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Summer 2023
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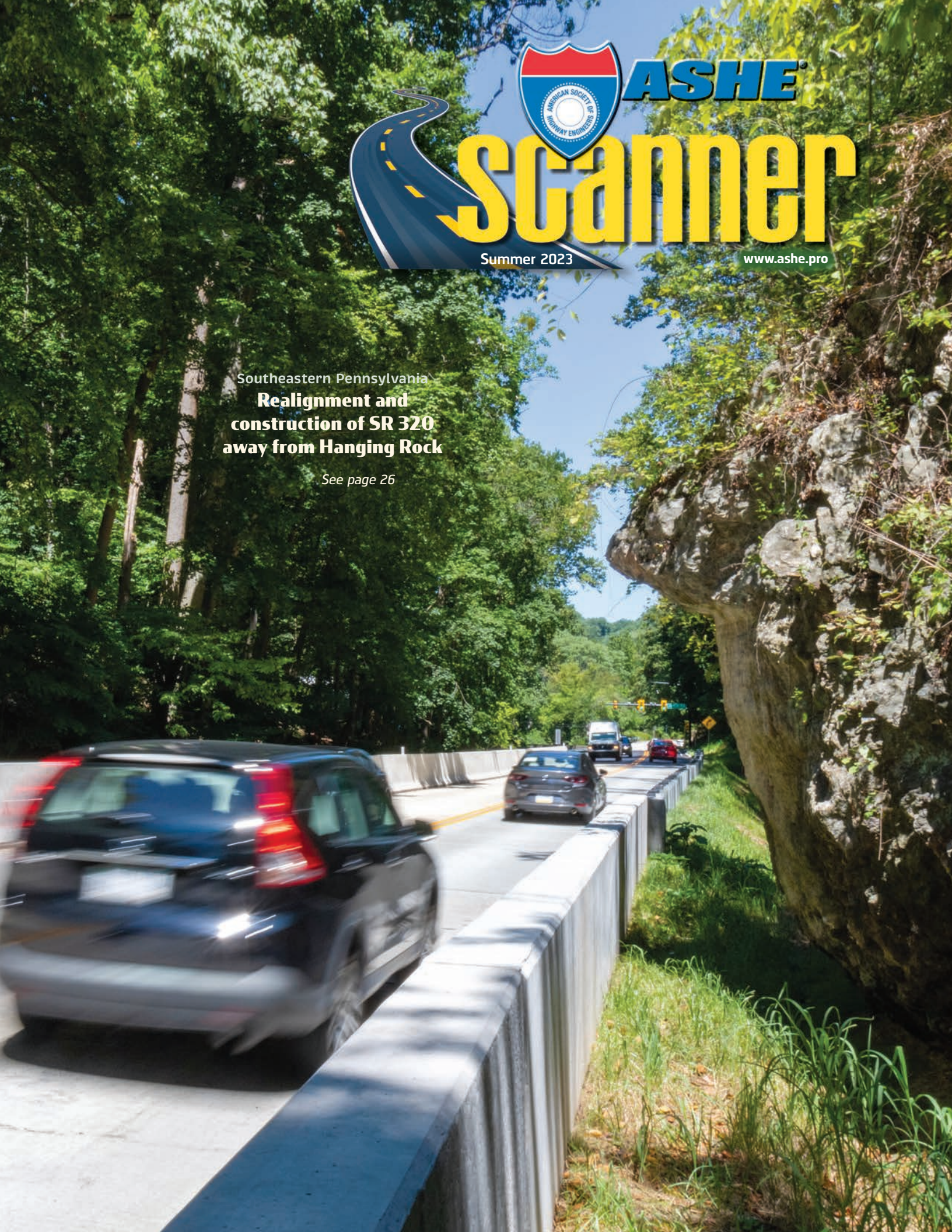

Southeastern Pennsylvania

Realignment and construction of SR 320 away from Hanging Rock

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scanner
Tammy Farrell, *Designer–Editor*
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MISSION

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

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610 Radcon Street
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Stan A. Harris, PE
ASHE National President 2023–2024

NEW DIRECTIONS

Greetings from the Cincinnati, OH, area! I am honored to serve you as ASHE's President for the 2023-24 year. I was a consulting geotechnical engineer for 40 years, primarily in Kentucky and Ohio, retiring in fall 2022. I worked on many types of projects, including buildings, dams, levees, water and wastewater treatment plants, but a major part of my work was always transportation projects. Over the years, I had the chance to provide geotechnical engineering services on four new bridges over the Ohio River and on many roadway projects. Since my retirement, my wife, Lynn, and I split our time between Florida and Ohio. The warm winters in Florida are nice, but the children and grandchildren in Ohio keep pulling us back!

I've been a member of ASHE since 2002 and currently belong to Triko Valley Section and Bluegrass Section. You may wonder why a retired individual would choose to continue to participate, much less help lead, a professional organization such as ASHE. To be honest, when I first joined ASHE, I saw membership as a good way to network with potential clients, and it was. But over time, I became increasingly involved with the Section, including publishing the Section newsletter for many years and chairing a committee for the 2010 National Conference in Cincinnati. Through these activities, I developed great friendships that last to this day.

I've had many opportunities to participate in first-class continuing professional development programs and to give something back to our profession through scholarship programs or other support of local engineering students' activities, such as Canstruction. I've also had the privilege to give back to my community through an Adopt-a-Highway program and the support of a homeless shelter.

But in total, I feel I have received much more in the way of benefits compared to what I have had to offer. I hope that by serving as your President for the next year, I can continue to contribute to this organization that has come to mean so much to me. If there is anything I can do to help your Section or Region over the next year, please reach out to me. I look forward to attending as many activities as possible.

As you read this, we've recently completed the National Conference in Atlanta, GA. Many thanks to Conference Co-chairs

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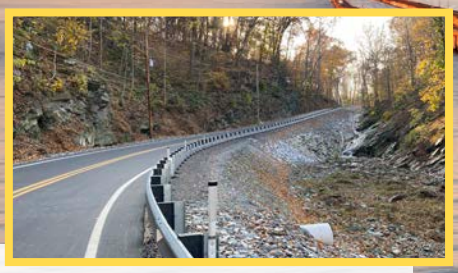

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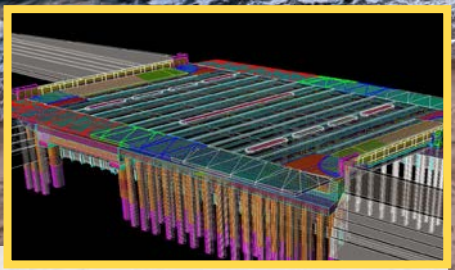

30 Technology Aids in Bridge Replacement

2023 National Conference

MEMORIES

Revamping Vital Bridges *in Center City, Philadelphia*

by **ASHE Delaware Valley Section**

The Chestnut Street Bridges Rehabilitation Project consisted of seven bridges and two retaining wall structures located along the corridor in the sections of University City and Center City, Philadelphia. This project covered the area between 31st Street and 23rd Street, and Schuylkill Avenue West from Market Street to Walnut Street. It also included the on- and off-ramps to I-76 (Schuylkill Expressway) near Walnut Street.

Chestnut Street (SR 3) served as an important river crossing from West Philadelphia into Center City. Located one block south of this major multimodal transportation hub, William H. Gray III 30th Street Station, Chestnut Street and Schuylkill Avenue West connected residents, commuters and visitors to schools and businesses. Chestnut Street operated as one-way eastbound and carried 18,300 vehicles per day, as well as pedestrians and bicyclists. Schuylkill Avenue West paralleled the Schuylkill River and was a viaduct structure over I-76, with on- and off-ramps located at the extreme north and south of the project limits. The goal of the project was to maintain and enhance safe and efficient transportation facilities for pedestrians, bicyclists and motorists while serving the city's existing and future transportation needs.

The work on the project was designed by Benesch, assisted by several team members/subconsultants.

A Complex Project

The main scope of work consisted of rehabilitating the five structural steel bridges and two brick masonry arch bridges in this corridor. It included internal strengthening to remove the 15-ton load posting on the Chestnut Street arch bridges. To prolong the life of the steel bridges, structural steel plates were repaired, and select steel members were replaced to improve vertical clearance and bridge ratings. The steel bridge superstructures and substructures were also painted. The brick masonry arch structures were partially dismantled, and earthen fill was removed and replaced with lightweight flowable fill. The masonry was also reconstructed in accordance with the Pennsylvania Department of Transportation's (PennDOT) historic bridge management plans and manuals, as well as The Secretary

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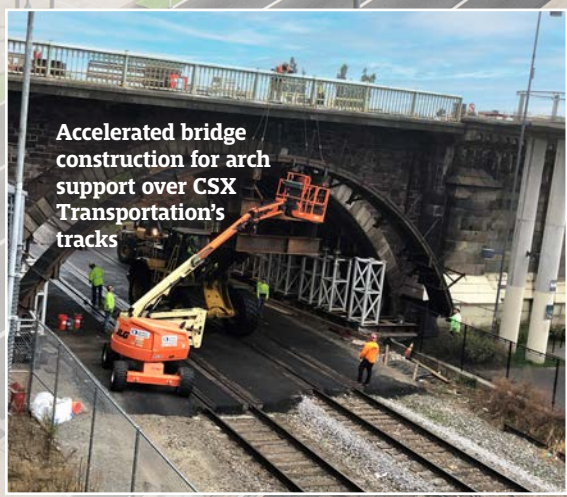


Accelerated bridge construction for arch support over CSX Transportation's tracks

