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# TRENCHLESS NORTH AMERICA



The Official Magazine of the North American Society for Trenchless Technology



*Introducing the*

**NASTT 2024 Board of Directors**

**NASTT 2024 NO-DIG SHOW Conference Edition**

**SPRING 2024**

Volume 14 • Issue 2



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# TRENCHLESS NORTH AMERICA



The Official Magazine of the North American Society for Trenchless Technology

SPRING 2024 – VOLUME 14, ISSUE No. 2

## NASTT 2024 NO-DIG SHOW

WELCOME Trenchless Colleagues! Spring excitement is in the air, as the world's largest Trenchless Technology conference & trade show sets sail again in beautiful downtown Providence at the Rhode Island Convention Center. Full conference preview, events and networking schedule.

Enjoy!

17



## FEATURES

### 8 Q&A: Kerby Primm, NASTT No-Dig Show Technical Program Committee

Interview with Kerby Primm, Burns and McDonnell, current member of the NASTT No-Dig Show Technical Program Committee. Kerby offers an informed perspective on a wide range of trenchless technology topics, the current state of the industry, and future prospects. Kerby honors the mentors whose guidance transformed him into the trenchless professional he is today.

### 28 Hall of Fame 2012 - 2024

A legacy of trenchless technology leadership, innovation and success. The NASTT Hall of Fame honors members who have made outstanding accomplishments and exceptional contributions to the advancement of the North American trenchless industry. Profiling the illustrious career of the exceptional 2024 inductee: Brian Dowart of Brierley Associates.

### 30 NASTT 2024 Board Of Directors

Meet YOUR 2024 NASTT Board of Directors and Officers! At the helm of the largest and most active trenchless technology organization in the world! Guiding the way are the nineteen members of the NASTT Board of Directors, generously volunteering their own time to provide overall direction for the organization. A salute to the NASTT leadership!

### 50 Simplifying Force Main Inspections with New Inline Tool

This paper was selected as an Outstanding Paper among the most highly rated and well-attended at the 2023 NASTT No-Dig Show in Portland OR. It details the use of an in-pipe free-floating multi-sensor device which can be deployed for screening level assessments in a wide variety of force mains ranging from 6 to 24 inches in diameter and up to 16,000 feet in length.



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**NO-DIG SHOW**

**2024**

## DEPARTMENTS

- 4 Executive Director's Message
- 6 Welcome from NASTT Chair
- 12 Morty's Trenchless Academy
- 15 No-Dig North 2024 – Call for Abstracts!
- 16 New NASTT Website Rolled Out!
- 24 NASTT 2024 Celebrate Trenchless Awards
- 44 Eye on Industry
- 61 Events Calendar
- 63 Index of Advertisers

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## ALL ABOARD! WELCOME TO THE SPRING 2024 EDITION OF NASTT'S TRENCHLESS NORTH AMERICA

Dear NASTT Members and Trenchless Advocates:

This issue announces the new NASTT Board of Directors, has the NASTT Award profiles, and of course previews the 33rd No-Dig Show where you can pick up more copies!

As this year's destination, Providence, has a strong sailing tradition... Pack your bags, as we set voyage in this issue, we introduce you to our esteemed NASTT Board of Directors for 2024. Their expertise, vision, and commitment will steer our organization toward greater heights. But that's not all! In this edition, we also shine a spotlight on the remarkable achievements of our members through the prestigious NASTT awards. And, of course, we offer a tantalizing glimpse into the upcoming No-Dig Show Conference—an event that promises innovation, networking, and knowledge sharing. Buckle up as we embark on this exciting journey!

As we celebrate the best in trenchless technology, I would also like to recognize and thank Leonard Ingram as he announces his retirement after 25 years as Executive Director for our Mid-Atlantic, Midwest and Southeast Regional Chapters. As they transition on their development we wish you a well-deserved retirement. Your visionary leadership, dedication, and tireless commitment have profoundly shaped each Chapters success. Your legacy will endure, inspiring us to continue your remarkable work. Thank you for your invaluable contribution.

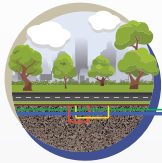
While on board we are delighted to announce the launch of the new NASTT Trenchless Knowledge Hub. Updating and expanding the Technical Library as one of the major benefits of NASTT Membership now provides unprecedented access to the vast technical resource library available, consisting of thousands of peer reviewed papers from the last 34 years of conferences. Having offered this on a reduced basis while we transitioned and updated our software systems, we can now enable a wider audience and more accessible portal to those seeking information on trenchless technology. Here you will find a continually increasing resource of technical papers, case studies, magazines, videos and e-publications. Access can be found at [www.nastt.org](http://www.nastt.org).

Providence awaits! The No-Dig Show Conference promises:

- Cutting-Edge Sessions: Dive into the latest advancements in trenchless technology. From cured-in-place pipes to robotics, we've got it all.
- Exhibition Extravaganza: Explore booths from 150+ companies. Witness live demos, ask questions, and discover game-changing products.
- Networking Galore: Connect with industry leaders, swap ideas, and forge partnerships that will shape the future.

So, whether you're a member or a curious newcomer, join us in Providence – it's where innovation meets opportunity. As we raise our sails toward the horizon, let's celebrate our new directors, honor our award winners, and gear up for the No-Dig Show. Providence, here we come!

**Matthew Izzard, Executive Director**  
**North American Society for Trenchless Technology (NASTT)**  
[mizzard@nastt.org](mailto:mizzard@nastt.org)



**GREEN ABOVE.  
GREEN BELOW.**

*“To all of  
you who  
volunteer and  
contribute to  
making NASTT  
continue to  
improve and  
thrive,  
thank you.”*



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## PROPEL OUR INDUSTRY FORWARD

Hello NASTT Members and No-Dig Show Conference Attendees!

The Spring edition of **Trenchless North America** serves as both a preview of the upcoming NASTT 2024 No-Dig Show as well as a hearty WELCOME to those of you reading a copy included in the attendee bags onsite in Providence.

The annual NASTT No-Dig Show serves as a cornerstone for professionals within our industry to come together, exchange ideas, and explore the latest advancements in trenchless technology. Throughout the duration of the conference, attendees will have the opportunity to engage with industry leaders and experts through various forums, an exciting exhibit hall, and networking events. One of the highlights of this year's program are presentations by the finalists for the Abbott Awards for Innovative Products & Services. Witness firsthand the groundbreaking solutions that are shaping the future of our field during their presentations on Monday morning.

I'd also like to encourage you to participate in the numerous networking events planned, as they provide excellent opportunities to share insights and forge partnerships with colleagues from around the world. Make sure to join us Monday evening for Meet, Greet, Drink & Eat – Networking Reception and Silent Auction. Enjoy cocktails and hors d'oeuvres while making connections and bidding on fantastic auction items donated by generous organizations in our industry. The auction proceeds directly benefit the NASTT Educational Fund which supports student and municipal scholarships, industry research, publications and more! Visit [www.nastt.org/no-dig-show](http://www.nastt.org/no-dig-show) for all the details.

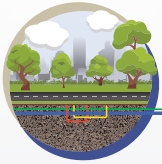
This Spring issue also profiles our many deserving members who are being honored with awards, including the Hall of Fame, Chair's Award for Distinguished Service, NASTT Volunteer Award and Ralston Award for Young Trenchless Achievement. Congratulations to these dedicated volunteers and read all about them in the following pages.

Along with previewing the conference, this edition of the magazine introduces our new board members for 2024. These members bring with them a wealth of experience and expertise that will undoubtedly contribute to the continued success of our society. Their dedication and commitment to advancing trenchless technology will inspire us all as we navigate the challenges and opportunities that lie ahead.

Thank you to all of the volunteers and members whose support and dedication to advancing the mission of NASTT allow us to continue to propel our industry forward.

*Matthew Wallin*

**Matthew Wallin P.E., Chair  
North American Society for Trenchless Technology (NASTT)**



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GREEN BELOW.**

*“The NASTT  
No-Dig Show  
serves as a  
cornerstone.”*

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with  
**Kerby Primm**

*His first encounter with trenchless technology happened in 2012 while working as a civil engineer installing new pipelines. First becoming involved with NASTT in 2015 at the Denver No-Dig Show, Kerby has served as a Technical Program Committee member, Track Leader and Moderator. He is a leader in trenchless design, including designing record-long underground crossings of Lake Sakakawea in North Dakota. Kerby is a registered professional engineer in 12 states, and an advocate for increasing use of HDD in electrical transmission and underground cabling installations.*



***What first inspired you to become interested in construction & engineering field, particularly underground construction?***

Growing up outside of a small town in an even smaller town, I was raised by my grandmother on a fixed income. Resources and opportunities were scarce, but my grandmother's resourcefulness and creativity in building and developing around our home sparked my interest in engineering. She was like an unsung, non-degreed engineer in her own right. In my community, construction was a common job path, and one of my fondest childhood memories is designing and building bike paths with my best friend. We used the red clay, common to our Arkansas hometown, for lane markings and even incorporated drainage systems. I remember being fascinated by how water flowed through molehill tunnels during heavy rains, which was my first foray into underground construction. My older sister paved the way as the first engineer in our family, graduating with a degree in chemical engineering. Initially, I started as a mechanical engineering major, but my interest in transportation and construction led me to switch to civil engineering. It's been a rewarding journey that combines my childhood curiosity with a passion for building and improving infrastructure.

***Outline your experience of first being introduced to trenchless technology methods and applications.***

My first encounter with trenchless technology was in 2012 while working as a civil engineer, primarily focused on site design. My company had just started a pipelines team in our office, and I was assigned to a project that involved the

installation of approximately 25 miles of new pipeline. The design included multiple trenchless crossings of wetlands, interstates, and railroads, which ignited my passion for trenchless technology. However, my real journey into the world of trenchless engineering began in 2014 when I was hired by Laney, thanks to Alan Snider. I still remember sitting across from him in the interview, eager to show off my previous trenchless designs. He jokingly told me to hide them because there was a lot to learn! Working under his mentorship in those first few months was eye-opening. I quickly learned that HDD design was more than just drawing lines on paper; it required a deep understanding of engineering principles, risks, mitigation, and seamless integration of design with field construction. This experience under Alan's guidance transformed me into the trenchless professional I am today.

***How did you first get involved with NASTT? What are some of the goals and initiatives you would like to see NASTT pursue?***

I first got involved with NASTT in 2015, shortly after joining one of the leading trenchless construction firms with a growing trenchless engineering team. My initial exposure to trenchless technology in 2012 had sparked a keen interest in the field, and attending the NASTT conference in Denver as an exhibitor and full participant was a pivotal moment for me. The conference provided an invaluable opportunity to meet industry leaders and peers, some of whom have become my best friends in the industry. The connections and knowledge gained through NASTT have been instrumental in my career development.

As for the goals and initiatives I would like to see NASTT pursue, I believe there is a significant opportunity to expand the application of trenchless technology into the realm of underground transmission and distribution cables. While trenchless installation



*“The opportunity to learn from others in this industry is truly invaluable.”*

has established its place in the oil, gas, and water sectors, there is a growing need for cost-effective solutions to underground power cables, driven by the demand for fire hardening, storm protection, and aesthetic considerations. Coming from the pipelines sector, I've had firsthand experience in the gap between the two. I hope to see NASTT take a leading role in promoting thought leadership and innovation in this area, helping owners and providers navigate the challenges and opportunities of undergrounding power infrastructure.

***What are your thoughts on the current state of the trenchless industry?***

The trenchless industry is in a solid and growing state. The collaboration that I have observed between engineers, academics and contractors over the years has significantly improved, bringing about mutual benefits to all parties involved. This enhanced cooperation has led to innovative solutions and advancements in trenchless technology, making it a more attractive option for infrastructure projects.

***What areas do you see evolving in STEM education and post-secondary academics?***

In the realm of STEM education and post-secondary academics, I see a strong evolution in thought leadership and research focused on more efficient trenchless design and installation. One area that particularly intrigues and excites me is the integration of robotics and artificial intelligence into energy infrastructure. Last year, a doctoral candidate at MIT reached out to me to discuss how these technologies can be applied to the trenchless industry. It's research like this that has the potential to captivate young minds and drive innovation, propelling the trenchless industry beyond what we currently believe is possible.

***Is the trenchless industry generally doing a good job of attracting young professionals? What do you think can be done to better engage students and young professionals in the trenchless industry?***

The trenchless industry is making strides in attracting young professionals, but there's definitely more that can be done to enhance its visibility and appeal. Given its niche nature, many engineering students may not be aware of the trenchless sector unless they encounter a related program at their college. One effective approach could be to actively promote

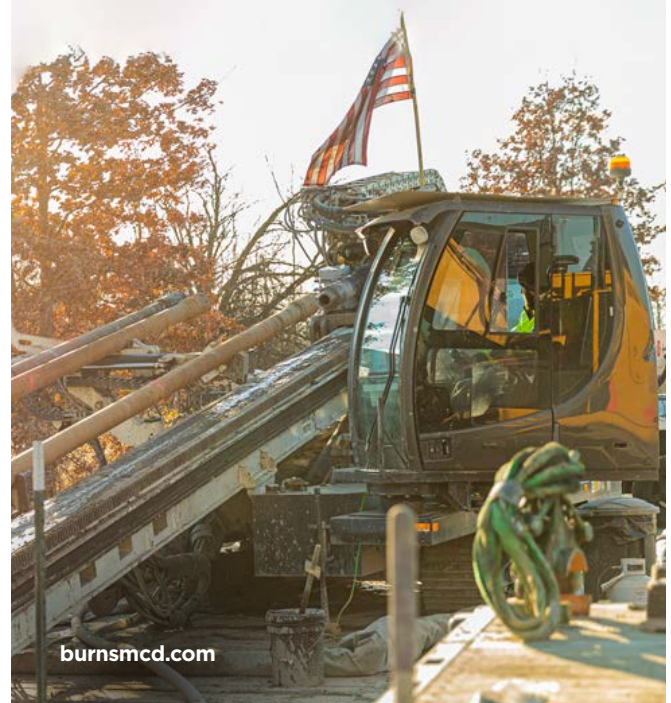
*“I quickly learned that HDD design was more than just drawing lines on paper.”*

trenchless technology to engineering students involved in student chapters of organizations like ASCE, ASME, NSBE, and SWE. Forming partnerships with these student chapters could significantly increase awareness and interest.

