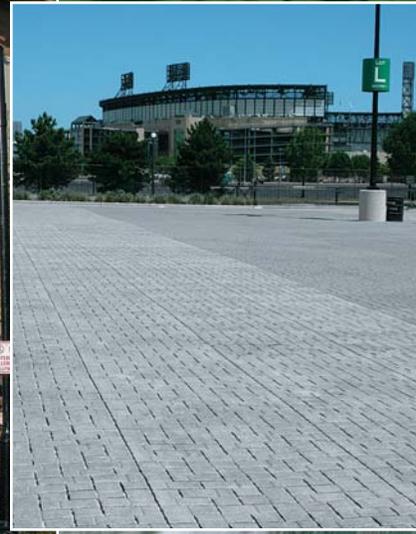




UNI-GROUP U.S.A.
Manufacturers of UNI® Paving Stones



Eco-Stone® Family of Permeable Interlocking Concrete Pavers
PROJECT PROFILES

Introduction

In 1989, the manufacturers of UNI-GROUP U.S.A. became the first interlocking concrete paver producers to introduce permeable pavers to North America. As leaders in the industry for more than 35 years, we have been at the forefront of new product development, technologies and advancements to meet the needs of an ever-changing marketplace.

Our first permeable paver, UNI Eco-Stone,[®] was developed in response to the implementation of the Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System, which mandates that municipalities and states require the use of best management practices (BMPs) to manage stormwater runoff to control non-point source pollution. Permeable interlocking concrete pavers (PICP) are an EPA-recommended infiltration BMP that filters runoff through aggregate and soils to reduce pollutants.



UNI[®] Permeable Pavers are very effective at reducing the volume of stormwater runoff and its associated pollutants through infiltration and detention. They are ideal for areas where storm sewers are at capacity, where detention or retention ponds are not feasible, when groundwater recharge is a priority due to population demands or drought, and in areas where impervious cover is restricted.

In the last few years, low impact development (LID), Smart Growth, sustainability, and green building have become popular – to the extent that many states and municipalities have adopted and implemented the construction practices encouraged by LID and LEED,[®] the voluntary green building assessment system from the U.S. Green Building Council. These approaches are quickly gaining favor across the country and are being incorporated into local development regulations to help meet stormwater runoff requirements and create more sustainable communities. Permeable and porous pavements are recommended practices under these programs as they reduce impervious cover and infiltrate rainwater on site where it can be used for more beneficial purposes. When used in conjunction with other practices, UNI[®] Permeable Pavers are a way to help preserve and protect the nation's water resources.

With permeable interlocking concrete pavements becoming more popular with municipalities, engineers, landscape architects, builders, and land developers, UNI[®] now offers a number of paver designs in the Eco-Stone[®] Family of Permeable Pavers:

- **Eco-Stone[®]** is the original permeable paver, first introduced in 1989
- **Ecoloc[®]** features an angled design that interlocks to withstand heavy, industrial loading
- **Eco-Optiloc[®]** combines three cobble shapes in a single L-shaped unit that offers superior structural strength under traffic loads
- **Eco-Priora[®]** can be produced in a variety of square and rectangle sizes for design versatility, and the minimal chamfers and narrower joints are ideal for pedestrian areas and ADA handicap-accessible pavements, as well as vehicular-trafficked applications



With millions of square feet of residential, commercial, municipal and even industrial permeable paver projects in North America, you can trust the name that is known world-wide for quality, durability, and reliability – UNI[®] Paving Stones. We've included a few of our manufacturers' projects in this brochure to demonstrate the versatility and beauty of the Eco-Stone[®] Family of Permeable Pavers. To learn more and find a manufacturer near you, visit www.uni-groupusa.org.

McKinney Green Building

The McKinney Green Building in McKinney, Texas, was one of the first in the country to achieve a LEED® Core and Shell Platinum rating from the USGBC. Over 80,000 sf of Eco-Stone® permeable pavers were used for the parking lot to clean stormwater, reduce heat island effects, and minimize negative impacts from runoff. “It’s important to design buildings and spaces that lessen the impact on the environment,” said Curt Parde, LEED AP, of HDR Architecture and project manager for McKinney.¹ The building is projected to reduce energy use by over 70 percent compared to a conventional office building. The facility is leased to tenants. HDR also developed “Green Tenant Guidelines” to encourage tenants to incorporate sustainable design into their respective spaces as well.



Construction Details

- Pavers 3 1/8" (80mm) thick UNI Eco-Stone®
- Square Footage 80,000
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 4" thick ASTM No. 57 stone
- Subbase 16" thick ASTM No. 2 stone

Architect/Manager: Curt Parde
HDR Architecture

Owner: West World Holding, Inc.

UNI Manufacturer: Pavestone Company
Date Installed: 2006
Paver Contractor: Concrete Paver Systems



U.S. Cellular Field

The Illinois Sports Authority wanted the new home of the Chicago White Sox to be “green,” right down to its parking lot. The 265,000 sf permeable Eco-Optiloc® pavement is currently the largest in the U.S. and the first to be used by a major league sports facility.

The Eco-Optiloc® permeable pavement saved about \$400,000 over traditional impervious asphalt, as underground drainage systems were not required. The hydrological design of the permeable pavement was developed according to the 2008 City of Chicago Stormwater Management Ordinance that seeks to minimize stormwater runoff from new development and redevelopment.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Optiloc®
- Square Footage 265,000
- Bedding & Joints 2" thick CA-16 (ASTM No. 8 stone)
- Base 6" thick CA-7 (ASTM No. 57 stone)
- Subbase 8" thick recycled crushed concrete CA-1 (Equivalent to ASTM No. 2 stone)
- Subgrade Silty Sand

Project Design: Ernest Wong, Site Design Group, Ltd.

Engineering: Robert Giurato, P.E.
Environmental Design International

Owner: Illinois Sports Facilities Authority

UNI Manufacturer: Unilock Chicago, Inc.
Date Installed: 2008
Paver Contractor: Midwest Brick Paving
General Contractor: Rose Paving

Hopworks Urban Brewery (HUB)



HUB is Portland, Oregon's first "Eco-Brewpub." Though the owner, who also was the designer, did not have to use permeable paving to meet stormwater regulations, he was committed to green building design methods and materials for this parking lot project. The HUB website promotes sustainability and they use organic ingredients in both the beer brewed on the premises and in the foods they prepare in their establishment.

This philosophy of using sustainable, local materials was used to design the brew pub and even extends out to the Ecoloc® permeable interlocking concrete pavement upper parking lot, which infiltrates stormwater and retains it on site. As an added environmental bonus, its light color reduces urban heat island effects.

Construction Details

- Pavers 3 1/8" (80mm) thick Ecoloc®
- Square Footage 6,000
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 4" thick ASTM No. 57 stone
- Subbase 10" thick ASTM No. 2 stone

Architect/Designer: Roy Ettinger

Owner: Christian Ettinger
Hopworks Urban Brewery

UNI Manufacturer: Mutual Materials, Inc.
Date Installed: 2007
Paver Contractor: Eastern States Paving
Dave Carlton, Project Mgr.
General Contractor Roy Ettinger

Commercial Office Building

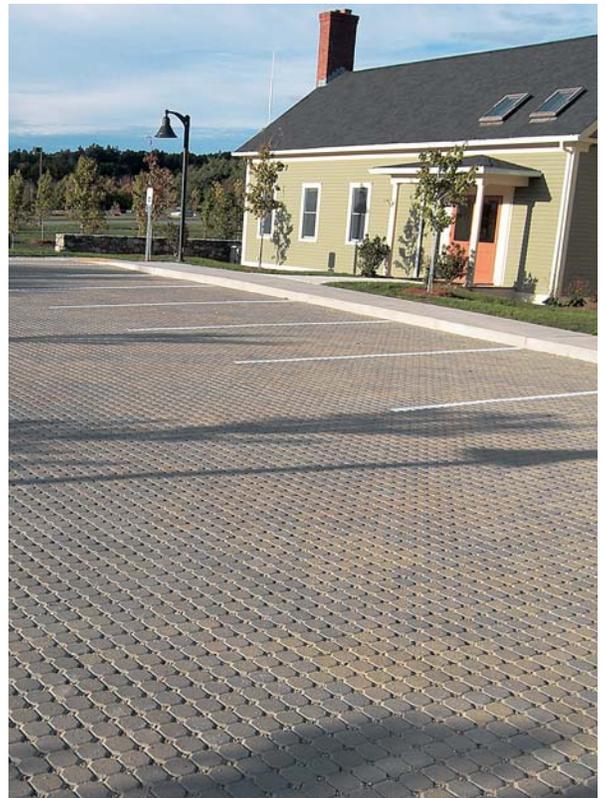
Located on Route 110 in Littleton, Massachusetts, this project demonstrates an ideal application for permeable interlocking concrete pavers. The parking lot offers a way to reduce stormwater runoff, while providing an attractive and durable pavement capable of supporting vehicular loads. To complement the building's color and style, Eco-Stone® permeable pavers in Pavers by Ideal's popular Vineyard Blend color were selected.

An added advantage of using permeable interlocking concrete pavements in New England is that they can withstand repeated freeze-thaw cycles without heaving due to the void space within the open-graded base. Moreover, less deicing salts are needed, as snow melts and drains through the voids in the surface, thereby minimizing the formation of ice. As there is no method for removing chlorides from stormwater, this provides an environmental benefit.

Construction Details

- Pavers 3 1/8" (80mm) thick UNI Eco-Stone®
- Square Footage 6,000
- Bedding & Joints 1 1/2" thick 3/8" stone
- Base 2" thick 3/4" open-graded stone
- Subbase 15" thick 1 1/2" open-graded stone
- Subgrade Well-draining

Engineering: VHB Engineers

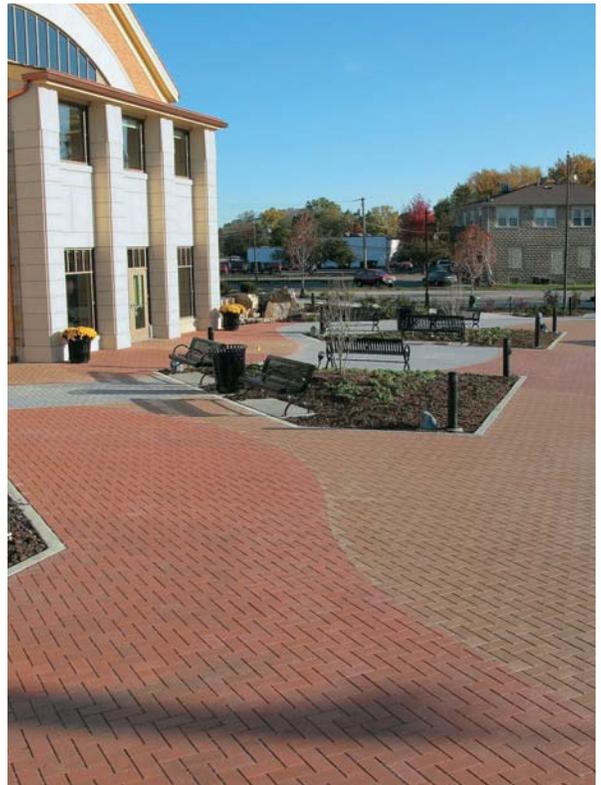


UNI Manufacturer: Ideal Concrete Block Co., Inc.
Date Installed: 2009
Paver Contractor: Chrisom Brick & Stone, Inc.

