Reconnecting Pittsburgh's Hill District with the city's downtown business and cultural center

See page 28

ASHE

AMERICAN SOCIETY
OF HIGHWAY ENGINEERS

scanner
Tammy Farrell, *Designer–Editor*
TNT GRAPhiCs
tammy@mytntgraphics.com

MISSION

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Leigh Lilla, PE, LEED
ASHE National President 2022–2023

NEW DIRECTIONS

Greetings, ASHE! I can't believe it's here: my final President's message for scanner. *Measuring the year in President's updates, I can honestly say the year flew by!*

Since my last message, the National Board had a productive meeting with my home Section, Tampa Bay. It was a weekend full of collaboration. The Section hosted a happy hour near a Tampa Bay Lightning hockey game, and we attended the Southeast Region Board meeting and National Board meeting the next day. We conducted a workshop regarding the Region structure, led by Jim Shea and Nimish Desai, and made strides toward finalizing the Strategic Plan renewal.

The National Board will hold its spring meeting in Columbia, SC. We look forward to supporting this recently chartered Section. We will also continue Region structure discussions, specifically related to funding further collaboration within the Regions.

We recently conducted the ASHE Officer Training online sessions. We offered two repeat sessions to explain the role of each ASHE Officer and how the National/Region/Section boards interface. We also shared best practices for Region and Section officers. Thank you to the Operations and Oversight Committee, chaired by Dave Greenwood, for facilitating these sessions along with National Secretary Tom Morisi and National Treasurer Frank O'Hare. If you were not able to attend but are interested in the content, you can view a PDF of the presentation at Training - American Society of Highway Engineers (ashe.pro).

As a reminder, I am asking those at the Section or Region levels to please involve the Region Directors in your events, board meetings, etc. The Region Directors are great resources. They were nominated to this position based on their previous experiences with ASHE, and they are there to help. They are some of the most invaluable resources that you have available for all things ASHE, so please reach out. If you aren't familiar with who your Director might be, you can find a listing of those individuals at Officers and Directors – American Society of Highway Engineers (ashe.pro).

My previous update was overshadowed by news of the passing of Shirley Stuttler, who served as the former National President's Assistant. Shirley was dedicated to ASHE; as a member of the Franklin Section, she served as its Secretary for 25 years and also served as President. She served as a National Director (1996-2000) and was appointed as the National President's Assistant, retiring in 2019. She was committed to ASHE and made many friends along the way.

(continued on page 16)

In This Issue

ASHE scanner

6 Uniquely Shaped Solution

24 Vital Upgrades for Local Network

33 ASHE Student Outreach

36 Completing a Critical Link

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The peanut-shaped roundabout helped maintain distance between the road and existing homes.

The intersection at SR 61, SR 656 and Wilson Road (TR 56) in Kingston Township, OH, had a high number of crashes in recent years, including some with injuries and one fatality. As part of the Ohio Department of Transportation's (ODOT) Highway Safety Improvement Program (HSIP), the intersection was listed on the 2012 Office of Systems and Program Management's Safety Studies list and the 2012 Systematic Intersection Signage Upgrade Program Priority List. Additional road signs were installed in 2013, including advance stop signs and intersection ahead signs. But the intersection appeared on the HSIP Studies list again in 2015, this time ranking fourth. Between 2014 and 2016, a total of 32 crashes occurred, 23 of which were angle crashes. When evaluating options to redesign the intersection, the skew of Wilson Road and SR 656 presented a challenge. A crest/sag curve combination on SR 61 just north of the intersection also created a safety concern with poor sight distance for both SR 61 traffic and turning traffic on all roads. Five alternatives were presented to the public: no build, four-way stop, signalization, single-lane roundabout (with and without profile adjustment) and adjusting the SR 61 profile only.

A roundabout was selected as the preferred option due to its ability to mitigate angle and injury crashes. Preliminary analyses anticipated a crash reduction of 71 percent for all crashes and 87 percent for injury crashes. The combination sag/crest vertical curve on SR 61 north of the intersection was smoothed out to improve sight distance coming into the intersection. The superelevation of the horizontal curve on SR 656 was also corrected.

In addition to improving safety, the roundabout would provide a continuous flow of traffic and an improved level of service from the previous two-way stop. *(continued on page 8)*

Delaware County, OH

Uniquely Shaped Solution Drives Safety at Skewed Intersection

by Katie Montoya, PE, Ohio Department of Transportation, District 6, and
Mike Taricska, PE, Burgess & Niple, ASHE Central Ohio Section

Looking north along SR 61 at the splitter island and pedestrian cut-through

Uniquely Shaped Solution Drives Safety at Skewed Intersection

(continued from page 6)

Overcoming Site Challenges

Once a roundabout was chosen, several existing site challenges had to be addressed. These included residential properties located at the northwest and southeast quadrants of the site and concerns from the public about maneuverability.

Three types of roundabouts were considered. A standard, or circular, roundabout was the most familiar design for drivers, but it would have been difficult to implement with the skewed intersection and right-of-way requirements. An oval-shaped roundabout would improve the geometrics compared to the standard roundabout but would not solve right-of-way needs.

Delaware County engineers suggested a peanut-shaped roundabout concept. This design moved most of the roadway onto vacant land in the southwest and northeast corners, away from the residential properties. The peanut shape also helped to correct the skew at the intersection by increasing the space between legs at the acute quadrants (southwest and northeast). This improved the angle of visibility and sight distance for drivers approaching the roundabout on the northern and southern legs.

Addressing Public Concerns

A public meeting and comment period revealed concerns with the roundabout's drivability for larger vehicles, such as farm equipment that frequently traveled the roadways. A 3D model with tractor trailer and combine harvester turning templates was created to simulate the drive and ensure the design was adequate to accommodate such vehicles. Observation after construction showed that tractor trailers could easily traverse the roundabout when using the truck apron appropriately. Educational resources also addressed the lack of driver knowledge about roundabouts, as a follow-up to the public meeting.

From a driver's perspective, looking west along SR 656 during construction

The First of Its Kind in Ohio

The peanut roundabout at the SR 61, SR 656 and Wilson Road intersection was the first to be constructed in Ohio, and one of only a few constructed nationally. When designing it, few standards existed for a peanut-shaped roundabout. There were, however, detailed parameters for a circular one. The Transportation Research Board's roundabout design manual, National Cooperative Highway Research Program Report 672, helped the project team develop standards for the peanut-shaped design based on those for a circular roundabout. These standards are now available for other applications of similar intersection designs across the state.

A Cleaner, Greener Approach

The new intersection, with curb and gutter, provided a cleaner appearance compared to the original one composed of dirt and gravel shoulders that were often driven on and rutted. Vegetated filter strips were installed to address the additional impervious area. These strips helped reduce sediment and other contaminants from runoff and maintained or improved water quality. By their nature, roundabouts provide a more sustainable option than signalized intersections because the continuous flow of traffic results in lower vehicle emissions.

The application of a peanut roundabout at the intersection of SR 61, SR 656 and Wilson Road significantly improved the safety of the high-crash location without impacting adjacent properties. It also alleviated the public's concerns over maneuverability and improved traffic flow, an additional benefit for the area's projected growth.

Traffic flowed easily through the new roundabout.

