

PART 1 - GENERAL

1.1 OBJECTIVES

- .1 Prevent the loss of soil from construction site resulting from storm water runoff, wind erosion and construction activities.
- .2 Prevent the sedimentation of storm sewers and receiving waters.
- .3 Prevent air pollution caused by dust and particulate matter.

1.2 DESCRIPTION OF WORK

- .1 Implement the Erosion and Sedimentation Control (ESC) measures shown on the project drawings and described in these specifications. Install ESC products in accordance with manufacturer instructions and the prescribed installation procedures in the referenced EPA document.
- .3 Inspect ESC measures on a weekly basis and following all significant storm events. If deficiencies are found, make repairs within 24 hours of detection.
- .4 Maintain an ESC inspection log to document observations, deficiencies and corrective actions.

1.3 REFERENCES

- .1 U.S. Environmental Protection Agency, Office of Water. EPA Construction General Permits (2012).

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used

PART 3 - EXECUTION

3.1 .1 General Practices:

- .1 Stabilized Construction Entrance (SCE)
 - .1 Construct an SCE before construction begins at every point where traffic leaves the site and enters onto a public road and/or any unpaved entrance/exit location where there is a risk of transporting mud or sediment onto paved roads.
 - .2 The SCE must be at least 3.65 m wide, with room for two vehicles to pass at high traffic areas, and constructed from 50 mm diameter clear stone, 150 mm diameter rip rap, and filter fabric with the following characteristics:
 - .1 Grab Tensile Strength: 100 kgs
 - .2 Elongation Failure: 60%
 - .3 Mullen Burst Strength: 195 kgs
 - .4 Puncture Strength: 57 kgs
 - .5 Equivalent Opening: Size 40-80 (US std sieve)
- .2 Site Arrangement

- .1 All construction trailers and equipment shall be positioned to reduce the disturbance of site. They shall be located close to the current phase of construction to minimize traffic damage to the site.
 - .3 Material Stockpiling
 - .1 If material in stockpile will not be used within 14 days, it must be stabilized using one of the following measures:
 - .1 Temporary Seeding
 - .2 Tarps
 - .3 Compaction
 - .4 Surface Roughening
 - .4 Install ESC products in accordance with manufacturer instructions and the prescribed installation procedures in the referenced EPA document.
- .2 Stabilization Practices
- .1 Preservation of Natural Vegetation
 - .1 Establish construction boundaries to limit site disturbance to 12.2 m beyond the building perimeter, 1.5 m beyond primary roadway curbs, walkways and main utility branches and 7.6 m beyond parking areas.
 - .2 Stakes shall be used to indicate limits of construction, grading and disturbance. Trees shall be clearly marked to be preserved and protected from the ground disturbances around the

base.

.2 Buffer Zones

.1 Incorporate vegetated strips of land on floodplains, next to wetlands, along stream banks and on steep, unstable slopes to decrease the velocity of storm water runoff, preventing soil erosion.

.2 May be an area of vegetation left undisturbed during construction, or it can be newly planted. New strips require establishment of permanent seeding and planting.

.3 Soil Retaining Measures

.1 Use skeleton sheeting, continuous sheeting or permanent retaining walls to hold in place loose or unstable soil where other soil retaining methods are not practical.

.4 Permanent Seeding

.1 Shall be applied to any graded or cleared area as specified on landscaping plan.

.2 Plant native species of grass, trees and shrubs during favourable growth conditions; for areas outside of construction activity preferably within 3 weeks of construction start.

.3 Species shall not require permanent irrigation after the first two years or fertilizers containing phosphorus. Species must

not be invasive.

- .4 Use topsoil on areas where topsoil has been removed, where soil is dense or impermeable, or where mulching and fertilizers alone cannot improve soil quality. Make topsoil layers at least 150 mm deep or similar to the existing topsoil depth.

.3 Structural Practices

.1 Silt Fence

- .1 Construct posts with filter fabric media to remove sediment from storm water volumes flowing through the fence.
- .2 The lower edge of the fence is to be vertically trenched and covered by backfill.
- .3 Filter fabric should be a pervious sheet of polypropylene, nylon, polyester, polyethylene or equivalent and have the following characteristics:
 - .1 Filtering Efficiency: 75%-85% (minimum)
 - .2 Tensile Strength at 20% Standard Strength - 0.54 kg/mm (max) Elongation Extra Strength - 0.89 kg/mm
 - .3 Slurry Flow Rate 15.0 L/m²/min (min)

.2 Outlet Protection

- .1 Install stone, riprap, concrete aprons, paved sections or settling

basins at all pipe, interceptor dike, swale or channel outlets where the velocity of flow may cause erosion or pools at the outlets of an ESC measure.

.3 Inlet Protection

- .1 Install stone, concrete masonry units and stone, filter fabric or slit fences around catch basins and manhole covers to prevent silting of inlets, storm drainage systems or receiving channels.

.4 Check Dams

- .1 Install check dams in steeply sloped swales or in swales where adequate vegetation cannot be established, and only in small open channels which will not overflow once dams are constructed.
- .2 Construct small, temporary or permanent dam of stone, straw bales, logs or pea gravel-filled sandbags across a drainage ditch, swale or channel to slow water flow and allow suspended sediment to settle.

.5 Drainage Swale

- .1 Construct a channel with a lining of vegetation, riprap, asphalt, concrete or other material to convey runoff from the bottom or top of a slope.
- .2 Intercepted runoff shall be diverted to an appropriate outlet with

sediment trap if
required; swale shall
have a positive grade
with no dips to collect
water.

