

APPENDIX A

Best Management Practices (BMP) Technical Specifications (GUIDANCE FOR TECHNICAL SPECIFICATIONS)

GUIDANCE FOR BMP TECHNICAL SPECIFICATIONS

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INTRODUCTION

Appendix A presents guidance on technical specifications for the Best Management Practices (BMPs) discussed in the Pollution Control Section of the Engineering Design Guidelines. **The specifications in this Appendix are provided as general guidance and should be adapted to site-specific conditions as needed. This information has been compiled from a number of sources. Careful consideration must be given when adapting this information to specific projects.**

When the technical specification items are used in the format presented in this appendix it is anticipated that construction contracts will typically include GENERAL SOURCE CONTROLS. Additionally, one or more of the other technical specification items will be included to describe the specific BMPs required during construction.

A three-part format has been used to present a general description of the item, to identify the products required for implementation, and to discuss the requirements for execution.

ITEM NO. BMP 100 – DIVERSION DIKES

PART 1 - GENERAL

1.01 Description

This Item describes the installation of erosion and sedimentation control diversion dikes utilized during construction operations and prior to the final stabilization of the site.

1.02 Related Work

Related work as called for on PLANS or specified elsewhere in this or other TECHNICAL SPECIFICATIONS.

PART 2 - PRODUCTS

Provide materials specified in PART 3.

PART 3 - EXECUTION

3.01 General

- A. Provide erosion and sedimentation control systems at the locations shown on PLANS. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on PLANS and set out in this Item.
- B. No clearing and grubbing or rough cutting, other than as specifically directed by the Owner to allow soil testing and surveying, shall be permitted until erosion and sedimentation control systems are in place.
- C. Maintain existing erosion and sedimentation control systems located within the project site installed by others prior to start of construction under this contract until acceptance of the project or until directed by the Owner to remove and discard the existing systems.
- D. Inspect and repair or replace components of all erosion and sedimentation control systems as specified for each type of system. Unless otherwise directed, maintain the erosion and sedimentation control systems until the project is accepted by the owner. Remove erosion and sedimentation control systems promptly when directed by the Owner. Discard removed materials offsite.
- E. Remove and dispose of sediment deposits at the project spoil site. If a project spoil site is not designated on PLANS, dispose of sediment offsite at location not in or adjacent to stream or floodplain. Off-site disposal will be the responsibility of the Contractor. Sediment to be placed at the project site should be spread, compacted and stabilized in accordance with the Owner's directions. Sediment shall not be allowed to flush into stream or drainage way. If sediment has been contaminated, it needs to be disposed of in accordance with existing federal, state and local regulations.

- F. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damages caused by construction traffic to erosion and sedimentation control systems shall be repaired immediately.
- G. Contractor shall employ protective measures described in Item General Source Controls to avoid damage to existing trees to be retained on the project site. Conduct all construction operations under this Contract in conformance with the erosion control practices described in that Item.

3.02 Construction Methods

- A. Install diversion dikes at locations specified on the PLANS in accordance with applicable drawings enclosed.
- B. Unless otherwise indicated, maintain a minimum dike height of 18 inches, measured from existing or graded ground at the upslope toe to the top of the dike.
- C. Flow from dike shall be diverted to sediment basins, stabilized outlets, or sediment trapping devices of the types and at locations shown on PLANS. The grades for dikes shall be as shown on PLANS, or, if not specified, provide positive drainage with maximum grade of 1% to outlet or basin.
- D. Area under dike shall be cleared, grubbed, and stripped of vegetation and root material. All trees, brush, stumps, roots, woody vegetation, oversized stones and rocks, obstructions, organic, and other objectionable material shall be removed and disposed of from compacted soil used as fill material for dikes, including soil obtained from swale construction. Dike side slopes shall be 2:1 or flatter. Compact embankments by mechanically blading, tamping, and rolling soil in maximum lifts of 8-inch layers. Compaction density shall be at a minimum of 90 percent of the Standard Proctor ASTM D 698 density. Make at least one test per 500 cubic yards of embankment.
- E. Inspect dikes at least once every 14 calendar days and within 24 hours of the end of storm event of 0.5 inches or greater; or at a minimum of. The SWP3 may be developed to require that these inspections will occur at least once every seven (7) calendar days. Maintain dikes at the required depth, grade, and cross section as specified on PLANS or in drawings. Remove projections or other irregularities which will impede normal flow.

3.03 Measurement and Payment

Measurement and payment requirements shall be developed as appropriate for each project.

ITEM NO.BMP 101 – DIVERSION DIKES AND SWALES

PART 1 - GENERAL

1.01 Description

This Item describes the installation of erosion and sedimentation control diversion dikes and swales utilized during construction operations and prior to the final development of the site.

1.02 Related Work

Related work as called for on PLANS or specified elsewhere in this or other TECHNICAL SPECIFICATIONS.

PART 2 - PRODUCTS

Provide materials specified in PART 3.

PART 3 - EXECUTION

3.01 General

- A. Provide erosion and sedimentation control systems at the locations shown on PLANS. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on PLANS and set out in this Item.
- B. No clearing and grubbing or rough cutting, other than as specifically directed by the Owner to allow soil testing and surveying, shall be permitted until erosion and sedimentation control systems are in place.
- C. Maintain existing erosion and sedimentation control systems located within the project site installed by others prior to start of construction under this contract until acceptance of the project or until directed by the Owner to remove and discard the existing systems.
- D. Inspect and repair or replace components of all erosion and sedimentation control systems as specified for each type of system. Unless otherwise directed, maintain the erosion and sedimentation control systems until the project is accepted by the owner. Remove erosion and sedimentation control systems promptly when directed by the Owner. Discard removed materials offsite.
- E. Remove and dispose of sediment deposits at the project spoil site. If a project spoil site is not designated on PLANS, dispose of sediment offsite at location not in or adjacent to stream or floodplain. Off-site disposal will be the responsibility of the Contractor. Sediment to be placed at the project site should be spread, compacted and stabilized in accordance with the Owner's directions. Sediment shall not be allowed to flush into stream or drainage way. If sediment has been contaminated, it needs to be disposed of in accordance with existing federal, state and local regulations.

- F. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damages caused by construction traffic to erosion and sedimentation control systems shall be repaired immediately.
- G. Contractor shall employ protective measures described in this Item General Source Controls to avoid damage to existing trees to be retained on the project site. Conduct all construction operations under this Contract in conformance with the erosion control practices described in that Item.

3.02 Construction Methods

- A. Provide diversion dikes and swales at locations specified on the PLANS in accordance with applicable drawings enclosed.
- B. Unless otherwise indicated, maintain a minimum dike height of 18 inches, measured from existing or graded ground at the upslope toe to the top of the dike.
- C. Dike and Swale Stabilization: When indicated on PLANS, stone stabilization shall be placed in a layer a minimum of 3 inches in thickness and embedded into the soil (6 inches if truck crossing is expected). The stone lining shall extend across the bottom and up the both sides of the channel a minimum height of 8 inches vertically, above the bottom. The stone lining on the dike side shall extend up the upslope side of the dike a minimum height of 8 inches, measured vertically from the interface of the existing or graded ground and the upslope toe of the dike, as shown in the Drawing. Coarse aggregate may be used in place of stone.
- D. Flow from swales shall be diverted to sediment basins, stabilized outlets, or sediment trapping devices of the types and at locations shown on PLANS. The grade for dikes and swales shall be as shown on PLANS, or, if not specified, provide positive drainage with maximum grade of 1 percent to outlet or basin.
- E. Area under dike shall be cleared, grubbed, and stripped of vegetation and root material. All trees, brush, stumps, roots, woody vegetation, oversized stones and rocks, obstructions, organic, and other objectionable material shall be removed and disposed of from compacted soil used as fill material for dikes, including soil obtained from swale construction. Dike side slopes shall be 2:1 or flatter. Compact embankments by mechanically blading, tamping, and rolling soil in maximum lifts of
- F. 8-inch layers. Compaction density shall be at a minimum of 90 percent of the Standard Proctor ASTM D 698 density. Make at least one test per 500 cubic yards of embankment.
- G. Excavation for swale construction shall be carried out in such a manner that erosion and water pollution be minimal. The minimum depth and bottom width shall be 1 foot and 4 feet, respectively, with the swale bottom constructed to level. Excavation slopes shall be 2:1 or flatter. Excavation area shall be cleared, grubbed, and stripped of vegetation and root material.

