

ARCHITECTURAL COLLECTION



**JUNILOCK**<sup>®</sup> **50**  
YEARS  
PAVING IT FORWARD

# Bringing YOUR VISION to Life

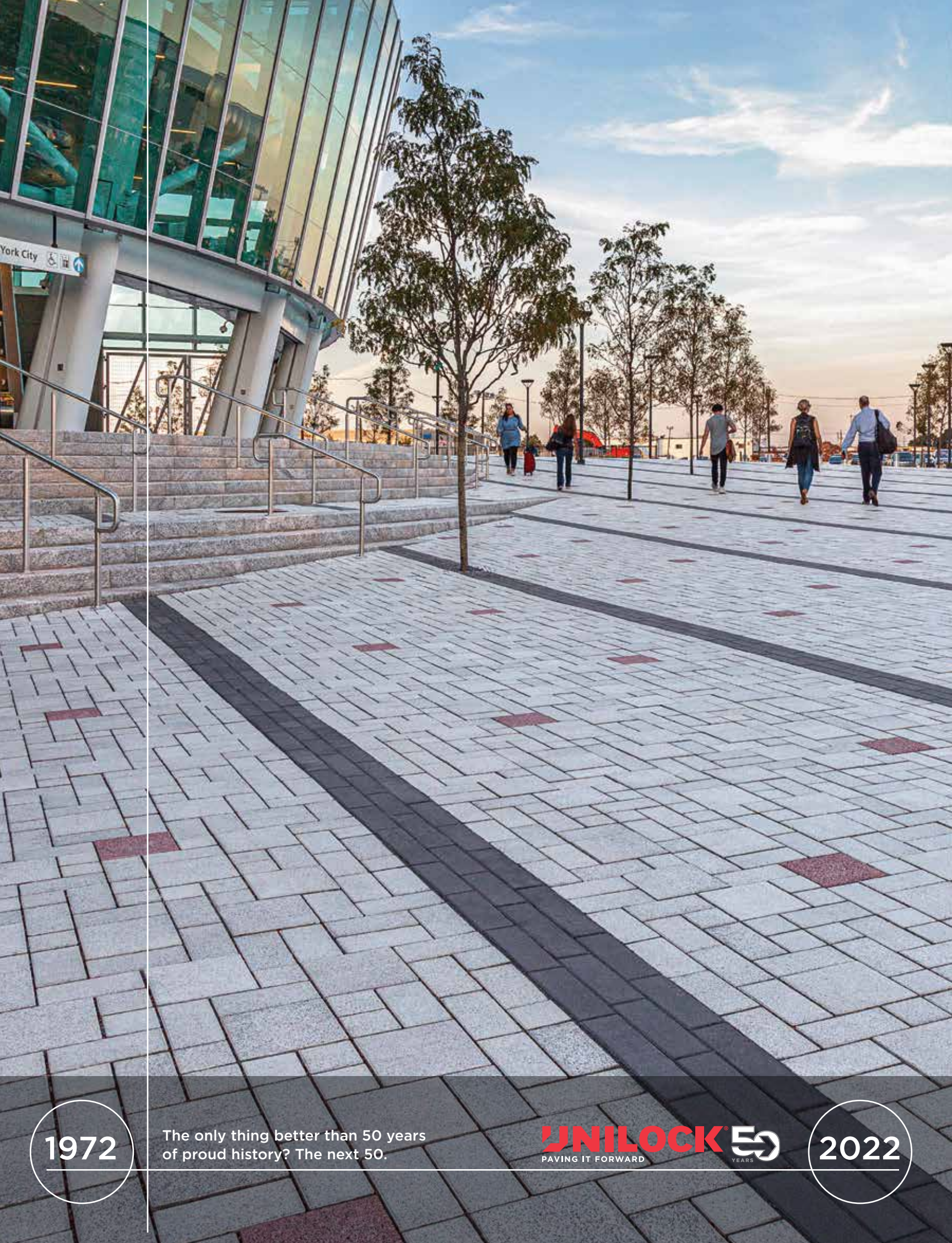
## ON THE COVER

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BIGELOW BOULEVARD COMPLETE STREET  
AND STUDENT UNION AT THE UNIVERSITY OF PITTSBURGH

DESIGNED BY LAQUATRA BONCI ASSOCIATES

Unilock plank pavers and permeable plank pavers with Series™ and Smooth Premier finishes are a unifying design element of this project - connecting each of the outdoor spaces with a lively paving pattern that delineates use through visual and textural changes.



1972

The only thing better than 50 years  
of proud history? The next 50.

**UNILOCK**   
PAVING IT FORWARD

2022

# A Brief History of Hardscaping Innovation



## It All Started with the Uni-Stone

In 1972 our founder, Ed Bryant, brought a revolutionary new paving method to North America: the Uni-Stone. In the process, he effectively established a new industry that has come to be known as “hardscaping.” Ed created our company with a vision of interconnectedness. Not just in the interlocking pavers we manufactured, but in the interconnectivity of people. He saw the long-term value of an ecosystem of businesses, working together to build the industry. Since then, other companies have tried to follow in our path, but Unilock remains the industry leader.

## A Rock-solid Commitment to Innovation

We've consistently maintained our reputation with a tireless commitment to raising the bar in everything we do. Today we offer an unmatched variety of paver and wall styles with unsurpassed durability that has been time tested in some of the most prestigious public spaces in North America. Our close relationships with European companies have given us access to exclusive new products and technologies and together with our own home-grown inventions, this has kept us on the leading edge.

*“The success of Unilock is a testament to a shared vision for what we could build.”*

- Ed Bryant, Founder



## Paving a Road Forward

It takes more than bringing new products to market to make a great company. It also requires providing excellent support, and fostering business practices that are inclusive, equitable and grounded in corporate integrity. As we pave the way forward, this remains at the core of our company culture. After all, we like to think of our first half-century as a good warm up.





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PROJECT: MLK Justice Plaza, Newark, NJ. DESIGN: Barreto/Dowd Landscape Architecture | Comito Associates. PRODUCT: 12 x 24" with Umbriano® finish in Winter Marvel and French Grey.



R. JUSTICE BUILDING

Dr. Martin Luther King Jr.  
WE MUST LEARN TO LIVE  
TOGETHER AS BROTHERS OR  
PERISH TOGETHER AS PEOPLE.  
BUT I KNOW SOMEDAY, THAT  
ONLY WHEN IT IS DARK ENOUGH,  
CAN YOU SEE THE STARS.  
I HAVE DECIDED TO STICK  
WITH LOVE. HATE IS TOO  
GREAY A BURDEN TO BEAR.  
LIFE'S MOST PERSISTENT  
AND URGENT QUESTION IS,  
WHAT ARE YOU DOING FOR OTHERS?

INJUSTICE ANYWHERE IS





A THREAT TO JUSTICE EVERYWHERE

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PROJECT: Camperdown Plaza, Greenville, SC. DESIGN: Beau Welling Design. PRODUCT: 4 x 12" and 6 x 12" with Smooth Premier finish in Opal, Dark Charcoal and custom color.

**BEAUTIFUL OUTDOOR SPACES** designed by Landscape Architects, Architects and Engineers are brought to life with Unilock pavers and walls. Through creative reimagining of the built and natural environment, attractive, functional and sustainable outdoor spaces are created for communities all across North America.



PROJECT: Legoland, Goshen, NY. DESIGN: Stantec. PRODUCT: Hex / City Park Paver™ with Smooth Premier finish in Red.



PROJECT: Pullman National Monument, Chicago, IL. DESIGN: Site Design Group, Ltd. PRODUCT: 4 x 16" Permeable with Series™ finish in SS0311 and 8 x 8" with Series finish in Onyx Black.





PROJECT: The DOT, Ferndale, MI. DESIGN: Grissim Metz Andriese Associates | Kenneth Weikal Landscape Architecture. PRODUCT: 4 x 16" with Smooth Premier and Series™ finishes.

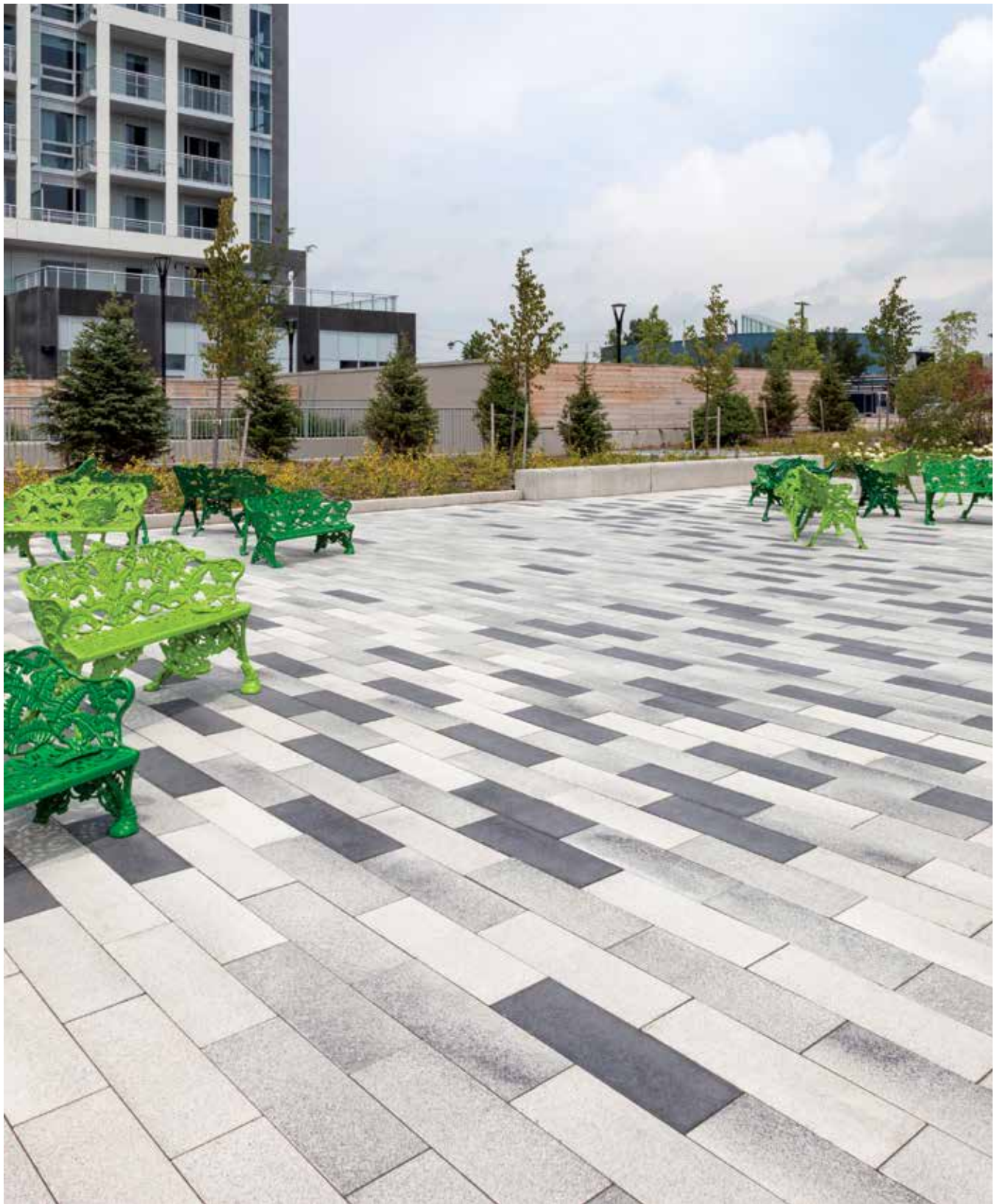


PROJECT: University of Pittsburgh - Bigelow Boulevard Complete Street, Pittsburgh, PA. DESIGN: LaQuatra Bonci Associates. PRODUCT: 4 x 12" with Series™ finish in Mocha and Smooth Premier finish in custom colors.



PROJECT: University of Guelph Stadium, Guelph, ON. DESIGN: Frontiers Design + Build. PRODUCT: 4 x 12" and 4 x 16" with Smooth Premier finish in Steel Grey and Opal and Il Campo® finish in Granite Blend.

# GEOMETRIC



**PROJECT:** Art on Main, Milton, ON. **DESIGN:** Forest and Field Landscape Architecture. **PRODUCT:** Planks with Umbriano® finish in French Grey, Midnight Sky and Winter Marvel.

**GEOMETRIC DESIGN** has roots in prehistoric and early modern art and is currently on-trend. Patterning used with standard shapes such as squares and rectangles can deliver strong geometric execution, achieving a truly unique design.



**PROJECT:** Georgetown Day School, Washington, DC. **DESIGN:** Lemon Brooke. **PRODUCT:** Hex / City Park Paver™ and Hex / City Park Paver™ - Permeable in Series™ finish in special order colors.



**PROJECT:** University of Pittsburgh - Bigelow Boulevard Complete Street, Pittsburgh, PA. **DESIGN:** LaQuatra Bonci Associates. **PRODUCT:** 4 x 12" wth Series™ finish in Mocha and Smooth Premier finish in custom colors.



PROJECT: Albion Islington Square, Etobicoke, ON. DESIGN: Forest and Field Landscape Architecture. PRODUCT: 7 x 14" with Umbriano® finish in Midnight Sky and Winter Marvel.





**PROJECT:** One Brookline Place, Brookline, MA. **DESIGN:** Mikyoung Kim. **PRODUCT:** Hex / City Park Paver™ with Smooth Premier finish in Granite, Natural and White.



**PROJECT:** Braintree East School, Braintree, MA. **DESIGN:** Traverse Landscape Architects. **PRODUCT:** 4 x 12", 4 x 16" and 8 x 24" with Series™ finish in Peppered Granite, Crystalline Basalt and Black Granite.



**PROJECT:** 99 Atlantic Ave Square, Toronto, ON. **DESIGN:** JSW + Associates. **PRODUCT:** 18 x 36" with Umbriano™ finish in Midnight Sky and Winter Marvel.



**PROJECT:** Faber Park, Staten Island, NY. **DESIGN:** Mark K. Morrison Landscape Architecture. **PRODUCT:** Hex / City Park Paver™ - Permeable with Smooth Premier finish in Steel Mountain.



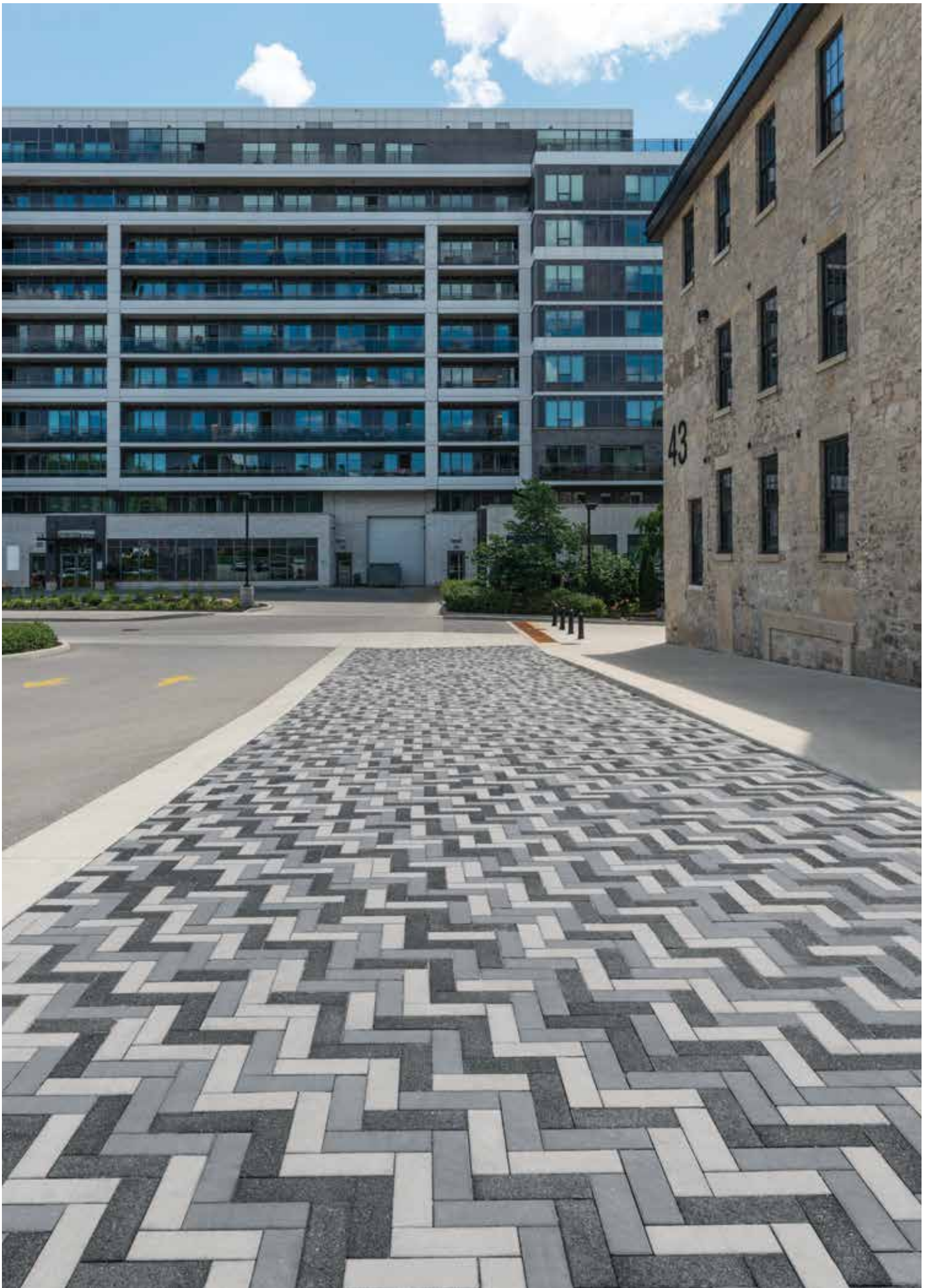
**PROJECT:** Uptown Waterloo Streetscape, Waterloo, ON. **DESIGN:** IBI Group. **PRODUCT:** 8 x 24" with Series™, Il Campo® and Smooth Premier finishes.



**PROJECT:** Pinnacle Uptown Condos, Mississauga, ON. **DESIGN:** NAK Design Strategies. **PRODUCT:** 4 x 16" with Smooth Premier Finish in Opal Blend and Steel Grey Blend.



PROJECT: Lower.com Field, Columbus, OH. DESIGN: MKSK. PRODUCT: 6 x 12" with Series™ finish in Mineral Ice and Nordic Star.



PROJECT: The Metalworks, Guelph, ON. DESIGN: Land Art Design. PRODUCT: 4 x 12" with Series™ finish in Black Granite and Smooth Premier finish in Opal Blend and Steel Grey Blend.

