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Scanner

Fall 2016
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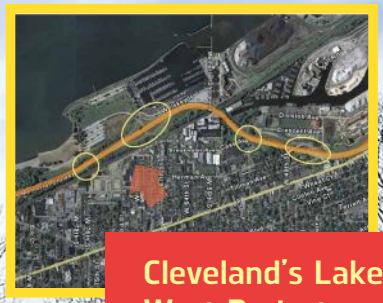

Cleveland's Lakefront West Project

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West Maple Avenue Bridge over the Neshaminy Creek

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Interchange Modifications Keep Clermont Traffic Rolling

See page 27

Celebrating our **50th Anniversary**, the **ASHE Pittsburgh Section** was proud to be your host for the

2016 ASHE National Conference

PITTSBURGH

The Pittsburgh Section celebrated its 50th anniversary by hosting the 2016 National Conference in May at the historical Wyndham Grand Hotel in downtown Pittsburgh. This was the sixth National Conference hosted by the Pittsburgh Section, with over 650 attendees and 69 exhibit booths. The Conference brought together engineers, planners, elected officials and policymakers, transportation researchers and educators to focus on moving transportation forward.

Thursday included one hour of technical sessions. The evening kicked off with the Ice Breaker Reception that included Exhibit Hall Bingo; winners received gift cards, a Fitbit Surge Fitness Watch and an iPad, the Grand Prize. Pittsburgh guitarist Mike DeLuca provided entertainment at the event for 369 attendees.

After a full day of technical sessions on Friday, 297 attendees enjoyed the World Series Suites at PNC Park as they watched the Pittsburgh Pirates beat the Colorado Rockies 2-1. Pregame festivities included an ASHE group salute on the field with outgoing ASHE National President Robert Hochevar, PE, incoming ASHE National President Larry Ridlen, PE, and Committee Chairs from the ASHE Pittsburgh Conference Committee.

Despite a rainy Saturday, 112 golfers from the ASHE Conference proved at nearby Quicksilver Golf Course that a drizzling day on the course is still better than a day at the office! Non-golfing Conference attendees toured the Phipps Botanical Garden and rode on the Gateway Clipper River Boat or Monongahela Incline.

After the Awards and Induction Ceremonies, attendees enjoyed the talents of magician and illusionist Mike Super. Several ASHE members were invited on stage to participate in the show: just ask Sam Mody how his ring got linked to two others' rings!

Thank you to the 30 Chairs/Co-Chairs of the Conference Committees, along with 79 other volunteers; the ASHE Pittsburgh Section couldn't have done it without you! And many thanks go out to the 135 sponsors making the 2016 Conference a great event! Here's hoping that all those in attendance found their visit to the City of Bridges a memorable one. Photos from the Conference can be found on the Conference website: http://2016conference.ashe.pro. Good luck to the New York Metro Section as it prepares for next year's Conference.

See you in the Big Apple!

MISSION

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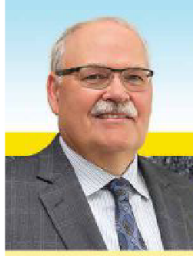

Larry Ridlen, PE
ASHE National President 2016–2017

New Directions

As we look back on the summer, I am sure each of you have a memory that will last a lifetime—whether it was at the beach, an amusement park or at home in the backyard. For me, that lasting memory is my experience at the 2016 ASHE National Conference in Pittsburgh, and my opportunity to represent ASHE on the Jumbotron before a Pittsburgh Pirates game at PNC Park! I hope everyone who attended the Conference left with fantastic memories, and if you were unable to be there, I hope you'll make an extra effort to join us at the 2017 ASHE National Conference in New York City. The Pittsburgh Section did an excellent job hosting this year's event, and I would like to extend a big "thank you" to all of the volunteers who made it a success.

During the Conference, ASHE Public Relations Committee Chair Amanda Schumacher unveiled a new promotional video, "Why Join ASHE?" Amanda and her committee did a great job in developing this three-minute film to help the New Section Committee and the various Sections nationwide encourage ASHE membership. Please make sure you take time to watch the video and use it at membership meetings and during any gatherings where you are encouraging new ASHE membership. A link to the video is available on our ashe.pro website, as well as an updated "2015 Year in Review" document highlighting many of our organization's recent achievements.

I have been honored to attend several of our Sections' anniversary celebrations, including Harrisburg's 55th, Clearfield's 55th, Delaware Valley's 50th and Southern New Jersey's 30th. I have marveled at the energy coming from so many individuals who are guiding productive, long-running Sections committed to relationship building, industry involvement, educational initiatives and community outreach. Here are some fun facts (if you didn't already know): Harrisburg was our first Section chartered on May 8, 1961, and Clearfield was the second Section chartered on June 15, 1961. Congratulations to these Sections and all of the others celebrating anniversaries this year.

At the National level, there are several changes being made to improve the efficiency of our organization. The National Board typically meets on Sunday during the National Conference to discuss ongoing business items with new Board members who were inducted the previous night. This year, the National Board meeting was dedicated exclusively to 2016-2017 goals. Each committee was asked to present their goals to the group, including a "stretch goal" that encourages committees to stretch their ideas about what they could or should do if the barriers of time and money were removed. A sampling of this year's "stretch goals" include:

- Setting up an ASHE blog on WordPress for easy publishing of resources, such as ASHE *scanner* articles and sharing of membership/leadership insights
- Speaking on ASHE's behalf on an international scale to escalate the organization's leadership and recognition
- Creating a working guidebook that new Sections can use to quickly become functional and get up to speed on processes
- Doubling the number of our organizational partnerships from four to eight

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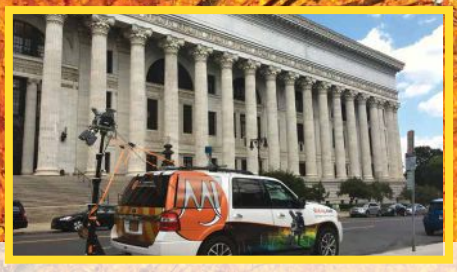
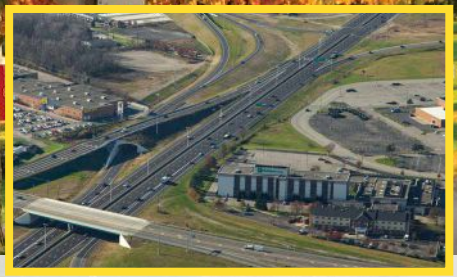
In This Issue

ASHE scanner





on the cover

Project of the Year – Under $10 Million

West Maple Avenue Bridge over the Neshaminy Creek

ASHE Delaware Valley Section

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Design LiNES

I hope you have had a great summer and found time to relax and enjoy the slower pace of the season.

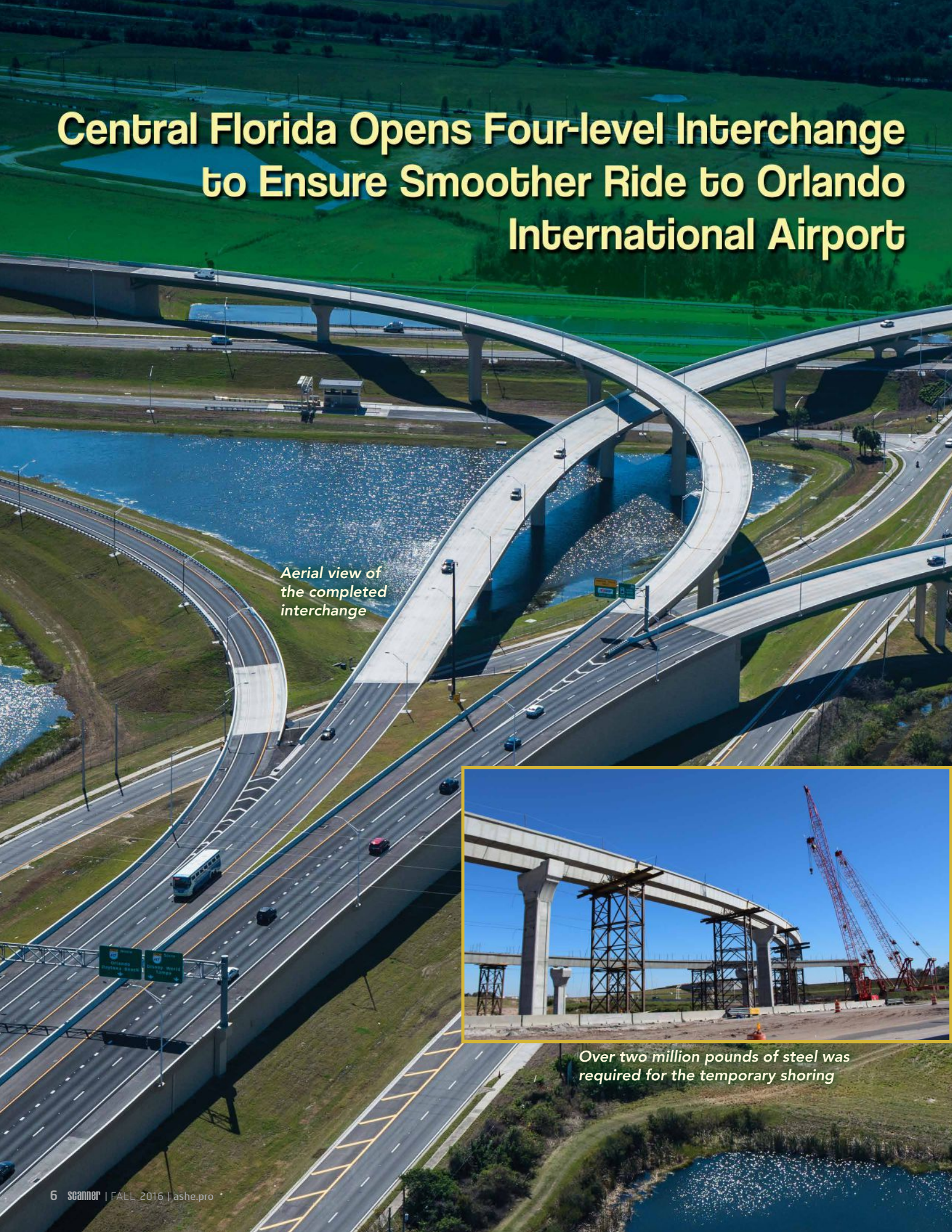
This year's National Conference in Pittsburgh was, as expected, another outstanding event, and I was delighted to have the opportunity to once again exhibit and connect with ASHE members.

