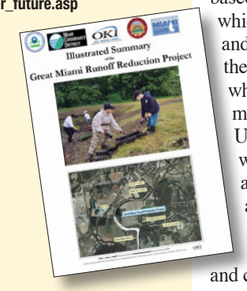
Pervious Pavers and Rain Gardens Filter Pollutants

Far right: Water quality samples are collected from the Heritage Park pervious parking area.

Below: A fully illustrated report of the Heritage Park Rain Garden Project is available from: www.miamiconservancy.org/water/building_our_future.asp



Project Description

Located along the Great Miami River in Hamilton County, pervious parking spaces and a rain garden were installed to filter the stormwater runoff from a large parking lot at Heritage Park. The park is a 125-acre recreational facility owned and operated by Colerain Township along the Big Bend of the Great Miami River, near Dunlap Run.

Partners

The Ohio-Kentucky-Indiana Regional Council of Governments (OKI) is a regional planning agency which designed and managed the project and recruited the project partners. The agency collaborated with the Friends of the Great Miami, a community-based watershed organization which managed the promotion and marketing of the project; the Greenacres Foundation, which managed the water monitoring program; the University of Cincinnati, which provided technical and scientific knowledge; and Colerain Township which donated the project site, landscape architect, and construction contractors.

Benefits

The pervious pavers and rain garden are designed to slow stormwater runoff, increase groundwater recharge, and reduce water pollution. The parking spaces are used for a roadside, pull-off area for school buses and vans and total approximately 1,300 square feet. The rain garden is approximately 11,000 square feet or about a quarter-acre and can handle up to a 10-year storm event (which is the typical runoff in about 90 percent of the storm events from this site). In addition, the pervious pavers eliminate standing water or ice on pavement and are easy to maintain and repair. The project's outreach and education activities show how these practices can be installed, maintained, and easily duplicated in other settings and communities.

Water Quality Results

The project was monitored monthly before, during, and after construction. Both the pervious and impervious parking areas were monitored to determine a difference in the quality and quantity of runoff that flowed from the different parking surfaces. Research showed that both the rain garden and pervious pavers allowed stormwater to infiltrate the ground, reducing and delaying the amount of pollution that runs to nearby streams and rivers.

The Heritage Park Rain Garden Project in Hamilton County is a good example of multi-government and community-based organizations working together to implement water runoff solutions.

Lessons Learned

The project succeeded, but there were challenges along the way. The challenges outlined below impeded project progress at times, and generated a learning experience in adaptive management for the project partners.

Be ready to redesign your project monitoring systems

Originally, the practices were monitored with lysimeters, which measure the amount of actual evapotranspiration released from an area of vegetated land. By recording the amount of precipitation that an area receives and the amount lost through the soil, the amount of water lost to evapotranspiration can be calculated.

Because the lysimeters were located within 650 feet of the Great Miami River over a high-yield portion of the Great Miami Buried Valley Aquifer, it was assumed that they would collect enough sample water for laboratory analysis, but this didn't happen. In response, the monitoring managers devised sub-surface water collection troughs with pipes, buckets and sampling ports. The monitoring managers also placed more emphasis on data collected from the project's two monitoring wells.

Accept no substitutes for rain garden materials

The contractor excavated deeper than necessary to create the depression for the rain garden. The extra material needed to re-fill the hole would have caused a budget overrun. Project partners agreed to control costs by using soil from other parts of Heritage Park for the rain garden's topsoil layer. The use of this material, however, is believed to be the cause of a drainage problem—the rain garden began to retain surface water for more than 48 hours. The substitute topsoil probably included silty clay particles that created an impervious layer. Other possible causes are that soil erosion runoff—from the nearby park construction—helped to create the sealing layer, or soil compaction from the heavy equipment working in the rain garden area.

Whatever its cause, the problem was solved by excavating holes through the rain garden's topsoil layer and filling them with gravel, allowing them to drain. Each hole was fitted with an intake pipe to ensure that stormwater would flow directly into the gravel pads whenever water levels exceeded 3 to 4 inches.

Outreach and education helps promote the project

Originally, OKI planned to promote the project solely through presentations to elected officials, but the plan was expanded to include local festivals, entertainment events, gardening programs, hunting and fishing shows, and site tours.

Costs

The pervious parking area cost $16,500 for labor and materials, excluding curbs and excavation—$12.70 per square foot (approximately). The rain garden cost approximately $15,000 excluding donated labor and materials.

Twenty-seven species of native grasses and spring-flowering perennials were planted around the pervious parking lot and in the rain garden, providing an important habitat for animals, and a burst of spring color for park visitors.

Heritage Park's parking area being prepared for pervious pavers.

Geotextile is installed in parking area.

Pervious brick pavers are installed to allow runoff to seep into the ground.

Completed parking area.