

## Westmoreland Conservation District Permeable Parking Lot Demonstration

**Design features:** Permeable pavements, monitoring devices

**Date of installation:** Fall 2016

**Location:** Westmoreland Conservation District, Greensburg, Westmoreland County, PA

**Client:** Westmoreland Conservation District

**Installation cost:** \$175,000 from Richard King Mellon Foundation and other donations

**Partners:** Westmoreland Conservation District, Unilock, Stormcrete, Kevcon, ACF Environmental, KB Industries, Hanson Aggregates, Ligonier Construction Company, Silvis Group, Inc.

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*Stormcrete™ precast permeable concrete paving slabs in the foreground with Unilock's Eco-Optiloc pavers with a border of Eco-Priora in the visitor parking lot in front of the Westmoreland Conservation District offices.*

### Project Description

This project is a renovation of two existing stormwater management demonstration parking lots for permeable paving systems at the Westmoreland Conservation District (WCD) office. Originally installed in 2002, using eight different permeable paving systems from gravel to concrete and plastic blocks, the parking lots had received daily use over 15 years and were showing wear. Some of the original products had been found to be unsatisfactory for the heavy use they received and had already been replaced. The products that were still functioning well were incorporated into the renovation and reused for parking spaces.

The front parking lot at WCD was redesigned to hold 12 cars with a central driving aisle using Unilock's Eco-Optiloc permeable concrete paver blocks with a row of Unilock's Eco-Priora paver as a border and for parking space lines incorporated into the paving pattern. The parking lot is accessed on foot by two other permeable paving systems: Stormcrete permeable concrete paving panels are laid as a walkway from the lot to the adjacent office building and education pavilion and the Flexi-Pave system, which

uses a combination of recycled rubber and granite aggregates held together with an epoxy, is used as a walkway to the WCD building entrance. All permeable paving systems are placed over six to ten inches of clean angular stone to provide sufficient storage and infiltration volume during rain events.

The rear parking lot of the WCD office was transformed from a solely gravel parking lot to a demonstration lot with seven different products, some new and some recycled from the original front parking lot demonstration. Pave Drain manufactured by Kevcon was used in the central driving lane while the other six products were each used for two and three parking spaces off the driving lane.

Electronic sensors have been placed beneath several of the permeable paving systems in both lots to monitor soil moisture and temperature to determine effectiveness of each systems' permeability. Rain gauges on-site also gather information that can be cross-referenced with the monitors. Each sensor and gauge is powered by a solar unit and regularly uploads its information to a cloud based database.

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## Benefits/Performance Measures

**Impervious area managed:** 12,000 square feet or over 0.25 of an acre comprised of 5,000 sf Unilock precast concrete paver parking lot; 900 sf Stormcrete permeable concrete walkway; 300 sf Flexi-Pave pathway; 2,400 sf PaveDrain driving aisle; 1,800 sf salvaged gravel grid pavers; 540 sf each of Perma-Drive; and additional Stormcrete and Unilock paving systems.

**Stormwater reduction performance analysis:**

Runoff from a two inch storm event on the parking areas (which combined, accommodates 29 cars) and walkways is fully managed by over 12,000 sf of permeable paving, which can capture and store up to 4,000 cubic foot of runoff.

**Community and economic benefits that have resulted from the project:**

The permeable paving provides catchment for stormwater runoff and pollutants, provides cooling for heated runoff, and provides volume reduction and water quality improvements to an unnamed tributary of Slate Run in the Sewickley Creek Watershed. The entire project and additional demonstrations on campus also provide valuable education for visitors to the property with interpretive signage explaining how permeable paving works.

**Related information:** The project costs listed above include demolition and salvage of existing pavements, installation of standard concrete walkway, concrete curb edging, underdrain systems, monitoring devices, and final permeable pavement bases and surfaces.

## Recommended Maintenance

Maintenance of any kind of permeable paving system is necessary in order to keep the system working properly. The voids must remain open to allow the water to infiltrate as it is designed to do. Maintenance of permeable pavements can use a combination of sweeping, raking, vacuuming, and power washing, depending on the paving system. Frequency of maintenance is based on site conditions and amount of use.

An ASTM1701 testing procedure has been developed for poured in place permeable concrete. This test should be conducted on the permeable concrete when it is initially installed, so that a baseline exists for future tests for maintenance. The test should then be done periodically, every six months to a year, to determine if there is a decrease in the infiltration rate and therefore a need for vacuuming. If the paving system is neglected over several years, the system will become clogged over time and the freeze thaw cycles will begin to break up and ravel the surface.

**Westmoreland Conservation District website - Publications**

*Stormwater BMP Maintenance Guides (see page 2)  
Operation Maintenance and Repair Plan –  
Porous Sidewalk / Street Trees*  
<http://wcdpa.com/wp-content/uploads/Stormwater-Maintenance-Guides.pdf>

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### Additional Information



*Existing permeable paving system demonstrations were salvaged for reuse*



*Flexi-Pave recycled rubber aggregate paving system accents the standard concrete front entrance to the Westmoreland Conservation District and extends to the visitor parking lot.*

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### Additional Information



*A combination of seven new and used permeable paving systems are included in the permeable paving demonstration in the rear parking lot at the Westmoreland Conservation District office.*



*Number 8 stone is raked into the surface of the salvaged and reused paving systems to continue to provide infiltration in the WCD parking lots.*