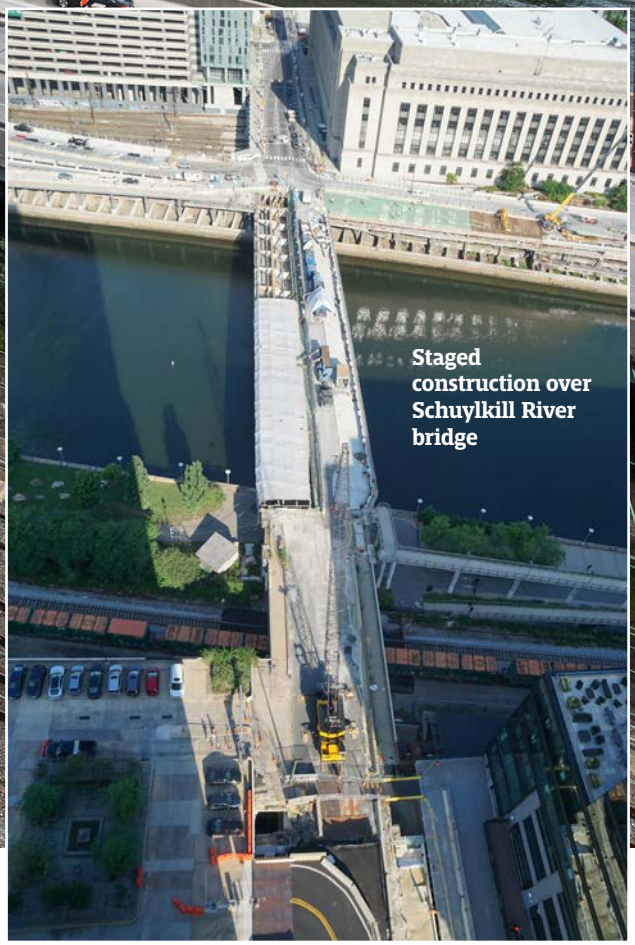
Center City, Philadelphia, PA

ASHE Delaware Valley Section

2022 Project of the Year

Over $20 Million

Chestnut Street Bridges Rehabilitation Project completed



Staged construction over Schuylkill River bridge

Revamping Vital Bridges *in Center City, Philadelphia*

(continued from page 6)

Improved safety for riders with new protected bike lane on Chestnut Street

of the Interior's Standards for the Treatment of Historic Properties.

Other major structural improvements included concrete deck and sidewalk replacements, bridge joint replacements and backfilling of void spaces with lightweight flowable fill and lightweight foamed glass aggregate. Upgrades also included concrete retaining wall repairs and repairs of the East River Wall structure supporting the Schuylkill River Trail. The roadway improvements involved pavement reconstruction on Chestnut Street between 31st Street and 23rd Street and installation of a parking-protected bike lane. The work also entailed upgrading and replacement of street lighting, navigation lighting and traffic signals. The installation of Philadelphia's first bicycle signal indication at the intersection of Chestnut Street and Schuylkill Avenue West was a pilot project of the City and PennDOT.

The urban setting made coordination with stakeholders a challenge throughout design and construction. The project spanned Amtrak's Northeast Corridor Line on the west and CSX Transportation's (CSX) double-track freight route on the east side of the Schuylkill River. In dealing with the river, a navigable waterway, and the adjacent rail lines, railroad and agency coordination for reviews and approvals was key to moving the project forward. East of the river, private building structures abutting Chestnut Street partially supported the sidewalk. The design focused on modifying the sidewalk supports to eliminate reliance on the private structures and place the sidewalk support solely on PennDOT-maintained structures in the public right-of-way.

New Application of Existing Techniques

Vertical clearance for the bridge over the CSX arch was the lowest along this double-track corridor, so reduction of more than one inch during construction was not permissible. To meet this requirement, the Benesch team designed a steel arch rib structure with steel towers for support that was installed with an integral work platform on the fascia of the arch. Due to critical freight activity of this line from Philadelphia's port to major cities in the Northeast as well as to the West, rail outages during construction had to be minimized. For that reason, accelerated bridge construction methods were used. The steel arch ribs were designed in sections, lifted in with cranes from Chestnut Street

and set into place on steel truss columns during a series of four-hour track outages.

Span Two of the CSX crossing is located over abandoned railroad right-of-way. In lieu of traditional timber supports, PennDOT District 6 used lightweight foamed glass aggregate to fill the Span Two opening from the original railroad station platform level (the Baltimore and Ohio Railroad's main passenger station in Philadelphia until the late 1950s) to the arch intrados. The easy transportability of the foamed glass allowed the contractor to deliver it along the CSX railroad haul road, off-load it with a conveyor system into the abandoned span and then use a plate compactor. The fill was retained using the PennDOT-standard Geosynthetic Reinforced Soil wall system matching up with the arch face.

Social and Economic Considerations

During construction, pedestrian access was maintained for all properties located within the project. A minimum of one sidewalk was maintained on Chestnut Street at either side of the Schuylkill River and Schuylkill Avenue West to reduce the impact to residents commuting to school and work. A signed detour one block north on Market Street was established for pedestrians and bicycles. Traffic and transit routes were detoured eastbound via Market Street starting at 33rd Street.

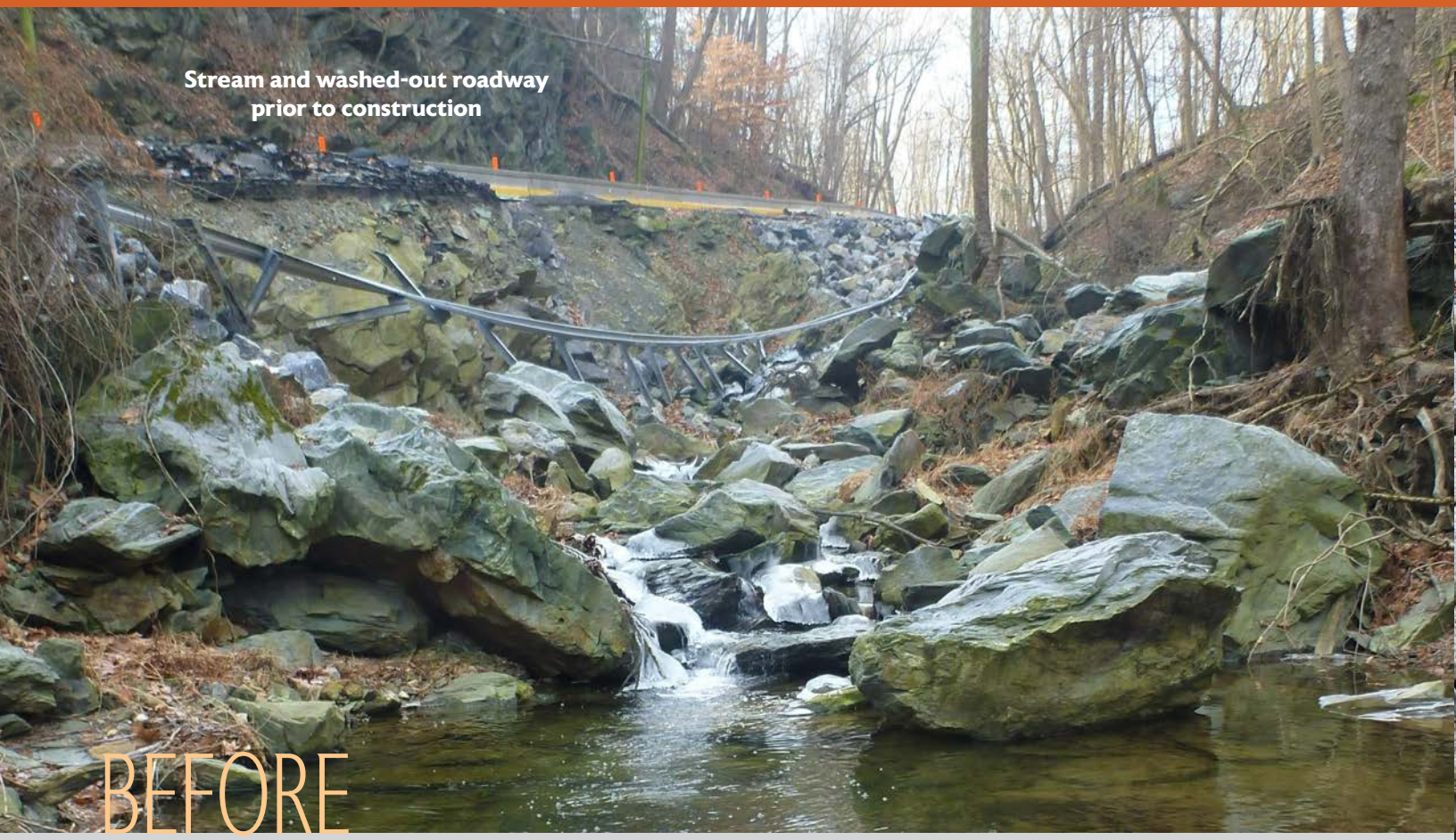
PennDOT repaired the retaining wall structure supporting the Schuylkill River Trail under Chestnut Street. Additionally, the Chestnut Street access to the nearby Trail ramp was improved with a widened sidewalk, bicycle layby area and direct connection to the parking-protected bike lane.

Enhanced Safety

The new left-side bike lane with a parking-protected buffer and dedicated bicycle signal at Chestnut Street and Schuylkill Avenue West improved bicycle safety within the corridor. Safety for all users was elevated through such streetscape elements as upgraded pedestrian and street lighting, new pavement markings and signing. Other enhancements included wider sidewalks with new PennDOT-approved standard barriers. The design and construction teams maintained a commitment to all safety protocols during construction, helping to ensure the well-being of stakeholders, pedestrians and the traveling public.

