Hayden Pass Emergency Watershed Program Project

Technical Specifications

PRELIMINARY FOR BIDDING – NOT FOR CONSTRUCTION

Submitted to:
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TECHNICAL SPECIFICATIONS
FOR
HAYDEN PASS EWP PROJECT
OTAK PROJECT NO. 19012
DRAFT

GENERAL

This scope of work incorporates by reference Colorado Department of Transportation (CDOT) Standard Specifications for Road and Bridge Construction (2017). The scope of work also incorporates by reference four Urban Drainage and Flood Control District (UDFCD) Standard Construction Specifications in the Supplemental Specifications. The Contractor shall use the 2017 CDOT Specifications as the controlling requirements with the exception of the UDFCD Standard Construction Specifications as amended for the subject work noted in the Supplemental Specifications. All three digit sections refer to 2017 CDOT specifications which have been amended and all six digit sections refer to UDFCD Specifications which have been amended. The respective reference should be used for each section.

In case of a discrepancy or overlap the order of precedence is as follows:

1) Permit Requirements
2) Technical Specifications
    a. Special Project Provisions
    b. Standard Specifcations (2017 CDOT Specifications)
    c. Supplemental Specifications (UDFCD Standard Construction Specifications)
3) Construction Drawings

Per CDOT Section 105.09, "the Contractor shall not take advantage of any apparent error or omission in the Contract. If the Contractor discovers an error or omissions, the Engineer shall immediately be notified. The Engineer will make corrections and interpretations as necessary to fulfill the intent of the Contract."

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SPECIAL PROJECT PROVISIONS

Special Project Provisions Table of Contents

REVISION OF SECTION 101 — DEFINITIONS AND TERMS

Section 101 of the Standard Specifications is hereby revised for this project as follows:

Delete Subsection 101.29 and replace with the following:

101.29 Engineer. The Engineer who designed the project acting directly or through an authorized representative, who is responsible for engineering and administrative supervision of the project.

Add the following:

Construction Manager: a person assigned to the project with specialized skills, training, education, and experience in managing construction projects under the direction of the engineer.

Stream Restoration Specialist (SRS): a person assigned to the project with specialized skills, training, education, and experience implementing stream restoration projects under the direction of the engineer.

Plant Specialist: a person responsible for implementing the project's revegetation plan, who has education and experience with selecting and installing native riparian plant species and is responsible to oversee all revegetation activities.

Surveyor: a Professional Land Surveyor (PLS) with survey equipment and experience to do layout staking, assist with spot-checking structure grades and elevations; establish survey control points for use by the contractor; and complete as-built survey.

REVISION OF SECTION 105 — CONTROL OF WORK

Section 105 of the Standard Specifications is hereby revised for this project as follows:

DESCRIPTION

Subsection 105.01 shall be modified to include the following:

105.01 This section includes quality control/quality assurance (QA/QC) and performance criteria related to planting and seeding.

Subsection 105.02 shall be modified to include the following:

105.02 All plant and seed materials and workmanship associated with planting and seeding, including any other materials defined in Sections 207, 212, 213, 214, 215 and 217.

Subsection 105.03 shall be modified to include the following:

105.03 Performance criteria. The contractor shall be responsible for achieving the following performance criteria for planting and seeding.

- All vegetation (woody or herbaceous) shall be "ecotypic" or native to the Sangre de Cristo Mountain Range and/or Fremont County.
- Trees and shrubs shall be maintained and replaced up to an 80% minimum survival rate.
- Willow clumps, cuttings, or perennial wetland plants shall be maintained and replaced up to an 80% minimum survival rate.
- Perennial wetland plant materials harvested/salvaged, if specified, shall be maintained and replaced up to an 80% minimum survival rate.
- Initial seed germination of all seeded areas shall produce a minimum of 2 mature, viable native plants per square foot.
- Seeded areas shall be considered successful when no bare areas in excess of 5 square feet are present.
- 80% of the seeded areas shall be comprised of the designed seed mix (as specified in the plans) or other desirable species (i.e., native or naturalized colonizers).
- Noxious & restricted weeds (as per State or local statute) shall not exceed a mean foliar cover of 5% for those on the A, B or C lists. Annual weeds (not listed) shall not exceed a mean foliar cover of 5%.
- Performance criteria will be assessed by the Vegetation Specialist.

Table 105-1 should be replaced as follows:

Table 105-1
SUMMARY OF CONTRACTOR SUBMITTALS

Section No.	Description	Type	Contractor P.E. Seal Required?
108	Debris Removal Plan	Working Drawing/ Methods	No
108	Excavation Hauling and Disposal Plan	Written Letter from Property Owner(s)	No
108	Disposal Site Permission	Written Letter from Property Owners	No
108	Trees to be salvaged	List	No
208	Stormwater Management Plan	Plan/Report to CDPHE and Fremont County, if required	No
514	Rock Screening Plan	Working Drawing/Methods	No
626	Staging Area Plan	Working Drawing/Methods	No
630	Traffic Control Plan	Working Drawing/Methods	No
214	Planting Plan	Shop Drawing	No
31 23 19	Water Control Plan	Working Drawing/ Methods	No

105.09 COORDINATION OF PLANS, SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS

Subsection 105.09 shall have the second paragraph replaced as follows:

In case of discrepancy the order of precedence is as follows:

1) Permit Requirements
2) Technical Specifications
    a. Special Project Provisions
    b. Standard Specifcations (2017 CDOT Specifications)
    c. Supplemental Specifications (UDFCD Standard Construction Specifications)
3) Construction Drawings

REVISION OF SECTION 201 — CLEARING AND GRUBBING

Section 201 of the Standard Specifications is hereby revised for this project as follows:

DESCRIPTION

Subsection 201.01 is replaced with the following:

The work consists of clearing (medium density) of vegetation and within the limits of grading areas, staging areas, and access routes. The work also includes landfill disposal of debris (i.e. trash) that cannot be beneficially reused onsite. Vegetation and objects designated to remain shall be preserved free from injury or defacement, including the limbs and roots of mature trees. Large wood specified for removal will remain intact including limbs and rootwads. Mature willows specified for removal will be stored appropriately for transplant. No chipping will be required as all woody material shall be reused onsite or in the vicinity. The scope includes removal of flood deposited trash debris (e.g. parts of houses, may contain small amounts of wood materials that are not salvageable).

CONSTRUCTION REQUIREMENTS

Subsection 201.02 shall include the following:

The contractor shall retain and stockpile large boulders encountered during clearing and grubbing for reuse in rock features and bank protection (Refer to Revision of Section 506—In-Channel Boulder Features). Management of large boulders for reuse will be paid for under Section 203.

The Contractor shall retain and stockpile large wood encountered during clearing and grubbing for reuse in stream restoration features requiring woody materials (i.e., Large Wood Structures, Habitat/Structure Logs, Brush Trench—Refer to Revision of Sections 214 and 519). The limbs and rootwads of large wood material shall remain intact. Removal of large wood for reuse will be paid for under Section 202.

The Contractor shall retain and stockpile small branches and material otherwise suitable for use in Brush Trench feature (refer to Revision of Section 214).

The Engineer and/or Ecologist shall flag vegetation that shall not be disturbed before construction begins. The Contractor shall not disturb existing stands of vegetation that have been flagged for protection. The Contractor shall review flagged vegetation stands with the Engineer and/or Ecologist prior to the start of work.

The debris removal location will be proposed by the Contractor and reviewed by the Engineer and/or Project Owner. When removing debris within mature vegetation, the Contractor shall take care not to disturb the vegetation, unless previously confirmed for removal by the Engineer or Vegetation Specialist. Debris removal may require use of specialty equipment or hand tools, in order to not disturb mature vegetation.

METHOD OF MEASUREMENT

Subsection 201.03 shall include the following:

The contractor is responsible for reviewing debris removal volume and estimating cost to haul offsite.

BASIS OF PAYMENT

Subsection 201.04 shall include the following:

Payment will be made under:

Pay Item	**Pay Unit**
Clearing and Grubbing	Acre
Debris Removal - landfill disposal of trash	Cubic Yard

Clearing and Grubbing does not include offsite disposal.
Debris Removal includes offset disposal.
Removal of woody material for beneficial reuse onsite or in the vicinity will be paid for under Section 202.

REVISION OF SECTION 202 — REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Section 202 of the Standard Specifications is hereby revised for this project as follows:

DESCRIPTION

Subsection 202.01 is replaced with the following:

The work consists of the removal of downed trees, standing dead trees, stumps, fence, existing structures slated for removal and all other obstructions that are not designated or permitted to remain. Except in areas to be excavated, the resulting trenches, holes, and pits shall be backfilled. The removal and replacement of fence is covered in Supplemental Specification 32 31 00.

Materials removed and not designate in the Contract to be salvage or incorporated into the work shall become the property of the Contractor.

CONSTRUCTION REQUIREMENTS

Subsection 202.02 is shall include the following:

The Contractor shall remove all large trees and stumps designated for removal. All trees and stumps shall be reused onsite for beneficial stream restoration purposes. The Contractor shall retain and stockpile large wood material for reuse onsite in stream restoration features requiring woody materials (i.e., Large Wood Structures, Habitat/Structure Logs—Refer to Addition of Section 519). The limbs and rootwads of large wood material shall remain intact. Small branches suitable for reuse in the Large Wood Structures (refer to Revision of 519) shall be retained and stockpiled.

Some downed woody material and standing dead trees (i.e. snags) shall remain on-site per the Engineer's direction. Large woody material that is not designated to remain will be flagged for removal by the Engineer and/or Ecologist before construction.

The Contractor shall remove the fence as noted in the planset and haul all debris to the landfill.

The Contractor shall demolish the existing structures as noted in the planset, and haul all debris to the landfill.

BASIS OF PAYMENT

Subsection 202.12 shall include the following:

Payment will be made under:

Pay Item	**Pay Unit**
Small Tree Removal (1-ft diameter or less)	Each
Stump Removal (Greater than 1-ft iameter or multi-stem)	Each
Remove Fence	Linear Foot
Demolish and Remove Existing Structures	Square Foot

REVISION OF SECTION 203 — EXCAVATION AND EMBANKMENTS

Section 203 of the Standard Specifications is hereby revised for this project as follows:

DESCRIPTION

Subsection 203.01 shall be replaced by the following:

203.01 General. This work consists of excavation, hauling, disposal, placement, processing and compaction of all material encountered within the limits of the work, including construction of berms and excavation for ditches and channels, necessary for the construction in accordance with the Contract.

Subsection 203.02 shall include the following:

Unclassified Excavation Alluvium (Haul Away) This work consists of excavation within the channel and floodplain which require material to be hauled offsite.

Unclassified Excavation Alluvium (Complete in Place) This work consists of excavation and fills within the channel and floodplain which are completed onsite.

Process Usable Boulders/Cobble/Gravels (final volume of cobble & gravel) This work includes the processing, sorting and stockpiling of in-situ riprap, larger, alluvial rounded rock and boulder material located in the existing river bottom, banks, floodplain, and soil piles, to be used in later stages of construction to form rock features (Addition and Revision of Section 31 37 00 – Riprap, Boulders, and Bedding).

Remove Sediment in Trees This work consists of removing excess sediment from trees and hauling it offsite.

Fine Channel Grading This work consists of the final excavation and fills (shaping) of the reconstructed or rehabilitated creek channel bottom where the channel is being relocated and in overflow paths, after other mass grading has been completed.

CONSTRUCTION REQUIREMENTS

Subsection 203.04 (General) shall include the following:

Contractor shall propose Haul Route(s) and obtain Engineer approval prior to use or preparation, etc.

Subsection 203.05 (Excavation) shall include the following:

Final grade cuts and fills shall not be steeper than 1.5: 1. The typical floodplain bench grading dimensions shown in the planset shall be field fit to tie into existing topography at slopes less steep than 3:1 unless noted in the planset.

Mass grading shall not be conducted from within the bankfull channel or disturb the bankfull channel except where grading is specifically proposed in the bankfull channel. Disturbances to the channel shall be regraded to existing conditions or better, per direction by the Engineer, at the Contractor’s expense.

Existing river conditions prior to mass grading shall be carefully documented with photographs or other approved method. Riprap materials (competent angular or sub-angular materials conforming to the rock quality and aspect ratio requirements of Section 506 (Riprap) and 31 37 00 (Riprap, Boulders, and Bedding) shall be retained for re-grading and re-use on the Project; All rounded cobbles and boulders suitable for use with floodplain stabilization or in-channel rock features (as shown on the river plans; see Supplemental Specification 31 37 00) shall be removed and stockpiled as close to the work area as possible. The proposed channel and floodplain shall be formed according to the typical sections and grading contours as shown on the plans.

When removing sediment in trees, the Contractor shall take care not to disturb the mature vegetation, unless previously confirmed for removal by the Engineer or Vegetation Specialist. Debris removal may require use of specialty equipment or hand tools, in order to not disturb mature vegetation.

The Engineer may direct the creation of micro-topography at their discretion to create small-scale stream channel and landscape features not shown on the plan set provided they are in-line with the vision of the project and not time intensive.

The final compaction level of graded areas shall be consistent with the intent to re-establish vegetation. Final compaction level shall be approved by the Engineer.

Fine Channel Grading is performed in multiple steps; the first step is mass grading completed under Unclassified Grading Alluvium. After the mass grading surface is prepared, the channel bottom will be reshaped by excavating 12” (typical) deep pools, as shown on the plans. This excavated material will then be placed and graded into slightly elevated areas adjacent to the low flow channel as directed by the Engineer. The placed material is then track packed. This process is repeated until design depths and shape are achieved. This work is followed by (or concurrent) with the placement of cobbles and gravels produced under Process Usable Boulders/Cobble/Gravels up to the proposed elevations. This item assumes 0.5’-1’ of cobble/gravel placed. Graded channel elements shall be inspected and approved by the Engineer. Contractor shall confirm existing conditions represent design plans prior to all road revetment and mass grading activity.

203.10(a) shall be included:

Processing. Excess cut from native alluvium shall be processed via screens or skeleton buckets to sort usable boulder, cobbles and gravels for reuse onsite. The size of material sorted shall meet the required rock sizes per the Planset. This includes transporting, processing and stockpiling of materials. Once the required amount of usable material is met, no additional processing shall be completed.

METHOD OF MEASUREMENT

Subsection 203.11(a) shall include the following:

Unclassified Excavation Alluvium (Complete in Place) is measured by the net in-place volume of material excavated and placed onsite in cubic yards. *Unclassified Excavation Alluvium (Haul Away) is measured by the net volume of material that was excavated and hauled offsite.* When grading is either partially or entirely complete and Engineer has approved grading, contractor shall estimate the volume (CY) of excavation in a method approved by the Engineer.

Subsection 203.11(g) shall be included:

Process Usable Boulders/Cobble/Gravels (final volume of cobble & gravel). Process Usable Boulder/Cobble/Gravels will be measured by the final volume of suitable boulders, cobbles and gravels that are processed or sorted from the native alluvium.

Remove Sediment in Trees will be measured by the volume of materials excavated from the designated areas in cubic yards. When sediment removal is either partially or entirely complete and Engineer has approved grading, contractor shall estimate the volume (CY) of excavation in a method approved by the Engineer.

Fine Channel Grading Channel grading is measured by the cubic yard volume of material disturbed for general channel shaping and cobble/gravel placement. Cost assumes a depth of one foot across the disturbed channel. This will not be measured in the field, but will be by plan quantity.

