Ingenium

in JEN ee um: Latin. Natural disposition of talents. Root word for "engineer"

SPRING 2020

A PUBLICATION OF EMH&T ENGINEERS, SURVEYORS, PLANNERS, SCIENTISTS

EMH&T

SWMPs, MS4s and Compliance

Design Efficiency

Public Infrastructure Supporting Private Development

Pooled Mitigation

Take a **break.**

Nearing the end of March 2020, and just prior to Ohio Governor Mike DeWine's "Stay at Home" order, EMH&T packed up nearly every one of its 280 office-based staff and sent them to work from home indefinitely. While telecommuting is nothing new, remote working on such a grand scale was. With the specialized hardware and software used for engineering design, each employee needed to take their entire computer system to their homes and set up the office-away-from-the-office. The operation was accomplished through the countless hours of preparation and execution of our Information Technology staff, to whom I am grateful for their dedication.

Within 24 hours of the decision to go remote, everyone was up and ready for the first of many work-from-home weeks. For our clients—public and private, large and small—the transition appeared seamless. With critical infrastructure listed as an essential service, EMH&T continued to serve our clients with every bit of the passion for which we have always undertaken our projects.

At the same time as so many shifted to sheltering in place at home, EMH&T's more than 85 field staff shifted into high gear. They are deployed for field data collection, construction oversight, sewer inspections and cleaning, cultural resources and environmental investigations, which are all tasks essential to the continuation of critical infrastructure services. They are performing their jobs while maintaining very strict adherence to social distancing and CDC guidelines.

I'm deeply grateful to lead a team here at EMH&T that demonstrates grace under pressure, adaptability at a moment's notice, and dedication to ensuring the continued service that impacts the quality of life for so many.

For too many months, the world has been held firmly in the grips of the COVID-19 pandemic. I invite you to sit back, and for just a little while, read in these pages the pandemic-free stories of the work of your neighbors, friends, and co-workers.

Sandy Doyle-Ahern
President

Ingenium

EMH&T
Engineers, Surveyors, Planners, Scientists
5500 New Albany Road
Columbus, Ohio 43054

Columbus
Charlotte
(888) 775-EMHT
emht.com

Sandra C. Doyle-Ahern, MEn
President

Douglas E. Romer, PE
Executive Vice President

Jeffrey A. Strung, PLA, ASLA
Vice President

Editor and Graphic Design
Lee Ruh
Director of Communications

Assistant Editors and Writers
Paul Davis
Gretchen Klamar
Quinn Sammons

Ingenium *is a semi-annual publication of EMH&T. It is designed to provide information on issues that are relevant to public officials and public servants of all levels, spanning the full array of public works industries. To add your name to the mailing list for* **Ingenium***, please send an e-mail to lruh@emht.com with your name, address, e-mail and phone number.*

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Contents

Features

Regular Columns

TOP WORK PLACES 2020
COLUMBUS CEO

ADAM BURGER, PE
The Path to Design Efficiency

Over the past year, Adam Burger, PE, newly appointed Director of the Design Innovation Division (DID) has brought a new way of thinking to engineering design processes at EMH&T.

Always a pioneer with opportunity, Adam worked on the Smart Cities grant for the City of Columbus as an engineer in the Transportation Division. The new design software he was exposed to while working on the grant left Adam thinking of other more efficient and more impactful ways to accomplish engineering projects.

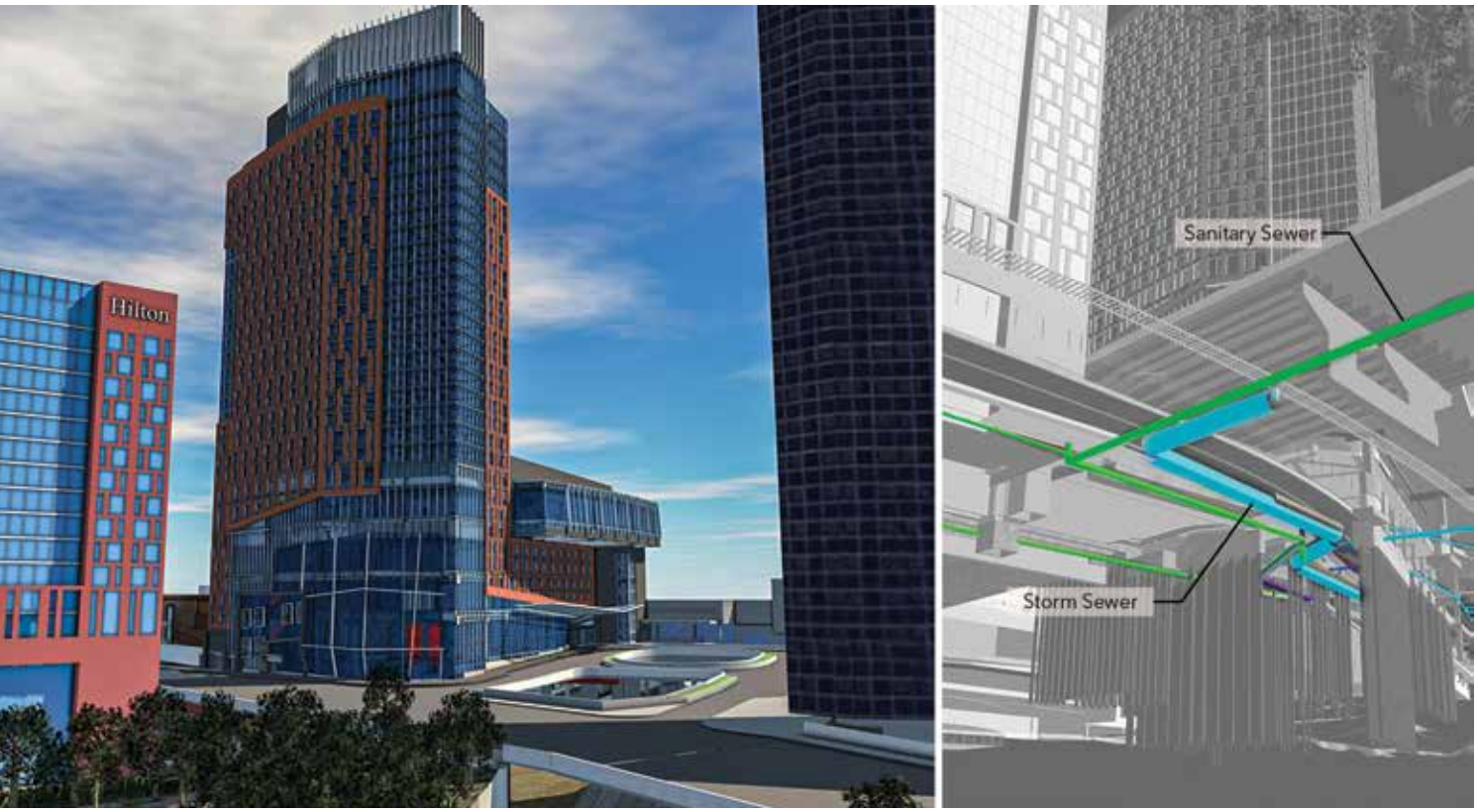
"There were more techniques and technology we could take advantage of," said Adam, "and if we learned them, it could help EMH&T provide even better service to our clients than we could do currently."

