

6.2.9 Bioswale

PURPOSE & DESCRIPTION

Filtrex® **Bioswale** is a permanent, vegetated, shallow depression or channel used to **convey, slow, and filter storm water**. The bioswale system combines infiltration, filtration, and flow velocity control mechanisms to reduce storm water pollutant loading and flow surges to receiving waters or areas. This Low Impact Development management practice combines the benefits of organic matter and vegetation to physically and chemically (ionic adsorption) filter storm water pollutants. Compost bioswales may use Filtrex® Check Dams (Section 1.3) to reduce storm water flow velocity and soil erosion, and increase infiltration and filtration within the bioswale system.

APPLICATION

The bioswale system is typically designed as a permanent feature of the landscape. Applications include:

- Replacement of curb and gutters along parking lots
- Replacement of conveyance ditches along roadways
- Pollutant removal and conveyance of storm water from impervious surfaces, such as roadways, parking lots, and rooftops
- Post-treatment for detention pond discharge or emergency storm overflow
- Pretreatment for permanent storm water collection ponds and containment systems
- Sediment and soluble pollution filtration from contaminated effluent
- Storm water flow velocity reduction
- Storm water peak flow reduction
- Storm water volume reduction
- Storm water conveyance
- Low Impact Development (LID) site design goals
- Landscape aesthetic and/or wildlife habitat enhancement
- Urban and development green space expansion or improvement

INSTALLATION

1. Bioswale shall meet Filtrex SiltSoxx Mesh Material, Filtrex Certified GrowingMedia and Filtrex Certified FilterMedia Specifications.
2. Call Filtrex at 877-542-7699 or visit www.filtrex.com for a current list of installers and distributors of Filtrex products.
3. Bioswale will be placed at locations indicated on plans as directed by the Engineer.
4. Bioswale shall be placed parallel to water flow in a manner that allows storm water to flow, percolate, and/or gravitate through the system.
5. Bioswale must be installed and stabilized before water flow is allowed to enter the system. Use runoff diversion practices prior to construction completion and vegetation maturity.
6. Land surface shall be cleared of debris, including rocks, roots, large clods, and sticks prior to bioswale installation.
7. Bioswale soil bed shall be scarified or shallow tilled to increase infiltration in the system.
8. Land surface shall not be compacted prior to installation.
9. Bioswales shall be placed on slopes between 0.5 and 4%.
10. Check dams shall be installed across the entire width of the flow path, perpendicular to flow, to force water to flow through or over the check dam, not around.
11. Check dams (with GrowingMedia) may be injected with seed to increase vegetation and phytoremediation within the bioswale system.

12. Once in place, check dams shall be lightly compacted to prevent water undercutting.
13. Stakes shall be installed through the middle of the check dams on a minimum of 5 ft (1.5m) centers, using 2 in (50mm) by 2 in (50mm) by 3 ft (1m) wooden stakes.
14. Stakes shall also be placed at the ends of check dams to hold them in place.
15. Minimum staking depth for sand and silt loam soils shall be 12 in (300mm), and 8 in (200mm) for clay soils.
16. Once all check dams are in place a turf reinforcement mat (TRM) or rolled erosion control product (RECP) may be placed on the soil surface.
17. TRMs and RECPs should follow manufacturers' installation and stapling procedures.
18. TRMs and RECPs shall be installed under the entire area of a Filtrex® Compost Erosion Control Blanket™ (CECB).
19. CECBs shall use GrowingMedia applied to 100% of the TRM or RECP area.
20. CECBs shall be 1 to 2 in (25-50mm) thick.
21. CECBs shall be seeded at the time of application; seed selection will be determined by the engineer.
22. Bioswales should not be installed prior to seasons where growing vegetation is difficult.
23. Seed shall be thoroughly mixed with the CECB prior to construction or injected into CECB at time of application.
24. After CECBs have been applied another RECP may be installed on top of the CECB to prevent erosion.
25. Installation procedures for RECPs on top of CECB shall be the same as the installation underneath the CECB.
26. Optional biotechnical engineering with live stakes, tubers, seedlings, or plugs should be conducted after staking of check dams (with GrowingMedia) is complete.
27. Live stakes should be from a live hardwood species and cuttings should be 1 to 3 ft (300-900mm) long.
28. Live stakes should be spaced 3 to 5 ft (1-1.5m) apart, and planted vertically with one end planted through the check dam and at least 2 in (50mm) into soil surface.
29. Seeded and/or live staked check dam shall be thoroughly watered after installation and allowed to settle for one week.
30. Drip tape may be installed within the check dam during construction to provide irrigation for establishing vegetation.
31. If drip irrigation system is installed, a reliable water source should be located and secured.
32. If drip irrigation system is installed and municipal water or a pump will be utilized, a pressure reducer may be required to manage flow.

INSPECTION & MAINTENANCE

Routine inspection should be conducted within 24 hrs of a runoff or flow event for the first year after installation, until permanent vegetation has established, or as designated by the regulating authority. If check dam dislodgement, erosion or bank sloughing occur, system should be repaired immediately. If vegetation does not establish or has been removed, the area should be reseeded and/or planted. Vegetation practices should always be inspected for noxious or invasive weeds. If sediment accumulation is 50% of the height of the check dam, 25% of the height of the vegetation, or 25% of the original design volume of the bioswale sediment removal is recommended. Storm debris and trash should be removed immediately.