BASIS OF PAYMENT

Subsection 203.12 shall include the following:

Payment includes the total volume excavated and reshaped into the final dimensions of the channel and floodplain. Payment includes haul away of any excess material to an approved offsite location. Payment includes the detailed sorting, stripping, stockpiling and replacement of select existing river materials as described above.

The work to be paid under pay item *Unclassified Excavation Alluvium (Haul Away)* consists of excavation, hauling, and disposal of excess cut material, including channel grading and floodplain grading excess.

The work to be paid under pay item *Unclassified Excavation (Complete in Place)* consists of excavation, placement, and compaction of material to be handled as part of the channel and floodplain grading.

The work to be paid under *Process Alluvium for Usable Boulders/Cobbles/Gravels/*Soils *(final volume of cobble & gravel)* consists of screening native alluvium for river boulders, cobbles, gravels and soils for reuse onsite.

The work to be paid under pay item *Remove Sediment in Trees* consists of removal and hauling offsite of excess sediment located mature vegetation in areas denoted on the planset.

Pay Item	**Pay Unit**
Unclassified Excavation Alluvium (Haul Away)	Cubic Yards
Unclassified Excavation Alluvium (Complete in Place)	Cubic Yards
Process Alluvium for Usable Boulders/Cobbles/Gravels/Soils	Cubic Yards
Remove Sediment in Trees	Cubic Yards
Fine Channel Grading	Cubic Yards

REVISION OF SECTION 207 — TOPSOIL

Section 207 of the Standard Specifications is hereby revised for this project as follows:

DESCRIPTION

Subsection 207.01, shall include the following:

All topsoil shall be approved by a Vegetation Specialist. This work shall include salvaging and stockpiling existing topsoil and the placement of topsoil upon constructed cut and fill slopes after grading operations are completed and prior to seeding. It is expected that all required topsoil can be salvaged from upland cut areas on-site before mass grading.

MATERIALS

Delete subsection 207.02 and replace with the following:

Existing topsoil shall be salvaged and placed to final grade or as directed by the Vegetation Specialist. The depth of topsoil salvage is approximately 6 inches, but may vary depending on actual site conditions. Topsoil generally includes the upper part of the soil profile with the following characteristics (NRCS 1993, 1999; Heckman 2003):

- Where plants have most of their roots
- Where there are higher concentrations of microorganisms
- Where the soil is darkened from the presence of organic matter
- Where there is a combination of particle sizes or texture classes, with generally no more than approximately 10 percent gravel, 65 percent sand, 60 percent silt, or 20 percent clay

CONSTRUCTION REQUIREMENTS

Delete subsection 207.03 and replace with the following:

Excavation, grading and drainage shall be performed as per the plans and directions of the Engineer and field fit as necessary to achieve optimal grades as indicated on the plans. Graded areas that will receive topsoil will be excavated and graded to accommodate placement of the specified topsoil thickness. The contractor shall check and the Engineer shall verify grades prior to and after placement of topsoil in preparation for seeding and planting.

Topsoil Removal: Existing topsoil within the limits of disturbance that will be disturbed by construction activities, hauling, or staging activities, or that needs to be stripped prior to excavation and grading shall be stripped and stockpiled in designated locations in a manner that will facilitate measurement, minimize sediment damage, and not obstruct natural drainage. Prior to stripping, any existing vegetation should be mowed to a maximum height of four (4) inches over the area to be disturbed. If the amount of vegetation exceeds what can be incorporated into the soil without interfering with establishing a proper seedbed, then excess vegetation shall be removed.

Existing topsoil should be removed by a front-end loader (preferred method) or grader. Under no circumstances should upland topsoil be removed under wet soil moisture conditions.

Under no circumstances shall subsoil be mixed with topsoil, and subsoil shall not be placed or stockpiled on top of the topsoil. If necessary, salvaged topsoil shall be cordoned off to delineate the topsoil from subsoil or other materials. The topsoil shall be protected from contamination by subsoil material, weeds, etc. and from compaction by construction equipment and vehicles.

Stockpiled topsoil shall be placed in the designated storage/staging area. Stockpiles will be placed a minimum of 50 feet away from drainageways and a vegetated buffer or appropriate BMPs must be maintained between the stockpile and the drainageway.

If a stockpile will be left for more than 30 days, it will be seeded and mulched with an approved temporary seed mix. Stockpiles are limited to a maximum height of 10 feet above the existing grade and side slopes must be flatter than 3:1; and appropriate BMPs must be installed to protect against erosion.

Relieving Compaction: Subsoil and/or alluvium shall be ripped to minimum depth of 12 inches prior to topsoil placement and/or soil amendment to ensure the topsoil layer is attached to the subsoil and does not slip. If upon inspection, the Vegetation Specialist finds deeply compacted subsoil or existing topsoil that may ultimately impact sustained plant growth and establishment, the Vegetation Specialist may require deeper ripping.

Preparation for Topsoil Placement: Rough graded areas shall tie in smooth & naturally with adjacent grades. Concrete and other unnatural debris shall be removed from the work area and disposed of in an appropriate location prior to topsoil placement. No material shall impede topsoil placement of seeding and all waste shall not be disposed of or dumped illegally.

Topsoil Placement: Topsoil shall be placed directly upon completed cut and fill slopes whenever conditions and the progress of construction will permit. Topsoil shall be placed without creating a compacted surface.

METHOD OF MEASUREMENT

Delete subsection 207.04 and replace with the following:

Upland topsoil material excavated from designated areas or from stockpiles, hauled and placed will be measured in cubic yards and paid for as Existing Upland Toposil – Stripped and Stockpiled, and Existing Upland Topsoil Placement.

BASIS OF PAYMENT

Delete subsection 207.05 and replace with the following:

207.05 The accepted quantities measured as provided above will be paid for at the contract unit price per cubic yard for each of the pay items listed below that appear in the bid schedule.

Payment will be made under:

Pay Item	**Pay Unit**
Existing Upland Topsoil – Stripped and Stockpiled	Cubic Yard
Existing Upland Topsoil Placement	Cubic Yard

Strip, Stockpile, and Grade Native Toplayer of Onsite Soil includes all labor and materials required to strip topsoil from designated areas, stockpile during mass grading, and final placement and grading the topsoil in designated areas. Soil conditioning of existing topsoil is covered in Revision of Section 212. Over-excavation required for topsoil placement shall be included in the cost of the work.

REVISION TO SECTION 208 — EROSION CONTROL

Section 208 of the Standard Specifications is hereby revised for this project as follows:

DESCRIPTION

Subsection 208.01 shall include the following:

The Contractor shall develop a Stormwater Management Plan (SWMP) and obtain a construction stormwater permit from CDPHE and Fremont County, if required.

Erosion control measures shall be installed and maintained in the locations specified and as described in the SWMP. Erosion control measures will consist of silt fence, erosion control log, or other approved measures.

CONSTRUCTION REQUIREMENTS

Subsection 208.06 shall include the following:

Biodegradable hydraulic fluids is encouraged for use on all heavy machinery.

Contractor will comply with equipment cleaning protocols to prevent the spread of New Zealand Mud Snails, other aquatic nuisance species (hitchhikers), and noxious plant species prior to entering the site per requirements of the Section 404 Authorization(s). Contractor is responsible for keeping a copy of Section 404 authorization(s) onsite and complying with all requirements.

A spill kit shall be kept onsite during all work with machinery (emergency pollutant isolation and clean-up materials, with procedures).

Vehicle tracking pads are required to prevent tracking debris on public roads.

The Contractor shall install and maintain measures that reduce sediment erosion into waterways and control dust from heavy machinery.

BASIS OF PAYMENT

Subsection 208.12 shall include the following:

Erosion Controlshall include the development of a SWMP, installation and maintenance of erosion and sediment control measures and management of erosion and sediment control.

Payment will be made under:

Pay Item	**Pay Unit**
Erosion and Sediment Control	Lump Sum

REVISION OF SECTION 212 — SEED AND SOIL CONDITIONING

Section 212 of the Standard Specifications is hereby revised for this project as follows:

MATERIALS

Delete subsection 212.02 and replace with the following:

212.02 Seed and Soil Conditioners

(a) Seed.

The Contactor will provide all seed for the project. Seed and seed mixes provided will meet all requirements as outlined in this section.

All seed shall be furnished unmixed, in individual bags by species. All seed bags shall be clearly labeled to show the name and address of the supplier, the seed name, the lot number, net weight, origin where collected, the percent of weed seed content, the guaranteed percentage of purity and germination, pounds of pure live seed (PLS), and the total pounds of PLS in the container.

The seed will be mixed on site (not by the supplier) and placed in the appropriate drill seeder hoppers or broadcaster by a qualified seeding contractor pursuant to the seed schedules.

Maximum crop and weed content shall follow the Colorado Seed Certification Standards for certified seed:

Prohibited noxious weeds	None
Restricted noxious weeds	Less than 0.1%
Total other crop seed	Less than 1.0%

Seed shall be free of prohibited noxious and invasive weeds including, but not limited to: Canada thistle, diffuse knapweed, spotted knapweed, Russian knapweed, field bindweed, hoary cress, jointed goat grass, leafy spurge, musk thistle and yellow toadflax. In addition, seed shall be free from cheatgrass (Bromus japonicus and Bromus tectorum). The Contractor shall furnish a signed statement certifying from supplier that the seed is from a lot that has been tested by a recognized laboratory for seed testing within 12 months prior to the date of seeding. The Contractor shall furnish all copies of seed tests for purity (inert matter, other crop, and weed seed) and germination for all seed lots for approval by the Vegetation Specialist. An All States Noxious Weed test will be required. Germination tests must be within 12 months prior to the date of seeding. Approved facilities for seed testing include official state seed laboratories in Arizona, California, Colorado, Idaho, Montana, Nevada, Oregon, South Dakota, North Dakota, Nebraska Crop Improvement, Utah, Washington, and Wyoming. Approved private Seed laboratories include the following: AV Seed Testing, Agri-Quality Testing, Inc., Agri-Seed Testing Services, Mid-West Seed Testing Services, Ransom Seed Laboratory, and J&T Green. The Contractor shall not use a seed lab with which they have close business connections, such as a financial interest, controlling interest, or associated interests. The Vegetation Specialist reserves the right to refuse any seed lot with excessive weed seeds and non-native contaminant seed for all native seed mixes, and to require the use of a different seed lot. The Contractor shall be responsible for replacing any refused seed at no additional cost to the project.

The contractor shall contact a minimum of three seed suppliers to obtain the seed species specified. If after checking multiple sources and the specified type or variety of seed is not available, substitutions must be

submitted and approved by the Vegetation Specialist. Seed which has become wet, moldy, or damaged in transit or in storage will not be accepted.

Seed and seed labels shall conform to all current State and Federal regulations and will be subject to the testing provisions of the Association of Official Seed Analysis. Computations for quantity of seed required on the project shall include the percent of purity and percent of germination.

Seed types and amount of PLS required per acre shall be provided in accordance with the Contract. If specified type or variety of seed is not available, substitutions must be submitted and approved by the Vegetation Specialist.

The formula used for determining the quantity of PLS shall be:

Bulk Pounds of Seed Species x (%Purity x %Germination) = Pounds of PLS

(b) Soil Conditioners.

Compost: Organic compost shall be certified weed free Class 1 organic compost and may be applied to seeding areas at a rate of 300 cubic yards per acre. Compost must be purchased from a facility fully permitted by the Colorado Department of Public Health and Environment or appropriate state agency and bare the US Composting Council STA certification. Compost must be weed-free and organic. Material must meet the following specification:

- pH: 5.5-8.0
- Carbon to nitrogen ratio: 20:1 or lower (10 to 12:1 ideal)
- Soluble salt concentration: 5.0 dS (mmhos/cm) or less preferred
- Organic matter content: 30-70 percent

Compost may consist of one or more of the following, or include other appropriate composts:

- Well-aged dairy cattle manure
- Composted yard wastes
- Vegetable food waste

Compost shall be processed at a consistent temperature of 140 °F or greater.

Biosolids (from sewage treatment facilities) are not considered a viable ingredient in compost.

The Contractor shall provide a participation certificate and test data showing the lab analysis on a Compost Technical Data sheet that verifies that the compost meets the requirements. Laboratory analysis must be done within 3 months prior to use and represent the compost currently available that will be delivered to the site.

Biosol Forte: After compost is incorporated, the fertilizer (Biosol Forte 7-2-1) shall be applied on the ground surface (before seeding), at approximately 750 pounds per acre. If equipment is used to apply fertilizer it must be low ground-pressure.

CONSTRUCTION REQUIREMENTS

Delete subsection 212.03 and replace with the following:

(a) **Seeding Seasons.** Seeding in areas that are not irrigated shall occur between when the ground thaws and June 1, or between September 1 and when the ground freezes. The ground must not be too wet so the seed can

be impregnated or buried in the soil ¼ to ½ inch thru normal raking operations. Vegetation Specialist shall approve the onsite conditions are suitable for seeding prior to seeding.

Seeding accomplished outside the time periods noted above will be allowed only when ordered by the Vegetation Specialist or when the Contractor's request is approved in writing. When requested by the Contractor, the Contractor must agree to perform the following work at no cost to the Owner: reseed, remulch, and repair areas which fail to produce species indicated in the Contract.

When seeding is ordered by the Vegetation Specialist outside the time periods listed above, the cost of any additional material needed to repair deficiencies will be paid for by the Owner. The Contractor will not be responsible for failure of the seeded area to produce growth if seeding is requested outside of the seeding seasons noted above.

The seeding, the soil conditioning, and the fertilizing application rate shall be as specified. The Vegetation Specialist may establish test sections for adjusting the seeding and soil conditioning to assure the specified rate. The Vegetation Specialist may order equipment readjustment at any time.

Seed and soil conditioners shall not be applied during inclement weather, including rain and high winds; or when soil is frozen or crusted; or soil moisture is too high to evenly distribute, incorporate and impregnate seed, soil conditioner or fertilizer in the soil.

Seed and soil conditioner application shall be performed only during specified periods or when site and weather conditions will produce beneficial results.

Delete subsection 212.04.

Delete subsection 212.05.

Delete subsection 212.06 and replace with the following:

212.06 Native Seeding. Areas that are unirrigated shall be seeded in accordance with subsection 212.03.

(b) **Soil Preparation**. All work areas (except for immediate stream banks) shall be loosened to a depth of 12 inches. All slopes and surfaces shall be left in a roughened condition. Uneven grading of the soil surface (micro-topography) is preferred. If upon inspection, the Vegetation Specialist finds deeply compacted soil that may ultimately impact sustained plant growth and establishment, the Vegetation Specialist may require additional or deeper ripping.

No soil preparation for seeding shall occur when soil is frozen or in an extreme wet or dry condition.

(c) **Soil Conditioning**. Prior to seeding, 150 cubic yards per acre of compost and 750 pounds per acre of Biosol Forte shall be applied. Compost shall be thoroughly worked into the top 6-inches of the seeding surface. Biosol Forte shall be applied on the surface after compost incorporation but before seeding.

(d) Seeding. Seeding shall be accomplished within 24 hours of completed soil preparation areas or as soon as practical thereafter depending on weather and soil conditions. The seeding application rate shall be as designated on the plans. Hydro-seeding may be done (without mulch in the mixture), followed by mulching.

Hydroseeding equipment shall include a pump capable of being operated at 100 gallons per minute and at 100 pounds per square inch pressure, unless otherwise directed. The equipment shall have a nozzle adaptable to hydraulic seeding requirements. Storage tanks shall have a means of estimating the volume used or remaining in the tank. Hydraulically applied seed shall include a tracer to ensure even distribution.