Adam has been at the forefront of emerging engineering and construction technology, diligently learning new software, and developing new practices for accurate and efficient design. He was able to get his feet wet on a few projects that benefitted from blending the in-place software capabilities and relying on his "never-say-never" attitude.

"Putting in the upfront effort, testing it, and creating efficiencies company-wide, will result in long-term rewards," he said. "Both the company and our clients benefit when work can be done more efficiently and deliverables are at a whole other level."

The DID offers two services. The first is visualization--a 3D image in the form of a photo-realistic rendered project alternative, or a carefully curated project flythrough video. Most would consider this a "pretty picture," and it is, but it is also much more. There is real engineering behind each image. That is where the second service comes into play--

Residential Development: Example of a rendering created purely for visualization purposes. It was created for a residential development project showing the clubhouse and swimming pool to be shared with stakeholders and prospective home buyers.



Urban Design: This model was used in design to identify underground utility conflicts with the proposed building foundation as well as evaluate sight distance concerns. A brief video was also produced to help demonstrate project elements to City officials to create agreement and understanding on design intent.

design and workflow efficiencies. Visualization is produced by the second (design efficiencies), and is only valuable if the engineering, calculations, and client's goals for aesthetics, budgets, and schedules are accurate.

In the past, renderings have been the domain of architecture firms, and very often, produced by graphic artists. As a registered professional engineer, Adam brings a different background adding value to the images.

"Our visualization currently produces incredible 3D images and videos backed by accurate engineering design that can also be constructed," said Adam. "We are progressing our design methods and client offerings in preparation for a future where the industry standard produces all design and deliverables in 3D."

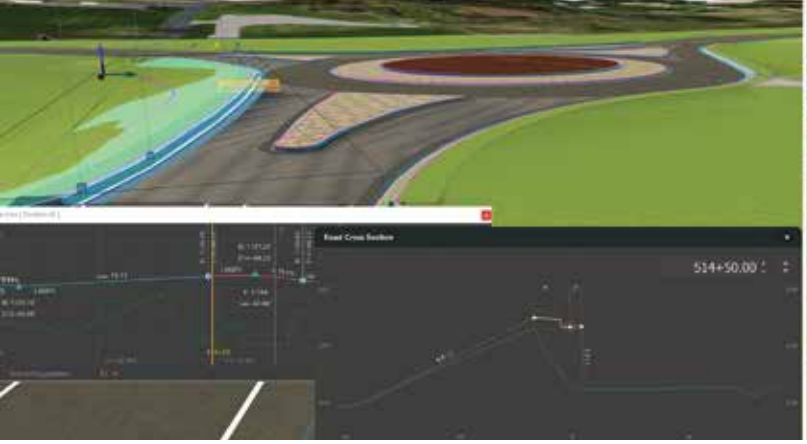
Adam further explained it could be years before this happens, but we are going to be at the forefront when it does.

As the Director of DID, Adam continuously explores ways to improve current practices using existing and new technologies to develop effective and efficient designs.

One of the benefits of Adam's new Division is the umbrella nature of what he does, connecting professionals across disciplines to share efficiencies with technology. For example, he brought an engineer in the Public Works Division who was designing a roundabout using a traditional hand calculation method, together with a Transportation Division engineer who was using newer Civil3D tools in a very effective and efficient way on a similar project. Together, they could utilize new and innovative techniques that will easily be converted into high quality rendering and videos.

"Because I was floating among the various Divisions within EMH&T," he said, "I was able to put the two individuals together to blend the software and personal knowledge into a better product," said Adam.

This is just one example of how Adam sees the use of efficient design techniques in 3D to not only improve accuracy and reduce rework, but also to easily predict project costs. This practice allows for quick and easy presentation of actual design in the form of renderings and videos that can help the public or stakeholders to understand a project before it is built.



Roundabout Design: A prime example of efficient 3D design being translated directly into highly detailed renderings and video animations. The use of 3D design for roundabouts is the new normal for EMH&T to improve geometrics, reduce impacts, dial in project costs and optimize drainage. It is a quick and efficient jump into the fully rendered version which can be used for public involvement and other marketing purposes.

"When combining Visualization with 3D engineering, we avoid encountering costly changes at later stages in a project," said Adam.

Taking the benefits that some Divisions have realized and sharing it with other Divisions is a by-product of the design and workflow efficiencies arm of DID.

"We want to keep the great ideas people are coming up with flowing throughout the company," Adam said. "Few firms have the over-arching resources to identify and connect among discipline groups."

Adam admits new technologies are released all the time and it is hard to know what the next big thing will be. "I want to be the filter for the newest technologies, so we can shift quickly when it does get here--understand it, implement it, and use it to benefit our work and clients."

What makes EMH&T unique is the fact that we are a large company performing a lot of diverse services. "We have to be flexible to produce a product that meets the needs of a broad client base," said Adam. "We are utilizing the right technologies combined with the new and innovative techniques developed across the company to help design better and more quickly." ■

If you have questions about how the Division of Design Innovation can help your community, contact Adam Burger, PE, at 614.775.4608 or by his email aburger@emht.com.

Streetscape Design: In conjunction with the project design process, highly detailed renderings and videos were created to convey project intent to the public during the public involvement phase of the project

SWMPs, MS4s AND COMPLIANCE

Bridging Both Sides of Erosion and Sediment Control

It was two years ago, in the Spring of 2018, when *Ingenium* sat down with EMH&T's James Akins, CPESC, to learn more about the changes being enacted by the Ohio EPA to the National Pollutant Discharge Elimination System (NPDES) permit program. At the time, the new version of the General Permit (OHC000005) associated with construction site stormwater management was completing its review and comment period. It was adopted in April. Since that time, EMH&T's professionals have been assisting our developer and other private-side clients with their Ohio EPA compliance.

