PERMEABLE PAVEMENT

(PERVIOUS CONCRETE OR POROUS ASPHALT) FACT SHEET

Permeable pavement systems have structural units that include void, or open, spaces, allowing stormwater to infiltrate and get treated and stored in an underlying gravel base. The stormwater is then filtered through native soils or is discharged through an underdrain. Permeable pavement systems include, permeable pavers (bricks or blocks), along with pervious concrete and porous asphalt. Pervious concrete and porous asphalt are similar in that their mixtures consist primarily of larger aggregate, which creates void spaces within the material. The pervious concrete or porous asphalt is applied over an open-graded gravel base course that is used for structural strength, stability and storage of stormwater. It is important that the subgrade not be overly compacted during placement.

These systems are designed to reduce peak flows and volumes of stormwater runoff. They are advantageous for groundwater recharge, particularly in areas where land values are high, as vehicles can drive and park on this stormwater practice. Placement of these systems where in-situ subsoils have an infiltration rate greater than 0.5 in./hr. is recommended. When underlying soils have low permeability, permeable pavement systems can utilize an underdrain to return filtered runoff to the conveyance system. Permeable pavement is designed to reduce runoff and improve water quality for average rain events (1.2 inches), but they can be designed to handle larger storm events with heavier rain. The ratio of impervious area to porous asphalt surface area should be no greater than 3:1. The ratio of impervious area to pervious concrete surface area should be no greater than 1:1.

POROUS ASPHALT POLLUTANT REMOVAL[1]

- **80%** of suspended solids
- **50%** of phosphorus
- **50%** of nitrogen
- **60%** of metals

PERVIOUS CONCRETE POLLUTANT REMOVAL[1]

- **80%** of suspended solids
- **50%** of phosphorus
- **65%** of nitrogen
- **60%** of metals

As with any type of infrastructure, pervious concrete, porous asphalt and other green infrastructure practices require maintenance to ensure continued functionality. It is important to avoid compaction and clogging of these pavement systems, beginning with construction. Undesirable vegetation, sediment accumulation and debris are common culprits of clogged permeable pavement systems. General inspection and assessment of three critical features can keep the practice operational. Street sweeping can be effective for source control and routine maintenance of the top layer. Surface cleaning is required to remove debris and undesired vegetation that clog the top layer of the permeable pavement system. Locations that are highly trafficked or near overhanging vegetation may need more frequent surface cleaning to maintain higher infiltration rates.

Three Critical Features to Inspect

1 Drainage Area

The condition of the drainage area or surrounding landscape that will contribute runoff to the practice is essential to its overall function. Unstable areas that are sources of sediment or drainage ways that have pollutants such as trash, debris, sediment, and grass clippings can hinder the performance of the permeable pavement by clogging the pavement surface or contributing additional nutrient and pollutant loads.

2 Inlet and Outlet Structures

If inlet or outlet structures are impeded, this could mean a number of things. Structural damage might be present, there might be evidence of erosion, or runoff may not be flowing over the pavement surface and maintenance is required to restore function.

3 Pavement Surface

Physical clues such as accumulation of fine sediment, stains, standing water, as well as cracking or settling of pervious concrete or porous asphalt are evidence of surface clogging, structural damage and subsequent maintenance needs. Pervious concrete raveling (i.e. aggregate becoming loose) and no visible pore space can reduce functionality or become a hazard to the public. This should be inspected regularly and replaced if needed.

Maintenance costs vary based on many factors. The maintenance cost as a percentage of capital cost is estimated at 3-5%; however, more robust local datasets are needed.[2]

1 Georgia Stormwater Management Manual. Atlanta, 2016. 2016 Edition. https://atlantaregional.org/natural-resources/water/georgia-stormwater-management-manual/

2 Clary, J. and Piza, H. (2017). "Cost of Maintaining Green Infrastructure." ASCE. Reston, VA.

For more a more detailed inspection checklist reference:

gacoast.uga.edu/stormwater-management