H. Inspect dike and swale at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater; or at a minimum of once every seven (7) calendar days. Maintain dikes and swales at the required depth, grade, and cross section as specified on PLANS or in drawings. Remove projections or other irregularities which will impede normal flow.

3.03 Measurement and Payment

Measurement and payment requirements shall be developed as appropriate for each project.

ITEM NO. BMP 200 – FILTER FABRIC FENCE (SILT FENCE)

PART 1 - GENERAL

1.01 Description

This Item describes the installation of erosion and sedimentation control filter fabric fences utilized during construction and prior to the final development of the site.

1.02 Related Work

Related work as called for on PLANS or specified elsewhere in this or other TECHNICAL SPECIFICATIONS.

1.03 Submittals

Manufacturers' catalog sheets and other pertinent information on geotextile fabric.

PART 2 - PRODUCTS

2.01 Filter Fabric

Provide geotextile filter fabric made of either polypropylene or polyethylene material. Geotextile fabric shall have a grab strength of 90 lbs in any principal direction (ASTM D 4632), and the apparent opening size between 50 and 140 for soils with more than 15 percent by weight passing a No. 200 sieve and between 20 and 50 for soil with less than 15 percent by weight passing a No. 200 sieve; and permittivity of 0.05 sec⁻¹ (ASTM D 4491). Filter fabric material shall contain ultraviolet ray inhibitors and stabilizers to provide an expected usable life comparable to the anticipated construction period. Ultraviolet stability shall exceed 70% after 500 hours of exposure (ASTM D 4355).

PART 3 - EXECUTION

3.01 General

- A. Provide erosion and sedimentation control systems at the locations shown on PLANS. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on PLANS and set out in this Item.
- B. No clearing and grubbing or rough cutting, other than as specifically directed by the Owner to allow soil testing and surveying, shall be permitted until erosion and sedimentation control systems are in place.
- C. Maintain existing erosion and sedimentation control systems located within the project site installed by others prior to start of construction under this contract until acceptance of the project or until directed by the Owner to remove and discard the existing system.
- D. Inspect and repair or replace components of all erosion and sedimentation control systems as specified for each type of system. Unless otherwise directed, maintain the erosion and sedimentation control systems until the project is accepted by the Owner.

Remove erosion and sedimentation control systems promptly when directed by the Owner. Discard removed materials offsite.

- E. Remove and dispose sediment deposits at the project spoil site. If a project spoil site is not designated on PLANS, dispose of sediment offsite at location not in or adjacent to stream or floodplain. Off-site disposal will be the responsibility of the Contractor. Sediment to be placed at the project site should be spread, compacted and stabilized in accordance with the Owner's directions. Sediment shall not be allowed to flush into stream or drainage way. If sediment has been contaminated, it needs to be disposed of in accordance with existing federal, state and local regulations.
- F. Unless otherwise indicated, compact embankments and sides and bottoms of excavations and trenches by mechanically blading, tamping, and rolling soil in a maximum of 8-inch layers. Compaction density shall be at a minimum of 90 percent of the Standard Proctor ASTM D 698 density. Make at least one test per 500 cubic yards of embankment.
- G. When installed in vehicular traffic areas, adjacent to such areas, or where vehicular traffic hazards exist (e.g. parking lots, roadways, etc.) orange filter fabric material (or another high-visibility color) shall be used.
- H. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damages caused by construction traffic to erosion and sedimentation control systems shall be repaired immediately.
- I. Contractor shall employ protective measures described in Item General Source Controls to avoid damage to existing trees to be retained on the project site. Conduct all construction operations under this Contract in conformance with the erosion control practices described in that Item.

3.02 Construction Methods

- A. Provide filter fabric fence systems at locations specified on PLANS in accordance with enclosed drawing. Filter fabric fence systems shall be installed in such a manner that surface runoff will percolate through the system in sheet flow fashion and allow sediment to be retained and accumulated.
- B. Attach the filter fabric to 2-inch by 4-inch heavy duty T-Posts spaced a maximum of 6 feet apart and embedded a minimum of 1 foot. The T-Posts shall be installed at a slight angle toward the source of anticipated runoff.
- C. Trench in the toe of the filter fabric fence with a spade or mechanical trencher so that the downward face of the trench is flat and perpendicular to the direction of flow or for V-trench configuration as shown on the attached drawing. Trench shall be a minimum of 6-inch by 6-inch or 4" deep for V-trench. Lay filter fabric along the edge and bottom of the trench. Backfill and compact material in trench.

- D. The filter fabric should be provided in continuous rolls and cut to the length of the Filter fabric fence to minimize the use of joints. When joints are necessary, the fabric should be spliced together only at a support post with a minimum 6 inch overlap.
- E. Inspect sediment filter barrier systems at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater; or at a minimum of once every seven (7) calendar days. Repair or replace damaged section immediately to restore the requirements of this Item. Remove sediment deposits when sediment reaches one-third of the height of the fence in depth.

3.03 Measurement and Payment

Measurement and payment requirements shall be developed as appropriate for each project.

**ITEM NO.BMP 201 – TRIANGULAR FILTER FABRIC FENCE
(TRIANGULAR FILTER DIKE)**

PART 1 GENERAL

1.01 DESCRIPTION

This Item describes the installation of erosion and sedimentation control triangular filter fabric fences utilized during construction and prior to the final development of the site.

1.02 RELATED WORK

Related work as called for on PLANS or specified elsewhere in this or other TECHNICAL SPECIFICATIONS.

1.03 SUBMITTALS

Manufacturers' catalogue sheets and other pertinent information on geotextile fabric.

PART 2 PRODUCTS

2.01 FILTER FABRIC

Provide geotextile filter fabric made of either polypropylene or polyethylene material. Geotextile fabric shall have a grab strength of 90 lbs in any principal direction (ASTM D 4632), and the apparent opening size. Filter fabric material shall contain ultraviolet ray inhibitors and stabilizers to provide an expected usable life comparable to the anticipated construction period. Ultraviolet stability shall exceed 70% after 500 hours of exposure (ASTM D 4355).

PART 3 EXECUTION

3.01 GENERAL

- A. Provide erosion and sedimentation control systems at the locations shown on PLANS. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on PLANS and set out in this Item.
- B. No clearing and grubbing or rough cutting, other than as specifically directed by the Owner to allow soil testing and surveying, shall be permitted until erosion and sedimentation control systems are in place.
- C. Maintain existing erosion and sedimentation control systems located within the project site installed by others prior to the start of construction under this contract until acceptance of the project or until directed by the Owner to remove and discard the existing system.
- D. Inspect and repair or replace components of all erosion and sedimentation control systems as specified for each type of system. Unless otherwise directed, maintain the erosion and sedimentation control systems until the project is accepted by the Owner.