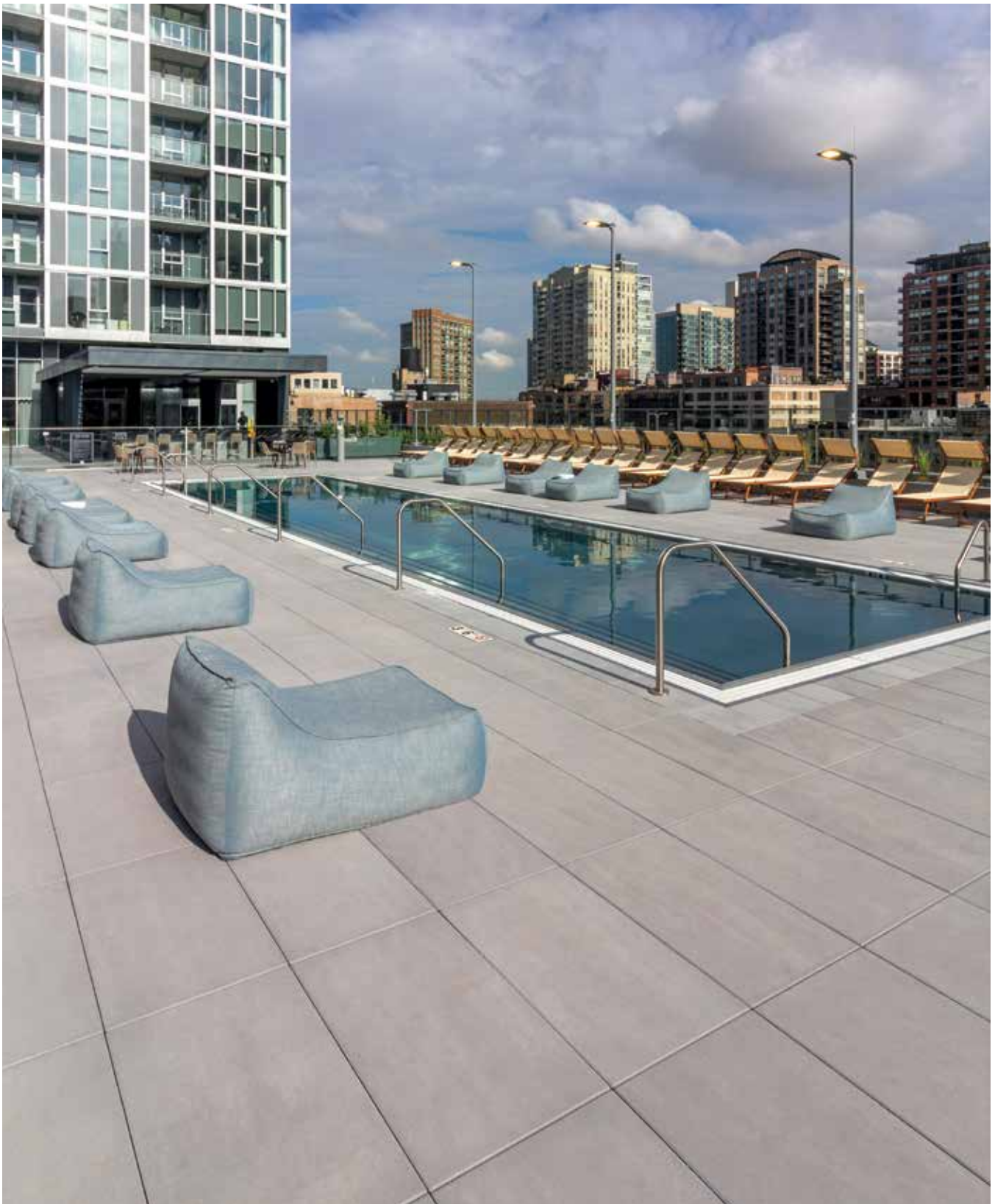


**PROJECT:** Financial Institution Head Quarters, Cape Cod, MA. **DESIGN:** Jenick Studio. **PRODUCT:** 4 x 12" and 4 x 16" with Umbriano® finish in Grenada White and Smooth Premier finish in Opal.



**PROJECT:** Thompson Park, Overland Park, KS. **DESIGN:** RDG Planning & Design. **PRODUCT:** Artline™ with Smooth Premier finish in special order colors.

# CONTEMPORARY



PROJECT: 369 W Grand Roof Deck, Chicago, IL. DESIGN: Daniel Weinbach & Partners, Ltd. PRODUCT: 21¼ x 35½" with Smooth Premier finish in Opal.

**CLEAN, UNCLUTTERED LINES** are the foundation for a contemporary project. Often achieved with large format slabs and pavers, the unique and modern finishes of Unilock products allow smaller format pavers to create distinctive, modern landscapes.



PROJECT: 465 N Park Roof Deck, Chicago, IL. DESIGN: Hitchcock Design Group. PRODUCT: Arcana™ in Modena and Vivanto.



PROJECT: MLK Justice Plaza, Newark, NJ. DESIGN: Barreto/Dowd Landscape Architecture | Comito Associates. PRODUCT: 12 x 24" with Umbriano® finish in Winter Marvel and French Grey.



PROJECT: Private Office Complex, Johnston, RI. DESIGN: IBI Placemaking. PRODUCT: 21 x 35" with Umbriano® finish in Summer Wheat.



PROJECT: 1036 W Fulton Roof Deck, Chicago, IL. DESIGN: Hartshorne Plunkard Architecture | Summit Design + Build. PRODUCT: Arcana™ in Modena.





PROJECT: Private Company Headquarters, Westerville, OH. DESIGN: Edge Landscape Architecture. PRODUCT: 16 x 16" with Umbriano® finish in Winter Marvel and Artline™ with Il Campo® finish in Granite Fusion.



PROJECT: Bloomington Go Station, Richmond Hill, ON. DESIGN: IBI Group. PRODUCT: 8 x 16" with Umbriano® finish in Grenada White and 4 x 16" with Series™ finish in Black Granite.



PROJECT: Mount St. Mary's, Cincinnati, OH. DESIGN: McGill Smith Punshon Design. PRODUCT: Umbriano® in Summer Wheat and 4 x 8" with Series™ finish in Onyx Black.



PROJECT: Rowan College at Burlington County, Mount Laurel, NJ. DESIGN: Sikora Wells Appel. PRODUCT: 12 x 24" with Umbriano® finish in French Grey, Midnight Sky and Winter Marvel.



**PROJECT:** Avani 2 Condo, Scarborough, ON. **DESIGN:** Studio TLA. **PRODUCT:** 8 x 8" and 8 x 16" with Series<sup>®</sup> finish in Ice Grey. 8 x 16" with Series finish in Mountain Mist. 4 x 8" with Il Campo<sup>®</sup> finish in Dark Charcoal.

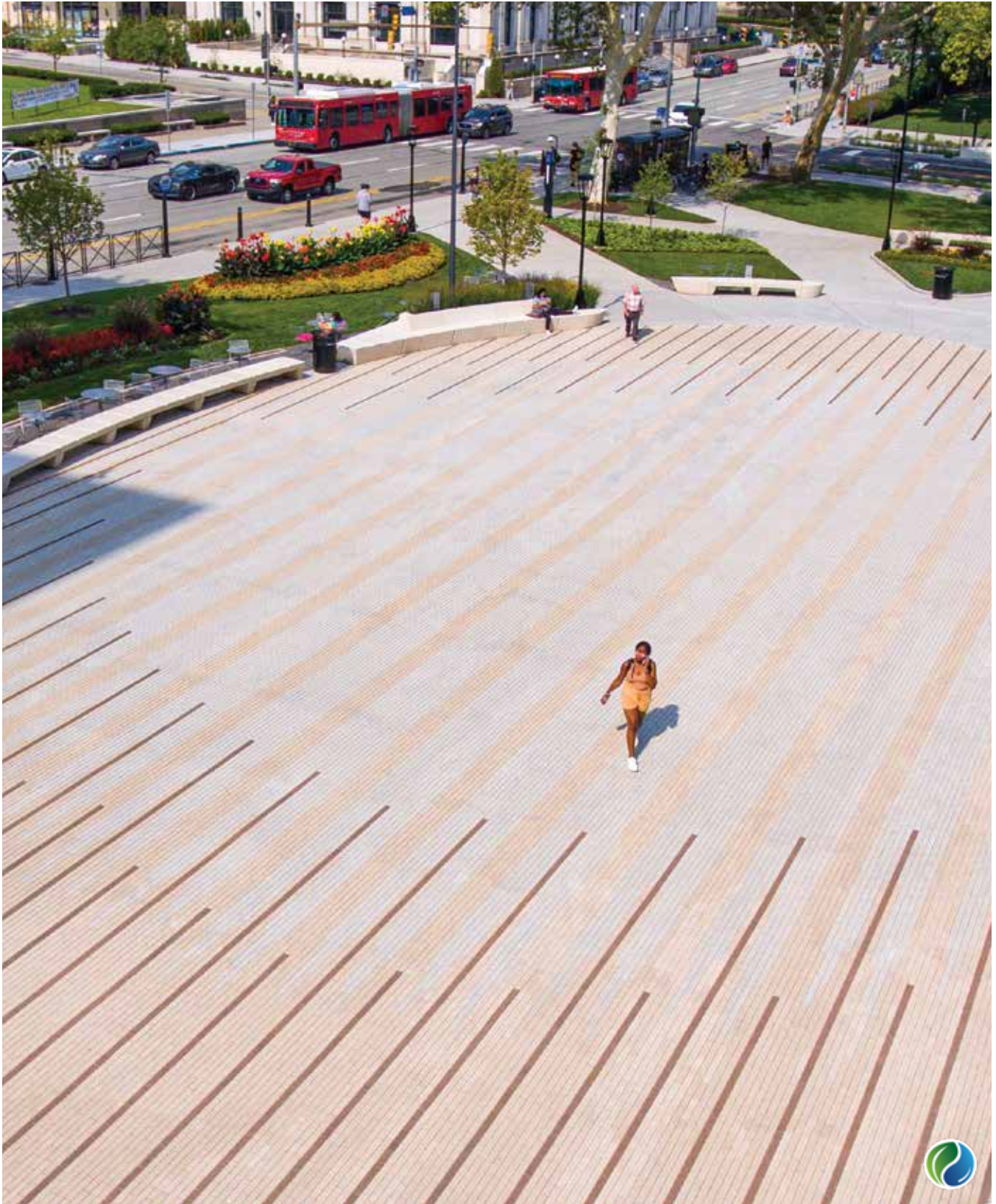


PROJECT: 369 W Grand Roof Deck, Chicago, IL. DESIGN: Daniel Weinbach & Partners, Ltd. PRODUCT: 21¼ x 35½" with Smooth Premier finish in Opal.



PROJECT: Veterans Memorial Park, Stamford, CT. DESIGN: Beta Group. PRODUCT: 8 x 16" with Umbriano® finish in Winter Marvel.

# LINEAR



PROJECT: University of Pittsburgh - Union, Pittsburgh, PA. DESIGN: LaQuatra Bondi Associates. PRODUCT: 3 x 12" Permeable with Series™ finish in Mocha and Smooth Premier finish in custom colors.

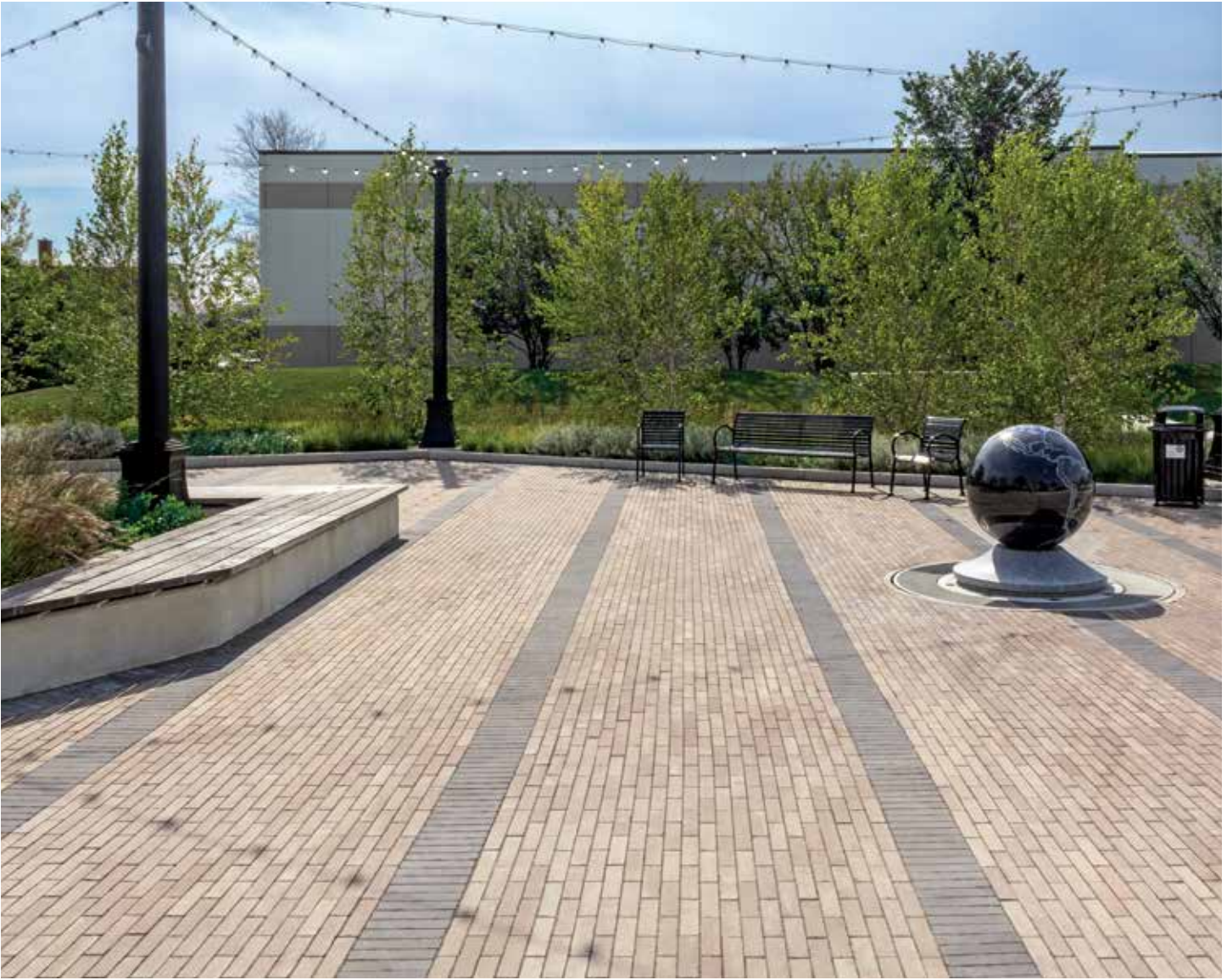
**LINEAR, PLANK PAVING DESIGN** provides creative and unique design opportunities. Whether directing the flow of traffic or creating a dramatic destination, Unilock offers an extensive range of sizes along with unique finishes to ensure your design vision is achieved.



PROJECT: TQL Stadium, Cincinnati, OH. DESIGN: Populus. PRODUCT: 6 x 24" Permeable with Smooth Premier finish in Dark Charcoal.



PROJECT: The Charles River Speedway, Brighton, MA. DESIGN: Klopfer Martin Design Group. PRODUCT: Artline™ with Smooth Premier finish in Steel Mountain.

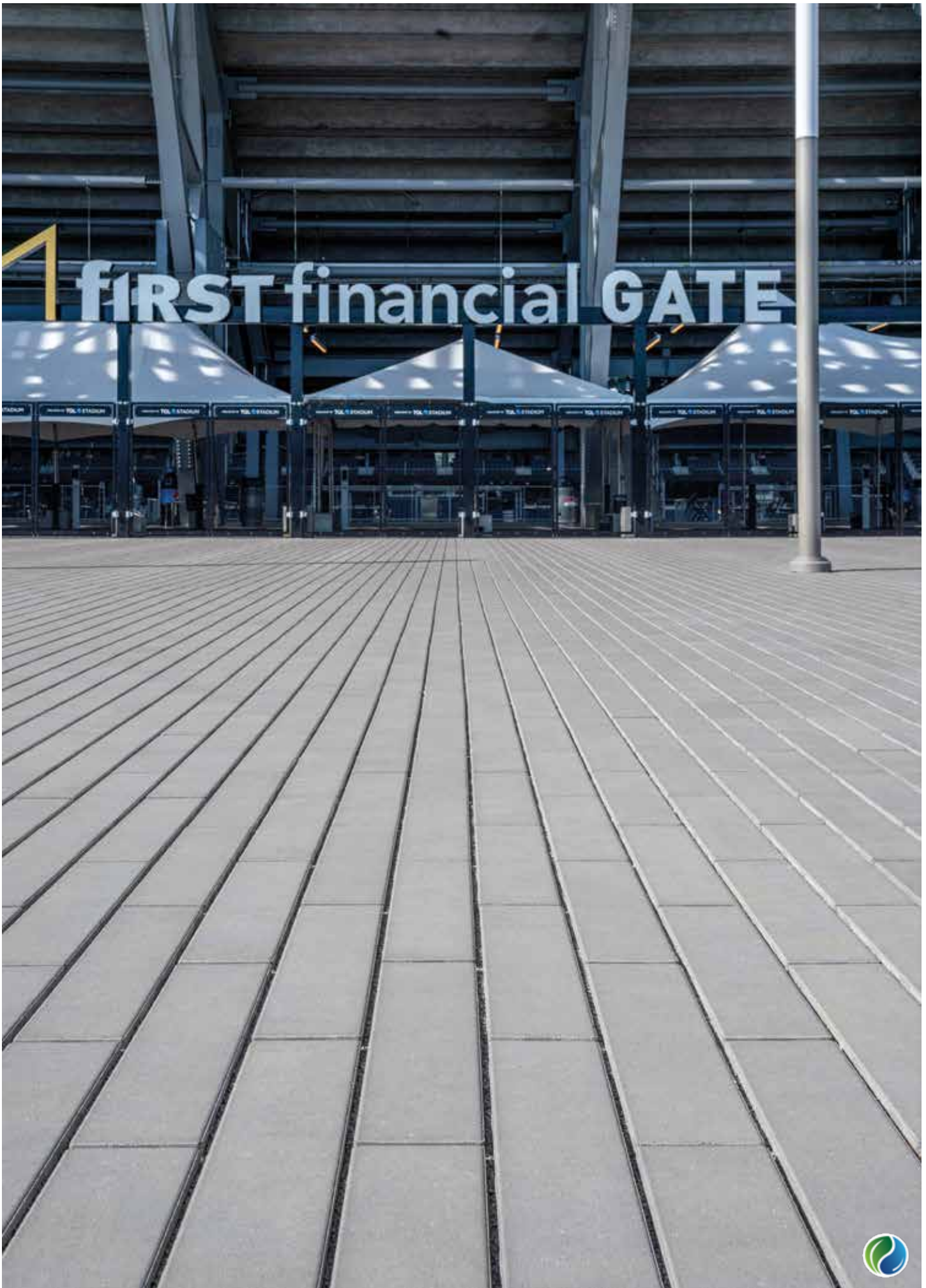


**PROJECT:** Ontarioville Plaza, Hanover Park, IL. **DESIGN:** The Lakota Group. **PRODUCT:** Mattoni™ in Sable Blend and Dark Charcoal.

