ADDENDUM NO. 1

March 15, 2017

CONTRACT DOCUMENTS FOR
ETHAN ALLEN GATEWAY STREETSCAPE
CITY OF TAKOMA PARK
IFB NO. HCD-20170201
SHA CONTRACT NO. MO0705125
FAP NO. TAP-3(481)E

TO ALL PROSPECTIVE BIDDERS:

The original specifications and plans for the project noted above are hereby modified as described below:

Qualifications and Bids are due in separate sealed envelopes by 3:30 pm on Wednesday, April 12, 2017.

The Bid Opening Date is now scheduled for **April 24, 2017.**

Pre-Bid Questions and Responses are included as an attachment to this letter.

Receipt of this ADDENDUM shall be acknowledged by attaching it to the Bid Proposal. Failure to acknowledge this ADDENDUM in the manner described above shall render the bidder's proposal non-responsive.

The attention of Prospective Bidders is directed to the following changes and/or additions to the Contract Documents:

INVITATION FOR BIDS

Page No.	Description
COVER	REVISED COVER. Revised Notice to Bidders to read "Qualifications and Bids are due in separate sealed envelopes by 3:30 pm on Wednesday, April 12, 2017."
VII	REMOVED SP-Section-902 – Portland Cement Concrete and Related Products (Table 902A). REVISED SPI -Section 920 – Landscaping Materials to SP – Section 920 – Landscaping Materials.
1	REVISED CITY OF TAKOMA PARK SUPPLEMENTAL SUBMITTAL REQUIREMENTS City IFB No. HCD-20170201. Revised procedure and submission dates for qualifications and bids.
89-89C	REVISED SECTION 101 – CLEARING AND GRUBBING. Revised to match current specification issued from MDSHA on 02/09/17.
120-121	REVISED SECTION 201 – ROADWAY EXCAVATION. Revised section 201.03.09.

175-178A	REVISED SECTION 505 – HOT MIX ASPHALT PATCHES. Revised to match current specification issued from MDSHA on 02/09/17.
216-219B	REVISED SECTION 701 – TOPSOIL AND SUBSOIL. Revised to match current specification issued from MDSHA on 02/09/17.
220-223	REVISED SECTION 704 – TEMPORARY MULCH AND TEMPORARY SEED. Revised to match current specification issued from MDSHA on 02/09/17.
224-229	REVISED SECTION 705 – TURFGRASS ESTABLISHMENT. Revised to match current specification issued from MDSHA on 02/09/17.
230-234	REVISED SECTION 708 – TURFGRASS SOD ESTABLISHMENT. Revised to match current specification issued from MDSHA on 02/09/17.
235-241	REVISED SECTION 709 – SOIL STABILIZATION MATTING. Revised to match current specification issued from MDSHA on 02/09/17.
242-255	REVISED SECTION 710 – TREE, SHRUB, AND PERENNIAL INSTALLATION AND ESTABLISHMENT. Revised to match current specification issued from MDSHA on 02/09/17.
256-261	REVISED SECTION 711 – ANNUALS AND BULBS INSTALLATION AND ESTABLISHMENT. Revised to match current specification issued from MDSHA on 02/09/17.
262-264	REVISED SECTION 712 – TREE BANCH PRUNING. Revised to match current specification issued from MDSHA on 02/09/17.
265-266	REVISED SECTION 715 – TREE ROOT PRUNING. Revised to match current specification issued from MDSHA on 02/09/17.
336-353A	REVISED SECTION 902 – PORTLAND CEMENT CONCRETE AND RELATED PRODUCTS. Revised to match current specification issued from MDSHA on 02/09/17.
373- 402	REVISED SECTION 920 – LANDSCAPING MATERIALS. Revised to match current specification issued from MDSHA on 02/09/17.
622	REVISED CITY OF TAKOMA PARK PROPOSAL FORM. Revised the date and time when Qualifications and Invitation for Bids must be received.
628	REVISED ITEM 2001 CUBIC YARD OF CLASS 1 EXCAVATION to 2,100 CUBIC YARDS.
633	REMOVED ITEM 3030 6 SQUARE YARDS of CLASS 0 RIPRAP FOR SLOPE AND CHANNEL PROTECTION

PLANS

Drawing No.	Description
TITLE	REVISED TITLE SHEET. Added Addendum No. 1 to Revision Block.

DT01 REVISED PAVEMENT DETAILS SHEET. Added note pavement legend number 14 to Pavement Detail F.

PS-02A REVISED ROADWAY PLAN SHEET. Added construction notes for: Grinding Asphalt Pavement 0 Inch to 2 Inch; 9 Inch Plain Portland Cement Concrete, Mix 9; 8 Inch Portland Cement Concrete for Driveway, Mix 9; Standard Type A Combination Curb and Gutter, any Height; Standard Type A Curb any Height or Depth; Monolithic Concrete Median 6 Feet 0 Inch Wide Type A-1; Detectable Warning Surface for Curb Ramps (Red) MD-655.40; Specialty Paver – Type 2; 5 Inch Concrete Sidewalk; Mix No. 8 Concrete for SWM Structures (Gravity Walls); Mix No. 9 Concrete For Miscellaneous Structures (Concrete Encasement for I-6); and Class 0 Riprap for Slope and Channel Protection.

PS-03 REVISED ROADWAY PLAN SHEET. Added construction notes for: Standard Type A Curb and Gutter any Height or Depth; 5 Inch Concrete Sidewalk; Grinding Asphalt Pavement 0 Inch to 2 Inch; 9 Inch Plain Portland Cement Concrete, Mix 9; 8 Inch Portland Cement Concrete for Driveway, Mix 9; Standard Type A Combination Curb and Gutter, Any Height or Depth; Detectable Warning Surface for Curb Ramps (Red) MD-655.40; and Specialty Paver – Type 2.

PS-04 REVISED ROADWAY PLAN SHEET. Added construction notes for: Grinding Asphalt Pavement 0 Inch to 2 Inch; 8 Inch Portland Cement Concrete for Driveway, Mix 9; Standard Type A Combination Curb and Gutter, any Height or Depth; Standard Type A Curb Any Height or Depth; 5 Inch Concrete Sidewalk; Detectable Warning Surface for Curb Ramps (Red) MD-655.40; Mix No. 8 Concrete for SWM Structures (Gravity Walls); and Remove and Reset Existing Fence.

Before submitting your bid, please remove any Invitation for Bids pages that have been replaced by this Addendum No. 1 and insert the revised Invitation for Bids pages in their proper sequence. Attach this Addendum letter to the front of your Invitation for Bids booklet before submitting your bid.

Questions relating to this Addendum No. 1 may be directed in writing to:

Ms. Rosalind Grigsby
RosalindG@takomaparkmd.gov
301-891-7205
7500 Maple Avenue
Takoma Park, MD 20912

City of Takoma Park
Housing and Community Development

7500 Maple Avenue,
Takoma Park, MD 20912
c/o Rosalind Grigsby

City of Takoma Park IFB No. HCD-20170201

ETHAN ALLEN GATEWAY STREETSCAPE

SHA Contract No. MO0705125

FAP No. TAP-3(481)E

SHA Tracking No. 15APMO015XX

NOTICE TO BIDDERS

A Pre-Bid Meeting will be conducted on Thursday, March 2, 2017 at 10:00 am. The meeting will be held in the Conference Room of the City of Takoma Park's office located at 7500 Maple Avenue, Takoma Park, Maryland 20912. *While attendance at the Pre-Bid Meeting is not mandatory, this is the offeror's opportunity to raise questions and/or issues of concern regarding the project.*

Qualifications and Bids are due in separate sealed envelopes by 3:30 pm on Wednesday, April 12, 2017.

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CATEGORY 950 TRAFFIC MATERIALS

CITY OF TAKOMA PARK SUPPLEMENTAL SUBMITTAL REQUIREMENTS
City IFB No. HCD-20170201

All responses must be complete. The City reserves the right to disregard any incomplete bid responses. The City will exercise a multi-step bidding process. Bidders responding to this Invitation for Bids are to provide two sealed and labeled envelopes at the same time **by 3:30 pm on Wednesday, April 12, 2017**:

1. Labeled "Qualifications" must include the following City of Takoma Park forms and information to adequately qualify and certify bidders:
   - Form A (Contact Information)
   - Bidder Qualification and Certification Statement
   - Bidder Reference List
   - Certification of Non-Involvement in the Nuclear Weapons Industry
   - Living Wage Requirements Certification

2. Labeled "Price Proposal" must include all items related to price.

Each bidder's sealed envelope labeled "Qualifications" will be reviewed prior to the bid opening for qualified bidders. All bidders that do not meet the minimum qualifications will be notified by April 19, 2017 and their bid price proposal returned unopened. In the event that a Bidder is ruled as not meeting the minimum qualifications, the bid opening may be postponed by the City of Takoma Park as deemed necessary.

Bidders who meet the minimum qualifications will have their bid opened on **April 24, 2017.** It is anticipated that the contract will be awarded by mid-June 2017. Contract will be awarded to a responsive and responsible bidder with the lowest priced proposal.

Bidders have the opportunity to submit a written protest as set forth in section GP-2.23 of the Maryland State Highway Administration's Standard Specification for Construction and Materials.

Responses may only be mailed or delivered to:

Rosalind Grigsby, Community Development Manager
Housing & Community Development
City of Takoma Park
7500 Maple Avenue
Takoma Park, MD 20912

CATEGORY 100
PRELIMINARY

SECTION 101 — CLEARING AND GRUBBING

137 **DELETE:** Section 101 – Clearing and Grubbing in it's entirety.

INSERT: The following.

SECTION 101 — CLEARING AND GRUBBING

101.01 DESCRIPTION. Clear and grub within the specified limits.

101.01.01 Definitions.

(a) Clearing. The removal and disposal of trees, fallen timber and rotten wood, brush, shrubs, vegetation, rubbish, fences, and structures not specified in the Contract Documents for removal and disposal. Unless otherwise specified, clearing outside the LOD includes the removal of rubbish only.

(b) Grubbing. An earth-disturbing activity, which includes the removing from the ground and disposing of all stumps, roots and stubs, brush, and debris.

(c) Limits of Disturbance (LOD). The maximum allowable limit of earth disturbance as delineated in the Contract Documents. When not delineated in the Contract Documents, the LOD will be 10 feet beyond the top of cut, toe of slope, or limit of ditch excavation. Do not perform earth-disturbing activities beyond the LOD without authorization.

(d) Limits. Clearing and grubbing is confined to the LOD and authorized modifications to the LOD. When indicated in the Contract Documents, the limit of clearing may include the area between the LOD and the right-of-way or easement lines.

(e) Grading Unit. A contiguous area of erodible material exposed at one time, not to exceed 20 acres.

(f) Disturbed Area. An area where erodible material is exposed by construction activities.

(g) Stabilization Measures. Activities that prevent erosion. These activities include the placement of temporary mulch, temporary seed, permanent seeding such as turfgrass establishment, soil stabilization matting, riprap, stone aggregate, and asphalt or concrete paving. The placement of one or more of these temporary or permanent stabilization measures to the satisfaction of the Engineer will meet the requirements for proceeding to the next grading unit or operation.

101.02 MATERIALS. Not applicable.

101.03 CONSTRUCTION.

101.03.01 Erosion and Sediment Control. Unless otherwise specified or approved, limit the clearing and grubbing area to a single 20-acre grading unit per grading operation. Once this first unit is half graded and stabilization measures are in place and approved, the work may proceed to a second 20-acre grading unit. When approved by the Engineer, the clearing and grubbing area may exceed the one grading unit requirement when necessary to balance earthwork or when grading interchanges. Maintain erosion and sediment controls as specified.

The grading operation will be limited to the Contractor's ability to provide adequate resources to perform the grading in a timely manner and to provide and maintain the proper erosion and sediment control measures. The Engineer is the final authority in this determination. When wet soil conditions are encountered, the clearing, grubbing, and grading of another unit will be allowed, once stabilization of the initial unit is approved.

The maximum area that may be cleared and grubbed is limited to a single grading unit unless otherwise specified and approved. Work may proceed to a subsequent grading unit once at least 50 percent of the current grading unit is stabilized as determined and approved by the Regional Environmental Coordinator. Unless specifically approved, no more than 30-acres cumulatively may be disturbed at any given time.

101.03.02 Tree Preservation Areas and Tree Branch Pruning. Trees, shrubs and plants to remain in place will be designated on the plans in conformance with Section 120 or will be designated by the Engineer.

(a) Protect Tree Preservation Areas and other designated plants according toGP-7.11 and Section 120.

(b) Perform Tree Branch Pruning according to Section 712. Cut and trim tree branches overhanging paved areas of the roadway to maintain a vertical clearance of 16 ft above the pavement, or conform to the specifications of any Tree Preservation Plan developed by the Administration.

101.03.03 Fences. Remove and dispose of all fences within the right of way, unless otherwise specified.

101.03.04 Mailboxes. Remove and reset mailboxes as directed.

101.03.05 Grubbing.

(a) Excavation Areas. Remove all embedded stumps and roots to a depth of at least 3 ft below the subgrade or slope surface. Refill all depressions made below the subgrade or slope surfaces with materials suitable for embankment and compact according to Section 204.

(b) Low Embankments. Grub areas where the total depth of the embankment is less than 3 ft.

(c) High Embankments. In areas where the embankment is 3 ft or more in depth, cut off trees and stumps as close to the ground as practical but not greater than 1 ft above the ground surface. Near the toe of embankment slopes, remove trees and stumps that are within 1 ft of the slope surface.

(d) Stormwater Management (SWM) Facilities. In areas specified for SWM facilities, grub excavation areas and embankments as specified in 101.03.05 (a) and (b) regardless of the total depth of the embankment. When SWM facility embankments include embankment cores, grub to a depth at least equal to the depth of the cut-off trench.

101.03.06 Stream and Channel Changes. When an LOD is not specified, clear and grub 5 ft beyond the top of the cut slopes or as directed.

101.03.07 Disposal.

(a) Burning. Burn only under the constant care of a watchperson and according to applicable laws and ordinances of respective jurisdictions.

(b) Disposal Locations. Remove from the right-of-way and dispose of all unburned material and debris. Make all necessary arrangements to obtain suitable disposal locations. Furnish the Engineer with a copy of resulting agreements.

(c) Wood Disposal. If disposal of wood to the public is proposed, submit the disposal plan to the District Engineer for review, and obtain approval prior to beginning the clearing and grubbing operation. Perform this method of disposal from a location that is off the job site.

(d) Ash Tree Quarantine. Wood of Ash trees of the genus Fraxinus is quarantined, and may not be moved outside the State of Maryland.

101.03.08 Damage to Trees and Other Protected Resources.

(a) Ensure that the LOD and all protected resources are demarcated according to Section 107.

(b) Perform damage repair and damage compensation as specified in Section 712 for damage beyond the LOD due to work operations. Refer to Occupying Wetlands provisions in the Contract Documents for unauthorized impacts to wetlands, wetland buffers, Waters of the United States (WUS), and floodplains.

101.04 MEASUREMENT AND PAYMENT. Clearing and Grubbing will not be measured but will be paid for at the Contract lump sum price. The payment will be full compensation for the removal and disposal of fences, removal and resetting of mailboxes, damage repair and compensation for trees, restoration measures for damaged or destroyed protected resources, repair to other damaged properties, removal and disposal of existing buildings when not covered as a specific pay item in the Contract Documents, and material, labor, equipment, tools, and incidentals necessary to complete the work.

101.04.01 Tree Branch Pruning to remove branches overhanging paved areas, and any other Tree Branch Pruning specified in the Contract documents, will be paid for separately at the Contract lump sum price.

CATEGORY 200
GRADING

SECTION 201 — ROADWAY EXCAVATION

DESCRIPTION. Refer to Section 201.01 of the 2008 MSHA Standard Specifications for Construction and Materials.

201.01.01 Classification

217 **DELETE:** Section 201.01.01 in its entirety.

INSERT: The following.

Excavation for this Contract will be classified as:

Class I Excavation – includes all roadway excavation, excavation for micro-bioretention (SWM-ESD) facilities (including hand excavation), erosion and sediment control excavation, and excavation for traffic/electrical items, regardless of width.

Class I-A Excavation – this item is established for all excavation of unsuitable material below the lowest excavation limits established and within the limits of the proposed roadway sections as specified in the Contract Documents or as directed by the engineer.

Class 3 Excavation (For Incidental Construction) – includes all storm system excavation below the planned elevation as directed. Class 3 Excavation (For Incidental Construction) shall be in accordance with Section 301. Backfill shall be in accordance with Section 302.

201.01.02 Excavation

INSERT: The following.

Excavation (Class I, I-A and Class 3) will include the removal of all materials regardless of its nature. This will include manholes, abandoned utilities, drainage structures, storm piping and incidental structures.

ADD: The following:

201.01.03 Wet Soil Conditions.

Materials with moisture in excess of the optimum moisture content may be encountered. These materials will require drying if they are to be used in embankment construction. No additional compensation will be allowed for dealing with these conditions.

MATERIALS. Not Applicable.

201.03 CONSTRUCTION.

ADD: The following:

Attention is called to the existing Verizon Business fiber optic cable that parallels the area of excavation for SHA BMP #150970 (Sta. 303+00, LT). Provide no mechanical excavation within 2 feet of the cable. Perform hand excavation only along the length of the BMP.

201.03.09 Unsuitable Material.

220 **DELETE:** The last sentence in its entirety:

INSERT: The following.

Class 1-A Excavation of unsuitable material shall be backfilled as described in SPI 505 (Section 505.03.05) and as directed by the Engineer. Backfill material shall be measured and paid for at the Contract unit price per cubic yard for Removal of Unsuitable Material and Refill.

MEASUREMENT AND PAYMENT. Excavation will be measured and paid for at the Contract unit price per cubic yard for the pertinent Class of Excavation.

CATEGORY 500
PAVING

SECTION 505 — HOT MIX ASPHALT PATCHES

483 **DELETE:** SECTION 505 — HOT MIX ASPHALT PATCHES in its entirety.

INSERT: The following.

SECTION 505 — ASPHALT PATCHES

505.01 DESCRIPTION. Repair rigid, flexible, or composite pavements by removing part or all of the section of the existing pavement and replace with asphalt paving material. The locations and extent of the repairs will be as specified or as directed.

Partial Depth Patching (PDP). PDP consists of removing areas of unsound pavement up to 50 percent of the pavement thickness and replacing with an asphalt mix. The pavement thickness is defined as the thickness of all bound materials in the pavement structure including asphalt mix, Portland cement concrete (PCC), and any other asphalt or cement modified material.

Full Depth Patching (FDP). FDP consists removing the full thickness of the pavement sections to the top of the aggregate base and replacing with an asphalt mix. Perform FDP whenever more than 50 percent of the pavement thickness requires repair.

505.02 MATERIALS.

Graded Aggregate Base	901.01
Aggregates for Asphalt Mixes	901.01
Performance Graded Asphalt Binders and Asphalt Mixes	904
Crack Filler	911.01
Production Plants	915
Cold Patch Material	924

505.03 CONSTRUCTION. Keep disturbance of the base material to a minimum. The faces of the remaining pavement shall be square and vertical without ragged edges. Do not use equipment that could damage the existing pavement.

505.03.01 Weather Restrictions. Refer to 504.03.02.

505.03.02 Existing Pavement. Complete all repairs on the same day in which excavation is completed. Do not leave open excavated areas at the end of the workday.

505.03.03 Removal of Pavement for PDP. Remove existing pavement by milling, grinding, or saw cutting to the specified depth. Maintain square vertical faces after removal.

(a) If concrete is encountered during removal, limit the depth of the patch to the top elevation of the PCC.

(b) For PDP of composite pavements, protect the PCC from damage during removal of the HMA.

(c) When the material at the bottom of the PDP is determined to be unsuitable, remove the unsuitable material until sound material is encountered.

(d) When any PCC present in a composite pavement is determined to be unsuitable, follow the removal and replacement procedures for a FDP.

(e) Remove all loose and foreign materials before placing the patch, then treat all spalled cracks and joints by tack coating, filling and tamping with asphalt.

505.03.04 Removal of Pavement for FDP. Make a perpendicular saw cut full depth around the perimeter and remove the existing pavement to the top of the aggregate base. Refer to 522.03.03 for the concrete portion of a composite pavement. Maintain square vertical faces after saw cutting.

505.03.05 Base and Subgrade Preparation. The aggregate base of the FDP area will be evaluated to determine its suitability.

(a) When the aggregate base is determined to be unstable, compact it as specified in 501.03.10.

(b) When no aggregate base is present, construct the subgrade foundation per Section 208 or as directed.

(c) Removal of Unsuitable Material:

(1) When the aggregate base or subgrade material is unsuitable, remove and dispose of the unsuitable material.

(2) Replace the unsuitable material with graded aggregate base conforming to Section 501.

(3) Compact the replacement material in layers no greater than 4 in. depth.

(4) Protect the aggregate base or subgrade after placement.

(5) Remove and replace any aggregate base or subgrade damaged due to lack of protection at no additional cost.

505.03.06 Subgrade Drains. Refer to Section 306. The construction of subgrade drains may be required in areas of wet underlying subgrade or in areas where future drainage problems may be a concern, as determined.

505.03.07 Emergency Filler. Have sufficient approved cold patch material readily available to fill the void of the repair area. Place and compact the material as directed. Completely remove the material at the beginning of the next workday.

505.03.08 Steel Plates. Ensure that an ample supply of 12 x 14 ft by 1 in. thick steel plates are available on site to cover the emergency filler.

505.03.09 Patch Construction. Refer to Section 504. Furnish equipment and perform placement, compaction, and quality control procedures as specified. Manual placement of the asphalt patches is permissible. Thoroughly clean and tack the exposed vertical surface of adjacent pavement prior to placing the asphalt patch per 504.03.04. Patches in excess of 50 ft. in length and 10 ft. or greater in width shall have the final riding surface placed by a paver. Lower lifts may be placed by a paver or other methods as necessary. Do not place asphalt patches on a frozen base.

505.03.10 Patch Placement. Maintain lift thickness in conformance with the following:

ASPHALT LIFT THICKNESS		
MIX DESIGNATION (mm)	**MINIMUM (in.)**	**MAXIMUM (in.)**
9.5	1.0	2.0
12.5	1.5	3.0
19.0	2.0	4.0
25.0	3.0	5.0
37.5	4.0	6.0

505.03.11 Patch Surface Checks. Have an approved 10 ft straightedge available as directed. The patch surface, after final compaction, shall be sufficiently smooth and true to the established line and grade. Test the surface with the straightedge in the longitudinal and transverse direction immediately behind the final roller. The tested surface shall not deviate by more than 3/16 in.

Correct any portions that deviate by more than 3/16 in. by removal and replacement or by diamond grinding at no additional cost.

Recheck all corrected pavement sections, including any additional transverse paving joints created, to determine if the sections meet specifications.

505.03.12 Mix Sampling Requirements. One random sample per mix will be required daily for projects using more than 200 tons per day. Quantities of 200 tons or less of asphalt per day may not require daily field sampling. However, one random sample per mix for every 1000 tons of asphalt or one sample per mix will be required weekly; whichever yields the greater frequency. Random mix samples will be required for patches placed with a paver. Patches not placed with a paver or patches less than 1000 sq ft. (10 ft wide x 100 ft long) will not require a mix sample.

505.03.13 Testing and Acceptance. Acceptance of Base and/or Surface of each patch per lift will be determined by using an asphalt density gauge with test data witnessed. Calibrate the density gauge to the mix in order to obtain representative readings.

505.03.14 Density Determination Requirements. On the first day of patching, perform density gauge testing and core sampling on three randomly selected test locations. Label the cores with the date sampled. Test the cores then submit the results to OMT. The average pcf of the three cores and the average pcf of two corresponding gauge readings shall be within 3.0 lb/ft^3 of each other. If they do not compare, recalibrate the density gauge according to the manufacturer's recommendation. When the difference between the gauge readings and the core tests are greater than 3.0 lb/ft^3, verify the gauge's accuracy by reading three new random locations. Report the density gauge test data as a percentage of the daily production maximum specific gravity.

An in-place density of 92.0 to 97.0 percent is required for each randomly selected patch test location per lift. Compliance will be determined for each patch separately by averaging all density tests performed within each specific patch. Submit compaction sheets to OMT daily for all production. Retain the tested cores in the QC Laboratory until OMT verifies the results.

A patch 2500 linear ft or greater shall require additional readings.

Take three cores and corresponding gauge readings per mix weekly to verify the gauge readings. If the average of the density gauge readings and the average of the core densities are within 3.0 lb/ft^3, all the daily density gauge readings will be accepted. If they do not compare, recalibrate the density gauge. Incentives are not applicable for patch density.

505.04 MEASUREMENT AND PAYMENT. Refer to 504.03.10 and MSMT 735. Payment will be full compensation for saw cutting, milling, grinding, removal, disposal, trimming of the existing pavement, subgrade preparation, placing all materials including tack coat, steel plates, emergency filler, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. After removal, steel plates and emergency filler will remain the property of the Contractor.

505.04.01 Partial Depth Patching and Full Depth Patching. Payment will be measured and paid for at the Contract unit price per square yard or per ton. The payment will be full compensation for furnishing, hauling, placing all material, additional removal of pavement above

the aggregate base, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

505.04.02 Removal of Unsuitable Material. Payment will be measured and paid for at the Contract unit price per cubic yard. The payment will also include excavation and disposal of unsuitable material, backfilling with aggregate, and compaction.

505.04.03 Price Adjustment for Asphalt Binder. Refer to 504.04.01. An adjustment will be made to the final Contract unit price for asphalt mixture if the price of asphalt binder fluctuates significantly from the prevailing price on the date of placement. This includes asphalt patching material converted to tons.

CATEGORY 700
LANDSCAPING

SECTION 701 — TOPSOIL AND SUBSOIL

544 **DELETE:** Section 701 — Topsoil and Subsoil, in its entirety.

INSERT: The following.

SECTION 701 — SUBSOIL AND TOPSOIL

701.01 DESCRIPTION. Prepare existing topsoil; or salvage and place subsoil and topsoil; or furnish and place subsoil and topsoil in preparation for vegetation establishment. Refer to Section 704 and provide short-term, long-term or permanent stabilization as necessary for soil erosion protection. Performance of Subsoil and Topsoil as specified herein complies with all requirements of the Maryland Department of the Environment for handling and placing soils.

701.02 MATERIALS.

Existing Topsoil	920.01.01
Salvaged Topsoil	920.01.01
Furnished Topsoil	920.01.02
Salvaged Subsoil	920.01.03
Furnished Subsoil	920.01.04
Limestone	920.02.01
Sulfur	920.02.02
Gypsum	920.02.04
Compost, Type A or Type B	920.02.05
Water	920.09.01
Pesticides	920.09.03

701.03 CONSTRUCTION.

701.03.01 General

(a) Schedule. Perform subsoil and topsoil operations when soil moisture and weather conditions are suitable. Cease operations when soil is muddy, frozen, or otherwise unsuitable.

(b) Pesticide Application. For any work involving existing or salvaged soils, the Contractor shall possess a Maryland Department of Agriculture Commercial Pesticide Business License and a Pesticide Applicator Certificate for the pertinent pesticide application Category: (2) Forest; (3-A) Ornamental Plant Exterior; (3-C) Turf; (5) Aquatic; (6) Right-of-Way and Weed.

Apply pesticides in conformance with the Maryland Pesticide Applicator's Law, OSHA and MOSH regulations, and the manufacturer's label and Safety Data Sheets (SDS).

Ensure that pesticides are applied by a Maryland Certified Pesticide Applicator, or by a Registered Pesticide Applicator under the supervision of a Certified Pesticide Applicator.

(c) Prohibited Weeds. Refer to 920.01.01. Areas of existing topsoil, and areas of topsoil and subsoil to be salvaged and their stockpiles, will be inspected and shall be free of prohibited weeds. Control prohibited weeds as needed and as directed.