Cold In-Place Surfacing: From Innovation

Cold In-Place (CIP) paving operation – mix production
Courtesy of North Dakota Department of Transportation

CIP windrow after processing by equipment train
Courtesy of Short Elliott Hendrickson, Inc.

to Implementation

by Matthew Schaible, PE, **ASHE Central Dacotah Section**

Drivers traveling along ND 8 in southwestern North Dakota had to contend with a dangerous ride from a severely distressed bituminous surface, causing reduction of travel speeds. The corridor was heavily used by rural farming operations and travelers going between western North Dakota and South Dakota. After considering several options for pavement preservation on the corridor, North Dakota Department of Transportation (NDDOT) chose to perform a trial of Cold In-Place (CIP) asphalt due to the size and distress of the roadway section.

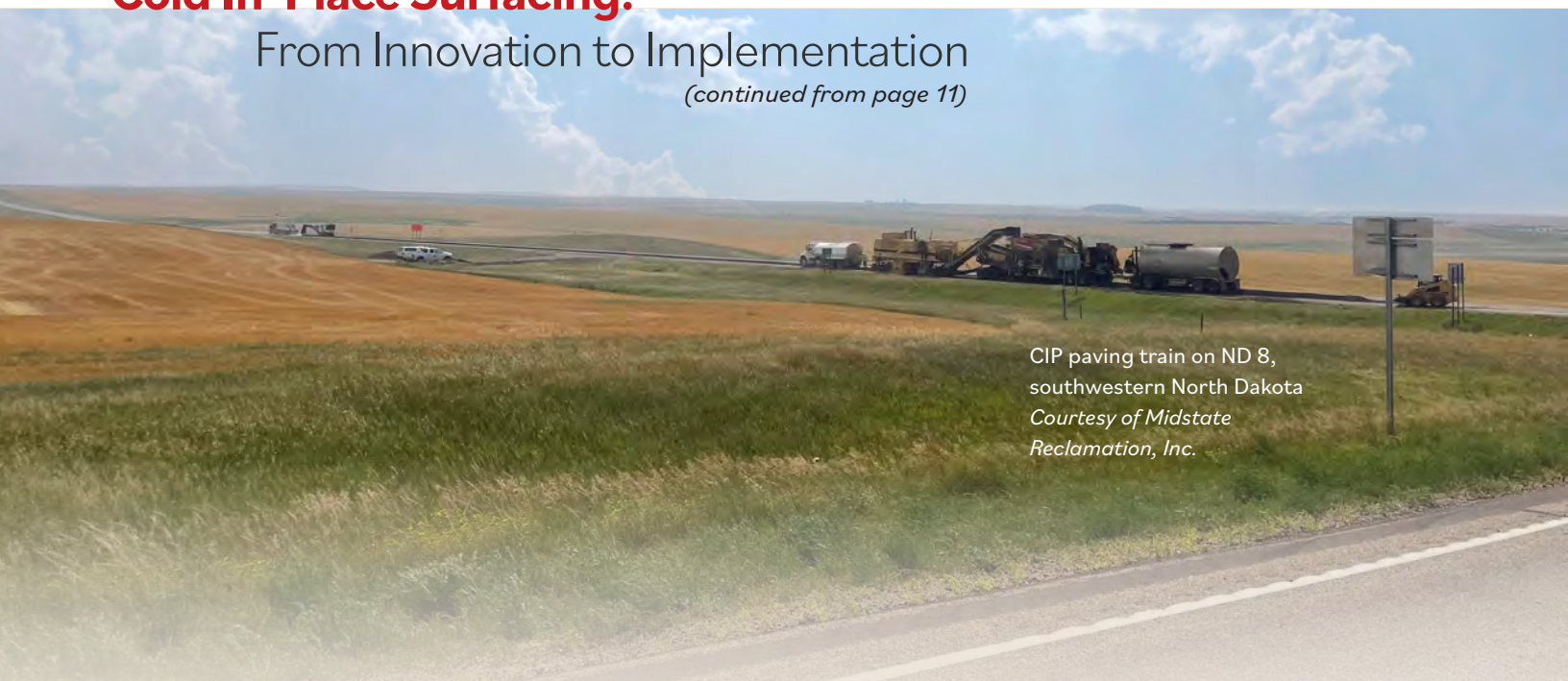
The project limits included 26 miles of two-lane highway with a 28-foot width, bookended by T-intersections at other state highway routes. The size of the highway was a key factor for implementation of the CIP operation. Due to widths of the mill head in the CIP train being 14 feet, the project required a certain width to make the option for this type of work feasible. This width allowed for a single pass in each direction to be made, capturing the entire driving lane and shoulder at one time.

A second factor in the selection of the CIP method was the poor ride of the roadway. The CIP operation was a cost-effective way to recycle poor asphalt and to create an improved ride at the pavement base layer. The third requirement of the roadway was the existing bituminous pavement thickness. Because of the machinery's weight, the depth of pavement left after milling needed to be such that the machinery would not risk breaking underlying pavement. The ND 8 section of highway met all three factors, allowing the project to be considered for the CIP trial.

The design of the project included safety improvements to roadside features. It entailed slope flattening of all approach types, guardrail slope widening and guardrail replacements. The pavement section was designed to be a three-inch CIP topped with three-inch Superior Performing Asphalt Pavements Federal Aviation Administration 45 (Superpave FAA 45). The CIP operation was to be completed ahead of the paving operations to ensure cure times, and the bituminous layer was completed in two one-and-one-half-inch lifts. This resulted in three separate opportunities to improve the ride quality of the highway. *(continued on page 12)*

Cold In-Place Surfacing:
From Innovation to Implementation

(continued from page 11)



CIP paving train on ND 8, southwestern North Dakota
Courtesy of Midstate Reclamation, Inc.

A special provision was written for the CIP operation requiring the mix to be cement stabilized, using an engineer emulsion and a one-and-one-quarter-inch nominal Recycled Asphalt Pavement (RAP). It also required the implementation of a Quality Assurance/Quality Control (QA/QC) process for acceptance.

The specific requirements adhered closely to national standards while incorporating changes for the specific roadway's section and regional weather. A control strip was used to determine the density of the Cold In-Place Recycling (CIR) material and target construction density. The control strip was checked at the start of each day and whenever specific triggers were hit. These triggers included a compaction result of a lot over 102.0 percent, existing pavement temperature increasing by 20 degrees F. or more or significant changes in the RAP gradation. Other triggers could have been changes in the roadway material (i.e., patching, chip seals, etc.) or a change in the asphalt stabilizing agent application rate greater than 0.3 percent.

CIP pavement placed and compacted on ND 8
Courtesy of Midstate Reclamation, Inc.

Specifications required that field density met a minimum of 98.0 percent of the target density established in the control strip by QA/QC. In addition, no bituminous paving operations were to be done over the CIR for a minimum of 10 days after final compaction. The only exceptions were if the moisture content of 3.0 percent or lower was achieved by testing or the change in moisture content of a full-depth sample was less than 0.30 percent over the course of testing for three days.

The project, bid in winter 2020-21, was awarded to Northern Improvement Company, Dickinson, ND. Construction engineering was awarded to Short Elliott Hendrickson, Inc., (SEH), Bismarck, ND. The CIP operation was

subcontracted to Midstate Reclamation of Midstate Companies, Inc. (Midstate Reclamation), Lakeville, MN. SEH hired Terracon Consultants, Inc., to perform all QA testing of the CIR in field. Midstate Reclamation hired American Engineering Testing, Inc. (AET), to perform QC testing. The project, begun in spring 2021, was completed in October 2021. The CIR operation for the 26-mile project was completed in 22 working days.