Remove erosion and sedimentation control systems promptly when directed by the Owner. Discard removed materials offsite.

- E. Remove and dispose sediment deposits at the project spoil site. If a project spoil site is not designated on PLANS, dispose of sediment offsite at location not in or adjacent to stream or floodplain. Off-site disposal will be the responsibility of the Contractor. Sediment to be placed at the project site should be spread, compacted and stabilized in accordance with the Owner's directions. Sediment shall not be allowed to flush into stream or drainage way. If sediment has been contaminated, it needs to be disposed of in accordance with existing federal, state and local regulations.
- F. Unless otherwise indicated, compact embankments and sides and bottoms of excavations and trenches by mechanically blading, tamping, and rolling soil in a maximum of 8-inch layers. Compaction density shall be at a minimum of 90 percent of the Standard Proctor ASTM D 698 density. Make at least one test per 500 cubic yards of embankment.
- G. When installed in vehicular traffic areas, adjacent to such areas, or where vehicular traffic hazards exist (e.g. parking lots, roadways, etc.) orange filter fabric material (or another high-visibility color) should be used.
- H. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damages caused by construction traffic to erosion and sedimentation control systems shall be repaired immediately.
- I. Contractor shall employ protective measures described in Item General Source Controls to avoid damage to existing trees to be retained on the project site. Conduct all construction operations under this Contract in conformance with the erosion control practices described in that Item.

3.02 CONSTRUCTION METHODS

- A. Provide triangular filter fabric fence systems at locations specified on PLANS in accordance with enclosed drawing. Filter fabric fence systems shall be installed in such a manner that surface runoff will percolate through the system in sheet flow fashion and allow sediment to be retained and accumulated.
- B. Attach the filter fabric to fence structure fashioned from 6 gauge, 6-inch by 6-inch wire mesh, 18 inches on each side as shown on attached drawing. The fabric cover and skirt should be continuous wrapping of fabric. The skirt should form a continuous extension of the fabric on the upstream side of the fence.
- C. The triangular fabric filter fence may be secured in place using one of the following methods:
 - 1. The skirt may be toed-in 6 inches with mechanically compacted material;

2. the skirt may be weighted down with a continuous layer of 3-inch to 5-inch graded rock; or
 3. the entire structure may be trenched-in 4 inches.
- D. The triangular fabric filter fence structure and skirt, if provided, should be anchored securely in place using 6-inch wire staples on 2-foot centers on both edges and on the skirt, or staked using 18-inch by 3/8-inch diameter re-bar with tee ends.
 - E. The fabric filter material should be lapped over 6 inches to cover the segment joints. The joints should be fastened with galvanized shoat rings.
 - F. Inspect sediment filter barrier systems at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater; or at a minimum of once every seven (7) calendar days. Repair or replace damaged section immediately to restore the requirements of this Item. Remove sediment deposits when sediment reaches one-third of the height of the fence in depth.

3.03 MEASUREMENT AND PAYMENT

Measurement and payment requirements shall be developed as appropriate for each project.

ITEM NO. BMP 202 – HYDRO-MULCH SEEDING

PART 1 - GENERAL

1.01 Description

- A. Scope: The work covered by this Item consists of furnishing all plant, labor, materials, equipment, supplies, supervision and tools, and performing all work necessary for topsoiling, smoothing, seeding, fertilizing, watering, maintenance, and cleanup of all areas disturbed during construction, all in accordance with the drawings and TECHNICAL SPECIFICATIONS.

- B. General: The hydro-mulch seeding operations, together with all other necessary related work, to conform to the requirements specified in this Item. The area to be hydro-mulch seeded to be noted on PLANS.

PART 2 - PRODUCTS

2.01 Materials

- A. Seed: All seed must meet the requirements of U.S. Department of Agriculture Rules and Regulations as set forth in Federal Seed Act and Texas Seed Law. Use seed which has been treated with an approved fungicide. Container labels should show locality and date of harvest, percent purity, percent germination, name and type of seed, and sources of origin. Type of seed, purity and germination requirements, rate of application, and planting dates are as follows:

| SEED | RATE OF APPLICATION IN POUNDS PER ACRE (PURE LIVE SEED) | PLANTING DATE |
|------------------------|------------------------------------------------------------------|------------------------|
| TYPE 'A' | | |
| Winter Grass | 3 lbs | October to February |
| Unhulled Bermuda Grass | 1 lbs | |
| TYPE 'B' | | |
| Hulled Bermuda Grass | 1 | March to September |
| | | |

- B. Fertilizer: Fertilizer to be water soluble with analysis containing nitrogen (N), phosphate (P), and potash (K). At least 50% of the nitrogen component must be of a slow-release formulation such as urea-based and plastic resin-coated fertilizers. Ensure that fertilizer is in an acceptable condition for distribution in containers

labeled with the analysis. Rate of application to be 100 pounds of nitrogen per acre or at the analysis and rate specified on the plans.

C. Mulch: Provide commercial quality mulch materials composed of straw or hay or cellulose fiber. Rate of application to be 2,000 pounds per acre or as specified on the plans or apply at a rate recommended by the manufacturer. Other soil binder compounds may be applied at the direction of the Owner.

PART 3 - EXECUTION

3.01 General

- A. Provide erosion and sedimentation control systems at the locations shown on PLANS. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on PLANS and set out in this Item.
- B. No clearing and grubbing or rough cutting, other than as specifically directed by the Owner to allow soil testing and surveying, shall be permitted until erosion and sedimentation control systems are in place.
- C. Maintain existing erosion and sedimentation control systems located within the project site installed by others prior to start of construction under this contract until acceptance of the project or until directed by the Owner to remove and discard the existing systems.
- D. Inspect and repair or replace components of all erosion and sedimentation control systems as specified for each type of system. Unless otherwise directed, maintain the erosion and sedimentation control systems until the project is accepted by the Owner. Remove erosion and sedimentation control systems promptly when directed by the Owner. Discard removed materials offsite.
- E. Remove and dispose of sediment deposits at the project spoil site. If a project spoil site is not designated on PLANS, dispose of sediment offsite at location not in or adjacent to stream or floodplain. Off-site disposal will be the responsibility of the Contractor. Sediment to be placed at the project site should be spread, compacted and stabilized in accordance with the Owner's directions. Sediment shall not be allowed to flush into stream or drainage way. If sediment has been contaminated, it needs to be disposed of in accordance with existing federal, state and local regulations.
- F. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damages caused by construction traffic to erosion and sedimentation control systems shall be repaired immediately.
- G. Contractor shall employ protective measures described in Item General Source Controls to avoid damage to existing trees to be retained on the project site. Conduct

all construction operations under this Contract in conformance with the erosion control practices described in that Item.

3.02 Construction Methods

A. After areas to receive hydro-mulch seeding have been completed to lines, grades, and sections shown on PLANS, apply seed, fertilizer and mulch at uniform average rates indicated in Paragraph 2.01 Materials.

3.03 Maintenance

A. The hydro-mulch seeding to be adequately watered until established. Any areas damaged by erosion or areas that do not have an acceptable turfing to be reseeded. An acceptable turfing area is when at least 90 percent of the seeded area is established. Inspect seeded area at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater; or at a minimum of once every seven (7) calendar days. Repair or replace damaged section.

3.04 Measurement and Payment

Measurement and payment requirements shall be developed as appropriate for each project.