(d) Herbicide. To control prohibited weeds, and to remove vegetation when preparing existing topsoil, apply glyphosate 3% solution in water or submit a written request to use another herbicide or application rate.

(e) Pesticide Application Reporting. Record the location and details of pesticide applications on the Pesticide Application Reporting Form. Submit the Form within 24 hours after applying pesticides.

(f) Nutrient Management Plan (NMP). The Administration will develop a NMP based upon soil tests. The NMP application rates for soil amendments and fertilizer will be within the ranges shown in the pertinent table of application rates.

Conform to the application rates of the NMP. Do not apply soil amendments when no NMP has been developed. Do not apply soil amendments to subsoil or to furnished topsoil.

(g) Nutrient Management Reporting. Record the location and details of soil amendment and fertilizer applications on the Nutrient Management Reporting Form. Submit the Form within 24 hours after applying soil amendments and fertilizer.

701.03.02 Existing Topsoil. Refer to 920.01.01.

(a) Vegetation Removal. Refer to 701.03.01(d). Cut brush and groundcover vegetation, remove debris, and apply herbicide as necessary to prepare areas for seeding or other specified vegetation installation. Do not injure trees, shrubs and other plants to remain.

(b) Compost and Tilling. Refer to 701.03.01(f) and Table 1. Spread Type B Compost over the soil surface as specified in the NMP and lightly till soil to prepare soil and incorporate compost. Immediately install seeding or other vegetation as specified in the Contract documents.

SUBSOIL AND TOPSOIL TABLE 1 - SOIL AMENDMENT APPLICATION RATES & MIXING		
SOIL AMENDMENT & MIXING	**APPLICATION RATE** [a]	
Compost – Existing Topsoil Spread Type B Compost over surface of existing topsoil and lightly till into soil.	Up to 0.25 in. depth compost spread over surface of existing topsoil	Up to 34 CY compost per acre of existing topsoil
Compost – Salvaged Topsoil Thoroughly mix Type A or Type B Compost into salvaged topsoil before placing topsoil.	Up to 1.0 CY compost per 6.0 CY of salvaged topsoil	Up to 0.17 CY of compost per 1.0 CY of salvaged topsoil
Gypsum Spread gypsum over surface of existing topsoil, or over surface of placed salvaged topsoil, and till to mix gypsum into upper 2 in. of topsoil.	Up to 0.721 LB gypsum per SY of existing topsoil or placed salvaged topsoil	Up to 3500 LB of gypsum per acre of existing topsoil or placed salvaged topsoil
Limestone Spread limestone over surface of existing topsoil, or over surface of placed salvaged topsoil, and till to mix limestone into upper 2 in. of topsoil.	Up to 1.446 LB limestone per SY of existing topsoil or placed salvaged topsoil	Up to 7000 LB of limestone per acre of existing topsoil or placed salvaged topsoil
Sulfur Spread sulfur over surface of existing topsoil, or over surface of placed salvaged topsoil, and till to mix sulfur into upper 2 in. of topsoil.	Up to 0.165 LB sulfur per SY of existing topsoil or placed salvaged topsoil	Up to 800 LB Sulfur per acre of existing topsoil or placed salvaged topsoil
[a] Note: For existing topsoil and salvaged topsoil, the application rates will be specified in the Nutrient Management Plan (NMP) included in the Contract documents. Do not apply soil amendments except as specified in the NMP. Do not apply soil amendments to subsoil or to furnished topsoil.		

701.03.03 Salvaging Soils.

(a) Vegetation Removal. Remove vegetation, brush, and other debris from areas where topsoil and subsoil will be salvaged.

(b) Soil Removal. Remove topsoil and subsoil to the depths as specified or as directed. Transport salvaged topsoil and subsoil separately, and keep them apart from other materials.

(c) Stockpiles. Construct stockpiles on well drained land, away from streams, drainage areas and floodplains as specified in Section 308. Maintain stockpiles of salvaged topsoil and salvaged subsoil away from other materials, and separate from each other.

Refer to Section 704 and apply Temporary Mulch or other stabilization as necessary for soil erosion protection immediately after constructing stockpiles. Refer to 308.03.29 and install perimeter sediment controls.

Maintain stabilization and sediment controls. Refer to 701.03.01(c) and control prohibited weeds as needed and as directed.

(d) Weed Inspection. Refer to 701.03.01(c) and ensure that inspection is completed and that prohibited weeds are controlled before removing vegetation, preparing soil, or transporting soil from stockpiles.

(e) Soil Preparation and Transportation.

Subsoil. Transport and place salvaged subsoil per 701.03.04 when directed.

Topsoil. Refer to Table 1. Mix compost in conformance with the Nutrient Management Plan and transport and place prepared salvaged topsoil per 701.03.05 when directed.

701.03.04 Placing Subsoil.

(a) Site Preparation. Ensure the site where subsoil will be spread is uniformly graded true to line and cross section.

(b) Spreading. Spread and compact subsoil in layers up to 8 in. thickness to provide a firm and uniform subsoil base. Ensure that subsoil is spread to the specified depth.

(c) Tracking. Track subsoil on slopes 4:1 and steeper with cleated track equipment operated perpendicular to the slope. Check subsoil thickness, lines, grades, and elevations to ensure the completed work is as specified.

(d) Debris. Remove stones and other debris with a length or width greater than 4 in. from the surface of the subsoil.

(e) Topsoil and Stabilization. Refer to 701.03.05 and immediately place topsoil over subsoil, or refer to Section 704 and provide stabilization as necessary for soil erosion protection.

701.03.05 Placing Topsoil.

(a) Site Preparation. Ensure the site where topsoil will be spread is uniformly graded true to line and cross section, and that the surface of the subsoil base is loose and able to provide a suitable bond for the topsoil layer to be spread.

If the subsoil base is crusted or excessively compacted, then roughen and loosen the surface of the subsoil base with approved machinery before spreading topsoil.

(b) Spreading. Spread topsoil over the designated areas and lightly firm the topsoil to ensure uniform thickness of the specified depth, and to meet the required grades.

(c) Tracking. Track topsoil on slopes 4:1 and steeper with cleated track equipment operated perpendicular to the slope.

(d) Grading Adjustment. When placing topsoil for grading adjustment, the minimum thickness shall be 1/2 in. and the maximum thickness shall be 8 in.

(e) Firming. Ensure that topsoil is uniformly firmed near sidewalks, structures and pavement edges, and that the topsoil surface is without gaps, mounds, depressions, soft spots, or areas that may impair surface drainage or future maintenance. Check topsoil thickness, lines, grades, and elevations to ensure the completed work is as specified.

(f) Soil Amendments. Refer to 701.03.01(f) and Table 1. Apply soil amendments to topsoil in conformance with the Nutrient Management Plan.

(g) Tilling. Refer to Table 1 and till topsoil to incorporate soil amendments and prepare areas for seeding or installation of other specified vegetation.

(h) Debris. In areas within 10 feet of the pavement edge and near commercial and residential property, remove stones, wood, metal, and other debris with a length or width greater than 2 in. from the topsoil surface when spreading is completed. In all other areas, remove debris with a length or width greater than 4 in., or as directed.

(i) Stabilization. Immediately perform Turfgrass Establishment, or install other permanent vegetation as specified in the Contract documents, or refer to Section 704 and install Temporary Mulch or Temporary Seed for soil erosion protection.

701.03.06 Inspection and Acceptance. Submit a request for Acceptance when operations are completed. Inspection will be conducted to verify that operations were completed as specified. Acceptance will be granted at that time.

701.04 MEASUREMENT AND PAYMENT. Subsoil and topsoil will be measured and paid for at the Contract unit price for one or more of the specified items. The payment will be full compensation for all material, labor, equipment, tools, disposal fees and incidentals necessary to complete the work.

701.04.01 Existing Topsoil will not be measured and paid for. The cost of preparing existing topsoil, and any cost required for applying soil amendments in conformance with the Nutrient Management Plan, shall be incidental to the pertinent Contract unit price of the specified vegetation establishment.

701.04.02 Salvaging Subsoil and Salvaging Topsoil will not be measured but the cost shall be incidental to the Contract unit price for Class 1 Excavation.

701.04.03 Placing Salvaged Subsoil and Topsoil will be measured and paid for at the pertinent Contract unit price for the specified depth per square yard, or per cubic yard. Any cost required for applying soil amendments in conformance with the Nutrient Management Plan shall be incidental to the pertinent Contract unit price of the specified vegetation establishment.

701.04.04 Placing Furnished Subsoil and Topsoil will be measured and paid for at the pertinent Contract unit price for the specified depth per square yard, or per cubic yard.

701.04.05 Placing Topsoil for Grading Adjustment will be measured and paid for at the pertinent Contract unit price per square yard, or per cubic yard. No payment will be made for topsoil placed less than 1/2 inch depth. Any cost required for applying soil amendments to salvaged soil in conformance with the Nutrient Management Plan shall be incidental to the pertinent Contract unit price of the specified vegetation establishment.

701.04.06 Temporary Mulch, Temporary Seed, Turfgrass Establishment and other permanent vegetation establishment will be measured and paid for at the pertinent Contract unit price per square yard.

CATEGORY 700
LANDSCAPING

SECTION 704 — TEMPORARY MULCH AND TEMPORARY SEED

547 **DELETE:** Section 704 — Temporary Seed and Temporary Mulch, in its entirety.

INSERT: The following.

SECTION 704 — TEMPORARY MULCH AND TEMPORARY SEED

704.01 DESCRIPTION. Perform Temporary Mulch and Temporary Seed to provide temporary soil erosion protection as follows.

Short-Term Temporary Stabilization. Refer to 704.03.02 and apply Temporary Mulch to stabilize topsoil, subsoil, common borrow, or other specified soil substrate for up to 2 months after installation.

Long-Term Temporary Stabilization. Refer to 704.03.03 and apply Temporary Seed to stabilize topsoil, subsoil, common borrow, or other specified soil substrate for 2 to 6 months after installation.

Permanent Stabilization. Refer to Section 705 and perform Turfgrass Establishment when redisturbance is expected in more than 6 months, or perform other permanent vegetation establishment as specified or as directed. Do not apply Temporary Mulch or Temporary Seed when redisturbance of soil is expected in more than 6 months.

Performance of Temporary Mulch and Temporary Seed as specified herein complies with all requirements of the Maryland Department of the Environment for temporary stabilization of soils.

704.02 MATERIALS.

Fertilizer 37-0-0 (SCU)	920.03.01
Straw Mulch	920.04.01
Wood Cellulose Fiber Mulch	920.04.02
Soil Stabilization Matting	920.05.01
Fasteners	920.05.02
SHA Temporary Seed Mix	920.06.07(c)
Water	920.09.01

704.03 CONSTRUCTION.

704.03.01 General.

(a) Schedule. Apply Temporary Mulch and Temporary Seed any time of the year.

(b) Nutrient Management Plan (NMP). The fertilizer application rate specified in Table 2 of 704.03.03 shall be the NMP rate for Temporary Seed unless the Administration develops a NMP to revise the application rate.

(c) Nutrient Management Reporting. Record the location and details of fertilizer applications on the Nutrient Management Reporting Form. Submit the Form within 24 hours after applying fertilizer.

704.03.02 Temporary Mulch. Refer to Description. Temporary Mulch may be either temporary straw mulch or temporary matting mulch.

(a) Selection of Temporary Mulch.

Apply temporary straw mulch or temporary matting mulch to provide temporary erosion protection in flat or mildly sloping areas.

Apply temporary matting mulch to provide temporary erosion protection in slopes or channels where flowing water may dislodge temporary straw mulch.

(b) Temporary Straw Mulch. Lightly smooth excessively rough areas, but do not till the soil. Immediately apply straw and cover with wood cellulose fiber. Apply materials as follows.

TEMPORARY MULCH AND TEMPORARY SEED
TABLE 1 - APPLICATION RATES - TEMPORARY STRAW MULCH

MATERIAL	LB PER SY	LB PER ACRE
Straw Mulch	0.826	4000
Wood Cellulose Fiber Mulch	0.155	750

Cover at least 90 percent of the soil surface with straw mulch. When applied with mulch blower, apply straw mulch to a loose depth of 3/4 to 2 in. When applied by hand, apply straw mulch to a loose depth of 1-1/2 to 3 in.

Secure straw mulch immediately after the completion of mulching operations by applying wood cellulose fiber uniformly over the straw without displacing the mulch.

Do not operate machinery during windy weather that may interfere with uniform application. Do not allow materials to blow onto sensitive areas or structures.

(c) Temporary Matting Mulch. Select Type A, Type B, Type D, or Type E soil stabilization matting for installation in areas that will be redisturbed within 2 months. Install any of these matting types using methods and fasteners as per Section 709 for Type E Soil Stabilization Matting.

Smooth the soil surface to allow uniform installation of matting. Install matting over the soil surface without tenting. Overlap edges of the matting at least 2 in. Install fasteners no more than 24 inches apart along edges, overlaps, and throughout the matting to firmly secure the matting to the soil surface. Do not water the matting.

Remove matting and fasteners before performing permanent vegetation establishment. When approved, matting and fasteners may be removed and reused as Temporary Mulch in the same or different locations when their integrity is not degraded by damage or decomposition.

704.03.03 Temporary Seed. Refer to Description. Prepare the soil and apply seed, fertilizer, straw mulch, and wood cellulose fiber mulch to areas that will remain undisturbed for 2 to 6 months.

Complete grading and shaping operations as directed. Perform operations when soil moisture and weather conditions are suitable. Cease operations when soil is frozen, or conditions are unsuitable. Loosen soil surfaces before applying seed and fertilizer.

Refer to 705.03.06 (b) thru (d) regarding application equipment, and apply fertilizer materials according to Table 2 at any time of the year.

Immediately apply straw and wood cellulose fiber over seeded and fertilized areas as specified in 704.03.02(b).

Refer to 704.03.02(b) and install Type A, Type D, or Type E soil stabilization matting in lieu of straw and wood cellulose fiber when approved.

TEMPORARY MULCH AND TEMPORARY SEED
TABLE 2 - APPLICATION RATES - TEMPORARY SEED

MATERIAL	LB PER SY	LB PER ACRE
SHA Temporary Seed Mix	0.026	125
Fertilizer 37-0-0 (SCU)	0.021	100
Straw Mulch	0.826	4000
Wood Cellulose Fiber Mulch	0.155	750

704.03.04 Repair. Repair Temporary Mulch or Temporary Seed that is defective before Acceptance.

704.03.05 Acceptance. Submit a request for Acceptance when operations are completed. Inspection will be conducted to verify completion.

704.03.06 Disturbance, Removal and Replacement.

(a) Do not disturb or remove Temporary Mulch or Temporary Seed except as necessary to prepare soil, or to install permanent vegetation, or to perform other work as directed.

(b) Replace Temporary Mulch with approved materials when it has degraded, or when more than 2 months have elapsed since Acceptance. Replace Temporary Mulch as additional work when directed.

(c) Replace Temporary Seed with approved materials when it has degraded, or when more than 6 months have elapsed since Acceptance. Replace Temporary Seed as additional work when directed.

704.04 MEASUREMENT AND PAYMENT. Temporary Mulch and Temporary Seed will be measured and paid for at the Contract unit price for one or more of the specified items. The payment will be full compensation for all material, labor, equipment, tools, disposal fees and incidentals necessary to complete the work.

704.04.01 Temporary Mulch, applied as either temporary straw mulch or temporary matting mulch, will be measured and paid for at the Contract unit price per square yard. Any soil stabilization matting which may be installed as temporary matting mulch will be incidental to the Contract unit price for Temporary Mulch, and will not be measured and paid for.

704.04.02 Temporary Seed will be measured and paid for at the Contract unit price per square yard. Any soil stabilization matting which may be installed with Temporary Seed will be incidental to the Contract unit price for Temporary Seed, and will not be measured and paid for.

704.04.03 Turfgrass Establishment will be measured and paid for at the Contract unit price per square yard.

CATEGORY 700
LANDSCAPING

SECTION 705 — TURFGRASS ESTABLISHMENT

550 **DELETE:** Section 705 — Turfgrass Establishment, in its entirety.

INSERT: The following.

SECTION 705 — TURFGRASS ESTABLISHMENT

705.01 DESCRIPTION. Perform Turfgrass Establishment as follows.

At Final Grade. For areas that are at final grade, establish turfgrass in topsoil or other specified soil substrate to provide permanent vegetation groundcover.

Not Final Grade. For areas that are not at final grade, or areas that will not be redisturbed for at least 6 months after seeding operations are completed, establish turfgrass in topsoil, subsoil, common borrow, or other specified soil substrate to provide temporary vegetation groundcover.

Temporary Stabilization. When it is not possible to perform Turfgrass Establishment, refer to Section 704 and perform Temporary Mulch or Temporary Seed, or as directed.

Performance of Turfgrass Establishment as specified herein complies with all requirements of the Maryland Department of the Environment for permanent seeding.

705.02 MATERIALS.

Fertilizer	920.03.01
Straw Mulch	920.04.01
Wood Cellulose Fiber	920.04.02
Seed	920.06
SHA Turfgrass Seed Mix	920.06.07(a)
SHA Special Purpose Seed Mix	920.06.07(b)
SHA Temporary Seed Mix	920.06.07(c)
Water	920.09.01

705.03 CONSTRUCTION.

705.03.01 General.

(a) Regions. Maryland is divided into Regions by counties as follows.

Region 1. Garrett, Allegany, and Washington, west of Clear Spring MD.

Region 2. Washington, east of Clear Spring, MD, Frederick, Carroll, Baltimore, Harford, Cecil, Howard, Montgomery, and Baltimore City.

Region 3. Anne Arundel, Prince George's, Calvert, Charles, St. Mary's, Kent, Queen Anne's, Talbot, Caroline, Dorchester, Wicomico, Worcester, and Somerset.

(b) Seeding Seasons and Seed Mixes. Perform operations according to Table 1 when soil moisture and weather conditions are suitable, when the temperature is above 32 F, and the soil is not frozen. Cease operations when conditions are unsuitable.

TURFGRASS ESTABLISHMENT

TABLE 1 – TURFGRASS SEASONS AND SEED MIXES

REGION	SEEDING SEASON - MONTH/DAY				
	Spring	Summer	Fall	Late Fall	Winter[3]
	SHA Turfgrass Seed Mix [1]				
1	3/1 to 6/14	6/15 to 7/31	8/1 to 9/30	10/1 to 11/15	11/16 to 2/29
2	3/1 to 5/14	5/15 to 7/31	8/1 to 10/14	10/15 to 11/15	11/16 to 2/29
3	3/1 to 4/30	5/1 to 7/31	8/1 to 10/31	11/1 to 11/15	11/16 to 2/29
		Plus Additive [2]		Plus Additive [2]	Plus Additive [2]

Notes:

[1] When seeding within 4 miles of a State airport: Use no additives and use SHA Special Purpose Seed Mix in lieu of SHA Turfgrass Seed Mix on slopes 4:1 and steeper, or in designated areas.

[2] Additive = SHA Temporary Seed Mix.

[3] Approval is required for seeding during Winter. When approved, apply all materials except fertilizer. Refer to 705.03.06(e).

(c) Nutrient Management Plan (NMP). Soil testing will be performed and a NMP will be developed by the Administration. Conform to the application rates of the NMP and replace application rates of Table 2 in 705.03.03 as required by the NMP. When no NMP has been developed, apply 200 lb. per acre of 20-16-12 (83% UF with MAP & SOP) fertilizer as the NMP rate for Turfgrass Establishment.

(d) Nutrient Management Reporting. Record the location and details of soil amendment and fertilizer applications on the Nutrient Management Reporting Form. Submit the Form within 24 hours after applying fertilizer.

705.03.02 Modification Request. Submit a written Modification Request to perform seeding during Winter Seeding Season; to install an approved tackifier at manufacturer's recommended application rates in lieu of wood cellulose fiber to secure straw mulch; or to use Type A, Type D, or Type E Soil Stabilization Matting per Section 709 in lieu of straw mulch and wood cellulose fiber in areas where those mattings have not been specified.

The Engineer in consultation with the Landscape Operations Division will evaluate the Request. If granted, a notice of approved modification will be returned within 14 days after the request is received.

705.03.03 Application Rates. Apply materials according to Table 2.

TURFGRASS ESTABLISHMENT
TABLE 2 - APPLICATION RATES

MATERIAL	LB PER SY	LB PER ACRE
INITIAL FERTILIZER per Nutrient Management Plan [a, b]		
20-16-12 (83% UF with MAP & SOP)	0 to 0.041	0 to 200
or one or more of the following [c]		
38-0-0 (UF)	0 to 0.021	0 to 100
11-52-0 (MAP)	0 to 0.036	0 to 175
0-0-50 (SOP)	0 to 0.041	0 to 200
SEED MIXES; select one		
SHA Turfgrass Seed Mix, applied to roadsides, facilities, and other designated areas	0.041	200
or		
SHA Special Purpose Seed Mix, applied to slopes 4:1 and steeper within four miles of a State airport, and other designated areas.	0.041	200
ADDITIVE SEED; when required per Table 1		
SHA Temporary Seed Mix	0.006	25
STRAW MULCH	0.826	4000
WOOD CELLULOSE FIBER to secure straw mulch	0.155	750
REFERTILIZING [d]		
37-0-0 Sulfur Coated Urea (SCU)	0.021	100

Notes:

[a] For existing topsoil and salvaged topsoil, the application rates will be included in the Contract documents. For furnished topsoil, the application rates will be developed for the approved source of supply.

[b] When no NMP has been developed, apply 200 lb per acre of 20-16-12 initial fertilizer.

[c] UF = Ureaform; MAP = Monoammonium Phosphate; SOP = Sulfate of Potash. When application rate of 20-16-12 fertilizer is below 200 lb. per acre, apply UF, MAP, and SOP per NMP.

[d] Refer to 705.03.06(d) and 705.03.09(c). Apply Refertilizing when included in the Contract documents.

705.03.04 Grade Repair. Ensure that soil meets specified grades. Repair any gullies, washes, or disturbed areas that develop before preparing soil.

705.03.05 Preparing Topsoil. Provide a uniform and porous surface that is free of debris and weeds as follows.

(a) Areas Flatter than 4:1. Remove clods, stones, wood, metal and other debris with a length or width greater than 1-1/2 in. in any dimension from the soil surface.

(b) Slopes 4:1 and Steeper. Track slopes 4:1 and steeper with cleated track equipment operated perpendicular to the slope.

After tracking, remove stones, wood, metal, and other debris with a length or width greater than 3 in. in any dimension from the soil surface.

705.03.06 Seeding and Initial Fertilizer.

(a) Application Schedule. Apply seed and initial fertilizer after preparing soil. Do not apply initial fertilizer in the Winter Seeding Season from November 16 thru February 29.

(b) Application Equipment. Use hydroseeders, spreaders, drills, or other approved machinery. Calibrate equipment before application. Apply materials accurately and uniformly to avoid misses and overlaps. Do not operate machinery during windy weather that may interfere with uniform application.

(c) Hydroseeders. Hydroseeders shall be equipped with an agitation system able to keep solids in suspension, and have a gauge to show fill levels and tank capacity. Apply fertilizer and seed mixtures within two hours after mixing. Direct hydroseeding mixtures so the droplets produce a uniform spray. Do not allow materials to runoff or cause erosion, or to blow onto sensitive areas or structures.

(d) Mechanical Seeders. Mechanical seeders shall be capable of uniformly placing seed and fertilizer at the specified rate.

(e) Delayed Initial Fertilizer. Apply initial fertilizer at the time of seeding per Table 1, except in Winter. When seeding from November 16 to February 29, apply initial fertilizer during March, and apply Refertilizing in conformance with 705.03.09(c) during April.

705.03.07 Mulching. Apply mulch immediately after seeding.

(a) Soil Stabilization Matting. Refer to Section 709 and install soil stabilization matting in lieu of straw mulch in designated areas.

(b) Straw Mulch. Cover at least 90 percent of the soil surface with straw mulch. When applied with mulch blower, apply straw mulch to a loose depth of 3/4 to 2 in. When applied by hand, apply straw mulch to a loose depth of 1-1/2 to 3 in.

Secure straw mulch immediately after the completion of mulching operations by applying wood cellulose fiber uniformly over the straw without displacing the mulch.

Do not operate machinery during windy weather that may interfere with uniform application. Do not allow materials to blow onto sensitive areas or structures.

705.03.08 Seeding Phase Acceptance. Submit a request for Seeding Phase Acceptance when operations are completed. Inspection will be conducted to verify completion, and Seeding Phase Acceptance will be granted at that time.

705.03.09 Establishment Phase. The Establishment Phase will begin upon Seeding Phase Acceptance.

(a) Period of Maintenance. Maintain seeded areas until Final Acceptance.

(b) Required Maintenance. Perform the following during the Establishment Phase.

Watering. Apply water as needed to ensure survival of the turfgrass. Apply water to seeded and mulched areas with approved machinery. Do not allow water to cause erosion or to displace the mulch.

Overseeding. Overseeding consists of seeding and mulching in areas where living turfgrass coverage is 40 to 90 percent. When living turfgrass groundcover is not acceptable, perform overseeding as directed. In areas to be overseeded, cut the turfgrass to a height of 3 to 5 in. and remove debris that may interfere with seeding. Apply seed mixtures, seed additives, fertilizer, mulch, and secure mulch as specified in 705.03.01 thru .07, but do not repair grade or prepare soil.

Reseeding with Slit Seeder. Perform reseeding when directed in areas where turfgrass groundcover is less than 40 percent, but soil conforms to 701.03.05 and 705.03.05. Cut the area to be reseeded to a height of 1 to 3 in., and remove debris that may interfere with seeding. Utilize a mechanical slit seeder to cut groves into the soil at least 0.25 in. depth. Refer to 705.03.06 and .07 and apply seed, fertilizer, and mulch, but do not secure mulch.

Soil Restoration, Tilling and Reseeding. Perform soil restoration and reseeding when directed in areas where turfgrass groundcover is less than 40 percent, or when soil does not conform to 701.03.05 and 705.03.05 because eroded gullies are present or soil grades are not acceptable. Cut the area to be restored and reseeded to a height of 3 to 5 in. and remove debris that may interfere with seeding. Refer to 705.03.01 thru .07 and repair grades, prepare soil, apply seed, fertilizer, and mulch, and secure mulch.

Mowing. Mow turfgrass in areas flatter than 4:1 before the grass grows to a height of 8 in. Use approved machinery to cut to a height of 3 to 5 in.

(c) Refertilizing. Refer to 705.03.06 and apply 37-0-0 SCU Refertilizing as specified in Table 2 at least 1 month after initial fertilizer was applied. Do not apply Refertilizing in the Winter Seeding Season from November 15 thru March 1.

705.03.10 Final Acceptance. The Engineer and the Landscape Operations Division will complete an Inspection Report of turfgrass height, color, and percent groundcover. When it is not possible to perform the Inspection, Final Acceptance will be delayed until Inspection is possible. The Inspection Report will be included in the Punch List requirements for the project. Complete the Punch List requirements as directed.

Final Acceptance will be granted after all operations have been completed, and when the seedlings of turfgrass species have grown at least 4 in. tall, exhibit dark green color, and are least 95 percent groundcover.

705.04 MEASUREMENT AND PAYMENT. Turfgrass Establishment will be measured and paid for at the Contract unit price for one or more of the specified items. The payment will be full compensation for all material, labor, equipment, tools, disposal fees and incidentals necessary to complete the work.

705.04.01 Turfgrass Establishment, including grade repair, preparing soil, applying soil amendments and initial fertilizer in conformance with the Nutrient Management Plan, seed mixes, seed additives, mulching, securing mulch, watering, overseeding, reseeding, and mowing, will be measured and paid for at the Contract unit price per square yard.

The use of other materials in conformance with an approved Modification Request shall be incidental to the Contract unit price, and will not be measured or paid for.