Broadcast seeding shall be accomplished using hand-operated "cyclone"-type seeders containing agitators and picker wheels to distribute fluffy seed. The larger seed species shall be combined and seeded first. Smaller seed species shall be mixed with a filler and then applied over the larger seed. Seed shall be frequently mixed within the hopper to ensure even distribution of species. Broadcast seeded areas shall be seeded in two perpendicular passes to ensure full coverage. Every square foot of disturbed soil, including excavation from fabric key trenches will be seeded.

All seed sown by hydroseeder or broadcast-type seeders shall be “raked in” or covered with soil to a depth between ¼ and ½ inch, unless otherwise shown in the plans.

The Contractor shall notify the Engineer 24 hours in advance and request inspection of prepared seeding areas prior to installation. Prior to commencement of seeding, calibration tests shall be conducted on the equipment to determine that the specified seeding rate of application will be met. Shortages of seed and failure to cover the designated area due to inadequate calibration will be corrected and compensated at the Contractor's expense.

Seeding under erosion control fabric/blanket shall be performed concurrently with the installation of the fabric/blanket and may be performed either by hydroseeding or broadcasting.

Seeded areas damaged due to circumstances beyond the Contractor’s control shall be repaired and reseeded as ordered. Payment for this corrective work, when ordered, shall be at the contract prices.

Multiple seeding operations shall be anticipated as portions of job are completed to take advantage of growing conditions and to comply with Section 208 and subsection 212.03.

METHOD OF MEASUREMENT

Subsection 212.07 shall be replaced with the following:

Soil preparation shall be measured by the acres prepared and paid for as Soil Preparation. Acres will be measured by length multiplied by width on the ground, by plan, or via aerial photography.

Soil conditioning, including all materials specified shall be measured by the acres prepared and paid for as Upland Soil Amendments. Acres will be measured by length multiplied by width on the ground, by plan, or via aerial photography.

Native Seeding shall be measured by the acres of seed applied, completed, and accepted, and paid for as Native Seeding. Acres will be measured by length multiplied by width on the ground, by plan, or via aerial photography.

The Contractor shall furnish the Vegetation Specialist with seed certifications and analysis, soil conditioner analysis, and bag weight tickets prior to placing any seed. Any seed or soil conditioner placed by the Contractor without the Vegetation Specialist’s approval will not be paid for.

BASIS OF PAYMENT

Delete subsection 212.08 (c) and replace with the following:

The accepted quantities of native seeding and soil conditioning will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule.

Payment will be made under:

Pay Item	**Pay Unit**

Soil Preparation	Acre
Upland Soil Amendments	Acre
Seeding (Native) Hydraulic	Acre

Soil preparation, water, seed, and soil conditioner, incorporated into the seeding or soil conditioning will not be paid for separately. Water needed for soil preparation shall be included in soil preparation.

Adjusting, calibrating, or readjusting seeding or soil conditioner spreading equipment will not be paid for separately but shall be included in the work.

REVISION OF SECTION 213 — MULCHING

Section 213 of the Standard Specifications is hereby revised for this project as follows:

DESCRIPTION

Delete subsection 213.01 and replace with the following:

This work consists of wood fiber mulching with tackifier of seeded areas.

MATERIALS

Delete subsection 213.02 and replace with the following:

a) Wood Cellulose Fiber Mulch: Wood cellulose fiber mulch shall consist of virgin wood fibers manufactured expressly from clean whole wood chips. The chips shall be processed in such a manner as to contain no growth or germination inhibiting factors. Fiber shall not be produced from recycled materials such as sawdust, paper, cardboard, or residue from pulp and paper plants. The wood cellulose fibers of the mulch must maintain uniform suspension in water under agitation. Upon application, the mulch material shall form a blotter like mat covering the ground. This mat shall have the characteristics of moisture absorption and percolation and shall cover and hold seed in contact with the soil. The Contractor shall obtain certifications from suppliers that laboratory and field testing of their product has been accomplished, and that it meets all of the foregoing requirements pertaining to wood cellulose fiber mulch.

The wood cellulose fiber mulch shall conform to the following specifications:

- Percent moisture content = 10.0% ± 3.0%
- Percent Organic Matter* (Wood Cellulose Fiber) = 99.3% ± 0.2%
- Percent Ash Content = 0.7% ± 0.2% (oven-dried basis)
- pH = 4.9 ± 0.5
- Water Holding Capacity* = 1200-1600 grams (per 100g of fiber)

(b) Tackifier: Material for mulch tackifier shall consist of a free-flowing, noncorrosive powder produced from the natural plant gum of Plantago insularis (Desert Indianwheat), applied in a slurry with water and wood fiber.

The powder shall possess the following properties:

- Protein content = 1.6% ± 0.2%
- Ash content = 2.7% ± 0.2%
- Fiber = 4.0% ± 0.4%
- pH 1% solution = 6.5 - 8.0

The material used for mulch tackifier shall not contain any mineral filler, recycled cellulose fiber, clays, plastics, or other substances which may inhibit germination or growth of plants. Water shall conform to subsection 209.02.

CONSTRUCTION REQUIREMENTS

Delete subsection 213.03 and replace with the following:

Wood cellulose fiber mulch and mulch tackifier shall be added to water to form a homogeneous slurry. The operator shall spray apply the slurry mixture uniformly over the designated seeded area. Hydraulic mulching shall not be done in the presence of free surface water. Mixing procedure for the hydraulic mulch and tackifier mixture shall be as follows:

(1) Fill tank with water approximately ¼ full.

(2) Continue filling while agitating with engine at full rpm.

(3) Pour tackifier, at a moderate rate, directly into area of greatest turbulence.

(4) With the recommended amount of tackifier in solution, add wood cellulose fiber mulch. Do not add fertilizer.

Apply the hydromulch and tackifier mixture at the following rate:

- Wood Cellulose Fiber Mulch = 2,000 lbs./Acre
- Tackifier = 100 lbs./Acre

Areas not properly mulched, or areas damaged due to the Contractor's negligence, shall be repaired and remulched as described above, at the Contractor's expense.

Mulch removed by circumstances beyond the Contractor's control shall be repaired and remulched as ordered. Payment for this corrective work shall be at the contract prices.

The Vegetation Specialist may order test sections be established for adjusting the mulching equipment to assure conformance with the specified application rate. The Vegetation Specialist may order equipment readjustment at any time.

METHOD OF MEASUREMENT

Delete subsection 213.04 and replace with the following:

This item of work shall include all labor, equipment, and materials necessary to supply and apply wood cellulose fiber mulch and tackifier. The quantities of mulch and tackifier shall be measured by the acres completed and accepted. Acres will be measured by length multiplied by width on the ground, by plan, or via aerial photography.

BASIS OF PAYMENT

Delete subsection 213.05 and replace with the following:

213.05 The accepted quantities will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule.

Payment will be made under:

Pay Item	**Pay Unit**

Mulching (Hydraulic) Acre

Water, wood fiber hydromulch tracers, mixing, and application for tackifier will not be measured and paid for separately but shall be included in the work. Adjusting, calibrating, or readjusting mulching equipment will not be paid for separately but shall be included in the work.

REVISION OF SECTION 214 — PLANTING

Section 214 of the Standard Specifications is hereby revised for this project as follows:

DESCRIPTION

Delete subsection 214.01 and replace with the following:

This work consists of furnishing and planting potted trees and shrubs, perennial wetland plants, live cuttings, and tree/shrub/herbaceous transplants.

MATERIALS

Subsection 214.02 shall include the following:

Contractor shall contact as many sources as necessary to acquire the plants specified. The Contractor shall then notify the Vegetation Specialist at least two months in advance of the quantities, species and delivery date. If the Contractor is unable to supply the plants, the Contractor must notify Vegetation Specialist immediately to work out substitutions.

Plant material, with the exception of live cuttings and tree/shrub/herbaceous transplants, shall be procured from a licensed, qualified and competitive nursery facility specializing in the production of native plant materials, or from approved willow harvest and tree/shrub salvage areas. All plant material shall be "ecotypic" whenever possible, which is defined for this specification as native to the northern Colorado Front Range and Boulder and/or Larimer County.

Plants shall be of the species, variety, and quantities designated on the Plant Schedules. All plants shall be in healthy condition with normal well-developed branch and root systems, free from disease, harmful insects and insect eggs, sun-scald injury, disfigurement or abrasion; and shall conform to the requirements of the current "American Standard for Nursery Stock." The Contractor shall obtain certificates of inspection of plant materials that are required by Federal, State, or local laws, and submit the certificates to the Vegetation Specialist.

Plant material shall be kept shaded, watered, and maintained in good health during transport. All plant materials shall be covered during transport to avoid desiccation and damage to the branches, trunk, root systems, or root ball. Branches shall be protected by tying-in.

Upon delivery, the Contractor shall count and confirm the plant delivery is accurate compared to the plant quantities in the contract. Plant material shall be staged by species in separate and identifiable groups during unloading, and then the Vegetation Specialist shall inspect all plant material to ensure it is in good condition and health prior to accepting delivery of plant materials.

Plant materials shall be stored and protected in a designated temporary on-site nursery area. If over the course of the project the Vegetation Specialist discovers the Contractor has failed to properly store, install and maintain any previously accepted plant material, said material will be removed and replaced with acceptable material at the expense of the Contractor.

Substitutions will not be permitted without written request and approval from the Vegetation Specialist. Before any substitution of plants will be considered, the Contractor shall furnish to the Vegetation Specialist written statements from three sources verifying that the plants designated on the plans are not available. All substitutions must represent native species that are "ecotypic" as defined above and appropriate for the elevation where the plant material will be planted.

The Vegetation Specialist may reject any nursery stock not meeting the specification at any of the following times and locations:

(1) At the named supplier's location. The Vegetation Specialist will notify the Contractor when nursery stock will be inspected at the supplier's location, if applicable.

(2) On the project site at the time of delivery, prior to planting.

(3) On the project site following delivery and prior to planting (while stored in the temporary on-site nursery area).

(4) At the time of installation. Final acceptance of all plant material will be made at the time of installation on the project site.

Delete subsection 214.02 (a), and replace with the following:

Live cuttings. Live cuttings will be collected on-site or from elsewhere in Fremont County (or nearby counties) within 1,000 vertical feet of near the site. A qualified ecologist must approve collection site(s).

No more than 20 percent of middle age plant material shall be taken from collection sites unless the plant will be removed or transplanted during excavation and grading or the property owner consents to harvesting over 20 percent. Written consent from the property owner must be received in areas where harvesting will occur.

Cuttings shall be cut by hand. Transport of cuttings on the collection site may be by hand or machinery. No machinery will be used on any property without consent of the owner. Written consent of the owner including explanation of machinery type and limits of machinery travel shall be provided to the owner before machinery is used for willow transport.

Live cuttings will be harvested when dormant (before leaves emerge or after they are dropped) from live plants 0.5 to 1.0 inch in diameter. The stem will be stripped of all branches before cutting and then trimmed to the desired length. The lower (rooting) end of the stem will be cut at a 45-degree angle and the upper end will be cut at a 90-degree angle. The lower end of the cuttings will be placed into cold water (<50 degrees F) within one minute of cutting and then transferred to a storage vessel within 1 hour where they will remain completely submerged for at least 72 hours, but not more than 14 days, prior to planting. The water will be kept cold (<50 degrees F) during the entire soaking period. During planting, the cuttings will be kept wet until placed into the ground and will not be allowed out of water for more than 10 minutes.

The collection team will be aware of all property lines and maintain cutting practices on lands that have provided consent only. Collections made on public lands must be permitted and carried out in accordance with local, state, and federal law. Cuttings grown in or collected by an approved nursery are allowed.

Cutting collection sites shall be left in good condition following the collection process. All slash will be

organized in to habitat brush piles or removed and disposed of as per the land owner's wishes.

The Contractor shall provide the Vegetation Specialist two weeks' notice prior to beginning willow collection.

Delete subsection 214.02 (b), and replace with the following:

Perennial Wetland Plants: Herbaceous wetland plants shall be supplied in 10 cubic inch (ci) containers as designated in the contract. All plants shall be "ecotypic" whenever possible, as defined above. Perennial wetland plants shall have been growing at least one growing season in the nursery. Perennial wetland plants shall not be shipped while in a dormant condition. The plants shall be a minimum of 6 inches in height when applicable to species and a root mass filling 75% of a 10-cubic inch container. At no time shall the plants be trimmed or cropped.

Subsection 214.02 (c) delete the 2nd sentence.

Delete subsection 214.02 (d), and replace with the following:

Soil Conditioning. Soil conditioner shall adhere to Section 212 of the Project Specifications.

Tree/Shrub/Herbaceous Transplants. Transplants shall be harvested while dormant (if feasible, depending on project schedule) from locations identified by the Vegetation Specialist and transplanted and immediately, if feasible, in locations designated by the Vegetation Specialist pursuant to Section 215. The Contractor will identify and notify the Vegetation Specialist when potential transplants are to be demolished. Exact locations and elevations for the transplants shall be field located by Vegetation Specialist.

Potted trees and shrubs. Potted trees and shrubs shall be in 40 cubic inch (ci), 60 ci, or 5-gallon containers used in standard nursery practice as indicated on the Plant Schedules. Each species shall be identified by means of grower's label affixed to the plant. Label shall be waterproof and use weather resistant ink. The grower's label shall include the source, correct scientific and common name.

Backfill. Backfill soil around nursery grown plant shall be native soil.

CONSTRUCTION REQUIREMENTS

Subsection 214.03 (a) shall include the following:

Planting Seasons. Plants shall be installed between May 1 and October 1. Areas to be planted shall be brought to the lines and grades designated prior to planting. The exact location of plants to be installed will be identified and approved by the Vegetation Specialist after grading and seedbed preparation is complete.

Staking, pin flags, or ground paint marking for planting layout may be conducted by the Contractor and then approved by the Vegetation Specialist before planting holes are prepared.

Subsection 214.03 (c) shall include the following:

Perennial Wetland Plants shall be installed in locations identified on the plans and approved by the Vegetation Specialist. Perennial wetland plants shall be planted following the placement of Erosion Control Fabric (where applicable).

Subsection 214.03 (d) shall include the following:

Backfilling. Backfill shall be native soil and worked and watered-in to eliminate air pockets. Watering shall be done immediately after the plant is placed. Backfilling of the planting pit shall be resumed after this water is absorbed. Roots shall be covered with soil at this time. After the soil has settled, plants must be in the proper position and at the proper depth. Plants damaged by the Contractor's operations shall be replaced at the Contractor's expense.

Subsection 214.03 (e) shall include the following:

Pruning. All deciduous trees and shrubs shall be pruned (if necessary) in accordance with standard horticultural practice, preserving the natural character of the plant. Guidelines for pruning are indicated in the planting details. Pruning cuts shall be made with sharp clean tools.
Clippings from pruning may be evenly distributed on site, stacked to make habitat brush piles, or shall become the property of the Contractor and be removed from the site.

Delete subsection 214.03 (g) and replace with the following:

Live Cuttings. Cuttings shall be installed while dormant in early spring before bud break. Planting of cuttings in late fall after leaf drop is not recommended but may be required if it dictated by the Owner or grant funding agencies. The Contractor will not be responsible to warrant or replace cuttings harvested or installed outside of the spring planting window if required by the Owner.

Planting of cuttings should be avoided when the ground is frozen. Cuttings may be cold stored, but no longer than 6 months. Prior to planting cold-stored stock, the cuttings shall be completely submerged in cold water (<50 degrees F) for at least 72 hours, but not more than 14 days. Water shall be free from any harmful oil, chemical, sprays, or other materials. The soaking cuttings shall be kept in the shade and the water shall be kept cold (<50 degrees F).