Reflecting on my own college experience, I was unaware of the trenchless world until I was well into my career. Had I been exposed to someone in the industry or learned about it during my studies, I would have likely jumped at the opportunity to explore this field sooner. Trenchless engineering is such a specialized area that it can easily go unnoticed by young professionals or students, much like it did for me. By increasing visibility and engagement, we can ensure that more young talent is aware of and attracted to the exciting opportunities within the trenchless industry.

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*Kerby Primm on project site of record-long underground crossing Lake Sakakawea ND*

## **Biggest challenges facing the trenchless industry today?**

While trenchless technology offers clear advantages like minimizing surface disruption, public perception and risk mitigation remain key hurdles. A lack of understanding about potential risks associated with underground installations can be a concern. However, these risks can be significantly reduced through thorough upfront planning, including detailed geotechnical investigations and well-engineered designs. It's crucial for engineering teams and contractors to collaborate on challenging projects from the earliest phase possible. In my experience, none of my past difficult projects would have been successful without leveraging my relationships with contractors for their invaluable constructability input. Investing in these pre-construction steps can save money in the long run by avoiding costly change orders during construction due to unforeseen underground conditions. One of the personal challenges I've faced in the trenchless industry is the higher costs associated with these installations compared to open-cut or overhead installations, such as cables. Convincing stakeholders to invest in trenchless methods requires demonstrating the long-term benefits and cost savings, which can be a tough sell in an industry focused on immediate returns. Despite these challenges, the trenchless community is a passionate group of professionals who are committed to the success of every project. I understand that one bad project can have reverberations throughout the entire industry, impacting public perception and future opportunities. That's why I push for excellence in every design and construction, regardless of

who is behind them. My goal is to continue advancing trenchless technology and ensuring its successful application in the field, for the benefit of all stakeholders and the environment.

## **Has acceptance and understanding of trenchless technology improved?**

In my current role at Burns & McDonnell, where I primarily deal with underground cables, I've observed that while trenchless solutions are regularly used in the installation of distribution and transmission cables, they are still less favored compared to their application in the pipelines/petroleum sector. However, as more large-scale high voltage transmission lines are being placed underground, there's a growing acceptance of trenchless technology. This shift is driven both by necessity, such as crossing water bodies, railroads, and thoroughfares, and by a desire to reduce public and surface area impact. Utility owners and developers are beginning to view new installations using trenchless technology as beneficial rather than as a costly, necessary evil. I am hopeful that with increased utilization will come further innovation, which in turn will drive down the cost of installation in the near future.

## **What do you personally enjoy most about working in the trenchless technology field?**

One of the things I love most about working in the trenchless technology field is the uniqueness and variety of each project. I've been lucky to be part of a wide range of projects, from small 500-foot conduit crossings to record-setting 15,000-foot pipe installations. Each one has been a learning experience, and I've been part of some fantastic teams. What's particularly exciting is that even within a single project with multiple crossings, each crossing can be different in design and installation. It reminds me of my previous career in civil site design, where designing the same complex on different sites meant that grading and drainage would be different for each. Similarly, in trenchless technology, you can have a horizontal directional drilling (HDD) offset just 30 feet from a parallel one, but you may encounter entirely different underground conditions between the two. It's challenges like these that make this industry so exciting. I've also had the incredible opportunity to learn from some amazing people in the industry. I've picked up so much from the likes of Skip Carlisle, Carlton Loftin, and Steve Meadors on the construction side, and Neil Smith and Alan Snider on the engineering side. The trenchless community is pretty tight-knit, and I've made some great friends along the way. It's pretty cool to be able to text/call and hang out with industry gurus like these, considering my late entry in the industry. As for the future, I'm excited about the chance to give back and mentor the next generation of trenchless professionals. The opportunity to learn from others in this industry is truly invaluable, and I'm enjoying sharing what I've learned so far.



# BORING BEYOND BOUNDARIES

## SLURRY MICROTUNNELING

Slurry microtunneling is an accurate trenchless pipe jacking method that provides continuous face support, transports material via a closed-loop slurry circuit, and is remotely operated from the surface. Innovations in slurry microtunneling technology have allowed for use in a wider range of ground conditions, longer drive lengths, and curved or complex alignments.

## Morty is Keeping a Close Eye on the Trenchless Industry: Tracking Advancements in Microtunneling Over the Last Decade

By: Chris Sivesind, Akkerman

Morty, the famous traveling sewer rat, is keeping a close eye on the Trenchless Industry, tracking advancements in microtunneling over the last decade.

Since 2009, Morty has seen many trenchless projects while spending time with the Akkerman team. He's traveled the world with us – from Bogota to Melbourne and much of the United States. He's learned a thing or two about trenchless new installations, rehabilitation, and even manufacturing. Most recently, Morty attended the Akkerman's 50th anniversary celebration in Brownsdale MN, and was involved in a pipe-jacking project in Bluffdale, UT.

Back in 2014, while living it up in Las Vegas, Morty spent significant time on the Paradise Whitney Interceptor project. This project featured over 25,000 feet of trenchless installation including over 11,000 ft of microtunneling. It was one of the largest trenchless projects ever completed in the US. Microtunneling installation standards have remained largely unchanged since then, but as our cities continue to grow and development expands, cities need larger and more reliable infrastructure. As development has spread to the outskirts of our major cities the need for larger diameter infrastructure to support the growth has led to the need for deeper installations in more complex geology.

What has changed since then, and what advancements have been made? The demands for this installation method are always pushing the limits for distance, diameter and now curves. I am going to review recent innovations in the microtunneling segment of the trenchless industry by highlighting navigation systems, lubrication, cutterheads, control containers and teamwork. How do we achieve longer, larger diameter, and potentially curved drives? Read on to learn more.

### Enhanced Tunnel Navigation Systems

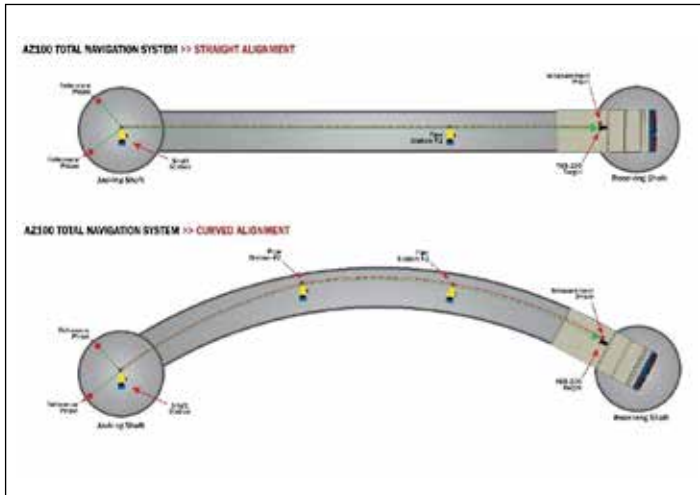
The evolution of the guidance system was necessary to effectively navigate long-distance and potentially curved installations. The standard industry practice of utilizing laser-



*Akkerman's advanced microtunneling units continue to be the preferred choice to tackle infrastructure improvements*

to-target-based guidance evolved due to constraints and laser refraction at distances greater than 600 linear feet. Over the years, laser-to-target systems have been utilized on drive lengths up to or just over 1,000 linear feet. On projects with drive lengths greater than 1,000 linear feet it's important to look at a more robust guidance system.

In 2015, Akkerman developed the AZ100 Total Guidance System (TGS) in response to the industry's growing trends for extended drive lengths and alignments with curves. The AZ100 TGS incorporates tunnel-mounted, self-leveling pipe stations behind the MTBM, which project a laser onto the standard MTBM Target. The tunnel stations receive positional coordinates from a fixed station and reference prisms in the jacking shaft. Additional stations are added to the tunnel as necessary to maintain a surveyed connection throughout the alignment without the need for continuous, manual surveying. The azimuth (AZ) positions enable the guidance system to communicate and transmit the designed tunnel alignment (DTA) to the MTBM



Evolution of the guidance system was necessary to effectively navigate long-distance and potentially curved installations



Morty Counts Kustoms

## “The three most important components of a trenchless crossing are geology, geology, and geology...”

operator console. The AZ100 TGS's self-surveying feature allows the system to automatically correct risk factors such as drift, which normally requires a manual survey on other enhanced guidance systems. The AZ100 TGS has been utilized on many curved and straight alignments up to 3,000 linear feet since it emerged on the market in 2017.

### Lubrication

There are several key factors to successful microtunneling installations, and it is difficult to prioritize one over another. Tunnel lubrication, selecting the appropriate mix, and embarking on a project with a lubrication plan are all at the top of the list.

The length of the tunnel, project geology, and the product pipe being pushed (which can have jacking force limitations) affect the need for a lubrication plan.

Contractors can manage risk and lower jacking loads on microtunnel drives by using a lubrication and propulsion module (lube and jacking can). This additional section, mounted at the rear of the machine, allows the contractor to have a jack station near the front of the tunnel. In addition, lubrication ports throughout the circumference of the

lubrication and propulsion module (lube and jacking can) allow for sequential lubrication at the back of the machine.

Many contractors elect to use an Automatic Bentonite Injection System (ABIS) in redundancy to the lubrication and propulsion module (lube and jack can). The ABIS is incrementally tied into the tunnel string and controlled by the MTBM operator in the control container for remote monitoring and operation. When using both the ABIS and lubrication and propulsion module (lube and jack can), the operator can monitor lubrication flows and pressures and deliver bentonite directly along the pipe annulus at the exact location it is needed.

### Cutter Head Design and Tooling

A very wise person told me years ago that the three most important components of a trenchless crossing are geology, geology, and geology. In other words, an accurate geotechnical report is vital.

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# Morty's Trenchless Academy



*While in Vegas, Morty spent significant time supervising the Paradise Whitney Interceptor project*

Complex geology and longer distances have led to advancements in cutterhead tooling. As microtunneling drives have grown in length and diameter, matching the cutterhead to the expected geology is essential for efficient installation. There are no longer catch-all cutter head designs. Complex geology often requires a project-specific cutterhead design.

Things to consider when selecting a cutterhead are soil or rock abrasiveness, hardness, and general geological characteristics. Depending on the diameter of the machine and geology, several alternate types of disc cutters can be installed. Ideally, if the cutterhead and geology are well-matched, no intervention will be required.

## Container and Connectivity

In the last twenty years, we have seen technology improve at breakneck speeds. Innovation has also made its way onto microtunnel project sites. The latest edition of MTBM Control Containers is equipped with the Akkerman Data Log system. With the client's blessing, it allows Akkerman engineers and field technicians to log in and view tunnel operations. This technology is a great resource for remote troubleshooting or real-time technical support during microtunneling operations.

## Collaborative Teams

As the microtunneling segment of the industry has evolved, so have field operations. If you ask owners of industry contracting companies about their biggest key to success –most would say that they owe a lot to their teams. I like to use the term team members versus employees because the complexity of microtunneling projects requires that the site crew work as a team to have a successful project. The construction team is



*Morty on a Akkerman Guided Boring Machine in Spokane WA, July 2023*

integral in executing a great finished product, but to get to the end of the project, you must first start with a great plan for the team to execute. Cohesive plans start with all project stakeholders, such as the owner, engineer, and contractor, in agreement on the project's identified risks and challenges. I have been both on the contracting and sales side of this business, and the contractors that take the time to put a plan together and then send out a great team to execute the plan have the best results. I am always impressed with the forethought and planning it takes to set up and operate a microtunnel site.

As Morty continues his travels while serving the trenchless mission, industry trends and technologies will change. What will remain the same is Akkerman's advanced microtunneling and other underground solutions, which will continue to be the preferred choice to tackle infrastructure improvements one project at a time.



*Chris Sivesind is Sales Manager for underground construction equipment manufacturer Akkerman. Chris currently serves on the NASTT Board of Directors and is an active participant in industry associations ISTT and CSITT. He has authored and presented several papers at industry conferences and served as chair and secretary for the Pacific Northwest Chapter of NASTT (PNWNASTT).*

# TRENCHLESS AT THE FALLS

NIAGARA FALLS, ONTARIO



**OCT. 28-30, 2024**

Niagara Falls Convention Centre

**CALL FOR ABSTRACTS - [nodignorth.ca](http://nodignorth.ca)**

Platinum Sponsors:



# New Website Info



## Exciting News:

### New NASTT Website Rolled Out in January!

*The new NASTT website is LAUNCHED! We took your feedback and developed new tools and features. Further improvements will be rolled out in phases over the next few months.*

#### An Improved Design:

- New navigation to get you where you're going faster
- Pared-down content that's easier to scan
- **NASTT information and the No-Dig Show content all on one site!**
- Calendar view of upcoming training opportunities and events

#### Improvements Coming Soon:

- New and improved Technical Paper Library
- Trenchless 101 Knowledge Hub
- New Trenchless Video and Photo Library
- New accessibility features
- Interactive Regional Chapter map
- And so much more!

