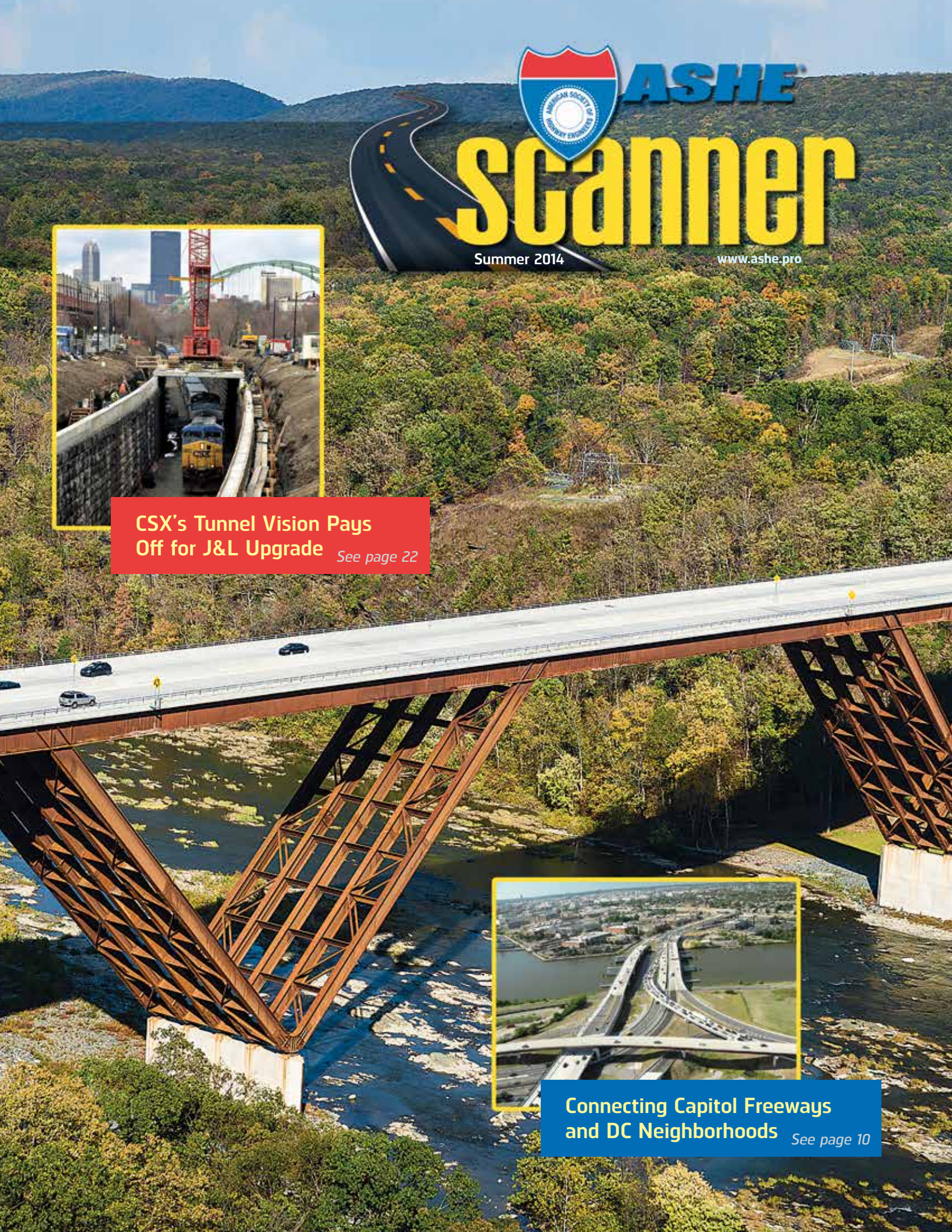
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CSX's Tunnel Vision Pays Off for J&L Upgrade
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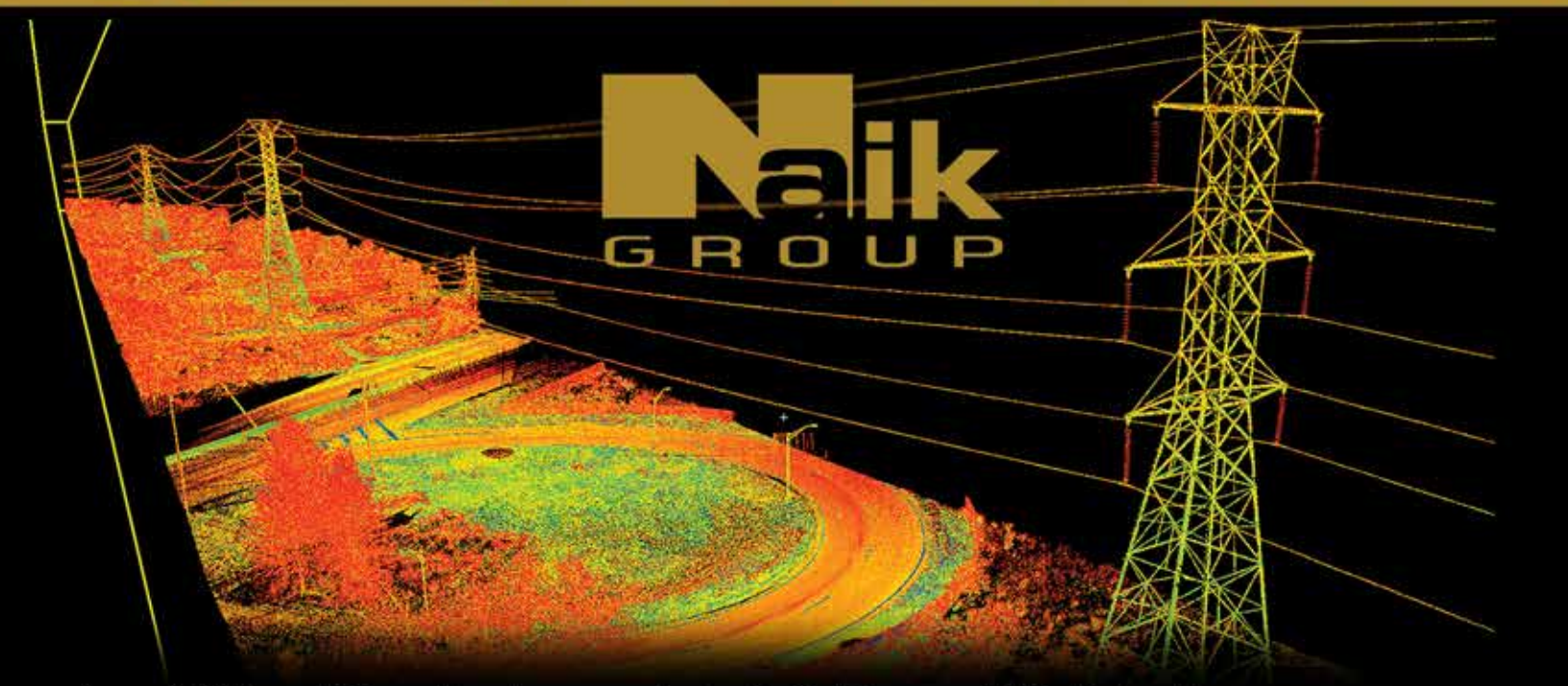

- Survey & ROW
- Highways
- Bridges
- 3D Laser Scanning
- Traffic / Electrical / ITS
- Transit
- Design-Build / P3
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- Utility Engineering
- Construction Management & Inspection
- Building Information Management (BIM)



Congratulations to our Senior Vice President, Samir D. Mody, PE for being elected ASHE's 54th National President.

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MISSION

Provide a forum for members and partners of the highway industry to promote a safe, efficient and sustainable highway system through education, innovation and fellowship.

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Samir Mody, PE
ASHE National President 2014-2015

New Directions

I hope this issue of the SCANNER finds everyone in an energetic mood as we approach warmer weather after a challenging winter season.

It is a privilege to have been elected as your 54th ASHE National President. I am truly honored and humbled to join the distinguished list of National Presidents and industry leaders who have preceded me to lead this outstanding organization. I am also grateful for the confidence and encouragement received from the ASHE membership, my former "Region 6" colleagues, the Naik Consulting Group and my family as I embark on this incredible journey. ASHE provided the foundation for my becoming a professional engineer, and has fostered many of the most rewarding relationships in my life, both personal and professional. This distinction is one of the biggest achievements of my career, and I pledge to serve you to the best of my ability.

My introduction to ASHE began in December 1985 when I, a young civil engineer with the NJ Department of Transportation, attended an "informal" Southern New Jersey (SNJ) Section membership meeting and was "hooked." It is through the idealities of that young civil engineer that for the next 27 years I served the organization at the Section, Region and National levels in various capacities that have led me to stand here now, ready to lead and serve the next generation of engineers through ASHE. The success of the SNJ Section golf outing during my tenure as chairman raised in excess of $125,000 in scholarship money that was distributed to civil engineering students attending local universities, and it is one of my proudest achievements.

For the past two years, I have had the opportunity and honor to serve on the Executive Board under the leadership of National Presidents Frank O'Hare and Thomas Morisi, and Past National Presidents Calvin Leggett, David Jones and Charles Flowe, who were all instrumental in preparing me for the challenges, expectations and commitment associated with serving in this capacity. This was further reinforced by President Morisi in soliciting ideas from the First and Second Vice Presidents, in the collaboration of a three-year plan commencing in 2013 to provide the organization with a cohesive and stable leadership. The three of us maintained open communication lines over the past year, and we are proud of the accomplishments and legacy realized under his tenure.

As a volunteer-based organization, it is important to be open to seeing the potential in different members as they offer their commitment to serve the organization. As I assessed the assignment of committee chairs for the upcoming calendar year, I made a concerted effort to balance the responsibilities of the National Board of Directors and integrate "future leaders" who expressed a desire to become more involved at the National Board level. I have seen firsthand where an organization, open to the ideals of many, can make a significant contribution to the highway industry when we all work together in a well-orchestrated, collaborative fashion toward the preservation of the vision, mission and values of ASHE.

During the coming year, I would like to build on the momentum created by my predecessors and focus our energy and allocation of resources with the following strategies:

Challenges of the Organization. In an effort to prepare ASHE to meet the challenges of the future, the National Executive Board conducted a SWOT

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In This Issue

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on the cover

Bridging Aesthetics with Practicality

ASHE North Central West Virginia

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From the Editor's Laptop

Winter has finally ended for the eastern part of the country, as TNT Graphics puts the final touches on the summer SCANNER. Many of you will receive your issue by mid-June and, as in the last issue. there are many excellent articles. I hope you enjoy reading your issue.

The staff would like to thank the many contributing editors, and again in this issue, we have 36 pages with many short articles for "As The World Turns" and a lesser number for the "MileMarkers," which is an area that our Sections need to give particular additional attention for our upcoming issues.

As the Managing Editor, I made a decision to keep this issue at 36 pages and hold three articles for the fall issue. This was a difficult choice, as all of the articles are excellent and, ultimately, we chose articles that were not time sensitive. This is a great problem to have, and I hope the trend continues.

Coming soon will be the option to receive an electronic issue versus the mailed issue. We're still working out the details, but hopefully, within the next two to three issues, this will be an available option for you.