Cuttings shall be planted in areas shown on plans or as directed by the Vegetation Specialist. Final locations and elevations shall be approved by Vegetation Specialist prior to installation.

Using a rock bar, hammer drill, or other hand tools, holes at least 2/3 the length of the designated cutting length shall be made in the planting area. The cuttings shall be planted by inserting angled end first into the ground a minimum of 2/3 their length, ideally into the water table or capillary fringe. After installing the cuttings, the holes backfilled with gravel/sand or native soil and tamped slightly to remove any air pockets around the cutting. All cuttings will be trimmed after installation to ensure that no more than 1/3 their length is left above ground. Care will be taken to avoid damage to buds and bark during handling. Bark must not be separated from the cambium layer.

At the time of installation water shall be applied to the cutting planting areas until the soil mass is saturated. All cuttings shall be watered thoroughly as per 214.04 (b) 1.

Irrigation. Plants shall be watered within 15 minutes of initial planting.

LANDSCAPE MAINTENANCE

Section 214.04 shall include the following:

From the time of installation, during construction, and throughout the Landscape Maintenance period the Contractor shall maintain all plant material and seeded areas in a healthy and vigorous growing condition and ensure the successful establishment of vegetation. This includes performing establishment, replacement work, watering, and landscape maintenance work as described below.

Section 214.04 (a) shall include the following:

After all planting on the project is complete, a plant inspection shall be held with the Contractor, Vegetation Specialist, and Owner to determine acceptability of seeding and plant material. During the inspection, an inventory of rejected material will be made, and corrective and necessary cleanup measures will be determined.

METHOD OF MEASUREMENT

Section 214.05 shall include the following:

The quantity of trees, shrubs, and perennial wetland plants will be measured by each plant, of the quantity, types and sizes designated in the Plant Schedules, that are delivered, installed, and accepted. Plant material shall be paid for as Trees, Shrubs, and Perennial Wetland Plants as indicated below in Basis of Payment.

The quantity of cuttings will be measured by the actual number harvested, delivered, planted and accepted. Harvest and installation of cuttings shall be included in the price of each. Cuttings will be paid for as Live Cuttings.

The quantity of trees/shrubs/herbs harvested and transplanted will be measured by the actual number planted, completed in place and accepted and paid for as Transplant Shrub or Transplant Sod.

BASIS OF PAYMENT

Section 214.05 shall include the following:

The accepted quantities of planting, and cuttings will be paid for at the contract unit price for each of the various items listed below that appear in the bid schedule.

Payment for the total cost of the item will be made at the completion of planting.

Payment will be made under:

Pay Item	**Pay Unit**
Live Cuttings (30 inch)	Each
Transplant Shrub	Each
Transplant Sod	Each
Nursery Stock DRC (D-10)	Each
Nursery Stock DRC (D-40)	Each
Nursery Stock DRC (D-60)	Each

Plant delivery will be included in the cost per plant.

REVISION OF SECTION 215 — TRANSPLANTING

Section 215 of the Standard Specifications is hereby revised for this project to include the following:

DESCRIPTION

Delete subsection 215.01 and replace with the following:

This work consists of transplanting various Trees, Shrubs, and Herbaceous Sod in accordance with this specification and as directed by the Vegetation Specialist.

MATERIALS

Delete subsection 215.02 and replace with the following:

Plants to be transplanted (roots and above ground stems) shall be selected and approved by Vegetation Specialist from plants presently growing in areas that will be disturbed.

CONSTRUCTION REQUIREMENTS

Provisions of CDOT Specification 240, Protection of Migratory Birds, shall be observed in the harvest and planting sites.

The Contractor shall provide the Engineer and Vegetation Specialist two weeks' notice prior to beginning transplanting.

Transplants shall be harvested while dormant (if feasible) and immediately planted in locations designated in the field by the Vegetation Specialist. Exact locations and elevations for individual plants shall be field located by Vegetation Specialist.

Transplants shall be watered in so as the ground is thoroughly saturated immediately following planting.

METHOD OF MEASUREMENT

Delete subsection 215.04 and replace with the following:

The accepted quantities of transplants will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule. Payment includes all materials, labor, and equipment necessary for a complete harvesting and transplanting, including but not limited to, excavation, transport of materials, and watering.

BASIS OF PAYMENT

Delete subsection 215.05 and replace with the following:

The accepted quantities of transplanted trees and shrubs shall be paid for at the contract unit price each. Payment will be made under:

Pay Item	**Pay Unit**
Transplant Shrub	Each
Transplant Sod	Each

REVISION OF SECTION 217 — HERBICIDE TREATMENT

Section 217 of the Standard Specifications is hereby revised for this project to include the following:

DESCRIPTION

This work consists of furnishing and applying herbicides to prevent or control undesirable plant growth in areas shown on the plans or designated. Noxious weeds include those on Colorado's List A, B, C, and Watchlist noxious weed species.

CONSTRUCTION REQUIREMENTS

Section 217.03 shall include the following:

Noxious & restricted weeds shall be monitored & controlled by a qualified weed management specialist where weeds prevent the establishment of native or naturalized stands of vegetation. The area where weeds shall be managed includes:

- the active footprint of the project as defined by the limits of disturbance (LOD) plus a 100-foot buffer;
- any areas disturbed by the contractor outside of the LOD;
- any areas specifically indicated on the plans or identified by the Vegetation Specialist.

Potential weed management controls shall include:

- Mowing entire seeded areas (to control annual weeds prior to seed set).
- Mowing localized infestations with a string trimmer.
- Hand-digging or pulling of the roots.
- Herbicide application of water safe or other approved herbicides (depending on weed type) including, but not limited State- or locally-listed noxious and invasive weeds, or common weeds that interrupt the establishment of desirable vegetation.

All herbicides shall be applied by commercial applicators licensed by the Colorado Department of Agriculture as qualified applicators. The Contractor shall furnish documentation of such licensing prior to herbicide application. Herbicide mixing and application shall be done in accordance with instructions on the registered product label. The Vegetation Specialist shall be furnished such label information prior to mixing and application.

The Contractor shall notify the Vegetation Specialist at least 24 hours prior to each herbicide application and shall indicate the time and location application will begin. Application will not be allowed on Saturdays, Sundays, or holidays unless otherwise approved by the Vegetation Specialist.

Herbicides shall not be applied when weather conditions, including wind or rain conditions, are unsuitable for such work. Herbicides shall not be applied when soil is extremely dry.

Herbicide application method shall be such that beneficial/desirable plant growth outside the designated treatment areas will not be damaged. All damage caused by improper herbicide application shall be repaired/replaced at the Contractor's expense.

Herbicides shall not be used on areas that are to be topsoil sources unless otherwise approved by the Vegetation Specialist.

Additional requirements:

- Do not apply herbicide during precipitation or when precipitation is forecasted within 24 hours of expected application, or in winds exceeding 5 miles per hour.
- Use only an approved aquatic formulation of a glyphosate-based herbicide (such as Rodeo) within 25 feet of creek.
- Transport and handle all herbicide materials according to the label. Store all herbicide materials in a secure place in the original container.
- Immediately respond to any leaks or spills according to the label.
- Read and follow information on herbicide label for the "Environmental Hazards" section and, if available, any information under the "Endangered Species Protection Requirements" section.
- Mix selected herbicide according to label.
- Apply selected herbicides on visible invasive rhizomatous perennial plants in the planting area.
- Dispose of any remaining herbicide mix according to the label

METHOD OF MEASUREMENT

Delete the 1st sentence in subsection 217.04 and replace it with the following:

217.04 The quantity of herbicide treatment to be measured will be the actual number of square feet treated in accordance with the foregoing requirements or the actual number of hours the Contractor spends applying the herbicide and accepted by the Vegetation Specialist.

BASIS OF PAYMENT

217.05 The accepted quantities of herbicide treatment will be paid for at the contract unit price per square foot or per hour.

Payment will be made under:

Pay Item	**Pay Unit**
Herbicide Treatment	Hour

Water will not be measured and paid for separately but shall be included in the work.

ADDITION OF SECTION 519 — LARGE WOOD FEATURES

Section 519 is hereby added to the Standard Specifications for this project and shall include the following:

DESCRIPTION

Subsection 519.01 shall include the following:

Large Wood Structures This work includes all equipment and labor associated with supplying and installing large wood structures as indicated in the plans. All materials will be costed separately. The large wood material (LWM) will be sourced onsite and is costed under Large and Small Tree Removal (see Section 202) and the boulder ballast is costed under 3-ft Diameter Riprap (see Supplemental Specification 31 37 00).

MATERIALS

Subsection 519.02 shall include the following:

Large wood material (LWM) are trees or tree trunks, preferentially sourced with intact root mass, used to develop riparian habitat features and for low-flow to bankfull-discharge stabilization of channel features, and floodplain habitat features which provide roughness to overbank or overland flow

LWM elements shall not be hollow or rotten, and shall include bark. LWM may be limbed to 18" minimum length from trunk for transport, handling, and installation. Some LWM elements with limbs intact may be incorporated into Features. Large woody material for construction shall include root mass, be a minimum of 6 inches in diameter, and 3 feet in length, measured as following:

(1) Diameter at Breast Height (DBH): the DBH shall be a minimum of 1 foot.
(2) Length: 20 ft (minimum); longer trunk lengths up to the maximum practicable length (assumed 35+ feet) shall be provided. Length to be measured from top of log to bottom of log, which is to include the root wad, if rootwad is present.
(3) No maximum length or diameter is specified.

Tree trunks without intact root mass may be substituted with approval of the Engineer if suitable LWM with intact root mass is not available.

LWM shall be sourced from within the Project and be of non-invasive species.

<u>Delivery, Storage, and Handling</u>
LWM shall be harvested, handled, and stored according to Section 202.

Large woody material for structures shall be secured from the following sources:

(1) Salvaged trees removed during Project activities, as approved by the Engineer

The contractor shall take care to protect the root wads and branches from damage during handling and installation of large woody material.

Boulders used for ballast are costed under Supplemental Specification 31 37 00. The diameter along the b-axis shall be a minimum or 3 feet. Smaller boulders may be used with Engineer approval. Boulders with a roughly flat side provide the easiest handling and placement.

CONSTRUCTION REQUIREMENTS

Subsection 519.04 shall include the following:

Add the following subsections immediately following subsection 519.04 as follows:

519.041 Large wood structure placement. Large wood structure shall be placed per the following:

(a) Place large wood structure as specified and indicated in the Plans.
(b) The contractor shall immediately notify the Engineer if a specified log size is not available.
(c) The location, element number, and configuration of large wood structures may vary in field due to site conditions, and the final location of these structures will be approved by the Engineer in the field prior to construction. After construction, final large wood structure number shall be totaled for payment.
(d) Material of large wood structures minimum diameter but shorter than minimum specified length shall not be included in final element count for payment, but shall be retained and used on-site for feature enhancement.
(e) Burial depth/length shall be 1/3-2/3 of total log length. A log with an orientation angle of 0 degrees shall be placed parallel to the bank, and a log with a 90-degree orientation shall be placed perpendicular to the bank. Orientation of logs shall be within 10 degrees of the specified orientation angle, unless approved by the engineer in the field.
(f) Large wood shall be secured in placement locations by designated anchoring method listed on the plans. The contractor shall notify the engineer of additional measures needed to secure elements beyond those outlined in the plans.
(g) Trench widths associated with log installation shall be limited to the log diameter plus 2 feet, and the contractor shall take care to minimize bank disturbance. Following construction, the contractor shall stabilize any disturbed banks using methods noted on the plans.

519.042 Large wood structure Quality Control and Acceptance. Large wood features shall be accepted by the Engineer per the following:

(a) Verify that large wood structure delivered to the placement site meets the applicable quality, size, type, and number of elements presented in the Plans. Verification of materials sourced within Project limits shall be by visual inspection of quality and by measurement of trunk length/diameter.
(b) Any large wood structures sourced from outside Project limits shall include Forester certification documentation.
(c) Rejected materials shall be transported off-site and disposed of at Contractor expense outside of Project limits.
(d) Verify that large wood structure has been placed to lines and grades indicated in plans. Verification shall be by visual inspection and survey of grade if specific elevations are identified on the Plans.
(e) Verify large wood structure count. Verification shall be by visual inspection. Elements not visible shall be counted prior to burial. LWM count of any individual installation shall not vary by more than +/-10% of element counts presented in the Plans.
(f) Placed large wood structure count for Project shall not be less than 95% of total presented in Plans and shall not exceed total presented in Plans without approval of the Engineer.

METHOD OF MEASUREMENT

Subsection 519.05 shall include the following:

Large Wood Structures shall be measured by the number of installed large wood structure elements as indicated in the Plans.

BASIS OF PAYMENT

Subsection 204.06 shall include the following:

The accepted quantities will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule.

Pay Item	Pay Unit
Large Wood Structure – Installation Only	Each

REVISION OF SECTION 625 — CONSTRUCTION LAYOUT AND SURVEYING

Section 625 of the Standard Specifications is hereby revised for this project as follows:

DESCRIPTION

Subsection 625.01 shall include the following:

The work consists of pre-construction surveying and layout, an As-Built survey, and utility locating.

CONSTRUCTION REQUIREMENTS

Subsection 625.03 shall include the following:

A pre-construction survey shall be conducted to mark the limits of grading and location of proposed features as indicated in the construction planset.

A post-construction survey shall be conducted to survey the final stations, elevations, and dimensions of constructed features and bench grading, at a minimum.

Prior to mobilization of construction equipment, a Engineer or Vegetation Specialist shall field flag critical stands of existing vegetation which are not to be disturbed. The Engineer shall review flagged areas with the Contractor prior to initiation of construction activities. Construction equipment shall not be mobilized before the Contractor has reviewed the flagged vegetation with the Engineer.

The Contractor shall be responsible for coordinating with local Utility owners (i.e. Colorado811) and conducting a private utility survey to locate utilities on-site.

Contractor shall verify owner and operator of electric distribution facilities within the proposed project area. The Contractor shall use caution when operating large vehicles beneath these lines, and minimum clearance requirements must be observed (i.e. 10-feet between the highest point of construction and the lowest wires).

BASIS OF PAYMENT

Subsection 625.10 shall include the following:

Payment will be made under:

Pay Item	**Pay Unit**
Construction Surveying (Layout & Staking)	Lump Sum
As-Built Survey	Lump Sum

REVISION OF SECTION 626 — MOBILIZATION AND DEMOBILIZATION

Section 626 of the Standard Specifications is hereby revised for this project as follows:

DESCRIPTION

Subsection 626.01 shall include the following:

The contractor shall propose a staging area for approval by the Engineer. The grading associated with creating this staging area is described in Section 203 and the revegetation after demobilization for this area is described in Sections 207-214.) The Contractor shall use BMPs to best protect the floodplain area per Section 208. The Contractor shall restore any areas disturbed by staging that are outside the proposed grading as shown on the plans to pre-disturbance grade and native revegetation (e.g. native seeding).

BASIS OF PAYMENT

Subsection 626.10 shall include the following:

Payment will be made under:

Pay Item	**Pay Unit**
Mobilization	Lump Sum

REVISION OF SECTION 630 —
CONSTRUCTION ZONE TRAFFIC CONTROL

Section 630 of the Standard Specifications is hereby revised for this project as follows:

DESCRIPTION

Subsection 630.01 shall include the following:

This work includes developing and implementing a traffic control/management plan (TCP). The TCP shall be approved by a Traffic Control Supervisor and submitted for review and approval to the Engineer.

