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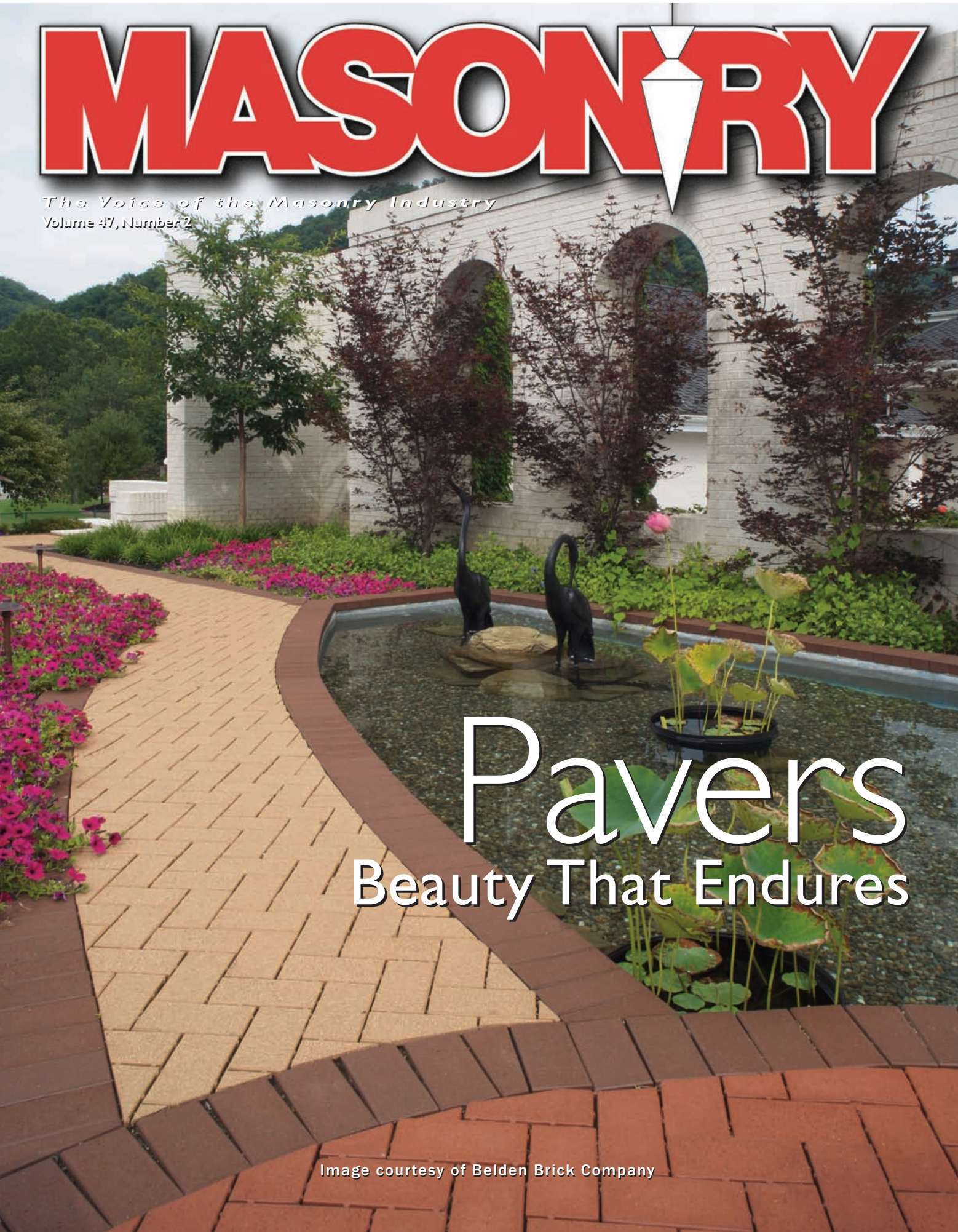