Did you know that you can obtain reprints of *scanner* articles to use as marketing/public relations pieces, cases studies or reference materials for your organization? This makes our publication an even more valuable resource that you can take advantage of to inform and educate specific groups or clients, as well as help grow ASHE membership!

More great news: When you advertise in the *scanner,* you can now pay for your ads via credit card. Fill out the form attached to the rate and information sheet on page 35 and mail it to TNT—or call me at 814-360-8220 to arrange payment with a credit card.

Tammy

Central Florida Opens Four-level Interchange to Ensure Smoother Ride to Orlando International Airport



Aerial view of the completed interchange

Over two million pounds of steel was required for the temporary shoring

by Don Hammack, PE, and Ted Davidson, PE, **ASHE Central Florida Section**

A ribbon cutting February 12 marked the opening of a new four-level interchange between the Central Florida Greenway (SR 417) and Orlando International Airport's (OIA) South Access Road at the location of the existing Boggy Creek Road Interchange. Officials from the Central Florida Expressway Authority (CFX), Greater Orlando Aviation Authority and Lake, Orange and Osceola Counties were in attendance, signifying the regional importance of this interchange.

The construction of a direct connection between SR 417 and OIA, which currently is the fourth busiest airport in the United States with over 35 million passengers annually, was needed to accommodate current traffic and future demands related to the expansion of OIA, including a new south terminal and multi-modal center. CFX took the lead on this multi-agency project that has been planned since 1990, when SR 417 was originally constructed with a diamond interchange at Boggy Creek Road.

A unique aspect of the project was the use of horizontally curved, precast concrete U-girders for three of the ramp bridges (a fourth was designed with curved steel trapezoidal box girders). All of the ramp bridges were originally designed with steel plate trapezoidal box girders; however, the CFX believed that a cost savings could be realized with the use of the concrete U-girders. Bids for the interchange, with precast concrete curved U-girders, were accepted in October 2013, with the low bid of $71 million, estimated to be a savings of $7 to $9 million over an all-steel girder design.

The SR 417 interchange is the first standard delivery project in the United States to incorporate curved precast concrete U-girders as the primary design. Previous projects constructed in Colorado have all been a result of value engineering redesigns or an alternate design allowed by the contract documents and completed by the contractor.

Girder Design

The bridge cross sections consist of two 84-inch-deep concrete U-girders supporting a cast-in-place concrete deck. One of the challenges of a precast concrete U-girder structure is the heavy self-weight of the segments. To keep the segments to a manageable length and weight for lifting and transport to the site, the spliced and post-tensioned method of construction was used. The bridges were broken up into segments, with one segment over each pier and a segment in between. The length of the girder segments was limited to a maximum of 110 feet so that each segment could be transported. The basic sequence included precasting the curved U-shaped segments, supporting each segment on temporary shoring towers and splicing the sections together by using post-tensioning. Gaps for the closure placements between each of the curved segment sections, which consist of cast-in-place concrete, were typically two feet wide. Post-tensioning tendons run through internal ducts from the beginning to the end of each unit, connecting all of the U-girder segments in the unit when stressed. Due to the complex geometry, numerous phases of construction and changes in support/loading conditions of the segments, a three-dimensional computer model was developed that included a detailed, time-dependent, staged construction analysis with both girder lines and deck slab. This analysis ensured that the segments met all design requirements during each phase of construction and also allowed for accurate calculation of camber.

Girder Construction

Since it was the first precast concrete curved U-girder bridge constructed in Florida, new forms had to be purchased by the precaster for the project. The curvature was obtained by using short, straight sections with small angle breaks between the sections, for both external and internal forms. Reinforcing bar cages, utilizing welded wire mesh, were built outside the forms and the completed assemblies lifted in one piece and placed in the forms. Additional

(continued on page 8)

longitudinal reinforcing bars were used in the webs and bottom slabs of the girders to address lifting and handling operations. To allow quicker girder removal from the forms, stresses were checked considering only the reinforcing steel, allowing the bottom flange tendons to be stressed in the yard later once the required concrete strength was achieved.

Shipping of the girders (maximum weight of 340 kips) was by multi-axle trucks to the construction site—about 40 miles from the fabrication yard. Girders were shipped at night to arrive early in the morning so that placement could occur during lane closure windows. Girder segments were supported at each end by temporary steel shoring towers (over two million pounds of steel was used for the towers) and, at the ends of the units, by the abutment or pier. Post-tensioned diaphragms were cast at the piers to tie the two-girder system together and transmit loads to the bearings. One of the continuous post-tensioning tendons was stressed in each web prior to casting a lid slab, which closed the top of the boxes for torsional rigidity. Thereafter, the remaining three post-tensioning tendons were stressed. After post-tensioning and grouting were completed, shoring was removed, and the girders were ready for placing the deck slab as with any other composite continuous girder system.

Concrete U-girder form

Summary

The design and construction of the SR 417 and Boggy Creek Road interchange introduced a new girder type to the state of Florida. Where curved structures are required and aesthetics are important, the concrete U-girder provides an alternative to the steel trapezoidal box girder, increasing competition and allowing for more competitive pricing. This new system brings the advantages of standard precast concrete construction, including durability, quality and speed of construction, to curved concrete U-girders.

Donald W. Budnovich, Resident Engineer for CFX, said, "The Central Florida Expressway Authority is excited to provide our customers and the central Florida region with a more efficient means to enter the Orlando International Airport, through the construction of this interchange. The innovative design employing the post-tensioned curved concrete U-girders provides a durable and cost-effective project that we expect will serve central Florida for decades to come."

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The use of mobile LiDAR data acquisition is revolutionizing the way in which the engineering community is documenting existing conditions. The mobile laser scanner is a highly functional survey tool that accurately captures 3D information at highway speeds. M.J. Engineering and Land Surveying, P.C., (MJ) of Clifton Park, NY, has utilized mobile scanning technology on a variety of projects, from mapping subway tunnels and highways to urban streetscapes and college campuses. Their team has now taken the capabilities of mobile mapping to a new level, by mapping an entire city in just four days.

Mobile mapping allows for a collection rate of up to two million data points per second compared to only a handful of data points every few minutes with traditional survey. By utilizing mobile mapping technology, the project team was able to obtain point cloud data throughout the entire city of Albany, collecting vast volumes of measurable data, while keeping field staff completely out of harm's way from the traveling public. The team drove the entire city (248 linear miles), street by street, collecting billions of data points of information.

The mapping is being used in the development of a Complete Streets Policy and Design Manual for Albany. The project team is working directly for the Municipal Planning Organization (MPO), and the Capital District Transportation Committee (CDTC) to create a design manual that will promote safety, health and smart growth for all modes of transportation, including pedestrian, bicycle, public transit, cars and trucks. Due to the fast-paced nature of this project, the project team needed cost-effective, accurate mapping and inventory of features such as sidewalks, crosswalks, curbs, bicycle racks, streetlights, trees and bicycle lanes. Geographic information system (GIS) technicians worked quickly to process the data to inventory and map the existing street infrastructure, allowing this important community project to stay on schedule.

For the creation of the Design Manual, only infrastructure such as sidewalks, crosswalks, street trees, curbs, bicycle racks and bicycle lanes needed

Drive-by Data Collection: Mobile Mapp

by Michael Koterba, Director, 3D Laser Scanning & Geospatial Services, M.J. Engineering and Land Surveying, PC, **ASHE Albany Section**

to be inventoried. Survey technicians extracted those features to create basemapping in specific study areas throughout the city. Using the data, a user-friendly GIS web map was developed so that the entire project team could easily work with the data on a daily basis.

Mobile mapping allowed the team to gather data on not only the presence (or absence) of these features, but the exact location, length, size and extent of the features within the roadway corridor. This baseline was critical in developing appropriate design guidelines for these corridors in the future. "The ability to efficiently inventory, process and map only the data needed to support a planning and design project of this nature has been vital to its success," said Jaclyn Hakes, AICP, M.J.'s Director of Planning and project manager responsible for the development of the Albany Complete Streets Design Manual. "By utilizing technology in new and innovative ways, we are continuing to enhance the quality of our final deliverable to the client, thus providing a better Design Manual for the community."

Mobile mapping offers significant value to the engineering profession beyond traditional surveying and mapping. Through the use of mobile mapping, technicians obtained all of the required data in one pass, eliminating the need for additional mobilization costs. Survey grade positional accuracies are possible with careful planning, quality hardware, good GPS conditions and supplemental ground control. Mobile mapping is quickly changing the old business models.

