# Porous Technologies, LLC

# URBAN RAINGARDEN

**Operation and Maintenance Instructions**

STORM CRETE®

*When it Rains…it's Porous™*

www.stormcrete.com

## General Description

The Urban Raingarden™ is a precast modular stormwater bioretention facility. Bioretention facilities use natural chemical, biological and physical properties of the plants and soil media to remove and retain pollutants in stormwater.

An Urban Raingarden™ mimics the processes of a natural forested environment by allowing the stormwater to infiltrate into the provided media, slowing the runoff rate and allowing for filtration by the soil microbes, mineral aggregate and organic matter. The Urban Rain Garden™ benefits from a manufactured pretreatment chamber located at the inlet that removes gross particulates and sequesters them in an easily maintainable sump.

Some pollutants like heavy metals will be organically affixed to the mulch and are slowly released for uptake by the plants. Phosphorus is chemically bounded to soil particles where it is slowly released back to the plants and soil bacteria for their natural processes. Nitrogen is also retained in the system where, depending upon a variety of conditions, it may also be available for plant uptake or may eventually be discharged as nitrates.

Cleansed stormwater passes from the Urban Raingarden™ into the storage system and underdrain below the plants and soil media where it may flow to a storm drain collection system downstream. Alternately, if on-site soils support infiltration, the cleansed stormwater may percolate into the soils below the system. Hybrid arrangements of under drained and infiltrating systems are also an option.

## Maintenance Drivers

Maintenance may be mandated by local regulatory agencies but beyond that, regular maintenance is a good practice to protect the environment and the investment made in the Urban Raingarden™. Regular maintenance will help support the growth of the desired plants and enhance the aesthetic appeal of the system.

Overtime the URG™ will accumulate silt and sediment on top of the mulch layer. Regular maintenance and removal of this material is required to ensure that the Urban Raingarden is effectively removing pollutants from stormwater. With proper

maintenance the longevity of the Urban Raingarden may be ensured, costly repairs may be avoided, and pollutant discharges reduced.

The maintenance cycle begins when the system is activated and fully operational. Fully operational means that all surrounding areas have been stabilized and not likely to erode, the storage media and underdrain, soil media, plants and mulch have all satisfactorily installed and are operational.

## Maintenance Frequency

Maintenance of the URG™ is dependent upon local rainfall frequency and intensity as well as the trash and sediment load that a particular system experiences. In the first months immediately following activation of a new system inspections should be carried out monthly with observations recorded on a document similar to the attached Maintenance and Inspection Report Template. After the Maintenance and Inspection Reports have been prepared for the first two or three months, they should be reviewed to determine the ongoing maintenance needs of a system.

Without giving consideration to the trash and sediment load at a particular location it is a good general practice to maintain an URG™ at least yearly in areas receiving less than 30 inches of rain per year and at least twice yearly if rainfall totals average greater than 30 inches per year.

When two visits per year are scheduled the first should occur in spring to clean up and remove sand and silt deposited during the winter. The second cleaning should occur after leaf drop in the fall to ensure that the system is cleaned and ready for operation through the winter months.

## Pretreatment Chamber Maintenance

Following rain events, inspect the pretreatment chamber for debris on the top grate, within the chamber, and on the vertical, drop-in filter wall. The maintenance steps described below should be completed if areas of the top grate are clogged, the chamber is >75% full, or the vertical filter wall is clogged. Maintenance should be completed when stormwater has completely drained from the bioretention practice. The filter wall allows the chamber to dry between rain events, which further simplifies maintenance by ensuring removed debris is largely dry. Ensure all debris collected during cleaning of the chamber is completely removed from the site and properly disposed of ac-

cording to local environmental rules.  Once cleaning is complete, reinstall the filter wall with filter fabric facing the inside of the chamber and replace the top grate.

## Summary of Maintenance Requirements

All maintenance events shall include the following:

1. Inspection of the URG™ and the surrounding areas (including downstream underdrain outlet as applicable).
2. Removal of sediment, trash and debris.
3. Maintenance of pretreatment chamber.
4. Plant evaluation, pruning, replacement and documenting.
5. Sweeping and general cleaning of URG™ and surrounding areas.
6. Photo documenting all conditions and completion of a Maintenance and Inspection Report.

## Required Maintenance and Inspection Equipment

At a minimum the following tools and equipment should be available to maintenance personnel:

1. Personal Protective Equipment (PPE) including gloves, protective eyewear, high visibility clothing, steel toed shoes and hard hats as required.
2. Traffic and pedestrian safety control measures including barricades, cones and signage as may be necessary.
3. Camera with time stamp capability for photo documenting all conditions.
4. Rakes, shovels, brooms or backpack blower and pruning equipment.

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## Maintenance & Inspection Report Template

### General Inspection of Urban Rain Garden and Immediated Contributing Area

All observations should be photodocumented with numbered photos and the photos shall be identified with a narrative description in a comprehensive Maintenance Report.
The following data shall be recorded for every Maintenance Report:

*Is there any visible damage to the structure or surroundings?* *yes/no*
*Is the outlet (where applicable) free to discharge?* *yes/no*
*Is there water ponding on the system?* *yes/no*

### Sediment and Debris Loading

Silt, sediment and debris should be shoveled out and removed as required and the following reported:

*Silt and sediment quantity removed (gallons, c.f. or lbs.)* _____
*Garbage volume removed (# of bags or general description)* _____
*Organic Matter (Leaves, # of bags or general description)* _____

### Pretreatment Chamber

Maintenance should occur when stormwater has completely drained from the unit. All debris should be removed from top grate as will as the interior sump, lower filter wall and filter fabric. Filter Fabric should be replaced with the fabric facing the inside of the chamber.

*Debris loading on top grate (narrative description)* _____
*Debris loading inside unit (narrative description)* _____
*Condition of filter fabric (narrative description)* _____
*Was the filter fabric replaced?* *yes/no*

### Mulch Layer Maintenance

The mulch layer should be attended to on every maintenance visit. After removal of accumulated debris and sediment mulch layer shall be top dressed with new double shredded hardwood mulch. A minimum depth of 2" of mulch shall be maintained.

**A completed Maintenance Report shall include all of the above observations, narrative descriptions and photos. Notes and appropriate photos should also be provided about URG ™ surroundings and contributory drainage area; i.e. is there heavy sediment loading upstream for some reason or high levels of trash and debris?**