# Pavers

## Beauty That Endures

Image courtesy of Belden Brick Company

# BEAUTY THAT ENDURES

## A LOOK AT THE ENDURING VALUE AND TIMELESS BEAUTY OF GENUINE CLAY PAVERS

By Leroy Danforth

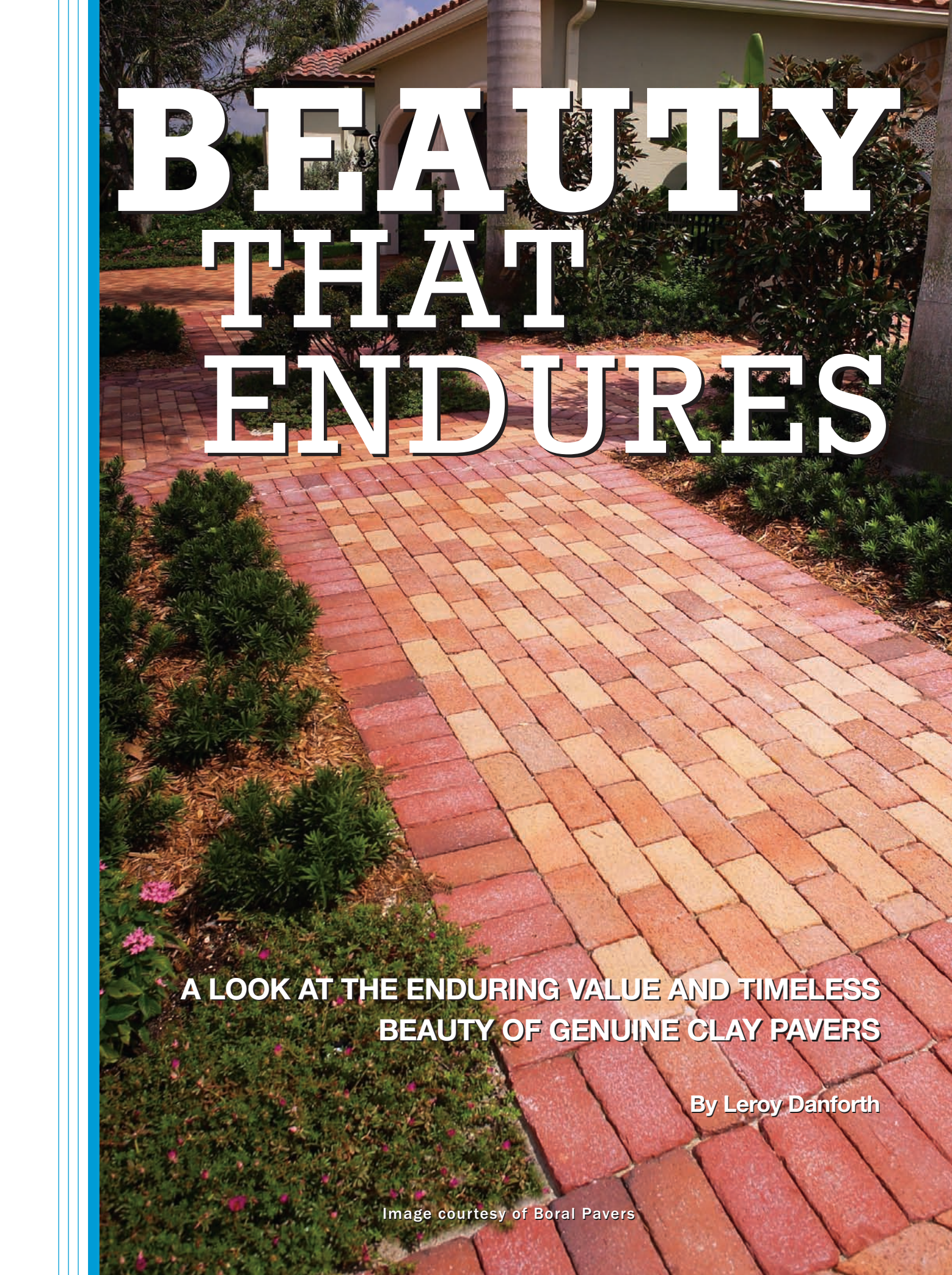


Image courtesy of Boral Pavers

# See Into the Future

AMERICANS HAVE USED CLAY BRICK PAVERS ON PEDESTRIAN PATHWAYS AND ROADWAYS SINCE EARLY COLONIAL DAYS, BECAUSE GENUINE CLAY PAVERS ADD STATURE, CHARACTER AND LONG-TERM APPEAL. Can you imagine what Georgetown, Old Town Alexandria, Va., and Boston's Beacon Hill would look like now, had the sidewalks been paved in a material other than genuine clay pavers?

Today, homeowners, designers and contractors still recognize that attractive landscaping increases the value and appeal of any project, and clay pavers are a popular way to transform hardscape projects. Adding paving products and services to your portfolio also can increase your profit potential. Whether it's a utilitarian brick driveway, a newly built town center, or a sleek, urban cityscape, clay pavers provide aesthetic charm and a human scale that look good immediately after installation and, frequently, even better decades later.