The Chestnut Street bridges over the Schuylkill River in Center City, Philadelphia, reopened for traffic in March 2022.

Challenges in Delivery and Resiliency:



Stream and washed-out roadway prior to construction

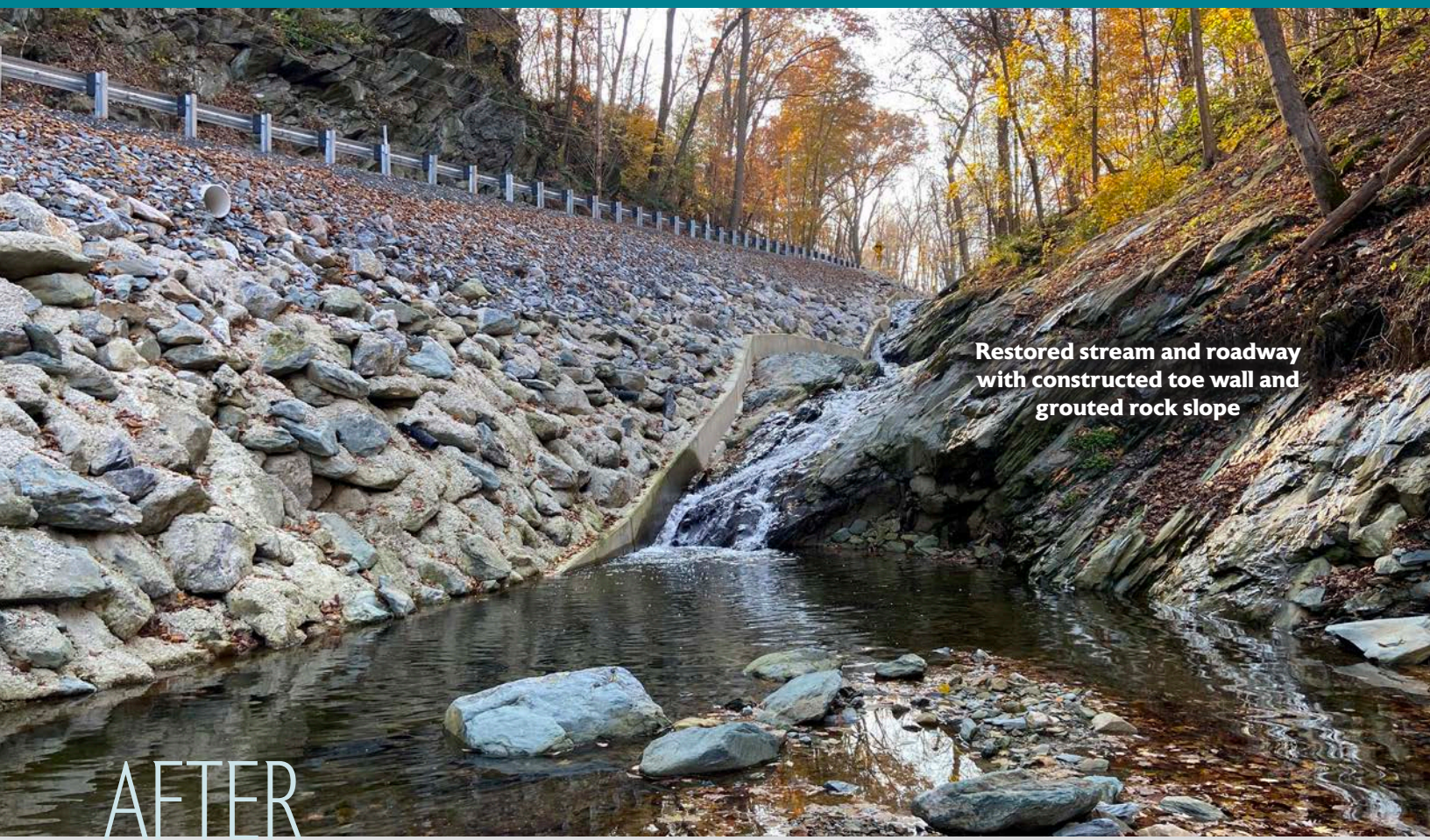
by Nathaniel S. Kirchner, PE, Project Manager, Gannett Fleming, Inc., **ASHE Harrisburg Section**

Resiliency is a word often heard today in the engineering industry while dealing with the challenges of building and maintaining infrastructure in an ever-changing environment. In 2018, a microburst storm struck eastern York County, in southcentral Pennsylvania, washing out the eastbound lane of Accomac Road. The local roadway provided access to residences along the western shore of the Susquehanna River. Gannett Fleming (GF), chosen by the Pennsylvania Department of Transportation (PennDOT), was to develop a solution to repair the roadway. It had to be resilient to future storms and provide a quick, cost-effective way to restore access for the community.

Shortly after the storm, geotechnical engineers from GF met with PennDOT Engineering District 8 representatives to evaluate the damage and to brainstorm solutions to repair and stabilize the roadway. Much of the remaining slope was bedrock with a few areas where a soil/rock mixture was still present. The soil areas were steep and susceptible to raveling. GF discussed the options, which included backfilling with riprap stone material and constructing temporary geosynthetic reinforced soil slopes. Both solutions were used where best suited along the washed-out area to stabilize the remaining westbound travel lane. A temporary barrier system was placed to maintain traffic in the single lane, and traffic flow was controlled using temporary signals. Visual points were established to monitor for further raveling/undermining of the roadway. This restored access to the community, while allowing the design team time to develop a long-term solution.

First, the team was tasked with developing alternatives. These included permanent closure and relocation of the roadway, permanent traffic signals with a single bi-directional travel lane and restoring the road to two

Restoring Accomac Road



Restored stream and roadway with constructed toe wall and grouted rock slope

lanes along the existing alignment. Local municipal officials and residents wanted the two-lane roadway. Environmental impacts, costs (both for construction and maintenance) and time to construct were all considered in developing the preferred option to restore the existing road.

To advance the design, the team obtained extensive survey data as flooding scoured the overburden down to the bedrock and deposited debris in the channel. They compared available pre-storm mapping to the post-storm survey to determine areas of debris vs. natural ground. Field verification of debris vs. natural ground took place. The design then moved forward on critical path items, such as right-of-way, environmental clearances, waterway permits and utilities. Design concepts sent to the Pennsylvania Department of Environmental Protection (DEP) solicited input on the proposed roadway and stream to minimize agency review time.

During the pre-application meeting with state and federal agencies, these groups determined that the channel would be reshaped and relocated along the stabilized roadway embankment with select boulders and debris removed. The boulders were relocated to provide instream habitat and the trees preserved, where possible, to maintain bank stability. Construction of instream habitat structures or features were determined to not be feasible because the floodwaters stripped the channel to bedrock. The DEP and the U.S. Army Corps of Engineers provided environmental permits for stream and floodway impacts associated with the channel reshaping and relocation.

To prevent filling of the stream channel and to avoid impacts to an adjacent historically eligible property, repair measures were created to minimize right-

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of-way take and reduce the design footprint. The use of steepened grouted rock slopes, ungrouted rock slopes and geosynthetic reinforced soil slopes (GRS) accomplished these goals.

One complication in the design was the post-storm stream channel consisting entirely of bedrock. It had to contain the toe of the rock fill during placement to prevent the rock from washing downstream in future events. A reinforced concrete toe wall was incorporated, where necessary, to contain the grouted rock slope and reduce the excavation of bedrock. The toe wall, keyed and doweled into solid bedrock, provided stability and reduced the potential for future events to undermine the repair. Grouting of the rock used to reconstruct the slope was necessary due to the steepness of the proposed slope (i.e., 45 degrees) and high stream velocities expected during future flooding events. Drainage provided behind the grouted rock slope helped prevent hydrostatic pressure build-up. Above the 100-year storm elevation, the slopes were slightly flatter and constructed with ungrouted rock fill or GRS. Use of GRS adjacent to the historically eligible property helped minimize the right-of-way required for construction.

In the construction phase of the project, GF provided on-call geotechnical services to resolve any potential construction issues. Several site visits took place in order to observe progress and to answer the contractor's questions. This resulted in minimal issues constructing the concrete toe wall and the rock fill slopes.

GF also provided an on-site environmental stream specialist to offer guidance to the contractor, maintaining production and ensuring permit compliance. This enabled changes to be made in boulder placement and channel configuration, as field conditions required, without stopping work or making changes after the work was completed. Minor modifications during construction improved natural habitat development.

Since construction, GF has provided stream monitoring services to fulfill the two-year permit commitment, verifying the stability and environmental health of the stream. During 2022, after a storm passed through the region, a site visit ensured that the stream remained stable. Small material was observed to have washed into the project limits from upstream. Velocities from the steep grade caused scour at the bottom of the steep channel slope. creating a deep plunge pool. The streambed material created a bar along the toe of the roadway bank, causing a bend in the stream flow.

During the first year of the post-construction monitoring event, the team observed that the channel had settled into a natural flow pattern, with functioning riffle/pool complexes and natural riparian vegetation. They also noted that macroinvertebrates had repopulated the rocks in the riffles, and small fish lived in the pools.

Impacts to Accomac Road in York County, PA, about one hour after flood peak August 31, 2018

Eastbound view of roadway during single lane traffic operations; lane protected with temporary signal system (background) and temporary barrier system

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NEW DIRECTIONS *(continued from page 3)*

Scott Jordan and Karyn Matthews, along with the National Conference Committee led by Nikki Parris, for their hard work in putting together such a great Conference. If your Section has never hosted a National Conference, I strongly encourage you to consider doing so. It will bring an energy that your Section has never experienced before. The National Conference Committee will help you through every step of the process, and you will make a lifetime of great memories.