I want to ask all of our membership and the Section secretaries to assist our staff by updating your membership database. We still get many nondeliverable issues, although many less than we did two years ago, which costs our organization additional money for each returned issue. To update your data base, go to www.database.ashe.pro and enter your eight-digit personnel ID number located on the mailing label, which doesn't change as long as you are a member. Your initial password is the zip code (including the dash, if it is a nine-digit code) also on the mailing label. CHANGE YOUR PASSWORD AFTER YOUR INITIAL LOGIN TO ENSURE THE SECURITY OF YOUR DATA. This will take you five minutes, but it will save our staff and the Society time and money.

As always, comments, corrections and/or suggestions can be sent to me at jlhetrick12@gmail.com.

John Hetrick P.E.

Factory Street Reconstruction: Preliminary Design

by Stephen J. Rutkey, PE, AECOM, **ASHE Albany Section**

In a 1907 advertisement in the *Municipal Journal and Engineer*, the City of Watertown, seat of Jefferson County in the northwestern corner of New York State, requested sealed proposals for paving portions of Factory Street: "bids will be received for each of the following kinds of pavement: with sheet asphalt pavement on concrete base; with bitulithic pavement with trap rock surface; with wood block pavement on concrete base; with Medina block pavement on concrete base."

Even the founding fathers of ASHE would have had trouble in their day recalling these now-bygone pavements, but at the turn of the 20th century they represented a combination of established and innovative options. Named for a village just across Lake Ontario from Watertown, its large sandstone deposits discovered during excavation of the Erie Canal, Medina block was in wide use as a paving stone by 1907. But the bitulithic pavement was a new, proprietary method and represented early hot-mix asphalt pavement. The inventor, Frederick J. Warren of Boston, Massachusetts, did, in effect, patent asphalt concrete, the asphalt binder, the construction of asphalt concrete-surfaced roads, and the overlaying of existing streets[1]. All the pavements seemed to be in hearty competition for the affections of travelers and the municipal contracts of the day, and it is refreshing to note Watertown's openness to using such diverse treatments.

When Factory Street (NY Route 283) is reconstructed in an $8.7 million locally administered federal aid project beginning in 2015, it is possible that some remnant of these early pavements will be found. Following New York State Department of Transportation (NYSDOT) standards, the proposed pavement will place seven inches total thickness of Superpave HMA 70-Series Compaction top, binder and base courses over four inches of asphalt-treated permeable base course and 12 inches of stone sub base.

Although the early 20th-century pavement design had to consider comfort and friction for the traffic of horse-drawn carriages, in addition to the first automobiles, the present project is planned for a design-year AADT of over 15,000 vehicles with seven percent heavy trucks. Interestingly, horse-drawn traffic remains a consideration; the area has an Amish population, and it is not uncommon to see a buggy traveling on Factory Street to visit a local business.

As its name implies, Factory Street is a longstanding industrial corridor. Knowlton Technologies, founded in 1808 and the oldest paper mill in continuous operation in the United States, anchors the west end of the project, drawing hydroelectric power from a flume of the turbulent Black River, which parallels Factory Street to the north. A block away, Morrison's Furniture has been in business for more than 90 years. Until the 1970s, a track of the New York Central and Hudson River Railroad Company ran down the center of Factory Street to a large rail

1 www.pavementinteractive.org research of U.S. Patent Office

yard and depot. Zoning changes enacted by the city in 2012 protect the longstanding heavy industry —but shift focus for the rest of the corridor from light industry to a mix of "downtown," commercial and neighborhood businesses—in line with the new vision of the project design.

Recent major projects in Watertown have renovated nearby State Street and Public Square; the Factory Street project will continue the visual themes of those projects while making substantial upgrades to infrastructure, including certain improvements that will be 100 percent funded by the city.

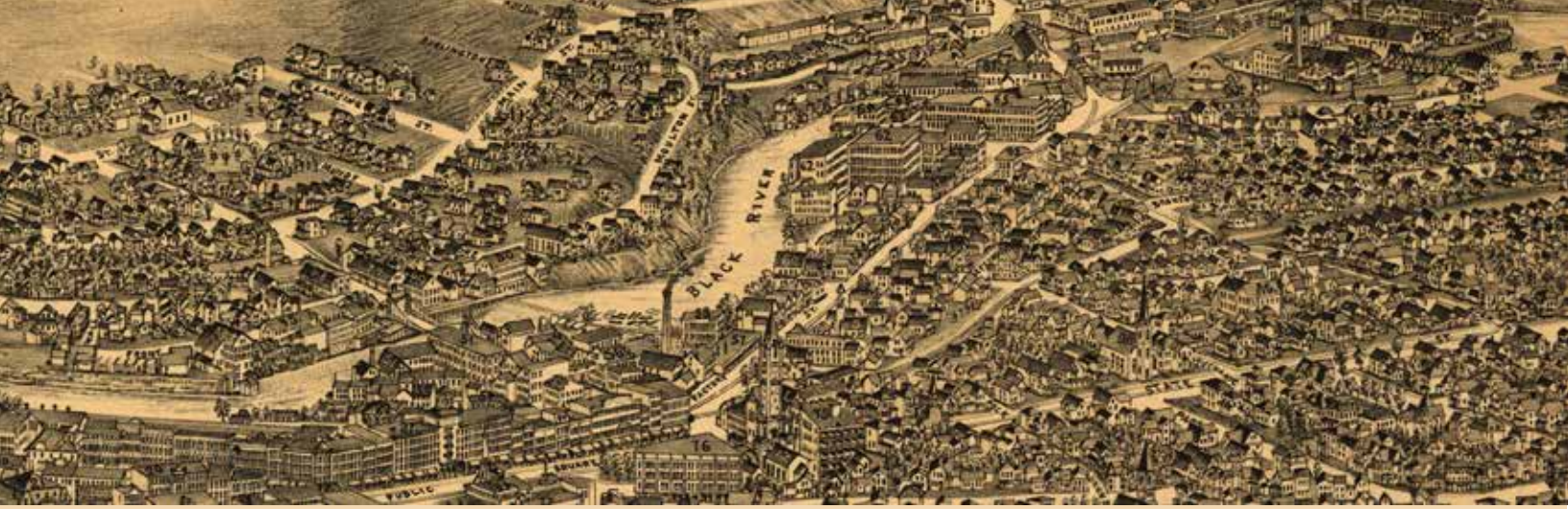
AECOM (Albany, NY) is the lead designer for the project, which will provide a new separate storm drainage system, eliminating combined sewer overflows to the Black River; rehabilitate a 24-inch interceptor sewer by cured-in-place lining and replace a 12-inch sanitary sewer by direct excavation; upgrade and replace water mains; reconstruct all pavement, curbs and sidewalks; and provide accessible sidewalks and sidewalk ramps throughout.

The project will also eliminate intersection slip ramps to reduce pedestrian crossing lengths; provide bicycle accommodation through the project and connecting links to public parks and trails at either end consistent with the city's planning vision; improve signals, signal timing, turning lanes and geometry, and provide signal interconnection to reduce delays through the corridor; provide water quality treatment of storm water; and introduce green space and street trees, among other improvements.

The Preliminary Design (NYSDOT Project Phases I-IV), completed when Design Approval was granted in January 2014, posed several challenges. A Quality Level "B" (QLB) survey by Underground Imaging Technologies was used to augment the ground survey and right-of-way mapping by Popli Design Group (PDG), and to scan—using Ground-Penetrating Radar—for possible sidewalk vaults or underground storage tanks (USTs) that might encumber the design, particularly the routing of a new storm drainage outfall to the Black River. An architectural survey by Timothy J. Abel, PhD, documented the four National Register of Historic Places-Eligible Structures and one National Register-Listed historic district along the project. A Hazardous Waste/Contaminated Materials assessment and soil sampling by PDG identified the several locations along the project where excavations risk encountering hazardous or nonhazardous contaminated soils. AECOM's ecologist documented the potential habitat of the endangered Indiana bat which has a known hibernaculum in caves along the river not far from the site and the newly listed Northern long-eared bat. And 53 parcels of right-of-way—a combination of Fee, permanent easements and temporary easements—needed to be acquired.

Every step of project development has been taken cooperatively with the city engineering department, other city departments and the NYSDOT regional office. The city has provided traffic count information, sewer video inspections, soil borings and pavement cores (by CME Associates, Inc.), record plans, GIS mapping and property owner outreach, among other support, to the design team.

During the now-underway Final Design phase, a complete, feature-enabled digital terrain model of the proposed final surface will be created in Bentley InRoads. All existing and proposed utilities will be 3D-modeled for conflict resolution; the highway lighting system will be modeled using Visual™; the traffic signals will be optimized using Synchro/



Excerpt from 1891 Lithograph by J.C. Kimball, Watertown, NY

SimTraffic 8; a Quality Level "A" survey will be used to obtain utility depth information at crucial locations; and the team will design the crossing of a 36-inch storm sewer directionally drilled beneath a stone-walled utility tunnel and through the four-foot-thick concrete abutment of an adjacent 1933-built bridge. The multi-office, multi-discipline design team is using a 100 percent paperless filing system and Trello collaboration software to track assignments, delegate responsibilities and reduce email clutter.

It's hard to fathom what type of pavement—if any!—the engineer of 100 years from now might specify for Factory Street; perhaps finding this ancient article in the *ASHE SCANNER* will be cause for some amusement about the outdated descriptions. But, for today, it is with pride that we anticipate the completion of this project and the many benefits it will bring to the residents, business owners and traveling public in Watertown.

City of Watertown: Jeffrey E. Graham, Mayor; Kurt W. Hauk, PE, City Engineer
NYS Department of Transportation: Joan McDonald, Commissioner; Nancy Catalina, Regional Local Project Liaison

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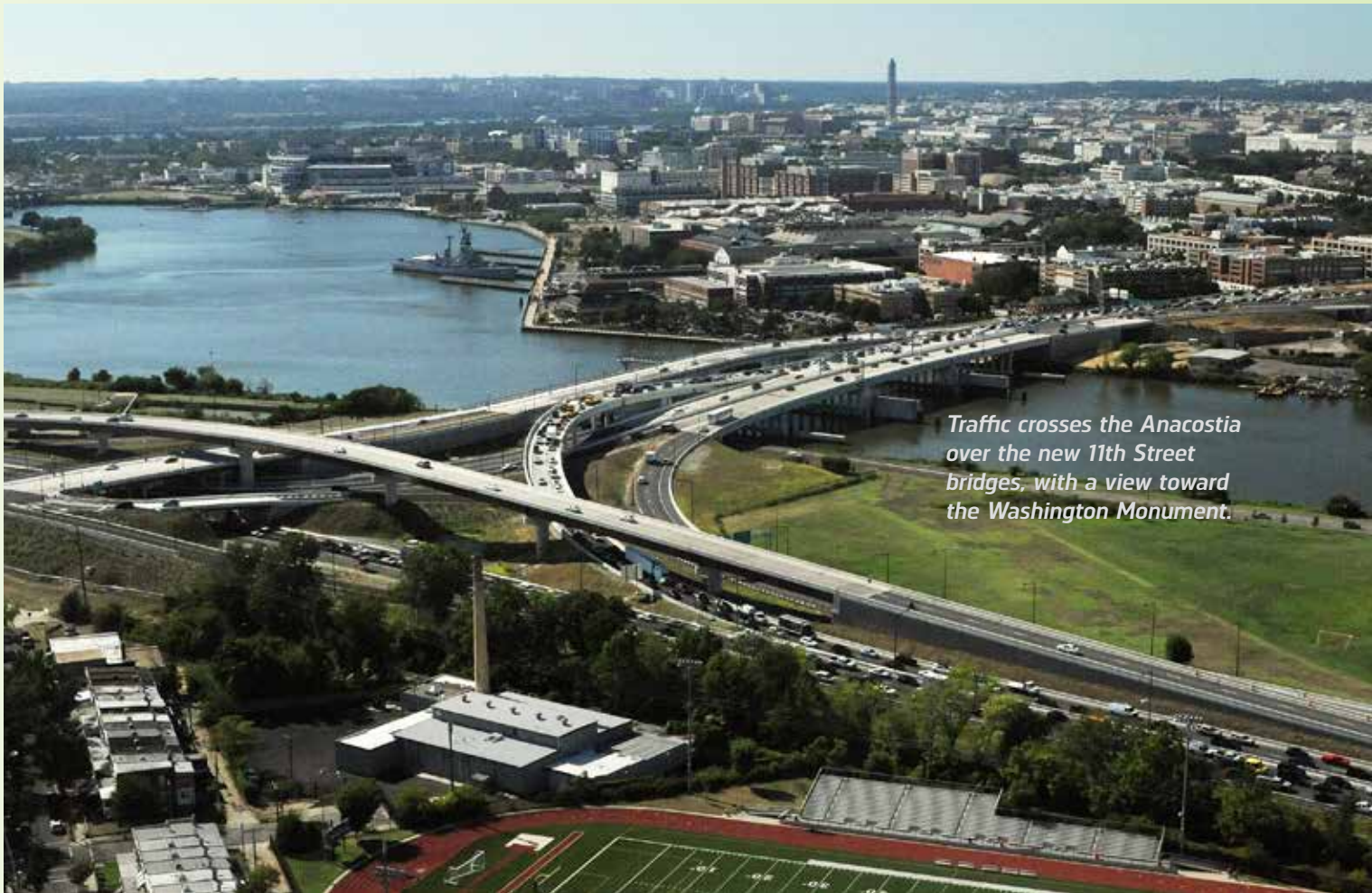
11th Street Bridges: Connecting Capitol Freeways and DC Neighborhoods

