

St. Vrain Creek Reach 3 Restoration Construction Specifications Highway 36 to Crane Hollow Road Boulder County, Colorado

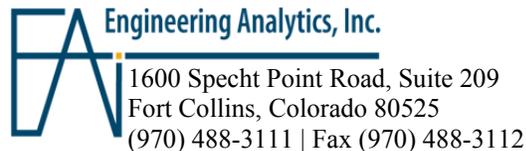
Prepared for:

Colorado Water Conservation Board
Department of Local Affairs CDBG-DR

Prepared by:



and



Project No. 110666

May 2017

AS-BUILT

6/19/2018

**CERTIFICATE
ST VRAIN REACH 3**

ENGINEER'S CERTIFICATION

I hereby certify that these Specifications for the **ST VRAIN REACH 3 STREAM RESTORATION PROJECT** for Boulder County Parks and Open Space Department were prepared by me, or under my direct supervision for the Owners thereof.



Clinton C. Brown P.E. #40189

June 19 _____, 2018
Date

PREFACE

These Construction Specifications are to be used on ST VRAIN CREEK REACH 3 RESTORATION Project (Project). These specifications are a modification of the Colorado Department of Transportation (CDOT) Standard Specifications for Road and Bridge Construction 2011 (CDOT 2011). Individual specifications can be found by referencing CDOT 2011. Copies of CDOT 2011 may be obtained from the Colorado Department of Transportation, Office of Bid Plans, 4201 E. Arkansas Avenue, Denver, CO 80222.

The Table of Contents has been modified from CDOT 2011 to reflect specifications that are applicable to the Project. Specifications that are deemed to not apply are omitted from the table of contents. If during the construction, a specification that has been omitted is deemed applicable the Contractor will be notified.

These specifications are expressed in United States Standard Measure (English units). The international System of Units (SI, Modernized Metric) is used only where standardized testing requires metric units. For clarity, aggregate sieve sizes appear in both SI and English Units. The dimensions, measurements, and requirements stated in English units are the specification requirements. All Contractor submittals shall be prepared in English Units. Pay item quantities will be measured in English units.

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1.0 GENERAL INFORMATION

1. The Contractor shall have a copy of the Colorado Department of Transportation "Standard Specifications for Road and Bridge Construction", 2011 on the project site at all times.
2. Contractor must follow QA plan, which will be included in the bid documents (includes specs for as-builts), as well as all provided Construction Documents listed in the Invitation to Bid.
3. All work must be completed by December 31, 2017.

2.0 PROJECT ADMINISTRATION

REQUIREMENTS OF THE 404 PERMIT

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 use one of the following treatments:

1. 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
2. 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 or 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 BCPOS is critical and shall be implemented early in the construction process to limit or avoid construction delays.
- b) The reach of St. Vrain Creek encompassed in the project area is designated as a Mouse Management Area under the map of Preble's Meadow Jumping Mouse - Habitat Conservation Areas in the Boulder County Comprehensive Plan – Environmental Resources Element. Preble's meadow jumping mice (Preble's) are protected under the Endangered Species Act. (See Preble's Habitat Conservation Area map in Boulder County Comprehensive Plan Environmental Resources Element).
- c) Compliance with Migratory Bird Treaty Act and the Bald and Golden Eagle Act is required. A known bald eagle nests exist just outside the project area and the recommended ½ mile buffer does NOT overlap this project area. However, haul routes and access points need to consider the location of this protective buffer. There are a number of known raptors nests within the project area. CPW recommended buffers shall be observed. Contractor's MBTA survey consultant will identify all nesting and roosting areas. If identified, contractor must adhere to all CPW buffer recommendations
- d) Project Specifics (these dates supersede all other dates with regard to species and vegetation protection)
 - i) The Preble's active season is from May 1 through November 1.
 - ii) Coordination with CPW on appropriate measures for protection for raptors is required.
 - iii) Primary nesting season for migratory birds is from April 1st through July 31st.
 - iv) Primary nesting season for nesting raptors is from February 1st through August 31st.
 - v) Primary nesting season for Bald and Golden eagles is from October 15th through July 31st and December 15th through July 15th, respectively.
- e) Conservation measures for plant and animal species protected under the Endangered Species Act (Preble's Meadow Jumping Mouse, Ute Ladies' Tresses Orchid, and Colorado Butterfly Plant)
 - 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) During Preble's active season (May 1-November 1), work only during daylight hours. (Preble's are nocturnal).
- (5) Promptly remove waste to minimize site disturbance and attraction of predators.
- (6) Cover exposed holes or loose dirt with tarps/boards to prevent entrapment.
- (7) 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.
- (8) 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 BCPOS Plant Ecologists recommend other restoration methods.
- (3) Fill and reseed with weed free material and native seed mixtures.
- (4) Consider monitoring the revegetated area for success.

f) 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. The project area is just outside the Colorado Parks and Wildlife ½ mile recommended buffer zone of a known bald eagle nest. If work occurs during the nesting period for bald eagles (October 15th through July 31st) and construction activities (including hauling of material) encroach on the ½ mile buffer, PRIOR to initiating work, 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.

- (1) Although there are currently no known bald nests within one mile of the project site, bald eagles have historically nested in this area. If a bald eagle chooses to nest within one half mile of the project area between October 15th and July 31st, all work within the ½ mile buffer zone of the nest must stop and notification must be provided to Owner, Colorado Parks and Wildlife Bird Conservation Coordinator and the U.S. Fish and Wildlife to receive guidance.

3.0 SUPPLEMENTAL SPECIFICATIONS

SECTION 109.11 - MEASUREMENT AND PAYMENT

General: This Section is provided to more specifically detail the scope of work outlined in the Contract Agreement and the method of payment.

The Contractor agrees to supply and include in this cost proposal the entire cost of all materials, equipment, labor, labor supervision, construction tools and equipment, construction services and utilities, all overhead, expendable, guarantees, and fuel costs as required for the St. Vrain Creek Reach 3 Restoration project as set forth in the Drawings and Contract Documents and has included all such costs in the Schedule of the Contract Documents.

It is understood that Unit Price Items in the Schedule shall be adjusted for additions or deductions to the Contract amount as measured after installation. Items that are Lump Sum prices as listed in the Schedule will not be adjusted unless a change in scope of work is initiated by Change Order. It is understood that payment for increases to the Contract amount and quantities as listed in the Schedule shall be by Change Order only.

Schedule Items:

1. Surveying

This item shall include all surveying as required for the Contractor to perform his work as indicated on the Drawings. The Contractor is responsible for all surveying to layout and measure the work and shall provide red-lined, as-constructed drawings to the Engineer at the completion of the project showing any changes from the plans and Specifications.

Payment for this item shall be made on a lump sum basis to be paid on a monthly, pro-rated basis throughout the construction period.

2. Mobilization and Demobilization

This item shall include, but not be limited to, all of the Contractor's move-in and move-out costs, including delivering equipment to the site, erection and maintenance of all temporary facilities and controls such as Contractor's field office, temporary toilets, temporary electricity, temporary heat, and completion and erection of the temporary signs. This item will also include the restoration of the staging areas to the pre-construction condition at the completion of the project. Also included in this item shall be the Contractor's cost of the performance bonds, payment bonds, insurance, permits, and any other such general requirements as may be set forth for the completion of this project. This item shall also include all contractor permits (not covered by other bid items), personnel, signs, traffic barriers, and plans that may be required to complete the project.

Payment will be made as the work progresses. Fifty-percent (50%) of the lump sum bid price will be paid at the time of the first monthly progress payment. An additional thirty-percent (30%) will be paid when one-half the original contract amount is earned. The remaining twenty percent (20%) will be paid upon final acceptance of the project.

3. Erosion and Sediment Control

This item shall include, but not be limited to, all work required by the Contractor to care for storm water on the site in accordance with the Specifications. This shall include control of all surface water runoff to prevent sedimentation and/or degradation of all streams, tributaries, and lakes. Included in this cost is the removal of these items post-construction. This item shall include, but not be limited to, all costs for temporary dikes, culverts, pumping systems, electricity or fuel, and all other such items, and shall include all permitting, management, and supervision required by the Specifications or government regulations. This can include, but is not limited to, silt fences, erosion control bales, tracking pads, and the storm water management plan. Included in this item is the cost of materials (and disposal of materials post-construction) required for any erosion and sediment control measures taken.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

4. Ramey Staging Area & Access Road

This item shall include all materials, equipment, and labor required to restore access road and staging area by ripping, regrading and seeding disturbed areas to pasture at the conclusion of the project as shown on the Drawings. This item also includes the cost of repairs for any damaged access during construction.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

5. Removal of Waste and Inorganic Debris

This item shall include the equipment and labor required for the removal of concrete, buried metals, and other inorganic waste from the construction zone as shown on the Drawings and Specifications. Also included in this item is the cost for the proper disposal of the wastes. This item does not include the disposal of general waste (trash) generated by the contractor.

Payment for this item shall be made on a per load basis with progress payments made based on each 10 cubic yard truck load of waste removed.

6. Removal of Organic Debris

This item shall include the equipment and labor required for the removal of organic debris that cannot be disposed of onsite from the construction zone as shown on the Drawings and Specifications. Also included in this item is the cost for the proper disposal of the removed debris. This item does not include the disposal of general waste (trash) generated by the contractor.

Payment for this item shall be made on a per load basis with progress payments made based on each 10 cubic yard truck load of waste removed.

7. Protection of Migratory Birds

This item shall include, but not be limited to, all work required by the Contractor for the Protection of Migratory Birds as outlined in the Specifications. This work includes actual authorized number of hours a wildlife biologist is on site performing the required tasks, removal of nests and netting etc.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed. During this period, the Contractor shall submit to the Engineer each week for approval a list of the workers who removed nests and the number of hours each one spent removing nests.

8. Ancillary Services

- a. Traffic Control – This item shall include, but not be limited to, all work required by the Contractor to develop a Traffic Control Plan to be approved by Boulder as required to obtain a Limited Use permit. This item shall also include all costs associated with labor, materials, equipment and devices required to implement the Traffic Control Plan as required by Boulder County in conjunction with the Limited Use permit.

Payment will be made as the work progresses. Fifty-percent (50%) of the lump sum bid price will be paid at the time of the first monthly progress payment. An additional fifty-percent (50%) will be paid when one-half the original contract amount is earned.

- b. QC Materials Testing – This item includes field testing of earthwork compaction and cast in place concrete and the associated laboratory testing required to support the field testing. Frequency of field compaction testing shall be will at every 2000 CY for fill placed and at every 500 CY for clay core placed. Testing and sampling of concrete shall be at every 50 CY of concrete placed. A set of four cylinders shall be cast and tested at 7 days, 28 days (2) and one retained. Locations of tests and variations from the stated frequency shall be agreed to between the Contractor and Engineer. The testing shall be scheduled by the contractor.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

9. Breach 1 Repair

This set of items includes all work necessary to construct the Breach 1 Repair according to the Drawings and Specifications. At a minimum, this item includes the following:

- a. Clear, Strip and Grub – This item shall include clearing, stripping, and grubbing all construction areas and removal of any trees in the required construction areas of the Breach 1 repair. The cost shall include spoiling waste materials in stockpiles as outlined in the Specifications. The cost shall also include stockpiling of topsoil material for later use in the project.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- b. Access Road Improvements – This item shall include all materials, equipment, and labor required to improve access roads and restore at the completion of the project to the “pre-construction condition” or as shown on the Drawings and described in the Specifications. This item also includes the cost of repairs for any damaged access during construction.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- c. Care and Diversion of Stream Water – This item shall include costs associated with diverting the streams, or any other consistently flowing water, as needed for construction of the Breach 1 repair and in accordance with the Specifications and Drawings. Also included in this item is any temporary pipes, walls, trenches, or other structures used in the care and diversion of the stream.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- d. Dewatering - This item shall include, but not be limited to, all work required by the Contractor to care for dewatering for the Breach 1 repair in accordance with the Specifications. This shall include control of ground water and seepage at individual excavations as required throughout construction and the prevention of sedimentation and/or degradation of all streams and tributaries. This item shall include, but not be limited to, all costs for temporary dikes, culverts, pumping systems, electricity or fuel, casings, sumps, wells, and all other such items, and shall include all permitting, management, and supervision required by the Specifications or government regulations.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- e. Excavation – This item of work shall include all work necessary to excavate the existing Breach 1 berm, river bed, and surrounding area to the lines and grades shown on the Drawings. The cost shall also include all work necessary to spoil excavated materials in the areas indicated on the Drawings or by the Engineer.

Payment for this item shall be made on a unit price basis per cubic yard of material excavated. Excavated volume shall be the in-place volume computed from the average end area method, or other appropriate survey and volume calculation methods, taken from field survey cross section measurements conducted before and after excavation.

- f. Borrow and Fill – This item of work shall include all work necessary to borrow, fill and compact the Breach 1 berm and surrounding areas to the lines and grades shown on the Drawings. The cost shall also include all work necessary to excavate and transport borrow materials from an onsite location. The cost shall also include all work necessary to compact and condition the materials for placement in the foundation and embankment as indicated on the Drawings and stated in the Construction Specifications. This item shall not include the placement of the clay core.

Payment for this item shall be made on a unit price basis per cubic yard of fill. Fill volume shall be the in-place volume computed from the average end area method, or other appropriate survey and volume calculation methods, taken from field survey cross section measurements performed by the contractor and conducted before and after fill.

- g. Non-woven Geotextile – This item of work shall include all work necessary to provide and place 6 oz./ sy. geotextile beneath the riprap as shown on the Drawings. This item includes the cost of the material and delivery to the construction area.

Payment for this item shall be made on a unit price basis per square yard of non-woven geotextile supplied and placed.

- h. Remove and Stockpile Riprap – This item of work shall include all work necessary to remove existing riprap in the Breach 1 location as shown in the Drawings. This item also includes the sorting and stockpiling of the riprap for later use.

Payment for this item shall be made on a unit price basis per cubic yard of riprap removed, sorted, and stockpiled. Volume shall be the in-place volume computed from the average end area method, or other appropriate survey and volume calculation methods, taken from field survey cross section measurements conducted before and after removal of existing riprap.

- i. Type M Riprap Delivered – This item of work shall include all work necessary to supply Type M Riprap to the Breach 1 location. The riprap shall be in accordance to the Drawings and Specifications. This item is to supplement the existing stockpiled riprap.

Payment for this item shall be made on a unit price basis per ton of riprap delivered to the Breach 1 location.

- j. Riprap Placement – This item of work shall include all work necessary to place both the existing stockpiled riprap and the Type M Riprap delivered in the thickness and locations as shown in the Drawings.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- k. Clay Core – The clay core material is provided by BCPOS. It is located in a stockpile at Swede Lake. Swede Lake is located at the intersection of 67th Street and Pike Road in Boulder County approximately 7 miles south of the site. This item of work shall include all work necessary to transport and place the clay core fill in the Breach 1 berm according to the lines, grades, and compaction requirements as shown on the Drawings and in the Specifications.

Payment for this item shall be made on a unit price basis per cubic yard of clay core placed, conditioned, and compacted.

10. Breach 2 Repair

This set of items includes all work necessary to construct Breach 2 Repair according to the Drawings and Specifications. At a minimum, this item includes the following:

- a. Clear, Strip and Grub – This item shall include clearing, stripping, and grubbing all construction areas and removal of any trees in the required construction areas of the Breach 2 repair. The cost shall include spoiling waste materials in stockpiles as outlined in the Specifications. The cost shall also include stockpiling of topsoil material for later use in the project.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- b. Access Road Improvements - This item shall include all materials, equipment, and labor required to improve access roads and restore at the completion of the project to the “pre-construction condition” or as shown on the Drawings. This item includes the maintenance of the Martin Marietta Low Water Crossing, during construction. This item also includes the cost of repairs for any damaged access during construction.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- c. Care and Diversion of Stream Water - This item shall include costs associated with diverting the streams, or any other consistently flowing water, as needed for construction of the Breach 2 repair and in accordance with the Specifications and Drawings. Also included in this item is any temporary pipes, walls, trenches, or other structures used in the care and diversion of the stream.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- d. Dewatering - This item shall include, but not be limited to, all work required by the Contractor to care for dewatering for the construction of the Breach 2 repair in accordance with the Specifications. This shall include control of ground water and seepage at individual excavations as required throughout construction and the prevention of sedimentation and/or degradation of all streams and tributaries. This item shall include, but not be limited to, all costs for temporary dikes, culverts, pumping systems, electricity or fuel, casings, sumps, wells, and all other such items, and shall include all permitting, management, and supervision required by the Specifications or government regulations.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- e. Excavation – This item of work shall include all work necessary to excavate the existing Breach 2 berm, river bed, and surrounding area to the lines and grades shown on the Drawings. The cost shall also include all work necessary to spoil excavated materials in the areas indicated on the Drawings.

