in the designated areas. The method and rate of seed application shall be as specified in section 12.7. Unless otherwise specified, seeding or sprigging shall be accomplished within 2 days after final grading is completed and approved.
- B. The rate, amount, and kind of mulching or mesh shall be as specified in section 12.7. Mulches shall be applied uniformly to the designated areas. They shall be applied to areas seeded not later than 2 working days after seeding has been performed. Straw mulch material shall be stabilized within 24 hours of application using a mulch crimper or equivalent anchoring tool or by a suitable tackifier. When the mulch crimper or equivalent anchoring tool is used, it shall have straight blades and be the type manufactured expressly for and capable of firmly punching the mulch into the soil. Where the equipment can be safely operated, it shall be operated on the contour. Hand methods shall be used where equipment cannot safely operate to perform the work required.
- C. The tackifier shall be applied uniformly over the mulch material at the specified rate, or it shall be injected into the mulch material as it is being applied. Mesh or netting stabilizing materials shall be applied smoothly, but loosely on the designated areas. The edges of these materials shall be buried.
- D. The Contractor shall maintain the mesh or netting areas until all work under the contract has been completed and accepted. Maintenance shall consist of the repair of areas damaged by water erosion, wind, fire, or other causes. Such areas shall be repaired to reestablish the intended condition and to the design lines and grades required by the contract. The areas shall be re-fertilized, reseeded, and re-mulched before the new application of the mesh or netting.

14.6. Measurement and Payment

- A. Payment will be made at the Bid Schedule total bid amount for the item "Seeding, Fertilizing and Mulching."

- B. No field measurement of seeding acreage quantities will be conducted during construction.
- C. Includes costs associated with all labor, materials, equipment, and permits required to perform scope.

14.7. Items of Work and Construction Details

14.7.1. Seed

- A. All seed shall conform to the current rules and regulations of the State of Oregon and shall be from the latest crop available. It shall meet or exceed the standard for purity and germination listed below.
- B. Seed shall conform to the standards for “Certified” grade seed.
- C. Seed shall be labeled in accordance with the state laws and the U.S. Department of Agriculture rules and regulations under the Federal Seed Act in effect on the date of invitations for offers. Bag tag figures are evidence of purity and germination. No seed will be accepted with a test date of more than 9 months before the delivery date to the site.
- D. Seed that has become wet, moldy, or otherwise damaged in transit or storage will not be accepted. The percentage of noxious weed seed allowable shall be as defined in the current State laws relating to agricultural seeds. Each type of seed shall be delivered in separate sealed containers and fully tagged unless an exception is granted in writing by the Contracting Officer.
- E. Areas disturbed by construction will be seeded at the end of the project prior to the onset of cold weather. The contracting Officer shall approve seeding dates.
- F. Seeding dates shall be selected to maximize growth. Seeding shall only be completed from August 15 until December 1, preferably between October and November, or as directed by the Contracting Officer.
- G. Seed mixture:
 - 1. Purity: 90 percent minimum.
 - 2. Germination:
 - a. 85 percent minimum.
 - b. Germination test less than 1 year old at time of seeding.
 - c. Uniform mixture as recommended for the area by local Extension Service or other approved source and as approved by the Contracting Officer.
 - 3. Seeding Rate: 35 pounds live seed per acre as shown on the Drawings.

14.7.2. Straw Mulch

- A. Straw mulch for non-hydroseeding applications from bent grass, bluegrass, fescue, or ryegrass singly or in combination. Cereal grain straw from barley, oat or wheat may be allowed upon approval of the Contracting Officer. Provide straw that is not moldy, caked, decayed or of otherwise low quality. Submit certification from the Supplier that the straw is free of noxious weed seeds or plant parts. Acceptable documentation is any one of the following:
 - 1. Mulch must be certified as weed-free. A local NRCS Extension Agent may be consulted for an approved erosion control seed mix and sources of certified weed-free mulch.

2. The straw is certified by a recognized program accepted by the Oregon Department of Agriculture as being weed free.
 3. Seed lab test results of seed harvested from the straw meet minimum Oregon Certified Seed quality for weed seed content.
- B. Long-fibered mulch (wood and/or straw) with an appropriate tackifier to form a bonded fiber matrix applied at a rate of 3,000 pounds/acre is preferred.

14.7.3. Water and Hydroseeding

- A. Water shall be the responsibility of the Contractor, unless otherwise noted. Water shall not contain elements toxic to plant life.
- B. Hydromulch from Cellulose, Wood, or Straw Fiber—Cellulose fiber produced from virgin wood, straw, or paper fiber product from the QPL. Furnish wood or straw mulch processed so the fibers remain uniformly suspended under agitation in water and the fibers have moisture absorption and percolation properties. Ship hydromulch in packages of uniform weight, ± 5 percent, and labeled with the manufacturer's name and air-dry weight. Include enough green dye tracer so applied mulch is easily visible.