At the National Board of Directors' March meeting in Columbia, SC, the decision was made to provide more financial support to our Regions. For ASHE to reach its potential as an organization, we need active, empowered Regions to effectively administer our various programs. Region Leadership is great training for individuals desiring to participate in national leadership positions someday, and I hope you will consider serving when the opportunity arises. I plan to share more about the expanded role of Regions in future scanner *editions.*

Many of our Sections will take a break over the summer. I hope each of you will have a chance to take time for yourself and your family, have fun and recharge your batteries. I'm excited about what is in store for all of us in ASHE over the next year.

As The Wheel *Turns*

ASHE Members on the Move!

ASHE Delaware Valley Section Honors Member and Young Member of the Year

Each season ASHE Delaware Valley Section recognizes the contributions of its members, choosing a Member of the Year and a Young Member of the Year. Nominations were solicited in December 2022, and the two members chosen received honors at the Section's dinner meeting in April.

Robert M. Wright, PE, was named the ***Section's Member of the Year.*** Bob is a Project Manager in the Center City, Philadelphia, office of McMahon, a Bowman Company, and has been with the firm for the past six years. He has a total of 44 years of experience in the transportation engineering field. For the first 27 years of his career he was with the City of Philadelphia Department of Streets and ultimately served as its Chief Engineer and Surveyor, directing all transportation, highway and bridge design efforts. He also served as the city's representative and project director on a number of undertakings for Pennsylvania Department of Transportation.

Bob has been a member of the ASHE Delaware Valley Section since 1986. He has also been part of the Section's Board in several capacities since 2003, including serving as Section President in 2014-15 and Section Executive for the past four years. He has been the editor of the Section's newsletter since 2005, and he participates on several Section committees as well.

Alexander J. Eadline, PE, was selected as the ***Section's Young Member of the Year.*** Alex serves as a Project Manager with CDM Smith in Wayne, PA. He has 14 years of transportation engineering experience with work in both the highway and aviation industries. His project management and design experience has been with highway projects ranging from bridge replacements to large-scale roadway reconstruction projects. As a project technical lead, he performs technical oversight of design tasks for project deliverables and addresses client-specific technical requests.

Alex was part of the I-95 Section BS1 project in Philadelphia, managed by Pennsylvania Department of Transportation (PennDOT) District 6, an $80 million reconstruction effort that is part of PennDOT's Revive 95 program. A member of ASHE since 2010, Alex has held membership in ASHE Delaware Valley Section for the past six years, where he serves on the PennDOT Breakfast Session planning committee.

ASHE Delaware Valley Section congratulates Bob and Alex on their honors.

THURSDAY, JUNE 8

The 2023 ASHE National Conference, hosted by the ASHE Georgia Section, was attended by more than 600 people over three days in sunny Atlanta, Georgia!

The conference got off to a bright start with beautiful weather for the Annual Golf Tournament. Held at Brookstone Golf & Country Club, nearly 100 players participated in the event – some choosing to make a run for the "Best Dressed" individual and team awards. For others, the day included a visit to the Atlanta Botanical Gardens – one of many guest tours hosted throughout the conference.

The day ended with a Welcome Reception and ice breaker game with more than 35 different exhibitors.

Thank you to all of our sponsors, exhibitors, volunteers, attendees, and guests who helped make the 2023 ASHE National Conference a success!

FRIDAY, JUNE 9

Friday kicked-off with the Opening Session, which featured keynote speaker Michael Thurmond, CEO of DeKalb County, followed by various technical sessions and the annual Past National Presidents Luncheon featuring FHWA's Sabrina David and GDOT's Meg Pirkle.

The highlight of the day was a tailgate party with live music from "Odd Man Out" band followed by an Atlanta Braves game – and win!

SATURDAY, JUNE 10

Following the remaining technical sessions, Saturday featured several excursions – from a technical tour to the Windy Hill Boulevard project construction site to a brewery tour featuring three of the areas most popular spots. The night ended with the annual Awards Banquet before everyone joined in for a fun casino event to cap off a great conference!

View photos from the 2023 ASHE National Conference at our #ASHE2023 website: **2023conference.ashe.pro**

KENTUCKY TRANSPORTATION CABINET (KYTC)

EDITION 1
AUGUST 2022

COMPLETE STREETS, ROADS, AND HIGHWAYS MANUAL

A GUIDE TO IMPLEMENTING SAFE AND EQUITABLE TRANSPORTATION STRATEGIES FOR FACILITIES IN RURAL AND URBAN KENTUCKY.

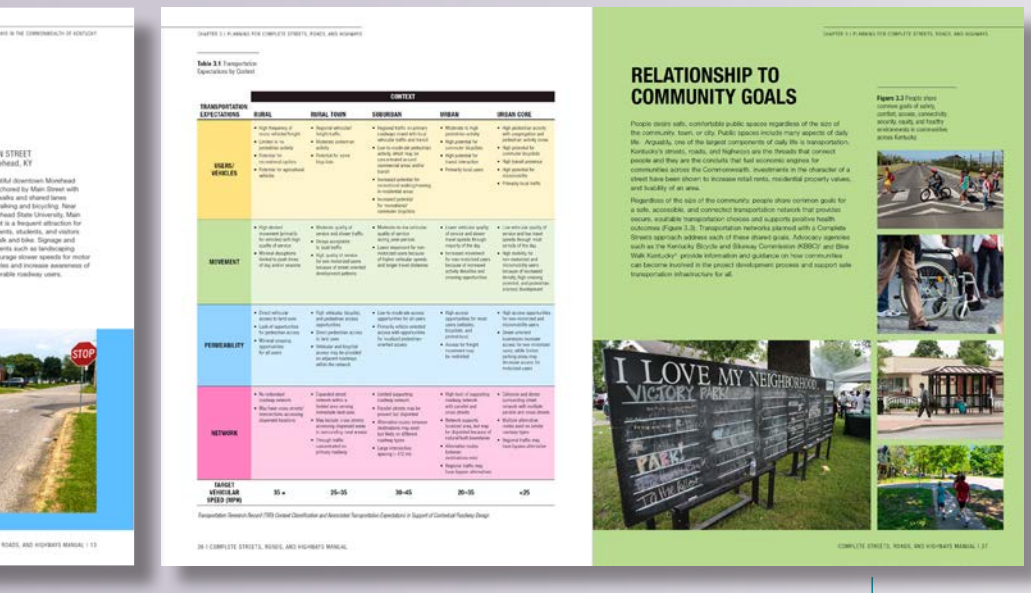
KENTUCKY TRANSPORTATION CABINET

Examples of Complete Streets are outlined in the Complete Streets, Roads, and Highways Manual developed by Kentucky Transportation Cabinet (KYTC).

A Guide for Communities: Complete Streets, Roads, and Highways Manual

by Katie Rowe, PE, Transportation Planner, Gresham Smith, and Jeremy Kubac, PE, Senior Transportation Engineer, Gresham Smith, Past President of **ASHE Derby City Section**

A Complete Street improves safety for all users, regardless of the mode of travel. The appropriate design for each mode is highly context-sensitive and dependent on a variety of factors unique to each community. A successful Complete Street that provides meaningful transportation choices in one location may look completely different from a Complete Street elsewhere. The common denominator among all Complete Streets is that they provide a safe, comfortable travel experience for all expected users.



The manual emphasizes the relationship between transportation and community goals across Kentucky.

To approach the Commonwealth of Kentucky's Complete Streets Policy and transportation networks holistically, Kentucky Transportation Cabinet (KYTC) developed a new Complete Streets, Roads, and Highways Manual. It replaced the previous KYTC Pedestrian and Bicycle Travel Demand Policy implemented in 2002. It also provided an opportunity to reflect on past efforts while evaluating new and emerging needs and opportunities to enhance the Complete Streets policy.

Intended to support planning and engineering practitioners, transportation agencies and local communities alike, KYTC's new manual provides in-depth guidance and recommendations for transportation design. It shifts from a motor vehicle-centric transportation system to a new approach for building a network that supports the needs of all users. The publication also contributes to the National Roadway Safety Strategy's adopted Safe System approach to transportation. Building on current and emerging national best practices for safe, enjoyable and equitable transportation, this comprehensive handbook was designed to be a flexible, living document. It offers recommendations that can be modified and implemented in ways specific to a location.

A Wide Reach

The manual's reach extends from small towns and communities that are the fabric of rural Kentucky to the state's most dense urban core. Along with its emphasis on safety, the manual also provides recommendations relating to equity and accessibility for all users of Kentucky's transportation network. It recognizes that the Complete Streets concept is a tool to help address disparities in transportation across a community. It provides design guidance for safe, adequate and well-maintained facilities for all people who use the street. This includes pedestrians, bicyclists and other micromobility users, along with children, public transportation users, motorists and freight vehicles. It recognizes vulnerable road users, as well as those who have experienced systematic underinvestment or whose needs have not been met through a traditional transportation approach. This last group comprises older adults, people living with disabilities and those who cannot afford or do not have access to a car.

The manual also emphasizes the relationship between transportation and community goals across Kentucky. By prioritizing gaps in the network for vulnerable users, transportation networks using the information can address the

(continued on page 22)

A Guide for Communities: Complete Streets, Roads, and Highways Manual

(continued from page 21)

common goals of safety, comfort, access, connectivity, security, equity and healthy environments.

Ease of Use

Organized into 10 chapters, the publication can be used in a variety of scenarios. These include site-specific applications, as well as general guidance on Complete Streets best practices and standards. Each chapter provides answers to questions about Complete Streets that benefit both transportation practitioners and the community. It also includes background information about the Complete Streets concept, a glossary of terms, an acronym list and a How to Use the Manual guide to aid in clarity for nonpractitioners. The terminology and industry practices become progressively more technical throughout the text.