Payment for this item shall be made on a unit price basis per cubic yard of material excavated. Excavated volume shall be the in-place volume computed from the average end area method, or other appropriate survey and volume calculation methods, taken from field survey cross section measurements conducted before and after excavation.

- f. Borrow and Fill – This item of work shall include all work necessary to borrow fill and compact the Breach 2 berm and surrounding areas to the lines and grades shown on the Drawings. The cost shall also include all work necessary to excavate and transport borrow materials from an onsite location. The cost shall also include all work necessary to compact and condition the materials for placement in the foundation and embankment as indicated on the Drawings and stated in the Construction Specifications. This item shall not include the placement of the clay core.

Payment for this item shall be made on a unit price basis per cubic yard of fill. Fill volume shall be the in-place volume computed from the average end area method, or other appropriate survey and volume calculation methods, taken from field survey cross section measurements conducted before and after fill.

- g. Non-woven Geotextile – This item of work shall include all work necessary to provide and place 6 oz./sy. geotextile beneath the riprap as shown on the Drawings. This item includes the cost of the material and delivery to the construction area.

Payment for this item shall be made on a unit price basis per square yard of non-woven geotextile supplied and placed.

- h. Remove and Stockpile Riprap – This item of work shall include all work necessary to removed existing riprap in the Breach 2 location as shown in the Drawings. This item also includes the sorting and stockpiling of the riprap for later use.

Payment for this item shall be made on a unit price basis per cubic yard of riprap removed, sorted, and stockpiled. Volume shall be the in-place volume computed from the average end area method, or other appropriate survey and volume calculation methods, taken from field survey cross section measurements conducted before and after removal of existing riprap.

- i. Type H Riprap Delivered – This item of work shall include all work necessary to supply Type H Riprap to the Breach 2 location. The riprap shall be in accordance to the Drawings and Specifications. This item is to supplement the existing stockpiled riprap.

Payment for this item shall be made on a unit price basis per ton of riprap delivered to the Breach 2 location.

- j. Riprap Placement – This item of work shall include all work necessary to place both the existing stockpiled riprap and the Type H Riprap delivered in the thickness and locations as shown in the Drawings.

Payment shall be made on a lump sum basis with progress payments made based on the percentage of total work completed.

- k. Clay Core – The clay core material is provided by BCPOS. It is located in a stockpile at Swede Lake. Swede Lake is located at the intersection of 67th Street and Pike Road in Boulder County approximately 7 miles south of the site. This item of work shall include all work necessary to transport and place the clay core fill in the Breach 2 berm according to the lines, grades, and compaction requirements as shown on the Drawings and in the Specifications.

Payment for this item shall be made on a unit price basis per cubic yard of clay core placed, conditioned, and compacted.

11. Breach 6 Repair

This set of items includes all work necessary to construct Breach 6 Repair according to the Drawings and Specifications. At a minimum, this item includes the following:

- a. Clear, Strip and Grub – This item shall include clearing, stripping, and grubbing all construction areas, and removal of any trees in the required construction areas for the Breach 6 repair. The cost shall include spoiling waste materials in stockpiles as outlined in the Specifications. The cost shall also include stockpiling of topsoil material for later use in the project.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- b. Access Road Improvements - This item shall include all materials, equipment, and labor required to improve access roads and restore at the completion of the project to the “pre-construction condition” or as shown on the Drawings and described in the Specifications. This item also includes the cost of repairs for any damaged access during construction.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- c. Care and Diversion of Stream Water - This item shall include costs associated with diverting the streams, or any other consistently flowing water, as needed for construction of the Breach 6 repair and in accordance with the Specifications and Drawings. Also included in this item is any temporary pipes, walls, trenches, or other structures used in the care and diversion of the stream.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- d. Dewatering - This item shall include, but not be limited to, all work required by the Contractor to care for dewatering for the construction of the Breach 6 repair in accordance with the Specifications. This shall include control of ground water and seepage at individual excavations as required throughout construction and the prevention of sedimentation and/or degradation of all streams and tributaries. This item shall include, but not be limited to, all costs for temporary dikes, culverts, pumping systems, electricity or fuel, casings, sumps, wells, and all other such items, and shall include all permitting, management, and supervision required by the Specifications or government regulations.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- e. Excavation – This item of work shall include all work necessary to excavate the existing Breach 6 berm, river bed, and surrounding area to the lines and grades shown on the Drawings. The cost shall also include all work necessary to spoil excavated materials in the areas indicated on the Drawings.

Payment for this item shall be made on a unit price basis per cubic yard of material excavated. Excavated volume shall be the in-place volume computed from the average end area method, or other appropriate survey and volume calculation methods, taken from field survey cross section measurements conducted before and after excavation.

- f. Borrow and Fill – This item of work shall include all work necessary to borrow, fill and compact the Breach 6 berm and surrounding areas to the lines and grades shown on the Drawings. The cost shall also include all work necessary to excavate and transport borrow materials from an onsite location. The cost shall also include all work necessary to compact and condition the materials for placement in the foundation and embankment as indicated on the Drawings and stated in the Construction Specifications. This item shall not include the placement of the clay core.

Payment for this item shall be made on a unit price basis per cubic yard of fill. Fill volume shall be the in-place volume computed from the average end area method, or other appropriate survey and volume calculation methods, taken from field survey cross section measurements conducted before and after fill.

- g. Non-woven Geotextile – This item of work shall include all work necessary to provide and place 6 oz./sy. geotextile beneath the riprap as shown on the Drawings. This item includes the cost of the material and delivery to the construction area.

Payment for this item shall be made on a unit price basis per square yard of non-woven geotextile supplied and placed.

- h. Type H Riprap Delivered – This item of work shall include all work necessary to supply Type H Riprap to the Breach 6 location. The riprap shall be in accordance to the Drawings and Specifications. This item is to supplement the salvageable existing riprap.

Payment for this item shall be made on a unit price basis per ton of riprap delivered to the Breach 6 location.

- i. Riprap Placement – This item of work shall include all work necessary to place both the recycled riprap salvaged from other breach locations and the Type H Riprap in the thickness and locations as shown in the Drawings.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- j. Clay Core – The clay core material is provided by BCPOS. It is located in a stockpile at Swede Lake. Swede Lake is located at the intersection of 67th Street and Pike Road in Boulder County approximately 7 miles south of the site. This item of work shall include all work necessary to transport and place the clay core fill in the Breach 6 berm according to the lines, grades, and compaction requirements as shown on the Drawings and in the Specifications.

Payment for this item shall be made on a unit price basis per cubic yard of clay core placed, conditioned, and compacted.

12. Breach 7 Repair

This set of items includes all work necessary to construct Breach 7 according to the Drawings and Specifications. At a minimum, this item includes the following:

- a. Clear, Strip and Grub – This item shall include clearing, stripping, and grubbing all construction areas, removal of any trees in the required construction areas of the Breach 7 repair. The cost shall include spoiling waste materials in stockpiles as outlined in the Specifications. The cost shall also include stockpiling of topsoil material for later use in the project.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- b. Access Road Improvements - This item shall include all materials, equipment, and labor required to improve access roads and restore at the completion of the project to the “pre-construction condition” or as shown on the Drawings and described in the Specifications. This item also includes the cost of repairs for any damaged access during construction.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- c. Care and Diversion of Stream Water - This item shall include costs associated with diverting the streams, or any other consistently flowing water, as needed for construction of the Breach 7 repair and in accordance with the Specifications and Drawings. Also included in this item is any temporary pipes, walls, trenches, or other structures used in the care and diversion of the stream.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- d. Dewatering - This item shall include, but not be limited to, all work required by the Contractor to care for dewatering of the Breach 7 repair in accordance with the Specifications. This shall include control of ground water and seepage at individual excavations as required throughout construction and the prevention of sedimentation and/or degradation of all streams and tributaries. This item shall include, but not be limited to, all costs for temporary dikes, culverts, pumping systems, electricity or fuel, casings, sumps, wells, and all other such items, and shall include all permitting, management, and supervision required by the Specifications or government regulations.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- e. Excavation – This item of work shall include all work necessary to excavate the existing berm, river bed, and surrounding area to the lines and grades shown on the Drawings. The cost shall also include all work necessary to spoil excavated materials in the areas indicated on the Drawings.

Payment for this item shall be made on a unit price basis per cubic yard of material excavated. Excavated volume shall be the in-place volume computed from the average end area method, or other appropriate survey and volume calculation methods, taken from field survey cross section measurements conducted before and after excavation

- f. Borrow and Fill – This item of work shall include all work necessary to borrow, fill and compact the Breach 7 berm and surrounding areas to the lines and grades shown on the Drawings. The cost shall also include all work necessary to excavate and transport borrow materials from an onsite location. The cost shall also include all work necessary to compact and condition the materials for placement in the foundation and embankment as indicated on the Drawings and stated in the Construction Specifications. This item shall not include the placement of the clay core.

Payment for this item shall be made on a unit price basis per cubic yard of fill. Fill volume shall be the in-place volume computed from the average end area method, or other appropriate survey and volume calculation methods, taken from field survey cross section measurements conducted before and after fill.

- g. Remove and Stockpile Riprap – This item of work shall include all work necessary to removed existing riprap in the Breach 7 location as shown in the Drawings. This item also includes the sorting and stockpiling of the riprap for later use at different breach location.

Payment for this item shall be made on a unit price basis per cubic yard of riprap removed, sorted, and stockpiled. Volume shall be the in-place volume computed from the average end area method, or other appropriate survey and volume calculation methods, taken from field survey cross section measurements conducted before and after removal of existing riprap.

- h. Clay Core – The clay core material is provided by BCPOS. It is located in a stockpile at Swede Lake. Swede Lake is located at the intersection of 67th Street and Pike Road in Boulder County approximately 7 miles south of the site. This item of work shall include all work necessary to transport and place the clay core fill in the Breach 7 berm according to the lines, grades, and compaction requirements as shown on the Drawings and in the Specifications.

Payment for this item shall be made on a unit price basis per cubic yard of clay core placed, conditioned, and compacted.

13. Breaches 8, 9, and Hygiene Road Approach

This set of items includes all work necessary to construct Breach 8, 9, and Hygiene Road Approach according to the Drawings and Specifications. At a minimum, this item should include the following:

- a. Clear, Strip, and Grub – This item shall include clearing, stripping, and grubbing all construction areas, removal of any trees in the required construction areas of the Breaches 8, 9, and Hygiene Road Approach. The cost shall include spoiling waste materials in stockpiles as outlined in the Specifications. The cost shall also include stockpiling of topsoil material for later use in the project.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- b. Access Road Improvements - This item shall include all materials, equipment, and labor required to improve access roads and restore at the completion of the project to the “pre-construction condition” or as shown on the Drawings and described in the Specifications. This item also includes the cost of repairs for any damaged access during construction.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- c. Care and Diversion of Stream Water - This item shall include costs associated with diverting the streams, or any other consistently flowing water, as needed for construction of Breaches 8, 9, and Hygiene Road Bridge Approach in accordance with the Specifications and Drawings. Also included in this item is any temporary pipes, walls, trenches, or other structures used in the care and diversion of the stream.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- d. Dewatering - This item shall include, but not be limited to, all work required by the Contractor to care for dewatering of the Breaches 8, 9, and Hygiene Road Bridge Approach in accordance with the Specifications. This shall include control of ground water and seepage at individual excavations as required throughout construction and the prevention of sedimentation and/or degradation of all streams and tributaries. This item shall include, but not be limited to, all costs for temporary dikes, culverts, pumping systems, electricity or fuel, casings, sumps, wells, and all other such items, and shall include all permitting, management, and supervision required by the Specifications or government regulations.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- e. Non-woven Geotextile – This item of work shall include all work necessary to provide and place 6 oz./sy. geotextile beneath the riprap as shown on the Drawings. This item includes the cost of the material and delivery to the construction area.

Payment for this item shall be made on a unit price basis per square yard of non-woven geotextile supplied and placed.

- f. Remove and Stockpile Riprap – This item of work shall include all work necessary to removed existing riprap in the Breaches 8, 9, and Hygiene Road Approach locations as shown in the Drawings. This item also includes the sorting and stockpiling of the riprap for later use at different breach location.

Payment for this item shall be made on a unit price basis per cubic yard of riprap removed, sorted, and stockpiled. Volume shall be the in-place volume computed from the average end area method, or other appropriate survey and volume calculation methods, taken from field survey cross section measurements conducted before and after removal of existing riprap.

- g. Type H Riprap Delivered – This item of work shall include all work necessary to supply Type H Riprap to Breaches 8 and 9 and Hygiene Road Bridge location. The riprap shall be in accordance to the Drawings and Specifications. This item is to supplement the salvageable existing riprap.

Payment for this item shall be made on a unit price basis per ton of riprap delivered to the Breaches 8, 9, and Hygiene Road Approach location.

- h. Riprap Placement – This item of work shall include all work necessary to place both the recycled riprap salvaged from other breach locations and the Type H Riprap in the thickness and locations as shown in the Drawings.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

14. Stream Channel Restoration

This set of items includes all work necessary to shape and grade instream sections according to the Drawings and Specifications. At a minimum, this item should include the following:

- a. Clear, Strip and Grub – This item shall include clearing, stripping, and grubbing all construction areas, removal of any trees in the required construction areas. The cost shall include spoiling waste materials in stockpiles as outlined in the Specifications. The cost shall also include stockpiling of topsoil material for later use in the project.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- b. Restore, Grade & Shape Channel – This item shall include all work required by the Contractor to restore, shape and grade the stream channel in the locations and manner as shown in the Drawings and Specifications. This item includes cost of borrowing materials, labor, and equipment.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- c. Stream Access Restoration - This item shall include all materials, equipment, and labor required to improve stream access locations and restore at the completion of the project to the “pre-construction condition” as shown on the Drawings. This item also includes the cost of repairs for any damaged access during construction.

Payment for this item shall be made on a unit price basis for each stream access restored and approved by the Engineer.

- d. Material Sorting – This item shall include all work required by the Contractor to sort materials for riffles, channel shaping, boulder clusters and bank stabilization as shown in the Drawings and Specifications. This item includes cost of labor and equipment required for sorting.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- e. Riffle/Pool Sequences – This item shall include all work required by the Contractor to construct riffle/pool sequences in the location and manner as shown in the Drawings and Specifications. This item includes costs of moving sorted materials, material installation, labor and equipment.

Payment for this item shall be made on a unit price basis per each riffle/pool sequence supplied and placed.

- f. Instream Fill Placement – This item shall include all work required by the Contractor to place excavated stream material in the location and manner as shown in the Drawings and Specifications. This item includes cost of materials delivered from borrow location or other channel excavation, wetting and compaction, material installation, labor, and equipment.

Payment for this item shall be made on a unit price basis per cubic yard material supplied and placed.

- g. Boulders Delivered – This item of work shall include all work necessary to supply supplemental boulders for use in boulder clusters locations as designated on the Drawings. Boulders shall be approximately 18” in diameter and round. The boulders shall be used to supplement onsite boulders when necessary and shall be used in accordance to the Drawings and Specifications and with prior approval by Engineer.

Payment for this item shall be made on a unit price basis per each of boulder delivered to the Stream Channel Restoration locations.

- h. Boulder Clusters – This item shall include all work required by the Contractor to place boulder clusters using salvaged material and supplemental (as approved) in the place boulder clusters in the location directed by the field engineer and manner as shown in the Drawings and Specifications. This item includes cost of materials delivered to the construction area, material installation, labor, and equipment. Materials should be taken from the site area if possible. This item excludes the cost of boulders delivered to site but includes the installation of all boulders.

Payment for this item shall be made on a unit price basis per each boulder cluster supplied and placed.

- i. Erosion Control Fabric – This item shall include all work required by the Contractor to supply and place erosion control fabric (North American Green “BioNet SC150BN” or Engineer Approved Equal) as shown in the Drawings and Specifications. This item includes cost of materials delivered to the construction area, material installation, labor, and equipment.

Payment for this item shall be made on a unit price basis per square yard supplied and placed.

15. Bifurcation Structure

This set of items includes all work necessary to construct the stream bifurcation according to the Drawings and Specifications. At a minimum, this item should include the following:

- a. Clear, Strip and Grub – This item shall include clearing, stripping, and grubbing all construction areas, removal of any trees in the required construction areas. The cost shall include spoiling waste materials in stockpiles as outlined in the Specifications. The cost shall also include stockpiling of topsoil material for later use in the project.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- b. Access Road Improvements - This item shall include all materials, equipment, and labor required to improve access roads and restore at the completion of the project to the “pre-construction condition” or as shown on the Drawings and described in the Specifications. This item also includes the cost of repairs for any damaged access during construction.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- c. Care and Diversion of Stream Water - This item shall include costs associated with diverting the streams, or any other consistently flowing water, as needed for construction and in accordance with the Specifications and Drawings. Also included in this item is any temporary pipes, walls, trenches, or other structures used in the care and diversion of the stream.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- d. Dewatering - This item shall include, but not be limited to, all work required by the Contractor to care for dewatering on the site in accordance with the Specifications. This shall include control of ground water and seepage at individual excavations as required throughout construction and the prevention of sedimentation and/or degradation of all streams and tributaries. This item shall include, but not be limited to, all costs for temporary dikes, culverts, pumping systems, electricity or fuel, casings, sumps, wells, and all other such items, and shall include all permitting, management, and supervision required by the Specifications or government regulations.

