



## **SECTION 312500**

### **EROSION AND SEDIMENTATION CONTROLS**

#### **PART 1 - GENERAL**

##### **1.01 GENERAL PROVISIONS**

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.
- B. Equality of material, article, assembly or system other than those named or described in this Section shall be determined in accordance with the provisions of the CONTRACT AND GENERAL CONDITIONS.

##### **1.02 DESCRIPTION OF WORK**

- A. The Contractor shall provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
  - 1. [For sites where more than one acre of disturbance will occur:] Coordinate with the Harvard Project Manager to prepare and file the necessary documents for construction stormwater permit coverage, including NPDES NOI/SWPPP.
  - 2. Install control measures to prevent all erosion, siltation and sedimentation of wetlands, waterways, construction areas, adjacent areas and off-site areas. Control measures include but are not limited to the following:
    - a. Siltation control fencing
    - b. Construction Entrance/Exit station
    - c. Catch basin inserts
  - 3. Install control measures adjacent to or in the following work areas:
    - a. Soil stockpiles and on-site storage and staging areas.
    - b. Debris and recycling material stockpiles.
    - c. Cut and fill slopes and other stripped and graded areas.
  - 4. Provide additional means of protection as required for continued or unforeseen erosion problems, at no additional cost to Harvard.



5. Provide Periodic maintenance of all sediment control structures to ensure intended purpose is accomplished. Sediment control measures shall be in working condition at the end of each day.
  6. Inspect control measure integrity within 24 hours after a precipitation event greater than 0.25" equivalent rainfall. Any damaged control measure shall be corrected immediately.
  7. Implement the requirements specified in the Stormwater Pollution Prevention Plan provided the attachment to this specification.
- B. The Contractor may select the type of siltation control fencing for installation [as long as it is in compliance with the NPDES Construction General Permit for Stormwater Discharges and the site SWPPP]. Material and installation procedures are provided for both hay bale/silt fence and filter socks.

#### 1.03 RELATED WORK

- A. Section 013543 - ENVIRONMENTAL PROTECTION PROCEDURES
- B. Section 015000 - TEMPORARY FACILITIES AND CONTROLS
- C. Section 311000 - SITE PREPARATION
- D. Section 312000 - EARTHWORK
- E. Section 312319 – DEWATERING

#### 1.04 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referenced in text by basic designation only. The list provided below is not intended to be all inclusive of each regulation prevailing over the work. The latest version of the document listed shall govern the work performed.

- A. Massachusetts Department of Transportation, Standard Specifications for Highways and Bridges (1988) and supplemental specifications.
- B. Massachusetts Department of Environmental Protection, Erosion and Sedimentation Control Guidelines for Urban and Suburban Areas.
- C. United States Environmental Protection Agency, Storm Water Discharges (applicable to State NPDES programs) 40 CFR 122.26 and amendments.



- D. United States Environmental Protection Agency, 2012 Construction General Permit

#### 1.05 DEFINITIONS

- A. Harvard Project Manager: A representative of the Property Owner, President and Fellows of Harvard College.
- B. Engineer: Authorized representative of the Harvard Project Manager. Engineer shall be the Architect or Designer of Record for the project.
- C. EH&S: Harvard University Environmental Health and Safety Department
- D. Mass DEP: Massachusetts Department of Environmental Protection
- E. NOI: Notice of Intent (NOI) for coverage under the USEPA NPDES Construction Stormwater permit.
- F. NOT: Notice of Termination (NOT) ending coverage under the USEPA NPDES Construction Stormwater permit.
- G. NPDES: National Pollutant Discharge Elimination System
- H. SWPPP: Stormwater Pollution Prevention Plan
- I. USEPA: United States Environmental Protection Agency

#### 1.06 SCHEDULING AND SEQUENCING

- A. The proposed work [including filing the NOI and preparing the SWPPP] shall be performed prior to initiating any excavation and other land-disturbing activities, including demolition. [There is a 14-day waiting period after the NOI is posted on USEPA's website until coverage is active under the Construction General Permit.]
- B. Erosion control measures shall be established at the beginning of construction and maintained during the entire period of construction. On-site areas that are subject to severe erosion and off-site areas that are especially vulnerable to damage from erosion and/or sedimentation shall be identified and receive special attention.
- C. All land-disturbing activities shall be planned and conducted to minimize the size of the area exposed at any one time and the length of the time of exposure.
- D. All land-disturbing activities shall be planned and conducted in a manner that minimizes off-site sedimentation damage.



- E. All erosion control measures shall be removed at the completion of the work. Proper disposal of erosion and sediment control materials shall be the responsibility of the Contractor.

