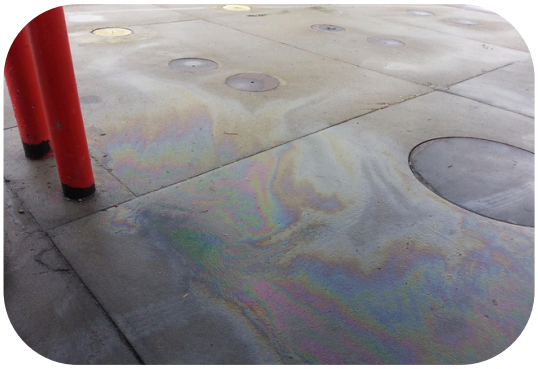
OIL & GREASE CONTROL

STORMWATER MANAGEMENT PRACTICES GUIDANCE FOR PRIVATE OWNERS

DANE COUNTY LAND&WATER RESOURCES DEPARTMENT



WHY DO WE CARE ABOUT OIL & GREASE?

The "first flush" in the context of stormwater refers to the initial runoff of rainwater from a surface. When it rains, the first flush of stormwater collects pollutants that have accumulated on surfaces such as roads, roofs, parking lots, and other impervious areas. These pollutants can include heavy metals, sediment, nutrients, pathogens, and oil and grease. Runoff during heavy rains can wash pollutants into rivers and lakes, harming aquatic ecosystems, and affecting fish, plants, and other organisms.

When the oil and grease dripping from vehicles and heavy machinery can accumulate on surfaces and washed into river and lakes it can degrade water quality by forming a film on the water surface, reducing oxygen levels, and inhibiting sunlight penetration. This can disrupt natural processes and harm the overall health of water bodies. Oil and grease may also harbor harmful bacteria or chemicals that pose risks to human health.

Sites must provide Oil and Grease control when they reach 40 or more parking stalls, have high traffic areas (such as drive thru windows/lanes), or commercial/business activities will take place that have the potential for oil and grease pollution (i.e. gas/service stations). These sites are required to treat the first half inch of runoff using approved methods for oil and grease control. These can include:

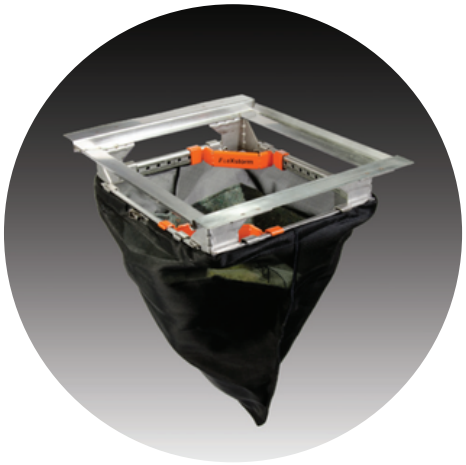
- Sorbent Inlet Filters: Permanent inlet filters designed to trap oil and grease have sorbent media either as part of the filter bag, as a boom around the rim of the frame, or as a pouch that sits in the bag. The frames must be made of a durable material, typically stainless steel, that will not require frequent replacement.

- Media filtration: Filtering devices are designed to remove oil, grease, sediments, trash, and other debris from stormwater by passing them through a filtering device. Oil and grease filters are most often used at gas stations, industrial sites, parking lots, loading areas, and anywhere hydrocarbons are likely to be present in large quantities. Because they generally operate underground, they are often used in retrofit applications where other management practices are not practical. In high flow situations, the volume of water may exceed the capacity of the filter chamber and stormwater may bypass the device without treatment.

- Rock Trench: Stone or rock trenches are designed to trap oil and grease pollution on the surface and pores of limestone. These trenches will typically line the edges of parking areas to act as the first line of treatment, before the oil and grease is emulsified downstream.

