

WILLOW CREEK PERMEABLE PAVERS REDUCE STORMWATER RUNOFF TO PROTECT THE MISSISSIPPI RIVER IN MINNEAPOLIS

Willow Creek Permeable Pavers are helping to dramatically reduce stormwater and pollutant runoff from a mile-long stretch of two streets in downtown Minneapolis. About 15,000 square feet of Willow Creek Brickstone Permeable pavers were installed as part of the Marquette Avenue and Second Avenue South Transit Project (Marq2), which runs through the heart of downtown.

The entire Marq2 project reduces stormwater runoff from nearly 5.5 acres. Marquette and Second Avenues, which run parallel to one another, were rebuilt from building front to building front on both sides over 12 blocks. The new streetscape includes wider sidewalks paved in part with permeable pavers, new transit shelters, public art, and 190 new trees.

The trees are planted in an innovative drainage system designed to collect stormwater runoff through the permeable pavers and hold it underground rather than divert it to storm sewers that discharge directly into the Mississippi River. The stormwater retention system, made by DeepRoot, comprises an underground grid of nearly 11,000 plastic-framed cells each filled with about 580 cu. ft. of a bioinfiltration soil mix. A grated cap is placed over the top of the filled cells and covered with a geotextile membrane. A layer of granite infiltration stone, about 2" to 3" in diameter, is placed on top of the geotextile, followed by a layer of smaller granite bedding aggregate. Brickstone Permeable pavers are laid on top of the aggregate, allowing runoff to drain into the soil-filled chambers below.

The trees, a mix of hardwoods and ornamentals, are planted in the soil mix and surrounded by iron grates. The stormwater that drains through the permeable pavers and grates not only reduces runoff to the river, it also precludes the need for irrigation. Each cell can hold up to 116 cu. ft. of stormwater in the uncompacted soil mix around the roots of the trees. Water slowly filters out from the cells naturally and through perforated pipe.

Chris Behringer, senior urban designer with SEH in Minneapolis, says permeable pavers are an excellent site solution for many municipalities concerned about stormwater runoff.

"As landscape architects, we're very interested in sustainability and best management practices," says Behringer. "Because stormwater management is such a huge issue, permeable pavers are becoming a regular part of our process in determining what we can do to infiltrate water rather than just drain it off. And," she adds, "There's a higher comfort level with pavers than there are with other permeable surfaces like porous concrete or asphalt."

Thanks to the combined use of Willow Creek Permeable Pavers and the DeepRoot bioinfiltration system, up to 21,600 cu. ft. of stormwater from each rain event will be stored and kept from draining into the Mississippi River. The system's filtration process through the soil will remove over 80 percent of the phosphorus, 60 percent of total Kjeldahl nitrogen and over 90 percent of the lead, copper, zinc and iron from the stormwater.

Property owners in the Marq2 district will reap financial as well as environmental benefits. The City of Minneapolis assesses a stormwater utility fee on all properties, including nonprofits and government buildings, to pay for the costs of stormwater management. Property owners in the project area can apply for Stormwater Utility Credits, which will reduce their stormwater bill by half.



PROJECT:
Marquette Avenue & Second
Avenue South Transit Project,
City of Minneapolis, Minnesota.

DATE COMPLETED:
October 2009

PRODUCT USED:
Willow Creek Brickstone
Permeable Pavers, Color: Slate

QUANTITY:
Approx. 15,000 square feet on
48 blocks of city sidewalks.

PAVER SUPPLIER:
Willow Creek Concrete
Products, Oakdale, MN

**LANDSCAPE ARCHITECT/
ENGINEER:**
SEH, Minneapolis, MN

INSTALLER:
Glacial Ridge Inc., Willmar, MN