AET performed the mix design with target values of 0.5 percent Portland cement content, 3.0 percent emulsion content and a target moisture content of 2.0 percent. The project control strips determined that average density of the CIR was between 129 and 134 pounds/cubic yards on average, with a median of 131.9 pounds/cubic yards. Moisture content was much higher than anticipated and ranged between 10 and 14 percent of newly laid mix. However, this did not interfere with bituminous paving operations of the Superpave FAA 45 due to staging of the operations. At the time of bituminous paving, the CIR dropped below 3.0 percent moisture due to time and ambient temperatures reaching as high as 102 degrees F.

The CIR operation provided a favorable surface for the bituminous paving of the Superpave FAA 45 because of the ride improvement and stability of the CIR. It not only allowed for ease of paving but also provided a softer layer between the remaining existing pavement and the new three-inch pavement over the CIR. This acted as a cushion barrier between the existing cracked pavement and the new pavement, lending improvements to crack reflectivity.

Before construction, this section of roadway had an International Roughness Index (IRI) score average of 172.0, a classification of “poor” (range > 145). The pavement had a distress score average of 79 and classification of “average” (range from 77 to 87). Although the project specifications did not include a specific flexible pavement ride specification, NDDOT performed multiple data collection sessions over the course of the project completion. It found the ride improved to the “excellent” range (0 to 60) for IRI with average in the 30 to 40 range and a distress score of “excellent” (≥ 98).

Using the CIR operation in conjunction with bituminous hot mix asphalt was key to providing a cost-effective plan that resulted in a smoother, safer ride on the busy route.

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NEW DIRECTIONS *(continued from page 3)*

Shirley and her husband, John, were fixtures during my early years on the National Board, and our thoughts and prayers are with her family.

I extend a heartfelt thank you to all of my fellow Board members and Committee Chairs for their commitment over the past year. ASHE prides itself on being a grassroots organization, and we are nothing without our members. So thank you to the membership as well. I am grateful for the experiences and friendships that this year has brought my way. It is a sprint to the finish, as I have a few more Section visits on the calendar while this membership year draws to a close. I am thankful for the opportunities this organization has given me and am excited to pass the torch to the incoming President, Stan Harris.

Thanks for a great year, ASHE!

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ASHE scanner

See page 39 for schedule and rates

As The Wheel *Turns*

ASHE Members on the Move!

Dewberry Promotion for Smith

Fairfax, VA—**Lee Smith, PE,** was promoted to associate vice president in Dewberry's Mechanicsburg, PA, office. Smith, a **member of ASHE's Altoona Section and Clearfield Section,** is the office's bridge structures department manager. He joined Dewberry in 2000 and has more than 25 years of technical expertise. His background includes projects primarily for the Pennsylvania Department of Transportation. Smith earned a Bachelor's degree in Civil Engineering from Penn State.

Betz Joins French & Parrello

Wall Township, NJ—**Eric C. Betz, PE, BCEE, CME,** has joined French & Parrello Associates as a vice president and senior project consultant. A **member of ASHE North Central New Jersey Section,** he has more than 30 years in engineering, management and business development experience in the water, transportation, building and energy sectors. Betz will be part of the management team with responsibility for developing business strategies that align with the firm's growth objectives.

Steib Receives Appointment

Trenton, NJ—**Sarah Steib, PE,** has been appointed to the Executive Committee of the American Council of Engineering Companies of New Jersey. Steib, a **member of ASHE North Central New Jersey Section,** serves at French & Parrello as discipline manager for bridges/dams and project manager. She will lead New Jersey Department of Transportation's Multi-Project/Multi-Proposal Replacement Projects over Railroads CR 531 Bridge over Lehigh Valley Main Line Railroad.

2023 ASHE National Conference

Atlanta, Georgia | June 7-11, 2023

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Conference Sponsorships

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- Logo included on display board at registration
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- Logo included on background slides
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- Recognition on social media posts
- Four (4) conference registrations*
- One (1) golf foursome
- Exhibit booth with priority in location choice**

Home Run ($7,500)

- Full page ad in program book
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- Logo included on background slides
- Logo included on conference websiteVerbal and printed recognition at opening session
- Recognition on social media posts
- Four (4) conference registrations*
- Exhibit booth with priority in location choice**

Triple ($5,000)

- Half page ad in program book
- Logo included on display board at registration
- Logo included in conference booklet
- Logo included on background slides
- Logo included on conference website
- Recognition at opening session
- Recognition on social media posts
- Two (2) conference registrations*

Double ($2,500)

- Quarter page ad in program book
- Name included on display board at registration
- Name included in conference booklet
- Name included on background slides
- Name included on conference website
- Printed recognition at opening session
- Recognition on social media posts
- One (1) conference registration*

**A separate registration form is required to account for each free registration. If the recipients are known, you may attach their registration form(s) at this time, or choose to register them later.*

***Please provide your preferred exhibit booth location with this form. Selection is subject to availability.*

Other Sponsorships

Hotel Key Sponsor ($3,000)

- Limit: 1
- Logo placement on hotel key cards

Wifi Sponsor ($3,000)

- Limit: 1
- Logo included in conference booklet
- Logo placement on all wifi information cards
- Ability to select the conference network password

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Event Sponsorships

Hospitality Room ($3,000)

- Limit: 3
- Logo displayed prominently on event signage and included in conference booklet

Friday Night Event ($2,500)

- This event will take place at Truist Park, home of the Atlanta Braves for a game. Join us for a tailgate event near the stadium before heading inside Truist Park for a game against the Washington Nationals. More than 340 tickets are available in the lower level, so plenty of fun for all!
- Limit: 8
- Logo included on display board at event
- Logo included in conference booklet
- Logo included on conference websiteTwo (2) event tickets included

Breakfast ($500)

- Limit: 12
- Logo displayed prominently on event signage and included in conference booklet

Ice Breaker ($1,500)

- Limit: 6
- Logo displayed prominently on event signage and included in conference booklet

Gala Banquet ($1,000)

- Limit: 4
- Logo included on display board at event
- Logo included in conference booklet
- Logo included on conference website and app

Technical Session Break ($500)

- Limit: 12
- Logo displayed prominently on event signage and included in conference booklet

Golf Sponsorships

Various Levels Available ($750-$2,000)

- Various sponsorship levels are available, including golf cart, breakfast, lunch, and beverage sponsors
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SOLD OUT!

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- Size: 4" x 8"

Inside Back Cover
$1,500

- Limit: 1
- Size: 4" x 8"

Full Page
$750

- Limit: None
- Size: 4" x 8"

Half Page
$375

- Limit: None
- Size: 4" x 4"

Quarter Page
$250

- Limit: None
- Size: 2" x 4"

Exhibitor Sponsorships

Premium Exhibitor Sponsor ($1,500)

- Limit: 8 *(Check conference website for availability)*
- Premium central location to conference event rooms
- Two complimentary conference registrations (does not include add-on events)
- Company listing in the program
- Each 10'x10' booth includes: draped side rails and backdrop, one 6' skirted table, two chairs, one wastebasket, access to electrical hook-up, and free wi-fi
- Double booth requests will be accepted and honored, if possible

Standard Exhibitor Sponsor ($1,250)

- Limit: 32 *(Check conference website for availability)*
- Central location to conference event rooms
- Two complimentary conference registrations (does not include add-on events)
- Company listing in the program
- Each 10'x10' booth includes: draped side rails and backdrop, one 6' skirted table, two chairs, one wastebasket, access to electrical hook-up, and free wi-fi

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Renaissance Atlanta Waverly Hotel & Convention Center

Our host hotel is located adjacent to "The Battery Atlanta," home of the 2022 World Series Champion Atlanta Braves and the location of a world-class live-work-play development. Throughout the conference, be sure to enjoy the daytime shopping, dining, and entertainment options of this area!