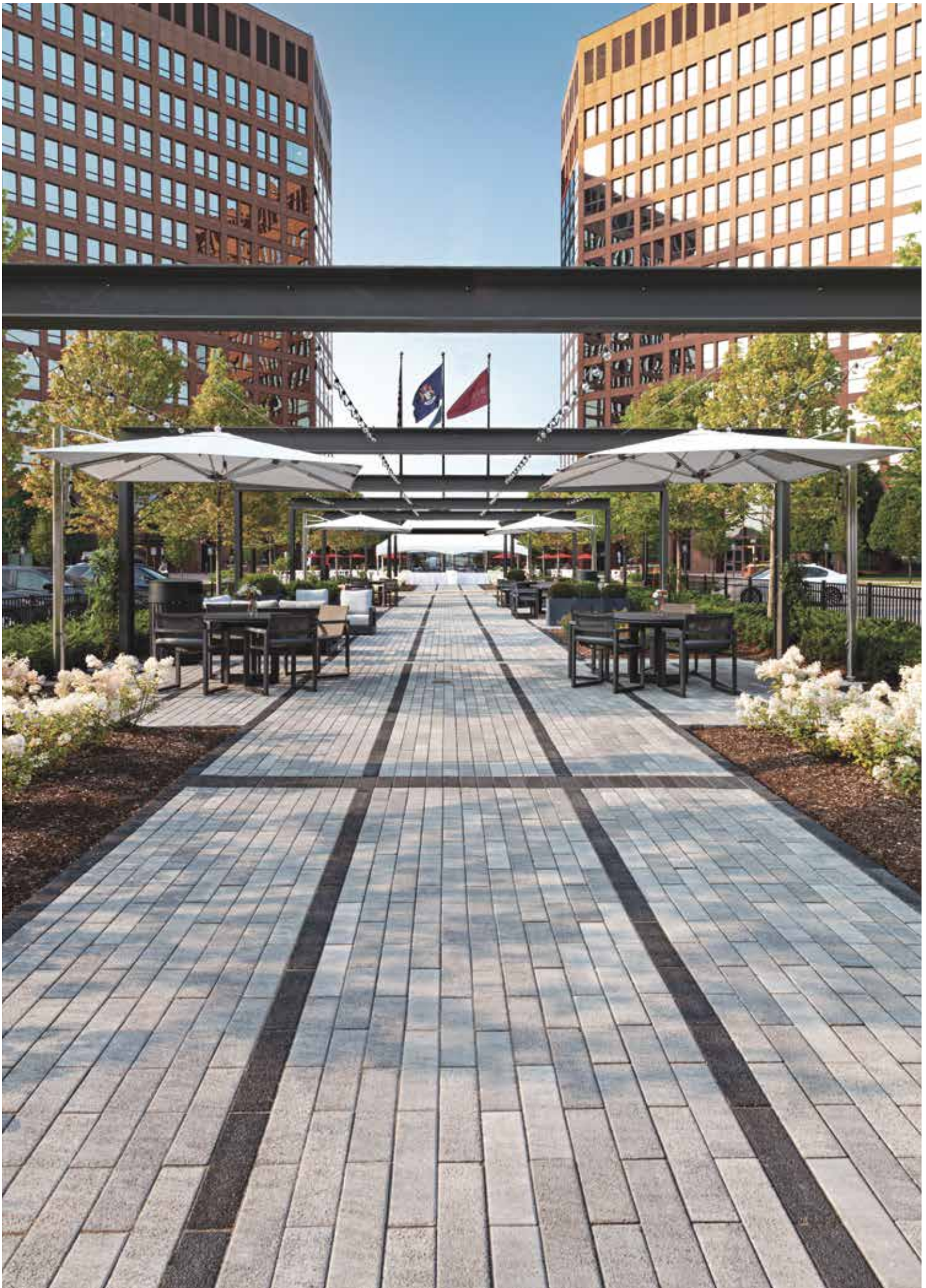


**PROJECT:** 54 Middlesex, Burlington, MA. **DESIGN:** PDA Associates. **PRODUCT:** Artline™ with Umbriano® finish in French Grey.





PROJECT: TQL Stadium, Cincinnati, OH. DESIGN: Populus. PRODUCT: 6 x 24" Permeable with Smooth Premier finish in Slate Blue.



PROJECT: Columbia Center, Troy, MI. DESIGN: Grissim Metz Andriese Associates. PRODUCT: 4 x 16" with Il Campo® finish in Granite and Series™ finish in Black Granite.



PROJECT: Lower.com Field, Columbus, OH. DESIGN: MKSK. PRODUCT: 6 x 6", 6 x 12" and 6 x 24" with Series" finish in Arctic Grey.



PROJECT: Court Street Plaza, Cincinnati, OH. DESIGN: Human Nature Inc. PRODUCT: 4 x 16" Permeable with Smooth Premier finish and Courtstone®.



PROJECT: Hood Park, Charlestown, MA. DESIGN: SMMA. PRODUCT: 3 x 12" Permeable with Smooth Premier finish in Granite Blend.



PROJECT: University of Guelph Stadium, Guelph, ON. DESIGN: Frontiers Design + Build. PRODUCT: 4 x 12" and 4 x 16" with Smooth Premier finish in Steel Grey and Opal.



PROJECT: 7200 Wisconsin Ave, Bethesda, MD. DESIGN: LandDesign. PRODUCT: Artline™ with Smooth Premier finish in Tuscany and Copper Ridge.



**PROJECT:** Toronto Water, Etobicoke, ON. **DESIGN:** Large Medium Design Office. **PRODUCT:** 4 x 16" Permeable with Smooth Premier finish in Steel and Opal.



**PROJECT:** Hood Park, Charlestown, MA. **DESIGN:** SMMA. **PRODUCT:** Artline™ with Umbriano® finish in French Grey.

HISTORIC



PROJECT: Allendale Streetscape, Allendale, NJ. DESIGN: Neglia - Engineering Associates. PRODUCT: Cophorne® in Burgundy Red, Burnt Clay, Old Oak, and Basalt.

**DESIGN HAS EVOLVED** through the ages but sometimes the right style is not the most recent. From old-world cobblestones to historic brick-style street pavers, Unilock offers authentic surface textures, colors and the assurance of the latest technology to deliver durable long-lasting products for your designs.



PROJECT: Court Street Plaza, Cincinnati, OH. DESIGN: Human Nature Inc. PRODUCT: Courtstone® in Belgian Blue.



PROJECT: Old Orchard Mall, Skokie, IL. DESIGN: Herrera Landscape & Snow Removal, Inc. PRODUCT: Richcliff® in Smoke Shale.



**PROJECT:** Court Street Plaza, Cincinnati, OH. **DESIGN:** Human Nature Inc. **PRODUCT:** Courtstone® in Belgian Blue.



**PROJECT:** Allendale Streetscape, Allendale, NJ. **DESIGN:** Neglia - Engineering Associates. **PRODUCT:** Copthorne® in Burgundy Red, Burnt Clay, Old Oak, and Basalt.





PROJECT: Little Caesars Arena, Detroit, MI. DESIGN: SmithGroup Ann Arbor. PRODUCT: Town Hall® in Burgundy Red, Burnt Clay and Old Oak.



PROJECT: Newton Streetscape, Newton, NC. DESIGN: Allison Platt and Associates. PRODUCT: Richcliff® in Dawn Mist and Town Hall® in Burgundy Red and Burnt Clay.

# TRADITIONAL



PROJECT: Walkway Over The Hudson, Poughkeepsie, NY. DESIGN: Saratoga Associates Landscape Architects. PRODUCT: 5 x 10" Permeable with Smooth Premier finish in New York Blend and Sandstone.

**THERE ARE MANY INTERPRETATIONS** of traditional paving design from formal to rustic. Explore possibilities in this expansive style from standard brick pavers to natural stone, smooth surfaces or riven flagstone. Whether your preference is simple rectangle or multi-unit random collections, there are many product styles to consider for your traditional design.



**PROJECT:** Pullman National Monument, Chicago, IL. **DESIGN:** Site Design Group, Ltd. **PRODUCT:** 8 x 24" with Il Campo® finish in Granite.



**PROJECT:** MTO Centre of Excellence, North York, ON. **DESIGN:** WSP Thornhill. **PRODUCT:** 5 x 10" Permeable with Il Campo® finish in Santa Fe.



**PROJECT:** 616 Lofts on Monroe, Grand Rapids, MI. **DESIGN:** Integrated Architecture. **PRODUCT:** 4 x 12", 6 x 8" and 12 x 12" with Il Campo® finish in Granite Blend.



**PROJECT:** Bloomington Go Station, Richmond Hill, ON. **DESIGN:** IBI Group. **PRODUCT:** Eco-Optiloc™ in Natural.



**PROJECT:** Pinnacle Uptown Condos, Mississauga, ON. **DESIGN:** NAK Design Strategies. **PRODUCT:** 10 x 10" with Il Campo® finish in Santa Fe.



**PROJECT:** Hydro-Systems Laboratory - University of Illinois, Urbana, IL. **DESIGN:** Upland Design. **PRODUCT:** 5 x 10" Permeable with Series™ finish in Golden Tan and Il Campo® finish in Heritage Brown.



**PROJECT:** Really Living Seventh-Day Adventist Church, Hamilton, ON. **DESIGN:** IBI Hamilton. **PRODUCT:** 5 x 10" Permeable with Smooth Premier Finish in Opal Blend and Steel Grey Blend.



**PROJECT:** Hancock Garage, Quincy, MA. **DESIGN:** BSC Group.  
**PRODUCT:** Eco-Line® with Il Campo® finish in Heritage Brown and Umbriano® finish in Summer Wheat.



**PROJECT:** Manufacturing Facility, Hyannis, MA. **DESIGN:** Dennis Group Inc.  
**PRODUCT:** 3 x 12" Permeable with Umbriano finish in French Grey.



PROJECT: 43 Foundry, Waltham, MA. DESIGN: IBI Placemaking. PRODUCT: 5 x 10" Permeable with Smooth Premier finish in Steel Mountain.



PROJECT: Bruce Peninsula National Park - Cyprus Lake the Hub, Tobermory, ON. DESIGN: Aecom Kitchener. PRODUCT: Eco-Optiloc™ in Natural and Charcoal.

# WALLS



PROJECT: Corporate Security Wall, North Chicago, IL. DESIGN: The Lakota Group. PRODUCT: U-Cara® Multi-Face Wall with Smooth Premier fascia panels in Bavarian.

**RETAINING WALLS** range from non-structural to structural, contemporary to natural, and small-scale to large. Unilock offers many different styles to meet the needs of the application and aesthetic for your project with additional resources, such as design support available as you need it.





**PROJECT:** Oak Knoll Subdivision, Richmond Hill, ON. **DESIGN:** RisiStone Engineering. **PRODUCT:** SienaStone™ Smooth / SienaEdge™ in Granite.



**PROJECT:** Carrville Road Town Homes, Richmond Hill, ON. **DESIGN:** JSW + Associates. **PRODUCT:** SienaStone™ Smooth / SienaEdge™ in Granite.



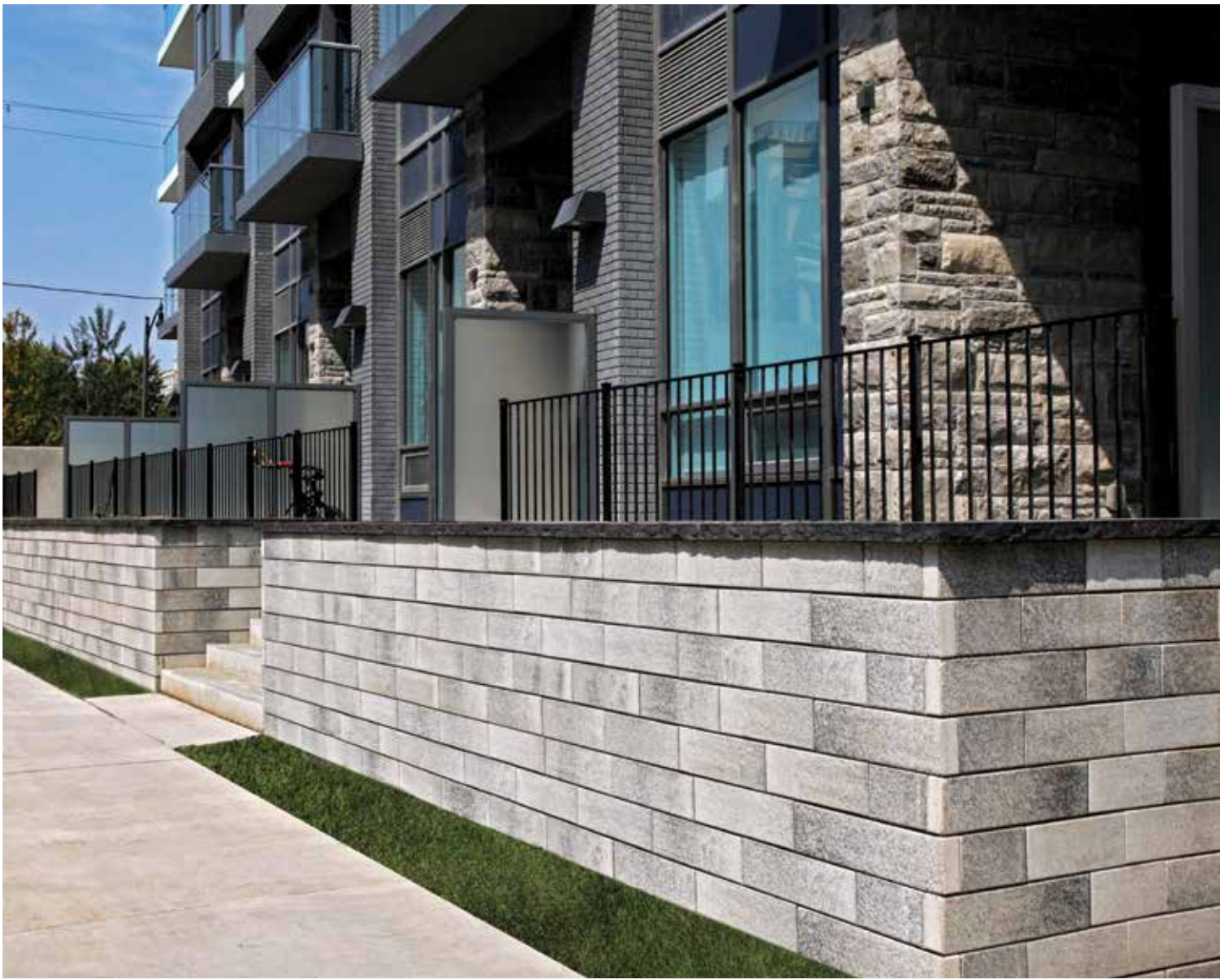
**PROJECT:** Synergy Apartments, Wauwatosa, WI. **DESIGN:** New Eden Landscape Architecture. **PRODUCT:** Lineo™ Dimensional Stone in Granite with Universal Coping in Buff.



PROJECT: North Village, Douglas, MA. DESIGN: Coweset Engineering. PRODUCT: Pisa XL / Concord Wall™ XL in Granite Blend.



PROJECT: Langley Terrace, Newton, MA. DESIGN: G2 Collaborative. PRODUCT: U-Cara® Multi-Face Wall with Smooth Premier fascia panels in Steel Mountain.



PROJECT: Lotus Condominium, Toronto, ON. DESIGN: STUDIO tla. PRODUCT: U-Cara® Multi-Face Wall with Umbrino® fascia panels in Winter Marvel.



PROJECT: West London Dyke, London, ON. DESIGN: RisiStone Engineering. PRODUCT: DuraHold® in Natural.



PROJECT: Cooksville GO Station, Mississauga, ON DESIGN: Brodies & Associates. PRODUCT: Durahold® in Natural.



PROJECT: Carrway Harrison-Toll Brothers. DESIGN: Melillo | Bauer | Carman Landscape Architecture. PRODUCT: U-Cara® Multi-Face Wall with Pitched fascia panels in Bavarian.



PROJECT: Colby College Sportfield, Waterville, ME. DESIGN: Activitas. PRODUCT: SienaStone™ in Natural.



PROJECT: Metrogate Condo, Scarborough, ON. DESIGN: Studio TLA. PRODUCT: Pisa2™ / Concord Wall™ in Natural.

# THE DETAILS

Every project's success is directly proportionate to the attention paid to the many details. At Unilock, we take pride in supporting designers with those fine details, from **product choice and finish selection, to cross-sections, construction documents and installation guidelines.** We're present from the very beginning of your design process right through to project completion.



# THE BEST Product

## SUPERIOR CHOICE

Surfaces must be engineered to withstand the test of time. Unilock pavers not only satisfy requirements for structural integrity, safety, cost, environmental impact, maintenance and field-proven performance, but they also provide superior skid resistance and weathering. Because of the unique combination of product strength, ease of maintenance, aesthetics and reusability, they have a better life-cycle cost than other products. Pavers are a flexible system, so their surface area can move slightly without jeopardizing structural integrity. Concrete pavers require less maintenance than other products and can withstand heavy loading. They can also be manufactured in different shapes, colors and finishes for your large scale projects.

## STRENGTH AND DURABILITY

All Unilock pavers and walls are manufactured to meet and exceed the ASTM standards without compromising the composition. They are stronger than other materials with their higher compressive strength, which is achieved by a specialized manufacturing process, and have lower absorption rates that are essential in freeze-thaw climates. At Unilock, we will not sacrifice quality for cost.

## STANDARDS & TEST METHODS

### ASTM STANDARDS - PAVERS & SLABS

Type	ASTM	Compressive Strength	Water Absorption	Freeze/Thaw (49 cycles)	Flexural Strength	Flexural Strength	Dimensional Accuracy
PAVERS	ASTM C936	8,000 PSI MIN.	< 5%	<500 G/M2			L&W: ± 1/16" (1.6MM) H: ± 1/8" (3.18MM)
SLABS	ASTM C1782	8,000 PSI MIN.	< 5%	<500 G/M2	>725 PSI AVG.	>650 PSI MIN.	L&W: ± 1/16" (1.6MM) H: ± 1/8" (3.18MM)

Unilock® meets and exceeds C936 paver manufacturing standards and C1782 Standard Specification for Paving Slabs.

