

EXHIBIT B
Project 23-129: Addendum 1
Technical Specifications

SUPPLEMENTAL SPECIFICATIONS AND SCOPE OF WORK

Supplemental Technical Specifications

SECTION 1.0: SUPPLEMENTAL REQUIREMENTS

The supplemental requirements identified in this document are intended to supplement the Georgia Department of Transportation (GDOT) standard front-end documents, basis for payment items, and/or standard technical specifications due to the specialty nature of this streambank restoration project.

In the event a bid item, basis of payment, technical specification, or requirement conflicts with GDOT Standard Specifications or contract documents, the Contractor shall alert the Engineer and Owner to request written clarification before proceeding.

1.01: Measurement and Payment

A. Supplemental Bid Items

The supplemental bid items identified below correspond with the bid form for this project and are intended to clarify measurement and payment of items that are not described in the GDOT standard front-end documents, basis for payment items, and/or standard technical specifications. Each item provides instructions relating to the measurement for the item and the payment provisions.

D.01 Offsite Haul

- Method of measurement: The quantity of offsite haul will be the actual cubic yardage of fill including removing, loading, transporting, dumping, stockpiling and/or rehandling stockpiled materials from the site as a result of Channel Excavation activities as well as disposing of unsuitable or excess excavated materials. The payment will be considered as full compensation for all material, labor, equipment and related expenses.

- Basis of payment:

Offsite Haul.....Cubic Yard (CY)

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D.02 Double Mud Sill

- Method of measurement: The quantity of double mud sill will be the actual linear feet measured that is installed and accepted by the Engineer. All measurement will be made in the horizontal plane. Materials shall include filter fabric, woody materials, seed, and coir matting. The payment will be considered as full compensation for all material, labor, equipment and related expenses.

- Basis of payment:

Double Mud Sill.....Linear Feet (LF)

D.03 Toe Wood

- Method of measurement: The quantity of toe wood will be the actual linear feet measured that is installed and accepted by the Engineer. All measurement will be made in the horizontal plane. Materials shall include woody materials, live stakes, permanent seed, and coir matting.

- Basis of payment:

Toe Wood.....Linear Feet (LF)

D.04 Angled/Notched Log Sill

- Method of measurement: The quantity of angled/notched log sill in-stream structures to be measured for payment will be the actual number of structures installed and accepted by the Engineer. The payment will be considered as full compensation for all material, labor, equipment, and related expenses.

- Basis of payment:

Angled/Notched Log SillEach (EA)

D.05 Log Grade Control Vane

- Method of measurement: The quantity of log grade control vane in-stream structures to be measured for payment will be the actual number of structures installed and accepted by the Engineer. The payment will be considered as full compensation for all material, labor, equipment, and related expenses.

- Basis of payment:

Log Grade Control Vane.....Each (EA)

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D.06 Angled Rock Sill

- Method of measurement: The quantity of angled rock sill in-stream structures to be measured for payment will be the actual number of structures, installed and accepted by the Engineer. The payment will be considered as full compensation for all material, labor, equipment and related expenses.

- Basis of payment:

Angled Rock Sill.....Each (EA)

D.07 Step Plunge Pool

- Method of measurement: The quantity of step plunge pool in-stream structures to be measured for payment will be the actual number of structures installed and accepted by the Engineer. The payment will be considered as full compensation for all material, labor, equipment and related expenses.

- Basis of payment:

Step Plunge PoolEach (EA)

D.08 Coir Fiber Matting

- Method of Measurement: The quantity of coir fiber matting to be installed will be the actual square yard measured that is installed and accepted by the Engineer. The payment will be considered the full compensation for all material, labor, equipment and related expenses.

- Basis of Payment:

Coir Fiber Matting Square Yards (SY)

D.09 Stream Crossing (Temp.) - Sr-B

- Method of Measurement: Stream crossings shall be measured for payment to be the actual number of crossings installed and accepted by the Engineer. The payment will be considered as full compensation for all material, labor, equipment and related expenses.

- Basis of Payment:

Stream Crossing (Temp.).....Each (EA)

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D.10 Log Mat (Temp. Stream Crossing) - Sr-B

- Method of Measurement: Log Mats shall be measured for payment to be the actual number of crossings installed and accepted by the Engineer. The payment will be considered as full compensation for all material, labor, equipment and related expenses.

- Basis of Payment:

Log Mat (Temp. Stream Crossing) Each (EA)

D.11 Construction Road Stabilization (Temp. Haul Road) - Cr

- Method of Measurement: The quantity of Construction Road Stabilization to be installed will be the actual measured square yardage of wood chips/mulch or gravel that is installed and accepted by the Engineer. The payment will be considered the full compensation for all material, labor, equipment and related expenses to install, maintain, and remove the temporary haul road.

- Basis of Payment:

Construction Road Stabilization (Temp. Haul Road – Wood Chips/Mulch) . Square Yards (SY)

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or

Construction Road Stabilization (Temp. Haul Road – Gravel) Square Yards (SY)

D.12 Concrete Encasement

- Method of Measurement: The concrete encasement installed shall be the actual linear feet measured that is installed and accepted by the Engineer. All measurement will be made in the horizontal plane. Materials shall include filter fabric, stone, and concrete. The payment will be considered as full compensation for all material, labor, equipment and related expenses.

- Basis of Payment:

Concrete Encasement..... Linear Feet (LF)

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D.13 Daily Water Diversion/Pump Around (Dv)

- Method of Measurement: The pump around dewatering operations shall be paid as a lump sum bid item. The payment will be considered the full compensation for all materials (including impervious dikes and silt screens), sediment bag/special stilling basin, labor, equipment and related expenses.

- Basis of Payment:

Pump Around Lump Sum (LS)

D.14 Temporary Seeding (Ds1)

- Method of Measurement: Live stakes shall be measured for payment will be the actual acreage or fractional acreage measured that is installed and accepted by the Engineer. The payment will be considered as full compensation for all material, labor, equipment and related expenses.

- Basis of Payment:

Temporary Seeding Acreage (AC)

D.15 Permanent Seeding (Ds3)

- Method of Measurement: Live stakes shall be measured for payment will be the actual acreage or fractional acreage measured that is installed and accepted by the Engineer. The payment will be considered as full compensation for all material, labor, equipment and related expenses.

- Basis of Payment:

Permanent Seeding..... Acreage (AC)

D.16 Bare Roots/Tubelings

- Method of Measurement: Bare roots shall be measured for payment will be the actual number of plants installed and accepted by the Engineer. The payment will be considered as full compensation for all material, labor, equipment and related expenses.