- Bioretention Basins: Bioretention basins are shallow, landscaped depressions that are used to treat on-site stormwater runoff. Stormwater is directed to the basin and then percolates through several layers that work to help remove pollutants, reduce runoff volume, and reduce temperature. Bioretention basins can be used as a standalone method, or in conjunction with other stormwater management practices. See the Bioretention Basin Flyer for more information.

SORBENT INLET FILTERS



Permanent inlet filters are installed in storm sewer inlets, and are designed to trap oil and grease along with debris and other pollutants. The frames must be made of a durable material, typically stainless steel, that will not require frequent replacement.

The inlet filters have sorbent media that catches the oil and grease as part of the filter bag, as a boom around the rim of the frame, or as a pouch that sits in the bag. As water passes freely through and across the sorbent media, adsorption of targeted hydrocarbons begins on contact. The sorbent media can adsorb up to 10 times their own weight in oils, greases and other toxic chemicals. Hydrocarbons adhere to the media even through extended dry periods and are not displaced by subsequent storm events.

Check your approved as-built plan to find out what type of inlet protection was installed. To find replacement parts, contact the manufacturer.

Installation and maintenance should follow the manufacturers' specifications. Below is a maintenance chart describing typical maintenance requirements.

ADVANTAGES

- Widely applicable
- Requires minimal land area
- Compatible with most storm drain systems
- Can be used in retrofit applications

DISADVANTAGES

- Limited effectiveness with large storm events
- Provides no other stormwater benefits
- Requires frequent maintenance

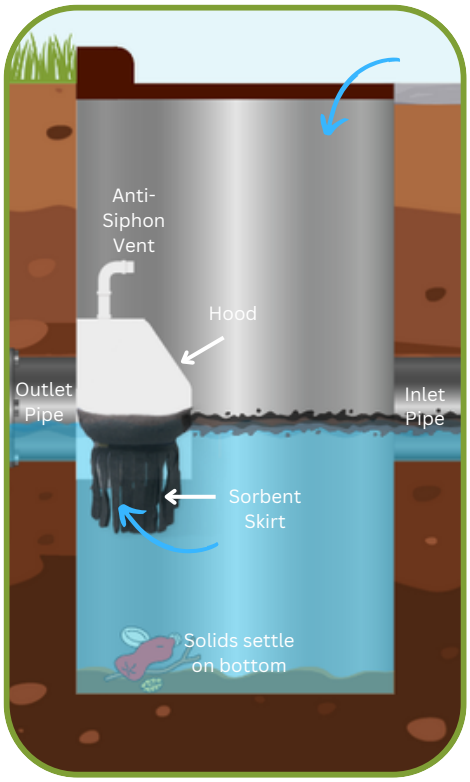
Activity	Frequency	Maintenance Notes
Routine Inspection	Four times per year	Perform a routine inspection four times per year to ensure the frame is in good condition, the inlet bag is free of tears, and to check for maintenance needs.
Cleaning Filter Bag	As needed	Remove the grate, and lift the drainage structure. Empty the filter bag if more than half filled with sediment and debris. As an alternative, an industrial vacuum may be used to collect the accumulated sediment. Remove any caked on silt from the sediment bag and reverse flush the bag with medium spray for optimal filtration. Replace the bag if torn or punctured to 1⁄2" diameter or greater on the lower half of the bag Post construction filter bags should be maintained prior to 50% oil saturation. The average 2' x 2' PC filter bag will retain approx. 96 oz (5.4 lbs) of oil at which time it should be serviced or replaced. It can be centrifuged or passed through a wringer to recover the oils, and the fabric reused with 85% to 90% efficacy. It may also be recycled for its fuel value through waste to energy incineration
Oil Pouch Replacement	As needed, or once per year	When utilizing sorbent oil pouches (such as a Cleartec Rubberizer Pouch) in the filter bags note that these oil skimmers will gradually turn brown and solidify as they become saturated, indicating time for replacement. Check the specific brand maintenace guide to see how much oil can typically be absorbed before requiring replacement. Dispose of all oil contaminated products in accordance with EPA guidelines
Filter Bag Replacement	As needed	Remove the bag by loosening or cutting off the clamping band. Take the new filter bag, which is equipped with a stainless steel worm drive clamping band, and use a screw driver to tighten the bag around the frame channel. Ensure the bag is secure and that there is no slack around the perimeter of the band.