Montgomery Village Hall

Montgomery Village in Illinois didn't want just any pavement for their new city hall. They wanted to make a statement with different colors, shapes and textures, as well as have a pedestrian-friendly permeable pavement.

Eco-Priora® offered the perfect solution for the project. Several custom colors and Unilock's Series 3000® finish were used to create a unique pavement design at the front entrance of the building. Curved designs were hand-cut into the pavement to create free-form areas that flow together and delineate pathways.



Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Priora®
- Square Footage 14,000
- Bedding Layer 1 1/2" thick ASTM No. 8 stone
- Paver Joints ASTM No. 89 stone
- Base 4" thick ASTM No. 57 stone
- Subbase 10" thick ASTM No. 2 stone
- Subgrade Clay with underdrains

Landscape Architect: Schoppe Design Group

Engineering: Jason Bauer
Engineering Enterprises

Owner: Montgomery Village, IL

UNI Manufacturer: Unilock Chicago, Inc.

Date Installed: 2008

Paver Contractor: Landworks, Ltd.



Toronto Parking Authority

Eco-Optiloc® permeable interlocking pavers were selected for a pilot project being conducted by the Toronto Parking Authority to reduce stormwater runoff in a municipal car park located at the northeast corner of Ossington and Bloor Streets in Toronto, Ontario.

All parking spaces on the north side of the parking lot feature Eco-Optiloc® pavers, with an asphalt driving lane and asphalt parking lanes at the south end of the lot. Primary drainage for the project is through the pavers, with overflow curb cut-outs to a bio-swale located adjacent to permeable pavers. Any excess overflow, if present in the swales, is ultimately directed to a catch basin.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Optiloc®
- Square Footage 1500
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 6" thick Granular "A" (ASTM No. 57 stone)
- Subbase 12" thick Granular "B" (ASTM No. 2 stone)
- Geotextile Used under base and up sides

Engineering/Design City of Toronto, Ontario
Trow Engineering

Owner: City of Toronto, Ontario

UNI Manufacturer: Unilock, Ltd.
Date Installed: 2007
Paver Contractor: Islington Nurseries
General Contractor City of Toronto
Toronto Transit Commission



Triangle Parking Plaza

The Stone Mountain Memorial Association in Georgia wanted to accomplish a number of goals when building a new parking lot at Stone Mountain Park. Stormwater management, groundwater recharge, and the ability to get materials locally were important aspects, but they also wanted a pavement that would be durable and allow for ease of repair, as well as make a statement about the park's commitment to sustainable design. UNI Ecoloc® permeable pavers were the ideal solution for the 430-space lot. The anchor-interlocking shape of Ecoloc® offers structural stability under traffic loads and provides an attractive, durable permeable surface. A unique design feature is that the permeable lot is divided into three tiered sections to accommodate the downward slope of the site.

Construction Details

- Pavers 3 1/8" (80mm) thick Ecoloc®
- Square Footage 160,000
- Bedding & Joints 2" thick ASTM No. 89 stone
- Base 12-18" thick ASTM No. 57 stone
- Geotextile Mirafi FW700
- Subgrade Sandy Loam

Engineering & Landscape Arch.

Robert and Company

Owner:

Stone Mountain Memorial Association

UNI Manufacturer: Pavestone Company
Date Installed: 2008
Paver Contractor: Flintstone Paving
General Contractor: Integra Construction

Snoqualmie Fire Station

The use of permeable pavement and its ability to manage rainfall and runoff is gaining popularity in the Pacific Northwest. The City of Snoqualmie in Washington wanted to expand their "green" objectives to include their new fire station.

Due to the significant weight of the hook-and-ladder truck and its four outrigger plates that exert forces up to 9,000 psf each, Ecoloc® permeable interlocking pavers were chosen for the access road to the fire station headquarters. Ecoloc's® angled design provides superior interlock under heavy and industrial loads. The road also contains a section of traditional UNI-Anchorlock® pavers that serves as an extension of the sidewalk and complies with ADA guidelines.

Construction Details

- Pavers 3 1/8" (80mm) thick Ecoloc®
3 1/8" (80mm) thick UNI-Anchorlock®
- Square Footage 1,500
- Bedding & Joints 1 1/2" thick Crushed Gravel (ASTM No. 8)
- Base 18" thick Crushed Rock (ASTM No. 57)
- Subgrade Glacier Till

Architect: TCA Architecture - Planning, Inc.

Engineering: HWA Geo Science

Owner: City of Snoqualmie, WA



UNI Manufacturer: Mutual Materials, Inc.
Date Installed: 2005
Paver Contractor: BC Pavers

Goodbys Creek Marina

When developing the city-owned marina, Jacksonville, Florida, needed a permeable pavement to manage stormwater runoff and keep it from discharging into Goodbys Creek, which flows into the St. Johns River. Eco-Stone® not only made an attractive choice, but also was strong enough to support larger vehicles towing boats to the boating ramp. The parking bays were designed with Eco-Stone® and the travel lanes were paved with traditional asphalt. The runoff from the asphalt pavements drain towards the permeable pavers so they can capture that runoff as well.

The city is pleased with the performance of the Eco-Stone® permeable interlocking concrete pavers and has been specifying them for use in other areas of the city.



Construction Details

- Pavers 3 1/8" (80mm) thick UNI Eco-Stone®
- Square Footage 23,600
- Bedding & Joints 2" thick 3/8" pea rock (ASTM No. 8)
- Base 12" thick ASTM No. 57 stone
- Subgrade Sandy

Engineering: Arcadis Engineering

Owner: City of Jacksonville, FL

UNI Manufacturer: Oldcastle Coastal
Date Installed: 2005
Paver Contractor: CityStone



Center Street Village

Center Street Village in Mentor, Ohio, is a redevelopment project that converted the old Center Street School building into residential condominiums. To make the project more attractive to residential and commercial buyers in a poor economy, townhouses and commercial space were added and Eco-Optiloc® permeable interlocking pavement was chosen for all parking and drive lanes. The cobble-like pavers enhance the historic architectural style of the buildings and also manage stormwater from the entire 10-acre site with fewer storm pipes and without a traditional detention pond. Designed for a 100-year storm event, the engineer notes that only minimal runoff to the city's sewer system has occurred during the heaviest of storms.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Optiloc®
- Square Footage 110,000 (All 3 Phases)
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 4-6" thick ASTM No. 57 stone
- Subbase 8-10" thick ASTM Nos. 1 & 2 stone
- Subgrade Sandy Gravel

Architect: Forum Architects

Engineering: Rick Cantanzriti
 Land Design Consultants

Owner: Rick Osborne, Jr., Junior Properties

UNI Manufacturer: Unilock Ohio, Inc.
Date Installed: 2007
Paver Contractor: Syrstone



Chicago Green Alleys

The city of Chicago has more miles of public alleys than anywhere in the world – over 1,900 miles. All of that pavement, however, poses a problem in handling stormwater runoff, causing flooding and overburdening sewer systems. To address the problem, the city and consulting engineers developed the “Green Alley Program.” Janet Attarian, director of the Chicago Department of Transportation’s streetscape and sustainable design program, noted that “the CDOT wanted permeable alleys, so the water goes into the ground, and it wanted alleys that reflect, rather than retain heat.”² Eco-Optiloc® permeable pavers were used for a number of alleys, along with pervious concrete and porous asphalt. Due to the success of the pilot projects, the CDOT is using permeable pavers in parkways, for permeable parking lanes, and for parking lots.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Optiloc®
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 12" thick gravel or crushed stone
- Subgrade Mix of clay, sand and gravel

Project Design & Engineering:

Janet Attarian, CDOT
Jeff Wickencamp, Hey & Associates

Owner:

Chicago Department of Transportation

UNI Manufacturer: Unilock Chicago, Inc.
Date Installed: 2006

Warrenville Road

In 2007, the city of Warrenville, Illinois, became the first community in the Midwest to use permeable interlocking concrete pavers on a public road. The road was the city’s first “green” project and demonstrated the community’s strong commitment to the environment. The reconstruction of a mile-long stretch of Warrenville Road was done in three phases to minimize impacts on the residents, businesses, and community facilities along the roadway. The “L-shaped” Eco-Optiloc® pavers provide superior structural support under traffic loading, as well as allow stormwater to infiltrate into the soil to help recharge the city’s aquifer. Any excess stormwater is filtered by the gravel base beneath the roadway before it reaches the west branch of the DuPage River, so that it is cleaner than stormwater from storm sewers that funnel water from asphalt or concrete roadways. Winter snow plowing has been conducted since 2007 without any problems.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Optiloc®
- Square Footage 125,000
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 4" thick ASTM No. 57 stone
- Subbase 18" thick ASTM No. 2 stone

Engineering:

Frank J. Novotney

Owner:

City of Warrenville, Illinois



UNI Manufacturer: Unilock Chicago, Inc.
Date Installed: 2007-2009
Paver Contractor: C.R. Schmidt Brick Paving

College School of Webster Groves

The College School of Webster Groves in Missouri underwent a multi-million dollar improvement campaign in an effort to use low impact, green design and construction techniques. The 17,000 sf Eco-Stone® permeable interlocking concrete parking lot was an integral part of the renovation project, allowing the school to minimize runoff and meet structural and design requirements for vehicular traffic. Project architect Steve Dehekker, vice-president of Hastings & Chivetta, worked with Kirchner Block & Brick to delineate parking spaces with contrasting colored pavers, which created a plaza effect instead of a traditional, monochromatic parking lot and eliminated the need for parking lane striping.



Construction Details

- Pavers 3 1/8" (80mm) thick UNI Eco-Stone®
- Square Footage 17,200
- Bedding & Joints 1/4-3/8" clean Iron Mountain Trap Rock
- Base 4" 3/4" clean Limestone
- Subbase 12" 2 1/2-3" clean Limestone

Engineering: Frontenac Engineering

Architect: Hastings & Chivetta

Project Manager: Kozeny-Wagner

Owner: The College School of Webster Groves, MO

UNI Manufacturer: Kirchner Block & Brick, Inc.

Date Installed: 2006-2007

Paver Contractor: RES-COM (2006)

Paver Contractor: Masters Contracting (2007)



The Portlands

Waterfront Toronto wanted to use a permeable pavement at The Portlands on Toronto Island to reduce the impact of stormwater runoff on Lake Ontario. They selected Eco-Optiloc® permeable interlocking pavers to replace the asphalt access way between two artificial turf playing fields, both for its aesthetics and its ability to infiltrate rainwater.