While we are working hard to ensure a seamless transition, you may encounter pages that are still in the process of being updated. We appreciate your patience and understanding during this exciting time of improvement. Our team is dedicated to making the transition as smooth as possible, and we believe the new features and enhancements will make your online experience even better. If, during your visit, you encounter any difficulty finding the information you're looking for, please don't hesitate to reach out to Jenna Hale, NASTT Marketing Manager, who can help you find what you are looking for on the website.

## Featured Website Upgrade:

### NASTT.org & NoDigShow.com Combined!

*All your NASTT information and No-Dig Show content are now consolidated on [nastt.org](http://nastt.org)! Experience seamless access to member benefits, conference details, trenchless information, and more, all in one place. The previous No-Dig Show website will redirect you to the main site, making your exploration easier than ever. Visit [nastt.org](http://nastt.org) for a comprehensive dive into the world of trenchless technology!*





APRIL 14-18 | PROVIDENCE, RI

**NASTT**

**NO-DIG SHOW**

**2024**

See You in  
**PROVIDENCE**



**2024**



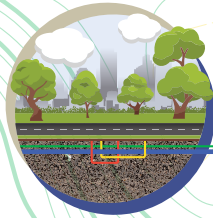
**SCAN THE QR CODE TO VIEW  
A VIDEO AND LEARN MORE  
ABOUT PROVIDENCE!**

NASTT

APRIL 14-18 | PROVIDENCE, RI

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**2024**



**GREEN ABOVE.  
GREEN BELOW.**

# Conference Overview

NASTT 2024 NO-DIG SHOW | APRIL 14-18 | PROVIDENCE, RI



NETWORKING EVENTS | EXHIBIT HALL | TECHNICAL SESSIONS

[nodigshow.com](http://nodigshow.com)



# WELCOME Trenchless Colleagues!



APRIL 14-18 | PROVIDENCE, RI

**NO-DIG SHOW**

**2024**

Set sail! Spring excitement is again in the air, with the world's largest Trenchless Technology conference & trade show hosted for the first time in beautiful downtown Providence, Rhode Island!

With six tracks of 130 peer-reviewed technical presentations, detailing environmentally friendly trenchless solutions and cost saving opportunities for municipalities and utilities, the NASTT 2024 No-Dig Show features the latest technology and research, nearly 200 innovative trenchless product and service exhibits and unmatched networking opportunities. This is the premier educational opportunity for trenchless infrastructure professionals from across North America, expanding their knowledge toolbox.

Exhibit Hall, the Meet, Greet, Drink & Eat- Networking Reception and Silent Auction and the Casino Royale event.

Finally, be sure to download the NASTT No-Dig Show Smart Phone App! The app is a great way to get involved with the attendee community. Everything you need to make the most of your time at the NASTT No-Dig Show will be right at your fingertips.



2024 No-Dig Show Technical Program Committee Chairs – (L) Drew Sparks, Laney Directional Drilling, (R) Chris Knott, BTrenchless

Check the overview schedule in this preview for more information. Included in the session schedule are interactive forums where audience participation is encouraged. One of these is the Innovative Products Showcase featuring the newest innovative product releases in the trenchless industry. Companies presenting products in this session are also this year's Abbott Innovative Products & Services Award finalists. There are an abundance of opportunities for business development, networking, and renewing friendships with trenchless colleagues including luncheons in the



The NASTT No-Dig Show is a great opportunity to meet the hardworking NASTT staff in person! From left to right: Michelle Hill – Program Director, Jessie Clevenger – Conference & Sales Director, Matthew Izzard – Executive Director, Victoria Cox - Regional Chapter Manager, Carolyn Hook – Membership Outreach & Database Manager, Kari Webb – Education Manager and Jenna Hale – Marketing & Brand Manager

Download the full digital Conference Preview here to view the schedule, sponsors, exhibitors and more!  
Enjoy the show!

<https://nastt.org/no-dig-show/conference-preview/>



The No-Dig Show is owned by the North American Society for Trenchless Technology (NASTT), a not-for-profit educational and technical society

established in 1990 to promote trenchless technology for the public benefit. For more information about NASTT, visit our website at [nastt.org](http://nastt.org)



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**VICTORIA COX**  
Regional Chapter Manager  
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# NASTT Awards Program

The NASTT awards program recognizes the commendable achievements and remarkable accomplishments of the individuals and companies associated with the trenchless technology industry.

## NASTT Hall of Fame

This award honors NASTT members who have made outstanding accomplishments and exceptional contributions to the advancement of the North American trenchless industry and NASTT.



*The Hall of Fame awards will be presented at the Casino Royale event on Tuesday, April 16.*

## NASTT Chair Award For Distinguished Service

This award acknowledges individuals who have selflessly given of their time and talents to enhance the Society and the industry. The person selected for the Chair Award is the decision of the NASTT Chair.



*The NASTT Chair Award for Distinguished Service will be presented at the Casino Royale event on Tuesday, April 16.*

## Ralston Award For Young Trenchless Achievement

This award applauds savvy NASTT members under 36 who have demonstrated excellence early in their career by making valuable contributions to the trenchless technology industry, achieving noteworthy professional success, and actively participating in NASTT or its regional or student chapters. With their talent and ability, these impressive people are the future of trenchless.



*The Ralston Award for Young Trenchless Achievement will be presented at the Opening Breakfast on Monday, April 15.*

## NASTT Volunteer Award

The Volunteer Award recognizes members who exemplify the mission, vision and core values of NASTT and make an impact in the trenchless industry through their dedication, leadership and volunteer contributions to NASTT during the past year. Recipients are chosen at the discretion of the NASTT Staff.



*The NASTT Volunteer Award will be presented at the Opening Breakfast on Monday, April 15.*

## Abbott Innovative Products & Services Award

This award celebrates companies with a state-of-the-art product or service making a significant impact in advancing the trenchless industry in the areas of rehabilitation or new installation. All applicants will discuss their product at the Innovative Products Forum at the No-Dig Show.



*The Abbott Innovative Products & Services Awards will be presented during the Exhibit Hall Ribbon Cutting Ceremony on Monday, April 15.*



# No-Dig Show Events & Networking *Synopsis*

## Saturday, April 13, 2024

### **NASTT Board Meeting**

9:00 AM – 3:00 PM – Room 557

### **NASTT Technical Program Committee Meeting & Reception**

3:30 PM – 6:30 PM – Room 555AB (Meeting) / Rotunda (Reception)

## Sunday, April 14, 2024

### **Attendee & Exhibitor Registration**

7:00 AM – 6:00 PM – Exhibit Hall Prefunction

### **Introduction to Trenchless Technology – New Installations**

8:00 AM – 12:00 PM – Room 552AB

### **Introduction to Trenchless Technology – Rehabilitation**

8:00 AM – 12:00 PM – Room 551AB

### **Municipal Sewer Grouting Good Practices**

8:00 AM – 12:00 PM – Room Ballroom D

### **Pipe Bursting Center of Excellence Meeting**

12:00 PM – 12:30 PM – Room 555AB

### **NASTT Chapter Chair and Vice Chair Meeting**

12:00PM – 1:00PM – Room 553AB

### **Annual General Meeting (Current NASTT Membership Required)**

1:00 PM – 2:00 PM – Room 555AB

### **NASTT Regional Chapter Meetings**

2:00 PM – 6:30 PM – Rooms TBD

(See Website for Details and Room Assignments)

### **Student Orientation Meeting**

4:00 PM – 5:00PM – Room 555AB

### **Young Professionals/Student/Municipal Scholarship Social (Ticketed Event)**

5:00 – 7:00PM – Rotunda

### **NASTT Past Chair Dinner (Invitation Only Event)**

7:00 PM – 10:00 PM – Offsite

## Monday, April 15, 2024

### **Attendee & Exhibitor Registration**

6:30 AM – 5:00 PM – Exhibit Hall Prefunction

### **Speaker Ready Room**

7:00 AM – 5:00 PM – Room 557

### **Opening Breakfast (Ticketed Event)**

7:30 AM – 9:30 AM – Ballroom A

### **Technical Paper Sessions (Tracks 1 – 6)**

10:00 AM – 11:55 AM – Rooms 551AB, 552AB, 555AB, 556AB, Ballroom B, Ballroom D

### **Exhibit Hall Ribbon Cutting Ceremony & Abbott Innovative Products & Services Award**

12:00 PM – 12:10 PM – Exhibit Hall Prefunction

### **Exhibit Hall Open**

12:10 PM – 3:30 PM – Exhibit Hall A - D



### **Technical Paper Sessions (Tracks 1 – 6)**

3:30 PM – 4:55 PM – Rooms 551AB, 552AB, 555AB, 556AB, Ballroom B, Ballroom D

### **Meet, Greet, Drink & Eat- Networking Reception and Silent Auction**

5:00 PM – 6:30 PM – Ballroom A

## Tuesday, April 16, 2024

### **Attendee & Exhibitor Registration**

7:00 AM – 5:00 PM – Exhibit Hall Prefunction

### **Speaker Ready Room**

7:00 AM – 5:00 PM – Room 557

### **Morning Wake Up Station**

7:00 AM – 8:00 AM – 5th Floor Prefunction

### **Technical Paper Sessions (Tracks 1 – 6)**

8:00 AM – 10:55 AM – Rooms 551AB, 552AB, 555AB, 556AB, Ballroom B, Ballroom D

### **Exhibit Hall Open**

10:55 AM – 3:30 PM – Exhibit Hall A - D

### **Casino Royale**

#### **(Ticketed Event)**

6:00 PM – 10:00 PM – Ballroom A

## Wednesday, April 17, 2024

### **Attendee & Exhibitor Registration**

7:00 AM – 5:00 PM – Exhibit Hall Prefunction

### **Speaker Ready Room**

7:00 AM – 5:00 PM – Room 557

### **Morning Wake Up Station**

7:00 AM – 8:00 AM – 5th Floor Prefunction

### **Technical Paper Sessions (Tracks 1 – 6)**

8:00 AM – 9:55 AM – Rooms 551AB, 552AB, 555AB, 556AB, Ballroom B, Ballroom D

### **Exhibit Hall Open**

9:00 AM – 1:00 PM – Exhibit Hall A - D

### **Closing Luncheon (Ticketed Event)**

12:00 PM – 1:00 PM – Exhibit Hall A - D

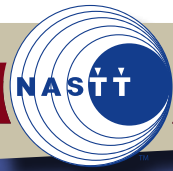
### **NASTT Good Practices Course – Day 1**

1:30 PM – 5:30 PM – Rooms 550A, 550B, 551AB and 552AB

## Thursday April 18, 2024

### **NASTT Good Practices Course – Day 2**

8:00 AM – 12:00 PM – Rooms 550A, 550B, 551AB and 552AB



APRIL 14-18 | PROVIDENCE, RI

**NO-DIG SHOW**

**2024**

# NASTT Educational Fund Auction

**APRIL 15**

**5:00-6:30 PM**

## Meet, Greet, Drink & Eat- Networking Reception and Silent Auction in the Ballroom!

The Annual Educational Fund Auction helps raise money for important causes. Due to your generosity, NASTT is able to provide targeted trenchless training and courses to the industry, publish resource manuals and sponsor university students' attendance to the NASTT No-Dig Show, as well as award scholarships.

*Text NASTT24 to 243725 to start bidding or make a donation*

**For more information visit [nastt.org/no-dig-show/auction/](https://nastt.org/no-dig-show/auction/)**

### Exciting Auction Items

Bid all day via your mobile device on great items like electronics, wine, spirits, industry items and more!

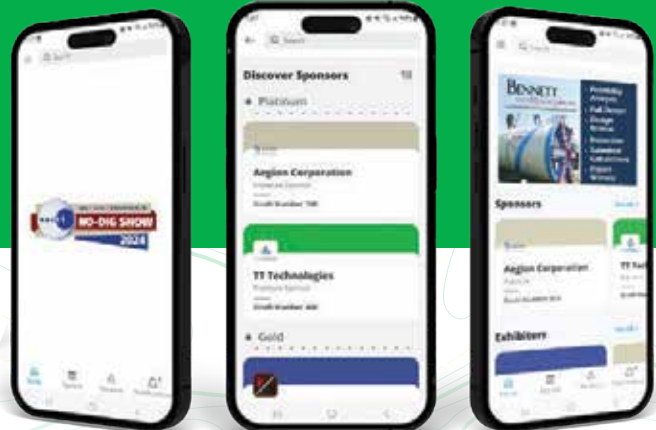
*And join us in the Ballroom on Monday evening for food, drinks and networking!*

Bidding is open to anyone in North America and items will be shipped to winners.

**Auction Reception sponsored by:**



## DOWNLOAD THE ND24 APP!



**To learn more and download visit:**

**<https://nastt.org/no-dig-show/show-app/>**



# Call for Abstracts

**SUBMISSION DEADLINE: JUNE 30, 2024**

The North American Society for Trenchless Technology (NASTT) is now accepting abstracts for its 2025 No-Dig Show in Denver, CO at the Colorado Convention Center March 30-April 3, 2025. Prospective authors are invited to submit a 250-word abstract outlining the scope of their paper and the principal points of benefit to the trenchless industry.