14.7.4. Pesticides

- A. Submit proposed pesticides and receive approval before using.
- B. Submit a copy of the manufacturer's federal registered label and, if requested, a Material Safety Data Sheet.
- C. The NPT reserves the right to restrict chemicals from being used in sensitive areas.

END OF SECTION

15.0 PLANTING

15.1. Scope

- A. Work in this section consists of furnishing all labor and equipment to store, provide care for, construct trenches and plant shrub cuttings as noted on the Drawings. Any substantive variance to this specification due to unforeseen conditions encountered on the site, weather conditions, plant availability, other construction activities, etc. must be approved by the Contracting Officer.
- B. Nothing in this Section shall relieve the Contractor from full responsibility for the adequacy of protective works and compliance with permit requirements. All work shall be approved by the Contracting Officer prior to commencement of work.

15.2. Delivery Inspection, Storage and Handling

- A. The Contractor shall provide all planting equipment, hand tools, bags, and other necessary tools to perform planting and quality control. Heavy equipment utilized will be subject to inspection prior to entry to the project site to ensure that it is clean and free of noxious weed seeds. Hand planting tools shall be long enough and wide enough to accommodate planting the specified size of native plants in a satisfactory manner. Planting bags shall be deep enough and, in a condition, to provide for the care and protection of the native plants.
- B. The care and protection of native plants during the periods of transportation, handling and planting is extremely important. Care shall be taken to adhere to the following requirements any time trees and/or shrubs are in the Contractor's possession. Noncompliance with these requirements may be grounds for termination of the contract.
 - 1. Native plants shall be protected from drying, heating, smothering, freezing, crushing, bending, drowning, abrasion, rapid temperature fluctuations, or contact with injurious substances.
 - 2. Contractors shall take precautions to keep roots and/or stems moist during the planting operation and throughout the period that plants are stored on-site. Shipping containers containing native plants shall be opened only in full shade and shall not be exposed to direct sunlight.
 - 3. Native plants that are frozen shall not be handled until completely thawed. They shall be thawed in accordance with directions from the Contracting Officer.
 - 4. Native plants carried in trailers and/or planting bags shall not exceed the amount that can be carried and removed without injury, or which can be planted before critical heating or drying occurs.
 - 5. When weather or unsuitable planting conditions prevent the Contractor from planting the native plants promptly after receipt, the Contractor shall store the native plants in a manner that will ensure their survival. The Contractor shall install plants within one week of delivery to the project site unless written approval is granted by the Contracting Officer.
- C. The contractor shall coordinate the delivery schedule with the Contracting Officer.
- D. Plants will be inspected on-site by the Contracting Officer representative and possibly rejected for not meeting specification must be removed immediately from site or red-tagged and removed as soon as possible.

15.3. Plant Materials

- A. Plants shall be true to species and variety or subspecies. No cultivars or named varieties shall be used.
- B. Plant species and size shall conform to those listed in the Drawings or otherwise approved by the contracting officer.
- C. Live Stakes:
 - 1. Cutting stock shall be gathered during the dormant period and installed within 7 calendar days of harvest or as authorized by the contracting officer. Cuttings shall not be gathered if temperatures are below 32°F (0°C).
 - 2. Cuttings shall be protected from sun, wind, freezing, drying or injury before and during planting. Cuttings shall be stored upright in water immediately after harvesting up until they are installed. Stored material shall be examined frequently for signs of disease and planted before dormant bud development.
 - 3. Cuttings shall be a minimum of 24 inches long (as specified in the plant lists) making the bottom cut slanted and below a dormant bud, and the top cut straight, ½ to 1 inch above a dormant bud. The diameter of pieces reserved for planting shall not be less than 1/2 inch thick.
 - 4. Cuttings shall be installed such that stems intercept groundwater during low-water periods.

15.4. Planting Time and Conditions

- A. Cutting plant material shall be gathered and installed from October 15 to November 30.
- B. When drought, excessive moisture, frozen ground, expected freezing air temperatures or other unsatisfactory conditions prevail, planting installation shall be discontinued or as otherwise directed by the contracting officer.

15.5. Planting

- A. Plant layout shall be done as indicated on the Drawings and as guided by the Contracting Officer.
- B. When obstructions below ground affect the work, Contractor shall propose adjustments to plant material location, type of plant and planting method for review and approval by the Owner's Representative.
- C. Materials excavated shall be stockpiled on the side of the trench away from the stream. Trenches shall be backfilled by hand to minimize root/stem damage and to limit air pockets near the roots.
- D. All plant material shall be set plumb and held in position until sufficient soil has been firmly placed around root system or ball. The base of the plant shall be level with the surrounding ground.

