



Protecting Stormwater Best Management Practices During Construction

Water and Science Administration
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Adequately protecting future filter based stormwater best management practices (BMP) during construction is critical to ensuring the long-term viability of their designed functions. The requirement for protecting these practices during construction is established in the *2000 Maryland Stormwater Design Manual* (SWM Manual). Adequate protection shall include preventing compaction of the existing soils in the footprint of the practice and preventing the discharge of sediment-laden water to the footprint of the practice. Both erosion and sediment control (ESC) plans and construction methods must ensure this protection. Sediment discharge into a filter based stormwater BMP must be prevented to avoid the loss of filtering capacity and/or contamination and clogging of filter media, to ensure that these practices provide stormwater management as designed.

Major Points

1. Stormwater practices with an infiltration/recharge component in the design must be protected from sediment-laden runoff and construction traffic prior to, during, and after excavation of the BMP.
2. Filtering controls that do not have an infiltration/recharge component as part of the design must be protected from sediment-laden runoff or construction traffic after the filtering media is installed.
3. Adequate protection is provided by controls such as diversion fences, earth dikes, and/or swales.
4. Silt fence and filter cloth are not acceptable controls for this purpose as both are permeable products that will allow fine particles to pass through and enter the BMP.

SWM Filtering BMPs

There are two types of filter based stormwater BMPs: those designed to infiltrate and provide groundwater recharge, and those that do not provide this function. All stormwater filtering practices filter and treat runoff, removing pollutants and contaminants before returning the runoff to the watershed. This is accomplished by directing runoff through a filter media that is within the practice. Recharge of the groundwater table is provided in those filtering practices that also allow for infiltration of runoff into native soils and eventually to the underground water table.

Due to the variations in native soil composition, recharge via infiltration may not be attainable. Fine-grained soils such as clays do not allow for the flow of water through the soil horizon/layer, nor do dense, highly consolidated native soils or compacted engineered fill soils. Filtering stormwater BMPs that are located in areas unsuitable for infiltration/recharge must utilize underdrains or other means to direct the filtered, treated runoff to a dedicated outfall.

Stormwater filtering BMPs include:

<i>dry well</i>	<i>rain garden</i>
<i>enhanced filter</i>	<i>reinforced turf</i>
<i>infiltration berm</i>	<i>swale (grass swale, wet swale, and</i>
<i>landscape infiltration</i>	<i>bio-swale)</i>
<i>micro-bioretenion</i>	<i>infiltration trench or basin</i>
<i>permeable pavement</i>	<i>bioretention</i>

Adequate Protection During Construction

Heavy construction equipment and general site traffic can compact soils that would normally have the ability to provide for infiltration, resulting in the loss of the capacity to infiltrate. Pervious native soils may also lose the ability to infiltrate if contaminated with runoff that includes fine soil particles that clog the natural pore spaces that permit natural water flow. Therefore, on-site methods must prevent these outcomes to ensure BMPs function as designed after construction is complete.

Adequate protection begins with careful consideration of the sequence of construction. It is recommended if possible that any stormwater filtering practice that is designed to provide infiltration and groundwater recharge should be constructed after the contributing drainage area is stabilized. If this is not possible, the SWM Manual requires all infiltration/recharge areas to be protected from fine sediments and compaction. It is recommended that the sequence of construction includes the instruction to install protection at the appropriate time.

Stormwater filtering practices that are designed to provide infiltration and recharge must be identified on stormwater and ESC plans, well-marked on the site, and protected prior to any land-disturbing activity. The SWM Manual indicates that “the erosion and sediment control plan for the site must clearly indicate how sediment will be prevented from entering the infiltration [practice].” It is further required in the SWM Manual that the concept plan shall include a drawing or sketch identifying the preliminary location of ESD practices.

Adequate protection requires the use of a diversion control such as diversion fence, or the use of berms and diversion channels, or a combination of both, and ensuring that flow is directed in a

non-erosive manner. Silt fence is not adequate for this purpose as it is considered a filtering control. Because silt fence is not an impermeable barrier, it will permit runoff containing fine sediment to enter the practice. As stated in the SWM Manual: “Infiltration practices may not serve as a sediment control device during the site construction phase.”

In cases where the proposed practice does not have an infiltration/recharge component, such as bioretention practices with underdrains, there is no need to protect the native soils from sediment-laden runoff or mechanical compaction by construction traffic. It is recommended that media installation is delayed for as long as possible if there is a potential for inundation with runoff from unstabilized areas. However, once the underdrains or filter media are installed, the components must be fully protected from exposure to turbid stormwater. This is accomplished with an impervious barrier such as diversion fence or berms/channels.

Erosion and Sediment Control Plan Requirements

1. Identify on the plans all proposed stormwater filtering practices to be located within the limit of disturbance (LOD) and distinguish between those that are designed to provide infiltration and groundwater recharge and those that do not. This should be done with a stormwater BMP schedule and each practice, and its location, should be identified on the plan view sheets.
2. Include and show on plan view sheets all diversion controls required to direct sediment-laden runoff away from all stormwater filtering practices.
3. Include construction sequencing to clearly field delineate the footprint for each of the proposed stormwater filtering practices prior to any earth disturbance.
4. Include construction sequencing to install diversion controls to divert runoff around all stormwater filtering practices prior to any earth disturbance. Where this is not practical, construction sequencing should clearly indicate how these practices will be protected.
5. Include protective diversion control standard details on the plans, e.g., Detail C-9 Diversion Fence.

Best Practices for Plan Reviewers and Site Inspectors

Construction inspectors, contractors, and plan review staff must have a full understanding of the purpose and function of each proposed stormwater practice shown on stormwater management plans. The Department recommends the following best methods to ensure future stormwater BMPs are adequately protected during construction:

- Local plan reviewers including authorized Soil Conservation Districts shall:
 - Require diversion controls as described above for the locations of future stormwater BMPs as applicable.
 - Ensure the erosion and sediment control plan is consistent with the approved stormwater management plan.

- Ensure erosion and sediment control plans identify and delineate the location of each stormwater filtering practice.
- Ensure erosion and sediment control plans identify all methods and steps that will be applied to protect these BMPs, including the locations of the practices, the details, and indicating when in the sequence of construction they will be installed and removed.
- Local enforcement authority inspectors shall:
 - Familiarize themselves with the locations and specifications of controls on the approved plans.
 - Regularly inspect these areas.
 - Instruct site crews to perform maintenance and repairs as needed.
 - Inform the contractor and authorized plan approval authority if contaminated runoff enters a protected BMP area for plan modification and approval.
- Site contractors and operators shall:
 - Familiarize themselves with the locations and specifications of controls on the approved plans.
 - Regularly inspect these areas.
 - Perform maintenance and repairs as needed.
 - Inform their supervisor of any failures that cause sediment-laden runoff to enter the protected area.