### Surprising product attributes

MANY PAVING PRODUCTS customers, and some installers, don't realize that genuine clay pavers significantly outperform other widely used paving materials. In fact, clay pavers offer the type of product attributes that can be downright surprising, including:

- **Wide color and texture selection**

It's not uncommon to think of various shades of red in a highly textured unit when clay pavers come to mind. However, with today's manufacturing technology, clay pavers are available

## PINE HALL BRICK'S PAVERSCAPE VISUALIZING SOFTWARE ENABLES CUSTOMERS TO VISUALIZE PROJECTS IN ADVANCE.

PaverScape Visualizing Software enables landscape designers and their customers to see how their finished patios, walkways or driveways would look with clay pavers in place before work begins.

The software is available free from Pine Hall Brick and its distributors nationwide and uses a digital photograph of the project as the starting point.

The first step is for the homeowner to take a digital photograph of the area where a driveway, walkway or patio is desired. To get a digital image of the project as it would appear after completion, the homeowner can go to the nearest Pine Hall Brick distributor (check www.pinehallbrick.com under Distributor Locator). Some distributors can design on the spot, or may have free PaverScape CDs available for the customer to take home. In addition, many landscaping design firms have a copy of the software or can get one from Pine Hall Brick.

From the PaverScape software, the digital photograph is opened, the areas that are to be paved are defined and the software shows the customer how the completed project will look with Pine Hall Brick pavers. It will also calculate how many pavers will be required. Customers can choose from any one of 24 styles of paver, laid in any of six patterns.

Out in the field, the software works well. Tim Hanauer, the founder and president of Earth Graphics, a mobile landscape design franchise company with five locations in the Carolinas, says the addition of PaverScape Visualizing Software has been a good fit. Earth Graphics uses specially outfitted office vans and does landscape design on site, using digital imaging.

Hanauer says homeowners have been especially impressed by the software's ability to immediately superimpose the bricks as they will appear on a driveway, a walkway or a patio at the project site. They're able to instantly compare the bricks and patterns.

Bringing digital imaging into clay paver design will help meet what's expected to be a high demand for brick pavers in 2008. The Brick Industry Association is, infact, predicting a market growth at roughly 50 percent over the next three years. For more information on Pine Hall Brick, call 800-334-8689, or visit www.pinehallbrick.com.

The wide color selection makes clay pavers an ideal material to blend with unique designs, bands, borders and panels.

in more colors and textures than ever before, including some that are unique to clay brick and can't be attained, or maintained, by other materials. For example, it is possible to get pavers ranging in color from polar white all the way to jet black that are extremely smooth and dimensionally precise. Clay pavers also come in a wide array of earth tones, pinks, oranges and burgundies, which work well alone or when blended together. At the same time, molded, red pavers are still available for those who want to recapture a timeless, traditional look inside and/or outside.

- **Design flexibility**

The relatively small size of clay pavers creates a pavement surface with human scale. And the wide color selection makes clay pavers an ideal material to blend with unique designs, bands, borders and panels. Additionally, many bonding patterns can be used when laying clay pavers. Some of the most popular include herringbone, running bond, stack bond and basket weave (See Figure 1). *Note: When choosing a bond pattern, considerations should include the setting bed of the pavement and any horizontal loads.*

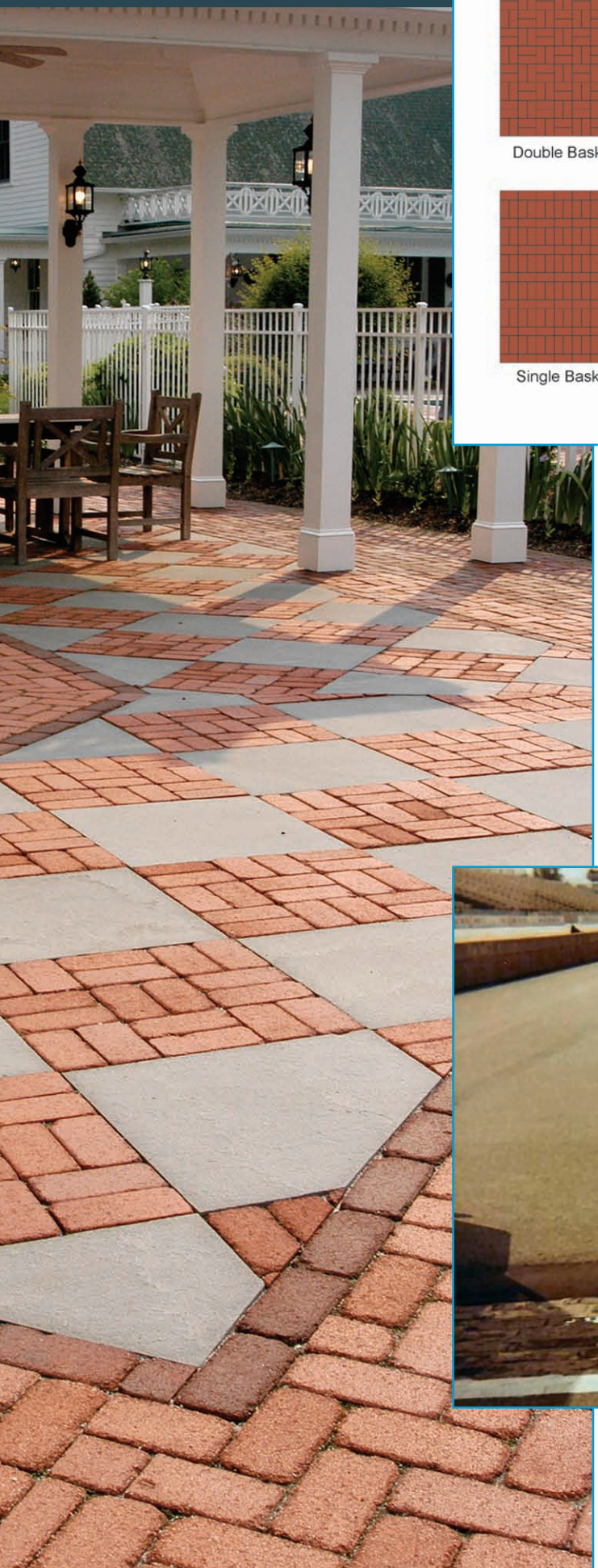
Keep in mind that clay pavers also complement clay masonry well. Many of your customers anguish over finding the perfect color that fits their vision for a project. You'll be surprised at how often the suggestion of a paving material that will harmonize the landscape into that vision will lead to additional work for you.