Projects covered in the manual include new construction, reconstruction and modernization projects. There is also specific guidance for urban curbside management and for rural and small communities with higher concentrations of farming, equestrians and horse-powered vehicles operating on or near Kentucky's streets and highways. As new methodologies and technologies evolve, the publication will continue to incorporate the latest information related to Complete Streets.

Since the planning, design, construction and maintenance of Complete Streets may require additional coordination with local, state and/or federal agencies, a vital part of the manual is the Complete Streets Planning Checklist. It was designed for use in conjunction with the most current edition of the American Association of State Highway and Transportation Officials (AASHTO) Green Book, in addition to other national design guides. The checklist provides practitioners with a framework to help them evaluate whether they have properly identified appropriate facilities for all users for each roadway context by meeting one or more of the checklist's criteria.

The manual also includes examples of Complete Streets in various communities across Kentucky, reflecting the variety of facilities and implementation strategies that best suit a specific community's needs. It focuses on new ways of imagining streets that serve everyone, balancing access, connectivity and equity for all modes in the community.

Graphics and images in the guidebook help reinforce the information provided in the recommendations. It offers new details on the use of tactical urbanism, pilot projects and interim design projects for quick-build, low-cost and phased construction strategies on existing streets, roads and highways to advance long-term goals. New research on transportation expectations by context, as well as prevailing planning and engineering judgement contained within its pages, will be included in AASHTO's next publication, A Policy on Geometric Design of Highways and Streets.

The publication provides guidance on the use of tactical urbanism, pilot projects and interim design projects on existing streets, roads and highways.

Implementation

Providing a one-stop guide for designing new streets and reconstructing or retrofitting existing streets, KYTC's manual contributes to the creation of safe and efficient transportation systems throughout the state that are equitably shared among diverse users. The publication launched in late 2022, receiving praise from Kentucky's Governor and the State Transportation Secretary, as well as the Grand Award from the American Council of Engineering Companies of Kentucky (ACEC-KY). An ongoing series of workshops across the state is guiding practitioners in their use of KYTC's new Complete Streets manual.

MileMarkers

News From Across ASHE-Miles

ASHE Altoona Section and PennDOT Host Annual Workshop

In April, ASHE Altoona Section and Pennsylvania Department of Transportation (PennDOT) District 9 hosted their 21st annual workshop in Duncansville, PA. The event included several updates by the District and a look ahead regarding investment in critical infrastructure. Technical presentations included updates on bridge preservation methods, slope stabilization with piles, new information pertaining to the Waters of the United States Rule and latest bridge replacement methods. Shown above are, *from left,* Suresh Gutta, PhD, PE, American Geotechnical and Environmental Services, Inc. (A.G.E.S.); ASHE Altoona Section President Barbara T. Hoehne, PE, STV Inc.; Sebastian Lobo-Guerrero, PhD, PE, DGE, A.G.E.S. Gutta and Lobo-Guerrero, both members of ASHE Pittsburgh Section, spoke at the workshop.

ASHE Albany Section Sponsors Competition for Youth

ASHE Albany Section was honored once again to serve in January as Gold Sponsor for the Capital District Future City Competition. Since the Section's inception in 2010, the group has sponsored Future Cities events in Albany, NY, using the proceeds from its golf outings. The competition encourages middle school students to design a city for the future, applying their knowledge of math, science, engineering and technology, as well as writing and presentation skills. Shown presenting the awards to winning teams are Wayne Bonesteel, ASHE Albany Section President, and Addyson Lyons, ASHE Albany Section Director. Lyons also serves Future Cities as Regional Coordinator. Thanks to all volunteers who helped make this event a success.

◀ Receiving the American Council of Engineering Companies of Kentucky (ACEC-KY) Grand Award for KYTC's guide, Complete Streets, Roads, and Highways Manual, are, left to right: Katie Rowe, PE, Gresham Smith; Chuck Allen, PE, ACEC-KY; Keith Lovan, PE, KYTC; Jeremy Kubac, PE, Gresham Smith.

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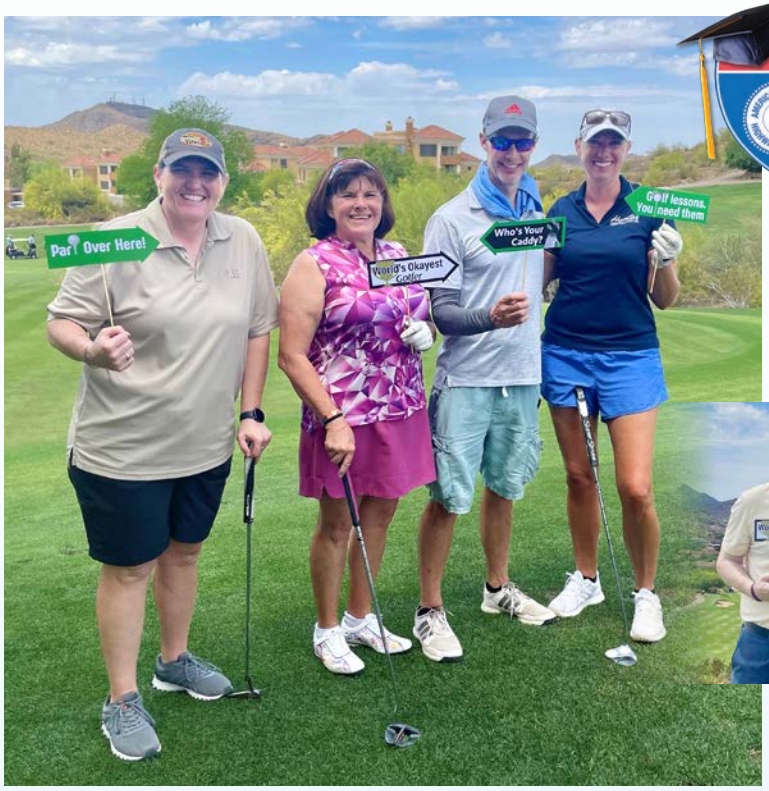
MileMarkers

News From Across ASHE-Miles



Teeing Off for Fun *and* Funds with ASHE Phoenix Sonoran Section

For about a decade, **ASHE Phoenix Sonoran Section** has raised funds for its college scholarship program primarily from proceeds of the group's popular annual golf tournament. The Scholarship Awards for Engineering, Surveying and Construction Management, for students attending four Arizona state schools, each range in size between $1,000 and $5,000. Recipients are chosen via a competitive application process. The Section awards four to six scholarships each year, presenting them in person to recipients at its December meeting.

ASHE Central Texas Section: Two Years Old and Growing Strong

In its second year, **ASHE Central Texas Section** draws support from its members, potential members, local industry representatives and subject matter experts, all participating in monthly events. Section gatherings include opportunities to network and earn professional development hours. The group already has 81 members and continues to expand. One highlight in December 2022 was its scholarship awards event, when five recipients received scholarships ranging from $1,250 to $2,500. The Section also organizes field trips and community service events to further educate and engage its members. These events include the Texas Department of Transportation's Adopt-a-Highway trash pick-up, Central Texas Food Bank and the City of Austin Animal Center.

ASHE Delaware Valley Section
2022 Project of the Year Award
Under $20 Million

The project to upgrade SR 320 (South Gulph Road) in southeastern Pennsylvania faced several challenges, including historic Hanging Rock protruding over part of the roadway. In addition to causing clearance issues, this natural feature was located along Gulph Creek, which experienced regular flooding. In January 2020, Pennsylvania Department of Transportation (PennDOT) Engineering District 6 began work to reconstruct and realign SR 320 away from Hanging Rock.

The project included the mile-long corridor between Arden Road and Upper Gulph Road and the intersection of SR 320 and Upper Gulph Road in Upper Merion Township, Montgomery County.

McCormick Taylor, the design consultant, was contracted to work through the challenges and complete the preliminary engineering and final design. The project entailed:

- Realignment of SR 320 away from Hanging Rock
- Raising of the profile of SR 320 to meet the 100-year flood elevation requirements
- Reconstruction of the cantilevered structure that carried SR 320 over Gulph Creek
- Reconstruction of the wall separating SR 320 and Gulph Creek
- Addition of a southbound right-turn lane at the intersection with Upper Gulph Road
- Installation of curb ramps and signal upgrades that met Americans with Disabilities Act guidelines
- Upgrades to drainage facilities

Project Complexities

In addition to the size and location of Hanging Rock and the proximity and regular flooding of Gulph Creek, the permitting process posed a challenge. After initial commencement of preliminary engineering, there were delays with securing environmental clearance and permit approval.

Most of the permitting issues had to do with the flooding of Gulph Creek. During normal rain events the road would close, often for hours. Sometimes it took days for the water to recede, preventing access for emergency services throughout the area. After many redesigns, the designer's environmental team coordinated with the regulatory agencies to achieve consensus on the design and satisfy requirements for the anticipated needed permits. The permitting process was completed in nine months with just one submission and minimal comments from the agencies.

The final roadway design raised the profile above the floodplain and shifted the alignment away from Hanging Rock to provide sufficient clearance for normal-sized vehicles and trucks to safely travel. To accommodate the shift, a retaining wall and a cantilevered roadway section over Gulph Creek were designed, which measured six feet wide at its largest point. The cantilevered section used a precast wall system. Coordination with the wall manufacturer was critical to achieve the correct properties for the design.

Development of the cantilever on top of a precast wall system was unique for both Montgomery County and the Commonwealth of Pennsylvania. This section extended one lane of the roadway over Gulph Creek for approximately 1,000 feet to avoid impacting the Hanging Rock.

