

TECHNICAL SPECIFICATIONS
FOR
EROSION PREVENTION AND SEDIMENT CONTROL

1. Description

This work shall consist of temporary control measures as shown on the plans or as ordered by the Engineer during the life of the Contract to control soil erosion and water pollution. Such measures shall include, but are not limited to, the use of silt barriers, fiber mats, netting, mulches, grasses, slope drains, and other control devices. Erosion prevention and sediment control (EPSC) measures as described herein shall be applied to any erodible material exposed by any activity within the project limits.

2. Materials

- (a) Seeding – Seed, mulches, fertilizer, agricultural limestone and other materials for seeding shall conform to ES-08 of the City of Knoxville’s BMP Manual.
- (b) Sodding – Sod, fertilizer, agricultural limestone and other materials for sodding shall conform to the ES-09 of the City of Knoxville’s BMP Manual.
- (c) Temporary Slope Drains – Slope drains may be constructed of pipe, fiber mats, rubble, Portland cement concrete, bituminous concrete, sod or other materials acceptable to the Engineer that will adequately deter erosion. Must be installed and maintained as per ES-21 of the City of Knoxville’s BMP Manual.
- (d) Silt Barriers
 - 1) Silt barriers may be brush or rock filter berms, baled straw barriers, or silt fences.
 - a. Brush or rock filter berms shall consist of brush, trees and trimmings, shrubs, plants and other approved refuse from the clearing and grubbing operation. Must be installed and maintained as per ES-17 of the City of Knoxville’s BMP Manual.
 - b. Baled straw barriers shall consist of two rows of tightly baled straw, plastic or wire binding preferred to twine, firmly anchored to the ground with steel drift pins or wooden stakes. Must be installed and maintained as per ES-15 of the City of Knoxville’s BMP Manual.

- c. Silt fences shall consist of an approved fabric filter, Mirafi 140 or equivalent, suitable supported by a woven wire fence. Must be installed and maintained as per ES-14 of the City of Knoxville's BMP Manual.

3. Construction Methods

(a) General

- 1) Prior to or simultaneously with the clearing and grubbing operations, the Contractor shall install EPSC devices in accordance with the approved erosion control plan. Such work may involve the construction of temporary berms, dikes, dams, silt fences, sediment basins, lined channels, permanent cut-off ditches, slope drains or other control devices as necessary to prevent erosion and control sediment. Water from cofferdams is not to be pumped directly into streams, but is to be pumped into sediment ponds or traps. No grading shall be performed until the EPSC devices are in place to the satisfaction of the Engineer. Areas to be graded shall not be cleared and grubbed more than 14 calendar days prior to beginning grading operations in such areas, without temporary stabilization. Areas to be graded that are steeper than 3:1 shall not be cleared and grubbed more than 7 calendar days prior to beginning grading operations in such areas, without temporary stabilization. Stockpiled topsoil or fill material is to be treated so the sediment runoff will not contaminate surrounding areas or enter nearby streams. In order to reduce sediment in runoff, EPSC measures shall be installed promptly during all construction phases.

The Contractor's operations shall be staged so that graded or otherwise disturbed erodible surfaces are protected as the work progresses. Once the Contractor begins grading for a roadway cut or embankment, he shall maintain a continuous, viable operation to complete the cut or embankment to subgrade elevation, unless otherwise approved in writing by the Engineer. Exposed erodible cut or embankment slopes shall be final dressed, topsoiled and protected with permanent seeding or sodding in vertical increments not exceeding 25 feet as the work progresses; and no portion of these slopes shall remain unprotected for more than 14 calendar days (7 days when slopes are steeper than 3:1). Temporary erosion control measures shall be implemented as required in the SWPPP or other EPSC plan or as directed by the Engineer.

Seeding or sodding operations shall be initiated within 48 hours after any one of the following conditions occurs:

- a. Each 25 foot vertical increment is graded, or
- b. Upon suspension or completion of grading operations in a specific area.

The above requirements for progressive EPSC also apply to graded areas off

the rights-of-way such as waste area, borrow areas and haul roads.

The Contractor shall incorporate all permanent EPSC measures into the project at the earliest practicable time. Temporary EPSC measures shall be used to control erosive conditions that warrant protection prior to installation of permanent control features or that are needed to temporarily control erosion or siltation that develops during construction but which is not associated with permanent control features on the Project.

- 2) In the event of conflict between these requirements and EPSC laws, rules, or regulations of other Federal or State or local agencies, the more restrictive laws, rules or regulations shall apply.
 - 3) The temporary EPSC measures installed by the Contractor shall be appropriately maintained by the Contractor until the completion of the Project, and he shall remove such installation if ordered by the Engineer. Any materials removed shall become the property of the Contractor.
 - 4) In case of repeated failure on the part of the Contractor to control erosion, pollution and siltation, the Engineer reserves the right to employ outside assistance or to use his own forces to provide the necessary corrective measures. Such incurred direct costs plus project engineering costs will be charged to the Contractor and appropriated deductions made from the Contractor's monthly progress estimate.
- (b) Seeding – Temporary seeding shall conform to the standard Specifications for Seeding except agricultural limestone need not be applied.
- (c) Sodding – Sodding shall conform to the Standard Specifications for Sodding. Care must be taken to properly anchor the sod to prevent any washouts. Seeding – Temporary seeding shall conform to the standard Specifications for Seeding except agricultural limestone need not be applied.
- (d) Temporary Slope Drains

Temporary slope drains shall consist of metal pipe, plastic pipe, flexible rubber pipe, or other materials which can be used as temporary measures to carry water accumulating in the cuts and on the fills down the slopes prior to installation of permanent facilities or growth of adequate ground cover on the slopes.