Visit 2023conference.ashe.pro for updated information and online registration!

Attendance and Activities Information

Time	*Event/Activity*	*Cost*	*Number Attending*	*Total*
Wednesday, June 7, 2023				
2:00pm – 7:00pm	Registration	Use Registration Form		
7:00pm – 12:00am	Hospitality Suite	No Cost or Registration Required		
Thursday, June 8, 2023				
6:00am – 1:30pm	*Guest Tour:* Fishing at Lake Lanier	$200		$
5:30am – 7:00pm	Registration	Use Registration Form		
7:30am – 5:30pm	Annual Golf Tournament	$175		$
9:00am – 3:00pm	*Guest Tour:* Wake Boarding at Lake Lanier	$140		$
9:00am – 3:00pm	*Guest Tour:* Atlanta Botanical Gardens	$50		$
12:00pm – 6:00pm	Hospitality Suite	No Cost or Registration Required		
12:00pm – 6:00pm	Exhibit Hall Open for Booth Set-up	-	-	-
6:00pm – 9:00pm	Welcome Reception and Ice Breaker with Exhibitors	No Cost or Registration Required		
9:00pm – 12:00am	Hospitality Suite	No Cost or Registration Required		
Friday, June 9, 2023				
7:00am – 7:00pm	Registration	Use Registration Form		
7:00am – 8:30am	Breakfast	No Cost or Registration Required		
7:00am – 5:00pm	Exhibits Open	-	-	-
8:00am – 9:30am	Opening Session	-	-	-
9:00am – 4:00pm	*Guest Tour:* City Pass Day 1***	$100 (Adults), $75 (Children)		$
9:00am – 2:00pm	*Guest Tour:* Eastside Atlanta Segway Tour	$80		$
9:00am – 1:00pm	*Guest Tour:* Atlanta History Center	$35		$
9:30am – 10:00am	Break with Exhibitors	-	-	-
Technical Session 1				
10:00am – 11:30am	1A – Connected Vehicles 1B – Alternative Delivery 1C – ASHE Region/Section Officers Meeting	-	-	-
11:30am – 12:00pm	Break with Exhibitors	-	-	-
12:00pm – 1:30pm	Luncheon Honoring Past Presidents *(no other lunch provided at conference)*	$50		$
1:30pm – 4:00pm	*Guest Tour:* Buckhead Village Shopping District	$20		$
1:30pm – 2:00pm	Break with Exhibitors	-	-	-
2:00pm – 3:30pm	Past National Presidents Meeting	-	-	-
Technical Session 2				
2:00pm – 3:30pm	2A – Multi-Use Facilities 2B – Technology 2C – Starting and Running an ASHE Section	-	-	-
3:30pm – 4:00pm	Break with Exhibitors	-	--	-

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2023 ASHE National Conference

Atlanta, Georgia | June 7-11, 2023

Technical Session 3				
4:00pm – 5:00pm	3A – Planning 3B – Safety 3C – Infrastructure	-	-	-
6:00pm – 10:30pm	Atlanta Braves/Washington Nationals Game	$75		$
10:30pm – 12:00am	Hospitality Suite	No Cost or Registration Required		
Saturday, June10, 2023				
7:00am – 6:00pm	Registration	Use Registration Form		
7:00am – 8:30am	Breakfast	No Cost or Registration Required		
8:00am – 12:00pm	*Guest Tour:* Sope Creek Hike and History of the Paper Mill	$20		$
Technical Session 4				
8:00am – 9:30am	4A – Large Highway Projects 4B – Infrastructure (Cont.)	-	-	-
9:00am – 4:00pm	*Guest Tour:* City Pass Day 2***	Included in Cost of Friday's City Pass		
10:00am – 12:00pm	National ASHE Board Meeting	-	-	-
10:00am – 1:30pm	*Technical Tour*: Windy Hill Boulevard Tour with Lunch at a Local Brewery	$25		$
12:30pm – 4:00pm	*Guest Tour:* Tour of Three Local Brewers, Including Lunch	$50		$
3:00pm – 6:00pm	Hospitality Suite	No Cost or Registration Required		
6:00pm – 7:00pm	President's Reception	No Cost or Registration Required		
7:00pm – 10:00pm	Annual ASHE Banquet	$100		$
10:00pm – 12:00am	Hospitality Suite	No Cost or Registration Required		
Sunday, June 11, 2023				
7:00am – 9:00am	Breakfast	No Cost or Registration Required		
9:00am – 10:30am	Conference Debrief Meeting	-	-	-
			Activities Subtotal	$

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Visit 2023conference.ashe.pro for updated information and online registration!

2023 ASHE National Conference

Atlanta, Georgia | June 7-11, 2023

Conference Registration Form

Online registration preferred. Register online or get more information at 2023conference.ashe.pro.

Last Name _____ First Name _____ Company _____

Street Address _____ City _____ State _____ Zip Code _____

Phone _____ Cell Phone _____ Email Address _____

__ Yes __ No ASHE Member _____ ASHE Section

__ Yes __ No Speaker

__ Yes __ No Past National President

__ Yes __ No National Board

Spouse/Guest Last Name _____ First Name _____ Name(s) of Children _____

Name as you would like it to appear on badge _____ Comments of special needs (access/dietary) _____

Spouse/Guest name as you would like it to appear on badge _____ Comments of special needs (access/dietary) _____

#	Full Conference Registration	Register on or before 5/1/2023	Register after 5/1/2023	TOTAL
	ASHE Member	$210	$275	$
	Non-ASHE Member	$250	$325	$
	Government Employee/Retiree	$150	$200	$
	Guest/Child 10 & Older *(no charge for child under 10)*	$50	$65	$
#	**One-Day Friday Registration**	**Register on or before 5/1/2023**	**Register after 5/1/2023**	**TOTAL**
	ASHE Member	$125	$175	$
	Non-ASHE Member	$165	$225	$
	Government Employee/Retiree	$100	$150	$
			Conference Registration Subtotal	**$**
			Confirmed Speaker [Deduct $50] *(code:)*	-$
			Confirmed Registration as an Exhibitor [Deduct Registration] *(code:)*	-$
			Confirmed Registration as a Sponsor [Deduct Registration] *(code:)*	-$
			Confirmed Past ASHE National President [Deduct $50] *(code:)*	-$
			Golf Registration Subtotal *(from Golf Registration form)*	$
			Activities Registration Subtotal *(from Attendance and Activities form)*	$
			GRAND TOTAL	**$**

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Vital Upgrades for a Local Transportation Network

by Eric Dues, PE SE, Gannett Fleming, Inc., **ASHE Central Ohio Section**

Project near completion, including bridges and roundabout

Lazelle Road provided a major link between I-71 and US-23 in Columbus, OH. It moved significant amounts of traffic around several corporate and residential complexes and one of Ohio's largest shopping malls. The widening of Lazelle Road was constricted by the short spans of railroad bridges built after a 1913 flood, barely accommodating two traffic lanes.