15.6. Maintenance and Irrigation/Watering

- A. Plant material installed in the initial phase of planting shall be maintained in a healthy growing condition during installation. Installed plants shall be maintained to foster establishment and growth. The maintenance includes watering and adjusting plant position to counteract settling.
- B. At least one site visit should occur within two weeks of planting to make any adjustments to plant material.

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

15.7. Measurement and Payment

- A. Payment will be made at the Bid Schedule total bid amount for the item “Planting.”
- B. No field measurement of material placement quantities will be conducted during construction.
- C. Includes costs associated with all labor, materials, equipment, and permits required to perform scope.

END OF SECTION

DIVISION 3
Materials

MATERIAL SPECIFICATION 522—AGGREGATES FOR PORTLAND CEMENT CONCRETE

Scope

- A. This specification covers the quality of fine aggregate and coarse aggregate for use in the manufacture of portland cement concrete.

Quality

- A. Aggregate shall conform to the requirements of ASTM Specification C 33 for the specified sizes. Aggregates that fail to meet any requirement may be accepted only when either:
 - a. The specified alternate conditions of acceptance can be proven before the aggregates are used on the job and within a period such that no work under the contract will be delayed by the requirements of such proof, or,
 - b. The specification for concrete expressly contains a provision of special mix requirements to compensate for the effects of the deficiencies.

Reactivity with alkalis

- A. The potential reactivity of aggregates with the alkalis in cement shall be evaluated by petrographic examination and, where applicable, the chemical method of test, ASTM Designation C 289, or by the results of previous tests or service records of concrete made from similar aggregates from the same source. The standards for evaluating potential reactivity shall be as described in ASTM Specification C 33, appendix A1.
- B. Aggregates indicated by any of the above to be potentially reactive shall not be used except under one of the following conditions:
 - a. Applicable test results of mortar bar tests made according to ASTM Method C 227 are available which indicate an expansion of less than 0.10 percent at 6 months in mortar bars made with cement containing not less than 0.8 percent alkalis expressed as sodium oxide; or,
 - b. Concrete made from similar aggregates from the same source has been demonstrated to be sound after 3 years or more of service under conditions of exposure to moisture and weather similar to those anticipated for the concrete under these specifications.
- C. Aggregates indicated to be potentially reactive, but within acceptable limits as determined by mortar bar test results or service records, shall be used only with low alkali cement, containing less than 0.60 percent alkalis expressed as sodium oxide.

Storing and handling

- A. Aggregates of each class and size shall be stored and handled by methods that prevent segregation of particles sizes or contamination by intermixing with other material.

MATERIAL SPECIFICATION 531—PORTLAND CEMENT

Scope

- A. This specification covers the quality of Portland cement.

Quality

- A. Portland cement shall conform to the requirements of ASTM Specification C 150 for the specific types of cement. Type IS Portland blast-furnace slag cement or Type IP Portland-pozzolan cement conforming to the requirements of ASTM Specification C 595 may be used unless prohibited by the specifications.

Storage at the construction site

- A. Cement shall be stored and protected at all times from weather, dampness, or other destructive elements. Cement that is partly hydrated or otherwise damaged will not be accepted.

MATERIAL SPECIFICATION 581—METAL

Scope

- A. This specification covers the quality of steel and aluminum alloys.
- Structural steel shall conform to the requirements of ASTM A 36.
 - High-strength low-alloy structural steel shall conform to ASTM A 242 or A 588.
 - Carbon steel plates of structural quality to be bent, formed, or shaped cold shall conform to the ASTM A 283, Grade C.
 - Carbon steel sheets of structural quality shall conform to ASTM Standard A 1011, Grade 40, or A 1008, Grade 40.

Commercial or merchant quality steel

Commercial or merchant quality steel shall conform to the requirements of the applicable ASTM listed below:

Product	ASTM standards
Carbon steel sheets	A 1011
Carbon steel strips	A 1011
Extruded bars, rods, shapes, and tubes	B 221

Bolts

- A. Steel bolts shall conform to the requirements of ASTM Standard A 307. If high-strength bolts are specified, they shall conform to the requirements of ASTM A 325.
- B. When galvanized or zinc-coated bolts are specified, the zinc coating shall conform to the requirements of ASTM Standard A 153 except that bolts 0.5 inch or less in diameter may be coated with electro-deposited zinc or cadmium coating conforming to the requirements of ASTM Standard B 633, Service Condition SC 3, or ASTM B 766, unless otherwise specified.

Welding electrodes

- A. Steel welding electrodes shall conform to the requirements of American Welding Society Specification AWS A5.1, "Specification for Mild Steel Covered Arc-Welding Electrodes," except that

they shall be uniformly and heavily coated (not washed) and shall be of such a nature that the coating does not chip or peel while being used with the maximum amperage specified by the manufacturer.

- B. Aluminum welding electrodes shall conform to the requirements of American Welding Society Specification AWS A5.10, "Specification for Aluminum and Aluminum-Alloy Welding Rods and Bare Electrodes."