(a) Payment Schedule. Payments will be made according to Table 3 when construction requirements are met:

TURFGRASS ESTABLISHMENT
TABLE 3 - PAYMENT SCHEDULE

CONSTRUCTION REQUIREMENTS	PERCENT OF TOTAL CONTRACT PRICE	PAYMENT FOR COMPLETED WORK
705.03.01 thru .08	80	At Seeding Phase Acceptance
705.03.09 (a) and (b) and 705.03.10	20	At Final Acceptance
Total Payment	**100%**	

(b) Forfeiture. Failure to complete operations as required in conformance with the Payment Schedule will result in forfeiture of that percentage of payment.

705.04.02 Refertilizing will be measured and paid for at the Contract unit price per square yard.

705.04.03 Temporary Mulch and Temporary Seed will be measured and paid for at the Contract unit price per square yard.

CATEGORY 700
LANDSCAPING

SECTION 708 — TURFGRASS SOD ESTABLISHMENT

578 **DELETE:** Section 708 — Turfgrass Sod Establishment, in its entirety.

INSERT: The following.

SECTION 708 — TURFGRASS SOD ESTABLISHMENT

708.01 DESCRIPTION. Establish turfgrass sod on topsoil or other specified soil substrate to provide permanent vegetation groundcover. When it is not possible to perform Turfgrass Sod Establishment, refer to Section 704 and perform Temporary Mulch, or as directed. Performance of Turfgrass Sod Establishment as specified herein complies with all requirements of the Maryland Department of the Environment for permanent vegetation groundcover.

708.02 MATERIALS.

Fertilizer	920.03.01
Turfgrass Sod	920.06.03
Fasteners	920.05.02
Water	920.09.01

708.03 CONSTRUCTION.

708.03.01 General.

(a) Regions. Refer to 705.03.01(a).

(b) Installation Season and Species. Perform operations when soil moisture and weather conditions are suitable. Cease operations when sod or soil is frozen, or conditions are unsuitable.

Tall Fescue Sod. Install from August 15 to May 31 in Region 1, Region 2, and Region 3 unless another species of sod is specified. Approval is required for installation from November 16 to February 29 when fertilizer may not be applied.

Zoysiagrass Sod. Install in specified areas of Region 2 and Region 3 from March 1 to June 15, and from August 1 to September 15.

Bermudagrass Sod. Install in specified areas of Region 3 from March 1 to June 15, and from August 1 to September 15.

(c) Nutrient Management Plan (NMP). Soil testing will be performed and a NMP will be developed by the Administration. Conform to the application rates of the NMP and replace application rates of Table 2 in 705.03.03 as required by the NMP. When no NMP has been developed, apply 200 lb. per acre of 20-16-12 (83% UF with MAP & SOP) fertilizer as the NMP rate for Turfgrass Sod Establishment.

(d) Nutrient Management Reporting. Record the location and details of soil amendment and fertilizer applications on the Nutrient Management Reporting Form. Submit the Form within 24 hours after applying soil amendments and fertilizer.

708.03.02 Grade Repair. 705.03.04.

708.03.03 Preparing Topsoil. 705.03.05.

708.03.04 Application Rates. Apply materials according to Table 1.

TURFGRASS SOD ESTABLISHMENT
TABLE 1 - APPLICATION RATES

MATERIAL	LB PER SY	LB PER ACRE
INITIAL FERTILIZER per Nutrient Management Plan [a, b]		
20-16-12 (83% UF with MAP & SOP)	0 to 0.041	0 to 200
or one or more of the following [c]		
38-0-0 (UF)	0 to 0.021	0 to 100
11-52-0 (MAP)	0 to 0.036	0 to 175
0-0-50 (SOP)	0 to 0.041	0 to 200
SEED MIXES; select one		
SHA Turfgrass Seed Mix, applied to roadsides, facilities, and other designated areas	0.041	200
or		
SHA Special Purpose Seed Mix, applied to slopes 4:1 and steeper within four miles of a State airport, and other designated areas.	0.041	200
ADDITIVE SEED; when required per Table 1		
SHA Temporary Seed Mix	0.006	25
STRAW MULCH	0.826	4000
WOOD CELLULOSE FIBER to secure straw mulch	0.155	750
REFERTILIZING [d]		
37-0-0 Sulfur Coated Urea (SCU)	0.021	100

Notes:

[a] For existing topsoil and salvaged topsoil, the application rates will be included in the Contract documents. For furnished topsoil, the application rates will be developed for the approved source of supply.

[b] When no NMP has been developed, apply 200 lb per acre of 20-16-12 initial fertilizer.

[c] UF = Ureaform; MAP = Monoammonium Phosphate; SOP = Sulfate of Potash. When application rate of 20-16-12 fertilizer is below 200 lb. per acre, apply UF, MAP, and SOP per NMP.

[d] Refer to 705.03.06(d) and 705.03.09(c). Apply Refertilizing when included in the Contract documents.

708.03.05 Initial Fertilizer. Apply initial fertilizer after preparing soil, or after installing sod, per Table 1. When sodding from November 16 to February 29, apply initial fertilizer during March, and apply refertilizing in conformance with 708.03.12 during April.

Use spreaders, drills, or other approved machinery. Machinery shall be capable of uniformly placing fertilizer at the specified rate. Calibrate equipment before application. Apply materials accurately and uniformly to avoid misses and overlaps. Do not operate machinery during windy weather that may interfere with uniform application.

708.03.06 Transporting and Handling Sod. Transport and install turfgrass sod within 48 hours after harvest. Handle sod without excessive breaking, tearing, or loss of soil.

708.03.07 Placing Sod. Place sod neatly over the soil surface. Ensure that sod edges are tightly abutted. Do not overlap edges of sod, or leave gaps between strips of sod.

708.03.08 Securing. Install fasteners in locations where sod may be dislodged by water flow. Secure turfgrass sod to the soil of ditches and slopes with at least two fasteners per strip spaced no more than 2 ft apart. Drive the fasteners through the sod and firmly into the soil, so there is no gap at the top of the fastener.

708.03.09 Firming. Tamp or roll turfgrass sod after installation and securing sod to close press the sod firmly into the soil. Hand tampers shall weigh approximately 15 lb with a flat surface of approximately 100 in^2. Rollers shall weigh approximately 40 lb per ft of width.

708.03.10 Initial Watering. Gently apply water with a sprinkler or water-breaker nozzle over the surface of the sod. Do not allow water to cause erosion or to displace the sod. Perform the first watering within 4 hours after placing sod. Wet the soil to a depth at least 2 in. below the sod.

708.03.11 Installation Acceptance. Submit a request for Installation Phase Acceptance when operations are completed. Inspection will be conducted to verify completion. Installation Phase Acceptance will be granted at that time.

708.03.12 Establishment Phase. The Establishment Phase will begin upon Installation Phase Acceptance. Perform the following during the Establishment Phase.

(a) Period of Maintenance. Maintain areas of sod until Final Acceptance.

(b) Required Maintenance. Perform the following during the Establishment Phase.

Watering. Apply water to ensure survival of sod in good condition. Apply water with approved machinery. Do not allow water to cause erosion, or to displace the sod.

Reset Sod. When sod is not firmly fastened to the soil, repair the unsecured areas using fasteners as needed or as directed.

Sod Replacement. When sod does not meet acceptance standards, remove the unacceptable sod and install new sod as needed or as directed.
Mowing. Mow sod before it grows to a height of 8 in. Use approved machinery to cut to a height of 3 to 5 in.

(c) Refertilizing. Refer to 708.03.05 and apply 37-0-0 SCU Refertilizing as specified in Table 1 at least 1 month after initial fertilizer was applied. Do not apply Refertilizing from November 15 thru March 1.

708.03.13 Final Acceptance. The Engineer and the Landscape Operations Division will complete an Inspection Report of sod height, color, and percent groundcover. When it is not possible to perform the Inspection, Final Acceptance will be delayed until Inspection is possible. The Inspection Report will be included in the Punch List requirements for the project. Complete the Punch List requirements as directed.

Final Acceptance will be granted after all operations have been completed, and when the turfgrass sod has grown at least 4 in. tall, exhibits dark green color, is firmly rooted into the soil, and is at least 99 percent groundcover.

708.04 MEASUREMENT AND PAYMENT. Turfgrass Sod Establishment will be measured and paid for at the Contract unit price for one or more of the specified items. The payment will be full compensation for all material, labor, equipment, tools, disposal fees and incidentals necessary to complete the work.

(a) Payment Schedule. Payments will be made according to Table 2 when construction requirements are met.

TURFGRASS SOD ESTABLISHMENT
TABLE 2 - PAYMENT SCHEDULE

CONSTRUCTION REQUIREMENTS	PERCENT OF TOTAL CONTRACT PRICE	PAYMENT FOR COMPLETED WORK
708.03.01 thru .11	80	At Installation Phase Acceptance
708.03.12 (a) and (b) and 705.03.13	20	At Final Acceptance
Total Payment	**100%**	

(b) Forfeiture. Failure to complete operations as required in conformance with the Payment Schedule will result in forfeiture of that percentage of payment.

708.04.01 Turfgrass Sod Establishment, including grade repair, preparing soil, applying soil amendments and initial fertilizer in conformance with the Nutrient Management Plan, sod, fasteners, watering, resetting sod, sod replacement, and mowing will be measured and paid for at the Contract unit price per square yard.

708.04.02 Zoysiagrass Sod Establishment, including grade repair, preparing soil, applying soil amendments and initial fertilizer in conformance with the Nutrient Management Plan, sod, fasteners, watering, resetting sod, sod replacement, and mowing will be measured and paid for at the Contract unit price per square yard.

708.04.03 Bermudagrass Sod Establishment, including grade repair, preparing soil, applying soil amendments and initial fertilizer in conformance with the Nutrient Management Plan, sod, fasteners, watering, resetting sod, sod replacement, and mowing will be measured and paid for at the Contract unit price per square yard.

708.04.04 Refertilizing will be measured and paid for at the Contract unit price per square yard.

708.04.05 Temporary Mulch will be measured and paid for at the Contract unit price.

CATEGORY 700
LANDSCAPING

SECTION 709 — SOIL STABILIZATION MATTING

583 **DELETE:** Section 709 — Soil Stabilization Matting, in its entirety.

INSERT: The following.

SECTION 709 — SOIL STABILIZATION MATTING

709.01 DESCRIPTION. For areas that are at final grade, install soil stabilization matting in conjunction with permanent vegetation groundcover per Section 705, 706, 707, or as specified.

For areas that are not at final grade or that will be redisturbed at least 6 months after seeding operations are completed, install soil stabilization matting in conjunction with Section 704 or 705.

Performance of Soil Stabilization Matting as specified herein complies with all requirements of the Maryland Department of the Environment for permanent seeding.

709.02 MATERIALS.

Topsoil	920.01
Turfgrass Sod	920.04.06
Soil Stabilization Matting (SSM)	920.05.01
Fasteners	920.05.02
Water	920.09.01

709.03 CONSTRUCTION.

709.03.01 Modification Request. Certain types of matting may be substituted for other matting when the substitution will provide improved erosion protection.

Submit a written Modification Request to substitute one type of soil stabilization matting for another type in areas where specific types of matting have been specified.

The Engineer in consultation with the Landscape Operations Division will evaluate the Request. If granted, a notice of approved modification will be returned within 14 days after the request is received.

The following modifications and others may be approved.

(a) Turfgrass Establishment: Type D SSM in lieu of Type A SSM.

(b) Turfgrass Establishment: Type A SSM in lieu of Type E SSM.

(c) Meadow Establishment: Type D SSM in lieu of Type E SSM.

(d) Shrub Seeding Establishment: Type D SSM in lieu of Type E SSM.

709.03.02 Soil Preparation. Perform operations when soil moisture and weather conditions are suitable. Cease operations when soil is frozen, saturated, or when conditions are otherwise unsuitable. Perform operations for the SSM type as follows.

(a) Type A. Prepare soil and seedbed for Turfgrass Establishment per Section 705, or for other specified vegetation, but do not apply mulch.

Install SSM as specified in 709.03.03 thru .06.immediately after seeding and fertilizing.

(b) Type B. Prepare soil and seedbed for Turfgrass Establishment per Section 705, or for other specified vegetation, but do not apply mulch.

Firm soil with an approved roller to ensure uniform soil surface and firmness. The roller shall weigh approximately 40 lb per ft of width.

Install SSM as specified in 709.03.03 thru .06 .immediately after seeding, fertilizing and rolling are completed.

(c) Type C. Prepare soil and firm with an approved roller to ensure uniform soil surface and firmness.

Install Type C SSM as specified in 709.03.03 thru .06 and infill with soil per 709.03.07.

(1) Immediately perform Turfgrass Sod Establishment per Section 708, but do not till; or

(2) Immediately perform Turfgrass Establishment per Section 705, but do not till or apply mulch, and then cover with Type B SSM; or

(3) Immediately install other specified material and vegetation.

(d) Type D. Prepare soil and seedbed for Meadow Establishment per Section 707, or for other specified vegetation, but do not apply mulch.

Install SSM as specified in 709.03.02 thru .05.immediately after seeding and fertilizing.

(e) Type E. Prepare soil and seedbed for Turfgrass Establishment per Section 705, or for other specified vegetation, but do not apply mulch.

Install SSM as specified in 709.03.03 thru .06 immediately after seeding and fertilizing.

709.03.03 Unrolling. Unroll SSM in the direction of the flow of water. Lay matting smoothly in firm, uniform contact with the soil surface, without stretching or tenting.

709.03.04 Overlapping. Overlap SSM with the upslope portion on top. Overlap edges at least 2 in., and ends at least 6 in. Do not install longitudinal overlaps in channel bottoms.

709.03.05 Keying-in. Key-in matting by digging a trench, fastening and backfilling one or more edges of the matting into the bottom of the trench.

(a) Type of Matting. Key-in the areas described in Table 1 for each type of matting.

SOIL STABILIZATION MATTING
TABLE 1 - AREAS OF MATTING TO KEY-IN

MATTING TYPE	AREA OF MATTING
A, B	Uppermost or leading-edge.
A, B, D	Edges adjacent to pavement, catch basins, and structures.
B	Lowermost or toe-edge.
B	Check trenches; folds of matting perpendicular to water flow every 40-45 ft.
C	All edges.
C	Check trenches; folds of matting perpendicular to water flow every 20-25 ft.
D	Edges exposed to flow in BSM, ponds, swales, channels, slopes. All edges when installed in streams.
E	As directed.

(b) Trenching. Trench into the soil perpendicular to the flow of water to at least 6 in. depth.

(c) Fastening. Install fasteners per 709.03.06 through SSM into the bottom of the trench.

(d) Backfilling. Backfill the trench with firmly tamped soil, and secure the matting over the backfilled area.

709.03.06 Fastening. Secure SSM with fasteners driven perpendicular to the soil grade, and flush with the surface of the matting.

(a) Fastener Selection. Refer to 920.05.02 and use fasteners of the shape and length approved for the matting type according to Table 2.

When more than one fastener is acceptable for a type of matting per Table 2, install the fastener type and length best suited to the installation conditions to ensure that the matting is securely installed, or as directed.

(b) Placement of Fasteners. Install fasteners at the specified distance apart as required for the matting type and the area of matting according to Table 3.

SOIL STABILIZATION MATTING TABLE 2 - FASTENER SELECTION					
MATTING TYPE	**FASTENER SHAPE**	**FASTENER LENGTH** *			
		6 in. Length	**8 in. Length**	**12 in. Length**	**18 in. Length**
A & E	U-Shaped Staple	X	X		
	Circle-Top Pin	X	X		
	Round Head Pin	X	X		
	T-Head Pin	X	X		
B	U-Shaped Staple		X	X	
	Fabric Pin			X	X
C	U-Shaped Staple			X	X
	Fabric Pin			X	X
D	U-Shaped Staple in BSM, Ponds, Swales, Slopes	X	X	X	
	U-Shaped Staple or Fabric Pin in Channels, Streams		X	X	X
Note: * X = Denotes fasteners acceptable for the matting type. Refer to 709.03.06(a)					

SOIL STABILIZATION MATTING TABLE 3 - FASTENER PLACEMENT		
AREA OF MATTING	**MATTING TYPE**	**MAXIMUM DISTANCE BETWEEN FASTENERS In.**
Uppermost or Leading-Edge of Matting	A, B, C, D, E	6
Overlapping Edges of Matting	A, B, C, D, E	18
Center of Ditch	A, B, C, D, E	18
Lowermost or Toe-Edge of Matting	A, B, C, D, E	18
Throughout Matting	A, B, C, D, E	24
Check Trenches in Folds Every 40-45 ft	B [1]	12
Check Trenches in Folds Every 20-25 ft	C	12
Note: * Do not install check trenches in Type B SSM installed over Type C SSM.		

709.03.07 Infilling Type C SSM. Infill the matting with approved topsoil to fill matting voids and to cover the matting with topsoil to a depth of 1/8 in. to 1/4 in. Immediately install sod, or seed and cover with Type B SSM, or as specified.

709.03.08 Watering. Gently apply water with a sprinkler or water-breaker nozzle immediately after installation is completed as follows.

(a) For Type E SSM, apply water over the surface of the matting as needed to settle the matting and soil.

(b) For Types A, B, and D SSM, apply water over the surface of the matting to wet the soil at least 2 in. depth.

(c) For Type C SSM, apply water over the sod, over the Type B SSM, or over other specified material, to wet the soil at least 2 in. depth.

709.03.09 Installation Phase Acceptance. Inspection will be conducted to verify that matting and vegetation installation operations were completed as specified. Installation Phase Acceptance will be granted at that time.

709.03.10 Establishment Phase. The Establishment Phase will begin upon Installation Phase Acceptance. Perform the following during the Establishment Phase.

(a) Period of Maintenance. Maintain areas of soil stabilization matting until Final Acceptance.

(b) Required Maintenance. Perform the following during the Establishment Phase.

Watering. Apply water to ensure survival of the seeded species or sod as needed. Apply water with approved machinery. Do not allow water to cause erosion or to displace the matting, seed, or sod.

Reset Matting. When matting is not firmly fastened to the soil, or if keyed-in areas or check trenches are not secure, repair the unsecured areas using fasteners as needed or as directed.

Seeding Repair. When Turfgrass Establishment has not met acceptance standards, remove Type A, B, D, or E SSM and refer to 705.03.09 and perform overseeding or reseeding as directed. Remove Type C matting only if directed. Install new matting unless the original matting is approved for reuse.

When Shrub Seeding Establishment or Meadow Establishment has not met acceptance standards, remove Type D or E SSM and refer to 706.03.10(b) and perform overseeding in conformance with specifications for the pertinent vegetation. Install new matting unless the original matting is approved for reuse.

Sod Replacement. When Turfgrass Sod Establishment does not meet acceptance standards, refer to 708.03.12 and remove the unacceptable sod and install new sod.

709.03.11 Final Acceptance. The Engineer and the Landscape Operations Division will complete an Inspection Report of the installed soil stabilization matting and vegetation establishment in conformance with the pertinent specifications. When it is not possible to perform the Inspection, Final Acceptance will be delayed until Inspection is possible.

The Inspection Report will be included in the Punch List requirements for the project. Complete the Punch List requirements as directed. Final Acceptance will be granted when the SSM is secure, and when the specified vegetation has met acceptance standards.

709.04 MEASUREMENT AND PAYMENT. Soil stabilization matting will be measured and paid for at the Contract unit price per square yard for one or more of the specified items. The payment will be full compensation for all material, fasteners, water, labor, equipment, tools, disposal fees and incidentals necessary to complete the work.

(a) Payment Schedule. Payments will be made according to Table 4 when construction requirements are met.

SOIL STABILIZATION MATTING
TABLE 4- PAYMENT SCHEDULE

CONSTRUCTION REQUIREMENTS	PERCENT OF TOTAL CONTRACT PRICE	PAYMENT FOR COMPLETED WORK
709.03.01 thru .09	80	At Installation Phase Acceptance
709.03.10 and .11	20	At Final Acceptance
Total Payment	**100**	

(b) Forfeiture. Failure to complete operations as required in conformance with the Payment Schedule will result in forfeiture of that percentage of payment.

709.04.01 Type A Soil Stabilization Matting. The measurement will be the area actually covered by matting, per square yard. Payment for Turfgrass Establishment or other specified vegetation will be measured and paid for separately.

709.04.02 Type B Soil Stabilization Matting. The measurement will be the area actually covered by matting, per square yard. Payment for Turfgrass Establishment or other specified vegetation will be measured and paid for separately.

709.04.03 Type C Soil Stabilization Matting. The measurement will be the area actually covered by matting, per square yard. Topsoil used for infilling will be incidental to the Contract price. Payment for Type B Soil Stabilization Matting, Turfgrass Sod Establishment, Turfgrass Establishment, or other specified vegetation will be measured and paid for separately.

709.04.04 Type D Soil Stabilization Matting. The measurement will be the area actually covered by matting, per square yard. Payment for Meadow Establishment or other specified vegetation will be measured and paid for separately.

709.04.05 Type E Soil Stabilization Matting. The measurement will be the area actually covered by matting, per square yard. Payment for Turfgrass Establishment or other specified vegetation will be measured and paid for separately.

709.04.06 Temporary Mulch and Temporary Seed will be measured and paid for at the pertinent Contract unit price per square yard. Any soil stabilization matting which may be installed with Temporary Mulch or Temporary Seed will be incidental to the pertinent Contract unit price of those items in conformance with 704.04.01 or 704.04.02.

CATEGORY 700
LANDSCAPING

SECTION 710 — TREE, SHRUB, AND PERENNIAL INSTALLATION AND ESTABLISHMENT

587 **DELETE:** Section 710 — Tree, Shrub, and Perennial Installation and Establishment in its entirety.

INSERT: The following.

SECTION 710 — TREE, SHRUB, AND PERENNIAL INSTALLATION AND ESTABLISHMENT

710.01 DESCRIPTION. Install and establish trees, shrubs, perennials, vines, and grasses in topsoil or Bioretention Soil Mix. When it is not possible to perform this work, refer to Section 704 and perform Temporary Mulch, or as directed to provide temporary soil stabilization.

710.02 MATERIALS.

Furnished Subsoil	920.01.04
Type B Compost	920.02.05(b)
Fertilizer	920.03
Shredded Hardwood Bark (SHB) Mulch	920.04.03
Plant Materials	920.07
Marking and Staking Materials	920.08
Water	920.09.01
Pesticides	920.09.03
Marking Dye	920.09.04
Spray Adjuvant and Wetting Agent	920.09.05

710.03 CONSTRUCTION.

710.03.01 General.

(a) Planting Seasons. Perform operations during Planting Seasons when soil moisture and weather conditions are suitable, when the temperature is above 32 F, and the soil is not frozen. Cease operations when conditions are unsuitable.

Spring Planting Season. February 1 through June 30. Do not install plants in July.

Fall Planting Season. August 1 through December 31. Do not install plants in January.

(b) Modification Request. Submit a written Modification Request to install plants of different species, cultivars, sizes, growth habits, or planting stock type. The Engineer in consultation with the Landscape Operations Division will evaluate the Request. If granted, notice of the approved modification will be returned within 14 days afterwards.

(c) Pesticide Application. The Contractor shall possess a Maryland Department of Agriculture Commercial Pesticide Business License and a Pesticide Applicator Certificate for the pertinent pesticide application Category: (2) Forest; (3A) Ornamental Plant Exterior; (3-C) Turf; (5) Aquatic; (6) Right-of-Way and Weed.

Apply pesticides in conformance with the Maryland Pesticide Applicator's Law, OSHA and MOSH regulations, and the manufacturer's label and Safety Data Sheets (SDS).

Ensure that pesticides are applied by a Maryland Certified Pesticide Applicator, or by a Registered Pesticide Applicator under the supervision of a Certified Pesticide Applicator.

(d) Pesticide Application Reporting. Record the location and details of pesticide applications on the Pesticide Application Reporting Form. Submit the Form within 24 hours after applying pesticides.

(e) Nutrient Management Plan (NMP). The specified application rates of 14-14-14 fertilizer will be the NMP unless the Administration develops a substitute NMP. Replace application rates of 710.03.04 and .05 as required by the NMP.

(f) Nutrient Management Reporting. Record the location and details of soil amendment and fertilizer applications on the Nutrient Management Reporting Form. Submit the Form within 24 hours after applying soil amendments and fertilizer.

(g) Plant Storage and Handling. Refer to 920.07.05.

(h) Standard Details. Refer to Maryland Standard MD-710.03-01 through MD-710.03-15 when preparing plant materials, constructing planting beds, and installing plant materials.

710.03.02 Submittals and Inspection. Submit the following items.

(a) Breakdown List of Contract Prices. Refer to 710.04.01 and develop a Breakdown List of Contract Prices for each plant in the Contract. Include the cost of all installation and establishment operations in the per plant price.

Submit the written Breakdown List within 14 days after Award of Contract. The Breakdown List will be reviewed by the Engineer and Landscape Operations Division for completeness and balance, and will be approved or returned for correction.

(b) Installation Phase Schedule. Develop a Schedule with dates for completing operations related to 710.03.01 thru .15 according to Table 1.

TREE, SHRUB, AND PERENNIAL TABLE 1 - OPERATIONS IN INSTALLATION PHASE SCHEDULE	
1	Layout, utilities review and marking.
2	Undesirable vegetation removal and herbicide application.
3	Planting pit excavation, soil preparation, and plant installation.
4	Planting beds rototilling and soil preparation, applying shredded hardwood bark (SHB) mulch, and plant installation.
5	Applying fertilizer solution after installation, and cleanup.

Submit the written Schedule at least 30 days before beginning landscape work. The Schedule will be reviewed by the Engineer and Landscape Operations Division for completeness and feasibility, and will be approved or returned for correction.

(c) Plant Material Inspection and Approval. The Inspection will be conducted by the Landscape Operations Division as specified in 920.07.02.

(d) Establishment Phase Schedule & IPM Program. Develop a Schedule with dates for completing 710.03.22. Include an Integrated Pest Management (IPM) Program with methods of pest monitoring (weeds, diseases, insects, mammals, etc.), pesticide selection, application rates, and scheduling.

Submit the written Establishment Phase Schedule & IPM Program at the Installation Phase Inspection.

The Schedule will be reviewed by the Engineer and the Landscape Operations Division, and will be approved or returned for correction.

710.03.03 Utilities Marking, Layout, and Inspection. Refer to Section 875 when included in the Contract Documents.

(a) Utilities Marking. Contact 'Miss Utility' or another approved service to identify and mark utilities in the rights-of-way and on SHA property.

(b) Conflicts. Notify the Administration in writing of conflicts that may involve design changes. Conflicts will be reviewed by the Landscape Operations Division and resolved within 14 days after notice.

(c) Planting Layout. Refer to Maryland Standard MD-710.03-10, MD-710.03-11 and MD-710.03-12. Provide the necessary materials and lay out the locations of planting pits and planting beds specified in the Contract Documents, or as adjusted by the Landscape Operations Division.

(d) Inspection. At least 7 days notice will be required to schedule each stage of a layout inspection in consultation with the Landscape Operations Division. Proceed with operations after layout approval.

710.03.04 Preparing Planting Pits. Refer to Maryland Standard MD-710.03-14 and MD-710.03-15. Perform the following operations when preparing planting pits for individual plants.

(a) Undesirable Vegetation. Manually remove undesirable vegetation or refer to 710.03.01(c) and 710.03.01(d) and apply non-selective herbicide in water with wetting agent and dye according to Table 2 at least 14 days before plant installation. Cut and remove dead vegetation or debris that interferes with soil preparation, plant installation or future maintenance.

TREE, SHRUB, AND PERENNIAL
TABLE 2 - NON-SELECTIVE HERBICIDE APPLICATION

MATERIAL	RATE PER ACRE
Glyphosate Herbicide	5 lb of active ingredient
Marking Dye	6 to 15 oz
Water	40 to 50 gal

(b) Excavation. Excavate planting pits to the depth required for the placement of root collars as specified in 710.03.09(c). Retain the excavated soil for preparation as backfill soil. Remove excess soil from the site, or spread as directed.

