

11.0 Post Construction BMP Standards and Specifications

11.1 Infiltration Practices

11.1.1 Infiltration practices are defined as practices that capture and temporarily store the design storm volume before allowing it to infiltrate into the soil over a two day period. Design variants include:

- 11.1.1.1 Infiltration Trench
- 11.1.1.2 Infiltration Basin
- 11.1.1.3 Underground Infiltration

11.1.2 Infiltration practices receive 100% retention volume credit (Rv) for the volume stored and infiltrated by the practice.

11.1.2.1 The Rpv runoff reduction performance credit for stormwater infiltration is 100% of the retention storage.

11.1.2.2 The Cv runoff reduction performance credit for stormwater infiltration is 100% of the retention storage.

11.1.2.3 The Fv runoff reduction performance credit for stormwater infiltration is 100% of the retention storage.

11.1.2.4 The total nitrogen pollutant reduction performance credit for stormwater infiltration is 100% of the load reduction.

11.1.2.5 The total phosphorus pollutant reduction performance credit for stormwater infiltration is 100% of the load reduction.

11.1.2.6 The total suspended solids pollutant reduction performance credit for stormwater infiltration is 100% of the load reduction.

11.1.3 Infiltration Feasibility Criteria

11.1.3.1 Infiltration practices shall be located a minimum horizontal distance of 200 feet from down-gradient slopes greater than 20% unless slope stability calculations demonstrate stable conditions.

11.1.3.2 A minimum vertical distance of 2 feet must be provided between the bottom of the infiltration practice and the seasonal high water table as determined by the soil investigation procedures or bedrock layer. The minimum vertical distance of 2 feet may be relaxed if a groundwater mounding analysis or piezometer testing has been performed by a qualified professional.

11.1.3.3 Native soils in proposed infiltration areas must have a minimum infiltration rate of 1 inch per hour. Designers must verify soil permeability by using the on-site soil investigation methods provided in the Soil Investigation Procedures.

11.1.4 Infiltration Conveyance Criteria

11.1.4.1 Infiltration practices must be designed to pass the maximum design storm event (Fv) if the Fv is being routed through the practice rather than bypassing. An emergency spillway designed to convey the Fv shall be cut in natural ground or, if cut in fill, must be lined with stabilization geotextile and riprap.

11.1.4.2 Infiltration basins constructed to meet regulatory stormwater management requirements in the State of Delaware shall be designed and constructed in accordance with the USDA NRCS Small Pond Code 378 as amended.

11.1.5 Infiltration Pretreatment Criteria

11.1.5.1 Every infiltration system shall have pretreatment mechanisms to protect the long term integrity of the infiltration rate.

11.1.5.2 Exit velocities from the pretreatment shall be non-erosive during the largest design storm that is connected to the facility.

11.1.6 Infiltration Design Criteria

11.1.6.1 Infiltration basin side-slopes shall be no steeper than 4H:1V.

11.1.6.2 Stone, when used for infiltration trenches or underground infiltration systems, shall consist of clean, washed aggregate with a maximum of 2.0 percent passing the #200 sieve. Stone shall have a maximum diameter of 2.5 inches and a minimum diameter of 0.5 inches. A porosity value of 0.4 shall be used in the design of stone reservoirs, although a larger value may be used if underground retention chambers are installed within the reservoir.

11.1.6.3 Infiltration trenches and underground infiltration practices shall include an inspection port to facilitate periodic inspection and maintenance.

11.1.6.4 Geotextile fabric when used to separate stone from native soil in an infiltration trench or underground infiltration system shall have a flow rate of 110 gal/min/sf or greater.

11.1.6.5 For design purposes, the field verified infiltration rate shall have a factor of safety applied in accordance with Soil Investigation Procedures to account for potential compaction during construction and to approximate long term infiltration rates.

11.1.6.6 Infiltration practices shall be designed so that the RPv infiltrates within 48 hours.

11.1.6.7 Infiltration practices shall be designed so that they will:

11.1.6.7.1 Infiltrate the Fv within 72 hours, or

11.1.6.7.2 Dewater the Fv within 72 hours, or

11.1.6.7.3 Manage the Fv on site with no adverse impact.

11.1.7 Infiltration Construction Criteria

11.1.7.1 During site construction, steps shall be taken to prevent compaction and sedimentation of the infiltration practice unless extensive design and construction methods are employed to protect the infiltration practices' ability to infiltrate.

11.1.7.2 Construction reviews are required during the following stages of construction, and shall be noted on the plan in the sequence of construction:

11.1.7.2.1 Pre-construction meeting.

11.1.7.2.2 Initial site preparation including installation of erosion and sediment controls and sensitive area protection surrounding infiltration practice locations.

11.1.7.2.3 Construction of the embankment, including installation of the principal spillway and the outlet structure, as applicable for infiltration basins.

11.1.7.2.4 Excavation and grading including interim and final elevations. Confirmatory infiltration testing and verification must be completed prior to stone placement for infiltration trenches and underground infiltration.

11.1.7.2.5 Implementation of required stabilization.

11.1.7.2.6 Final construction review including development of a punch list for facility acceptance.

11.1.7.3 The infiltration rate and separation from groundwater of the constructed infiltration practice shall be verified prior to completion of construction in accordance with the Soil Investigation Procedures. The results shall be included with the Post Construction Verification Documentation upon project completion.

11.1.7.4 Upon project completion, the owner shall submit Post Construction verification documents to demonstrate that the infiltration practice has been constructed within allowable tolerances in accordance with the approved Sediment and Stormwater Management Plan and accepted by the approving agency. Allowable tolerances for infiltration practices are as follows:

11.1.7.4.1 The acceptable top of bank elevation may be no lower than the design elevation for top of bank.

11.1.7.4.2 The allowable tolerance from the design surface area of the infiltration surface is ten percent less than the design surface area.

11.1.7.4.3 The allowable tolerance from the design volume of the infiltration surface storage is ten percent less than the design volume.

11.1.7.4.4 The allowable tolerance for elevations on any structure is 0.1 foot.

11.1.7.5 When the allowable tolerances are exceeded for infiltration practice surface area or volume or structure elevations, supplemental calculations must be submitted to the approval agency to determine if the infiltration practice, as constructed, meets the design requirements.

11.1.8 The infiltrating surface must never be covered by an impermeable material, such as asphalt or concrete.