Fast forward two years and now the current version of the general permit for Small MS4 (municipal separate storm sewer system) municipalities has expired and the new version is in process with a release date set for some time in 2020. A Small MS4 Community is defined as one that serves populations less than 100,000 and located partially or fully within an urbanized area.

While the focus of the general permit for developers is essentially about construction site pollution control, the MS4 Community program is part of a bigger picture effort for local municipalities.

"A developer submits a Storm Water Pollution Prevention Plan (SWP3) to a municipality when their project disturbs an acre or more," said James. "As part of an overall community specific Storm Water Management Program (SWMP), municipalities are required to develop and enforce an erosion and sediment control program to ensure that polluted waters from private sites do not end up in natural, open waters or municipal storm sewers."

"The municipality is required to develop the program and to ensure when development occurs, Ohio EPA NPDES permit coverage is obtained, and plans are prepared, submitted, and enforced," he added. "They have responsibility to inspect and monitor construction site activity and to enforce the approved plan."

The SWMP addresses requirements for six minimum control measures (MCMs) and is a comprehensive program for municipalities to manage the quality of stormwater discharge from the MS4. The six MCMs include:

- MCM #1: Public Education and Outreach on Storm Water Impacts

EMH&T serves as a bridge between the public and private sides of erosion and sediment control within the development process.

- MCM #2: Public Involvement/ Participation
- MCM #3: Illicit Discharge Detection and Elimination
- MCM #4: Construction Site Storm Water Runoff Control
- MCM #5: Post-construction Storm Water Management in New Development and Redevelopment
- MCM #6: Pollution Prevention/ Good Housekeeping for Municipal Operations

EMH&T works with municipal clients on all of these MCMs to ensure they remain in compliance with Ohio EPA regulations, but tend to spend a larger amount of time assisting with compliance related to MCM #4: Construction Site Storm Water Runoff Control. Specifically, EMH&T's services related to MCM #4 include:

- Regulation, including assisting with the development and adoption of ordinances that require SWP3s to be submitted for review and for developers to install and maintain the Best Management Practices (BMPs) during construction. Also, assist communities with updating ordinances to reflect Ohio EPA's updated NPDES general permit requirements (occurs every five years);
- Enforcement, including assisting communities with the development of an enforcement protocol resulting from the erosion and sediment control inspection. They assist with development of Notice of Violation (NOV) letter templates that communities can issue to developers for noted violations during inspections;
- SWP3 Reviews, including reviewing developer-submitted plans on behalf of the communities to ensure requirements of both city code and Ohio EPA's NPDES general permit requirements are being met;
- Preconstruction Meetings, including attending preconstruction (project kick-off) meetings, with developers, contractors, and community staff. We help ensure the developer/ contractor understands its role for ensuring the community approved SWP3 is properly implemented;
- SWP3 Observations, including providing monthly observations during construction activities to ensure that the approved SWP3 is being properly implemented; and,
- Ohio EPA annual reporting.

One of EMH&T's MS4 municipal clients is the City of Grove City, which with a population of just over 41,000 people, is categorized as a small MS4 community. EMH&T has assisted Grove City with a variety of services related to their overall erosion and sediment control program, including SWP3 reviews, attendance at preconstruction meetings, and monthly SWP3 observations and reports.

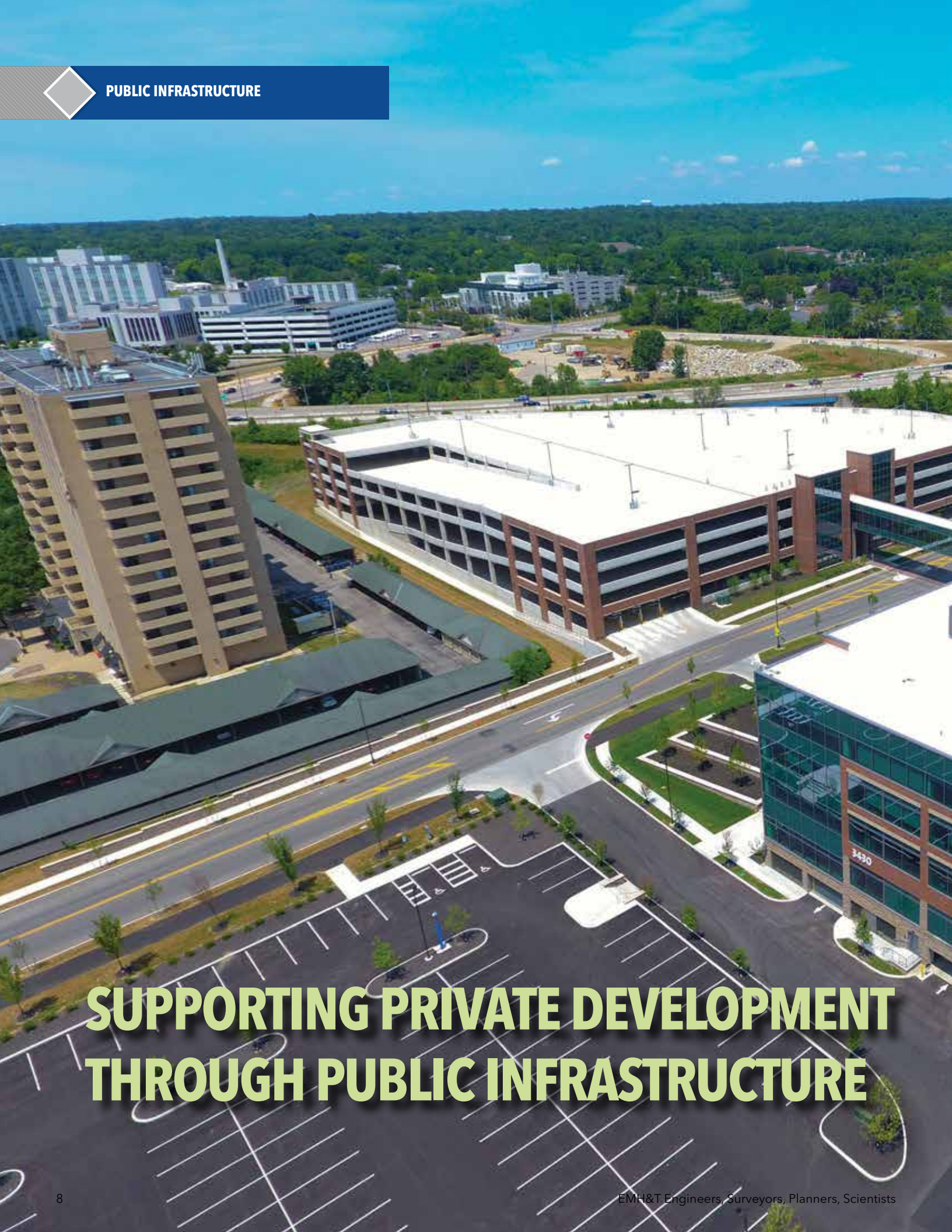
"Grove City continues to experience rapid growth and development, which means numerous active construction sites in our community. We look to EMH&T's expertise for guidance on navigating the various regulations that are required by the Ohio EPA to ensure compliance with our Small MS4 permit," said Cindi Fitzpatrick, PE, Grove City Director of Public Service.