1. The Contractor shall maintain the bioswale in a functional condition at all times and it shall be routinely inspected.
2. If the system has been damaged, it shall be repaired, or replaced if beyond repair.
3. The Contractor shall remove sediment at the base of the upslope side of the baffle when accumulation has reached 1/2 of the effective height of the baffle, 25% of the height of the vegetation, or 25% of the original design volume, or as directed by the Engineer.
4. The system shall be kept free of debris.
5. If check dam becomes clogged with sediment or hydraulic flow is significantly reduced it may be replaced.
6. The bioswale shall be maintained until disturbed area above the device has been permanently stabilized and construction activity has ceased.
7. Once bioswale is vegetated, the Contractor shall mow or maintain the vegetation in a functional condition at all times and it shall be routinely inspected.
8. Vegetation shall be maintained until a uniform minimum cover of 70% of the applied area has been vegetated, permanent vegetation has established, or as required by the jurisdictional agency.
9. Vegetation may need to be irrigated in hot and dry weather and seasons, or arid and semi-arid climates to ensure vegetation establishment.
10. Where vegetation does not establish, fails, or rilling occurs, the Contractor will repair, reseed, or provide an approved and functioning alternative.
11. No additional fertilizer or lime is required for vegetation establishment and maintenance.
12. Regular mowing of vegetation to a minimum height of 4 in (100mm) and a maximum height of 10 in (250mm) will deter invasive weeds, and allow sunlight to kill captured pathogens.

ADDITIONAL INFORMATION

For other references on this topic, including additional research reports and trade magazine and press coverage, visit the Filtrexx website at filtrexx.com

Filtrexx International, Technical Support
877-542-7699 | www.filtrexx.com | info@filtrexx.com
Call for complete list of international installers and distributors.

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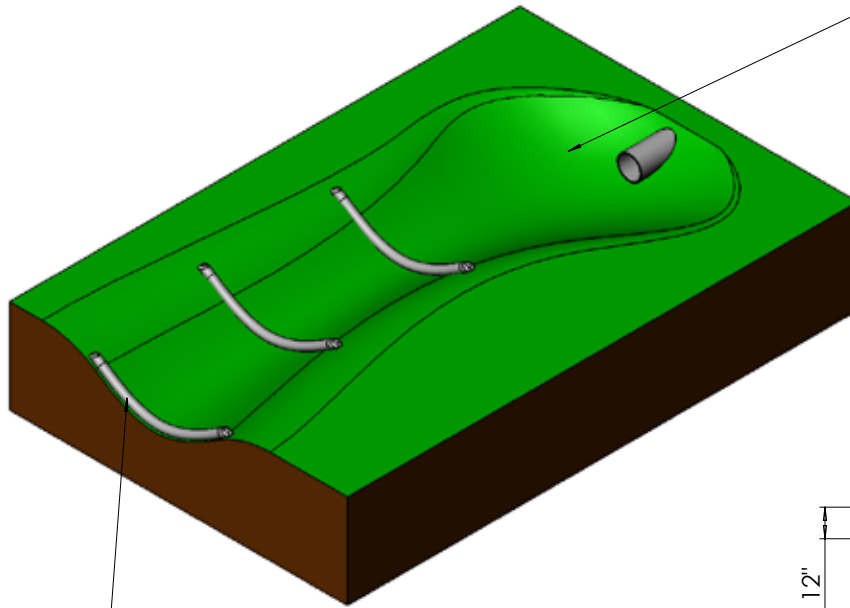
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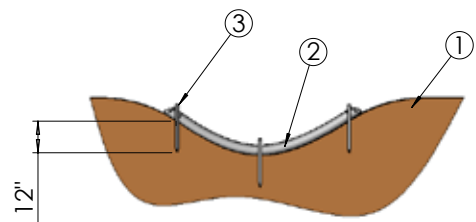
Figure 9.1. Engineering Design Drawing for Filtrexx Bioswale

FILTREXX® BIOSWALE



Influent and Runoff Entrance:
At the system entrance, it is important to maintain sheet flow or create equalized flow conditions, reduce runoff velocity, and stabilize soil and vegetation complexes. Options include: level spreaders, gravel infiltration trenches (minimum of 12 in [300mm] wide and 12 in [300mm] deep), pretreatment forebay, turf reinforcement mats, Filtrexx Channel Protection (see Filtrexx Design Manual Section 2.4), or rip rap.

Outfall Flow:
A weir or Soxx Baffle™ should be placed across the entire width of flow path at the exit of the Bioswale system, perpendicular to flow, to act as a final filtration treatment and to equalize and disperse flow as it exits the system. Depending on slope and discharge angle at outfall, it may be necessary to install turf reinforcement mats, or other stabilization practices, until mature vegetation can provide adequate stabilization.



Minimum staking depth for sand and silt loam soils shall be 12 in (300mm), and 8 in (200mm) for clay soils.

ITEM NO.	DESCRIPTION	QTY.
1	SWALE	1
2	SOXX™	3
3	2" X 2" X 36" WOODEN STAKE	3

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DIMENSIONS ARE IN INCHES
ANGULAR: BEND ± 2°
TWO PLACE DECIMAL ± .015
THREE PLACE DECIMAL ± .005

DO NOT SCALE DRAWING

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DRAWN KJN	03/10/09		<small>SOXX™ INDEPENDENT SYSTEMS Turf Reinforcement Mats</small>	A
CHECKED ECO				
SITE TITLE: BIOSWALE		DWG./PART NO. 1000007	SHEET 1 OF 1	