Further complicating traffic flow was an offset alignment between Flint Road and South Old State Road, a single continuous lane through farmland before the railroad raised its embankments to prevent impacts on freight. Because urban development ultimately constricted the geometrics and drainage, the roadway operated at a Level of Service "F", the worst grade level, before construction. The new grade separation design required the once continuous road to be offset and connected by the newly constructed road.

The Lazelle Road Widening Project's design increased traffic flow and improved drainage under the bridges, which was critical to the area's revitalization. It also accommodated the uninterrupted flow of freight traffic and emergency services during construction. Finally, the design team limited rail outages to force account cut-throw operations while designing the temporary structure, providing full under-clearance during construction. These details were acceptable to both the Norfolk Southern Railway (NS) and CSX Transportation (CSX) rail system, limiting rework over the roadway. This, in turn, allowed for consistent movement of public traffic and improved times for Emergency Medical Services (EMS) from Fire Station #33 located east of South Old State Road.

ASHE Central Ohio Section 2022 Project of the Year Award *Over $5 Million*

Complex Design

With a constrained right-of-way, difficult railroad median access and 1.5:1 railroad embankment side slopes, the method and sequencing of construction required forethought and coordination. A tangent drilled shaft wall, constructed from the top down, was a natural fit given the shallow shale. However, access within the right-of-way between the two bridges proved critical. The design of a multiphased shoring installation and removal process allowed the contractor access to the track median and reuse of shoring in subsequent phases.

The shoring design considerations included multiple components of several elements deflecting in different directions at diverse stages of phased rail traffic. None of this calculated deflection could exceed the maximum allowable deflection of three-eighths of an inch in any direction at any point. The structural system involved bolted connections at points of reversible force, king piles embedded in the final structure and sheeting supported by a large cantilevered waler carried by the king piles.

The cantilever portions were removed in phases to allow the tangent wall construction to commence in one direction. In the first phase, the cantilever shoring was in compression against the king pile connection. However, in subsequent phases, the system would carry live load and fill between the rows of sheeting, reversing the force in the system and its connections. For this reason, a field drilled-and-bolted connection scheme was devised to allow phased removals of the shoring and eliminate field welds in tension.

Construction Challenges

In addition to installing and removing the shoring system, there were more challenges. The coordination for delivery and erection of the girders for the

(continued on page 26)

Vital Upgrades for a Local Transportation Network

(continued from page 25)

temporary bridge between the existing active railroad tracks had little margin for error during installation and removal. The access roads and temporary crossing over the CSX track allowed for material and girder delivery.

The last roadway closure eased the final lowering of the Flint Road intersection and installation of utilities. All roadway lowering and utility installations had to contend with shallow shale, so rock excavation took time. It had to be completed concurrently and in coordination with both railroads' permitting and construction processes.

The construction team proposed and built portions of a roundabout using an alternate phasing, allowing roadway forces to focus on the closure when that critical path item occurred. These extra resources available during the full closure helped minimize the full closure lowering of the roadway under the bridges.

Long-term Benefits

Gannett Fleming's Complete Streets approach created a multimodal transportation corridor, benefiting residential, commercial office and retail space. These improvements will save time on nearly 10,000,000 trips on the roadway network every year. The renovated roadway network had an average daily traffic count of 25,000 vehicles.

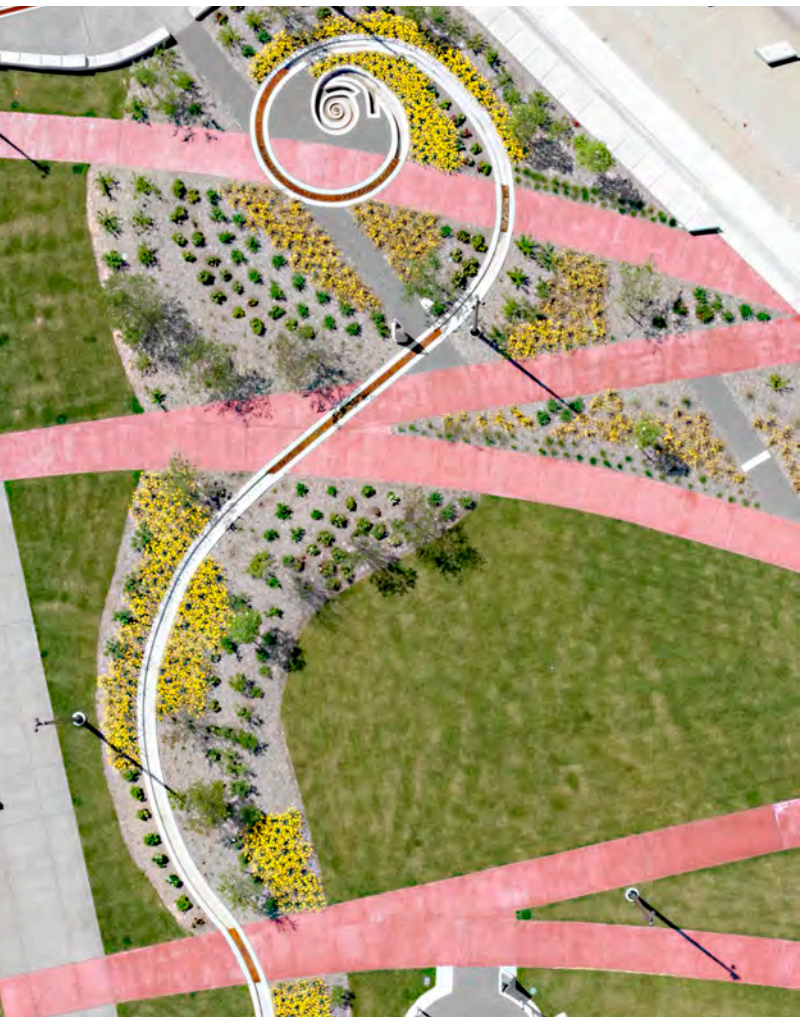
The project included the design of the bridge superstructure, abutment and wing walls for future loading. While not standard for railroads, as they typically require full build-out, this method ultimately saved the project $2.5 million in construction cost.

Public and private utility coordination contributed to easier management of construction schedules. A shared duct bank was installed to facilitate a location away from the existing and proposed foundation despite complex railroad permitting and structural review of those permits. Managing a mix of designs and details of the shared temporary track and structure (used by both railroads but on CSX property) required multilevel reviews from the City of Columbus, NS and CSX. These reviews uncovered discrepancies between project owners that required close coordination between the City and the design engineer. Regular and responsive communication via text between the construction foreman, construction manager and design engineer aided in faster decision-making on minor issues during construction.

The existing narrow, crumbling railroad overpass was replaced with a new, longer and slender-looking superstructure. It was supported by a low-maintenance, cast-in-place concrete abutment facing that mimicked stone and column construction. The longer bridges will accommodate the additional roadway traffic generated by the area's revitalization.

The Lazelle Road Widening Project received several awards. Its improved roadways and roundabout positively affected traffic patterns and subsequent travel time costs. For example, a five-minute delay on workdays by 25 percent of the traffic through this congested intersection previously had a cumulative effect of 135,000 hours of total delays annually. This equated to an economic impact of approximately $3 million per year, now substantially reduced by improved and more reliable transportation. It also improved public safety by lowering EMS response times.