Aesthetics and Sustainable Features

The retaining wall system (t-Wall) provided a more robust support system for the roadway. This design slightly realigned the roadway to move traffic away from the historically protected Hanging Rock and also brought the roadway surface and cantilevered slab out of the flood plain. The scour protection along the wall was upgraded from the existing gabion baskets to a modified R-7 riprap rock material to prevent future washout, which should prove to be more resilient against expected flood surges.

Improved Traffic Controls

Traffic signals incorporated in the project area were linked to PennDOT's Traffic Control Center with its new unified command and control. With this connection, SR 320 could be used as a major diversion route when accidents or weather events occurred on the parallel I-76 (Schuylkill Expressway). The new technology allowed PennDOT to connect directly into the signal system and to optimize traffic flow in the area. Emergency programs based on the time of day could be established in advance to make quick adjustments. In addition, to improve traffic flow, a south-

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A Rocky Challenge to Improving Pennsylvania's SR 320

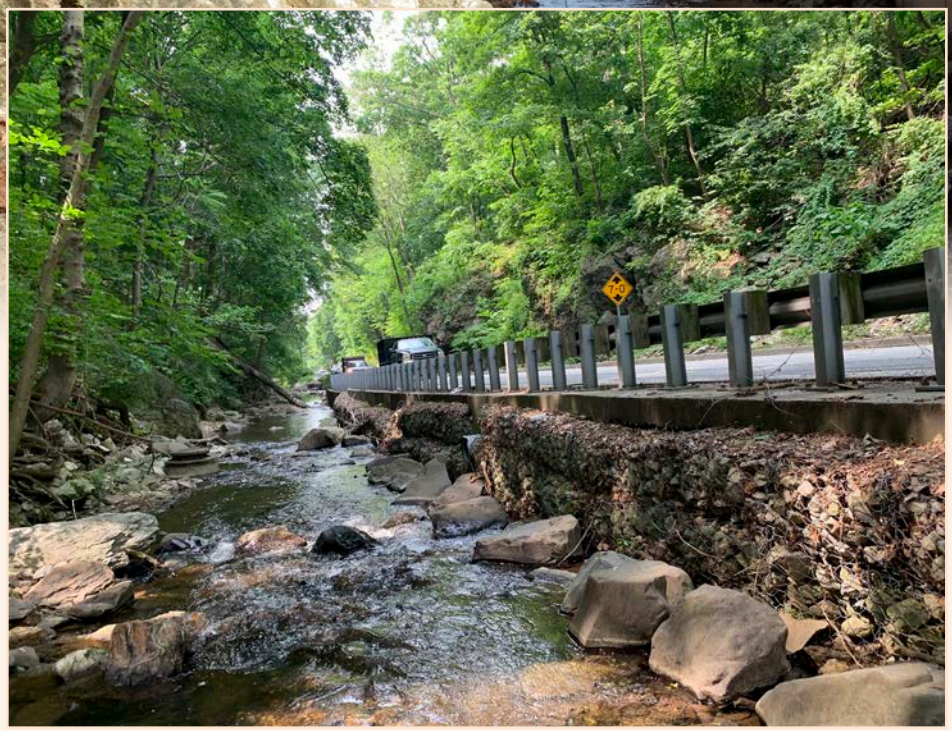
by ASHE Delaware Valley Section

Completed wall and structure carrying SR 320 along Gulph Creek

Start of wall excavation at Arden Road, using custom- made trench box

A Rocky Challenge to Improving Pennsylvania's SR 320 *(continued from page 26)*

New cantilevered structure carrying SR 320 over Gulph Creek



SR 320 prior to construction along Gulph Creek, looking north

bound right-turn lane at the Upper Gulph Road intersection was included.

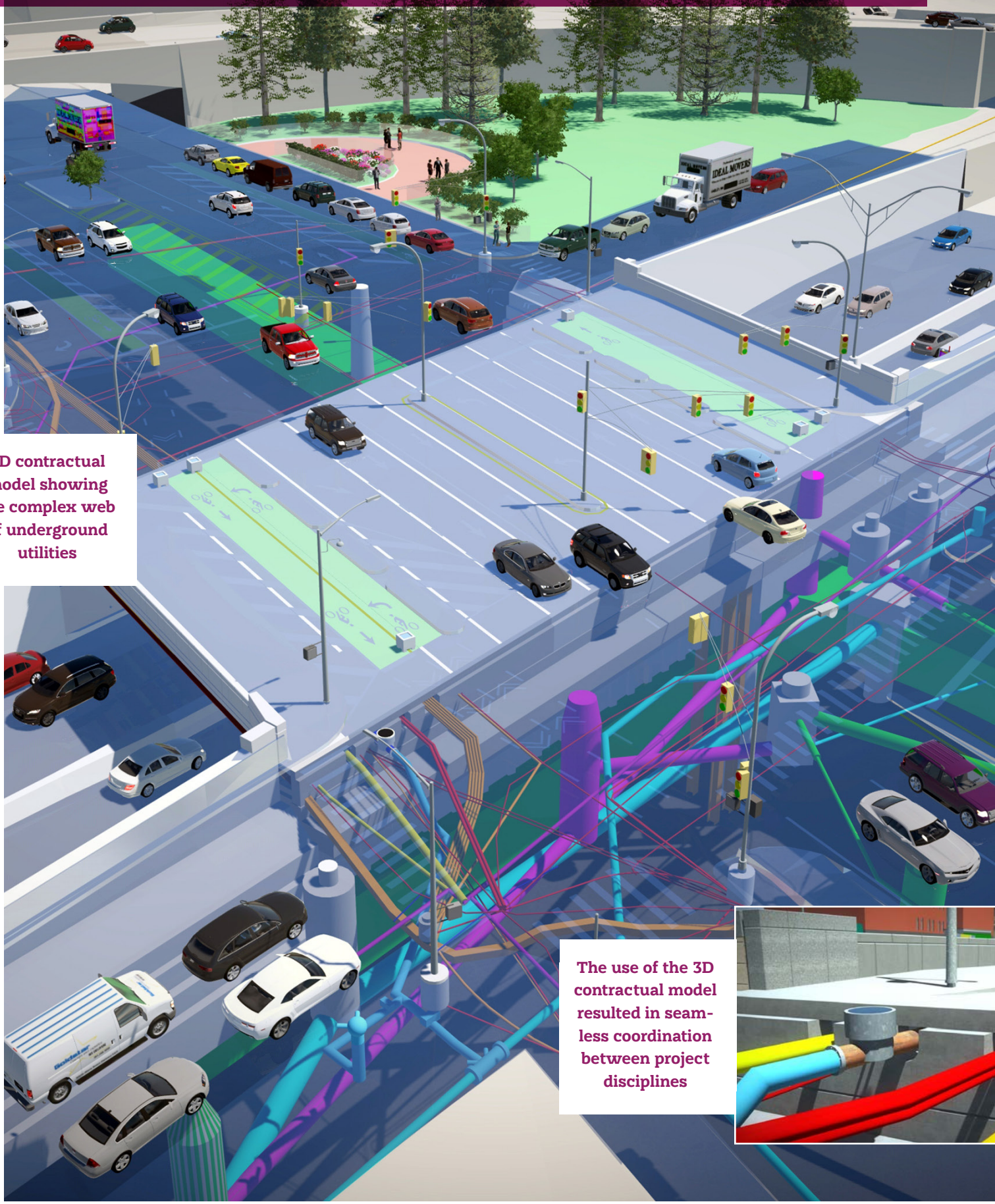
Project Completion

Construction was initially delayed due to complexities with the prefabrication of the wall and shop drawings and an extreme weather event (remnants of Hurricane Ida) that flooded an exposed open job site. PennDOT motivated the contractor to finish the project as soon as possible. The initial schedule was delayed by approximately one construction season. However, the contractor worked through the winter months, completing the project in June 2022.

This project not only enhanced safety on the heavilytraveled section of SR 320, but also preserved the historical importance of Hanging Rock. The reconstructed road benefited residents and commuters alike, including students who commuted to nearby Villanova University and visitors to the King of Prussia shopping mall complex to the north. The improvements also reduced the amount of maintenance and resources that the flooding had continually caused.

Innovative Technology Aids in Bridge Replacement

by Zachary Maybury, PE, **ASHE Albany Section**



3D contractual model showing the complex web of underground utilities

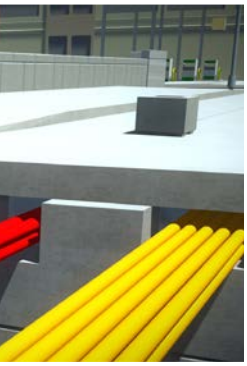
The use of the 3D contractual model resulted in seamless coordination between project disciplines

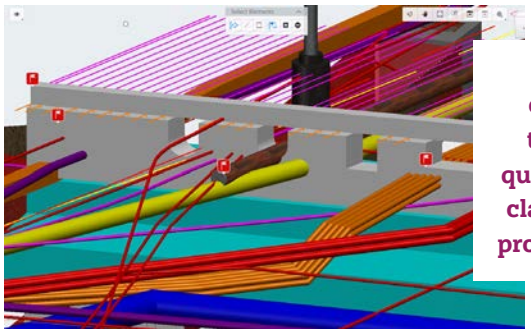
The East 138th Street Bridge over the Major Deegan Expressway, a mile south of Yankee Stadium, was in the heart of New York City. The bridge functioned as a grade-separated diamond interchange with the expressway below. Many drivers used this interchange to access Manhattan, as the Madison Avenue Bridge was located directly adjacent to this interchange. Because of its proximity, the interchange had a traffic demand exceeding 150,000 vehicles per day.