For Expanded Tree Pits (ETP), refer to the detail provided in the Contract documents. Excavate additional depth and width as shown in the detail, place furnished subsoil to the dimensions shown in the detail, and complete tree installation using Table 3. Remove excess soil from the site, or spread as directed.

(c) Planting Pit Diameter. Use Table 3 to determine the diameter of the planting pit based upon the container or root ball diameter.

TREE, SHRUB, AND PERENNIAL TABLE 3 - PREPARING PLANTING PITS AND BACKFILL SOIL					
Container or Root Ball Diameter In.	**ANSI Z60 Container Size**	**Planting Pit Diameter in.**	**Compost ft^3**	**14-14-14 Fertilizer oz**	**Water per Event gal**
< 3	Plugs	2 to 4	0	0	0.10
3	#SP3	6	0.02	0.10	0.15
5	#SP4	10	0.02	0.12	0.2
6	#SP5 or #1	12	0.03	0.18	0.3
8	#2	17	0.09	0.30	0.5
10	#3	21	0.18	0.55	1.0
12	#5	24	0.28	0.75	1.5
14	#7	28	0.44	1.0	2.3
16	#10	32	0.65	1.3	3.5
18	#15	36	0.94	1.6	5.0
20	#20	40	1.27	2.0	6.8
24	#25	48	2.20	3.0	12
30	-	60	4.30	4.5	23
36	#45	72	7.40	6.5	40
42	#65	84	11.80	8.8	60
Note: When water is applied over the surface of planting beds where most plants are less than 36 in. apart, apply water per plant in conformance with 'Water per Event', or apply at least 5 gallons of water per SY of planting bed.					

(d) Compost and Fertilizer. Use Table 3 to determine the quantity of compost and 14-14-14 fertilizer to mix into backfill soil, based upon planting pit diameter. Uniformly mix compost and fertilizer into the backfill soil.

Use a scale with 0.01 oz or gram accuracy to calibrate measures and verify application rates of 14-14-14 fertilizer when directed.

(e) Water. Use Table 3 to determine the quantity of water to apply for each installed plant based upon planting pit diameter.

710.03.05 Preparing Planting Beds. Refer to Maryland Standard MD-710-03-10, MD-710.03-11, MD-710-03-12 and perform the following operations.

(a) Undesirable Vegetation. Remove undesirable vegetation as specified in 710.03.04(a). Cut or mow dead vegetation to a height of 1 in. and remove the debris.

(b) Compost and Rototilling.

(1) Areas Flatter than 4:1. Apply 2 in layer of compost over the soil surface of the planting bed. Rototill to a depth of 6 in. to thoroughly mix compost and any materials specified in the NMP. Do not apply compost or rototill Bioretention Soil Mix (BSM) unless specified otherwise.

(2) Slopes 4:1 and Steeper. Do not rototill.

(c) Fertilizer. Mix 14-14-14 fertilizer into the backfill soil of each planting pit within the bed according to Table 3.

(d) Debris Removal. Remove debris, stones, and soil clods with a length or width greater than 2 in. that are uncovered during rototilling.

(e) Leveling. Level the soil surface after rototilling, and leave it in a condition ready for shredded hardwood bark (SHB) mulching and plant installation.

710.03.06 Plant Acclimation. Ensure that container grown plants are acclimated to prevailing weather conditions before installing. Install bare root plants while dormant when soil and air temperatures are above freezing.

710.03.07 Plant Care. Begin plant care at the time each plant is installed, and continue until Installation Phase Acceptance is granted.

710.03.08 Pruning. Refer to Maryland Standard MD-710.04-14. Remove dead branches, damaged branches, water sprouts, and other undesirable growth manually with pruners. Preserve the natural appearance of trees and shrubs. Remove branches or portions of branches over sidewalks to ensure 8 ft clearance for pedestrians.

710.03.09 Installing. Install plants vertically in planting pits and beds prepared as specified in 710.03.04 and .05, and as follows.

(a) Removing Containers, Burlap, Wire Baskets. Remove containers. Remove twine, burlap or other fabric from the tops of root balls to a depth at least 6 in. below the surface of the backfilled planting pit. Cut and remove the tops of wire baskets from the upper half of the rootball. Discard containers and any removed twine, wire, burlap or other fabric.

(b) Preparing Roots. Carefully remove the containers of container grown plants, and loosen the soil mass to eliminate girdling roots.

Spread the roots of bare root plants in a natural position, and firmly press backfill soil around the roots.

(c) Placing Root Collar. Refer to Maryland Standard MD-710.03-15. Place the root collar of plants at or above the average soil surface grade outside the planting pit according to Table 4.

TABLE 4- ROOT COLLAR PLACEMENT	
SOIL CONDITIONS	**HEIGHT OF ROOT COLLAR**
Normal, Well Drained	Place collar at same level to 1 in. above average surface grade.
Compacted	Place collar at 1 to 2 in. above average surface grade.
Poorly Drained or Wet	Place collar as needed to ensure 25% of root mass is above average surface grade.

(d) Backfilling. Remove clods, stones and other foreign material with a length or width greater than 2 in. from soil used for backfilling.

Place backfill soil that has been mixed with compost and fertilizer as specified in 710.03.04 and .05 under and around roots to stabilize plants in upright position and restore the grade. Lightly firm and compact backfill soil to reduce air pockets.

710.03.10 Soil Berming. Form a 4 in. high berm of backfill soil around planting pits and planting beds as follows.

(a) Planting Pits. On areas flatter than 4:1, form the berm around the entire planting pit. On slopes 4:1 and steeper, take soil from the upslope rim of the pit and place it on the downslope rim to form the berm.

(b) Planting Beds. On slopes 4:1 and steeper, form the berm as a shoulder at the lower edge of the bed. Berm individual trees and shrubs installed within beds on slopes 4:1 and steeper as described in (a) above.

710.03.11 Edging. Cut edging at a steep angle into the mulched area to a 3 in. depth into the soil. On slopes 4:1 and steeper, cut edging outside of the bermed area on the lower edge of berm. Remove and discard excess soil.

(a) Planting Pits. Edge entirely around all planting pits except planting pits within planting beds.

(b) Planting Beds. Smoothly cut edging around all planting beds to the shapes specified.

710.03.12 Staking and Guying. Refer to Maryland Standard MD-710.03-01 through MD-710.03-09. Stake and guy trees the same day they are installed.

(a) Installation. When two or three stakes are specified for trees, install two stakes parallel to the direction of traffic, or as directed. Drive stakes vertically to a depth of 10 in. below the bottom of the pit, and 5 to 8 in. away from roots according to Table 5.

TREE, SHRUB, AND PERENNIAL TABLE 5 - STAKING AND GUYING			
TREE	**CALIPER**	**HEIGHT**	**SUPPORT**

TYPE	in.	ft	No. of Stakes	Length, ft
Shade	Under 1	6 and 8	2	6
	1 to 2	–	2	8
	2-1/2 to 3-1/2	–	3	10
	4 and over	–	—	3 guy wires attached to tree anchors
Flowering	3/4 to 2-1/2	–	2	5-8
	3 and over	–	—	3 guy wires attached to tree anchors
Evergreen	–	5 and 6	2	5-6
	–	7, 8 and 9	3	7-8
	–	10 and over	—	3 guy wires attached to tree anchors

(b) Maintenance. Promptly straighten trees that become crooked after installation. Repair or replace stakes, guys, and other support materials as needed.

710.03.13 Mulching. Spread SHB mulch uniformly over the soil surface to a 3 in. depth. Promptly repair damage caused by washouts or construction activities.

(a) Planting Pits. Spread SHB mulch the same day that plants are installed. Mulch around the base of each plant to cover the soil of the planting pit to its outside edge, including the soil berm. Do not allow mulch to touch the bark or main stem of the plant.

(b) Planting Beds. SHB mulch may be spread before or after installing plants. Spread mulch over the entire bed and rake it to an even surface, including berms and shoulders. Ensure that mulch does not cover plants.

For rototilled beds, spread mulch the same day after rototilling. For non-rototilled beds, spread mulch within 3 days after plant installation. When installation is completed, ensure that mulch uniformly covers the soil to a uniform 3 in. depth.

(c) Stormwater Infiltration Facilities or other specified areas. SHB mulch applied as Shredded Hardwood Bark Mulching 3 in. Depth may be spread before or after installing plants. Spread SHB mulch over the specified area and rake it to an even surface the same day that soil is placed, or refer to 704.03.02 and immediately install Temporary Matting Mulch. As soon as feasible, remove Temporary Matting Mulch and install SHB mulch, and ensure that SHB mulch uniformly covers the specified area to a uniform 3 in. depth.

710.03.14 Watering after Installation.

(a) Application Equipment. Watering equipment shall consist of sprinklers or hoses equipped with water breaker nozzles so the materials are applied with care to prevent damage to plants and minimize disturbance to SHB mulch.

For planting pits, refer to Table 4 and apply the required quantity of water to each plant.

For planting beds, apply water to the entire bed area to wet the soil to a depth of 3 in.

(b) Follow-Up Watering. Monitor and apply water during the Installation Phase to supply plant needs.

710.03.15 Cleanup. Remove growers tape, plant stakes, pot markers, field tags, and similar materials at the time of installation. Ensure that the Administration's Material Inspection Approval Seals and plant tags remain on trees and shrubs until the end of the Establishment Phase.

Keep turfgrass areas, paved surfaces, and sidewalks clean. Promptly remove excess and waste materials. Take precautions to avoid damage to existing structures, plants, and turfgrass. Repair damage caused to surrounding areas during installation, and fill ruts and reestablish turfgrass as necessary.

710.03.16 Relocating Plants. Begin plant relocation operations within 7 days after notice to relocate, and continue until work is completed. Remove plants installed in undesirable locations as directed by the Engineer, and reinstall these plants as specified in herein.

710.03.17 Abandoned Planting Pits. Backfill abandoned planting pits when directed with excavated soil or approved backfill. Compact the backfill in 8 in. layers to the finished grade. Establish turfgrass as specified in Section 705.

710.03.18 Unacceptable Plants and Replacement Plants. Promptly remove and replace plants that are unacceptable at any time during the Installation Phase as specified in 920.07, or when requested.

Plants that are determined to be missing, dead, dying, damaged, diseased, deformed, underdeveloped, damaged by pesticides, or not true to species, cultivar, size or quality shall be replaced.

Refer to GP-5.09 regarding removal of defective work and materials, and GP-7.16 regarding Contractor responsibility for work, theft, damage, and loss.

(a) Criteria. The criteria of Table 6 will be used to identify unacceptable plants.

TREE, SHRUB, AND PERENNIAL

TABLE 6 - CRITERIA FOR UNACCEPTABLE PLANTS

Item	Plant Type	Condition	Unacceptable
1	Tree, Shrub, Vine, Perennial Grass	Dead or Missing	Any dead or missing plant, any cause.
2	Tree, Shrub, Vine, Perennial Grass	Defoliation	More than 25% of leaf area dead, lost or dropped.
3	Tree, Shrub, Vine	Bark Wound	More than 15% of bark circumference or 2 in. length.
4	Shrub or Vine	Height Die-back	More than 25% of the shrub or vine height.

5	Tree	Leader Die-back	More than 10% of tree height.
6	Tree	Branch Die-back	More than 6 in. on 75% of branches.

(b) Replacement Plants. Replacement plants shall be true to species, cultivar, size, and quality as specified in the Contract Documents unless a Modification Request is approved.

Install replacement plants as soon as feasible during the current Planting Season, or if between Planting Seasons, during the next Planting Season. Promptly submit a Modification Request as specified in 710.03.01(b) when it is not possible to obtain plants that meet specifications.

Replacement plants shall meet the specifications of 920.07, and be installed and established as specified in Section 710 until Final Acceptance.

710.03.19 Installation Phase Inspection. Submit a request for Installation Phase Inspection when operations are completed, and provide the Establishment Phase Schedule as specified in 710.03.02(d).

The Installation Phase Inspection will be scheduled by the Engineer at the project with the Contractor and the Landscape Operations Division to verify completion. At least 14 days notice will be provided before the scheduled Inspection so that it may be completed in the company of the Contractor.

710.03.20 Installation Phase Punch List. The Engineer in consultation with the Contractor and the Landscape Operations Division will develop the Installation Phase Punch List and list of plants to be replaced. Complete the Punch List requirements and replace plants as required.

710.03.21 Installation Phase Acceptance. Re-inspection will be performed as needed. Installation Phase Acceptance will be granted when the Punch List and all Installation Phase requirements are completed according to Table 7.

TREE, SHRUB, AND PERENNIAL

TABLE 7 - REQUIREMENTS FOR INSTALLATION PHASE ACCEPTANCE

Item	Requirement	Section
a	Submittals are accepted and Inspections are completed.	710.03.01(b), 710.03.02, 920.07
b	Damaging pests are controlled.	710.03.02(c)
c	Layouts are inspected and approved.	710.03.03
d	Fertilizer and compost is mixed soil, as required.	710.03.04 and 710.03.05
e	Planting pits and planting beds are weed free.	710.03.04(a) and 710.03.05(a)
f	Trees and shrubs are pruned.	710.03.08
g	Trees are installed vertically and straightened.	710.03.09
h	Planting pits and beds are bermed and edged.	710.03.10 and 710.03.11
i	Staking and guying are repaired or replaced.	710.03.12

j	SHB mulch is uniformly spread to the specified depth.	710.03.13
k	Washouts in planting pits and beds are repaired.	710.03.13
l	Plants receive initial watering and follow up watering.	710.03.04 and 710.03.14
m	Clean up is completed, plant tags and ribbons are removed.	710.03.15
n	Plants are relocated to approved locations.	710.03.16
o	Abandoned planting pits are filled and seeded.	710.03.17
p	Unacceptable plants are replaced.	710.03.18
q	Damage repairs and Installation Phase Punch List is completed.	710.03.20
r	Pesticide Application and Nutrient Management Reporting Forms are completed.	710.03.01(d) and (f)
s	Plants are properly installed, are none are unacceptable or require replacement.	710.03.01 thru .18
t	Establishment Phase Schedule & IPM Program is accepted.	710.03.02 (e) and 710.03.21

710.03.22 Establishment Phase. The Establishment Phase begins upon Installation Phase Acceptance. Maintain plants and provide care and replacement as specified in 710.03.01 thru 0.21, and as follows

(a) Period of Maintenance. Maintain plants for 12 months after installation, until Final Acceptance.

(b) Plant Watering. Monitor the soil moisture and water needs of plants. Promptly apply water as specified in 710.03.14 to planting pits and planting beds as needed, or as directed.

(c) Pest Management. Monitor and promptly control weeds, insects and other pests in conformance with the IPM Program, or when requested. Control weeds in mulched areas in preparation for inspection. Remove dead weeds taller than 6 in. Refer to 710.03.01(d) and complete the Pesticide Application Reporting Form.

(d) Unacceptable Plants and Replacement Plants. Refer to 710.03.18. Promptly remove and replace plants that have become unacceptable during the Establishment Phase as needed or as directed.

(e) End-of-Season Foliage Removal. For perennials, remove the aboveground parts that have declined during the months of November and December, or as directed. For grasses, remove the aboveground parts that have declined and in February or March, or as directed.

(f) Refertilizing. Dissolve 40 lb of 20-20-20 water soluble fertilizer in 1000 gal water. Refer to 710.03.14 regarding application equipment. Apply fertilizer solution in the final 60 days of the Establishment Phase. For planting pits, refer to Table 3 and apply gallons of fertilizer solution to each installed plant based upon the planting pit diameter and water per event gal. For planting beds, apply 0.21 gal of fertilizer solution per SY of planting bed. Apply fertilizer solution to the entire bed area.

(g) Removing Supports and Seals. Remove tree supports, hoses wires, guys and Material Inspection Approval Seals in the final 30 days of the Establishment Phase. Pull stakes from the soil or cut them to ground level.

(h) Partial Establishment Phase Inspection. The Project Engineer will inspect plant establishment 6 months after Installation Phase Acceptance according to Table 8. The Inspection Report will include actions to perform before Partial Establishment Phase Acceptance is granted. Perform repairs, replacements, and other work as specified in the Contract Documents and Inspection Report.

710.03.23 Establishment Phase and Final Acceptance. The Engineer and the Landscape Operations Division will complete an Inspection Report 12 months after Installation Phase Acceptance. When it is not possible to perform the Inspection, Final Acceptance will be delayed until Inspection is possible.

Final Acceptance will be granted when the requirements of Table 8 are satisfactorily completed. The Inspection Report will be included in the Punch List requirements for the project. Complete the Punch List requirements as directed.

TREE, SHRUB, AND PERENNIAL

TABLE 8 - REQUIREMENTS FOR ESTABLISHMENT PHASE AND FINAL ACCEPTANCE

Item	Requirement	Section
1	Water sprouts are manually pruned and removed.	710.03.08
2	Trees are straightened.	710.03.09
3	Staking and guying are repaired or replaced.	710.03.12
4	Washouts in planting pits and beds are repaired.	710.03.13
5	Plants are relocated to approved locations.	710.03.16
6	Abandoned planting pits are filled and seeded.	710.03.17
7	Plants are successfully established.	710.03.22(a) and (b)
8	Damaging pests are controlled.	710.03.22(c)
9	Planting pits and planting beds are weed free.	710.03.22(c)
10	Unacceptable plants are replaced.	710.03.22(d)
11	Annual foliage dieback of perennials and grasses is cut and removed.	710.03.22(e)
12	Plants are refertilized.	710.03.22(f)
13	Pesticide Application and Nutrient Management Reporting Forms are completed.	710.03.01(d) and (f)
14	Staking, guying, and Material Inspection Seals are removed.	710.03.22(g)
15	Damage repairs and Establishment Punch List are completed.	710.03.22(h)

710.04 MEASUREMENT AND PAYMENT. Tree, Shrub, and Perennial Installation and Establishment will be measured and paid for at the Contract unit price for one or more of the specified items. The payment will be full compensation for all plants, material, labor, equipment, tools, disposal fees and incidentals necessary to complete the work.

710.04.01 Tree, Shrub, and Perennial Installation and Establishment. Tree, Shrub, and Perennial Installation and Establishment shall include the cost of trees, shrubs, vines, perennials, and grasses of all planting stock sizes and classes, layout, marking, pruning, planting pit excavation and disposal of excavated soil, fertilizer, compost, backfilling, staking, guying, berming, edging, watering, cleanup, relocating plants, abandoned planting pits, pest management, plant maintenance, refertilizing, and all operations related to the Installation and Establishment Phases of each plant, until Final Acceptance.

Tree, Shrub, and Perennial Installation and Establishment will be paid according to Table 9 based upon the approved Breakdown List of Contract Prices. Refer to 710.03.02(a). In the event of change in the quantities required, payment adjustments will be based on the approved Breakdown List of Contract Prices.

(a) Payment Schedule. Payments will be made according to Table 9 when construction requirements are met.

TREE, SHRUB, AND PERENNIAL
TABLE 9 - PAYMENT SCHEDULE

CONSTRUCTION REQUIREMENTS		PERCENT OF TOTAL CONTRACT PRICE	PAYMENT FOR COMPLETED WORK
710.03.01 thru .21	Installation Phase	70	At Installation Phase Acceptance
710.03.22(a) thru (e)	Establishment Phase	15	At Partial Establishment Phase Acceptance
710.03.22(a) thru (h) and 710.03.23	Establishment Phase and Final Acceptance	15	At Final Acceptance
Total Payment		**100%**	

(b) Forfeiture. Failure to complete operations as required or directed in conformance with the Payment Schedule will result in forfeiture of that percentage of payment based upon the Breakdown List of Contract Prices.

710.04.02 Constructing Planting Beds. Constructing Planting Beds will be measured and paid for at the Contract unit price per square yard. The price will include the cost of layout, marking, fertilizer, soil amendments, rototilling, berming, edging, applying 3 in. of SHB mulch, refertilizing, and all operations related to construction of the planting bed, and any necessary damage repair per 710.03.21 and 710.03.22 until Final Acceptance. Mulching individual planting pits of trees, shrubs, perennials, vines, and grasses within planting beds will not be measured but the cost will be incidental to 710.04.02.

710.04.03 Shredded Hardwood Bark Mulching 3 in. Depth. Shredded Hardwood Bark Mulching 3 in. Depth that is installed within stormwater infiltration facilities or within other specified areas, and which is not installed as part of Constructing Planting Beds, will be measured and paid for separately. The payment will include the cost of SHB Mulch, installation, and any necessary damage repair per 710.03.21 and 710.03.22 until Final Acceptance. Mulching

individual planting pits of trees, shrubs, perennials, vines, and grasses within areas of Shredded Hardwood Bark Mulching 3 in. Depth will not be measured but the cost will be incidental to 710.04.03.

710.04.04 Expanded Tree Pit. Expanded Tree Pit will be measured and paid for at the Contract unit price per each. The price shall include the cost of excavation to the specified dimensions, furnished subsoil, disposal of excavated soil, and all operations related to construction of the expanded tree pit.

710.04.05 Temporary Mulch will be measured and paid for at the Contract unit price.

CATEGORY 700
LANDSCAPING

SECTION 711 — ANNUALS AND BULBS
INSTALLATION AND ESTABLISHMENT

603 **DELETE:** Section 711 — Annuals and Bulbs Installation and Establishment in its entirety

INSERT: The following.

SECTION 711 — ANNUALS AND BULBS
INSTALLATION AND ESTABLISHMENT

711.01 DESCRIPTION. Install and establish annuals and bulbs in topsoil. When it is not possible to perform this work, refer to Section 704 and perform Temporary Mulch, or as directed to provide temporary soil stabilization.

711.02 MATERIALS.

Type B Compost	920.02.05(b)
Fertilizer	920.03
Shredded Hardwood Bark (SHB) Mulch	920.04.03
Plant Materials	920.07
Marking and Staking Materials	920.08
Water	920.09.01
Pesticides	920.09.03

711.03 CONSTRUCTION.

711.03.01 General.

(a) Regional Areas. Refer to 705.03.01(a).

(b) Planting Seasons. Perform operations when soil moisture and weather conditions are suitable. Cease operations when conditions are unsuitable. Install plants according to Table 1.

ANNUALS AND BULBS TABLE 1 - PLANTING SEASONS				
SEASON	**PLANTS**	**INSTALLATION DATE**		
		Region 1	**Region 2**	**Region 3**
Spring	Container Grown Summer Annuals	5/20 – 6/20	5/10 – 6/10	5/01 – 6/01
Fall	Container Grown Winter Annuals	9/01 – 10/20	9/10 – 10/31	9/20 – 11/10
	Spring Flowering Bulbs	9/01 – 11/30	9/10 – 12/31	9/20 – 12/31

(c) Modification Request. 710.03.01(b).

(d) Pesticide Application. 701.03.01(b).

(e) Pesticide Application Reporting. 701.03.01(e).

(f) Nutrient Management Plan (NMP). 710.03.01(e).

(g) Nutrient Management Reporting. 710.03.01(f).

(h) Plant Storage and Handling. 920.07.05.

(i) Standard Details. Refer to Maryland Standard MD-710.03-11 and MD-710.03-12 when constructing planting beds and installing plant materials.

711.03.02 Submittals and Inspection. Submit the following items as indicated.

(a) Breakdown List of Contract Prices. Refer to 710.03.02(a).

(b) Installation Phase Schedule. Refer to 710.03.02(b) and submit the Schedule with dates for completing 711.03.02 thru .12.

(c) Plant Material Inspection and Approval. The Inspection will be conducted by the Landscape Operations Division as specified in 920.07.01.

(d) Establishment Phase Schedule & IPM Program. Refer to 710.03.02(d) and submit the Schedule with dates for completing 711.03.17.

711.03.03 Utilities Marking, Layout, and Inspection. Refer to 710.03.03.

711.03.04 Preparing Planting Beds and Planting Areas.

(a) Planting Beds. Refer to 710.03.05 for preparing beds and planting holes for container grown annuals and bulbs. Dig holes for bulbs to the depth and width recommended for the species or variety by the grower.

(b) Planting Areas for Naturalized Daffodils. Dig planting holes to 3.0 in. diameter and to a 5 in. depth. Mix 0.20 oz of 14-14-14 fertilizer into the backfill soil of each bulb, or as specified in the NMP. Firmly cover each bulb with backfill soil to the level of the surrounding grade. Omit 711.03.05 thru .10 when installing naturalized daffodils.

711.03.05 Soil Berming. Refer to 710.03.10.

711.03.06 Edging. Refer to 710.03.11.

711.03.07 Mulching. Refer to 710.03.13.

711.03.08 Plant Acclimation. Refer to 710.03.06.

711.03.09 Plant Care. Refer to 710.03.07.

711.03.10 Installing. Handle annuals and bulbs with care to avoid damage or bruising. Refer to 710.03.09 and the following.

(a) Foliage Removal. Remove dead foliage of annuals and other unwanted vegetation from the previous season without damaging or disturbing perennials or other desirable vegetation.

(b) Mulch. Remove and conserve SHB mulch at sites where annuals or bulbs will be installed before digging the planting hole. Replace mulch to a depth of 2 in. over bulbs and around the stems of annuals.

711.03.11 Watering After Installation.

(a) Application Equipment. Refer to 710.03.14(a).

(b) Follow-Up Watering. Refer to 710.03.14(d).

711.03.12 Cleanup. Refer to 710.03.15.

711.03.13 Unacceptable Plants and Replacement Plants. Refer to 710.03.18, 920.07 and replace unacceptable plants as specified in Section 711 for the remainder of the growing season until Final Acceptance.

711.03.14 Installation Phase Inspection. Refer to 710.03.19.

711.03.15 Installation Phase Punch List. Refer to 710.03.20.

711.03.16 Installation Phase Acceptance. Refer to 710.03.21 and provide the Establishment Phase Schedule as specified in 711.03.02(e). Installation Phase Acceptance will be granted when the Punch List and all Installation Phase requirements are completed according to Table 2.

ANNUALS AND BULBS TABLE 2 - REQUIREMENTS FOR INSTALLATION PHASE ACCEPTANCE		
Item	**Requirement**	**Section**
a	Submittals are accepted and Inspections are completed.	710.03.01(b), 711.03.02, 920.07
b	Dead foliage in existing beds is removed.	711.03.10(a)
c	Fertilizer and compost is applied, as required.	711.03.04
d	Planting pits and planting beds are bermed and edged.	710.03.10 and 710.03.11
e	SHB mulch is uniformly spread to the specified depth.	710.03.13 and 711.03.10(c)
f	Plants receive initial watering and follow up watering.	711.03.04 and 711.03.11
g	Damaging pests are controlled.	711.03.02(c)
h	Cleanup is completed, plant tags and ribbons are removed.	710.03.15
i	Washouts in and around planting beds are repaired.	710.03.13
j	Unacceptable plants are replaced as needed or required.	710.03.18
k	Damage repairs and Installation Phase Punch List is completed.	710.03.20
l	Pesticide Application and Nutrient Management Reporting Forms are	710.03.01(d) and (f)
m	Plants are properly installed, are none are unacceptable or require replacement.	711.03.01 thru .13
n	Establishment Phase Schedule & IPM Program is accepted.	710.03.02(e) and 711.03.16

711.03.17 Establishment Phase. The Establishment Phase for annuals and bulbs planted in beds begins upon Installation Phase Acceptance. Maintain all plants except naturalized daffodils as specified in 711.03.01 thru 0.16 and as follows.

(a) Period of Maintenance. Plants shall be maintained for one Planting Season, until Final Acceptance.

(b) Plant Watering. Refer to 710.03.22(b).

(c) Pest Management. Refer to 710.03.22(c).

(d) Unacceptable Plants and Replacement Plants. Refer to 710.03.18. Promptly remove and replace plants that have become unacceptable during the Establishment Phase as needed, or at the request of the Engineer.

(e) End-of-Season Foliage Removal. Remove the foliage of annuals that have declined in late summer or fall, as directed by the Engineer. Remove the foliage and flower stems of bulbs planted in beds after they have declined at the end of their growing season in June.

(f) Refertilizing. 710.03.22(f).