ITEM NO. BMP 203 – TEMPORARY EROSION CONTROL SEEDING

PART 1 - GENERAL

1.01 Description

Scope: Seeding of vegetated filter strip within a project construction site. Work area covered by this Item should be indicated on PLANS. Temporary seeding intended to germinate and establish within 10-14 days. The species used in this seeding are not permanent, so should be integrated with a permanent seeding or planting. When shown on PLANS, provide soil retention protection such as loose hay mulch or erosion control/soil retention fabric blanket.

1.02 Related Work

Permanent Grass Matrix and Forb/Wildflower Seeding ; and Planting and Planting/Seeding Maintenance as described in the plans or specified by design.

PART 2 - PRODUCTS

2.01 Materials

A. Seeds: Conform to requirements of U.S. Department of Agriculture Rules and Regulations as set forth in Federal Seed Act and Texas Seed Law. Use seed which has been treated with an approved fungicide. Container labels to show purity, germination, name and type of seed, and source of origin. Planting date, type, and rate of application as follows:

| Type | Rate of Application in Pounds per Acre | Planting Date |
|--------------------------------------------------------|-------------------------------------------|------------------|
| Unhulled Bermuda Grass/oats/winter rye | 20 | Jan. 1 to Apr. 1 |
| Hulled Bermuda Grass/lovegrass | 12 | Apr. 1 to Oct. 1 |
| Mix Bermuda and Annual Rye in Following Proportions | 12:200 | Oct. 1 to Jan. 1 |
| Annual Millet Grass | 35-40 | Apr. 1 to Nov.1 |
| | | |

B. Fertilizer: Use pellet or granular fertilizer with analysis of 16 percent nitrogen, 20 percent phosphoric acid, and zero percent potash (or 10-10-5), unless otherwise required as determined by soil analysis. Determine percent by methods of Association of Official Agricultural Chemists. Container labels to show analysis. Powdered or caked fertilizer not permitted.

C. Hay Mulch: Use loose hay of oat or rice stems, native prairie grass hay, Bermuda grass, or other approved straw. Do not use mulch containing Johnson grass or other noxious weeds and foreign materials.

- D. Erosion Control Soil Retention Fabric: Use a biodegradable hay and cotton twine based blanket or approved substitute.

PART 3 - EXECUTION

3.01 Construction Methods

A. General

Fertilizing and Seeding: After the vegetated strip areas are finely graded and completed to lines, grades, and sections shown on PLANS, apply fertilizer at uniform average rate of 500 pounds per acre or as required based on soil analysis. Thoroughly mix upper 4 inches of topsoil with fertilizer until a uniform mixture of fertilizer and topsoil is obtained. Sprinkle areas to be seeded with water, using fine spray to avoid washing or erosion of soil. Broadcast seed with sowing equipment or hand cast at rate specified above, using care to obtain uniform distribution. After broadcasting, lightly rake seeds into soil to a depth not to exceed 1/2 inch. Complete seeding by rolling with roller developing 15 to 25 pounds per inch of tread. Keep seeded areas moist for a period of 10 to 14 days immediately following placement. When watering seeded areas, use fine spray to prevent erosion of seeds or soil. Reseed any areas damaged by erosion. Do not apply seeds when weather is too windy, hot or drying, or other adverse conditions exist.

B. Hay Mulch or Soil Retention Blanket

1. Mulch Application: Immediately upon completion of planting of seed and fertilizing, spray or hand spread hay mulch uniformly over the area at the rate of 200 pounds of hay or hay mulch per acre. When watering seeded areas, use fine spray to prevent erosion of seeds or soil. Reseed any areas damaged by erosion for any reason. Mulching operation to follow seeding and fertilizing immediately in continuous operation. Care must be taken not to drive mulching equipment on seeded/planted areas.
2. Soil Retention Blanket: Roll blanket over newly prepared and seeded area. Attach as per manufacturers' instructions.

3.02 Maintenance

- A. The seeding must be adequately watered until established. Any areas damaged by erosion or areas that do not have an acceptable turfing to be reseeded. An acceptable turfing area is when at least 70 percent of the seeded area is established.
- B. Inspect seeded area at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater; or at a minimum of once every seven (7) calendar days. Repair or replace damaged section immediately to restore requirements of this Item.

3.03 Measurement and Payment

Measurement and payment requirements shall be developed as appropriate for each project.

ITEM NO. BMP 300 – STONE OUTLET SEDIMENT TRAP (SEDIMENT TRAP)

PART 1 - GENERAL

1.01 Description

This Item describes the installation of erosion and sedimentation control stone outlet sediment traps utilized during construction and prior to the final development of the site.

1.02 Related Work

Related work as called for on PLANS or specified elsewhere in this or other TECHNICAL SPECIFICATIONS.

1.03 Submittals

Manufacturer's catalogue sheets and other pertinent information on filter fabrics showing that they meet or exceed requirements of this Item.

PART 2 - PRODUCTS

2.01 Geotextile Fabric Wrap

Provide geotextile filter fabric made of either polypropylene or polyethylene material. Geotextile fabric shall have a grab strength exceeding 270 psi (ASTM D 4632) and apparent opening size. Filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0°F to 120°F. Both the geotextile and threads shall be resistant to chemical attack, mildew and rot.

2.02 Rock and Stone

Use open-graded rock with most of the fines removed. Rock shall be a minimum of 3 inches in diameter and less than 1/2 cubic foot in volume, unless otherwise specified on PLANS and drawings in this Item. Use only clean, hard rocks free from adherent coatings, salt, alkali, dirt, clay, loam, shale, soft or flaky materials, or organic and injurious matter.

PART 3 - EXECUTION

3.01 General

- A. Provide erosion and sedimentation control systems at the locations shown on PLANS. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on PLANS and set out in this Item.
- B. No clearing and grubbing or rough cutting, other than as specifically directed by the Owner to allow soil testing and surveying, shall be permitted until erosion and sedimentation control systems are in place.
- C. Maintain existing erosion and sedimentation control systems located within the project site installed by others prior to start of construction under this contract until

acceptance of the project or until directed by the Owner to remove and discard the existing system.

- D. Inspect and repair or replace components of all erosion and sedimentation control systems as specified for each type of system. Unless otherwise directed, maintain the erosion and sedimentation control systems until the project is accepted by the Owner. Remove erosion and sedimentation control systems promptly when directed by the Owner. Discard removed materials offsite.
- E. Remove and dispose sediment deposits at the project spoil site. If a project spoil site is not designated on PLANS, dispose of sediment offsite at location not in or adjacent to stream or floodplain. Off-site disposal will be the responsibility of the Contractor. Sediment to be placed at the project site should be spread, compacted and stabilized in accordance with the Owner's directions. Sediment shall not be allowed to flush into stream or drainage way. If sediment has been contaminated, it needs to be disposed of in accordance with existing federal, state and local regulations.
- F. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damages caused by construction traffic to erosion and sedimentation control system shall be repaired immediately.
- G. Contractor shall employ protective measures described in Item General Source Controls to avoid damage to existing trees to be retained on the project site. Conduct all construction operation under this Contract in conformance with the erosion control practices described in that Item.

3.02 Construction Methods

- A. Install rock outlet sediment traps at locations specified on PLANS in accordance with enclosed drawing.
- B. Fill material for embankment shall be free of roots, woody vegetation, oversized stones or rocks, or organic or other objectionable matter. Area under embankment shall be cleared, grubbed, and stripped of vegetation and root mat.
- C. Limit of excavation and outlet length and height shall be as specified on PLANS. The side slopes shall be 2:1 or flatter.
- D. Maintain a minimum of 6 inches between top of core material and top of Stone Outlet, a minimum of 4 inches between bottom of core material and existing ground, and a minimum of 1 foot between top of stone outlet and top of embankment.
- E. Rock shall be embedded a minimum of 4 inches into existing ground.
- F. Core shall be a minimum of 1 foot in height and in width and shall be wrapped in a triple layer of geotextile fabric.