#### 1.07 SUBMITTALS

- A. The Contractor shall submit each item in this Section according to the Conditions of the Contract and the Submittals Specification [Section 013300], for information only, unless otherwise indicated.
- B. [For sites where more than one acre of disturbance will occur:] The Contractor shall file a Notice of Intent (NOI), as co-permittee with the Owner, as well as comply with conditions set forth in the site's Stormwater Pollution Prevention Plan (SWPPP). Should the Contractor elect to prepare his/her own SWPPP, he/she shall coordinate with EH&S and file the NOI within the required time to the start of construction, allowing enough time for EH&S review and comment. Upon completion of work, the Contractor must file a Notice of Termination (NOT) and provide all documentation to the Owner.
- C. Submit to the Engineer, material specification for all materials and equipment furnished under this Section.

#### 1.08 QUALITY ASSURANCE

- A. The Contractor shall comply with [the requirements of the Stormwater Pollution Prevention Plan prepared for the USEPA NPDES General Construction Permit, which are incorporated herein by reference, and] all applicable requirements of governing authorities having jurisdiction. The Specifications and Drawings are not represented as being comprehensive, but rather convey the intent to provide complete slope protection and erosion control for both Harvard's and adjacent property.
- B. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to the site-specific Stormwater Pollution Prevention Plan or requirements of authorities having jurisdiction, whichever is more stringent.



- C. Erosion control measures shall be established at the beginning of construction and maintained during the entire period of construction. On-site areas which are subject to severe erosion, and off-site areas which are especially vulnerable to damage from erosion and/or sedimentation, are to be identified and receive special attention.
- D. All land-disturbing activities are to be planned and conducted to minimize the size of the area to be exposed at any one time, the length of time of exposure, and to minimize sedimentation damage outside of the Limits of Work.
- E. Surface water runoff originating upgradient of exposed areas should be controlled to reduce erosion and sediment loss during the period of exposure.
- F. When the increase in the peak rates and velocity of storm water runoff resulting from a land-disturbing activity is sufficient to cause accelerated erosion of the receiving stream bed, provide measures to control both the velocity and rate of release so as to minimize accelerated erosion and increased sedimentation of the stream.
- G. The Contractor is responsible for cleaning out and disposing of all sediment once the storage capacity of the sediment controls is reduced by one-half.
- H. The Contractor shall inspect, repair, and maintain erosion and sedimentation control measures weekly, and within 24 hours after storm events of greater than 1/4 inch (or in accordance with the frequencies established in the permit), during construction until completion of the project.
- I. Erosion and sedimentation control measures employed will be subject to approval and inspection by governing agencies having jurisdiction over such work. All erosion and sedimentation control work shall be conducted in accordance with the Erosion and Sedimentation Control Guidelines for Urban and Suburban Areas (Mass DEP).
- J. Fines and related costs resulting from failure to provide adequate protection against any environmentally objectionable acts and corrective action to be taken are the obligations of the Contractor.

## **PART 2 - PRODUCTS**

### **2.01 CATCH BASIN INSERTS:**

- A. Siltsack® (or equal) shall be manufactured from a specially designed woven polypropylene geotextile manufactured by SI® Geosolutions and sewn by a double needle machine, using a high strength nylon thread or equal. Siltsack® (or equal) will be manufactured to fit the opening of the catch basin or drop inlet.



2.02 HAYBALES

- A. Bales of hay fastened with wire and have a minimum size of 1 foot by 1.5 feet by 3 feet and conform to the applicable portions of Section 767 of The Commonwealth of Massachusetts, Mass Highway Standard Specifications for Highways and Bridges, latest edition.

2.03 SILTATION FENCE

- A. Filter fabric siltation fencing shall be a woven filter fabric having a permittivity of not less than 0.15 sec<sup>-1</sup>, a water flow rate of a minimum 12 gallons per minute per square foot, and a grab tensile strength of a minimum of 100 lbs. The material shall have a high sediment filtration capacity, high slurry flow and minimum clogging characteristics.

2.04 FILTER SOCKS

- A. Filter Socks are biodegradable sediment-trapping devices. Manufacturers include SiltSoxx, Corr Logs, Straw Wattles, or equal.

2.05 WOODEN STAKES

- A. Stakes: Oak wood, minimum 1-inch by 1-inch, by minimum 36 inches long.

2.06 CONSTRUCTION ENTRANCE/EXIT STATION

- A. Geotextile: A non-woven geotextile fabric that meets the requirements of Section 804.11 of the *Standard Specifications for Highway Construction* "Geotextile Fabric for Slope Protection".
- B. Aggregate: The proposed aggregate shall have the following gradation:

Sieve	Percentage by Weight Passing
<u>Designation</u>	<u>Square Mesh Sieves</u>
4 in.	100
3-1/2 in.	90 to 100
2-1/2 in.	25 to 60
1-1/2 in.	0 to 15



¾ in.