by Michael Blair, PE. Johnson, Mirmiran & Thompson, Inc., Sparks, MD, **ASHE Chesapeake Section**

The history of bridges at 11th Street, SE, over the Anacostia River, adjacent to the Washington Navy Yard and approximately one mile from Capitol Hill in the District of Columbia, dates back nearly 200 years. The most recent 11th Street bridges, built in the 1960s, handled extensive traffic. Unfortunately, unfinished roadway connections at this location prevented direct access between the Southeast Freeway (I-695) and the northern segment of the Anacostia Freeway (DC 295/I-295), forcing thousands of commuters to divert onto local roads to travel between freeway segments. The District Department of Transportation (DDOT) sought a solution that would complete all freeway connections and replace structurally deficient bridges along the 11th Street corridor between the Southeast and Anacostia Freeways, providing maximum accessibility while separating local traffic from regional traffic. With innovative elements and creative approaches, this challenge was met.

The original engineer's estimate to complete the project was $460 million. Due to budgetary constraints, DDOT undertook a $260 million Design-Build-to-Budget Stipulated Sum procurement with a challenge of seeking "best value," engaging firms to build a facility while providing as much functional improvement as possible for this sum. The key to this challenge was maximizing construction of crucial project elements, including rehabilitation or replacement of existing bridges and providing interchange connectivity. The Design-Build team of Skanska/Facchina JV (contractor) and Johnson, Mirmiran & Thompson (JMT—lead designer) was selected to provide three



Traffic crosses the Anacostia over the new 11th Street bridges, with a view toward the Washington Monument.

Phase 1 is open to traffic. The 16-foot-wide, multi-use trail/sidewalk and overlooks are evident in the left-most bridge.

new bridges over the Anacostia River and build approximately 75 percent of the ultimate project, known as Phase 1. The team refined the planning document alignments and interchanges to reduce environmental and community impacts and to save substantial construction costs through numerous Alternative Technical Concepts.

This project, the largest construction job in DDOT history, includes better regional connections as well as easier accessibility to DC neighborhoods, not only by adding bridges to connect the freeways, but also by adding a dedicated bridge for local traffic. Primary structures include three new major continuous steel multi-girder bridge crossings of the Anacostia River and a complex interchange on each side of the river. In addition to new construction, several existing bridges have been rehabilitated for use in the new interchanges.

By redesigning the geometric layouts of both interchanges, the team was able to provide shorter grade-separated bridges with embankment fill over reinforced ground, in lieu of flyover bridges. This approach reduced costs significantly, while still providing the functional requirements of the approved environmental documents.

A large portion of the project on the south side of the river was to be constructed over poor material that had been placed as fill on the south bank in the 1920s, creating what is now National Park Service land. The proposed construction, which included large approach embankments, would result in significant settlement of up to a few feet. Several innovative ground improvement methods, including lightweight aggregate, geofoam block (read more about geofoam on page 32), geosteel columns and geoconcrete columns, were successfully implemented to mitigate settlement and global stability issues.

A key design element was a smooth and minimally impactive maintenance of traffic strategy. As a major commuter route within the nation's capital, this project not only impacts hundreds of thousands of commuters every day, but is also part of a major emergency access route. With this in mind, the design and sequencing of construction allowed for approximately 70 percent of the project to be constructed offline with minimal impact to the existing roadway. Generally, regional traffic was moved from existing alignments to final alignments with one traffic shift. Temporary roadways and detours were typically used only for local movements. The design and sequencing was accomplished with minimal phases and constructed in significantly less time than specified in the original planning documents.

Benefits to the community were key objectives on the 11th Street project. The mere act of removing through traffic from neighborhoods was essential. The local traffic bridge provided a new way to link the two sides of the river, uniting DC communities. This bridge included a 16-foot-wide, multi-use trail/sidewalk, as well as overlooks that have already become popular for their excellent vantage points during river recreational events.

The roadway was designed with provisions for full multi-modal use. Accommodations have been incorporated into the design for DC's new streetcar system to be extended across the local bridge. The 11th Street thoroughfare was designed and constructed to accommodate a simple retrofit to provide two track lines.

JMT's five-person Environmental Compliance (EC) team developed the project Environmental Compliance Plan and subsequent updates and obtained all environmental permits and/or permit updates, including Section 404 and 401, Rivers & Harbors Act Section 10, NPDES, US Coast Guard permits and National Park Service Use Permits. Additionally, the EC team researched anadromous fish migration in the Anacostia River in order to avoid wildlife impacts during the installation of river bridge cylinder piles.

With Phase 1 now open to traffic, the 11th Street project connects the freeways, separates access for local traffic, enables better accessibility to DC neighborhoods, enhances safety and quality of life for residents and improves regional connections with new traffic movements. All work was completed while maintaining full environmental compliance throughout construction over a major waterway.

DDOT elected to continue with Skanska/Facchina/JMT for Phase 2 to complete the project, which is scheduled for 2015. All told, the team has saved DDOT more than $80 million compared to the engineer's estimate.

 (continued from page 3)

(Strengths, Weaknesses, Opportunities and Threats) analysis in January 2014, to reflect on ASHE in its entirety and decide what changes are needed to make us a viable organization for years to come. The action items derived from this productive exercise will be addressed by the current Board and integrated into our Strategic Plan, including:

- Produce a fully interactive, electronic version of the SCANNER.
- Develop an Internal Communications Plan, including but not limited to:
  - –a written plan for communication between National, Regions and Sections
  - –improved internal communications
- Develop a Leadership Training Program at the National level and provide a model/guidance for a Leadership Training Program at the Regions and Sections levels.
- Foster development of Chair Responsibilities for inclusion in the Operations Manual (OM).
- Review governance model at the National level.
- Update the Operations Manual; a workshop will be conducted in the third quarter to align all of our governing documents with the OM.
- Expand professional development education at National, Sections and Regions levels.

We will once again enlist your participation to work with the Board and develop a plan to execute each of these important Actions within the timelines now being established.

Expand and Retain Membership Strength and Viability.
At the time of this publication, the organization is composed of 6,368 members. Given the economic climate of the highway industry over the past few years, our membership has remained predominantly stagnant. In order to continue to lead the industry, it is imperative that we use our resources from the New Sections, Partnerships, At-Large Membership and Public Relations committees to stimulate common dialogue, strength and viability to increase our chances for success. We need to be collectively committed to continue exploring ways in which our strategic alliances will strengthen our exposure, membership base and voice on political matters. All these organizations are geographically positioned where ASHE is minimally represented. Startup initiatives continue to be promising in Denver, CO, Portland, OR and Beaumont, TX.

Strengthening our Regional Organization. The Regional Oversight Committee (ROC) will continue their efforts on implementing an effective communication plan to facilitate open dialogue between the National, Regions and Sections levels, coupled with sharing best practices at all levels.

Promote Educational and Technology Transfer. A new committee was formed this year to establish a vision and expand our use of technology to improve our internal and external communication needs. The website and cloud subcommittees have been rolled into this organization.

Public Relations. The committee will draw upon the ASHE brand and the tireless efforts of former chair Sandy Ivory to focus on the following goals and objectives for the upcoming year:

1. Increase National membership by adding marketing materials and increasing communication among National, Regions and Sections through local and national partnerships;
2. Standardize materials and make them more accessible to all Regions/Sections by sharing via the Cloud, educating through a new rollout campaign and consistency through designating a PR Representative from each Region;
3. Increase brand awareness nationwide through highlighting member benefits via our campaign and partnership with other organizations;
4. Enhance social media and electronic presence through LinkedIn, Facebook, YouTube and Twitter and utilize PR representative from each Region to form a social media committee to keep content up to date; the goal is to post Section, Regional and National news and make connections with other organizations.

In order to visit all six Regions during my tenure as President, here is a snapshot of our Executive/National Board meeting calendar for the coming year: June, 2014 (North Central Region— Bismarck, ND); August, 2014 (Northeast Region—Atlantic City, NJ); October, 2014 (Great Lakes Region —Toledo, OH); January, 2015 (Southeast Region—Nashville, TN); April, 2015 (Rocky Mountain Region—Denver, CO); and May, 2015 (Mid-Atlantic Region—Baltimore, MD).

I am excited, eager and ready to lead this organization by working together with ALL of ASHE to tackle the challenges that lie ahead. I believe it is critical to our overall success to understand and to know all of the Sections and Regions that comprise the whole. I will be traveling and visiting as many of you as I can. ASHE as a whole entity, not individual parts, needs to be the focus of our success so that the next young engineer who attends an "informal" ASHE meeting can be our future.

The unique shape of the new delta-frame Shenandoah River Bridge strikes a pose worthy of its picturesque West Virginia surroundings. Equally attractive is the $8 million that the West Virginia Division of Highways (WVDOH) saved, thanks to a creative design solution.

The new Shenandoah River Bridge is part of a project to transform West Virginia 9 in historic and scenic Jefferson County into a four-lane divided highway. Just 58 miles from the Washington, DC, Beltway, and less than 40 miles from Dulles International Airport, Jefferson County is a prime getaway destination for people living in the Washington and Baltimore metro areas. In addition to being the most visited county in the state, Jefferson County is seeing significant commercial and residential growth.

The highest-ranked priority in the West Virginia eastern panhandle transportation improvement plan was a five-mile section of WV9 between Charles Town, WV, and the Virginia state line, which includes a crossing of the Shenandoah River valley. The valley is both wide and deep, creating a proposed profile grade nearly 200 feet above the river and an overall bridge length of almost 1,800 feet.