The traffic control/management plan shall include the following items:

(1) Flaggers and/or other traffic control measures.
(2) Locations and types of warning signs along the roads shall be shown.
(3) The applicant must use vehicle tracking to minimize the amount of rocks, mud, and other debris tracked onto public roads.
(4) The applicant must provide a sweeping plan for affected portions public roads if sweeping becomes necessary.
(5) Prior to project commencement, the applicant must photo-document the conditions of all public roads used for hauling. The applicant must restore all affected roadways to pre-project conditions or better.

Prior to commencement of site disturbance, the applicant must provide verification of a CDOT Access Permit, right-of-way permits; and/or traffic control/management plans.

The Contractor shall obtain Oversize/Overweight permits from CDOT if applicable.

BASIS OF PAYMENT

Subsection 630.10 shall include the following:

Payment will be made under:

Pay Item	**Pay Unit**
Traffic Control (Special)	Lump Sum

SUPPLEMENTAL SPECIFICATIONS

Supplemental Specifications Table of Contents

ADDITION OF SECTION 00 73 92 —
UTILITES

Section 00 73 92 is hereby added to the Supplemental Speficications for this project:

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The WORK includes the relocation of power poles at the locations shown on the DRAWINGS.

PART 2 PRODUCTS

2.02 POWER POLE

A. The materials of the replacement power pole must meet the requirements of the utility owner, Sangre De Cristo Electric.

PART 3 EXECUTION

3.02 POWER POLE

A. The CONTRACTOR shall work with the electric utility owner, Sangre De Cristo Electric, to coordinate the removal and relocation of power poles noted on the planset.

PART 4 MEASUREMENT AND PAYMENT

4.02 POWER POLE RELOCATION

A. The power pole relocation shall be measured as units relocated and installed and paid for per unit (EA).

The accepted quantities will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule.

Pay Item	**Pay Unit**
Relocate Power Poles	Each

ADDITION AND REVISION OF SECTION 31 37 00 — RIPRAP, BOULDERS, AND BEDDING

Section 31 37 00 of the UDFCD Standard Construction Specifications is hereby added to the Supplemental Speficications for this project:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The WORK includes excavation, grading, and installation of riprap, boulders, soil riprap, void-filled riprap, and bedding placed at the locations shown on the DRAWINGS. The materials to be used and the construction of such structures shall be as specified herein.

1.2 RELATED SECTIONS

A. The following is a list of SPECIFICATIONS, which may be related to this section:

1. Section 01 57 19, Temporary Environmental Controls
2. Section 31 23 00, Excavation and Fill.
3. Section 31 23 19, Dewatering.
4. Section 31 23 33, Trenching and Backfilling.
5. Section 31 25 00, Erosion and Sedimentation Controls
6. Section 31 37 19, Grouted Boulders, Stacked Grouted Boulders, and Grouted Rock Retaining Walls

1.3 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of State Highway and Transportation Officials (AASHTO):
    a. T85, Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate.
    b. T96, Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
    c. T103, Standard Method of Test for Soundness of Aggregates by Freezing and Thawing.
    d. T104, Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate.
    e. T248, Reducing Field Samples of Aggregate Test Size.

2. ASTM International (ASTM): D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft^3 (600 kN-m/m^3)).

1.4 SUBMITTALS

A. CONTRACTOR shall cooperate with ENGINEER in obtaining and providing samples of all specified materials.

B. CONTRACTOR shall submit certified laboratory test certificates for all items required in this section.

PART 2 PRODUCTS

2.1 MATERIALS

A. RIPRAP

1. Riprap used shall be the type designated on the DRAWINGS and shall conform to Table 1.

Table 1: Riprap Gradation

Riprap Designation	% Smaller Than Given Size By Weight	Intermediate Rock Dimension (inches)	d_{50}* (inches)
Type VL	70 - 100 50 - 70 35 - 50 2 - 10	12 9 6 2	6**
Type L	70 - 100 50 - 70 35 - 50 2 - 10	15 12 9 3	9**
Type M	70 - 100 50 - 70 35 - 50 2 - 10	21 18 12 4	12**
Type H	70 - 100 50 - 70 35 - 50 2 - 10	30 24 18 6	18
Type VH	70 - 100 50 - 70 35 - 50 2 - 10	41 33 24 9	24

*d_{50} = Mean Particle Size

**Mix VL, L and M riprap with 35% topsoil (by volume) and bury it with 4 to 6 inches of topsoil, all vibration compacted, and revegetate.

2. 1. The riprap designation and total thickness of riprap shall be as shown on the DRAWINGS. The maximum stone size shall not be larger than the thickness of the riprap.
3. Neither width nor thickness of a single stone of riprap shall be less than one-third (1/3) of its length.

4. The specific gravity of the riprap shall be two and one-half (2.5) or greater.

5. Riprap specific gravity shall be according to the bulk-saturated, surface-dry basis, in accordance with AASHTO T85.

6. The bulk density for the riprap shall be 1.3 ton/cy or greater.

7. The riprap shall have a percentage loss of not more than forty percent (40%) after five hundred (500) revolutions when tested in accordance with AASHTO T96.

8. The riprap shall have a percentage loss of not more than ten percent (10%) after five (5) cycles when tested in accordance with AASHTO T104 for ledge rock using sodium sulfate.

9. The riprap shall have a percentage loss of not more than ten percent (10%) after twelve (12) cycles of freezing and thawing when tested in accordance with AASHTO T103 for ledge rock, procedure A.

10. Rock shall be free of calcite intrusions.

11. Gradation:

    a. Each load of riprap shall be reasonably well graded from the smallest to the largest size specified.

    b. Stones smaller than the two to ten percent (2 to 10%) size will not be permitted in an amount exceeding ten percent (10%) by weight of each load.

    c. Control of gradation shall be by visual inspection. However, in the event ENGINEER determines the riprap to be unacceptable, ENGINEER shall pick two (2) random truckloads to be dumped and checked for gradation.

        1) Mechanical equipment and labor needed to assist in checking gradation shall be provided by CONTRACTOR at no additional cost.

12. Color:

    a. The color of the riprap shall be approved by ENGINEER prior to delivery to the PROJECT site.

    b. Color shall be consistent on the entire PROJECT and shall match the color of rock to be used for all other portions of the WORK.

13. Broken concrete or asphalt pavement shall not be acceptable for use in the WORK.

14. Rounded riprap (river rock) is not acceptable, unless specifically designated on the DRAWINGS.

B. BOULDERS

1. Boulders used shall be the type designated on the DRAWINGS and shall conform to Table 2.

Table 2: Boulder Properties

Boulder Classification	Nominal Size (inches)	Range in Smallest Dimension of Individual Rock Boulders (inches)	Maximum Ratio of Largest to Smallest Rock Dimension of Individual Boulders
B24	24	20 - 28	1.50
B30	30	26 - 34	1.50
B36	36	32 - 40	1.50
B42	42	38 - 46	1.50
B48	48	44 - 52	1.50

2. The specific gravity of the boulders shall be two and one-half (2.5) or greater.

3. Boulder specific gravity shall be according to the bulk-saturated, surface-dry basis, in accordance with AASHTO T85.

4. The bulk density for the boulder shall be 1.3 ton/cy or greater.

5. The boulders shall have a percentage loss of not more than forty percent (40%) after five hundred (500) revolutions when tested in accordance with AASHTO T96.

6. The boulders shall have a percentage loss of not more than ten percent (10%) after five (5) cycles when tested in accordance with AASHTO T104 for ledge rock using sodium sulfate.

7. The boulders shall have a percentage loss of not more than ten percent (10%) after twelve (12) cycles of freezing and thawing when tested in accordance with AASHTO T103 for ledge rock, procedure A.

8. Rock shall be free of calcite intrusions.

9. Color:

   a. The color of the boulders shall be approved by ENGINEER prior to delivery to the PROJECT site.
   b. Color shall be consistent on the entire PROJECT and shall match the color of rock to be used for all other portions of the WORK.

C. SOIL RIPRAP

1. Rock requirements are to comply with riprap as specified in Article Materials.

2. The soil material shall be native or topsoil and mixed with sixty-five percent (65%) riprap and thirty five percent (35%) soil by volume.

3. Soil riprap shall consist of a uniform mixture of soil and riprap without voids.

D. VOID-FILLED RIPRAP

1. Rock requirements are to comply with riprap material specifications in Paragraph A.

2. Samples of riprap and void-fill materials shall be submitted for the review and approval of the ENGINEER prior to construction.

3. Where “Void-Filled Riprap” is designated on the DRAWINGS, riprap shall be mixed with the materials and associated proportions listed in Table 3 and Table 4 to fill the voids of the riprap.

4. If specified, an alternate void-filled riprap mix that includes river cobble shall be used; this mix appears in Table 5 and Table 6.

5. Mix proportions and material gradations in Tables 3 through 6 are approximate and are subject to adjustment by the ENGINEER. No adjustment in unit price for void-filled riprap will be allowed based on modifications to the mix proportions.

Table 3: Mix Requirements for Type VL and L Void-Filled Riprap without River Cobble

Approximate Proportions (loader buckets)	Material Type	Material Description
6	Riprap	Type VL or L
1	Void-fill material	VTC (Vehicle Tracking Control) rock (crushed rock with 100% passing 4-inch sieve, 50-70% passing 3-inch sieve, 0-10% passing 2-inch sieve)
1	Void-fill material	4-inch minus pit run surge (round river rock and sand, well graded, 90-100% passing 4-inch sieve, 70-80% passing 1.5-inch sieve, 40-60% passing 3/8-inch sieve, 10-30% passing #16 sieve).
1	Void-fill material	Type II bedding
½ to 1	Void-fill material	Native topsoil

Note: Mix proportions and material gradations are approximate and are subject to adjustment by the ENGINEER.

Table 4: Mix Requirements for Type M and H Void-Filled Riprap without River Cobble

Approximate Proportions (loader buckets)	Material Type	Material Description
6	Riprap	Type M or H
2	Void-fill material	7-inch minus crushed rock surge (100% passing 7-inch sieve, 80-100% passing 6-inch sieve, 35-50% passing 3-inch sieve, 10-20% passing 1.5-inch sieve)
1	Void-fill material	VTC (Vehicle Tracking Control) rock (crushed rock with 100% passing 4-inch sieve, 50-70% passing 3-inch sieve, 0-10% passing 2-inch sieve)
1	Void-fill material	4-inch minus pit run surge (round river rock and sand, well graded, 90-100% passing 4-inch sieve, 70-80% passing 1.5-inch sieve, 40-60% passing 3/8-inch sieve, 10-30% passing #16 sieve).
1	Void-fill material	Type II bedding
½ to 1	Void-fill material	Native topsoil

Note: Mix proportions and material gradations are approximate and are subject to adjustment by the ENGINEER.

Table 5: Mix Requirements for Type VL and L Void-Filled Riprap with River Cobble

Approximate Proportions (loader buckets)	Material Type	Material Description
6	Riprap	Type VL or L
1	Void-fill material	2 to 4-inch cobble (round washed river rock that is well-graded, 100% passing 6-inch sieve, 35-50% passing 3-inch sieve, 5-20% passing 2-inch sieve)
1	Void-fill material	4-inch minus pit run surge (round river rock and sand, well graded, 90-100% passing 4-inch sieve, 70-80% passing 1.5-inch sieve, 40-60% passing 3/8-inch sieve, 10-30% passing #16 sieve).
1	Void-fill material	Type II bedding
½ to 1	Void-fill material	Native topsoil
Top layer	Top dressing	Additional 4 to 12-inch cobbles (round washed river rock that is well graded, 80-100% passing 12-inch sieve, 35-50% passing 6-inch sieve, 5-20% passing 4-inch sieve) shall be mixed in on the surface of exposed sections of void-filled riprap (covering approximately 15% of the surface) prior to compaction of the void-filled riprap. Cobbles shall be fully embedded into the mass of the void-filled riprap.

Note: Mix proportions and material gradations are approximate and are subject to adjustment by the ENGINEER.

Table 6: Mix Requirements for Type M and H Void-Filled Riprap with River Cobble

Approximate Proportions (loader buckets)	Material Type	Material Description
6	Riprap	Type M or H
2	Void-fill material	7-inch minus crushed rock surge (100% passing 7-inch sieve, 80-100% passing 6-inch sieve, 35-50% passing 3-inch sieve, 10-20% passing 1.5-inch sieve)
1	Void-fill material	2 to 4-inch cobble (round washed river rock that is well-graded, 100% passing 6-inch sieve, 35-50% passing 3-inch sieve, 5-20% passing 2-inch sieve)
1	Void-fill material	4-inch minus pit run surge (round river rock and sand, well graded, 90-100% passing 4-inch sieve, 70-80% passing 1.5-inch sieve, 40-60% passing 3/8-inch sieve, 10-30% passing #16 sieve).
1	Void-fill material	Type II bedding
½ to 1	Void-fill material	Native topsoil
Top layer	Top dressing	Additional 4 to 12-inch cobbles (round washed river rock that is well graded, 80-100% passing 12-inch sieve, 35-50% passing 6-inch sieve, 5-20% passing 4-inch sieve) shall be mixed in on the surface of exposed sections of void-filled riprap (covering approximately 15% of the surface) prior to compaction of the void-filled riprap. Cobbles shall be fully embedded into the mass of the void-filled riprap.

Note: Mix proportions and material gradations are approximate and are subject to adjustment by the ENGINEER.

E. BEDDING:

1. Gradation for granular bedding shall conform to Table 7.

2. Granular bedding designation and total thickness of bedding shall be as shown on the DRAWINGS.

3. Granular bedding shall meet the same requirements for specific gravity, absorption, abrasion, sodium sulfate soundness, calcite intrusion, and freeze-thaw durability as required for riprap.

    a. Broken concrete asphalt pavement or sledge, shall not be acceptable for

use in the WORK. Rounded river rock is not acceptable unless specifically designated on the DRAWINGS.

b. The requirements for the wear test in AASHTO T96 shall not apply.

Table 7: Granular Bedding Gradation

	Percent by Weight Passing Square-Mesh Sieves	
U.S. Standard Sieve Size	**Type I (CDOT Sect. 703.01)**	**Type II (CDOT Sect. 703.09 Class A)**
3 inches	-	90 - 100
1½ inches	-	-
¾ inch	-	20 - 90
⅜ inch	100	-
No. 4	95 - 100	0 - 20
No. 16	45 - 80	-
No. 50	10 - 30	-
No. 100	2 - 10	-
No. 200	0 - 2	0 - 3

F. FEATURE BOULDERS:

1. Feature Boulders shall consist of the same material as boulders, differing only by size.

2. Feature Boulders shall meet the same requirements for specific gravity, absorption, abrasion, sodium sulfate soundness, calcite intrusion, and freeze-thaw durability as required for boulders.

3. Feature Boulders shall have a minimum dimension of four (4) feet, or as shown on the DRAWINGS.

PART 3 EXECUTION

3.1 PREPARATION

A. Channel slope, bottom, or other areas that are to be protected with riprap, boulders, soil riprap, or void-filled riprap shall be free of brush, trees, stumps, and other objectionable material and be graded to a smooth compacted surface as shown on the DRAWINGS.

B. CONTRACTOR shall excavate areas to receive riprap to the subgrade as shown on the DRAWINGS accounting for granular bedding.

C. CONTRACTOR shall excavate areas to receive boulders, soil riprap, or void-filled riprap to

the specified depth (bedding material is not required for boulders, soil riprap, or void-filled riprap).