Geotechnical Aspects of Pittsburgh's Urban Open Space Cap Project



"It connects a part of town that was isolated and somehow left behind, and also provides green infrastructure and sustainability. It is really an example of what a downtown highway project can provide for the communities in a different way than just a highway."

-Sebastian Lobo-Guerrero, PhD, PE

by Roger Eaton, PE, and Nicholas Burdette, PE, HDR; Taylor DaCanal, EIT, and Sebastian Lobo-Guerrero, PhD, PE, American Geotechnical & Environmental Services, Inc., **ASHE Pittsburgh Section**

2022 Project of the Year Award Over $20 Million

The I-579 Urban Open Space Cap Project, a new, three-acre green space, reconnected Pittsburgh's historic Hill District with the city's downtown business and cultural center. This first-of-its-kind project sought to remedy historical development that harmed the Hill District by reconnecting this predominantly African American neighborhood through a unique land bridge spanning over the interstate.

Of all the challenges this project possessed, developing a viable structural solution for the bridge was the greatest hurdle to overcome. The new bridge had to "fill the gap" between the two existing vehicular bridges, while maintaining required vertical clearance above the interstate and carrying sufficient soil depth to sustain plantings on the surface. HDR developed the preferred solution to minimize initial cost, limit impacts to the existing structures and interstate traffic and utilize low-maintenance components. The result was a series of adjacent prestressed concrete box beam superstructures supported on semi-integral abutments and multi-column bents.

- Adjacent prestressed concrete box beams were used for the superstructure to minimize construction impacts to the interstate below. The superstructure was divided into three units transversely to allow transverse post-tensioning of the beams and align the new piers with the existing gore areas/adjacent structures. Two of the units consisted of two-span continuous bridges while the third unit was a three-span continuous bridge.
- The new abutments were constructed behind the existing large retaining walls that separated the interstate from the adjacent facilities. The retaining walls were trimmed to accommodate the new bridge beams. New abutments were supported by over 200 drilled micropiles used to minimize disturbance to the existing walls founded on spread footings. The micropile foundations were unconventional since lateral load had to be resisted by battering the piles away from the new superstructure to avoid conflicts with the retaining walls. This resulted in battered tension micropiles. *(continued on page 31)*

Ideas transform communities

At HDR, we're helping our clients push open the doors to what's possible, every day.

I-579 Urban Open Space Cap, Pittsburgh, PA

hdrinc.com

Geotechnical Aspects of Pittsburgh's Urban Open Space Cap Project

(continued from page 29)

- New piers were founded on drilled caissons that could be installed in narrow gore areas and transition directly into slender multicolumn bents, to limit impact to the interstate roadway template.

The complexity of design for this constrained urban site was exacerbated by the fact that there were no standard design codes for bridges carrying a park. HDR developed project-specific criteria to meet the demands associated with the intended use of the park area. These criteria evaluated both the final in-service condition of the bridge and the construction loadings associated with placing the fill/amenities on the bridge.

Foundation Challenges

The site constraints and the geology of uptown Pittsburgh posed unique challenges for the foundation design of the I-579 Urban Open Space Cap. The foundations had to be placed in a constrained area, including foundations of existing walls, highway ramps, bridges and buildings.

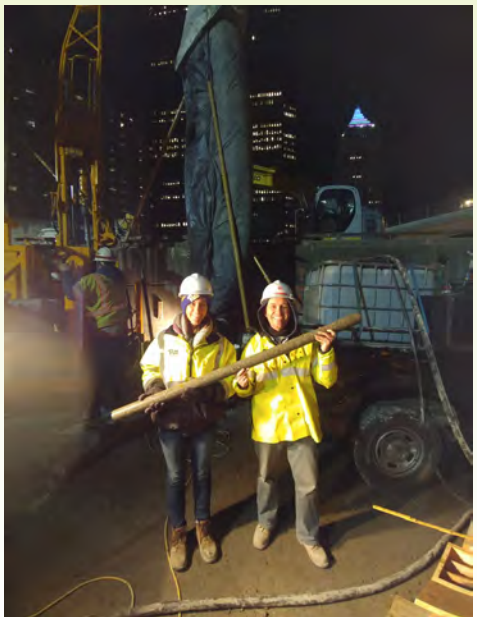
The geology generally consisted of soil fill underlain by approximately 20 feet of a weak claystone layer, followed by 15 to 20 feet of competent sandstone, above another incompetent claystone layer. The weak claystone layers are part of the Pittsburgh Red Beds, known for their low strength and susceptibility for landslides. Because of the constraints and geology, deep foundation systems were designed to utilize the competent sandstone layer between the two unsuitable claystone layers.

The foundation elements consisted of 42 caissons and 220 micropiles across the piers and abutments, respectively. Caissons three-and three-and-one-half-feet in diameter were used at the pier locations. The minimum rock socket length of the caissons was nine feet in the competent sandstone. Temporary casing was used during construction only on the soil portion. The caissons were designed for side friction resistance in the sandstone only. End bearing resistance was neglected due to the presence of weak layers underneath. The lateral capacity of each shaft was also verified. Group effects were considered for vertical and lateral capacities to ensure that the block encompassed by the drilled shafts did not break the sandstone layer and penetrate the underlying claystone.

The micropiles used at the abutments had a nine-and-five-eighth-inch outer diameter with a central No. 28 epoxy-coated 75 ksi steel bar. The cased section of the micropiles was required to be embedded a minimum of two feet in the competent sandstone, and the bond zone was a minimum of 14 feet in the competent sandstone. It was assumed that all resistance to the factored load came from the bond zone in sandstone. Battered and vertical micropiles were used in the design.

Typically, piles are battered for lateral capacity from the front of the wall, and they work in compression to carry the lateral loads. Due to the presence of the existing retaining walls along I-579, micropiles were battered toward the back of the abutment to avoid any interference with the walls. The battered micropiles were designed to resist the applied lateral loads in tension. This was not a standard practice and required special consideration and approval.

An extensive installation and testing program was developed for all foundation elements. During the caisson installation, a Miniature Drilled Shaft Inspection Device was used to ensure no accumulation of sediment at the bottom of the drilled caissons before placement of the concrete. A downhole camera was also used to verify the conditions of the rock along the caisson's walls. After the caissons were constructed, Thermal Integrity Profiling (TIP) and Cross Hole Sonic Logging (CSL) were used to evaluate the quality of the concrete in the caissons.



Due to location of piers along existing I-579 highway, testing concrete was done at night.

TIP was performed on every caisson; if the TIP results were not acceptable, CSL was employed as additional testing. TIP used temperature monitoring of the curing concrete to identify any potential anomalies, since there is a relationship between the quality and quantity of concrete and the heat generated. CSL used ultrasonic compressive pulses sent between probes to detect anomalies in the concrete between pairs of CSL

(continued on page 32)

Geotechnical Aspects of Pittsburgh's Urban Open Space Cap Project

(continued from page 31)

The Cap project's design provided areas for recreation and education as well as improved links to public transit.

tubes. Coring of the shafts was used if the TIP and CSL testing were not acceptable to confirm the quality of the concrete. Due to the location of the piers along the existing I-579 highway, night work was required for the testing of the concrete.

The testing of the micropiles included verification and proof tests. All testing was performed in tension, as this loading frame setup was more economical. It also fit the congested site better than the larger frame that would have been required for compression testing. The verification testing was performed on two sacrificial micropiles per abutment. The load during the verification test was taken to two times the design load, approximately 580 kips. The load applied during the verification testing was among the highest applied to a micropile for transportation projects in the area. Proof tests were performed on five percent of all production piles at each abutment. The load for the proof test was one-and-six-tenths times the design load.

