



**MINNEHAHA CREEK**  
WATERSHED DISTRICT

# Inspection Guide

## Permeable Pavers



Maintenance of stormwater management structures is essential for keeping nearby lakes, wetlands, and streams within the Minnehaha Creek Watershed District (MCWD) clean. A poorly maintained and failing best management practice (BMP) provides little to no water quality benefit. BMPs are used to mitigate the negative effects of development by storage, infiltration, and/or filtration of stormwater runoff before it reaches valuable waterbodies.

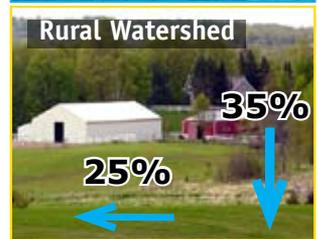
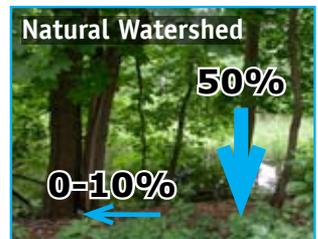
# Importance of BMPs and their Maintenance



In a natural environment, most rainwater soaks into the ground or is captured by trees and other plants. As land is developed, it is covered by hard surfaces - roads, parking lots and rooftops – that prevent natural infiltration, and allow water to quickly run downstream. This runoff, known as stormwater, carries dirt, fertilizer, pet waste, pesticides and debris into lakes, streams and wetlands. Polluted stormwater runoff is the number one water quality problem in Minnesota and across the country.

In many urban environments, stormwater is managed with storm sewer systems that quickly move stormwater away to prevent localized flooding. However, storm sewers often drain directly into lakes, streams and wetlands, rapidly carrying pollution into our valuable surface waters.

Stormwater Best Management Practices (BMPs) are the primary method for dealing with polluted runoff. BMPs may include ponds, raingardens, porous pavement, green roofs, or other practices that temporarily hold, filter, or reduce stormwater. Slowing down or reducing the flow of water minimizes flooding and reduces the amount of pollution reaching downstream water bodies.



# What is Pervious Pavement?

Pervious pavement functions like traditional concrete or asphalt surfaces, but allows water to seep through the pavement surface - which would otherwise be impermeable.



Installation of porous pavement.

Pervious pavement allows water to flow into an underlying storage area that helps filter pollutants out of stormwater. In soils that are conducive to infiltration, pervious pavements allow water to soak into the ground, replenishing ground water. In tighter soils, the system is designed with a drain that conveys clean water to the storm sewer system.

Pervious pavement works best in areas of pedestrian traffic or low automobile traffic such as sidewalks and parking lots.



# 1.

## Runoff

Pervious pavement will filter out many pollutants and most importantly store water reducing the amount of runoff rushing through our stormwater pipes to local waterbodies. Sediment will accumulate in pervious pavements and needs to be removed regularly to ensure it continues to function.



Sediment is silt, sand, and gravel, which is carried downstream by water and wind along impervious surfaces like streets, driveways, or sidewalks.



The picture to the left demonstrates what sediment accumulation can look like. These pervious pavers no longer function.

Sediment Accumulation

What can you do? Regularly maintain your pervious pavement to ensure it continues to function as intended.



# Pavement imperviousness evaluation

Permeable pavement is meant to infiltrate water into the ground and allow it to slowly filter through the soil, thereby removing pollutants and reducing the amount of water going directly into surface waters. Standing water indicates that the permeable pavement is not infiltrating water into the soils below and is therefore not functioning properly.



These pavers are still working properly. The water drains directly down into the storage chamber below instead of running off.

What can you do? Take a bucket of water and dump it on the pavers. Watch to make sure the water is draining down into them instead of running off.

## 3-4.

### Cracked, broken, heaved up pavers, or missing filler

Cracked or broken pavers should be replaced to reduce the chance of further damage to the system. Slight upheaval of pavers is common during the winter months. If upheaval of pavers lasts into the spring and summer, the pavers should be taken up, re-lain, and have filler rock replaced. Missing filler rock should be replaced as necessary. Over time, it may have to be replenished.

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Not all BMPs are designed to have plantings. The dry swale to the left is an example of a functioning BMP with out exposed bare soil.