D. Subgrade Materials:

1. The subgrade materials shall be stable.

2. If unsuitable materials are encountered, they shall be removed and replaced as Muck Excavation in accordance with Section 31 23 00, Excavation and Fill, for subgrade that has been excavated in undisturbed soil.

E. Additional Compaction:

1. Additional compaction shall not be required unless specified by ENGINEER.

2. When subgrade is built up with embankment material it shall be compacted to ninety five percent (95%) maximum density (ASTM D698).

F. Bedding:

1. After an acceptable subgrade is established, bedding shall be immediately placed and leveled to the specified elevation on the DRAWINGS.

2. Immediately following the placement of the bedding material, the riprap shall be placed.

3. If bedding material is disturbed for any reason, it shall be replaced and graded at CONTRACTOR's expense.

4. Contamination:

a. In-place bedding materials shall not be contaminated with soils, debris or vegetation before the riprap is placed.

b. If contaminated, the bedding material shall be removed and replaced at CONTRACTOR's expense.

3.2 PLACEMENT

A. RIPRAP

1. Following acceptable placement of granular bedding, riprap placement shall commence as follows:

a. Machine Placed Riprap:

1) Riprap shall be placed on the prepared slope or channel bottom areas in a manner which will produce a reasonably well graded mass of stone with the minimum practicable percentage of voids.

2) Riprap shall be machine placed, unless otherwise stipulated in the DRAWINGS or SPECIFICATIONS.

3) It is the intent of these SPECIFICATIONS to produce a fairly compact riprap protection in which all sizes of material are placed in their proper proportions. Unless otherwise authorized by ENGINEER, the riprap protection shall be placed in conjunction with the construction of embankment or channel bottom with only sufficient delay in construction of the riprap protection, as may be necessary, to allow for proper construction of the portion of the embankment and channel bottom which is to be protected.

b. Slope Placement:

1) When riprap is placed on slope, placement shall commence at the bottom of the slope working up the slope.

c. The entire mass of riprap shall be placed on either channel slope or bottom so as to be in conformance with the required gradation mixture and to line, grade, and thickness shown on the DRAWINGS.

d. Riprap shall be placed to full course thickness at one operation and in such a manner as to avoid displacing the underlying bedding material. Placing of riprap in layers, or by dumping into chutes, or by similar methods shall not be permitted.

e. All material used for riprap protection for channel slope or bottom shall be placed and distributed such that there shall be no large accumulations of either the larger or smaller sizes of stone. Some hand placement may be required to achieve this distribution.

f. The basic procedure shall result in larger materials flush to the top surface with faces and shapes arranged to minimize voids, and smaller material below and between larger materials.

g. Surface grade shall be a plane or as indicated, but projections above or depressions under the finished design grade by more than ten percent (10%) of the rock layer thickness shall not be allowed.

h. Smaller rock shall be securely locked between the larger stone. It is essential that the material between the larger stones not be loose or easily displaced by flow or by vandalism.

i. The stone shall be consolidated by the bucket of the backhoe or other means that will cause interlocking of the material.

j. All rock is to be placed in a dewatered condition beginning at the toe of the slope or other lowest point.

k. CONTRACTOR shall maintain the riprap protection until accepted. Any material displaced for any reason shall be replaced to the lines and grades shown on the DRAWINGS at no additional cost to OWNER. If the

bedding materials are removed or disturbed, such material shall be replaced prior to replacing the displaced riprap.

2. Hand Placed Riprap:

   a. Hand placed riprap shall be performed during machine placement of riprap and shall conform to all the requirements of PART 2, above.

   b. Hand placed riprap shall also be required when the depth of riprap is less than two (2) times the nominal stone size, or when required by the DRAWINGS or SPECIFICATIONS.

   c. After the riprap has been placed, hand placing or rearranging of individual stones by mechanical equipment shall be required to the extent necessary to secure a flat uniform surface and the specified depth of riprap, to the lines and grades as shown on the DRAWINGS.

3. Soil Replacement Over Riprap:

   a. Where riprap is designated to be buried, place onsite excavated material that is free from trash and organic matter in riprap voids by washing and rodding.

   b. Prevent excessive washing of material into stream.

   c. When voids are filled and the surface accepted by ENGINEER, place a nominal six (6) inches of topsoil over the area, or as designated on the DRAWINGS.

   d. Fine grade, seed, and mulch per the SPECIFICATIONS.

B. BOULDERS

1. Following excavation and acceptance of subgrade by ENGINEER Boulder placement shall commence as follows:

   a. Boulders shall be placed on the prepared subgrade in a manner which will minimize voids.

   b. Voids between boulders exceeding 4" shall be chinked.

2. If Boulders are to be grouted, boulders shall be installed according to Section 31 37 19, Grouted Boulders, Stacked Grouted Boulders and grouted Boulder Retaining Walls.

C. SOIL RIPRAP

1. Adjacent stockpiles of riprap and soil shall be created and mixing done at the stockpile location, not at the location where soil riprap is to be placed.

2. Mix thirty-five percent (35%) soil by volume with stockpiled riprap, using

additional moisture and control procedures that ensure a homogenous mixture; where the soil fills the inherent voids in the riprap without displacing riprap.

3. With prior approval of ENGINEER, layering the riprap and soil instead of premixing may be allowed if the native soil is granular.

4. Place a first layer of smaller soil riprap of approximate d_{50} thickness. Then place the top layer with surface rocks that are largely d_{50} or greater, filling voids as necessary with smaller planted riprap. Create a smooth plane as described in Paragraph A.

5. The mixture shall be consolidated by large vibratory equipment or backhoe bucket to create a tight, dense interlocking mass.

6. The soil shall be further wetted to encourage void filling with soil.

7. Any large voids shall be filled with rock and small voids filled with soil.

8. Excessively thick zones of soil prone to washing away shall not be created (for example, no thicknesses greater than six (6) inches).

9. For buried soil riprap, the top surface shall be covered with four (4) inches of topsoil such that no rock points are protruding.

10. The final surface shall be thoroughly wetted for good compaction, smoothed and compacted by vibrating equipment; the surface shall then be hand raked to receive planting or seeding.

D. VOID-FILLED RIPRAP

1. The ENGINEER and/or CONSTRUCTION INSPECTOR shall observe mixing and placing of the material.

2. Approved individual component materials of void-filled riprap mix shall be delivered to site in separate marked stockpiles. Mixing shall be accomplished using a front end loader or other approved means to add the specified number of "loader buckets" of each material to a mixing stockpile. Ensure that each loader bucket comprises an approximately equal volume. If the loader operator is only able to fill the bucket partially full with large riprap (due to the force required to push the bucket into the pile), but uses full buckets of finer material, the mix proportions will not be correct. Avoid picking up excessive amounts of native soil from the subgrade under the stockpiled materials during the loader bucket mixing operations. The ENGINEER may reduce or eliminate the volume of topsoil added to the mixture based on the amount of native soil was incorporated during the bucket mixing operation.

3. Once all the materials have been added to the mixing stockpile in the specified proportions, thoroughly mix the pile using a loader, large track- hoe excavator, or other approved means to fill the voids of the riprap **without displacing the riprap** or creating pockets of finer material absent of riprap.

4. Segregation of materials shall be minimized when hauling from the stockpile to the installation location. Remixing shall occur as necessary to correct for any segregation as the material is placed.

5. The loose material shall be placed in a single lift of sufficient height such that final grade will be achieved upon compaction. Additional mixing with a track excavator shall be required after initial placement to ensure that the void-filled riprap is thoroughly mixed and no segregation or excessive amount of smaller void-fill material is present on the surface. The mixing and placement process shall result in larger riprap (D_{50} size or larger) flush to the top surface with faces and shapes arranged to minimize voids, and smaller material between and below larger materials.

6. If the top of the compacted material is below final grade, placement of only the smaller void-fill materials to achieve final grade will not be permitted. Additional void-filled riprap shall be added and the entire section mixed with a track excavator to eliminate the presence of smaller void-fill material on the surface.

7. Avoid segregation of materials and remix any section where the combined material consists primarily of the void-fill materials. The density and interlocking nature of riprap in the mixed material shall essentially be the same as if the riprap was placed without filling the voids. This requires care and persistence on the part of the CONTRACTOR to install the work and on the part of the ENGINEER to assure that the work is installed correctly.

8. At the direction of the ENGINEER, a 50:50 mixture of pit run and Type II bedding shall be sprinkled on the surface of the void-filled riprap and washed-in with water using a high pressure hose to fill-in small voids. This shall be done just prior to compaction of the void-filled riprap.

9. If specified as part of the cobble mix, the top dressing of cobbles shall also be mixed in on the surface of exposed sections of void-filled riprap material prior to compaction of the riprap material.

10. Compaction of the void-filled riprap shall be performed by running over the void-filled riprap with a large, heavy duty track excavator or dozer. The moisture content of the mixture shall be at optimum conditions prior to compaction and water shall be added, as necessary, at the direction of the ENGINEER. Compaction of void-filled riprap shall be reviewed and approved by the ENGINEER.

11. Where indicated on the DRAWINGS, a surface layer of 4 to 6 inches moist topsoil shall be placed over the void-filled riprap. The topsoil surface layer shall be compacted to approximately 85% of maximum density and within two percentage points of optimum moisture in accordance with ASTM D698. Topsoil shall be added to any areas that settle.

12. CONTRACTOR shall install a test section of at least 100 square feet of void-filled riprap for the review and approval of the ENGINEER prior to installation of the remaining void filled-riprap.

13. Elevation tolerance for the void-filled riprap shall be 0.10 feet. Thickness of void-

filled riprap shall be no less than thickness shown and no more than 2-inches greater than the thickness shown.

E. FEATURE BOULDERS

1. Feature Boulders serve an aesthetic function and as such shall be placed and rotated into final position as directed by ENGINEER in order to achieve the desired result.

3.3 REJECTION OF WORK AND MATERIALS:

A. ENGINEER will reject placed riprap, boulders, soil riprap and bedding that do not conform to this section. CONTRACTOR shall immediately remove and re-lay the riprap, boulders, soil riprap, void-filled riprap, and bedding to conform to SPECIFICATIONS.

B. Riprap, boulders, soil riprap, void-filled riprap and bedding that do not conform to this section shall be rejected, whether delivered to the job site or placed.

C. Rejected riprap, boulders, soil riprap and bedding shall be removed from the PROJECT site by CONTRACTOR at CONTRACTOR's expense.

REVISION OF SECTION 31 37 00 —
RIPRAP, BOULDERS, AND BEDDING

Section 31 37 00 of the UDFCD Standard Construction Specifications is hereby revised as follows:

Subsection 31 37 00 shall include the following:

PART 1 GENERAL

1.01 SECTION INCLUDES

B. The WORK includes excavation grading and installation of Riprap Embankment Treatment, Riprap Toe Treatment, Cobble Toe, Vertical Boulder Wall, Type 1 Grade Control - Rock Ramp, Type 2 Grade Control - Horizontal Grade Control, and Type 3 Grade Control – Step-Pool Features at the locations shown on the DRAWINGS. The materials to be used and the construction of such structures shall be as specified herein.

1.02 RELATED SECTIONS

B. The following is a list of SPECIFICATIONS from the Technical Specifications for this Project, which may be related to this section:

1. Section 201 – Clearing and Grubbing
2. Section 203 – Excavation and Embankments
3. Section 207 – Topsoil
4. Section 208 – Erosion Control

1.03 REFERENCES

1.04 DEFINITIONS

1.05 QUALITY ASSURANCE

PART 2 PRODUCTS

2.01 MATERIALS

G. COBBLE AND BOULDERS

1. Cobble and Boulders: Cobble mixes specified in Cobble Toe shall adhere to these material specifications. Specific details of the boulder and rock materials required for each feature are depicted in the typical details in the Planset.
2. The rock for use in channel features shall be rounded to subrounded, and diameters as specified in the planset (measured on the B-axis).
3. Rocks that make up subgrade materials or other less prominent portions of each feature may be angular.
4. Boulders and cobble for use in the boulder and cobble features shall be sorted from on-site native alluvium per Section 203.
5. If the gradation specified in the Planset cannot be met by on-site sorted material, then the remainder of the gradation must be imported or the available gradation must be approved by the

Engineer.All imported boulders and cobbles shall be rounded to subrounded, and diameters as specified in the planset (measured on the B-axis).

6. The color shall be consistent on the project site and shall match the color of rock to be used for all other portions of the boulder and cobble features.

PART 3 EXECUTION

3.02 PLACEMENT

G. RIPRAP EMBANKMENT TREATMENT

1. Following acceptable placement of granular bedding, riprap placement shall commence as follows:

a. Machine Placed Riprap:

1) Riprap shall be placed on the prepared slope or channel bottom areas in a manner which will produce a reasonably well graded mass of stone with the minimum practicable percentage of voids.

2) Riprap shall be machine placed, unless otherwise stipulated in the DRAWINGS or SPECIFICATIONS.

3) It is the intent of these SPECIFICATIONS to produce a fairly compact riprap protection in which all sizes of material are placed in their proper proportions. Unless otherwise authorized by ENGINEER, the riprap protection shall be placed in conjunction with the construction of embankment or channel bottom with only sufficient delay in construction of the riprap protection, as may be necessary, to allow for proper construction of the portion of the embankment and channel bottom which is to be protected.

b. Slope Placement:

1) When riprap is placed on slope, placement shall commence at the bottom of the slope working up the slope.

c. The entire mass of riprap shall be placed on either channel slope or bottom so as to be in conformance with the required gradation mixture and to line, grade, and thickness shown on the DRAWINGS.

d. Riprap shall be placed to full course thickness at one operation and in such a manner as to avoid displacing the underlying bedding material. Placing of riprap in layers, or by dumping into chutes, or by similar methods shall not be permitted.

e. All material used for riprap protection for channel slope or bottom shall be placed and distributed such that there shall be no large accumulations of either the larger or smaller sizes of stone. Some hand placement may be required to achieve this distribution.

f. The basic procedure shall result in larger materials flush to the top surface with faces and shapes arranged to minimize voids, and smaller material below and between larger materials.

g. Surface grade shall be a plane or as indicated, but projections above or depressions under the finished design grade by more than ten percent (10%) of the rock layer thickness shall not be allowed.

h. Smaller rock shall be securely locked between the larger stone. It is essential that the material between the larger stones not be loose or easily displaced by flow or by vandalism.

i. The stone shall be consolidated by the bucket of the backhoe or other means that will cause interlocking of the material.

j. All rock is to be placed in a dewatered condition beginning at the toe of the slope or other lowest point.

k. CONTRACTOR shall maintain the riprap protection until accepted. Any material displaced for any reason shall be replaced to the lines and grades shown on the DRAWINGS at no additional cost to OWNER. If the bedding materials are removed or disturbed, such material shall be replaced prior to replacing the displaced riprap.

2. Hand Placed Riprap:

a. Hand placed riprap shall be performed during machine placement of riprap and shall conform to all the requirements of PART 2, above.

b. Hand placed riprap shall also be required when the depth of riprap is less than two (2) times the nominal stone size, or when required by the DRAWINGS or SPECIFICATIONS.

c. After the riprap has been placed, hand placing or rearranging of individual stones by mechanical equipment shall be required to the extent necessary to secure a flat uniform surface and the specified depth of riprap, to the lines and grades as shown on the DRAWINGS.

3. Soil Replacement Over Riprap:

a. Where riprap is designated to be buried, place onsite excavated material that is free from trash and organic matter in riprap voids by washing and rodding.

b. Prevent excessive washing of material into stream.

c. When voids are filled and the surface accepted by ENGINEER, place a nominal six (6) inches of topsoil over the area, or as designated on the DRAWINGS.

d. Fine grade, seed, and mulch per the SPECIFICATIONS.