Payment for this item shall be made on a lump sum basis with progress payments made based on percentage of total work completed.

- e. Excavation – This item of work shall include all work necessary to excavate the river banks, river bed, and surrounding area to the lines and grades shown on the Drawings. The cost shall also include all work necessary to spoil excavated materials in the areas indicated on the Drawings.

Payment for this item shall be made on a unit price basis per cubic yard of material excavated. Excavated volume shall be the in-place volume computed from the average end area method, or other appropriate survey and volume calculation methods, taken from field survey cross section measurements conducted before and after excavation

- f. Borrow and Fill – This item of work shall include all work necessary to borrow, fill the surrounding areas to the lines and grades shown on the Drawings. The cost shall also include all work necessary to excavate and transport borrow materials from an onsite location. The cost shall also include all work necessary to compact and condition the materials for placement in the foundation and embankment as indicated on the Drawings and stated in the Construction Specifications. This item shall not include the placement of the clay core.

Payment for this item shall be made on a unit price basis per cubic yard of fill. Fill volume shall be the in-place volume computed from the average end area method, or other appropriate survey and volume calculation methods, taken from field survey cross section measurements conducted before and after fill.

- g. Bifurcation Structure – The Contractor shall provide all materials, concrete, reinforcing steel, formwork, handrails, gates, trash racks, embedments, bolts, labor, and other items required to construct the bifurcation structure, and gate operator support as shown on the Drawings. This item shall also include all excavation, grading, and backfill required to construct the structure as shown on the Drawings.

Payment shall be made on a lump sum basis with progress payments made based on the percentage of total work completed.

- h. Non-woven Geotextile – This item of work shall include all work necessary to provide and place 6 oz./sy. geotextile beneath the riprap as shown on the Drawings. This item includes the cost of the material and delivery to the construction area.

Payment for this item shall be made on a unit price basis per square yard of non-woven geotextile supplied and placed.

- i. Type M Riprap Delivered – This item of work shall include all work necessary to supply Type M Riprap to the bifurcation location. The riprap shall be in accordance to the Drawings and Specifications.

Payment for this item shall be made on a unit price basis per ton of riprap delivered to the bifurcation location.

- j. Riprap Placed – This item of work shall include all work necessary to place both the recycled riprap from other breach locations and the Type M Riprap in the thickness and, locations for the bifurcation structure, and associated riffle/pool sequence as shown in the Drawings.

Payment shall be made on a lump sum basis with progress payments made based on the percentage of total work completed.

16. Bank Stabilization

This set of items includes all work necessary to construct Bank Stabilization items according to the Drawings and Specifications. At a minimum, this item should include the following:

- a. Type VL Riprap Delivered – This item of work shall include all work necessary to supply Type VL Riprap for stream restoration to the locations shown on the Drawings. The riprap shall be in accordance to the Drawings and Specifications.

Payment for this item shall be made on a unit price basis per ton of riprap delivered to the Stream Restoration locations.

- b. Type A Bank Stabilization – This item of work shall include all work necessary to supply and install Type A Bank Stabilization for stream restoration to the locations shown on the Drawings. The materials and installation shall be in accordance to the Drawings and Specifications. This item excludes the cost of Type VL Riprap delivered.

Payment for item shall be made on a unit price basis per linear foot of bank stabilization supplied and installed including soil for soil filled riprap.

- c. Type B Bank Stabilization – This item of work shall include all work necessary to supply and install Type B Bank Stabilization for stream restoration to the locations shown on the Drawings. The materials and installation shall be in accordance to the Drawings and Specifications. This item excludes the cost of Type VL Riprap delivered.

Payment for item shall be made on a unit price basis per linear foot of bank stabilization supplied and installed including soil for soil filled riprap.

- d. Type C Bank Stabilization – This item of work shall include all work necessary to supply and install Type C Bank Stabilization for stream restoration to the locations shown on the Drawings. The materials and installation shall be in accordance to the Drawings and Specifications.

Payment for item shall be made on a unit price basis per linear foot of bank stabilization supplied and installed.

- e. Type D Bank Stabilization – This item of work shall include all work necessary to supply and install Type D Bank Stabilization for stream restoration to the locations shown on the Drawings. The materials and installation shall be in accordance to the Drawings and Specifications. This item includes supplying and installing all rootwads needed for construction.

Payment for item shall be made on a unit price basis per linear foot of bank stabilization supplied and installed.

17. Vegetation

This set of items includes all work necessary to install vegetation items according to the Drawings and Specifications. These items shall also include the costs of maintenance and replacement for the time period of one-year including watering. At a minimum, this item should include the following:

- a. Willow Cuttings – This item of work shall include all work, labor, and equipment necessary to harvest and transplant Willow Cuttings 4' long x ¾" min. diameter to the locations in Zones 2C and 2D as shown on the Drawings. The materials and installation shall be in accordance to the Drawings and Specifications.

Payment for this item shall be made on a unit price basis per each cutting harvested and transplanted.

- b. Deciduous Trees & Shrubs 14" Tall 1-GAL – This item of work shall include all work, labor and equipment necessary to transport and install Boulder County Supplied Deciduous Trees & Shrubs 14" Tall 1-GAL to the locations in Zones 2A, 2B, 2C, and 3 as shown on the Drawings. The materials and installation shall be in accordance to the Drawings and Specifications.

The materials and installation shall be in accordance to the Drawings and Specifications. Payment for this item shall be made on a unit price basis per each tree/shrub Installed.

- c. Deciduous Trees & Shrubs 40 CI – This item of work shall include all work, labor and equipment necessary to transport and install Boulder County Supplied Deciduous Trees & Shrubs 40 CI to the locations in Zones 2A, 2B, 2C, and 3 as shown on the Drawings. The materials and installation shall be in accordance to the Drawings and Specifications.

Payment for this item shall be made on a unit price basis per each tree/shrub installed.

- d. Willow Transplant (Clump) – This item of work shall include all work, labor and equipment necessary to harvest and transplant Willow Transplant (Clump) to the locations in Zone 2 as shown on the Drawings. The materials and installation shall be in accordance to the Drawings and Specifications.

Payment for this item shall be made on a unit price basis per each tree/shrub harvested and transplanted.

- e. Herbaceous Plants (10 CI) – This item of work shall include all work, labor and equipment necessary to transport and install Boulder County Supplied Herbaceous Plants 10 CI to the locations in Zone 1 as shown on the Drawings. The materials and installation shall be in accordance to the Drawings and Specifications.

Payment for this item shall be made on a unit price basis per each Herbaceous Plants installed.

- f. Lower Riparian Seeding – This item of work shall include all work, labor, equipment and materials necessary to supply and install a Boulder County approved Lower Riparian Native Seeding Mix to the Zone 1 and Zone 2 locations shown on the Drawings. The materials and installation shall be in accordance to the Drawings and Specifications.

Payment for this item shall be made on a unit price basis per acre of lower riparian native seed supplied and installed.

- g. Upper Riparian Seeding – This item of work shall include all work, labor, equipment and materials necessary to supply and install a Boulder County approved Upper Riparian Native Seeding Mix to the Zone 3 and other areas identified as “Seeding Only” locations shown on the Drawings. The materials and installation shall be in accordance to the Drawings and Specifications.

Payment for this item shall be made on a unit price basis per acre of upper riparian native seeding supplied and installed.

- h. Wood Straw – This item of work shall include all work, labor, equipment and materials necessary to supply and install a Boulder County approved “Weed Free” Wood Straw Mix to the Zone 3 and “Seeding Only” locations shown on the Drawings. The materials and installation shall be in accordance to the Drawings and Specifications.

Payment for this item shall be made on a unit price basis per acre wood straw is applied.

- i. Beaver and Vole Protection – This item of work shall include all work, labor, equipment and materials necessary to supply and install a Beaver Protection Fence and Vole Protection Fence for the trees and shrubs planted as part of this project. The materials and installation shall be in accordance to the Drawings and Specifications.

Payment shall be made on a lump sum basis with progress payments made based on the percentage of total work completed.

18. Topsoil

This set of items includes all work necessary to install topsoil items according to the Drawings and Specifications. At a minimum, this item should include the following:

- a. Imported Topsoil – This item of work shall include all work, labor, equipment and materials necessary to supply a Boulder County approved topsoil to the locations shown on the Drawings. This material will supplement any topsoil that has been stockpiled during Clearing and Grubbing or as directed by the Engineer. The materials shall be in accordance to the Drawings and Specifications.

Payment for this item shall be made on a unit price basis per cubic yard topsoil supplied and placed.

- b. Class 1 Compost – This item of work shall include all work, labor, equipment and materials necessary to supply a Boulder County approved A-1 Organics Biocomp (or equivalent), Class 1 Compost at 130 CY/AC to the Zone 3 areas locations shown on the Drawings. The materials shall be in accordance to the Drawings and Specifications.

Payment for this item shall be made on a unit price basis per acre material supplied and placed.

- c. Granular Endo Mychorrhzal Inoculum – This item of work shall include all work, labor, equipment and materials necessary to supply a Boulder County approved Granular Endo Mychorrhzal Inoculum at 20#/AC to the Zone 3 areas locations shown on the Drawings.

The materials shall be in accordance to the Drawings and Specifications. Payment for this item shall be made on a unit price basis per acre material supplied and placed.

- d. Granular Humate – This item of work shall include all work, labor, equipment and materials necessary to supply a Boulder County approved Granular Humate at 250#/AC to the Zone 3 areas locations shown on the Drawings. The materials shall be in accordance to the Drawings and Specifications.

Payment for this item shall be made on a unit price basis per acre material supplied and placed.

- e. Biosol 7-2-1 Organic Fertilizer – This item of work shall include all work, labor, equipment and materials necessary to supply a Boulder County approved Biosol 7-2-1 Organic Fertilizer at 800#/AC to the Zone 3 only areas locations shown on the Drawings.

The materials shall be in accordance to the Drawings and Specifications. Payment for this item shall be made on a unit price basis per acre material supplied and placed.

- f. Biochar - This item of work shall include all work, labor, equipment and materials necessary to supply a Boulder County approved Biochar at 4 CY/AC to the Biochar Test Plot area shown on the Drawings.

The materials shall be in accordance to the Drawings and Specifications. Payment for this item shall be made on a unit price basis per acre material supplied and placed.

- g. Application and Tillage – This item of work shall include all work, labor, equipment and materials necessary to transport, spread, apply and till at 6" - 12" depth multiple passes the topsoil and amendments to the Zone 3 locations shown on the Drawings. The materials and installation shall be in accordance to the Drawings and Specifications.

Payment for this item shall be made on a unit price basis per acre tilled.

SECTION 211 – DEWATERING

Section 211 is hereby added to the Standard Specifications for this project as follows:

DESCRIPTION

This work consists of dewatering temporary excavations in accordance with Colorado Department of Health and Environment dewatering regulations to facilitate construction activities.

MATERIALS

The Contractor shall provide all required materials and equipment to facilitate dewatering. On-site materials meeting specifications may be used within the limits of construction to construct temporary dams and berms. Other materials such as plastic sheeting and sandbags may also be used if desired by the Contractor.

CONSTRUCTION REQUIREMENTS

The Contractor shall dewater, by pumping or by excavating trenches leading to a positive gravity outlet.

General: For all work, the Contractor shall provide suitable equipment and labor to remove water, and he shall keep the excavations dewatered so that construction can be carried on under dewatered conditions where required by the Drawings and Specifications. Water control shall be accomplished such that no damage is done to adjacent banks or structures. The Contractor is responsible for investigating and familiarizing himself with all site conditions that may affect the work including surface water, level of groundwater and the time of year the work is to be done. All excavations made as part of dewatering operations shall be backfilled with the same type material as was removed and compacted to 95 percent of maximum density (ASTM D698) or to 75 percent relative density (ASTM D2049), except where replacement by other materials and/or methods are required.

Surface Water Control: Surface water control generally falls into the following categories:

- 1) Normal low flows along St Vrain Creek;
- 2) Storm/flood flows along St Vrain Creek;
- 3) Flows from existing storm drain pipelines; and
- 4) Local surface inflows.

The Contractor shall coordinate, evaluate, design, construct, and maintain temporary water control conveyance systems. These systems will not worsen flooding, alter major flow paths, or worsen flow characteristics during construction. The Contractor is responsible to ensure that any such worsening of flooding does not occur. The following is approximate storm flow data for St Vrain Creek is for information only. This information was obtained from St. Vrain Creek 30% Design Report (Engineering Analytics, 2016).

<i>Design Point</i>	Design Storm Hydrology (Years)		
	10	25	100
St Vrain Creek through Project Area	2,212 ft ³ /sec	4,912 ft ³ /sec	12,268 ft ³ /sec

The 100-year flood flow of 12,268 cfs has a one percent probability of being equaled or exceeded in any given year.

The Contractor will be responsible for diverting surface flow around the construction area so that the excavation for boulders and riprap remain free of surface water for the time it takes to install these materials, and the time required for curing of the concrete in the channel structures.

The contractor shall have the option of completing instream channel work while working in the live stream. Appropriate erosion control measures shall be employed when working in the live stream.

The Contractor shall, at all times, maintain a flow channel or route for St Vrain Creek. Temporary structures such as berms, sandbags, pipeline diversions, etc., shall be permitted for the control of creek flow, as long as such measures are not a major obstruction to flood flows, do not worsen flooding, or alter historic flow routes. Existing trees and vegetation should be preserved as possible.

Groundwater Control: The Contractor shall install adequate measures to maintain the level of groundwater below the foundation subgrade elevation and maintain sufficient bearing capacity for structures, pipelines, earthwork, and rock work. 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. The foundation bearing surfaces are to be kept dewatered and stable until the structures or other types of work are complete and backfilled. Disturbance of foundation subgrade by Contractor operations shall not be considered as originally unsuitable foundation subgrade and shall be repaired at Contractor's expense.

Special Dewatering Provisions for Instream Structures: The Contractor shall isolate the work area from surface waters, and then drawdown the groundwater level to an elevation below subgrade in a manner which will prevent "quick" conditions. The dewatering operation will be continuous, 24 hours per day, until the affected portion of the stream work is complete and the groundwater level can be allowed to rise without endangering the stability of existing or new features.

The Contractor should anticipate that even with the groundwater level lowered below subgrade where subgrade features are to be placed, conditions will be moist and possibly soft and easily disturbed by his activities. The Contractor is responsible to control such conditions and prevent loosening of the subgrade material and refrain from activities which would make the materials more permeable and/or inadequate to support the structure.

The Contractor may use special drain zones in his design for dewatering trenches or well points, as long as the system does not harm the permanent weep drain system or toe drain filter system's effectiveness. Any temporary dewatering trenches or well points will be restored following dewatering operations to reduce permeability in those areas as approved by the Engineer. Dewatering trenches are not acceptable on slopes where they may compromise the integrity of the sloped subgrade material.

SECTION 240 - PROTECTION OF MIGRATORY BIRDS

BIOLOGICAL WORK PERFORMED BY THE CONTRACTOR'S BIOLOGIST

Section 240 is hereby added to the Standard Specifications for this project as follows:

DESCRIPTION

240.01 This work consists of protecting migratory birds during construction.

MATERIALS AND CONSTRUCTION REQUIREMENTS

240.02 The Contractor shall schedule clearing and grubbing operations, earth work, soil disturbance and work on structures (hereinafter "Construction Activities") to avoid taking (pursue, hunt, take, capture or kill; attempt to take, capture, kill or possess) and minimize disturbance to migratory birds protected by the Migratory Bird Treaty Act (MBTA). The Contractor shall retain a qualified wildlife biologist for this project. The wildlife biologist shall have a minimum of three years' experience conducting migratory bird surveys and implementing the requirements of the MBTA. The Contractor shall submit documentation of the biologist's education and experience to the Engineer and BCPOS biologist for acceptance. A biologist with less experience may be used by the Contractor subject to the approval of the Engineer and BCPOS biologist based on review of the biologist's qualifications.

(a) To protect migratory birds, the Contractor will take the following actions prior to commencement of construction activities:

1. *Nest Surveys.* The Contractor shall notify the Engineer at least ten working days prior to the start of construction activities. During the active nesting season, a survey for active nests shall be conducted by a qualified wildlife biologist within the seven days immediately prior to the commencement of construction and prior to each construction phase of the project.
 - i. Primary nesting season for migratory birds is from April 1st through July 31st.
 - ii. Primary nesting season for nesting raptors is from February 1st through August 31st.
 - iii. Primary nesting season for Bald and Golden eagles is from October 15th through July 31st and December 15th through July 15th, respectively.