The complexity of mobile mapping an entire city centers around the tremendous amount of data collected. After four days of scanning several hundred miles of roadway, the dataset contains billions of data points. An effective in-house method of managing the storage of these massive datasets is vital to the process of working with point cloud data. To stay up to date on this evolving technology, it is essential that survey technicians receive continuous training in the use of the technology, both in the field and in the office.

The data gathered will be available to the city to utilize for other purposes that extend well beyond the scope of the Design Manual. Providing the city with up-to-date mapping and 3D locations of infrastructure will serve as a valuable resource in future engineering and construction projects and could become a useful resource in an emergency situation.

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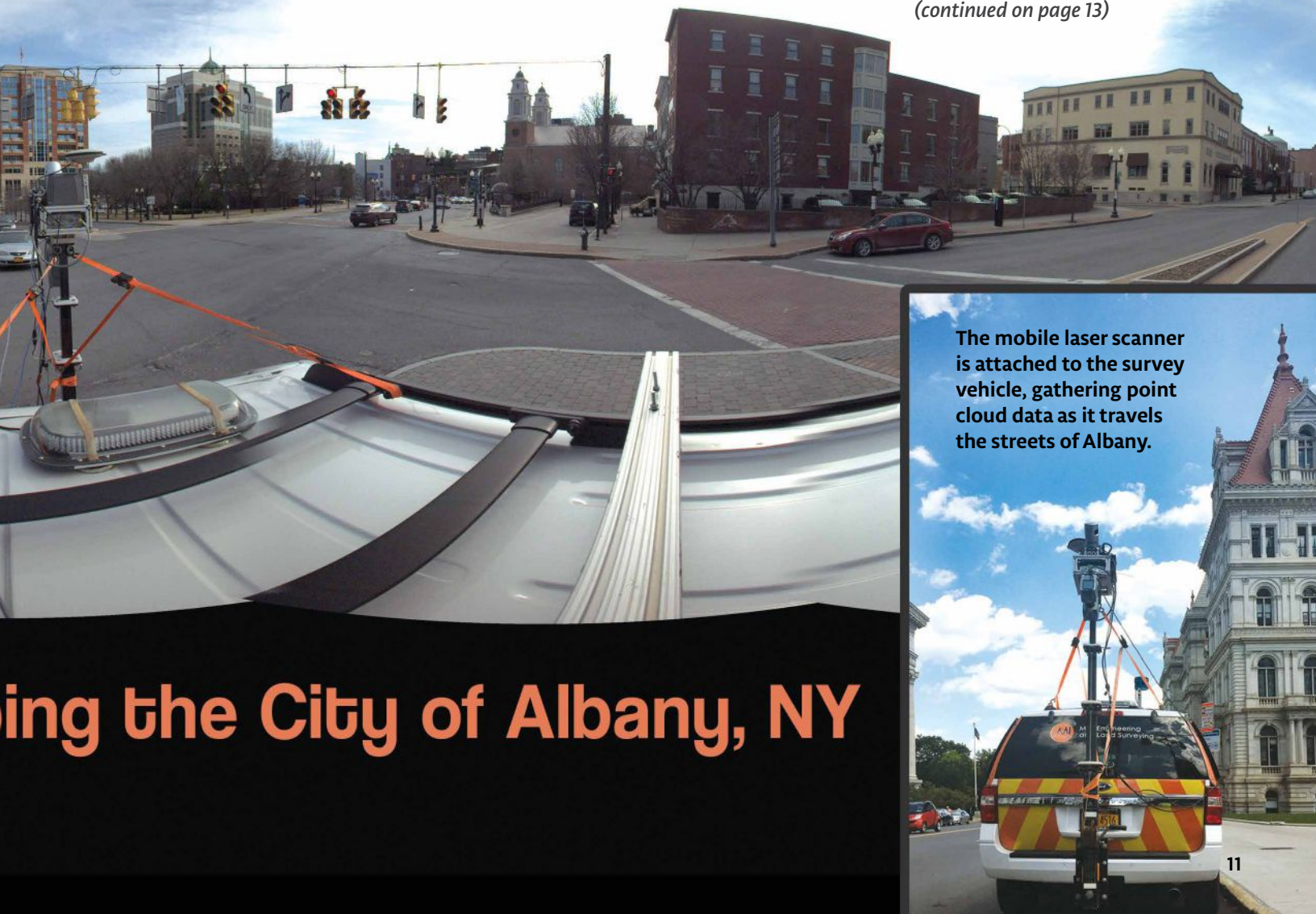
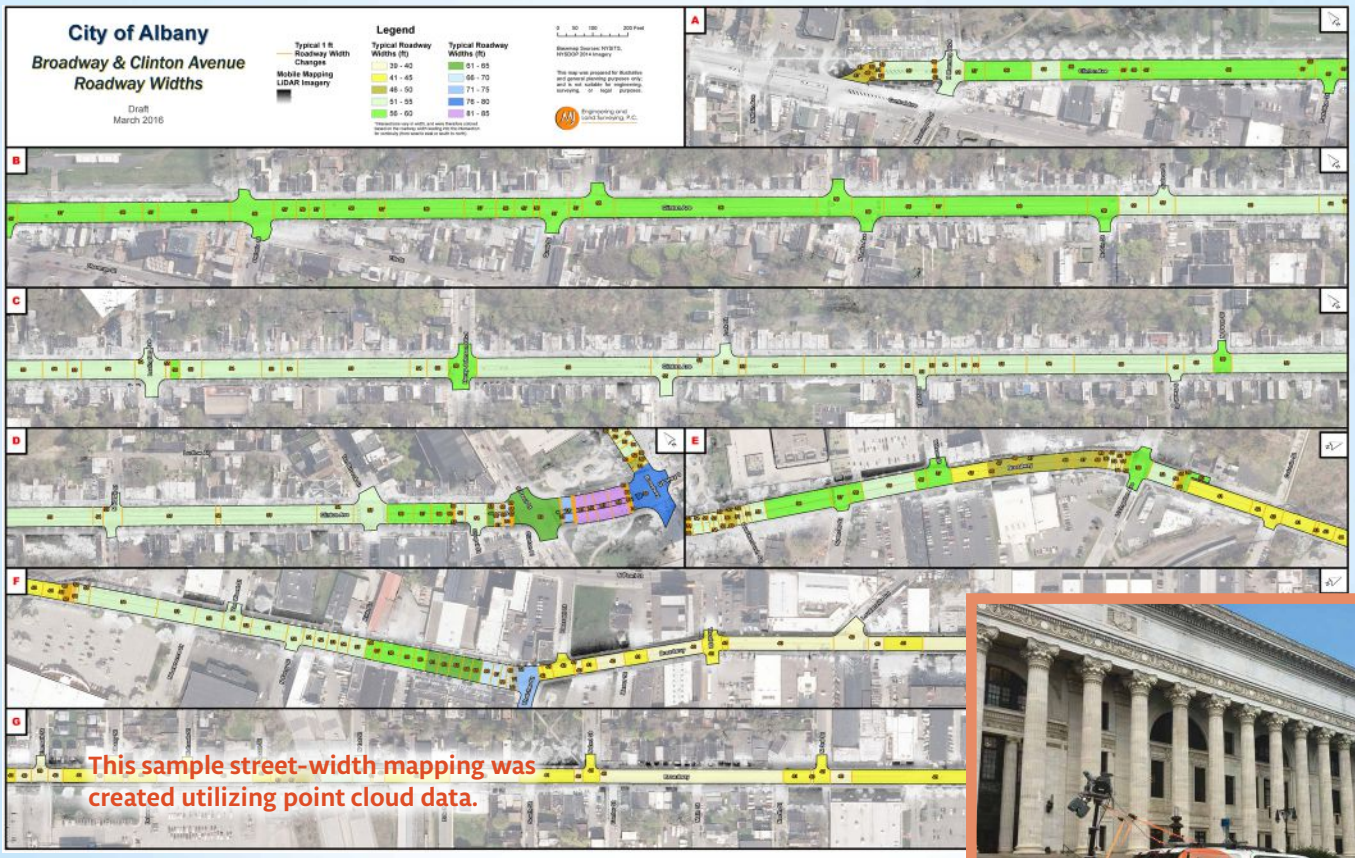
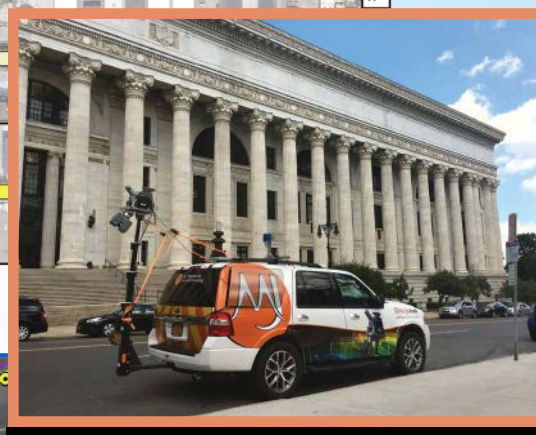


The mobile laser scanner is attached to the survey vehicle, gathering point cloud data as it travels the streets of Albany.

ing the City of Albany, NY



This sample street-width mapping was created utilizing point cloud data.



Using time-of-flight, phased-based laser scanning, coupled with a survey-grade Inertial Measuring Unit and GPS system, the team collected point cloud data at safe roadway speeds.