H. RIPRAP TOE TREATMENT

1. Following acceptable placement of granular bedding, riprap placement

shall commence as follows:

a. Machine Placed Riprap:

1) Riprap shall be placed at the eroded toe first and then extended down a minimum of 2*D50 for the toe-down to avoid collapsing by the upper bank.

2) Riprap shall be machine placed, unless otherwise stipulated in the DRAWINGS or SPECIFICATIONS.

3) It is the intent of these SPECIFICATIONS to produce a fairly compact riprap protection in which all sizes of material are placed in their proper proportions. Unless otherwise authorized by ENGINEER, the riprap protection shall be placed in conjunction with the construction of embankment or channel bottom with only sufficient delay in construction of the riprap protection, as may be necessary, to allow for proper construction of the portion of the embankment and channel bottom which is to be protected.

b. The entire mass of riprap shall be placed so as to be in conformance with the required gradation mixture and to line, grade, and thickness shown on the DRAWINGS.

c. Riprap shall be placed to full course thickness at one operation and in such a manner as to avoid displacing the underlying bedding material. Placing of riprap in layers, or by dumping into chutes, or by similar methods shall not be permitted.

d. All material used for riprap toe protection shall be placed and distributed such that there shall be no large accumulations of either the larger or smaller sizes of stone. Some hand placement may be required to achieve this distribution.

e. The basic procedure shall result in larger materials flush to the top surface with faces and shapes arranged to minimize voids, and smaller material below and between larger materials.

f. Surface grade shall be a plane or as indicated, but projections above or depressions under the finished design grade by more than ten percent (10%) of the rock layer thickness shall not be allowed.

g. Smaller rock shall be securely locked between the larger stone. It is essential that the material between the larger stones not be loose or easily displaced by flow or by vandalism.

h. The stone shall be consolidated by the bucket of the backhoe or other means that will cause interlocking of the material.

i. All rock is to be placed in a dewatered condition.

j. CONTRACTOR shall maintain the riprap toe protection until accepted.

Any material displaced for any reason shall be replaced to the lines and grades shown on the DRAWINGS at no additional cost to OWNER. If the bedding materials are removed or disturbed, such material shall be replaced prior to replacing the displaced riprap.

2. Soil Replacement Over Riprap:

   a. Where riprap is designated to be buried, place onsite excavated material (native alluvium) that is free from trash and organic matter in riprap voids by washing and rodding.

   b. Prevent excessive washing of material into stream.

   c. Fine grade, seed, and mulch per the SPECIFICATIONS.

I. VERTICAL BOULDER WALL

1. Subgrade:
   a. The subgrade to receive each boulder shall be excavated and any unstable material shall be removed.

   b. Boulders shall be placed on subgrade without granular bedding unless approved by ENGINEER.

   c. Material approved by ENGINEER shall be placed and compacted in a maximum of four-inch (4") lifts to ninety five percent (95%) of Maximum Standard Proctor Density (ASTM D698) to re-establish the subgrade of each boulder.

   d. Unstable material shall be removed from the PROJECT site and disposed of by CONTRACTOR. Removal and replacement of unstable material shall only be completed at the direction of ENGINEER and shall be paid for under Muck Excavation.

   e. Subgrade shall be excavated a minimum of 6" to a maximum of 12" behind boulders.

   f. Backfill behind boulders shall be compacted to ninety five percent (95%) Maximum Standard Proctor Density (ASTM D698). Care shall be taken during compaction to avoid disturbing and/or damaging the integrity of the boulder channel edge.

   g. Finished grades and subgrade for boulders shall be determined from the height of each boulder used.

2. Boulders
   a. The top of all boulders shall be as indicated on the DRAWINGS.

   b. The boulders shall be carefully picked and arranged so that adjacent rock surfaces match within two (2) inches in top elevation and two (2) inches along the vertical exposed face or channel side of rock.

c. Boulders shall be placed such that adjacent boulders “touch” each other and voids do not exceed four (4) inches. It is the intent of construction to minimize voids and grout placed between boulders.

d. Smaller rocks shall be “chinked in” to fill all voids behind the boulders. Smaller rocks shall also be used to "chink in gaps larger than four (4) inches. Placement shall be approved by ENGINEER prior to grouting.

J. TYPE 1 GRADE CONTROL - ROCK RAMP

1. Type 1 Grade Control includes a well graded mix of riprap placed in the channel to diffuse energy and reduce the risk of head cuts. Type 1 Grade Controls should be installed per the typical detail shown in the planset. The cost of materials for this scope item is accounted for separately.
2. The rock gradations for the crest and ramp sizes specified in the planset is the minimum rock size. For ease of material handling, the Contractor may choose to use a gradation of riprap larger than what is specified in the planset, per approval by the engineer. A larger gradation must include a well-graded mix of rock sizes that can create an interlocking matrix.
3. Areas specified for Type 1 Grade Control shall be over-excavated to the depths specified in the Planset. Place bedding if required.
4. The Crest will be constructed first with individually placed boulders which will be in close contact across the channel into the tie-ins and down to the toe-down depth. Their placement will be guided by the Engineer o create a natural form and variability. The Crest will then be chinked in with smaller material.
5. The ramp will them be constructed by placing a layer of well graded riprap up to the proposed grades with a minimum depth of 2 times the D_{50} for the full extent of placement. There shall be no pockets of smaller material and the layer shall be compacted to ensure good contact.

K. TYPE 2 GRADE CONTROL - HORIZONTAL GRADE CONTROL

1. Type 2 Grade Control includes riprap placed on horizontal surfaces to resist erosion at areas of concentrated flow and higher velocity. Type 2 Grade Control should be installed per the typical detail shown in the planset. The cost of materials for this scope item is accounted for separately.
2. The rock gradation size specified in the planset is the minimum rock size. For ease of material handling, the Contractor may choose to use a gradation of riprap larger than what is specified in the planset, per approval by the engineer. A larger gradation must include a well-graded mix of rock sizes that can create an interlocking matrix.
3. Areas specified for Type 2 Grade Control shall be over-excavated to the depths specified in the Planset and a well graded mix of riprap shall be placed up to the proposed grades. The depth of the Type 2 Grade Control shall be a minimum of 2 times the D_{50} for the full extent of placement.
4. A layer of vehicle tracking control shall be placed over the riprap and worked into the voids to create a final surface which is free of abrubpt elevation changes or protruding points of riprap.
5. All connections to surrounding work and existing grades shall be free of abrupt elevation changes.

L. TYPE 3 GRADE CONTROL – STEP-POOL FEATURES

1. Type 3 Grade Control includes a well graded mix of riprap placed in the channel to diffuse energy and reduce the risk of head cuts. Type 3 Grade Controls should be installed per the typical detail shown in the planset. The cost of materials for this scope item is accounted for separately.
2. The rock gradation specified in the planset is the minimum rock size. For ease of material handling, the Contractor may choose to use a gradation of riprap larger than what is specified in the planset, per approval by the engineer. A larger gradation must include a well-graded mix of rock sizes that can create an interlocking matrix.
3. Areas specified for Type 3 Grade Control shall be over-excavated to the depths specified in the Planset. Place bedding if required.
4. The Crest will be constructed with individually placed boulders which will be in close contact across the channel into the tie-ins and down to the toe-down depth. Their placement will be guided by the Engineer o create a natural form and variability. The Crest will then be chinked in with smaller material.

M. COBBLE TOE

1. The work consists of installing the Cobble Toe treatment in the locations and as per the typical detail shown in the planset. The cost of materials for this scope item is accounted for separately. Revegetation in and landward of the Cobble Toe is a critical part of this bank treatment; however, the scope and cost of the revegetation portion of this scope item is part of the general revegetation plan as described in L Series sheets.
2. The rock gradation size specified in the planset is the minimum rock size. For ease of material handling, the Contractor may choose to use a gradation of cobbles larger than what is specified in the planset, per approval by the engineer. A larger gradation must include a well-graded mix of rock sizes that can create an interlocking matrix.
3. Only on-site rounded cobbles may be used as materials.
4. The Cobble Toe shall be keyed in a minimum of 2 times the D_{50} feet below the toe of slope and 2 times the D_{50} feet into the bank. The Cobble Toe shall extend to the bankfull channel elevation or approximately 3 feet above the toe of slope.
5. If inadequate bank material (such as sand) is encountered during excavation for the Cobble Toe, it should be over-excavated to install an additional bedding layer per Engineer direction.
6. As the cobble is placed, the eroded top of bank shall smoothed out and blended with the surrounding elevations.
7. Revegetate the bank per the specifications of the planting plan. The Planting Plan overrides the vegetation information shown on the Cobble Toe detail in the planset. When willow or cottonwood stakes are specified to be installed in the Boulder Cobble Toe, they must be installed simultaneously with the installation of the rock. Installation of willow or cottonwood stakes after the installation of the rock will not be allowed.

PART 4 MEASUREMENT AND PAYMENT

4.01 RIPRAP EMBANKMENT TREATMENT

A. The riprap embankment treatment shall be measured as percent complete and paid for as cubic yards. The cost includes installation only. The majority of materials to be imported and and accounted for under 2-ft Diameter Riprap (Similar to UDFCD Type VH), the remainder to be processed from native alluvium and paid for under Process Alluvium for Usable Cobbles/Gravels/Soils.

4.02 RIPRAP TOE TREATMENT

A. The riprap toe treatment shall be measured as percent complete and paid for as cubic yards. The cost includes installation only. Materials to be imported and and accounted for under 3-ft Diameter Riprap (Void Filled Complete-in-Place).

4.03 VERTICAL BOULDER WALL A. The vertical boulder wall shall be measured as percent complete and paid for as cubic yards. The cost includes installation only. Materials to be imported and and accounted for under 4-ft Diameter Boulders (Angular).

4.04 TYPE 1 GRADE CONTROL - ROCK RAMP

A. The Type 1 Grade Control-Rock Ramp shall be measured as percent complete and paid for as cubic yards. The cost includes installation only. Materials shall be imported under 1.5-ft Diameter Riprap (Similar to UDFCD Type H) and processed from native alluvium and paid for under Process Alluvium for Usable Boulders/Cobbles/Gravels/Soils.

4.05 TYPE 2 GRADE CONTROL - HORIZONTAL GRADE CONTROL

A. The Type 2 Grade Control-Horizontal Grade Control shall be measured as percent complete and paid for as cubic yards. The cost includes installation only. Materials shall be imported under 1-ft Diameter Riprap (Similar to UDFCD Type M), and processed from native alluvium and paid for under Process Alluvium for Usable Boulders/Cobbles/Gravels/Soils.

4.06 TYPE 3 GRADE CONTROL – STEP-POOL FEATURES

A. The Type 3 Grade Control-Step-Pool Features shall be measured as percent complete and paid for as cubic yards. The cost includes installation only. Materials shall be imported under 1.5-ft Diameter Riprap (Similar to UDFCD Type H), and processed from native alluvium and paid for under Process Alluvium for Usable Boulders/Cobbles/Gravels/Soils.

4.07 COBBLE TOE

The Cobble Toe shall be measured as percent complete and paid for as cubic yards. The cost includes installation only. Materials shall be processed from native alluvium and paid for under Process Alluvium for Usable Boulders/Cobbles/Gravels/Soils.

Pay Item	**Pay Unit**
Riprap Embankment Treatment 2’ D50 (Similar to UDFCD Type VH)– Installation Only	Cubic Yard
Riprap Toe Treatment 3’ D50– Installation Only	Cubic Yard

Vertical Boulder Wall 4’ Boulders (Angular)– Installation Only	Cubic Yard
Type 1 Grade Control 1.5’/0.5’ D50 - Rock Ramp – Installation Only	Cubic Yard
Type 2 Horizontal Grade Control 1’ D50 (Similar to UDFCD Type M) – Installation Only	Cubic Yard
Type 3 Grade Control 1.5’ D50– Step-Pool Features – Installation Only	Cubic Yard
Cobble Toe 0.75’ D50 (Similar to UDFCD Type L) – Installation Only	Cubic Yard

ADDITION OF

SECTION 31 23 19
DEWATERING

Section 31 23 19 of the UDFCD Standard Construction Specifications is hereby added to the Supplemental Speficications for this project:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The WORK of this section consists of controlling groundwater, site drainage, and storm flows during construction. CONTRACTOR is cautioned that the WORK involves construction in and around drainage channels, local rivers, and areas of local drainage. These areas are subject to frequent periodic inundation.

1.2 RELATED SECTIONS

A. The following is a list of SPECIFICATIONS which may be related to this section:

1. Section 01 57 19, Temporary Environmental Controls
2. Section 31 23 00, Excavation and Fill.
3. Section 31 23 33, Trenching and Backfilling.
4. Section 31 35 00, Erosion and Sedimentation Control

1.3 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
   a. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft^3 (600 kN-m/m^3)).

1.4 SUBMITTALS

A. CONTRACTOR shall submit to the ENGINEER a Water Control Plan 2 weeks prior to execution of the PROJECT. At a minimum, the Water Control Plan shall include:

1. Descriptions of proposed groundwater and surface water control facilities including, but not limited to, equipment, methods, standby equipment and power supply, means of measuring inflow to excavations, pollution control facilities, discharge locations to be utilized, and provisions for immediate temporary water supply as required by this section.

2. Drawings showing locations, dimensions, and relationships of elements of each system.

3. Design calculations demonstrating adequacy of proposed dewatering systems and components.

4. If system is modified during installation or operation, revise or amend and resubmit Water Control Plan.

PART 2 PRODUCTS

2.1 MATERIALS

A. Onsite materials may be used within the limits of construction to construct temporary dams and berms. Materials such as plastic sheeting, sand bags, and storm sewer pipe may also be used if desired by CONTRACTOR.

PART 3 EXECUTION

3.1 GENERAL

A. For all excavation, CONTRACTOR shall provide suitable equipment and labor to remove water, and keep the excavation dewatered so that construction can be carried on under dewatered conditions.

1. Water control shall be accomplished such that no damage is done to adjacent channel banks or structures.

2. Continuously control water during course of construction, including weekends and holidays and during periods of work stoppages, and provide adequate backup systems to maintain control of water.

B. CONTRACTOR is responsible for investigating and becoming familiar with all site conditions that may affect the WORK including surface water, potential flooding conditions, level of groundwater and the time of year the work is to be done.

C. CONTRACTOR shall conduct operations in such a manner that storm or other waters may proceed uninterrupted along their existing drainage courses.

1. By submitting a BID, CONTRACTOR acknowledges that CONTRACTOR has investigated the risk arising from such waters and has prepared BID accordingly, and assumes all of said risk.

D. At no time during construction shall CONTRACTOR affect existing surface or subsurface drainage patterns of adjacent property.

1. Any damage to adjacent property resulting from CONTRACTOR's alteration of surface or subsurface drainage patterns shall be repaired by CONTRACTOR at no additional cost to OWNER.

E. Pumps and generators used for dewatering and water control shall be quiet equipment enclosed in sound deadening devices.

F. CONTRACTOR shall remove all temporary water control facilities when they are no longer

needed or at the completion of the PROJECT.

G. All excavations made as part of dewatering operations shall be backfilled with the same type material as was removed and compacted to ninety-five percent (95%) of Maximum Standard Proctor Density (ASTM D698) except where replacement by other materials and/or methods are required.