## Sediment build-up, leaf litter, or debris

5.a-b.



Above is a picture of pervious pavers that have not been properly maintained and the sediment has filled up to the tops of the pavement.



The above conditions will likely allow for sediments to wash into the permeable pavement. Fine sediments can be washed into and clog the permeable pavement system, which can cause it to not function properly. If sediment accumulation is noticed, the source of the sediment should be determined and remedied to not allow water to carry it into the permeable pavement. Additionally, the sediment that has already washed into the permeable pavement should be removed. Regular maintenance should be performed to remove leaf litter from the pavement as well.

What can you do? Have your pervious pavement maintained regularly to ensure that sediment, leaf litter, and garbage is removed.

## 6.a-b.

### Source of sediment

Sediment can come from many different places. Erosion of soil, sand and grit put down during the winter, or a nearby construction site. It is to be expected that some sediment will accumulate in the pours of your pervious pavement or pavers. That is why regular maintenance is needed. If the sediment is coming from a nearby construction site that may require additional maintenance on your end to ensure they continue to infiltrate water.



Sediment can come from sites of erosion and is a regular part of stormwater runoff.

Is the accumulation due to a nearby construction project?



What can you do? The addition of mulch to planting beds can help to stop erosion and sediment accumulation into the permeable pavers. Shredded hardwood mulch is ideal. Areas of exposed soil should be planted with turf or another planting to ensure that the soil does not get to the permeable pavers. If nearby construction projects are affecting sediment accumulation in the permeable pavers, water and sediments should be directed away from the permeable pavement.



After installation of a permeable paver system, **maintenance is relatively minimal but absolutely necessary** to ensure the long lifetime of the system.

Permeable concrete and permeable pavers require that the surface be kept clean of organic materials (leaves, for example), and periodic vacuuming and low-pressure washing should be used to clear out voids and extend the paver's functional life.

In commercial installations, conventional street sweepers should be used with vacuums, brushes and water ideally **four (4) times a year and at least 1 time a year**, but the actual required frequency will be determined by local conditions.

In residential installations, vacuuming can be performed by loosening sediment with a pick if necessary and vacuuming with a shop-vac type of product. Additional aggregate filler material may also need to be added after cleaning.

## Winter Care Snow Removal and Salt Use



With all of these systems, snow removal operations should be carefully considered, and the use of sand or ash should be avoided as it may cause clogging of the pavement. Plowing requirements for grass or gravel pavers are similar to those of any other unpaved road; in general, the blade must be lifted to clear the grass or gravel surface. A mall in Connecticut with grass paver parking areas custom fit their plows with rollers so that the blade remained about  $\frac{1}{2}$  inch off the turf and was able to keep the lot open for winter use.

Most manufacturers of permeable paver systems recommend the use of skids on the corners of snowplow blades. Manufacturers of the interlocking pavement blocks, however, state that the structure of the blocks' top edges minimizes chipping and allows for normal plowing procedures.

In general, as is always the case, the use of salt can create a potential pollution problem (it is not removed by the permeable paver system), and de-icing products adversely affect all concrete and turf materials. For highly clogged pavement openings, the stones can be removed with vacuuming and replaced with clean material. This is a distinct maintenance advantage over pervious concrete and porous asphalt pavements.

# Key Terms



**BMPs (Best Management Practices)** are structures or techniques used to reduce the impacts of stormwater runoff. This runoff often contains pollutants or flows at rates that negatively affect water bodies downstream.



**Compaction** is the process by which the porosity of a given form of sediment is decreased as a result of its mineral grains being squeezed together by the weight of overlying sediment or by mechanical means.



**Erosion** is the process by which rocks, sediments, and soils are worn away by water and wind. Erosion also results in the displacement of this material to a new location.



**Gullies or channelization** is the formation of a ditch or channel from running water.



**Impervious Surfaces** are hard surfaces through which water cannot pass. Instead, the water simply runs off these surfaces. Examples include: most streets, driveways, sidewalks, and highly compacted soils.



**Sediment** is the weathered fragments of rock deposited by wind, water, or ice. Most commonly referred to as sand, silt, and clay.

