Organic Filter

Description: Usually a two chambered stormwater treatment practice and variant on a sand filter. The first chamber is for settling and the second is a filter bed of organic media. Large particles settle out in the first chamber and finer particles and other pollutants are removed in the second chamber.

Variations: Surface Sand Filter (PTP-04), a general application BMP.

Components:

- Settling chamber—settles coarse particles and trash
- Filter chamber—provides water quality treatment by filtering other pollutants
- Spillway system(s) provide discharge control

Advantages/Benefits:

- High pollutant removal capability
- Removal of dissolved pollutants is greater than sand filters due to cation exchange capacity until exchange capacity is exhausted

Disadvantages/Limitations:

- Intended for hotspot or space-limited applications or for areas requiring enhanced pollutant removal capability
- Filter may require more frequent maintenance than most of the other stormwater controls
- Severe clogging potential if exposed soil surfaces exist upstream

Design considerations:

- Minimum head requirement of 5 to 8 feet
- Contributing drainage area of up to 10 acres for organic filter
- Organic filter media with underdrain system
- In karst areas, use polyliner or impermeable membrane to seal bottom of earthen surface sand filter or use watertight structure

Selection Criteria:

☐	**Water Quality 80 % TSS Removal**
✓	**Accepts Hotspot Runoff**
☐	**Residential Subdivision**
✓	**High Density / Ultra Urban Use**

Maintenance:

- Ensure that inlets and outlets are free from debris and not clogged.
- Check for sediment buildup in gravel bed.
- Remove gravel and sediment from cell; replace gravel and replant vegetation.

H **Maintenance Burden**

L = Low M = Moderate H = High

General Description

The organic filter is a design variant of the surface sand filter that uses organic materials such as leaf compost or a peat/sand mixture as the filter media. The organic material enhances pollutant removal by providing adsorption of contaminants such as soluble metals, hydrocarbons, and other organic chemicals until the adsorptive capacity is exhausted.

As with the surface sand filter, an organic filter consists of a pretreatment chamber, and one or more filter cells. Each filter cell is a layer of leaf compost or a peat/sand mixture, followed by filter fabric and a gravel/perforated pipe underdrain system. The filter bed and subsoils can be separated by an impermeable polyliner or concrete structure to prevent movement into groundwater.

Organic filters are typically used in densely developed areas, or in areas that require an enhanced pollutant removal ability. Maintenance is typically higher than the surface sand filter facility due to the potential for clogging. In addition, organic filter systems have a higher head requirement than sand filters.

Site and Design Considerations

1. Organic filters are typically used on relatively small sites (up to 10 acres), to minimize potential clogging.
2. The minimum head requirement (elevation difference needed at a site from the inflow to the outflow) for an organic filter is 5 to 8 feet.
3. Organic filters can utilize a variety of organic materials as the filtering media. Two typical media bed configurations are the peat/sand filter and compost filter (see Figure 12.1). The peat filter includes an 18-inch 50/50 peat/sand mix over a 6-inch sand layer and can be optionally covered by 3 inches of topsoil and vegetation. The compost filter has an 18-inch compost layer. Both variants utilize a gravel underdrain system.
4. The type of peat used in a peat/sand filter is critically important. Fibric peat in which undecomposed fibrous organic material is readily identifiable is the preferred type. Hemic peat containing more decomposed material may also be used. Sapric peat made up of largely decomposed matter should *not* be used in an organic filter.
5. Typically, organic filters are designed as "off-line" systems, meaning that the water volume (WQ_v) is diverted to the filter facility through the use of a flow diversion structure or flow splitter. Stormwater flows greater than the WQ_v are diverted to other controls or downstream using a diversion structure or flow splitter.
6. Consult the design criteria for the surface sand filter (PTP-04, *Sand Filters*) for the organic filter sizing and design steps. The coefficient of permeability for a peat/sand mix is 2.75 feet/day and compost is 8.7 feet/day, while pure sand is 3.5 feet/day (CWP, 1996).

As-Built Certification Considerations

After the organic filter has been constructed, an as-built certification by a registered Professional Engineer must be submitted to Metro. The as-built certification verifies that the BMP was installed as designed and approved.

