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See page 40



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New Directions

Creating a shared vision for the future is one of the biggest challenges of any organization, and ours is no different. As we continue to grow, our unwavering approach to supporting each other should give us a tremendous sense of pride and accomplishment. You can be sure that the new Board and I will continue to focus on our priorities of Collaboration, Inclusion and Success. Along those lines, I want to congratulate again the Carolina Triangle Section for an excellent Conference and thank them for welcoming the entire ASHE family to their city. I also want to thank every member for trusting me to lead this organization. I am excited to contribute to our growth, and I promise to do my best for you. I am proud of this organization's success across the country, particularly in providing professional development and outreach opportunities through innovative program topics and social gatherings.

The ASHE San Antonio Section received its Charter in August, and I attended the celebration, a first for me as National President. Congratulations to all for the effort and planning that takes place to establish a new Section. ASHE is also planning to establish a Section in the Boston area soon and looking for local potential new members. As you read this, please consider becoming a Charter member or taking on a board position.

One of the goals of the National President is to visit Sections and Regions to show support and reinforce all the work done by members. I participated in a golf outing with the East Penn Section and spent a late June day in the Pocono Mountains with many friends, making many new friends as well. I attended the New York Metro Section's 20th anniversary celebration in New York City in September, as part of our late summer/fall Board meeting [see pages 10-11]. Plans for October include attending the Northeast Region Conference, the Ohio Transportation Engineering Conference in the Great Lakes Region and the Southeast Region Conference. Thanks to all who have invited me, and I promise to attend as many events as possible.

I hope you enjoyed the summer and will watch for remarkable things as ASHE heads into fall. I also hope you found this edition of my message informative and inspiring. Think about how you would like to be involved with the many activities and events happening around the Sections and the Regions. I want to thank all ASHE members, sponsors and client colleagues for their participation and continued support.

Be well! 🇺🇸

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From scanner's Chair

The scanner is a snapshot in time of our camaraderie and support for each other as members in our Sections. It showcases the contributions of our members to the transportation industry and highlights our activities across the country. We invite YOU to contribute your best work, ideas and innovations. Send us your Project of the Year articles, details about humanitarian work, Section activities and individual accomplishments.

Our nation's infrastructure is the foundation of America's economy and our edge on a global scale. There is a shift happening, moving from one-problem solutions to those that hit multiple transformative outcomes and how infrastructure is being planned, developed and delivered. Transformative Infrastructure significantly impacts more than just our economic growth; it includes climate change, adaptability and equality. The scanner spotlights the advancements we are making, reflects the latest trends and details how we are responding to social, environmental and population needs with our projects and people.

As we navigate uncertainties and challenges, we remain determined to make this journey exciting! ASHE core values strengthen our commitment to inclusivity, transparency, accountability, communication, innovation and educational excellence. Send us your photos and information on your education programs for members, and scholarship programs for upcoming students and development of emerging leaders. Let us know what your Section is doing to encourage entry into our industry, remove barriers to education, develop the workforce and ensure that we have the tools and resources to deliver on these projects.



We look forward to another successful round of articles for scanner SAY Awards 2024-25. Keep in mind the evaluation factors for winning articles: contribution to the engineering field, value to the community, innovation, photographic excellence, connection to content, distinctiveness and alignment with the Strategic Plan Objectives.

Rhonda Cardone, scanner Chairwoman
ASHE New York Metro Section



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ASHE Delaware Valley Section 2024 Outstanding Response Award

Emergency Repairs After I-95 Bridge Collapse

by ASHE Delaware Valley Section

Completed temporary roadway, looking northbound



Placing lightweight aggregate fill

On June 11, 2023, the driver of a tanker truck carrying 8,500 gallons of gasoline lost control while exiting the northbound I-95 on the Cottman Avenue off-ramp in Philadelphia. It resulted in a loss of life and a fire that engulfed the I-95 northbound bridge. The steel beams of the northbound bridge yielded and collapsed within minutes, and the southbound bridge was compromised beyond repair. Because this sudden closure of I-95 impacted a major East Coast transportation link, politicians and the public demanded a quick solution.



West elevation of temporary roadway and retaining wall

As consultant on the contract that included the original bridge design approximately 10 years ago, Benesch developed a plan alongside Pennsylvania Department of Transportation (PennDOT), the bridge owner and the contractor, Buckley & Company, Inc. (Buckley). Their task was to quickly restore traffic along this corridor that accommodates 160,000 vehicles daily.

The team created a temporary roadway solution: a welded wire retaining wall system with geogrid supports filled with ultra-lightweight foamed glass aggregate fill. Once this system was constructed up to the roadway base, workers installed precast barriers and built a temporary asphalt roadway. The solution considered not only rapidly restoring I-95 on the temporary roadway, but also constructing the permanent bridge replacement. In just 12 days, three lanes of traffic in each direction could travel on the temporary roadway system.

The I-95 solution was a testament to engineering ingenuity, teamwork and resilience. Planning and construction of the temporary roadway required communication with PennDOT, Buckley, utility companies, local suppliers/fabricators and the public. Benesch continues to provide design services for the permanent bridge replacement. When complete, the permanent bridge will restore four lanes and two full shoulders in each direction on I-95, and the Cottman Avenue northbound off-ramp will reopen to traffic.

Sudden and unexpected bridge collapses, fortunately, remain rare. However, the design team met this project with creative solutions, high-level communication and ongoing collaboration. They needed to develop solutions without all data and information available. The group also had to make design decisions for both the temporary roadway and permanent bridge replacement within a few hours and days of the collapse, and they needed to satisfy both fixes. The project team evaluated and incorporated the following elements within the 12-day construction period.

Constructive Staging

Staging limits for all phases of construction were determined through evaluation of the existing plans coupled with field measurements soon after the collapse. The staging evaluation revealed half-width construction of the permanent bridge would be feasible within the existing footprint, which would accelerate construction with fewer phases. The team determined that once the temporary roadway was in place and carrying traffic, construction of the permanent replacement bridge could be completed in two stages:

- First, construct the outer half of the permanent bridge replacement in each direction, outside of the operating temporary roadway.
- Second, switch traffic to the outer portion of the permanent replacement bridge, remove the temporary roadway and construct the inner half of the permanent replacement bridge in its place.

These phases maintain three lanes of traffic in each direction, providing 75 percent interstate capacity until completion of the permanent solution. The staging limits work by inches, requiring 11-foot traffic lanes and a custom median barrier.

Custom Median Barrier

The proposed staging limits combined with the existing curved, bifurcated and superelevated roadway section required a single bifurcated median barrier. A custom-detailed median barrier may sound infeasible for an emergency project. However, the original concrete fabricator revealed that existing forms could be modified to produce the shape needed. Approval of the design details and shop drawings occurred within a day. The fabricator worked nonstop to cast the barriers in just five days to deliver and install the median barrier without delaying construction.

Evaluation of Fire Damage

Prior to installing the temporary roadway, the fire-damaged abutments were evaluated, using concrete core samples. The samples provided information on the depth of damage and the remaining concrete capacity. This information was collected before the temporary roadway construction

(continued on page 8)

Emergency Repairs After I-95 Bridge Collapse
(continued from page 7)

covered up the abutments, which allowed the team to finalize concrete removal limits for the permanent bridge replacement plans. The project required coordination across multiple disciplines to ensure cohesion between key elements, including the structural design of the retaining wall system and assessment of existing sewers under the project site.

In regard to the Philadelphia Water Department's existing sewers and water mains under Cottman Avenue, ultra-lightweight foamed glass aggregate fill was used to minimize additional loading. This aggregate was 85 percent lighter than standard earthen fill and fabricated locally in Eddystone, PA, allowing quick delivery with up to 100 cubic yards per truckload.

Gravix precast modular traffic barriers were used along the exterior of the highly skewed temporary roadway. These barriers have passed the MASH (Manual for Assessing Safety Hardware) TL-4 impact test. With availability in nearby Douglassville, PA, their installation expedited the timeline. Gravix barrier units have a rectangular footprint and require placement without modification. The ultra-lightweight fill stopped at the base of the Gravix barriers, and subbase 2A fill was used per specifications. However, these barriers typically included a lip extending downward for T-walls and mechanically stabilized earth walls, requiring removal to level the barriers on top of the welded wire retaining walls.



Placing Gravix barriers

The I-95 bridge collapse posed significant concern both locally and throughout the country. Closure of this section of I-95 impacted local traffic and businesses in Philadelphia and threatened the country's supply chain along the East Coast. It affected thousands of daily



Nighttime construction of the temporary roadway

commuters, interstate truck services and summer vacation travelers. Restoring 75 percent capacity in 12 days, rather than waiting months for a permanent bridge replacement, minimized economic impacts and inconvenience to the public.

The cooperation and efforts of all involved allowed for completion of this high-profile, emergency project, reopening a vital link along the Northeast Corridor in less than two weeks. 🇺🇸

Revolutionizing Safety in Inspections with the ELIOS-3

Advanced capabilities in the ELIOS-3 drone set a new standard for safety and accuracy in surveying.

The ELIOS-3 drone is revolutionizing RaganSmith's survey inspections by enhancing safety and accessibility. Its collision-resistant design allows it to navigate confined or hazardous spaces without risking human injury. Capable of operating in GPS-denied environments and boasting extended battery life, the ELIOS-3 ensures even the most challenging inspections are safe and efficient. For RaganSmith, this drone symbolizes a commitment to safer and more accessible industrial inspections.

Selections from an interview with Victor Morris, Survey Project Manager

How has the implementation of the ELIOS-3 drone impacted the overall safety and efficiency of RaganSmith's inspection processes?

Using this drone has significantly enhanced our inspection processes by reducing the need for human entry into hazardous spaces, which has considerably improved safety for our team. This drone only measures about 19 inches wide by 14 inches high, allowing it to fit easily into confined spaces typically challenging or dangerous for humans to enter. The drone's advanced capabilities have streamlined inspections, making them faster and more accurate. As a result, RaganSmith has seen a noticeable increase in efficiency.



Can you share any success stories where the ELIOS-3 drone significantly improved inspection outcomes for RaganSmith and our clients?