- Basis of Payment:

Bare Root Seedling Each (EA)

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D.17 Live Stakes

- Method of Measurement: Live stakes shall be measured for payment will be the actual number of plants installed and accepted by the Engineer. The payment will be considered as full compensation for all material, labor, equipment and related expenses.

- Basis of Payment:

Live Stakes Each (EA)

D.18 Tree Protection

- Method of Measurement: Tree Protection shall be shall be paid as a lump sum bid item. The payment will be considered as full compensation for all material, labor, equipment and related expenses.

- Basis of Payment:

Tree Protection Lump Sum (LS)

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1.02 : Construction Scheduling, Coordination and Sequencing

A. Supplemental Requirements

Construction work under this contract shall have the least amount of interferences with the operations of existing park facilities. Existing facilities must be maintained in continuous operation at all times during the course of the work under this contract, unless otherwise shown on the Drawings.

1.03 : Field Services

A. Supplemental Qualifications of Surveyor or Engineer

1. Licensed Land Surveyor shall be currently registered in the state of Georgia.

B. Supplemental Survey Reference Points

1. Locate and protect control points prior to starting site work and preserve all permanent reference points during construction.
2. Make no changes or relocation of the reference points without prior written notice of the Owner.
3. Report to the Owner when any reference point that is lost or destroyed, or that requires relocation because of necessary changes in grades or locations.
4. Require the surveyor to replace Project control points that may be lost or destroyed at no additional cost to the Owner.

C. Supplemental Project Survey Requirements

1. Establish permanent benchmarks, at a maximum spacing of 500 feet, along the alignment. Permanent benchmarks shall be referenced to data established by survey control points.
2. Record the location of the permanent benchmarks, with horizontal and vertical data, on the Project Record Documents.
3. Maintain a complete, accurate log of all control and survey work as it progresses.

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1.04 : Supplemental Project Record Documents

A. Contractor shall maintain at the site one record copy of:

1. Drawings.
2. Addenda.
3. Change orders and other modifications to Contract.
4. Field orders, written instructions, or clarifications.
5. Approved submittals.
6. Field test records.
7. Construction photographs and videos.
8. Associated permits.
9. Certificates of inspection and approvals.
10. Building Permits

B. Pre-Construction Video

Prior to any site disturbance, Contractor shall prepare an existing conditions pre-construction audio-visual survey of the project site and submit to Owner prior to the first request for payment. Pre-construction video format shall be high-resolution DVD or digital file in accordance with the DVD Forum. Video display shall show location, description of existing structures and landscaping, including existing features, date, address, and compass direction of travel and view. Footage shall be correlated to plan stationing and sheet number. Vulnerable, damaged, or deteriorated areas within the zone of influence shall be shown.

C. Daily Construction Report (DCR)

For periodic review at the discretion of the Owner, daily construction reports shall be submitted to the Owner detailing construction activities performed each day throughout the project duration.. The record documents shall consist of progress photos, construction activities performed that day, and quantities of materials installed each day.

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D. Record Drawings

For periodic review at the discretion of the Owner, deliver one marked up set of record drawings to the Owner current with the most recent submitted request for payment. The record documents shall consist of: "Red Line" record drawings; and "Red Line" specifications. Certified record drawings shall be submitted to the owner at the end of construction.

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SECTION 2.0: EARTHWORK

2.01 : Offsite Haul

- **Scope:** Furnish labor, materials, equipment and incidentals necessary to perform the operations in connection with hauling and disposing of materials from the locations specified in accordance with the plans associated with Channel Excavation (GDOT 204-0001) activities.

- **Materials:** N/A

- **Construction Methods:** Hauling of materials may be performed by the use of any excavating and hauling equipment adaptable to the work and by any method generally accepted for this type of work, which is compatible with project requirements and conditions.

2.02 : Additional Tree Removal

- **Scope:** Any additional tree removal work shall be performed on an as-needed basis to complete the construction of the project with the prior written approval of the Engineer and/or Owner. Leave trees shall be marked prior to construction to prevent impacts. Tree removal and preservation is subject to field orders, as approved by the Engineer and/or Owner.

SECTION 3.0: IN-STREAM STRUCTURES

3.01 : Structure Stone/Boulder Selection:

- **Scope:** Structure stone consists of several different classes of approved stone that is utilized to construct structures in and along the stream and at other locations designated on the Plans or directed by the Engineer. It is the Contractor's responsibility to furnish, weigh, stockpile, re-handle, place, and maintain the structure stone. Additionally, the Contractor must dispose of any stone not incorporated into the project. The Contractor shall place structure stone, in locations shown on the Plans or as directed by the Engineer, to the thickness, widths, and lengths as shown on the Plans or directed by the Engineer. All stone shall be placed neatly and uniformly with an even surface. Certain devices may require hand placement to obtain correct size and dimension.

The quantity of structure stone to be installed will be affected by the actual conditions that occur during the construction of the project and may be increased, decreased, or eliminated entirely at the direction of the Engineer. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

- **Materials:** Structure Stone shall consist of natural fieldstone, natural river rock, or blasted quarry stone. The stone shall be sound, tough, dense, resistant to the action of air and water, and suitable in all respects for the purpose intended.

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All stone shall meet the approval of the Engineer. The size of an individual stone particle will be determined by measuring its diameter across the intermediate axis.

The following materials shall meet the requirements of the Georgia Department of Transportation's Standard Specifications:

Coarse Aggregate, No. 5 Stone	Section 800
Coarse Aggregate, No. 57 Stone	Section 800
Coarse Aggregate, No. 67 Stone	Section 800
Plain Rip Rap, Type 1	Section 603
Plain Rip Rap, Type 3	Section 603

Other Structure Stone shall meet the requirements of the following:

ACCEPTANCE CRITERIA FOR STRUCTURE STONE

CLASS	REQUIRED STONE SIZES –INCHES		
	MINIMUM	MIDRANGE	MAXIMUM
SMALL COBBLE	2	4	6
COBBLE	5	8	12
LARGE COBBLE	5	10	17
XXL-COBBLE	9	14	23
BOULDER	18*	36	48

*** NOTE: NO BOULDER DIMENSION SHALL BE SMALLER THAN 18 INCHES**

No more than 5.0% of material in a particular classification may be less than the minimum size specified and no more than 10.0% may exceed the maximum size specified.