A bridge made up of a main unit with a three-span continuous deck truss (400 feet – 600 feet – 400 feet) with short plate-girder approach units initially was advanced through the design process. During review of the proposed design, it became apparent that other alternatives might be more cost effective. The fracture-critical nature of the proposed truss presented additional cause to consider making a design change. The August 2007 collapse of the I-35W deck truss bridge in Minnesota occurred relatively late in the Shenandoah truss design process, and was followed by an increased scrutiny within the industry of the gusset plates used in truss construction.

In early October 2009, WVDOH changed the project from a traditional design-bid-build process to a design-build letting and invited contractors to bid either the as-designed truss or develop and bid a different structure type. Any proposed alternatives were required to accommodate several design limitations, primarily aimed at compliance with existing environmental commitments and previously established parameters for alignment (horizontal and vertical) and substructure location. As a result, the main span still needed to be approximately 600 feet.

Following a December 2009 letting, WVDOH selected Trumbull Corporation as the design-build contractor, with HDR serving as Trumbull's design consultant. The project team evaluated both concrete and steel alternatives before ultimately determining that a steel delta frame design met all of the owner's criteria while providing significant savings over more traditional bridge types.

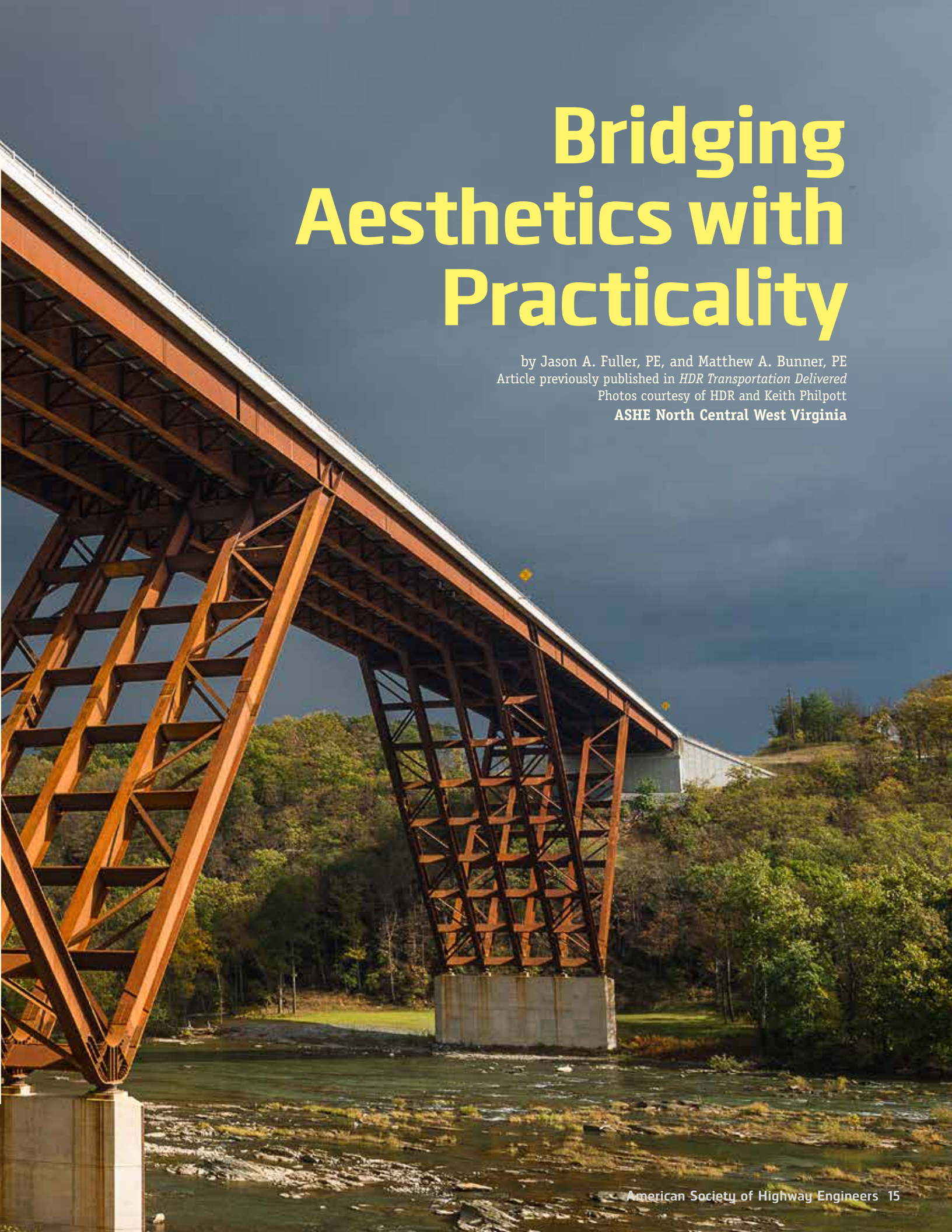
The Delta Difference

HDR and Trumbull performed preliminary design on both concrete and steel options, but the anticipated construction costs for concrete were much greater than for steel. There was enough of a difference that it became obvious that steel would be more economical, so the preliminary design of the concrete alternative was set aside. For the steel evaluation, it was understood that deck configuration and cost would be similar for all of the bridge types. The differences in cost, therefore, would be driven by the amount of steel, unit cost of fabrication and erection cost.

Based on a database of past projects, the team believed that a steel plate girder bridge with span lengths similar to the originally proposed truss (400 feet – 600 feet – 400 feet) would result in approximately 145 pounds per square foot (PSF) of structural steel, or approximately 50 percent more steel than the truss.

From a superstructure perspective, the overall length of the main unit would have been ideal for a traditional five-span steel plate girder unit with span lengths of 250 feet – 300 feet – 300 feet – 300 feet – 250 feet. Such a unit would likely only result in approximately 60 PSF of structural steel; however, the design constraints did not allow for additional piers.

While investigating the possible plate-girder arrangements, the team determined that the ideal five-span plate girder option actually could be achieved if supports for the girders were provided 150 feet to either side of the existing river pier locations. The supports, envisioned to be steel slant legs at each girder line, could be inclined and meet at the existing river pier locations. With 200 feet vertically from the profile grade to the river, the



Bridging Aesthetics with Practicality

by Jason A. Fuller, PE, and Matthew A. Bunner, PE

Article previously published in *HDR Transportation Delivered*
Photos courtesy of HDR and Keith Philpott

ASHE North Central West Virginia

supports could be inclined as much as 45 degrees and still remain above the required river flood elevation (there was no requirement for navigational clearance).

This configuration of steel rigid frame is known as a delta frame, due to its unique triangular appearance. The delta frame design produced 110 PSF of structural steel, which was slightly above the original truss weight, but facilitated significant fabrication cost savings. This fabrication cost savings, along with other cost-effective options, offered a savings of about $8 million compared to the other bidders.

The Final Design

The steel superstructure of the new Shenandoah River Bridge consists of a five-girder, four-substringer system supported by five lines of delta legs—one for each girder. Each individual leg covers a vertical distance of 150 feet and a horizontal distance of 150 feet, creating a girder span of 300 feet between the delta legs. The spans between the abutments and piers are 400 feet – 600 feet – 400 feet.

Relatively few rigid steel frames have been constructed over the past several decades. Both slant-leg frames and, to a lesser degree, delta frames were used more extensively during the 1960s and 1970s. The singular nature of the bridge design meant there were no directly applicable design codes for portions of the structure, so the team established tailored design checks. Designers developed a finite element analysis of the erection procedure so each of the 207 steps could be examined individually, and so the temporary works and permanent steel framing could be assessed as a system to provide stability to the structure until completed. The detailed erection plan had to account for the nearly 200-foot height of the bridge, the unique procedures for erecting the delta legs, tall temporary works, a small site footprint, fluctuating river levels and other challenging site conditions.

The final plans even included a future re-decking scheme, which was analyzed to ensure its viability. After consideration of changes to the dead load as a result of removing portions of the deck, the re-decking scheme involves removing and replacing an outside third of the deck, replacing the other outside third, then the middle third. Traffic lanes will be restricted and temporary barriers used.

The Finished Product

The new Shenandoah River Bridge is in aesthetic harmony with its surroundings. The project exists within a unique ecosystem where the scenic Shenandoah River

is bounded by steeply rising wooded mountains, providing picturesque locations for canoeing, rafting, fishing and wildlife viewing. For the bridge to gracefully integrate into these surroundings, it must complement rather than overpower them. The shallow plate-girder superstructure is only 10 feet deep, which, when compared to truss options (which varied from 40 to 80 feet deep) and other options such as segmental concrete (which would be nearly 35 feet deep near the piers), is much less obtrusive.

The triangular shape of the delta frame, one of the most basic structural forms, yields a sense of stability and strength, of simplicity and functionality. The earth-tone reddish-brown color of the weathering steel blends with the natural colors of the valley and is bounded and complemented by the natural concrete color of the deck and barriers as well as the piers and abutments.

The Shenandoah River Bridge opened in November 2012 and now ranks as one of the longest delta frame bridges ever constructed.

For more information, contact Jason.Fuller@hdrinc.com.

In our spring 2014 edition, an incorrectly inserted photo was placed on page 30 in the article titled "Innovation in a Roundabout Way—Project of the Year Winner: Under $3 Million in Construction Costs." Here is the photo that should have appeared in the article showing the intersection prior to construction of the roundabout, taken from another view angle. We sincerely apologize for this error.

As The World Turns

ASHE Members on the Move!

Johnson, Mirmiran, & Thompson, Inc.

Promotion for Jeffrey B. Minnix, PE

Jeffrey B. Minnix, PE, was promoted to Vice President in the Virginia Beach, VA, office of Johnson, Mirmiran, & Thompson. Mr. Minnix has more than 34 years of experience in traffic and transportation planning, engineering, design, construction engineering and inspection and operations and maintenance. His background also includes more than 25 years of experience implementing Intelligent Transportation Systems solutions for various state and municipal Departments of Transportation.

He serves as the Quality Assurance Manager for the Elizabeth River Tunnels Project in Norfolk and Portsmouth, VA, a $2.1 billion Public-Private Partnership project between Elizabeth River Crossings and the Virginia Department of Transportation. The project includes fabrication and placement of a new tunnel adjacent to the existing Midtown Tunnel under the Elizabeth River between the cities of Portsmouth and Norfolk; extension of the Martin Luther King Expressway through Portsmouth and connecting to I-264 at a new interchange; and rehabilitations and upgrades to the existing Midtown and Downtown Tunnels.

Mr. Minnix has worked on numerous projects for the Virginia Department of Transportation, many of the municipalities in and around the Hampton Roads region of Virginia, as well as with the U.S. Army Corps of Engineers and the Naval Facilities Engineering Command. He has also worked on a variety of projects throughout the country, including planning, design and construction administration for a large portion of the Advanced Traffic Management System in the Hampton Roads area of Virginia; management of the design for replacement of the River Terrace Vehicular Bridge and East Approach Ramp at the Pentagon; management of multiple task-order contracts with VDOT related to planning and design of Traffic Control Devices and ITS in all areas of the state; and management of the design for the replacement of the existing bridge with a five-lane double bascule bridge at the Atlantic Intracoastal Waterway Bridge at Great Bridge, Chesapeake, VA.

Mr. Minnix is a Registered Professional Engineer in Virginia and Texas. He earned a Bachelor of Science degree in Civil Engineering at the Virginia Military Institute, and served 20 years in the U.S. Army Reserve as a U.S. Army Corps of Engineers Officer, attaining the rank of Major. He is a Fellow of the Institute of Transportation Engineers, and a member of the Society of American Military Engineers and the American Society of Highway Engineers. He joined JMT in 2012.