**The abstracts must be submitted electronically by June 30, 2024 on the NASTT website:**  
**[nastt.org/no-dig-show](https://nastt.org/no-dig-show)**



*The No-Dig Show is owned by the North American Society for Trenchless Technology (NASTT), a not-for-profit educational and technical society established in 1990 to promote trenchless technology for the public benefit. For more information about NASTT, visit our website at [nastt.org](https://nastt.org).*

# NASTT Celebrate Trenchless Awards 2024

*NASTT Celebrate Trenchless Awards honor the growth and advancements in the trenchless industry. NASTT recognizes the many ways that these individuals contribute significant time, energy and intellect to developing trenchless technology and fostering its success.*



## Chair Award for Distinguished Service

*Recognizing trenchless professionals that have provided both NASTT and the trenchless industry with meritorious, prominent and long-standing service. One NASTT member is chosen annually at the discretion of the NASTT Chair. This year, Chair Matthew Wallin has selected Babs Marquis to be recognized with the Chair Award for Distinguished Service.*



### Babs Marquis

Trenchless Practice Lead, East Coast,  
Delve Underground

Babs Marquis has more than 30 years' experience in underground project design and construction. He is the Delve Trenchless Practice Lead for the East Coast, and is located in the Burlington, MA office. Previously, Babs worked for Jacobs Engineering Group for 10 years and Stone & Webster Engineering Corporation for 11 years as a construction manager. During his extensive career in the trenchless industry, Babs has been involved in major tunneling and trenchless projects in the northeast for clients such as the Massachusetts Water Resources Authority, Boston Water & Sewer Commission, the Metropolitan District Commission (Hartford, CT), and Narragansett Bay Commission (Providence, RI), DC Clean Rivers Project, (Washington, DC), New York City Department of Design & Construction, and New York City Department of Environmental Protection.

For the past 20 + years, Babs has focused on underground construction management for tunnels and conveyance pipelines, including water and wastewater pipeline design and

*“Babs has a long history of providing his energy, expertise, leadership, and thoughtful council to NASTT. As a long-standing volunteer, Babs’ service to NASTT has ranged from the No-Dig Show Technical Program Committee, to the Regional Chapter Committee, to the Finance Committee, and Executive Committee of the Board of Directors. Babs was also instrumental in the early history of the successful Northeast Chapter of NASTT and is currently serving as the Program Chair for the upcoming No-Dig Show in Providence, RI. In short, Babs is a shining example of the volunteer spirit that drives the success of NASTT!”*

– Matthew Wallin P.E., Chair  
North American Society for Trenchless Technology (NASTT)



construction projects, with an emphasis on trenchless construction methods. He has worked on various pipeline projects utilizing microtunneling with wet retrieval; pipe jacking; horizontal auger bore; and pipeline renewal methods such as pipe bursting, slip-lining as well as cured in place pipe lining. Babs was involved with the planning and design of the East Boston Branch Sewer Relief Project as part of the Boston Harbor cleanup, ordered under a Massachusetts Water Resources Authority (MWRA) consent decree. From 2009 to 2011 he was resident engineer on the project's pivotal microtunneling and pipe bursting components. In 2011, East Boston Branch Sewer Relief was named North American Society for Trenchless Technology (NASTT) Project of the Year. Babs has authored and coauthored several papers for the NASTT No-Dig Show, American Society of Civil Engineers (ASCE) Pipelines Conference, and Rapid Excavation & Tunneling Conference (RETC); and is a member of NASTT, ASCE, Underground Construction Technology (UCT), and the Construction Management Association of America (CMAA).

Babs is the current chair for NASTT No-Dig Show Planning Committee and has been working to promote the event to his region with great enthusiasm! He will be recognized at the Casino Royale event held on April 16 during the NASTT 2024 No-Dig Show in Providence, RI.



## NASTT Volunteer Award

*Recognizing members who exemplify the mission, vision and core values of NASTT and make an impact in the trenchless industry through their dedication, leadership and volunteer contributions during the past year.*

### **Craig Vandaele**

Vice President,  
Trenchless Preconstruction Services at Michels Corporation



The 2024 NASTT Volunteer Award recipient is Mr. Craig Vandaele! "Craig is one of NASTT's biggest advocates. He is constantly looking to better our society not just by growing the No-Dig Show or our membership numbers, he is dedicated to understanding our industry, our membership, our staff, and every part of what makes this Society so spectacular." The Staff described Craig in three words: Leader, Selfless, Inspiring.

Craig has more than 20 years of experience in the North American tunneling and trenchless technology industries. His vast experience includes design, inspection, construction and construction management of trenchless projects throughout North America.

Craig is proud to be a leader and an advocate of the trenchless technology industry. He is active in many industry organizations, including North American Society for Trenchless Technology Northwest Chapter (Past Chair), Tunnel Association of Canada (TAC) and of course NASTT. Craig has co-authored papers for several No-Dig conferences.

Craig will be recognized during the Opening Breakfast at the NASTT No-Dig Show on Monday, April 15.

*Celebrate Trenchless Award recipients are recognized at the NASTT No-Dig Show and promoted through NASTT communication outlets which include [nastt.org](http://nastt.org), social media, NASTT E-News, and NASTT's Trenchless North America. Find out how you can become a NASTT award recipient at [www.nastt.org/awards](http://www.nastt.org/awards).*



## NASTT Ralston Young Trenchless Achievement Award

*The Ralston Young Trenchless Achievement Award applauds savvy members under 36 who demonstrate excellence early in their careers by making valuable contributions to the trenchless technology industry and NASTT.*

### **Tucker Toelke, EIT,**

Vice President,  
Alternative Deliver Manager at Michels Trenchless, Inc.

Please join NASTT in celebrating the 2024 Ralston Award recipient: Tucker Toelke, EIT, Alternative Deliver Manager at Michels Trenchless, Inc.



Tucker uses his experience to navigate the trenchless industry by helping owners and engineers exceed their goals in the advancement of critical infrastructure projects. At 29, Tucker has developed projects in nearly every facet that the trenchless industry touches including oil and gas pipeline transmission and distribution to water and wastewater rehabilitation, and emerging underground electric industries, including offshore wind. Tucker works on projects in many of Michels trenchless construction methods, including Michels' hallmarks of horizontal directional drilling (HDDs), Direct Steerable Pipe Thrusting (DSPT), microtunneling and complex rehabilitation projects.

"Tucker has earned a reputation for thoughtfully, strategically and tirelessly working to improve a project's probability for operational and financial success," says Chraig Vandaele, Michels' Vice President of Trenchless Preconstruction. "At the same time, he has educated colleagues, customers, and the industry on the intricacies of trenchless construction."

Praised for his enthusiasm, dedication and trenchless smarts by project collaborators, Tucker is recognized for using his knowledge to mentor his peers in the industry and help owners and engineers understand the value of trenchless methods. "Tucker embraced collaborative delivery early on and demonstrates exceptional skill in nurturing relationships between the contractors, engineers, and manufacturers needed for a successful design-build, progressive design-build, or CM/GC project," shared Daniel Buonadonna, Global Principal at Jacobs Engineering Group, Inc. "By building these coalitions early in his career, Tucker is laying a solid foundation to contribute to the growth and advancement of our industry."

Tucker was first exposed to trenchless new installation technologies 2015, working as an intern for the execution of a 4,039-foot DSPT installation beneath the Dow Barge Canal in Freeport, Texas. Enthusiastic about his first trenchless experience, Tucker decided to begin a career in the trenchless industry and quickly became involved in NASTT, speaking at his first NASTT No-Dig Show at the age of 22. Tucker also volunteers on the NASTT Technical Program Committee, continues to present at the No-Dig Show and trains as part of microtunneling short courses.

The team at Williams Pipeline has worked with Michels on various projects, trusting Tucker to deliver the right trenchless solutions according to their Principal Engineer Webb Winston, PE. "One remarkable trait that Tucker possesses is his ability to work with people from all different backgrounds, utilizing extraordinary communication skills. He goes out of his way to ensure he is delivering world-class client service."

NASTT Hall of Fame Honoree (2022), Paul Nicholas, VP Tunneling and Trenchless Technology, AECOM, has seen Tucker use his extensive and practical knowledge to help Michels deliver record-breaking projects. "Tucker is always ready to listen and learn, has great communication skills and is able to explain trenchless concepts and methods clearly to colleagues and clients to highlight their applicability to a given project. Tucker is a growing star in the trenchless industry."

Special recognition of Tucker will take place at the NASTT 2024 No-Dig Show in Providence, Rhode Island.

Join Tucker and other trenchless professionals in their 20s and 30s at the Young Trenchless Professionals Networking Night on Sunday, April 14 from 5:00- 7:00 p.m. in the Rotunda.



# PPI

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## NASTT Hall of Fame Honors Class of 2024

### A Legacy of Trenchless Technology Leadership

*The NASTT Hall of Fame honors members who have made outstanding accomplishments and exceptional contributions to the advancement of the North American trenchless industry and NASTT. We are grateful for their years of service and lasting impact on trenchless technology.*

*Nominees can be current or former NASTT members who have been members for a minimum of 10 years and are age 50 or older. Nominations accepted online March through August. Only current NASTT members can submit nominations. 2025 nominations are now open! Visit [www.nastt.org/no-dig-show/hall-of-fame](http://www.nastt.org/no-dig-show/hall-of-fame) for details.*

*Congratulations to the 2024 Hall of Fame inductee Brian Dorwart who will be celebrated at the 2024 No-Dig Show in Providence RI at the Casino Royale event April 16.*

The NASTT Hall of Fame is pleased to present its Class of 2024 honoree to NASTT members and trenchless professionals across North America.

“This year’s inductee, Brian Dorwart has worked diligently over the years and selflessly in both the trenchless industry and as a NASTT volunteer”, said NASTT Executive Director, Matthew Izzard. “On behalf of the NASTT Hall of Fame committee, we thank him for being a trailblazer who shaped the profession and for his contributions that continue to impact the development of trenchless technology solutions.”



#### **Brian Dorwart, PE, PG**

*Trenchless Specialist, Brierley Associates*

Mr. Brian Dorwart, PE, PG started in the construction industry in 1972 as a geologist, geotechnical exploration driller, and construction technician in Rochester, NY. Always striving to learn more, in 1979, Brian graduated with a Masters’ degree in Civil Engineering and immediately started work with a geotechnical engineering firm. His engineering experience has included construction, technical analyses, and management of projects involving geology, geotechnical engineering, underground construction, and geotechnical instrumentation. He has provided expertise on projects ranging from heavy construction of pipelines, tunnels, dams, and highways, to light industrial buildings and dynamic machine foundations, but his area of specialization

is the interaction of ground to excavation tools and/or natural environmental processes and ground modification for construction. This specialization has been applied to trenchless technologies including directional drilling, small to large tunnels, soil/rock stability in shoreline protection systems, landslides, during permitting, design, and construction. In addition to his technical expertise, his management experience includes developing strategies for bid preparation, risk based design, conceptual design, research and development, construction engineering, forensic analyses, and consulting. Brian has worked for numerous national firms, including Shannon and Wilson, GZA, Haley & Aldrich, and now Brierley Associates.

Brian's clients have included contractors, private industry, public agencies, owners, engineers, and other governmental agencies in numerous business sectors such as oil and gas pipelines, telecommunications, water and waste water, power transmission, rehabilitation of pipes and culverts, and transportation. Mr. Dorwart is a registered Professional Engineer in 23 states and a Registered Professional Geologist in 2 states. He has more than 40 years' experience in underground engineering and more than 25 years design and field experience with various types of horizontal directional drilling (HDD) including subsurface characterization, design, cost analyses, construction management, forensics, and construction. He has worked in all 50 states, throughout Canada, Central and South America, and New Zealand.

Brian has been qualified as technical expert in Federal and State courts, a "Friend of the Court" in Canadian Provincial Courts supporting both contractors and owners in claim negotiation and remediation for geotechnical and geological matters associated with tunnels, directional drills, shoreline development, landslides, and forensic studies for geologic and geotechnical issues in jury trials, hearings, and before public boards.

Brian will be recognized during the Casino Royale event held on April 16 during the NASTT 2024 No-Dig Show in Providence, RI.



*"We thank them for being trailblazers who shaped the profession."*

– Matthew Izzard,  
Executive Director, NASTT

## NASTT Hall of Fame Inductees (2012 – 2024)

### 2012

Frank Canon (1948-2024)  
Bernie Krzys  
Gary Vermeer (1918-2009)

### 2013

Dr. David Bennett  
Ed Malzahn (1921-2015)  
Eric Wood (1935-1994)

### 2014

Bob Affholder  
Joe Loiacono  
Dr. Ray Sterling

### 2015

Ron Halderman (1947-2020)  
David Magill, Jr. (1943-2014)  
Kaleel Rahaim

### 2016

Martin Cherrington  
Ken Foster  
Richard Thomasson

### 2017

Joseph L. Abbott Jr. (1953-2010)  
John Hemphill  
David T. (Tom) Iseley  
Roderick W. (Rod) Sutliff  
(1934-2014)

### 2018

Chris Brahler  
Ian Doherty  
George Ragula

### 2019

Maynard Akkerman  
Chris Macey  
Robert Westphal (1944 – 2020)

### 2020

James S. Barbera (1940-2019)  
Tom Marti  
Lynn Osborn

### 2022

Dennis Doherty  
Paul Nicholas  
Michael J. Willmets

### 2023

Steven R Kramer  
Kevin Miller

### 2024

Brian Dowart



*Introducing the*  
**NASTT 2024  
BOARD OF DIRECTORS**



*Leading the way to a*

**BRIGHT SUCCESSFUL FUTURE!**

# NASTT 2024 Board of Directors



*NASTT Board Executive Officers 2024 (l-r) Dan Buonadonna, P.E. (Treasurer); Tiffanie Mendez (Officer-at-Large); Matthew Wallin, P.E. (Chair); Andrea L. Long, PE, PMP (Secretary); Greg Tippett, P.Eng. (Vice-Chair)*



*New to the 2024 Board (l-r) Brian Avon, Eric Schuler, Carl Pitzer, Kevin Bainbridge, John J. Kraft IV Ph.D.*

The 2024 NASTT Board of Directors is poised to continue the rapid growth both NASTT and the trenchless technology industry have experienced in recent years. As the organization leading and promoting the trenchless technology industry, NASTT provides the membership with educational resources, activities, national and regional conferences, networking events, webinars and much more. With creativity and hard work from both the NASTT Board and Staff, the organization continues to maintain its position as the leading-edge organization for underground construction professionals, showing exceptional leadership looking forwards to a bright successful future for trenchless technology.