- G. Inspect rock outlet sediment traps and outlets at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater; or a minimum of once every seven (7) calendar days. Repair or replace damaged trap components to restore the requirements of this Item. Redress and replace stone as needed to replenish depleted stone. Remove sediment deposit and restore traps to original dimensions when the sediment has accumulated to one-half the design depth of the trap or one foot, whichever is less.

3.03 Measurement and Payment

Measurement and payment requirements shall be developed as appropriate for each project.

ITEM NO. BMP 301 – SEDIMENT BASIN WITH STONE OUTLET

PART 1 GENERAL

1.01 DESCRIPTION

This Item describes the installation of sediment basins with stone outlets utilized during construction and prior to the final development of the site.

1.02 RELATED WORK

Related work as called for on PLANS or specified elsewhere in this or other TECHNICAL SPECIFICATIONS.

1.03 SUBMITTALS

Manufacturers' catalogue sheets and other pertinent information on filter fabrics showing that they meet or exceed requirements of this item.

PART 2 PRODUCTS

2.01 GEOTEXTILE FABRIC WRAP

Provide geotextile filter fabric made of either polypropylene or polyethylene material. Geotextile shall have a grab strength exceeding 270 psi (ASTM D 6832) and apparent opening size. Both the geotextile and threads shall be resistant to chemical attack, mildew and rot.

2.02 ROCK AND STONE

Use open-graded rock with most of the fines removed. Rock shall be a minimum of 3 inches in diameter and less than 1/2 cubic foot in volume, unless otherwise specified on PLANS and drawings with this item. Use only clean, hard rocks free from adherent coatings, salt, alkalis, dirt, clay, loam, shale, soft or flaky materials, or organic and injurious matter. Crushed concrete in the size range specified be used for this purpose.

PART 3 EXECUTION

3.01 GENERAL

- A. Provide erosion and sedimentation control systems at the locations shown on PLANS. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on PLANS and set out in this Item.
- B. No clearing and grubbing or rough cutting, other than as specifically directed by the Owner to allow soil testing and surveying, shall be permitted until erosion and sedimentation control systems are in place.
- C. Maintain existing erosion and sedimentation control systems located within the project site installed by others prior to start of construction under this contract until acceptance of the project or until directed by the Owner to remove and discard the existing systems.

- D. Inspect and repair or replace components of all erosion and sedimentation control systems as specified for each type of system. Unless otherwise directed, maintain the erosion and sedimentation control systems until the project is accepted by the Owner. Remove erosion and sedimentation control systems promptly when directed by the Owner. Discard removed materials offsite.
- E. Remove and dispose sediment deposits at the project spoil site. If a project spoil site is not designated on PLANS, dispose of sediment offsite at a location not in or adjacent to stream or floodplain. Off-site disposal will be the responsibility of the Contractor. Sediment to be placed at the project site should be spread, compacted and stabilized in accordance with the Owner's directions. Sediment shall not be allowed to flush into stream or drainage way. If sediment has been contaminated, it needs to be disposed of in accordance with existing federal, state and local regulations.
- F. Unless otherwise indicated, compact embankments and sides and bottoms of excavations and trenches by mechanically blading, tamping, and rolling soil in a maximum of 8-inch layers. Compaction density shall be at a minimum of 90 percent of the Standard Proctor ASTM D 698 density. Make at least one test per 500 cubic yards of embankment.
- G. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damages caused by construction traffic to erosion and sedimentation control systems shall be repaired immediately.
- H. Contractor shall employ protective measures described in Item General Source Controls to avoid damage to existing trees to be retained on the project site. Conduct all construction operation under this Contract in conformance with the erosion control practices described in this Item.

3.02 CONSTRUCTION METHODS

- A. Provide sediment basins at locations specified on PLANS. Sediment basin shall be constructed in accordance with construction drawings shown on PLANS.
- B. Installation of sediment basins shall not be started until permits from governmental agencies, where required, have been obtained.
- C. Install stone outlet for sediment basin at location specified on PLANS and in accordance with enclosed drawing.
- D. Inspect sediment basin at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater; or at a minimum of once every seven (7) calendar days. Maintain basin dimensions necessary to obtain the required basin volume as shown on PLANS. Repair and replace damaged components of the basin.

E. Remove sediment deposits when design basin volume is reduced by one-third or sediment level is one foot below the principal spillway crest, whichever is less.

3.03 MEASUREMENT AND PAYMENT

Measurement and payment requirements shall be developed as appropriate for each project.

ITEM NO. BMP 400 – SODDING

PART 1 - GENERAL

1.01 Description

- A. Scope: Furnish plants, materials, labor, equipment and appliances, and perform all operations in connection with the planting of sod within the areas designated on the PLANS for the purpose of surface stabilization, channel stabilization and/or vegetation buffer strips.
- B. Related work as called for on PLANS as specified elsewhere in this or other TECHNICAL SPECIFICATIONS.

1.02 Quality Assurance

Related work as called for on PLANS as specified elsewhere in this or other TECHNICAL SPECIFICATIONS.

PART 2 - PRODUCTS

2.01 Materials

- A. Sod: Certified grade cultivated turf sod; with strong, fibrous root system; free from stones and burned or bare spots.
- B. Topsoil: Fertile, agricultural soil typical of locality and capable of sustaining vigorous plant growth; from well drained site that is free of flooding; free from admixture of subsoil, slag or clay, stones, lumps, live plants and their roots, sticks and other extraneous matter; pH value of minimum 5.4 and maximum 7.0. Use topsoil excavated from site only if conforming to specified requirements.
- C. Fertilizer: Commercial type conforming to FS 0-F-241, Type 1, Grade A recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil as indicated in analysis.
- D. Wooden Pegs: Of sufficient size and length to ensure satisfactory anchorage of sod on slope in excess of 2:1.
- E. Roll Lite Erosion Control Mulching Fabric as manufactured by Gulf States Paper Corporation or equal.
- F. Water: Clean, fresh, and free of substances or matter which would inhibit vigorous growth of grass.

PART 3 - EXECUTION

3.01 General

- A. Provide erosion and sedimentation control systems at the locations shown on PLANS. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on PLANS and set out in this Item.
- B. Inspect and repair or replace components of all erosion and sedimentation control systems as specified for each type of system. Unless otherwise directed, maintain the erosion and sedimentation control systems until the project is accepted by the Owner.
- C. Remove and dispose of sediment deposits at the project spoil site. If a project spoil site is not designated on PLANS, dispose of sediment offsite at location not in or adjacent to stream or floodplain. Sediment to be placed at the project site should be spread, compacted and stabilized in accordance with the Owner's directions. Sediment shall not be allowed to flush into stream or drainage way.
- D. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damages caused by construction traffic to erosion and sedimentation control systems shall be repaired immediately.
- E. Contractor shall employ protective measures described in Item General Source Controls to avoid damage to existing trees to be retained on the project site. Conduct all construction operations under this Contract in conformance with the erosion control practices described in that Item.

