

SECTION 12: BIORETENTION

12.3.1 Step 1: Understand Basic Layout Concepts

12.3.1.1 Pretreatment Options

Sheet flow must be achieved prior to entering the bioretention cell. Concentrated flow is not recommended. Therefore, a level spreader or a combination of gravel and grass or sod, with a minimum 10 feet in width needs to be in place for pretreatment. This is the City of Greensboro's requirement instead of 3-5 feet of sod stated in the State BMP Manual section 12.3.1.

12.3.6 Step 6: Size the Underdrain

All bioretention cells in the City of Greensboro shall have an underdrain system. Underdrain system are to be sized in accordance to provisions stated on Chapter 5.7.

Since an underdrain is required to be incorporated into the device in Greensboro, the device does not require a one hundred feet (100') separation from water supply wells unless it is a community well. A community well has fifteen (15) or more connections and/or serves twenty five (25) or more people.

12.3.8 Step 8: Select Plants and Mulch

The vegetation of choice for some bioretention cells is grass. Varieties, of centipede, Bermuda, and zoysia can survive in cells that are well drained. Bioretention cells with higher percentages of fines in the filter soil medium tend to be wetter making it difficult for these grasses to grow. Because of this, grass-only bioretention cells are not currently recommended for TN removal.

12.4 Common Maintenance Issues

Drainage, Maintenance & Utility Easement (DMUE) & Access Easement

A Drainage, Maintenance and Utility Easement (DMUE) shall be placed over the bioretention cell and extend 15' beyond its perimeter. A 20' wide access easement will be required from the public street right-of-way to the Bioretention cell's DMUE.

Reduction of Pollutants Entering BMPs

Stormwater BMPs are not 100% efficient in removing pollutants; therefore, when the amount of pollutants into the BMP is higher, the amount of pollutants discharged from the BMP will be higher. Also, increased amounts of pollutants entering the BMP will increase the maintenance required to keep the BMP functioning properly.

To assist the stormwater BMP in removing pollutants, every effort should be made to reduce the initial pollutant load entering the BMP. Pollution prevention activities described elsewhere in this manual should be implemented along with the following efforts:

- ⇒ Outside trash dumpsters should be kept covered, and the area around the dumpster should be kept neat and clean.

- ⇒ Chemicals, petroleum products and other pollution sources (such as machinery) should be stored in a covered area away from possible stormwater contact. Spent chemicals are to be properly disposed or recycled.
- ⇒ Fertilizers and pesticides should be used conservatively on the property grounds. Excessive amounts of these chemicals can be washed away with stormwater runoff increasing the nutrient load to the pond.
- ⇒ Chemicals such as copper sulfate used to inhibit algae growth in the water quality pond degrade water quality. Since the pond's main function is to enhance water quality, these chemicals should not be used. Rather, reducing the amount of fertilizer application and ensuring that the pond outlets are properly functioning so the pool is flushed periodically will help to deter algae growth.
- ⇒ Trash and vegetative floatables (grass clippings, leaves, limbs, etc.) should be cleaned from the pond surface and surroundings periodically to promote a healthy, aesthetically pleasing environment, and to prevent blockage of the pond outlets. Studies have shown that people are less likely to litter ponds that are aesthetically pleasing and support wildlife.

Stabilization of BMP drainage area

The area draining to the BMP should remain stabilized to prevent excessive sediment from entering the BMP facility. When the bare soil is directly exposed to precipitation the sediment concentration in runoff is much higher than for soil that is stabilized. A stabilized area is covered by impervious surfaces (pavement, buildings), grass cover, landscaped cover (mulch, pine straw), etc.

For filtration practices such as sand filtration facilities and bioretention, maintaining a stabilized drainage area is especially important. Eroded sediment can quickly “seal” the filtration bed, drastically decreasing its filtration capacity.

Erosion Concerns

The inlet and outlet areas, side slopes (swales), and the rest of the conveyance area should be inspected for erosion problems.

Where water discharges from a pipe and where the stormwater runs off impervious area onto pervious area, there may be erosion problems. The BMP should have riprap protection at the end of pipes and a gravel trench at the edge of impervious areas to help prevent erosion. These devices should be inspected to ensure they are functioning properly. If erosion is noticed in within the rip rap pad or along the edges of the pad, more rock may be needed or it may have been improperly placed (no geotextile liner or improper placement of liner, rip rap not well graded, etc.) If the rock or gravel is displaced downstream, a larger size rock or gravel should be used.

Rill erosion (small channels or gulleys in the ground) is a common problem found in these control devices where the water runoff is naturally trying to channelize. Rill erosion can be repaired by filling in the rills with suitable (clayey) soils and reseeding. It may be necessary to use a temporary erosion resistant matting or to use sod to repair these areas.