The Board is comprised of 20 directors, who are elected by the Society's members. Only elected Directors may serve as Officers of the Society and are appointed by the Board of Directors.

The NASTT Board of Directors manages the affairs of the Society, on behalf of NASTT and its membership. Guiding the way are the nineteen members of the NASTT Board of Directors, generously volunteering their own time to provide overall direction for the organization. Directors are elected by the NASTT membership each year in the fall. Only elected Directors may serve as Officers of the Society and are appointed by the Board of Directors.

New to the Board for 2024 are: Brian Avon, Associate Vice President, Carollo Engineers; Kevin Bainbridge, Vice President, Robinson Consultants; John J. Kraft IV Ph.D., Research Scientist, Adjunct Professor, Trenchless Technology Center (TTC), Carl Pitzer, Trenchless Manager, Thompson Pipe Group; and, Eric Schuler, Deputy Commissioner, Onondaga County Department of Water Environment Protection

Welcoming five new members to the 2024 NASTT Board!  
This brings the Board to the full complement of 20 Directors.

## **MEET AND WELCOME YOUR NASTT BOARD OF DIRECTORS FOR 2024!**

## Executive Officers



### **CHAIR & INTERNATIONAL REPRESENTATIVE**

**Matthew Wallin, P.E.**

*Partner & Senior Project Manager,  
Bennett Trenchless Engineers*

Matthew Wallin is a Principal Partner and Senior Project Manager with Bennett Trenchless Engineers, located in Folsom, California.

BTE's engineering practice is focused entirely on trenchless technology design, construction management, and claims assistance with clients and projects located throughout California, as well as Texas, Florida, Nebraska, Iowa, and Canada.

Matthew holds both bachelor's and master's degrees in civil engineering from Case Western Reserve University in Cleveland, Ohio. He began his career working for URS in Oakland, California in 2000 in their geotechnical group. Since that time, Matthew has focused his practice on geotechnical engineering and the design and construction management of new pipeline projects using horizontal directional drilling, microtunneling, open-shield pipejacking, pipe ramming, tunneling and auger boring.

Matthew has been a member of NASTT since 2002 and has participated in the organization in many capacities. He has been an active member in the Western Chapter (WESTT) since 2003 and previously served as a member of the Board of Directors and as the Chapter Treasurer from 2008 to 2016. He joined the No-Dig Program Committee in 2010 and has acted as a session leader for the annual No Dig Conference since that time. Matthew is also an instructor for NASTT's HDD Good Practices Course as well as the Introduction to New Trenchless Methods Course, each of which are taught annually at the No Dig Show and at other off-site venues throughout the year.



### **VICE CHAIR**

**Greg Tippett, P.Eng.**

*Regional Delivery Lead,  
Western Canada Water Group,  
Stantec Consulting Ltd.*

Greg Tippett is the Regional Delivery Lead for the Western Canada Water Group at Stantec Consulting Ltd. He is currently responsible for the

group's project delivery and quality control. Greg graduated from Lakehead University in 2003 and has been working as a consulting engineer in Alberta's Capital Region since. Throughout his career, Greg has specialized in the design, assessment, and construction of municipal underground infrastructure. Greg has successfully designed and implemented a number of projects within the Capital Region that included the use of several trenchless technologies. His past trenchless experience includes case bore, pipe jacking, horizontal directional drilling, microtunneling and conventional tunneling.

Greg has been an active member of the Northwest Chapter of NASTT since 2009 and is a past Chair of the Chapter's Board. Greg's journey with NASTT began in 2010 when he joined the NASTT-NW 2010 Conference planning committee and has never looked back. Since then he has served in many different capacities on these committees, including Conference Chair for the 2016 and 2018 NASTT-NW Conferences. In 2019, Greg was very proud to Chair the first ever No-Dig North, NASTT's inaugural Canadian Conference.



### **TREASURER**

**Dan Buonadonna, P.E.**

*Global Technology Leader, Jacobs's  
Condition Assessment and Rehabilitation  
Services (CARS) Practice*

Dan Buonadonna is a senior technologist for Jacobs's Condition Assessment and Rehabilitation Services (CARS) practice.

He has over 20 years of pipeline analysis, design, and rehabilitation experience for over 1,700 miles of buried water, sewer, and industrial infrastructure.

His consulting career has focused on trenchless condition assessments, trenchless rehabilitation technologies, and buried infrastructure asset management. He has authored over 20 technical publications on pipeline asset management, is a regular presenter at the NASTT No-Dig Shows, trainings, and webinars. He is a member of the Society's Pacific Northwest Chapter and is also involved with the Water Research Foundation as part of Peer Advisory Committees. Dan holds a Bachelor's degree in Civil Engineering from the University of Notre Dame, and a Master's in Environmental Engineering from the University of California, Berkeley.

On the NASTT Board, Dan is committed to improving the dialogue and coordination between municipal owners and industry providers, and advocating for increased diversity and inclusion programs in the heavy-civil marketplace.





**SECRETARY**  
**Andrea L. Long, PE, PMP**

*Principal Engineer, Capital Projects,  
City of Aurora, CO*

Andrea Long began working for the City of Aurora in 2015 and is currently the Principal Engineer for the Capital Project's Wastewater and Stormwater Programs. In this role, she works with

internal and external stakeholders to upgrade and repair their aging infrastructure and support the growth and expansion of the City. These duties require her to have a technical understanding of various means and methods to construct buried pipelines in a wide variety of conditions. Since working at Aurora, she has utilized a variety of trenchless technologies to successfully execute design and construction projects. From performing in-house CIPP design and training staff, to more complex applications such as guided auger bore, pipe bursting, jack and bore, and microtunneling.

Over the years, Andrea has become active in NASTT at both the local and national levels. She volunteered on the program committee for the national conference, reviewed papers and

presentations, and moderated. She has also published papers and presented at both the local and national NASTT conferences. She is excited for the opportunity to serve on the NASTT board so she can utilize her municipal background to bring a different perspective to the board and support the organization's mission to advance trenchless technology and to promote its benefits to the public and environment.



**OFFICER-AT-LARGE**  
**Tiffanie Mendez**

*National Director of Sales for  
Sunbelt Rentals, Pump Solutions*

A 25 year liquids solutions management professional, Tiffanie began her career in the early 90's in Yuma, AZ., focusing on specialty equipment rental systems and design/build liquids handling systems. Her early focus was groundwater dewatering, filtration systems, sewer bypass systems and construction storm water runoff management. After relocating to Northern California in 2005, the design/build systems focus grew to include temporary plants

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# NASTT 2024 Board of Directors

for environmental remediation, low and medium voltage electrical power systems and compressed air systems.

Tiffanie is now the National Director of Sales for Sunbelt Rentals, Pump Solutions. She holds a BSBA from Northern Arizona University and an MBA, General Management from California State University, East Bay. Tiffanie has been a part of NASTT's No-Dig Show Program Committee since 2016, and believes the future of the industry lies in preparing the new leaders of the trenchless industry now. As such, she is particularly passionate about the student programs and student chapters associated with NASTT.



## IMMEDIATE PAST CHAIR

### Alan Goodman

*Market Development Manager,  
HammerHead Trenchless*

Alan Goodman has more than twenty years of experience in the underground construction industry. Alan began his career in the auger boring/ HDD industry as a sales representative and is currently employed with HammerHead Trenchless as Market Development Manager for Oil & Gas in the United States and Canada. After learning Japanese in high school, Alan studied abroad in Japan and served as an Ambassador for the Rotary International exchange program. Alan completed his education with a B.A. in International Business from the Stephen F. Austin State University in East Texas and had the opportunity to manage the Asia/Australia business and utilize his Japanese.

During his tenure at HammerHead Trenchless, he has worked closely with municipalities, engineering firms, and contractors around the world providing customer training, technical support, pre-project planning, project specifications, and installations for pipe ramming, pipe bursting and slitting, cured-in-place pipe (CIPP) and other trenchless projects.

Alan currently serves as Immediate Past Chair on NASTT's National Board and sits on the Program Committee. He is also Past Chair of NASTT's (North America Society for Trenchless Technology) South Central chapter which includes Oklahoma & Texas.

Alan is also an active member of the following industry associations: DCA (Distribution Contractors Association), AGA (American Gas Association), CGA (Common Ground Alliance), PLCAC (Pipe Line Contractors Association of Canada), and NUCA (National Utility Contractor's Association).

## Directors



### Alan Ambler, P.E.

*Owner, AM Trenchless*

Edward "Alan" Ambler has 20 years of experience working on engineering projects including the World Islands in Dubai and cruise ship berth construction in Alaska. While an employee at the City of Casselberry, Florida, Alan managed the day to day operations of a municipal utility while developing the capital improvement program and executing projects. Alan has designed over 370,000 linear feet of pipeline projects and is a national leader in trenchless technologies, such as pipe bursting.

Alan joined NASTT in 2013 and serves as a Track Leader on the No-Dig Show Program Committee. Alan is the Chair of NASTT's Pipe Bursting Center of Excellence and a co-author of the forthcoming Pipe Bursting Good Practices Guidelines, 3rd Edition. Alan also volunteers as an instructor for NASTT's Good Practices Training Courses. Alan has a BS in Civil Engineering, a MS in Environmental Engineering, holds two patents, and is the owner of AM Trenchless LLC.

Alan loves to play guitar, cook for his wife and coach baseball for his three boys.

## WELCOME TO THE BOARD!



### Brian Avon

*Associate Vice President,  
Carollo Engineers*

Brian Avon is a Vice President with Carollo Engineers, located in Walnut Creek, California. Brian has more than 18 years of experience in design, preparing contract documents and cost estimates, and facilitating the acquisition of permits for pipeline projects. His work has included systems evaluation, development of rehabilitation/replacement improvements, construction, geotechnical engineering, and specialty inspection. Over the past 16 years most of Brian's projects have been trenchless focused. Brian serves as Carollo's trenchless technology lead, is the immediate past chair of WESST and teaches good practice courses on Trenchless New Installation Methods and Horizontal Directional Drilling for NASTT. Brian was also the 2022 winner of NASTT's Volunteer of the Year Award.

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# NASTT 2024 Board of Directors

## WELCOME TO THE BOARD!



### Kevin Bainbridge

*Vice President, Robinson Consultants*

Kevin Bainbridge is Vice President of Robinson Consultants Inc. Kevin has been with RCI for over 13 years and has over 28 years of experience in municipal infrastructure, including project management, water and wastewater operations, infrastructure planning, rehabilitation design and

quality control, specifications, product reviews, training and construction management. Kevin's infrastructure management and trenchless rehabilitation experience spans over 25 years and covers a broad range of both condition assessment and rehabilitation of buried pipes. He has led numerous watermain and sewer condition assessment and rehabilitation projects for various clients across Canada. Kevin's infrastructure management experience includes levels of service, state of infrastructure (condition) analysis, risk management, decision support, life cycle analysis, capital prioritization, asset management plans and criticality analysis.

Kevin has a Civil Engineering Technology Diploma and has been trained in numerous national and international standards and practices in the fields of infrastructure management and trenchless rehabilitation technologies, including the International Infrastructure Management Manual, Developing Levels of Service and Performance Measures, Optimized Decision-Making Guidelines, along with USEPA Fundamentals of Asset Management.

Kevin has been a member of NASTT since 2004 and has served on several committees for the organization, including: GLSLA Board Chair, 2011-2022; No-Dig North Committee Member, 2019, 2021, 2022; CIPP Course Renewal Committee Member, 2022-2024; and Laterals Course Renewal Committee Member, 2022-2024.

Kevin is an experienced educator and trainer in the trenchless industry, having spoken at dozens of conferences on trenchless technology, including No-Dig, No-Dig North, MFOA, AWWA, OWWA, APWA, ACWWA, CNAM, OGRA, and BCWWA. He is also a NASTT trainer for the CIPP Good Practices Course (2016 – present), Lateral Good Practices Course (2010 – Present), and Introduction to Rehabilitation Course (2010 – present). He has

lectured at the University of Toronto and Queens University on trenchless technology and has trained on trenchless rehabilitation internationally in the USA and the middle east.

He has authored or co-authored over 30 papers and spoken at over 50 industry conferences nationally and internationally. Kevin has published and presented a combined 23 papers at No-Dig and No-Dig North. Of those papers, he received the NASTT Outstanding Paper Award in 2017 and 2019.