(g) Partial Establishment Phase Inspection. Refer to 711.03.02. The Engineer and the Landscape Operations Division will inspect plant establishment according to Table 2 on the scheduled inspection date, approximately 1 month after Installation Phase Acceptance.

The Inspection Report will include actions to perform before Partial Establishment Phase Acceptance is granted. When it is not possible to perform the Inspection, Partial Establishment Phase Acceptance will be delayed until Inspection is possible.

Perform repairs, replacements, and other work as specified in the Contract Documents and Inspection Report.

711.03.18 Establishment Phase and Final Acceptance. Refer to 711.03.02. The Engineer and the Landscape Operations Division will inspect plant establishment according to Table 3 on the scheduled inspection date, at least 1 month after the Partial Establishment Phase Acceptance is granted.

The Inspection Report will include actions to perform before Final Acceptance is granted. When it is not possible to perform the Inspection, Final Acceptance will be delayed until Inspection is possible.

Perform repairs, replacements, and other work as specified in the Contract Documents and Inspection Report.

Final Acceptance will be granted when the requirements of Table 3 are satisfactorily completed. The Inspection Report will be included in the Punch List requirements for the project. Complete the Punch List requirements as directed.

ANNUALS AND BULBS

TABLE 3 - REQUIREMENTS FOR ESTABLISHMENT PHASE AND FINAL ACCEPTANCE

Item	Requirement	Section
1	Washouts in and around planting beds are repaired.	710.03.13
2	Plants are watered as needed and refertilized when directed.	710.03.22(b) and (f)
3	Damaging pests are controlled.	710.03.22(c)
4	Planting beds are weed free.	710.03.22(c)
5	Pesticide Reporting and Nutrient Management Reporting Forms are completed.	710.03.01(d) and (f)
6	Unacceptable plants are replaced as requested.	711.03.17(d)
7	End-of-season foliage removal is completed.	711.03.17(e)
8	Damage repairs and Establishment Punch List are completed.	711.03.17(f)

711.04 MEASUREMENT AND PAYMENT. Annuals and Bulbs Installation and Establishment will be measured and paid for at the Contract unit price for one or more of the specified items. The payment will be full compensation for all plants, material, labor, equipment, tools, disposal fees and incidentals necessary to complete the work.

711.04.01 Annuals and Bulbs Installation and Establishment. Annuals and Bulbs Installation and Establishment shall include the cost of plants, layout, marking, pruning, planting pit excavation, fertilizer, compost, backfilling, berming, edging, watering, pest management, plant maintenance, refertilizing, and all operations related to the Installation and Establishment Phases of each plant, until Final Acceptance.

Annuals and Bulbs Installation and Establishment will be paid according to Table 4 based upon the approved Breakdown List of Contract Prices. Refer to 711.03.02(a). In the event of change in the quantities required, payment adjustments will be based on the approved Breakdown List of Contract Prices.

(a) Payment Schedule. Payments will be made according to Table 4 when construction requirements are met.

ANNUALS AND BULBS

TABLE 4 - PAYMENT SCHEDULE

INSTALLATION AND ESTABLISHMENT PHASE COMPLETION		PERCENT OF TOTAL CONTRACT PRICE			PAYMENT FOR COMPLETED WORK
		Annuals in Beds	Bulbs in Beds	Naturalized Bulbs	
711.03.0 thru .16	Installation Phase	70	70	100	At Installation Phase Acceptance
711.03.17(a) thru (d)	Establishment Phase In-Season Maintenance	15	15	–	At Partial Establishment Phase Acceptance
711.03.17(e) thru (g)	End-of-Season Maintenance, Removal & Replacement, and Final Acceptance	15	15	–	At Final Acceptance
Total Payment		**100**	**100**	**100**	

(b) Forfeiture. Failure to complete operations as required or directed in conformance with the Payment Schedule will result in forfeiture of that percentage of payment based upon the Breakdown List of Contract Prices.

711.04.02 Constructing Planting Beds. Refer to 710.04.02.

711.04.03 Temporary Mulch will be measured and paid for at the Contract unit price.

CATEGORY 700
LANDSCAPING

SECTION 712 — TREE BRANCH PRUNING

610 **DELETE:** Section 712 — Tree Branch Pruning, in its entirety.

INSERT: The following.

SECTION 712 — TREE BRANCH PRUNING

712.01 DESCRIPTION. 712.01 DESCRIPTION. Prune tree branches as indicated in the SP 700 Tree Preservation Program, or in the plans. Perform Tree Branch Pruning in conformance with 101.03.02, and Section 120 when pruning is specified within the limits of a Tree Preservation Area.

712.02 MATERIALS. Not applicable.

712.03 CONSTRUCTION.

712.03.01 General.

(a) Permits. Obtain a Roadside Tree Permit from the Maryland Department of Natural Resources - Forest Service.

(b) Tree Preservation Program (TPP). Conform to the requirements of the TPP when developed by the Administration.

(c) Schedule. Perform operations when weather conditions are suitable. Cease operations when conditions are unsuitable.

712.03.02 Breakdown List of Contract Prices. Refer to 712.04 and develop a Breakdown List of Contract Prices for each tree or group of trees in the Contract. Include costs for pruning and completing all operations per tree or group of trees.

Submit the written Breakdown List within 14 days after Notice of Award. The Breakdown List will be reviewed by the Engineer and Landscape Operations Division for completeness and balance, and will be approved or returned for correction.

712.03.03 Maryland Licensed Tree Expert (LTE). A LTE shall perform or directly supervise the Operations in conformance with the Maryland Roadside Tree Law, the Forest Conservation Act, and accepted arboricultural practices.

712.03.04 Meetings. Meet with the Engineer, the LTE, and the LOD to review areas, Operations, and the approved Breakdown List of Contract Prices before beginning Operations.

712.03.05 Marking. Identify trees to be pruned, and obtain approval before beginning Operations.

712.03.06 Equipment. Equipment and tools shall conform to accepted arboricultural practices.

712.03.07 Notice. Notify the Engineer at least 10 days before beginning Operations.

712.03.08 Operations. The Contract Documents will indicate the trees to be pruned or the dimensions or goals to be achieved by pruning. Meet ANSI A300 standards for Tree Care Operations in conformance with one or more of the following Operations, or as specified.

(a) Cleaning. To remove dead, diseased, and broken branches.

(b) Thinning. To reduce the density of live branches; or to remove crossed branches or a codominant leader.

(c) Raising. To provide vertical clearance to a height of 16 ft, or as specified in the Contract Documents.

(d) Reducing. To decrease the height or spread.

(e) Specialty Pruning. To meet the needs of young trees, at planting, once established, pollarding, for restoration, to maintain vistas, or to accommodate utilities.

712.03.09 Disposal and Wood Chipping. Dispose of wood, or chip wood and disperse chips to a depth of 1 in. as directed.

712.03.10 Cleanup and Restoration. Avoid damage to existing structures, plants, and turfgrass. Keep turfgrass areas, paved surfaces and sidewalks clean. Restore ruts and damaged turfgrass areas by seeding in conformance with Section 705, or perform Turfgrass Sod Establishment in conformance with Section 708 when directed, before beginning any other landscape operations.

712.03.11 Damage Repair. Do not injure vegetation to be preserved. Repair injuries to bark, trunks, or limbs by cutting, smoothing, and tracing the bark in accordance with ANSI A300 Standards for Tree Care Operations.

712.03.12 Damage Compensation. Monetary compensation for damage or loss of trees will be calculated and assessed in conformance with the Guide for Plant Appraisal of the Council of Tree & Landscape Appraisers.

712.04 MEASUREMENT AND PAYMENT. Tree Branch Pruning will not be measured, but will be paid for at the Contract lump sum price based upon the Breakdown List of Contract Prices. The payment will be full compensation for all labor, material, equipment, tools, wood disposal and chipping, cleanup and restoration, damage repair, disposal fees and incidentals necessary to complete the work. If the Administration requests a change, the units and payment will be adjusted on the basis of the approved Breakdown List of Contract Prices.

CATEGORY 700
LANDSCAPING

SECTION 715 — TREE ROOT PRUNING

617 **DELETE:** Section 715 — Tree Root Pruning, in its entirety.

INSERT: The following.

SECTION 715 — TREE ROOT PRUNING

715.01 DESCRIPTION. Prune tree roots as indicated in the SP 700 Tree Preservation Program, or in the plans. Perform Tree Root Pruning within a Tree Preservation Area per Section 120 when specified.

715.02 MATERIALS.

Salvaged Topsoil	920.01.01
Furnished Topsoil	920.01.02

715.03 CONSTRUCTION.

715.03.01 General.

(a) Permits. Obtain a Roadside Tree Permit from the Maryland Department of Natural Resources - Forest Service.

(b) Tree Preservation Program (TPP). Adhere to the requirements of the TPP when developed by the Administration.

(c) Schedule. Perform operations when soil moisture and weather conditions are suitable. Cease operations when conditions are not suitable.

715.03.02 Maryland Licensed Tree Expert (LTE). A LTE shall perform or directly supervise the Operations in conformance with the Maryland Roadside Tree Law, the Forest Conservation Act, and accepted arboricultural practices.

715.03.03 Meetings. Meet with the Engineer, the LTE, and the Landscape Operations Division before beginning Operations.

715.03.04 Utilities Marking and Conflicts. Refer to Section 875 when included in the Contract Documents.

(a) Utilities Marking. Contact 'Miss Utility' or another approved service to identify and mark utilities in the rights-of-way and on SHA property.

(b) Conflicts. Notify the Administration of conflicts that may affect operations. Conflicts will be reviewed by the Landscape Operations Division and resolved within 14 days after notice.

715.03.05 Marking. Mark areas to be root pruned, and obtain approval before beginning Operations.

715.03.06 Equipment. Use a vibratory knife or other equipment and tools that conform to accepted arboricultural practices.

715.03.07 Notice. Notify the Engineer at least 10 days before beginning Operations.

715.03.08 Operations. Meet ANSI A300 standards for Tree Care Operations. Cleanly cut tree roots along the approved line to a depth of 24 in., or to the depth specified in the Tree Preservation Program, and immediately backfill trenches with excavated soil.

715.03.09 Cleanup and Restoration. Avoid damage to existing structures, plants, and turfgrass. Keep turfgrass areas, paved surfaces and sidewalks clean. Promptly remove, disperse, or dispose of wood debris and other waste materials as directed. Restore areas of root pruning, ruts and damaged turfgrass areas by seeding in conformance with Section 705, or perform Turfgrass Sod Establishment in conformance with Section 708 when directed, before beginning other landscape operations.

715.03.10 Damage Repair. Do not injure vegetation to be preserved. Repair injuries to bark, trunks, or limbs by cutting, smoothing, and tracing the bark in accordance with ANSI A300 Standards for Tree Care Operations.

715.03.11 Damage Compensation. Monetary compensation for damage or loss of trees will be calculated and assessed in conformance with the Guide for Plant Appraisal of the Council of Tree & Landscape Appraisers.

715.04 MEASUREMENT AND PAYMENT. Tree Root Pruning will be measured and paid for at the Contract unit price per linear foot. The payment will be full compensation for all labor, material, equipment, tools, cleanup and restoration, damage repair, disposal fees and incidentals necessary to complete the work.

CATEGORY 900
MATERIALS

665 **DELETE:** SECTION 902 — PORTLAND CEMENT CONCRETE AND RELATED PRODUCTS in its entirety.

INSERT: The following.

SECTION 902 — PORTLAND CEMENT CONCRETE AND RELATED PRODUCTS

902.01 STORAGE. Storage of materials shall conform to the Contract Documents and as directed by the Engineer.

902.02 CERTIFICATION OF PORTLAND CEMENT AND BLENDED HYDRAULIC CEMENT. The manufacturer shall furnish certification as specified in TC-1.03. The certification shall also include:

(a) The mill shall report its quality control procedures, and submit a new report whenever there is a procedural change.

(b) The mill's control laboratory shall be inspected by the Cement and Concrete Reference Laboratory of the National Institute of Standards and Technology on their regularly scheduled visits. The Engineer shall be provided with copies of the reports of these inspections along with an account of the action taken to correct cited deficiencies.

(c) Records of data accumulated by the quality control procedures shall be produced upon request.

(d) A certified document shall accompany each shipment stating that the contents conform to all applicable requirements. Additionally, the document shall show the producer's name, mill location, carrier number, date loaded, weight contained in carrier, silo number, consignee, destination, Contract number, and type of cement. The signature and title of the signer shall be shown on the document.

(e) The mill shall, upon request, supply certified chemical and physical test values that can be associated with any sample representing cement drawn from a particular silo on a given date.

(f) Acceptance of cement by certification will be terminated if test results differ from mill results by more than the precision limits given in the test method. The acceptance procedure will then revert to storage testing and approval prior to shipment.

902.03 HYDRAULIC CEMENT.

902.03.01 Portland Cement. M 85, with the fineness and the time of setting determined using T 153 and T 131, respectively.

902.03.02 Slag Cement. M 302, Grade 100 or 120. The Contractor may request to substitute up to a maximum of 50 percent of the weight of cement with slag cement. When slag cement is used, the minimum cement factor and water/cement ratio will be determined on the basis of the combined weight of the portland cement and slag cement.

902.04 BLENDED HYDRAULIC CEMENT. M 240 Type IP containing 15 to 25 percent Fly Ash by weight of cement or Type 1S containing 25 to 50 percent slag cement by weight of cement. Maximum loss on ignition is 3.0 percent. The requirement for a manufacturer's written statement of the chemical composition is waived.

902.05 MASONRY CEMENT. C 91, except the water retention and staining tests are waived.

902.06 CONCRETE ADMIXTURES. Do not use concrete admixtures that contribute more than 200 ppm of chlorides based on the cement content when tested per MSMT 610. Use only prequalified admixtures.

902.06.01 Air Entraining Admixtures. M 154.

902.06.02 Chemical Admixtures. M 194, Type A, D, or nonchloride C.

902.06.03 High Range Water Reducing Admixtures. M 194, except that it shall be a liquid, the water content shall be a maximum of 85 percent of that of the control, and the durability factor shall be a minimum of 90. Use Type F for early strength, which shall produce a minimum compressive strength in 12 hours of 180 percent of that of the control. Use Type G when early strength is not specified. The manufacturer shall furnish certification as specified in TC-1.03. The certification shall include curves indicating the fluid ounces of admixture per 100 lb of cement as related to water reduction and strength gain for 12 hours when used with a minimum cement factor of 700 lb.

902.06.04 Pozzolans. When a pozzolan is used, determine the minimum cement factor and water/cement ratio on the basis of the combined weight cement and pozzolan. Do not use pozzolan and Blended Hydraulic Cement in the same mix.

(a) Fly Ash. M 295, pozzolan Class C or F, except that the maximum permissible moisture content shall be 1.0 percent, and when used in concrete Mix Nos. 3 and 6 the maximum loss on ignition 3.0 percent. Fly Ash may be substituted up to a maximum of 25 percent of the weight of cement.

(b) Microsilica. C 1240, except that the oversize requirement is waived. Microsilica may be substituted up to a maximum of 7 percent of the weight of cement.

902.06.05 Corrosion Inhibitors. Corrosion inhibitors shall be calcium nitrite based and contain a minimum of 30 percent active ingredients by mass. The gallonage of corrosion inhibitor used in the concrete mixture shall be included as water when determining the water/cementitious materials ratio.

902.07 PORTLAND CEMENT CONCRETE CURING MATERIALS. Use burlap cloth, sheet materials, liquid membrane forming compounds, or cotton mats.

902.07.01 Burlap. M 182, Class 1, 2, or 3.

902.07.02 Sheet Materials. C 171 with the following exceptions:

(a) White Opaque Burlap Polyethylene Sheeting. Tensile strength and elongation requirements are waived. Use sheeting having a finished product weight of not less than 10 oz/yd^2.

(b) White Opaque Polyethylene Backed Nonwoven Fabric. 902.07.02(a), with the thickness requirement waived. Use material having a finished product weight of not less than 5 oz/yd^2.

(c) White Opaque Polyethylene Film. Tensile strength and elongation requirements are waived.

902.07.03 Liquid Membrane. C 309. Field control testing of the white pigmented curing compounds is on the basis of weight per gallon. The samples shall not deviate more than ± 0.3 lb/gal from the original source sample.

902.07.04 Cotton Mats. Cotton mats consist of a filling material of cotton bats or bats covered with unsized cloth and tufted or stitched to maintain the shape and stability of the unit under job conditions of handling.

Use coverings of either cotton cloth, burlap or jute having the following properties:

(a) Cotton cloth covering shall weigh not less than 6.0 oz/yd^2 and have an average of not less than 32 threads/in. of warp and not less than 28 threads/in. of filling. Use raw cotton, cotton comber waste, cotton card strip waste, or combinations thereof as the raw material used in the manufacture of the cotton cloth.

(b) Burlap or jute covering for cotton mats shall weigh not less than 6.4 oz/yd^2 and shall have not less than of 8 threads/in. of warp and not less than 8 threads/in. of filling. Use the grade known commercially as "firsts" and they shall be free from avoidable imperfections in manufacture and from defects or blemishes affecting the serviceability.

Use a cotton bat, or bats made of raw cotton, cotton waste, cotton linters, or combinations thereof, as the filling material for the mats. Mats shall weigh not less than 12 oz/yd^2.

902.08 FORM RELEASE COMPOUNDS. Use form release compounds that effectively prevent the bond of the concrete to the forms. Form release compounds shall not cause discoloration of the concrete or adversely affect the quality or rate of hardening at the interface of the forms.

The flash point of the form release compound shall not be less than 100 F when tested per D 93.

902.09 PARAFFIN WAX. Use clear paraffin wax for use as a bond breaker for concrete. The flash point shall not be less than 380 F when tested under D 92.

902.10 PORTLAND CEMENT CONCRETE. Section 915 and as specified herein.

902.10.01 Proportioning. Prior to the start of construction, submit to the AME the source and proportions of materials to be used for each concrete mix. The mixture shall meet 902.10.03.

The concrete, with the exception of water and chemical admixtures, shall be proportioned by weight. Water and chemical admixtures may be proportioned by volume or weight. The mix shall be uniform and workable.

902.10.02 Materials.

Coarse Aggregate	901.01
Fine Aggregate	901.01
Cement	902.03 and 902.04
Concrete Admixtures	902.06
Synthetic Fibers	902.15
Water	921.01

902.10.03 Portland Cement Concrete Mixtures.

The concrete mixes shall conform to the following:

TABLE 902 A

PORTLAND CEMENT CONCRETE MIXTURES										
MIX NO.	SPECIFIED ACCEPTANCE COMPRESSIVE STRENGTH psi	COMPRESSIVE STRENGTH ACCEPTANCE TEST AGE days	STD. DEV. psi	CRITICAL VALUE psi	MIN CEMENT FACTOR lb/yd^3	COARSE AGGREGATE SIZE M 43 / M 195	MAX WATER/ CEMENT RATIO by wt	SLUMP RANGE in.	TOTAL AIR CONTENT %	CONCRETE TEMP. °F .
1	2500	28	375	2430	455	57, 67	0.55	2 - 5	5 - 8	50 - 95
2	3000	28	450	3010	530	57, 67	0.50	2 - 5	5 - 8	50 - 95
3	3500	28	525	3600	580	57, 67	0.50	2 - 5	5 - 8	50 - 95
4	3500	28	525	3600	615	57, 67	0.55	4 - 8	N/A	50 - 95
5	3500	28	525	3600	580	7	0.50	2 - 5	5 - 8	50 - 95
6	4500	28	675	4770	615	57, 67	0.45	2 - 5	5 - 8	50 - 80
7	4200	28	630	4420	580	57	0.50	1½ - 3	5 - 8	50 - 95
8	4000	28	600	4180	750	7	0.42	2 - 5	5 - 8	50 - 80
9	3000	(a)	N/A	N/A	800	57, 67	0.45	4 - 8	5 - 8	60 - 100
10	4500	28	675	4770	700	¾" – No. 4	0.45	2 - 5	6 - 9	50 - 80
11	4200	28	630	4420	—	57, 67	0.45	2 - 5	5 - 8	50 - 80
12	4200	28	630	4420	—	¾" – No. 4	0.45	2 - 5	6 - 9	50 - 80
HE	3000	(b)	N/A	N/A	N/A	N/A	N/A	3 - 9	5 - 8	60 - 100
PC (c)	N/A	N/A	N/A	N/A	450	7, 8	0.45	N/A	15 - 25	N/A
WT	2500	(d)	NA	NA	650	57	0.45	5 max	5 - 8	50 - 95

Note 1: When concrete is exposed to water exceeding 15,000 ppm sodium chloride content, Type II cement shall be used. In lieu of Type II cement, a Type I cement may be used in combined form with an amount of up to 50 percent replacement with slag cement, or an amount of up to 25 percent replacement with Class F fly ash. The Contractor shall submit to the Engineer the proposed mix proportions and satisfactory test results per C 1012 showing a sulfate resistance expansion not exceeding 0.10 percent at 180 days

Note 2: The temperature of Mix No. 6 when used for other than superstructure work as defined in TC-1.03 shall be 50 - 95 F.

Note 3: Type A or D admixture shall be added to bridge, box culvert, and retaining wall concrete.

Note 4: Nonchloride Type C admixtures may be used when approved by the Engineer.

Note 5: Other Slump Requirements:
When a high range water reducing admixture Type F or Type G is specified, the slump shall be 4 to 8 in.
When synthetic fibers are specified, the slump shall be 5 in. maximum.
When concrete is to be placed by the slip form method, the slump shall be 2-1/2 in. maximum.
When the absorption of the coarse aggregate is greater than 10 percent, the slump shall be 3 in. maximum.

Note 6: Mix 9 shall contain a Type F high range water reducing admixture.

Note 7: Mix 10 and 12 shall be proportioned as specified in 211.2 of the ACI's Recommended Practices for Selection Proportions for. Structural Lightweight Concrete. The maximum average Density of Cured Concrete shall be 118 lb/ft^3. Control testing for Density of Cured Concrete shall be two companion cylinders for each 100 yd^3, or fraction thereof, as specified in M 195.

Note 8: Mix 11 and 12 shall also conform to all requirements as specified in Table 902 C.

Note 9: Add Polyolefin Macro Fibers to Mix No. 8, Mix No. 9 and High Early Strength Patch Mix (HE). The dosage rate shall be per the manufacturer's recommendations.

(a) Mix 9 is for concrete pavement repair only . Match cure of the samples is permissible in accordance with AASHTO PP 54. Strength tests shall be scheduled accordingly on weekdays and acceptance will be based on a minimum compressive strength of 3000 psi in 24 hours or 3600 psi in 3 days. Acceptance testing shall conform to 902.10.08 except that cylinders shall be field cured

and remain in the molds until tests are conducted. Mix 9 when specified for incidental work and not requiring traffic control in conformance with 522.03.15 will not require the addition of fibers.

(b) Match cure the samples in accordance with AASHTO PP 54. Design approval will be given based on trial batch obtaining a minimum compressive strength of 2500 psi in 6 hours. Strength tests shall be scheduled accordingly on weekdays and acceptance will be based on a minimum compressive strength of 3000 psi in 24 hours or 3600 psi in 3 days. Acceptance testing shall conform to 902.10.08 except that cylinders shall be field cured and remain in the molds until tests are conducted.

(c) Pervious Concrete (PC) shall be proportioned as specified in 522R of the ACI's Recommended Practices for Pervious Concrete Mixture Proportions. Acceptance of freshly mixed Pervious Concrete shall be made based on Density and Total Void Content. Density and Total Air Voids of Freshly Mixed Pervious Concrete shall be performed per C 1688

(d) Whitetopping (WT) mix shall contain a high range water reducing admixture, macro-fibers at 3 lbs/yd^3 Max, and acceptance will be on a minimum compressive strength of 2500 psi in 24 hours.

Preventive Measures for Aggregate Alkali-Silica Reactivity (ASR). All aggregate, both coarse and fine, intended for use in concrete shall be tested for ASR in accordance with C 1260. Testing shall be performed by an accredited laboratory. Coarse and fine aggregate from the same source shall be tested separately. Testing shall be performed once every 3 years.

The following limitations apply for C 1260 results:

EXPANSION @ 14 DAYS	CLASS AND REACTIVITY STATUS	MITIGATION NOTE
≤ 0.10%	R0- Innocuous	No mitigation required
>0.10 but ≤0.20%	R1- Potentially Reactive	Mitigation Required*
>0.20 but ≤0.30%	R2- Reactive	Mitigation Required*
>0.30%	Highly Reactive	Shall not be used in PCC

*See Table 902 B for the minimum Supplementary Cementitious Material (SCM) replacement levels for ASR mitigation

Optional C 1293 Concrete Prism Testing. Testing in accordance with C 1293 is non-mandatory but recommended. The test may be used to verify the ASR class status of aggregate having C 1260 result greater than 0.10 percent expansion. If C 1293 testing is not performed, then compliance is assessed based entirely on the C 1260 result.

The requirements for compliance when using C 1293 are as follows;

(a) Test frequency is once every 3 years.

(b) The Administration will not perform this test. Testing must be performed by an accredited laboratory.

(c) Coarse and Fine aggregate from the same source shall be tested separately

(d) Each sample shall be split and tested in accordance with both C 1260 and C 1293. This is required to provide comparable data for future reference. Scheduling of the testing is at the producer's discretion, but both results must be submitted together for approval review.

(e) The C 1293 result will supersede the C1260 result for compliance status.

The following limitations apply for C 1293 results:

EXPANSION AT 1 YEAR	CLASS AND REACTIVITY STATUS	MITIGATION NOTE
≤ 0.04%	R0- Innocuous	No mitigation required
>0.04 but ≤0.12%	R1- Potentially Reactive	Mitigation Required*
>0.12 but ≤0.24%	R2- Reactive	Mitigation Required*. **No structural use allowed.**
>0.24%	Highly Reactive	May not be used in PCC

*See Table 902 B for the minimum Supplementary Cementitious Material (SCM) replacement levels for ASR mitigation

TABLE 902 B

MINIMUM MITIGATION REQUIREMENTS				
SCM Type	**Low** Alkali Cement (≤0.7% Na_20 equiv.) **R1**	**Normal** Alkali Cement (≤1.0% Na_20 equiv.) **R1**	**Low** Alkali Cement (≤0.7% Na_20 equiv.) **R2**	**Normal** Alkali Cement (≤1.0% Na_20 equiv.) **R2**
Class F Fly Ash	20%	25%	25%	25%
Slag (GGBFS)	35%	50%	50%	50%
Ternary Blends	Approval Required	Approval Required	Approval Required	Approval Required

Ternary blends using two SCM's will require C 1567 testing by an accredited laboratory. The expansion test results shall not be greater than 0.10 percent to be considered acceptable. Changes to the SCM blend percentages will require retesting.

TABLE 902 C

MIX PHYSICAL PROPERTIES		
TEST PROPERTY	**TEST METHOD**	**SPECIFICATION LIMITS**
Minimum Cementitious Materials Factor, lb/yd^3	—	580
Maximum Content of Portland Cement, lb/yd^3	—	550
Water/Cementitious Materials Ratio by Wt.	—	0.45
Corrosion Inhibitor, gal/yd^3	902.06.05	2.0
Synthetic Fibers, lb/yd^3	902.15	1.5
Permeability of Field Concrete, moving average of three tests, coulombs max	T 277	2500
Permeability of Field Concrete, individual test, coulombs max	T 277	3000
Shrinkage at 28 days, microstrains	C 157	400

Note 1: Only Type I or II Portland cement shall be used.

Note 2: Mixes shall contain slag cement, fly ash or microsilica.

Note 3: The water to cement ratio shall be based upon the total water to cementitious materials ratio. The gallonage of the corrosion inhibitor shall be included in the water/cementitious materials ratio.

Note 4: The permeability test value of field concrete shall be the average of two test specimens representing production concrete. Test specimens shall be molded on the project site in 4 x 8 in. molds conforming to M 205. Test specimens shall be handled in accordance with T 277 - Accelerated Moist Curing. Test for the geometry of test specimens will be waived.