One notable example is a recent pipe failure on SR-111 in Dunlap, TN (left image) where a road collapsed causing significant drainage problems. Using the ELIOS-3 drone, RaganSmith expertly inspected the hazardous area, providing detailed visual and thermal data that ensured team safety while expedited repairs. Similarly, in the Murfreesboro, TN Town Creek Corridor inspection (right image), the drone allowed us to safely identify a significant blockage, facilitating a swift and effective resolution.



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News From Across ASHE-Miles



< ASHE NY Metro President Andrew Schueller's message



ASHE National President Don Di Zuzio inducted the ASHE New York Metro Board.



ASHE New York Metro Section Marks 20th Anniversary

On September 12, **ASHE New York Metro Section** celebrated its 20th anniversary at the 101 Club in New York City. It brought together folks from both the public and private sectors to celebrate as well as share ideas that promote solutions to project infrastructure challenges. David Greenwood, PE, CCM, ASHE National Board, said, *"The event was the epitome of the mission for ASHE by providing a forum for the exchange of ideas for members and their partners of the transportation industry to promote a safe, effective and sustainable transportation system."* Past Presidents of the Section and more than 90 of its Charter members received recognition from ASHE National President Don Di Zuzio. The National Board of Directors was honored to receive an invitation to the event, which included senior transportation officials from highway, city street and transit sectors. These leaders, specifically Dana Hecht, PMP, Metropolitan Transportation Authority, praised ASHE for the many benefits it provides. Highway/transportation VIPs were among the more than 270 attendees at the event.

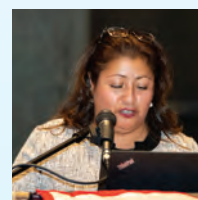
First Vice President Rhonda Cardone opening remarks



Dana Hecht, PMP, Metropolitan Transportation Authority



ASHE NY Metro President Andrew Schueller and First Vice President Rhonda Cardone with Keynote Speaker and Agency Awardee, Chris Gatchell, Director of the NYC Metro and Local Program Management Office, Federal Highway Administration



ASHE Past Presidents in attendance



Members of ASHE National Board attended.



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ASHE San Antonio Section Chartered

Members of the new ASHE San Antonio Section, representatives of the ASHE National Board and many others gathered in May to celebrate the formal Chartering of the fourth ASHE Section in Texas. Joining them were representatives from ASHE Southwest Region, ASHE New Section Committee, ASHE Phoenix Sonoran Section, ASHE Houston Section, ASHE Central Texas Section and ASHE Dallas-Fort Worth Section. In addition to celebrating the new Charter, it provided an opportunity to thank all who dedicated their time and energy to making the vision of an ASHE San Antonio Section a reality. The San Antonio group became ASHE's 50th Section and the seventh one west of the Mississippi.



Ahmed Valdez, PE, Past President of ASHE Houston Section, and Markus Neubauer, PE, served as co-chairs to spearhead the Chartering of ASHE San Antonio Section.



A Weighty Issue

One in five miles of U.S. highways and major roads and over 45,000 bridges are in poor condition, according to the 2021 Fact Sheet: The Bipartisan Infrastructure Deal, and <https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.2200-05.pdf>. A major contributor to road damage stems from heavy or excess weight vehicles, or, more precisely, the heavy axle loads of these vehicles on the road surface and/or pavement. As claimed by an article in Inside Science, this damage grows exponentially with the axle load of the vehicle. For comparison, a 40-ton commercial truck with eight axles causes 625 times more road damage than a two-ton passenger sedan with two axles.

Enforcement of vehicle weight limits is typically cumbersome, requiring dedicated stations, and contributing to delays and strain on law enforcement resources. Even with the use of portable scales and virtual Weigh-in-Motion (WIM) systems, these efforts are not comprehensive, leading to a culture of noncompliance. This issue is further exacerbated in urban environments with limited space and enforcement personnel.

Going beyond weight enforcement, officers in most states are responsible

by Tanvi Pandya, PE, DBIA, New York City Department of Transportation, ASHE New York Metro Section

for checking Commercial Motor Vehicles (CMVs) for safety. This includes various levels of truck inspection, including driver credentials, hours of service, key systems on the truck, load security and more. The highest level of inspection, Level One, has 20+ safety criteria that an officer checks on a CMV. Currently, most weigh-in sites have a single officer focused on weighing, conducting an inspection or interviewing a driver. Other unsafe vehicles behind the one under examination can go by without scrutiny until an officer can complete a task.

Based on the data collected on the Triple Cantilever section of the Brooklyn Queens Expressway (BOE) in Brooklyn, NY, the New York City Department of Transportation (NYCDOT) advocated for the ability to better enforce weight limits on the structure. The New York State legislature

authorized NYCDOT in 2021 to conduct direct overweight vehicle enforcement using WIM as a demonstration program on this portion of I-278, the sole interstate highway in Brooklyn. This critical link, constructed in 1954, connects it to Manhattan, Staten Island and Queens. During the first seven months of direct enforcement, a monthly average of 2,769 overweight trucks crossed the triple cantilever. Prior to the launch, a monthly average of 7,777 overweight trucks had traveled the same portion of the highway for the seven months leading up to the launch of the program.

(continued on page 16)



A Weighty Issue

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The decline comes as the overall number of vehicles, including trucks, remains steady, with the share of overweight trucks falling from about 6.3 percent of all trucks on the roadway to 1.9 percent in most recent months. During this time, there have been no challenges related to the accuracy of the system.

So why doesn't everyone already use the WIM system? To implement this nationwide, two things must take place:

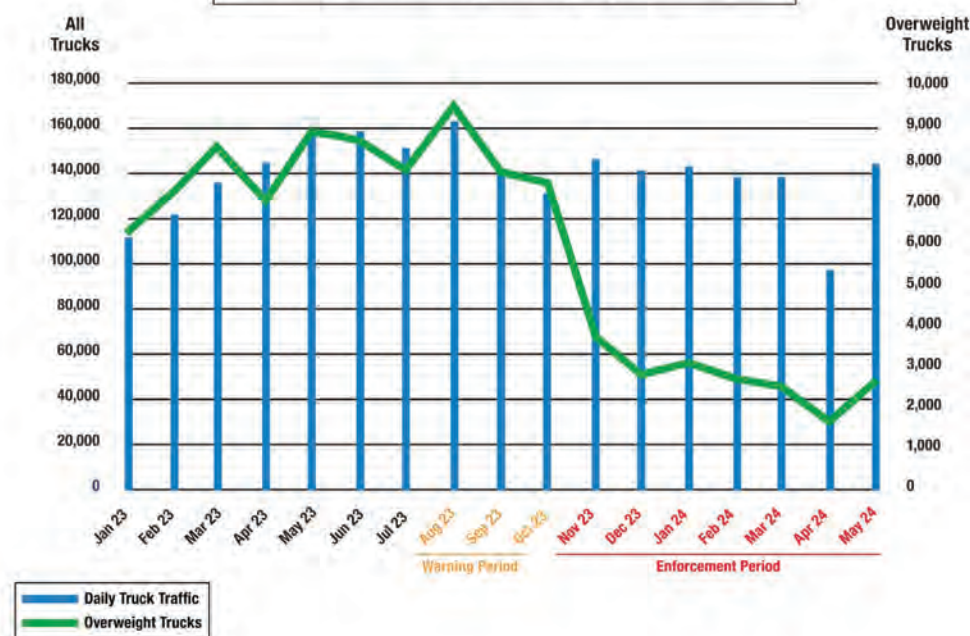
1. Legislation authorizing use of WIM for direct enforcement
2. Updating the National Institute of Standards and Technology (NIST) Handbook 44 to include the WIM system for direct enforcement

In terms of legislation, several states have begun efforts to obtain legislative authority to do weight limit enforcement using WIM. These include Georgia and New Jersey, while several other states are reviewing their options. The reason both the legislation and updates must take place is that for jurisdictions to effectively use a WIM system for direct enforcement of weight limits, it must be evaluated against a recognized standard to establish suitability for its intended application. Most weighing instruments used for legal metrology purposes (including law enforcement) need to comply with the requirements in NIST Handbook 44 Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices. However, this handbook does not yet cover WIM systems for direct enforcement. Since 2022, NYCDOT, C2SMARTER and Kistler have worked with the procedure for inclusion of the testing requirements in the update of this handbook. In the

meantime, New York City had its system certified by New York State Department of Agriculture on the BQE by designating it as a pilot project. The inclusion of the procedure in the handbook does not require a jurisdiction to begin direct enforcement using WIM. That authority remains with the legislative bodies of the jurisdiction.

updated, a vote on including the testing procedure for WIM technology for direct enforcement of weight limits took place at the National Conference on Weights and Measures's Annual Meeting in July 2024. However, several states either voted against inclusion of this standard or were not present to make their voices heard.

Monthly Truck vs. Overweight Truck Traffic: Brooklyn Queens Expressway Triple Cantilever



However, the standard for the system should be formalized across the nation to ensure that a unified testing protocol is used by jurisdictions who so choose. Guarding against violations of vehicle weight restrictions based on local legislative authority to protect critical infrastructure is an issue of national concern.

Officials from each state's Department of Agriculture, along with other enforcement officials, review and vote on updating the NIST Handbook 44 (for details, see <https://www.ncwm.com/standards-dev>). Based on efforts made since 2022 to have the standard

There continues to be a disconnect between the Department of Agriculture who votes on the procedure and the Department of Transportation who is concerned with maintaining the infrastructure. There is a need for better coordination between these two parts of the state government to ensure clear understanding of the proposal and related responsibilities. For those of us charged with managing our infrastructure assets in the Departments of Transportation at state or city level, it is important to have our voices heard. Contact your respective Department of

Weights and Measures to vote in favor to expeditiously update the NIST Handbook 44. This will bring U.S. codes up to date to match with international codes like the International Organization of Legal Metrology. It will ensure that as jurisdictions review their needs and potential for legislative authority, they will have a clear standard for the system required and the ability to plan appropriately.

Use of WIM technology is not new in the U.S., which should help in addressing current concerns with the handbook update. Several states have implemented vehicle weight enforcement measures using a WIM screening protocol that includes the use of mobile enforcement officers and stationary scales. However, these measures have been insufficient in significantly reducing the volumes of overweight vehicles on the nation's infrastructure. There is an opportunity with direct weight enforcement to not only deter overweight vehicles on the nation's infrastructure but to automate the inspection tasks of officers. This would free them up so they can do more inspections for other safety issues related to CMVs.