The wildlife biologist shall survey the area-of-disturbance and a 50-foot buffer around the area-of-disturbance for each area and/or phase of the project for active bird nests in all bird nesting habitat types (standing vegetation, herbaceous ground cover, bare ground, cavities, exposed earthen banks, cliffs and rock ledges, and structures). The wildlife biologist shall record the location of each active nest, bird species, the method used to protect the nest, and the date of installation of the protection measure(s). A copy of these records shall be submitted to the Engineer and BCPOS biologist. If the status of a nest (active/inactive) cannot be readily determined, the biologist shall monitor the nest up to three separate occasions, with at least three and no more than seven days between monitoring events. After three negative surveys, a nest shall be deemed inactive.

The wildlife biologist shall conduct raptor nest surveys within 0.5 mile of the area-of-disturbance within the seven days immediately prior to the commencement of construction activities and prior to each construction phase. This survey can be done with binoculars. If construction activities are located within the Colorado Parks and Wildlife (CPW) recommended buffer zone for specific raptors, "NO WORK" zones shall be established around active nest sites during construction according to the CPW standards or as recommended by the wildlife biologist in consultation with CPW. The "NO WORK" zone shall be marked with either fencing or signing. Work shall not proceed within a

“NO WORK” zone until the wildlife biologist has determined that the young have fledged or the nest is unoccupied. Coordination with CPW on appropriate measures for protection for raptor nest sites is required.

2. *Vegetation Removal and Trimming (including trees, shrubs, and other vegetation).* When possible, vegetation shall be cleared prior to the time when active nests are present. Vegetation removal activities shall be timed to avoid the migratory bird breeding season, when possible.
3. *Grasses and Other Vegetation Management.* The undisturbed ground cover to 50 feet beyond the area-of-disturbance, or to Project Area, whichever is less, shall be maintained at a height of 6 inches or less beginning April 1 and continuing until August 31 or until the end of ground disturbance work, whichever comes first.
4. *Work on structures.* The Contractor shall prosecute work on structures in a manner that does not result in a taking of migratory birds protected by the Migratory Bird Treaty Act (MBTA). The Contractor shall not prosecute the work on structures during the primary breeding season, April 1 through August 31, unless the following actions are taken:
 - i. The Contractor shall remove existing nests prior to April 1. If the Contract is not awarded prior to April 1 and the Owner has removed existing nests, then the monitoring of nest building shall become the Contractor’s responsibility upon Notice to Proceed.
 - ii. During the time that the birds are trying to build or occupy their nests, between April 1 and August 31, the Contractor shall monitor the structures at least once every three days for any nesting activity.
 - iii. If the birds have started to build any nests, they shall be removed before the nest is completed. Water shall not be used to remove the nests if nests are located within 50 feet of any surface waters.
 - iv. Installation of netting may be used to prevent nest building. The netting shall be monitored and repaired or replaced as needed. Netting shall consist of a mesh with openings that are $\frac{3}{4}$ inch by $\frac{3}{4}$ inch or less.

If an active nest become established, (i.e., there are eggs or young in the nest), all work that could result in abandonment or destruction of the nest shall be avoided until the young have fledged or the nest is unoccupied as determined by the wildlife biologist and approved by the Engineer. The Contractor shall prevent construction activity from displacing birds after they have laid their eggs and before the young have fledged.

If the project continues into the following spring, this cycle shall be repeated. When work on the structure is complete, the Contractor shall remove and properly dispose of netting used on the structure.

- (b) *If Active Nests are Discovered:* If active nests containing eggs or young birds are found within the survey area, an appropriate buffer of 50 feet will be established around the nest by the wildlife biologist. This buffer dimension may be changed if determined appropriate by the wildlife biologist and approved by the Engineer and BCPOS biologist. The Contractor shall install fence (plastic) at the perimeter of the buffer. The Contractor shall avoid all active migratory bird nests. The Contractor shall avoid the area within 50 feet of the active nests or the area within the distance recommended by the biologist until all nests within that area have become inactive. Work shall not proceed within the buffer until the young have fledged or the nests have become inactive.

If the fence is knocked down or destroyed by the Contractor, the Engineer will suspend the work, wholly or in part, until the fence is satisfactorily repaired at the Contractor's expense. Time lost due to such suspension will not be considered a basis for adjustment of time charges, but will be charged as contract time.

Inactive nest removal and other necessary measures shall be incorporated into the work as follows:

- (c) *If inactive nests are discovered:*

1. Inactive nests outside the limits of ground disturbance and vegetation removal shall be left in place.
2. Inactive nests shall not be monitored.

- (c) *Taking of a Migratory Bird.* The taking of a migratory bird shall be reported to the Engineer and BCPOS biologist. The Contractor shall be responsible for all penalties levied by the U. S. Fish and Wildlife Service (USFWS) for the taking of a migratory bird.

SECTION 519 - ROCK STRUCTURES

GENERAL

This work includes construction of in-channel and floodplain rock structures within the St. Vrain Creek in accordance with these specifications and in conformity with the lines and grades shown on the plans. Each feature contains a variable number of boulders and rocks from on-site sources, and can be supplemented by imported rock from an off-site source to be identified by the Contractor. Work includes the selection and placement of approved boulders and rocks into distinct features as shown on the plans, and bid items for classes of rock, including:

- a. Riffle structures
- b. Type A Bank Stabilization
- c. Type B Bank Stabilization
- d. Type C Bank Stabilization
- e. Boulder Clusters
- f. Native Streambed Mix

Delineations of what constitutes a single “feature” is depicted on the plans. Construction will be limited to areas as shown on the plans or as approved by the Engineer.

MATERIALS

Stone shall be hard, durable, resistant to weathering and to water action, free from overburden, spoil, shale, structural defects, and organic material, and shall meet the size class specified. Neither breadth nor thickness of a single stone shall be less than one-third its length.

Boulders for use in-channel features shall be rounded to subrounded, and diameters as specified in the plan set (measured on the secondary axis, or B-axis). Rocks that make up subgrade materials or other less prominent portions of each feature may be angular. Specific details of the boulder and rock materials required for each feature are depicted in the typical details in the plans.

Boulders and rocks for use in the channel features shall be salvaged during construction activities per requirements in Section 203 and as approved by the Engineer and/or Owner’s representative. The Contractor may not remove boulders from existing bank stabilization measures unless approved by the Engineer in the field.

If additional rock and/or boulders are required for completion of the Work as shown on the plans, the Contractor will notify the Engineer immediately. Upon approval by the Engineer, the Contractor shall purchase and haul additional rock and/or boulders to the site. Material shall be supplied within a reasonable time frame to complete the Work per the Project Schedule. Rock color shall be similar to natural material found in the project area.

Table 511-1: Rock Mix Gradation Summary (inches)

Rock Mix Type	Dmin	D50	Dmax	Potential Sources of Material
Native streambed mix	Sand	1 to 4	18	Salvage: Stockpile from limits of in stream and other excavation.
Boulders mix	12	NA	48	Salvage and Import: Remove and stockpile boulders as they are uncovered during excavation. Import remaining quantities.
Bifurcation Riffle	Sand	9	24	Salvage: Stockpile from limits of in stream and other excavation.
Riffle Head	Sand	6	12	Salvage: Stockpile from limits of in stream and other excavation.
Point Bar Edge	Sand	4	12	Salvage: Stockpile from limits of in stream and other excavation.
Type C Stabilization	Sand	6	18	Salvage: Stockpile from limits of in stream and other excavation.

Angular rock material may be used to construct riffle beginnings, bank stabilization and the bifurcation riffle.

CONSTRUCTION REQUIREMENTS

Arrangement of boulders and rock within each feature and spacing between channel features will be as shown on the plans. The Contractor may be required to reposition or adjust the installation as directed in the field by the Engineer or their designated representative.

Rock shall be placed to minimize voids and form as smooth a surface as practical. This may require placing rock in multiple lifts, and backfilling voids with native streambed material, unless otherwise specified on the plans. Boulders may be machine-placed and then arranged as necessary by use of an excavator with a multi-prong grappling device or by hand to interlock and form a substantial bond.

During ground preparation for each rock structure, the Contractor shall remove and replace unsatisfactory material with satisfactory materials in areas to receive fill, as directed by the Engineer. Fill voids of substrate material to provide uniform surface for proposed fills.

The Contractor is responsible for protection and maintenance of the rock structures including all individual elements during construction and until final acceptance of the work. Disturbance of adjacent, previously-constructed work shall be repaired by the Contractor at the Contractor's expense.

Any dewatering required during construction shall follow the approved construction dewatering permit requirements and/or water control plan.

4.0 REVISIONS TO CDOT SPECS

REVISION OF SECTION 101 - DEFINITION OF TERMS

Technical Specifications related to construction materials and methods for the Work embraced under this Contract shall consist of the "Colorado Department of Transportation's Standard Specifications for Road and Bridge Construction", dated 2011.

All reference to the Colorado Division of Highways, Colorado Department of Transportation, and / or Department or Division shall also mean Boulder County Parks & Open Space

Certain terms utilized in the Specifications referred to in the paragraph above shall be interpreted to have different meanings within the scope of this Contract. A summary of redefinitions follows:

- Subsection 101.01: Abbreviations.
"NRCS" Natural Resources Conservation Service
"CWCB" Colorado Water Conservation Board
"BCPOS" Boulder County Parks and Open Space
"EWP" Emergency Watershed Protection
"CDBG-DR" Community Development Block Grant – Disaster Relief
"SVC" St Vrain Creek
"Reach 3" St Vrain Creek Reach 3 Restoration
- Subsection 101.28: "Department" shall mean the Boulder County Parks and Open Space.
- Subsection 101.29: "Chief Engineer" shall mean the Engineer, Boulder County Parks and Open Space or their designated representative.
- Subsection 101.51: "Project Engineer" or "Project Manager" shall mean the Engineer, Boulder County Parks and Open Space or their designated representative.
"Owner" shall be Boulder County Parks and Open Space
"Owners Representative" shall be Boulder County Parks and Open Space
"Boulder County Parks and Open Space", "Boulder County", "Owner", and "Sponsor" are all interchangeable.
- Subsection 101.76: "State" shall mean Boulder County Parks and Open Space (where applicable).

"DBH" refers to Diameter at Breast Height which is considered to be 4.5 feet above ground for this project

Below is a table outlining the specific personnel recommended for this project:

Sponsor's Representative:	Jesse Rounds (Boulder County), and/or representative
Technical Representative:	Obadiah Broughton (Boulder County), and/or representative
Project Engineer	XXXXXXXXX XXXXXXXXX (Boulder County), and/or representative
Vegetation Specialist:	Claire DeLeo (Boulder County), and/or representative
Stream Restoration Specialists:	Claire DeLeo (Boulder County), Project Engineer (Boulder County), and/or representative
Design Team:	Clint Brown (Design Engineer, Engineering Analytics), Troy Thompson (Design Engineer, Ecological Resource Consultants, Inc.), Grant Gurnée (Senior Restoration Ecologist, Ecosystem Services, LLC), Jon Dauzvardis (Senior Restoration Ecologist, Ecosystem Services, LLC) and/or representatives

REVISION OF SECTION 105 - CONTROL OF WORK

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

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 northern Colorado Front Range and Boulder and/or Larimer Owner.
- Trees and shrubs shall be maintained and replaced up to an 80% minimum survival rate.
- Willow clumps, cuttings, or tublings 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 one (1) mature, viable native plant per square foot.
- Seeded areas shall be considered successful when no bare areas in excess of five (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	Disposal Site Permission	Written Letter from Property Owners	No
108	Trees to be salvaged	List	No
514	Rock Screening Plan	Working Drawing/Methods	No
214	Planting Plan	Shop Drawing	No
514	Pedestrian and Bikeway Railing	Working Drawing	No
518	Expansion Devices: 0-6", 9", 12"...	Shop Drawing	Yes
602	Reinforcing Steel	Working Drawing	No
614	Traffic Control Plan	Working Drawing	No
618	Prestressed Concrete (Pre-tensioned)	Shop Drawing	Yes*
618	Prestressed Concrete (Post-tensioned)	Shop Drawing	Yes*
618	Steel Diaphragms between Prestressed Girders	Working Drawing	No
628	Pre-fabricated Pedestrian Bridges	Shop Drawing	Yes

*A PE seal is required where the Contractor has provided the design for the item, or performed engineering to modify the details shown on the plans. The PE seal is not required where complete details are provided on the plans.

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:

- (a) Special Provisions
 - 1. Project Special Provisions
 - 2. Standard Special Provisions

- 3. Boulder County Special Provisions
 - 4. Boulder County Permit Provisions
- (b) Plans
- 1. Detailed Plans
- (d) Supplemental Specifications
(e) Standard Specifications

A hard copy of the Boulder County Special Provisions may also be obtained from the Boulder County Parks and Open Space.

Section 105 of the Standard Specifications is hereby revised for this project to include:

REVISION OF SECTION 106 - CONTROL OF MATERIAL

Section 106.08 shall include the following:

Site Access and Storage

1.1 GENERAL

- A. The Contractor shall take all necessary precautions for the protection of the Work and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. The Contractor shall station such guards or flaggers and shall conform to such special safety regulations relating to traffic control as may be required by the public authorities within their respective jurisdictions. All signs, signals, and barricades shall conform to the requirements of the "Manual on Uniform Traffic Control Devices" 2009 Edition including the latest revisions.

1.2 HIGHWAY LIMITATIONS

- A. The Contractor shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to and from the site of the Work. It shall be the Contractor's responsibility to construct and maintain any access or haul roads required for its construction operations.
- B. All hauling by motor vehicles shall be confined to truck routes, except where otherwise authorized in writing by the County.

1.3 CONTRACTOR'S WORK AND STORAGE AREA

- A. The Contractor shall make its own arrangements for any necessary off-site storage or shop areas necessary for the proper execution of the Work. The Contractor shall submit a site plan, drawn to scale, of the proposed storage/trailer and/or construction site to the County for review and approval.
- B. The County will designate and arrange for the Contractor's use, a portion of the property (adjacent to the Work) for its exclusive use during the term of the contract as storage and shop area for its construction operations relative to this contract.
- C. Lands to be furnished by the County for construction operations, roads, and other purposes are as shown on the plans and/or specified herein. Should the Contractor find it necessary to use any additional land for its purposes during the construction of the Work, it shall provide for the use of such lands at its own expense. The Contractor shall obtain the County's or private property owner's written approval prior to using any additional land.

1.4 TEMPORARY STREET USE

- A. Nothing herein shall be construed to entitle the Contractor to the exclusive use of any public street, alley, way, or parking area during the performance of the Work hereunder, and it shall so

conduct its operations as not to interfere unnecessarily with the authorized work of the Boulder County, utility companies, or other agencies in such streets, roadways, or parking areas.

- B. No Street shall be closed to the public without first obtaining the permission of the Board of County Commissioners and other proper governmental authority, where applicable. Where excavation is being performed in primary streets or highways, one lane of traffic shall be kept open in each direction at all times unless otherwise noted in the plans under the terms of the permits issued by the County, State, or other public agencies, as required.
- C. Fire hydrants on or adjacent to the Work shall be kept accessible to firefighting equipment at all times.
- D. Temporary provisions shall be made by the Contractor to assure the use of sidewalks and the proper functioning of all gutters, sewer inlets, and other drainage facilities.
- E. Wherever necessary or required for the convenience of the public or individual residents or business places at street or highway crossings, private driveways, or elsewhere, the Contractor shall provide suitable temporary bridges or steel plates over unfilled excavations, except in such cases as the Contractor shall secure the written consent of the individuals or authorities concerned to omit such temporary bridges or steel plates, which written consent shall be delivered to the County prior to beginning the excavation. All such bridges or steel plates shall be maintained in service until access is provided across the backfilled excavation.
- F. Temporary bridges or steel plates for street and highway crossings shall conform to the requirements of the authority having jurisdiction in each case, and the Contractor shall adopt designs furnished by said authority for such bridges or steel plates, or shall submit designs to said authority for approval, as may be required.

Replace Tables 106-2 and 106-3 with Table 106-2

Table 106-2 – Testing Schedule – Item 412 Portland Cement Criteria

Element	Minimum Testing Frequency Contractor's Quality Control
Aggregate Gradation and Sand Equivalent	For the first five days, minimum of 1/day, then 1/10,000 sq. yds. After 5 days, 1/40,000 sq. yds.
Slump	First three loads each day, then as needed for control.
Water Cement Ratio	First three loads each day, then as needed for control.
Air Content and Yield	First three loads each day, then as needed for control.
Compressive Strength	1/100 cu. yds.