- **Durability and permanent color retention**

The unsurpassed durability and rich, intense color of a clay paver is one of its most desirable and enviable attributes. Amazingly, many of the brilliant, red pavers that people stroll on when walking through Boston's Beacon Hill have been in service for more than 200 years. While lower, initial-cost options are available, this longtime track record speaks volumes about how long the product will last and the quality that your customers get for their money.

The reason for the superior color retention of clay pavers is that the color is from natural impurities within the clay, which means that color is consistent throughout the body of the unit and will not fade due to weathering. Other segmental paving products, like those made from concrete, have to get their color artificially from pigments or dyes and may require application of sealants to maintain their color after installation.

**Shown right: Different-colored Whitacre-Greer pavers designed to work together.**



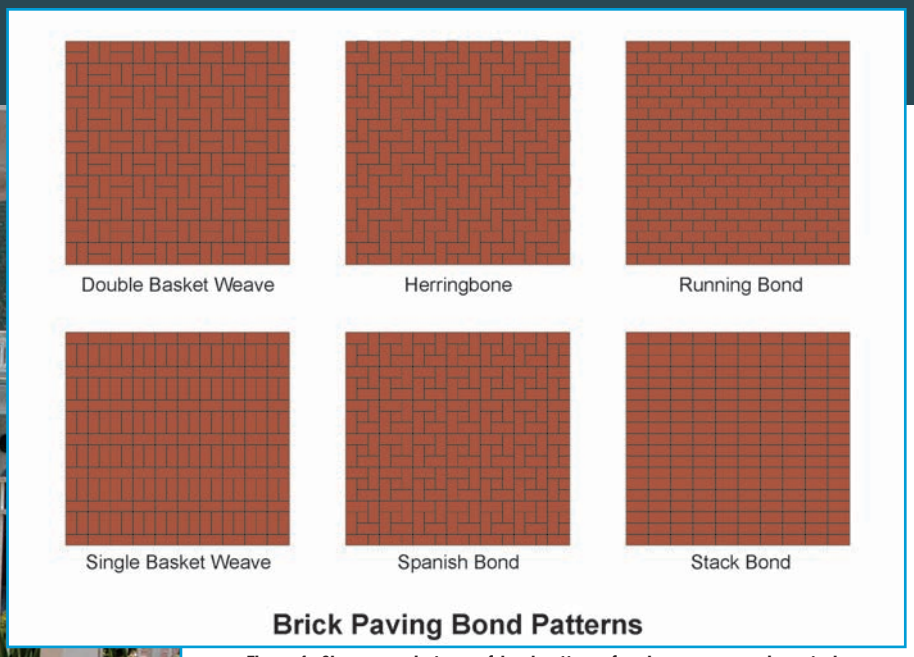



**Figure 1. Shown are six types of bond patterns for clay pavers: running, stack, herringbone, Spanish bond, single basket weave and double basket weave.**

- **Compressive strength**

Many contractors and designers do not realize just how strong clay pavers are. In fact, clay pavers have an average compressive strength of 14,000 psi – stronger than the standard for both concrete pavers and poured concrete. Some clay pavers have a compressive strength of more than 36,000 psi. So, they are resistant to abrasions, stains, deicing salts, and other elements.

