

## Green Infrastructure Guidelines

Green infrastructure installed on sites that are subject to the requirements of the Sewer Permit Ordinance and the Manual of Procedures for the Administration of the Sewer Permit Ordinance, shall adhere here to the guidelines provided below.

### Applicability

For sites where MWRD-required stormwater detention volume is going to be met using GI features:

- For project areas of 1.0 acre or less, if conditions allow, 100% of detention requirements could be satisfied using green infrastructure
- For larger project areas, up to 25% of the MWRD-required stormwater detention volume can be met in stone void storage volume and/or by ponding in bioswales/rain gardens.
- Any design for development of a site must include a stormwater management system for which the actual release rate does not exceed the allowable release rate in the 100-year rain event, regardless of whether or not GI is used as part of the stormwater management system.
- A maintenance and operation plan is required to be submitted with each type of GI the Co-Permittee chooses to use. A Special Condition will be added to the permit mandating that if the GI features are removed or found to be functioning improperly, the GI system must be restored or the detention must be revised to account for the additional runoff. Signage shall be provided to identify the green infrastructure. The District will require a letter from the Permittee acknowledging its responsibility to ensure the green infrastructure is maintained properly.

### General Parameters

For all project areas, if green infrastructure (GI) is installed and the surface of the GI feature meets minimum design depth requirements as described below, a reduced runoff coefficient (C) value for the area where the GI feature is located will be allowed. Any GI feature installed to satisfy MWRD stormwater detention requirements must include an overflow structure that is sized to accommodate the 100-year flow from the tributary area. Such flow must be conveyed to avoid damaging/flooding structures and infrastructure. Local governments may apply more restrictive requirements.

### Permeable Pavement

Permeable pavement is a pavement system that allows water to seep through the surface, permitting natural filtration. It could be comprised of permeable concrete, permeable asphalt or permeable interlocking concrete pavers. The water infiltrates into an aggregate bed of open graded crushed stone, and is held in the voids formed by the interstices of the aggregate particles. Over time, the water can infiltrate into the subsurface soil or evaporate

up through the permeable pavement into the atmosphere. In a separate sewer area, where possible, an underdrain should be used to drain excess water from the aggregate bed to a storm sewer. In a combined sewer area an underdrain may not be used to drain excess water from the aggregate bed to the combined sewer. The underground aggregate bed is placed in an excavation lined with filter fabric. The stone may be directly deposited on the fabric or placed in plastic cells that are stacked upon each other. The MWRD will require a plastic monitoring well with a cap brought to the surface grade in order to determine the effectiveness of the underground void storage over an extended period of time.

The minimum design depth of a permeable pavement system, which is 12" of open graded crushed stone, and additional stone void storage below minimum design depth may be credited towards MWRD-required stormwater detention volume. Note that if pavement receives runoff from non-permeable surfaces, some form of sediment collection upstream of the pavement is required. Storage volume below the minimum design depth of permeable pavement provided by voids in a bed of open graded crushed stone, usually a ¾ inch size or a No. 57 stone aggregate, will be credited on a 1:1 basis. The volume of storage contained in the stone voids is calculated as 36% of the volume of the stone. Thus one cubic yard of stone would yield 0.36 cubic yards (9.72 cubic feet or 0.00022 acre-feet) of voids. A C value of 0.75 will be allowed for systems constructed in this manner.

#### Bioswale/Rain Garden

Rain gardens or bioswales are depressions integrated into the landscape to capture stormwater runoff and allow it to infiltrate into an engineered soil mixture that is planted with native plants that will absorb the water from the soil. The soil mixture must be a minimum depth of 24". A C value of 0.15 will be allowed for bioswales constructed in this manner. The stormwater infiltrates into the subsurface soil, is absorbed by the roots of the plants or evaporates into the atmosphere. The depression may be graded to overflow to a catch basin. In a separate sewer area the catch basin must outlet to a storm sewer. MWRD-required detention storage volume may be provided in the depressional area above the finished grade of a bioswale. The release rate from such a facility that is not directly connected to a storm sewer system via an underdrain may be controlled by an outlet weir structure.

#### References:

[www.epa.gov/owow/nps/lid/section438](http://www.epa.gov/owow/nps/lid/section438)

[www.epa.gov/greeninfrastructure](http://www.epa.gov/greeninfrastructure)

[www.bmpdatabase.org](http://www.bmpdatabase.org)

[www.lowimpactdevelopment.org](http://www.lowimpactdevelopment.org)