#### Pavers

- > C140 for Compressive Strength and Absorption
- > C1645 for Freeze-Thaw Durability

#### Slabs

- > C140 for Absorption and Compressive Strength
- > ASTM C1645 for Freeze-Thaw Durability
- > ASTM C1782 or CSA 231.1 for Flexural Strength

### ASTM STANDARDS - WALLS

TYPE	ASTM	ASTM/ NCMA Compressive Strength	Water Absorption	Freeze/Thaw (50 cycles)	Dimensional Tolerances
WALLS	ASTM 1372 NCMA Zone 3	3000/5,500 PSI MIN.	< 7LB/FT <sup>2</sup>	≤1.5%	± 1/8" (3.2MM)

Unilock meets and exceeds C1372 Standard Specification for Dry Cast Segmental Retaining Wall Units.

#### Dry Cast Retaining Walls

- > C140 for Compressive Strength and Absorption
- > ASTM C1262 for Freeze-Thaw Durability
- > NCMA Zone 3 with de-icing salt exposure guidelines

## ACCESSIBILITY

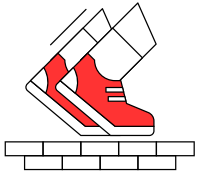
The Americans with Disabilities Act Accessibility Guidelines (ADAAG) provides measurable criteria to determine compliance, not individual product evaluation. Gaps, joints or openings, greater than 1/2" horizontal and 1/4" vertical should be avoided as they can disrupt wheelchair maneuvering (United States Access Board - Guidelines and Standards).

## THE IMPORTANCE OF ASPECT RATIO

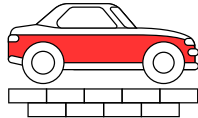
Simply defined, aspect ratio is the overall length of a paver divided by its height.

**LENGTH/HEIGHT = ASPECT RATIO**

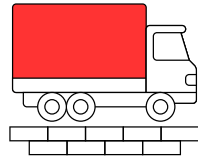
If an insufficient aspect ratio is used, any flexing or rocking caused by movement on the surface such as pedestrian or vehicular traffic, could result in breakage of the paver units. Not only is this breakage unsightly, but it can also compromise the integrity of the segmental system.



**OVER 5 : 1**  
Pedestrian Only



**4 : 1**  
Light-Duty  
Vehicular

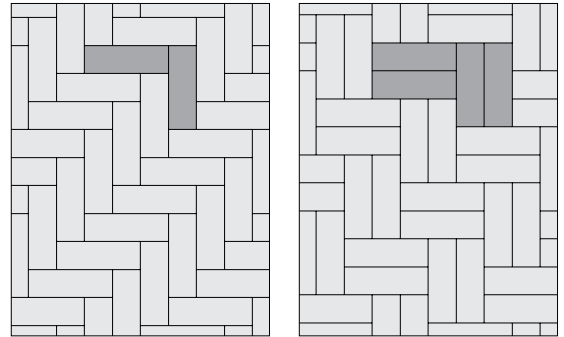


**3 : 1 OR LESS**  
Heavy-Duty  
Vehicular

## LAYING PATTERN CONSIDERATIONS

The laying pattern used in your application can also add a significant amount of strength to your design. A herringbone pattern provides the best 'lock-up', adding strength against rotational forces such as tires at a roadway intersection in the same way the 'L' shaped paver provides maximum performance.

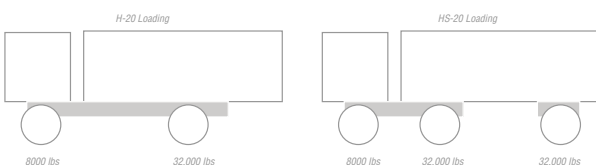
*SPEAK WITH YOUR UNILOCK REPRESENTATIVE FOR MORE INFORMATION.*



## HEAVY-DUTY CONSIDERATIONS

Unilock has a variety of shapes and sizes available to fit your heavy-duty application and style preferences. For maximum performance where twisting and tipping will be factors, consider the unique "L" interlocking shape as it provides superior resistance under heavy loads. The patented locking features work in tandem with the "tri-axis" technology. The result? A stronger, more stable pavement surface.

Heavy-duty Unilock paving systems are also designed for rapid mechanized installation, making them competitive and affordable.



### H-20 & HS-20 LOAD RATING

Similar to top of deck stresses per AASHTO H-20 loading conditions (32,000 lbs/14,500 kg), Unilock pavers can support 3-4 axle vehicles. This would include delivery, fire and semi-truck and trailer traffic in light-duty roadway applications.



## APPLICATION BY SIZE, THICKNESS & PRODUCT

Product	Product Size	Thickness	Pedestrian	Commercial Pedestrian*	Light-Duty Vehicular	Commercial Vehicular	Heavy-Duty	Permeable
Anchorlock™		80 mm	✓	✓	✓	✓	✓	
Artline™		100 mm	✓	✓	✓			
Artline™		70 mm	✓					
Beacon Hill™		80 mm	✓	✓	✓			
Beacon Hill™		60 mm	✓					
Bristol Valley™		60 mm	✓					
Brussels Block™		70 mm	✓	✓	✓			
Brussels Dimensional™ Paver		100 mm	✓	✓	✓	✓		
Hex / City Park Paver™		70 mm	✓	✓	✓	✓		✓ (80 mm)
Cophorne™		60 mm	✓	✓	✓	✓		
Courtstone™		60 mm	✓	✓	✓	✓		
Dura-Mat		100 mm	✓		✓			✓
Eco-Line™		100 mm	✓	✓	✓	✓	✓	✓
Eco-Optiloc™		80 mm	✓	✓	✓	✓	✓	✓
Mattoni™		70 mm	✓	✓	✓			
Optiloc™		80 mm	✓	✓	✓	✓	✓	
Richcliff™		60 mm	✓	✓	✓	✓		
Thornbury™		70 mm	✓	✓	✓			✓
Town Hall™		70 mm	✓	✓	✓	✓		✓
	36 x 36	100 mm	✓					
	18 x 36	100 mm	✓					
	24 x 24	100 mm	✓	✓	✓			
	24 x 24	70 mm	✓					
	24 x 24	50 mm	✓					
	18 x 24	50 mm	✓					
	16 x 24	100 mm	✓	✓	✓ **			
	12 x 36	100 mm	✓					
	12 x 24	150 mm	✓	✓	✓	✓		
	12 x 24	100 mm	✓	✓	✓ **			
	12 x 24	70 mm	✓					
	12 x 24	50 mm	✓					
	12 x 18	100 mm	✓	✓	✓	✓		
	8 x 24	150 mm	✓	✓	✓			
	8 x 24	100 mm	✓	✓	✓ **			
	6 x 24	150 mm	✓	✓	✓	✓		
	6 x 24	70 mm	✓					
	16 x 16	100 mm	✓	✓	✓	✓		
	16 x 16	80 mm	✓	✓	✓			
	16 x 16	70 mm	✓	✓	✓			
	8 x 16	100 mm	✓	✓	✓	✓		
	8 x 16	70 mm	✓	✓	✓			
	7 x 14	60 mm	✓					
	7 x 14	80 mm	✓	✓	✓			
	4 x 16	100 mm	✓	✓	✓	✓		✓
	12 x 12	100 mm	✓	✓	✓	✓		
	12 x 12	70 mm	✓	✓	✓			✓
	6 x 12	100 mm	✓	✓	✓	✓	✓	
	6 x 12	80 mm	✓	✓	✓	✓		
	6 x 12	70 mm	✓	✓	✓			
	10 x 10	80 mm	✓	✓	✓	✓		✓
	5 x 10	80 mm	✓	✓	✓	✓	✓	✓
	8 x 8	100 mm	✓	✓	✓	✓	✓	
	8 x 8	80mm	✓	✓	✓	✓		
	8 x 8	70 mm	✓	✓	✓	✓		
	6 x 8	70 mm	✓	✓	✓	✓	✓	
	4 x 12	100 mm	✓	✓	✓	✓	✓	
	4 x 12	80 mm	✓	✓	✓			
	4 x 12	70 mm	✓	✓	✓			
	3 x 12	100 mm	✓	✓	✓	✓	✓	✓
	6 x 6	80 mm	✓	✓	✓	✓		
	6 x 6	70 mm	✓	✓	✓	✓		
	5 x 5	80 mm	✓		✓	✓		✓
	4 x 8	80 mm	✓	✓	✓	✓	✓	
	4 x 8	70 mm	✓	✓	✓	✓		
	4 x 8	60 mm	✓	✓	✓			
	4 x 4	70 mm	✓	✓	✓	✓		
	3 x 6	100 mm	✓	✓	✓	✓	✓	

All pavements require a site specific design. A Herringbone laying pattern is essential for most vehicular trafficked pavements and becomes more critical as the demands on the pavements increase. Please contact your local Unilock Representative for specific design details. This chart is only a guideline. \*Subject to occasional light duty service vehicles. \*\*Installed on a concrete base.

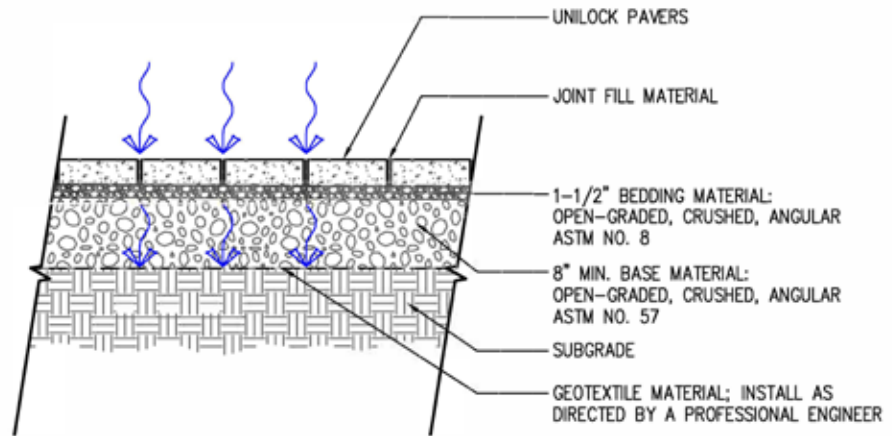


## PERMEABLE INSTALLATIONS

Similar to the non-permeable paver systems structural component, permeable paver installations offer secondary purpose for capturing and detaining rainwater. Common uses can range from sidewalk and plaza areas, to heavy-duty parking lots and roadways and include various base depths as shown in the two details below.

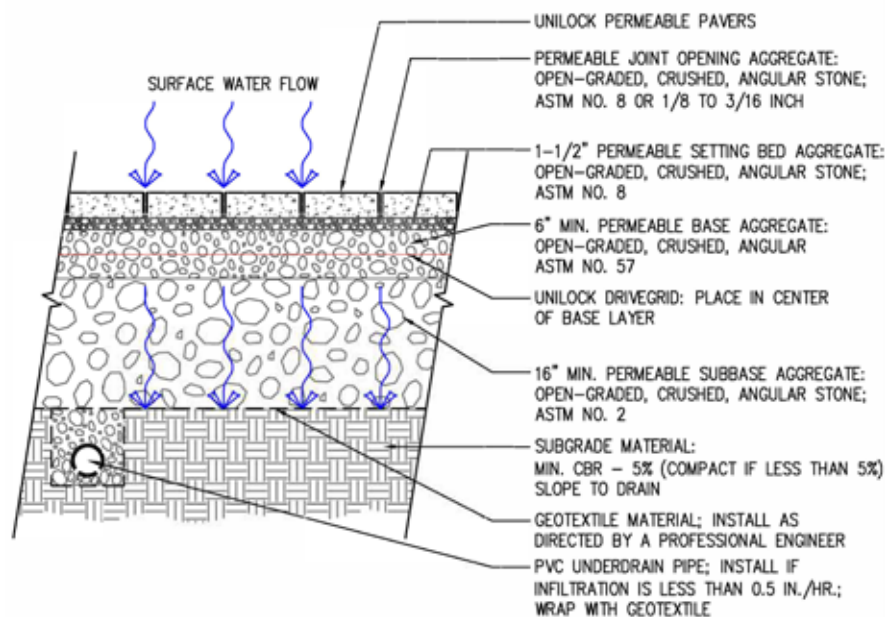
### PERMEABLE ON OPEN-GRADED AGGREGATE - LIGHT DUTY

This cross-section is an example of a light-duty pedestrian sidewalk application. Contact your Unilock Representative to learn more. Specific installation details will vary based on site conditions.



### PERMEABLE ON OPEN GRADED AGGREGATE - HEAVY-DUTY

Heavy-duty permeable applications require additional base support as illustrated below. This cross section is only an example. Contact your Unilock Representative to learn more. Specific installation details will vary based on site conditions.



## ARCHITECTURAL SLABS

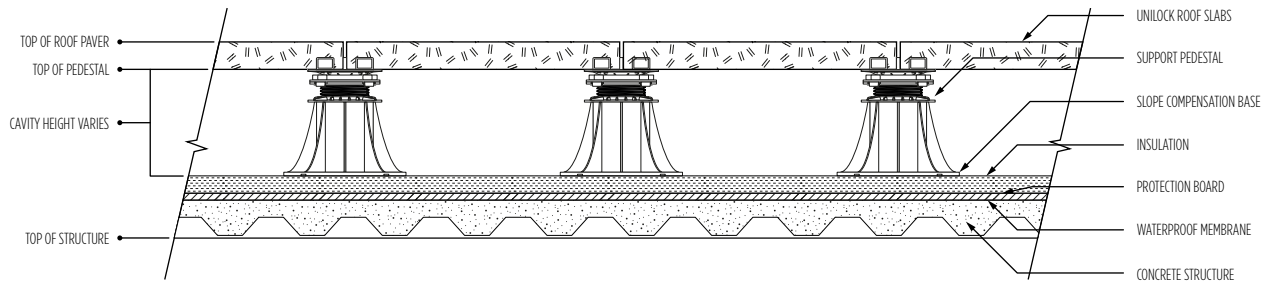
Unilock has many options for paving products on roof decks. Various installation methods will determine the appropriate products for the application. While pedestal installation typically utilizes the square or large slabs, a granular installation will extend your product choice and design flexibility. Ask your Unilock Representative for details.



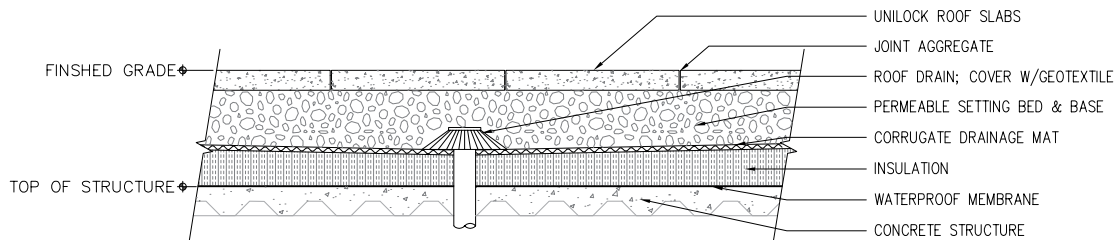
Product Type	Thickness	Shape	Product Weights
Arcana™ + Skyline™	50mm	606 x 606mm	24 lbs/sq.ft.
Beacon Hill™ XL	60mm	900 x 540mm** 720 x 540mm**	27.5 lbs/sq.ft.

### PEDESTAL SYSTEM

Unilock offers adjustable and stackable pedestal systems for your project. Contact your Unilock Representative to learn more. Specific installation details may vary based on pedestal height, load-bearing requirements, safety standards and wind-lift.



### GRANULAR BASE SYSTEM



The cross sections shown are examples of the type of installation systems and technical features of Unilock products. Unilock shall not be deemed responsible for improper use of the product or of damage deriving from any use different from those recommended

and/or installation procedures not in line with the following instructions relevant to a raised installation. **All roof top slab/pedestal installations must be engineered by a professional engineer.**

# LEED® Credit Opportunities

LEED, Leadership in Energy & Environmental Design, is a green building certification program that recognizes best-in-class building strategies and practices that have a positive impact on the health of occupants, while promoting renewable, clean energy. To receive LEED certification, building projects satisfy prerequisites and earn points to achieve different levels of certification. Unilock products can contribute toward achieving your certification goals with sustainable components/characteristics and Health Product Declarations.

## POTENTIAL LEED CREDITS FOR UTILIZING PERMEABLE PAVERS

### Rainwater management: LEED v4.1

Up to three points can be achieved for retaining rainwater onsite based on the percentile kept. 85% (zero lot line projects only) • 3 points, 95% - 2 points and 98% - 3 points. (all except Healthcare - subtract one point). *See LEED v4.1 for more specific project/site details.*

### Heat Island Reduction - Non-Roof: LEED v4.1

Paving materials with a three-year aged solar reflectance (SR) value of at least 0.28. If three-year aged value information is not available, use materials with an initial SR of at least 0.33 at installation OR use an open grid pavement at least 50% pervious • 2 points (except Healthcare - 1 point). *See LEED v4.1 for more specific site calculations.*

### Solar Reflectance










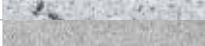




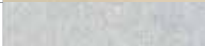
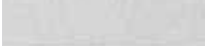







Solar Reflectance Index (SRI) is a criterion used by USGBC that measures values of sunlight and radiation bouncing from built surfaces. It is used to measure urban heat island effects in city centers. Dark pavement absorbs heat during the day and then releases it at night. This process creates a situation that causes urban centers to stay warmer all the time which contributes to air pollution and increased energy consumption. Careful selection of materials and colors can help reduce urban heat island effects.

### Materials and Resources: LEED v4.1

- > Building Product Disclosure and Optimization - Sourcing of Raw Materials
  - Sourcing of Raw Materials and Extraction • 1 point
- > Building Product Disclosure and Optimization - Material Ingredient Reporting
  - Material Ingredient Reporting • 1 point

**Unilock offers Health Product Declarations (HPDs) for all of our products.**

*\* Values may change slightly by region due to variations in local aggregate and granite. Contact your local Unilock Representative for more information.*









SAMPLE OF QUALIFIED UNILOCK COLORS (≥33) *				
Surface Finish	Color	Swatch	Solar Reflectance	SRI*
Umbriano® (mottled)	Grenada White		0.45	52
	Summer Wheat		0.42	48
	Winter Marvel		0.35	38
Series™ (Exposed Granite)	SS0025		0.42	48
	SS0016		0.41	46
	Golden Tan		0.40	45
	Chardonnay Tan		0.39	44
	Peppered Granite		0.38	42
	Coral Gem		0.37	41
	SS0026		0.37	41
	Ice Grey		0.35	38
	Mineral Ice Grey		0.31	33
Arcana™	Lugano		0.46	53
	Modena		0.46	53
Smooth Premier	Cream		0.49	57
	TX Active White		0.46	53
	SS0080		0.44	50
	Chamois		0.41	46
	Tuscany Blend		0.39	44
	Steel Mountain		0.30	32
Standard Finish	Canvas		0.33	36
	River		0.32	34
	Nevada		0.31	33

# UNILOCK HISTORY

Since 1972, Unilock has been helping people create beautiful outdoor spaces that become treasured places to build lasting memories. It all started when **our founder brought a revolutionary new paving method to North America.** Since then, other companies have tried to follow in our footsteps, but Unilock continues to pave it forward with a growing history of industry firsts.