The site was formerly used for industrial purposes and the city is investigating the possibility of revitalization and redevelopment of the island for the public's use and provide a reconnection to the waterfront. In addition to the playing fields, Waterfront Ontario also built a playground at the location.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Optiloc®
- Square Footage 6,000
- Bedding & Joints 2" thick Clear Chip Gravel (1/4")
- Base 7" thick Granular "A" (ASTM No. 57)

Architect: Forum Architects

Engineering: Earth Tech (Stormwater & Geotechnical)

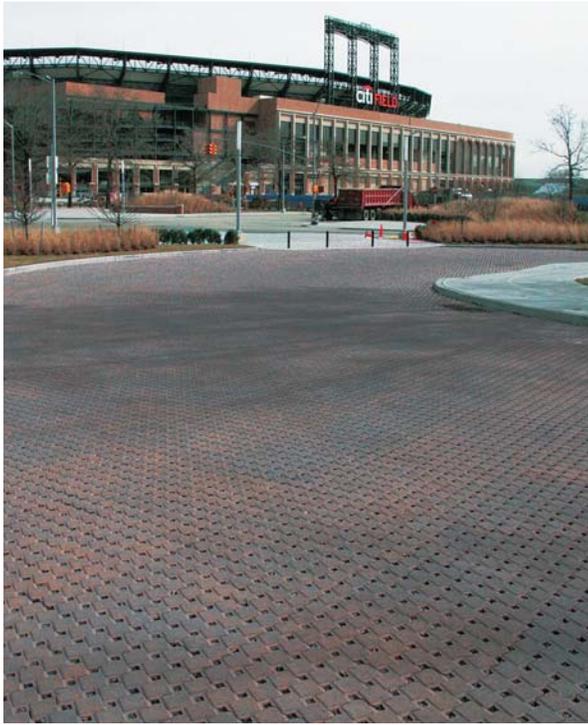
Landscape Architect: The Hough Group

Owner: Waterfront Toronto, Ontario

UNI Manufacturer: Unilock Ltd.

Date Installed: 2008

General Contractor: Dol Turf



Citi Field

The New York Mets new stadium is going green with technological innovation and a commitment to sustainable development. Citi Field has been cited by EPA regional administrator, Alan J. Steinberg as a leader in the sports industry and is reducing its carbon footprint with the construction and operation of Citi Field.³

Over 80,000 sf of Ecoloc® permeable interlocking pavers were installed in the commuter bus parking lot across from the field to control stormwater runoff and recharge groundwater. The design also incorporated a 3,500 sf drainage bed next to the parking area for overflow during excessive storm events. The Ecoloc® paver's angled interlocking design offers superior structural support under the heavy bus loading the area receives.

Construction Details

- Pavers 3 1/8" (80mm) thick Ecoloc®
- Square Footage 80,000
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 12" thick gravel or crushed stone

Architect: HOK Sport

Developer: Queens Ballpark Co., LLC

Owner: Sterling Equities

UNI Manufacturer: Unilock New York, Inc.
Date Installed: 2008
Paver Contractor: Syrstone, Inc.
Developer: Queens Ballpark Co., LLC

Dogwood Terrace

A permeable pavement was required for this parking lot for an upscale restaurant in Acworth, Georgia, due to site limitations. The environmentally-conscious owner was willing to capture and store rainwater on site in a 1500-gallon tank that would be used to irrigate the property in an area that has water restrictions due to a prolonged drought.

Approximately 8,000 sf of pewter Eco-Stone® pavers were installed with a decorative border and inset circle of traditional pavers as an accent. Parking stripes are delineated by charcoal Eco-Stone® pavers, so restriping won't be required over time.



Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Stone®
- Square Footage 8,000 sf
- Bedding & Joints 1 1/2" thick ASTM No. 89 stone
- Base 8" ASTM No. 57 stone
- Subbase 4" ASTM No. 34 stone
- Geotextile Subsurface Drain

Architecture: Lyles & Associates

Engineering: Consulting Engineering

Landscape Architect: Ross Engineering

Owner: Darlene Stone

UNI Manufacturer: Pavestone Company
Date Installed: 2008
Paver Contractor: Unique Paving

Tacoma Community College

Tacoma Community College is located in the Leach Creek Watershed where most stormwater runoff is largely undetained and untreated and ultimately discharges to the Leach Creek Holding Basin, which is overseen by the Tacoma, Washington Public Works Department.

Working with Tacoma Community College and City of Tacoma staff, JKA Civil Engineering designed a parking lot utilizing UNI Ecoloc® permeable interlocking pavers to store stormwater runoff and infiltrate it into the subgrade. The 250-stall lot was built on an undeveloped area of bare earth and worn grass that had historically been used for “overflow” parking by students when the conventional paved lots were full.

Construction Details

- Pavers 3 1/8" (80mm) thick UNI Ecoloc®
- Square Footage 85,000
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 8" thick ASTM No. 57 stone
- Subgrade Sandy Loam
- Geotextile Used between base and subgrade

Engineering: JKA Civil Engineering

Owner: Tacoma Community College
Tacoma, WA



UNI Manufacturer: Mutual Materials, Inc.
Date Installed: 2004
Paver Contractor: BC Pavers, Inc.
General Contractor: Harlow Construction



Autumn Trails

As an environmentally-conscious developer, George Bialecki, Jr., is an advocate for green building and feels his projects sell faster because of it. For his Autumn Trails community in Moline, Illinois, he used over 39,000 sf of Ecoloc® permeable interlocking pavers for the community’s roadways for their ability to reduce stormwater runoff. An added benefit of using the permeable pavers was that he saved thousands of dollars in drainage construction costs and runoff fees and also was able to eliminate a detention pond, which made more land available for housing units and greater profitability.

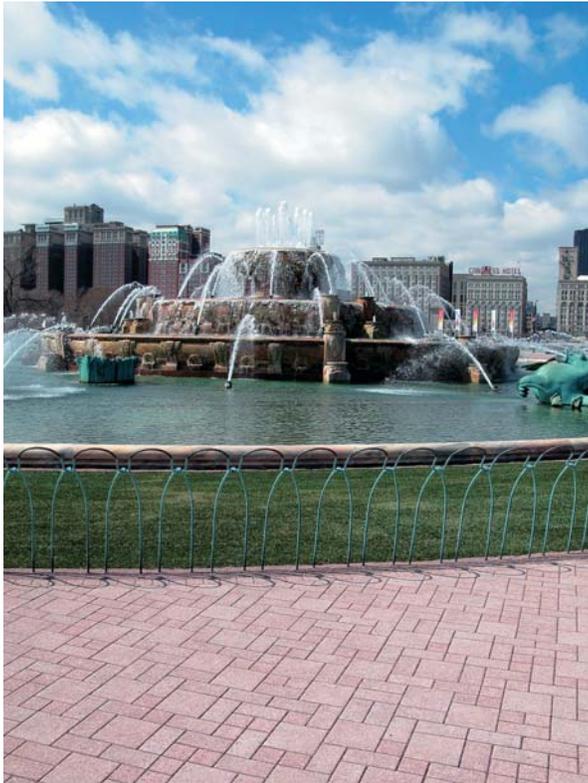
Construction Details

- Pavers 3 1/8" (80mm) thick Ecoloc®
- Square Footage 39,000
- Bedding & Joints 2" thick Illinois DOT CA-16 stone
- Base 8" thick CA-7 stone (ASTM No. 57)
- Subbase 8" thick CA-1 stone (ASTM No. 2)
- Drainage Perforated pipe to remove excess water
- Geotextile Between subbase and subgrade

Designers: George Bialecki, Jr.
Alternative Energy Builders
Robert McLean
Twins Landscaping and Design

Owner: George Bialecki, Jr.

UNI Manufacturer: Unilock Chicago, Inc.
Date Installed: 2006



Buckingham Fountain

The Clarence F. Buckingham Memorial Fountain is the centerpiece of Grant Park in Chicago, Illinois. When the Chicago Park District (CPD) and the Art Institute of Chicago decided the fountain and surrounding pavement needed extensive renovations, stormwater solutions were not part of the plan. However, with the implementation of the City of Chicago's green initiative, sustainability and stormwater detention became important aspects of the design. The CPD's main goals were ADA accessibility, durability, the ability to take up and reinstall the hardscape without patching, and historical character. As a result, project designer Thompson Dyke & Associates selected Eco-Priora® permeable concrete pavers, manufactured by Unilock Chicago with a custom Series 3000® exposed-aggregate finish to match the historical pavement color.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Priora®
- Square Footage 236,000
- Joints Open-graded crushed granite
- Bedding 2" thick Illinois DOT CA-16 stone
- Base 12" thick CA-7 stone (ASTM No. 57)

Landscape Architect & Engineering: Peter Dyke, AICP
Thompson Dyke & Associates

Owner: Chicago Park District

UNI Manufacturer: Unilock Chicago, Inc.
Date Installed: 2008
Paver Contractor: LPS Paving

Anchorage Inn

Anchorage Inn, located in York, Maine, needed to comply with coastal stormwater runoff requirements for their parking lot, yet provide an attractive pavement surface for their inn that boasts Atlantic Ocean vistas. Eco-Stone® permeable interlocking pavers offered the perfect solution. Maine's Department of Environmental Protection has incorporated low impact development practices and techniques into their stormwater management manual and these practices, which include the use of permeable pavements, control flow generation at the source and prevent the production of large volumes of stormwater runoff.

The design incorporates contrasting parking lane stripes of rectangular pavers in Pavers By Ideal's Beacon Hill Blend color that will save the inn on future re-stripping costs.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Stone®
- Square Footage 20,000 sf
- Bedding & Joints 1 1/2" thick 3/8" chip stone
- Base 18" thick 1 1/2" graded stone
- Subgrade Well-draining coastal soil

Engineering: Ideal Concrete Block Company, Inc.

Owner: Anchorage Inn



UNI Manufacturer: Ideal Concrete Block Co., Inc.
Date Installed: 2008
Paver Contractor: Chrisom Brick & Stone

Bioline

Stormwater management and potential LEED® United States Green Building Council certification were just two of the reasons that Eco-Priora® permeable interlocking concrete pavers were chosen for the driveway and parking lot of Bioline Fishing in Portland, Oregon.