Across the nation, the deterioration of aging infrastructure is compounded by the presence of overweight vehicles exceeding the Federal Bridge Formula. Coupled with WIM certification standards in place and accurate technology, direct WIM enforcement provides a mechanism for enabling jurisdictions to align weight compliance beyond inefficient past weight enforcement methodologies. This would effectively level the playing field for the trucking industry. 🇺🇸

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News From Across ASHE-Miles



ASHE Delaware Valley Section Hosts Kickball Tournament and Picnic

In June more than 50 engineers gathered at Fairmount Park, Philadelphia, for a day of friendly competition, camaraderie and food. ASHE Delaware Valley Section hosted the second annual Multi-Society Kickball Tournament and Summer Picnic. The event provided an opportunity to network, build relationships and foster a sense of community within the industry. Attendees also included members of American Society of Civil Engineers, Young Professionals in Transportation and the Mid-Atlantic Section of Institute of Transportation Engineers. Thanks to all who attended the event.



by Matthew DeSapri, Project Manager,
Great Lakes Construction Company,
ASHE Lake Erie Section

**ASHE Lake Erie Section
2023 Project of the Year Award**

Upgrades to Ohio Bridge Help Avoid Future Traffic Snarls

Westbound Phase
Two of SR 2 shoring
installation

Northeastern Ohio's SR 2 carries high volumes of traffic, connecting the western Lake County suburbs to the Euclid Spur toward downtown Cleveland. The 2022 Annual Average Daily Traffic on the road was roughly 75,000; the 2038 design year Average Daily Traffic estimate was 87,000.

Improvements to the SR 2 corridor were important to Ohio Department of Transportation (ODOT) because of the projected increase in traffic. The project in Wickliffe, just east of Cleveland, began in 2021 and consisted of the widening and replacement of the SR 2 twin concrete slab bridge structures over Worden Road. It included full-depth pavement removal, 90,000 square yards of new asphalt pavement and storm drainage. It also entailed a new concrete median barrier, highway lighting, bridge-mounted noise barrier and substructure rehabilitation, including composite fiber wrapping of existing concrete columns.

Maintenance of traffic for the bridge slab replacements posed challenges during design for the Engineer, 2LMN, Inc., due to the constraint of maintaining three lanes in each direction. The structures, built in 1959, were narrower than the abutting roadway. The only way to accommodate this was to use the existing median area to put traffic into a contraflow configuration for two of seven planned phases of construction. Project

phasing considered the need for seasonal winter shutdown periods, which put pressure on the construction schedule. This posed challenges specifically during the 2023 construction season that included all the eastbound reconstruction, new median wall and resurfacing both directions of SR 2.

Additional Improvements

The project widened both the eastbound and westbound inside shoulders, providing an additional buffer between travelers and the newly constructed concrete median wall. The widened roadway also allowed for lighter traffic impacts during maintenance operations. The new median barrier, approximately 4,800 feet long, enhanced safety by modernizing the wall type and upgrading the lighting system with 32 LED low-mast lights. The preconstruction project goals included replacing the deteriorated bridge slabs and widening the bridges to fix substandard inside shoulders. It increased the vertical clearance on Worden Road and brought the superelevation on SR 2 up to standard for a 65-mph design speed.

Construction Challenges

Placement of concrete slab bridges and proposed maintenance of traffic configurations were two of the most challenging construction aspects of

(continued on page 20)



Concrete bridge slab demolition with
Worden Road closed underneath



Phase Four temporary shoring for the
concrete bridge slab



UPgrades to Ohio Bridge Help Avoid Future Traffic Snarls

(continued
from
page 19)

the project for The Great Lakes Construction Company (GLC). The slab bridges were unique from the standpoint that there were no beams or girders proposed as part of the demolition or forming. The strategy for demolition focused on processing the existing concrete slabs with excavators underneath the bridge and behind each abutment. Considering the substantial amount of concrete and rebar debris generated from the demolition operation, the local municipality coordinated with ODOT and GLC to allow weekend closures of Worden Road during each demolition phase.

A combination of steel plates and crane mats were used to line the adjacent roadway and provide protection from falling debris. A temporary falsework design was developed for each of the four phases as part of the contract requirements of the new slab bridge construction. The falsework consisted of a combination of crane mats, header and footer beams and shoring towers that supported the concrete load during slab pours. One challenge during the forming operation was maintaining one-way vehicular and pedestrian traffic on Worden Road. However, these aspects were incorporated into each phase's falsework design.

From a maintenance of traffic perspective, the project teams partnered to revise the Phase Four and Five designs, allowing installation of most of the median wall earlier in 2023. To further alleviate pressure on the schedule, the project team pursued a maintenance of traffic exception with ODOT's Maintenance of Traffic Exception Committee. This allowed a reduction of eastbound traffic to two lanes during phase Five in conjunction with the elimination of Phase Six. The exception was not to exceed 12 weeks and included both incentives and disincentives tied to the completion

of Phase Five. The exception change removed roughly 30 percent of the remaining critical activities (at that time) from the longest path.

Innovative Features

The twin concrete slab bridges constructed on mainline SR 2 over Worden Road included new inside median piers with foundation piling and rehabilitation to the existing substructure. The two-foot-thick slab bridges are each approximately 132 feet long by 67 feet wide with new parapet walls and approach slabs. The project increased vertical clearance on Worden Road from 15 feet, one-and-one quarter inches to 15 feet, nine-and-one-quarter inches. Vibration monitoring was used during pile driving due to the proximity of local residences. The westbound bridge included a fiberglass reflective panel noise barrier wall on the outside parapet wall.

After the project was sold, ODOT's District office received a request from its Office of Technical Services (OTS) to add various work items to the project for the future installation of new detection units in the travel lanes of SR 2 eastbound and westbound. The additional work included new conduit and junction and pull boxes placed in the median barrier and off the shoulders of SR 2. OTS enlisted the assistance of ODOT District Planning Department to design the layout and produce plan sheets for the work. From an aesthetic perspective, the new concrete median wall and lighting added significant improvements. The median wall low-mast lighting included LED fixtures providing up to a 65 percent energy reduction over traditional high-intensity discharge lighting. Full project completion took place in November 2023. ❤️



ASHE New York Metro Section

The Section, along with Member Firm Sponsorships, provided \$17,500 in scholarship awards to college students in New York.

Seven 2023-2024 awards of \$2,500 each from:

1) **AECOM**, presented by left, Glen Karlalis and right, Rob Lowe. Recipient Kanghyuk (Chris) Lee, Cooper Union, Senior Mechanical Eng.

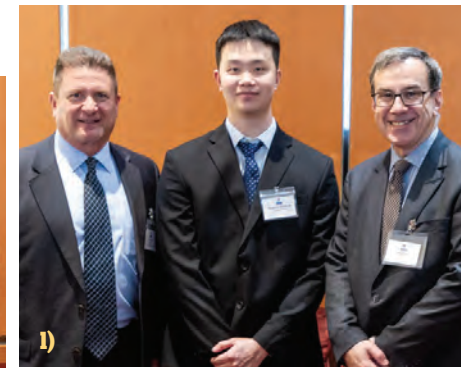
2) **Jacobs**, presented by Maria Losyeva. Recipient Fary Sarr, CUNY City Tech, Junior Construction Eng Tech.

3) **GPI**, presented by Marc Matalon. Recipient Ibrahima Fall, CUNY City College, Junior Civil Eng.

4) **Arora and Associates**, presented by left, Luis Calderon, PE, and right, Mandeep Singh Arora, PE. Recipient Sreevarshini Karthikeyan, Cooper Union, Junior Civil Eng.

5) **M&J Engineering**, presented by Mohammad Malik. Recipient Vincent Lombardozzi, Manhattan College, Senior Civil Eng.

6 & 7) **ASHE New York Metro**, presented by Maria Losyeva. Recipients left, Diana Minchala, CUNY City Tech Senior Constr. Tech and Civil Eng., center, Taha Waseem, Manhattan College, Senior Civil Eng.



ASHE Scholarships Boost Education Opportunities for Youths



Awarding ASHE scholarships to deserving students encourages them to consider the many employment opportunities available in the highway engineering profession. ASHE is proud of its longstanding tradition to award these scholarships wherever ASHE Sections are located. Shown above are Garrett Zug and Brooke Kelley, scholarship recipients from ASHE Franklin Section, Pennsylvania.

(continued on page 22)

ASHE Scholarship Totals from 2020 to 2024



Region
Totals
Great Lakes
\$98,200
Mid-Atlantic
\$152,593
Northeast
\$764,365
Southwest
\$76,500
Southeast
\$86,374.70

ASHE Regions
Grand Total
\$1,178,032.70

Thank
You!