Boulder minimum and maximum dimensions shall be strictly adhered to. Boulders of the appropriate dimensions shall be **individually picked**. Boulders shall be relatively flat on either side in the same dimension, preferably the long dimension. Rectangular boulders are preferred; round boulders will not be accepted. Boulder sizes may vary based on the rock available, however, boulders of approximate size 18” x 18” x 24”, 24” x 24” x 30”, 24” x 36” x 36”, 24” x 36” x 48” are preferred. The Engineer shall approve the maximum dimension of all boulders.

The Engineer shall approve the boulder selection prior to in-stream structure placement to ensure conformity with the specifications. If the Engineer rejects the boulders due to characteristics that conflict with the above requirements, the contractors shall replace at no cost to the Owner.

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3.02 : Double Mud Sill

Scope: The work covered by this section consists of the construction and maintenance of physical barriers placed along the stream at locations designated on the Plans for bank stabilization. The double mud sill is primarily used for streambank protection.

- **Materials:** Filter fabric shall meet the requirements of Section 455 of the Georgia Department of Transportation Standard Specifications for Filter Fabric for Embankment Stabilization.

Coir Matting shall meet the requirements of the Section “Coir Matting.”

Structure Stone shall meet the requirements of the Section “Structure Stone.”

Logs: Hardwood tree species and have a minimum basal diameter of 10 inches. The length of each log shall be sufficient to allow proper construction in accordance with the Double Mud Sill Detail.

Construction Methods: Double Mud Sill shall be constructed according to the detail shown on the Plans; field conditions may dictate changes as directed by the Engineer.

Face logs shall be stacked and placed without gaps while the footer log is to be installed the just in front of the toe of slope. Backfill behind face logs shall installed in accordance with the mud sill detail. The Double Mud Sill shall extend from the channel bed up to the bankfull elevation as shown on the Plans. The limits of the Double Mud Sill application (length, width, and height) may be affected by the actual conditions at the time of project construction and may be increased, decreased, or eliminated entirely at the direction of the Engineer. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

Install excavated materials wrapped in coir matting in lift layers as per the dimensions as shown on the Plans. Install as many lift layers as needed so that top of the top lift layer is at bankfull elevation. Install Live Stakes at three (3) feet on-center into the top coir blanket lift layer. Alternatively, and at the Direction of the Engineer, sod mats may be placed on top of the double mud sill as shown on the plans.

Tie the top of the Double Mud Sill bank stabilization to the bankfull elevation, following the typical sections and transitioning smoothly into the bankfull bench. Plant, seed, and install sod mats directed on the Plans.

Minor modifications to the structure may be necessary after water has been returned to the channel. The structure must meet approval by the Engineer.

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3.03 : Toe Wood

- **Scope:** The work covered by this section consists of the construction and maintenance of physical barriers placed along the stream at locations designated on the Plans for bank stabilization. Toe Wood is primarily used for streambank protection.

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Materials: Filter fabric shall meet the requirements of Section 455 of the Georgia Department of Transportation Standard Specifications for Filter Fabric for Embankment Stabilization.

Trunks with Roots: Tree trunks with root balls shall be ten (10) feet to fifteen (15) feet in length, not including the root ball. The trunk diameter shall be ten (10) inches to eighteen (18) inches in diameter, measured at a distance of thirty (30) inches to thirty-six (36) inches above the root base. The root ball shall be not less than four (4) times the trunk base diameter, minimum four (4) feet. The Contractor shall provide a mix of sizes for selection by the Engineer for the various installation locations. Contractor may submit a written request to the Engineer to use alternative dimensions, but materials not falling within the dimensions specified herein, shall not be installed until approved by the Engineer.

Tree species shall be hardwoods, with the tree trunk, stump, and root wad in one single piece. All limbs and branches shall be removed from the trunk segment. All root wads shall be relatively solid (hard) and visibly free from decay, breakage or other damages. Use material identified during work under these sections for tree trunks with root balls

Branches and Woody Debris: Branches and small woody debris shall include limbs, small logs, tree tops, brush and woody shrubs. Limbs may be a variety of sizes with or without leaves/needles depending on the season. Leaves and/or needles not attached to a tree limb (i.e. bundles, piles, etc.) are not allowed. Tree species for the wood material shall be hard woods. Use material identified during work under these sections for branches and small woody debris.

Logs: Hardwood tree species and must have a minimum basal diameter of 10 inches. The length of each log shall be sufficient to allow proper construction in accordance with the Toe Wood Detail.

- **Construction Methods:** Toe Wood shall be constructed according to the detail shown on the Plans; field conditions may dictate changes as directed by the Engineer. Toe Wood shall extend from the channel bed up to the bankfull elevation as shown on the Plans. The limits of the Toe Wood application (length, width, and height) may be affected by the actual conditions at the time of project construction and may be increased, decreased, or eliminated entirely at the direction of the Engineer. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

Install the footer log just in front of the toe of slope such that the branches and woody debris lay on-top of and perpendicular to the log at the toe of slope as shown on the Plans. Place the tree trunk with root wads atop of the footer log oriented so that the flow of the stream is directly into the base of the root ball. The branches and woody debris shall be nestled in between the footer log and tree

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trunk with root wads.

Install excavated materials wrapped in coir matting in lift layers as per the dimensions as shown on the Plans. Install as many lift layers as needed so that top of the top lift layer is at bankfull elevation. Install Live Stakes at three (3) feet on-center into the top coir blanket lift layer. Alternatively, and at the Direction of the Engineer, sod mats may be placed on top of the toe wood as shown on the plans.

Tie the top of the Toe Wood bank stabilization to the bankfull elevation, following the typical sections and transitioning smoothly into the bankfull bench. Plant, seed, and install sod mats directed on the Plans.

Minor modifications to the structure may be necessary after water has been returned to the channel. The structure must meet approval by the Engineer.

3.04 : Angled/Notched Log Sill

- **Scope:** The work covered by this section consists of the construction and maintenance of physical barriers placed in and along the stream at locations designated on the Plans to direct the stream flow toward the center of the channel (thalweg). An Angled/Notched Log Sill is primarily used for energy dissipation and to re-direct the thalweg through a sinuous path along the channel bed.

- **Materials:** Filter fabric shall meet the requirements of Section 455 of the Georgia Department of Transportation Road Standard Specifications for Filter Fabric for Embankment Stabilization.

Structure Stone shall meet the requirements of the Section "Structure Stone."

Logs: Hardwood tree species and must have a minimum basal diameter of 10 inches. The length and basal diameter of each log shall be sufficient to allow proper construction in accordance with the Log Grade Control Vane Detail.