Through subsurface investigation, design and extensive testing, a foundation plan could be used to maximize the available space and support a project that will continue to contribute to the development and growth of Pittsburgh.

The $30 million Cap project has received multiple national awards. Sebastian Lobo-Guerrero, PhD, PE, American Geotechnical & Environmental Services, Inc., said about the project: "It connects a part of town that was isolated and somehow left behind, and also provides green infrastructure and sustainability. It is really an example of what a downtown highway project can provide for the communities in a different way than just a highway."

The New Jersey Example

by **ASHE Southern New Jersey Section**

The American Society of Highway Engineers (ASHE) has approximately nine Student Outreach groups. New Jersey is home to three of them, all active thanks to efforts of the ASHE Southern New Jersey Section's Education Committee formed in 2019. To attract universities and colleges from northern New Jersey, the Southern New Jersey Section joined forces with North Central New Jersey Section, extending the Education Committee's coverage to the entire state.

The interest in ASHE Student Outreach began in 2016 at a spring meeting of the Southern New Jersey Section attended by Rowan University (Rowan) students, including Godfrey Joyner, a junior. After his meeting with ASHE Southern New Jersey's Board member Richard

(continued on page 34)

ASHE Rutgers Student Outreach members at Rutgers Club Day showed off their newly formed group. ***Luca Ondris***, their ***President***, is at far right.

Members of ASHE MCCC Student Outreach volunteered at a Habitat for Humanity event. ***Shane Steinberg, current President of ASHE MCCC Student Outreach***, is second from left.

The New Jersey Example

(continued from page 33)

Former ASHE MCCC Student Outreach President Javuan Linton, right, received an award from ASHE Southern New Jersey Section Board member Richard Grubb for helping to grow ASHE MCCC Student Outreach and for participating at Southern New Jersey Section events.

Grubb, they gauged Rowan students' interest in forming the state's first ASHE Student Outreach.

To build momentum, Grubb and fellow ASHE Southern New Jersey Section member John Eric Henson gave a PowerPoint presentation to Rowan engineering students, aided by Joyner and Rowan professor Parth Bhavsar. Bhavsar became the liaison between Rowan and the ASHE Southern New Jersey Section.

The presentation focused on the ASHE organization and highlighted the benefits of establishing a Student Outreach. A month later, 30 students became prospective members of the first ASHE Student Outreach in New Jersey. They chose a slate of officers, and the new group, called ASHE Rowan Student Outreach, began its one-year trial as a mandated university club.

In the year that followed, ASHE Rowan Student Outreach held regular meetings, often featuring presentations by ASHE Southern New Jersey Section members. The students' group, under Joyner's leadership, worked on projects and fundraisers. They attended ASHE Southern New Jersey Section gatherings, meeting prospective employers and learning about the parent organization.

ASHE Rowan Student Outreach became official after completing its trial period thanks, in large part, to Joyner, his student colleagues and professor-liaison Bhavsar.

The establishment of ASHE Rowan Student Outreach illustrated two of the main ingredients for a successful Student Outreach: an enthusiastic student leader and an invested academic advisor. After Joyner graduated from Rowan University and Professor Bhavsar stepped down as liaison, it took effort to ensure the group remained viable.

Following establishment of ASHE Rowan Student Outreach, ASHE Southern New Jersey's relationship with Professor Jim Maccariella, of Mercer County Community College (MCCC), led to forming ASHE's first community college Student Outreach. The same plan was followed at MCCC: presentations to students by ASHE Southern New Jersey Section members and regular meetings of ASHE MCCC Student Outreach, often with talks by professional engineers. Professor Maccariella also spearheaded projects carried out by his students.

ASHE MCCC Student Outreach has thrived since its formation in 2017. This is

due in large part to the efforts of Professor Maccariella's commitment to overseeing the group and making sure his students get the most out of it. The continued success of ASHE MCCC Student Outreach has fallen on the shoulders of Professor Maccariella, its academic liaison and advisor. That has been critical for ASHE MCCC Student Outreach due to the student turnover occurring every two years.

In 2022, ASHE Rutgers Student Outreach was established, and a fourth Student Outreach at The College of New Jersey is forming this year. These have taken place, in large part, due to the efforts of a student first exposed to ASHE through his participation in ASHE MCCC Student Outreach. The Education Committee is also considering the New Jersey Institute of Technology (NJIT) for a fifth ASHE Student Outreach. Two members of the Education Committee have connections with the faculty in the Civil Engineering Department at NJIT, and there is interest in forming an ASHE Student Outreach there.

The growth of new ASHE Student Outreach groups illustrates their benefits to engineering students and to the ASHE Section that helped establish them. Graduating seniors will often join companies whose employees participated in the activities of the particular ASHE Student Outreach. National Section memberships can grow when young engineers, who were exposed to the organization through their school's Student Outreach, join the "parent" ASHE Section after beginning their careers. In fact, Godfrey Joyner now co-chairs the ASHE Southern New Jersey/ASHE North Central New Jersey Education Committee. Finally, participation in the activities of an ASHE Student Outreach will help prepare engineering students for life as a professional engineer after graduation.

ASHE Rowan Student Outreach at an ASHE Southern New Jersey Section field trip observed construction methods for a new bridge. ***Former ASHE Rowan President Godfrey Joyner (left) and former Vice President Johnathan Grande are pictured here.***

Suggestions for establishing an ASHE Student Outreach in other states:

1) Depending on the size of the state, form one or more Education Committees with several ASHE Sections joining forces. This can encourage various ASHE Sections to work collaboratively in the effort to establish a Student Outreach.

2) Establish a relationship with a professor at the school of interest, who will promote the benefits of a Student Outreach. This should be done by reaching out to the school's Civil Engineering Department.

3) Develop a PowerPoint presentation to show to a class or classes organized by a professor.

4) Get a list of attendees from the PowerPoint presentation and follow up with them and the professor to determine the viability of forming a Student Outreach.

5) If there is interest, encourage the students to choose a slate of officers and write a set of bylaws consistent with both ASHE and their university.

ASHE Student Outreach

COMPLETING A CRITICAL LINK

by James Bishoff, PE, and Jonathan Wilfong, PE, J2 Engineers, **ASHE Potomac Section**

Sixteen 148-foot-long precast girders were placed over the South Fork of Broad Run.

The final design reduced the multi-span bridge to a 150-foot single-span bridge, resulting in project savings and permit impacts.

IN NORTHERN VIRGINIA

Loudoun County's Northstar Boulevard was recognized by the Virginia Department of Transportation (VDOT) as part of a north/south Corridor of Statewide Significance. It had the potential to reduce congestion on parallel north/south routes between I-95 and Dulles International Airport. It could also connect travelers to places in Loudoun County and beyond. The new four-lane segment of Northstar Boulevard, to be completed by the end of this year, will provide an alternative north/south connection to US 50 from Tall Cedars Parkway.

Loudoun County Department of Transportation and Capital Infrastructure tasked J2 Engineers (J2) with preliminary and final designs for roadway improvements. These consisted of 4,100 linear feet of new alignment, 1,900 linear feet of roadway widening, turn lanes at three intersections and a 40-foot-wide depressed grass median. The design also included 10-foot-wide shared-use paths on both sides of the road. Traffic signals with pedestrian controls will be installed at the US 50 and Tall Cedars Parkway intersections as part of the project.