The 8" square units offer easy pedestrian accessibility, especially for ADA handicap requirements, but they also provide superior structural stability under vehicular loads due to their patented interlocking spacers. As an added bonus, the owner, Pat Ferguson, has noted that he has received many compliments from everyone who has seen the pavers.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Priora®
- Square Footage 4,000
- Bedding & Joints 1-2" thick 1/4" No. 10 crushed gravel
- Base 8-10" thick 3/4" clean, crushed gravel

Architect: John Hasenberg Architects

Landscape Arch.: Brian Bainnson, Quatra Foil

Engineering: Matt Nava, Nava Engineering

Owner: Pat Ferguson
Bioline Fishing, Portland, OR



UNI Manufacturer: Mutual Materials, Inc.
Date Installed: 2009
Paver Contractor: Leonard Construction
General Contractor: Galloway Construction



UNI Manufacturer: Unilock Chicago, Inc.
Date Installed: 2009
Paver Contractor: Midwest Brick Paving

Aurora Police Headquarters

The Aurora Police Headquarters and Branch Court in Illinois includes many features that give it unique functionality and environmental benefits. The project was designed to meet its goal of LEED® Gold certification. Project designers chose Eco-Optiloc® permeable concrete pavers for the site's parking lot. The pavers are manufactured with a high-reflective value custom finish and its interlocking "L-shape" design can easily handle heavier municipal vehicles. The attractive cobble-patterned surface will allow rainwater to infiltrate and drain via a gently-sloped subgrade to a bio-swale and sedimentation basin at the south end of the property.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Optiloc®
- Square Footage 92,000
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 4" thick ASTM No. 57 stone
- Subbase 13" thick ASTM No. 2 stone
- Subgrade Clay

Design Team: Cordogan Clark & Associates
McClaren Wilson
Engineering Enterprises, Inc.
Schoppe Design Group
Leopardo Companies

Owner: City of Aurora, IL



Dominican University

In 2002, Dominican University in River Forest, Illinois, was faced with the need for increased parking on campus. If they paved with conventional asphalt, it would mean constructing an extensive storm drainage system and overburdening the city's sewer system. In addition, the school's soccer field was at risk because a retention pond would have been necessary to handle the increased stormwater runoff. After a failed installation of another type of porous pavement, designers decided to use Ecoloc® interlocking permeable pavement for its superior structural stability under loading. The project engineers utilized Lockpave Pro® and PC-SWMM™ PP to design a pavement system that would meet all the University's stormwater management and parking needs.

Construction Details

- Pavers 3 1/8" (80mm) thick Ecoloc®
- Square Footage 147,375
- Bedding & Joints 2" thick Illinois DOT CA-16 stone
- Base 4" thick CA-7 stone (ASTM No. 57)
- Subbase 12" thick CA-1 stone (ASTM No. 2)

Engineering: V 3 Consultants
Testing Service Corp.

Management: Trammell Crow Company

Owner: Dominican University

UNI Manufacturer: Unilock Chicago, Inc.
Date Installed: 2002
Paver Contractor: LPS Pavement Company
General Contractor: Harrington Excavating and Construction

Drake Hill Commons

Drake Hill Commons (formerly Lafayette Road Office Park) in North Hampton, New Hampshire installed 15,000 sf of Eco-Stone® permeable pavers in their parking lot to meet impervious cover restrictions required by the town.

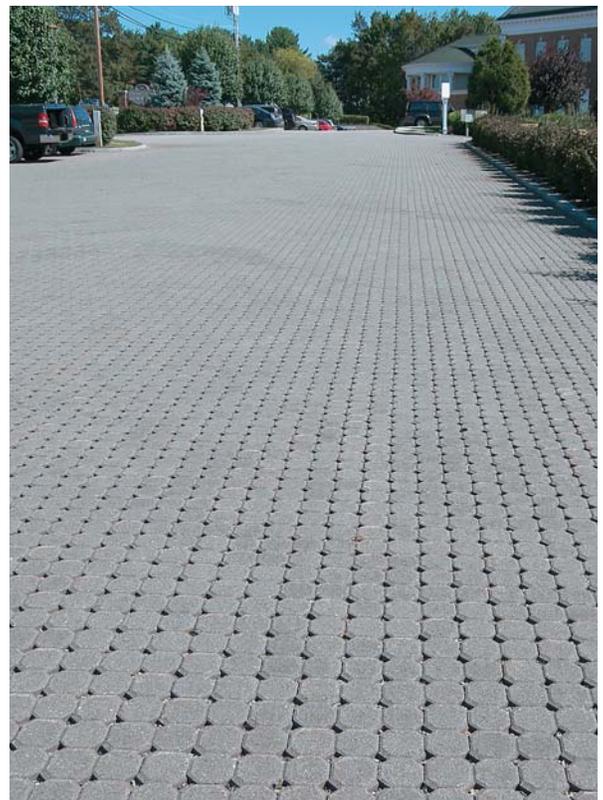
The New Hampshire Department of Environmental Services includes permeable pavements in their stormwater manual under Treatment Best Management Practices.

Though most permeable interlocking pavements utilize open-graded aggregate materials for the bases, this project was built on a dense-graded base. However, after over 10 years of use, this project is still performing well, despite the harsh New England winters, snow-plowing and sanding.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Stone®
- Square Footage 15,000
- Joints 1/4" stone
- Bedding 1 1/2" thick stone sand
- Base 14" thick processed gravel
- Subgrade Well-draining coastal soil

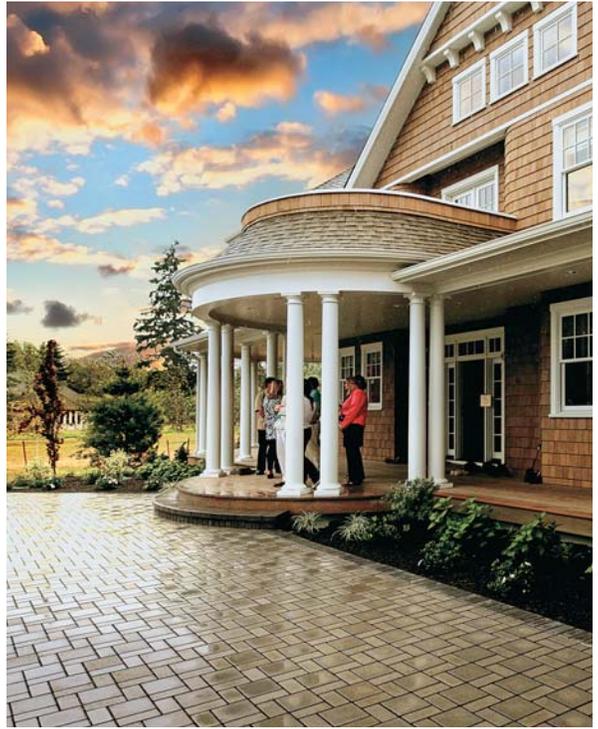
Owner: Drake Hill Commons
North Hampton, NH



UNI Manufacturer: Ideal Concrete Block Co., Inc.
Date Installed: 1999
Paver Contractor: Phil Griffen

Private Residence

The Pacific Northwest is one of the most environmentally-friendly areas in the United States. The Parkers of Battle Ground, Washington wanted a permeable pavement for their new custom home. Mutual Materials, Kyne Landscaping, and Tamarack Homes worked with the homeowners who selected Eco-Priora® permeable concrete pavement for the home's stately driveway. "The Hampton" model was entered in the 2009 Clark County Parade of Homes and won for "Best Landscaping" in the categories of "People's Choice" and "Past Presidents." The home was designed by award-winning architect Michael Blondino. The 8" square and 4" x 8" Eco-Priora® pavers were installed in a herringbone pattern to create a refined, yet permeable, eco-friendly surface, proving that a permeable driveway can look beautiful and manage stormwater runoff at the same time.



Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Priora® 8" x 8" and 4" x 8"
 - Square Footage 4,200
 - Bedding & Joints 1-1 1/2" thick ASTM No. 8 stone
 - Base 6" thick ASTM No. 57 stone
 - Subbase 6-8" thick 3/4-minus and ASTM No. 2
- Architect:** Michael Blondino
Owners: Michael and Cindi Parker

UNI Manufacturer: Mutual Materials, Inc.
Date Installed: 2009
Paver Contractor: Kyne Landscaping, Inc.
General Contractor: Tamarack Homes



Mickel Field & Highlands Park

Installed in the spring of 1995, the Eco-Stone® parking areas at Mickel Field and Highlands Park in Wilton Manors, Florida, are still functioning well hydrologically and structurally, despite having no traditional drainage structures. For many years, prior to the installation of the permeable pavers, the site was prone to standing water due to the lack of drainage. City officials wanted to provide their citizens with a durable, cost-effective permeable pavement that would address aesthetic considerations, drainage, and environmental issues. The pavement system has been tested under the most severe rainfall conditions, with two tropical storm systems in 1995 and Hurricane Wilma in 2005. The city is so pleased with the performance of the Eco-Stone® pavers that they now use them in all parking areas where drainage calculations are hard to meet.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Stone®
- Square Footage 37,165
- Joints/Voids P-rock
- Bedding 1" thick gunite sand
- Base 12" thick Florida DOT crushed rock
- Subgrade Sandy

Project Designer: Robert S. Walters, A.I.A.
Owner: City of Wilton Manors, FL

UNI Manufacturer: Oldcastle Coastal
Date Installed: 1995
Paver Contractor: CSE Paving, Inc.



Whole Foods

Over 165,000 square feet of Eco-Optiloc® pavers were used in the parking lot of a Whole Foods market in Naperville, Illinois. The primary reason for selecting the pavers for the project was the reflectivity of the paver to reduce the heat island effect caused by darker paved surfaces such as asphalt. Since the project was integrated with the Springbrook Prairie Station, which utilized traditional impervious asphalt paving, the design incorporated a concrete tank system for detention and did not rely on the permeable pavement for storage.

During a visit to the site, a Unilock Chicago representative noted they were already seal coating the asphalt areas within the lot after just two years. This represents an added maintenance cost, as well as the inconvenience to businesses when sections of the lot are blocked off. This will not be necessary with the Eco-Optiloc® pavers.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Optiloc®
- Square Footage 165,000
- Bedding & Joints 2" thick Illinois DOT CA-16 stone
- Base 4" thick CA-7 stone (ASTM No. 57)
- Subbase 12" thick CA-1 stone (ASTM No. 2)

Engineering: V 3 Consultants

UNI Manufacturer: Unilock Chicago, Inc.
Date Installed: 2007
Paver Contractor: LPS Pavement Company

Glen Brook Green - Jordan Cove

Jordan Cove, a small estuary fed by Jordan Brook, is located along the Connecticut side of the Long Island Sound. When water quality sampling showed the cove did not meet standards for safe shell fish harvesting, the Environmental Protection Agency selected the Glen Brook Green residential project for its 319 National Monitoring Program, where runoff from three sub-divisions would be compared. The best management practice area of the project included techniques to reduce runoff, including Eco-Stone® permeable pavers for the cul-de-sac street and some driveways. Despite being installed on a dense-graded base, the project has performed well since its installation in 2002, with runoff volume from this low impact development sub-division reduced by 42% from pre-development levels.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Stone®
- Square Footage 15,000
- Bedding & Joints 1 1/2" thick 1/4" stone
- Base 12" thick 1 1/2" processed gravel

Landscape Arch. & Water Quality: John Alexopoulos
 Dr. John Clausen
 University of Connecticut

Engineering: D.W. Gerwick Engineering

Project Developer: Lombardi Inside/Out, LLC



UNI Manufacturer: Ideal Concrete Block Co., Inc.
Date Installed: 2000
Paver Contractor: Expert Stone

Palm Beach Zoo

The Palm Beach Zoo is a non-profit zoological organization located at Dreher Park in West Palm Beach, Florida. The zoo houses over 1,400 animals within 23 acres of lush tropical habitat. The Palm Beach Zoological Society sought to use low impact development principals when building their new veterinary clinic and animal hospital. The project was designed utilizing as many LEED® practices as possible, though the project did not seek USGBC certification.