The bridge was notably wider than it was long, providing accessibility to six lanes of traffic, along with bike paths and sidewalks to accommodate high pedestrian use. Many utilities were carried on the structure and even more below. Most notably, these included a 15-foot-wide by 10-foot-tall sewer line running parallel to the bridge, and below both abutments. When this bridge started to approach the end of its service life, the New York State Department of Transportation (NYSDOT) faced a complex project for making the needed upgrades.

Model-Based Digital Delivery

Because the nature of the site posed so many challenges, NYSDOT chose Model-Based Digital Delivery (MBDD) to carry out the East 138th Street Bridge Replacement Project. MBDD consisted of creating a 3D model to a level of development that contractually enabled a contractor to build directly from the model, with a reduced set of 2D plans. Building Information Modeling (BIM) and 3D models have been used for several years in the vertical construction industry. Today, BIM and 3D models are still in their infancy on transportation projects nationwide. However, they have gained momentum across the country and will be standard practice before long. With NYSDOT already delivering one successful project using this delivery technique, it knew it could meet the challenges of this project's complexity by way of technology.





Reviews conducted in the 3D model quickly identified clashes between project disciplines

Complex Maintenance of Traffic Schemes

This project's location, with both high traffic rates and a high number of pedestrians, was also a key connection in the annual New York City Marathon. All of those factors proved to be challenges in staging the project. NYSDOT also needed to ensure that accessibility to Manhattan remained constant throughout the project. This resulted in a plan that replaced the bridge in four independent stages over three years while using accelerated bridge construction techniques.

Stakeholder Involvement

Given the project location, there was much stakeholder involvement. In order to conduct design coordination reviews with the various parties of interest, NYSDOT used a web-based software platform that allowed users to access the digital models without downloading any software. NYSDOT created user tutorial videos for use of the software and hosted brief seminars demonstrating its use prior to key review milestones.

While this method was effective at coordinating with technical parties, it was not a good tool to convey the project to the public. Instead, NYSDOT used the already created 3D model and elevated it into a 4D simulation. The result was a video for use at community board meetings that depicted all facets of the proposed construction sequence. This allowed NYSDOT to not only convey what the impacts to traffic were going to be, but also provided the visual component of construction activity to explain the reasons for those impacts.

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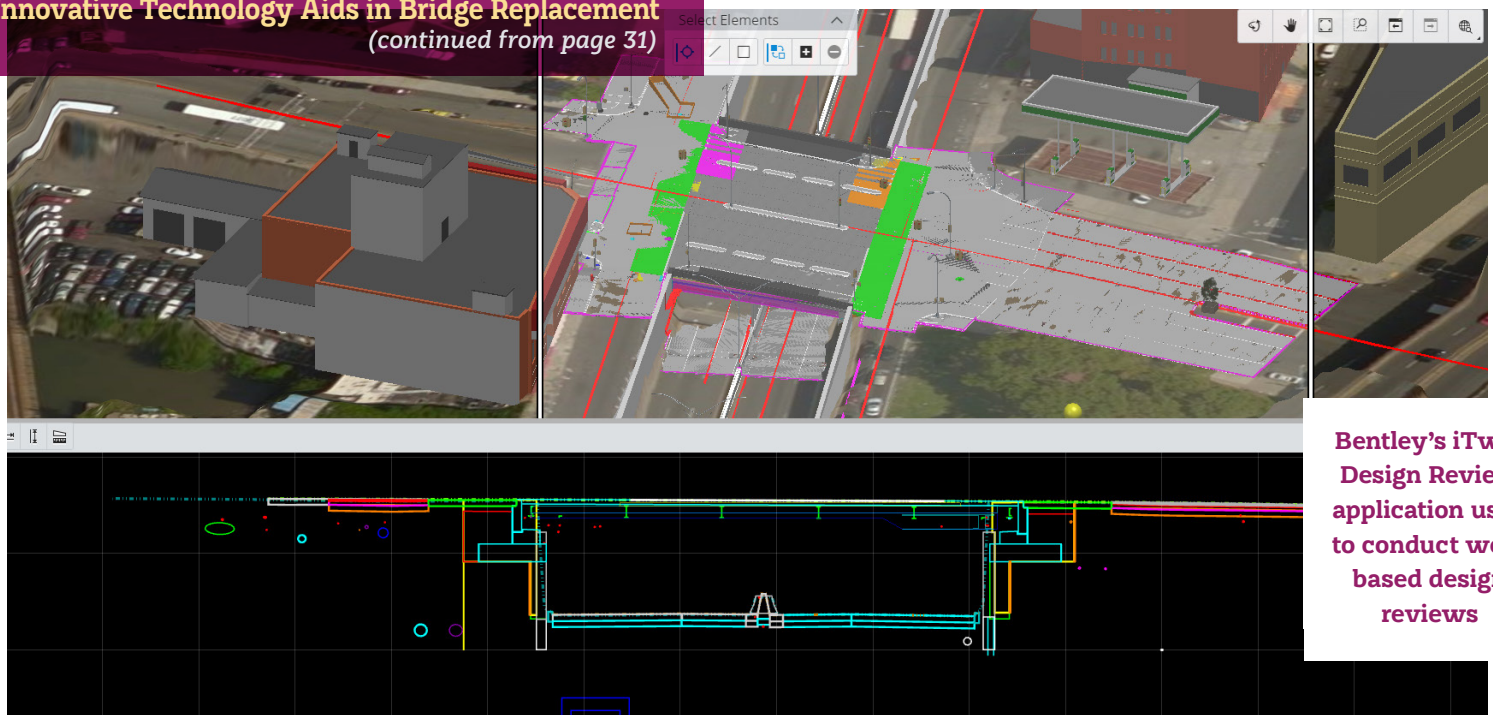


Bentley's iTwin Design Review application used to conduct web-based design reviews

Innovative Structural Solutions

The construction staging of the bridge into four distinct phases inherently led to a project with an extended duration. In order to mitigate not only the schedule, but the impacts to the public as well, NYSDOT incorporated accelerated bridge construction techniques. Modular deck beams were specified for this contract. A modular deck beam is an individual unit fabricated off-site, consisting of two steel girders with a precast deck. Each unit is set for a specific stage; then, ultra-high-performance concrete is used for the closure pours between to form a complete bridge deck. This enabled the contractor to install the bridge superstructure more quickly for each stage.

The sewer line running under each abutment was slated to be replaced later and doubled in size. This required the design team to design an abutment that could span over a 58-foot-wide opening to allow for future widening. The solution was to install a carry beam system to span the required opening and carry the abutment. This consisted of a drilled shaft on each side of the clearance envelope with a composite carry beam system connecting the two. The abutment would then be constructed on top of the carry beam system, which provided a load transfer mechanism for the abutment to span over the sewer below. The clearances between the sewer and the adjacent historical retaining walls that were to remain in place were tight. Having the 3D models ensured that the proposed solutions put forth in the contract documents were constructable.