- Construction Methods:

Angled/notched log sills shall be constructed according to the "Angled/Notched Log Sill" detail shown on the plans or as directed by the Engineer. Header and foot logs used in the structure shall meet log specifications described above. The structure step should extend diagonally across the channel with a minimum 5 percent slope from the streambank down towards the upstream bed elevation. The top elevation of the step will decrease from ½ bankfull elevation toward the center of the channel at a minimum slope of 5 percent. The thalweg notch (shown as hatched on the plans) should be depressed 3-4" lower than the rest of the log structure to concentrate the flow path. The log step is locked together and anchored into the bank by a structure class stone. Vanes shall extend into the streambank a minimum of 5'. A footer log is placed below the bed elevation while the header log is placed downstream and rests on top of the footer log. Place Type 2 filter fabric at the upstream side of the vane log and backfill with washed bed material or cobble stone. The filter fabric shall be securely fastened to the back of the logs using galvanized roofing nails on

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approximately 8 inch centers. A scour pool is dug on the downstream side of the sill.

Minor modifications to the structure may be necessary after water has been returned to the channel. The structure must meet approval by the Engineer.

3.05 : Log Grade Control Vane

- **Scope:** The work covered by this section consists of the construction and maintenance of a grade control vane to direct overland flow into the channel at the location indicated on the plans. A grade control vane is used to create a scour pool for energy dissipation.

- **Materials:** Filter fabric shall meet the requirements of Section 455 of the Georgia Department of Transportation Road Standard Specifications for Filter Fabric for Embankment Stabilization.

Logs: Hardwood tree species and must have a minimum basal diameter of 10 inches. The length and basal diameter of each log shall be sufficient to allow proper construction in accordance with the Log Grade Control Vane Detail.

- Construction Methods:

Log grade control vane shall be constructed according to the "Log Grade Control Vane" detail shown on the plans or as directed by the Engineer. Header and foot logs used in the structure shall meet log specifications described above. A vane each approximately 1/3 of the stream channel bankfull width will form a 18-39-degree angle out from the streambank toward the upstream. The top elevation of the vane will decrease from 1/2 bankfull elevation toward the center of the channel at a slope of 3 to 7 percent. A footer log is placed upstream of the log sill and below the bed elevation. The header log is placed downstream of the footer log and rests on top of the footer log. The logs are bound with 3/8 inch steel cable and buried beneath anchor stone and extended into the bank. Sill and wing logs will be notched to ensure proper connection. Attach filter fabric at the upstream side of the vane with Type 2 filter fabric and fill with washed bed material or cobble. The filter fabric shall be securely fastened to the back of the logs using galvanized roofing nails on approximately 8 inch centers. A scour pool is dug on the downstream side of the vane.

Minor modifications to the structure may be necessary after water has been returned to the channel. The structure must meet approval by the Engineer.

3.06 : Angled Rock Sill

- **Scope:** The work covered by this section consists of the construction and maintenance of physical barriers placed in and along the stream at locations designated on the Plans to direct the stream flow toward the center of the channel (thalweg). An Angled Rock Sill is primarily used for energy dissipation and to re-direct the thalweg through a sinuous path along the channel bed.

- **Materials:** Filter fabric shall meet the requirements of Section 455 of the Georgia Department of Transportation Road Standard Specifications for Filter Fabric for Embankment Stabilization.

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Structure Stone shall meet the requirements of the Section “Structure Stone.”

- **Construction Methods:** Angled Rock Sills shall be constructed according to the rock n’ roller detail shown on the plans or as directed by the Engineer. The structure step should extend diagonally across the channel with a minimum 5 percent slope from the streambank down towards the upstream bed elevation. The top elevation of the step will decrease from ½ bankfull elevation toward the center of the channel at a minimum slope of 5 percent. Thalweg rocks (shown as hatched on the plans) should be depressed 3-4” lower than other rocks in the structure to concentrate the flow path. The rock step is locked together and anchored into the bank by a structure class stone. Vanes shall extend into the streambank a minimum of 5’ Place Type 2 filter fabric at the upstream side of the vane rocks and backfill with washed bed material or cobblestone.

Minor modifications to the structure may be necessary after water has been returned to the channel. The structure must meet approval by the Engineer.

3.07 : Step Plunge Pool

- **Scope:** The work covered by this section consists of the construction and maintenance of a step plunge pool to direct overland flow into the channel at the location indicated on the plans. A step plunge pool is primarily used for energy dissipation.

- **Materials:** Filter fabric shall meet the requirements of Section 455 of the Georgia Department of Transportation Road Standard Specifications for Filter Fabric for Embankment Stabilization.

Structure Stone shall meet the requirements of the Section “Structure Stone.”

- **Construction Methods:** Step plunge pool shall be constructed according to the “Step Plunge Pool” detail shown on the plans or as directed by the Engineer. Header and foot rocks used in the structure shall be boulders. The step plunge pool shall extend along the bank and key into the toe of slope with rock toe protection to prevent undercutting. Rock steps are locked together and anchored into the bank by a structure class stone. Attach filter fabric at the upstream side of the vane with Type 2 filter fabric and fill with washed bed material or cobble stone. The nonwoven filter fabric shall be securely fastened to the back of the rock using galvanized roofing nails on approximately 8 inches (200 mm) centers.

Minor modifications to the structure may be necessary after water has been returned to the channel. The structure must meet approval by the Engineer.

3.08 : Soil Layer Lifts

- **Scope:** The work covered by this section consists of the construction and maintenance of stream bank protection measures placed along the stream at locations designated on the Plans for bank

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stabilization. Soil Layer Lifts consist of a series of soil layers wrapped in coir fiber matting as shown on the Plans. The Soil Layer Lifts will be applied above double mud sills and toe wood.

- **Materials:** Coir fiber matting shall meet the requirements of the Section “Coir Fiber Matting.”

- **Construction Methods:** Install excavated materials wrapped in coir matting in lift layers as per the dimensions as shown on the Plans. Install as many lift layers as needed so that top of the top lift layer meets existing top of streambank elevation. Install Live Stakes at three (3) feet on-center into the top coir blanket lift layer. Alternatively, and at the Direction of the Engineer, sod mats may be used in place of coir wrapped lifts, as shown on the plans.

Plant, seed, and install sod mats directed on the Plans.

3.09 : Coir Fiber Matting

- **Scope:** The work covered by this section consists of the construction and maintenance of stream bank protection measures placed along the stream for bank stabilization. Coir fiber matting is to be placed on any disturbed ground for stabilization.