High-intensity raster images, used to inventory and map street infrastructure, illustrate vital streetscape components to the project team.

Drive-by Data Collection: Mobile Mapping the City of Albany, NY *(continued from page 11)*

Cleveland's Lakefront West Pr
The West 73rd Street Extension an

by Kirsten Bowen, PE, Michael Baker International, **ASHE Lake Erie Section**

The City of Cleveland, Ohio, initiated a comprehensive update of the City's Master Plan in 2002 to create a more accessible lakefront. The resulting Master Plan, Connecting Cleveland: The Waterfront District Plan, identified improvements to the West Shoreway (now designated as "Lakefront West") as a priority transportation project to be addressed by the Ohio Department of Transportation (ODOT) and the City of Cleveland (City).

The Lakefront West Project study corridor resides entirely in the City and runs along the existing alignment of Ohio SR 2 from Clifton Boulevard on the west to the Main Avenue Bridge on the east. It is bounded on the south by the Norfolk Southern (NS) Railroad and on the north by various properties, including Cleveland Metroparks' Edgewater Park, the City of Cleveland Water Treatment Plant, and the Northeast Ohio Regional Sewer District's westerly sewage treatment plant.

Construction of temporary railroad runaround

Construction of 84" interceptor sewer

Construction of railroad bridge, setting beams

ROJECT:
D Grade Separation

A series of workshops were held with Project Stakeholders, which included ODOT, the City, Michael Baker International (Michael Baker) as the lead consultant, partner agencies, a variety of community politicians and community development organizations. This stakeholder group developed the goals for the project:

1. Increase access to Lake Erie.
2. Improve green space, biking and pedestrian facilities.
3. Increase development potential.
4. Simplify connections along the current limited-access freeway.

The existing limited-access, six-lane, two-mile freeway will be transformed into a scenic, tree-lined boulevard. The project will preserve three lanes of traffic in each direction, and the reduction of the speed limit from 50 mph to 35 mph is expected to add just over a minute of total travel time along the boulevard.

Importance of the Connection to the Traveling Public

One of the goals of the project was to enhance neighborhood connectivity with the Lake Erie Waterfront across NS' Chicago Line and the West Shoreway. Despite being nearly adjacent to Lake Erie, the Detroit-Shoreway neighborhood of Cleveland has limited accessibility to the Lakefront as a result of the NS railroad, the natural bluff of Lake Erie and the West Shoreway creating barriers to vehicular and pedestrian traffic. A new grade separation enabled the project to extend West 73rd Street under NS and connect to the West Shoreway, which provides a new pedestrian, bicycle and vehicular connection from the Detroit-Shoreway neighborhood to the West Shoreway and Edgewater Park.

Design and Construction

During the planning process, four alternatives were developed for this connection. The preferred alternative aligned West 73rd north under Father Caruso Boulevard and the railroad to connect with the West Shoreway EB

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Engineering rendering of preferred alternative

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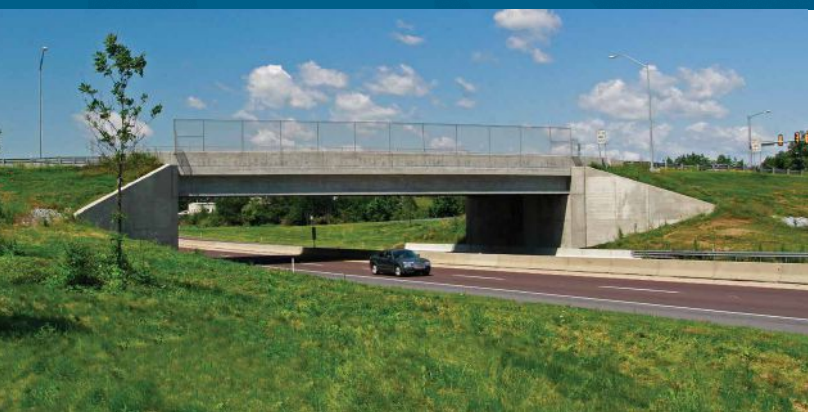

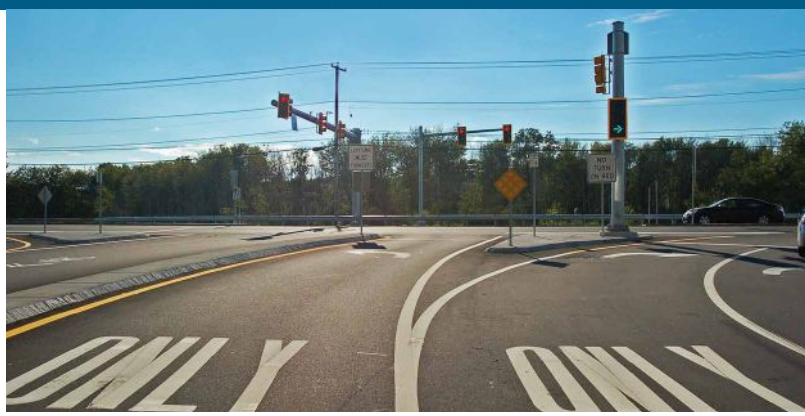

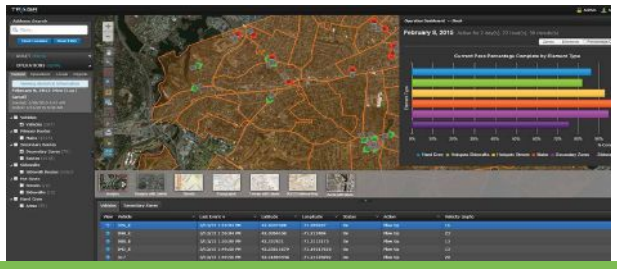

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New Directions *(continued from page 3)*

- Completely revamping ASHE's website, collaborating with the Public Relations Committee to improve its appearance and functionality for both members and prospective members
- Increasing sponsorship in the *scanner* by $10,000

I appreciate that each of the committees took the time to develop goals for 2016-2017, especially the "stretch goals." They prove that this organization will continue to grow, improve and provide new, exciting benefits to our members for many years to come.

More changes are coming at the National level as we strive to streamline our activities and focus on the most important issues. We are testing a few new ideas, including a Friday afternoon workshop devoted to a current hot topic (such as technology this fall) at each of the National Board meetings. And though we are fortunate to have had money in ASHE's "rainy day account" to cover current expenditures, we know that account will not last forever, so we have a committee that is carefully examining our finances. Each year, the National Board approves a budget that projects income and expenditures, including financial support of our committees that are working to improve the value of ASHE. A major expense is travel associated with ASHE's meetings, which is why we are reviewing the quantity and benefit of our National Board meetings. We are considering ways to be more productive when gathered together, as well as opportunities to use video-conferencing technology for committee meetings to reduce travel necessity. ASHE's leadership is conscious of our limited funds and is committed to using our available resources in ways that make the greatest impact.

I look forward to meeting you and hearing suggestions from the various Sections this year. Please let me know what I can do to help support your efforts at the Section or Region level. ASHE is a great organization, but only due to the hard work of our members!

ASHE Delaware Valley Section

Project of the Year: *Over $10 Million*

Interstate 95 Reconstruction, Section GR2:

by **ASHE Delaware Valley Section**

Interstate 95 was constructed in the 1960s as part of the massive Interstate Highway System initiated by President Dwight D. Eisenhower. The freeway stretches from Maine to Florida and serves as the primary north-south route on the East Coast. Within the City of Philadelphia, I-95 follows the alignment of the Delaware River, traversing 51 miles and carrying significant traffic volume in both the northbound and southbound directions. As the highway completed its third decade in the 1990s, the Pennsylvania Department of Transportation (PennDOT) began planning and scheduling the upcoming reconstruction of the facility. The first group of reconstruction projects, otherwise known as "Sector A," had a southern limit at Race Street in Center City and a northern limit at Cottman Avenue in Northeast Philadelphia.

The I-95/Girard Avenue Interchange (Section GIR) was identified as one of the highest-priority areas for reconstruction within Sector A, due to the age of the highway and the significant number of bridge structures. SR 0095, Section GIR, extends for approximately three miles from Race Street to Allegheny Avenue and includes complete reconstruction of the interstate, as well as reconfiguration of the interchange ramps and associated surface streets. This stretch of I-95 is one of the most heavily traveled interstates in the Commonwealth, carrying over 200,000 vehicles per day, and the interchange provides access to and from four major arterials: Girard Avenue, Delaware Avenue, Aramingo Avenue and Richmond Street. Locally, I-95 is perceived as a barrier between Philadelphia's Riverward neighborhoods and the Delaware River and has become a focus of development and waterfront planning efforts. These characteristics combined to create a formidable challenge: reconstruct the aging facility to improve safety, capacity and accessibility while minimizing the impact to the traveling public and the nearby neighborhoods and restoring waterfront connectivity.

Completed project from neighborhood side of I-95

With a total estimated construction cost of over $1 billion, PennDOT identified the need to separate Section GIR into six individual construction contracts. Section GR2 is the first mainline construction section and was built in advance to use as a traffic crossover between the long viaduct structures to the north and south during future sections.