# 50 Years of INNOVATION

1972	1991	1992	1993
<p><b>UNILOCK INTRODUCES THE FIRST PAVING STONE TO NORTH AMERICA.</b></p> <p>Founder Ed Bryant kick-started the entire industry, securing a license to manufacture and sell the iconic UNI-Stone from Europe.</p>  <p>UNI-STONE</p>	<p><b>FIRST PERMEABLE PAVER</b></p> <p>We were the first to manufacture permeable pavers to address growing concerns around stormwater management. Today we have more permeable paver design options for residential and commercial projects than anyone.</p>  <p>UNI ECO-STONE</p>	<p><b>FIRST FACEMIX</b></p> <p>Before Unilock Series, all pavers in North America were thru-mix. We were the first to introduce facemix technology, now known as EnduraColor. Some manufacturers are trying to market facemix as something new, but we've been selling it for more than twenty-five years.</p>  <p>SERIES</p>	<p><b>TUMBLED PRODUCTS</b></p> <p>The idea of 'antiquing' pavers for a timeworn look was something that many people said would never fly. But Brussels Block quickly became the most popular product in our line, leading to Brussels Dimensional wall, and scores of imitators.</p>  <p>BRUSSELS BLOCK</p>
2004	2007	2018	2022
<p><b>FIRST ULTIMA CONCRETE</b></p> <p>Unilock remains the only manufacturer in North America with this technology. Ultima™ Concrete makes our Elegance products second-to-none in beauty and durability.</p>  <p>Look for our <b>ELEGANCE</b> Product line-up.</p>	<p><b>FIRST COATED PRODUCT</b></p> <p>Unilock introduced Umbriano as the first product with EasyClean™ stain resistance technology. Other factory sealed products have followed since then.</p>  <p>UMBRIANO</p>	<p><b>PATENTED U-CARA WALL</b></p> <p>The U-Cara Multi-Face Wall was developed to deliver unlimited design flexibility with a single wall system that brings EnduraColor™ finishes to vertical features. Only Unilock holds the patent for this product.</p>  <p><b>U-CARA</b> US PAT. 9,453,341</p>	<p><b>THE NEXT 50 YEARS</b></p> <p>This year marks our 50<sup>th</sup> anniversary as the industry trend-setter and we're investing more than ever before. Developing new products, processes and technologies that will pave the way forward for another 50 years.</p>  <p><b>UNILOCK</b> PAVING IT FORWARD</p>

“Innovation is really what makes this company...Just about every new product technology that’s come into North America we developed and brought in.”

~ Ed Bryant, Unilock Founder



PROJECT: City Point, Waltham, MA. DESIGN: CBA Landscape Architects LLC. PRODUCT: 4 x 8" with Umbriano® finish in Midnight Sky and 8 x 8" with Umbriano® finish in French Grey and Grenada White.



# Dedication to **QUALITY**

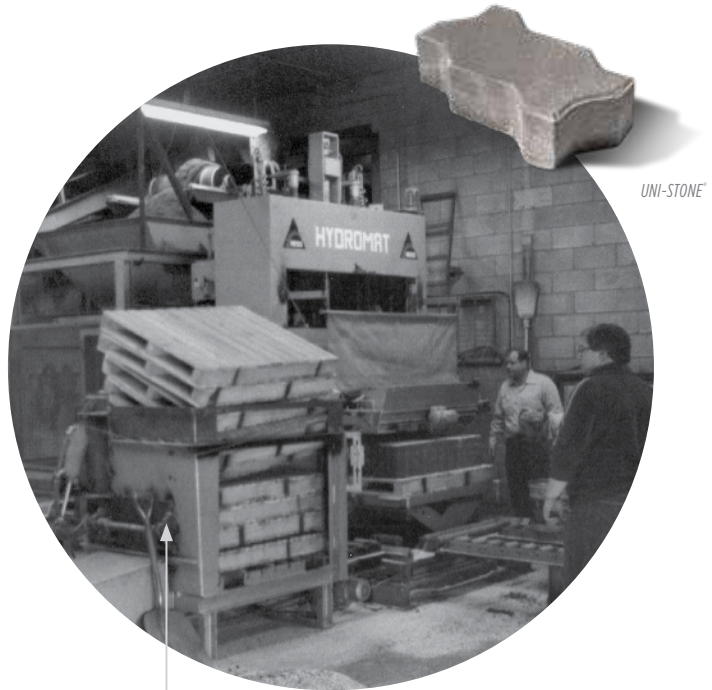
## **FOR US, IT'S PERSONAL**

Over 50 years ago, our founder stumbled upon a unique little European product called the UNI-Stone. Intrigued by the benefits of this revolutionary paving method, he decided to license the product and bring the concept to North America. He purchased a basic paver machine from Europe and hired a small staff to produce the stones.

In those early days, most sales of Unilock were to large-scale commercial properties and streetscapes. Any lapse in quality would be costly and would jeopardize our owner's personal reputation, so quality was of paramount importance.

From these humble beginnings, through to the multinational company we are today, Unilock has remained a family-owned company that puts quality first. For us, it's not just a matter of dollars and cents, it's our personal reputation that's on the line.

Homeowners, Contractors, Landscape Designers and Architects across North America know they can rely on us to supply them with top quality product every time.



The first Unilock press produced a humble 817 square feet of pavers a day.



Today we produce approximately 500,000 square feet of pavers a day.

# Standing the **TEST OF TIME**

Why do design professionals choose Unilock pavers and walls? In a word: confidence. Confidence that Unilock products have the performance capabilities needed to build extraordinary projects that stand the test of time. As North America's original manufacturer of pavers and walls, Unilock has the most proven products on the market.

## **Shops @ Don Mills** *by* **Quinn Design Associates Inc.**

Toronto, Ontario

*Umbriano® pavers installed in 2009.*



THEN



NOW

**RBC Office Plaza** *by* **The MBTW Group**

Mississauga, Ontario  
Series™ pavers installed in 2002.



THEN



NOW

# UNILOCK TECHNOLOGIES

**Unilock is the only company** in North America with memberships in Eurobeton and Stein + Design, two prestigious European concrete product innovation groups, which give us exclusive access to **leading edge product designs** and manufacturing processes.



# ENDURACOLOR™ ARCHITECTURAL FINISHES

Only Unilock offers EnduraColor Architectural Finishes. These products set a new standard for everlasting beauty thanks to proprietary blends of some of nature's highest performing minerals such as granite and quartz, combined with manufacturing technologies that are unique to Unilock.



## ENDURACOLOR™

The refined surface of Unilock EnduraColor products is achieved with a **two-step manufacturing process** that combines a base of coarser aggregates for a **stronger foundation**, with concentrated color and **wear-resistant finer aggregates on top**. This process protects the surface from the appearance of fading over time because the top layer prevents large, lighter color aggregates from ever showing through. Now, with U-Cara®, walls are available with EnduraColor too!



## CLASSIC

Unilock Classic pavers and walls are manufactured to exceed ASTM standards for quality and strength. Available in classic shapes and styles, these products utilize a traditional **product mix of large and small aggregates**, that is consistent from top to bottom, with color mixed throughout.

# Unilock TECHNOLOGIES

All **products are not created equal**. Many products look great when they're first installed, but after time the difference shows. With durability that is second to none, color that lasts, unique textures, and exclusive technologies, designers can rely on Unilock products to create world-class commercial spaces.



**Without Ultima**  
*Deteriorating brick pavers exposed to deicing salts*

**With Ultima**  
*Unilock Town Hall pavers are built to last*

## Reala™

Utilizing Reala technology, a multitude of natural stone surfaces, brick and historic cobblestones are cast to create a wide variety of authentic textures with consistent dimensions that are more cost efficient to install.

**Products with Reala:**  
COPTHORNE®, COURTSTONE®, RICHCLIFF®,  
TOWN HALL® AND LEDGESTONE™

## Ultima™

Only Unilock has the technology in North America to manufacture Ultima Concrete resulting in pavers up to four times stronger than poured concrete. With Ultima, the look you purchase is the look that will last.

**Products with Ultima:**  
COPTHORNE®, COURTSTONE®, RICHCLIFF®  
AND TOWN HALL®



## ColorFusion™

The look of natural granite is achieved when color and granite particles are randomly dispersed using proprietary ColorFusion technology to achieve a unique mottled surface.

**Products with ColorFusion:**  
UMBRIANO® AND U-CARA®



Stains set for thirty minutes, then removed with damp paper towel, hand scrub brush and mild soap.

## EasyClean™

With EasyClean, the occasional spill doesn't have to leave a lasting mark on your new pavement. Unlike costly after-market sealers which merely coat the top, EasyClean goes beyond the surface and becomes integral to the product during manufacturing, making spills and other debris easier to clean before a stain can develop. Ask your Unilock Representative for more information about adding EasyClean to the products on your commercial projects.

**Products with EasyClean:**  
ARCANA™, BRISTOL VALLEY®, MATTONI™ AND UMBRIANO®

Nothing protects pavers from stains like EasyClean.

Pavers are pre-sealed at the factory
Enhanced resistance to weathering
Reduced dirt absorption
Stains from leaves, coffee, ketchup, mustard, wine and BBQ oils are easier to remove

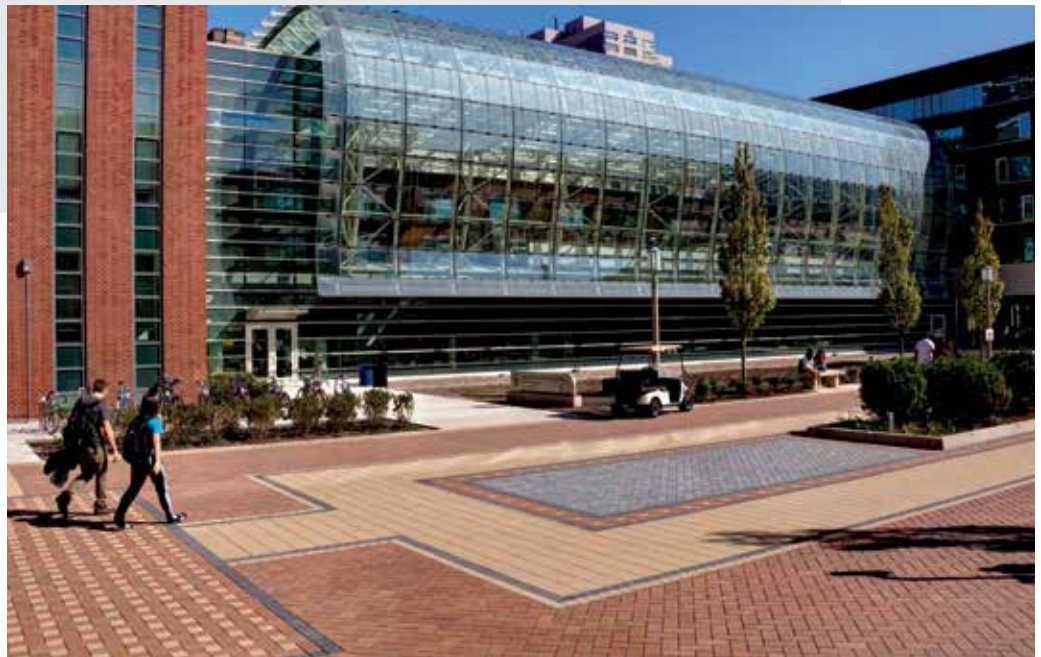
## Classic Coat

Factory sealed standard finish pavers are available with Classic Coat to protect the surface texture and color. Ask your Unilock Representative for more information about using products with Classic Coat on your commercial projects to save time and money post installation.

**Products with Classic Coat:**  
CONSULT YOUR REGIONAL PRODUCT DATA

# SELLING PRODUCT S

At Unilock, we take pride in our **advanced technologies and unique manufacturing capabilities.** We offer a range of in stock products but can also work with you to create special order custom products to deliver your design vision.





# ARCHITECTURAL COLLECTION

The Unilock Architectural Collection offers desired shapes and colors in Umbriano® and Series™ finish for your commercial projects. Available for projects across the United States, this offering will be available from specification to construction, to see your vision become reality. **Connect with a Unilock Representative to learn more about the product options available in our Architectural Collection.**



Series™ finish in Squares



Smooth Premier and Series™ finishes in Permeable Planks



Umbriano® finish in Rectangles

# REGIONAL COLLECTION

Unilock offers an extensive collection of in stock products that vary regionally to accommodate local design ethos. While this collection may change year over year, the range and variety will allow you to create unique and distinctive projects. **Connect with a Unilock Representative, consult your product data guide or visit our website for in stock options available in your region.**



Brussels Block®



Beacon Hill™ Smooth



Bristol Valley®

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**Unilock finishes are one-of-a-kind.**

Discover the unique design opportunities by exploring our finishes and color ranges. Speak with your Unilock Representative about in stock and special order opportunities in your market.



# ENDURACOLOR™

## ARCHITECTURAL FINISHES

Proprietary blends of some of nature's highest performing minerals such as granite and quartz are combined with manufacturing technologies that are exclusive to Unilock.



Umbriano® Mottled Finish  
with ColorFusion™ and EasyClean™



Series™ Exposed Granite Finish



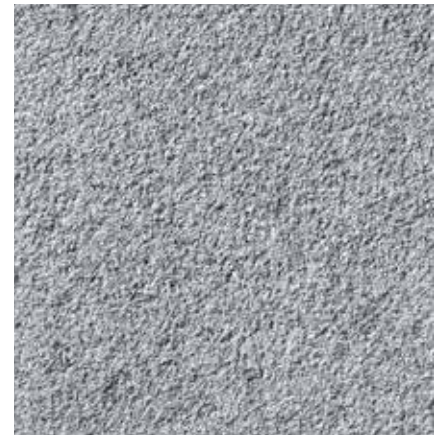
Il Campo® Brushed Finish



Smooth Premier Finish



Flagstone Premier Finish



Revela™ Shot-Blast Finish



Classic Thru-Mix Finish

## CLASSIC FINISH

Classic finish utilizes a traditional product mix of large and small aggregates, that is consistent from top to bottom, with color mixed throughout. Rest assured they are manufactured to exceed ASTM standards for quality and strength.



Design award  
winner 2011

# UMBRIANO®

Rich, mottled granite particles with a non-slip texture.

## COLORS



French Grey



Grenada White (SR 0.45)



Midnight Sky



Summer Wheat (SR 0.42)



Winter Marvel (SR 0.35)

## SPECIAL ORDER COLORS



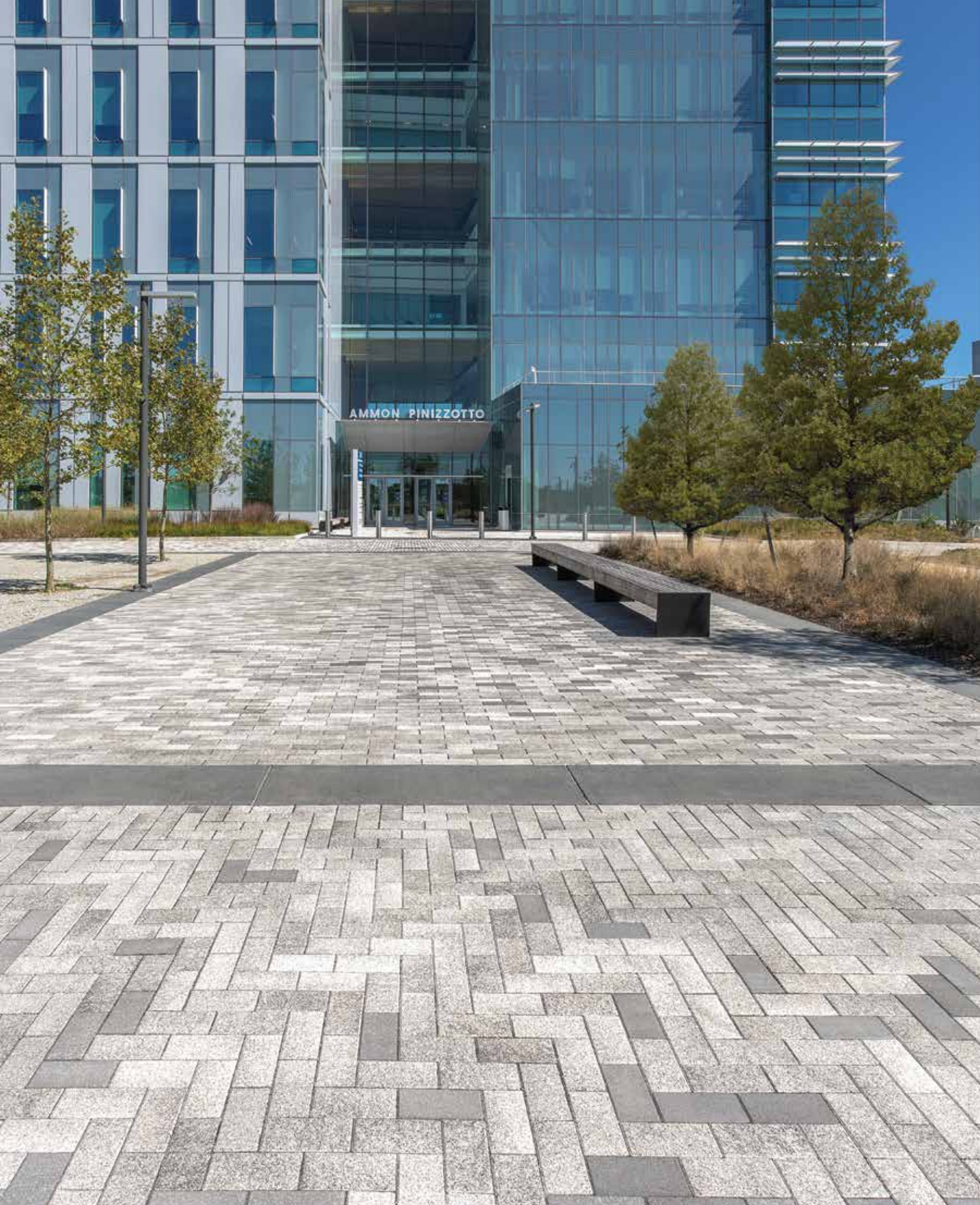
Autumn Sunset (SR 0.30)



Harvest Brown



Summer Rose



# SERIES™

Timeless micro-pebbled exposed granite.

## COLORS



Arctic Grey



Autumn Granite



Black Granite



Cobalt Grey



Glacier



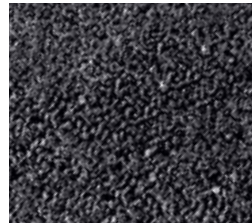
Golden Tan (SR 0.40)



Nordic Star



Mountain Mist (SR 0.28)



Onyx Black

## SPECIAL ORDER COLORS



Baritone Black



Buff



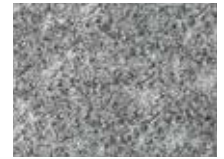
Cabernet Red



Coral Gem  
(SR 0.37)



Crystal Rose



Crystalline Basalt



Grey



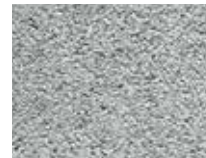
Ice Grey  
(SR 0.35)



Laurentian Green



Mocha Brown



Mineral Ice Grey  
(SR 0.31)



Peppered Granite  
(SR 0.38)



Platinum Grey  
(SR 0.28)



Starlight



# IL CAMPO®

Brushed finish for rich detail. Striking and slip resistant.