- **Materials:** Coir fiber matting shall meet the following specifications:

Physical Specification (Roll)	
Material	100% (coconut fiber) coir twine woven into a high strength matrix
Thickness	0.30 inch minimum
Tensile Strength	1348 x 626 lb/ft. minimum
Elongation	34% x 38% maximum
Flexibility	65030 x 29590 mg-cm
Flow Velocity	Observed 11 ft./sec.
Weight	20 oz./SY
Size	6.6 x 164 ft. (120 sy) or (100 sm)
“C” Factor	0.002
Open Area (measured)	50%

Stakes shall be hard wood with a minimum length of 24 or 36 inches depending on stake location. Stakes shall have a notch cut two inches from the top of the stake. The notch must be able to sufficiently grab and retain matting when installed. Upon request, the Engineer may allow a nail to be driven in the stake at an angle of approximately 45 degrees and pointed towards the ground in lieu of the notch. The nail must be embedded into the stake a minimum of one inch and must have a minimum of two inches extending out from the stake. Stakes shall be of sufficient thickness for soil penetration without cracking or breakage.

- **Construction Methods:**

1. Coir fiber matting, erosion control blankets, and synthetic roving shall be installed

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- immediately following seeding and mulching operations. Water shall not be diverted into new channels until matting is installed. Provide a smooth soil surface free from stones, clods, or debris that will prevent the contact of the matting with the soil. The matting shall be pressed into the soil to ensure good contact with the soil. Take care to preserve the required line, grade, and cross section of the area covered. The matting shall be staked according to the Plans unless otherwise directed by the Engineer.
2. Coir fiber matting shall be unrolled and applied without stretching such that it will lie smoothly but loosely on the soil surface. There are to be no creases or bulges in the matting. Bury the top slope end of each piece of matting in a narrow trench at least 6 in. deep by 6-in. wide and tamp firmly. Where one roll of matting ends and a second roll begins, overlap the end of the upstream roll over the buried end of the downstream roll so there is a minimum one-foot overlap. Fold over and bury matting to the full depth of the trench, close and tamp firmly. Overlap matting a minimum of one foot where 2 or more widths of matting are installed side by side. Construct minimum one-foot wide check folds in the matting every 50 ft. longitudinally, or as directed by the Engineer.
 3. Coir fiber matting shall have hardwood stakes placed across the ends, sides, junctions, check trenches, and the toe of the channel bank at a spacing of approximately 2.5 ft. apart. Interior stakes may be spaced at approximately 2.5 ft. apart. Stakes are to be a minimum of 24 inches in length. The stake notch or nail shall face upslope. The Engineer may require adjustments in the trenching or staking requirements to fit individual site conditions.

3.10: Concrete Encasement

- **Scope:** The work covered by this section consists of the installation of a concrete encasement for an exposed ductile iron sanitary sewer crossing at the location indicated on the plans. The concrete encasement shall meet the latest GDOT specifications and requirements.

- **Materials:** Filter fabric shall meet the requirements of Section 455 of the Georgia Department of Transportation Road Standard Specifications for Filter Fabric for Embankment Stabilization.

Concrete shall meet the requirements of Section 300 and Section 400 of the Georgia Department of Transportation Road Standard Specifications.

Structure Stone shall meet the requirements of the Section "Structure Stone."

- **Construction Methods:** The concrete encasement shall be constructed according to the "Concrete Sewer Encasement" detail shown on the plans or as directed by the Engineer.

SECTION 4.0: EROSION AND SEDIMENT CONTROL

401 : Stream Crossing (Temp.) – Sr-B

- **Scope:** The work covered by this section consists of the construction and maintenance of a temporary stream crossing installed across a flowing stream or watercourse for use by construction equipment at the location indicated on the plans. The temporary stream crossing shall meet the latest GDOT specifications and requirements and the requirements per the Georgia Manual for Erosion and Sediment Control, latest edition.

- **Materials:** Filter fabric shall meet the requirements of Section 455 of the Georgia Department of Transportation Road Standard Specifications for Filter Fabric for Embankment Stabilization.

Structure Stone shall meet the requirements of the Section “Structure Stone.”

- **Construction Methods:** The temporary stream crossing shall be constructed according to the “Temporary Stream Crossing (Sr-B)” detail shown on the plans or as directed by the Engineer.

The crossing must meet approval by the Engineer.

402 : Log Mat (Temp. Stream Crossing) – Sr-B

- **Scope:** The work covered by this section consists of the construction and maintenance of a log mat temporary stream crossing installed across a flowing stream or watercourse for use by construction equipment at the location indicated on the plans. The temporary stream crossing shall meet the latest GDOT specifications and requirements and the requirements per the Georgia Manual for Erosion and Sediment Control, latest edition.

- **Materials:** Filter fabric shall meet the requirements of Section 455 of the Georgia Department of Transportation Road Standard Specifications for Filter Fabric for Embankment Stabilization.

Structure Stone shall meet the requirements of the Section “Structure Stone.”

- **Construction Methods:** The log mat temporary stream crossing shall be constructed according to the “Log Mat – Temporary Stream Crossing (Sr-B)” detail shown on the plans or as directed by the Engineer.

The crossing must meet approval by the Engineer.

4.03 : Construction Road Stabilization (Temporary Haul Road) - Cr

- **Scope:** The work covered by this section consists of the construction and maintenance of a temporary haul road for use by construction equipment at the location indicated on the plans to provide a fixed route for construction traffic and reduce erosion. The temporary haul road shall meet the latest GDOT specifications and requirements and the requirements per the Georgia Manual for Erosion and Sediment Control, latest edition.

- **Materials:** Filter fabric shall meet the requirements of Section 455 of the Georgia Department of Transportation Road Standard Specifications for Filter Fabric for Embankment Stabilization.

Haul road to be constructed with wood chips/mulch or gravel, as directed by the City. The wood chips/mulch and gravel to meet the latest GDOT specifications and requirements and the requirements per the Georgia Manual for Erosion and Sediment Control, latest edition.

- **Construction Methods:** The temporary haul road shall be constructed according to the “Cr – Construction Road Stabilization” detail shown on the plans or as directed by the Engineer on sheets ES-11, DT-4, and DT-6. A tree survey will be performed prior to construction in order to field-locate “leave trees” for the contractor to avoid. The haul road alignment is subject to change based on field order issued by the City/Engineer.