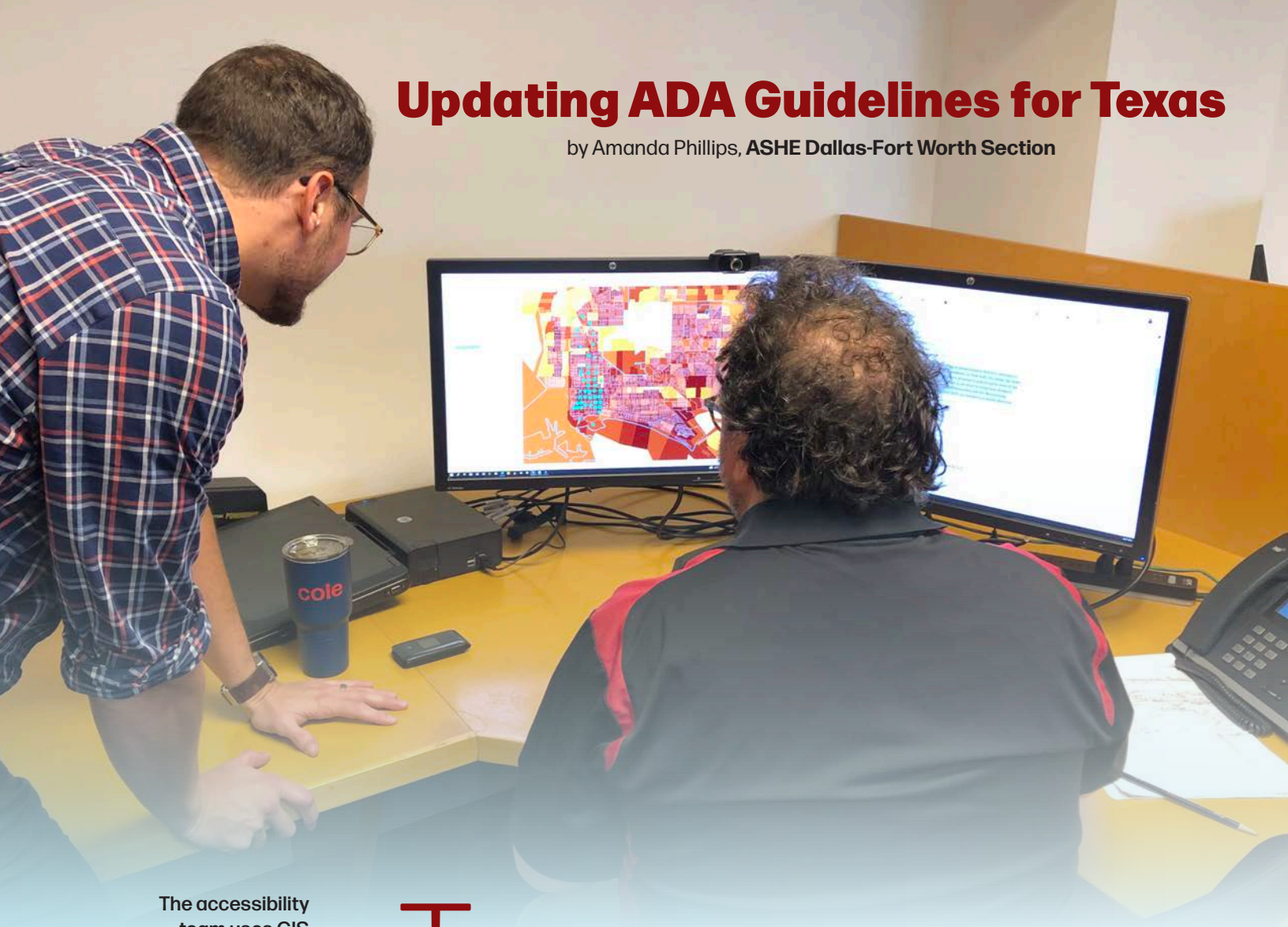
Construction

The East 138th Street Bridge Replacement Project was awarded in fall 2021, with the winning contractor's bid being 15 percent less than the engineer's estimate. To ensure that this project was successful at using the contractual 3D model in construction, NYSDOT held a series of seminars with the contractor and field inspection staff. The seminars helped them gain advanced skills for using the software and additional confidence in the use of this delivery method. The inspection team was outfitted with a total station so that they could readily compare information from the model to actual elements of work being constructed.

The project is expected to be completed in early 2025. NYSDOT's use of technology in construction allowed inspectors to capture geolocated 3D pictures in the field, upload them to an online platform and then compare the as-built work with the 3D model. While the project progresses to completion, NYSDOT will continue to gain insight that will shape its digital delivery goals for the future.

Updating ADA Guidelines for Texas

by Amanda Phillips, **ASHE Dallas-Fort Worth Section**



The accessibility team uses GIS systems to map, manage and prioritize data collection and associated findings for ADA assessment projects.

The process to create an updated Americans with Disabilities Act (ADA) Transition Plan for Texas began in 2020 with a pilot study and extensive data collection. Texas Department of Transportation (TxDOT) chose Cole to serve as its ADA resource on the state's team of consultants. The project to create this upgraded transition plan was divided into three phases.

Pedestrian Access of Infrastructure (PAI) Pilot Study (Phase One)

This phase involved Public Right-of-Way (PROW) policy guidance, planning, coordinating and testing a data collection and Geographic Information System (GIS) technology approach, incorporated into updating the transition plan. Workshops were conducted between the state's design department and civil rights division to determine needs and policy concerns. The team's ability to identify several options for data collection methodology for sidewalks, intersections, access to transit stops and accessible pedestrian signals guided the configuration of customized technology. The group also developed GIS integration solutions for the statewide data collection effort.

TxDOT PAI (Phase Two)

After leading a pilot study data collection for Williamson County, TX, including over 600 miles of sidewalks, corresponding intersections and right-of-way features, data was collected from 13 TxDOT districts. Representing 2,488 total miles of sidewalks, corre-

ULIP-ADA™ Automated Collectors: Version 3.0

- Proven Advanced Technology
- Cited as a Best Practice by NTRB & FHWA
- GPS Locator, HD Video Log
- Fast and Cost Efficient, Assesses 8 Miles Per Day
- 100% Sampling of Sidewalk Continuous Data
- Provides All Compliant and Non-Compliant Data

Sample curb ramp collection gathered from the ULIP-ADA

sponding intersections and right-of-way features, this included San Antonio, Yoakum, Beaumont, Corpus Christi, Houston, Pharr, Laredo, Lufkin, Atlanta, Paris, Tyler, Odessa and San Angelo.

Information was collected using its proprietary technology, Ultra-Light Inertial Profiles (ULIP). It provides continuous sidewalk data by measuring sidewalk cross slope, running slope (grade), gaps and bumps, giving cities the ability to report and map degrees of noncompliant sidewalks and compliant sidewalks. The ULIP is one of few technologies that can identify changes in level at a one-quarter-inch level of accuracy, a requirement of both 2010 ADA Standards and Public Right of Way Accessibility Guidelines.

A remediation cost was estimated with prioritization for the project. Technology was developed from data collectors and assessment protocols to GIS Integration tools, prioritization algorithms and the online GIS web viewer. This, in turn, allowed finalization of the remediation tracking tool within the web viewer to be used in Phase Three.

ADA Transition Plan (Phase Three)

TxDOT's updated ADA Transition Plan will incorporate all PROW, facilities and its policy moving forward. Cole also assisted the consultant team with facilitating statewide public outreach, handling implementation planning and tracking and drafting the state's updated transition plan. This plan will serve as the basis for other municipalities and agencies throughout Texas in the development of their ADA Transition Plan.

An in-house GIS team collected all previously gathered data and created a workable GIS-based mapping tool and web application for data management. All public rights-of-way and TxDOT buildings, including rest areas, travel information centers and sites and government buildings, will be integrated into this system. By including the PAI and facility data results, along with the built-in facility and PROW tracking, the web application provides real-time access to the state's information. Any resolved violations are immediately removed, leaving the unresolved violations in the system until addressed. Another custom data collection application developed by the GIS team is for use on Toughbook laptops. This is an inspection application used in the field to ensure remediation is compliant during construction, allowing for immediate correction if needed.

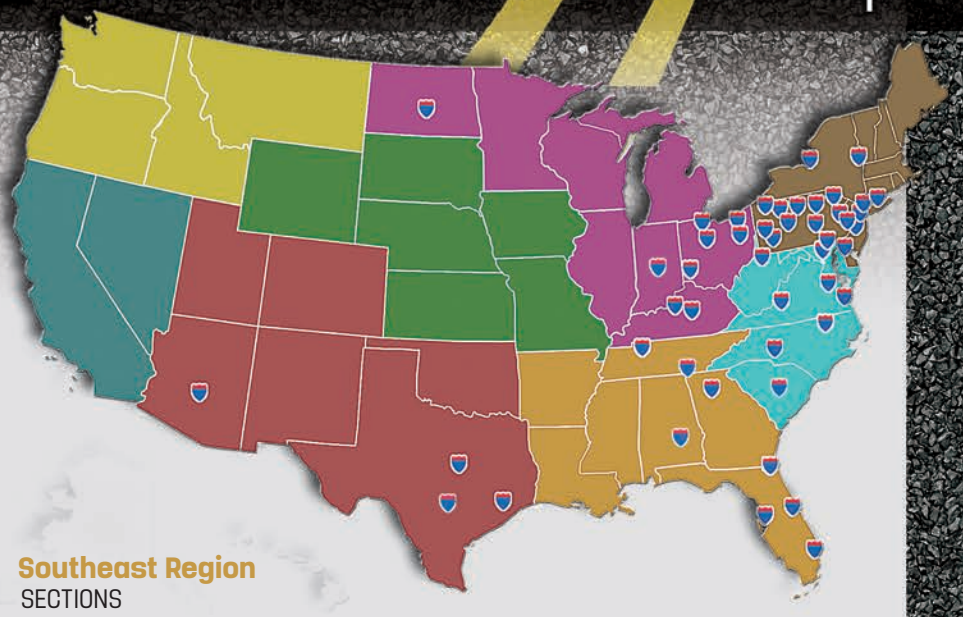
The end result of Phase Three will provide the different TxDOT divisions with the ability to develop unique user pathways to analyze their specific needs and ultimately implement short- and long-term project planning and remediation. It will deliver the standard that other municipalities and agencies use in establishing their ADA Transition Plan. This comprehensive way to plan, track and report improvements throughout the state will save time and money.

The ULIP-ADA can collect between six and 10 miles of sidewalk per day, maintains one-quarter-inch accuracy for vertical and horizontal measurements and integrates collected data seamlessly into GIS systems.

AMERICAN SOCIETY OF HIGHWAY ENGINEERS
610 Radcon Street
Johnstown, PA 15904

Change Service Requested

ASHE National Membership



Regions *and* Sections

Northeast Region

SECTIONS	
Albany	85
Altoona	186
Central New York	50
Clearfield	190
Delaware Valley	341
East Penn	118
First State	212
Franklin	130
Harrisburg	424
Long Island	47
Mid-Allegheny	125
New York Metro	162
North Central New Jersey	133
North East Penn	134
Pittsburgh	545
Southern New Jersey	173
Southwest Penn	227
Williamsport	78
Subtotal	**3,360**

Mid-Atlantic Region

SECTIONS	
Blue Ridge	57
Carolina Piedmont	46
Carolina Triangle	202
Chesapeake	253
Greater Hampton Roads	79
North Central West Virginia	51
Old Dominion	78
Potomac	159
South Carolina	119
Subtotal	**1,044**

Southeast Region

SECTIONS	
Alabama	55
Central Florida	119
Georgia	599
Middle Tennessee	312
Northeast Florida	205
South Florida	12
Tampa Bay	42
Tennessee Valley	115
Subtotal	**1,459**

Great Lakes Region

SECTIONS	
Bluegrass	97
Central Dacotah	83
Central Ohio	205
Circle City	46
Cuyahoga Valley	112
Derby City	86
Lake Erie	224
Northwest Ohio	45
Triko Valley	151
Subtotal	**1,049**

Southwest Region

SECTIONS	
Central Texas	77
Dallas-Fort Worth	45
Houston	72
Phoenix Sonoran	147
Subtotal	**341**

National Total	**7,253**
Professional Status	56%
Government	12%
Consultant	75%
Contractor	5%
Other	8%

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Emerging Section locations:
New Mexico
Denver, CO
Hartford, CT