REVISION OF SECTION 107 - LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

Section 107 of the Standard Specifications is hereby revised for this project as follows:

107.02 PERMITS, LICENSES, AND TAXES

Subsection 107.02 shall include the following:

Unless otherwise specified, the Contractor shall procure or ensure that all required permits and licenses are acquired; pay all charges, fees, and taxes, including permits procured for this project by others; and give all notices necessary and incidental to the due and lawful prosecution of the work. The costs of these permits will not be paid for separately, but shall be included in the work.

Prior to beginning work, the Contractor shall furnish the Engineer with a written list of all permits required for the proper completion of the contract. The list shall clearly identify the types of permits that must be obtained before work on any particular phase or phases of work can be started. Copies of the fully executed permits shall be furnished to the Engineer upon request. Below is a list of some applicable permits for this project. This list is not all inclusive and should be compared to list developed by contractor.

BCPOS and the Engineer will support the contractor in applying for permits required as part of this project. Permits are in various stages of process and contractor should be able to obtain permits not acquired prior to the start of the project by BCPOS or the Engineer. Permits that are may be required are:

1. Boulder County Land Use Department Limited Impact Special Use Permit
2. Boulder County Stream Restoration Permit (A Combined Boulder County Grading Permit and Boulder County Floodplain Development Permit).
3. Boulder County Department of Transportation Right of Way Permit
4. US Army Corps Clean Water Act Section 404 Nationwide Permit 37
5. Stormwater Discharge Permit Colorado Department of Public Health and Environment
6. Construction Dewatering Wastewater Discharge Permit CDPHE
7. State Department of Revenue Tax Exempt Permit
8. Boulder County Oversize/Overweight permit (if applicable)
9. Colorado Department of Transportation special use and/or access permit (if applicable)

Contractor shall verify all appropriate permits have been acquired and transferred to their name, as applicable, prior to starting any work. Contractor must meet requirements of all permits acquired for this project.

Contractor shall obtain relevant permits required for construction, including but not limited to the following:

1. Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division Storm Water General Permit for Construction Activities.
2. CDPHE Construction Dewatering Wastewater Discharge Permit

3. Oversize/Overweight permits (if applicable).

The BCPOS will obtain the following permits or clearances:

1. US Army Corps Clean Water Act Section 404 Nationwide Permit 37
2. Boulder County Land Use Department Limited Impact Special Use Permit
3. Boulder County Stream Restoration Permit; including Floodplain Development Permit and Grading permit (subject to Contractor permit commitments and collaboration)
4. Section 7 – Endangered Species Act: US Fish and Wildlife Service (USFWS)
5. Section 106 – National Historic Preservation Act
6. Colorado Parks and Wildlife - SB40 Review

The Contractor and BCPOS shall collaborate to obtain the Boulder County Stream Restoration Permit, which upon approval results in the issuance of a Boulder County Floodplain Development Permit and Boulder County Grading Permit. A preliminary Boulder County Floodplain Development Permit has already been applied for by the County Project Team. Contractor shall address remaining requirements of the Boulder County Stream Restoration Permit and Boulder County Limited Impact Special Use Permit including grading permit, erosion control, traffic control plan, transportation management plan, haul routes, stream access routes, Boulder County Oversize/Overweight permit (if applicable), and all other necessary information required by Boulder County to obtain permit approvals.

Some clearances have been developed by the engineers and BCPOS, but will need to be verified by contractor prior to starting any work. Some clearances require review of the work area prior to start of work by a qualified individual. Please review requirements in this document for specifics. Contractor must meet requirements of all clearances acquired for this project.

107.12 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE

Subsection 107.12 shall include the following:

The Contractor shall protect in place existing riparian, wetlands, and other vegetation, except for those what must be removed to accommodate construction of the project. The Contractor shall fence specific areas of vegetation to be protected in the field as shown in the plans or as directed by the Engineer. All trees designated to be protected on the design plans and within the specifications will receive plastic fencing on all sides facing either direct construction or access routes.

The Contractor shall perform all the work in such a manner that the least environmental damage will result. Any questionable areas or items shall be brought to the attention of the Engineer for approval prior to vegetation removal or any damaging activity. Damaged or destroyed fenced trees, shrubs, or wetlands, which could have been avoided as determined by the Engineer, shall be replaced in kind at the expense of the Contractor.

If the protective vegetation fence is knocked down or destroyed by the Contractor, the Engineer will suspend the work, wholly or in part, until the fence is repaired to the Engineer's satisfaction. Replacement of the protective fence shall be at the Contractor's expense. Time lost due to such suspension will not be considered a basis for adjustment of time charges, but will be charged as contract time.

Before beginning construction, the contractor shall determine the location of all the existing approved OWTS components in the project area. The documents are scanned into septicmart.org. If there are unapproved OWTS, there may not be any information online. In this case, the owner should help with the general location of the system.

Heavy equipment shall be restricted from the surface of the absorption fields of nearby residences. Detailed information about the location of OWTS components can be found at www.bouldercounty.org/env/water/pages/septicmartcheckrecords.aspx.

107.15 RESPONSIBILITY FOR DAMAGE CLAIMS

Subsection 107.15 shall include the following:

All Insurance Policies and Certificates of Insurance issued for this project shall name as additional insured(s), Boulder County Parks and Open Space, whether private or governmental, the Boulder County Parks and Open Space officers and employees, and the Engineer and its agents and employees, and any other person(s), company(ies), or entity(ies) deemed necessary by the Boulder County Parks and Open Space.

Subsection 107.24 shall include the following:

The emission of dust into the atmosphere shall be minimized during handling and storage of construction materials, and the Contractor shall use such methods and equipment as are necessary to minimize or prevent dust during these operations.

Equipment and vehicles that are found to have emissions of exhaust gases or particulates that exceed applicable limits established by Federal, State or local laws or authorities, shall not be operated until corrective repairs or adjustments are made. If required by the County, the Contractor shall provide acceptable evidence that equipment and vehicles have been tested for exhaust emissions and have been found to be in compliance with applicable limits.

The Contractor shall carry out proper and efficient measures wherever and as often as necessary to reduce the dust nuisance, and to prevent dust from damaging crops, orchards, cultivated field, and dwellings, or causing a nuisance to persons. The Contractor shall be held liable for any damage resulting from dust originating from his operations under these specifications on County property or elsewhere.

107.25 WATER QUALITY CONTROL

Subsection 107.25 (b) *Construction Requirements* is hereby revised to include the following:

25. This project is subject to permits with the Colorado Department of Health for Stormwater Discharges and Dewatering Discharges Associated with Construction Activities. The permits shall be obtained by the Contractor. The Contractor shall prepare all applications required and submit to the Colorado Department of Health. The Contractor shall submit a copy of certification of the permit to the Engineer prior to the start of construction. The Contractor is

responsible for all application permit fees.

26. This project is subject to US Army Corps of Engineers Nationwide Permit 37 for Emergency Watershed Protection and the Pre-Construction Notifications for the St Vrain Creek Reach 3 Restoration.
27. Dewatering work for earthwork operations adjacent to or encroaching on, streams or water courses shall be conducted in a manner to prevent muddy water and eroded materials from entering the streams or water courses by construction of intercepting ditches, bypass channels, barriers, evaporation ponds, or by other approved means. Excavated materials or other construction materials shall not be stockpiled or deposited near or on streambanks, lake shorelines, or other water course perimeters where they can be washed away by high water or storm runoff or can in any way encroach upon the water course itself, except as approved by the County. Turbidity limits from the Dewatering Permit shall be followed.
28. Turbidity increases in a stream or other bodies of water that are caused by construction activities shall be limited to the increases above the natural turbidities permitted under the water quality standards prescribed for that stream or body of water. When necessary to perform required construction work in a stream channel, the prescribed turbidity limits may be exceeded, as approved by the Colorado Department of Public Health and Environment (CDPHE), and the County, for the shortest practicable period required to complete such work. This required construction work may include such work as diversion of a stream, or specified earthwork in or adjacent to a stream channel, and construction of turbidity control structures. Mechanized equipment shall not be allowed to operate in flowing water except as necessary and permitted to construct crossings or to perform the required construction.

Abatement of Noise pollution:

Work Hours:

Hours of operations shall be limited to 7:30 a.m. to 5:00 p.m. Monday through Friday.

Hauling Hours:

Hours of hauling shall be limited to 8:30 a.m. to 4:00 p.m. Monday through Friday.

Work on Saturdays and Sundays, nights, and federal holidays shall not be allowed unless approved in writing by the County.

For information on required steps to secure the Stormwater Discharge Permit and the Construction Dewatering Permit, the Contractor shall contact:

Colorado Department of Public Health and Environment
WQCD-P-B2
4300 Cherry Creek Drive South
Denver, CO 80246-1530
Attn: Permits Unit, % Nathan Moore
Phone: (303) 692-3555

REVISION OF SECTION 201 - CLEARING AND GRUBBING

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

Subsection 201.01 shall be deleted and replaced with the following:

This work consists of clearing, grubbing, removing, and disposing of vegetation within the limits of disturbance required by the work. Vegetation and objects designated to remain shall be preserved free from injury or defacement. Clearing and Grubbing includes the removal of woody material that is measured to have a Diameter at Breast Height (DBH) less than 6 inches at 4.5 feet above ground surface. This work also includes stockpiling the limited quantity of topsoil within the project limits.

Subsection 201.02 shall be deleted and replaced with the following:

Areas of protection shall be designated by the Engineer and/ or Owner prior to construction. All trees, shrubs, plants, grasses and other vegetative materials within those areas of protection shall remain, except as approved by the Engineer. Every object that is designated to remain and is damaged shall be repaired or replaced as directed, at the Contractor's expense. Once all clearing and grubbing is completed and approved, no additional clearing shall be allowed unless approved, in writing, by the Engineer.

Clearing and Grubbing shall typically extend to the toe of fill or the top of cut slopes and shall not extend beyond the limits of disturbed area for the project. The Contractor shall install temporary plastic fence or demarcation flagging, acceptable to the Engineer, along the limits of construction prior to commencing with the clearing and grubbing. Clearing and Grubbing limits, area of disturbance fencing and flagging, and woody material to be removed shall be approved by BCPOS and Engineer in the field prior to work.

Contractor shall harvest the limited quantity of topsoil within the limits of disturbance for the project and stockpile for later placement on the floodplain. Topsoil removal should be according to the following specifications:

Topsoil Removal: After the construction area and its access have been delineated, the 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.

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.** The depth of the topsoil layer may vary. Topsoil may be delineated from the subsoil by a higher organic matter content (usually, but not always, indicated by a darker color) **and** a relatively loose and friable soil structure. Typically, topsoil is between four (4) and eight (8) inches in depth.

Under no circumstances shall subsoil be mixed with topsoil, and subsoil shall not be placed 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.

Woody material removed under Clearing and Grubbing that are less than 1-inch DBH will be shredded on site for use as mulch at Engineer's direction. See Section 213.02 for specifications on Wood Shreds.

Woody material removed under Clearing and Grubbing that are between 1 and 6 inch DBH will be used in fascines, slash material for large wood structures, and other design elements as laid out in the Plans at the direction of the Engineer. Woody material of this size shall be stockpiled with branches intact to the extent possible. For trees with diameters equal to or less than 6 inches in diameter, the Contractor shall leave the stump and roots in place if they are below the proposed final grade. The portion of the stump and roots that are above the proposed final grade shall either, (a) be removed and chipped, or; (b) salvaged intact with the rest of the tree for incorporation into large wood structures as slash debris. Woody material that cannot be re-used in project elements will be chipped and spread across the floodplain as approved by BCPOS or Engineer. Crack willows shall be hauled off site. Siberian elms are to be removed, but can be reused on site. Locusts shall not be used. Owner or engineer can provide support as needed.

Avoid the unnecessary removal of trees or shrubs; for example, prune the aerial portions of trees and shrubs that hang over a project area and interfere with equipment. All trimming shall be done in accordance with good tree surgery practices.

Existing willows should be harvested and paid for separately per Section 215 (Transplanting Plant Material).

Non-native woody vegetation removed and not utilized on site under Clearing and Grubbing shall be hauled off-site to an approved disposal site. Removal of non-native woody material is included in Clearing and Grubbing. Non-native material will be cleared and hauled away offsite. Burning of cleared material will not be permitted.

Sediment and debris removal shall be planned and performed according to Colorado NRCS Conservation Practice Standard 326- Clearing and Snagging- (Website Link: Colorado eFOTG- https://efotg.sc.egov.usda.gov/efotg_locator.aspx?map=US), and the following:

The contractor must provide a disposal plan for clearing and snagging for review and approval by the NRCS/sponsor/owner's representative. The disposal plan for anthropogenic debris must be according to all applicable local regulations and Colorado Department of Health and Environment requirements titled: 2013 Floods - Guidance: Management and Disposal of Flood Debris.

Except in areas to be excavated, all holes resulting from the removal of vegetation and obstructions shall be backfilled with suitable material and compacted.

Migratory birds, as well as their eggs and nests, are protected under the Migratory Bird Treaty Act (MBTA). The active nesting season for most migratory bird species in Colorado is between April 1 and August 31. To avoid a violation of the MBTA, conduct habitat-disturbing activities (F, clearing and grubbing, etc.) in the non-breeding season (August 16 to March 31). If work activities are planned between April 1 and August 31, remove or alter vegetation within construction footprints and road right-of-ways (ROW) prior to April 1 to discourage nesting within areas scheduled for summer construction. If the Contractor is unable to meet these requirements, the Contractor shall notify the Engineer prior to any vegetation removal. A qualified biologist shall conduct a nest survey within 1 one week of

construction. If no nests are present, construction may commence with the Engineers or Owners approval. See Revision of Section 240 for additional information.

If already on-site, some large downed woody material shall remain, particularly if embedded in stream deposits. Standing dead trees (snags) shall remain standing. Approval from the engineer is required to remove snags not indicated in the demo plan.

Areas of existing vegetation that are to be protected shall be delineated in the field so that heavy machinery is prevented from entering the areas and disturbance is avoided.

Clearing and snagging should only remove as much large wood as needed to reestablish the pre-flood capacity of the channel and floodplain. Leave large wood in the riparian zone where it does not create a risk to life or property, and where possible consider using logs to construct channel and bank stabilization measures.

REVISION OF SECTION 202 - REMOVAL OF STRUCTURES AND DEBRIS

Section 202 of the Standard Specifications is hereby revised for this project to include the following:

Subsection 202.01 shall include the following:

This work includes removal of abandoned utilities appurtenances in the project area and flood generated trash and debris that requires removal as directed by the engineer.

CONSTRUCTION REQUIREMENTS

Subsection 202.02 shall include the following:

The contractor shall submit to the Engineer methods that will be utilized to remove debris along the project corridor. Methods proposed by the contractor will need approval by the Engineer, especially for areas that impact the active stream environment.

The Contractor shall remove and dispose of all visible abandoned utility appurtenances and flood generated debris that are located within the work area and abandoned as a result of this project. These items shall not be disposed of within the project limits.

The Contractor shall make all arrangements to obtain written permission from property owners for disposal locations outside the limits and view of the project. Copies of this written agreement shall be furnished to the Engineer before the disposal area is used.

Any object that is not designated to be removed and is damaged shall be repaired or replaced as directed by the Engineer, at the Contractor's expense. BCPOS will be required to approve replacement of any items removed in error.

1. Within 10 calendar days after the Notice to Proceed is issued, the Contractor shall submit to the County for review and approval, a Materials Handling Plan.
2. The Materials Handling Plan must be approved in writing by the County prior to the Contractor's commencement of work within the defined areas.
3. The Materials Handling Plan shall, at a minimum include: Detailed written procedures to be used to load and transport the debris to an approved landfill or recycling facilities.
4. The County will establish the limits of areas where debris is to be removed, or areas, objects or features that are designated to remain undisturbed.
5. In general, the work areas shall include the road section, stream channels, ditches, temporary approaches to bridges, detours and other areas as shown in the contract documents or directed by the County.
6. Debris removal beyond the areas of construction shall be done only where specified or directed by the County.

7. As detailed on the plans, it is expected that all materials encountered at the site will be classified as uncontaminated debris. If any material is encountered that can be classified as contaminated debris, it shall be reported to the County and at the County's direction stockpiled, tested and disposed of in accordance with all applicable regulations.
8. Removal and disposal of uncontaminated debris shall be taken to facilities accepting such designated wastes.

The Contractor is responsible for choosing appropriate disposal facilities and specifying those facilities to the County.

202.02.1 Removal of Trees.

Trees removed on this project will fall into one of the following categories:

- All trees measured to have a Diameter at Breast Height (DBH) greater than 12 inches at 4.5 feet above ground surface will be salvaged with rootwad intact for potential re-use as key members in the various large wood structures proposed for this project. Desired rootwad width is 3 to 4 times the DBH of the tree. Salvaged trees will have a minimum length of 25 feet (if possible) and will be limbed to a limb length of no more than 24 inches, unless otherwise directed by engineer. Exceptions to salvage rootwad trees are those trees that are not in locations accessible with an excavator, or trees that have root systems growing out of rock.
- Trees less than 12-inch DBH are not designated for reuse as key logs in Large Wood Structures, but they will be re-used for fascines or slash material in the large wood structures. Any trees not used as such and trees less than 1" DBH will be shredded on site for use as mulch (see Section 213.02, Wood Shreds).