The scope of work of Section GR2 included:

- Approximately 1,200 feet of full-depth concrete pavement between Frankford Avenue and Palmer Street
- Three single-span precast concrete box beam bridges, one of which was identified as structurally deficient prior to construction
- Five retaining walls supporting I-95 with sound barrier walls
- Two ground-mounted sound barrier walls
- Mainline highway lighting and understructure lighting
- Drainage, stormwater management and landscaping
- Intelligent Transportation System (ITS) devices

At first glance, the SR 0095 Section GR2 project ($43 million) appears to be of merit because it is the first I-95 mainline reconstruction section to be completed. However, the completion and opening of the highway is not as significant as the concept of "humanizing infrastructure" that was incorporated into every step of design and construction. Through an unprecedented planning and outreach program driven by PennDOT, the neighboring communities were drawn in as project stakeholders and were considered to be as important as the highway user in the design process.

(continued on page 20)

Rendering of I-95 GR2 landscape and public art improvements designed in partnership with the Delaware River Waterfront Corporation

Completed rain garden at Richmond Street and Shackamaxon Street

Through public design charrettes and near-neighbors' meetings, the design team was able to tailor the features surrounding the highway to fit community needs.

"Small" Project, Big Challenges

Although covering a relatively short distance along I-95, the SR 0095 Section GR2 project presented many challenges during design and construction. To carry the traffic on this critical limited-access freeway, PennDOT required three lanes to be provided in each direction during all stages of construction. In addition, a commitment was made to the local neighborhoods to maintain the ramp access off of northbound I-95 and onto southbound I-95 during construction. The result was a five-stage construction sequence that maximized construction areas as much as possible while maintaining traffic flow and allowing access for the contractor.

Maintenance of city street and pedestrian traffic was also a concern during design. The three streets crossing underneath I-95 within the project limits—Shackamaxon Street, Marlborough Street and Columbia Avenue—are used by the residents of neighboring Fishtown to connect to the local arterials by foot, bike and car. The three streets serve as the most direct connection to the shops and restaurants on Girard Avenue to the west and also to Penn Treaty Park and other waterfront attractions along Delaware Avenue to the east. To maximize mobility for the locals, the bid special provisions prohibited the contractor from closing the two eastbound streets at the same time. The contractor was also required to maintain safe pedestrian access or establish signed sidewalk detours for the cross streets.

Completed bioswale near Shackamaxon Street

Another key design challenge was the incorporation of stormwater management facilities that would meet Philadelphia Water Department (PWD) regulations while complying with Department of Environmental Protection (PennDEP) policies. A limited amount of right-of-way is available adjacent to I-95, and the surrounding homes are extremely close to the highway. The final result was a series of 10 small, shallow rain gardens along the project's retaining walls that are landscaped for both appearance and stormwater function. These rain gardens will not hold standing water, and they include impervious liners to prevent infiltrating stormwater from entering the basements of the adjacent houses.

Keeping It Green

The body of stakeholders that regularly meet to coordinate planning and outreach for the I-95 corridor projects is called the Sustainable Action Committee, so there is a continuing emphasis on sustainability. SR 0095 Section GR2 was one of the first I-95 sections designed with "green" elements in mind. The stormwater management design is intended to fulfill all agency regulations with respect to water quality and to not overload the PWD storm sewer system. The landscape design includes varied species of plants, which are less susceptible to disease and require less maintenance than monoculture plantings. Repurposed salvage from nearby bridge and building demolition was incorporated into the aesthetic design as public and industrial art. The enhanced pedestrian and bicycle access through the highway improves safety and reduces vehicle trips to waterfront venues.

ASHE Scholarship Totals for 2014 and 2015

	2014 Totals	2015 Additions	2015 Totals
Great Lakes Region			
Central Dacotah	$ 1,000.00		$ 1,000.00
Central Ohio	$ 16,500.00	$ 3,000.00	$ 19,500.00
Circle City			$ 0.00
Cuyahoga Valley	$ 14,000.00	$ 2,500.00	$ 16,500.00
Derby City			$ 0.00
Lake Erie	$ 7,500.00	$ 1,500.00	$ 9,000.00
Northwest Ohio	$ 29,000.00	$ 3,000.00	$ 32,000.00
Triko Valley	$ 21,500.00	$ 2,500.00	$ 24,000.00
TOTAL			**$ 102,000.00**
Mid-Atlantic Region			
Blue Ridge	$ 5,000.00	$ 1,000.00	$ 6,000.00
Carolina Piedmont	$ 22,103.00	$ 4,500.00	$ 26,603.00
Carolina Triangle	$ 54,000.00	$ 6,000.00	$ 60,000.00
Chesapeake	$ 56,500.00	$ 7,500.00	$ 64,000.00
Greater Hampton Roads	$ 16,500.00	$ 5,000.00	$ 21,500.00
North Central West Virginia	$ 49,500.00	$ 4,500.00	$ 54,000.00
Old Dominion	$ 13,000.00	$ 3,000.00	$ 16,000.00
Potomac	$ 20,000.00	$ 5,000.00	$ 25,000.00
TOTAL			**$ 273,103.00**
Northeast Region			
Albany	$ 9,000.00	$ 3,000.00	$ 12,000.00
Altoona	$ 46,500.00	$ 1,500.00	$ 48,000.00
Central New York	$ 7,500.00	$ 1,000.00	$ 8,500.00
Clearfield	$ 40,000.00	$ 5,500.00	$ 45,500.00
Delaware Valley	$114,850.00	$16,000.00	$ 130,850.00
East Penn	$ 33,000.00	$ 4,000.00	$ 37,000.00
First State	$110,000.00	$ 5,300.00	$ 115,300.00
Franklin	$ 32,000.00	$ 4,000.00	$ 36,000.00
Harrisburg	$143,900.00	$12,000.00	$ 155,900.00
Long Island	$ 7,500.00	$ 2,500.00	$ 10,000.00
Mid-Allegheny	$ 15,000.00	$ 2,500.00	$ 17,500.00
New York Metro	$ 60,500.00	$ 7,500.00	$ 68,000.00
North Central New Jersey	$110,500.00	$11,000.00	$ 121,500.00
North East Penn	$ 47,282.00	$13,400.00	$ 60,682.00
Pittsburgh	$ 20,000.00	$ 2,000.00	$ 22,000.00
Southern New Jersey	$156,000.00	$ 7,500.00	$ 163,500.00
Southwest Penn	$ 49,750.00	$ 2,000.00	$ 51,750.00
Williamsport	$ 19,458.00		$ 19,458.00
TOTAL			**$ 1,123,440.00**
Rocky Mountain Region			
Phoenix Sonoran	$ 7,000.00	$4,000.00	$ 11,000.00
TOTAL			**$ 11,000.00**
Southeast Region			
Central Florida	$ 42,500.00		$ 42,500.00
Georgia	$ 45,900.00	$3,000.00	$ 48,900.00
Gold Coast			$ 0.00
Northeast Florida	$118,745.00	$5,000.00	$ 123,745.00
Middle Tennessee	$ 34,000.00	$4,000.00	$ 38,000.00
Tampa Bay	$ 53,500.00	$2,000.00	$ 55,500.00
TOTAL			**$ 308.645.00**
ACCUMULATED TOTAL			**$ 1,818,188.00**

(Information for the 2016 report will be collected after December 31, 2016)

Cleveland's Lakefront West Project:
The West 73rd Street Extension and Grade Separation *(continued from page 15)*

exit ramp. It would continue traveling east on a two-way ramp connector road, ultimately going under the West Shoreway utilizing the existing Edgewater Bridge. The new railroad bridge is a four-track, 108-foot, single span, steel plate girder bridge with ballasted, composite, reinforced concrete deck on reinforced concrete abutments and pile foundations.

Construction of a new bridge on the existing railroad alignment posed many challenges. This section of NS's Chicago Line carries 90 trains per day, with design speeds of 60 mph for freight and 79 mph for passenger trains. Construction of the bridge under active NS tracks was accomplished using top-down construction techniques. The project included construction of a temporary railroad runaround and extensive third-party utility coordination and relocations, including four fiber optic runs, water, power and an 84-inch interceptor sewer. Through extensive stakeholder and public outreach, the project constructed a pedestrian path and aesthetic enhancements of the streetscape, landscape, bridge and retaining walls.

Construction of new tracks on the bridge

ODOT awarded the project to Great Lakes Construction Company (Great Lakes), and construction of the new bridge began in July 2013. The general construction phasing scheme included:

1) Construct a relocated 84-inch interceptor sewer.
2) Construct temporary run-around tracks, including a temporary shoring system.
3) Construct the new bridge on original alignment.
4) Relocate trains to the new bridge and remove the temporary runaround and shoring.
5) Excavate W. 73rd Street underneath the new structure and construct retaining walls, slope paving, streetscape and landscape elements.

Partnering

Multiple utility, weather and third party delays arose that, left unresolved, had the potential to delay the project, resulting in a longer construction schedule and increasing fixed construction costs. A partnering approach was employed and embraced by all team members. When project issues arose, the entire team came together to discuss possible options, ideas and actions that could not only solve the issue at hand, but also look for the solution that provided the best value to the project and local stakeholders.The project team recognized that value had different meanings for each stakeholder.

One example of partnering on this project occurred early in the project when Great Lakes experienced delays involving third-party utility relocations, including aerial electrical facilities and numerous underground fiber optic lines along NS right-of-way. ODOT, the City, Michael Baker and Great Lakes partnered in development of an acceleration schedule to achieve substantial completion for the entire project by the end of 2015. The acceleration scheme included rephasing of construction activities, winter protection for concrete operations and design and construction changes to address poor soil conditions. In December 2014, a temporary ramp was constructed from the West Shoreway and portions of West 73rd north, in advance of the bridge completion. The temporary ramp allowed for reduced impact to City residents and Edgewater Park through partial construction of West 73rd, providing for utility work and paving that ultimately shortened the construction duration. The team found ways to make local residents' lives easier by providing temporary access and performing work out of sequence.