	2020-2021	2021-2022	2022-2023	2023-2024
Great Lakes Region				
Bluegrass	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,500.00
Central Dacotah	\$ 0.00	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00
Central Ohio	\$ 7,500.00	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00
Circle City	N/A	N/A	N/A	\$ 0.00
Cuyahoga Valley	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	\$ 7,000.00
Derby City	\$ 1,500.00	\$ 1,200.00	\$ 1,500.00	\$ 1,500.00
Lake Erie	\$ 3,000.00	\$ 2,500.00	\$ 4,500.00	\$ 4,500.00
Northwest Ohio	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Triko Valley	\$ 6,500.00	\$ 6,500.00	\$ 6,500.00	\$ 6,500.00
Grand Region Total	\$ 22,500.00	\$ 22,200.00	\$ 24,500.00	\$ 29,000.00
Mid-Atlantic Region				
Blue Ridge	\$ 0.00	\$ 0.00	\$ 5,000.00	\$ 0.00
Chesapeake	\$ 20,000.00	\$ 13,000.00	\$ 12,000.00	\$ 11,000.00
Carolina Piedmont	\$ 1,250.00	\$ 0.00	\$ 0.00	\$ 0.00
Carolina Triangle	\$ 8,000.00	\$ 8,000.00	\$ 8,000.00	\$ 16,000.00
Greater Hampton Rds	\$ 4,000.00	\$ 4,000.00	\$ 3,227.00	\$ 3,616.00
North Central WV	\$ 0.00	\$ 0.00	\$ 0.00	\$ 1,500.00
Old Dominion	\$ 4,000.00	\$ 4,000.00	\$ 2,000.00	\$ 4,000.00
Potomac	\$ 6,000.00	\$ 8,000.00	\$ 3,000.00	\$ 3,000.00
South Carolina	N/A	\$ 0.00	\$ 0.00	\$ 0.00
Grand Region Total	\$ 43,250.00	\$ 37,000.00	\$ 33,227.00	\$ 39,116.00
Northeast Region				
Albany	\$ 1,000.00	\$ 3,000.00	\$ 1,500.00	\$ 1,500.00
Altoona	\$ 0.00	\$ 4,500.00	\$ 4,500.00	\$ 1,500.00
Central New York	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Clearfield	\$ 5,500.00	\$ 5,500.00	\$ 7,000.00	\$ 7,500.00
Delaware Valley	\$ 12,000.00	\$ 11,250.00	\$ 4,750.00	\$ 15,000.00
East Penn	\$ 20,000.00	\$ 20,000.00	\$ 20,000.00	\$ 20,000.00
First State	\$ 15,000.00	\$ 15,000.00	\$ 23,000.00	\$ 25,000.00
Franklin	\$ 10,000.00	\$ 10,000.00	\$ 10,500.00	\$ 11,000.00
Harrisburg	\$ 27,000.00	\$ 26,000.00	\$ 17,000.00	\$ 25,000.00
Long Island	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Mid-Allegheny	\$ 0.00	\$ 1,500.00	\$ 1,500.00	\$ 0.00
North Central NJ	\$ 8,000.00	\$ 15,000.00	\$ 15,000.00	\$ 8,500.00
New York Metro	\$ 25,000.00	\$ 33,000.00	\$ 33,500.00	\$ 17,500.00
North East Penn	\$ 20,000.00	\$ 20,000.00	\$ 20,000.00	\$ 20,000.00
Pittsburgh	\$ 2,500.00	\$ 0.00	\$ 0.00	\$ 2,500.00
Southern New Jersey	\$ 12,000.00	\$ 19,500.00	\$ 20,000.00	\$ 24,000.00
Southwest Penn	\$ 13,000.00	\$ 13,500.00	\$ 11,000.00	\$ 18,500.00
Williamsport	\$ 1,868.00	\$ 2,057.00	\$ 2,313.00	\$ 2,627.00
Grand Region Total	\$172,868.00	\$199,807.00	\$191,563.00	\$200,127.00
Southwest Region				
Central Texas	N/A	\$ 0.00	\$ 10,000.00	\$ 10,000.00
Colorado	N/A	N/A	N/A	N/A
Dallas-Fort Worth	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Houston	\$ 0.00	\$ 0.00	\$ 4,000.00	\$ 8,000.00
Phoenix Sonoran	\$ 9,500.00	\$ 10,000.00	\$ 10,000.00	\$ 15,000.00
San Antonio	N/A	N/A	N/A	N/A
Grand Region Total	\$ 9,500.00	\$ 10,000.00	\$ 24,000.00	\$ 33,000.00
Southeast Region				
Alabama	N/A	\$ 2,050.00	\$ 0.00	\$ 1,500.00
Central Florida	\$ 600.00	\$ 600.00	\$ 0.00	\$ 0.00
Georgia	\$ 6,000.00	\$ 6,000.00	\$ 6,000.00	\$ 6,000.00
Middle Tennessee	\$ 5,000.00	\$ 5,000.00	\$ 7,000.00	\$ 4,000.00
Northeast Florida	\$ 0.00	\$ 19,494.70	\$ 7,130.00	\$ 10,000.00
South Florida	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Tampa Bay	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Tennessee Valley	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Grand Region Total	\$ 11,600.00	\$ 33,144.70	\$ 20,130.00	\$ 21,500.00



Participants in ASHE North East Penn Section's Annual Scholarship Golf Tournament included, from left, ASHE National President Don Di Zuzio, ASHE North East Penn Section President Mark Lemon, John Baldassari, David Frey and Gerard Bahinski.

ASHE North East Penn Section Goes to the Links for Scholarships

Mountain Valley Golf Course near Frackville, PA, was the scene in June for ASHE North East Penn Section's 25th Annual Scholarship Golf Tournament. Over 180 golfers from eastern and central Pennsylvania, New Jersey, New York and Delaware took part in the event. The tournament raised approximately \$14,000 for the Section's scholarship program, supporting engineering students in northeastern Pennsylvania.

ASHE First State Section Awards Scholarships

Winners of 2023-24 scholarships received recognition at ASHE First State Section's dinner meeting in October 2023. Scholarship winners for 2024-25, already selected, will be honored at the Section's October 2024 dinner meeting. With the scholarship winners for 2023-24 are, from left, Len Brooks (President of ASHE First State Section at that time), Dr. Heidi Curdo, EdD, (Delaware Technical Community College), Matthew Singleton, Jefferey Kummeth, Matthew Kinzel, Travis Johnson, Caden Brooks, Cameron Beulah, Nick Hetrick (Scholarship Chair). Absent from photo: Julian Depireux.



Urgent Microchip Need Sparks Beast Mode Interchange Construction

Completed Loop 303 traffic interchange at 51st Avenue



Concrete application for girder bridges

In September 2022, construction of two critical traffic interchanges (TI) began on the Loop 303 corridor in Phoenix, AZ. The interchanges at 43rd Avenue and 51st Avenue would provide access to the Taiwan Semiconductor Manufacturing Company (TSMC), the largest contract silicon chip manufacturer in the world. The firm had committed to investing \$40 billion for two semiconductor plants in Phoenix.

TSMC had indicated that it selected the location for its access to the Loop 303 corridor, making the project a classic illustration of the tie between transportation and economic development. Understanding this and spurred by increasing problems with the chip supply chain, the Maricopa Association of Governments (MAG) and city of Phoenix teamed with Arizona Department of Transportation (ADOT) to construct the TI project as quickly as possible.

The \$70 million TI project consisted of mainline roadway and earthwork, two signalized traffic interchanges with overpass bridges and ramps. It also included crossroads, drainage systems, a freeway management system and a frontage road, completed in 345 days.

Jacobs, selected as designer, started the work in July 2021. Several subsequent design changes occurred, including an added frontage road, floodplain map revision and electric utility relocation. The team committed to producing the final design (including all clearances and agreements), advertisements for bids and the award to start construction by summer 2022.

The contract was bid using an accelerated A + B method. The "A" component was the total of the contractor's bid prices for each construction item. The "B" component was the product of the contractor's specified completion time at a daily monetary value.

The TI project's complexity, enhanced by the accelerated construction delivery methods and the commitment to complete within 345 calendar days, included:

- Mainline construction required importing 590,000 cubic yards of borrow material to support early drainage system installation and start Portland cement concrete pavement (PCCP) operations. To minimize traffic impact, four extended weekend closures were implemented with two crews for around-the-clock heavy haul operation to import 80 percent of the embankment material.
- The drainage system included 15,000 feet of 18- to 54-inch reinforced concrete pipe, 160 catch basins and 8,300 square yards of channel. Four culvert pipe installation crews were deployed at various locations with tight grade management. Volumetric trucks hauled, mixed and placed a one-sack slurry backfill material to reduce substantial labor that would have been needed to place and manually compact the storm drain pipe backfill material.

(continued on page 26)



Application of slurry backfill at all storm drain pipes, bridge footings and abutments saved labor costs compared to manual placement of aggregate.

by Sara Howard, PE,
Assistant District
Engineer, Central District,
Arizona Department
of Transportation,
and Norman Bessler,
Project Manager, Fisher
Industries, **ASHE**
Phoenix Sonoran
Section

Urgent **Microchip** Need Sparks **Beast Mode** Interchange Construction
(continued from page 25)



Bridge structures in Arizona's Sonoran Desert included aesthetic patterns such as saguaro cacti, snakes, lizards, triangles and vertical rustications.

The mainline roadway structural section was 58,885 square yards of 13-inch-thick PCCP placed on road base. During that construction, 17 recordable rain events occurred with minimal schedule impact. The mainline pavement was placed in 23 shifts, and 38,000 cubic yards of concrete were placed in 54 shifts.



Completed Loop 303 traffic interchange at 43rd Avenue

Four two-span girder bridges were completed in eight months. The structures included 128 precast girders, 4,000 square feet of retaining walls, 1.4 million pounds of reinforcement, 7,900 cubic yards of structural concrete and 2,500 feet of drilled shafts.

The team opened the traffic interchanges on time in 345 calendar days and realized the entire 30 days of early completion incentive.

Approaches that contributed to the successful accelerated project completion included:

- Advancing procurement of long lead electrical items, gaining approximately six months on manufacturing and delivery
- Stay-in-place decking in lieu of false work to accelerate the

construction schedule, typically used over waterways

- Abbreviating the advertisement period to maximize construction time for the contractor
- Executing the contract early, having contract time start 21 days after award (typically 60 days)
- Milestone incentives: A maximum payout for 30 calendar days in advance of September 22, 2023
- Vertical integration: Fisher self-performed all earthwork activities, construction of bridge structures, all construction aggregates and asphalt paving. The company also worked with some of their subsidiaries for precast bridge elements and ironworks, concrete paving and barrier and asphalt supply.
- Expediting drainage scope: Expediting the drainage scope reduced labor force requirements and accelerated the schedule.
- Reuse materials: 17,000 feet of curb/gutter and barrier were removed, along with 24,000 square yards of mainline pavement and 14,000 square yards of asphalt. Processing of these materials took place on-site and were recycled for roadway aggregate base course.
- Contract modifications: ADOT modified traffic restrictions, extending closure times and allowing closures during holidays for additional shifts.
- Slurry backfill: The team implemented complete one-sack cement slurry backfill at all storm drain pipe, bridge footings and abutments instead of manually placing aggregate base material.
- Safety: Bridge design included stay-in-place decking versus standard falsework, accelerating the

schedule and minimizing fall hazards. Work zone interface points with the public were protected through traffic control/temporary barriers or weekend closures with detours to ensure workforce safety.

- Aesthetics: Bridge structures included aesthetic patterns such as saguaros, snakes, lizards, triangles and vertical designs. Full-size mock-ups of the features were provided prior to application. Other features included painted concrete at interchanges, exposed aggregate surfaces on abutment slopes and rock mulch matching the existing desert.
- Environmental protection: Giant multi-armed saguaro cacti were rescued and replanted on roadway slopes.
- *Beast Mode* schedule approach: Partnering among firms and agencies allowed open discussion of ideas to resolve real-time challenges. Team pre-activity,

pre-planning meetings and daily communication produced high-quality outcomes and minimal rework. Resolution of emerging issues usually occurred within 48 hours, without schedule impact, and most of the project was executed with a seven-day-per-week schedule.

