1. BIORETENTION FOR STORMWATER MANAGEMENT
The new stormwater permit emphasizes the adoption of runoff reduction practices and onsite collection for the treatment of stormwater. Bioretention system is an innovative urban stormwater practice that meets the above new permit criteria.

2. HOW BIORETENTION SYSTEMS WORK
Bioretention utilizes microorganisms, plants, and vegetation, as follows:
• At the start of the storm (the first flush) the runoff is diverted directly from overland flow into the bioretention cell
• During the storm, the pond above the bioretention cell collects and stores the stormwater as well as filters the runoff through the topsoil and planting medium
• Pollutants from the stormwater are adsorbed by soil particles, plants, and vegetation,
• The organic topsoil layer provides a medium in which microorganisms bio-degrade petroleum-based solvents and hydro-carbons and the planting soil below provides a medium for plants to absorb heavy metals, nutrients, and other pollutants
• Through plant evapotranspiration runoff is released into the atmosphere
• Excess stormwater not absorbed by the plants and vegetation recharges the ground water below
• During heavy rains, filtered runoff, not absorbed, overflows into a connecting drain to a nearby waterbody or adjacent MS4 storm sewer system

FOR MORE INFORMATION CONTACT YOUR STORMWATER COORDINATOR: VINCENT GARNOT AT:
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3. APPLICABILITY OF THE BIORETENTION SYSTEMS
Bioretention systems are applicable almost anywhere and are typically utilized for:

- **Landscape Islands in Sidewalks and Parking Lots**: in densely developed residential and commercial lots
- **Stormwater Hotspots**: for the removal of pollutants from hotspots such as gas stations and convenience stores
- **Overland Flow from Parking Lots**: to collect grease, oil, antifreeze, debris and other pathogens
- **Off-Line Bioretention System in Swales**: for the removal of pollutants off-line in a swale, before redirecting the stormwater back into the storm sewer system, nearby waterbody, or adjacent MS4
- **On-Line Outfall Pre-Treatment**: prior to the outfall discharge point, for the removal of pollutants before discharging the stormwater into a nearby waterbody, or adjacent MS4

4. LIMITATIONS OF THE BIORETENTION SYSTEMS
Bioretention systems have some limitations as noted below:

- Pretreatment such as a filter strip (grass or pea gravel) is generally required to capture and remove coarse sediment particles
- The bioretention system should be sized to be between 5% and 10% of the impervious area draining to it.
- The bioretention area should be designed to pond a small depth of water (6” to 9”) above the filter bed.
- Slopes of intercepting land to a bioretention system should be gently sloping and not greater than 10%
- The bottom of the bioretention cell may have to be lined with an impermeable liner, in areas where contaminated hot spots exist below the system
- For bioretention systems without underdrains, the seasonal high water table should be at least 2 feet below the bottom of the soil planting bed
- The system must have sufficient storage volume above the surface of the bed to contain the design storm runoff volume without overflow
- The soil bed permeability should be sufficient to allow the system to drain the storage volume within 72 hours