Over 3,000 square feet of UNI Eco-Stone® permeable interlocking concrete pavers was installed in the parking lot to reduce runoff from the site. In the handicap parking stalls, lane striping and handicap emblems were created using blue-colored pavers.



Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Stone®
- Square Footage 3,000
- Bedding & Joints 2" thick ASTM No. 89 stone
- Base 4" thick ASTM No. 57 stone
- Subbase 8" ASTM No. 4 stone

Engineer: Kimley-Horn Engineers

Landscape Arch.: Urban Resource Group

Owners: Palm Beach Zoological Society

UNI Manufacturer: Oldcastle Coastal
Date Installed: 2009
Paver Contractor: Signature Design Pavers



Cawrse & Associates

Cawrse & Associates, a 30-year old landscape architecture and land-planning firm in Chagrin Falls, Ohio, used Eco-Optiloc® permeable pavers as an integral part of updating their offices. The site also includes a bio-swale, bioretention basin and a rain garden to help meet their low-impact development goals. A grant from Chagrin River Watershed Partners, Inc., (CRWP) was awarded to the project, which was completed in 2008. CRWP instituted a two-year monitoring project to measure water quality and quantity, and the U.S. Geological Survey installed monitoring systems at various locations and depths within the open-graded base of the pavement to measure moisture. The monitoring project is supported by the USGS Ohio Water Science Center, the U.S. EPA National Research and Monitoring Laboratory, the Northeast Ohio Regional Sewer District and the Lake Erie Protection Fund.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Optiloc®
- Square Footage 8,000
- Joints/Voids P-rock
- Bedding 2" thick ASTM No. 8 stone
- Base 14" open-graded stone
- Drainage 4" diameter drains to bio-swale

Project Designer & Owner: Cawrse & Associates

UNI Manufacturer: Unilock Ohio, Inc.
Date Installed: 2008
Paver Contractor: FMD



Stonehill College Science Quadrangle

Stonehill College located in Easton, Massachusetts, wanted a permeable pedestrian courtyard that could be used daily by the students, as well as a venue for events. Eco-Priora® permeable interlocking pavers in three custom colors were selected for the project. The local conservation commission accepted the permeable interlocking concrete pavement as a best management practice for handling the increased runoff that would have otherwise been generated by an expanse of impervious pavement. In addition, the Eco-Priora® pavement system was determined to be a less costly alternative to the elaborate sub-surface drainage infrastructure that was originally considered for the project. Flush-mounted panels have anchorages for tents and also serve as electrical supply points.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Priora®
- Square Footage 20,000
- Bedding & Joints 1" thick ASTM No. 8 stone
- Base 6" thick ASTM No. 57 stone
- Subbase 8" thick ASTM No. 2 stone

Engineering: Nitsch Engineering

Landscape Arch.: Brown Sardina, Inc.

UNI Manufacturer: Unilock New England, Inc.
Date Installed: 2009
Paver Contractor: D. Schumacher Landscaping
 Chrisom Brick & Stone

Morton Arboretum

In the late 1990s, Morton Arboretum, in Dupage County, Illinois decided to undertake a large-scale redevelopment of their 1700-acre outdoor museum. When they received a grant from the Illinois Environmental Protections Agency for a renovation of nearby Meadow Lake, which lies adjacent to the property, it was determined that a traditional impervious asphalt parking lot wouldn't be appropriate for the site. After researching permeable and porous pavements, the design team selected Ecoloc® permeable pavers for their 173,000 square foot parking lot. The designers felt that the Ecoloc® pavement would be the best choice over the long term, due to its lower-life cycle costs, durability under heavy bus loading, and its environmentally beneficial infiltration capabilities.

Construction Details

- Pavers 3 1/8" (80mm) thick Ecoloc®
- Square Footage 173,000
- Bedding & Joints 2" thick Illinois DOT CA-16 stone
- Base 6" thick CA-7 stone (ASTM No. 57)
- Subbase 12" thick CA-1 stone (ASTM No. 2)

Engineering: Christopher B. Burke
 Engineering West, Ltd.

Landscape Arch.: Conservation Design Forum

Construction Mgr.: Hanscomb, Faithful & Gould



UNI Manufacturer: Unilock Chicago, Inc.
Date Installed: 2002
Paver Contractor: LPS Pavement Company
General Contractor: V3 Construction Corp.

South Shell Park

In 2008, the Town of Oakville in Ontario, Canada, decided to design and construct a park with permeable paving for parking. The Environmental Strategic Plan Advisory Committee chose South Shell Park as the pilot project for the town's new Official Plan, which promotes a "Liveable Oakville." The plan states that stormwater management techniques shall be used in the design of new developments to control both the quality and quantity of stormwater runoff. The use of permeable surfaces and landscaping are encouraged. Cosburn Gilbertson Landscape Architects selected Eco-Optiloc® permeable pavers due to permeability factors, strength and performance features, and proven track record. According to Frank Loconte, OALA, ISA and Landscape Architect with Oakville, the paving system has performed flawlessly with no standing water, even minutes after major storms.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Optiloc®
- Square Footage 15,000
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 4" thick Granular A stone
- Subbase 14" thick Granular B stone
- Subgrade Sandy

Landscape Architect: Cosburn Gilbertson Landscape Architects

Owners: Town of Oakville, Ontario, Canada



UNI Manufacturer: Unilock Ltd.

Date Installed: 2009

Paver Contractor: DDR Landscape Contractors



Marina Grande

This fire access lane for the Marina Grande condominiums was originally designed with cast-in-place concrete, however, the city engineer for Riviera Beach, Florida, required a switch to Eco-Stone® permeable interlocking concrete pavers. Though a stormwater conveyance system and dense-graded base had already been installed at the site, the city engineer wanted to reduce runoff from the site. Based on the successful Eco-Stone® installation in Wilton Manors, Florida, which was installed in 1995, the engineer determined the permeable pavement would provide better infiltration than poured concrete with traditional drainage.

As an added benefit, the attractive permeable pavers complemented the colors used to paint the buildings, thereby becoming an asset for the community.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Stone®
- Square Footage 9,000
- Bedding & Joints 2" thick ASTM No. 89 stone
- Base 12" dense-graded base
- Subgrade Sandy

Engineering: City of Riviera Beach, Florida

Owner: Momentis Property Group

UNI Manufacturer: Oldcastle Coastal

Date Installed: 2009

Paver Contractor: Stoneage Pavers



Broadway West Retail Center

Located in Forest Lake, Minnesota, the Broadway West Retail Center utilizes over 43,000 square feet of UNI Eco-Stone® permeable interlocking concrete pavers in its parking lot. While the pavers were installed as a stormwater runoff management practice, the attractive colors and distinctive shape were an added asset for the center, perfectly complementing the project's architectural style. Pavement markings delineating parking lanes were applied, as with any traditional pavement.

The UNI Eco-Stone® permeable pavers were installed in late fall. Despite snow falling periodically during the construction phase, the paver contractors could continue to install the permeable pavement, unlike other types of pervious and porous pavement systems that are dependent on climate conditions for optimal installation.

UNI Manufacturer: Borgert Products, Inc.
Date Installed: 2008
Paver Contractor: Glacial Ridge, Inc.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Stone®
- Square Footage 43,000
- Bedding & Joints 2" thick 3/8" stone chips
- Base 4" thick ASTM No. 57 stone
- Subbase 12" thick 1 1/2" to 3" stone

General Contractor: VSI

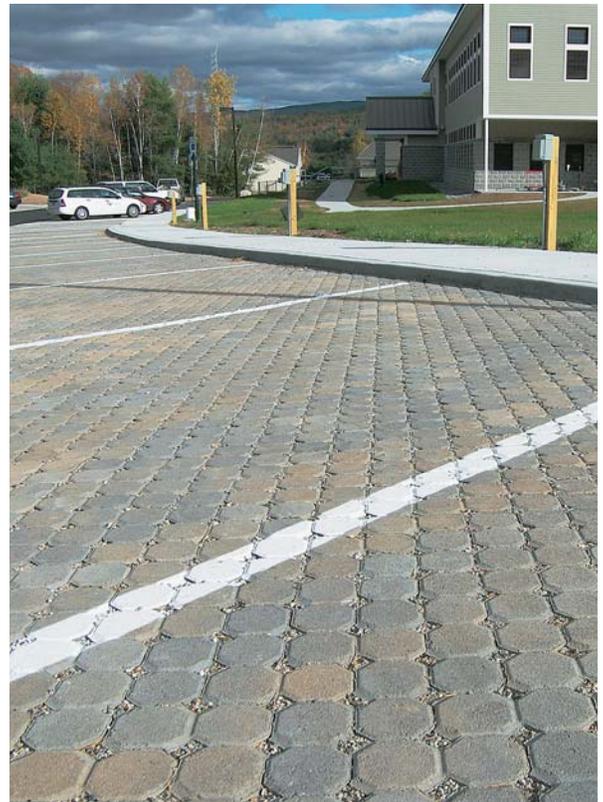
White Mountain National Forest Headquarters

Located just off I-93 in Campton, New Hampshire, the White Mountain National Forest headquarters complex provides office space for approximately 100 permanent and seasonal employees from the Supervisor's Office and Pemigewasset Ranger District. The facility has been built using construction techniques to reduce the carbon footprint and increase sustainability. The project was designed to achieve a "Silver" LEED® rating, but it is believed that a "Gold" certification is within reach. Original project specifications called for porous asphalt in the parking bays, however, Eco-Stone® permeable interlocking concrete pavers were selected instead to reduce runoff from the site. The main parking area is divided by earth mounds planted with shade trees to help reduce heat island effects and native ground cover and plants also were utilized.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Stone®
- Square Footage 23,400
- Bedding & Joints 2" thick 3/8" stone
- Base 12" thick 1 1/2" stone
- Subbase Compacted gravel
- Subgrade Well-draining

Engineer & Owner: U.S. Forest Service



UNI Manufacturer: Ideal Concrete Block Co., Inc.
Date Installed: 2009
Paver Contractor: Saints Landscaping

Advanced Skin Care Institute

Planning for the future, the Advanced Skin Care Institute in White Bear Lake, Minnesota, designed their one-story building so that a second story could be added at a later date as the facility expanded. As a result, additional parking was needed, and the owner originally thought more land would be required. Instead, Larson Engineering of Minnesota was able to utilize the land that had been previously dedicated to stormwater retention ponds for the necessary parking by using Eco-Stone® permeable interlocking concrete pavement.

UNI® permeable pavements effectively combine parking with retention/detention to manage stormwater runoff volumes through infiltration, thereby allowing for better land-use planning and more efficient use of available land for greater economic value.