- **Compatibility with accessibility requirements**

Research from the University of Pittsburgh proves that properly installed clay pavers can meet or exceed the American with Disabilities Act requirements and Public

**It is interesting to note that the Indianapolis Motor Speedway was surfaced with more than 3 million clay pavers before it was covered with asphalt. The original pavers still stand at the start/finish line of the track as shown.**

Clay pavers are a strong contributor to green-building design and sustainability and are made from clay and shale – two of the most abundant natural materials on earth.

Right-of-Way Accessibility Guidelines by not increasing the amount of work required for mobility and offering less vibration than many poured concrete sidewalks. Ensuring that joints between pavers aren't too wide and that differences in height between adjacent pavers are kept to a minimum reduces work and potential trip hazards. It also assures an ability to compete with other pavement options as an accessible surface.

- **Sustainability**

Clay pavers are a strong contributor to green-building design and sustainability and are made from clay and shale – two of the most abundant natural materials on earth.

This project won a "Best In Class" in the 2007 Brick In Home Building Awards competition in the "Paving and Landscaping Architecture" category. The brick is manufactured by Whitacre-Greer.

Clay pavers are stronger then people may think. Shown are Whitacre-Greer pavers used in a vehicular application on Marion Street in Oak Park, Ill.

The small size, modular nature and minimal packaging of brick result in little on-site construction waste. Pavers can be re-used or crushed and recycled for new uses, thus avoiding the landfill. Flexible or permeable clay pavements can reduce stormwater runoff and filter pollutants. In addition, light colored pavers can reflect a significant amount of solar energy, reducing the heat island effect. Brick paving can be used as part of several passive solar design strategies in interior applications to store heat and moderate temperature swings. Finally, flexible pavements allow relatively easy access to utilities or services that lie beneath the pavement, and the pavement can often be restored with the original materials with no change in appearance.

## Specification and installation

CLAY PAVERS CAN PROVIDE a durable walking or riding surface that is beautiful and smooth for an extremely long period. The key to success, as with any building material, consists of proper specification, installation and maintenance. Because the initial planning plays such a key role in determining the final ultimate success of a project,

contractors and designers should take special care in determining which installation method makes the most sense for their project. Table 1 (right) provides an overview on the strengths and weaknesses of each installation method.

## Brick Industry Association resources

NO MATTER THE PRODUCT and installation method you choose, the Brick Industry Association can help you achieve your desired outcome. To find out more information on genuine clay pavers, visit www.gobrick.com/pavers. This site includes the latest technical information, including the Technical Notes 14 Series, a presentation on the municipal use of clay pavers, various case studies, a template guide specification, and a list of manufacturers who sell and distribute genuine clay pavers. MAS

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**Table 1.**

**Comparison of Pavements Made with Clay Pavers**

| Clay Pavers On: | Advantages | Disadvantages |
|---|---|---|
| Sand Setting Bed on Aggregate Base | • Most durable<br>• Cost-effective<br>• Easy access to repair underground utilities<br>• Good as overlay to existing asphalt or concrete pavement<br>• Allows use of semi-skilled labor<br>• Can be designed as a permeable pavement | • May require a thicker base<br>• Intensive cleaning may erode joint sand |
| Sand Setting Bed on Asphalt Base | • Good as overlay to existing asphalt pavement | • Intensive cleaning may erode joint sand |
| Sand Setting Bed on Cement-Treated Aggregate Base | • Good over poor soils or in small, confined areas<br>• Good as overlay to existing concrete pavement | • Intensive cleaning may erode joint sand |
| Sand Setting Bed on Concrete Base | • Good over poor soils or in small, confined areas<br>• Good as overlay to existing concrete pavement | • Intensive cleaning may erode joint sand<br>• Requires good drainage above base<br>• Susceptible to greater offset with subgrade movement |
| Bituminous Setting Bed on Asphalt Base | • Reduced horizontal movement and uplift<br>• Enhanced water penetration resistance | • Repairs are more difficult and expensive<br>• Little tolerance for paver thickness variations or inaccurate base elevations |
| Bituminous Setting Bed on Concrete Base | • Reduced horizontal movement and uplift<br>• Enhanced water penetration resistance<br>• Good over poor soils or in small, confined areas | • Repairs are more difficult and expensive<br>• Little tolerance for paver thickness variations or inaccurate base elevations |
| Mortar Setting Bed Bonded to Concrete Base | • Greater tolerance for paver thickness variations or inaccurate base elevations<br>• Can be used on steeper slopes and greater vehicle speeds<br>• Drainage occurs on the surface | • Movement joints must align through entire paving system<br>• Least cost-effective<br>• Mortar joint maintenance required<br>• Repairs are most difficult and expensive |
| Mortar Setting Bed Unbonded to Concrete Base | • Greater tolerance for paver thickness variations or inaccurate base elevations<br>• Movement joints in setting bed and base are not required to align<br>• Preferred when used over elevated structural slab | • Bond break must be used to avoid stresses caused by horizontal movement between layers<br>• Least cost-effective<br>• Mortar joint maintenance required<br>• Repairs are most difficult and expensive |