Finally, MAG Chair and Phoenix Mayor Kate Gallego credited the dedicated half-cent sales tax for enabling quicker construction of the interchanges:

"Thanks to the funding in Proposition 400, we were able to build these two new interchanges with urgency and meet the growing needs of our community in north Phoenix. A big reason TSMC chose our city for their expansion was our modern transportation infrastructure, and these new traffic improvements are that asset in action." 🇺🇸



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Easing Traffic Flow for More Safety and Reduced Travel Time

by Matt McDow, PE, Arcadis, ASHE Georgia Section

The Hub Transformation Project in downtown Woodstock, GA, began with the city's desire to improve traffic operations while maintaining the area's small-town character and walkability. As the city's primary transportation design consultant, Arcadis developed a traffic model that included 20 intersections in the downtown area. The model identified both Towne Lake Parkway's intersections at Mill and Main Streets as the worst bottlenecks that would operate at Level-of-Service "F" in the design year without improvements. This was both an issue of traffic operations and safety for the community because drivers made unsafe left turns due to the traffic delays.

After reviewing several options, the team devised a solution that reduced traffic delays and improved safety. The concept, finalized in 2019, included constructing a roundabout at Towne Lake and Mill Street. It would convert Mill Street from one-way to two-way traffic and construct a left-turn lane on the western leg. It would also prohibit left turns from the southern leg of the Towne Lake and Main intersection. These changes could allow many vehicles to effectively bypass the heavily congested Towne Lake at Main Street intersection, while also balancing the opposing traffic volumes at the intersection, making more efficient use of the traffic signal green time.

The analysis showed that these improvements would reduce project management design year

(continued on page 30)



Main Street at Towne Lake Parkway, looking west

delays at Towne Lake's intersections with Mill and Main Streets by approximately 80 percent and 40 percent, respectively. By replacing the unprotected left turn from Mill Street with the roundabout, this could also reduce the frequency of crashes. The travel time savings alone were expected to provide a project benefit/cost ratio of approximately 2.5. The project received a \$2 million loan and \$1.25 million grant from the Georgia Transportation Infrastructure Bank (GTIB), administered by the State Road and Tollway Authority (SRTA), to construct the project.

The project, completed in summer 2023, received positive reviews from residents and city staff alike. The accelerated schedule allowed the team to advance the project from concept to construction in two years. Their methodology and approach resulted in a project that improved traffic flow in downtown Woodstock without significant impacts. The project delivered a sustainable, cost-effective solution to a complex transportation problem.

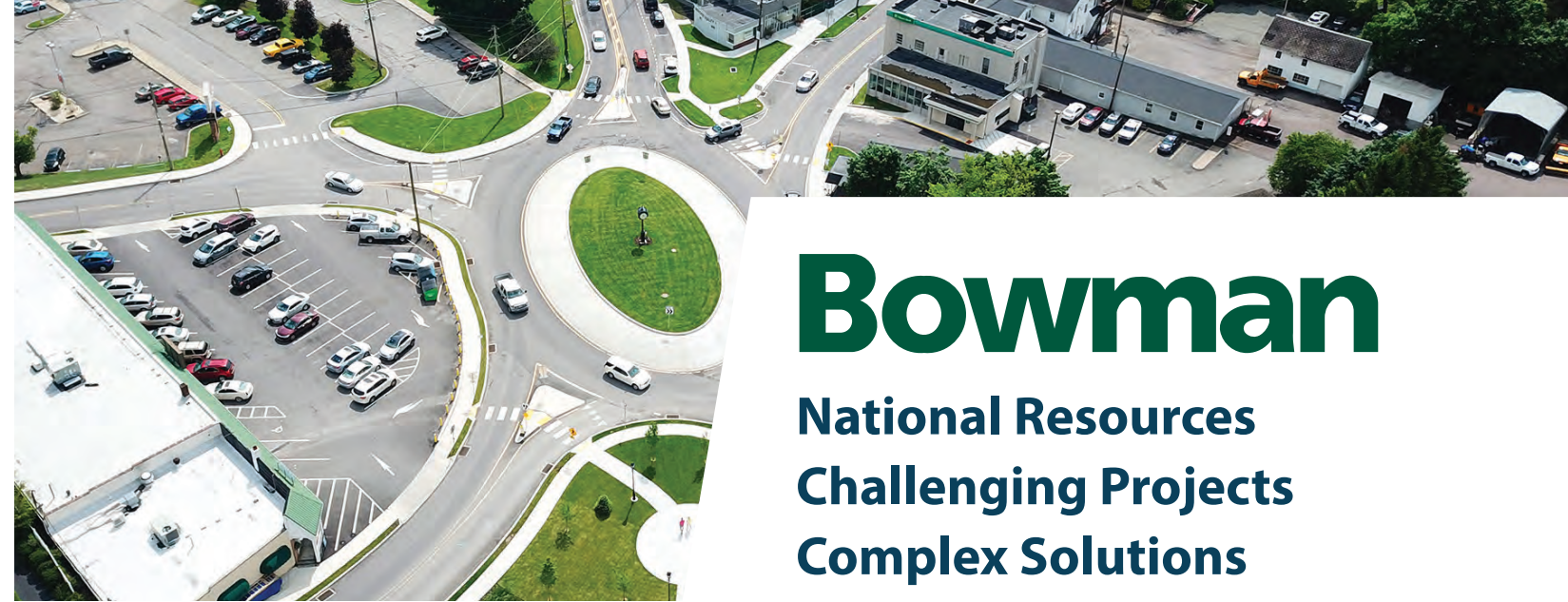
Traffic flow has improved since the project's completion. In addition, more plans have evolved for further improvements in the downtown area. These, in turn, could lead to projects that would further bypass traffic around the congested Towne Lake at Main Street intersection.

The success of this project led to two additional GTIB awards to the city totaling \$3.4 million in loans and \$1.825 million in grants for other projects in Woodstock. The city and Arcadis appreciated the contributions and teamwork from partners, including Atlanta Regional Commission and GTIB/SRTA. 🇺🇸

Easing Traffic Flow
for More Safety and
Reduced Travel Time
(continued from page 29)



Woodstock Hub Transformation Project, looking east



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Improving a Road Network in Rural East Texas

by Blair Stocker, PE, and Larry Marr, PE, Gannett Fleming, **ASHE Houston Section**

The Farm to Market Road (FM) 1409 Roadway and Bridge Project included the design and construction of four miles of two-lane roadway and shoulders on a new alignment in Chambers County, TX. The project extends FM 1409 from its existing terminus at FM 565 in Old River-Winfree across I-10 to its new terminus at FM 565, west of Cove, TX. Gannett Fleming was selected by Chambers County, in partnership with the Texas Department of Transportation (TxDOT), to design PS&E (plans, specifications and estimates), bid and inspect the project as part of the county’s goal to improve mobility in the region. The design began in 2012, with final PS&E submitted in 2019. Construction started in 2020.

The existing FM 1409 functioned as a rural major collector, featuring a two-lane undivided roadway. The extension project upgraded this section to a modern two-lane undivided highway with paved shoulders, including a half-mile bridge over

I-10, complete with associated approaches, access roads and a utility relocation at I-10. Chambers County initiated this arterial upgrade in response to escalating transportation demands, providing an uninterrupted connection from Old River-Winfree to FM 565.

The project involved such challenges as utility adjustments, drainage detention complexities and the coordination of 24 active oil and gas pipelines. The team collaborated with pipeline companies to secure necessary approvals and elevate roadway embankments to meet clearance requirements. Additionally, TxDOT transitioned mid-project from 2004 to 2014 roadway specifications and standards. This required major adjustments, including separating the roadway and bridge projects, each awarded and constructed independently within an 18-month period.

One project highlight was the construction of ramps facilitating direct access from FM 1409 to I-10 frontage roads, including U-turn

provisions to enhance traffic flow. The bridge over I-10 improved access to the interstate frontage roads by connecting ramps from FM 1409 to the frontage roads on both sides of I-10 below. This also included U-turn movements to facilitate traffic back onto FM 1409. These new FM 1409 ramps allowed all traffic movements from FM 1409 onto the frontage roads, providing access directly to I-10 and alleviating congestion at existing interchanges within the area. The design of the I-10 bridge required raising the bridge vertically while preserving the deck's original profile to meet required freight corridor clearance.

Before the completion of the FM 1409 roadway extension, through traffic from Liberty County used FM 565, FM 3180 or SR 146 to enter Chambers County and access I-10. Traffic on FM 565 had increased beyond safe levels, prompting safety concerns due to the proximity of several schools along FM 3180. The completion of the FM 1409 extension introduced

a direct and alternative route from Liberty County to I-10, reducing traffic on previously congested routes.

The extension has critical safety implications for commuters, especially those associated with the schools. The heavy traffic on FM 565 and FM 3180 posed safety risks due to the daily influx of school traffic. The FM 1409 extension diminished the burden on these routes, enhancing safety and improving traffic flow for school-related commuting.

Moreover, development north of I-10 had been constrained in terms of access points, relying predominantly on FM 565 or Eagle Road. Chambers County Commissioner Gary Nelson emphasized the challenges, noting that “more than 10,000 to 12,000 cars a day travel that route.” The FM 1409 extension addressed this bottleneck, providing residents with a more efficient route to access I-10, reducing travel time and alleviating congestion

on existing routes. The anticipated population increase in western Chambers County has also impacted residential and commercial development. The FM 1409 extension opened previously inaccessible areas for growth, presenting new development opportunities.

During construction, the structural design team addressed deviations in column design caused by the contractor’s use of smaller-sized spiral bars in bent cap columns. The team resolved it by adding several vertical bars to achieve TxDOT design compliance. These adaptations ensured structural integrity and adherence to project specifications without compromising quality. They also kept the project on schedule by minimizing design changes.

Judge Jimmy Silva, executive officer of Chambers County, said, *“Extending FM 1409 with pass-through financing helps solve our transportation problems when money is hard to come by.”*

This funding mechanism, supported by TxDOT, allowed the county to initiate construction despite financial constraints, gradually reimbursing costs based on vehicle usage.