All temporary slope drains shall be adequately anchored to the slope to prevent disruption by the force of the water flowing in the drains. The base for temporary slope drain shall be compacted and concavely formed to channel the water or hold the slope drain in place. The inlet end shall be properly constructed to channel water into the temporary slope drain. Energy dissipaters, sediment basins or other approved devices shall be constructed at the outlet end of the slope drains to reduce erosion downstream. An ideal dissipater would be dumped rock or a small sediment basin which would slow the water as well as pick up some sediment. All temporary

slope drains shall be removed when no longer necessary and the site restored to match the surroundings.

- (e) Silt Barriers – Silt barriers shall be constructed by one of the methods listed below. It shall be the Contractor's choice of which barrier to use unless the silt barrier type is specified in the plans.
- 1) Brush or rock filter berms shall consist of brush, trees and trimmings, shrubs, plants and other approved refuse from the clearing and grubbing operations. The brush barriers shall be constructed approximately parallel to original ground contour, placed at the bottom of fill slopes to trap and retain sediment. The top of the brush barrier shall be at least five (5) feet below finished roadway grade. The brush barrier shall be compressed to an approximate height of three (3) to five (5) feet and an approximate width of five (5) to ten (10) feet. The embankment shall not be supported by the construction of brush barriers.
 - 2) Baled Hay or Straw Erosion Checks – Hay or straw erosion checks shall be embedded in the ground a minimum of 4 inches to prevent water flowing under them. The bales shall also be anchored securely to the ground by wooden stakes driven through the bales into the ground. Bales can remain in place until they rot, or be removed after they have served their purpose, as determined by the Engineer. The Contractor shall keep the checks in good condition by replacing broken or damage bales immediately after damage occurs. Normal debris clean-out will be considered routine maintenance.
 - 3) Silt fences shall consist of an approved fabric filter, Mirafi 140 or equivalent, suitable supported by a woven wire fence, and are located at the bottom of fill slopes to trap and retain sediment. Fence posts may be wood or metal securely anchored to the ground on centers not to exceed twelve (12) feet. The woven wire fence shall be from two (2) to four (4) feet in height as required, and the mesh openings shall be 4" x 4".

The Contractor shall be required to maintain the silt fence and filter barriers in a satisfactory condition for the duration of the Project or until its removal is requested by the Engineer. The silt accumulation at the fence may be left in place and seeded, removed, etc. as directed by the Engineer. Unless otherwise directed by the Engineer, all silt fence or filter barrier shall be removed prior to completion of the Project and shall become the property of the Contractor.

The Contractor shall install and maintain all temporary EPSC measures until no longer needed or permanent control measures are installed. Any materials removed shall become the property of the Contractor. In order to insure EPSC measures work properly, it is imperative the sediment be removed; therefore, inspection and maintenance of EPSC measures is to be performed on a regular basis. During sediment removal, the Contractor shall take care to insure that structural components of EPSC measures are not damaged and

thus made ineffective. If damage does occur, the Contractor shall repair the EPSC measure at his own expense. Upon complete removal of sediment traps, special ditches, etc., the area where they were constructed is to be topsoiled, seeded and mulched.

In the event that temporary EPSC measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of work as scheduled, and are ordered by the Engineer, such work shall be performed by the Contractor at his own expense.

(f) **Sediment Structures**

- 1) Sediment structures can be utilized in many locations to control sediment; at the foot of embankments where slope drains outlet; at the bottom as well as in the ditch lines atop waste sites; in the ditch lines on borrow pits. Sediment structures may be used in most drainage situations to prevent excessive siltation of pipe structures. All sediment structures must be installed and maintained as per the City of Knoxville's BMP Manual.
- 2) When use of temporary sediment structures is to be discontinued, all sediment accumulation shall be removed, all excavation backfilled and properly compacted and the existing ground restored to its natural or intended conditions.

4. Method of Measurement

EPSC will be measured by the unit for the completion of the work as described above, and payment will be made on a lump sum basis.

<u>% of Total Contract Amount on Estimate</u>	<u>% Allowed This Item</u>
Not Less Than	
10%	50%
50%	75%
100%	100%

5. Basis of Payment

Partial payments for EPSC measures will be made on the basis of a percentage of the lump sum payment line item for EPSC as indicated above. Full payment for EPSC will be made in accordance with the provisions set out in the payment schedule above, which price shall be full compensation for the installation, maintenance, repair of EPSC measures as per the SWPPP, and any and all additional EPSC measures necessary to comply with all City of Knoxville and TDEC water quality and EPSC regulations, regardless of the number of times such items need to be installed, maintained, or repaired.