JMT Merges with Atlantic Engineering, LLC

Johnson, Mirmiran & Thompson, Inc. (JMT), and Atlantic Engineering, LLC, are proud to announce a merger of the two firms. JMT has grown considerably—in size and services—in the past four decades, and Atlantic Engineering possesses extensive knowledge and expertise in marine inspections.

The addition of Atlantic Engineering allows JMT to provide clients with a new business line of services with regard to underwater inspections, as well as the investigation, repair design and construction inspection of structures such as bridges, dams, piers, bulkheads, ferry terminals, platforms and water tanks. The team of more than 10 qualified divers and other professionals is based in Kinnelon, NJ, with a second office in Toms River, NJ.

Atlantic Engineering Kinnelon Office

Over the past 20 years, Atlantic has worked with a wide range of clients, including the Port Authority of New York and New Jersey, New York City Department of Transportation, New York State Department of Transportation, New York City Economic Development Corporation, New York Metropolitan Transportation Authority, New Jersey Transit, water supply companies and most New Jersey counties.

Atlantic's owner and President, Bryan Juncosa, PE, is a licensed professional engineer and diver with more than 30 years of experience. He has worked on 3,000 highway and railroad bridges—above and below water. Juncosa is also a member of the New Jersey Task Force-1 Urban Search and Rescue Team.

"JMT is a great firm to be associated with," Juncosa said. "Its reputation for excellence and commitment to quality makes JMT a preeminent firm in the New York/New Jersey region and beyond."

Brian Strizki, JMT Vice President and Trenton Office Manager, said: "The addition of Atlantic Engineering expands JMT's capabilities, particularly with regard to underwater structural inspections, which are required on many of our bridge contracts. We know Atlantic's expertise will benefit many of our clients."

GBF Engineering Joins JMT

Sparks, MD, Johnson, Mirmiran & Thompson, Inc. (JMT), and GBF Engineering, Inc. (GBF), are proud to announce the acquisition of GBF by JMT. The addition of GBF expands JMT's presence in Florida and strengthens the commitment of a 1,000-person firm to provide quality construction engineering and inspection (CEI) services for our clients throughout the United States.

Founded in 1997, GBF has built a reputation for providing quality construction engineering and inspection services that have earned several awards. GBF's team of more than 40 professionals is headquartered in Fort Lauderdale, with several offices throughout the state.

"This was a very well-thought-out decision, and I am confident that the outcome will be very beneficial to our continued growth and success," said Karina Enrico-Jackson, PE, President of GBF. "Like us, JMT's dedication to client satisfaction, quality, innovation and safety makes this a terrific partnership."

JMT President John Moeller, PE, said, "GBF is an outstanding Florida firm with a reputation for excellence in construction inspection. We are excited to combine our staff and offer a wider range of services to benefit our clients throughout the state."

About JMT

Founded in 1971, JMT is a 100 percent employee-owned firm based in Sparks, Maryland, with 19 offices located throughout the eastern United States, providing a full range of multi-disciplined engineering, architectural and related services to public agencies and private clients. Possessing multi-modal transportation expertise, the firm has completed thousands of assignments, including many design-build projects for highway, transit, aviation, marine and port and naval facilities throughout the United States. JMT's staff of more than 900 professionals—engineers, architects, planners, environmental scientists, surveyors, construction and program managers, inspectors, designers, CADD technicians and GIS and information technology specialists—is dedicated to engineering excellence and the highest-quality project performance.

Dewberry Announces Promotions

Dewberry, a privately held professional services firm, has recently promoted **Steven K. Kuntz, PE, DBIA,** to associate vice president in the Fairfax, VA, office. Kuntz has more than 15 years of experience in the civil engineering field, mainly concentrated on major transportation design projects. Having served as a project manager or assistant project manager on numerous transportation projects, including large design-build projects, he has in-depth knowledge of roadway, drainage, and maintenance of traffic design. He has coordinated the completion of lighting and electrical plans, structural plans, storm water management designs, and signing and marking plans as part of interchange and roadway projects. His portfolio includes projects of varying size and budgets throughout Virginia and Maryland.

Kuntz holds a Bachelor of Science in civil engineering from Virginia Polytechnic Institute and State University. He is a member of the Design-Build Institute of America and is a licensed professional engineer in Virginia, Maryland and Georgia.

Timothy Belcher, PE, has been promoted to senior associate in the Fairfax, VA, office. Belcher has more than 13 years of professional experience in highway project management, design-build services, drainage design, erosion and sediment control design, right-of-way and easement acquisition, public involvement, and utility relocation design.

Belcher's experience with utility relocations gave him the opportunity to serve on the Transportation Research Board Utilities Committee. Belcher has served on the Potomac Section Board of the American Society of Highway Engineers since 2009 and was awarded the 2012 Section Member of the Year. He earned a Bachelor of Science in civil engineering from Virginia Polytechnic Institute and State University, and is a licensed professional engineer in Virginia and Maryland.

About Dewberry

Established in 1956, Dewberry is headquartered in Fairfax, VA, with more than 40 locations and 2,000+ professionals nationwide. To learn more, visit www.dewberry.com.

(continued on page 20)

As The World Turns

ASHE Members on the Move!

C.S. Davidson's Simpson Receives Professional Registration

Gettysburg, PA — C.S. Davidson, Inc., announced that **Nathan C. Simpson** has received his Professional Engineer license from the Commonwealth of Pennsylvania. Simpson joined C.S. Davidson in 2009 after receiving a Bachelor of Science in civil engineering with transportation emphasis from the University of Pittsburgh. Simpson serves as a Project Manager specializing in civil engineering. His duties involve the oversight and administration of various projects including design-build projects within the National Park Service's northeast region, municipal streetscapes, roadway maintenance plans, annual street improvement contracts and municipal plan reviews. He is also a PennDOT Certified Bridge Inspector and serves as a bridge inspection team member within C.S. Davidson's structural department.

C.S. Davidson, Inc., is a leading engineering firm with offices in York, Lancaster and Gettysburg, PA. With a tradition of service since 1923, C.S. Davidson has regional offices that provide our clients with genuinely unrivaled service. Visit www.csdavidson.com for more information.

Gillott New Director of Transportation Design for Scranton, PA, Branch

Greenman-Pedersen, Inc. (GPI), an employee-owned professional engineering firm, has appointed **Joseph Gillott, PE,** as Director of Transportation Design in their Scranton, PA, office of GPI. Joe has over 20 years of experience as a civil engineer, with a focus in the design and analysis of highway bridges and structures. He has extensive highway, bridge and project management experience on projects of all sizes, from small bridges to $0.5 billion major highway, interchange and bridge projects. Joe is also a certified Design Build practitioner with experience in over 60 Design Build projects and extensive design build training through the Design Build Institute of America. He earned his bachelor's degree in civil engineering from Penn State. He is a board member of ASHE North East Penn and is a licensed professional engineer in Pennsylvania, New York, Ohio and Michigan.

Toran New President of Western PA's Engineers' Society

Charles Toran was elected President of the Engineers' Society of Western Pennsylvania, the first African American to be so honored in the 144 years since the society was formed in 1880.

Mr. Toran has held increasingly responsible positions in the Society, the most recent as First Vice President. He holds degrees in mechanical engineering and business from the University of Pittsburgh, and is founder, in 1996, and President of Sci-Tek Consultants, Inc., a civil/environmental and geotechnical engineering consultancy with offices in Pittsburgh (Penn Hills) and Philadelphia. Sci-Tek was ranked as the #1 Hot Growth Engineering/Environmental firm by the Pittsburgh Business Times in 2004, 2005 and 2006, and Mr. Toran was honored as the Minority Business Person of the Year by the Pittsburgh office of the U.S. Small Business Administration in 2007.

A resident of Monroeville, Mr. Toran is also active in numerous civic organizations, including The Pittsburgh Public Schools Robotics and Engineering Career Advisory Committee and the University of Pittsburgh Swanson School of Engineering Diversity Advisory Committee.

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CSX's Tunnel Vision Pays Off

by Jim Swadley, PE, Michael Baker Jr., Inc., **ASHE Southwest Penn Section**

In 2008, CSX launched the National Gateway Clearance Improvement Program, a public-private partnership to improve freight transportation services. A key initiative of the project was to increase the vertical rail clearances of public overpasses throughout the nation's Mid-Atlantic and Midwest regions to enable trains to carry double-stack intermodal container cars. One of the facilities targeted in the Pittsburgh region was the Jones and Laughlin (J&L) Tunnel at the South Side Works.

Constructed in the 1880s to allow rail operations under the J&L Steel Company's Pittsburgh Works South Side plant, the tunnel is 1,626 feet long by 24 feet wide. It consists of an 818-foot-long tangent section and an 808-foot-long curved section that carry a single track. After the closing of the South Side plant in the mid-1980s, the City of Pittsburgh's Urban Redevelopment Authority converted the once-brownfield site into a commercial, retail and residential mixed-use development. The tunnel lies beneath the core of this busy development and is flanked by elevated streets. The area above the tunnel is used as a green-space park.

To coordinate with the local businesses, CSX implemented various public outreach measures to inform the community and other stakeholders about the planned improvements for the J&L Tunnel, including press releases and town meetings. Much of this work was done in advance of the design-build RFP being issued. Once the project was awarded to Mascaro Construction Company, LP (Mascaro) as the design-build contractor and Michael Baker Jr., Inc. (Baker) as the design engineer for Mascaro, the Mascaro-Baker team joined CSX in a town meeting with the local businesses to inform them of the construction plans. Mascaro Superintendent Bob Yeckel walked the site daily and got to know many of the neighbors-tenants. He also provided his cell phone number and communicated with them regularly. As Michael Hoey, director of CSX noted, "Our engineering department in Jacksonville felt that this would be the most difficult and challenging of the 43 projects. It ended up being the brightest spot and least complex of the 43."

CSX realized that raising and reconstructing the roof of the J&L Tunnel to meet National Gateway clearance criteria would involve significant engineering and logistics challenges. Mascaro-Baker's task was to analyze conditions and devise a safe and cost-effective way to increase vertical clearance, ultimately replacing the tunnel roof, while minimizing impacts to rail traffic and the surrounding community during construction. To provide a greater understanding of the project complexities, Baker's designers went to the University of Pittsburgh archives and found old drawings of the tunnel. As part of the subsurface investigation, Mascaro excavated across the full 30-foot width of the tunnel at three locations to expose the tunnel roof and the rear side of the masonry stone walls to define the outer wall and roof geometry. In addition, Baker probed and drilled through the roof to determine its thickness. Baker also mapped the inside of the tunnel with its mobile LiDAR unit, using this data to do a detailed analysis of the roof and walls, which resulted in an erection plan that placed the crane on the tunnel roof. The team analyzed more than 17 structural conditions before submitting to CSX for approval.

The Mascaro/Baker design-build team then devised and implemented a unique, "out-of-the-box" solution to overcome the engineering complexities of this project and meet the construction deadline. The team's innovative approach involved assembling and positioning a 250-ton crawler crane on the existing tunnel roof in such a manner that forces on the existing roof were controlled. Lateral construction loads on the walls were also minimized

For J&L Upgrade

Tunnel Park 1 - After construction

to prevent instability of the walls during removal of the existing roof, raising the tunnel walls and placement of the new roof. The old roof members were then picked off, the tunnel walls were built up with a 25-inch concrete cap to increase the vertical clearance to 21 feet above top of rails and the roof was replaced with adjacent precast reinforced concrete beams. All of this work was accomplished under live rail traffic conditions, during a tight construction window, while avoiding impacts to surrounding businesses, restaurants and other establishments.

