



# ELKRIDGE LIBRARY & DIY EDUCATION CENTER

New Permeable Parking Lot Ties in With Existing System to Achieve Stormwater Management Goals

## LOCATION:

Elkridge, Maryland

## PRODUCTS:

Aqualine™ 9" L - 80mm Silex Blend

## INSTALLED AREA:

45,000 sq. ft.

## SPECIFIER/ENGINEER:

Pennoni Associates – Columbia, MD

## GENERAL CONTRACTOR:

Costello Construction –  
Columbia, MD

## ARCHITECT:

Grimm + Parker – Calverton, MD

## PAVER INSTALLER:

Imperial Stone Paving –  
Elkridge, MD



## Background

Demand for the community resources provided by the Elkridge campus of the Howard County Library System had outgrown the size of the facility. The property site offered adequate space for expansion, so the county embarked on a \$28.9 million project to modernize the facility and increase the footprint to more than twice its existing size.

## The Challenge

The existing stormwater management facility included traditional storm drains and a pond. "Rainfall events in the past few years have been increasingly intense in the region, and the older stormwater facilities weren't designed for the volume," said project engineer Sharon K. Cruz, PE of Pennoni Associates.

Since original construction, the county had adopted new stormwater management requirements. Any new pavements needed to be compatible with the older system while still in compliance with these newer guidelines. "The intent of the new requirements was to treat runoff in a way to mimic existing site conditions and provide even distribution," Cruz added. The existing facility also needed to handle runoff from

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adjacent upstream properties as well as the project site without being overwhelmed by the changes. "And with a roadway immediately downstream of the existing facility, ensuring that the facility wasn't overwhelmed was extremely important."

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*Sharon K. Cruz  
PE of Pennoni Associates*

Since adopting the new stormwater guidelines, the Howard County municipal group had experienced both success and failure with permeable interlocking concrete pavements (PICPs), which allow water to percolate through paver joints and bedding layers into the ground below. "The main reason for their varied success was often due to compacted soils that wouldn't allow water infiltration," said Cruz. "For this project, though, the biggest challenge for PICP was the slope."

### The Solution

Parking spaces in the main parking lot were designed to be permeable. Joint openings between the pavers ranged from 7 to 8 mm and were filled with a highly permeable filter aggregate (ASTM No. 9 stone). The open-graded base of aggregate beneath the pavers were designed to act as a reservoir to hold stormwater like a detention basin until it could be released back into the environment, minimizing runoff from the property. Entrances and driving aisles were not permeable to prevent underlying utilities from being impacted by detained rainwater. Cruz specified Aqualine® 9L pavers for the product's permeable capabilities and traffic load capacity. Cruz also preferred Belgard's® localized manufacturing network. The proximity of a plant only 25 miles from the job site meant significant time and cost savings. "We try to specify a product available locally when we can," Cruz said. "Not only is that a better cost savings in terms of shipping, it also keeps the economics local, which is better for everyone."

Adjustment were made to the PICP system design to account for the slope. "We had to level the bottom of the base and step some sections down instead sloping them, which also helped reduce the price of the installation," Cruz said.

### The Result

The new facility opened in 2018. The Aqualine® product helped the project obtain LEED® Gold certified due to both the reduction in impervious area and local sourcing. The project also won a USGBC® Wintergreen Award for environmental stewardship. Due to the infiltration rates of the PICP, expansion of the pond was not required, and the new combined systems are functioning together as designed, according to Cruz.

The Belgard team returned to visit the site one year after paver installation and measured surface infiltration in accordance with ASTM C1781, Standard Test Method for Surface Infiltration Rate of Permeable Unit Pavement Systems. Four representative locations were tested using an infiltrometer ring to measure the rate of water absorption. The average surface infiltration rate measured was 155 inches/hour, an indication that the system was functioning as designed and the surface was not generating surface runoff.

"We are using this project as a case study to monitor over the next couple of years for Howard County," said Kathy Walsh, Belgard Commercial Sales. "This is an opportunity to show the long-term performance of a largescale PICP project in helping to meet their new regulations."



#### About Belgard Commercial®

Belgard Commercial, part of Oldcastle® APG, offers a complete collection of paver and wall products for plazas, terraces, parking areas, roadways, rooftops and retaining walls. Available in a range of styles, premium Belgard Commercial products have been found in the nation's finest developments and award-winning commercial and retail properties since 1995.

Oldcastle APG is part of CRH's Building Products division. As the largest building materials company in North America, CRH provides a single-source solution for commercial construction projects with a full portfolio that also includes structural masonry, masonry veneers, dry mix products, hardscape jointing sands and sealants, stormwater management systems, concrete infrastructure, architectural glass, lawn & garden products, and composite decking.