The FM 1409 roadway extension project helped create more efficient connections between existing FM roadways and I-10. The new alignment improved local and through-transportation networks in the western part of Chambers County. While FM 1409 may not be designated as an official hurricane evacuation route, improved accessibility provided by the new alignment created better connections to those routes. This, in turn, contributed to the broader emergency management infrastructure. The project also incorporated an upgraded stormwater drainage system. Combined with the higher profile grade, this system fortified FM 1409’s resilience during potential storm-related challenges. Texas Sterling Construction completed the project in December 2022. 🇺🇸





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AsTheWheelTurns

ASHE Members on the Move!



Tone Joins Dewberry as Vice President

Fairfax, VA—**Donald Tone, PE**, has joined Dewberry as Vice President and Regional Market Segment Leader. Tone, a **member of ASHE New York Metro Section**, will lead the development and growth of traffic, Intelligent Transportation Systems, street and highway lighting and transportation planning disciplines. He brings over 25 years of engineering experience in both public and private traffic and transportation markets. Prior to joining Dewberry, Tone served as a senior director in one of the region’s leading traffic engineering and planning firms.



Rahman Receives New Post at Dewberry

Fairfax, VA—**Dr. Khan Rahman, PE, SE, PMP**, joined Dewberry’s New York City office as a Vice President and the Bridge Department Manager in the firm’s New York City office. Dr. Rahman, a **member of ASHE New York Metro Section**, is a licensed structural and civil engineer. He has more than 37 years of demonstrated professional and leadership experience in managing large infrastructure projects involving bridges, buildings and complex structures.



STRENGTHENING COMMUNITIES
AND IMPROVING QUALITY OF LIFE



In southwestern Pennsylvania, US 119 bisects Youngwood Borough as a pair of one-way, two-lane streets, Third Street (northbound) and Fourth Street (southbound), through the community of nearly 3,000 residents. The roadway is a major north-south arterial between I-70/76 and US 30 and of Greensburg, Westmoreland County's seat. US 119, a high-speed, four-lane divided highway at the northern and southern project limits, transformed into the low-speed, one-way pair of streets with parking lanes through the central business district of Youngwood Borough.

The project corridor was an urbanized area including a mix of residential and commercial land use, with on-street parking permitted along one side. Its modes of transportation ranged from vehicular and public transit to bicycle and pedestrian. Constructed in the late 1930s, the road had

deteriorated, failing to provide acceptable levels of service. In response, Pennsylvania Department of Transportation (PennDOT) programmed a three-mile roadway reconstruction project to provide a reliable and efficient thoroughfare that catered to current and projected traffic (including pedestrians) and improved congestion to an acceptable level of service. And it all had to take place while ensuring the traveling public had adequate safe access points throughout the corridor. PennDOT's Engineering District 12-0 selected Stantec Consulting Services, Inc. (Stantec), to complete preliminary engineering, final design, right-of-way acquisition and construction phase services.

Reconstruction of US 119 included upgrades to roadway drainage, sidewalks, ADA-compliant curb ramps/driveway crossings, eight signalized intersections and replacement of an outdated median barrier. Numerous traffic calming and safety measures also included:

- Multiple chicanes (lateral lane shifts) to passively reduce traffic speed
- Curb extensions at intersections to increase pedestrian visibility and reduce crossing times
- Lane width reduction from 12 feet to 11 feet (road diet) and inclusion of edge lines along curbs
- Optical speed bars
- Bulb-outs to define parking areas, reduce traffic speed and provide shelter for parked vehicles
- Overhead radar speed display signing to alert motorists of their speed
- Over five miles of new or reconstructed sidewalks to provide cohesive pedestrian access throughout Youngwood Borough
- Bulb-outs to limit temporary construction easements needed for driveway modifications at sensitive locations where driveway closure and property owner negotiations would be challenging
- Extensive utility coordination, including relocation/replacement of all gas, water and sanitary sewer lines (nearly 31,000 feet)
- ADA-accessible driveway transitions and ramps (68 driveways and 200 ADA ramps) constructed while maintaining access, requiring dozens of pedestrian detours and complex staging
- Improvements to 32 intersections
- Installation of 361 new drainage inlets
- Ninety utility and drainage maintenance holes relocated out of the wheel paths
- Right-of-Way acquisition (73 claims) completed in 11 months

(continued on page 38)

A secondary benefit of the traffic calming measures was to reduce impervious areas, eliminating the need for stormwater management features. The reconstructed roadway also included:

- High-friction surface treatments to reduce rear-end collisions on approaches to an isolated signalized intersection

Calming Traffic on a Busy Corridor

by Steve Moore, PE, Stantec Consulting Services, Inc., ASHE Southwest Penn Section

Aerial photo of US 119 corridor

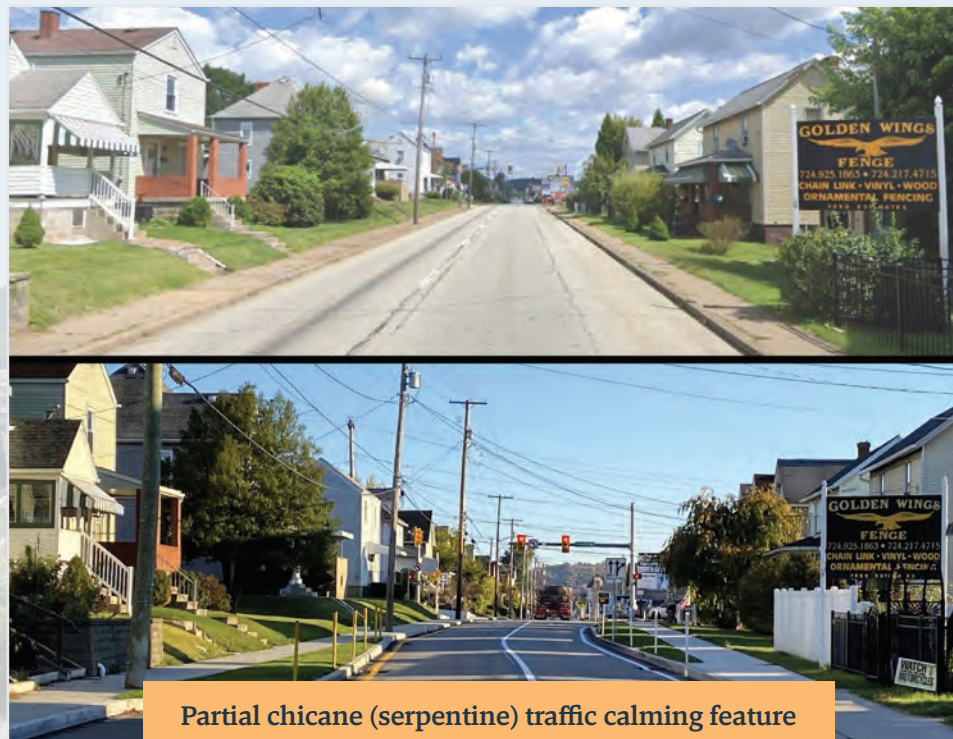
Optical speed bars and sidewalk addition

Calming Traffic on a Busy Corridor

(continued from page 37)

Under the PennDOT CONNECTS public involvement initiative, PennDOT Project Manager James Sisul and District 12-0 Plans Engineer Liberty Hill, PE, held stakeholder meetings with Youngwood Borough officials, the Westmoreland County Planning Department and residents. Their input allowed Stantec and PennDOT to understand and address the Borough's needs. In several instances, the location of a chicane was shifted to maintain parking in an area to ease access concerns of adjacent property owners. Stakeholders also stressed the importance of providing sidewalk access between the roadway corridor and Five Star Trail, connecting the residential area of Youngwood to that recreational facility.

The construction contract went to Golden Triangle Construction during the initial weeks of the COVID-19 pandemic. However, due to a shutdown for several weeks, extensive construction material shortages occurred. Despite these hurdles, the project ended in fall 2023 within budget and on time over portions of four construction seasons. Youngwood Borough residents and the 24,000 vehicles traveling the US 119 corridor daily now benefit from safer travel, increased mobility and improved accessibility to the community's businesses and recreational facilities. 🇺🇸



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Making an Urban Area's Roadways Safer for All

by William Masol, PE, Senior Project Manager, French & Parrello Associates, ASHE Southern New Jersey Section

Aerial of Central Avenue bicycle and pedestrian improvements

From San Francisco to New York, cities throughout the United States have implemented infrastructure projects to eliminate traffic fatalities and severe injuries among roadway users via the Vision Zero program. Started as a trial nationally in 2016, Vision Zero was adopted in Jersey City two years later as a proactive commitment to ensuring safety for motorists, bicyclists and pedestrians.

Jersey City's Director of Infrastructure Barkha Patel said that protecting residents and visitors was the city's top priority: "Through our diligent planning, research and commitment, we now know we can use innovative approaches to create significantly safer streets for pedestrians and motorists with preventative solutions."

Vision Zero member organizations include a variety of backgrounds and expertise, working together toward the goal of reaching zero traffic deaths, a goal achieved by Jersey City last year on city roadways. As one of the most densely populated and transit-rich cities in New Jersey, Jersey City is actively leading the Vision Zero charge. This is evident in the recent completion of the Central Avenue Streetscape and Roadway Improvement Project and the continued commitment to the current design of West Side Avenue Streetscape and Road Improvement Project. The American Council of Engineering Companies (ACEC) of New Jersey selected the Central Avenue Project for its Grand Honor Award.

Investing in the Central Avenue Streetscape Project exemplified a commitment to improving safety and quality of life for all Jersey City residents, according to Jersey City's Mayor Steven Fulop: "This initiative revitalizes neighborhoods, promotes economic growth, fosters community pride and ensures a safer, more accessible environment for everyone. Similar projects across our city are crucial in building a vibrant, inclusive and sustainable future for Jersey City."

It was an honor for all involved to receive recognition by ACEC New Jersey, according to Paul Russo, PE, Jersey City's Director of Engineering. He said the project had several stakeholders, each with their own set of concerns important to them. The city partnered with these groups and collaborated successfully to solve difficult issues. "For those efforts to be acknowledged is rewarding," he added.