**SOURCE:** *Technical Note 14, "Paving Systems Using Clay Pavers," Brick Industry Association*

# PAVERS IN HARDSCAPING
## Case-by-Case

**SEVERAL AWARD-WINNING PROJECTS FROM THE BRICK INDUSTRY ASSOCIATION'S 2007 BRICK IN ARCHITECTURE AWARDS COMPETITION** have been examined through case studies. These case studies break down different installation systems for pavers.

- MEDINAH COUNTRY CLUB
- NORTHEASTERN UNIVERSITY
- AMERICAN TOBACCO HISTORIC DISTRICT RENOVATION

**Compiled By Brian E. Trimble, P.E., LEED AP**

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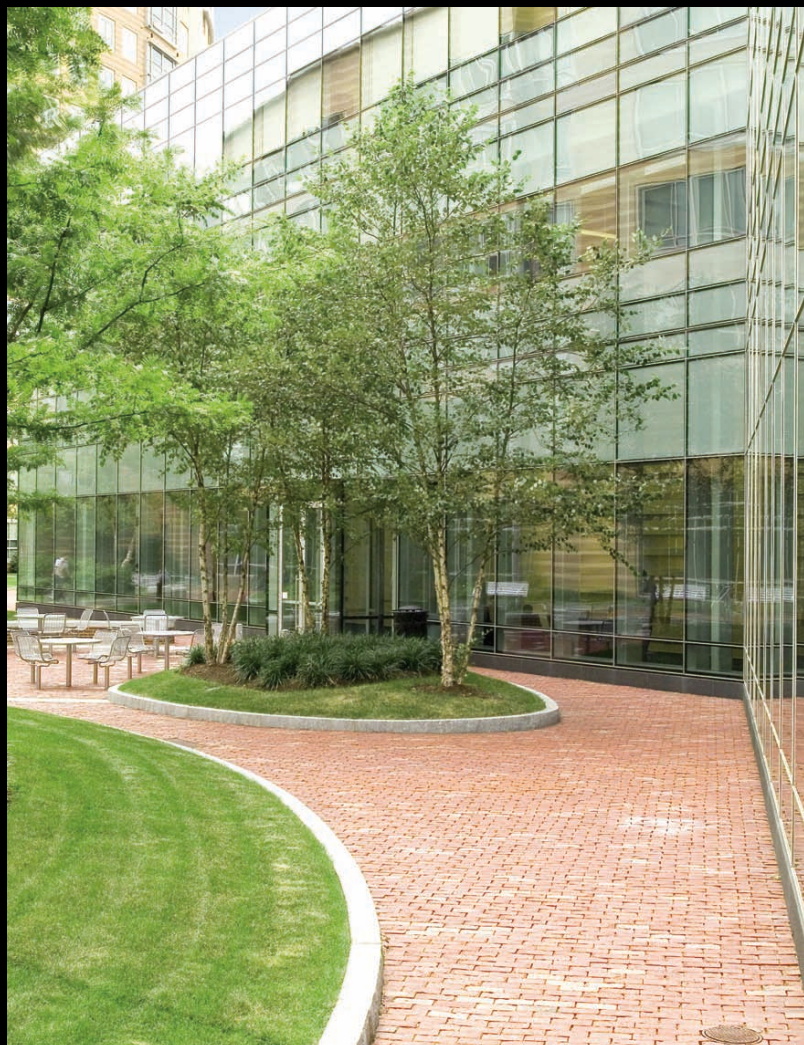

CASE STUDY #1 >>>

# Medinah Country Club

MEDINAH, ILL.