Note 5: Shrinkage tests will be performed on trial mixes only.

Note 6: High range water reducing admixture may be used except the water reducing requirements will be waived.

Note 7: A sealer conforming to 902.12 shall be used on the finished surface.

902.10.04 Trial Batch. A trial batch shall be prepared to certify that each mix meets 902.10.05 and 902.10.06 except for mix 9. Approval will be given when the test results meets the minimum required average strength. Mix 9 design approval will be given based on trial batch obtaining a minimum compressive strength of 2500 psi in 12 hours.

Make arrangements with the AME at least two weeks in advance, to have an authorized representative present during the batching and testing. Each trial batch shall consist of at least 3 yd^3 of concrete. Laboratory testing in lieu of plant trial batches may be conducted when approved by the AME. Supply all equipment, and labor required to produce the trial batches and conduct the required tests at no additional cost to the Administration.

The AME may waive the requirement for a trial batch when past performance records show that the required average strength requirement has been met.

902.10.05 Design Required Average Strength.

Specified compressive strength, f_c', psi	Required average compressive strength, f_{cr}', psi
$f_c' \leq 5000$	Use the larger value computed from Eq. (A-1) and (A-2) $f_{cr}' = f_c' + 1.34s$ (A-1) $f_{cr}' = f_c' + 2.33s - 500$ (A-2)
Over 5000	Use the larger value computed from Eq. (A-1) and (A-3) $f_{cr}' = f_c' + 1.34s$ (A-1) $f_{cr}' = 0.90 f_c' + 2.33s$ (A-3)

where:

f_c' = the 28 day specified compressive strength.
s = the standard deviation as specified in 902.10.06.

A test is defined as the average strength of two companion cylinders.

902.10.06 Standard Deviation.

(a) When past performance records are available, a standard deviation will be established from documented performance records of the producer consisting of a minimum of 15 consecutive 28 day compressive strength tests obtained within the last 12 months.

The standard deviation will be established as the product of the calculated standard deviation and multiplier.

NUMBER OF TESTS	MULTIPLIER FOR STANDARD DEVIATION
15	1.16
20	1.08
25	1.03
30 or more	1.00

Interpolate for intermediate number of tests.

(b) When past performance records are not available, the required average strength shall meet to the following:

Specified compressive strength, f_c', psi	Required average compressive strength, f_{cr}', psi
$f_c' < 3000$	$f_{cr}' = f_c' + 1000$
$3000 \leq f_c' \leq 5000$	$f_{cr}' = f_c' + 1200$
$f_c' > 5000$	$f_{cr}' = 1.10 f_c' + 700$

902.10.07 Standard of Control. The average of all sets of three consecutive strength tests shall equal or exceed the critical value as specified in 902.10.03 which shall be computed using the following formula:

Critical Value = $fc' + (1.14 \text{ X } S) - 500$

Failure to conform to this criterion shall be cause for immediate investigation and remedial action up to and including suspension of production. A design standard deviation equal to 15 percent of the specified strength shall be used for calculation until a minimum of 15 test results are obtained.

The actual average strength and standard deviation shall be computed upon the availability of 28 day strength data comprising a minimum of 15 tests. Should this determination indicate an excessive margin of safety, the concrete mix may be modified to produce lower average strength as approved by the Engineer. If these calculations indicate a coefficient of variation greater than 15, the quality of the concrete and testing will be evaluated.

902.10.08 Testing. Sampling per R 60. Testing as follows:

TEST	METHOD	MINIMUM TEST FREQUENCY	RESPONSIBILITY
Temperature (e)	T 309	1 per 50 yd^3 (or fraction thereof)	Project Engineer
Slump (a)(e)	T 119	1 per 50 yd^3 (or fraction thereof)	Project Engineer
Air Content (a)(e)	T 152 T 196	1 per 50 yd^3 (or fraction thereof)	Project Engineer
Compression (b)(c)(d)	T 23	1 per 50 yd^3 (or fraction thereof)	Project Engineer
Compression (b)(c)(d) Mix No. 7 Only	T 23	3 per Day	Project Engineer

(a) A second test will be made when the first slump or air content test fails. Acceptance or rejection will be based on the results of the second test.
(b) Compressive strength tests are defined as the average of two companion cylinders.
(c) The Contractor shall be responsible for the making of all early break cylinders and furnishing the molds, stripping, curing/delivery of all cylinders, including 28 day cylinders, to the testing laboratory.
(d) The Project Engineer will be responsible for making, numbering and signing the 28 day cylinders.
(e) When constructing plain and reinforced concrete pavements, the testing frequency for slump, air content, and temperature shall be 1 per 100 yd^3 or fraction thereof.

902.10.09 Acceptance. Concrete will be acceptable if both of the following requirements are met:

(a) The average of all sets of three consecutive strength tests equal or exceed the specified design strength.

(b) No individual strength test (average of two companion cylinders) falls below the specified design strength by more than 500 psi.

902.10.10 Price Adjustment. A price adjustment will be based on the Contract unit price per cubic yard of concrete. If the unit is a lump sum item, the price per cubic yard for the concrete will be determined by dividing the cubic yards into the Contract lump sum price.

(a) Test Results More Than 500 psi Below the Specified Design Strength. Failing strength tests will be considered individually with a price adjustment being applied on the percentage basis as shown below.

(Price per yd^3) X (quantity of yd^3 represented by the failing concrete strength) X (percent of failure).

Example:

$400.00 per yd^3 X 50 yd^3 X [1-(3600/ 4500 psi)] = $4,000.00

No payment will be allowed when the test results fall below 50 percent of the specified design strength for structural concrete or 40 percent for incidental concrete.

The Engineer will determine when the strength of the concrete represented by the failing tests is sufficient to remain in place or whether it must be removed and replaced with Specification concrete.

(b) Test Results 500 psi or Less than the Specified Design Strength. Strength failures 500 psi or less than the specified design strength will be averaged with the next two consecutive tests. If those two tests include a failure greater than 500 psi, those tests will be evaluated as in 902.10.10(a) and replaced with the next consecutive test. If the resulting average falls below the specified design strength, a price adjustment will be applied as specified in the table below. Any failure will only be included in one grouping.

STRENGTH BELOW THE SPECIFIED (avg of 3 tests) DESIGN LEVEL, psi	**ADJUSTMENT FACTOR**
MIX NO. 1 THRU MIX NO. 12 EXCLUDING MIX 9	
1 – 100	0.005
101 – 200	0.01
201 – 300	0.02
301 – 400	0.04
401 – 500	0.08

Adjustment price equals (price per yd^3) X (quantity of yd^3 represented by the failing cylinders) X (the adjustment factor).

Example:

$400.00 per yd^3 X 50 yd^3 X 0.01 = $200.00

902.11 MORTAR FOR GROUT. Mortar used for grouting anchor bolts, pipe, handrail posts, and miscellaneous items shall be composed in accordance with one of the following:

(a) One part Portland cement or blended hydraulic cement and one part mortar sand by dry loose volume.

(b) Prepared bag mixes consisting of Portland cement or blended hydraulic cement and mortar sand. The prepared mixes shall produce a mortar meeting the strength requirements specified in the Contract Documents.

(c) Use nonshrink grout when specified. The grout shall have a minimum compressive strength of 5000 psi in seven days when tested as specified per T 106, except that the cube molds shall remain intact with a top firmly attached throughout the curing period. The

nonshrink grout shall have a minimum expansion of 0.0 percent after seven days when tested as specified per T 160.

(d) Epoxy grout shall consist of sand and epoxy mixed by volume in per the manufacturer's recommendations. The grout shall be capable of developing a minimum compressive strength of 6500 psi in 72 hours when tested per MSMT 501. Sand for epoxy grout as specified in 901.01.

(e) An epoxy or polyester anchoring system may be used when approved by the Engineer in accordance with the manufacturer's recommendations. Strength values shall be as specified in the Contract Documents.

902.12 LINSEED OIL. Shall consist of a 50-50 mixture (by volume) of boiled linseed oil meeting Federal Specification TT-L-190 and kerosene per D 3699.

902.13 LATEX MODIFIED CONCRETE. Portland cement concrete containing prequalified Laboratory approved styrene butadiene latex emulsion is defined as Latex Modified Concrete (LMC).

Latex emulsion shall have a minimum of 90 percent of the nonvolatiles as styrene butadiene polymers. The latex emulsion as specified in Table 902.13 A. The material shall be stored in suitable containers and be protected from freezing and exposure to temperatures in excess of 85 F.

LMC shall be proportioned using volumetric mixing and designed as follows:

LATEX MODIFIED CONCRETE	
MATERIAL	**SPECIFICATION LIMITS**
Portland Cement, CWT/yd^3, min	6.6
Latex Emulsion/Cement Ratio	0.31 – 0.34
Water/Cement Ratio, max	0.22
Entrained Air, %	6.0 ± 3
Slump, in.	5 ± 1

The physical properties of LMC shall conform to Table 902.13 B. The Contractor shall furnish the necessary 3 X 6 in. molds per M 205 to be used for the fabrication of compressive strength cylinders.

Control and Acceptance Sampling.

(a) Submit a two quart minimum sample, of the styrene butadiene latex emulsion to the AME daily for each lot of material used in a day's production.

(b) A batch for LMC is defined as the capacity of the equipment being used on the project. Slump and air samples will be taken and tested before the placement of a batch is

permitted. The slump shall be measured four to five minutes after discharge from the mixer. The test material shall be deposited off the deck and not be disturbed during this waiting period. One additional sample for slump and air will be taken randomly during the placement of each batch. For seven day compressive strength, two tests each per batch are required. A test is defined as consisting of two companion cylinders. The samples for these tests will be taken at random while the placement is in progress.

TABLE 902.13 A

REQUIREMENTS FOR CHEMICAL PROPERTIES OF LATEX EMULSION MATERIALS				
PROPERTY	**SPECIFICATIONS**		**QUALITY ASSURANCE TESTS**	
	LIMITS	**TOLERANCE**	**PREQUALIFICATION TESTS**	**CONTROL AND ACCEPTANCE**
Color	White	—	X	X
pH	9.0 – 11.0	—	X	X
Weight, lb/gal	8.40 – 8.47	—	X	X
Solids Content, %	46 – 53	—	X	X
*Butadiene Content, % of polymer	30 – 40	—	—	—
Viscosity @ 10 rpm-cps	Match Original	± 20	X	X
*Surface Tension, dynes/cm max	50	—	—	—
*Mean Particle Size, polymer – Å	1400 – 2500	—	—	—
Coagulum, % max	0.10	—	X	X
*Freeze-Thaw Stability, coagulum, % max	0.10	—	X	X
Infrared Spectra of Latex Film	Match Original	—	X	X
Infrared of Alcohol, Soluble Portion of Latex	Match Original	—	X	X
Shelf Life, min	1 yr	—	X	—

Note 1: Quality assurance tests shall be conducted as specified in MSMT 612 except those denoted by an * shall be conducted as specified in FHWA RD – 78-35.

Note 2: The original or prequalification sample shall be accompanied by the producer's certification on all of the tests and properties noted above and as specified in TC-1.03. The certification shall contain actual test values of the product and the infrared spectrograph.

Note 3: A separate certification is required for each lot of material. The certification shall note the date of manufacture, lot size, and whether or not the material is identical to the formulation of the original sample.

TABLE 902.13 B

LATEX MODIFIED CONCRETE PHYSICAL PROPERTIES			
TEST PROPERTY	**TEST VALUES**	**QUALITY ASSURANCE TESTS**	
		PREQUALIFIED TESTS	**CONTROL AND ACCEPTANCE**
7 Day Compressive Strength, psi min	3000	X	X
28 Day Compressive Strength, psi min	3500	X	—
42 Day Compressive Strength, psi min	3500	X	—
7 Day Flexural Strength, psi min	550	X	—
28 Day Flexural Strength, psi min	650	X	—
42 Day Shear Bond Strength, psi min	2000	X	—
Durability Factor, 300 cycles, % min	85	X	—
Chloride Permeability, Ppm max	510	X	—
Scaling Resistance, 50 cycles, max	3	X	—

Note 1: Quality assurance tests shall be conducted as specified in MSMT 721.

Note 2: Seven Day Compressive Strength Test will be used for Control & Acceptance of the material. The minimum specified design strength is 3000 psi at seven days. The mix design approval and acceptance will be based on a coefficient of variation of 10 percent with a probability of 1 in 10 tests falling below the specified strength. Only test values 80% or greater than the specified strength will be accepted

902.14 RAPID HARDENING CEMENTITIOUS MATERIALS FOR CONCRETE PAVEMENT REPAIRS. Materials shall be a dry, packaged cementitious mortar having less than 5 percent by weight of aggregate retained on the 3/8 in. sieve and meet the following requirements:

Classification.

Class I — For use at ambient temperatures below 50 F.
Class II — For use at ambient temperatures of 50 to 90 F.
Class III — For use at ambient temperatures above 90 F.

Chemical Requirements. C 928 except that no organic compounds such as epoxy resins or polyesters as the principal binder.

Physical Requirements. Meet the following when tested per MSMT 725:

COMPRESSIVE STRENGTH, psi min				
CLASSIFICATION	**< 2 hr**	**2-6 hr**	**6 hr**	**28 days**
Type I — Slow	—	—	2000	4500
Type II — Rapid	—	2000	—	4500
Type III — Very Rapid	2500	—	—	4500

TEST RESULTS	
TEST PROPERTY	**LIMITS**
Bond Strength, 7 days, psi min	2000
Length Change, increase after 28 days in water, based on length at 3 hr, % max	+ 0.15
Length Change, decrease after 28 days, % max	- 0.15
Freeze Thaw, loss after 25 cycles in 10% $CaCl_2$ solution, % max	8
Initial Setting Time, minutes min	10

Marking. All packages delivered to the project shall be marked with the following information:

(a) Date material was packaged.

(b) Approximate setting time.

(c) Recommended dosage of water or liquid component.

(d) Mixing instructions.

(e) Class or temperature range.

Certification. The manufacturer shall furnish certification as specified in TC-1.03 showing the actual test results for each class and type of material submitted to the Laboratory.

902.15 SYNTHETIC FIBERS. When synthetic fibers are specified in the Contract Documents, the fibers shall be 1/2 to 1-1/2 in. long and conform to C 1116, Type III. The manufacturer shall furnish certification as specified in TC-1.03. The quantity of fibers used and their point of introduction into the mix shall conform to the fiber manufacturer's recommendations.

902.15.01 Macro Polyolefin Fibers. D 7508 with a minimum length of 1-1/2 in.

902.16 CONTROLLED LOW STRENGTH MATERIAL.

902.16.01 Usage. Controlled Low Strength Material (CLSM) shall consist of the types described below:

Type A – Used where future excavation of the CLSM may be necessary (e.g. utility trenches, pipe trenches, bridge abutments, and around box culverts).

Type B – Used where future excavation of the CLSM is not anticipated (e.g. filling abandoned conduits, pipes, tunnels, mines, etc. and replacing unsuitable soils below roadway and structure foundations where extra strength is required).

902.16.02 Materials.

Coarse Aggregate	901.01*
Fine Aggregate	901.01
Cement	902.03 and 902.04
Concrete Admixtures	902.06
Fly Ash	902.06.04
Water	921.01

*maximum size of 3/4 in.

Produce CLSM in conformance with the applicable portions of Section 915 and the following:

902.16.03 Proportioning. Submit the sources and proportions of materials, and certified test data as specified in TC-1.03 for each CLSM mixture prior to construction. CLSM shall be proportioned, on the basis of field experience and/or laboratory trial mixtures, to produce a flowable and self-compacting mixture meeting the requirements of 902.16.04.

CLSM shall be proportioned by weight; with the exception of water and chemical admixtures. Water and chemical admixtures may be proportioned by volume or weight.

902.16.04 CLSM Mixtures. Proportion CLSM with sufficient amounts of Portland cement, fly ash, or slag cement; individually or in combination, to produce a cohesive, non-segregating mixture that conforms to the physical properties in the following table:

CLSM Mix	28 Day Compressive Strength, (psi) D 4832	Flow Consistency, (in.) D 6103
Type A	50 - 200	8 min.
Type B	500 min.	8 min.

902.17 SELF CONSOLIDATING CONCRETE (SCC). The SCC mixture must meet the following requirements.

SELF-CONSOLIDATING CONCRETE PROPERTIES		
	PRESTRESS BEAMS	**PRECAST**
Compressive Strength C1758 / T 23	As per Contract Documents	As per Contract Documents
Min. Cement Factor lbs./yd^3	700	615
W/C ratio	.32 -.45	.32-.50
Total Air Content	5.5 +/- 1.5	6.5 +/- 1.5
Concrete Temperature F	65 +/- 15	70 +/- 20
Slump Flow C 1611	22 – 28 in.	22 – 28 in.
Visual Stability Index (VSI)	0 to 1	0 to 1
T20(T50)	2 – 10 sec.	2 – 10 sec.
J-Ring C 1621	+/- 2 in. design slump flow	+/- 2 in. design slump flow
Column Segregation C 1610	12 % maximum	-
Rapid Chloride Permeability	Coulombs maximum 2500	-
Freeze Thaw C 666	Minimum durability factor 80	-
Shrinkage at 28 Days C 157	400	-

Note 1: Column Segregation (C 1610), Rapid Chloride Permeability (T 277), Freeze Thaw (C 666), and Shrinkage at 28 Days (C 157) are required only at time of trial batch for mix approval or any time there is a change in materials.

Note 2: Report water/cement ratio, aggregate moistures and cement temperature on each batch ticket.Note 3: Mold a minimum of one set of Compressive Strength Test Cylinders for each trial batch and for each day's production or each 50 CY lot. Take the temperature of the mix once for each day's production or each 50 CY lot. Slump Flow, T20 and VSI testing shall be performed at trial batch and at the beginning of each day's production or each 50CY lot. Conduct J-Ring testing during each trial batch or on the next batch following a failure of either the spread or VSI test.

Note 4: For ASR Mitigation see 902.10.03 - Preventive Measures for Aggregate Alkali-Silica Reactivity

Note 5: High Range Water Reducing admixtures must be Type F or Type G and meet M 194.

Note 6: Viscosity modifying admixtures may be used only with prior approval by the Administration.

902.18 CONCRETE STAIN.

The material shall conform to the following requirements:

TEST PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Accelerated Weathering	G7	Passing results
Mildew Resistance/fungus growth	Fed. Test Method STD.141, Method 6271	Resistance
Weatherometer, 1000 hours minimum	ASTM G26	No crazing, cracking, chipping, or flaking. Light chalk and color change. No other deterioration.
Total Non Volatile Vehicle, %	D2369	Mfr. Stated Value +/- 2%
Viscosity, Krebs Units, 77 deg. F	D562	Mfr. Stated value +/- 10 KU
Drying time (to touch)	D1640	1 hour minimum
Recoat dry time	D1640	Able to recoat within 24 hours
Infrared Spectrogram	D2621	n/a
Color	Fed. Std. 595	As specified in contract documents
Weight/gallon, lb.gal	D1475	Mfr. State value +/- 0.3 lb/gal
Shelf life		6 months minimum

Material more than six months old shall be retested. Material must be VOC compliant for Maryland.

CATEGORY 900
MATERIALS

SECTION 920 — LANDSCAPING MATERIALS

748 **DELETE:** Section 920 — Landscaping Materials, in its entirety.

INSERT: The following:

SECTION 920 — LANDSCAPING MATERIALS

920.01 SOILS. Topsoil, Subsoil, and Bioretention Soil Mix shall conform to requirements of this section. Soils shall be sampled, tested and approved per specifications of MSMT 356 by the Soils and Aggregates Technology Division of the Office of Materials Technology, or by other approved tests or laboratories. Soils shall be amended as specified by the Nutrient Management Plan (NMP).

920.01.01 Existing Topsoil and Salvaged Topsoil.

(a) Existing Topsoil. Existing topsoil is the surface material of existing landscaped areas on SHA property that will be used for seeding or other landscape construction without excavation or significant grading.

(b) Salvaged Topsoil. Salvaged topsoil is the surface material of existing landscaped areas on SHA property that will be used for seeding or other landscape construction after being excavated, stockpiled, and placed in designated areas.

(c) Composition. Existing topsoil and salvaged topsoil shall conform to the following:

<table>
<tr><th colspan="6">COMPOSITION - EXISTING TOPSOIL & SALVAGED TOPSOIL</th></tr>
<tr><th>TEST PROPERTY</th><th>TEST [1] METHOD</th><th colspan="4">TEST VALUE AND AMENDMENT</th></tr>
<tr><td>Prohibited Weeds</td><td>—</td><td colspan="4">Free of live stems or roots of Shattercane, Johnsongrass, Canada Thistle, Bull Thistle, Plumeless Thistle, Musk Thistle, Common Reed and Japanese Knotweed when inspected before transportation.</td></tr>
<tr><td>Debris</td><td>—</td><td colspan="4">1.0 % or less by weight of cement, concrete, asphalt, crushed gravel or construction debris when inspected.</td></tr>
<tr><td rowspan="4">Grading Analysis</td><td rowspan="4">MSMT 356</td><td colspan="2">Sieve Size</td><td colspan="2">Passing by Weight Minimum %</td></tr>
<tr><td colspan="2">2 in.</td><td colspan="2">100</td></tr>
<tr><td colspan="2">No. 4</td><td colspan="2">90</td></tr>
<tr><td colspan="2">No. 10</td><td colspan="2">80</td></tr>
<tr><td rowspan="5">Textural Analysis</td><td rowspan="5">MSMT 356</td><td colspan="2">Particle</td><td colspan="2">% Passing by Weight</td></tr>
<tr><td>Size</td><td>mm</td><td>Minimum</td><td>Maximum</td></tr>
<tr><td>Sand</td><td>2.0 – 0.050</td><td>15</td><td>77</td></tr>
<tr><td>Silt</td><td>0.050 – 0.002</td><td rowspan="2">Combined Silt and Clay 23</td><td>80</td></tr>
<tr><td>Clay</td><td>less than 0.002</td><td>30</td></tr>
<tr><td>Soil pH</td><td>MSMT 356</td><td colspan="4">pH of 4.8 to 7.6. Apply limestone to Existing Topsoil and Salvaged Topsoil with pH 4.8 to 6.1 per NMP. Apply sulfur to Existing Topsoil and Salvaged Topsoil with pH 7.1 to 7.6 per NMP.</td></tr>
<tr><td>Organic Matter</td><td>MSMT 356</td><td colspan="4">1.0 to 8.0 % OM by weight. Apply compost to Existing Topsoil and Salvaged Topsoil with 1.0 to 3.7% OM per NMP.</td></tr>
<tr><td>Nutrient Content</td><td>MSMT 356</td><td colspan="4">Administration will assess. Apply fertilizer per NMP for nitrogen requirement and optimum fertility index values (FIV) for phosphorus and potassium.</td></tr>
<tr><td>Soluble Salts</td><td>MSMT 356</td><td colspan="4">800 ppm (1.25 mmhos/cm) or less. Apply gypsum to Existing Topsoil and Salvaged Topsoil with 500 to 800 ppm (0.78 to 1.25 mhos/cm) per NMP.</td></tr>
<tr><td>Harmful Materials</td><td>—</td><td colspan="4">Topsoil shall not contain substances in concentrations that are harmful to human health, water quality, or plant growth. Industrial waste such as ash, slag, raw sludge, dredge spoil, or similar materials shall not be soil components.</td></tr>
<tr><td colspan="6">Note:
[1] Materials Standards and Materials Testing 356 (MSMT 356) published by the Administration defines the approved test methods; other materials shall be approved by visual inspection or methods defined by the Landscape Operations Division.</td></tr>
</table>

920.01.02 Furnished Topsoil. A natural, friable, surface soil that is uniform in color and texture, and not derived from the project. Producers shall be included in the Qualified Products List maintained by the Administration for Furnished Topsoil.

(a) Composition. Furnished topsoil shall conform to the following.

COMPOSITION - FURNISHED TOPSOIL					
TEST PROPERTY	**TEST [1] METHOD**	**TEST VALUE AND AMENDMENT**			
Prohibited Weeds	—	Free of live stems and roots of species in 920.01.01 as well as live stems and roots of Bermudagrass, Quackgrass, and Yellow Nutsedge.			
Debris	—	920.01.01			
Grading Analysis	MSMT 356	920.01.01			
Textural Analysis	MSMT 356	**Particle**		**% Passing by Weight**	
		Size	**mm**	**Minimum**	**Maximum**
		Sand	2.0 – 0.050	20	75
		Silt	0.050 – 0.002	Combined Silt and Clay 25	75
		Clay	less than 0.002		30
Soil pH	MSMT 356	pH 6.1 to pH 7.2			
Organic Matter	MSMT 356	4.0 to 8.0% OM by weight			
Nutrient Content	MSMT 356	920.01.01			
Soluble Salts	MSMT 356	500 ppm (0.78 mmhos/cm) or less.			
Harmful Materials	—	920.01.01			

Note:

[1] Materials Standards and Materials Testing 356 (MSMT) published by the Administration defines the approved test methods; other materials shall be approved by visual inspection or methods defined by the Landscape Operations Division.

(b) Storage. Furnished topsoil shall be a homogenous mixture stored at a specific, identifiable site in a stockpile constructed as specified in 308.03.28 and 701.03.02(c).

(c) Approval. Tests shall be completed and approval will be granted before furnished topsoil is delivered. Ensure that Form 27B has been completed and that a source of supply letter for the furnished topsoil soil has been submitted and approved.

(d) Delivery. Certification shall be submitted that the furnished topsoil is delivered from an approved stockpile. A bill of lading or other acceptable documentation that identifies the approved source of supply shall be submitted when furnished topsoil is delivered.

920.01.03 Salvaged Subsoil. Salvaged subsoil is the subsurface material of existing areas that will be used for landscape construction after being excavated, stockpiled, and placed in designated areas.

(a) Composition. Salvaged subsoil shall conform to the following:

COMPOSITION - SALVAGED SUBSOIL					
TEST PROPERTY	**TEST [1] METHOD**	**TEST VALUE AND AMENDMENT**			
Prohibited Weeds	—	920.01.01			
Debris	—	5.0 % or less by weight of any combination of cement, concrete, asphalt, or other construction debris when inspected.			
Grading Analysis	MSMT 356	**Sieve Size**		**Passing by Weight Minimum %**	
		2 in.		90	
		No. 4		85	
		No. 10		60	
Textural Analysis	MSMT 356	**Particle**		**% Passing by Weight**	
		Size	**mm**	**Minimum**	**Maximum**
		Sand	2.0 – 0.050	10	85
		Silt	0.050 – 0.002	10	85
		Clay	less than 0.002	5	40
Soil pH	MSMT 356	pH of 4.5 to 7.8.			
Organic Matter	MSMT 356	0.1 to 5.0 % by weight.			
Soluble Salts	MSMT 356	1000 ppm (1.56 mmhos/cm) or less.			
Harmful Materials	—	920.01.01			
Note: [1] Materials Standards and Materials Testing 356 (MSMT) published by the Administration defines the approved test methods; other materials shall be approved by visual inspection or methods defined by the Landscape Operations Division.					

920.01.04 Furnished Subsoil. A natural subsurface soil that is uniform in texture and not derived from the project. Furnished subsoil shall conform to the following:

(a) Composition. Furnished subsoil shall conform to the following:

COMPOSITION - FURNISHED SUBSOIL		
TEST PROPERTY	**TEST [1] METHOD**	**TEST VALUE AND AMENDMENT**
Prohibited Weeds	—	920.01.01
Debris	—	920.01.03
Grading Analysis	MSMT 356	920.01.03
Textural Analysis	MSMT 356	920.01.03
Soil pH	MSMT 356	920.01.03
Organic Matter	MSMT 356	920.01.03
Soluble Salts	MSMT 356	800 ppm (1.25 mmhos/cm) or less
Harmful Materials	—	920.01.01

Note:

[1] Materials Standards and Materials Testing 356 (MSMT) published by the Administration defines the approved test methods; other materials shall be approved by visual inspection or methods defined by the Landscape Operations Division.