The structure was completed and opened to rail traffic in June 2015. The West 73rd roadway, the new eastbound exit ramp and pedestrian facilities were completed in December 2015. The project presented a wide range of challenges both in design and construction. Stakeholder collaboration and partnering assisted in overcoming many challenges, but the winter 2015 construction acceleration resulted in months of schedule savings. In contrast to the harsh winter conditions present in December 2014, stakeholders enjoyed an unseasonably warm day in December 2015 for the ribbon-cutting celebration.

Excavation for roadway under new bridge

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Charlotte Streetcar System map circa 1928; the CityLYNX Gold Line follows and extends part of the original system corridors.

The current CityLYNX Gold Line System Map serves the central business district and neighborhoods east and west of uptown Charlotte.

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ASHE Delaware Valley Section
Project of the Year: *Under $10 Million*

West Maple Avenue Bridge and Roundabout Ease Traffic Flow

by **ASHE Delaware Valley Section**

The SR 0213, Section Neshaminy Creek Bridge (NCB) project involved two main goals: the replacement of the West Maple Avenue Bridge over Neshaminy Creek and the conversion of the existing signalized intersection of West Maple Avenue/Bridgetown Pike into a one-lane roundabout. The project is located in Lower Southampton and Middletown Townships in southern Bucks County, Southeastern Pennsylvania.

Bridge Replacement

The existing 288-foot-long concrete open spandrel bridge over Neshaminy Creek was originally constructed in 1929 and has suffered significant deterioration over the years. Due to advanced deterioration of most of the existing concrete superstructure and substructure components, this bridge was scheduled to be replaced. In order to facilitate construction of this structure and accommodate the 11,000 vehicles that cross the bridge daily, a full detour was implemented during construction. The open spandrel nature of the existing bridge would not allow staged construction. The existing bridge had narrow lanes and shoulders and did not accommodate pedestrians. The bridge replacement creates a roadway with more appropriate shoulder widths and additional width on the south side to facilitate pedestrians walking from the adjacent residential development to the nearby Playwicki Park.

To streamline construction and to minimize future maintenance, it was recommended that an innovative prefabricated, multi-cell Bebo arch bridge system be constructed. The three arches were approximately 75 feet wide and 20 feet high. The prefabricated arches also are sympathetic to the open spandrel arch configuration of the former structure.

Roundabout

The project also consisted of an intersection improvement at SR 213 (West Maple Avenue)/ SR 2010 (Bridgetown Pike). The existing signalized intersection experienced traffic delays and congestion on a daily basis. After a comprehensive development of traditional widening and turn lane alternatives, it was recommended that a single-lane roundabout be explored. Since the intersection straddled the municipal boundary between two townships, detailed coordination with both municipalities was required. After several one-on-one meetings with PennDOT and municipal staff to review the technical details of the Synchro models for each intersection alternative, the townships agreed to move forward with the concept of a roundabout, pending feedback from the general public at several public meetings. Although the general public was initially apprehensive about the replacement of the traditional intersection with the roundabout, they were supportive of the concept after several presentations on the operational and safety benefits of roundabouts. The chosen alternative involved replacing the existing signalized intersection with a single-lane roundabout located approximately 300 feet to the east of the existing intersection on an adjacent township-owned parcel. There was extensive coordination between the PennDOT right-of-way unit, the townships and the property owners to address the ownership and maintenance of the land in the abandoned portions of the signalized intersection.

This project is notable as one of the first applications of this low-maintenance and cost-effective, prefabricated bridge type in Pennsylvania. As this type of structure is used more often for bridge replacement projects, PennDOT will realize cost savings during construction, time savings from the use of this prefabricated structure type and reduced future maintenance costs. Also, the replacement of an inefficient signalized intersection with a more efficient and safer roundabout deserves recognition. With education and explanation of the benefits of the roundabouts to the general public and municipal representatives, support was gained from the community to build an updated transportation facility. Roundabouts have a proven track record of reduced

numbers of crashes compared to conventional signalized intersections due to the reduced number of conflict points. Conventional intersections have 32 conflict points versus eight for roundabouts. In addition, roundabouts have a 48 percent reduction in all crashes and 78 percent reduction in fatal/injury crashes.

Coordination

A full detour was utilized for the bridge construction, and two construction seasons were required. To mitigate the addition of the detoured 11,000 vehicles per day from West Maple Avenue to the proposed detour route, the signal timing of four existing traffic signals was modified, and one temporary signal was installed. The staging for the bridge detour was also coordinated with roundabout construction to ensure access to the residents and businesses.

Innovation and Sustainable Design

This project incorporated several innovative approaches, including the use of a three-cell Bebo arch bridge system. Several sustainable design efficiencies were implemented in the project, including LED streetlights at the roundabout, six bioretention swales/areas using native landscape plantings at the bridge and the roundabout and the removal of the existing traffic signal equipment to reduce electricity consumption. The prefabricated Bebo bridge system incorporates a typical asphalt roadway surface, and the concrete culvert system will reduce bridge maintenance requirements.

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Flyover ramp at SR 32 Interchange with I-275 in Clermont County, Ohio

I-275 and SR 32 Interchange Modifications Keep Clermont Traffic Rolling

by Steven Shadix, PE, PS, and Steve Mary, PE, Stantec Consulting Services, Inc., Cincinnati, OH; **ASHE Triko Valley Section**

Background

The I-275 and SR 32 Interchange was first constructed in 1974 and is located in southwestern Ohio on the east side of the interstate beltway around Cincinnati, Ohio. The Ohio Department of Transportation (ODOT), in conjunction with the local governments, coordinated efforts to design and reconstruct the I-275 and SR 32 interchange to address safety concerns. Primary safety concerns were related to weave movements on I-275 because of the existing cloverleaf design, as well as weaving caused by the close proximity of the adjacent SR 32 interchange at Eastgate Boulevard. Congestion was also a major concern and had to be accommodated in the design. Traffic volumes continue to increase due to the expanding economic development occurring in the Eastgate area. ODOT contracted with Stantec Consulting Services, Inc., (Stantec) to redesign the interchanges at I-275/SR 32 and SR 32/Eastgate Boulevard. This family of projects not only included the interchanges, but also tied into the Clermont County Transportation Improvement District's (CCTID) Eastgate North Frontage Road project and provided overpass structures to reconnect Aicholtz Road, which had been severed by the original construction of I-275.

Planning to Enhance Economic Development

From the outset of the project, Stantec worked with ODOT and the locals to develop a plan that addressed current and projected safety concerns, but also enhanced economic activity in the area. The project team carefully sequenced the numerous projects occurring in the Eastgate area to keep traffic flowing smoothly through the business corridor. Numerous public meetings were held to keep the citizens and business community informed concerning the maintenance of traffic. Project activities included preliminary engineering with development of various design alternatives and an Interchange Modification Study for the preferred alternative. The project team also completed all required environmental field studies, ecological base studies, hazardous material screenings and cultural resource investigations, and prepared a Level 4 Categorical Exclusion Environmental Document and necessary waterway permits.

Interchange Design and Construction Sequencing

Eastgate North Frontage Road was the first project (CLE-CR382-0.00) constructed as part of the area-wide improvements. The CCTID bid this project first to improve access to the businesses on

(continued on page 28)

the north side of SR 32 and prepare for the next phases of construction. Eastgate North Frontage Road connects to Eastgate Boulevard at the west end, and to Glen Este-Withamsville Road at the east. During the second project (CLE-CR341-0.17), the existing Eastgate Boulevard Bridge over SR 32 was replaced to provide additional lanes and to accommodate the flyover ramp from southbound I-275 to eastbound SR 32. This project also constructed the westbound SR 32 half of the interchange, connecting the new ramps directly to Eastgate North Frontage Road to provide better signal spacing and traffic flow on Eastgate Boulevard. The ramp modifications at the Eastgate Boulevard interchange also eliminated weaving on westbound SR 32 approaching the I-275 interchange.

This project was designed to be constructed partial-width to maintain traffic during construction. The third and largest construction project (CLE-275-10.15 and CLE-275-8.95) was the reconstruction of the I-275 and SR 32 interchange. Due to safety concerns, the weave movements on I-275 had to be eliminated from the existing cloverleaf interchange design. Numerous options were developed to modify the interchange. The preferred option eliminated two of the loop ramps, resulting in two ramp terminal intersections with SR 32. During the evening rush hour, southbound I-275 traffic exits to SR 32, and drivers have the choice to go to the ramp terminal with SR 32 and proceed westbound or eastbound on SR 32, or to proceed onto the flyover ramp that goes over SR 32 and I-275. This flyover ramp combines with the northbound I-275 exit ramp to eastbound SR 32, and both ramps pass through a tunnel under Eastgate Boulevard before tying into SR 32. The eastbound exit from SR 32 to Eastgate Boulevard is then braided over the tunnel. This unique braided ramp design allows motorists to bypass the Eastgate Boulevard interchange and proceed directly to the Glen Este-Withamsville Road at-grade intersection. This project also included widening SR 32 to three lanes in each direction, as well as intersection improvements at Old SR 74 to the west of the interchange. Additionally, the project included new drainage, retaining walls, lighting, signing, pavement marking and five traffic signals.