Central Avenue bicycle and pedestrian safety features

The Central Avenue Streetscape and Improvement Project included road and sidewalk enhancement through a one-mile segment of Jersey City's Heights section. This two-year, \$4 million project included replacing sidewalks, installing ADA-compliant curb ramps at all intersections and resurfacing the roadway. The specific streetscape elements included new decorative lighting, bicycle racks and benches, as well as new street trees and sidewalks featuring brick pavers.

Revitalizing the roadway was another objective. The asphalt had exceeded its useful service life, displaying visible signs of wear and tear. William Masol, PE, Senior Project Manager for French & Parrello Associates, said the solution involved milling and resurfacing to ensure a renewed aesthetic appeal and improved functionality. He added, "We also focused on new traffic signage and striping for improved traffic flow and safety. We ... identified delineating parking lanes and strategically positioning bus stops to enhance the overall experience and provide additional safety measures."

Masol said Jersey City has a distinct commitment to the bike community. The installation of Endurablend "green-backed super sharrows" within travel lanes was a way to underscore the city's commitment to bicycle compatibility. The super sharrows serve as symbols in the roadway, illustrating that the roadway is not just for cars but bikes as well.

Jersey City's West Side Avenue Project will improve a nearly half-mile stretch of busy roadway, including upgrades to two traffic signals for compliance with ADA requirements and the installation of several curb bump-outs at corners to enhance pedestrian safety. The project will also

(continued on page 42)



Making an Urban Area's Roadways Safer for All

(continued from page 41)

upgrade the drainage system with green infrastructure features, such as bioretention basins and rain gardens.

Masol said West Side Avenue focuses on pedestrian safety and green infrastructure. "First, we will be using

curb bump-outs to allow pedestrians improved access to see oncoming traffic. Next, we are going to make the distance to cross the street a shorter span, so pedestrians are in the roadway for less time. Finally, we will restripe the roadway to ensure clarity for motorists, while also designating specific no-parking areas near intersections to avoid sight issues for pedestrians." He said the project embraces and pushes green infrastructure. The city plans to incorporate stormwater retention basins in sidewalk areas, removing concrete and filling the space with plants, grasses and trees to absorb rainwater.

Patel stressed the importance of embracing the changing perspectives of downtown areas: "Since the invention of the automobile, roads have largely been built to best service the car. For a long time, pedestrians and bicyclists have either not been considered a factor at all, or they have been an afterthought during roadway and intersection design. But we are changing those antiquated approaches. Pedestrian and bike safety is being pushed in the engineering and transportation communities, particularly related to urban areas, where there are more bikes and pedestrians because people are leaving their cars behind. We in Jersey City are happy to see these changes and are dedicated to making them happen for our residents and visitors." 🇺🇸



Construction of Central Avenue
bicycle sharrow



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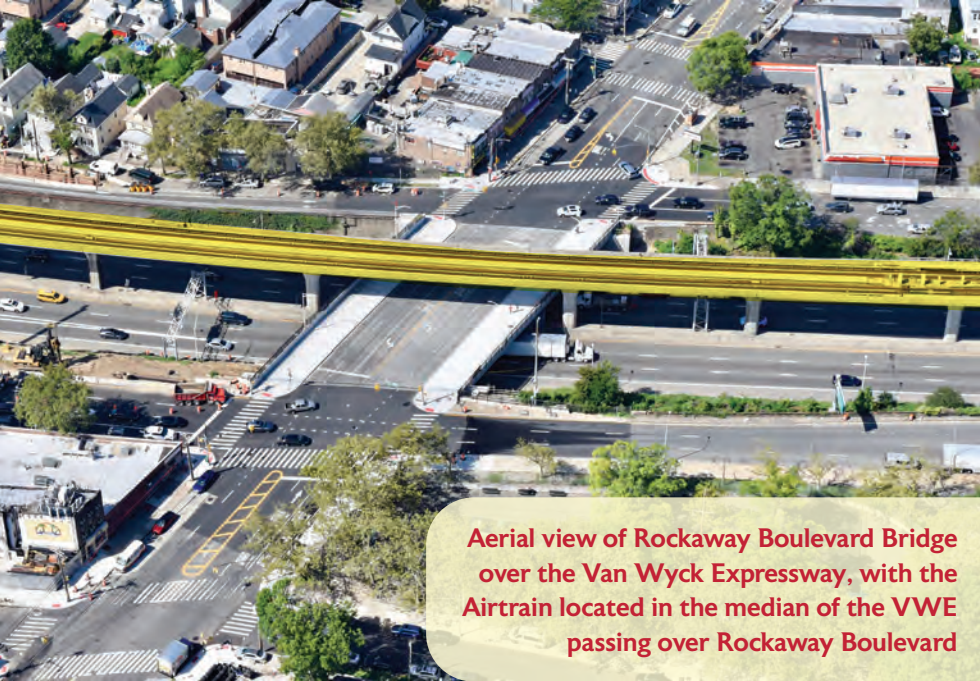
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The goal of the John F. Kennedy (JFK) Airport's Vision Plan is to transform the airport into a world-class transit hub for air travelers and visitors to New York and the surrounding community. In addition, the State of New York has undertaken contracts through the New York State Department of Transportation (NYSDOT) and Port Authority of New York and New Jersey (PANYNJ) to improve roadways leading to the airport. The Van Wyck Expressway (VWE) serves as a global gateway between JFK Airport and New York City. VWE Construction Contract One is the first major step in improving the roadway, setting the stage for adding future travel lanes that will reduce travel time to and from the airport.

Complexity

The two most complex aspects of Contract One had the greatest likelihood of causing significant adverse impacts to the project schedule or budget: maintenance of traffic and utility coordination. With only three years to complete design and construction, these elements required close management from the start.

Contract One included the reconstruction and lengthening of nine overpass bridges crossing the VWE between 133rd Avenue and Hillside Avenue and relocation of the Linden Avenue exit ramp. It also entailed modifications at Exit 1 West to



Aerial view of Rockaway Boulevard Bridge over the Van Wyck Expressway, with the Airtrain located in the median of the VWE passing over Rockaway Boulevard

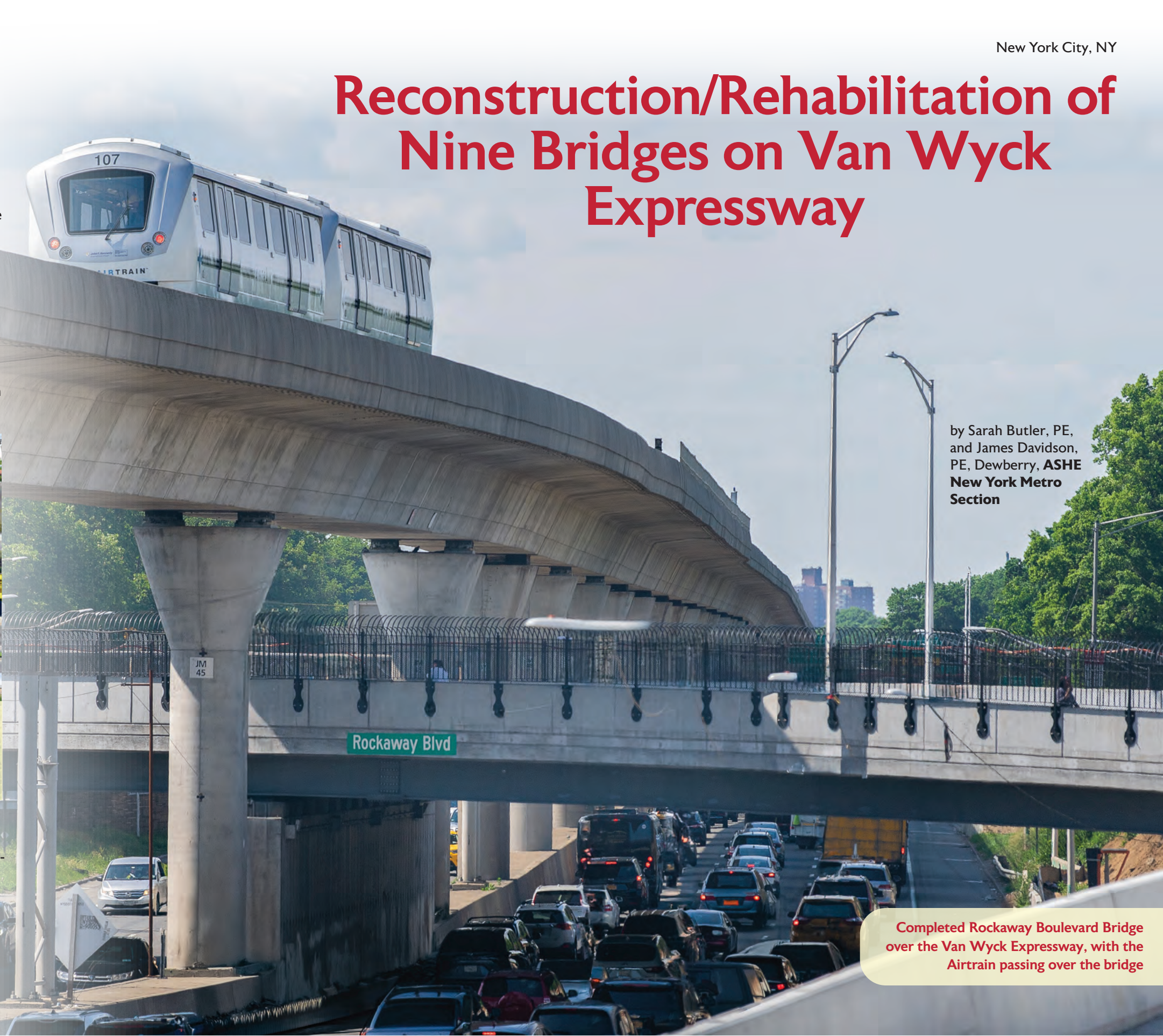
North Conduit Avenue and replacement of the ramp from Conduit Avenue to the westbound Belt Parkway. The bridges were divided into two construction groups to lessen impacts to traffic and utilities, with construction of the Group One bridges beginning in June 2020, followed by the Group Two bridges approximately a year later.