Fortunately for Grove City and other municipalities, EMH&T is familiar with both the public side regulations for municipalities and the private side regulations for contractors and developers.

"We are able to serve as a bridge between the public and the private sides of erosion and sediment control within the development process, and we can do so for small or large MS4 communities," said James.

EMH&T's knowledge and understanding of the regulations associated with these important regulatory matters helps make for a smoother process for both developers and municipalities. This capability is increasingly important as the pace of development increases. ■

To learn more about how EMH&T can assist your large or small MS4 community with erosion and sediment control issues, contact James Akins, CPESC, at 614.775.4389 or email him at jakins@emht.com.



SUPPORTING PRIVATE DEVELOPMENT THROUGH PUBLIC INFRASTRUCTURE

Ongoing Development Drives Need for Utilities, Roadways

From corner to corner and everywhere in between, growth across Central Ohio and in the greater Charlotte, North Carolina, area has moved at a significant pace. That means EMH&T continues working with our wide and diverse range of clients, supporting both the private development that is responding to the growth and the public infrastructure so vital to supporting it.

EMH&T clients in both Columbus and Charlotte represent some of each area's largest and most successful companies. These companies are helping fuel the growth in these two dynamic markets.

EMH&T serves both "big clients" experiencing big growth, and many "smaller clients" experiencing equally big growth. These companies continue to develop the warehouses, office buildings, retail centers, hospital and healthcare facilities, higher education facilities, and single-and multi-family housing developments that both fuel and support growth. The cities and municipalities where the development is occurring also continue to build, upgrade, and maintain the public infrastructure to support the growth, all of which leads to an ever-changing landscape–both above ground and below it.

Whether the project work is new development on unimproved sites or redevelopment of existing areas, the impact is the same: new and expanded/improved utility and roadway infrastructure is vital to project success.

OhioHealth David P. Blom Administrative Campus

OhioHealth: Transforming overflow parking into a bustling corporate campus

For Columbus-based hospital system OhioHealth, the idea for a new 240,000 square foot administrative office campus across from their main Riverside Hospital created an opportunity for economic development on a previously under-developed site within the City.

The project was successfully completed on a constricted site, sandwiched between State Route 315 and the Olentangy River. The required traffic access improvements and supporting infrastructure made it as complex as it was transformative. The metamorphosis created a bustling corporate campus from what was once an overflow parking lot.

While EMH&T's Development Division provided site civil design services to the project architect, OhioHealth, and Daimler Group, the firms' Transportation and Public Works divisions bridged the infrastructure gap between the private site and the public realm, designing the infrastructure vital to a successful project.

EMH&T Director of Transportation Partnerships Mike Brehm, PE, led the firm's public side work for the project, which followed the City's public-private partnership (3P) process, and according to him involved significant coordination among several stakeholders.

"Not only were we working with the City on scoping, design, scheduling, and navigating the 3P process, we were also working with the site design team, including other EMH&T divisions, to ensure our public infrastructure design was cohesive with the private site design," said Mike.

The site's public infrastructure includes a new main access roadway into the development, OhioHealth Parkway. The new road provides the main ingress/egress into the new campus, as well as a rebuilt existing roadway, now called Healthy Community Way, providing ingress/egress on the other public-facing side of the site.

"As a rule, design and permitting of private site improvements tends to happen at a faster pace than a typical publicly-funded roadway project," said Mike, "but in this case, OhioHealth Parkway literally split the site with the parking garage on one side and the office building on the other. We had to work through the City's project development process in a very condensed timeframe to keep things in sequence."

The site's development also required significant modification to the State Route 315 freeway ramps that provide access to Riverside Hospital and the new administrative campus. EMH&T was responsible for the first phase of the roadway and infrastructure redesign, which consisted of design for the demolition and right-of-way vacation of a freeway exit-ramp to create space for the site's new parking structure.

Another public infrastructure project associated with the new OhioHealth campus development was not originally planned, but quickly became a vital piece of the entire expansion. The City's waterlines through the Olentangy River Road corridor had experienced operational issues and a first phase replacement project was in process when the site's development was announced. Everyone soon realized that the next planned phase of the waterline replacement would need to be immediately advanced. Since roadway work was nearing construction, it made total sense to add this to the scope of infrastructure improvements.

Scioto Peninsula, Columbus, OH, with COSI in the foreground, the National Veterans Memorial and Museum upper right, and the developing peninsula in the distance.

Shane Spencer, PE, SI, of EMH&T's Public Works Division led this piece of the public improvement work.

"The waterlines in this area are considered critical because they serve the hospital and various other surrounding healthcare facilities," said Shane. "And fortunately, we were able to jump onboard and integrate with the rest of the EMH&T team without causing project delays."

"We did have to work within the final roadway design since it was nearly completed by the time we were engaged, but we were able to sync the waterline design with the roadway design without issues," he added.

Mike Brehm collaborated with the City of Columbus staff and site team to prepare a preferred sequence of construction, which was used to develop interim milestones for the infrastructure project work. The result was key utility connections and other points of interface were delivered timely to keep the private site construction on schedule.

"EMH&T's ability to coordinate seamlessly internally, combined with their expertise with City processes and standards, streamlined the execution of these projects and allowed for the

designs to be completed faster than usual," said Steve Schmidt, PE, Project Manager for the City of Columbus.

Scioto Peninsula: Redeveloping Columbus' first neighborhood for the 21st century

Another major project with a strong connection between public infrastructure and private development is the extensive redevelopment of the Scioto Peninsula, an urban area west of downtown Columbus, Ohio.