Connectivity

During the planning stages, it became clear that including parallel routes to the north and south of SR 32 would benefit the free flow of traffic and provide multiple options for the local traveling public to bypass the SR 32 corridor during busy times. While Old SR 74 provides a parallel route to the north, the route on the south had been severed by the original construction of I-275. To reconnect Aicholtz Road, the project included the design of four new bridges on the I-275 mainline and ramps over the future southern corridor. Another unique aspect of this project is the multi-agency cooperation that has resulted in planning and construction of four bridges, along with the planning and funding of the proposed road for the Aicholtz connection.

Award Recognition

The project was recognized by the Triko Valley Section of ASHE with the 2015 Donald C. Schramm Transportation Improvement Award in the over $5 million category. The American Council of Engineering Companies (ACEC) of Ohio also recognized the project with an Outstanding Achievement Award as part of the 2016 Engineering Excellence Awards.

Rehabilitating two interchanges immediately adjacent to one another in a large retail and office environment was challenging. The key was to design a transportation plan that provides safeguards to local business while, at the same time, preserving the corridor's vitality and ensuring that it satisfies the safety and traffic flow concerns of motorists. The cooperation between the design team, contractors, ODOT, CCTID and Union Township helped to accomplish that goal, which in turn has supported $347 million in completed or planned commercial and residential investment in the area.

SR 32 looking west from Eastgate Boulevard

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Attention, ASHE members! Do you have a project deserving of a national award? A new opportunity for national recognition is in the works! The ASHE National Project Awards Committee is preparing guidelines for the first annual National Project of the Year Awards that may be presented at the 2017 ASHE National Conference in New York City. There will be two national awards—one for projects with a construction cost of up to $20 million and one for projects with a construction cost of more than $20 million.

Project submissions will flow from Sections to Regions and then to the National Project Awards Committee for final selection by a panel of judges. The awards ceremony will take place during the National Conference, and each winner will receive a plaque. The winning projects will also be featured in the National Conference registration booklet, the National Conference website, the ASHE National website, and highlighted in the *scanner*. Be sure to start thinking of potential projects that have been completed in the last two calendar years for submission for these prestigious awards. Details will soon be available on the ashe.pro website, in the *scanner* and through your Section.

The New Baltimore Slid
Identification, Investigation and Re

by Cristina Barnes, Marketing Manager, Stahl Sheaffer Engineering,
ASHE Southwest Penn Section

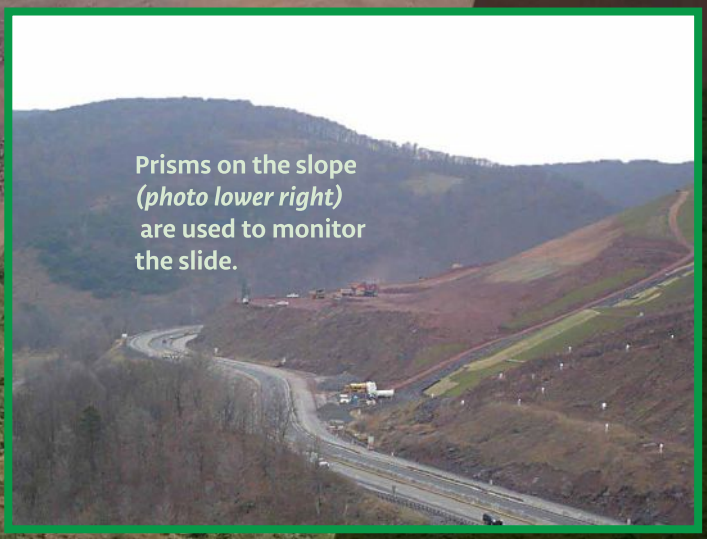
The New Baltimore Slide remediation shown in the foreground is approximately 75 percent complete (July, 2016). Fine grading, drainage work and seeding are ongoing. The other cut slope involved in the project can be seen in the distance.

de:
emediation

Identification: The New Baltimore Slide, Southwestern Pennsylvania, Has Been Monitored Since Before Turnpike Construction Began

In 1935, the Pennsylvania legislature authorized a feasibility study for building a highway—a turnpike—that had an estimated construction cost of between $60 million and $70 million. Two years later in 1937, Governor George Earle signed a bill authorizing the creation of a Turnpike Commission. When the original 160-mile long Pennsylvania Turnpike opened for business October 1, 1940, it became America's First Superhighway, receiving nationwide acclaim as an engineering marvel and establishing national standards for superhighway design. (Read more on the history of the Turnpike at https://www.paturnpike.com/yourTurnpike/ptc_75th_Anniversary.aspx.) Subsequent expansions increased the roadway to 552 miles.

The Pennsylvania Turnpike, constructed mostly along the path of the original roadbed of the old South Penn Railroad, passed through the Borough of New Baltimore in Somerset County. This area has become well known for the "Church on the Turnpike," and also for the ancient landslide that was re-activated at Milepost 127.9 by construction activities in 1939. The 800-foot-wide mass of rock and soil is sliding along a bedding plane of clayey siltstone extending 1,250 feet back from the Turnpike.



Prisms on the slope *(photo lower right)* are used to monitor the slide.

The Pennsylvania Turnpike Commission (PTC) was well aware of the slide and the problems that it would cause. Provisions were made to limit the impact on the slide and, therefore, the impact to the road. The original alignment was revised (vertically and horizontally) to minimize impact on the slide. Original survey records taken during construction showed movements of up to 13 feet per year (1938 to 1940). Subsequent expansions and realignments that required excavation stopped just short of the slide. The slide continues to be active, moving toward the eastbound lane at a rate of approximately six to 10 inches per year, causing the shoulder and right lane to heave approximately eight inches per year.

Investigation: Geotechnical Investigations, Slope Inclinometers, Robotic Total Station Laser Survey

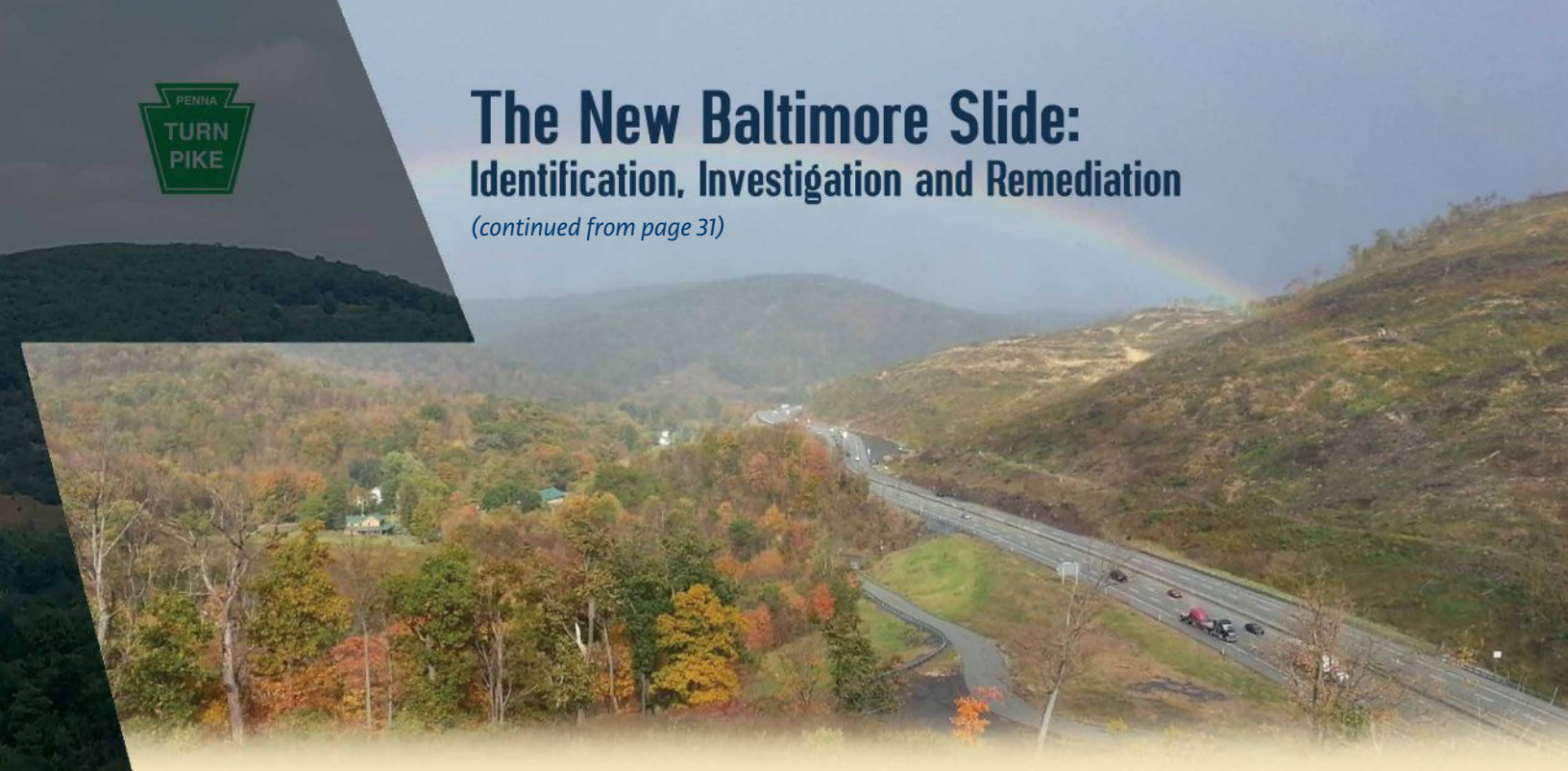
The PTC continued to measure and monitor the slide through the years to ensure the safety of the traveling public. Turnpike maintenance personnel performed roadway repairs annually on the roadway and shoulder at the base of the slide as the mass moved and caused pavement upheaval.