(b) Storage. Refer to 920.01.02(b).

(c) Approval. Refer to 920.01.02(c).

(d) Certification and Delivery. Refer to 920.01.02(d).

920.01.05 Bioretention Soil Mix (BSM). BSM shall be a homogenous mixture as follows:

(a) Components. BSM shall be composed of Sand, Furnished Topsoil, and Hardwood Mulch. BSM may include approved soil amendments. No other components shall be used.

(1) Sand. Sand shall be washed silica sand that conforms to ASTM C-33 or ASTM M-6 with less than 1 percent by weight of any combination of diabase, greystone, calcareous, or dolomitic sand.

(2) Furnished Topsoil. Refer to 920.01.02.

(3) Hardwood Mulch. Hardwood Mulch shall be the bark and wood of hardwood trees that is milled and screened to a uniform particle size of 2 in. or less. Hardwood Mulch shall be aged for 6 months or longer, with negligible quantity of sawdust and no foreign materials.

(4) Amendments. Refer to 920.02. Limestone, Sulfur, and Iron Sulfate may be used to adjust pH of BSM. No other amendments shall be used.

(b) Composition. BSM shall conform to the following:

<table>
<tr><th colspan="6">COMPOSITION- BIORETENTION SOIL MIX (BSM)</th></tr>
<tr><th>TEST PROPERTY</th><th colspan="5">TEST VALUE</th></tr>
<tr><td>Weeds</td><td colspan="5">Free of seed and viable plant parts of species in 920.06.02(a)(b)(c) when inspected.</td></tr>
<tr><td>Debris</td><td colspan="5">No observable content of cement, concrete, asphalt, crushed gravel or construction debris.</td></tr>
<tr><td>Hardwood Mulch</td><td colspan="5">20% of the loose volume of BSM when inspected.</td></tr>
<tr><td rowspan="5">Textural Analysis</td><td colspan="2">Particle</td><td colspan="3">% Passing by Weight</td></tr>
<tr><td>Size</td><td>mm</td><td>Minimum</td><td colspan="2">Maximum</td></tr>
<tr><td>Sand</td><td>2.0 – 0.050</td><td>79</td><td colspan="2">94</td></tr>
<tr><td>Silt</td><td>0.050 – 0.002</td><td>4</td><td>20</td><td rowspan="2">Combined Silt and Clay 21</td></tr>
<tr><td>Clay</td><td>less than 0.002</td><td>1</td><td>10</td></tr>
<tr><td>Soil pH</td><td colspan="5">pH of 5.7 to 7.4.</td></tr>
<tr><td>Organic Matter</td><td colspan="5">Minimum 1.5 % by weight.</td></tr>
<tr><td>Soluble Salts</td><td colspan="5">500 ppm (0.78 mmhos/cm) or less.</td></tr>
<tr><td>Harmful Materials</td><td colspan="5">920.01.01(a).</td></tr>
</table>

(c) Storage. Refer to 920.01.02(b).

(d) Approval. Refer to 920.01.02(c).

(e) Certification and Delivery. Refer to 920.01.02(d).

920.02 SOIL AMENDMENTS.

920.02.01 Limestone. Limestone shall be an agricultural product manufactured and labeled for sale in Maryland for increasing soil pH. Limestone shall contain at least 85 percent calcium and magnesium carbonates. Dolomitic limestone shall contain at least 10 percent magnesium as magnesium oxide and 85 percent calcium and magnesium carbonates.

Limestone shall be supplied as a fine powder, or as pellets produced from fine powder, that conforms to the following:

LIMESTONE GRADING ANALYSIS	
SIEVE Size Number	**PASSING BY WEIGHT Minimum %**
10	100
20	98
100	50

920.02.02 Sulfur. Sulfur shall be an agricultural product manufactured and labeled for sale in Maryland for reducing soil pH. Sulfur labeled as a fertilizer may also be used to supply sulfur as a plant nutrient. Sulfur shall be supplied as a fine powder or pelletized powder with a minimum purity of 90 percent elemental sulfur.

920.02.03 Iron Sulfate. Iron sulfate shall be an agricultural product manufactured and labeled for sale in Maryland for reducing soil pH. Iron sulfate labeled as a fertilizer may also be used to supply sulfur or iron as a plant nutrient. Iron sulfate shall be supplied as a fine powder or pelletized powder with a minimum purity of 15 percent water soluble iron derived from ferrous sulfate.

920.02.04 Gypsum. Gypsum shall be an agricultural product manufactured and labeled for sale in Maryland as an aid for improving soil structure and removing soil soluble salts, or as a fertilizer to supply calcium and sulfate. Gypsum shall be supplied as a fine powder or pelletized powder with a minimum purity of 68 percent calcium sulfate dihydrate.

920.02.05 Compost. Compost products shall by Type A, Type B, or Type C in conformance with this specification. All compost types shall be biologically mature and no longer able to reheat to thermophilic temperatures per DeWar Self Heating > 5 stable.; shall have a moisture content of 30 to 55 percent; shall have a weight of 1,400 lb per cubic yard or less when delivered.

(a) Type A Compost. Type A Compost shall be composed primarily of biosolids, manure, and similar compost source materials with low Carbon to Nitrogen ratios. Type A Compost shall be used as a soil amendment when specified in a Nutrient Management Plan (NMP).

The typical fertilizer analysis of Type A Compost shall be provided on bagged products offered for sale. The typical fertilizer analysis of bulk Type A Compost products offered for sale by CY or Ton shall be provided to the Administration as a requirement of prequalification, or the analysis may accompany the delivery of bulk compost products.

Type A Compost shall conform to the table below:

COMPOST PHYSICAL PROPERTIES PARTICLE SIZE AND GRADING ANALYSIS Type A and Type B Compost		
Type A and Type B Compost shall have pH of 6.0 to 7.5; shall have soluble salt concentration less than 10.0 mmhos/cm; shall have a moisture content of 30 to 55 percent; and shall be screened as follows.		
SIEVE		**PASSING BY VOLUME**
SIZE	**mm**	
0.5 in.	12.5	100 % minimum
No. 4	4.75	90 % maximum
No. 40	0.425	25 % maximum
No. 200	0.075	2.2 % maximum

(b) Type B Compost. Type B Compost shall be composed primarily of tree leaves, lawn clippings, and similar compost source materials with high Carbon to Nitrogen ratios. Type B Compost shall be used as a soil amendment when specified in a Nutrient Management Plan (NMP).

The typical fertilizer analysis of Type B Compost shall be provided on bagged products offered for sale. The typical fertilizer analysis of bulk Type B Compost products offered for sale by CY or Ton shall be provided to the Administration as a requirement of prequalification, or the analysis may accompany the delivery of bulk compost products.

Type B Compost shall conform to the table in 920.02.05(a) above.

(c) Type C Compost. Type C Compost shall be composed primarily of chipped, ground or granulated wood, bark, and similar compost source materials with very high Carbon to Nitrogen ratios. Type C Compost shall be used to construct compost socks, compost logs, compost berms and other manufactured products for sediment and erosion control.

Type C Compost shall conform to the table, below:

COMPOST PHYSICAL PROPERTIES PARTICLE SIZE AND GRADING ANALYSIS Type C Compost	
Type C Compost shall have pH of 5.0 to 8.0; shall have soluble salt concentration less than 4.0 mmhos/cm; shall have a moisture content of 30 to 55 percent; and shall be screened as follows.	
SIEVE SIZE	**PASSING BY VOLUME**
6 in.	100 % minimum
3/4 in.	75 % minimum

920.02.06 Peat Moss. A milled sphagnum peat moss with negligible woody substances.

920.02.07 Aged Pine Bark Fines. Derived from the bark of pine trees that have been composted and milled to a fineness approved for use by the Landscape Operations Division.

920.02.08 Water Absorbent Gel. A cross linked polyacrylamide agricultural product used to maintain moisture around bare root plants and as a soil conditioner. Formulas used shall conform to the manufacturer's recommendations.

920.03 FERTILIZERS.

920.03.01 Composition. Standard Fertilizers and Special Fertilizers shall be commercial grade products labeled for sale and use as agricultural fertilizer, and shall conform to Federal and Maryland State regulations and the Standards of the Association of Official Analytical Chemists. All analyses are subject to approval by the Landscape Operations Division prior to application.

(a) Standard Fertilizer. Standard fertilizers shall be produced of ingredients, analysis, and composition as follows:

(1) Ingredients. Standard fertilizers shall include one or more of the following:

FERTILIZER INGREDIENTS Abbreviation and Chemical Name of Ingredient			
	ammonium nitrate		polymer coated urea
	ammonium sulfate		potassium chloride
	biosolids		potassium nitrate
	calcium nitrate	SOP	potassium sulfate
DAP	diammonium phosphate	SCU	sulfur coated urea
	isobutylidene diurea		triple super phosphate
	methylene urea		urea
MAP	monoammonium phosphate	UF	ureaform

(2) Analysis and Composition. Standard fertilizers shall contain nitrogen (N), phosphorus (P), potassium (K), and sulfate (SO_4) derived from ingredients above.

STANDARD FERTILIZER ANALYSIS AND COMPOSITION	
FERTILIZER	**USE**
0-0-50 SOP [a]	Source of potassium (K) and sulfate (SO_4) fertilizer. Used alone or in fertilizer mixtures for turfgrass and other groundcover establishment.
11-52-0 MAP [a]	Source of nitrogen (N) and phosphorus (P) fertilizer. Used alone or in fertilizer mixtures for turfgrass and other groundcover establishment.
20-16-12 (83% UF with MAP & SOP) [b]	Source of slow-release nitrogen (N), phosphorus (P), potassium (K) and sulfate (SO_4). Fertilizer mixture used for turfgrass and other groundcover establishment.
38-0-0 UF [a]	Source of slow-release nitrogen (N) fertilizer. Used in fertilizer mixtures for turfgrass and other groundcover establishment
37-0-0 SCU	Source of slow-release nitrogen (N) and sulfate (SO_4). Fertilizer used for Temporary Seed and Refertilizing for groundcover establishment.
Note: [a] Purity shall be at least 98% UF, MAP, or SOP as indicated. [b] Mixture of UF, MAP, and SOP with no more than 2% of any combination of other materials.	

(b) Special Fertilizers. Special fertilizers shall be of ingredients, analysis, and composition as follows:

(1) Ingredients. Special fertilizers shall provide label analysis guaranteeing nitrogen, phosphorus, and potassium from ingredients in 920.03.01(a) and also include plant micronutrients, coatings, or materials to augment their performance.

(2) Analysis and Composition. As follows:

SPECIAL FERTILIZER ANALYSIS AND COMPOSITION	
FERTILIZER [a]	**USE**
14-14-14 Polymer-coated fertilizer with minor nutrients	Slow-release fertilizer used to install trees, shrubs, perennials and other plant materials.
14-14-14 Granular fertilizer with minor nutrients	Slow-release fertilizer used to install trees, shrubs, perennials and other plant materials.
20-10-5 21 to 23 grams per fertilizer tablet. 13% water insoluble and 7% water soluble N, with minor nutrients	Slow release fertilizer tablet used to install trees, shrubs, perennials and other plant materials.
20-20-20 Water soluble powder fertilizer with minor nutrients	Fertilizer solution used to refertilize trees, shrubs, perennials and other plant materials
Note: [a] Shall be a mixture of any ingredients listed in 920.03.01(a)(1) and (b)(1) with no more than 5% by weight of any combination of other materials.	

920.04 MULCHES. Materials used as mulch shall have a uniform texture and be free from foreign materials or concentrations of metals, chemicals, or other substances that are harmful to human health, water quality, or plant growth.

920.04.01 Straw Mulch. Shall consist of thoroughly threshed stems and leaves of barley, oats, rye, and wheat. Straw mulch shall be in an air-dry condition suitable for application with a

mulch blower or other equipment. Straw mulch shall be visually inspected to ensure it is free of objectionable quantities of mold, foreign substances, and weed seeds.

920.04.02 Wood Cellulose Fiber Mulch. A uniformly processed wood product that is able to form a homogenous slurry with seed, fertilizer, and other materials under agitation with water.

The fiber shall perform satisfactorily in hydraulic seeding equipment without clogging or damaging the system. The slurry shall contain a green dye to provide easy visual inspection for uniformity of application.

The manufacturer shall furnish certification as specified in TC-1.03 of the Technical Association of Pulp and Paper Industry (TAPPI) in conformance with the following:

WOOD CELLULOSE FIBER	
TEST PROPERTY	**TEST VALUE**
Particle Length	Approx. 0.5 in.
Particle Thickness	Approx. 0.063 in.
Net Dry Weight Content	Minimum as stated on bag
pH, TAPPI Standard T 509	4.0 – 8.5
Ash Content, TAPPI Standard T 413	7.0% maximum
Water Holding Capacity	90% minimum

The material shall be delivered in packages of uniform weight, which shall not exceed 75 lb net weight and shall bear the name of the manufacturer, the net weight, and a supplemental statement of the net weight content.

920.04.03 Shredded Hardwood Bark (SHB) Mulch. Shall consist of natural bark derived from hardwood trees that has been milled and screened to a maximum 4 in. particle size. SHB mulch shall contain negligible quantities of sawdust or other non-bark woody materials.

920.04.04 Composted Wood Chip (CWC) Mulch. Shall consist of natural wood mechanically reduced to a maximum size of 2 x 2 x 0.5 in. by a chipping machine before being composted. Grading analysis of CWC mulch shall be as follows:

COMPOSTED WOOD CHIP MULCH	
SIEVE SIZE in.	**PASSING BY VOLUME Maximum %**
2	100
1	30
0.5	10

920.05 SOIL STABILIZATION MATTING.

920.05.01 Soil Stabilization Matting (SSM). SSM products shall be selected from the Office of Materials Technology's Qualified Products List (QPL) for Soil Stabilization Matting Manufacturers.

SSM shall consist of machine-produced matting of uniform thickness, weave, or distribution of fibers, supplied in rolls at least 40 in. wide. SSM shall be smolder resistant.

The chemical components shall be nonleaching, nontoxic to vegetation and germinating seed, and noninjurious to the skin.

(a) Type A. Degradable; excelsior or nonwoven coconut fibers with biodegradable netting on top and bottom; netting shall be cotton, cotton blend or coir. Type A soil stabilization matting products shall be listed in the current AASHTO National Transportation Product Evaluation Program (NTPEP) Report for Erosion Control Products. Large scale results shall be obtained by a Geosynthetic Institute Accredited or other approved laboratory for Criteria marked *.

COMPOSITION - TYPE A SSM		
CRITERIA	**METHOD**	**MEASUREMENT**
Thickness	D 6525	At least 0.25 in.
Weight	D 6475	At least 7.9 oz per yd^2
Tensile Strength – MD	D 6818	At least 6.25 lb per in.
Tensile Strength – TD	D 6818	At least 4.7 lb per in.
Light Penetration	D 6567	At least 5%
Slope Erosion – C Factor*	D 6459	No more than 0.2
Shear for 0.5 in Soil Loss*	D 6460	At least 1.75 lb per ft^2
Netting Opening		No more than 2.0 x 1.0 in.
Thread		Biodegradable
Stitching and Spacing		No more than 4.0 in apart

(b) Type B. Permanent; non-woven, nondegradable, UV stabilized, synthetic fibers; with non-degradable, UV stabilized, synthetic netting on top and bottom. Type B soil stabilization matting products shall be listed in the current AASHTO National Transportation Product Evaluation Program (NTPEP) Report for Erosion Control Products. Large scale results shall be obtained by a Geosynthetic Institute Accredited or other approved laboratory for Criteria marked *.

COMPOSITION - TYPE B SSM		
CRITERIA	**METHOD**	**MEASUREMENT**
Thickness	D 6525	At least 0.3 in.
Weight	D 6655	At least 10.0 oz per yd^2
Tensile Strength – MD	D 6818	At least 12.5 lb per in.
Tensile Strength – TD	D 6818	At least 12.5 lb per in.
Tensile Strength > 500 hr. exp.	D 4355	At least 80 % of original
Light Penetration	D 6567	At least 10 %
Slope Erosion – C Factor*	D 6459	No more than 0.2
Shear for 0.5 in Soil Loss*	D 6460	At least 2.25 lb per ft^2
Netting Opening	□	No more than 1.0 x 0.75 in.
Thread	□	Nondegradable, UV stabilized, synthetic
Stitching and Spacing	□	No more than 4.0 in. apart

(c) Type C. Permanent; nondegradable, synthetic lattice; and easily filled with soil.

COMPOSITION - TYPE C SSM		
CRITERIA	**METHOD**	**MEASUREMENT**
Thickness	D 6525	At least 0.4 in.
Weight	D 6655	At least 7.0 oz per yd^2
Tensile Strength – MD	D 6818	At least 12.5 lb per in.
Tensile Strength – TD	D 6818	At least 9.5 lb per in.
Tensile Strength > 500 hr. exp.	D 4355	At least 80 % of original
Porosity or Open Area	□	At least 80 %

(d) Type D. Degradable; woven coir.

COMPOSITION - TYPE D SSM		
CRITERIA	**METHOD**	**MEASUREMENT**
Thickness	D 6525	At least 0.30 in.
Weight	D 6475	At least 19.0 oz per yd^2
Porosity or Open Area	□	At least 35 %

(e) Type E. Degradable; excelsior, straw, or straw/coconut blend fibers; biodegradable netting on top and bottom; netting shall be cotton, cotton blend or coir. Type E soil stabilization matting products shall be listed in the current AASHTO National Transportation Product Evaluation Program (NTPEP) Report for Erosion Control Products. Large scale results shall be obtained by a Geosynthetic Institute Accredited or other approved laboratory for Criteria marked *.

COMPOSITION - TYPE E SSM		
CRITERIA	**METHOD**	**MEASUREMENT**
Thickness	D 6525	At least 0.25 in.
Weight	D 6475	Excelsior: 6.0 to 7.9 oz per yd^2
		Straw; Straw & Coconut: At least 6.0 oz per yd^2
Tensile Strength – MD	D 6818	At least 6.25 lb per in.
Tensile Strength – TD	D 6818	At least 2.5 lb per in.
Light Penetration	D 6567	At least 5 %
Slope Erosion – C Factor*	D 6459	No more than 0.2
Shear for 0.5 in Soil Loss*	D 6460	At least 1.5 lb per ft^2
Netting Opening	□	Excelsior: 2.0 x 1.0 in. or less
		Straw; Straw & Coconut: 0.75 x 0.75 in. or less
Thread	□	Biodegradable
Stitching and Spacing	□	Excelsior: 4.0 in. apart or less
		Straw, or Straw & Coconut: 2.0 in apart or less

920.05.02 Fasteners for Soil Stabilization Matting and Turfgrass Sod. Fasteners shall be selected as specified in Section 709.03.06 and conform to the following:

(a) Wood Peg. Wood, biodegradable, untreated; single leg is driven into the soil so that wider top is flush with turfgrass sod and SSM.

6 Inch. Approx. 6 in. long, 3/8 in. thick; top 1 in. wide, tapered to base.

(b) T-Head Pin. Molded plastic; biodegradable. Single leg with barbs is driven into the soil so that molded T-Head top is flush with turfgrass sod and SSM.

6 Inch. Approx. 6 in. long, 3/8 in. thick; head 1 in. wide.

8 Inch. Approx. 8 in. long, 3/8 in. thick; head 1 in. wide.

(c) Circle-Top Pin. Steel wire; single leg is driven into the soil so that coil or loop top is flush with turfgrass sod and SSM.

6 Inch. 11 gauge; leg 6 in long.

8 Inch. 11 gauge; leg 8 in. long.

(d) Round-Head Pin. Molded plastic; biodegradable. Single leg with barbs is driven into the soil so that molded disk top is flush with turfgrass sod and SSM.

6 Inch. Approx. 6 in long; head 1 in. diameter.

8 Inch. Approx. 8 in long; head 1 in. diameter.

(e) U-Shape Staple. Steel wire; two main legs are driven into the soil so that top of staple is flush with turfgrass sod and SSM.

6 Inch. 11 gauge bent into U shape; legs 6 in. long; top 1 to 1-1/2 in. wide.

8 Inch. 8 gauge bent into U shape; legs 8 in. long; top 1 to 1-1/2 in. wide.

12 Inch. 8 gauge bent into U shape; legs 12 in. long; top 1 to 1-1/2 in. wide.

(f) Fabric Pin. Steel nail; single leg is driven into the soil so that steel washer top is flush with SSM.

12 Inch. 11 gauge approx. 12 in. long.

18 Inch. 3/16 in. approx 18 in. long.

920.06 SEED AND TURFGRASS SOD STANDARDS.

920.06.01 Names and Naming. The authority for common and scientific names shall be the USDA NRCS The Plants Database website at http://plants.usda.gov. Cultivar names shall be those of the registered cultivar.

Plant and seed identification, tags, and labels shall correspond to the common name and scientific name of the species in The Plants Database. Any conflict in names or naming shall be resolved by the Engineer in consultation with the Landscape Operations Division.

920.06.02 Prohibited Weeds.

(a) Weeds Prohibited in Turfgrass Sod and SHA Seed Mixtures. Turfgrass Sod, SHA Turfgrass Seed Mix, SHA Temporary Seed Mix, and Additive Seed shall be free from seed or viable parts of the following species:

WEEDS PROHIBITED IN TURFGRASS SOD & SHA SEED MIXTURES	
COMMON NAME	**SCIENTIFIC NAME**
Annual Bluegrass	*Poa annua* L.
Balloonvine	*Cardiospermum halicacabum* L.
Bermudagrass	*Cynodon dactylon* (L.) Pers. (approved for Bermudagrass sod)
Canada Thistle	*Cirsium arvense* (L.) Scop.
Carolina Horsenettle	*Solanum carolinense* L.
Common Corncockle	*Agrostemma githago* L.
Common Reed = Phragmites	*Phragmites australis* (Cav.) Trin. ex Steud.
Crested Anoda = Spurred Anoda	*Anoda cristata* (L.) Schltdl.

Dodder	*Cuscuta spp.* L.
Field Bindweed	*Convolvulus arvensis* L.
Japanese Bristlegrass = Giant Foxtail	*Setaria faberi* Herrm.
Java-Bean = Sicklepod	*Senna obtusifolia* (L.) Irwin and Barneby
Johnsongrass	*Sorghum halepense* (L.) Pers. and hybrids
Meadow Garlic = Wild Onion	*Allium canadense* L.
Plumeless Thistle, Musk Thistle	*Carduus* L.
Quackgrass	*Elymus repens* (L.) Gould
Rough Cocklebur	*Xanthium strumarium* L.
Serrated Tussock	*Nassella trichotoma* (Nees) Hack.
Wild Garlic	*Allium vineale* L.
Yellow Nutsedge	*Cyperus esculentus L.*

(b) Weeds Prohibited in Meadow and Wildflower Seed. Meadow and Wildflower Seed shall be free of species listed in (a) and the following species:

WEEDS PROHIBITED IN MEADOW & WILDFLOWER SEED	
COMMON NAME	**SCIENTIFIC NAME**
Asiatic Tearthumb = Mile-a-Minute	*Polygonum perfoliatum* L.
Burdock and related species	*Arctium* L.
Canarygrass = Reed Canarygrass and related spp.	*Phalaris* L.
Common Wormwood = Mugwort	*Artemisia vulgaris* L.
Dogbane and related spp.	*Apocynum* L.
Eastern Poison Ivy	*Toxicodendron radicans* (L.) Kuntze
Fig Buttercup = Lesser Celandine	*Ranunculus ficaria* L. var. *bulbifera* Marsden-Jones
Garlic Mustard	*Alliaria petiolata* (M. Bieb.) Cavara and Grande
Giant Hogweed	*Heracleum mantegazzianum* Sommier and Levier
Japanese Honeysuckle, Tatarian Honeysuckle, related spp.	*Lonicera* L.
Japanese Knotweed	*Polygonum cuspidatum* Siebold and Zucc.
Lesser Knapweed = Spotted Knapweed	*Centaurea nigra* L.
Multiflora Rose	*Rosa multiflora* Thunb.
Nepalese Browntop = Japanese Stiltgrass	*Microstegium vimineum* (Trin.) A. Camus
Poison Hemlock	*Conium maculatum* L.
Purple Loosestrife and related spp.	*Lythrum* L.
Silvergrass and related spp.	*Miscanthus* Andersson
Thistle and related spp.	*Cirsium* Mill., *Onopordum L.*

(c) Weeds Prohibited in Shrub Seed. Shrub Seed shall be free of species listed in (a) and (b) and the following species:

WEEDS PROHIBITED IN SHRUB SEED	
COMMON NAME	**SCIENTIFIC NAME**
Burningbush	*Euonymus alatus* (Thunb.) Siebold
Common Buckthorn	*Rhamnus cathartica L.*
Japanese Barberry	*Berberis thunbergii* DC.
Oriental Bittersweet	*Celastrus orbiculatus* Thunb.
Oleaster; Russian Olive, Autumn Olive, and related spp.	*Elaeagnus L.*
Privet, and related species	*Ligustrum L.*
Tree of Heaven	*Ailanthus altissima* (Mill.) Swingle

920.06.03 Turfgrass Sod. Turfgrass sod shall be Maryland Certified Tall Fescue Sod unless Bermudagrass Sod or Zoysiagrass Sod is specified.

Sod shall be field grown in the State of Maryland in compliance with the Maryland Turfgrass Law and Regulations of the State of Maryland. Each load of tall fescue sod shall bear a Maryland State Certified Label.

Sod shall be sufficiently knitted when harvested to resist breakage under normal handling and be in good health at the time of delivery. Sod shall be machine cut in strips at least 14 in. wide. Tall Fescue Sod shall be uniform thickness of 0.75 to 1.25 in., excluding top growth, with thatch thickness less than 3/8 in.

Prior to harvest, Tall Fescue Sod shall be mowed to a height of 2.0 to 3.5 in. Bermudagrass Sod and Zosiagrass Sod shall be mowed to a height of 0.75 to 3.0 in.

920.06.04 Approved Cultivars. Refer to 'University of Maryland Turfgrass Technical Update TT-77 Recommended Turfgrass Cultivars for Certified Sod Production and Seed Mixtures in Maryland'. Only cultivars included in TT-77 may be used. When no cultivar is specified, any common type cultivar of the species may be used.

920.06.05 Seed Testing and Sampling. Seed shall comply with the Maryland Seed Law and Regulations of the State of Maryland. Seed suppliers shall assume charges for seed inspections and testing.

(a) Certified Seed. Component cultivars of SHA Turfgrass Seed Mix, SHA Special Purpose Seed Mix, SHA Temporary Seed Mix, and any seed used as additives for these mixes, shall be certified and carry the tags of their state of origin that show the percent purity, percent germination, percent weed seed, and types and content of noxious weed seed.

(b) SHA Seed Mixtures. Turfgrass Seed Mix, SHA Special Purpose Seed Mix, and SHA Temporary Seed Mix shall be sampled and tested by an inspector of the Maryland Department of Agriculture, Turf and Seed Section (MDA) for percent purity, percent germination, percent weed seed, and types and content of noxious weed seed. These seed mixtures shall conform to MDA Standards for Maryland Certified Seed and carry the certified tag of the State of Maryland.

(c) Unmixed Seed. Seed supplied for use as Meadow Seed, Wildflower Seed, and Shrub Seed shall be supplied in containers of a single species, unmixed. Each species shall be tested by the producer or supplier and carry a tag that shows the percent purity, percent germination, percent weed seed; and types and content of noxious weed seed.

920.06.06 Standards for Seed Species. Seed supplied in lots of individual species or used to produce mixes shall conform to the requirements of this section for minimum percent germination, minimum purity, and maximum percent of weed seed.

Meadow seed, wildflower seed, and shrub seed that does not conform to these standards may be used after review and approval by the Engineer in consultation with the Landscape Operations Division. The seed will be subject to use at increased seeding rates or measures to compensate for substandard seed purity, germination, or weed content.