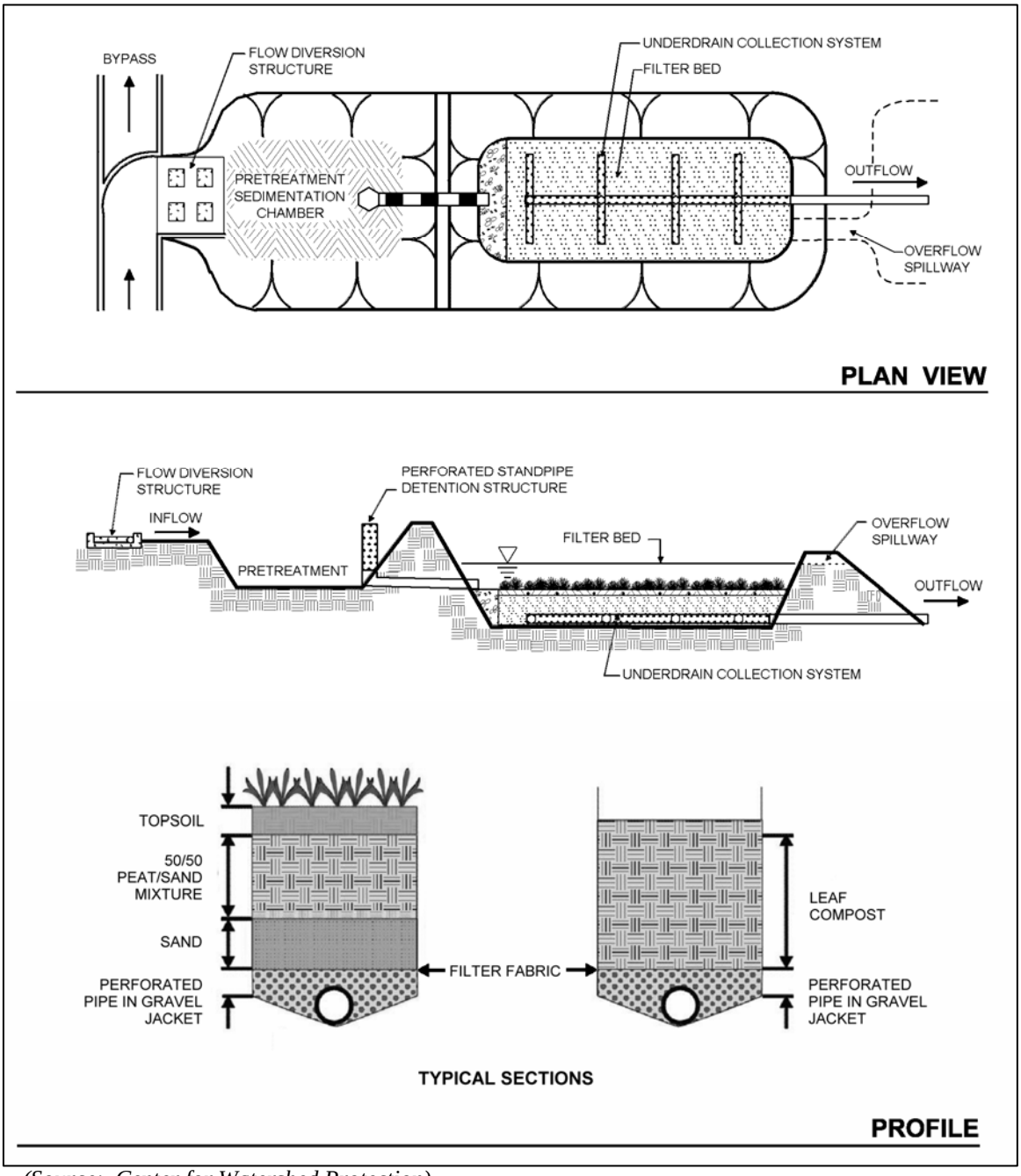
Maintenance

Each BMP must have an Operations and Maintenance (O&M) Agreement submitted to Metro for approval and maintained and updated by the BMP owner. Refer to Volume 1 Appendix C for the Operation and Maintenance Agreement, as well as an inspection checklist. The O&M Agreement must be completed and submitted to Metro with grading permit application. The O&M agreement is for the use of the BMP owner in performing routine inspections. The developer/owner is responsible for the cost of maintenance and annual inspections. The BMP owner must maintain and update the BMP operations and maintenance plan. At a minimum, the operations and maintenance plan must address:

1. Inspect for clogging—rake upper stratum of media as needed.
2. Remove sediment from forebay-chamber.
3. Replace organic filter media as needed.
4. Clean spillway system(s).

Design Procedures

See PTP-04 *Sand Filter*, surface sand filter sections, for additional guidance.



(Source: Center for Watershed Protection)

Figure 12.1 Schematic of Organic Filter

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Suggested Reading

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