The project funding (Tier 2 – revenue sharing) required the VDOT Locally Administered Projects process. The $45.8 million project budget included 70 percent regional and 30 percent local funding from the Northern Virginia Transportation Authority and proffers. The project's scope of work consisted of roadway design, coordination with adjacent developers, minimizing environmental impacts, design of stormwater management facilities and water and sewer design. It also entailed utility coordination, bridge design, traffic and signal design, maintenance of traffic plan, permitting, plat preparation, public involvement and construction administration. The J2 Team used laser scanning to gather survey data for more than 6,500 linear feet of the project's associated roadway.

One feature of the project is the 150-foot-long by 126-foot-wide single-span bridge over the South Fork of Broad Run, designed in coordination with J2's subconsultant E.L. Robinson. The project required a floodplain model calibration, floodplain alteration and an approved Conditional Letter of Map Revision (CLOMR) from the U.S. Army Corps of Engineers. The design included bridge approaches, guardrail, shared-use path, evaluation of deck drains, scour protection, utility relocations and public input for bridge and abutment aesthetics. Working with Loudoun County and VDOT, the bridge foundation was redesigned to reflect the variable bedrock encountered at depths different from the estimated bedrock depth, which was based on the original subsurface investigation. Even with this site challenge, the project has remained on schedule.

(continued on page 38)

Completing a Critical Link in Northern Virginia

(continued from page 37)

Northstar Boulevard Video

Residents and motorists will benefit from additional routes, alleviated traffic congestion and safer roadways when this project is completed.

Bridge Challenges

The proposed roadway alignment of Northstar Boulevard required crossing the South Fork of Broad Run Major Floodplain. One of the challenges was that the roadway alignment crossed the floodplain at a 45-degree skew, requiring a 480-foot multispan bridge to cross the existing floodplain. J2 discovered that the 100-year flow distribution at the crossing was located incorrectly within the model. This resulted in an increased 100-year flow by about 600 cubic feet per second at the crossing and a larger structure.

J2 worked with the Loudoun County Floodplain Team to update the existing model. This would correct flow location and provide an analysis approvable by Loudoun County, VDOT and the Federal Emergency Management Agency with a CLOMR. J2 modeled multiple bridge options to provide a design that limited the flood elevation rise and minimized the bridge length. The final design reduced the multispan bridge to a 150-foot single-span bridge, resulting in project savings and permit impacts.

Intersection Design

Another challenge with this project was designing an intersection at US 50 that would be both safe and cost-effective. The adjacent properties had previously reserved right-of-way for this new roadway that dictated where the alignment of Northstar Boulevard would intersect with US 50. J2 studied the corridor and found that US 50 is bifurcated between the eastbound and westbound lanes, in some locations as much as 14 feet vertical difference. This geometric constraint required multiple iterations to understand where the new roadway would connect to US 50, and evaluated the future continuation of Northstar Boulevard north. This effort reduced improvement costs on US 50 and promoted a safe transition through the crossover. The intersection accommodated dual turning movements at each approach, intersection crossover design, drainage and signalization. J2 worked with VDOT to ensure the interim improvements would not sacrifice public safety until the ultimate improvements are completed.

An additional challenge with this intersection was the inadequate intersection spacing on US 50 with an existing intersection to the west of the proposed intersection. A VDOT Access Management Waiver was supported by the state's Location and Design Division and VDOT-Traffic Engineering for the reduction of the crossover spacing. The VDOT maintenance facility was also located on the northeastern quadrant of the intersection, and the design included maintaining access to the facility during and after construction.

Residents and motorists will benefit from additional routes, alleviated traffic congestion and safer roadways once this project is finished. Construction progress is on track, and the project is expected to be completed on time.

Loudoun County is also developing a future segment of Northstar Boulevard from Tall Cedars Parkway to Braddock Road, which will join this segment with the existing roadway in the Dulles area. J2 is lead designer on the project that includes planning, design, right-of-way and construction of the remaining two lanes of Northstar Boulevard between Tall Cedars Parkway and Braddock Road.

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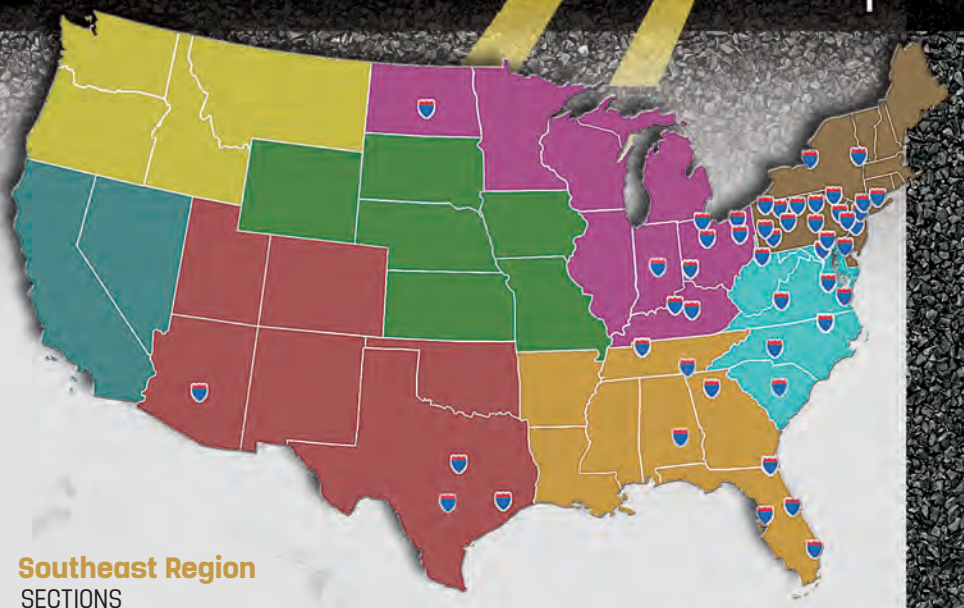

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SECTIONS	
Albany	85
Altoona	187
Central New York	50
Clearfield	188
Delaware Valley	342
East Penn	101
First State	210
Franklin	130
Harrisburg	370
Long Island	47
Mid-Allegheny	126
New York Metro	134
North Central New Jersey	129
North East Penn	132
Pittsburgh	549
Southern New Jersey	173
Southwest Penn	228
Williamsport	78
Subtotal	**3,259**

Mid-Atlantic Region

SECTIONS	
Blue Ridge	55
Carolina Piedmont	46
Carolina Triangle	190
Chesapeake	253
Greater Hampton Roads	79
North Central West Virginia	51
Old Dominion	78
Potomac	159
South Carolina	120
Subtotal	**1,031**

Southeast Region

SECTIONS	
Alabama	55
Central Florida	112
Georgia	560
Middle Tennessee	312
Northeast Florida	203
South Florida	2
Tampa Bay	42
Tennessee Valley	114
Subtotal	**1,400**

Great Lakes Region

SECTIONS	
Bluegrass	97
Central Dacotah	83
Central Ohio	206
Circle City	46
Cuyahoga Valley	106
Derby City	84
Lake Erie	225
Northwest Ohio	45
Triko Valley	151
Subtotal	**1,043**

Southwest Region

SECTIONS	
Central Texas	77
Dallas-Fort Worth	35
Houston	72
Phoenix Sonoran	136
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National Total	**7,053**
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