0 to 5

### **PART 3 - EXECUTION**

#### **3.01 CATCHBASIN INSERTS**

- A. The Contractor shall install catch basin inserts in catch basins in accordance with manufacturer's instructions.
- B. The Contractor cannot pierce/cut/remove catch basin inserts to allow discharge of turbid water to the drainage system.
- C. Drawing [X] provides an inventory of catch basins requiring protection including the width, length, and approximate depth to inverts. The Contractor is responsible to conduct a pre-construction survey of catch basins to verify site conditions with design drawings.

#### **3.02 HAYBALES**

- A. The Contractor will be responsible for two (2) separate items of construction under this item, namely:
  - 1. The control of erosion and siltation during the construction. This is expected to require haybales, siltation fencing, diversion and control of storm water run-off, ponding areas and similar methods.
  - 2. Restoration of the ground surface in all disturbed areas as required on the Contract Documents and required under any environmental ruling.
- B. Haybales shall be installed in location as shown on the Drawings and as directed by the Engineer.
- C. Haybales shall be installed by anchoring bales butted together to existing ground with at least two (2) stakes per bale. Deteriorated hay bales shall be replaced. The hay bales shall be removed and disposed of following the successful growth of vegetation in the areas disturbed by the construction. The removal of the hay bales will be subject to the approval of Engineer. On embankment areas and on flat areas adjacent to wetland areas, the hay bales shall be installed continuously between the construction site and the wetland area as indicated on the Plans.



- D. Haybales shall be installed around all catch basins to be protected as identified on the Drawings.

### 3.03 FILTER SOCKS

- A. Install in location as shown on the Drawings and as directed by the Engineer. Installation shall be performed in accordance with the manufacturer's instructions.

### 3.04 SILTATION FENCE

- A. Install a filter fabric siltation fence prior to construction and remove after full surface restoration has been achieved. Install siltation fence as indicated on the Drawings. Install as follows:
  1. Hand shovel excavate a small trench on the upstream side of the desired fence line location.
  2. Unroll the siltation fence system, position the post in the back of the trench (downhill side), and hammer the post at least 1½ feet into the ground.
  3. Lay the bottom 6 inches of the fabric into the trench to prevent undermining by storm water run-off.
  4. Backfill the trench and compact. Compaction is necessary to prevent the runoff from eroding the backfill.

### 3.05 CONSTRUCTION ENTRANCE

- A. The Contractor shall install the stabilized construction entrance at all points where traffic will be leaving the Site. The location of the stabilized construction entrance shall be proposed by the Contractor and approved by the Engineer.
- B. The stabilized construction entrance shall be a minimum of 12 feet wide by 20 feet long with a minimum of 6 inches of aggregate.
- C. The Contractor shall remove all vegetation and any objectionable material from the proposed location. Divert all surface runoff and drainage from the aggregate to a sediment trap.





- D. Install the geotextile prior to placing any aggregate. The geotextile shall be placed in accordance with the manufacturer's instructions.
- E. Place a minimum of six inches of aggregate on top of the geotextile.
- F. Excavate from the construction of the stabilized construction entrance described above shall be managed in accordance with the requirements for Earthwork (Section 312000).

### 3.06 CLEANING AND MAINTENANCE

- A. The Contractor shall clean all catch basins at the beginning and end of the Project.
- B. The Contractor shall inspect the stabilized construction entrance every seven days. The Contractor shall check for mud and sediment buildup and pad integrity. The Contractor shall wash, replace, and/or add stone whenever the entrance fails to perform effectively or as directed by the Engineer.
- C. The Contractor shall inspect the control system immediately after each rainfall and daily during prolonged rainfall. Make repairs immediately.
- D. Remove and dispose of accumulated sediments when they reach fifty percent of the aboveground height of the control system, and when directed by the Engineer.
- E. Any catch basin that collects sediments as a result of the Contractor shall be thoroughly cleaned out by the Contractor.
- F. Catch basin grit can be disposed of at an approved solid waste landfill provided there is no evidence to suggest that the material has been impacted by a spill or release or that the material otherwise exhibits characteristics of a hazardous waste.
- F. Replace control system promptly if fabric decomposes or system becomes ineffective prior to the expected usable life.
- G. Maintain or replace system until no longer necessary for intended purposes.



### 3.07 REMOVAL AND RESTORATION

- A. The Contractor shall notify the Engineer upon completion of the work but prior to the removal of control structures.
- B. The Contractor shall not remove the control structures until the Engineer approves removal.
- C. The Contractor shall remove and dispose of all control system at completion of the work.
- D. The Contractor shall spread remaining sediment to conform to grade.