UNI Manufacturer: Borgert Products, Inc.
Date Installed: 2008
Paver Contractor: Glacial Ridge, Inc.
General Contractor: Bucks Black Top

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Stone®
- Square Footage 26,700
- Bedding & Joints 2 1/2" thick ASTM No. 8 stone
- Base 4" thick ASTM No. 57 stone
- Subbase 8" thick ASTM No. 2 stone

Engineering: Larson Engineering of Minnesota

Owner: Advanced Skin Care Institute



Saint Clare Parish

Saint Clare's new parish addition in Westerly, Rhode Island, needed a significant number of new parking spaces, which would have contributed to increased stormwater runoff to Misquamicut Beach and Block Island Sound. Municipal regulations called for maintaining runoff volumes at pre-development hydrology levels, and the Rhode Island Department of Environmental Management and Rhode Island Coastal Resources Management Council have restrictions in place regarding new development. With both pedestrian and vehicular pavement requirements on the site, Eco-Priora® permeable pavers, installed in the popular herringbone pattern, were perfectly suited for the project. The flat surface and minimal chamfers are pedestrian-friendly, while the patented interlocking spacers offer superior structural support under traffic loading.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Priora®
- Square Footage 13,000
- Bedding & Joints 2" thick ASTM No. 9 stone
- Base (Pedestrian) 12" thick ASTM No. 57 stone
- Base (Vehicular) 16" thick ASTM No. 57 stone

Engineering: Cherenzia Engineering

Architect: TLA Architects

Owner: St. Clare Church

UNI Manufacturer: Unilock New England, Inc.

Date Installed: 2009

Paver Contractor: New England Hardscapes

General Contractor: Tower Construction



Doc Harris Stadium

Doc Harris Stadium in Camas, Washington serves as the home stadium for the Camas Papermakers and Seton Catholic Cougars. Owned by the Camas School District, the stadium was built in 2010 and features seating for approximately 4,000 fans.

Nearly 11, 000 sf of 4" x 8" and 8" x 8" Eco-Priora® permeable pavers in gray and charcoal were utilized for an entry area and plaza surrounding the stadium. The design team incorporated permeable paving in response to student input to reduce the environmental impact of the project. The design allows for partial exfiltration to retain a majority of stormwater on-site, with any excess stormwater directed to a storm drain.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Priora®
- Square Footage 10,890 sf
- Bedding & Joints 2" thick ASTM No. 8
- Base 4" thick ASTM No. 57 stone
- Subbase 6" thick ASTM No. 2 stone

Engineering: Winzler & Kelly Consulting Engineers

Architect: Dull Olson Weekes Architects

Landscape Architect: Atlas Landscape Architecture

Owner: Camas School District

UNI Manufacturer: Mutual Materials, Inc.
Date Installed: 2010
Paver Contractor: Landscape Management & Service

National Renewable Energy Laboratory

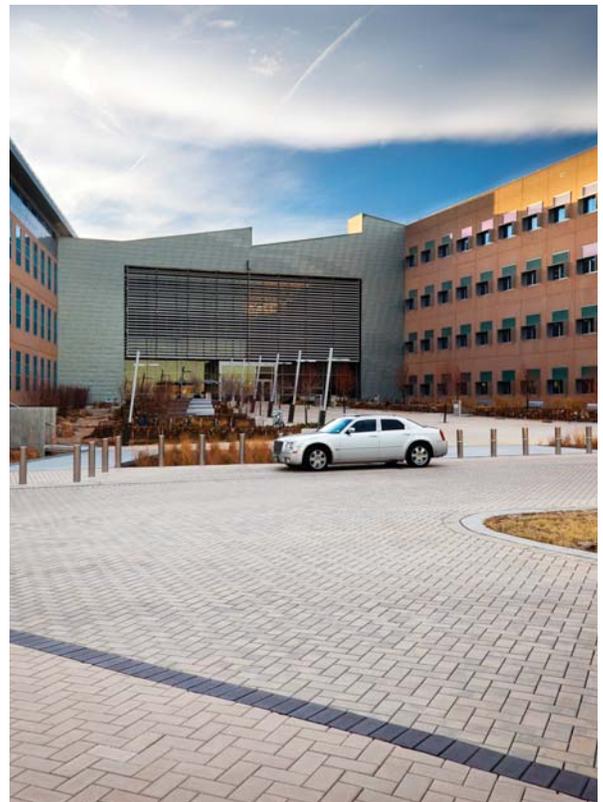
The U.S. Department of Energy's National Renewable Energy Laboratory in Golden, Colorado, was built to be not only energy efficient, but also to create as much energy as it used. Everything from plants, to walkways, to the entry drive, to the building had to be considered in the design, which achieved LEED® Platinum Certification. As part of the green initiative, Eco-Priora® permeable pavers were chosen to mitigate runoff and improve water quality. UNI manufacturer, Pavestone Company, even produced the pavers in a custom color blend to increase reflectance values for the project. Since the use of recycled materials was important, recycled concrete was used for the base. This also contributed to lower costs for the project.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Priora®
- Square Footage 20,000 sf
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 12" thick recycled concrete

Design/Build Team: Haselden Construction
RNL Design

Owner: U.S. Department of Energy
U.S. Government



UNI Manufacturer: Pavestone Company

Date Installed: 2011

Paver Contractor: Continental Hardscape Systems

Genzyme Bio-Logistics Support Center

This owner of this new LEED® certified office building in Framingham, Massachusetts, sought to utilize permeable pavement for their entrance drive to reduce stormwater runoff and improve recharge. To help contribute to LEED® Credit 7.1, Unilock produced the 7,000 sf of Eco-Priora® pavers in a specialty color and finish - Umbriano Winter Marvel, which featured an SRI value of 38.

This is the second Genzyme property to install UNI® permeable pavers in recent years.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Priora® 5" x 10"
- Square Footage 7000 sf
- Bedding & Joints 2" thick ASTM No. 9 stone
- Base 4" thick ASTM No. 57 stone
- Subbase 8" thick ASTM No. 2 stone

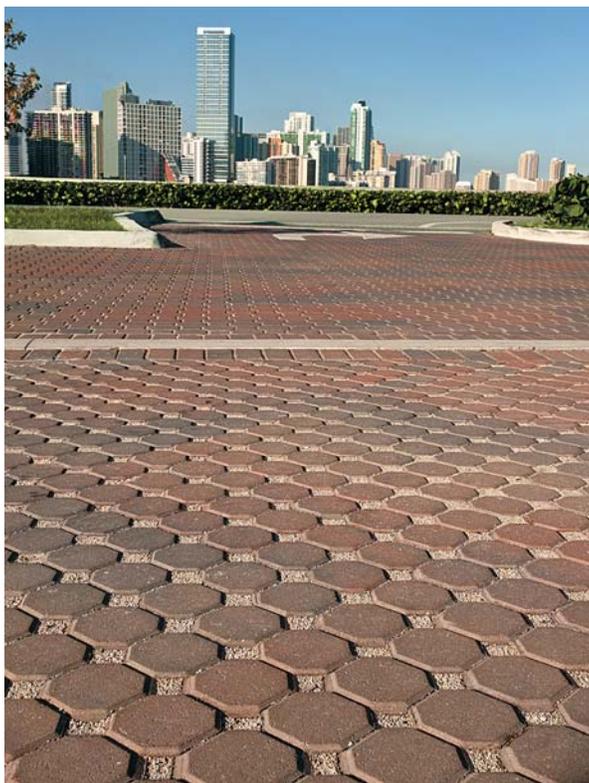
Engineering: Tetra Tech

Architect: ARC Architectural Resources

Owner: Genzyme



UNI Manufacturer: Unilock New England
Date Installed: 2011
Paver Contractor: United Stone and Site



Rickenbacker Causeway Park

The Rickenbacker Causeway links the City of Miami, Florida to Miami Beach by land and elevated bridges. For years, the land had been used as a recreational area on weekends by residents in the area. In 2011, Dade County decided to make it a designated park and use traditional Uni-Decor® pavers in combination with permeable Uni Eco-Stone® pavers to help reduce stormwater runoff and keep total suspended solids from entering Biscayne Bay.

The site contractor was also required to remove all exotic vegetation from the site and replace it with native vegetation, which also helps contribute to stormwater runoff reduction.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Stone® and 3 1/8" (80mm) thick Uni-Decor®
- Square Footage 85,000 sf / 225,000 sf
- Bedding & Joints 2" thick ASTM No. 89 stone
- Base & Subbase 10" thick ASTM No. 57 stone

Engineering: Senior Coastal Engineering

Owner: City of Miami, FL

UNI Manufacturer: Oldcastle Coastal
Date Installed: 2011
Paver Contractor: CSE Paving of Florida, Inc.



Schmelz Countryside VW/SAAB

The Schmelz dealership parking lot in Maplewood, Minnesota, was originally planned as a traditional asphalt lot. However, the city required zero runoff for the site and requested the Schmelz family create a detention pond that would take up almost half the allotted parking spaces. As a result, the engineers for the project decided to install UNI Eco-Stone® permeable pavers, which restored 900 parking stalls.

In addition, the county gave the project a stormwater credit. The Eco-Stone pavement not only allowed the owner to fully utilize their property, but also saved them money in future stormwater fees. Installed in 2003, the project has performed so well that the Minnesota Erosion Control Group has conducted several tours to demonstrate how well it works.

UNI Manufacturer: Borgert Products
Date Installed: 2003
Paver Contractor: LPS Pavement Company
General Contractor: Rehbein Companies

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Stone®
- Square Footage 43,000 sf
- Bedding & Joints 2" thick ASTM No. 8
- Base 20" thick ASTM No. 57 stone

Engineering: Rehbein Companies

Owner: Schmelz Family

Waubonsee Community College

Waubonsee Community College's Plano Campus was the first permeable interlocking concrete pavement installed in Plano, Illinois and was the largest in the state in 2010 at 120,000 sf. Originally, the land where this satellite campus is located was deemed unusable due to wetlands on the site. By creating a design sensitive to the environmental restrictions and using Eco-Optiloc® permeable pavers, the project was able to proceed.

In 2011, another 102,000 sf of Eco-Optiloc was installed at their northeast lot at their Sugar Grove campus. This project was the largest permeable project installed that year and is the third installation the college has done. Stormwater management and a longer life-cycle are reasons why Eco-Optiloc pavers were selected.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Optiloc®
- Square Footage 120,000 and 102,000 sf
- Bedding & Joints 1 1/2" thick ASTM No. 8 stone
- Base 4" thick ASTM No. 57 stone
- Subbase 12" thick ASTM No. 2 stone

Engineer & Landscape Architect: JJR Inc.