As a result of the 21-foot vertical clearance at this site and others across the country, CSX is able to place double-stack container trains in operation. When the National Gateway project is completed in 2015, to coincide with the expansion of the Panama Canal, increased traffic is expected through East Coast ports. The National Gateway project will then provide more than $1.6 billion in public benefits to Pennsylvania in the route's first 30 years of operations by decreasing fuel consumption, lowering emissions, improving safety, reducing highway maintenance costs and saving shipping costs. The final cost of the tunnel modifications was $10.5 million.

Tunnel Park 3 - Crane lifting new roof beams

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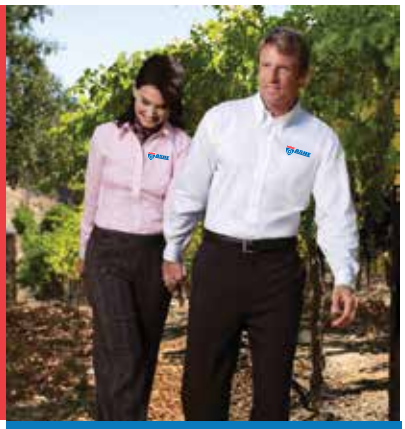

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How to Increase Membership:
An ASHE Delaware Valley Section Retrospective

by Bruce P. Masi, Past President/Political Information Network (PIN)

As I sat in the National, Regional, and Section Meeting at the 2013 ASHE National Conference in Lake Placid, NY, outgoing National President Frank O'Hare was encouraging the attendees to be more innovative with their recruitment tools for prospective ASHE members. I agreed with him, so I raised my hand to share the proactive approaches that the Delaware Valley Section has been using to increase our membership rolls. This information was so well received that I'd like to present it to other ASHE Sections for consideration and possible use.

In the 2008-2009 season, the DelVal Section had approximately 350 members on its rolls. In the following season, I began my two-year stint as Membership Chair. (The DelVal Section has a Membership Committee that is charged with all membership responsibilities, which is unique among the 41 Sections that make up our National organization. The other 40 sections have these functions tucked under the Section Secretary position or a part of another committee.) For the next two years, we maintained our membership rolls at 350, despite the severe economic downturn (resulting in the loss of approximately 15 members) and the culling of an additional 60 delinquent members from our rolls. We added approximately 75 members to our Section in that period when many Sections lost members, so I have been told. From that time to the present, a two-year period, we have added a net of about 50 more members to our Section under our current Membership Chair, John Caperilla. Now we are just shy of 400 members, making the DelVal Section one of the most populous Sections in our organization (the second largest, as reported in the Spring 2014 *SCANNER*). It appears that we have been successful at increasing our membership, despite the worst economic recession since the Great Depression of the 1930s. We accomplished this through several techniques:

- We do not differentiate between members and non-members at our Dinner Meetings. We use these forums as "marketing tools" to allow non-members to see, firsthand, the benefits of membership.
- We provide a $15/person discount for government employees and students to encourage participation from both of these groups at our Dinner Meetings to inspire them to become members.
- We provide three FREE Technical Sessions (each season) for our Section Members; otherwise, a Technical Session costs $40 per person. Each Technical Session provides two PDH credits toward the 24 credits required during the two-year PE license period in Pennsylvania and New Jersey (Delaware will soon have the same requirement). This is arguably a $100 value. Several dozen membership applications have resulted from this effort. One member can secure all 24 PDH credits required for license renewal within a two-year period from ASHE DelVal events alone. This encourages very high attendance, and we typically get between 100 and 200 attendees per Dinner Meeting.
- Only DelVal Section members can attend the annual ASHE-PennDOT Morning Seminar at the Pennsylvania Department of Transportation (PennDOT) Engineering District 6-0 office (worth between three-five PDH's). In the first year alone (2011), we received 35 applications between April and May before this mid-May event, and these were mostly from high-level private sector colleagues, half of whom had dropped their membership just one year prior. Additionally, we have restricted this to two members attending, per private firm. to maximize the benefit to the PennDOT District staff, using another tool to enhance our membership numbers within the DOT.
- Two years ago, we created the Young Members Committee (YMC). This group facilitates activities and events to encourage participation from the "under 35-year-old" crowd (though all ages are welcome) and focuses on making them feel welcome at our Dinner Meetings, which can be a little intimidating to a first-time attendee. We've secured approximately 30 membership applications from these undertakings, which are spearheaded by our YMC Chair, Alexa Harper.
- We are starting up at least one Student Chapter (Temple University) from one of four local engineering universities. Our ultimate goal is to install all four schools (Drexel University, Temple University, Villanova University, and Widener University) with Student Chapters, under the auspices of the Section. This will provide a potential pool of new Section members after their graduation. We also offer a fairly generous scholarship program for college students and are using that program as a recruitment tool where possible.

Throughout the past five years, the Delaware Valley Section Board of Directors and Officers has leveraged the relatively new Pennsylvania continuing education requirements for Professional Engineering Licensure to encourage highway industry professionals to join our Section. In that period, both neighboring New Jersey and Delaware have enacted similar continuing education requirements (with Delaware's to officially begin in July 2014), thereby inadvertently aiding our goal.

We also have focused on "adding value" for our members. The "President's Message" lead-in to our Newsletter highlights pertinent industry issues and trends for our members' edification, or they delve into the inner workings of our Section. For example, our current Section President, Stephanie Butler, has highlighted two Section Committees in each of her Messages this season and then extolled the benefits of joining one of our Section Committees.

We have begun to use technology to better communicate the Section activities and proceedings to our members. We transmit our Dinner Meeting and Technical Session announcements, as well as our newsletter and all other Section announcements, via e-mail. We also recently added an electronic option for signing up for our Dinner Meetings, Technical Sessions and other Section activities.

If anyone is interested in learning more about DelVal's membership efforts, please contact me.

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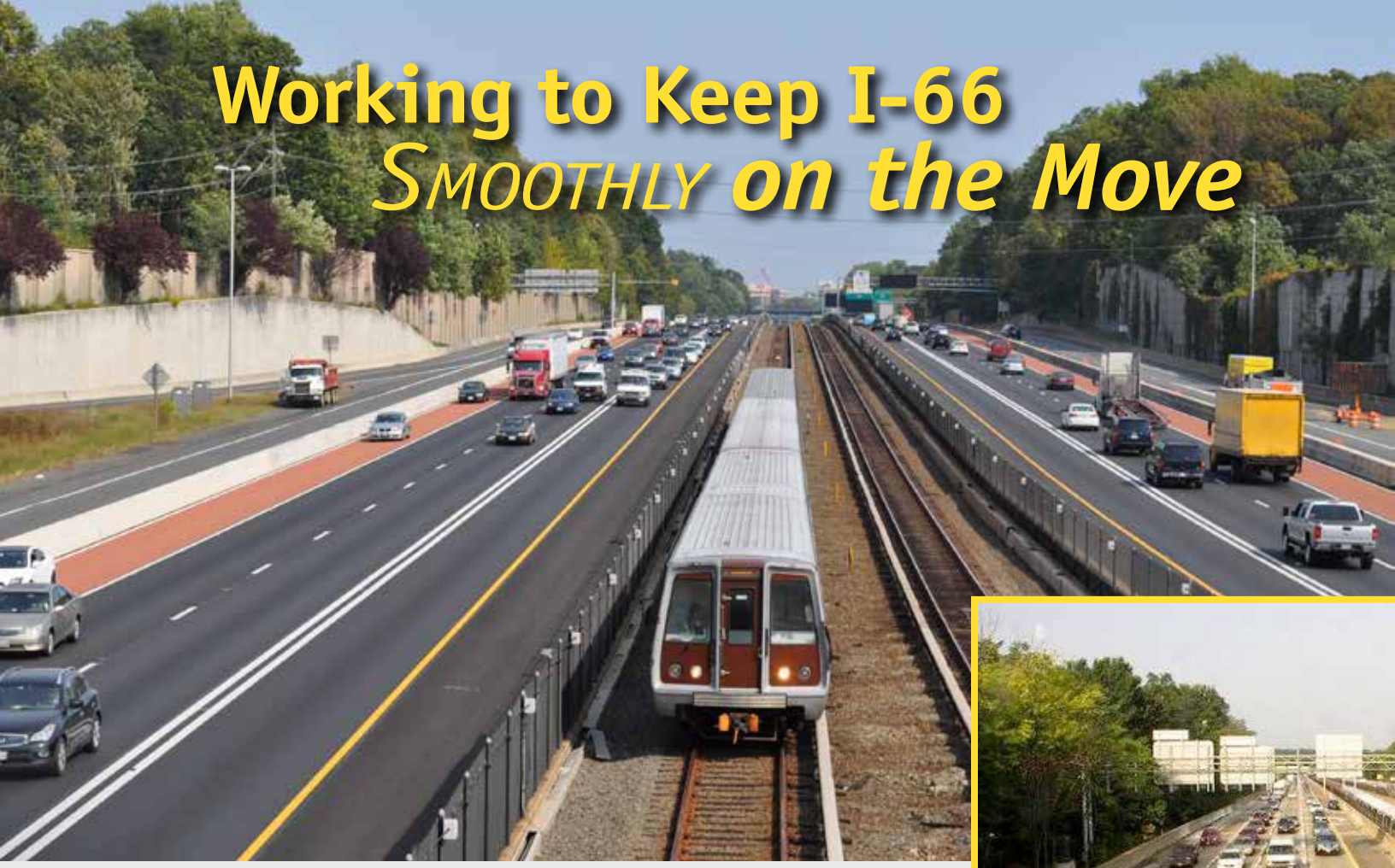
Working to Keep I-66 *Smoothly* on the Move



by Volkert, Inc., Staff, **ASHE Potomac Section**

With several major construction projects ongoing on Interstate 66, the Virginia Department of Transportation began a rehabilitation project in 2011 to improve the riding surface on this critical northern Virginia east-west corridor that carries over 180,000 vehicles per day. Contracted as design-build, the project rehabilitated badly deteriorated pavement along a 6.5 mile stretch of I-66 between the Capital Beltway and Route 50 in Fairfax County. Construction work was conducted between 9 p.m. and 5 a.m. Sunday through Thursday, and required nighttime lane closures five nights per week. Work included concrete patching and asphalt overlay on the east- and west-bound mainline and ramps, upgrades to concrete barriers and guardrails and ITS upgrades. The $48-million project, featured in *Roads & Bridges*, was completed in October 2012 and received an award from the National Asphalt Pavement Association.

Volkert served as lead engineer on the design-build team and provided engineering, construction quality assurance and public outreach services. Mid-Atlantic Region Chief Engineer Keith Weakley, PE, DBIA, managed the project for Volkert.

Volkert and the contractor, Fort Myer Construction Corporation, formed an integrated team with expertise in interstate design and construction; schedule development and analysis; the analysis of constructability issues and traffic management issues in high traffic areas; safety; and the design, planning and implementation of complex phased construction and sequencing plans.

Volkert and Fort Myer worked collaboratively to plan and implement an aggressive integrated design and construction schedule to maximize efficiency and flexibility. The project was divided into seven work packages. The first two packages included concrete slab on grade repairs and concrete median and roadside barrier modifications.

During construction of the first two packages, Volkert obtained approval of the ITS plans and completed design of the two work packages for paving and guardrail adjustments. Drainage design was divided into three work packages and maintenance-of-traffic was divided into four work packages. This organization of the work packages allowed for greater flexibility, because potential issues with one work package did not delay construction on other components of the project. Work packages were approved by VDOT.