Rob Ferguson, PE, MS, Project Manager in EMH&T's Urban Design Division, is leading the work effort for this endeavor, which includes rebuilding and expanding utilities and roadways to support the area's proposed new developments. The utility work includes water, sanitary, and storm sewer lines, as well as power lines.

This project may seem straightforward, but this area of Columbus is where the city was founded over 200 years ago, which means a lot of unknowns.

"Much of the infrastructure in this area dates to the 19th Century making it up to 150 years old," said Rob. "So, it's not just way beyond its useful life, it is significantly undersized to support any amount of new development."

"Fortunately, EMH&T is accustomed to the issues associated with aged utilities and we have the capability to successfully solve the project's challenges," he added.

Shane Spencer was again able to jump in on this project and assist by providing design for the water and sanitary sewer lines.

In addition to the improved water and sewer lines, the Scioto Peninsula is receiving redesigned roadways via a "road diet," which means less roadway for cars in favor of increased areas for pedestrian activity, through sidewalks and multi-use paths as well as streetscape components to improve neighborhood walkability and character.

Another public infrastructure upgrade vital to the Scioto Peninsula is the storm sewer system. Again, due to the age of the utilities, the storm sewer system provided insufficient capacity due to its size (far too small) and an inadequate number of inlets. EMH&T's Water Resources Division joined the effort and developed an area-wide Stormwater Master Plan that reroutes the storm sewer lines and includes creative stormwater detention through the incorporation of Green Infrastructure (GI) such as areas of permeable pavement and an underground aggregate stormwater storage system.

"This GI approach to handling the increased stormwater volumes created by the new development is designed to not overburden the existing system while providing for additional street and landscape amenities throughout the neighborhood," said Rob.

The Scioto Peninsula project has presented several design challenges to the EMH&T team. One of the biggest was how to tie this area's new, modern underground infrastructure into the much older infrastructure adjacent to it without overburdening that older piece.

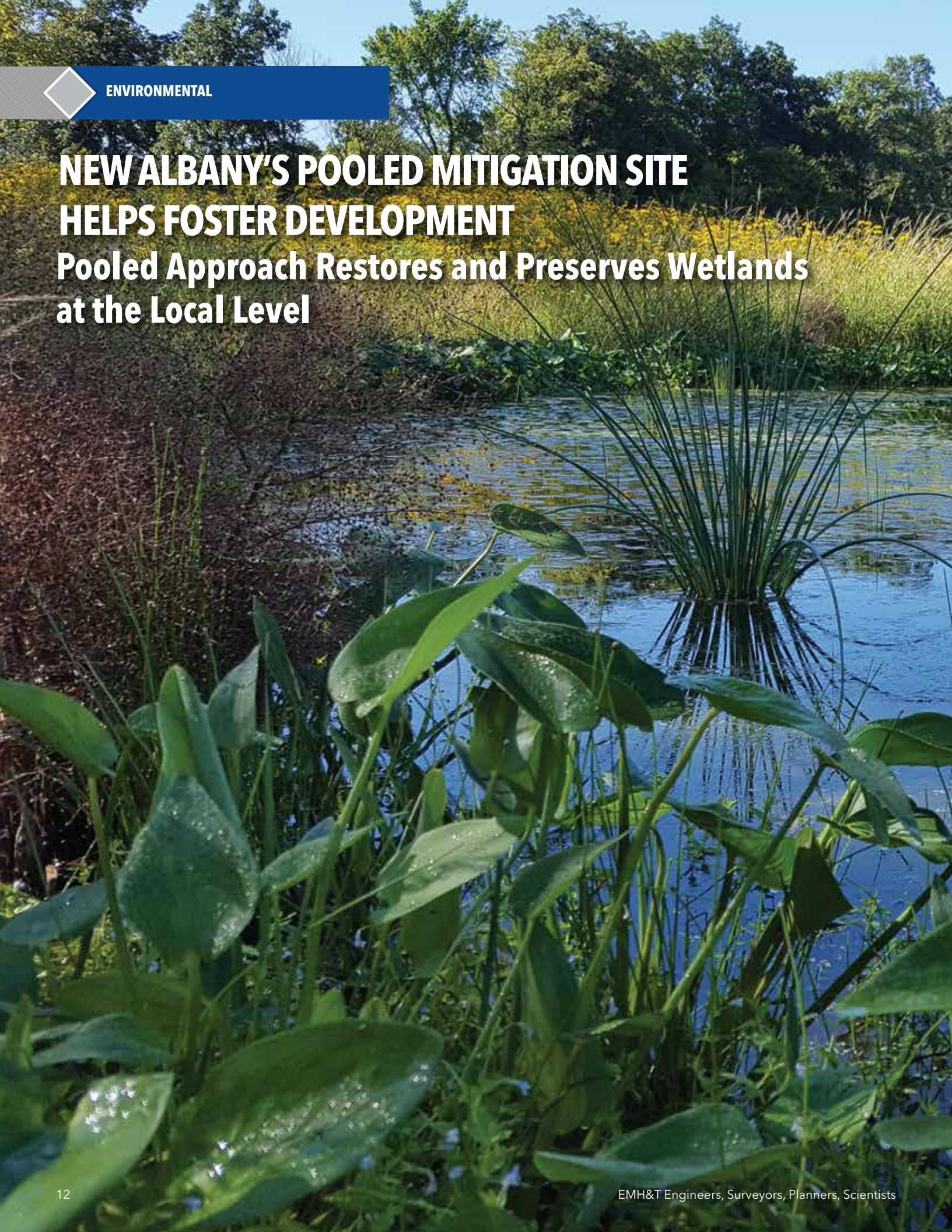
"There's no way to upgrade all of that infrastructure at once," said Rob, "so we were tasked with developing ways to support the new while maintaining the integrity of the old."

The proof will be seen in the not-too-distant future, as construction on both the new infrastructure improvements, as well as vertical development (two parking garages, two apartment buildings, an office building, and hotel) is set to begin this summer with initial project completion coming in 2022. ■

To learn how EMH&T can assist with your critical infrastructure needs, contact Mike Brehm, PE, at 614.775.4616 or email him at mbrehm@emht.com or contact Rob Ferguson, PE, MS, at 614.775.4619 or email him at rferguson@emht.com.

NEW ALBANY'S POOLED MITIGATION SITE HELPS FOSTER DEVELOPMENT

Pooled Approach Restores and Preserves Wetlands at the Local Level



One of the costs associated with economic and real estate development is the environmental permitting process. While the main burden of these costs is borne by the private developers, municipalities still have a vested interest in the process.