Tree removal with rootwads intact shall follow a detail provide by the Engineer at pre-construction meeting. Process includes excavating trench around rootwad of tree and use of excavator to topple tree over, and may necessitate climbing tree to cut to length prior to toppling..

Native woody material will be re-used to the extent possible on-site. Contractor shall take care to protect the intact rootwads and limbs, if present, from damage during handling, stockpiling, and eventual installation in large wood structures. Trees, branches, and rootwads that are not re-used in project elements shall be chipped and spread onsite at the direction of the Engineer in the field.

Only invasive trees that do not sprout new growth from dead material (e.g., Elm) will be considered for re-use onsite, as approved by BCPOS. Crack willows (*Salix fragilis*) shall not be re-used on site. All other non-native woody material shall become the property of the contractor, and hauled off-site to an approved disposal site at the Contractor's expense. The Contractor shall make all arrangements to obtain written permission from property owners for disposal locations outside the limits and view of the project. Copies of this written agreement shall be furnished to the Engineer before the disposal area is used.

Full removal of tree roots will be required for all trees that are in conflict with structure excavation limits.

All trees cut and removed, leaving roots intact in the ground, shall have remaining stumps cut as flush to the ground as possible, with no more than 4” protruding above finished grades. All non-native tree species, as designated by the Project Manager or Ecologist, shall have the cut stumps treated with an appropriate herbicide (refer to Section 217) within five minutes of cutting to prevent re-sprouting.

The Contractor shall identify and mark each tree to be removed. The Engineer shall be notified for inspection and approval of these marked trees. No tree greater than 6 inch DBH shall be removed without prior approval by the Engineer. Trees removed without prior approval of the Engineer shall be replaced at the Contractor’s expense.

Materials being stored for future use shall be stockpiled in areas designated on plans or approved by the Engineer. Areas shall be protected with fence and erosion control measures.

REVISION OF SECTION 203 - EXCAVATION AND EMBANKMENT

Section 203 of the Standard Specifications is hereby revised for this project to include the following:

DESCRIPTION

Subsection 203.02 shall include the following:

This work consists of excavation and fills within the St. Vrain Creek channel and floodplain and hauling excess material off site. This work includes the selective stripping, stockpiling and replacement of existing native river bottom material (sand, gravel, cobbles) as described herein.

This work also consists of the final excavation and fills (shaping) of the reconstructed or rehabilitated St Vrain Creek bottom as shown on the plans, after other mass grading has been completed. This includes fine grading to create riffles, pools, bank contouring, and creating a low flow channel with the typical dimensions and planforms indicated on the Plans. The Engineer may provide additional direction in the field on the location and dimensions of these channel features. 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.

This work also includes the sorting, screening, and stockpiling of in-situ larger, alluvial rounded rock and boulder material located within the grading limits. This salvaged material will be used in later stages of construction to form river features and design elements.

Contractor shall provide a Rock Screening Plan as part of this work to describe the proposed methods to achieve/meet required rock mix gradations for instream rock structures and bank stabilization structures as depicted in design plans. The Rock Screening Plan shall include available equipment, proposed screening and stockpile areas, methods of creating and verifying accurate gradations for each specified rock mix, expected schedule for screening activities, a detailed list of assumptions for developing the price quote in the bid (including expected volume of material to be screened), and a brief summary of the Contractor's past experience with similar screening work. The Rock Screening Plan shall be submitted to Engineer and approved prior to implementation.

CONSTRUCTION REQUIREMENTS

Subsection 203.05 shall include the following:

Existing river conditions prior to ground disturbing activities shall be carefully documented with photographs or other approved method. The Contractor shall immediately notify the Engineer if the existing conditions appear to significantly vary from the surveyed topography shown on the Plans.

Channel grading is performed in multiple steps, beginning with mass grading. The proposed channel and floodplain shall be formed according to the typical sections and grading contours as shown on the plans. During this stage, all boulders greater than 30-inches in diameter that are suitable for use with design features shall be removed and stockpiled as close to the work area as possible. The Contractor shall also salvage and screen all rock excavated from within designated coarse sediment deposits in the floodplain and within the vicinity of pre-flood channels. In addition, a 45-foot wide and 18-inch thick

layer of the existing river bottom material along the existing channel alignment is to be scraped and stockpiled/salvaged for eventual replacement as the surface layer of the design channel.

After the mass grading surface is prepared, fine grading will then occur in the bottom of the final multi-stage channel. The channel bottom will be reshaped by excavating a 12-inch (average) deep thalweg and pools, as shown on the plans. This excavated material will then be placed and graded into slightly elevated areas adjacent to the thalweg in the form of point bars and riffles as shown on the plans. Bed material cut during fine channel grading shall be used as fill for areas in the channel requiring alluvial fill. The placed material will then be track packed. This process is repeated until design depths and shaping are achieved. This work is often concurrent with the construction of riffle structures and placement of habitat boulders (separate pay items). Most of this work is performed by utilizing an excavator equipped with a thumb and assisted by either a second excavator, loader, tracked skid steer or small dozer. Graded channel elements shall be inspected and approved by the Engineer.

Where practicable, fine grading in run segments shall consist of shifting river substrate across the channel to enhance the existing low-flow channel shape without extensive disturbance to the bed.

The specific location of certain riffle crests and pool tail-outs may be adjusted under the supervision of the Engineer to better match existing conditions and minimize bed disturbance if field conditions differ from the existing conditions shown in the Plans.

If additional rock material is necessary for a given size class, the Contractor will need to sort, screen, and stockpile coarse rock during excavation to limit the quantity of imported material. It is the Contractor's responsibility to identify potential salvage areas in the field to collect substrate material for screening, but the Engineer will provide additional guidance. Target areas for screening will likely include relic (pre-flood) channels, and coarse rock uncovered during floodplain excavations. If additional material is still necessary to meet the project demand, the Contractor shall import material from an off-site source (separate pay item) as a last resort, if approved by the Engineer.

Screening shall be used to split the salvaged rock material into at least three size classes: 6-inch, 12-inch, and 24+ inch. This sorted and screened rock material shall be combined with the native streambed mix to form a well-graded mix. Refer to Section 506 (Rock Structures) for more detailed information about the required gradation of each rock mix. Rock shall continue to be sorted and screened until the demand is met for the coarse substrate mix, floodplain sill mix, and boulder mix, unless otherwise directed by the Engineer. For reference, pebble Count data collected during the design phase of the project, along with maps, can be found in the "30% Planning and Design Report, St. Vrain Creek Restoration Highway 36 to Crane Hollow Road Boulder County, Colorado", submitted to Boulder County by Engineering Analytics in March 2017. It is important to note that these pebble counts were typically collected at existing riffles, and may represent a coarser substrate gradation than may be found elsewhere in the channel and floodplain. No bulk substrate samples have been collected.

Soils Compaction Testing:

1. The County may require the Contractor to perform QA/QC testing of geotechnical materials and work product in areas with substantial fill to determine the conformance of the Work with the requirements of the Contract Documents.

2. The Contractor will retain a qualified consultant to perform any necessary Contractor's QA/QC testing to assist the Contractor in determining the state of materials incorporated into the Work.
3. The County's QA/QC program is for the sole use of the County to determine the quality of the Work and is in no way intended to replace the Contractor's QA/QC.
4. The frequency of the County's QA/QC compaction testing will be in conformance with the accepted industry standard of care and at the Engineer's discretion.
5. Areas of noncompliance, as determined by the County's QA/QC testing, shall be removed and re-compacted to conform to requirements of the Contract Documents upon receipt of test results. Costs for reworking and retesting backfill material to meet the requirements of the Contract Documents are at the Contractor's expense.
6. Fill materials shall be thoroughly mixed to achieve uniform moisture content, placed in uniform lifts not exceeding 8 inches in loose thickness, and properly compacted, unless otherwise approved by the Engineer. Soils that classify as GP, GW, GM, GC, SP, SW, SM, or SC in accordance with the USCS classification system (granular materials) should be compacted to 95 percent of the maximum standard Proctor density at moisture contents from 2 percent below to 2 percent above the optimum moisture content as determined by ASTM D698. Soils that classify as ML, MH, CL, or CH should be compacted to 95 percent of the maximum standard Proctor density at moisture contents from 2 percent below to 2 percent above the optimum moisture content as determined by ASTM D698. It may be necessary to rework the fill materials more than once by adjusting moisture and replacing the materials, in order to achieve the recommended compaction and moisture criteria.

REVISION OF SECTION 207 - TOPSOIL

Section 207 of the Standard Specification is hereby revised as follows:

Subsection 207.01, shall include the following:

All topsoil shall be either secured from the site or imported and shall be approved by Boulder County at the source prior to import. It shall also include the placing of topsoil upon constructed cut and fill slopes after grading operations are completed and prior to seeding.

Subsection 207.02 shall include the following:

Imported topsoil shall be a minimum thickness of 4" of topsoil placed to final grade or as directed by the Engineer or Vegetation Specialist. Imported topsoil shall consist of roughly equal parts sand, clay & loam (i.e., a sandy clay loam) and capable of supporting plant life. Imported topsoil shall be free of subsoil, refuse, stumps, woody roots, rocks, brush, noxious weed seed and reproductive plant parts from current state and Owner weed lists (as feasible), heavy clay, hard clods, toxic substances, or other material which would be detrimental to its use on the project.

Imported topsoil shall not be toxic to plant life and exhibit the following qualities:

- pH between 6.0 and 8.0
- Salts shall be less than 2.0 mmhos/cm or EC and sodium less than 10 esp or meq/100g soil
- CEC no less than 15.0

An agronomic soil nutrient analysis of existing and imported soil shall be provided by the Contractor a minimum of four weeks before its use on the project site for the Vegetation Specialist's approval. Topsoil analysis shall be current and have been conducted within 60 days from the submittal date. The analysis shall indicate any deficiencies or excesses, and recommended amendments and rates, including macro- and micro-nutrients for native seeding. The Contractor shall provide as many samples and analyses from as many sources as necessary until a suitable topsoil is found or can be amended to be suitable. The Vegetation Specialist reserves the right to waive specific requirements set forth herein.

Topsoil and/or seeding surfaces shall be amended as per Section 212 – Seeding, Fertilizer and Soil Conditioner to obtain the above qualities, including the addition of other soil conditioners.

Subsection 207.03, paragraph two, shall include the following:

Relieving Compaction: Areas to receive topsoil that have been compacted by heavy equipment shall be ripped or chiseled **prior to redistribution of topsoil**. Construction areas and other compacted areas will be chiseled to a minimum depth of 10 inches, with no more than a 10 inch interval between chiseled furrows. Two passes with a chiseler may be necessary, with the second pass chiseling between the first furrows, or perpendicular to original furrows.

Subsection 207.03, paragraph four, shall include the following:

Redistribution of Topsoil and Application of Soil Conditioning: The topsoil should be redistributed uniformly over the disturbed areas, minimizing compaction by equipment. **Topsoil redistribution**

shall not occur under wet soil conditions. Topsoil shall be ripped again after it is placed as specified above in the paragraph “Relieving Compaction” if compaction has occurred during topsoil redistribution. See Specification 212 for Seeding, Fertilizer, Soil Conditioning, and Sodding application. Soil conditioning shall be incorporated evenly throughout the topsoil.

REVISION OF SECTION 208 - EROSION CONTROL

STORMWATER MANAGEMENT

Section 208 shall include:

“Erosion control” is interchangeable with “Stormwater Management Plan”.

Stormwater Management plans are provided as guidelines for the contractor. A permit from the CDPHE must be acquired prior to starting the project. Temporary stream crossings might be required as part of this project depending on contractor means and methods. Temporary stream crossings should follow Boulder County Standards and will be included in the cost of the work being completed.

Erosion control will also include dust control on haul routes through watering and sweeping.

Available erosion control reference documents include UDFCD Volume 3 Stormwater Quality and CDOT M&S Standards.

Appropriate erosion control measures shall be installed downslope and parallel to contours for all disturbed areas including staging areas. The location of erosion control shall be shown on site plans submitted for building permit approval.

Stockpiled fill piles not disturbed over 30 days shall be properly covered and/or stabilized with temporary vegetation.

Subsection 208.02 is hereby revised to include the following:

- (n) Straw wattle. Shall be the following types unless otherwise shown on the plans:
100% biodegradable netting with a core of noxious weed free rice, wheat or barley straw.
Photodegradable netting shall not be allowed.

Subsection 208.05 shall include the following:

- (5) (n) *Straw wattles*. Straw wattles shall be installed according to manufacturer recommendations and be anchored securely to the ground with wood stakes. *Wood Stakes* stake shall be constructed out of untreated wood at a minimum nominal dimension of 1.5 inches by 1.5 inches by 18 inches long. If used on slopes, straw wattles shall be installed in a 2-3 inch deep trench. Straw wattles may be used in place of silt fencing.

REVISION OF SECTION 209 – WATERING AND DUST PALLIATIVES

Section 209 of the Standard Specifications are hereby revised for this project as follows:

Delete Subsection 209.06, Landscaping and replace with the following:

209.06 Landscaping. The Contractor shall furnish water for seeding, mulching, planting, transplanting, and any other landscape work required for the project. The contractor will be responsible for watering through the one-year warranty period.

REVISION OF SECTION 212 - SEEDING, FERTILIZER, SOIL CONDITIONER, AND SODDING

Section 212 of the Standard Specification is hereby revised as follows:

DESCRIPTION

Delete subsection 212.01 and replace with the following:

This work consists of soil preparation, application of fertilizer, soil conditioners, or both, and furnishing and placing seed. The work shall be in accordance with the Contract and accepted horticultural practices.

MATERIALS

Subsection 212.02 (a) shall include the following:

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 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. The Contractor shall furnish to the engineer 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 thirteen months prior to the date of seeding. In addition, seed shall be free from cheatgrass (*Bromus japonicus* and *Bromus tectorum*). 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 Engineer/Vegetation Specialist. An All States Noxious Weed test will be required. Germination tests must be within twelve 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 Engineer/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.

If specified type or variety of seed is not available, substitutions must be submitted and approved by the Vegetation Specialist.

Subsection 212.02 (b) 1 shall include the following:

Fertilizer shall be Biosol Forte or approved equal and consist of a granular slow release all natural organic fertilizer with no chemical content, consisting of a fungal and bacterial biomass. The nutrient source shall be derived from fermented plant material along with nutrients such as cottonseed meal, soybean meal and trace elements all under constant sterile conditions with a minimum Nutrient (N-P-K) content of 7-2-1.

Nutrients shall be derived from fermented plant material and not contain any urea, animal waste, animal by-products or sewage material. Nutrient content of fertilizer shall be as follows:

Organic Matter > 75%, Carbon/Nitrogen ratio 5:1, Nitrogen (total) >7%. Nitrogen (water soluble) <0.5%, Phosphorus (P205) 2-4%, Potassium (K20) 1%, pH level of 6.5 -7.5. Nutrients shall be derived from fermented plant material and not contain any urea, animal waste, animal by-products or sewage material.

Subsection 212.02 (b) 2, paragraph four, last sentence shall be replaced with the following:

Compost: 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 Class 1 weed-free and organic. Material must meet the following specification: a carbon to nitrogen ratio between 10:1 and 20:1, pH between 6.0 and 8.0, soluble salts not greater than 10 mmhos/cm, moisture content between 30 and 60%, a stability of 8 or below, a minimum of 40% organic matter. Compost may consist of one or more of the following, or include other appropriate composts:

1. Well-aged dairy cattle manure
2. Composted yard wastes
3. Food waste

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 six months prior to use. Biosolids (from sewage treatment facilities) are not considered a viable ingredient in compost.

Subsection 212.02 (b) 2, shall include the following:

Biochar: Biochar shall be a USDA Certified Biobased Product. Biochar shall be made in a slow pyrolysis process and exceed 70% carbon content in the delivered product. The size of an individual piece of char shall range between 0.25 inches to 1.25 inches.

Delete subsection 212.02 (c).

CONSTRUCTION REQUIREMENTS

Subsection 212.03, paragraph one, table shall be replaced with the following:

Zone	Fall Seeding
Below 6000'	September 1 to April 15 or the end of the project, whichever is first.

Delete subsection 212.06 (a) and replace with the following:

- (a) *Soil Preparation.* Disturbed areas shall be loosened to a minimum depth of twelve (12) inches, with no more than a 10 inch interval between chiseled furrows. All slopes shall be left in a roughened condition. Uneven grading of the soil surface is acceptable and encouraged to prevent further compaction from excess heavy machinery operation. All slopes shall be free of concrete and asphalt. Slopes flatter than 2:1, shall be tilled into an even and loose seed bed 4 inches deep. Harrowing, disking, or other operation may be required to breakdown large soil clods greater than 4 inches in diameter and provide an acceptable seed bed. No soil preparation for seeding shall occur when soil is frozen or in an extreme wet or dry condition.