3.02 Preparation of Subgrade

- A. Fine grade subgrade, eliminating uneven areas and low spots. Maintain lines, levels, profiles, and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Remove foreign materials, undesirable plants and their roots, stones, and debris. Do not bury foreign material beneath areas to be sodded. Remove and replace subsoil which has been contaminated with petroleum products.
- C. Cultivate subsoil to a depth of 3 inches where topsoil is to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

3.03 Placing Topsoil

- A. Spread topsoil to a depth of minimum 2 inches over entire area to be sodded.
- B. Place topsoil during dry weather and on dry unfrozen subgrade.
- C. Grade to eliminate rough and low areas, ensuring positive drainage. Maintain levels, profiles, and contours of subgrade.

- D. Remove stones, roots, grass, weeds, debris, and other foreign nonorganic material while spreading.

3.04 Fertilizing

- A. Apply fertilizer at rate recommended by manufacturer. Apply after fine grading and prior to compaction. Mix thoroughly into upper 2 inches of topsoil.
- B. Lightly water to aid the breakdown of fertilizer.
- C. Apply fertilizer within 48 hours before laying sod.

3.05 Laying Sod

- A. Lay sod as soon as possible after delivery to prevent deterioration.
- B. Full Sodding: Lay sod closely knit together with no open joints visible, and pieces not overlapped. Stagger sod units to avoid continuous seams. Lay smooth and flush with adjoining grass areas, paving, and top surfaces of curbs.
- C. Strip Sodding: Lay sod in the following patters: 3-inch continuous sod strip, 12-inch topsoil, 3-inch continuous sod strip. See dirt areas between sod strips.
- D. On slopes 2:1 and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum 2 feet on center. Drive pegs flush with soil portion of sod.
- E. Prior to placing sod, on slopes 3:1 or where indicated, place Hold/Gro or Roll/Lite or equal over topsoil. Securely anchor in place with posts sunk firmly into the ground at maximum 16 feet on center along pitch of slope and equal to width of wire mesh horizontally across slopes.
- F. Immediately water sodded areas after installation. Water in sufficient amounts to saturate sod and upper 4 inches of soil.
- G. After sod and soil has dried sufficiently to prevent damage, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities. Ensure rolling equipment weight not over 250 pounds or less than
- H. 150 pounds.

3.06 Maintenance

- A. Begin maintenance of plant materials immediately after planting and continue maintenance until issuance of Certificate of Acceptance of project.
- B. Maintenance to include measures necessary to establish and maintain plants in a vigorous and healthy growing condition, including the following:
 - 1. When herbicides are used for weed control, apply in accordance with manufacturer's
 - 2. instructions. Remedy damage resulting from use of herbicides.

3. Watering sufficient to saturate root system.
4. Disease and insect control.

3.07 Measurement and Payment

Measurement and payment requirements shall be developed as appropriate for each project.

ITEM NO. BMP 500 – INLET PROTECTION BARRIERS

PART 1 - GENERAL

1.01 Description

This Item describes the installation of erosion and sedimentation control inlet protection barriers utilized during construction and prior to the final development of the site.

1.02 Related Work

Related work as called for on PLANS or specified elsewhere in this or other TECHNICAL SPECIFICATIONS.

1.03 Submittals

Manufacturers' catalog sheets and other pertinent information on filter fabrics showing that they meet or exceed requirements of this Item.

PART 2 - PRODUCTS

2.01 Reinforced Filter Fabric Fence

For filter fabric inlet protection barriers, products shall comply as specified on plans.

2.02 Bagged Gravel Barrier

For bagged gravel barriers, products shall comply as specified on plans.

PART 3 - EXECUTION

3.01 General

- A. Provide erosion and sedimentation control systems at the locations shown on PLANS. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on PLANS and set out in this Item.
- B. No clearing and grubbing or rough cutting, other than as specifically directed by the Owner to allow soil testing and surveying, shall be permitted until erosion and sedimentation control systems are in place.
- C. Maintain existing erosion and sedimentation control systems located within the project site installed by others prior to start of construction under this contract until acceptance of the project or until directed by the Owner to remove and discard the existing system.
- D. Inspect and repair or replace components of all erosion and sedimentation control systems as specified for each type of system. Unless otherwise directed, maintain the erosion and sedimentation control systems until the project is accepted by the Owner. Remove erosion and sedimentation control systems promptly when directed by the Owner. Discard removed materials offsite.

- E. Remove and dispose sediment deposits at the project spoil site. If a project spoil site is not designated on PLANS, dispose of sediment offsite at location not in or adjacent to stream or floodplain. Off-site disposal will be the responsibility of the Contractor. Sediment to be placed at the project site should be spread, compacted and stabilized in accordance with the Owner's directions. Sediment shall not be allowed to flush into stream or drainage way. If sediment has been contaminated, it shall be disposed of in accordance with existing federal, state, and local regulations.
- F. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damages caused by construction traffic to erosion and sedimentation control system shall be repaired immediately.
- G. Contractor shall employ protective measures described in Item General Source Controls to avoid damage to existing trees to be retained on the project site. Conduct all construction operation under this Contract in conformance with the erosion control practices described in that Item.

3.02 Construction Methods

- A. Install inlet protection barriers of the type specified on PLANS in accordance with enclosed drawings and in accordance with the following TECHNICAL SPECIFICATIONS, as applicable. Other options may be used with approval of agency with jurisdiction.
- B. Inspect inlet protection barriers at least once every 14 calendar days and within 24 hours at the end of a storm event of 0.5 inches or greater; or at a minimum of once every seven (7) calendar days. Repair or replace damaged barrier components to restore the requirements of this Item. Remove sediment deposit when the sediment has accumulated to one-half the height of the barrier.

3.03 Measurement and Payment

Measurement and payment requirements shall be developed as appropriate for each project.

ITEM NO. BMP 501 – STORM INLET SEDIMENT TRAPS

PART 1 - GENERAL

1.01 Description

This Item describes the installation of erosion and sedimentation control storm inlet sediment traps utilized during construction and prior to the final development of the site.

1.02 Related Work

Related work as called for on PLANS or specified elsewhere in this or other TECHNICAL SPECIFICATIONS.

PART 2 - PRODUCTS

Provide materials as specified in PART 3.

PART 3 - EXECUTION

3.01 General

- A. Provide erosion and sedimentation control systems at the locations shown on PLANS. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on PLANS and set out in this Item.
- B. No clearing and grubbing or rough cutting, other than as specifically directed by the Owner to allow soil testing and surveying, shall be permitted until erosion and sedimentation control systems are in place.
- C. Maintain existing erosion and sedimentation control systems located within the project site installed by others prior to start of construction under this contract until acceptance of the project or until directed by the Owner to remove and discard the existing system.
- D. Inspect and repair or replace components of all erosion and sedimentation control systems as specified for each type of system. Unless otherwise directed, maintain the erosion and sedimentation control systems until the project is accepted by the Owner. Remove erosion and sedimentation control systems promptly when directed by the Owner. Discard removed materials offsite.
- E. Remove and dispose sediment deposits at the project spoil site. If a project spoil site is not designated on PLANS, dispose of sediment offsite at location not in or adjacent to stream or floodplain. Off-site disposal will be the responsibility of the Contractor. Sediment to be placed at the project site should be spread, compacted and stabilized in accordance with the Owners directions. Sediment shall not be allowed to flush into stream or drainage way. If sediment has been contaminated, it needs to be disposed of in accordance with existing federal, state and local regulations.

- F. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damages caused by construction traffic to erosion and sedimentation control system shall be repaired immediately.
- G. Contractor shall employ protective measures described in Item General Source Controls to avoid damage to existing trees to be retained on the project site. Conduct all construction operation under this Contract in conformance with the erosion control practices described in that Item.