- .3 Swale shall be lined
using geotextiles, grass,
sod, riprap, asphalt or
concrete - based on the
volume and velocity of
the runoff.

.6 Gravel or Stone Filter Berm

- .1 Construct a temporary
ridge of loose gravel,
stone or crushed rock to
slow filter flow and
divert it from exposed
traffic in areas with
gentle slopes and
traffic.

.7 Sediment Trap

- .1 Excavate a pond area or
construct earthen
embankments to allow for
settling of sediment from
storm water volumes.
- .2 Incorporate temporary
seeding, mulching and/or
earth dike per
installation procedures
to reduce erosion of
banks.
- .3 Use a sediment trap for
small drainage areas, no
more than 2 hectares (5
acres).

.8 Temporary Sediment Basin

- .1 Use sediment basins for
areas larger than 2
hectares (5 acres).
- .2 Construct a pond with a
controlled water release
structure to allow for
settling of sediment from
water volumes.
- .3 Construction shall occur

- before any clearing and grading occurs, and must not be built on an embankment in an active stream.
- .4 Incorporate temporary seeding, mulching and/or earth dike per installation procedures to reduce erosion of banks.
- .5 Outlet pipe and spill way shall be designed by Departmental Representative based on an analysis of the expected runoff flow rates from the site.
- .9 Subsurface Drains
 - .1 Place a perforated pipe or conduit beneath the surface of the ground at a designed depth and grade to drain an area with high water table.
 - .2 Use relief drains in a gridiron, herringbone or random pattern to dewater an area where the water table is high.
 - .3 Place interceptor drains, as single pipes, to remove water where sloping soils are excessively wet or subject to slippage.
 - .4 Backfill with open granular, highly permeable soil immediately after pipe is placed.
 - .5 Stabilize outlet and ensure sediment-laden storm water runoff is directed to a sediment trapping measure.

3.2 INSPECTIONS AND
MAINTENANCE

- .1 Inspection procedures specified below summarize the EPA document and shall be followed in conjunction with details, drawings and manufacturer requirements.
- .2 Inspect all control measures at least once each week (unless otherwise noted) and following any significant storm (13 mm of precipitation or greater). Complete the inspection log for each inspection, and keep in an accessible location on site until all corrective measures have been documented. Submit each completed log to the Departmental Representative for review.
- .3 Maintain all measures in good working order. If a repair is necessary, initiate within 24 hours of report.
- .4 Stabilized Construction Entrance: Apply additional gravel as required, remove sediments and other materials from all areas to minimize clogging. Keep adjacent public roadway(s) free from sediment.
- .5 Site Arrangement: Verify that movement of construction equipment to appropriate area occurs at the same time as movement of construction activities.
- .6 Material Stockpile: Inspect for effective prevention of runoff and erosion. Remove built-up sediment from silt fence when it has reached 1/3 the height of the filter fabric.
- .7 Preservation of Natural Vegetation:

Routine maintenance shall include mowing, fertilizing, liming, irrigating, pruning and weed and pest control, depending on the specific species and environmental conditions. Remove any debris and ensure area is protected from traffic.

- .8 Buffer Zones: Routine maintenance shall include mowing, fertilizing, liming, irrigating, pruning and weed and pest control, depending on the specific species and environmental conditions. Remove any debris and ensure area is protected from traffic.
- .9 Soil Retaining Measures: Inspect for structural damage and repair as required.
- .10 Permanent Seeding: Inspect for sufficient growth and water conditions. Replant areas if cover does not provide erosion control.
- .11 Silt Fence: Silt fence to be inspected for depth of sediment, tears, loose fabric attachment at fence posts, channel erosion beneath fence, sagging or collapse, and to ensure the fence posts are firmly in the ground. Built-up sediment is to be removed from silt fence when it has reached 1/3 the height of the fence. Repair such that fence is in original installation condition.
- .12 Outlet Protection: Inspect for erosion and pooling of water. Necessary repairs to be made as required to reduce exit velocity of runoff. If a riprap apron is used, inspect for riprap displacement and damage to filter fabric.
- .13 Inlet Protection: Inspect that

measures are in original installed condition. Ensure measures are effectively trapping sediment. Remove accumulated sediment and debris when it reaches $\frac{1}{2}$ the design depth of the trap. Repair protection measures as required.

- .14 Check Dams: Inspect for sediment and debris accumulation and erosion of sides. Sediment should be removed when it reaches $\frac{1}{2}$ the original dam height. Repair dam as required.
- .15 Drainage Swale: Inspect for dips or low points along the swale where water is pooling and ensure that runoff is being directed to sediment-trapping measure used onsite.
- .16 Gravel or Stone Filter Berm: Inspect for breach in structure caused by vehicles, and accumulated sediment. Replace filter material if needed and remove and properly dispose of accumulated sediment.
- .17 Temporary Sediment Basin/ Sediment Trap: Remove sediment when it reaches 300 mm in depth. If outlet becomes clogged with sediment it must be cleaned to restore flow capacity. Maintain until site area is permanently stabilized and/or permanent structures are in place. Ensure bank is sufficiently compacted and stabilized such that erosion into basin does not occur.
- .18 Subsurface Drains: Inspect pipe for breaks or clogging by sediment or debris. Remove blockage immediately, replace any broken sections and restabilize the surface. Check inlets and outlets for sediment or debris, and remove and dispose of these materials

properly.

3.3 REMOVAL OF
PRODUCTS

- .1 ESC measures shall not be removed and shall be fully inspected and maintained until final landscaping is complete.