PROJECT: Ronald McDonald House, Kansas City , MO. DESIGN: Viero. PRODUCT: 4 x 8" with Il Campo® finish in Granite Blend.

## COLORS



Bavarian Blend



Dark Charcoal



Granite Blend



Granite Fusion



Heritage Brown



Light Grey



Mocha



Sandstone



# REVELA™

Shot-blasted paver surface added to your favorite finish.



PROJECT: Tempo Cambridge, Cambridge, MA. DESIGN: Copley Wolff Design Group. PRODUCT: 12 x 24" with Revela™ finish in special order colors.

## COLORS



Metallic Grey  
(Shot Blast - Series™ Finish)



Mica Grey  
(Shot Blast - Smooth Premier)



Pewter  
(Shot Blast - Smooth Premier)



Savannah  
(Shot Blast - Series™ Finish)

# FLAGSTONE PREMIER

Long-lasting, colorfast, flagstone texture.

## COLORS



Almond Grove



Almond Grove Fusion



Alpine Grey



Bavarian



Birch



Fossil



Granite Fusion



New York Blend



Oak Brown Fusion



Oakwood



River



Sierra



Slate Blue



Steel Mountain



Tuscany



Walnut



# SMOOTH PREMIER

Long-lasting, colorfast, smooth, contemporary finish.

## COLORS



Almond Grove



Almond Grove Fusion



Bavarian Blend



Birch (SR 0.28)



Brown



Chamois (SR 0.41)



Charcoal



Charleston



Cocoa Brown



Dark Brown



Dark Charcoal



Fossil



Granite



Granite Fusion (SR 0.28)



Heritage Brown



Medium Grey



Midnight Charcoal



Mocha



New York Blend



Opal Blend (SR 0.32)



Red



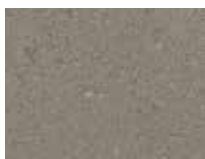
River



Rustic Red



Sable Blend



Sandstone



Sierra



Silver Grey



Steel Grey Blend



Steel Mountain (SR 0.30)



Tuscany (SR 0.39)



PROJECT: Cooksville GO Station, Mississauga, ON DESIGN: Brodies & Associates. PRODUCT: 7 x 14" with Smooth Premier finish in Granite Fusion, Midnight Charcoal and Opal Blend.

# STANDARD

A classic thru-mix paving stone surface.

## COLORS



Almond Grove



Autumn Red



Beechwood



Charcoal



Dark Charcoal



Granite Blend



Natural (SR 0.30)



River Blend (SR 0.32)



Rustic Red



Sandstone



Sierra

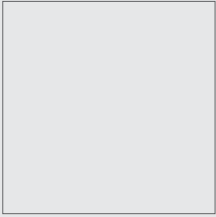


Terra Cotta



# SHAPES & SIZES

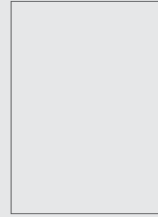
## SLABS



23 1/2 x 23 1/2 x 2 (600 x 600mm)  
T: 50mm



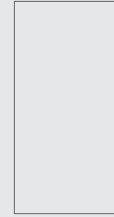
23 x 23 x 2 (606 x 606mm)  
T: 50mm



17 x 23 1/2 (453 x 606mm)  
T: 50mm



11 1/2 x 23 1/2 (301 x 606mm)  
T: 50mm

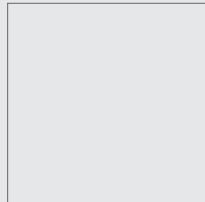


11 x 23 1/2 (300 x 600mm)  
T: 50mm

## SQUARES



36 x 36" (900 x 900mm)  
T: 100mm



24 x 24" (600 x 600mm)  
T: 50, 70 or 100mm



16 x 16" (400 x 400mm)  
T: 70, 80 or 100mm



12 x 12" (300 x 300mm)  
T: 70 or 100mm



8 x 8" (200 x 200mm)  
T: 70, 80 or 100mm

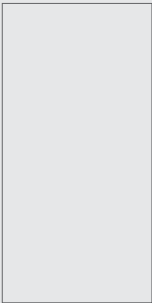


6 x 6" (150 x 150mm)  
T: 70 or 80mm

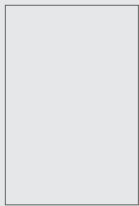


4 x 4" (100 x 100mm)  
T: 70mm

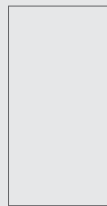
## RECTANGLES



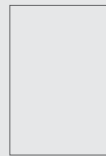
18 x 36"  
(450 x 900mm)  
T: 100mm



16 x 24"  
(400 x 600mm)  
T: 100mm



12 x 24"  
(300 x 600mm)  
T: 50, 70, 100 or 150mm



12 x 18"  
(300 x 450mm)  
T: 100mm



8 x 16"  
(200 x 400mm)  
T: 70 or 100mm



7 x 14"  
(180 x 360mm)  
T: 60 or 80mm



6 x 12"  
(150 x 300mm)  
T: 70, 80 or 100mm



5 x 10"  
(120 x 240mm)  
T: 80mm



6 x 8"  
(150 x 200mm)  
T: 70mm



4 x 8"  
(100 x 200mm)  
T: 60, 70 or 80mm



3 x 6"  
(75 x 150mm)  
T: 100mm

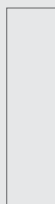
## PLANKS



12 x 36" (300 x 900mm)  
T: 100mm



8 x 24" (200 x 600mm)  
T: 100 or 150mm



6 x 24" (150 x 600mm)  
T: 70 or 150mm



4 x 16" (100 x 400mm)  
T: 100mm



4 x 12" (100 x 300mm)  
T: 70, 80 or 100mm



3 x 12" (75 x 300mm)  
T: 100mm



2 1/4 x 9" (60 x 240mm)  
T: 70mm





RANDOM BUNDLES		
<p><b>Artline™ Platform</b>            6" - 17" x 4" and 7" (170-450 x 125 and 187.5mm)            T: 70mm or 100mm</p>	<p><b>Beacon Hill™ Platform</b>            21 x 14, 14 x 14, 7 x 14" (540 x 360, 360 x 360, 180 x 360mm)            T: 60 or 80mm</p>	
<p><b>Thornbury Platform</b>            13" x 16", 13" x 8", 6" x 8"            (350 x 420, 350 x 210, 170 x 210mm)            T: 70 or 80mm</p>	<p><b>Tribeca Platform</b>            5" x 12, 5" x 9, 5" x 7"            (130 x 305, 130 x 230, 130 x 175mm)            T: 70mm</p>	<p><b>Small Random Platform</b>            6 x 8, 6 x 6, 4 x 6"            (150 x 200, 150 x 150, 100 x 150mm)            T: 70mm</p>

GEOMETRICS			
<p>8 x 8" (200 x 200mm)            T: 70mm</p>	<p>10" x 10" (260 x 260mm)            T: 80mm</p>	<p>6x12x16" (150 x 300 x 424mm)            T: 70 or 80mm</p>	<p>8" x 5" (147 x 224mm)            T: 80mm</p>

PERMEABLE OPTIONS				
<p>8 x 8" (200 x 200mm)            T: 80mm</p>	<p>10" x 10" (260 x 260mm)            T: 80mm</p>	<p>9" x 9" (250 x 250mm)            T: 80mm</p>	<p>4 x 16" (100 x 400mm)            T: 100mm</p>	<p>3 x 12" (75 x 300mm)            T: 100mm</p>
<p>12 x 12" (300 x 300mm)            T: 100mm</p>	<p>10 x 10" (240 x 240mm)            T: 80mm</p>	<p>5 x 10" (120 x 240mm)            T: 80mm</p>	<p>5 x 5" (120 x 120mm)            T: 80mm</p>	<p><b>Eco-Line™ Random Bundle</b>            9" - 14" x 3 3/8" and 4" T:100mm</p>

Not all shapes and sizes are available in all regions, or in all finish or edge options (not shown). Consult your Unilock Representative for more information. All measurements are nominal.

T = height / thickness of the slab or paver

Since **Unilock introduced permeable pavers to North America** more than thirty years ago, we have steadily increased our selection of sizes, shapes, colors and finishes. Our permeable pavers are **suitable for a variety of applications** and have joint spacing that is appropriate for accessibility.



# Permeable Paver Innovation

Unilock introduced permeable paving to North America in 1991, and has continued to lead the charge with new innovative products. Our extensive involvement in permeable paving and long-standing international alliances have allowed us to gain valuable knowledge, experience, and best practices that we can share with clients to help ensure their projects are a success.

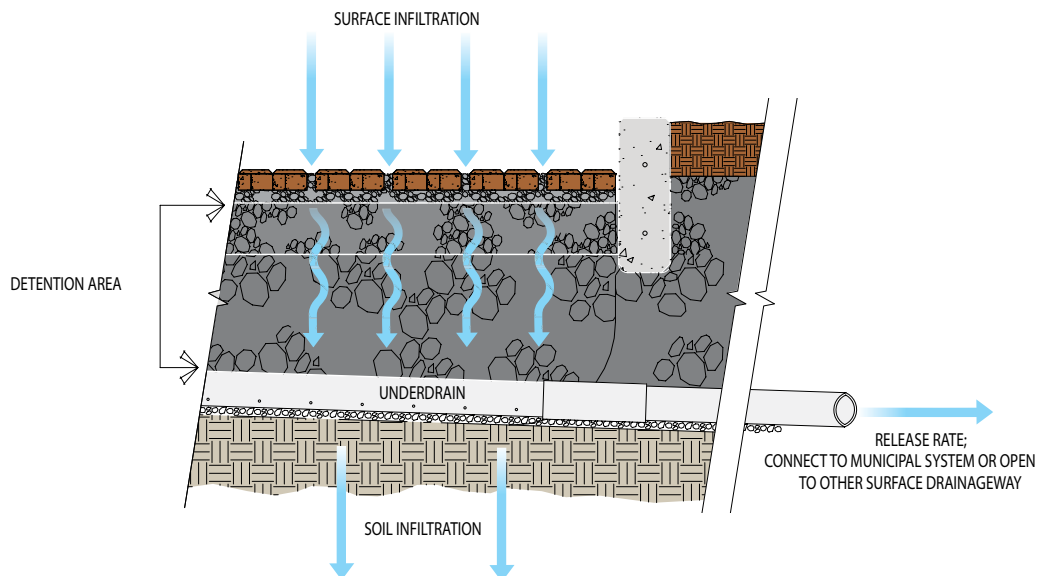


The problem with stormwater is that it has to have somewhere to go, ideally back into the ground. Today's urban environments are covered with impervious hard surfaces such as rooftops, parking lots and highways in excessive amounts, instead of pervious fields and forests. This runoff flows into storm drains and ultimately into local rivers, lakes and streams, carrying heavy metals, bacteria and other pollutants that foul our water and put our health at risk.

Some communities use separate systems for sewage and stormwater, however, older urban communities use

combined sewer systems that allow for overflow from the two inputs that release directly into local rivers and coastal waters when the system is overloaded. This allows for millions of gallons of raw waste and other pollutants into the waters we may fish, swim, boat or may be sources of drinking water.

Storm frequencies, intensities and duration are shifting and in many regions more severe storms occur more frequently than expected. Increased rainfall and snowfall will place increased demands on stormwater sewer and flood control systems.





**PROJECT:** Yolanda Garcia Park, Bronx, NY. **DESIGN:** New York City Parks. **PRODUCT:** Hex / City Park Paver™ - Permeable with Smooth Premier finish in Dark Charcoal, Medium Grey and White.

# Permeable Paver DESIGN CONSIDERATIONS

Rainfall intensity and duration are typically analyzed together for traditional non-permeable surfaces. However, with a permeable paver surface, intensity is less of a factor as the surface infiltration rate will exceed the capabilities of most storms. A permeable paver surface is **capable of handling more than 100" (2,540 mm) per hour**. The paver joints must be adequately maintained to allow for maximum infiltration.

Although many rainfall events only last for a few minutes, for larger rainfall events, the impact of duration is important to recognize. A heavy rain could fall at the intensity rate of 6" (152 mm) per hour, but the duration may only last for 10 minutes with a resulting actual rain amount of only 1" (25 mm). Longer duration events can often be more demanding, even with less intensity. Actual monthly rainfalls in the Midwest U.S., for example, average 4" (100 mm). Therefore, permeable paving systems can easily contain most rainfall events.

Runoff coefficient (C value) is used to measure the percentage of water that runs off different surface types. For example, bituminous asphalt has a C value of 0.85. This means that during a rainfall, 85 percent of the water will run off the surface. (Source: Design and Construction of Sanitary and Storm Sewers, American Society of Civil Engineers, New York, p. 332, 1969). In comparison, turf has a C value of 0.15 or 15 percent. **The C value**

**of permeable paving, with up to a 5 percent slope, is actually zero**, unless the rainfall intensity exceeds the surface infiltration rate or the entire open-graded base reaches capacity. With a properly designed permeable paver system, capacity will rarely be reached. To achieve maximum surface infiltration, maintenance of the joints may be necessary.

Soil infiltration is another way to absorb runoff. During the site investigation project phase, conducting a geotechnical or porosity test will determine the soil infiltration rate, which will establish stormwater design requirements. Typical industry recommendations suggest installing an underdrain for soil with less than 0.5" (13 mm) per hour of infiltration. It is possible for underdrain systems to be eliminated for soils with infiltration rates greater than 0.5" (13 mm) per hour.

Release rate refers to the volume of water that is allowed to be discharged into a municipal system or waterway, usually measured in cubic feet per second. Many stormwater regulatory agencies require that the post-development release rate not exceed pre-development conditions. **Permeable paving slows and detains stormwater in the open-graded base so that it can be gradually released.** Local jurisdictions should be contacted for required release rates.

# Benefits of INFILTRATION

Rainwater infiltration is extremely important to the groundwater supply. According to the U.S. Geological Survey, one of America's most important natural resources is groundwater. Half of the drinking water in the U.S. comes from groundwater, with the balance coming from lakes and rivers. It is vital to agriculture and other industries, as well as essential for ensuring the health of rivers, streams, wetlands and other water bodies. Urban sprawl contributes to the decrease in pervious area for rainwater infiltration and reduced groundwater levels. Soil infiltration is a simple method for ensuring future water availability.

Installing a permeable paver system above porous soils allows for rainwater infiltration, reducing runoff and flooding. Most soils, even clay, allow for some infiltration. Soils with high porosity, such as sand, can have a higher infiltration rate than the actual rate of rainfall. For example, if it is raining at a rate of 2" (51 mm) per hour, and the soil has an infiltration rate of 4.5" (114 mm) per hour, the soil will absorb water before it can run off. Even poor soil with a low infiltration rate will work. For example, a soil with 0.25" (6 mm) per hour of infiltration will have complete infiltration after about four hours per inch of rainfall.

## TYPICAL INFILTRATION RATES OF VARIOUS SOIL GROUPS

Soil Conservation Service Group	Typical Soil Type	Saturated Infiltration Rate	
		in/hr	mm/hr
A	Sand	8.27"	210 mm
A	Loamy Sand	2.41"	60 mm
B	Sandy Loam	1.02"	26 mm
B	Loam	0.52"	12.7 mm
C	Silt Loam	0.27"	6.8 mm
C	Sandy Clay Loam	0.17"	4.3 mm
D	Clay Loam and Silty Clay Loam	0.09"	2.3 mm
D	Clay	0.06"	1.5 mm

## INFILTRATION RATES FOR UNILOCK PERMEABLE PAVERS *Newly Installed*

	PAVER	JOINT MATERIAL	Joint Width*	Void Space*	Infiltration Rate**	Minimum Infiltration Rate** for Rainfall intensity of:				
						2"/hr	4.5"/hr	6.5"/hr	11"/hr	
ADA ACCESSIBLE	Small: 1/4" Joint	Eco-Line®	ASTM # 9 Aqua Rock	6.25 mm	5.8%	560	34	78	112	190
		Eco-Promenade®	ASTM #9 - SEK Chip	7 mm	10.12%	934	20	44	64	109
		Eco-Priora™ Herringbone	ASTM #9 - SEK Chip	7 mm	7.08%	676	28	64	92	155
		Eco-Priora™ 5 x 10	Kafka - 1/8 to 3/16"	7 mm	6.8%	633	29	66	96	162
		Eco-Priora™ Pattern H	ASTM #9 - Roscoe Chip	7 mm	5.7%	509	35	79	114	193
		Eco-Priora™ Pattern H	IDOT FA 22	7 mm	5.7%	347	35	79	114	193
		Eco-Priora™ 10 x 10	Kafka - 1/16 to 3/16"	7 mm	4.6%	327	43	98	141	239
		Treo® Permeable	ASTM #9 - SEK Chip	7 mm	5.5%	335†	36	81	118	200
	Medium: 1/4" to 3/8" Joint	Town Hall®	Kafka - 1/8 to 3/16"	9 mm	6.5%	784	31	69	100	169
		City Park Paver™	ASTM #9 - SEK Chip	10 mm	4.2%	934	48	107	155	262
	Large: 3/8" to 1/2" Joint	DuraFlow™	ASTM #8 IDOT CA-16	12 mm	8%	912	25	56	81	138
		Eco-Optiloc™	HPB	12 mm	7.3%	404	27	62	89	151
		Eco-Optiloc™	ASTM #8 IDOT CA-16	12 mm	7.3%	912	27	62	89	151
	Extra Large: >1/2"	Tribeca Cobble™	ASTM #9 Aqua Rock	10mm	5.6%	400	36	80	116	196
		Thornbury™	ASTM # 9 Aqua Rock	18mm	4.4%	385	45	102	148	250
		Eco-Stone™	ASTM #8 IDOT CA-16	6 mm	10.18%	784	19	42	60	102
Ecoloc®		Kafka - 1/8 to 3/16"	7 mm	12.18%	1060	18	41	59	99	

**NOTE:** The 2", 4.5", 6.5" and 11" per hour Rainfall Intensity examples are based on common 5 minute rainfall intensity charts and are not the same as total rainfall quantity. \*Joint Width is measured at the top of the paver. Void Space is calculated at the base of the paver. \*\*Infiltration rate is inches per hour based on testing done when first installed and is an approximation. † Estimate based on similar void space data.

# Detention and VOLUME CONTROL

## BASE STORAGE CAPACITY

Traditional surface detention ponds which act as holding facilities for rainfall are an inefficient use of space. For most land uses and all impervious areas, such as roofs, roads and parking lots, stormwater runoff flows through a system of pipes that release it into detention or retention ponds. This valuable surface area could be much more effectively utilized.