His technical contributions have also been recognized by NASTT in the form of Project of the Year Awards: Northwest Arm Trunk Sewer Rehabilitation (Trenchless Technology Magazine POTY Runner Up 2019); Stamford Phase II Trunk Sewer Rehabilitation (No-Dig North POTY Winner 2022), and York-Peel Emergency Feedermain Repair (No-Dig North POTY Winner 2023).



### Andrew Costa

*Vice President, Business Development, Insituform Technologies, LLC*

Andrew Costa has worked in the trenchless water/wastewater industry since 2006. His experience includes positions in the contracting, manufacturing, and distribution sectors. His expertise in the water/wastewater markets includes cementitious/

polymer manhole rehabilitation, specialty coatings, cured-in-place pipe (CIPP) rehabilitation, carbon fiber remediation, geopolymer solutions, and concrete corrosion. He is currently the Vice President of Sales, East Region for Insituform Technologies – the leading worldwide provider of CIPP and other technologies/services for the rehabilitation of gravity and pressure pipeline systems.

Andrew has been with Insituform Technologies since 2014 and is heavily involved with NASTT at the national and regional levels, including active participation in a variety of NASTT committees including: No-Dig Show Technical Program Committee, No-Dig Show Track Leader, No-Dig Show Planning Committee, No-Dig Show Technical Session Moderator, No-Dig Show Innovative Product Award Committee, No-Dig Show Regional Ambassador, NASTT Education/Training Committee – CIPP Subcommittee Chair and SESTT Board Member.

Andrew holds a NACE Level 1 Coatings Inspector License and is also a member of AWWA and NASSCO.



**Kim Hanson, P.E.**

*Project Manager and  
Tunnel Design Engineer,  
Hazen and Sawyer*

Kim Hanson is a Project Manager and Tunnel Design Engineer with Hazen and Sawyer in Raleigh, North Carolina. Hazen and Sawyer currently has 1,500 employees in 65 offices across the

country where they focus on water, wastewater, and stormwater engineering.

Kim manages and coordinates the workload for the company's tunnel design team and is also involved in Hazen's Construction Management group, which she considers invaluable experience in developing practical and constructible designs. Kim is a registered professional engineer in both North Carolina and Texas and has over 10 years of experience working in surveying and engineering. She is currently working towards obtaining her Certified Construction Manager (CCM) certification. Before

joining Hazen and Sawyer, Kim served in the United States Navy working internationally as an IHO Certified Hydrographic Surveyor.

Kim has her B.S in Ocean Engineering from the United States Naval Academy and Master of Civil Engineering from North Carolina State University.

She is an active member of NASTT and currently serves on the No-Dig Planning and Technical Program Committees, as a No-Dig Show Track Leader, and as the Vice Chair of the Silent Auction Committee. She is also an active member of the American Water Works Association (AWWA) and has volunteered with Water for People since 2015, organizing the North Carolina Committee's annual 5k Race and Silent Auction fundraisers. She currently serves as the Vice Chair of the NC Chapter of Water For People.

Outside of the office, Kim volunteers as a Blue and Gold Officer (admissions representative) for the United States Naval Academy and coaches Little League Softball.



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Iowa Trenchless takes pride in using the newest technology and equipment to get the job done right the first time. Their website is [www.iowatrenchless.com](http://www.iowatrenchless.com).



# NASTT 2024 Board of Directors



## Chris Knott

*Director of Business Development and Estimating, BTrenchless*

With more than 27 years in civil utilities construction, Chris Knott began his career as a laborer and quickly progressed to an operator for an auger bore crew. He then advanced to supervisor, overseeing the auger bore crews, pipe ramming crews and the directional drilling operations. Chris enjoyed working with a variety of trenchless methods, and ultimately took on project management and estimating.

Chris began working at BT Construction, Inc. in 2005 in the role of both trenchless estimator and project manager. He has been integral to the formation of their trenchless division, BTrenchless, and is currently the lead trenchless estimator, reviewing all work involving bores and tunnels. Additionally, his expertise is utilized to market BTrenchless, Inc. as the region's premier tunneling contractor, showcasing their ability to perform Pipe Ramming, Auger Boring, Pilot Tube, TBM, Microtunnels, Hand Tunneling and Slip Lining as the Director of Business Development.

Over the years, Chris has become a valuable resource for engineers and owners alike, helping to determine the best trenchless methods in a wide array of soil conditions. He has a passion for sharing the capabilities and opportunities of trenchless construction, helping to inspire young engineers by presenting the applications of trenchless construction at annual presentations, hosted by The Colorado School of Mines (Microtunneling Short Course) and the University of Colorado-Boulder.

His natural ability to convey an aggressive but attainable game plan stems from decades of coaching lacrosse. Chris often brings the enthusiasm of a championship game to his professional endeavors, as witnessed in the organization of the inaugural Rocky Mountain NASTT No-Dig in Denver in 2010.

Involved with RMNASTT since its inception, Chris serves on its board as an officer, helping with the local NASTT show, clay shoot, and recently contributing to the Program and Auction Committee for the National show.

Chris continues to contribute fully to the foundation and growth of the trenchless industry and progress the NASTT membership. He generates energy and provides expertise to all his pursuits, both on and off the field or in this case, in and out of the field.

## WELCOME TO THE BOARD!



## John J. Kraft IV Ph.D.

*Research Scientist, Adjunct Professor, Trenchless Technology Center (TTC)*

John Kraft is a Research Scientist and Adjunct Professor at the Trenchless Technology Center at Louisiana Tech University. John holds a Master of Science and a Ph.D. in Civil Engineering and a Bachelor of Science in Construction Engineering Technology.

John has received numerous awards and honors including 2023 COES Graduate Student of the Year; 2022 ISTT Outstanding Student Research Award (Helsinki, Finland); 2022 Student Research Competition (2nd Place), NASTT No-Dig (Minneapolis, MN); 2021 Bob Westphal Memorial Scholarship; and 2019 NASTT Argent Memorial Scholarship.

His recent project involvement includes Pickle Jar Testing of Coating Materials; Evaluation of Innovative Carbon – Fiber Reinforced Energy Pipe Liner; CISIA: Center for Innovations in Structural Integrity Assurance; and Validation of Innovative Large-Diameter Spray-in-Place Pipe (SIPP) Technology; among numerous others.



## Rick Melvin

*National Product Specialist, TT Technologies, Inc.*

Rick Melvin is a National Product Specialist for TT Technologies, Inc. He has been involved in a variety of underground construction applications for over 20 years. This includes sales and servicing of pipe ramming, horizontal directional boring machines and pipe bursting systems. Rick has also been heavily involved in pursuing overall growth of the trenchless technology market. He has assisted in educating engineers and contractors on the extensive benefits of various available trenchless technologies and trenchless equipment techniques.



**Stephanie Nix-Thomas, P.E.**

*President, Claude H. Nix Construction Co.*

Stephanie Nix-Thomas earned her degree in civil and environmental engineering with a business minor from Utah State University in 1984. She worked as a consultant engineer in Salt Lake City for seven years before

moving to the State Department of Environmental Quality where she worked in water quality as an environmental engineer. In 1992 she moved to the policy office of DEQ as a liaison with small businesses and Native American tribes.

In January 2000 Stephanie joined her family's construction business, Claude H. Nix Construction Co. Her experience in engineering and government proved to be beneficial as she and her brother, Jon Nix, purchased and took control of the business from their parents in 2002. She also found that underground construction, especially trenchless technologies, was her career of choice. It has held her attention for over 20 years!

In 2004, Nix Construction completed the first pilot tube microtunneling project in the state of Utah and, in 2005, they

made the decision to focus their general contracting company on trenchless methods of construction. In the same year, they won recognition from NASTT for pioneering pilot tube pipe ramming on the commuter rail project in Utah. Over the years, the company has gained expertise in not only pilot tube microtunneling, but also tunnel bore, auger bore, pipe ramming, pipe bursting and any combination of methods. They have made choosing the "right horse for the course" with respect to trenchless methods, a resource for construction projects and for assisting engineers with trenchless designs.

At the inception of the Rocky Mountain Chapter of NASTT, Nix Construction established Utah's first group of participants. Stephanie was involved from the beginning and organized one-day Training Day Conferences in Utah in 2015 and 2016. In the fall of 2016, she led the organization's first regional chapter conference on the west side of the Rockies and has led or helped with conferences in Utah and Colorado since. She served as the chapter treasurer (2016-2020), vice chair (2021-2022), and is currently the regional chair. Recently, she is a volunteer on the Auction Committee for No-Dig, the Education Committee as well as other committees as needed. In addition to NASTT, Stephanie is a member of the American Society of Civil Engineers, and the Associated General Contractors (AGC). She was recently elected as a board member of the Utah AGC.

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# NASTT 2024 Board of Directors

## WELCOME TO THE BOARD!



### Carl Pitzer

*Trenchless Manager,  
Thompson Pipe Group*

Carl Pitzer manages Thompson Pipe Group's trenchless focus in North America. He graduated with a Bachelor of Science in Construction Engineering Management from Oregon

State University. After graduating he worked for Kiewit Infrastructure West on the SR520 Floating Bridge in Seattle, Washington as the Structures Field Engineer. In 2015 he left the bridge world for the underground world and started with Thompson Pipe Group. Carl is a licensed Engineer in the State of Washington.

He is actively involved in many organizations including NASTT, ASCE, NUCA, and participates in other forums to help educate on the value of trenchless technology.

## WELCOME TO THE BOARD!



### Eric Schuler

*Deputy Commissioner,  
Onondaga County Department of Water  
Environment Protection*

Eric Schuler is a Deputy Commissioner for a public wastewater system serving a population of roughly 350,000 residents. In his leadership role he oversees all of Capital Programming, Construction,

Asset Management, Fleet, and Inventory Control. Mr. Schuler has over 10 years of experience in both the private and public sectors. He earned his Bachelor of Science in Civil Engineering degree from Clarkson University in Potsdam, NY and has primarily been involved in wastewater, drinking water, civil-site, and stormwater sectors. Eric is a licensed Professional Engineer in New York whose design, project management, and construction-related experiences have helped successfully execute many "trenchless"-focused projects.

Early in his engineering career he gained exposure to various trenchless technologies through utility evaluations and development



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# NASTT 2024 Board of Directors

of utility project design alternatives. He immediately started to envision great opportunities for communities plagued by utility deficiencies and construction constraints to utilize CIPP, HDD, among other trenchless technologies; and for them to be able to benefit from both social and economic perspectives. Eric has also stressed the importance for municipalities to incorporate asset management into utility system evaluations and system rehabilitation designs in order to aid development of capital projects and to determine the most suitable trenchless applications for implementation.

Eric is currently the Past Chair (Chair 2022-2023) for NASTT-NE, while also a President for the Central New York Branch of the American Public Works Association (APWA), and a Director of the Central New York Water Works Conference (CNYWCC). Eric continues to push for growth of trenchless technologies in upstate-New York and has trained utility owners on the use of hydraulic modeling methods for proper development of utility rehabilitation project design. He is an advocate for educating (designers & installers) of trenchless applications through proper training and increased accessibility of industry standards/guidelines to ensure successful project design and execution. The successful use and increased awareness of modern-day trenchless technologies that incorporate innovative equipment and materials are what Eric believes will continue to shape and drive the direction of the utility industry for the coming decades.



## Chris Sivesind

*Territory Sales Manager,  
Akkerman*

Chris Sivesind is a Territory Sales Manager with Akkerman, a pipe jacking and tunneling equipment manufacturer. Sivesind is responsible for sales in the western most portions of the United States as well as Western Canada, Europe and Southeast Asia. Sivesind's career in the pipe jacking and tunneling industry has been multi-faceted. Early on, he was regional manager for his family's pipe jacking and auger boring construction business. Following this, he worked as west coast sales representative and specialty shoring installation consultant for a trench safety rental group. Prior to Akkerman, Sivesind worked for another pipe jacking equipment manufacturer. Sivesind is an active participant in industry associations NASTT, ISTT and CSITT, has authored and presented several papers at their



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conferences and served as chair and secretary for the Pacific Northwest Chapter of NASTT. He received his formal education from Washington State University with a bachelor's degree in Business Administration. Go Cougs!



## Andrew (Drew) Sparks

*Director of Engineering, Engineering Group, Laney Directional Drilling*

Drew Sparks is geotechnical engineer with 27 years of experience and is a registered professional engineer in 27 states. He has 20 years of experience in designing Horizontal Directional

Drill and Direct Pipe® projects up to 48 inches in diameter and lengths over 13,000 feet.

Drew worked on a team of engineers to develop a design procedure for Direct Pipe® design as well as developed a proprietary software program to evaluate the hydraulic fracture and drilling fluid surface release risk for Horizontal Directional Drill crossings.

Drew received his B.S. in Civil and Environmental Engineering and a M.S. in Geotechnical Engineering from Brigham Young University. Drew currently holds the position of Secretary for the ASCE Manual of Practice Committee for Direct Pipe® and is serving as the Director of Engineering for the engineering group of Laney Directional Drilling.



## Jim Williams, P.E., PMP

*Senior Associate, Brierley Associates*

Jim Williams' experience includes 28 years in the trenchless industry in design and project management in HDD and other trenchless projects including design/build and EPC delivery methods, allowing him to remain on the cutting edge of current technology in this niche. He has completed projects as an owner, a consulting engineer, and a contractor, resulting in a uniquely comprehensive perspective on project execution in the areas of water, wastewater, gas distribution, and other conveyance needs.