HOOD WITH SORBENT SKIRT

A hood with a sorbent skirt is a type of stormwater management device used to help treat runoff before it enters a storm sewer system. The system includes a sump (a pit where liquid collects), a hood, and a sorbent skirt.

When stormwater enters the structure, pollutants in the water separate into floatables (such as oil, grease, and trash), and elements that sink to the bottom of the sump (such as trash and heavier sediment). The hood, whose bottom edge is typically a foot or more beneath the pipe invert, creates a baffle that allows floatable debris to be skimmed off the surface, preventing pollution from exiting the structure and causing problems downstream. With free-floating oils trapped on the surface, the boom of the skirt works to absorb hydrocarbons and sediment. The tendrils of the skirt extend below the water surface where they encounter more stubborn hydrocarbons like emulsified oils and PAHs (Polynuclear Aromatic Hydrocarbons). These hydrocarbons and oils are removed and brought up to the main boom of the skirt through capillary action.

These systems are most commonly seen in high-traffic parking lots, fueling areas, industrial spaces, transportation facilities, fast food restaurants, marinas, and other hot spots where oil and trash are a problem As with all BMPs, regular maintenance is key to ensuring long-term function.



Activity	Frequency	Maintenance Notes
Routine Inspection	Monthly for the first year, then four times per year	Monthly monitoring should be performed for the first year of a new installation after the site has been stabilized. After the first year, perform a routine inspection four times per year to check and note the sediment depth and surface pollutants in the structure, and to check the condition of the sorbent skirt. The pollutants collected in hood equipped structures will consist of floatable debris and oils on the surface of the captured water, and grit and sediment on the bottom of the structure.
Clean Structure	As needed	The structure should be cleaned when the sump is half full of material. Structures should also be cleaned if a spill or other incident causes a larger than normal accumulation of pollutants in a structure. Maintenance is best done with a vacuum truck. All collected wastes must be handled and disposed of according to local environmental requirements.
Sorbent Skirt Replacement	As needed or once per year	If sorbent bioskirts are being used in the structure to enhance hydrocarbon capture, they should be checked on a monthly basis for the first year, and serviced or replaced when more than 2/3 of the boom is submerged, indicating a nearly saturated state. Assuming a typical pollutant-loading environment exists, bioskirts should be serviced annually or replaced as necessary. In the case of an oil spill, the structure should be checked and serviced and bioskirts (if present) replaced or serviced immediately To extend the service life of a bioskirt, the unit may be “wrung out” to remove oils and washed in an industrial washing machine with warm water. The bioskirt may then be re-deployed if the material maintains it’s structural integrity. A maintained bioskirt can last for several years. Each bioskirt can hold about one gallon of oils.
Hood Maintenance	As needed	To maintain the hoods, an annual inspection of the anti-siphon vent and access hatch are recommended. A simple flushing of the vent, or a gentle rodding with a flexible wire are all that’s typically needed to maintain the anti-siphon properties. Opening and closing the access hatch once a year can help prolong the lifetime of the structure.

STONE TRENCH

Stone or rock trenches are designed to trap oil and grease pollution on the surface and pores of limestone. These trenches will typically line the edges of parking areas to act as the first line of treatment, before the oil and grease would be emulsified downstream.

Stone trenches need to have enough volume to treat the first half inch of stormwater runoff, either through total void space or through hydrologic modeling. Trenches must also have the ability to draw down between storms, typically with an underdrain, and be lined with geotextile fabric to prevent soil migration.