Volkert developed a Transportation Management Plan involving a study

of traffic and crash data and an operational-level traffic analysis. These were used to determine the best construction phasing and temporary traffic control techniques to meet the construction schedule while maintaining traffic flow and safety.

A temporary precast modular patching system was developed by Volkert to increase the contractor's ability to do more patching each night. It also provided a contingency in case of weather delays or problems when pouring concrete and obtaining strength in time to open for traffic in the morning. Volkert developed a metal grate adjustment collar system that eliminated the need for precast or cast-in-place concrete for the permanent configuration. (The precast alternative had durability issues due to thin sections, and cast-in-place was too time-consuming for the permanent configuration.)

I-66 Before

Weekly scheduling meetings and looking ahead three weeks to plan construction also helped to keep construction on schedule. With an on-time completion of the project, and the rideability of the roadway exceeding expectations, Garrett Moore, PE, VDOT's Chief Engineer, who at the time served as Northern Virginia District Administrator, stated "We've had more compliments on this than on any single project."

Reconstructing the PA Turnpike through Mountainous Terrain

by Barry A. Epley, PE, Senior Vice President, Johnson, Mirmiran & Thompson, Inc., **ASHE Clearfield Section**

New Baltimore Borough in Somerset County, southwestern PA, was founded in the late 18th century by a wealthy resident of Baltimore, Maryland, who dreamed of establishing a Catholic settlement, church and college. He found this valley below the Allegheny Mountain range and adjacent to the Raystown Branch of the Juniata River, selected a site for a church, plotted a town adjoining the church and then convinced as many German and Irish immigrants who landed in Baltimore to head to New Baltimore. The college never came to fruition, but the church was opened and dedicated in 1826. The church building and rectory have been expanded and rebuilt through the years, with the current St. John the Baptist Church constructed in 1890.

Fast Forward to 1940

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. The alignment passed between the church and the Borough and actually impacted the cemetery adjacent to the church. Because state law did not permit the Pennsylvania Turnpike Commission (PTC) to acquire the graveyard by eminent domain, it entered into negotiations with the church. As a result, a pair of stairways serving both the eastbound and westbound lanes connect the church and the Turnpike. This access has led St. John the Baptist to become known as "The Church on the Pike."

The construction of the Turnpike encountered other challenges through this corridor. At Milepost (MP) 127.9, approximately 4.5 miles east of the Allegheny Tunnel, the construction activities activated a landslide that is now referred to as the New Baltimore Slide. This active slide zone is 800 feet wide and extends 1,100 feet upslope from the roadway and is sliding along a clayey siltstone bedding plane. This mass of rock and soil has been moving slowly ever since the original construction and has been measured and monitored through the years to ensure the safety of the travelers along the Turnpike.

Fast Forward to Present Day

The PTC is in the midst of reconstructing and widening the road from Ohio to New Jersey. For this project, they selected a team of consultants to design a nine-mile-long section that extends from just east of the Allegheny Tunnel (MP 124.5) to a point approximately 4.5 miles east of the church (MP 133.5). The scope of the project is to completely reconstruct the roadway; widen to six lanes and a 26-foot median from the current configuration; eliminate most curves that exceed 3°; address the geotechnical issues at the slide by excavating below the failure plane; and replace all of the overhead bridges as early action projects—all while maintaining a minimum of two lanes of traffic in each direction.

Environmental Concerns

During preliminary design, the team evaluated the environmental issues in the corridor and developed an approach to address each as follows:

Threatened and Endangered Species -The entire project corridor is located within the known swarming habitat of the federally endangered Indiana Bat (Myotis sodalis). Detailed coordination has occurred with the U.S. Fish and Wildlife Service (USFWS) to discuss options to avoid and minimize the amount of forested habitat that will be removed with the reconstruction project. The project team has agreed on a mitigation plan

St. John the Baptist Church and old stairway access from Turnpike Eastbound.

that includes a tree cutting restriction during the active roosting periods and payment into the Indiana Bat Conservation Fund, allowing for the acquisition and protection of existing Indiana Bat habitat by the USFWS.

Historic Church and Archaeological Concerns - St. John the Baptist Church was recommended for inclusion in the National Register of Historic Places, in the areas of community planning and development, and in architecture. Although the steps leading to and from the Turnpike provide an interesting anecdote in the history of the church and the Turnpike itself, the steps are not significantly related to those features that make either the church eligible, nor were they an integral function in the operation of the church during its period of significance (ca 1820 to 1895). A Phase I and II Archaeological Survey was conducted to determine if the church yard site is eligible for listing on the National Register. Although 19th- and 20th-century artifacts were found, the church yard was not considered eligible.

Stream Mitigation and Natural Channel Replacement -The project will have unavoidable impacts on wetlands and streams. It is anticipated that approximately 4,500 linear feet of waters of the U.S. and just over a half acre of wetlands will be permanently impacted by construction activities. The project team is currently assessing options to mitigate these impacts that include both on-site and off-site mitigation alternatives.

Geotechnical Concerns

The most challenging aspect of the design has been determining how to address the New Baltimore Slide that has been moving slowly since the Turnpike was constructed in 1940. The PTC has been monitoring the movement and performing ongoing repairs of the roadway shoulder at the base of the slide, as the mass moves and upheaves the pavement. Early in the design phase, the team began a geotechnical exploration program to continue the monitoring work that preceded this project. Prior monitoring by the PTC included inclinometers, core borings and conventional field surveys to develop structure contours of the failure plane, delineate the boundary of the slide, determine the rate of movements and understand the trend of movements in relation to rainfall events. The team reviewed all of the available information gathered and developed a program to supplement that data. The goal of the exploration program was to fully understand how this mass is moving, in order to develop plans and specifications to allow for the safe and efficient removal of the slide. The exploration program consisted of the following items:

- There were 52 borings drilled to develop the surface of the failure plane, delineate the boundary of the slide, obtain rock quality information and identify the groundwater conditions.
- Eight standard vertical inclinometer casings were installed at various zones to accurately determine the location of the failure plane and to calculate the rate of movement at various depths.
- Five in-place inclinometers were installed in 2013 with sensors at different depths in the casing. Measurements can be collected continuously, using a data logger connected to the sensor system, and transmitted remotely via a wireless modem.
- Two vibrating wire piezometers were installed to correlate the variation of groundwater with the rate of slide movements.
- Two test blast studies were conducted to characterize the response of different zones in the rock mass to blasting. Many of the first round of blasting borings repeatedly collapsed during drilling, and open-holes could not be maintained.
- Conventional field surveys have been performed by the team once per month since 2010, using different surface monuments distributed throughout the slide area. Based on the rate of movements observed, the slide area has been divided into 12 zones. This data will be used to develop monitoring guidelines for construction activities.
- A laser total station system has been installed to monitor movements of the slide in real time prior to, during, and after construction.

Slope Electronic Monitoring Prism - New Baltimore Slope is across Turnpike Eastbound.

The design team developed an excavation plan that stipulates top down excavation to remove all material to below the failure plane and to bedrock. This plan will also minimize the amount of failure plane exposed at any one time through limitations established for staged excavation. To minimize the amount of waste, a significant portion of the excavated material can be placed back onto the slope, because the slope will be stable after removal of the failure plane.

New Baltimore Slope Remediation Project Location.

Construction Schedule

The estimated overall cost of this project exceeds $250 million and will be constructed through six separate contracts. Four of these contracts are early action contracts prior to the mainline construction. The contracts include:

- *Two Cider Road overhead bridges* (completed)
- *Findley Street overhead bridge* (scheduled for 2014) - This bridge is the only access across the Turnpike from the Borough of New Baltimore to St. John the Baptist Church. Therefore, the new bridge will be constructed adjacent to the existing bridge, which will continue to carry traffic during construction. The steps to this church will be closed during construction.
- *New Baltimore Slope Remediation* (scheduled for 2015) - This approximately four-million-cubic-yard earthwork contract will remove and rebuild the New Baltimore Slope along with an adjacent cut necessary for the reconstruction of the Turnpike at a later date. Preliminary plans were released to interested bidders in September 2013.
- *West Mainline Contract from MP 124.5 to MP 129.8* (scheduled for 2016/2017) - This project will flatten the various curves down the mountainside from the Allegheny Tunnel, while widening the mainline to six lanes with a full median and wider outside shoulders.
- *East Mainline contract from MP 129.8 to MP 133.5* (scheduled for 2019) - This project will complete the widening and reconstruction of the mainline in this section to MP 133.5.

The design team is led by Johnson, Mirmiran & Thompson, Inc. (York, PA); the PTC's Design Management Team is led by KCI Technologies, Inc. (Mechanicsburg, PA); and the PTC's Construction Management Team is led by Stahl Sheaffer Engineering, LLC (State College, PA). The challenging geotechnical design is led by American Geotechnical and Environmental Services, Inc. (Canonsburg, PA) and Design Manager GeoMechanics, Inc. (Elizabeth, PA). The PTC's Project Manager is Kevin Scheurich, PE.

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News From Across ASHE-Miles

ASHE Northeast Florida Section

Takes Aim at Fundraising

by Jennifer Yoder, *CPSM Director of Business Development,* England-Thims & Miller

ASHE Northeast Florida teamed with the Design-Build Institute of America to hold a Celebrity Clay Shoot Tournament on April 10, 2014. Twenty-one sponsor teams participated in the event that raised over $14,000 for the University of North Florida (UNF) College of Computing, Engineering and Construction.

Participants at the Celebrity Practice Shoot included, from left: Matt Maggiore, ETM; Larry Parks, FDOT; Darrell Locklear, St. Johns County; Rob Mizell, ETM; James Bennett, FDOT; and Christian Stahl, UNF student and shooting club member. (ETM – Practice Shoot Sponsor)

The tournament featured 21 local public agency celebrities, such as leaders from the Florida Department of Transportation, as a draw to entice sponsor teams, all of whom were paired with one of the celebrities for the afternoon shoot. The celebrities were chosen by sponsors in order of sponsorship dollars first, then on a first-come, first-served basis. A Celebrity Practice Shoot was sponsored by a local consultant who covered the costs, set up the event and accompanied the celebrities in a day of shooting and instruction with the UNF Shooting Club. The UNF Shooting Club also assisted in the tournament with setup, cleanup and filling incomplete teams. Partial proceeds from the raffle were donated to the club.

The successful event included a BBQ lunch and an afternoon of clay pigeon shooting at 17 stations. To aid in additional fundraising, mulligan and raffle tickets were sold and then drawn for prizes, including such donated items as two new shotguns, a large-screen TV, a bicycle and more. Coupled with the ASHE NEFL annual golf tournament, this event brings the 2013-14 UNF donations to more than $31,000. This tournament has become an annual signature event for the two organizations.

ASHE Phoenix Sonoran Section

ASCE/ASHE Joint Conference a Success!