The crossing must meet approval by the Engineer

SECTION 5.0: DAILY WATER DIVERSION/PUMP AROUND

5.01 : General

The work covered by this section consists of water diversion/pump arounds use to redirect flow. Water diversions/pump arounds are used for flows exceeding 5 cubic feet per second (cfs) and no more than 10 cfs to divert water around the area where work is being done. Daily water diversion/pump around is required only when active construction activities are being undertaken in the channel or along channel banks.

5.02 : Materials

Water Diversion/Pump Around

It shall be the responsibility of the contractor to provide all pumps, hose, materials, apparatus, fuel, pipe, and maintenance required to maintain pumping/diversion activities required during construction for the duration of the project.

Impervious Dike/Rock Silt Screen

Acceptable materials for the Impervious Dike/Rock Silt Screen shall include, but not be limited to, sheet piles, woven polypropylene sandbags, and polypropylene, polyethylene, or other impervious fabric. Earth material that is silty or otherwise likely to cause sedimentation shall not be used to construct an impervious dike.

Sediment Bag/Special Stilling Basin

Permeable fabric bags used for special stilling basins shall trap sand, silt, and fines as sediment- laden water is pumped into it. This device shall be constructed such that it is portable and can be used adjacent to the section of stream construction. Unless the Engineer gives written exception, the special stilling basin(s) bag shall be constructed to a size of 10' x 10' and made from a non- woven fabric. It shall have a sewn-in spout for receiving pump discharge. The bag seams shall be sewn with a double needle machine using a high strength thread. The seams shall have a minimum wide width strength as follows:

Test Method	Minimum Specifications
ASTM D-4884	60 lb/in (10.7 kg/cm)

The fabric used to construct the bag shall be stabilized to provide resistance to ultra-violet degradation and meet the following specifications for flow rates, strength, and permeability:

Property	Test Method	Minimum Specifications	
		Units	Value
Weight	ASTM D-3776	oz/yd	8
Grab tensile	ASTM D-4632	lb	200
Puncture	ASTM D-4833	lb	130
Flow rate	ASTM D-4491	gal/min/sf	80
Permittivity	ASTM D-4991	1/sec	1.5
UV Resistance	ASTM D-4355	%	70

5.03 : Construction Method

Impervious Dike/Rock Silt Screens

Impervious dikes and rock silt screens shall be constructed at locations as shown on the Plans or as directed by the Engineer. Clear and grub all side slopes of the channel. Construct the impervious dike or rock silt screen across the entire width of the channel. Rock silt screens may be converted to Stone impervious dikes, and vice versa, with the addition or removal of impervious fabric

Water Diversion/Pump Around

1. Install temporary impervious dikes as shown in the Plans. Pump/divert water around the work site. If the water is turbid or exposed to bare soil, pump through a special stilling basin. Follow the detail for the pump-around/pipe diversion. Once the work is complete in the construction area, impervious dikes, pumping systems, and/or diversions shall be removed or relocated. Water diversions/pump arounds shall comply with permit requirements.

The Contractor shall install and maintain temporary construction channel entrances in accordance with the details in the Plans to access the channel during water diversion/pump around activities. The stone shall be rolled or tamped to provide an even stable surface to access the channel during construction. Periodic topdressing will be required during the construction phase to maintain the entrances.

2. After completion of the project, temporary construction channel entrances will be removed. The contractor shall, as a minimum, return construction entrances to their pre-construction condition and repair and re-seed any eroded areas that have resulted from construction activities.

Sediment Bag/Special Stilling Basin

1. The Contractor shall install the special stilling basin in accordance with the details in the Plans and at locations as directed by the Engineer. The special stilling basin(s) shall be placed so the incoming water flows into and through the basin without causing erosion. When using a permeable fabric bag, the neck or spout of the bag shall be tied off tightly to stop the water from flowing out of the bag without going through the walls.

2. The special stilling basins(s) shall be replaced and disposed of when it is 3/4 full of sediment, when it is impractical for the basin to filter the sediment out at a reasonable flow rate, or when it becomes damaged (punctured or torn bag).
3. The Contractor shall be responsible for providing a sufficient quantity of material (bags, etc.) to contain silt from pumped effluent during construction of the stream.

SECTION 6.0: PLANTING

The work covered by this section consists of furnishing, installing, and maintaining all vegetative plantings at locations described on the Plans and as directed by the Engineer. The work includes planting bed preparation, initial planting, plant establishment, watering, and replacement planting. Seeded and mulched areas that have been disturbed from the Vegetation Planting operation shall receive further Seeding and Mulching. The Contractor shall perform the work in a careful, workmanlike manner that will promote the continued life and healthy growth of all plants in their final location. **The Plant List in the Plans gives the particular species to be used for Vegetation Plantings.**

The Planting Supervisor (i.e. Contractor superintendent) shall be on-site during all Vegetative Planting operations. The Planting Supervisor is responsible for managing the Vegetative Planting operations, including but not limited to ordering vegetation, site preparation for planting, planting operations, quality control inspections, and managing plant competition. Activities associated with Vegetative Plantings that are not supervised by the Planting Supervisor may be halted by the Engineer and may not be approved for payment.

The Planting Supervisor shall locate sources for all specified vegetation and place orders immediately following notice to proceed. Requests for substitutions shall be submitted to the Engineer within two weeks of notice to proceed.

The Contractor shall extend the warranty another year, or up to the end of the next growing season, for ensuring the survivability of 70% of temporary and permanent seeding, 80% of bare-roots and live stakes and 100% of ball and burlaps against defects, including mortality and poor growth, except for defects resulting from abuse by other parties and abnormal weather conditions.

No planting shall be done when the temperature is below 32°F, when soil to be excavated for the plant hole is frozen, when the sides or bottom of the plant hole are frozen, or when the soil to be used for backfilling is frozen or too wet. **No trees shall be planted in utility easements or under utility lines, whether or not indicated on the plans.** The Contractor shall consult the Engineer for direction on the type of vegetation to plant in utility easements and under utility lines. Generally, vegetation plantings shall be minimized or eliminated in these areas. When allowed, only low-growing vegetation shall be permitted.

In digging, loading, transporting, unloading, planting, or otherwise handling plants, the Contractor shall exercise utmost care and use adequate precautions to prevent injury to or drying out of the trunk, branches, or roots as well as prevent freezing of the plant roots. Container vegetation must always be handled by the container and never by the tops of the

plants. Unless directed otherwise by the Engineer, vegetative plantings shall be dormant at the time of acquisition and planting but living based on the presence of young buds and green bark. Vegetation Plantings shall be installed between November 15 and May 15, unless directed otherwise by the Engineer.