3.02 Construction Methods

- H. Excavate storm inlet sediment traps at locations specified on PLANS in accordance with enclosed drawing.
- I. Limit of excavation and outlet length and height shall be as specified on PLANS. The side slopes shall be 2:1 or flatter.
- J. Inspect rock inlet sediment traps and inlets at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater; or at a minimum of once every seven (7) calendar days. Repair or replace damaged trap components to restore the requirements of this Item. Redress and replace stone as needed to replenish depleted stone. Remove sediment deposit and restore traps to original dimensions when the sediment has accumulated to one-half the design depth of the trap or one foot, whichever is less.

3.03 Measurement and Payment

Measurement and payment requirements shall be developed as appropriate for each project.

ITEM NO. BMP 600 - STABILIZED CONSTRUCTION ENTRANCE

PART 1 - GENERAL

1.01 Description

This Item describes the installation of erosion and sedimentation control stabilized construction exits utilized during construction and prior to the final development of the site.

1.02 Related Work

Related work as called for on PLANS or specified elsewhere in this or other TECHNICAL SPECIFICATIONS.

1.03 Submittals

- A. Manufacturers' catalog sheets and other pertinent information on geotextile fabric.
- B. Sieve analysis of aggregates conforming to requirements of this Item.

PART 2 - PRODUCTS

2.01 Geotextile Fabric

Provide geotextile fabric made of either polypropylene or polyethylene material. Geotextile fabric shall have minimum grab strength of 270 psi in any principal direction (ASTM D 4632) and the apparent opening size. The geotextile shall be resistant to chemical attack, mildew and rot.

2.02 Coarse Aggregates

- A. Coarse aggregates shall consist of crushed stone, gravel, or combinations thereof. Particles shall compose of clean, hard, durable materials free from adherent coatings, salt, alkali, dirt, clay, loam, shale, soft or flaky materials, or organic and injurious matter. Coarse aggregates to consist of open graded rock 4" to 8" in size.

2.03 Materials for Alternative Construction Methods

Use materials specified in PART 3 - 3.02.J.

PART 3 - EXECUTION

3.01 General

- A. Provide erosion and sedimentation control systems at the locations shown on PLANS. Such systems shall be of the type indicated and shall be constructed in accordance with the requirements shown on PLANS and set out in this Item.
- B. No clearing and grubbing or rough cutting, other than as specifically directed by the Owner to allow soil testing and surveying, shall be permitted until erosion and sedimentation control systems are in place.

- C. Maintain existing erosion and sedimentation control systems located within the project site installed by others prior to start of construction under this contract until acceptance of the project or until directed by the Owner to remove and discard the existing system.
- D. Inspect and repair or replace components of all erosion and sedimentation control systems as specified for each type of system. Unless otherwise directed, maintain the erosion and sedimentation control systems until the project is accepted by the Owner. Remove erosion and sedimentation control systems promptly when directed by the Owner. Discard removed materials offsite.
- E. Remove and dispose sediment deposits at the project spoil site. If a project spoil site is not designated on PLANS, dispose of sediment offsite at location not in or adjacent to stream or floodplain. Off-site disposal will be the responsibility of the Contractor. Sediment to be placed at the project site should be spread, compacted and stabilized in accordance with the Owner's directions. Sediment shall not be allowed to flush into stream or drainage way. If sediment has been contaminated, it needs to be disposed of in accordance with existing federal, state and local regulations.
- F. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of rights-of-way and easements for construction. Damages caused by construction traffic to erosion and sedimentation control systems shall be repaired immediately.
- G. Contractor shall employ protective measures described in Item General Source Controls to avoid damage to existing trees to be retained on the project site. Conduct all construction operation under this Contract in conformance with the erosion control practices described in that Item.

3.02 Construction Methods

- A. Provide stabilized access roads, subdivision roads, parking areas, and other on-site vehicle transportation routes when shown on PLANS.
- B. Provide stabilized construction exits, and truck washing areas when approved by owner, of the sizes and locations shown on PLANS. Construction traffic shall not be allowed to leave construction site and move directly onto public roadway, alley, sidewalk, parking area, or other right-of-way in areas other than at locations of stabilized construction exits.
- C. Vehicles leaving construction areas shall have their tires cleaned to remove sediment prior to entrance onto public right-of-way. When washing is needed to remove sediment, Contractor shall construct a truck washing area. Truck washing shall be done on stabilized areas which drain into sediment traps.
- D. Detail for stabilized construction exit is shown in Drawing attached at the end of this Item. Use the same specifications for construction of all other stabilized areas.

Roadway width shall be at least 14 feet for one-way traffic and 20 feet for two-way traffic and shall be sufficient for all ingress and egress. Furnish and place geotextile fabric as a permeable separator to prevent mixing of coarse aggregate with underlying soil. Exposure of geotextile fabric to the elements between laydown and cover shall be a maximum of fourteen days to minimize damage potential.

- E. Roads and parking areas shall be graded to provide sufficient drainage away from stabilized areas. Use sand bags, gravel, boards, or similar methods to prevent sediment from entering public right-of-way, storm drain, ditch, and watercourse.
- F. The stabilized areas shall be inspected and maintained daily. Provide periodic top dressing with additional coarse aggregates to maintain the required depth. Repair and cleanout damaged measures used to trap sediment. All sediment spilled, dropped, washed, or tracked onto public right-of-way shall be removed immediately.
- G. The length of the stabilized area shall be as shown on PLANS, but not less than 50 feet. The thickness shall not be less than 8 inches. The width shall not be less than full width of all points of ingress or egress.
- H. Stabilization for other areas shall have the same course aggregate, thickness, and width requirements as the stabilized construction exit, except where shown otherwise on PLANS.
- I. Stabilized area may be widened or lengthened to accommodate truck washing area when authorized by Owner. Outlet Sediment Trap must be provided for truck washing area.
- J. Alternative methods of construction may be utilized when shown on PLANS, indicated on a special provision to this Item, or when approved by the Owner. These methods include the following.
 - 1. Cement Stabilized Soil - Compacted, cement stabilized soil, limestone aggregate or other fill material in an application thickness of at least 8 inches.
 - 2. Wood Mats/Mud Mats - Oak or other hardwood timbers placed edge to edge and across support wooden beams which are placed on top of existing soil in an application thickness of at least 6 inches.
 - 3. Steel Mats - Perforated mats placed across perpendicular support members.

3.0 Measurement and Payment

Measurement and payment requirements shall be developed as appropriate for each project.

ITEM NO. BMP 601 - STREET CLEANING

PART 1 GENERAL

1.01 DESCRIPTION

- A. This Item describes the street cleaning needed to remove sediment tracked from the construction site onto private or public roadways.
- B. Street cleaning is to be used in conjunction with stabilized access road and parking areas when the construction site will disturb more than one acre at any one time or as directed by the Owner.

1.02 RELATED WORK

Related work as called for on PLANS or specified elsewhere in this or other TECHNICAL SPECIFICATIONS.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Remove and dispose sediment deposits at the project spoil site. If a project spoil site is not designated on PLANS, dispose of sediment offsite at location not in or adjacent to stream or floodplain. Off-site disposal will be the responsibility of the Contractor. Sediment to be placed at the project site should be spread, compacted and stabilized in accordance with the Owner's directions. Sediment shall not be allowed to flush into stream or drainage way. If sediment has been contaminated, it needs to be disposed of in accordance with existing federal, state and local regulations.
- B. Contractor shall prohibit equipment and vehicles from maneuvering on areas outside of dedicated rights-of-way and easements for construction.
- C. Contractor shall employ other erosion and sediment control measures as determined by the erosion and sediment control inspector to minimize the amount of sediments tracking onto roadway. Conduct all construction operations under this Contract in conformance with the erosion control practices described in that Item. The Inspector's SWP3 inspection report shall include a certified report on erosion and sediment control measures required and/or used in conjunction with street cleaning.
- D. Contractor shall employ protective measures described in Item General Source Controls to avoid damage to existing trees to be retained on the project site.

