

EcoStream™ Biofiltration System Operation & Maintenance Guidance

Description

The EcoStream Biofiltration System (EcoStream) is an engineered stormwater biofiltration treatment system designed to capture and retain a variety of pollutants including sediments, phosphorus, heavy metals, and hydrocarbons from stormwater runoff. EcoStream incorporates the processes of sedimentation, filtration, infiltration, adsorption, and biological uptake to provide both water quality and quantity benefits in a small footprint. EcoStream should be activated after a site is stabilized to prevent uncontrolled stormwater runoff from the construction site from entering the system.

Configuration

The EcoStream system comes in many standard sizes and is available in several different deployment configurations. Excess flow spills over an overflow pipe and is directly discharged along with treated flow. The EcoStream system can be configured as a planter box filter with an open top that is suitable for shrubs and grasses, or as an underground filter with a subsurface inlet pipe. The optional external high flow bypass may be incorporated with any of these configurations.

Operations

Stormwater runoff enters the EcoStream via a pipe inlet or curb inlet and flows downward under gravity flow through mulch/media/gravel layers. The top layer provides pretreatment by retaining the coarse sediments, trash, and debris. The fine sediments and dissolved pollutants are further treated through the media bed in depth. Treated water enters an underdrain pipe or infiltrates into the ground (installations with open bottoms). A flow control orifice is placed downstream of the underdrain to ensure the distribution of flow in the media bed.

Inspections and Maintenance Overview

The EcoStream system requires periodic inspection and maintenance for it to operate at the design efficiency. The inspection process helps in deciding when and what level of maintenance will be needed to bring the unit up to or near peak efficiency. As with ADS' other water quality products, the maintenance cycle of the EcoStream system will be driven mostly by the actual solids and trash/debris load brought into the system.

The frequency of maintenance depends on the site-specific pollutant loading conditions. ADS recommends a visual inspection of the system quarterly for the first year of service, and after every high intensity and high-volume storm event occurring (1 in/hr and greater than 3 inches rainfall within 24 hours) during the first six months. After the first year, systems should be inspected at least bi-annually and ideally before the spring or rainy season and after the summer season, or prior to fall or winter seasons. The inspections should look for signs of but not limited to erosion, displacement, sediment, and trash accumulations in the upper portion of media bed or planting area. It is recommended that some general "good housekeeping" maintenance be performed at the beginning of the rainy or spring season every year. Depending on the site conditions, full system maintenance including removal of all media and plant life may be necessary if ponding water remains on top of media bed for 24 hours after any storm event.

For most maintenance needs, the EcoStream planting component follows the practices used for handling standard bioretention systems (i.e., general landscaping, cover management, and replacement planting of surface plants).

It may be advisable to “water” or irrigate the EcoStream plant area in geographical regions experiencing droughts or prolong periods without rainfall during the first year of service. Watering the plant life will help to ensure the plants can take hold and be established for future growth and treatment capabilities.

Inspection and General Maintenance Equipment

The following is a list of equipment recommended for inspection and general maintenance.

- Personal Protection Equipment (pants, steel-toed shoes, safety glasses, gloves, safety vest, hard hat, etc.)
- Manhole Hook or Crowbar
- Traffic Cones and Signage
- Stadia Rod and Tape Measure
- Inspection Operation and Maintenance (O&M) Log or other recording method (included at end of guide)
- Flashlight, Trash removal “Net” device, shovel, rake, broom and trash receptacle
- Vac Truck (if more extensive maintenance is required)
- Light Duty Construction Equipment (if bioretention media replacement is required)

General Inspection and Maintenance Procedures

Routine inspection will ensure that the system is performing at optimal conditions and that the risk of public flooding is low. EcoStream inspection involves a visual inspection of the plant surface area, structure inlet, and the media bed. This can all be done at the surface and requires no confined space entry into the EcoStream unit. An Inspection O&M log should be used, dates and weather conditions should be noted.

If the EcoStream is located in a traffic area (i.e. roadway or automobile travel way), and inspection is not possible without entering the vehicular area, safety measures should be employed --safety cones setup, etc. --prior to performing the inspection and maintenance.

For inspection of the treatment chamber of the EcoStream system, the manhole cover should be safely removed (i.e., using a manhole hook). A visual inspection of any inlet grates should be noted. If grates are missing or inlets are damaged, contact ADS for recommendation of repair. A visual inspection of the general appearance of the EcoStream should be performed, and notes should be taken detailing the condition of the surface plant life, invasive species intrusion, vandalism, erosion in the planting area and any signs of standing water or disturbed or “shifted” surface soil bed area. This general system condition should be noted in the inspection/maintenance log.

If the plant life and surface media show signs of distress, general landscaping O&M should be performed, i.e., raking, weeding (removal of invasive plants), and general planting replacement to maximize the cover area in the planting bed/media treatment chamber. If ponding of water is present in the media treatment cell and the last rain event was greater than 24 hours prior, further inspection should be performed to ensure the effluent pipe is not blocked.

A visual inspection (with a flashlight if needed) will inspect the appearance of the inlet (pipe or curb) and media bed. Remove all trash and debris from the inlet and the top of the media bed manually or by vacuum truck as required. If there is a visible sediment load or the media bed appears to have been greatly disturbed during preceding storm events, redistribute or replace the top mulch layer as needed. If sediment load is heavy, remove the mulch layer and inspect the biofiltration media and replace the top two-inch media if it appears clogged. Additionally, a further inspection should be undertaken within 24 hours after a major storm event to see if there is standing water in the system. Water stagnation in the treatment chamber indicates that media bed replacement may be recommended. ADS Field Engineering can assist with this analysis.

ADS should be contacted for material specifications and replacement parts. Media chamber replacement will involve utilizing small construction excavation equipment.

Disposal of material from the treatment chamber should be in accordance with the local municipality’s requirements. Typically, traditional municipal landfills can be used for disposal of solids and trash obtained from servicing the EcoStream. Call ADS at 800-821-6710 for further information.

Records of Operation and Maintenance

The owner shall maintain annual records of the operation and maintenance of the EcoStream unit to document the effective maintenance of this important component of a site’s stormwater management program. The attached Inspection & Maintenance Log is suggested and should be retained for a minimum period of two years.

EcoStream BioFilter Inspection and O&M Log Sheet

Project Name: _____

Location: _____

| Date | Inspection or O&M | Observation/Actions | Operator comments and general description | Inspector |
|------|-------------------|---------------------|---|-----------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