**A permeable paving base for stormwater detention is a very efficient use of land.** With this system, the surface is pervious, allowing detention area to be contained underneath. The detention is created under every square foot of permeable paving, as deep as necessary.

Permeable paver systems use crushed, angular, open-graded aggregate base materials. These materials are entirely different from those used for traditional impervious roads and parking lots. Those traditional systems use dense-graded aggregates containing fines, making them extremely slow-draining. Conversely, the **use of open-graded aggregates provides a void space or porosity of approximately 40 percent.** This is utilized for detention and allows for a rapid surface infiltration rate of over 500" (12,700 mm) per hour (see page 30 for aggregate infiltration rates).

CRITERIA				RAINWATER HARVEST VOLUME			BASE STORAGE CAPACITY			SURPLUS / (DEFICIT) STORAGE			% USED
Rainfall In/Hr (mm/hr)	Surface Area Ft2 (m2)	Base Depth In (mm)	Void Space	Cubic Ft (m3)	Acre Feet	Gallons (m3)	Cubic Ft (m3)	Acre Feet	Gallons (m3)	Cubic Ft (m3)	Acre Feet	Gallons (m3)	
1 (25 mm)	43,560 (4,047 m <sup>2</sup> )	14 (35 mm)	40%	3,630 (103 m <sup>3</sup> )	0.08	27,154 (103 m <sup>3</sup> )	20,328 (576 m <sup>3</sup> )	0.47	152,064 (576 m <sup>3</sup> )	16,698 (473 m <sup>3</sup> )	0.38	124,910 (473 m <sup>3</sup> )	17.9%
1 (25 mm)	43,560 (4,047 m <sup>2</sup> )	18 (46 mm)	40%	3,630 (103 m <sup>3</sup> )	0.08	27,154 (103 m <sup>3</sup> )	26,136 (740 m <sup>3</sup> )	0.60	195,511 (740 m <sup>3</sup> )	22,506 (637 m <sup>3</sup> )	0.52	168,357 (637 m <sup>3</sup> )	13.9%
1 (25 mm)	43,560 (4,047 m <sup>2</sup> )	22 (56 mm)	40%	3,630 (103 m <sup>3</sup> )	0.08	27,154 (103 m <sup>3</sup> )	31,944 (905 m <sup>3</sup> )	0.73	238,958 (905 m <sup>3</sup> )	28,314 (802 m <sup>3</sup> )	0.65	211,804 (802 m <sup>3</sup> )	13.9%
3.04 (77 mm)	43,560 (4,047 m <sup>2</sup> )	14 (35 mm)	40%	11,035 (312 m <sup>3</sup> )	0.25	82,548 (312 m <sup>3</sup> )	20,328 (575 m <sup>3</sup> )	0.47	152,064 (575 m <sup>3</sup> )	9292.92 (263 m <sup>3</sup> )	0.21	69,516 (263 m <sup>3</sup> )	54.3%
3.04 (77 mm)	43,560 (4,047 m <sup>2</sup> )	18 (46 mm)	40%	11,035 (312 m <sup>3</sup> )	0.25	85,548 (312 m <sup>3</sup> )	26,136 (740 m <sup>3</sup> )	0.60	195,511 (740 m <sup>3</sup> )	15,101 (428 m <sup>3</sup> )	0.35	112,963 (428 m <sup>3</sup> )	42.2%
7.58 (19 mm)	43,560 (4,047 m <sup>2</sup> )	14 (35 mm)	40%	27,515 (779 m <sup>3</sup> )	0.63	205,827 (779 m <sup>3</sup> )	20,328 (575 m <sup>3</sup> )	0.47	152,064 (575 m <sup>3</sup> )	(7,187) 203 m <sup>3</sup>	(0.16)	53,763 (204 m <sup>3</sup> )	135.4%
7.58 (19 mm)	43,560 (4,047 m <sup>2</sup> )	22 (56 mm)	40%	27,515 (779 m <sup>3</sup> )	0.63	205,827 (779 m <sup>3</sup> )	31,944 (905 m <sup>3</sup> )	0.73	238,957 (905 m <sup>3</sup> )	4,429 (125 m <sup>3</sup> )	0.10	33,131 (125 m <sup>3</sup> )	86.1%

Detention volumes or storage capacities for permeable paving are based on different rainfall events.



PRODUCT: 3 x 13" Permeable with Series® finish.

## CASE STUDY

### **Southwest Park** *by* **Starr Whitehouse**

*Hoboken, New Jersey*

As part of an extensive resiliency plan to mitigate flooding in a Hoboken neighborhood, a one-acre parking lot was turned into a unique park. The new space offers a refined spot for a variety of recreational activities with moveable seating areas, a lawn, child-friendly play zones and much more.

Permeable pavers helped the park meet the city's demand for sustainability with integrated green infrastructure capable of managing 200,000 gallons of stormwater in its underground water detention system. Permeable Planks were designed to direct rainwater back into the subbase and detention system through the joint material and keep it away from sewer systems.

The paving pattern was achieved using three colors of special order Unilock Series finish in the Permeable Plank shape. The colors play on the hues of neighborhood buildings creating an interesting and vibrant space for all to enjoy.

# Improved WATER QUALITY



## MEDIAN POLLUTANT REMOVAL

**Without water, life cannot survive.** For fish, wildlife and humans, clean water is a necessity. Even plants need a certain quality of water. The infiltration process of a permeable paving system will remove harmful pollutants such as oil. **The EPA recognizes permeable paving as a best management practice (BMP)** for non-point source pollutants. Utilizing permeable pavers is a simple step to ensure cleaner water and to minimize increases in water temperature. Often forgotten, water temperature is an important quality issue. Increased water temperatures can increase the amount of bacteria and algae, and can decrease aquatic life. Allowing the water to immediately drain from the surface ensures it

will not be heated from an impervious surface before it reaches a runoff area.

The Interlocking Concrete Pavement Institute (ICPI) has conducted tests that determine water quality. Their findings indicate that **cleaner water results from being filtered through a permeable paving system.** Traditional systems have no means for cleaning water. Many municipalities in North America have begun to implement strategies to improve water quality by using BMPs like permeable paver systems. Even smaller communities have joined in the effort to create more sustainable water management systems.

POLLUTANT	INFILTRATION TRENCH DESIGN TYPE*			INFILTRATION TRENCHES & POROUS PAVEMENT
	0.5 in (13mm) Runoff per Impervious Acre	1.0 in (25mm) Runoff per Impervious Acre	2-Year Design Storm Treatment	Median Pollutant Removal**
Total Suspended Solids	60-80%	80-100%	80-100%	95%
Total Phosphorous	40-60%	40-60%	60-80%	70%
Total Nitrogen	40-60%	40-60%	60-80%	51%
Biological Oxygen Demand	60-80%	60-80%	80-100%	-
Bacteria	60-80%	60-80%	80-100%	-
Metals	60-80%	60-80%	80-100%	99% (Zn)

\*Note: These rates are not based on actual data since monitoring what enters and leaves any infiltration facility is difficult to measure. This data is based on land application of pollutants and their treatment through soils. \*\*Actual monitored removal rates.





PRODUCT: Eco-Optiloc<sup>®</sup> in Natural.

## CASE STUDY

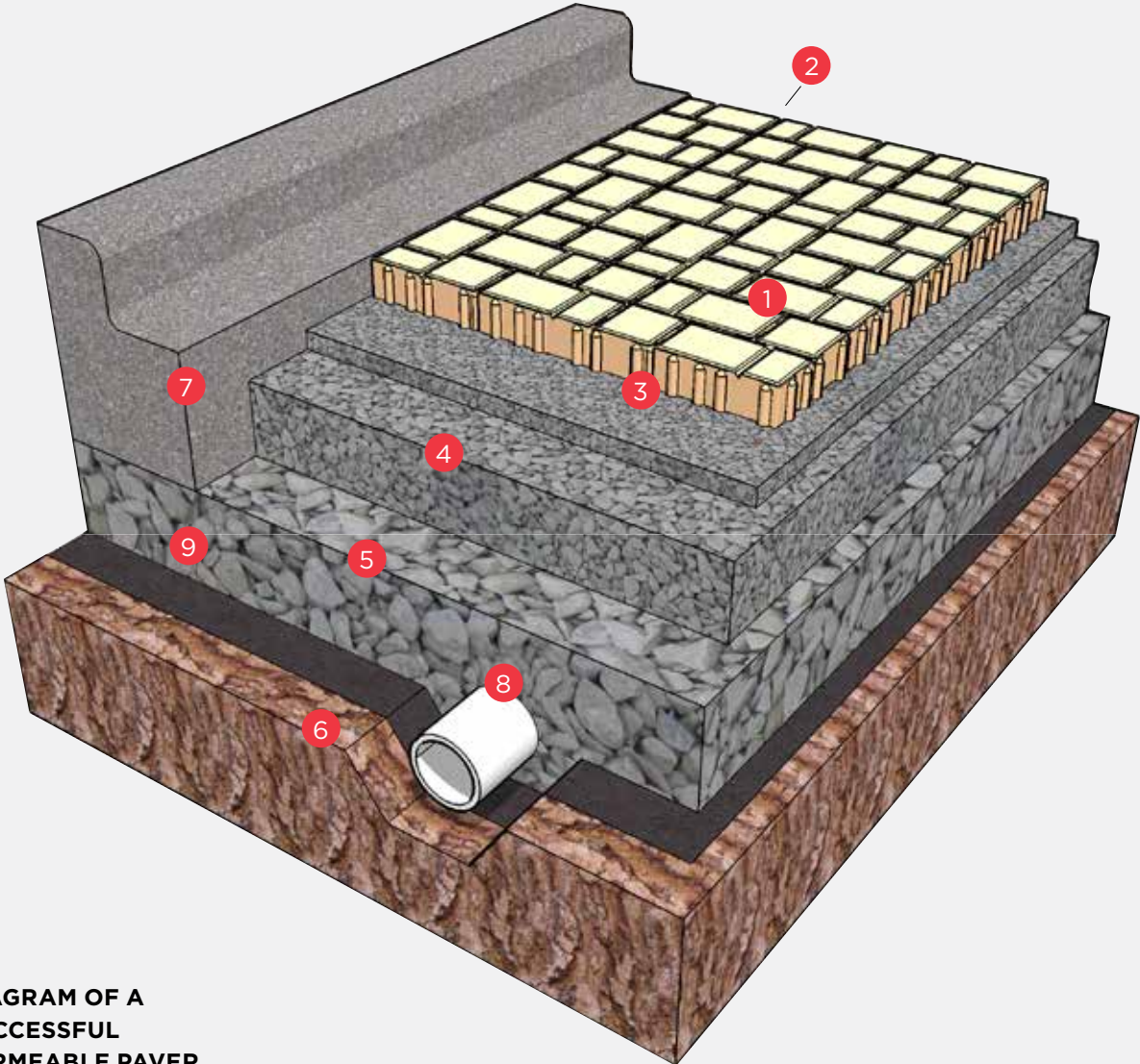
### Cleveland Clinic Hospital *by* Cawrse & Associates, Inc.

*Avon, Ohio*

**WETLAND REQUIREMENTS.** Cleveland Clinic Hospital located in Avon, Ohio needed to expand in order to continue meeting the health care needs of its community. The clinic identified the need to build a new, multi-story tower and significantly increase parking on a tight budget. The challenge the design team faced was that much of the available property and the adjacent property was wetland. Stormwater runoff from the parking lot was not allowed in order to protect the wetland.

The design team, in conjunction with the Army Corps of Engineers, decided that permeable pavers were the best approach to deal with the stormwater sensitivities. The high infiltration rate of Eco-Optiloc meant that stormwater would be reabsorbed below ground and the 'L' interlocking shape of Eco-Optiloc provided superior resistance to heavy vehicular and truck traffic. The mechanical installation of the pavers, coupled with the low cost of maintenance, kept the project on budget in the short and long term.

# Nine components of a highly **Successful Permeable Pavement**



**DIAGRAM OF A  
SUCCESSFUL  
PERMEABLE PAVER  
INSTALLATION**

### **1 | Unilock Permeable Interlocking Concrete Paver**

With various aesthetically pleasing colors and textures, creative choices are not compromised by function. Permeable Interlocking Concrete Pavers (PICPs) are the most durable of any porous pavement material. Unilock's minimum 8,500 psi (57 MPa), high-strength, no-slump concrete allows water to infiltrate between paver units instead of through the material. The joint sizes vary between paver options, ranging from 0.25" (6 mm) to 0.5" (13 mm), which meet the Americans with Disabilities Act specifications for permeable pavement, and allows a minimum of 100" (2,540 mm) per hour of surface infiltration.

### **2 | Joint Aggregate - ASTM No. 8 OR 9**

As the initial filtering layer, the 0.25" (6 mm) crushed, angular, chip stone captures approximately 80 percent of debris in the first 1" (25 mm) to 2" (51 mm). The secondary function of the joint aggregate is to increase the positive interlock between the paver units, which is essential to the structural stability of the PICPs. The joint aggregate must always remain filled to the lip of the PICP units to reduce unnecessary clogging.

### **3 | Setting Bed Aggregate - ASTM No. 8**

Using the 0.25" (6 mm) crushed, angular, chip stone, instead of sand, provides a smooth leveling course for placing pavers and additional structural interlocking of the PICPs. Unlike sand, the setting bed aggregate allows for rapid water infiltration with over 500" (12,700 mm) per hour through the 40 percent void-space. Sand must be avoided as a setting bed in a PICP application.

### **4 | Base Aggregate - ASTM No. 57**

When subsoil conditions are conducive to supporting the ASTM No. 57 (12.5-25mm) crushed, angular, open-graded base material without migration, it can be used without ASTM No. 2 (50-63mm) subbase aggregate. Minimum thickness must be designed to sufficiently support anticipated loads, as well as accommodate stormwater detention in the 40 percent void space of the material. The ASTM No. 57 base aggregate, with a minimum thickness of 4" (102 mm), serves as a transition material between the ASTM No. 8 (2-10mm) setting bed and the ASTM No. 2 subbase aggregate. The infiltration rate of the ASTM No. 57 is over 500" (12,700 mm) per hour.

### **5 | Subbase Aggregate - ASTM No. 2**

Subsoil conditions will dictate the necessity of this larger ASTM No. 2 (50-63mm), crushed, angular, open-graded subbase aggregate thickness. Installation of such material will provide increased structural stability on sites with poor soil conditions. A minimum thickness of 8" (203 mm) is required for effective performance. Subbase aggregate thickness must be designed to sufficiently support anticipated loads. As an added feature, the ASTM No. 2 subbase aggregate temporarily detains stormwater runoff in the 40 percent void-space of the material. The ASTM No. 2 also has an infiltration rate of over 500" (12,700 mm) per hour.

### **6 | Subgrade**

Existing soil materials will determine the performance capabilities of the PICP system. Pre-construction soil analysis, including percolation, California Bearing Ratio and penetrometer measurements (blow counts), are mandatory for proper design. Subsoils with less than 0.5" (13 mm) per hour of infiltration may require underdrainage, scarification and potentially amendments. Subsoils with greater than 0.5" (13 mm) per hour are considered highly permeable. Subsoil compaction can cause a detrimental reduction in permeability and can be eliminated.

### **7 | Edge Restraint**

PICP containment is vitally important to the success of interlocking properties. Lack or failure of an edge restraint will negatively impact the integrity of the pavement surface. For all vehicular PICP applications, an edge restraint, such as a concrete curb, is required. For non-vehicular and pedestrian areas, a plastic edging is sufficient when properly anchored into the subbase.

### **8 | Underdrain**

In PICP systems, the underdrain pipe is based on several factors, such as the permeability of the subsoil, detention requirements, and stormwater release rate of the site. With highly permeable subsoils over 0.5" (13 mm) per hour, the underdrain pipe could be eliminated. Underdrain pipe size is inconsequential, provided the flow rate is greater than the release rate.

### **9 | Mechanical Base Stabilization**

Subsoil characteristics will determine the need for base stabilization. Specifically designed geogrid style systems, such as DriveGrid™ system, can be placed between the subsoil and ASTM No. 57 (12.5-25mm) base aggregate or ASTM No. 2 (50-63mm) and subbase. DriveGrid is not required between aggregate material layers. The base stabilization must be determined by soil conditions specific to each project. DriveGrid should be considered for any weaker subsoils.

# Design and TECHNICAL INFORMATION

## Typical Runoff Coefficients for the Rational Method

Land Use Type	Recommended Value
Industrial	0.75
Downtown Business District	0.85
Single-Family Residential	0.40
Multi-Family Residential	0.60
Parks	0.20

Source: *Design and Construction of Sanitary and Storm Sewers.*  
American Society of Civil Engineers, New York, p. 332, 1969.  
Coefficients are based on 5 – 10 year storm frequencies.

Surface Type	Recommended Value
Bituminous Asphalt	0.85
Pour-In-Place Concrete	0.85
Lawns - Sandy Soils	0.13
Lawns - Heavy Soils	0.20
Permeable Pavers	0.0*

\* Actual value until detention in permeable base reaches capacity.



		SOIL SUBGRADE TEXTURE / INFILTRATION RATE INCHES / HOUR (MM/SEC)										
		Sand	Loamy Sand	Sandy Loam	Loam	Silt Loam	Sandy Clay Loam	Clay Loam	Silty Clay Loam	Sandy Clay	Silty Clay	Clay
Criterion	T <sub>s</sub> (hrs)	8.27 (6x10 <sup>-5</sup> )	2.41 (2x10 <sup>-5</sup> )	1.02 (7x10 <sup>-6</sup> )	0.52 (4x10 <sup>-6</sup> )	0.27 (2x10 <sup>-6</sup> )	0.17 (1x10 <sup>-6</sup> )	0.09 (6x10 <sup>-7</sup> )	0.06 (4x10 <sup>-7</sup> )	0.05 (3x10 <sup>-7</sup> )	0.04 (2x10 <sup>-7</sup> )	0.02 (10 <sup>-7</sup> )
f x T <sub>s</sub> / V <sub>r</sub>	24	496 (12.6)	145 (3.7)	61 (1.5)	31 (0.8)	16 (0.4)	10 (0.25)	5 (0.12)	4 (0.1)	3 (0.07)	2 (0.05)	1 (0.02)
for	48	992 (25.2)	290 (7.4)	122 (3.1)	62 (1.6)	32 (0.8)	20 (0.5)	11 (0.3)	7 (0.17)	6 (0.15)	2 (0.15)	2 (0.05)
(V <sub>r</sub> = 0.4)	72	1489 (37.8)	434 (11)	183 (4.6)	93 (2.4)	149 (1.2)	31 (0.8)	16 (0.9)	11 (0.13)	9 (0.2)	7 (0.17)	4 (0.1)

T<sub>s</sub> = Maximum allowable storage time

V<sub>r</sub> = Voids ratio

Lowest values unless base exfiltration is supplemented with drain pipes.

Maximum allowable depths, inches (m) of storage for selected maximum storage times (T<sub>s</sub> in hours), minimum infiltration rates and inches/hour (mm/sec)(31).