3.02 CONSTRUCTION METHODS

- A. Provide street cleaning, such as sweeping or vacuuming, at locations around the project site where construction traffic has caused tracking of sediments onto roadways. Washing or flushing of sediments into adjacent drainage systems is prohibited.
- B. Mechanical sweepers shall be vacuum-type or regenerative sweepers. Sweeping speed not to exceed 6 mph. Two passes shall be made.
- C. Street must be cleaned daily before the end of the workday. If in the opinion of the Owner, excess sediments have tracked onto the streets or if rain is expected, clean the street as often as necessary to keep the street clean at all times or as directed by the Owner. Remove and dispose of sediments properly.
- D. Use other erosion and sediment control measures to prevent sediment runoff during period of rains and non-working hours and when storm discharges are expected.

3.03 MEASUREMENT AND PAYMENT

Measurement and payment requirements shall be developed as appropriate for each project.

ITEM NO. 700 – GENERAL SOURCE CONTROLS

PART 1 – GENERAL

1.01 Description

This Item describes erosion and sedimentation control related practices which must be utilized during construction activities.

1.02 Related Work

Related work as called for on PLANS or specified elsewhere in this or other TECHNICAL SPECIFICATIONS.

PART 2 - PRODUCTS

Provide materials as specified in Part 3.

PART 3 - EXECUTION

3.01 General

- A. No clearing and grubbing or rough cutting, other than as specifically directed by the Owner to allow soil testing and surveying, shall be permitted until erosion and sedimentation control systems are in place.
- B. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damages caused by construction traffic to erosion and sedimentation control systems shall be repaired immediately.
- C. Contractor shall employ protective measures described in this Item to avoid damage to existing trees to be retained on the project site.
- D. Conduct all construction operations under this Contract in conformance with the erosion control practices described in this Item.

3.02 Topsoiling for Erosion and Sedimentation Control Systems

- A. When topsoiling is called for as a component of another Item, conduct erosion control practices described in this Item during topsoiling operation.
 - 1. When topsoiling, maintain erosion and sedimentation control systems, such as swales, grade stabilization structures, berms, dikes, waterways, and sediment basins.
 - 2. Maintain grades which have been previously established on areas to be topsoiled.
 - 3. After the areas to be topsoiled have been brought to grade, and immediately prior to dumping and spreading the topsoil, the subgrade shall be loosened by discing or by scarifying to a depth of at least 2 inches to permit bonding of the topsoil to the subsoil. Compact by passing a bulldozer up and down the slope, tracking over the entire surface area of the slope to create horizontal erosion control slots.

4. No sod or seed shall be placed on soil which has been treated with soil sterilants until sufficient time has elapsed to permit dissipation of toxic materials.

3.03 Protection of Trees in Construction Areas

- A. Heavy equipment, vehicular traffic, and stockpiles of construction materials, including topsoil, are not permitted within the dripline of any tree to be retained. Contractor shall avoid all contact with trees to be retained unless otherwise directed by the Owner or required by the work under this Contract.
- B. Specimen trees shown on the PLANS shall be boxed or fenced. When called for in the PLANS, tunnel under the root system for the installation of utility lines.
- C. Tree trunks, exposed roots, and limbs of the trees designated to be retained which are damaged during construction operations will be cared for as prescribed by a forester or licensed tree expert at the expense of the Contractor.

3.04 Dust Control

- A. Control dust blowing and movement on construction sites and roads to prevent exposure of soil surfaces, to reduce on and offsite damage, to prevent health hazards, and to improve traffic safety.
- B. Control dust blowing by utilizing one or more of the following methods.
 1. Mulches bound with chemical binders such as Curasol, Terratack, or equal.
 2. Temporary vegetative cover.
 3. Spray-on adhesive on mineral soils when not used by traffic.
 4. Tillage to roughen surface and bring clods to the surface.
 5. Irrigation by water sprinkling.
- C. Barriers using solid board fences, snow fences, burlap fences, crate walls, bales of hay or similar materials.
- D. Dust control methods shall be implemented immediately whenever dust can be
- E. observed blowing on the project site.

3.05 Equipment Maintenance and Repair

- A. Maintenance and repair of construction machinery and equipment must be confined to areas specifically designated for that purpose. Such designated areas must be located and designed so that oils, gasoline, grease, solvents, and other potential pollutants cannot be washed directly into receiving streams or storm water conveyance systems. These areas must be provided with adequate waste disposal receptacles for liquid as well as solid waste. Maintenance areas should be inspected and cleaned daily.
- B. On a construction site where designated equipment maintenance areas are not feasible, care must be taken during each individual repair or maintenance operation to

prevent potential pollutants from becoming available to be washed into streams or conveyance systems. Temporary waste disposal receptacles must be provided.

3.06 Waste Collection and Disposal

- A. A plan shall be formulated for the collection and disposal of waste materials on a construction site. Such a plan must designate locations for trash and waste receptacles and establish a special collection schedule. Methods for ultimate disposal of waste must be specified and carried out in accordance with applicable local, state and federal health and safety regulations. Special provisions must be made for the collection and disposal of liquid wastes and toxic or hazardous materials.
- B. Receptacles and other waste collection areas must be kept neat and orderly to the extent possible. Waste should not be allowed to overflow its container or accumulate for excessively long period of time. Trash collection points must be located where they will least likely be affected by concentrated storm water runoff.

3.07 Washing Areas

- A. Vehicles such as cement or dump trucks and other construction equipment must not be washed at locations where the runoff will flow directly into a watercourse or storm water conveyance system. Special areas or concrete washouts must be designated for washing vehicles. These areas should be located where the wash water will spread out and evaporate or infiltrate directly into the ground, or where the runoff can be collected in a temporary holding or seepage basin. Wash areas must have gravel or rock bases to minimize mud generation and proper perimeter controls preventing potential runoff.

3.08 Storage of Construction Materials, Chemicals, Etc.

- A. Sites where chemicals, cements, solvents, paints, or other potential water pollutants are to be stored, must be isolated in areas where they will not cause runoff pollution. Toxic chemicals and materials, such as pesticides, paints, and acids must be stored in accordance with manufacturers' guidelines. Groundwater resources must be protected from leaching by placing a plastic mat, packed clay, tarpaper, or other impervious materials on any areas where toxic liquids are to be opened or stored.

3.09 Demolition Areas

- A. Demolition projects usually generate large amounts of dust with significant concentrations of heavy metals and other toxic pollutants. Dust control techniques shall be used to limit the transport of the airborne pollutants. However, water or slurry used to control dust must be retained on the site and not be allowed to run directly into watercourses or storm water conveyance systems.

3.10 Sanitary Facilities

- A. All construction sites must be provided with adequate sanitary facilities for workers in accordance with applicable health regulations.

3.11 Pesticides

A. Pesticides used during construction should be stored and used in accordance with manufacturers' guidelines and with local, state and federal regulations. Overuse should be avoided and great care should be taken to prevent accidental spillage. Pesticide containers must **never** be washed in or near flowing streams or storm water conveyance systems.

3.12 Measurement and Payment

Measurement and payment requirements shall be developed as appropriate for each project.