In the suburban City of New Albany, just northeast of Columbus, Ohio, the City, with private developer The New Albany Company (NACO), have consistently worked hand-in-hand to develop and build a well-rounded community almost from scratch. This public-private partnership (3-P) approach to growth and development has benefited both entities, as the area's various development zones continue to add major new businesses.

American writer and humorist Mark Twain, when asked about the ever-expanding United States, is credited with saying: "Buy land. They're not making it anymore." This quip seems to have been taken to heart by NACO who, in the early 1990s, began buying land around the then Village of New Albany. The idea then, as it remains today, was to develop a planned community that celebrates the best practices of timeless, iconic communities, while avoiding the pitfalls of post-World War II suburban sprawl.

The ongoing relationship between NACO and the City has allowed for continued growth, while protecting New Albany's architectural integrity and its natural setting, yet encouraging progressive 21st century infrastructure, technology, and innovation.

From its earliest days, NACO has worked with EMH&T to develop the surrounding land, expanding the footprint of New Albany, and in particular, its International Business Park. The goal is to create "shovel-ready" sites suitable for a variety of facility types from offices to warehouses to data centers.

According to Jennifer Chrysler, New Albany's Director of Community Development, the creation of these sites provides NACO and the City with a distinct speed to market advantage.

"When a prospective company learns New Albany can provide a streamlined planning and development process to accommodate their facility needs, they realize the benefit this provides for getting their facility up and running quickly," she said.

As part of "pre-developing" these sites, EMH&T, NACO, and the City of New Albany early on developed a unique way to economically address the environmental issues related to land development, particularly the issue of wetland mitigation.

According to EMH&T Environmental Division Director Rob Milligan, the City's 3P team approach successfully developed a way to protect and even improve the natural resources to reduce the impact of the area's development.

"Rather than mitigating each site separately during development, we addressed the issue more globally by designing one "pooled" mitigation site large enough to provide the necessary mitigation credits to meet the U.S. Army Corps of Engineers and Ohio EPA permit requirements for multiple development sites," said Rob.

This approach has enhanced development by streamlining the permitting process.

"It's essentially like self-funding," said Rob, "we custom-designed and built a 100-acre wetland area, which we then use to provide the credits needed to mitigate wetland areas on other development sites in the business park."

"Another benefit is this occurs at the local community level. The wetlands being protected are all within the same watershed. We aren't mitigating the impact in New Albany by buying credits from a mitigation bank or in-lieu fee program located in a completely different geographic area," added Rob.

This efficient approach enhances development goals within New Albany and provides a marketing/selling tool for potential buyers because it streamlines the permitting process since mitigation credits are readily available.

The pooled mitigation site is located within a former farm field in the business park, and is protected by a conservation easement held by the City of New Albany. The wetlands were created, per the design completed by EMH&T, by blocking field tiles, excavating shallow wetland cells, and placing topsoil. The area was then seeded and planted with the appropriate wetland plants, native trees, and shrub species. Over time, the area has demonstrated it is on a trajectory to provide nearly 100 acres of restored forested wetland and associated buffer.

The site requires 10 years of monitoring and must meet performance standards as promulgated by the Ohio EPA and the US Army Corps of Engineers, including ongoing invasive species control. Upon the successful completion of the monitoring, the future use of the site will be determined by the City as the conservation easement holder. Current thoughts for the site include creation of a nature preserve or other type of natural, passive recreation area.

The pooled mitigation site has been a very successful venture for NACO and the City of New Albany, with additional similar wetland sites currently in the early planning stages. ■

For more information about EMH&T's environmental services, including wetland mitigation capabilities, contact Rob Milligan at 614.775.4515 or email him at rmilligan@emht.com.

STRUCTURES ENGINEERING

Bridges, Culverts Only Part of the Picture

Civil engineering is the world's second oldest engineering discipline preceded only by military engineering. As a discipline, it deals with a wide range of professional activities related to the design of the built environment and includes a range of public works such as roads, bridges, airports, sewer systems, pipelines, site components for buildings, and railways. And no matter the location or complexity, almost all civil engineering projects are touched by a major sub-discipline of civil engineering–structural engineering.

EMH&T designed a 149-foot single span plate girder bridge over CSX railroad tracks, which facilitated semi-integral abutments behind MSE walls, architectural enhancements to the bridge railing, and pedestrian facilities on both sides of the roadway. EMH&T's rail engineers also provided coordination with CSX throughout the project.

Structural Engineering Abounds At EMH&T

While many people think first about buildings and skyscrapers when structural engineering is mentioned, it actually plays a key role in many of EMH&T's civil engineering projects, according to EMH&T's Craig Schrader, PE, MS. Craig manages the firm's structural engineering group.

"We spend a lot of our time focused on robust infrastructure from planning through detailed design with a major focus on bridges and structural solutions for large public transportation projects," said Craig.

The group generally pursues these types of projects as the lead firm, providing full professional planning and design services as well as project management and construction administration services. Recent clients for bridge projects completed by EMH&T include cities, counties, state DOTs, and private development.

One of the group's most recent completed representative projects is the Webster Street Bridge in downtown Dayton, Ohio. This structure replaced an aging bridge in the same location with a unique design that incorporates several signature design elements as well as the latest in color-changing LED lighting embedded within the structure. The structures group has also completed over 25 bridge design projects for ODOT in the last few years–ranging from full replacements to complex rehabilitations and minor repairs.

Another significant project is the new iconic pedestrian bridge crossing the Scioto River in the growing Bridge Park development in Dublin, Ohio, dubbed Dublin Link. This unique project provided an opportunity for the group to work with an international bridge design firm in a challenging project site with high visibility. See sidebar article for more information on this project.

It's More Than Just Bridge Design

While bridges and other large structures are a main focus

In Dublin, Ohio, this aesthetically enhanced pedestrian underpass tunnel below Riverside Drive provides a safe connection between the new parks and the Bridge Street District.

of the group, they are by no means the sole focus.

"We are actively working with most of EMH&T's other Divisions on a variety of projects with a range of complexities," said Craig.