Jim has a BS in Environmental / Civil Engineering from the University of Florida and is the Immediate Past Chair of the South Central Regional Chapter of NASTT.

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The PPI-BoreAid™ software simplifies the analysis of complex horizontal directional drilling (HDD) trenchless applications of HDPE pipe, which is used in potable water, sewer, reclaimed water systems. Project and pipe details can be entered into the software to calculate deflection, critical collapse, pull back force and then compare the results to the corresponding allowable values.



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“This is another one of the vast technical resources of PPI to help consulting engineers, contractors, and owners analyze these infrastructure systems,” said Camille George Rubeiz, P.E., F. ASCE, senior director of engineering for the Municipal and Industrial Division of the Plastics Pipe Institute, Inc. and is also the co-chair of the HDPE Municipal Advisory Board.

“As the significant economic, social, and environmental advantages of trenchless construction methods are increasingly being documented, owners, engineers, and contractors are paying closer attention to this construction method that should be considered as an alternate for most open-cut projects, and HDPE pipe is the number one product used in HDD trenchless installations.”

PPI BoreAid is applicable for use in the analysis and design of municipal pressure and non-pressure HDPE pipe systems.

The PPI-BoreAid software was developed by eTrenchless engineers, Dr. Karl Lawrence, and Dr. Alireza Bayat, P. Eng., a professor, University of Alberta, Dr. Mark A. Knight, P. Eng., associate professor at the University of Waterloo (Ontario, Canada). The software allows the user to select the type of

PE (HDPE PE4710, or MDPE PE2708), the pipe classification (IPS, DIPS) and application (M&I Pressure Pipe, M&I Non-Pressure Pipe/Gravity, and Gas Flow) to design HDD-installed pipelines. It is an extremely useful and expeditious evaluation aid that blends all available industry guides.



The PPI-BoreAid tool facilitates in the design process as outlined in PPI’s Handbook of Polyethylene Pipe, Chapter 12, which supplies guidance in horizontal directional drilling (HDD) projects in accordance with the ASTM F1962 standard. For more information and to view the details in the handbook go to:

<http://plasticpipe.org/pdf/chapter12.pdf>

The PPI-BoreAid™ tool can be found at <https://ppiboreaid.com/>

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## Vortex Companies Acquires Applied Felts® Inc. to Deliver Comprehensive Trenchless Rehabilitation Solutions

Since 2015, Vortex Companies has been a trailblazer in transforming the trenchless rehabilitation industry through a commitment to making access to cutting-edge technologies easier and more streamlined. Today, this commitment takes a giant leap forward with the landmark acquisition of Applied Felts® Inc., positioning Vortex Companies to deliver a direct, UNITED offering to the market. Applied Felts Inc. including MaxLiner® and FerraTex Solutions™ represents all manufacturing and distribution throughout the Americas. Applied Felts Ltd. based in the U.K will remain with W.E Rawson Limited including manufacturing and distribution supporting customers outside of the Americas.

and excitement about the acquisition: “This marks a transformative moment for Vortex Companies and the industry at large. The acquisition of Applied Felts Inc, its people and the great business they’ve built, positions us to provide a total offering, revolutionizing the way infrastructure projects are approached and completed. We are excited about the total impact this will have on our combined customer base and the industry.”

### A NEW ERA BEGINS: VORTEX & APPLIED FELTS INC.

The acquisition of Applied Felts Inc., home to industry-leading brands MaxLiner and FerraTex Solutions, marks a monumental move for Vortex Companies. This strategic alliance allows Vortex to offer a direct, total solution to the market all under one roof. Mike Vellano, CEO of Vortex Companies, expressed his gratitude

Alex Johnson, President of Applied Felts, also shared his perspective on the acquisition: “Joining forces with Vortex Companies represents an exciting chapter for Applied Felts Inc. The Vortex approach to the market will allow them to deliver integrated solutions, ensuring quality and innovation in every aspect of trenchless rehabilitation throughout the Americas. Applied Felts Ltd, based in the U.K., will continue to support all business in an advisory relationship. This is a significant step forward for the future of the industry we serve. There was no better choice than Vortex to carry the business forward and I look forward to continuing our long friendship and watching all the people of Applied Felts Inc. and Vortex flourish together.”

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## ARA's Updated Economic Forecast Released

*Rental revenue projections show positive outlook in 2024*

In its updated forecast released at The ARA Show™, the American Rental Association (ARA) indicates that the United States equipment rental industry's growth has a fairly positive outlook. Last quarter, the year-over-year growth was expected to be 7.6% in 2023 and 3.1% in 2024. The most current projections indicate a 7.9% increase in 2024 totaling \$77.3 billion in construction and general tool rental revenue.

"The ARA Rentalytics™ quarterly forecast reinforces the strength of the rental industry," says Tom Doyle, ARA vice president, program development. "Rental should benefit with tailwinds from interest rates, inflation, improving supply, a preference to rent, and

government and private spending. Rental revenue is again forecasted to increase."

Looking more granularly at construction and industrial equipment (CIE) growth in the United States, \$60.9 billion is the projected revenue in 2024, which is 7.5% growth. In the coming years, 2025, 2026, and 2027, 3% growth is projected. The difference is smaller but still appreciable and more in line with a steadily growing economy.

"We see a slowing of growth this year compared to last year but bear in mind, we have a slowing of inflation this year as well," says Scott Hazelton, managing director at S&P Global. "The growth rates tail off

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in the future years, with growth of 4.3% in 2025 and 3.9% in 2026.”

The current forecast for total Canadian equipment rental revenue shows a 3.1% growth to \$974 million in 2024. 2024 growth is stronger in Canada than 2023 growth due to inflation and resilient demand. In addition, Canada’s housing market and nonresidential structure construction are both improving.

While CIE investment will decline from previous years, a 7.2% increase is forecasted. The stark contrast from previous years is attributed to the lack of post-COVID investments in 2024.

As businesses choose rental over ownership, the CIE rental penetration rate follows. The 2023 estimate of 56.4% is near the pre-pandemic peak.

General tool investment in the United States is not quite as positive of an outlook. There is muted investment growth at 6.8%. Manufacturing is driving the growth and housing is still the weak spot.

“ARA’s quarterly member survey showed conflicting results amongst members with just over half of respondents saying they

saw a revenue increase in quarter four, a slight improvement over quarter three which saw an even split between those an increase and decrease,” says Mike Savely, ARA director, program development.

It is worth noting that in current forecasts, no state in the United States has a decline in rental revenue growth in the next five years. There are states with weaknesses, but there is still growth.

For more in-depth economic data, visit [www.ARArental.org/ara-rentalytics](http://www.ARArental.org/ara-rentalytics), to learn more about RentalyticsTM.

About ARA: ([www.ARArental.org](http://www.ARArental.org)) The American Rental Association, Moline, Ill., is an international trade association for owners of equipment and event rental businesses and the manufacturers and suppliers of construction/industrial, general tool, and event rental equipment. ARA members, which include more than 11,500 rental businesses and more than 1,000 manufacturers and suppliers, are located in every U.S. state, every Canadian province, and more than 44 countries worldwide. Founded in 1955, ARA is the source for information, advocacy, education, networking, and marketplace opportunities for the equipment and event rental industry throughout the world.

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### Simplifying Force Main Inspections with New Inline Tool

Patrick Hulsebosch, P.E., RJN Group, Inc., Downers Grove, IL  
 Yann Gallin, RJN Group, Inc., Downers Grove, IL

#### 1.0 ABSTRACT

Force mains are critical system assets with a very high consequence of failure and comprise approximately 7.5 percent of all wastewater systems. However, usually only a few basic details are known about them. Countless force mains were installed between the 1950s and 1980s as substantial urban development occurred. These pipes typically had design lives of 50 - 70 years, and so many are reaching the end of this period. Many pipelines traverse thousands of feet between access points, and traditional inspection methods can call for complete pipeline shutdowns, which may require costly bypass setups. Screening level assessments (SLA), represent a solution that provides a phased, cost-effective way to identify defects and separate the good pipelines from the bad.

Utilizing an in-pipe, free-floating, multi-sensor technology RJN has successfully created an efficient and effective SLA for a wide variety of force mains ranging from 6" to 24" in size, metallic and non-metallic pipe material, and lengths of up to 16,000 feet. These devices have the benefit of being easy to deploy and allow force mains to remain online during inspection while simultaneously delivering vital information collected on a pipeline's performance at a fraction of the cost, by minimizing mobilization and eliminating bypass operations.

Using case studies in Illinois, this paper highlights the benefits of successful SLA programs, and how they provide system owners with three primary courses of action: targeted recommendations for follow-up studies; rehabilitation recommendations; or cleaning and reinspection at recommended intervals.

#### 2.0 INTRODUCTION



## SIMPLIFYING FORCE MAIN INSPECTIONS WITH NEW INLINE TOOL

AUTHORS



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## 1. ABSTRACT

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This paper was selected as one of the most Outstanding Papers – Rehabilitation from all the presentations at the 2023 NASTT No-Dig Show in Portland OR. NASTT No-Dig Papers are available for download, free to members, at [www.nastt.org](http://www.nastt.org)

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## 2023 No-Dig Paper – Rehabilitation

### 2. INTRODUCTION

Force mains are an integral asset in a gravity sewer system that convey wastewater under pressure to a discharge point and comprise just 7.5 percent of all wastewater pipes (EPA, 2010). Force



Figure 1: In-Line Screening Pipers® Device

mains provide solutions for challenging topography that cannot support a gravity-reliant system, significantly reducing the size and depth of sewers, and decreasing the overall costs of sewer system construction and maintenance by avoiding deeper excavations. Despite these advantages, force mains have proven to be challenging to maintain, inspect, and repair. Force mains often cannot be taken out of service for any significant period of time because any extended downtime would result in surcharging issues in the upstream tributary system. As a result, routine inspections or maintenance can be difficult and costly.

Since force mains are pressurized, they typically run a higher risk of failure than their gravity counterparts. Despite this increased risk, force mains usually have a limited number of access points for inspection or maintenance. Additionally, typical inspection and maintenance



Figure 2: Broken Air Release Valve due to H<sub>2</sub>S Damage



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technologies are not applicable to force mains. Televising is not feasible as force mains are designed to run at full capacity and consistent visibility in wastewater is near impossible. Flushing or jetting a force main is not as effective as it is in gravity lines because deposit buildup in force mains can be hardened. Because of these limitations, force mains are often not included in regular assessment and maintenance programs and municipalities react to force main failures instead of being proactive to prevent force main failures.

Inspection technologies have improved with time and tools available that can extract actionable data at an affordable price. RJN, utilizing INGU and PICA's free-floating Pipers® devices as seen in Figure 1, has developed a screening level assessment that doesn't require a force main to be shut off to collect vital information on a pipeline's condition.

## 3. FORCE MAIN RISKS

When inspecting force mains, it is important to know their common modes of failures. Force mains can vary in material and the failure mechanisms differ in each. Understanding each force main and its high-risk locations is vital in assessing a force main's risk of imminent failure.

### 3.1 Internal Corrosion

Approximately 64 percent of force mains are ferrous material such as cast iron, ductile iron, and steel. The highest cause of failure in these force mains is internal corrosion caused by hydrogen sulfide (H<sub>2</sub>S) gases (EPA, 2010). H<sub>2</sub>S is formed under anaerobic (septic) conditions when bacteria produce sulfides that then combine with hydrogen. High retention times at pump stations and low velocity flow, resulting in long travel times, can increase the amount of hydrogen sulfide in wastewater which can then form into gas pockets at high elevation points along the force main. Proper installation

and maintenance of air release valves (ARVs) can help mitigate gas pockets and subsequent hydrogen sulfide damage at high elevation locations.

### 3.2 Structure Deterioration

Depending on the profile of a force main, it may have one or multiple structures along its path. High points in force mains trap air, which reduces hydraulic capacity, causes non-uniform flow, and creates the potential for sulfide corrosion. ARVs, as aforementioned, are installed if high points in the alignment of force mains cannot be avoided, while blowoffs are installed at low points. All structures and valves must be diligently inspected and maintained as they are integral components of an efficient force main.

As seen in Figure 2, if not properly maintained, these structures can be the source of failure on a force main. For example, the ARV in Figure 2 was on a PVC force main but a local stream had submerged the structure with infiltration. As a result, the ARV became inoperable and sulfide corrosion slowly deteriorated the metallic piping and valve. In the end, one of few only metallic components of the entire PVC force main was the source of the failure.

### 3.3 Low Scouring Velocity

The minimum self-cleaning velocity for a force main is two (2) feet per second. Below this minimum velocity, deposits can build up on a force main which will restrict capacity and can be a risk for abrasion over time. The profile of a force main will reveal low points that are at risk of significant deposit buildup if a self-cleaning velocity is not achieved. In addition, as wastewater flows through gravity and force main pipes, heavier particles can accumulate forming a solid deposit. Depending on the type of particles, this results in a flow regime with a sliding bed or a stationary bed. A sliding bed can cause

abrasion of the pipe's invert as seen in Figure 3. Conversely, a stationary bed reduces the cross-sectional area available in the pipe effectively reducing the hydraulic capacity. Both types of solid deposits can cause long-term force main problems to occur if left unaddressed. Finally, gas pocket formation is more likely to occur in slower velocities.