The Natural Resources Conservation Service (NRCS) method typically uses 24-hour storm events as the basis for design. Therefore, this design method is based on controlling the increased runoff for a specific 24-hour storm. The specific duration and return period (e.g., 6 months, 1 year, 2 years, etc.) are provided by the locality. If the increase in peak discharge associated with the storm event cannot be managed, a first-flush event should be the minimum selected for design.

## BASE & AGGREGATE CHARTS

Careful selection of base material, as described below, ensures that an installation can handle almost any amount of rainfall. Testing results of all the aggregates listed below show a void ratio of approximately 40 percent. Choosing the correct void filter is critical as well. The aggregate infiltration rates below illustrate the performance of the system.

### Aggregate Infiltration Rates

Approximate Particle Size	Permeability (k) in./hr (m/s)
ASTM No. 8 (2 - 10 mm)*	1,400 - 4,000 ( $3 \times 10^{-1}$ to $1 \times 10^{-2}$ )
ASTM No. 9 (2 - 5 mm)	140 - 1,400 ( $1 \times 10^{-2}$ to $1 \times 10^{-3}$ )
ASTM No. 10 (1 - 3 mm)	14 - 140 ( $1 \times 10^{-3}$ to $1 \times 10^{-4}$ )
ASTM No. 57 (12.5 - 25 mm)*	500 - 2,000
ASTM No. 2 (50 - 63 mm)*	>1,000

Permeability ranges of joint fill aggregates for permeable pavers.

\* Unilock recommendations

### Setting Bed Aggregate

Sieve Size	Percent Passing
0.5" (12 mm)	100
0.375" (9.5 mm)	85 - 100
(4.75 mm) (No. 4)	10 - 30
(2.36 mm) (No. 8)	0 - 10
(1.16 mm) (No. 16)	0 - 5

Grading requirements for ASTM No. 8 bedding and joint / opening filler.

Setting bed aggregate can be used as joint aggregate for Eco-Optiloc®.

### Base Aggregate

SIEVE Size	Percent Passing
1.5" (37.5 mm)	100
1" (25 mm)	95 - 100
0.5" (12 mm)	25 - 60
(4.75 mm) (No. 4)	0 - 10
(2.36 mm) (No. 8)	0 - 5

Grading requirements for ASTM No. 57 base.

### Subbase Aggregate

Sieve Size	Percent Passing
3" (75 mm)	100
2.5" (63 mm)	90 - 100
2" (50 mm)	35 - 70
1.5" (37.5 mm)	0 - 15
0.75" (19 mm)	0 - 5

Sieve sizes for ASTM No. 2 aggregates.

## BASE THICKNESS

Permeable paving is not a typical segmental pavement. Unilock recommends that a professional engineer design a site-specific plan based on available site information. Along with information provided in this brochure, Unilock offers comprehensive software solutions, and industry-experienced consultants to assist you in the design of your pavement.

Pavement Use	Subbase ASTM No. 2	Base ASTM No. 57	Minimum Total
Heavy-duty industrial	14" (355 mm)	6" (152 mm)	20" (508 mm)
Municipal street	12" (305 mm)	6" (152 mm)	18" (457 mm)
Light-duty parking lot	8" (203 mm)	6" (152 mm)	14" (356 mm)
Residential driveway	n/a	12" (305 mm)	12" (305 mm)
Non-vehicular sidewalk	n/a	10" (254 mm)	10" (254 mm)

Notes: 1) All permeable pavers require a 1.5" (38 mm) setting bed of ASTM No. 8 for placement. 2) All thicknesses are after compaction. 3) Geotextiles between subgrade and ASTM No. 2 are optional and based on soil conditions. 4) Geotextiles are not required between the subbase, base or setting bed layers.

# RETAINING WALLS

A great retaining wall should provide an aesthetic that **blends subtly with the environment and surrounding architecture**. For decades, Unilock segmental retaining walls have been the choice of Landscape Architects, Designers and Engineers who are looking for **classic, clean lines and timeless appeal**.



# RETAINING WALL Design

## SEGMENTAL RETAINING WALLS

Why do so many engineers select Unilock for retaining walls? In a word: confidence. Confidence that Unilock manufactured products have the structural, safety and weathering capabilities needed for the project. Confidence in the field performance of a vast portfolio of structures. Confidence that Risi Stone will provide the engineering support required to get the job done accurately and expeditiously.



PROJECT: Office Complex Mississauga Rd. Mississauga, ON. DESIGN: RisiStone Engineering. PRODUCT: SonomaStone™ in Natural.

	ASTM C1372 / NCMA Zone 3 (de-icing exposure)	UNILOCK STD.
Compressive Strength - Minimum	3000/5500 PSI	5500 PSI
Absorption - Maximum (No individual unit greater than)	15 lb/ft <sup>3</sup>	7 lb/ft <sup>3</sup>
Dimensional Tolerance (length, width, or height)	± 1/8" ( ± 3.2mm)	± 1/8" ( ± 3.2mm)

## SOLID CORE CONSTRUCTION

The solid body tongue and groove design provides engineers with the assurance that the structural properties are guaranteed. Not having to fill a hollow block core and the ability to easily modify blocks on-site is a considerable labor savings. Owners can be confident in the proven long-term performance of the wall's integrity.

## QUALITY MANUFACTURING

Each unit's structural integrity and performance is ensured by manufacturing to specifications that meet or exceed American Society of Testing and Materials (ASTM) standards. The Unilock manufacturing system provides peace of mind by exceeding technical standards set by the National Concrete Masonry Association (NCMA) recommendation for Roadway and Non-Roadway Applications - Zone 3 - with exposure to de-icing salts, as well as local building codes.

## BUILT TO LAST

Unilock manufactured retaining wall systems are engineered to last. Individual units range from 19lbs (8.6kg) to 1,700lbs (772.7kg), and some can be used to construct walls up to 40ft (12.2m) high. The mechanical installation characteristics of Unilock retaining walls surpass conventional modular wall systems in speed and performance. Vespa.RS advanced engineering software from Risi Stone lets you analyze all important factors including height, differing soil types, unique site conditions and loading requirements directly from CAD, saving valuable time.

## SOLID ADVANTAGES

FEATURE	ADVANTAGE	BENEFIT
Solid Blocks	Provides greater durability	<ul style="list-style-type: none"> <li>• More resistant to breakage and minor damage</li> </ul>
	Easy to split or modify	<ul style="list-style-type: none"> <li>• Blocks can be simply cut/alterd with no risk to final wall integrity</li> </ul>
	No hollow cores to fill with gravel & compact	<ul style="list-style-type: none"> <li>• Ensures maximum weight of each block is present</li> <li>• Maximum resistance to overturning</li> <li>• Reduced installation time and labor costs</li> </ul>
Modular System	Wall is flexible, while still retains its structural integrity	<ul style="list-style-type: none"> <li>• Absorbs movement and settlement</li> <li>• Requires minimal embedment</li> </ul>
	Array of complementing special blocks	<ul style="list-style-type: none"> <li>• Easily create site-specific features</li> <li>• Coping can be selected for various wall arrangements</li> <li>• Pre-fabricated corner blocks intensify corner strength and appearance, while speeding construction</li> </ul>
	Requires only a compact granular base	<ul style="list-style-type: none"> <li>• Reduces installation cost</li> </ul>
Interlocking Tongue & Groove	Interlocking mechanism is molded directly in to the block	<ul style="list-style-type: none"> <li>• Easy, quick installation</li> <li>• No separate pins or clips to install</li> </ul>
	Maximum shear strength	<ul style="list-style-type: none"> <li>• Shear strength is maintained along the entire length of block</li> <li>• Allows for superior geogrid connection</li> </ul>
	Automatic alignment & self-battering	<ul style="list-style-type: none"> <li>• Once the first course is installed flat and level, successive blocks stack quickly and easily</li> </ul>
	Blocks are dry-stacked	<ul style="list-style-type: none"> <li>• Lower cost — No mortar requirements</li> <li>• Minimal training is required to achieve excellent results</li> </ul>
	Continuous interlock achieved throughout the wall	<ul style="list-style-type: none"> <li>• Creates a stronger, more damage-resistant structure</li> </ul>
Combined with Geogrid Reinforcement	Higher walls can be achieved	<ul style="list-style-type: none"> <li>• Able to use the same fascia throughout the project on lower and higher walls (i.e. Gravity and geogrid reinforced walls can be mixed as site conditions dictate)</li> </ul>

## SUPPORT AND ASSISTANCE

### Unilock & Risi Stone®

Unilock manufactures a number of Risi Stone Systems licensed retaining walls: Pisa2™, Concord Wall™, RomanPisa™, Rivercrest® Wall, SienaStone™, SonomaStone™, DuraHold® and DuraHold®2. With installations more than 25 years old, we offer the most proven SRW systems on the market.

### Design assistance

Risi Stone offers many different levels of assistance. From general product information, typical cross-sections and software programs, to site specific final design packages, they will work with you to achieve the best possible design solution.

### Preliminary Sections

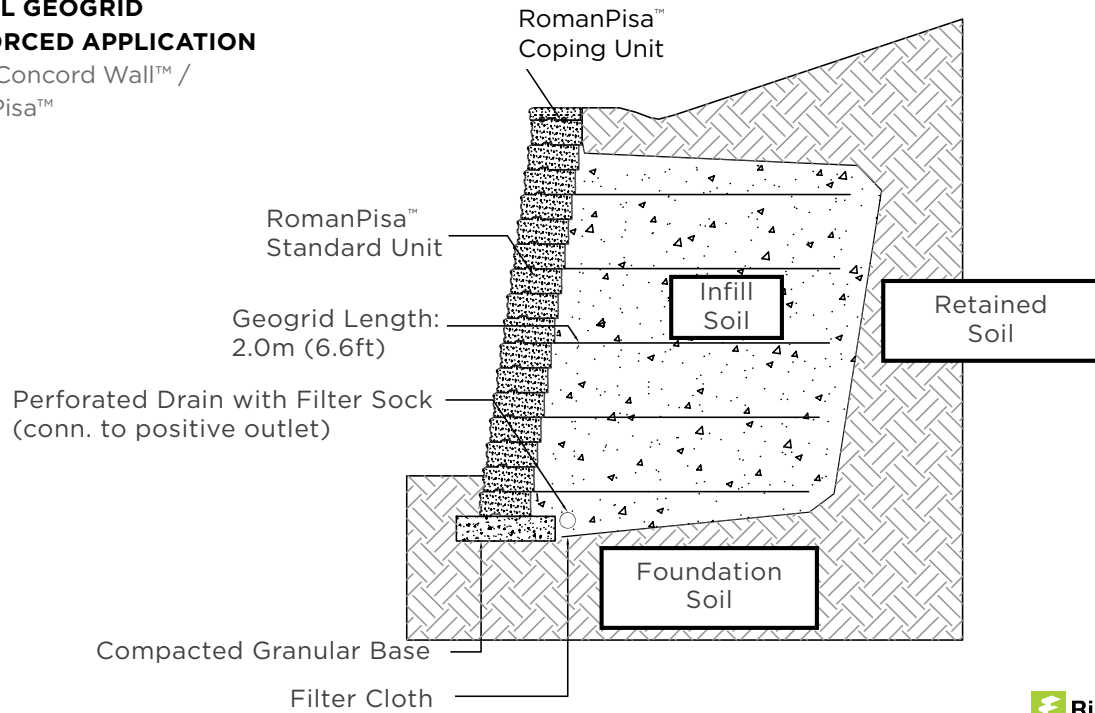
For preliminary design, bidding or feasibility purposes, Risi Stone Systems have created one of the industry's most comprehensive collections of pre-engineered typical cross-section drawings for a variety of applications. These sections have been designed to meet very specific criteria in an attempt to be as close to your particular project as possible. They are sorted according to the main criteria used in the design of a segmental retaining wall. The search tool at [www.unilock.com](http://www.unilock.com) allows you to select the Risi Stone licensed product, the loading and the height of the wall, according to your project requirements to find cross sections that most closely match your project needs.



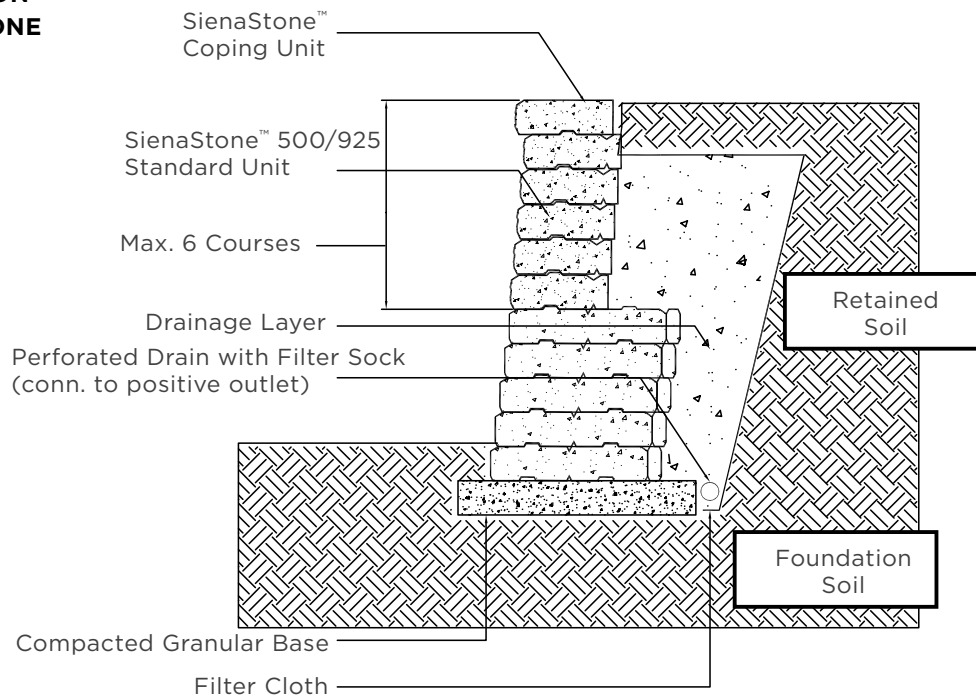
# TYPICAL CROSS SECTIONS

## TYPICAL GEOGRID REINFORCED APPLICATION

Pisa2™/Concord Wall™ / RomanPisa™



## TYPICAL GRAVITY APPLICATION - SIENASTONE



# PROJECT SUPPORT

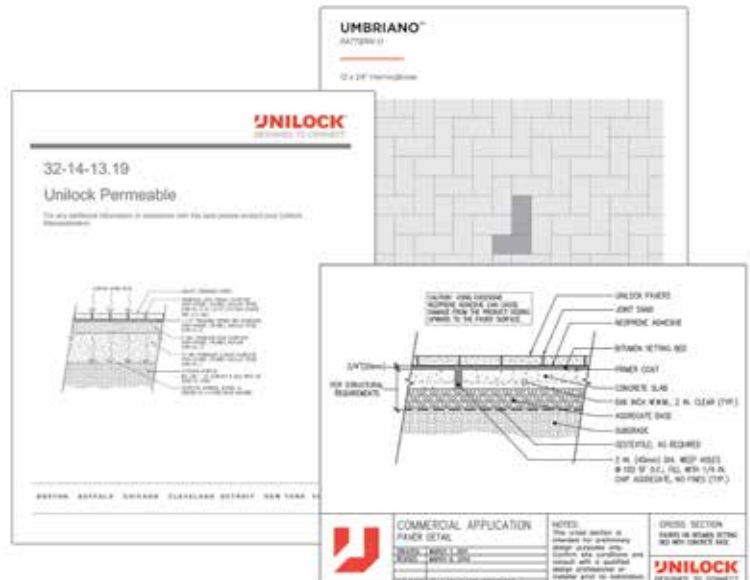


## YOUR TRUSTED PARTNER

Our years of industry-leading expertise and unparalleled personal attention and collaboration ensure that every intricate detail of your project runs smoothly. Our level of support is tailored to meet your needs. We're here to help through every step of your project. Talk to your Unilock Representative today to get all the details.

## DETAILS AND SPECS

Cross sections, details, specifications and technical support are assets available to you to build out your documents and drawings. Contact your Unilock Representative for more information.



# CEU'S AND SEMINARS

Live in-person or online seminars are available to you to provide learning experiences that expand your professional skills and knowledge while keeping you up-to-date on industry trends and relevant topics. Ask your Unilock Representative about seminars that also earn you valuable continuing education credits.



# UVISION<sup>®</sup> AND SAMPLES

Choosing the perfect product has never been easier. Our Uvision design software conveys your design in a rendering to aid your client with visualization. And when the time comes to finalize your product selection, your Unilock Representative will bring you all the real life samples you need.



# OUTDOOR IDEA CENTERS

Unilock Outdoor Idea Centers provide you with the perfect place for inspiration and a great destination for client feedback. When you visit be sure to see, touch and experience all that Unilock has to offer.





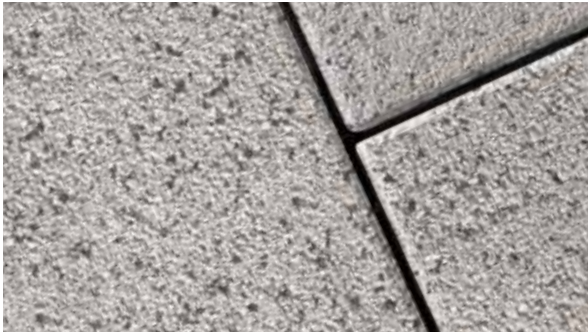
PROJECT: Cooksville GO Station, Mississauga, ON DESIGN: Brodies & Associates. PRODUCT: 7 x 14" with Smooth Premier finish in Granite Fusion, Midnight Charcoal and Opal Blend, and Series® finish in Black Granite.

# CUSTOMIZATION

Unilock allows you to customize products to suit your project. Our vast array of sizes, edges, finish and color options make it easy to achieve your design vision. Choose a shape or a finish first and then narrow down the desired color range. Then call your Unilock Representative for all of the special order options available in your market.



## **STEP 1** CHOOSE SHAPES



## **STEP 2** CHOOSE FINISHES



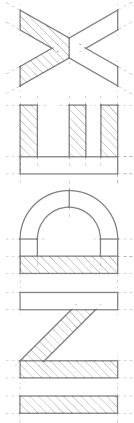
## **STEP 3** CHOOSE COLORS



## **STEP 4** CALL YOUR UNILOCK REPRESENTATIVE

Creating products to suit your unique design ideas is what we do best. Call us early in the design process to ensure every aspect is accurate, from shape and finish, to color and edge detail. Let's see what we can create together!

Special pricing, minimum quantities and additional lead times for manufacturing may apply. Contact your Unilock Representative to confirm all details before creating your specification.



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PROJECT: Medpace, Cincinnati, OH. DESIGN: Human Nature Inc. PRODUCT: 6 x 12" and 12 x 12" with Smooth Premier finish in Dark Charcoal, Opal and a custom color.



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