The projects support other firm divisions, such as Development or Urban Design, and allow EMH&T's structural group to stretch their creative design muscles. For instance, the Cannon Drive Phase 1 Relocation Project on The Ohio State University Medical Campus has been a multi-year design and construction project. A key element of the project is the addition of a stormwater pump station associated with the levee system and detention basin that are components of the project flood protection for a 100-year event. The structures group designed a 30-foot deep reinforced concrete underground structure for this pump station in conjunction with the other EMH&T Divisions working on the project. Significant coordination with Ohio State's staff and local architects resulted in an integral maintenance bridge and masonry building structure atop the underground features–each complex design elements successfully incorporated by our team.

At 30 feet below ground, this reinforced concrete chamber houses the pumps and equipment vital to flood protection measures for The Ohio State University's extensive medical campus infrastructure located near the Olentangy River.

Another EMH&T-led project provides the group with a somewhat different design opportunity. At Kent State University's Tuscarawas Campus in New Philadelphia, Ohio, EMH&T designed a new campus entry roadway with a signature gateway feature. Working closely with EMH&T's Landscape Architecture (LA) Division, Craig's team was able to develop a uniquely aesthetic reinforced masonry and brick veneer design for the new entry feature that welcomes visitors and students onto the campus. Beyond the entry feature, the structures group designed a new prestressed concrete I-beam bridge—an integral component of the entry roadway functionality due to the existing creek that splits the campus.

The group also works with the Landscape Architecture, Transportation Partnerships, and Public Works Divisions on structures that are part of the firm's wide range of park and trail projects. These projects can range in size and often include retaining walls and various concrete and metal structures within parks. Use of prefabricated truss bridges and even timber bridges are typically proposed by EMH&T's team for projects within a park or trail systems. In Mount Vernon, Ohio, the group played a major role in the rehabilitation and reuse of two abandoned railroad bridges, one a large steel truss, as part of that City's Downtown Connecter Trail project. This project provided a critical extension of the Kokosing Gap shared-use trail for the community.

"We also work with the Development Division serving private clients, particularly our single-family developer clients, many of whom are including structural entry features into these developments as well as foot bridges and pedestrian underpasses as part of walking/biking trails in these new neighborhoods," added Craig.

Yep, We Do That!

Designing bridges, culverts, pump stations, and entry features is still only part of what this group does. Their experience and expertise is also called upon for bridge inspection and conditional evaluation services by ODOT or by private organizations. Load ratings for bridges, rail structures, and buried facilities are another service the group provides.

Another interesting project type the group does is structural design solutions for underground utility protection. They provide planning through detailed design for these structures which are essentially underground bridges, according to Craig. These structures can prove to be vital to a project's success, especially when the status of the underground utilities is unknown or can't be traced through record drawings or available documents.

"Underground utility protection structures are often used in congested urban areas because they serve as a means to support and protect existing facilities from changes in loading associated with the proposed work. We have been successful in eliminating the need for replacements of large and aged utility infrastructure using creative buried solutions to protect these sensitive features," said Craig.

Utility tunnels and vault structures are a similar underground structure that the group designs, sometimes from scratch and sometimes as part of a renovation/rehabilitation project. Two recent examples include underground utility work for the 15th and High Street improvements on the edge of The Ohio State University campus and a major utility tunnel project on the campus of Columbus State Community College that included rehabilitation and reconstruction of deteriorating utility tunnels within the school's quad area.

And if that's not enough, there's also those ubiquitous noise walls that line the sides of freeways throughout Columbus and in major (and smaller) cities throughout the country.

"They may seem like simple walls of metal or concrete, but there is a significant amount of analysis needed to determine the proper location of the wall and necessary foundation design in order to meet DOT and local standards–which is often complicated by the community desire to improve aesthetics with custom design features," said Craig.

So the next time you see a unique bridge carrying traffic over a river or lake or a massive culvert doing its job conveying water from one place to another, remember that a structural engineer is responsible for that important piece of public infrastructure. It might even have been Craig or a member of his team that designed it! ■

If you'd like to discuss a structural engineering project or situation that you need to have solved, contact Craig Schrader, PE, MS, at 614.775.4632 or email him at cschrader@emht.com.

Riverside Crossing Park and Dublin Link Pedestrian Bridge

The new pedestrian bridge over the Scioto River in Dublin, Ohio, is the crown jewel in the bicycle and pedestrian connection across the river. Called "Dublin Link, the bridge is a key element in the larger Riverside Crossing Park development plan.

Working with T.Y. Lin International as lead bridge design engineer and prime consultant, Endrestudio| Architects + Engineers as bridge architect, and several other local firms, EMH&T provided a range of professional services for this project, including survey, site civil engineering, bikeway design, structural engineering for the numerous retaining walls, water resources engineering, and environmental services.

The bridge is 760 feet long by 14 feet wide and is anchored into the earth at the embankments. Its deck is "S" shaped with a radius of 500 feet. Four 65-foot approach spans lead to a 500-foot-long suspension span. The bridge deck passes through the "keyhole" of the main tower, which is 169 feet high. It is the longest (and only!) single-span, single-tower, S-shaped suspension bridge in the world!

"EMH&T's structures group has designed structures for pretty much everything around and up to the bridge, including retaining walls at each end of the bridge and the nearby North Riverview Street arch culvert," said Craig.

The park area on both sides of the bridge is extensive and is designed to enhance the overall experience for District residents and visitors to Riverside Crossing Park. Within the park and landscape design are a variety of structural elements, including retaining walls and complicated multi-level paths and stairways. Additionally, waterfalls and pools will provide even more enjoyment for the park's users.

Tyler Adams, PE, EMH&T's Design Lead for the project added, "These kinds of structural elements are especially interesting. The designs have to blend with the natural beauty of the area without being obtrusive or creating safety issues–often resulting in custom design details."

"The level of coordination with both the bridge designers and engineers as well as with the landscape architect was significant," Tyler added, "but as the structures moved from design to construction, it was apparent that they helped create the kind of atmosphere and place that the City envisioned."

Photo by Cory Klein Photography, courtesy of the City of Dublin

Shorts

BCSIS ACEC Award

EMH&T is proud to receive one of ACEC Ohio's Outstanding Awards for the Blacklick Creek Sanitary Interceptor Sewer project. This City of Columbus Department of Public Utilities project extended the existing sanitary sewer approximately 4.5 miles to the north using tunneling and shaft construction methods to expand service to the growing northeast region of Columbus and surrounding communities. Accepting the award at the banquet held On March 14, 2020, was EMH&T's Director of Public Works Mike Keller (center) with City of Columbus Project Manager Nick Domenick (right). The award was presented by ACEC Ohio Board Chairman Rod Sommer (left).