Slopes shall be free of soil clods, sticks, stones, and debris in excess of four (4) inches in any dimension, and be brought to the desired grade and line. Uneven grading of the soil surface is acceptable and encouraged to prevent further compaction from excess heavy machinery operation. All slopes shall be free of concrete and asphalt. No soil preparation for seeding shall occur when soil is frozen or in an extreme wet or dry condition.

Delete subsection 212.06 (b) and replace with the following:

- (b) *Soil Conditioning.* Prior to seeding, soil conditioner shall be applied evenly to the soil surface designated as Zone 3 areas as designated on the plans. The following amendments shall be applied at the following rates to all seeding (upland) areas, combined seeding areas, and floodplain benches to be planted with willows:

1. Fertilizer – Biosol Forte or approved equal applied at 800 lbs/acre
2. Compost – Applied at three (3) cubic yards (CY) per 1,000 square feet
3. Humic acid (Humates) – 250 pounds per acre.
4. Granular Endo Mychorrizal Inoculum - 20 pounds per acre.

The following amendments shall be applied at the following rates to the Biochar Test Plot area designated on the plan including Zones 1-3

Biochar shall be applied to areas to be planted with perennial (tubelings) and areas to be seeded with 'combined seeding' on river right (looking downstream) as shown on plans at a rate of 5% by volume (4 cubic yards per acre).

All soil amendments shall be applied uniformly over the soil surface and incorporated into the top eight (8) inches of soil. No measurable quantity of organic amendment shall be present on the surface after incorporation.

Delete subsection 212.06 (c) and replace with the following:

- (b) *Seeding.* Seeding shall be accomplished within 24 hours of tilling or scarifying to make special seed bed preparation unnecessary. The seeding application rate shall be as designated in the Contract. All slopes flatter than 2:1 shall be seeded with grass or no-till drills followed by packer wheels. Drag chains are not allowed. Drills shall have depth bands set to maintain a planting depth between $\frac{1}{2}$ and $\frac{3}{4}$ inch and shall be set to space the rows not more than seven (7) inches apart. Packer wheels that firm the soil over the drill row are required. Seed that is extremely small shall be sowed from a separate hopper adjusted to the proper rate of application. The Contractor shall notify the Engineer and Vegetation Specialist 24 hours in advance and request inspection of seeding areas prior to installation.

Seed drills must be clean of seed from previous seeding jobs before any seeding begins.

If strips greater than seven (7) inches between the rows have been left unplanted or other areas skipped, the Engineer or Vegetation Specialist will require additional seeding at the Contractor's expense.

When requested by the Contractor and approved by the Engineer or Vegetation Specialist, seeding may be accomplished by broadcasting at twice the rate specified in the Contract at no additional cost to the project.

All seed sown by broadcast-type seeders shall be "raked in" or covered with soil to a depth of at least $\frac{1}{4}$ inch. Broadcasting seed will be permitted only on small areas not accessible to machine methods or areas too rocky to use a seed drill. Broadcast seeding shall proceed on freshly disturbed (raked or harrowed) soil surface and broadcast seed shall be immediately raked or harrowed into the surface. Raking shall be accomplished using metal-tined garden or landscape rakes; no plastic leaf rakes shall be allowed. If harrowing is used, an English harrow or its equivalent shall be required.

Hydraulic seeding will not be accepted.

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 performed as portions of job are completed to take advantage of growing conditions and to comply with Section 208 and subsection 212.03.

1. Seeding (Upper Riparian) – Prior to seeding, the soil conditioner shall be applied at 3 CY per 1000 SF and incorporated into the top eight (8) inches of soil.

Seed shall be applied at the percent of mix (% of mix) and application rate (PLS/Acre) that is designated on the plans under Seeding (Upper Riparian). Seed

shall be applied to Planting Zone 3 and Seeding Only areas shown on plans.

2. Seeding (Lower Riparian) - Seed shall be applied at the percent of mix (% of mix) and application rate (PLS/Acre) that is designated on the plans under Seeding (Riparian). Seed shall be applied to Planting Zones 1 and 2 areas shown on plans.

All seeding shall occur between September 1st and December 31st as long as the ground is not frozen or too wet. Engineer or Vegetation Specialist shall approve the onsite conditions are suitable for seeding prior to seeding.

REVISION OF SECTION 213 – MULCHING

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

DESCRIPTION

Subsection 213.01 shall include the following:

This work includes furnishing and applying WoodStraw Engineered Erosion Control Mulch (ECM) Model LS64-100 (Forest Concepts, LLC™) or Wood Shreds after seeding for reclamation of disturbed areas as approved and inspected by the Engineer and Vegetation Specialist.

MATERIALS

Subsection 213.02, shall include the following:

Delete the last paragraph in subsection 213.02 and replace with the following:

Materials for mulching shall consist of WoodStraw ECM Model LS64-100 (Forest Concepts, LLC™) a manufactured wood-strand erosion control mulch, comprised of a blend of loose thin wood pieces, each with a high length-to-width ratio such that the pieces form a protective matrix when distributed on the soil. Model LS64-100 is composed of long and short wood strands that have the following nominal properties:

“L” Length: 6.3 inch

“S” Length: 2.5 inch

Width: 3/16 inch

Thickness: 1/10 – 1/8 inch

Ratio of L:S 50:50 by area (mass)

The components of the WoodStraw ECM blend shall be as specified in the Manufacturer’s technical data for the model number specified (<http://www.forestconcepts.com/docs/LS64-100.Technical.Specification.2016.09.20.pdf>). The materials are baled in green or air-dried condition and inherently free of noxious weed seeds and other chemicals/additives detrimental to plant life.

Wood-strand mulch is packaged in bales tied with poly bale twine and placed on pallets with 20-24 regular bales per pallet and 3 large bales per pallet.

- Regular bales are 14” x 18” x 18”-22”.
- Large bales are 30” x 40” x 42”-54”.

The small bales are readily available from the Manufacturer’s licensed representative (listed below) and are used for hand and straw blower application. The large bales are special order product and recommended for aerial application.

Contact information for the Manufacturer’s licensed representative for CO, WY, ND, SD, KS & Eastern MT:

MOUNTAIN PINE MANUFACTURING - Steamboat Springs, CO
970-367-6111 or gus@mpinem.com
<http://www.mpinem.com>

Wood Shreds may be used as a substitute for WoodStraw.

- 1) Wood shreds are limited to pine, spruce or fir trees. Wood shreds from urban tree removal that may have material from undesirable tree species such as Russian olive trees (*Elaeagnus angustifolia*) will not be accepted. Other trees may be used for wood shreds at the approval of the Vegetation Specialist.
- 2) The wood shredding process should include screening that will ensure the size range of the wood mulch. The size of the mulch shall be in two dominant sizes to allow interlocking of mulch material and provide the most resistance to water runoff, soil erosion and wind removal of mulch. The size shall consist of a relatively even mix or composition of smaller length strands (between about 2-3 inches) and larger length strands (about 8 inches). Finer materials (less than about 1 inch) will be present, but should be much lower percentage compared to the two dominant size classes described above. The mulch will be appropriately mixed before application to assure effective interlocking of mulch materials on hillslopes. The thickness of the mulch is generally from 1/8-1/4 inch for smaller length shreds to 1 inch for larger length shreds.
- 3) The wood shreds shall be free from dirt and rocks.
- 4) The County will inspect and approve the wood shreds, where possible, prior to purchase. If the County is unable to inspect the wood shreds on site, a sample of the wood shreds will be required. The County will provide approval of the wood shreds, in writing, to the Contractor.
- 5) A sample truck weight for every 20th truckload may be required.

CONSTRUCTION REQUIREMENTS

Subsection 213.03 shall include the following:

No work shall occur when soil is extremely wet.

(g) *WoodStraw ECM/Wood Shreds*. After seeding has been completed or when required for erosion control (pursuant to the Plans and as directed by the Vegetation Specialist), WoodStraw ECM/Wood Shreds shall be applied via hand application or straw blower with an approximate coverage rate of 70% soil cover. The coverage rate is estimated by the manufacturer as follows:

Soil Cover	Regular Bales		Large Bales	
	Sq. Ft. per Bale	Bales per Acre	Sq. Ft. per Bale	Bales per Acre
70% Soil Cover	158	276	1,819	24

A Coverage Rate Calculator is also provided by the Manufacturer at:
<http://www.woodstraw.com/index.php?wspage=10003>

Application of WoodStraw ECM/Wood Shreds mulch must be evenly distributed over the designated mulch areas on the plan sheets.

(1) *Straw Blower Application*. **WoodStraw/Wood Shreds shall not be applied with the type of**

straw blowers that chop up/break materials apart, as they will break down the WoodStraw/Wood Shreds and destroy the manufactured dimensions and properties for the product (thus the product will no longer meet the Manufacturer's specifications and will not meet the specification for the Project). As such, the Finn, Reinco, or similar type straw blower is required for proper application.

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, wetland perennial tublings, willow cuttings and willow clump transplants (from sources designated by the Vegetation Specialist) as shown on the plans.

MATERIALS

Subsection 214.02 shall include the following:

Boulder County has a supply of native wetland plants, shrubs and trees. Contractor shall use this source of plants, if available. Contractor should notify Boulder County at least two months in advance of the requested quantities, species and delivery date. If Boulder County is unable to supply the plants, contractor is responsible for obtaining plant materials.

Plant material, with the exception of willow cuttings and willow clump transplants, shall be procured from a licensed, qualified and competitive nursery facility specializing in the production of native plant materials, or from the willow cutting and willow clump collection areas as designated below. All plant material shall be “ecotypic” 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 Boulder County Plant Ecologist and 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 Boulder County Plant Ecologist and/or 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.

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 Boulder County Plant Ecologist and 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 Boulder County Plant Ecologist and/or 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 County. Before any substitution of plants will be considered, the Contractor shall furnish to BCPOS and 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 Boulder County Plant Ecologist and/or Vegetation Specialist may reject any nursery stock not meeting the Contract at any of the following times and locations:

- (1) At the named supplier’s location. The Boulder County Plant Ecologist and/or 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.

Subsection 214.02 shall include the following:

Time-Release Water shall be Aquasorb as manufactured by SNF SAS., ZAC de Milieux, 42163 Andrezieux Cedex - France, or approved equal. Product unit shall consist of a polyacrylamide-based, cross-linked polymers ranging from 1 to 4 millimeters in size.

Aquasorb product shall be placed in water to hydrate per manufacturer's recommendations prior to installing. Aquasorb will be evenly distributed around the entire root ball of the plant, at 2 oz. wet product per plant, then back filled with amended soil.

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

(a) Willow cuttings. Willow cuttings shall be collected in areas within 1,000 vertical feet of elevation, and of similar hydrology to those existing at the planting site as directed by a qualified ecologist.

No more than 20 percent of middle age plant material shall be taken from willow collection sites unless plant will be removed or transplanted during excavation and grading. Written consent from the property owner must be received in areas where harvesting will occur, and will specify if it is beneficial to take more than 20 percent of the plant material.

Willows shall be cut by hand. Transport of willow 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 Engineer before machinery is used for willow transport.

All Willow Cuttings will be harvested while dormant, stripped of all branches. Willow cuttings taken from designated plants shall be at least 0.5 inch in diameter or larger at the narrow end. Willow cuttings shall be 48 inches long with the bottom end cut off at a 45-degree angle and the top end with a straight cut. The top end of each cutting shall be dipped in latex paint to minimize desiccation. The cuttings will be placed into water within one hour of cutting and soaked at a water depth of one (1) foot for 5-7 days prior to planting. Cuttings shall be maintained in a shaded, moist, and cool condition from the time of harvest through the time of installation, including during transportation and upon delivery to the site. The cuttings will be kept wet until placed into the ground and will not be allowed out of water for more than 30 minutes during planting.

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. Willow cuttings grown in an approved nursery will be allowed.

Willow collection sites shall be left in good condition following the collection process. All slash will be removed and disposed of as part of the work.

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

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

(b) Perennial Wetland Tublings (Tublings): Tublings shall be supplied in 10 cubic inch (CI)

containers as designated in the contract. All plants shall be “ecotypic” as defined above. Tublings shall have been growing at least one growing season in the nursery. Tublings shall not be shipped while in a dormant condition. Tublings 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:

(c) Soil Conditioning and Fertilizer. Soil conditioner shall adhere to Section 212 of the Project Specifications.

(d) Mature Willow Transplants: Mature Willows (Willow Clumps) shall be harvested while dormant (if feasible, depending on project schedule) from locations identified by the Boulder County Plant Ecologist and/or Vegetation Specialist and immediately planted in locations designated by the Vegetation Specialist and pursuant to Section 215. Exact locations and elevations for individual Mature Willows shall be field located by Vegetation Specialist.

(e) Potted trees and shrubs. Potted trees and shrubs shall be in 14”-tall one-gallon or 40 cubic inch (CI) containers used in standard nursery practice. Each species shall be identified by means of grower’s label affixed to the plant. Label shall be waterproof labels and use weather resistant ink. The grower’s label shall include the source, correct scientific and common name.

(f) Wildlife depredation. Beaver Protection Fence shall be installed around all cottonwoods, alders and birch. See plans for detail of Beaver Protection Fence. Vole Protection Fence shall be installed around all cottonwoods, alders, birch, chokecherry, plum and dogwood. See plans for detail of Vole Protection Fence. Trees that receive both (cottonwoods, alders and birch), the Vole Protection Fence shall be installed prior to Beaver Protection Fence.

Beaver Protection Fence shall be surrounded by a hoop of metal mesh or hardware cloth 2” x 2” staked or anchored at ground level, 4 feet high and 1 foot in diameter, for protection from beavers.

Vole Protection Fence shall be caged with hardware cloth to prevent small mammal herbivory. Hardware cloth shall be 1/8” to 1/4” size openings. Each fence shall be cut to one foot (1’) high and be long enough to completely circle the base of the plant with space allowing for three years growth. Caging shall be secured to the ground with landscape staples and level with the ground such that small mammals cannot get underneath. Hardware cloth shall be secured above ground with zip ties or cable ties.

(g) Backfill. Backfill soil shall be composed of 50 percent native soil and 50% topsoil as specified in Section 207. If native soil is greater than 50 percent rock then topsoil shall be used.

CONSTRUCTION REQUIREMENTS

Subsection 214.03 (a) shall include the following:

(a) Planting Seasons. Plants shall be planted in accordance with the Contract. Areas to be planted shall be brought to the lines and grades designated or approved. The location of plants shown in the Contract is approximate to the degree that unsuitable planting locations shall be avoided. Locations and layouts shall be approved by the Vegetation Specialist before preparatory work for planting is started.

All staking, pin flags or ground paint marking for planting layout shall be done by the Contractor and shall be approved by the Vegetation Specialist before planting holes are prepared.

Subsection 214.03 (c) shall include the following:

Planting pits shall be dug to a minimum of two (2) times the width of the ball or container being planted.

Perennial Wetland Tublings shall be installed in locations shown on plans. Tublings shall be planted following the placement of Erosion Control Fabric (as applicable). All Tublings shall be field located by Contractor and approved by the Vegetation Specialist prior to planting.

Subsection 214.03 (d) shall include the following:

(d) Backfilling. Backfill shall be thoroughly mixed with 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 and crown 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. Saucers shall be prepared around each plant to the dimensions shown on the planting details using material excavated from the pit. Saucers shall be covered with a 4 inch thick layer of fresh moist wood mulch conforming to Section 213. After completion of all planting and before acceptance of the work, the Contractor shall water plants installed under this Contract, as needed to maintain a moist root zone optimum for plant growth. Plants damaged by the Contractor's operations shall be replaced at the Contractor's expense.

Subsection 214.03 (d) shall include the following:

Contractor shall install time-release watering to all Trees and Shrubs.

Subsection 214.03 (e) shall include the following:

(e) 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 or shall become the property of the Contractor and be removed from the site.

Delete subsection 214.03 (f), and replace with the following:

(f) Staking. All deciduous trees 2 inch caliper and greater shall be staked with three stakes. Stakes shall conform to subsection 214.02(c). Stakes shall be driven 2 feet into the ground with one stake on the

side of the prevailing wind (generally the northwest side) and the other stakes shall be spaced equally around the tree approximately 120° apart as shown on the planting details. Stakes shall be driven at least 1 foot outside of each edge of the planting pit. Trees shall be guyed with 3 to 4 inch wide strips of nylon webbing with metal grommets. Trees specified to be guyed with wire shall be secured with No. 12 gage annealed galvanized steel wire free of bends and kinks.

