Case Study

BELGARD COMMERCIAL

RICHARD H. FULTON COMPLEX

Previous Asphalt Parking Lot Gets a Permeable Interlocking Concrete Paver Upgrade

LOCATION:
Nashville, Tennessee

PRODUCTS:
Aqua-Bric® Type 4

INSTALLED AREA:
52,000 sq. ft.

DESIGNERS:
Sir David Adjaye

HuntonBrady

INSTALLER:
Cumberland Valley Construction, Aqua Paving Construction

Background

In 2005, when Nashville was seeking a parking solution for the Richard H. Fulton Complex Metro Water Service Fulton campus, it looked for a pavement system with low impact benefits to meet new local stormwater requirements under the EPA and the Clean Water Act. Like many municipalities across the country seeking to meet stormwater regulations and take environmental stewardship to the next level, the primary goal was sustainability. Nashville's installed a 52,000 sq. ft. porous asphalt parking lot as part of a low impact design (LID) system to control stormwater runoff. When porous asphalt was chosen, it was a sound decision at the time based on industry buzz around the low impact design that promised stormwater infiltration instead of runoff. The system was intended to reduce peak flows as the water would pass through the wearing course and then travel to bioretention islands and bio-retention swales before being introduced into the traditional storm water system. An under drain configuration of pipes was put in place to make sure the water was directed to the various bioretention islands and swales. A few years later, it was discovered that the asphalt couldn't carry the weight of its burden in traffic and storm water management, and continuous maintenance was necessary to keep the asphalt pores free of debris and functioning properly. Ultimately, due to the consistent maintenance/sweeping, the parking lot had eroded the asphalt surface making it unsafe for walking on the surface.

The Challenge

The city needed to replace the porous asphalt parking lot with a new, long-term, sustainable solution that could control stormwater runoff and also be implemented quickly.

The Solution

The solution was a permeable interlocking concrete paver (PICP) makeover from Belgard®. In 2012, the City of Nashville

elected to replace the failing porous asphalt with Belgard permeable interlocking concrete pavers, basing the decision on the performance benefits of PICP— strength, durability, superior functionality and lower lifetime maintenance—and the effective results PICP was gaining in other projects. Nearby shopping center, Gateway Village—a 92,000 square-foot mixed-use parking lot in Murfreesboro—had recently installed a PICP system and was able to show exceptional results and success in the two years following the install.

Working with a grant from the City of Murfreesboro, the Concrete Industry Management program at Middle Tennessee State University studied water quality and quantity using an ISCO sampler situated at the site for two years. In that period of time, there was 41 inches of rain (2.3 million gallons of water) and they found that there was no water discharge at the outlet located at the back of the site. All of the water from the rooftops and parking surface was infiltrated back into the soil and replenished into the groundwater aquifer system. With this case study in hand and several other area commercial projects seeing success in permeable pavers, the City of Nashville had a clear path for a long-term solution.

Permeable interlocking concrete pavers offered both a long-term sound environmental solution and a short-term benefit. During construction, half the parking area needed to remain open to the public to conduct business with the various government offices that share the lot. Contractor Cumberland Valley Construction and installer Aqua Paving Construction began by demolishing and removing the existing four to five inches of porous asphalt. The area was regraded to bring the existing #57 open-graded aggregate to a compacted elevation of -5". The project team placed and screeded #8 washed chips as a setting bed and support of the 80mm (3") thick concrete permeable pavers.

They mechanically placed the Belgard Aqua Bric Type 4 permeable pavers in 12 square foot layers in the final laying pattern. The pavers were saw-cut at the edges, as required, and the installation crew used a 5,000-pound plate compactor to force setting bed and pavers into position. Once this portion of the project was completed, they were able to sweep and compact washed ¼-inch chips into joints (the open spaces between the pavers). The job was estimated to take six weeks, but the mechanical installation helped reduce the schedule by two weeks. Additionally, the areas completed were immediately available the next day for business parking, since no curing time is required for PICP.

The Result

In addition to keeping the parking lot open during renovation, the project team also was able to save time during the installation phase thanks to the condition of the base. The layer of No. 57 stone needed very little re-leveling, and the existing bioswales and original storage capacity were both in good condition and did not need replacing or reconstruction.

After the installation, the City of Nashville enlisted the help of the local fire department to conduct a demonstration of the new paver parking lot's infiltration capabilities. Thousands of gallons of water was released in an isolated area to show the infiltration rates. The test proved the stormwater benefits; permeable pavers efficiently reintroduce rain water back into the ground, reducing the amount of stormwater runoff entering the Cumberland River and carrying with it contaminants and pollutants.

Additionally, the engine from the Nashville Fire Department illustrated the structural capability of the paved parking surface, whose concrete pavers offer both durability and aesthetics. Permeable interlocking concrete pavers provided the City of Nashville with a post-structural Best Manufacturing Practice that reflects its commitment to sustainability and safety.

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.