In addition to the two-phase construction approach, multiple Design Units were prepared for each bridge to allow fabrication and construction of critical elements while the rest of the design was completed. Scope items specific to the bridge construction included:

- replacing the entire superstructure at four locations
- deck replacement and lengthening existing steel stringers at five locations
- construction of new abutments at each bridge
- retrofitting existing abutments at three locations
- pier reconstruction and/or retrofitting throughout

(continued on page 46)

Reconstruction/Rehabilitation of Nine Bridges on Van Wyck Expressway



by Sarah Butler, PE,
and James Davidson,
PE, Dewberry, ASHE
New York Metro
Section

Completed Rockaway Boulevard Bridge over the Van Wyck Expressway, with the Airtrain passing over the bridge

Reconstruction/Rehabilitation of Nine Bridges on Van Wyck Expressway

(continued from page 44)

Schedule and Risks

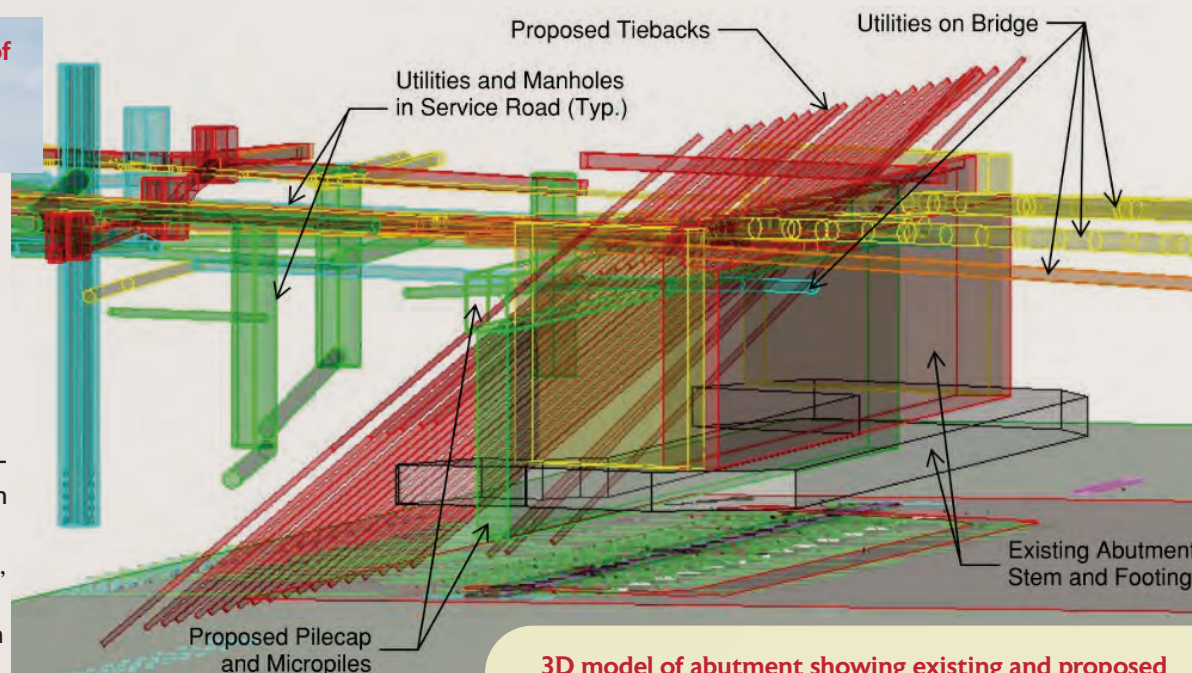
The Design-Build Team of Posillico/EI Sol JV (PESJV), with Dewberry as the lead designer, received the Notice of Award for Contract One in mid-2020. The three-year design and construction schedule left little room for delays. During procurement, the team performed a risk assessment to identify which aspects of the project had the greatest potential to cause adverse schedule and budget impacts.

The biggest challenge to maintaining traffic was the project's location. Its densely urban Queens neighborhood had walls flanking both sides of the expressway and service roads parallel to the VWE at both ends of the bridges. High traffic volumes only allowed lane closures during specific windows, and vehicular and pedestrian traffic across the bridges had to be maintained. Mitigation of this risk included the implementation of a complex construction sequence for each bridge and the use of a top-down construction method for the new abutments. This approach reduced traffic impacts and was key to the success of the project.

Utility coordination had potential to negatively impact the schedule. Up to 11 different utilities were carried across each bridge, requiring coordination to ensure that service was maintained throughout construction. To mitigate this risk, the team's strategy was to coordinate early and often with the utility companies. They developed comprehensive 3D models to compile utility as-built information and field data along with the proposed modifications to the structures and utilities. This allowed the team to understand the relationship between the subsurface utilities and the structural elements and ensure the new abutment construction would not impact the utilities.

It soon became clear that construction of the abutments was the project's most crucial element. Abutment construction could affect both maintenance of traffic and utility coordination. Any misstep would cause major impacts to both the project schedule and budget, so planning of the design and construction of these abutments was top priority.

Most of the bridges required a new fixed frame abutment paired with a new semi-integral abutment. During procurement, the team submitted Alternative Technical Concepts (ATCs) for the fixed frame and semi-integral



3D model of abutment showing existing and proposed abutments and all utilities, piles and tiebacks

abutments. These ATCs, approved by NYSDOT, proposed both abutment types consisting of a pile cap supported on a single row of micropiles. The request for proposal (RFP) requirements limited movement at the fixed frame abutments to one-quarter of an inch at the end of the approach slab. To meet this requirement, additional lateral support was provided by tiebacks through the pile cap. Tiebacks were also required for the semi-integral abutments to provide adequate lateral support.

Top-Down Construction

New abutments were constructed behind the existing abutments, requiring coordination with the construction staging. Such activities, as well as demolition, would impact traffic on the VWE, service roads and local streets carried by each structure. A top-down construction method developed by the team minimized traffic impacts. Construction began by installing drilled micropiles in a narrow trench along the top of the roadway during nighttime closures. The trenches were covered with steel plates during the day to allow the bridge to fully reopen to traffic. After installation of the micropiles, a pile cap was poured with cast-in sleeves allowing for the installation of the tiebacks.

The next step in the abutment construction was removal of the existing approach slabs and installation of temporary timber deck panels spanning between the new and existing abutments. During overnight closures, individual or multiple deck panels could be removed, allowing excavation and other work activities. At the end of each closure window, deck panels were replaced to return the bridge to full service, minimizing the time that temporary traffic configurations were required. The last step in building the pile cap was installing the tiebacks themselves.

After installation of tiebacks, the area between the new and existing abutments was excavated down to final grade using timber lagging and steel plates between piles. At this point, demolition of the existing abutments could proceed with minimal impact on expressway traffic. Finally, a cast-in-place reinforced concrete wall facing was constructed below the pile cap to the expressway grade.

Micropile and Tieback Layout

Micropile and tieback layout at each abutment underwent several iterations over the course of the design phase. First, an initial layout of the micropiles and tiebacks at each abutment was developed based on the as-built utility information. Micropiles were laid out along the abutment to avoid existing utilities. Analysis of the layout from both a structural and geotechnical perspective confirmed that it met all project requirements.

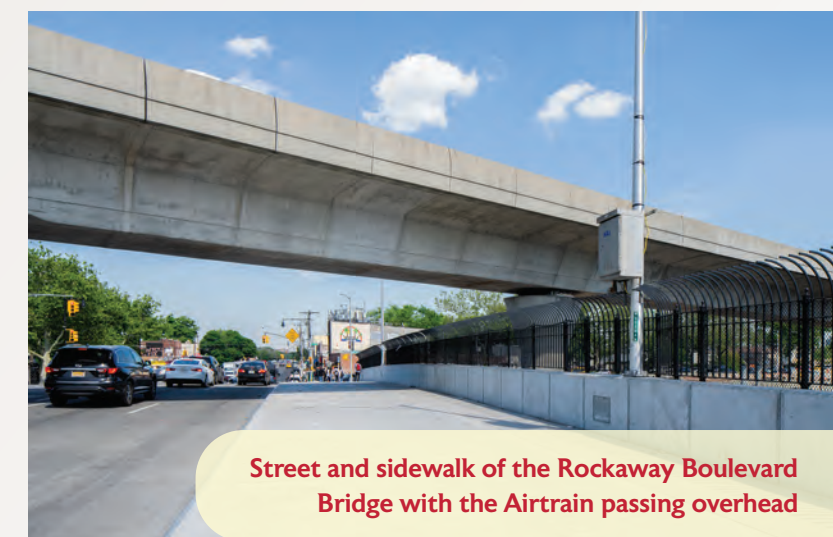
As field work progressed, the team performed test pits and utility surveys at each abutment. The updated data was added to the abutment drawings, and the micropile lay-outs were modified, as necessary. Since existing utilities would be in place when the micropiles were installed, locations were adjusted to avoid any conflicts.

Layout of the tiebacks followed a similar procedure. In addition to the horizontal position along the pile cap, the installation angle of the tiebacks, both vertically and horizontally, required consideration. At seven of the bridges, the AirTrain to JFK Airport ran along the median of the Van Wyck Expressway crossing over the bridge. Specifications of the installation equipment used were evaluated in conjunction with the tieback angles to ensure that required clearance envelopes to the AirTrain could be maintained.

Several 3D models were prepared for the bridge abutments during the project. The primary model was a Finite Element Method model for each fixed frame abutment as required by the RFP. This model incorporated micropiles and tiebacks, ensuring that the fixed frame abutment deflection met the one-quarter-inch movement project requirement.

A 3D utility model was also prepared for each bridge to understand the location of each utility on the bridge and under the adjacent service roads relative to the bridge structural elements. Compiling this information into a single model allowed the design team to avoid conflicts with existing and proposed utilities, which could have caused extensive construction delays. The proposed abutments and tiebacks were added to the 3D utility model, enabling the team to identify each location for potential conflicts between the tiebacks and utilities.

Key to the success of any major construction project, Design-Build or otherwise, is in the ability to accurately identify potential risks early and implement effective mitigation strategies throughout all phases. This project provided an example of the advantages of the Design-Build delivery method where collaboration between contractor, designer, owner and stakeholders produced a high-quality finished product while minimizing the chance of deviating from the proposed schedule and budget. Development of the abutment construction



concept could not have been achieved without such collaboration. As a result, this project reached completion in September 2023 with minimal delays and impacts on the surrounding community and traveling public, despite a multitude of challenges. 🇺🇸



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National Total 7,537

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