Owner: Waubonsee Community College



UNI Manufacturer: Unilock Chicago

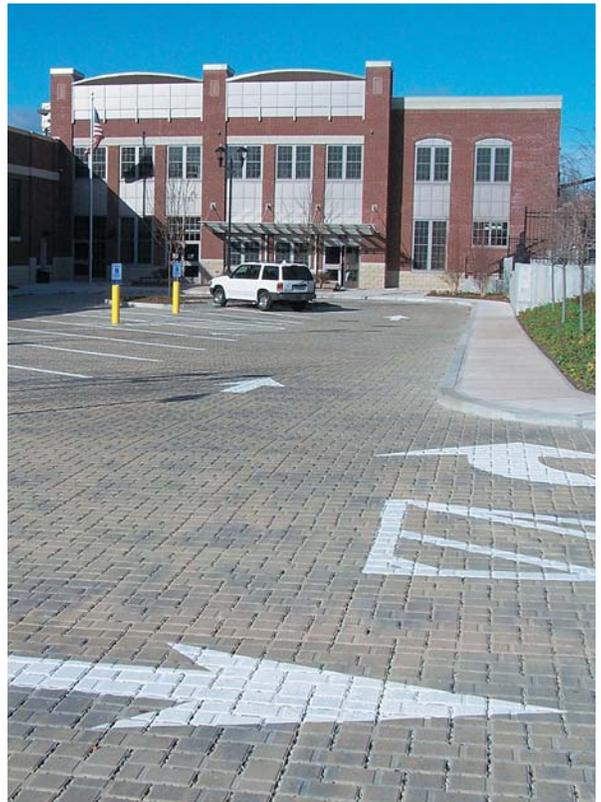
Date Installed: 2011

Paver Contractor: LPS Paving

Rhode Island Public Transit Authority

Located in Providence, Rhode Island, the Rhode Island Public Transit Authority (RIPTA) installed two parking lots featuring Eco-Optiloc® permeable pavers. The design firm chose Eco-Optiloc due to its anchor-interlocking “L-shape,” that could withstand heavy loading of passenger buses.

The LEED® certified project was built on a former brownfield site that both RIPTA and the state had initiated cleanup on for planned reuse. Special effort was made to reduce impervious coverage as post-development runoff could not exceed pre-development volumes. Extensive water runoff remediation systems were incorporated, including bio-swales and the pavers.



Construction Details

• Pavers	3 1/8" (80mm) thick Eco-Optiloc®
• Square Footage	46,500 sf
• Bedding & Joints	2" thick ASTM No. 9 stone
• Base	6" thick ASTM No. 57 stone
• Subbase	8" thick ASTM No. 2 stone
Design:	RGB Architects
Owner:	State of Rhode Island

UNI Manufacturer:	Unilock New England
Date Installed:	2010
Paver Contractor:	Alpine Landscape Company



Andrew H. Wilson Charter School

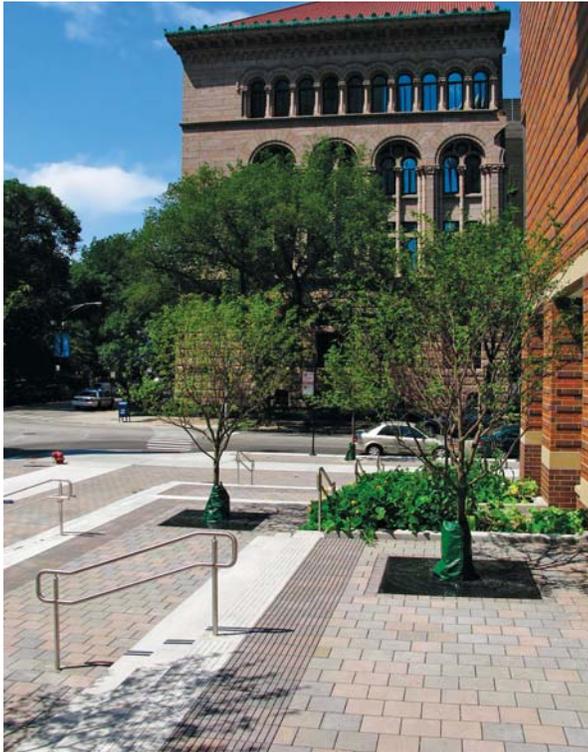
The Andrew H. Wilson Charter School in New Orleans, Louisiana, was one of many hit hard by Hurricane Katrina in 2005. The historic building had received approximately two feet of water on the first floor and substantial wind damage. As result, it was chosen as one of five Quick Start Schools for the New Orleans Recovery School District. Part of the new design was a courtyard area for the children. The goal of the courtyard was to have a system that would clean stormwater and recharge groundwater and a 12,000 gallon rainwater collection tank was installed along with Eco-Priora® permeable pavers, which won out over permeable asphalt. Shortly after installation, heavy rains flooded the area, but the Wilson campus courtyard drained perfectly. The project was also awarded LEED® Gold Certification.

Construction Details

• Pavers	3 1/8" (80mm) thick Eco-Priora®
• Square Footage	9,000 sf
• Bedding & Joints	2" thick ASTM No. 89 stone
• Base	4" thick ASTM No. 57 stone
• Subbase	6" thick ASTM No. 2 stone

Landscape Architect:	HMS Architects
Owner:	Andrew H. Wilson Charter School

UNI Manufacturer:	Pavestone Company
Date Installed:	2011
Paver Contractor:	Castle Rock Pavers



Ogden Elementary School

Located in the River North area of Chicago, Ogden Elementary is truly an urban school. The project uses both the roof and plaza areas to capture as much rainfall as possible for other uses. Eco-Priora® permeable pavers by Unilock Chicago were used for all the pedestrian walkways, around the playground equipment, in the parkway and on the roof.

Produced in three sizes - 5" x 5", 5" x 10" and 10" x 10" - the shapes delineated areas of the pavement to create contrast and to define the space. The urban setting also made it important that stormwater could be managed on site.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Priora®
- Square Footage 10,000 sf
- Bedding & Joints 1 1/2" thick ASTM No. 8
- Base 10" thick ASTM No. 57 stone

Architect: Nagle Hartray Architecture

Landscape Architect: Christy Webber Landscaping

Owner: Chicago Public School System

UNI Manufacturer: Unilock Chicago

Date Installed: 2011

Paver Contractor: LPS Paving

Bethel University Commons

Bethel University in Arden Hills, Minnesota, needed to expand their facilities, and along with it, more parking. Due to stormwater management requirements, they chose Eco-Stone® permeable pavers to help reduce runoff from the site.

The university has used Eco-Stone for sidewalks and three other parking lots on campus and hopes to replace all their parking lots and sidewalks with it in the future.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Stone®
- Square Footage 17,358 sf
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 4" thick ASTM No. 57 stone
- Subbase 12" thick ASTM No. 2 stone

Architect: KKE Architects

Landscape Architect: Close Landscape Architecture, Inc.

General Contractor: Mortenson Construction

Owner: Bethel University



UNI Manufacturer: Borgert Products, Inc.

Date Installed: 2010

Paver Contractor: Glacial Ridge, Inc.

Ravinia Festival

The Ravinia Festival in Highland Park, Illinois, is home to the summer-long concert series. Established in 1904, it is the longest running outdoor music festival in North America, attracting such artists as Yo-Yo Ma, Sting, Tony Bennett, Crosby, Stills & Nash, and the Chicago Symphony Orchestra. However, during storm events, the old 30,000 sf gravel parking lot would flood, making it useless and it would occasionally overflow to nearby homes. As a result, it was decided in 2010 to repave with Eco-Priora® permeable pavers, which are not only attractive, but they have also eliminated flooding of the lot and neighborhood. A second 75,000 sf Eco-Priora lot was completed in the fall of 2011. This project is also being used as a best management practice by the City of Highland Park's Environmental Commission and Lakefront Commission.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Priora®
- Square Footage 30,000 and 75,000 sf
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 4" thick ASTM No. 57 stone
- Subbase 12" thick ASTM No. 2 stone

Engineer &

Landscape Architect JJR, Inc.

Owner: Ravinia Festival



UNI Manufacturer: Unilock Chicago

Date Installed: 2010 & 2011

Paver Contractor: LPS Paving



UNI Manufacturer: Pavestone Company

Date Installed: 2010

Paver Contractor: JBI Construction

Peterson Airforce Base

In 2009, the Energy Independence and Security Act established into law new stormwater design requirements for federal development and redevelopment projects. "We need to ensure we don't create significant stormwater runoff issues as a result of our construction," said Randy Hawke, 21st Space Wing Civil Engineer Squadron architect. "By creating subsurface detention and filtration areas, the paver system dramatically reduces, or even eliminates, the need for retention ponds," he said. The Eco-Priora® permeable pavers that have been used for projects on the base have already proven to be an efficient way to handle stormwater runoff. While the pavers cost more than traditional asphalt initially, the designers noted that savings will be realized as there will be no need to reseal, restripe, or mill and repave in the future.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Priora®
- Square Footage 18,000 sf
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 4" thick ASTM No. 57 stone
- Subbase 12" thick ASTM No. 2 stone

Architect & Engineer: 21st Civil Engineering Squadron

Owner: Peterson Airforce Base

Mary Bartelme Park



This urban park is located in the West Loop neighborhood of Chicago and was the first project in the city with TX Active® photocatalytic Eco-Priora® permeable pavers. Approximately 11,500 sf of the pavers are Eco-Priora with a standard finish, while the remaining 4,500 sf features the TX Active pavers, which reduce the need for cleaning and remain brilliant white over time. A striking sculpture-like metal gateway draws visitors into the park. The 2.3 acre park features an Eco-Priora plaza area, bisected by walkways and green spaces. The designers worked with Unilock Chicago to create a statement for urban contemporary parks. The colors, finishes, textures, and laying patterns of the pavers were integral to the success of the project and the native plants will benefit from the ability of the permeable pavers to infiltrate rainwater into the ground.

UNI Manufacturer: Unilock Chicago
Date Installed: 2010
Paver Contractor: LPS Paving

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Priora®
- Square Footage 16,000 sf
- Bedding & Joints 1 1/2" thick ASTM No. 8
- Base 4" thick ASTM No. 57 stone
- Subbase 12" thick ASTM No. 2 stone

Landscape Architect: Site Design Group

Owner: City of Chicago

Colorado School of Mines

Over 35,000 sf of Eco-Priora® permeable pavement was used to create a beautiful and dramatic pedestrian environment in the heart of the Colorado School of Mines at Brown Hall in Denver.

The pavement had to accommodate emergency and service vehicles, avoid exceeding historic off-site storm flows, meet campus maintenance requirements and provide a durable, long-lasting pavement surface. The system was designed for both partial and full infiltration and paver colors were selected to meet solar reflectance values to meet LEED® Credit 7.1. The pavers also contributed to LEED® Credits 6.1 and 6.2 and Regional Materials Credit 5. Though the designers originally sought Silver Certification, the project was able to achieve LEED® Gold.

Construction Details

- Pavers 3 1/8" (80mm) thick Eco-Priora®
- Square Footage 35,000 sf
- Bedding & Joints 2" thick ASTM No. 8 stone
- Base 4" thick ASTM No. 57 stone
- Subbase 12" thick ASTM No. 2 stone

Owner: Colorado School of Mines



UNI Manufacturer: Pavestone Company

Date Installed: 2012

Paver Contractor: Bryan Miller Company, Inc.

What they are saying about permeable pavements...

“The City of Wilton Manors is very pleased with the performance of UNI Eco-Stone® permeable concrete pavers, we use them in all parking and driveway areas where drainage calculations are hard to meet.”

*David J. Archacki, Director of Public Services
City of Wilton Manors, FL*

“The Jordan Cove monitoring project is a real life example of neighborhood-level environmental stewardship where innovative land-use practices have been applied to reduce pollution and improve the quality of life of the residents who live in this urban subdivision. Not only will the residents of this subdivision benefit from this national project, the ideas and practices utilized at Jordan Cove can be applied across Connecticut and the country to improve water quality, becoming the standard for the design and construction of residential neighborhoods nationwide.”