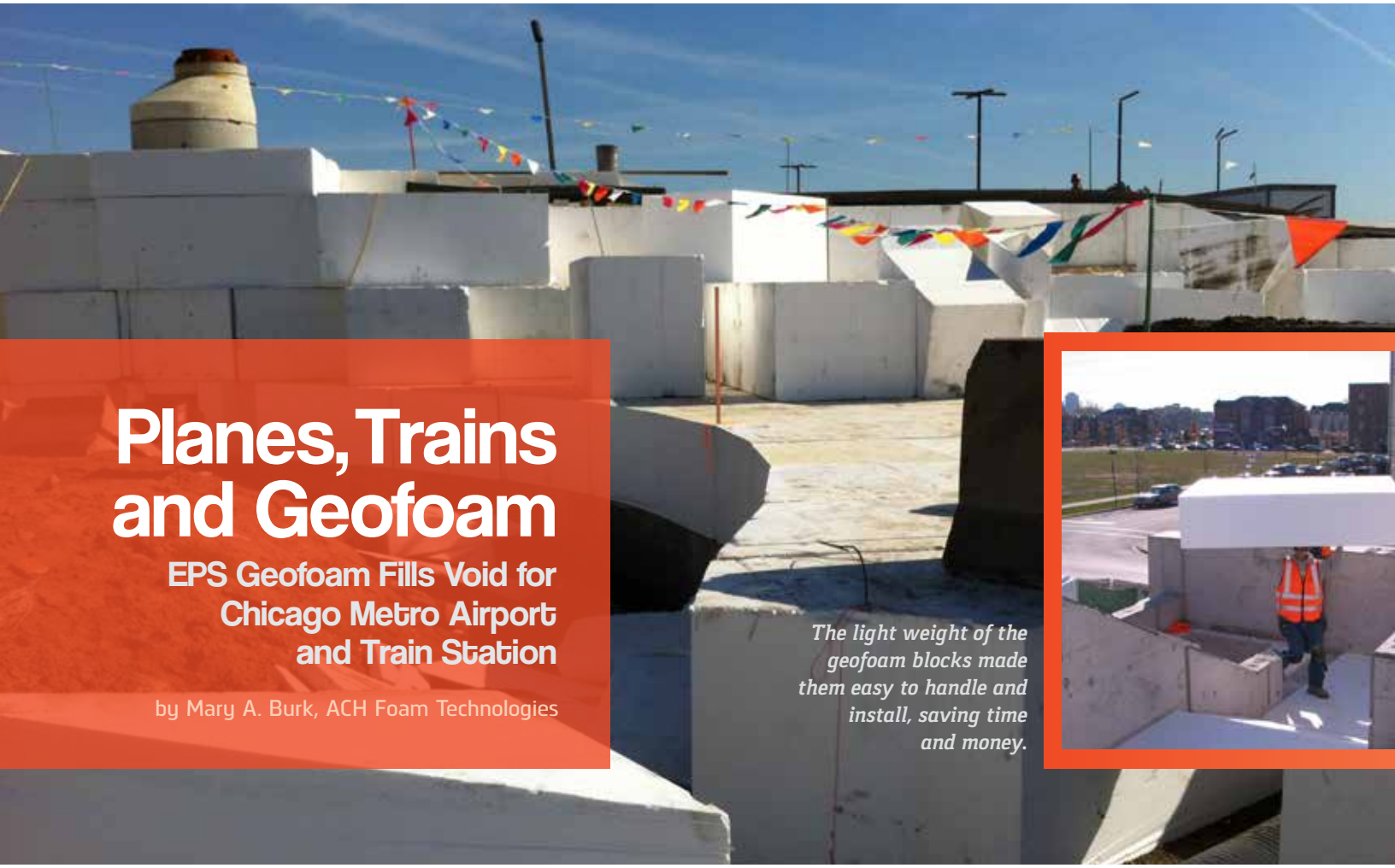
The Phoenix Sonoran Section reported that comments were positive this year from all who attended the annual ASCE/ASHE Joint Conference. ASHE's National President, Tom Morisi, was the keynote speaker for the event held at the Desert Willow Conference Center in Phoenix, Arizona. Participation from ASHE members increased considerably from last year and, as a result, the Section profited by more than $1,300.00—all for the Scholarship Fund.

Here's the conference by the numbers:

ASHE Attendees: 23; ASHE Sponsors: 2; Booth Purchases: 1.

Continued support of the Scholarship Program is a great way to assist engineering students locally and encourage participation in ASHE as well. The conference was such a success that the Board is set to participate again next year.

Attending the annual ASCE/ASHE Joint Conference in Phoenix were, from left: Yung Koprowski, PE, Second Vice President; Jason Pagnard, PE, Past President; James Schleich, PE, President; Tom Morisi, National President; and Dawn Fortuna, First Vice President of the Phoenix Sonoran Section.



Planes, Trains and Geofoam

EPS Geofoam Fills Void for Chicago Metro Airport and Train Station

by Mary A. Burk, ACH Foam Technologies

The light weight of the geofoam blocks made them easy to handle and install, saving time and money.

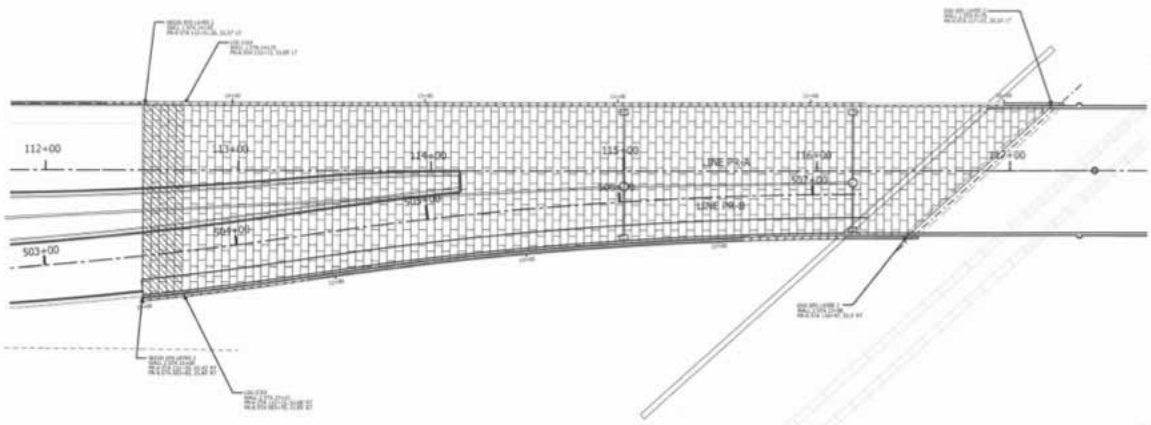
Construction of a two-span steel bridge at Gary-Chicago International Airport. The new bridge spans over the EJ & E railroad tracks that bisect Airport Road near Chicago Avenue.

ACH Foam Technologies, Denver, has provided EPS geofoam for several construction projects in the Windy City—among them, Millennium Park, Soldier's Field and most recently—the Gary-Chicago International Airport roadway expansion and the Metra 35th Street train station accessing White Sox U.S. Cellular Park.

As part of the airport's roadway expansion, a two-span steel bridge had to be built over the EJ & E railroad tracks that bisected Airport Road near Chicago Avenue. This was project number six of 18 work segments that comprise the Gary-Chicago International airport expansion—scheduled for completion mid-September of 2014.

Superior Construction won the general contractor position, and Superior's Pete Keilman acted as Project Superintendent for the roadway expansion bridge. According to Keilman, the bridge had to be built over two existing rails as well as two future rails. There was a potential problem with the quality of soil where the bridge was to be built, as well as an embankment that might require purchase of additional right-of-way.

In the initial investigation, it was discovered that the soil where the bridge would be built was questionable. The preliminary analysis found soil about 12 feet down that contained a large percentage of peat, which would settle over time. Geofoam then became the preferred alternative, because the material would



Installation of a load distribution slab on top of the geofoam secures the blocks by keeping them in place and distributes the traffic loads. The load distribution slab also protects the geofoam from potential chemical spills.

Side view of the Gary-Chicago International Airport Geofoam embankment.

distribute the load and prevent any future settlement of the roadway.

According to Keilman, placement of the geofoam blocks went well. His crew of five to seven men were able to cut a trench through the geofoam, which would carry a storm sewer pipe for 400 feet on each side of the bridge approach.

"We hadn't done this before," he explained. "Engineers provided detailed drawings that we followed on the job site, and ACH Foam provided a hotwire that would easily cut through the foam. We also used a chain saw and a smaller saw in various sections.

"Once we had the foam down and the sewer pipe in, we laid a single mat of rebar, then poured six inches of concrete on top of that. Two feet of stone topped the concrete, and that stone was surfaced with a foot of asphalt. The bulk of the geofoam embankment was installed in the fall of 2012; more geofoam was installed this spring for a total of 43,000 cubic yards of Foam-Control® EPS Type 22 geofoam."

A trucking company to the east had its property line too close to the bridge embankment to allow for the slope that would have been required by conventional soil fill. Vertical geofoam embankments made purchase of additional right-of-way unnecessary.

Oracle Engineering was the Geofoam Design Company for the bridge expansion. Oracle's Marvin Cook, an EPS design engineer for projects all over the world, considers geofoam design and installation the preferable alternative to addressing soil problems for conventional fills. "We place utilities in EPS all the time. For this roadway we installed the sewer pipe directly in the geofoam material. The easy way to cut a trench is to use hotwire on the job site. Using geofoam as an alternative fill reduces, and in many cases eliminates completely, the loading against bridge structures as well as adjacent roadways," Cook added.

With regard to settlement issues on the Gary-Chicago roadway, it was estimated that stage one primary settlement of the soil could take anywhere from six to 12 months. Using geofoam eliminated that settlement time, so the closure lasted only weeks instead of months. Airport Road was reopened in November of 2012.

ACH's Frank Kiesecker said that geofoam is being used in transportation projects with greater frequency. "Once it became common knowledge that geofoam weighs about 1/100th the weight of soil and saves money and

Finished Metra train station platform and ramp embankment on 35th Street in Chicago. White Sox Park is directly accessed from the new Metra train Station platform on 35th Street in Chicago.

time for installation as well as road closures," Kiesecker explained, "the Federal Highway Commission began to require DOTs to compare cost and time savings using geofoam versus soil and other alternatives."

During the 2010 design phase for the station platform, architects had safety concerns about the elevation of the Americans with Disabilities (ADA)-compliant concrete. In addition, the aggressive construction schedule wouldn't allow for the settlement time that conventional soil fill would require.

Architects turned to EPS Type 12 geofoam to solve their design challenges and shorten the construction time. According to Dan Orlich, Metra's Construction Manager, "A great amount of time and labor was saved by not having to compact the lifts of traditional fill. Compensating for the drains within the ramp cells was a snap, because on-site cutting of the geofoam was so easy." Approximately 31,300 cubic feet of Foam-Control® EPS geofoam with Perform Guard® termite-resistant treatment was installed as stairway and ramp fill for the Metra's 35th Street Station platform at the Chicago White Sox Stadium.

Meeting tight construction schedules has been a key benefit to using geofoam in many projects. John Grskovich, of General Contractor John Burns Construction, explained, "John Burns Construction continues to use ACH Foam Technologies as our geofoam supplier because they are so responsive to our schedules."

Mary A. Burk is the Corporate Marketing Manager at ACH Foam Technologies. She authored over 20 technical articles for the engineering, construction and architectural industries. She can be reached at mburk@achfoam.com.

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Harrisburg	382
Long Island	43
Mid-Allegheny	111
New York Metro	131
North Central New Jersey	177
North East Penn	130
Pittsburgh	548
Southern New Jersey	198
Southwest Penn	312
Williamsport	125
Subtotal	**3,424**

Mid-Atlantic Region

Blue Ridge	70
Carolina Piedmont	43
Carolina Triangle	219
Chesapeake	202
Greater Hampton Roads	128
North Central West Virginia	32
Old Dominion	88
Potomac	220
Subtotal	**1,002**

Southeast Region

Central Florida	45
Georgia	404
Gold Coast	7
Middle Tennessee	158
Northeast Florida	200
Tampa Bay	93
Subtotal	**907**

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Cuyahoga Valley	119
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