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

Willow Cuttings. Cuttings shall be installed while dormant in early spring or before bud break, or in late fall after leaf drop. Cuttings shall not be planted when the ground is frozen. Willow cuttings may be cold stored, but no longer than 6 months. Immediately prior to planting, the cuttings shall be submerged at least 2/3 of their length in containers of water for a period of 5-7 days. Water shall be free from any harmful oil, chemical, sprays, or other materials. The containers shall be kept in the shade. Only the number of willow cuttings that can be planted in one day will be removed from storage and delivered to the planting site. Failure to properly stored and hydrate willow cuttings or if cuttings linger on site more than 2 days before planting will be replaced by the contractor at no cost to the client if said cuttings fail to thrive.

Willow Cuttings shall be planted in areas shown on plans and pursuant to the Willow Cutting detail. Final locations and elevations for Willow Cuttings shall be approved by Vegetation Specialist prior to installation.

Using a rock bar, mechanical stinger, or other tool, holes at least 42 inches deep shall be made in the streambank or other areas. The cuttings shall be planted by inserting angled end first into the ground a minimum of 42 inches extending 6-8 inches into the water table or capillary fringe. If in riprap, the hole shall be backfilled with soil to within 3 inches of the riprap surface. The top 3 inches of the void shall be filled with gravel/sand from the streambank or streambed and compacted slightly. All cuttings will be trimmed after installation to ensure that no more than 6 inches and no fewer than 3 to 4 live buds are left above ground. Care will be taken to avoid damage to buds during handling. Bark must not be separated from the cambium layer.

The placement of these cuttings shall be in areas shown on the plans that remain damp, seasonally inundated, or where subsurface alluvial interflow is within 36 of the surface, or as directed. Willow cuttings shall be planted at a density and/or spacing specified on the plant schedules on streambank or other designated areas. The planting zone that is most successful for willow cutting establishment is typically only several yards wide and approximately, plus or minus, 2 feet from the ordinary high water line.

Water shall be applied to the willow cutting planted areas until the soil mass is saturated. Willow cuttings shall be watered thoroughly as per 214.04 (b) 1.

Perennial Wetland Tublings, Willow Clump Transplants, and Potted trees and shrubs. Perennial Wetland Tublings, Willow Clump Transplants, and Potted trees and shrubs shall be installed in locations shown on plans, shall be field located by Contractor, and approved by BCPOS and Vegetation Specialist prior to planting.

(i) Irrigation. Plants shall be watered within 15 minutes of initial planting and watered thereafter until

final acceptance according to the watering rates specified in Section 214.04 (b) 1.

(j) Saucers. Soil excavated from the plant pit will be handled deliberately to form a 4-6" high (min.) plant saucer and will not be carelessly wasted or cover existing vegetation or seeded areas. When inter-planting in existing, mature grassland or wetland, excavated soil will be placed on a tarp or similar to avoid indiscriminate spoils from burying adjacent, existing vegetation. Excess soil excavated from the plant pit that is not used to form the saucer shall be removed from the site and disposed of by the Contractor at sites/locations approved by the Vegetation Specialist.

LANDSCAPE ESTABLISHMENT

Section 214.04 shall include the following:

From the time of installation, during construction, and throughout the Landscape Establishment 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 including the Contractor, Vegetation Specialist, and BCPOS to determine acceptability of plant material. During the inspection, an inventory of rejected material will be made, and corrective and necessary cleanup measures will be determined.

Subsection 214.04 (b) shall include the following:

The detailed maintenance plan is subject to review and approval by the Vegetation Specialist. The Vegetation Specialist will not issue the Notice of Substantial Completion until the Vegetation Specialist has received and approved the maintenance plan.

The Contractor shall keep a project diary documenting all landscape and irrigation maintenance activities including work locations and time spent. The Contractor shall provide copies of the diary to the Vegetation Specialist upon request.

All planting saucers shall be inspected and the following maintenance activities completed as necessary:

- Removal (by pulling or string trimmer, depending on conditions) of any plants that are not of the species planted.
- Re-building of saucers and repair of blow-outs, if needed, to a minimum height of 4 inches.
- Application of additional wood mulch up to the 4 inches that may have blown away or been displaced.

Observation of the health of trees and reporting to the Vegetation Specialist if any evidence of damage is noticed.

Subsections 214.04 (b) 1. and 214.04 (b) 2. Shall be deleted and replaced with the following:

1. Watering

Every effort has been made in the development of the planting plans to specify species and locate plants in zones that will be naturally sustained by surface and alluvial subsurface flow. However, run-off and precipitation, either in the form of rain or snow, cannot be guaranteed. Therefore, this section is provided to provide on-going watering maintenance of installed plants until time of final acceptance.

All woody plant material specified, including trees, shrubs, and cuttings, shall be watered by the contractor by hand, hose, bucket, portable or fixed pump, water tank or truck, temporary or permanent irrigation system (overhead spray and/or drip), or other effective method or watering device as determined by the Contractor.

BCPOS will make available an on-site water source or water rights (if necessary) that can be used to irrigate and maintain plant material and seeding areas. Thereafter, the Contractor shall be responsible for delivery of the water to individual plant locations.

At the time of initial watering at the time of installation and until final acceptance, the Contractor shall continue to water all plant materials according to the following general parameters:

Trees & shrubs

Year 1 - Watering will need to occur on the following schedule during the first growing season:

- November - February: once every three weeks
- March - May: once every two weeks
- June - August: once every week
- September - October: once every two weeks

The Contractor shall diligently monitor the plants, soil moisture levels, and the amount of natural precipitation they are receiving. If trees & shrubs need to be watered more or less frequently than outlined above, the Contractor shall make adjustments to the schedule accordingly to ensure that the plants are watered appropriately.

Willow Cuttings & Tublings

Willow cuttings and/or tublings (if soil is not naturally & persistently saturated) shall be watered to completely saturate the soil at least once a week in accordance with the year 1 watering schedule for trees & shrubs.

Seeding Areas

Seeded areas shall be allowed to establish naturally without irrigation if a temporary or permanent overhead irrigation and water source is not available, cost effective, or feasible. If feasible, water shall be applied using a method determined by the Contractor at a frequency and time of day (early morning

or late evening) to ensure that seedlings thrive. The duration of each irrigation session shall not produce gullies, rills or otherwise erode the soil.

Gully, rill and erosional areas caused by poorly managed irrigation will be repaired as necessary as per Section 212 until seeding areas have established and erosion problems cease. Erosion control blanket and/or fabric may need to be installed, reinstalled or repaired at the Contractor's expense.

Quantity of Water:

1. At each watering, woody plants shall receive the following minimum amounts of water based on container size or an amount sufficient to saturate the soil within the planting saucer to a depth of 12 inches:

- A. 40 CI and Quart-sized containers shall receive 1 gallon
- B. One-gallon sized containers shall receive 2.5 gallons,
- C. Five-gallon sized containers shall receive 5 gallons
- D. Seven-gallon-sized containers shall receive 7.5 gallons
- E. Ten-gallon sized containers shall receive 10 gallons
- F. 2" caliper-sized trees shall receive 20 gallons
- G. Twenty-five gallon sized containers shall receive 25 gallons

Water shall be distributed evenly within the saucer and not breach or damage the saucer. Water shall be distributed evenly over seeded areas. Watering shall be accomplished without damage to existing or recently planted vegetation.

The contract performance bond, shall guarantee replacement work during the plant establishment period.

If all other work is completed on a project, no contract time will be charged during the plant establishment period.

Subsections 214.04 (b) 1. and 214.04 (b) 2. Shall be deleted and replaced with the following:

REVISION OF SECTION 215 - TRANSPLANTING

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

DESCRIPTION

This work consists of transplanting Mature Willows in accordance with this specification and as directed by the Engineer.

MATERIALS

Mature willow plants shall be selected by Contractor and approved by Vegetation Specialist from plants presently growing in areas within the limits of disturbance.

CONSTRUCTION REQUIREMENTS

Willow Cuttings shall be taken from approved mature willow plants while dormant before buds appear. Contractor shall harvest Willow Cuttings from mature willow plants in accordance with the requirements in section 214.03 Willow Cuttings. All cuttings available for harvesting shall be collected, limits in section 214.03 do not apply.

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

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

Mature Willows shall be harvested while dormant and immediately planted in locations shown on plans. Exact locations and elevations for individual Mature Willows shall be field located by Vegetation Specialist

Maintain 1' of cutting above ground. Mature Willows shall have a rootball between 3-5 feet deep and between 2-3 feet wide. Contractor can divide approved mature willow plants that will be used for Mature Willows if necessary.

Mature Willows shall consist of one willow plant harvested onsite and planted at 6 foot on-center. See Mature Willow detail in the Revegetation Plans. The Mature Willows shall be planted a minimum of 3 feet into the creek bank with the rootball extending a minimum of 6 inches into the water table or capillary fringe.

A minimum of 6 inches shall extend above the finished grade with no fewer than 3 to 4 live buds per cutting left above ground. Care will be taken to avoid snapping cuttings or damaging the rootball.

Contractor shall backfill Mature Willow planting with a slurry of native bank or streambed material. Mature Willow shall be watered in so as the ground is thoroughly saturated immediately following planting.

REVISION OF SECTION 216 - SOIL RETENTION COVERING

Section 216 of the Standard Specifications is hereby revised for this project to include the following:

DESCRIPTION

Soil Retention Blanket (Special) consists of stabilizing vegetation and utilized as erosion control.

MATERIALS

Soil Retention Blanket (Special) shall be Nedia C400B or approved equal. The blanket shall be 100% coconut fiber matrix stitch bonded between two biodegradable nettings with a total thickness of 0.31 inches and a tensile strength of 240 x 164 lb./ft.

CONSTRUCTION REQUIREMENTS

Soil Retention Blanket (Special) shall be installed in locations seeded with Seeding (Riparian) or areas where Perennial (Tubelings) are to be planted. See plans for locations.

Prior to the installation of the Soil Retention Blanket (Special) areas shall have soil conditioner and riparian seeding applied as described in the plans and Section 212 of the specifications. Perennial (Tubelings) shall be planted after the installation of the Soil Retention Blanket (Special).

Soil Retention Blanket (Special) shall be installed and secured according to the manufacturer's recommendations.

Contractor shall contact Vegetation Specialist and Engineer prior to Soil Retention Blanket (Special) order. Approval of locations and quantities shall be given by BCPOS prior to order.

REVISION OF SECTION 506 - RIPRAP

Section 506 of the Standard Specifications is hereby revised for this project to include the following:

Table 506-2

Pay Item		Percent of Material Smaller Than Typical Stone ²	Typical Stone Dimensions ³ (Inches)	Typical Stone Weight ⁴ (Pounds)
	Stone Size d50 ¹ (Inches)			
Type VL Riprap	6	70-100	12	85
		50-70	9	35
		35-50	6	10
		2-10	2	0.4
Type L Riprap	9	70-100	15	160
		50-70	12	85
		35-50	9	35
		2-10	3	1.3
Type M Riprap	12	70-100	21	440
		50-70	18	275
		35-50	12	85
		2-10	4	3
Type H Riprap	18	100	30	1280
		50-70	24	650
		35-50	18	275
		2-10	6	10
Type VH Riprap	24	100	42	3500
		50-70	33	1700
		35-50	24	650
		2-10	9	35

¹d50 = nominal stone size
²based on typical rock mass
³equivalent spherical diameter
⁴based on a specific gravity = 2.5

Nominal stone size and total thickness of the riprap shall be as shown on the plans.

DESCRIPTION

Soil Retention Blanket (Special) consists of stabilizing vegetation and utilized as erosion control.

REVISION OF SECTION 625 - CONSTRUCTION SURVEYING

Section of the Standard Specifications is hereby revised for and shall include the following: Subsection 625.01, first paragraph shall be modified to include:

This work consists of the construction surveying, calculating, and staking necessary for the construction of all elements of the project. Following the completion of the project, as-built surveys will be required. This work shall be done under the supervision of a Professional Land Surveyor (PLS) or Professional Engineer (PE) who is experienced and competent in road and bridge construction surveying and licensed in the State of Colorado.

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 in-stream features as indicated in the construction plan set.

A post-construction survey shall be conducted to survey the final stations, elevations, and dimensions of constructed in-channel features and bench grading, at a minimum. Post-construction surveying and as-built requirements are in Appendix A3 of the EWP Project Engineering Guidance for the 2013 Colorado Flood Recovery Phase 2 on the Colorado EWP website:

<https://coloradoewp.com/document/emergency-watershed-protection-ewp-program-2013-colorado-flood-recovery-phase-2-project>

Please anticipate the following as a minimum for the post construction as-built survey:

1. Thalweg survey capturing overall stream profile and grade breaks for instream structures.
2. Detailed in-stream structure survey following rock crests or edges and/or select survey at structures showing conformance to plans or changes from plans.
3. Cross section survey at minimum of 200 feet (or as specified by the Engineer – to match hydraulic modeling used for Floodplain Development Permit) spanning the entire regulatory floodplain. Cross sections shall capture all grade breaks along a section including thalweg, toe of slope on each bank, flood benches, and other significant geographic features.
4. All as-built survey to be provided in AutoCAD format and also include a PDF version certified by a Professional Land Surveyor.

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.

REVISION OF SECTION 626 - MOBILIZATION

Section of the Standard Specifications is hereby revised for and shall include the following:

Subsection 626.01 shall be modified to include:

Mobilization shall cover all work including labor, material and any incidental work and equipment necessary for mobilization of personnel, equipment and supplies at the project site. This item shall also include the establishment of the Contractor's offices, buildings, and other necessary facilities. This item may also include providing of required bonds, insurance and preparation of the project schedule. The removal of the Contractor's equipment, supplies, excess materials, and cleanup of the site is also included in this item. No mobilization can take place until all permits have been acquired along with applicable planning documents required of the permits.

Steam cleaning of all equipment is mandatory, before it is transported to the site, to remove both noxious plant seeds and aquatic nuisance species. Prior to the initial arrival onto the project site, all equipment shall be thoroughly steam cleaned, including the undercarriages and tires. Equipment must be clean of all mud, vegetative matter, and other debris to prevent importation of non-native and noxious weed seeds and aquatic nuisance species from other project sites.

All hydraulic fluid used in machines on this project shall be biodegradable. Biodegradable hydraulic fluids shall be utilized for all equipment operating in surface waters. The Contractor shall submit a list of equipment operating with certified non-toxic, biodegradable hydraulic fluids to the engineer prior to use. All fueling, oiling, or maintenance of equipment shall be performed in designated upland locations, with adequate BMPs to contain potential spills.

A spill kit must be on-site during all work with heavy machinery. A spill kit, including absorbent socks and booms, shall be kept onsite during all work with machinery (emergency pollutant isolation and clean-up materials, with procedures). All crew members shall be trained on how to use the spill kit equipment and where the materials are kept onsite. The Engineer shall approve the Contractor's plan for leaking equipment extraction from the creek (spill plan information to be included in SWMP).

During mobilization to the construction site, minimize disturbance to the primary stream channel, side channels, and streambanks.

REVISION OF SECTION 630 – CONSTRUCTION ZONE TRAFFIC CONTROL

Section 630 of the Standard Specifications is hereby revised for this project to include the following:

The Contractor shall submit five (5) copies of a Traffic Control Plan (TCP) to the Engineer for approval at the preconstruction meeting. The TCP shall be in conformance to the Manual of Uniform Traffic Control Devices (MUTCD) and the CDOT standards. The TCP will be reviewed by the Boulder County Transportation, BCPOS and the Engineer.

Flaggers and all necessary traffic control devices shall be supplied and installed by the Contractor.

County Transportation Staff will provide a transportation management plan for the project at the time of building permit application. The plan will outline how progress and other information, such as commute interruptions, will be communicated to the public. The plan will include the following provisions:

- The applicant shall coordinate with the Transportation Department's Public Information Officer, Andrew Barth (303-441-1032) and/or representative. The contractor may provide their own transportation management plan if desired for staff approval.
- Hours of hauling shall be from 8:00 AM to 4:30 PM to limit impacts on regular vehicular traffic, especially during peak commuter periods.
- Workers' vehicles can be parked in designated approved areas that are outside of the road traveled way that do not conflict with the project work. Parking plans shall be shown on the site plans for approval.

The Contractor shall submit a traffic control plan completed by a Traffic Control Supervisor (TCS) to the Transportation Department for review and approval. The TCS shall refer to the transportation management plan when developing the traffic control plan. The traffic control plan shall be submitted at the time of building application. The traffic control plan shall include, at a minimum:

- Flaggers and/or other traffic control measures shall be used at the intersections of the access points to roadways during hauling operations.
- Locations and types of warning signs along the roads shall be shown.
- If applicable, the applicant shall coordinate with the Colorado Department of Transportation (CDOT) about the potential for traffic control at access points on State Highways. Contact Gloria Hice-Idler and/or representative at CDOT (970-350-2148).

END OF SPECIFICATIONS