## Creating new spaces that connect back to a distinctive architectural heritage

**AWARD:**
Gold, Paving and Landscape Category

**INSTALLATION SYSTEM:**
Sand-Setting Bed on Aggregate Base

**LANDSCAPE ARCHITECT:**
Private Gardens, Public Spaces Inc.

**CONTRACTOR:**
R. Sanchez & Sons

**MANUFACTURERS:**
The Belden Brick Co. and Endicott Clay Products Co.

When the PGA scheduled a major golf tournament at a distinguished country club in suburban Chicago, the club members determined to make the grounds around their clubhouse as impressive as was their renowned golf course. Private Gardens, Public Places Inc. was hired to create new terraces, gardens and walkways serving the clubhouse and the practice putting green. This area, which was to be spotlighted on national television, was also to be a traffic hub, providing safe pathways to the front doors, the locker rooms and the pool passage, despite being surrounded by the clubhouse's main driveway. The goal was to make the new gardens and the existing building appear as if they were built at the same time. The clubhouse, which was completed in 1924 in the Moorish Revival style so popular at the time, challenged the firm with its style and mass. Which architectural features, repeated in the landscape, would best tie the building and landscape together? With these questions in mind, the firm traveled to southern Spain to research, first-hand, Moorish design, architecture and gardens.

R. Sanchez & Sons was asked to install the mosaic of clay pavers. The clay pavers were chosen because of the variety of available colors. Initial planning was key in making this project successful. To blend in with the structure, they had to do a lot of mathematical gymnastics to make the patterns work properly. The placement of each brick was called out, since there were seven colors in the patterns. To assure future maintenance would be minimized, a 12-inch crushed limestone base was used, though many local projects use six- to eight-inch bases. A sand-setting bed was laid on top of the base and the pavers set in it. Brick edging was set in concrete to act as an edge restraint. In laying the pavers, the installers left just enough space for sand to filter into the joints and keep the pavers edges from chipping. The pavement also had a crown along it, which created a slight wedge shape to the joint and helped keep the joints from being too tight at the top edge. This also kept the pavers from touching and possibly chipping in service.

After hosting a past PGA Championship, Medinah Country Club and its grounds are ready to host other major tournaments with the likes of Tiger Woods.

CASE STUDY #2 >>>

# Northeastern University

## BUILDINGS G AND H, BOSTON

Making an inviting gateway in the middle of a busy urban environment

**AWARD:**
Best In Class, Paving and Landscape Category

**INSTALLATION SYSTEM:**
Brick with Sand-Filled Joints, Bituminous-Setting Bed and Asphalt Base

**LANDSCAPE ARCHITECTS:**
Pressley Associates, Landscape Architects

**MANUFACTURER:**
The Stiles & Hart Brick Co.

At Northeastern University, the construction of two new buildings presented the opportunity to create a new campus entrance from the adjacent Avenue of the Arts, a major Boston thoroughfare and home to multiple cultural institutions. The new gateway entrance, defined by the two buildings, skillfully utilizes clay brick pavers to establish an inviting planned sequence of pedestrian experiences. Entering the university campus, students, faculty and staff are invited to follow wide, curving, brick pathways that comfortably accommodate pedestrians, joggers and the handicapped. As visitors continue along these paved thoroughfares, they encounter small pocket parks, promenades and open quadrangles.

Traditionally used throughout the university campus, the red brick pavers blend harmoniously with the warm tones of the surrounding buildings. They will maintain their color and functionality over time with minimal maintenance. The brick also offers a highly durable surface that readily accommodates emergency and service traffic.

To enliven and distinguish the outdoor seating areas at the building entrances, the main path's carpet of red clay pavers is punctuated with accent pavers. A surrounding field of irregular, hand-molded lines of specialized clay brick softens the rigid lines and saw-cut edges of the contrasting pavers. For all who visit, the finished hardscape creates an inviting gateway and welcome oasis in the midst of the busy surrounding urban environment.

The pavement consisted of an asphalt base overlaid with a bituminous setting bed, modified neoprene tack coat and brick pavers laid hand-tight. Brick pavers have been laid in this system on the campus for the last 25 years and have become standard at the university. The asphalt base is used in urban locations to deal with soft spots in the soil and make the pavement stronger. Sandstruck pavers are used on this project. While these units often have some unique variations in them, they have worked well with this type of system. The system holds these units in place while keeping a narrow sand-filled joint. Once known as the "Hastings Pavement System" named for the asphalt block pavers that made it popular, it is now used in many pavements subject to vehicular traffic.

CASE STUDY #3 >>>

# American Tobacco Historic District Renovation

DURHAM, N.C.