In 1999, serious subsurface investigations were conducted by American Geotechnical and Environmental Services, Inc., (AGES) to assess pore water pressures at different depths and also to determine the location of the slide's failure plane. These subsurface investigations included more than 30 borings, the installation of eight slope inclinometers, 15 piezometers and 11 Time Domain Reflectometry (TDR) cables.

(continued on page 33)

The New Baltimore Slide:
Identification, Investigation and Remediation

(continued from page 31)



For years, it was determined that long-term maintenance was more cost effective than remediation until the $180 million Total Reconstruction and Widening Project was approved for the Turnpike from MP 124 to MP 133.5 in Somerset and Bedford Counties. The scope of the project is to completely reconstruct the roadway, widen it to six lanes with a 26-foot median, eliminate most curves that exceed three degrees, address geotechnical issues at the slide by excavating below the failure plane and replace all of the overhead bridges.

Stahl Sheaffer Engineering began providing construction management services to the Pennsylvania Turnpike Commission for the remediation project at the beginning of 2013. The early involvement of Stahl Sheaffer personnel enabled the firm to facilitate on-site activities, such as test blast studies and the implementation of a robotic total station laser surveying system. This system provides continuous 24-hour monitoring of the slide, providing real-time coordinates of over 80 permanent prism locations on the slide, before and during construction. Stahl Sheaffer is responsible for viewing the information on a daily basis. After construction is complete, this monitoring system will remain in place with 10 strategically located prisms.

Remediation: Blasting, Mass Excavation, Recycled Backfill and Reclamation

After several years of carefully considered design, construction of the New Baltimore Slide Remediation began in 2015 with a seven-stage construction sequence. The Turnpike is being widened and will consist of six travel lanes (three westbound and three eastbound) with a 26-foot median, and 12-foot outside shoulders. The initial project approach was featured in the summer 2014 edition of the *scanner*. It was designed by Johnson, Mirmiran & Thompson, Inc., and AGES and managed by KCI Technologies.

Stages one to three and five to seven are for the purpose of safely moving traffic away from the work area and providing a work zone and access for the project. Stage four is for mass excavation, which is being performed by Independence Excavating. Remediation of the New Baltimore Slide will require 2.1M yards3 of excavation. An additional 1.6M yards3 of excavation are required for an adjacent cut slope. This slope is being modified to realign an existing four-degree curve to a three-degree curve, which will bring it into compliance with current Turnpike design criteria and facilitate the Turnpike's widening to six lanes.

The construction sequencing of the slide remediation consists of 26 phases in a top-down manner. Each phase or slot is 75 feet wide, and the idea is to "flip flop" the excavated material on top of the previous sequence where the slide plane has been removed. Each sequence is an orchestration of blasting, excavation, benching, backfilling and grading.

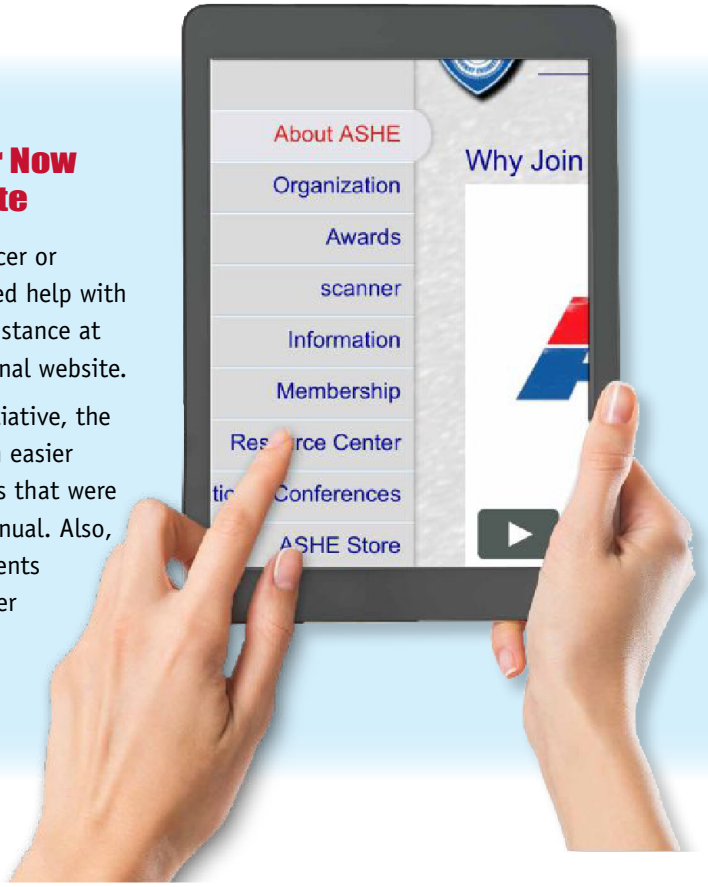
In addition to monitoring and inspection services, Stahl Sheaffer is providing design and schedule review, shop drawing and submittal review, third surveying, geotechnical engineering and environmental and safety monitoring.

The project is scheduled to be completed in November 2016—nine months ahead of schedule!

Convenient Resource Center Now Available on ashe.pro Website

Are you a National, Region or Section officer or director in search of a form, or do you need help with an ASHE procedure? Now you can find assistance at the Resource Center on the ashe.pro national website.

In response to an ASHE strategic plan initiative, the Resource Center was created to provide an easier way to find guidance documents and forms that were formerly found in the ASHE Operations Manual. Also, as part of this initiative, all of the documents and forms contained in the Resource Center were updated in accordance with current operating procedures.



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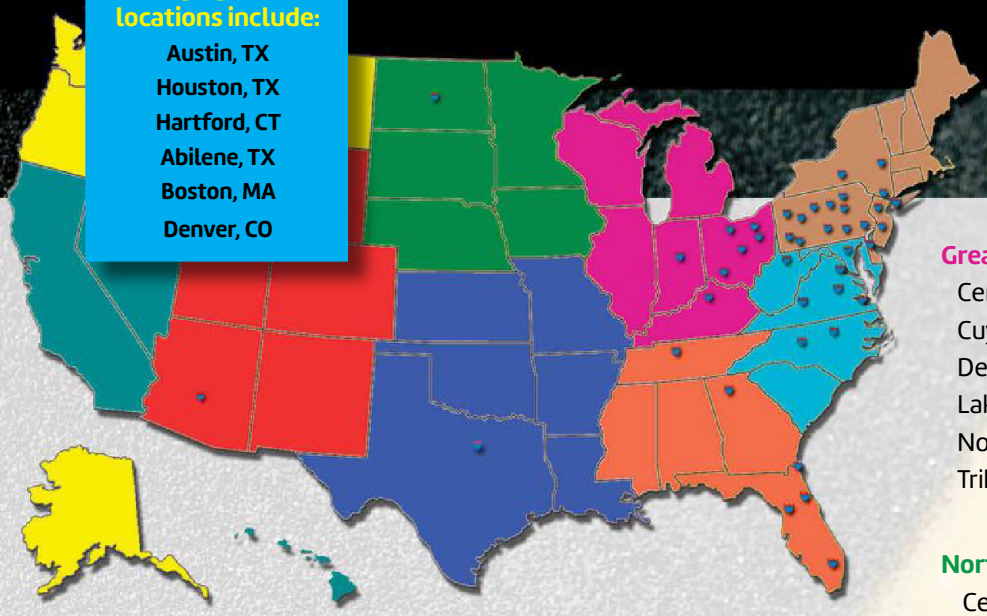

Northeast Region

Albany	117
Altoona	205
Central New York	49
Clearfield	155
Delaware Valley	398
East Penn	78
First State	141
Franklin	145
Harrisburg	356
Long Island	45
Mid-Allegheny	132
New York Metro	86
North Central New Jersey	166
North East Penn	124
Pittsburgh	582
Southern New Jersey	180
Southwest Penn	302
Williamsport	129
Subtotal	**3,390**

Mid-Atlantic Region

Blue Ridge	88
Carolina Piedmont	58
Carolina Triangle	241
Chesapeake	207
Greater Hampton Roads	141
North Central West Virginia	37
Old Dominion	103
Potomac	215
Subtotal	**1,090**

Southeast Region

Central Florida	48
Georgia	391
Gold Coast	11
Middle Tennessee	282
Northeast Florida	212
Tampa Bay	97
Subtotal	**1,041**

Great Lakes Region

Central Ohio	190
Cuyahoga Valley	123
Derby City	87
Lake Erie	146
Northwest Ohio	42
Triko Valley	173
Subtotal	**761**

North Central Region

Central Dacotah	123
Subtotal	**123**

Rocky Mountain Region

Phoenix Sonoran	146
Subtotal	**146**

South Central Region

Dallas-Fort Worth	80
Subtotal	**80**

Other Memberships

Domestic At-Large	13
International At-Large	2
Subtotal	**15**

National Total	**6,646**
Professional Status	58%
Government	13%
Consultant	69%
Contractor	5%
Other	13%

Want to join and don't see a Section near you? Become an At-Large Member or visit our website to see how to start a new Section. www.ashe.pro