

MAINTENANCE

MWS – Linear

Hybrid Stormwater Filtration System



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Maintenance Summary –

- Clean screening filter device a least twice per year (*15 minute service time*).
- Clean separation (sediment) chamber once a year (*30 minute service time*).
- Evaluate and replace primary filtration media (BioMediaGREEN blocks) as needed. Typically replacement occurs once every 12 to 18 months (*60 minute service time*).
- Evaluate condition of wetland media. Replacement of media occurs once every 5 to 20 years (*4 hours*).
- Replace drain down filter media (*BioMediaGREEN block*) once every year (*5 minute service time*).
- Trim vegetation as needed (*15 minute service time*).

Maintenance Procedures –

A. Every installed MWS – Linear unit is to be maintained by the Supplier, or a Supplier approved contractor. The cost of this service varies among providers.

B. The MWS – Linear is a multi-stage self-contained treatment train. Each stage protects subsequent stages from clogging. These stages include: screening, separation, primary filtration, and biological remediation. The biological remediation stage contains plants and therefore requires ongoing landscape maintenance, similar to that of other landscaped areas.

1. Screening is provided by Bio Clean Catch Basin Insert Filters. This screening filter has a capacity of 2 or 4 cubic feet (curb type and grate type respectively). This filter targets gross solids, including litter, and sediments greater than 200 microns. **It is recommended that this screening filter be cleaned at least two times per year.** Cleaning of this device is relatively inexpensive. *This procedure takes approximately 15 minutes.*

2. Separation is provided by a 3' x 3' settling chamber. This chamber has a capacity of approximately 21 cubic feet. This chamber targets smaller sediments, larger TSS, and particulate metals and nutrients. This chamber protects the following filtration stages from premature clogging. **It is recommended that this separation chamber be cleaned out once a year.** This procedure can be performed with a standard vac truck. *This procedure takes approximately 30 minutes.*

3. Primary filtration is provided by a horizontal flow perimeter filter utilizing BioMediaGREEN. The perimeter filter has a default media surface area of 28 square feet. This surface area can also be doubled to 56 square feet, upon request, by a simple physical modification to the media blocks. The greater the surface area, the longer the media will maintain appropriate flow rates before clogging. This perimeter filter and the revolutionary BioMediaGREEN media targets fine TSS, dissolved metals, nutrients, and bacteria. **It is recommended that the filter media be evaluated once per year and recharged if necessary.** Media life depends on local loading conditions and can easily be replaced and disposed of without any equipment. *Replacement of media takes approximately 60 minutes.*

4. Biological remediation (natural filtration) is provided by a 4th generation enhanced sub-surface flow vegetated gravel wetland. This natural filter is 14 feet long and contains 248 cubic feet of filter media and plant material. It targets the finest TSS, nutrients, dissolved metals, and bacteria. This filter provides the final polishing step of treatment. If prior treatment stages are properly maintained, the life of this media can be more than 5 years. **It is recommended the wetland and its plants be inspected once a year.** Replacement of the rock media may be needed as soon as five years or as long as 20 years. *Inspection takes approximately 15 minutes. Replacement of rock media takes approximately 4 hours and requires a vac truck.*

5. A drain down filter, similar in function to the perimeter filter is located in the discharge chamber. This filter allows standing water to be drained and filtered out

of the separation chamber. This addresses any vector issues, by eliminating all standing water within this system. **It is recommended the media of the drain down filter be replaced one a year.** *Replacement of media takes approximately 5 minutes and is performed without any equipment.*

The MWS – Linear catch basin filter, separation chamber, and wetland filter are designed to allow for the use of vacuum removal of captured materials in the filter screens and sediment and wetland chambers, serviceable by centrifugal compressor vacuum units without causing damage to the filter or during normal cleaning and maintenance. Filters can be cleaned and vacuumed from the standard manhole access or at grade.