If the trench is undersized, or if void spaces are filled with sedimentation, oil will float over the trench and will not come in contact with the stone. Due to the unique properties of limestone, oil absorbs to the surface, which allows it to be used as oil and grease treatment. Eventually, the limestone will change color, indicating it's time to be replaced. Rock should be replaced when it becomes coated with oil and grease (i.e. black-colored) or if it becomes filled with sediment. Sediment will settle out in the stone trench, adsorbing nutrients, metals, and organic material as the water infiltrates. Stone trenches must be inspected regularly to ensure that it's functioning properly.

LIMESTONE IN ACTION

Limestone pictured on the left is fresh and has the capability to capture oil. Limestone shown on the right has absorbed oil and is in need of replacement.

ADVANTAGES

- Limestone widely available
- Relatively inexpensive

DISADVANTAGES

- Applicability limited to sites without storm sewer
- Provides little other stormwater benefits
- Replacement of rock may be difficult

Activity	Frequency	Maintenance Notes
Routine Inspection	Twice per year	Perform a routine inspection twice per year to ensure the trench is operating properly and there are no problems such as dirty limestone, erosion, or unwanted vegetation.
Trash & Debris Removal	Every 1-3 months and after large storm events	Trenches should be kept clear of debris to allow stormwater to flow as intended. A blocked stone trench can clog result in overflow. Trenches near high traffic areas may collect more trash & debris.
Vegetation Management	As needed	· Remove all grass, weeds, trees and woody vegetation growing in trench. · Re-seed and cover adjacent areas of bare soil to prevent erosion
Replace pea gravel/topsoil and top surface filter fabric	As needed (when clogged)	To maintain proper infiltration it's imperative that device is not clogged. Fabric should be replaced if/when damaged.
Rehabilitate the trench and restore design capacity	Upon failure	Mow grass around the perimeter of infiltration trench. (Be careful— keep grass clippings out of the infiltration trench!)

BIORETENTION BASIN

Bioretention basins are shallow, landscaped depressions that are used to treat on-site stormwater runoff. While bioretention basins are an approved practice for oil and grease control, pretreatment of runoff for oil and grease is recommended for large parking lots, commercial sites, and industrial sites when a significant potential exists for discharge of contaminants to groundwater or surface water (e.g., spills, high concentrations of oil/grease). Consideration of trash capture in these areas is also advisable due to the increased potential for generation of litter.

Bioretention basins handle oil and grease by allowing water to flow through a series of layers that filter and absorb pollutants. However, oil and grease do not break down completely in the same way that some other pollutants might. Instead, these substances are managed through a combination of mechanisms:

- Filtration: The layers of soil, sand, and gravel in a bioretention basin help filter out oil and grease from the water. These layers trap particles and some of the larger droplets of oil and grease.
- Absorption: Soil and organic matter in the basin can absorb some of the oil and grease. The porous nature of the soil allows these substances to adhere to soil particles.
- Biological Degradation: Microbes in the soil can partially break down oil and grease. While they might not eliminate all contaminants, they can reduce the concentration of some pollutants over time.
- Vegetation: Plant roots and associated microbial communities can also aid in breaking down and trapping some pollutants. However, vegetation alone is not sufficient for complete oil and grease removal.

While bioretention basins can significantly reduce the amount of oil and grease in runoff, they are not designed to handle large quantities of oil or heavy oil contamination. For substantial oil spills or high concentrations of oil and grease, additional treatment methods or systems might be necessary.

See the Bioretention Basin Flyer for more information on managing your BMP.

MEDIA FILTRATION DEVICES

Filtering devices are designed to remove oil, grease, sediments, trash, and other debris from stormwater by passing them through a filtering device. Oil and grease filters are most often used at gas stations, industrial sites, parking lots, loading areas, and anywhere hydrocarbons are likely to be present in large quantities. Because they generally operate underground, they are often used in retrofit applications where other management practices are not practical. In high flow situations, the volume of water may exceed the capacity of the filter chamber and stormwater may bypass the device without treatment.

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For more information regarding Stormwater Management in Dane County, scan the QR code or visit us at danecountystormwatermanual.com