During periods of dry weather, the Contractor shall be required to irrigate vegetation plantings. Dry weather includes any period of 8 days with no rainfall. The volume of irrigated water shall be a minimum of a ½ inch over the planted area. The application rate shall not create overland erosion.

6.01 : Permanent and Temporary Seeding

- **Scope:** The work includes seedbed preparation; furnishing, placing, and incorporating soil amendments, fertilizer and seed; compacting the seedbed; furnishing, placing, and securing mulch; and performing other operations necessary for the permanent establishment of vegetation. Seeding is divided into two categories: temporary and permanent. Temporary mixtures include annual ground covers that grow quickly. Permanent mixtures include riparian native, perennial ground covers that may take significant time to germinate. Both temporary and permanent seeding is to be sown together unless the construction sequence requires a later disturbance of the area that will destroy the permanent ground cover. The temporary seed will sprout quickly and provide a ground cover that stabilizes the soil and minimizes erosion and sedimentation. At the turn of the season, the temporary seed will die off. However, the permanent seed will have had additional time to germinate and grow, becoming a ground cover that can reduce erosion and sedimentation.

The Contractor is responsible for establishing and maintaining vegetation on all disturbed areas. Disturbed areas shall be seeded, fertilized, mulched, and tacked within three days of the completion of construction activities in that area. Disturbed areas must be vegetated within timeframes dictated by permit requirements. When the Contractor fails or neglects to diligently pursue the control of erosion and siltation, the Engineer may suspend the Contractor's grading operations. If an area is disturbed after initial vegetation establishment **or** vegetation otherwise fails to become established, the Contractor is required to do all work necessary to prepare, reseed, and mulch the area until vegetation is established using a combination of temporary and permanent seed. No additional compensation shall be made for this effort. This may require several supplemental seeding and mulching and/or multiple seeding and mulching applications. In locations where disturbance of the area at a later time is inevitable, but erosion control requirements oblige the Contractor to establish a vegetative cover, the Contractor shall use a temporary seed mixture. Once land disturbing activities cease, a temporary/permanent seed mix combination and fertilizer may be applied to the area. Temporary seeding shall be applied in conjunction with permanent seeding whenever viable. Fertilizer is only to be used with the permanent seeding.

When a summer mix is used in the initial application of the temporary/permanent seed combination, a winter mix shall be applied in the month of October. When a winter mix is used in the initial application of the temporary/permanent seed combination, a summer mix shall be applied in the month of April. The Engineer shall provide written notification to the Contractor if both a winter and summer seeding application is not warranted.

All applications of seed, will include the application of fertilizer, amendments, and mulch according to the recommended rates.

Seed mixtures will vary by the specific planting location. These locations are termed zones and are further defined on the Planting Plan and Planting Schedule. In general, a temporary and a permanent seed mix shall be combined to form the final mixture for seeding. The planting rate of the combined mixture shall equal the sum of the planting rates for the temporary and permanent seeding mixtures. The planting zone dictates the permanent seed mixture, while the planting date determines the associated temporary seed mixture. The following table summarizes seeding rates:

Seed Mix	Type	Seeding Rate (lbs./acre)
Winter	Temporary	50
Summer	Temporary	50
All	Permanent	25

- **Material:** Seed shall meet the requirements of Section 890 of the Georgia Department of Transportation Standard Specifications for Seed and Sod. Only certified seed shall be allowed unless the Engineer specifies otherwise in writing. **The Planting Schedule in the Plans gives the particular variety of seed used in the permanent and temporary seed mixtures as well as the planting zones.** Seed mixtures shall be a minimum of 75% pure live seed (PLS). The Contractor shall submit a copy of the seed label to the Engineer for approval. The label shall provide detailed information including, but not limited to, germination rates, noxious weed seeds, date and location of harvest. The Contractor shall not accept seed from a vendor who cannot supply this information about the viability, purity, and provenance of the seed. Wet seed or seed that is moldy or otherwise damaged in transit or storage is not to be used.

Mulch shall meet the requirements of the Georgia Department of Transportation Standard Specifications for Mulch for Erosion Control.

Mulch applied by means of a hydro-seeder shall be a wood/cellulose fiber mixture that contains equal portions of wood fiber material and cellulose fiber material. Wood fiber hydro-seeding mulch shall be made from wood chip particles manufactured particularly for discharging uniformly on the ground surface when dispersed by a hydraulic water sprayer. Cellulose fiber hydro-seeding mulch shall be made from recycled magazine stock products that are shredded into small pieces for discharging uniformly on the ground surface when dispersed by a hydraulic water sprayer. The mixture shall remain in uniform suspension in water under agitation and blend with grass seed and fertilizer to form homogeneous slurry. The fibers shall intertwine physically to form a strong moisture-holding mat on the ground surface and allow rainfall to percolate the underlying soil. The fiber material shall be heat processed and contain no germination or growth-inhibiting factors. It shall be dyed (non-toxic) an appropriate color (i.e. green) to facilitate the application of material. Suppliers shall be

prepared to certify that laboratory and field- testing of their product has been accomplished and that it meets all of the foregoing requirements based upon such testing.

Binding material for straw mulch shall be undiluted emulsified asphalt for tacking material.

- **Methods:** The seedbed shall be prepared by disposing of weeds or other unacceptable growth. Shape and smooth uneven and rough sections. Prepared areas are to be moistened prior to seeding when soil is dry, but care shall be taken not to create muddy conditions. Fertilizer, seed, and mulch shall be applied within 24 hours of the seedbed preparation. The Contractor is to limit sub-grade and finish grade preparation to areas that will be planted immediately.