## Transforming an industrial complex into a vibrant, mixed-use "district"

**AWARD:**
Gold, Paving and Landscape Category

**INSTALLATION SYSTEMS:**
Sand-Setting Bed on Aggregate Base and Sand-Setting Bed on Concrete Base

**ARCHITECT:**
Belk Architecture

**LANDSCAPE ARCHITECTS:**
Smallwood, Reynolds, Stewart, Stewart & Associates

**CONTRACTOR:**
Fred Adams Paving Co.

**MANUFACTURER:**
Pine Hall Brick Co.

The project called for creating a new life for a dormant industrial complex composed of 10 buildings constructed between 1874 and 1954 in downtown Durham, N.C. The existing brick buildings, enclosing more than 1 million square feet in various states of disrepair, surround a central courtyard containing the site's signature water tower. Belk Architecture's task was to adapt the former factory into a vibrant, mixed-activity center, while retaining and enhancing the architectural integrity of the buildings. Existing buildings were carefully repaired and restored, new interior lobbies were created, and two new parking facilities were integrated into the campus. Inside the courtyard, the water tower and brick chimney were stabilized and repainted, asphalt removed and replaced with landscaping and lawn, and a new water feature created. The water feature is a 440,000-gallon re-circulating river flowing through the project, Bull River.

The landscape architecture firm of Smallwood, Reynolds, Stewart, Stewart & Associates used brick pavers to tie the surrounding buildings together. The architect developed a blend of colors, since the buildings each varied in color. Clay brick was the only material considered, as they didn't want to introduce new materials into this historic district. Bold diagonal lines are used for direction, and the bridges crossing the river are covered with brick pavers to connect the site.

Two paving systems were used on the project: brick set on an aggregate base and brick set on a concrete slab. In both cases, a sand-setting bed was used. The sand used for the setting bed conformed to ASTM C 33 concrete sand, since it provides better drainage than a mason's sand. The bridge had originally been designed as a steel bridge, but availability of steel was a problem. It was redesigned as a concrete bridge with a clay paver surface. The concrete deck served as a base for the clay pavers, which were then set in a sand-setting bed. Other areas of the project used an aggregate base, in many cases only four inches thick, to satisfy the pedestrian-only traffic. The contractor followed the Brick Industry Association's installation guidelines (Technical Notes 14 Series) to ensure a good job was performed.

Phase 1 of the redevelopment created an office, retail, restaurant and leisure destination with activity at the site continuing day and night. The use of brick has tied this unique development together. Surrounded by history and tradition, the "District" has become one of Durham's most active urban spaces. IMAS

# Ground Work

WESTFIELD, N.J., REJUVENATES A DOWNTOWN AND BUILDS AN AWARD-WINNING MAIN STREET.

## Challenge

Revitalize a downtown by improving its attractiveness and safety to create an environment that is inviting for businesses, residents and visitors to work and play. Westfield, N.J., is a small town in close proximity to metropolitan New York and New Jersey suburbs. In the early-1990s, large shopping malls and multiplexes lured local shoppers away from their home town, resulting in Westfield's downtown experiencing a nearly 40 percent vacancy rate.

Recognizing the need for action, community leaders recommended Westfield re-create itself as a Main Street Community. Per the National Main Street Center of the National Trust for Historical Preservation, Main Street Communities revitalize older and historical commercial districts, increase economic vitality and create a place where people can shop, work or live. The town's goal was to combine the appeal of modern shops, restaurants and businesses without eliminating the charm and character of its 1700s origin.

## Action

The first phase of Westfield's restoration called for re-designing streetscapes to bring back the feel of a late-1800s/early-1900s city center. In October 2004, Westfield selected Boral pavers for sidewalks, alleys and general streetscapes. Boral's Bourbon Street Antique pavers were specifically chosen, because their rich deep color and rugged, tumbled texture reinforced the feeling and appeal of Westfield's existing architecture. Since they are made from genuine clay, Boral's pavers were also considered superior to other streetscape products as they are guaranteed to never fade.

With a beautiful foundation in place, Westfield's building facades are continually undergoing treatments and renovations to bring back the charm and character of historical buildings. The local bakery shop even used photographs of buildings from the early-1900s as a guide to add new windows, framing and doors to its storefront.

## Result

The comprehensive revitalization of downtown Westfield garnered praise from local businesses and residents, establishing downtown as a significant element of the city. The downtown occupancy rate remains a constant 97 percent, and big name retailers like Lord and Taylor, Williams Sonoma and Trader Joe's have established a presence there. These new businesses thrive side-by-side with existing Westfield merchants, a third of whom have been doing business downtown for the last 25 years or more. Additionally, residents and businesses in Westfield have experienced an increase in property values.

Best of all, Westfield was bestowed the Great American Main Street Award by the National Trust in 2004. This award is given annually to five of the nation's 1,600 Main Street Communities. Of the 566 towns in New Jersey, only 26 are considered Main Street Communities designated by the National Trust. Westfield has earned re-designation each year since 1993.

For more information about the revitalization of Downtown Westfield, N.J., visit www.westfieldtoday.com/Downtown.html.