COLUMBUS BUSINESS FIRST
B P t W
2019 BEST PLACES TO WORK

TOP WORK PLACES 2020

COLUMBUS CEO

Top Workplaces Wins

EMH&T won the Business First "Best Places to Work" Award. The firm was an honoree for the second year in a row in the Extra Large Company category! Employees along with Sandy Doyle-Ahern, our President, enthusiastically attended and received the award at a luncheon in November.

EMH&T was awarded from CEO Magazine a "Top Work Places of 2020" Award. The award from the business news source for Central Ohio professionals was performed using an independent survey company. EMH&T employees completed the survey, and their feedback afforded the firm a win within the category of a Midsize Organization Top Work Place. The survey took into account our firm culture, meaningful work experience, and encouraging new ideas!

Columbus CA/CI

EMH&T has won the City of Columbus Professional Engineering Services Construction Administration (CA)/ Construction Inspection (CI) Services Contract for 2020-2022. Working with the Department of Utilities, EMH&T will perform various CA and CI services for water, drainage, sewerage, and power projects throughout the City.

Walnut Woods OPRA Award

Gahanna Parks and Recreation Department and the City of Gahanna won first place in the 2019 Awards of Excellence program presented by the Ohio Parks and Recreation Association (OPRA) for the Big Walnut Trail Section 4 McKenna Creek Restoration project. EMH&T was proud to team with the City on the design of this new trail section. The project provides an enhanced pedestrian connection in support of the Big Walnut Trail system, beginning at Knob Hill Drive, continuing along Cherry Bottom Road to US-62, and terminating at Lower McCorkle Park adjacent to Ridenour Road. This project specifically connects Big Walnut Trail Section 5 along Olde Ridenour Road to the existing Big Walnut Trail Section 3 on Nob Hill Drive.

Photo credit: By Mbrickn - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=79854102

BGSU Campus Infrastructure

EMH&T recently was awarded the contract for the full design and construction administration services for the Bowling Green State University (BGSU) 2021 Campus Infrastructure Improvements project. Through our Urban Design Division, the team will make various infrastructure improvements and renovations, ensuring reliable services to several buildings on the BGSU main campus. The EMH&T team's goal is working with BGSU to resolve long-term energy needs for the University within the project area.

People In The News

Promotion to Director

A. Burger

Adam Burger, PE, is the newly appointed Director of the Design Innovation Division. He works closely with other EMH&T team members to improve engineering processes through utilization of new technologies and visualization practices. He came to EMH&T in 2013 as a transportation engineer with expertise in supporting the preliminary through final design of a wide range of transportation projects, including existing and new roadways and structures. See the feature article on Adam on page 2.

New PEs

Congratulations to EMH&T's latest group of Professional Engineers! Back Row (L to R): Jeremy Eisele, Matt Poindexter, Kevin Gradert (all Development II) Front Row (L to R): Mariah Anderson and Chelsea Hager (Water Resources) and Sydney Berry (Development I).

New Employees

S. Beal

Steven Beal, PE, joins EMH&T as a Senior Engineer in Transportation Planning and Design. Steven comes to EMH&T with 17 years of experience designing roadway improvement projects, geometrics, storm sewers, and signing and pavement markings. He also provides cost estimating, maintenance of traffic, surveying, mapping, and other transportation engineering solutions. Steven is a graduate of The Ohio State University where he earned his Bachelor of Science in Civil Engineering.

M. Rotar

Matthew Rotar, PE, SI, joins EMH&T as a Structural Engineer in Transportation Planning and Design. Matt has six years of experience engineering, inspecting, analyzing, and reviewing plans for public improvement projects such as road widenings, turn lane additions, bridge rehabilitation and replacement, and drainage improvements. Matt is a graduate of The Ohio State University where he earned his Bachelor of Science in Civil Engineering.

New Associates

J. Meyer

Josh Meyer, PE, PS, is a senior member of the Land Survey Division and is actively involved in significant survey projects throughout the company. He joined EMH&T in 2003 and assists with training activities, process and procedure development for survey practices, and mentoring with staff in both Columbus and Charlotte survey. He has 17 years of experience in boundary, right-of-way surveys, and right-of-plan development.

K. Shreves

Kyle Shreves, PE, joined EMH&T in 2006 and is currently working in the Development Division. He has worked on many development projects throughout the region during his 13-year tenure. Kyle manages project design, permit approvals, and client relationships for several key clients in the housing market. He has been instrumental in managing projects that cover the spectrum of multi-family, single-family, affordable, and market rate products.

M. Rahall

Mark Rahall, PE, joined EMH&T six years ago and is a project manager in the Transportation Planning and Design Division. His 12 years of experience includes ODOT highway design projects, municipal roadways, and public/private partnership infrastructure projects.

New PS

J. Kleemeyer

Congratulations to Josh Kleemeyer on earning his Professional Land Surveyor license in Ohio.

Contact Us

Contact EMH&T's Director of Business Development **Linda Peck** today to schedule a visit at your office. You can reach Linda directly at **(614) 774-1270** or by email at **lpeck@emht.com.**

You are also welcome to contact any of the experts identified at the end of each article in this issue of *Ingenium*.

Giving Back

EMH&T has long valued its commitment to give back to the communities where we live and work. The firm offers employees paid time off so they can participate in a wide variety of charitable efforts. Working as individuals on personal passions to Division staff working together on a group project, philanthropic endeavors are held in high esteem at EMH&T. Here's a brief look at how some of our staff have been giving back.

EMH&T's Transportation Partnerships Division volunteered at the Ronald McDonald House Columbus (RMHC) and prepared a delicious meal for the families of hospitalized children at Nationwide Children's Hospital. Under the guidance of a chef-designed, carefully selected menu, this group of EMH&T volunteers set to work cooking some great food to put some smiles on residents' faces. The Columbus RMHC serves more than 4,500 families each year and provide over 35,000 nights at the house.

EMH&T
5500 New Albany Road
Columbus, Ohio 43054

Toll Free: 888.775.3648
info@emht.com

Columbus Office:
5500 New Albany Road
Columbus, OH 43054
Phone: (614) 775-4500

Charlotte Office:
301 McCullough Drive
Suite 109
Charlotte, NC 28262
Phone: (704) 548-0333

TOP WORK PLACES 2020
COLUMBUS CEO

Delivering**Solutions.**

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Wastewater Collection Systems
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Visualization and Design Innovation
Construction Services
Infrastructure Evaluation and Management
Land Surveying
Environmental Sciences
Infrastructure Renewal
Railroad Services