

Porous Pavement



Source: (Ohio Dept of Natural Resources, 2003)

General Description

Porous pavement is a permeable pavement surface that allows surface runoff to infiltrate into the subsoil. Stone reservoirs are often constructed below pavement to temporarily store surface runoff prior to infiltration; or are used to collect stormwater in underlying drain pipes prior to discharge off-site. Pollutants are removed by absorption onto soil particles and by bacterial decomposition in the reservoir or in surface soils. There are many types of porous pavement including: turf blocks (grass planted through load-bearing plastic or concrete frame), modular blocks (stone or concrete blocks interspersed with pervious material such as gravel or sand), granular pavement (crushed aggregate with wood mulch and cobbles), porous asphalt, and pervious concrete.

Inspection/Maintenance Considerations

Successful operation of porous pavement depends on maintaining the percolation rate of the porous spaces in the pavement surface and in the underlying base and soils. Keys to assuring long-term performance are accurate estimation of the soil's percolation rate, proper construction, and regular maintenance. Porous pavements have a tendency to clog with fine particulate matter. Once clogged, it is very difficult and expensive to rehabilitate, often requiring complete replacement. The production and transport of fine particulate matter and debris from adjacent areas should be managed using pretreatment BMPs.

Porous asphalt and concrete should be regularly swept and/or vacuumed to maintain porosity. High pressure jet hosing should be used less frequently to "deep clean" voids and help restore permeability. If porous pavement continues to clog, rehabilitation (e.g., drilling holes through pavement) or replacement may be needed. Spills of gasoline or other potentially hazardous materials can lead to soil or groundwater contamination. Spills must be immediately vacuumed, followed by jet washing.

Maintenance Concerns, Objectives, and Goals

- Reduced porosity from clogging
- Limit erosion / sedimentation from adjacent area
- Keep pavement surface clean from debris and sediment

Targeted Constituents

✓ Sediment	■
✓ Nutrients	■
✓ Trash	
✓ Metals	■
✓ Bacteria	■
✓ Oil and Grease	
✓ Organics	■
✓ Oxygen Demanding	■

Legend (Removal Effectiveness)

- Low
- High
- ▲ Medium



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Inspection Activities	Suggested Frequency
<ul style="list-style-type: none"> ■ Inspect to assure pavement was installed and working properly. ■ Inspect adjacent areas for potential erosion or damage to vegetation. 	Post-construction
<ul style="list-style-type: none"> ■ Visibly inspect surface after major storm event for evidence of debris, ponding of water, oil-dripping accumulations, clogging of pores, and other damage. ■ Inspect overflow devices (pipes) for obstructions or debris that would prevent proper drainage when filtration capacity is exceeded. ■ Inspect for bare areas in grass coverage of turf block and other filter media (e.g. sand, gravel, and mulch) ■ Inspect porous asphalt and concrete surfaces to determine if debris, organic matter and sediment are clogging pore spaces. 	Annually, after large storms
Maintenance Activities	Suggested Frequency
<ul style="list-style-type: none"> ■ Remove excess sediment from construction area and stabilize adjacent areas with vegetation. 	Post-construction
<ul style="list-style-type: none"> ■ Prevent soil from being washed onto pavement. Keep landscape areas well maintained. ■ Rake and remove fallen leaves and debris from deciduous trees and shrubs to reduce the risk of clogging. ■ Mow grass in turf blocks to less than four inches and remove grass clippings. Mowing is generally not required in areas of frequent traffic. Avoid use of fertilizers and pesticides. Reseed bare spots. ■ Remove debris and clear obstructions from overflow devices (pipes). ■ Re-supply pervious material between modular pavements, which may include sand, gravel or mulch. 	Annually, as needed
<ul style="list-style-type: none"> ■ Vacuum sweep porous asphalt or concrete systems (with proper disposal of removed material), followed by high-pressure hosing to free pores on the surface. 	2-3 times per year
<ul style="list-style-type: none"> ■ If ponding persists, clogged concrete and asphalt pavement can be restored by drilling holes, 0.25 inch in diameter on one-foot centers. Sections of porous pavement can be saw cut and removed, along with replacement of subbase if ponding persists. 	As needed (infrequent)

Additional Information

The maintenance requirements of a pervious surface will depend on 1) type of use, 2) ownership, 3) level of traffic, and 4) the local environment and contributing catchments.

References

Operations, Maintenance, and Management of Stormwater Management Systems (Watershed Management Institute, Inc., 1997)

Stormwater Management Manual, Chapter 6, O & M Requirements, City of Portland, 2002.

Guidance on Selection of Stormwater Quality Control Measures, City of San Jose, Department of Planning, Building and Code Enforcement, 1998

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Storm Water Technology Fact Sheet. EPA 832-F-99-023, September 1999.

Niemczynowicz J, Hogland W, 1987. Test of porous pavements performed in Lund, Sweden, in Topics in Drainage Hydraulics and Hydrology. BC Yen (Ed), pub. Int. for Hydraulic Research, pp 19-80.