*Jane Stahl, Deputy Commissioner of Connecticut's DEP
Jordan Cove Project Completion Ceremony*

“Runoff from parking lots and driveways is a significant source of water pollution in the United States and puts undo stress on our water infrastructure, especially in densely-populated urban areas. By evaluating different designs and materials, this study will help us develop strategies to lessen the environmental impacts of parking lots across the country and make our communities more sustainable.”

*George Pavlou, Acting Regional Administrator EPA
EPA News Release - Edison New Jersey EPA Facility
Permeable Paver, Porous Concrete and Pervious Asphalt Test*

“This form of pavement offers new possibilities in surface water control with the potential of reducing the size or need for special stormwater retention facilities. When properly designed, these pavement systems can provide functional requirements for most loading conditions and can be designed to accommodate stormwater management requirements.”

*Bruce Morton, Project Manager Jordan Cove
Aqua Solutions*

“As a landscape architect, sustainability is inherent and not a criteria to be achieved or a requirement to meet. Sustainability and permeability can be seamless with a great design.”

*Benjamin Kutscheid, ASLA
Buckingham Fountain Stays Pink While Going Green
Landscape Architect and Specifier News, Feb. 2009*

“The Eco-Optiloc® pavers at my Center Street Village project are truly superb and aesthetically amazing.”

*Rick Osborne, Jr.
Center Street Village*



“This lot has the capability of holding what amounts to a hundred-year flood, which we experienced. It has the ability to hold roughly eight inches of water over a twenty-four hour period. When you look at everything in total-ity, the savings on maintenance, the aesthetics of the lot, and the reduction of runoff, it's really a nice investment for Stone Mountain Park.”

*Gerald Rakestraw, General Manager
Stone Mountain Park, GA*

“It seems as though pervious concrete and asphalt are subject to undue wear or degradation by turning movements - by people turning into a parking place or a drive-through. So, while pervious concrete or asphalt might be quite acceptable once the car has turned into the parking place, you probably are going to want to use either impermeable concrete, asphalt, or something like interlocking pavers that will handle those turning movements and heavier traffic.”

“We're trying to build more walkable communities and to have a much more appealing environment in our urban areas. More and more, we're emphasizing the aesthetics and other aspects of low-impact development, such as trees and swales that are attractively planted. They might be adjacent to a permeable sidewalk, which would be attractive as well. The two work together well as a treatment train.”

*Jack Miriam, Environmental Manager for Sarasota County
Permeable Pavers by Carol Brzozowski
Stormwater Magazine Sept. 2009*

“A material that deserves to be used more is permeable pavers, also known as open-jointed block or PICIP (permeable interlocking concrete pavement). These are manufactured units with openings in the joints where single-sized aggregate gives the pavement its permeability. Pavers manufactured to ASTM standards are extremely strong and durable units. They are very reliable.”

*Bruce Ferguson, School of Environmental Design
at the University of Georgia
Porous Pavement Q & A, Stormwater Magazine Sept. 2009*

What they are saying about permeable pavements...

“Two issues - the planning and design aspects of parking - illustrate one of the primary challenges for local government managers implementing National Pollutant Discharge Elimination System Phase I and II post-construction stormwater requirements. In recent years, we have learned that there is a direct correlation between impervious surface in a watershed and the quality of its streams, lakes, and coastal waters. Permeable pavements can infiltrate rainwater and treat runoff from adjacent impervious areas.

Nikos Singelis, United States EPA
Lisa Nisenson, Principle, Nisenson Consulting
Martina Frey, Environmental Scientist, Tetra Tech, Inc.
Lots and Lots of Parking Lots,
Stormwater Solutions Magazine, Feb. 2008



“The Chicago Park District approved the Eco-Priora® Coral Gem pavers for Buckingham Fountain primarily because the product meets three critical requirements: the pavers satisfy federal guidelines for ADA accessibility requirements, they match the original Fountain paving color and appearance, and they satisfy stormwater management requirements without the need for additional water storage in surface basins or underground chambers. Additionally, the permeable pavers have the added benefits of proven durability, minimal maintenance, ready availability, invisible repairs, and they demonstrate the use of best management practices regarding sustainability and environmental sensitivity.”

“Overall, the permeable paving at Buckingham Fountain has been very successful. Foremost it solved a lot of problems with accessibility and best management practices for water management while retaining the historic integrity of the monument’s original pink paving.”

Michael Fus, Preservation Architect
Chicago Park District

“In past projects, I found myself having to remove other people’s stormwater. Whatever ran off from others’ property became my problem and my cost to manage. Autumn Trails takes a different approach, where we don’t make our runoff someone else’s problem, mostly because there is no runoff thanks to the permeable pavers.”

George Bialecki, Alternative Energy Builders, Moline, IL
Autumn Trails Pioneers, PICP in Streets
Interlocking Concrete Pavement Magazine, May 2007

“This project has proven to be transformational for CDOT and for the local permeable pavement market. Cities both around the region and around the world have spoken to us about starting their own Green Alley Programs and trying permeable pavements. I feel we have started a kind of revolution.”

“We are monitoring the green alley locations to see how they hold up to traffic and weather-related wear and tear, such as snow and ice, and how they maintain their permeability. So far, the results are very positive. The Green Alley Program has filtered into many of the other projects we are working on, so this year alone we will have several streetscape projects with permeable pavers and open-bottom catch basins.”

Janet Attarian, Project Director
Chicago’s Streetscape and Urban Design Program in the
Department of Transportation
Chicago Green Alleys, Stormwater Magazine, Oct. 2008

“From day one, the Board wanted a permeable lot, a view heightened by the long-term drought in the southeast which drastically lowered lake levels and threatened drinking water supplies. They visited pervious concrete and permeable interlocking concrete pavement (PICP) projects in the region. This raised everyone’s confidence in these types of systems. The Board went with PICP because of easy repairs and a better looking surface.”

Robert Benson, ASLA, Vice President, Robert and Company
Stone Mountain Paver Picnic
Interlocking Concrete Pavement Magazine, Nov. 2008

“Though we have not kept up on the maintenance, the system is continuing to outperform my expectations. I was hesitant at first, as to the durability of the pavers, and was skeptical whether they could hold up to the constant use of a fully-loaded fire engine. The system has performed well beyond my expectations. There is no movement, channeling, or cracking of the pavers. They still look great with very little noticeable wear.”

Bob Rowe, Fire Chief, Snoqualmie Fire Department, WA



Advantages & Benefits

- Provides volume-based runoff reductions of up to 100% depending on project parameters and site design and infiltrates stormwater on site, replicating natural hydrology
- Can be designed to accommodate a wide variety of stormwater management objectives
- Contributes to ground-water recharge and may be used with rainwater harvesting technologies
- Reduces runoff volumes, TSS, pollutant loads and captures “first flush,” mitigates impacts on surface waters and reduces or eliminates downstream flooding and streambank erosion
- Minimizes impacts and stress on existing storm sewer systems through reduced peak discharges
- Allows better land-use planning for greater economic value, may decrease project costs by reducing or eliminating drainage and retention/detention systems, and may qualify for reduced stormwater utility fees
- Reduces urban heat island effects and thermal loading on surface waters and facilitates evapotranspiration
- Meets firm, stable and slip-resistance standards from the Americans with Disabilities Act (ADA)
- Qualifies for LEED® Credits
- Are traffic-ready immediately after installation and can be installed in any season
- Exceptionally durable surface withstands turning movements of tires without the surface degradation seen in pervious concrete and porous asphalt pavements
- Does not use petroleum-based materials that can leach into the soil



The Eco-Stone® Family of Permeable Pavers features shapes that offer the highest degree of interlock and have been tested and proven worldwide. They are designed for fast mechanical installation, saving time and money on construction, and when

combined with low life-cycle costs, UNI® Permeable Pavers are very cost effective.

A civil or geotechnical engineer experienced in local site conditions and stormwater management should be consulted to ensure permeable pavement project parameters and stormwater management objectives are met and to determine the suitability of the site for permeable pavement installation. Please consult our *UNI Eco-Stone® Family of Permeable Interlocking Concrete Pavers Design Guide and Research Summary* and the *Permeable Interlocking Concrete Pavements Guide* by the Interlocking Concrete Pavement Institute for guidance on design and construction.

Maintenance

Periodic cleaning is required to maintain high infiltration rates of permeable pavements, and care must be taken to keep sediment off the pavement during and after construction. Studies and field experience have shown that infiltration rates can be maintained by street sweeping/vacuuming. The frequency of cleaning is typically dependent on traffic levels. It is generally recommended to clean the pavement surface at least once or twice a year, though some low-use pavements may not need cleaning as often. Periodic inspections of the site should be conducted for ponding or areas with reduced levels of infiltration. Vacuum settings on sweeping equipment may require adjustment to prevent the uptake of aggregate in the pavement openings and joints during routine cleaning. Some types of vacuum systems are capable of removing more aggregate should infiltration rates be reduced after several years and more regeneration is needed. The surface should be dry when cleaning. Replenishment of the joint and opening aggregate can be done, if needed, when cleaning. *It is important to keep the drainage voids and joints filled with aggregate.* As street cleaning is a BMP under EPA guidelines, this also satisfies other criteria in a comprehensive stormwater management program.

Properly constructed and maintained PICP should provide a service life of 25+ years. The Eco-Stone® Family of Permeable Pavers may be taken up and reinstated without leaving an unsightly patch if underground repairs to utilities or the subgrade are needed. If at the end of its design life the pavement no longer infiltrates the required amount of stormwater runoff, PICP is the only type of permeable pavement that can be taken up and the same pavers reinstated with new aggregates. Snowplowing poses no problem for properly installed pavements. Studies have shown less deicing salts are needed as snow melts and drains through the surface. Winter sanding is not recommended, however, a small aggregate, similar to the gradation used in the joints, may be used.

For more detailed information and to find the local UNI manufacturer nearest you, please visit www.uni-groupusa.org.

This brochure provides an overview of the types and scope of permeable interlocking concrete pavements that are being designed and built in North America and is only to be used as a guideline. It is not intended to be relied upon as an industry standard or specification and is not intended to replace the judgement or expertise of professional engineers, architects or landscape architects, who should be consulted in the design and construction of permeable pavements. Design and construction will vary with local regulations and specifications, environmental conditions, materials, and established construction methods for that area.

REFERENCES & RESOURCES

¹ RevitalizationOnline.com

² Chicago Sun Times

³ Commercial Real Estate News & Property Resource

• *The UNI Eco-Stone® Family of Permeable Interlocking Concrete Pavers Design Guide and Research Summary*

• *Lockpave® Pro structural design software / PC-SWMM™ PP hydrologic design software*

• *Permeable Interlocking Concrete Pavements - Interlocking Concrete Pavement Institute*

Thank you to the Interlocking Concrete Pavement Institute for use of some project photos.

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