Maintenance Notes:

1. Modular Wetland Systems, Inc. recommends the **catch basin filter** be inspected and cleaned a minimum of once every six months and replacement of hydrocarbon booms once a year. The procedure is easily done with the use of any standard vacuum truck.
 - Remove grate or manhole to gain access to catch basin filter insert. Remove the deflector shield (grate type only) with the hydrocarbon boom attached. Where possible the maintenance should be performed from the ground surface. Note: entry into an underground stormwater vault such as an inlet vault requires certification in confined space training.
 - Remove all trash, debris, organics, and sediments collected by the inlet filter insert. Removal of the trash and debris can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screen of the filter.
 - Evaluation of the hydrocarbon boom shall be performed at each cleaning. If the boom is filled with hydrocarbons and oils it should be replaced. Attach new boom to basket with plastic ties through pre-drilled holes in basket. Place the deflector shield (grate type only) back into the filter.

- Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.
 - The hydrocarbon boom may be classified as hazardous material and will have to be picked up and disposed of as hazardous waste. Hazardous material can only be handled by a certified hazardous waste trained person (minimum 24-hour hazwoper).
2. Modular Wetland Systems, Inc. recommends the **separation chamber** be inspected and cleaned a minimum of once a year. The procedure is easily done with the use of any standard vacuum truck. Remove grate or manhole, remove catch basin filter, spray down pollutants accumulated on fiberglass media panels (do not spray media directly, doing so can damage the media), vacuum out separation chamber, replace catch basin filter, replace grate or manhole cover.
 3. Modular Wetland Systems, Inc. recommends the **perimeter filter's** media be inspected and cleaned a minimum of once a year. The procedure will require prior maintenance of separation chamber. Remove grate, remove catch basin filter, enter separation chamber, unlatch top and bottom of each media protection panel, remove media protection panels to expose media, power wash surface, evaluate media condition, replace if necessary. New media blocks can be ordered from Modular Wetland Systems, Inc. Replace media protection panels, replace catch basin filter, replace grate or manhole cover.
 4. Modular Wetland Systems, Inc. recommends the **drain down filter** be inspected and maintained a minimum of once a year. Open hatch of discharge chamber, enter chamber, unlatch fiberglass cover, remove media block, replace with new block, replace and latch cover. Exit chamber, close and lock down the hatch.
 5. Modular Wetland Systems, Inc. recommends the **wetland filter** and its plants/vegetation be inspected and maintained a minimum of once a year. It is also recommended that the plants receive the same care as other landscaped areas.

Note: No fertilizer is to be used on this area.

6. Following maintenance and/or inspection, the maintenance operator shall prepare a maintenance/inspection record. The record shall include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanism. .
7. The owner shall retain the maintenance/inspection record for a minimum of five years from the date of maintenance. These records shall be made available to the governing municipality for inspection upon request at any time.
8. Any person performing maintenance activities must have completed a minimum of OSHA 24-hour hazardous waste worker (hazwoper) training.
9. Remove access manhole lid or grate to gain access to filter screens and sediment chambers. Where possible the maintenance should be performed from the ground surface. Note: entry into an underground stormwater vault such as an inlet vault requires certification in confined space training.
10. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.
11. The hydrocarbon boom is classified as hazardous material and will have to be picked up and disposed of as hazardous waste. Hazardous material can only be handled by a certified hazardous waste trained person (minimum 24-hour hazwoper).

Maintenance Sequence



Service Crews Arrive On Site And Remove Access Manhole To Perform Maintenance Service.



Assess Condition and Pollutant Loading. A Few Gallons Of Water Are Sprayed Into Sediment Chamber To Allow Sediment To Be Vacuumed.



Catch Basin Filters Are Completely Vacuumed Free Of All Pollutants.



Cleaned Catch Basin Filters Are Removed Through Access Manhole To Allow For Unimpeded Access To Sediment Chamber.



Sediment Chamber Is Vacuumed Clean Of All Accumulated Sediment And Associated Pollutants.



Filter Media Shields Are Removed To Expose BioMediaGREEN Filter Media To Be Cleaned Or Replaced.



Exposed Filter Media Will Be Evaluated For Clogging And Loading Condition.



Media To Be Power Washed To Reveal Extent Of Clogging. If Only Surface Is Clogged, Media Can Be Re-Used Once. If Clogged Replace With New Media Blocks. Remove and Replace.



Washed Or New Media Is Now Ready For Use. If Media Was Replaced, Old Media Will Need To Be Properly Disposed Of Properly.



Replace Media Filter Panels And Lock Into Position.



Replace Catch Basin Filters.



Replace Access Manhole. Check Plants For Growth, Trim If Necessary. Service Is Complete. Total Service Time = 45 Minutes.