3.2 CONSTRUCTION

A. Surface Water Control:

1. Surface water control generally falls into the following categories:

a. Normal low flows along the channel.
b. Storm/flood flows along the channel.
c. Flows from existing storm drain pipelines.
d. Local surface inflows not conveyed by pipelines.

2. CONTRACTOR shall coordinate, evaluate, design, construct, and maintain temporary water conveyance systems.

a. These systems shall not worsen flooding, alter major flow paths, or worsen flow characteristics during construction. CONTRACTOR is responsible to ensure that any such worsening of flooding does not occur.
b. CONTRACTOR is solely responsible for determining the methods and adequacy of water control measures.

3. At a minimum, CONTRACTOR shall be responsible for diverting the quantity of surface flow around the construction area so that the excavations will remain free of surface water for the time it takes to install these materials, and the time required for curing of any concrete or grout. CONTRACTOR is cautioned that the minimum quantity of water to be diverted is for erosion control and construction purposes and not for general protection of the construction site.

a. It shall be CONTRACTOR's responsibility to determine the quantity of water which shall be diverted to protect the WORK from damage caused by stormwater.

4. CONTRACTOR shall, at all times, maintain a flow path for all channels.

a. Temporary structures such as berms, sandbags, pipeline diversions, etc., may be permitted for the control of channel flow, as long as such measures are not a major obstruction to flood flows, do not worsen flooding, or alter historic flow routes.

B. Groundwater Control:

1. CONTRACTOR shall install adequate measures to maintain the level of groundwater below the foundation subgrade elevation and maintain sufficient bearing capacity for all structures, pipelines, earthwork, and rockwork.

a. Such measures may include, but are not limited to, installation of perimeter

subdrains, pumping from drilled holes or by pumping from sumps excavated below the subgrade elevation.

b. Dewatering from within the foundation excavations shall not be allowed.

2. The foundation bearing surfaces are to be kept dewatered and stable until the structures or other types of work are complete and backfilled.

   a. Disturbance of foundation subgrade by CONTRACTOR operations shall not be considered as originally unsuitable foundation subgrade and shall be repaired at CONTRACTOR's expense.

3. Contractor shall dispose of groundwater as follows:

   a. Obtain discharge permit for water disposal from authorities having jurisdiction.
   b. Treat water collected by dewatering operations, as required by regulatory agencies, prior to discharge.
   c. Discharge water as required by discharge permit and in manner that will not cause erosion or flooding, or otherwise damage existing facilities, completed Work, or adjacent property.
   d. Remove solids from treatment facilities and perform other maintenance of treatment facilities as necessary to maintain their efficiency.

4. Any temporary dewatering trenches or well points shall be restored following dewatering operations to reduce permeability in those areas as approved by ENGINEER.

ADDITION OF
SECTION 32 31 00
FENCES

Section 32 31 00 of the UDFCD Standard Construction Specifications is hereby added to the Supplemental Speficications for this project:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This section shall consist of furnishing and installing new fence and/or removing and salvaging existing fence and restoring the same in conformance with the lines and grades and requirements shown on the DRAWINGS. Wherever the materials to be removed are not in good condition, as judged by the ENGINEER, or wherever CONTRACTOR has damaged the materials during the process of removal, equal or better quality fencing materials than the existing shall be furnished and installed by CONTRACTOR.

1.2 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of State Highway and Transportation Officials (AASHTO):

   a. M111M/M111, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   b. M133, Standard Specification for Preservatives and Pressure Treatment Processes for Timber.
   c. M181, Standard Specification for Chain-Link Fence.
   d. M232M/M232, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   e. M281, Standard Specification for Steel Fence Posts and Assemblies, Hot-Wrought.

2. ASTM International (ASTM):

   a. A116, Standard Specification for Metallic-Coated, Steel-Woven Wire Fence Fabric.
   b. A121, Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.
   c. A392, Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
   d. A491, Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric.
   e. B211, Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire. Fences Constructed of Wood and Related Materials.

3. Federal Specification (FED): FCGS-02-1, Fencing, Wire and Post, Metal (Chain-link Fence Posts, Top Rails and Braces).

PART 2 PRODUCTS

2.1 MATERIALS

A. Timber: All timber materials for new fencing shall be No. 1 grade cedar.

B. Barbed Wire: Steel barbed wire shall conform to the requirements of ASTM A121 Class I. Aluminum barbed wire shall be manufactured in accordance with ASTM B211 with alloy 5052-O for the line wire and alloy 5052-H38 for the barbs.

C. Woven Wire: Woven wire shall conform to the details and requirements shown on the DRAWINGS and to the following:

1. Zinc-coated steel woven wire shall conform to the requirements of ASTM A116, coating Class I.
2. Aluminum-coated steel woven wire shall conform to the requirements of ASTM A116, coating Class I.
3. Fittings and attachments shall be zinc coated to conform to the requirements of AASHTO M232M/M232.

D. Chain Link Fabric: Chain link fabric and required fittings and hardware shall conform to the requirements of AASHTO M181 for the kind of metal, sizes of wire and mesh specified. Zinc coating for steel fabric shall conform to ASTM A392, Class I and aluminum coating for steel fabric to ASTM A491, Class I.

E. Snow Fence: Wire-bound picket fence shall conform to the requirements of ASTM F537. Posts shall conform to the requirements of AASHTO M281.

F. Construction Fence: Construction fence shall be bright orange woven plastic mesh, four feet (4') minimum in height.

G. Fence Posts

1. Wood posts shall conform to the details and dimensions indicated on the DRAWINGS. Wood posts shall be straight, sound, and seasoned with ends sawed off square or as indicated. All knots shall be trimmed flush with the surface. Wood posts shall be peeled and treated with preservative in accordance with AASHTO M133. When native cedar posts are called for on the DRAWINGS, the requirements for peeling and for treating may be omitted.
2. All dimension timber and lumber required for fences or gates shall be sound, straight, and free from knots, splits, and shakes. It shall be of the species and grades indicated on the DRAWINGS.
3. Concrete posts shall be made of concrete of the class specified, and shall contain steel reinforcement as shown on the DRAWINGS.
4. Steel posts shall be galvanized in accordance with AASHTO M111M/M111. Fittings, hardware, and other appurtenances not specifically covered by the DRAWINGS and SPECIFICATIONS shall be standard commercial grade, and in accordance with current standard practice. Pipe material for fence posts shall conform to the requirements shown on the DRAWINGS and to the requirements of Class 1 Pipe, Grade A or Grade B, of FED FCGS-02-01.
5. Construction fence posts shall be studded steel tee posts.

H. Nails: All nails used for construction shall be galvanized.

PART 3 EXECUTION

3.1 REMOVAL OF EXISTING FENCE

A. All rails, braces, posts, and the like shall be removed and disposed of or salvaged by CONTRACTOR to allow construction of the PROJECT as described on the DRAWINGS.

3.2 CONSTRUCTION OR REPLACEMENT OF FENCE

A. General:

1. CONTRACTOR shall perform such clearing and grubbing as may be necessary to construct or replace the fence to the required grade and alignment as shown on the DRAWINGS.
2. At locations where breaks in a run of fencing are required, appropriate adjustments in fence alignment and/or post spacing shall be made to satisfy requirements or conditions encountered.

B. Posts and Rails: Posts shall be securely embedded into the ground to meet the proper alignment and elevations. Posts shall be embedded in concrete as shown on the DRAWINGS. Posts and rails shall be held in proper positions by secure bracing until such time as the concrete has set sufficiently to hold the posts. Materials shall not be installed on posts, or stress placed on bracing until the concrete has set sufficiently to withstand the stress. The complete fence shall be plumb and in straight alignment as shown on the DRAWINGS or as directed by ENGINEER.

C. Construction Fence: Construction fence posts shall be installed at ten (10) feet on center and the plastic mesh shall be attached to each post at top, bottom, and center using plastic ties. A twelve and one-half (12-1/2) gage wire strand shall be installed along the top and bottom of the fence for added stability. The plastic mesh shall be attached to the top and bottom strand wires in three (3) equally spaced locations between each post using plastic ties. Construction fence shall be installed along the limits of disturbance. Construction fence shall remain in place and be repaired as necessary throughout construction.

REVISION OF SECTION 32 31 00 — FENCES

Section 32 31 00 of the UDFCD Standard Construction Specifications is hereby revised as follows:

PART 1 GENERAL

1.03 RELATED SECTIONS

A. The following is a list of SPECIFICATIONS from the Technical Specifications for the Project, which may be related to this section:

1. Section 201 – Clearing and Grubbing

PART 3 EXECUTION

3.03 SPECIFIC REQUIREMENTS FOR REMOVE AND REPLACE WOOD FENCE

A. In additional to the materials and execution specifications provided in this specification, the replacement of the wood fence shall conform to the following criteria:

No specific criteria at this time

PART 4 MEASUREMENT AND PAYMENT

4.01 REMOVE AND REPLACE WOOD FENCE

A. The fence shall be measured as percent complete and paid for as linear feet. The cost includes the removal and disposal of the existing fence, the maerials for the new fence and the installation of the new fence.

Pay Item	**Pay Unit**
Remove and Replace Wood Fence	Linear Feet

PERMIT REQUIREMENTS

Permit Requirements Table of Contents

REQUIREMENTS OF THE 404 PERMIT AND SB 40
REGARDING PREVENTION OF THE SPREAD OF AQUATIC INVASIVE SPECIES

Equipment and gear that were previously used in another stream, river, lake, pond or wetland, and that are to be used in or near the waters on the project, shall be treated to prevent the spread of aquatic invasive species. These species include, but are not limited to:

(1) Eurasian watermilfoil
(2) Zebra mussel
(3) Quagga mussel
(4) New Zealand mudsnail

Equipment that shall be treated includes all parts of machinery and vehicles of all types and sizes that came into contact with the live water.

Gear that must be treated includes boots, waders, hand tools, and all other materials and attire used previously in the live water.

The Contractor shall coordinate with Engineer, who will verify compliance with Section 404 authorization requirements, and use one of the following two treatments:

- Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.)
- Spray/soak equipment with a solution of commercial grade quaternary ammonium disinfectant compound containing at least 8.0% active ingredient diluted in solution to achieve at least 0.8% concentration (roughly 12 ounces of product per gallon of water). Specifically, a 1:15 solution of Quat 4 or Super HDQ Neutral institutional cleaner and water, could be used for effective treatment.
- Treated equipment should be kept moist for at least 10 minutes, managing rinsate as a solid waste in accordance with local, county, state, or federal regulations

or

- Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.)
- Spray/soak equipment with water hotter than 140 degrees Fahrenheit for at least 10 minutes.
- Do not move water from one water body to another
- Be sure Equipment is dry before use.

Prior to moving such equipment onto the project, the Contractor shall submit to the Engineer a written list of the equipment and a signed certification that it was treated using one of the two methods specified above.

After project completion, this equipment shall be treated prior to its use in another stream, river, lake, pond of wetland.

PROTECTED PLANTS AND WILDLIFE CONSERVATION MEASURES

1) SUMMARY
   a) Section includes pertinent criteria relating to the:
      i) Endangered Species Act
      ii) Migratory Bird Treaty Act
      iii) Bald and Golden Eagle Protection Act

2) General
   a) Coordination with the Owner, Engineer, and Vegetation Specialist is critical and shall be implemented early in the construction process to limit or avoid construction delays.

   b) Compliance with Migratory Bird Treaty Act and the Bald and Golden Eagle Act is required. A comprehensive nesting bird survey must be performed within the Site and adjacent CPW recommended raptor buffers immediately prior to construction, in order to ensure compliance with the Migratory Bird Treaty Act (MBTA). If identified, contractor must adhere to all CPW buffer recommendations.

   c) Project Specifics (these dates supersede all other dates with regard to species and vegetation protection)

      i) Coordination with CPW on appropriate measures for protection for raptors is required.
      ii) Primary nesting season for migratory birds is from April 1st through July 31st.
      iii) Primary nesting season for nesting raptors is from February 1st through August 31st.
   iv) Primary nesting season for Bald and Golden eagles is from October 15th through July 31st and December 15th through July 15th, respectively.

   d) Conservation measures for preservation of existing habitat that is not intended to be or planned for disturbance:

      i) Pre-Construction:
         (1) Minimize footprint of disturbance by limiting access points, staging, etc.
         (2) Locate access routes and haul routes in previously disturbed areas and existing roads.
         (3) Contractor shall delineate areas of no entry for equipment on the ground with plastic construction fencing.
         (4) Project engineer will debrief onsite personnel of area-of-disturbance, Project Area, no entry areas and other conservation pertinent measures.
         (5) Follow stormwater guidelines and utilize best management practices to limit sedimentation, contamination, erosion.

      ii) Project Implementation:
         (1) The Contractor shall contact the Engineer or Owner to contact US Fish and Wildlife Service if Preble's, Colorado Butterfly plant, or Ute Ladies' Tresses are found within project area.
         (2) Limit disturbance (crushing) or removal of vegetation. (Willows, trees, shrubs, and herbaceous plants within riparian and adjacent upland habitat.
            (a) Limit disturbance to vegetation to the area-of-disturbance as defined in the project plan set.
            (b) Choose equipment size/type appropriately to minimize disturbance and soil compaction.
         (3) Stage, operate, locate and refuel equipment outside of riparian habitat and immediately adjacent upland habitats.

(a) Operate equipment from previously disturbed or modified roadbeds or shoulders above riparian, when possible.
(b) Limit entrance and exit points in project area.
(c) Stockpile topsoil and debris outside of riparian area and protect from stream flows.

(4) Promptly remove waste to minimize site disturbance and attraction of predators.
(5) Cover exposed holes to prevent wildlife entrapment.
(6) Use best management practices to limit construction disturbance.
(a) Soil compaction: Establish one access route preferably along existing disturbed surface or route.
(b) Soil compaction: Temporarily line access routes with geotextiles in wet, unstable soil.
(c) Weed control: Wash and inspect vehicles and equipment before entering or leaving project area.
(d) Weed control: Use only weed free certified materials, including gravel, sand, topsoil, mulch, and seed to the maximum extent feasible.
(7) Complete construction before beginning restoration activities.

iii) Post-Construction:
(1) Upon completion of project, revegetate all disturbed areas with native vegetation.
(2) Rip compacted areas prior to replanting with native vegetation, unless Vegetation Specialist recommends other restoration methods.
(3) Fill and reseed with weed free material and native seed mixtures.
(4) Consider monitoring the revegetated area for success.

e) Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act:

i) Migratory Birds: If work requiring ground disturbance and/or removal of woody and herbaceous vegetation occurs during the primary breeding season (April 1st through August 31st), pre-construction surveys, using accepted bird survey protocols, for nesting migratory birds must be completed within one week prior to commencement of work (contractor's responsibility) by a qualified wildlife biologist. Contractor must follow the 'CDOT Standard Specifications Section 240: Protection of Migratory Birds Biological Work Performed by the Contractor's Biologist' for requirements and survey protocol.

ii) Raptors: If work occurs during the nesting season for raptors (February 1st through August 31st), pre-construction surveys for nesting raptors must be completed within one week prior to commencement of work. If nesting raptors are discovered, contractor will abide by the Colorado Parks and Wildlife Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors https://cpw.state.co.us/Documents/WildlifeSpecies/LivingWithWildlife/RaptorBufferGuidelines2008.pdf). Notification must be provided to OWNER to receive guidance.

iii) Eagles: Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act. If discovered, the contractor must coordinate with the Colorado Parks and Wildlife Bird Conservation Coordinator (Liza Rossi – 970.871.2861) and the U.S. Fish and Wildlife Service (303-236-4773) to receive guidance.