(a) SHA Turfgrass Seed Mix and SHA Special Purpose Seed Mix. Species included in SHA Turfgrass Seed Mix and SHA Special Purpose Seed Mix shall be MDA Certified Seed of approved cultivars and conform to the following requirements for minimum percent purity, maximum percent weed seed, and minimum percent germination:

TURFGRASS SEED SPECIES			
COMMON NAME, and SCIENTIFIC NAME	**PURITY Min %**	**WEED Max %**	**GERM Min %**
Chewings Fescue *Festuca rubra* L. ssp. *fallax* (Thuill.) Nyman	98	0.5	85
Red Fescue *Festuca rubra* L. ssp. *rubra*	98	0.5	85
Hard Fescue *Festuca brevipila* Tracey	98	0.5	85
Kentucky Bluegrass *Poa pratensis* L. ssp. *pratensis*	95	0.4	80
Sheep Fescue *Festuca ovina* L.	98	0.5	85
Tall Fescue *Schedonorus arundinaceus* (Schreb.) Dumort., nom. cons.	98	0.5	85

(b) Temporary and Grass Additive Seed. Species included in SHA Temporary Seed Mix, or used as Additive Seed with SHA Turfgrass Seed Mix or SHA Special Purpose Seed Mix shall conform to the following requirements for minimum percent purity, maximum percent weed seed, and minimum percent germination:

TEMPORARY AND GRASS ADDITIVE SEED SPECIES			
COMMON NAME, and SCIENTIFIC NAME	**PURITY Min %**	**WEED Max %**	**GERM Min %**
Cereal Rye *Secale cereale* L.	98	0.1	85
Common Barley, winter type *Hordeum vulgare* L.	98	0.3	85
Common Oat, winter type *Avena sativa* L.	98	0.5	85
Common Wheat, winter type *Triticum aestivum* L.	98	0.1	85
Foxtail Millet *Setaria italica* (L.) P. Beauv.	99	0.1	80
Perennial Ryegrass *Lolium perenne* L. ssp. *perenne*	97	0.5	85
Weeping Alkaligrass *Puccinellia distans* (Jacq.) Parl.	97	0.5	85

(c) Meadow Forb Seed. Seed shall be supplied in lots of individual species, unmixed, labeled with common name and scientific name in conformance with the following:

(1) Purity. Weed and/or other crop seed content shall be 2.5 percent or less by weight. Seed that does not conform to this specification may be used after approval by the Engineer in consultation with the Landscape Operations Division at increased seeding rates, or with measures to compensate for increased weed or crop seed content.

(2) Origin. Except as noted with asterisk*, Seed shall either be collected from native sources in USDA Hardiness Zone 5b, 6a, 6b and 7a in the States of Maryland, Pennsylvania, New York, New Jersey, Delaware, Virginia, West Virginia, or North Carolina, or shall be grown and produced from seed certified to have been collected from sites in the USDA Hardiness Zones of those States.
Seed that does not conform to origin requirements may be used after review and approval by the Engineer in consultation with the Landscape Operations Division.

(3) Species. Seed shall conform to the following species, subspecies and varieties:

MEADOW FORB SEED SPECIES	
COMMON NAME	**SCIENTIFIC NAME**
Allegheny Monkeyflower = Square Stem Monkeyflower	*Mimulus ringens* L. var. *ringens*
Birds-Foot Trefoil *	*Lotus corniculatus L.*
Bearded Beggarticks = Showy Tickseed	*Bidens aristosa* (Michx.) Britton
Blackeyed Susan	*Rudbeckia hirta* L. var. *hirta* *Rudbeckia hirta* L. var. *pulcherrima* Farw.
Blanketflower	*Gaillardia aristata* Pursh
Browneyed Susan	*Rudbeckia triloba* L. var. *triloba* *Rudbeckia triloba* L. var. *pinnatiloba* Torr. and A. Gray
Common Boneset	*Eupatorium perfoliatum* L. var. *perfoliatum*
Common Evening Primrose	*Oenothera biennis* L.
Common Yarrow *	*Achillea millefolium L.*
Crimsoneyed Rose Mallow	*Hibiscus moscheutos* L.
Eastern Purple Coneflower	*Echinacea purpurea* (L.) Moench
Flat-top Goldentop = Grass-Leaved Goldenrod	*Euthamia graminifolia* (L.) Nutt. *Euthamia graminifolia* (L.) Nutt. var. *graminifolia* *Euthamia graminifolia* (L.) Nutt. var. *hirtipes* (Fernald) C.E.S. Taylor and R.J. Taylor
Gray Goldenrod	*Solidago nemoralis* Aiton var. *nemoralis*
King of the Meadow = Tall Meadow Rue	*Thalictrum pubescens* Pursh
Lanceleaf Tickseed = Lanceleaf Coreopsis	*Coreopsis lanceolata* L.
Maryland Senna	*Senna marilandica* (L.) Link
Maximilian Sunflower	*Helianthus maximiliani* Schrad.
New England Aster	*Symphyotrichum novae-angliae* (L.) G.L. Nesom
New York Aster	*Symphyotrichum novi-belgii* (L.) G.L. Nesom var. *elodes* (Torr. and A. Gray) G.L. Nesom *Symphyotrichum novi-belgii* (L.) G.L. Nesom var. *novi-belgii* *Symphyotrichum novi-belgii* (L.) G.L. Nesom var. *villicaule* (A. Gray) J. Labrecque and L. Brouillet
New York Ironweed	*Vernonia noveboracensis* (L.) Michx.
Partridge Pea	*Chamaecrista fasciculata* (Michx.) Greene *Chamaecrista fasciculata* (Michx.) Greene var. *fasciculata* *Chamaecrista fasciculata* (Michx.) Greene var. *macrosperma* (Fernald) C.F. Reed
Red Clover	*Trifolium pratense* L.
Seedbox	*Ludwigia alternifolia* L.
Smooth Blue Aster	*Symphyotrichum laeve* (L.) A. Löve and D. Löve var. *laeve*

	Symphyotrichum laeve (L.) A. Löve and D. Löve var. *concinnum* (Willd.) G.L. Nesom
Smooth Oxeye = Ox-eye Sunflower	*Heliopsis helianthoides* (L.) Sweet var. *helianthoides* *Heliopsis helianthoides* (L.) Sweet var. *scabra* (Dunal) Fernald
Spotted Trumpetweed = Spotted Joe Pye Weed	*Eupatoriadelphus maculatus* (L.) King and H. Rob. var. *maculatus*
Stiff Goldenrod	*Oligoneuron rigidum* (L.) Small var. *rigidum*
Sundial Lupine = Wild Blue Lupine	*Lupinus perennis* L. ssp. *perennis* *Lupinus perennis* L. ssp. *perennis* var. *perennis* *Lupinus perennis* L. ssp. *perennis* var. *occidentalis* S. Watson
Swamp Milkweed	*Asclepias incarnata* L. *Asclepias incarnata* L. ssp. *incarnata* *Asclepias incarnata* L. ssp. *pulchra* (Ehrh. ex Willd.) Woodson
Swamp Sunflower = Narrow-Leaved Sunflower	*Helianthus angustifolius* L.
Swamp Verbena = Blue Vervain	*Verbena hastata* L. var. *hastata*
Talus Slope Penstemon = Tall White Beardtongue	*Penstemon digitalis* Nutt. ex Sims
Joe Pye Weed = Trumpetweed	*Eutrochium maculatum* (L.) E.E. Lamont var. *maculatum*
White Clover *	*Trifolium repens L.*
Wild Bergamot	*Monarda fistulosa* L. ssp. *fistulosa* *Monarda fistulosa* L. ssp. *fistulosa* var. *mollis* (L.) Benth. *Monarda fistulosa* L. ssp. *fistulosa* var. *rubra* A. Gray *Monarda fistulosa* L. ssp. *brevis* (Fosberg and Artz) Scora, ined.

(d) Meadow Grass, Sedge, and Rush Seed. Seed shall be supplied in lots of individual species, unmixed, labeled with common name, scientific name, and cultivar in conformance with the following:

(1) Purity. Refer to 920.06.06(c)(1). Grasses with awns shall be debearded or deawned.

(2) Origin. Refer to 920.06.06(c)(2). Cultivars may be produced in any state east of the Mississippi River.

(3) Species. Seed shall conform to the following species, subspecies, varieties, and cultivars:

MEADOW GRASS, SEDGE AND RUSH SEED SPECIES	
COMMON NAME and CULTIVARS	**SCIENTIFIC NAME**
Big Bluestem cv. Niagara	*Andropogon gerardii* Vitman
Broomsedge Bluestem = Broomsedge	*Andropogon virginicus* L. *Andropogon virginicus* L. var. *virginicus* *Andropogon virginicus* L. var. *decipiens* C.S. Campbell
Common Rush = Soft Rush = Lamp Rush	*Juncus effusus* L. var. *conglomeratus* (L.) Engelm. *Juncus effusus* L. var. *decipiens* Buchenau *Juncus effusus* L. var. *pylaei* (Laharpe) Fernald and Wiegand *Juncus effusus* L. var. *solutus* Fernald and Wiegand
Deertongue cv. 'Tioga'	*Dichanthelium clandestinum* (L.) Gould
Fowl Bluegrass	*Poa palustris L.*
Fox Sedge	*Carex vulpinoidea* Michx. var. *vulpinoidea*
Gamagrass cv. 'Meadowcrest', 'Pete'	*Tripsacum dactyloides* (L.) L.
Indiangrass cv. 'Rumsey'	*Sorghastrum nutans* (L.) Nash
Little Bluestem cv. 'Aldous'	*Schizachyrium scoparium* (Michx.) Nash var. *scoparium* *Schizachyrium scoparium* (Michx.) Nash var. *divergens* (Hack.) Gould
Longhair Sedge = Bristly Sedge	*Carex comosa* Boott
Rattlesnake Mannagrass	*Glyceria canadensis* (Michx.) Trin.
Shallow Sedge = Lurid Sedge	*Carex lurida* Wahlenb.
Switchgrass cv. 'Blackwell', 'Shelter'	*Panicum virgatum* L. var. *virgatum* *Panicum virgatum* L. var. *spissum* Linder
Virginia Wildrye	*Elymus virginicus L., Elymus virginicus* L. var. *halophilus* (E.P. Bicknell) Wiegand
Woolgrass	*Scirpus cyperinus* (L.) Kunth

(e) Wildflower Seed. Seed shall be supplied in lots of individual species, unmixed, labeled with common name, scientific name, and cultivar in conformance with the following:

(1) Purity. Species shall be 98 percent purity or greater, with 75 percent germination or greater, and with weed and/or other crop seed content of 2.5 percent or less by weight. Seed that does not conform to purity requirements may be used after approval by the Engineer in consultation with the Landscape Operation Division at increased seeding rates, or with measures to compensate for increased weed or crop seed content.

(2) Origin. Any State of the United States.

(3) Species. Seed shall conform to the following species, subspecies, varieties, and cultivars:

WILDFLOWER SEED SPECIES	
COMMON NAME and CULTIVARS	**SCIENTIFIC NAME**
Blackeyed Susan	*Rudbeckia hirta* L. var. *hirta* *Rudbeckia hirta* L. var. *pulcherrima* Farw.
Calendula	*Calendula officinalis* L.
Common Sunflower cv. 'Autumn Beauty'	*Helianthus annuus* L.
Corn Poppy, cv. 'Shirley Mix'	*Papaver rhoeas* L.
Doubtful Knight's-spur = Rocket Larkspur	*Consolida ajacis* (L.) Schur
Firewheel = Annual Gaillardia	*Gaillardia pulchella* Foug. *Gaillardia pulchella* Foug. var. *pulchella*
Garden Cornflower = Bachelors Button	*Centaurea cyanus* L.
Garden Cosmos = Pink Cosmos, cv. 'Sensation'	*Cosmos bipinnatus* Cav.
Golden Tickseed	*Coreopsis tinctoria* Nutt.
Lemon Beebalm	*Monarda citriodora* Cerv. ex Lag.
Moroccan Toadflax = Spurred Snapdragon	*Linaria maroccana* Hook. f.
Siberian Wallflower	*Erysimum* ×*marshallii* (Henfr.) Bois
Sulphur Cosmos = Yellow Cosmos, cv. 'Bright Lights'	*Cosmos sulphureus* Cav.

(f) Shrub Seed. Seed shall be supplied in lots of individual species, unmixed, labeled with common name and scientific name in conformance with the following:

(1) Purity. Weed and/or other crop seed content shall be 0.5 percent or less by weight. Minimum purity and minimum germination shall conform to the requirements of (3), below.

(2) Origin. Refer to 920.06.06(c)(2).

(3) Species. Seed shall conform to the following species, subspecies, and varieties:

SHRUB SEED SPECIES		
SPECIES **Including Subspecies and Variety**	**PURITY** **Min %**	**GERM** **Min %**
American Black Elderberry *Sambucus nigra* L. ssp. *canadensis* (L.) R. Bolli	98	60
American Cranberrybush *Viburnum opulus* L. var. *americanum* Aiton	99	70
Black Chokeberry *Photinia melanocarpa* (Michx.) K.R. Robertson and Phipps	99	70
Bristly Locust *Robinia hispida* L. var. *fertilis* (Ashe) R.T. Clausen *Robinia hispida* L. var. *hispida*	99	90
Chokecherry	99	70

Prunus virginiana L. var. *viginiana*		
Common Buttonbush *Cephalanthus occidentalis*	98	60
Common Ninebark *Physocarpus opulifolius* (L.) Maxim., orth. cons.	99	75
Common Winterberry *Ilex verticillata* (L.) A. Gray	99	60
Desert False Indigo *Amorpha fruticosa* L.	98	70
Fragrant Sumac *Rhus aromatica* var. *aromatica*	99	85
Gray Dogwood *Cornus racemosa* Lam.	99	70
Inkberry *Ilex glabra* (L.) A. Gray	98	60
Mapleleaf Viburnum *Viburnum acerifolium* L.	99	70
Maryland Senna Senna marilandica (L.) Link	99	70
Nannyberry *Viburnum lentago* L.	99	75
Red Chokeberry *Photinia pyrifolia* (Lam.) K.R. Robertson and Phipps	85	60
Red Elderberry *Sambucus racemosa* L. var. *racemosa*	95	70
Redosier Dogwood *Cornus sericea* L. ssp. *sericea*	99	70
Silky Dogwood *Cornus amomum* Mill.	98	70
Smooth Sumac *Rhus glabra* L.	99	80
Southern Arrowwood *Viburnum dentatum* L. var. *dentatum* *Viburnum dentatum* L. var. *venosum* (Britton) Gleason *Viburnum recognitum* Fernald	99	70
Spicebush *Lindera benzoin* (L.) Blume var. benzoin	95	60
Staghorn Sumac *Rhus typhina* L.	99	85
Steeplebush *Spiraea tomentosa* L.	85	70
Swamp Rose *Rosa palustris* Marsh.	99	65
Witch Hazel *Hamamelis virginiana* L.	99	70

920.06.07 Seed Mixes. Refer to 920.06.01 thru .06 and the document 'Specifications for Seed and Seed Mixes' maintained by the Landscape Operations Division, which includes lists of approved cultivars.

(a) SHA Turfgrass Seed Mix.

SHA TURFGRASS SEED MIX		
MIX %	**SPECIES**	
	Common Name	**Scientific Name**
95	Tall Fescue	*Schedonorus arundinaceus* (Schreb.) Dumort., nom. cons.
5	Kentucky Bluegrass	*Poa pratensis* L. ssp. *pratensis*

(b) SHA Special Purpose Seed Mix.

SHA SPECIAL PURPOSE SEED MIX		
MIX %	**SPECIES**	
	Common Name	**Scientific Name**
75	Hard Fescue	*Festuca brevipila* Tracey
25	Chewing's Fescue	*Festuca rubra* L. ssp. *fallax* (Thuill.) Nyman

Note: When pre-mixed SHA Special Purpose Seed Mix is not available, a small quantity exception will allow the mix to be performed at the seeding location using Certified seed of the required species.

(c) SHA Temporary Seed Mix.

SHA TEMPORARY SEED MIX		
MIX %	**SPECIES**	
	Common Name	**Scientific Name**
95	One or more of the following: Common Wheat, winter type Common Barley, winter type Common Oat, winter type Cereal Rye, winter type	 *Triticum aestivum* L. *Hordeum vulgare* L. *Avena sativa* L. *Secale cereale* L.
5	Foxtail Millet	*Setaria italica* (L.) P. Beauv.

920.07 PLANT MATERIALS.

920.07.01 Certificate and Licenses. Sellers, distributors, installers or producers of nursery stock shall possess the Plant Dealer License, Plant Broker License, or Nursery Inspection Certificate of the Maryland Department of Agriculture, or substitute a similar certificate or licenses from another State where they do business.

920.07.02 Plant Material Inspection. Plant material will be inspected for conformance with 920.07.03 thru .05, and tagged with Administration Plant Material Inspection Seals (Seals) as follows:

(a) Inspection. The Plant Material Inspection will be conducted in Maryland at the nursery where the plant material is grown, or at the brokerage where the plant material is sold. When plant material is produced by a nursery outside Maryland, the Inspection will be conducted at the Contractor's holding area, or at the project site before planting, unless otherwise specified in the Contract Documents.

The Contractor shall ensure that the plant material is present for inspection on the scheduled date, and that it meets the requirements of 920.07. The condition and identity of plant material will be subject to re-inspection for the duration of the Contract.

(b) Scheduling. The Inspection will be scheduled by the Engineer in consultation with the Landscape Operations Division. At least 14 days notice to schedule an Inspection within Maryland, and at least 45 days notice to schedule an Inspection outside Maryland.

(c) Seals. The Administration will determine which plants, if any, will be tagged with Seals. When Seals are placed upon representative plants within a block of plant material, the plant material delivered for installation shall be similar in size, shape and character to the plant material that received Seals. Plant material that is delivered with broken or missing Seals, or that is not similar to the plant material within the block that was tagged with Seals will be rejected.

(d) Rejected Plants. Plant materials which do not meet these requirements will be rejected. Plant material rejected at the nursery or holding area shall not be delivered to the project; if delivered, it shall immediately be removed. Plants shall not be installed until the Plant Material Inspection has been completed and satisfactory identification has been provided.

920.07.03 Plant Material Standards. Plant material shall be grown, identified, graded, and delivered in good condition as specified in this section.

(a) Hardiness Zones and Origin. Trees, shrubs, perennials and ornamental grasses shall be nursery grown within plant hardiness zones 5, 6, or 7 according to the 'USDA Plant Hardiness Zone Map' in the following states, unless specified otherwise: Maryland, Ohio, Pennsylvania, New York, New Jersey, Delaware, Virginia, West Virginia, North Carolina, Tennessee, Kentucky, Georgia. Annuals and bulbs shall be nursery grown.

(b) Names and Identification. Refer to 920.06.01. Plant material shall be clearly and correctly identified by the grower or distributor. Plant materials that are misidentified, or not satisfactorily tagged or labeled, or do not conform to the accepted characteristics of the species or cultivar, will be rejected.

(c) ANSI Standards. Plant material shall conform to 'American Standard for Nursery Stock (ANSI Z60.1) of the American Nursery and Landscape Association. Plant grades shall be those established in ANSI Z60.1, and shall include plants from that size up to but not including the next larger grade size. When specimen plants are specified by the Contract

documents, the specimen requirement shall also be met. Plant material which does not meet the standards of this section shall be rejected.

(d) Health and Sanitation. Plant material shall be dug and transported in conformance ANSI Z60.1. Bare root deciduous plants shall be delivered in a dormant condition. Roots shall be adequately protected and kept moist.

Plant material shall be in good health and be declared and certified free from disease and insects as required by law for transportation, and shall be free from pest-related stress and pest damage.

Plants shall be healthy, free from physical defects and stresses, and have well-developed branches and a vigorous root system. Plants shall not exhibit wilt, shriveling, insufficient root mass, broken or loose root balls, or inadequate protection.

Container grown plants shall be well rooted, vigorous and established in the size pot specified, shall have well balanced tops for their pot size, and shall not be root bound. Plants grown in fields or containers which include Ailanthus, Canada Thistle, Johnsongrass, or Yellow Nutsedge will be rejected.

(e) Shade and Flowering Trees. Shade and flowering trees shall be symmetrically balanced. Major branch unions shall not have 'V' shaped crotches, bark inclusion or unions derived from water sprouts (epicormic growth) capable of causing structural weakness.
Trees shall be free of unhealed branch removal wounds greater than 1 in. diameter, or wounds or scars caused by staking, wire or ties, or any other defect which could cause structural failure or disfigurement.

Shade trees and central leader flowering trees shall have a single main trunk. Trunk height to the lowest branch shall conform to the following:

HEIGHT TO LOWEST BRANCH	
CALIPER in.	**HEIGHT ft**
1-1/2 and 1-3/4	4
2 to 2-1/2	5
3	6

(f) Unacceptable Plants. Plant material that becomes unacceptable after installation shall be rejected as specified in 710.03.18.

920.07.04 American Holly (*Ilex opaca* Aiton*).** Unless other cultivars or ratios are specified in the Contract document, each lot of plants shall include 90 percent female plants and 10 percent male plants of cultivars selected from the following list, unless specified otherwise.

AMERICAN HOLLY CULTIVARS		
FEMALE		**MALE**
Angelica	Miss Helen	David
Arlene Leach	Old Heavy Berry	Jersey Knight
B and O	Patterson	Leather Leaf
Dan Fenton	Satyr Hill	Nelson West
Jersey Princess	Wyetta	North Wind

920.07.05 Plant Storage and Handling. Adequate facilities shall be provided for plant storage. Plants shall be handled with care to avoid damage.

(a) Bulbs. Bulbs shall be stored under appropriate climate control.

(b) Perennials, Ornamental Grasses, Plug Plants and Annuals. Perennials, ornamental grasses, plug plants and annuals shall be kept moist.

(c) Bare Root Plants and Live Stakes. Bare root plants and live stakes shall be kept moist and heeled into moist soil or other suitable material until installed. During transport, the roots shall be covered with canvas, burlap or straw.

(d) Balled and Burlapped and Container Grown Plants. Balled and burlapped plants and container grown plants shall be kept moist and installed within seven days of delivery, or the root balls or containers shall be covered with mulch or straw until removed for installation.

920.08 MARKING AND STAKING MATERIALS.

920.08.01 Outline Stakes. Outline stakes shall be full cut 1.75 x 1.75 in. sound hardwood, 48 in. long, as approved.

920.08.02 Stakes. Stakes for supporting trees shall be rough sawn, straight grain hardwood reasonably free from bark, knot holes, excessive warping, or other imperfections. Stakes shall be full cut 2.0 x 2.0 in. thickness.

920.08.03 Wire. Wire shall be No. 12 and 14 gauge new annealed galvanized wire.

920.08.04 Wire Rope. Wire rope shall be 0.25 in. zinc coated steel wire seven strand as commonly used for guying large trees.

920.08.05 Cable Clamps. Cable clamps shall be zinc galvanized steel.

920.08.06 Hose. Hose shall be 5/8 in. inside diameter corded synthetic rubber hose.

920.08.07 Turnbuckles. Turnbuckles shall be zinc galvanized with 4.5 in. openings and 5/16 in. threaded ends with screw eyes.

920.08.08 Anchors. Tree anchors shall be earth anchors of a type commonly used for anchoring large trees.

920.09 WATER, PESTICIDES, AND ADJUVANTS.

920.09.01 Water. Water used for the installation and establishment of vegetation shall not contain concentrations of substances that are harmful to plant growth. Water derived from public and municipal water systems in Maryland shall be acceptable for irrigation, fertilization, or mixing with pesticides. Water derived from wells or other sources may be used when it has soluble salts concentration less than 500 ppm, sodium less than 50 percent of total salts, and pH 5.0 to pH 7.8.

920.09.02 Seed Carrier. Seed carrier shall be one or more inert, horticultural-grade materials used to improve seed mixing and distribution through a spreader or drill. Seed carriers shall be free flowing, easily mixable with seed, and nontoxic to seed, plants, humans, and wildlife. Seed carrier shall include one or more of the following:

(a) Calcined Clay. Calcined clay shall be a furnace-baked clay product.

(b) Cocoa Shell. Cocoa shell shall be processed cocoa seeds.

(c) Oyster Shell. Oyster shell shall be crushed shells of oyster or other mollusk.

(d) Vermiculite. Vermiculite shall be heat-expanded mineral mica.

(e) Perlite. Perlite shall be heat-expanded mineral perlite.

920.09.03 Pesticides. Pesticides shall be EPA-approved and registered for use in Maryland to control plants, fungi, insects or other pests. Pesticides shall be approved for use, and acceptable application rates established by the Landscape Operations Division as follows:

(a) Herbicide. Herbicide shall control or prevent regrowth of plants or vegetation.

(b) Insecticide. Insecticide shall control or protect against insect or other arthropod pests.

(c) Fungicide. Fungicide shall control or protect against fungal or bacterial pests.

(d) Other Pesticides. Other pesticides shall control or protect against other pests such as deer, beaver, etc.

920.09.04 Marking Dye. Marking dyes shall be used to color spray solutions, be nonphytotoxic, oil or water soluble, and compatible with the pesticide products they are applied with. Marking dye products and application rates shall be approved by the Landscape Operations Division.

920.09.05 Spray Adjuvant and Wetting Agent. Spray adjuvant and wetting agents shall be compatible with the pesticides or other products they are applied with.

920.09.06 Antidesiccant. Antidesiccant and antitranspirant products shall be materials that provide a film over plant surfaces to limit water loss. These products and application rates shall be approved by the Landscape Operations Division.

CITY OF TAKOMA PARK
PROPOSAL FORM

Proposal by _____
Name

_____
Address (Street and/or P.O. Box)

_____
City State Zip

( ) ( )
A.C. Phone No. A.C. Fax No.

to furnish and deliver all materials and to do and perform all work, in conformance with the Standard Specifications, revisions thereto, General Provisions and the Special Provisions in this contract for **The City of Takoma Park**, the work being located in, **Montgomery County**, Maryland, for which Qualifications and Invitation for Bids will be received (2 separate envelopes) until **3:30 pm** on the **12th day of April 2017**, this work being situated as follows:

To the City of Takoma Park
Housing and Community Development Department
7500 Maple Avenue
Takoma Park, Maryland 20912

In response to the advertisement by the Administration, inviting bids for the work in conformance with the Contract Documents, now on file in the office of the Administration. I/We hereby certify that I/we am/are the only person, or persons, interested in this bid proposal as principals, and that an examination has been made of the work site, the Specifications, the Plans, and Invitation for Bids, including the Special Provisions contained herein. I/We propose to furnish all necessary machinery, equipment, tools, labor and other means of construction, and to furnish all materials required to complete the project at the following unit price or lump sum price.

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE DOLLARS	UNIT PRICE CENTS	AMOUNTS DOLLARS	AMOUNTS CENTS
2001 201030	2,100	CUBIC YARDS OF CLASS 1 EXCAVATION	201				
2002 201031	60	CUBIC YARDS OF CLASS 1-A EXCAVATION	201 SP				
2003 202065	680	CUBIC YARDS OF COMMON BORROW	205				
2004 203030	65	CUBIC YARDS OF TEST PIT EXCAVATION	205				
2005 210081	1	EACH OF REMOVE EXISTING MANHOLE	205				

END OF CATEGORY NO. 2

STATE CONTRACT - MO0705125
FEDERAL CONTRACT - FAP NO. TAP-3(481)E

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE DOLLARS	 CENTS	AMOUNTS DOLLARS	 CENTS
3025 374100	1	EACH OF 5 FOOT COG/COS OPENING	305				
3026 374110	1	EACH OF 10 FOOT COG/COS OPENING	305				
3027 380610	1	EACH OF 60” DIA MANHOLE 27”-36” PIPE MIN DEPTH	305				
3028 388063	1	EACH OF PORTABLE SEDIMENT TANK	308				
3029 388066	10	EACH OF INLET PROTECTION	308				