Seed, fertilizer, amendments, and mulch shall be applied with a hydro-seeder. Hydro-seeding equipment shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend, and homogeneously mix slurry of the specified amount of mulch, fertilizer, seed, and water. The slurry distribution lines shall be large enough to prevent stoppage. The discharge line shall be equipped with a set of hydraulic spray nozzles that will provide even distribution of the slurry on the various areas to be seeded. The slurry tank shall have a minimum capacity of 1000 gallons. The seed, fertilizer, amendments, mulch, and water shall all be combined into the slurry tank for distribution of all ingredients in one operation by the hydraulic seeding method specified herein. The materials shall be combined in a manner recommended by the manufacturer. Normally, the hydro-seeder tank shall be loaded by filling the tank to 1/3 of capacity with water, adding liquid lime, mulch, and fertilizer. The slurry mixture shall be so regulated that the amounts and rates of application shall result in a uniform application of all materials at rates not less than the amounts specified. Using the color of the mulch as a guide, the equipment operator shall spray the prepared seedbed with a uniform visible coat. The slurry shall be applied in a sweeping motion, in an arched stream, to fall like rain, allowing the mulch applications to build upon each other until an even coat is achieved. Seed shall be evenly distributed by distributing in two directions at right angles to each other. The hydro-seed mixture shall be applied so that the existing soil surface is not visible. Seed is not to be broadcast or dropped when wind velocity exceeds 5 mph. When hydro-seeding, soil amendments shall be applied to all planting areas according to the following schedule:

<u>AMENDMENT</u>	<u>TYPE</u>	<u>RATE</u>
Nitrogen (N)	Liquid	30 lbs./acre
Lime	Liquid	2.5 gallons/acre
Mulch	Slurry	1500 lbs./acre

Either liquid Ammonium Nitrate (NH₄NO₃) or Sodium Nitrate (NaNO₃) may be used to meet the Nitrogen requirement. However, the rate listed for Nitrogen (N) is for pure Nitrogen; therefore rates of Ammonium Nitrate or Sodium Nitrate will be significantly higher than the rate for the Nitrogen alone. The Contractor shall provide material specifications of all amendments to the Engineer.

Distribute fertilizer and seed uniformly over the seedbed at the required rate of application and immediately harrow, drag, rake, or otherwise work so as to cover the seed with a layer of

soil and/or mulch. When using seed drills, hydro-seeders, or sod-seeders, working the soil may not be necessary. All areas to be seeded shall be mulched. The specific type of mulch may be indicated on the Planting Plan. If the Engineer allows the use of grain straw, it may be applied as mulch at any time of the year. Spread mulch uniformly by hand or by approved mechanical spreaders or blowers that will provide an acceptable application. An acceptable application will allow sunlight penetration while shading the ground, reducing erosion, and conserving soil moisture. Mulch shall be held in place by a sufficient amount of binding material. The Engineer shall approve the rate and method of application of binding material.

All fertilizing and seeding operations after the initial fertilizer and seed application shall be done by a method that does not disturb existing vegetation. Minimum tillage methods such as seed drills, hydro-seeders, hydro-mulchers, or sod-seeders shall be used.

6.02 : Bare Roots/Tubelings

- **Scope:** The work includes planting of bare root/tubeling tree stock.

- **Material:** Hardwood species planted as bare-root/tubeling seedlings must have a minimum of four (4) first order lateral roots (FOLR) that exceed 1 mm in diameter. Seedlings that do not possess the minimum number of FOLR will be culled from planting.

Hardwood bare-root/tubeling seedlings that will form the canopy must have a minimum root collar diameter (RCD) of 3/8-inch. Seedlings with lesser RCD's will be culled from planting. For species of bare-root/tubeling seedlings that do not typically exhibit RCD's of 3/8-inch, such as bald cypress or river birch, a minimum RCD of 1/4-inch may be allowed.

Roots shall be dipped in a polymer-based root dip prior to planting to aid in plant survival during dry periods.

For soil layer lift wall areas, hardwood seedlings shall be planted at time of soil layer lift installation. Contractor shall select type of seedling (bare root/tubeling) which will survive the season in which Construction of soil layer lifts take place. Selection of seedlings shall be coordinated with Engineer if species composition or type changes.

- **Installation:** The storage, handling, and planting of bare-root/tubeling seedlings will follow the procedures outlined in the Georgia Department of Forestry's *Seedling Care and Planting Instructions*. Bare roots will be installed in the location and in the configuration presented in the plans.

All bare-root/tubeling seedlings will be planted with shovels or augers rather than with a hoe-dad, KBC bar, dibble bar, or OST bar. The Engineer may monitor the planting operation to enforce correct planting techniques. Each planted bare-root/tubeling seedling must be mulched with two flakes from a bale of straw or other organic material approved by Engineer.

The Engineer will conduct inspections of permanent vegetation. Seedlings are to be examined for above-ground and below-ground defects that include but are not limited to the following:

cull seedlings; planted excessively deep or shallow; more than one tree per planting location; loosely planted seedlings; excessively leaning seedlings; dead or damaged seedlings; cull seedling (RCD/ FOLR); debris in planting hole; ‘J’, ‘U’, or ‘L’ rooted seedlings; and twisted roots.

6.03 : Live Stakes

Material: Live stakes shall consist of a random mix of flood-tolerant, woody species that root rapidly from vegetative cuttings.

Live stakes shall be ½” to 2” in diameter and 2 to 4 feet in length. The Engineer may direct alternative size requirements for species that do not perform well at the noted diameters.

The basal ends of the live stakes shall be cleanly cut at an angle to facilitate easy insertion into the soil and the tops shall be cut square or blunt for tamping. All lateral limbs and shoots shall be removed from the live cutting, avoiding damage to the bark ridge and branch collar.

Materials shall be installed the same day as prepared or stored in cold, moist conditions (40-50 degrees F, >50% humidity) for no longer than 2 weeks until use. Cuttings shall remain wet until they are planted. Outside storage locations shall be continually shaded and protected from wind and direct sunlight.

- **Installation:** Live stakes shall be installed in the location and according to the configuration presented in the Plans. Live stakes shall be tamped perpendicularly into the finished bank slope with a dead blow hammer, with buds oriented in an upward direction. Stakes shall be tamped until approximately ¾ of the stake length is within the ground. One to two inches shall be cut cleanly off of the top of each live stake (with loppers) at an angle of approximately 15 degrees following installation. Any stakes that are split or damaged during installation shall be removed and replaced. A minimum of two buds shall be above the planting depth. The area around each live stake shall be compacted by foot after the live stake has been installed.

6.05 Tree Protection

- **Scope:** The work covered by this section includes the protection of desirable trees from injury during construction activities through the use of fencing and tree prescription measures..

- **Material:** Tree Protection materials shall be implemented according to the “Tr – Tree Protection” detail shown on the plans or as directed by the Engineer on the erosion control (“ES”) and tree protection (“TR”) plan sheets.

- **Installation:** Tree Protection measures shall be implemented according to the “Tr – Tree Protection” detail shown on the plans or as directed by the Engineer on the erosion control (“ES”) and tree protection (“TR”) plan sheets. A tree survey will be performed prior to construction to field-locate “leave trees” for contractor to avoid and/or apply tree protection measures towards.

******END EXIHIBIT B******