These three factors contribute to the majority of the different ways a force main can fail. Reducing and highlighting these risks is the goal force main management programs. Evaluating consequence of failure guides which pipelines to inspect and what techniques to use. Condition assessment determines likelihood of failure. Together, consequence and likelihood of failure create a clear picture of risk that informs short- and long-term management decisions.



Figure 3: Pipe Invert Abrasion

### 3.4 Other

Force mains can fail due to a multitude of other reasons. If a force main is not cathodically protected, external corrosion can cause breaks via weathering of exposed pipe, stray currents, and corrosive soils. External loading due to road crossings, utility crossings, and previous repairs can also lead to eventual failure. Lastly, pressure surges caused by sudden changes in the flow's velocity often occur during pump start-ups or shutdowns or as the result of sudden expulsion of air from the system. Pressure surges can affect the integrity of the pipe over time and if the surge is in excess of the pipe's pressure rating, it can result in a catastrophic failure of the pipe.

## 4. PLANNING AND PREPARATION

### 4.1 Desktop Study

The first phase in the SLA is gathering and reviewing all available data for a force main. This includes type of material,

diameter, lengths, pump curves, pump run times, force main plan and profiles, and design and/or record drawings of the lift station. The objective of this phase is preparing for a preliminary site visit. All available data is used to develop an understanding of the force main operations including an estimate of travel times.

Potential launch and retrieval points and any structures on the force main will be noted after studying the plans.

Pumps have to be running throughout the entire duration of a deployment to ensure accurate data. Pipers® are a free-floating device meaning their arrival speed is directly correlated to the flow speed and therefore highly predictable. Thus, once travel time times have been estimated, it is essential to follow-up with system owners and inquire if there is sufficient flow to the lift station for the pumps to run continuously. Knowing the travel time also helps with the retrieval process as well.



Figure 4: Lift Station Check Valves - Insertion Points

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## 4.2 Preliminary Site Visit

The primary goal of a preliminary site visit is to increase the likelihood of a smooth deployment of the inspection devices. The fundamental tasks of a preliminary site visit are as follows:

- **Confirmation of Sufficient Volume**  
- Determine if extended pump shut-down times will provide enough volume in the upstream tributary system for a deployment or if nearby hydrants/vacuum trucks need to be used to provide supplemental flow.
- **Calculating Precise Travel Times**  
– Perform timed dye test runs to precisely calculate confirm travel times and flows to ensure retrieval success.
- **Confirmation of Deployment Procedures** – Assess the lift station function, insertion points as seen in Figure 4, and visiting the discharge manhole, if applicable, to plan for retrieval.
- **Accessibility of the Force Main** – Document areas and structures, such as ARVs or cleanout structures, where the force main is accessible and their respective conditions.

A preliminary site visit will provide a tangible deployment work plan consisting of the insertion and retrieval points as well as all the necessary velocity and travel time calculations. These travel time calculations are imperative for both the retrieval process, with regards to timing, and for determining how much flow is needed for the duration of each deployment. If the upstream tributary system cannot support enough volume without risk of basement backups, then supplemental flow must be brought in, such as nearby fire hydrants or vacator trucks.

## 5. DEPLOYMENT

For the deployment, once sufficient volume is confirmed and the retrieval set-up is ready, dye and the activated

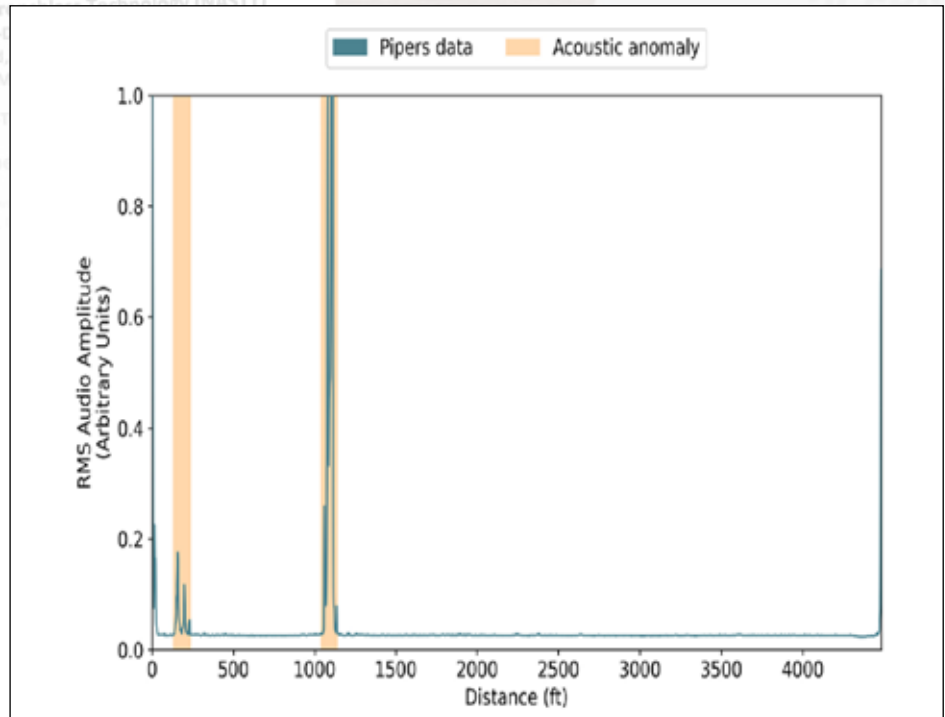


Figure 5: Acoustic Amplitude Analysis

device will be inserted into the designated insertion point. Together with the preliminary site visit travel times, the dye will help crews at the retrieval point know when to expect the device and be prepared. Two successful deployments are recommended to determine what is repeatable in each run. Repeatability is important for verifying possible defects or gas pockets. If something can be produced in both deployments under the same exact conditions in a relatively short amount of time, it can be assumed the results are not random.

## 6. SCREENING LEVEL ASSESSMENT DATA ANALYSIS

The three sets of data collected in an SLA is acoustic data, a pressure survey, and a magnetic flux analysis. A breakdown of these three sets of data and how they can be interpreted and analyzed are below.

### 6.1 Acoustic Data

Acoustic data can detect sounds caused by air pockets, pumps, and other noise sources in the pipeline.

Air pockets are usually louder than the background noise in the pipeline and can be confirmed by the specific spectral signature at its location. Acoustic anomalies should always be compared to a force main's profile. Acoustic anomalies with large amplitudes, such as the one in Figure 5, that align with localized high points should be considered when budgeting next steps.

Any other background noises that do not produce enough amplitude to be considered an air pocket are referred to as acoustic anomalies. Acoustic anomalies are short sections where air is entrapped. The acoustic data could be picking up noise where the flow gets slightly more turbulent at a bend, a valve, or sudden change in the force main's profile. For that reason, these

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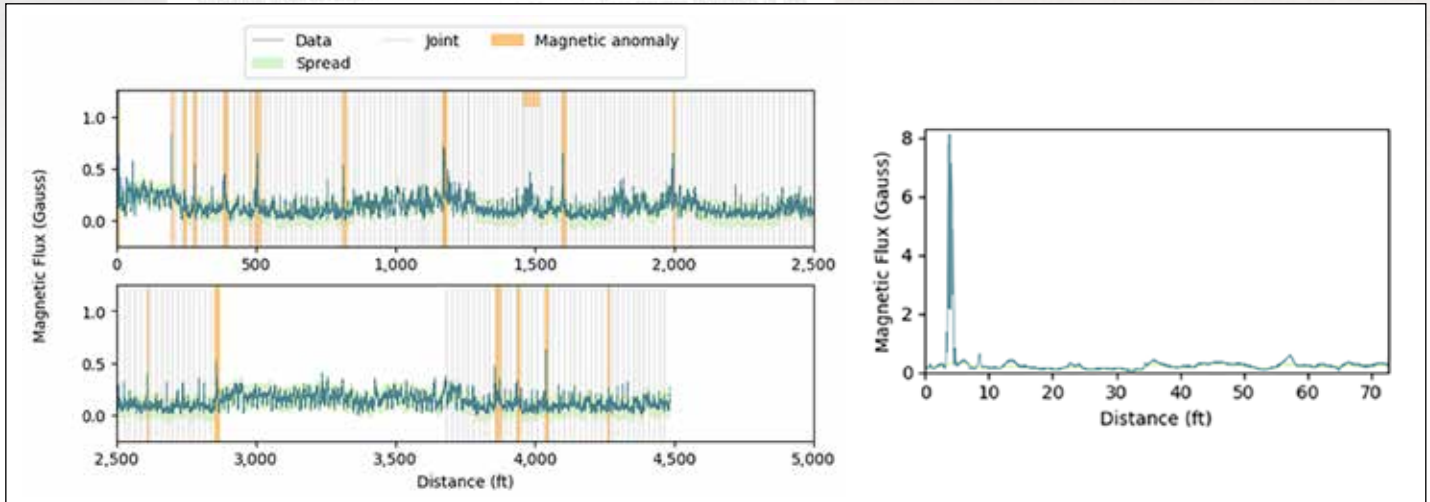


Figure 6: Magnetic Flux Analysis (Left); Flow Meter Identified as Anomaly (Right)

anomalies should be monitored to ensure they do not develop into air pockets over time as more air gets trapped.

All existing ARVs should be inspected and rehabilitated if needed. Additional ARVs should be installed at localized

high points or at acoustic anomaly locations if an ARV is not already present. Ferrous force mains with larger acoustic anomalies at higher points should be considered for further inspection and even rehabilitation. Depending on the size and age of a force main, it may

make more economical sense to partially rehabilitate an older, smaller force main than to put more money towards further inspection. Conversely, further inspection such as a broadband electromagnetic (BEM) inspection may be warranted on larger force mains where rehabilitation



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would require extensive bypass operations and significant cost.

## 6.2 Pressure Monitoring Survey

SLAs will also collect pressure data throughout the force main based on the hydraulic grade line (HGL). The HGL is calculated based on the measured pressure and the force main elevation which accounts for the effects of hydrostatic pressure. The HGL is an indication of the amount of frictional pressure loss throughout the force main, where regions of the HGL with a steeper slope experience more flow friction suggesting increased internal surface

**Table 1: City of Naperville Inspected Force Main Features**

| Lift Station   | Force Main Size (inches) | Force Main Length (feet) | Force Main Material | No. of Air Valves | Year Installed |
|----------------|--------------------------|--------------------------|---------------------|-------------------|----------------|
| Cinnamon Creek | 6                        | 2,261                    | DIP                 | 1                 | 1976           |
| Hobson Oaks    | 4                        | 770                      | DIP                 | 0                 | 1987           |
| Rivermist      | 4                        | 476                      | DIP                 | 0                 | 1987           |
| Riverwoods     | 6                        | 1,633                    | DIP                 | 0                 | 1988           |
| Country Lakes  | 10                       | 1,094                    | PVC                 | 1                 | 1998           |

roughness and/or diameter restrictions. These diameter restrictions can indicate buildup such as tuberculation in ferrous

force mains and grease in PVC force mains. These buildups can vary in size depending on the profile of the force main and the scouring velocity.

| Force Main    | Cleaning Rating | Condition Rating | Overall Rating | Recommendations  | Follow-Up Investigation? | Minor Improvement/Upgrades  | Budgetary Cost Estimates  |
|---------------|-----------------|------------------|----------------|--|--------------------------|---|---|
| Hobson Oaks   | 4               | 4                | 4              | 1. Force Main Rehabilitation - Partial Replacement, Full Replacement, or Trenchless Rehabilitation<br>2. Restoring Hydraulic Capacity - Piggings the 4" DIP force main | Yes                      |   | 1. Partial Replacement (150 LF) - \$95,050<br>2. Full Replacement - \$348,205<br>3. Trenchless Rehabilitation - \$333,000<br>4. Piggings - \$50,000<br>5. Monitoring and Inspection Program - \$43,000  |
| Rivermist     | 5               | 5                | 5              | 1. Force Main Rehabilitation - Partial Replacement, Full Replacement, or Trenchless Rehabilitation<br>2. Restoring Hydraulic Capacity - Piggings the 4" DIP force main | Yes                      |   | 1. Partial Replacement (390 LF) - \$178,930<br>2. Full Replacement - \$240,250<br>3. Trenchless Rehabilitation - \$234,250<br>4. Piggings - \$50,000<br>5. Monitoring and Inspection Program - \$43,000 |
| Riverwoods    | 2               | 2                | 2              | 1. Restoring Hydraulic Capacity - Piggings the 4" DIP force main   | Yes                      | 1. Installation of Air Release Valve and Structure at Localized High Point.                                       | 1. Piggings - \$50,000<br>2. Monitoring and Inspection Program - \$43,000<br>3. Air Release Manhole and Valve - \$25,000  |
| Country Lakes | 2               | 1                | 1              | 1. Restoring Hydraulic Capacity - Piggings the 10" PVC force main  | Yes                      | 1. Installation of Cleanout and Blowoff Valves and Structures at Low Point.<br>2. Valve Vault Manhole Replacement | 1. Piggings - \$50,000<br>2. Monitoring and Inspection Program - \$43,000<br>3. Cleanout and Blowoff Manholes and Valves - \$40,000<br>4. Valve Vault Manhole Replacement - \$60,000                    |

**Table 2: 2022 Naperville Force Main Programs Recommendations Summary**

The 2022 force main program featured three DIP force mains ranging from 4" to 6" in diameter and one 10" PVC force main. All force mains were nearing their design life and had suffered no breaks in their histories. The SLA provided insight to the City on the condition of these force mains and the recommendations are summarized in Table 2. The cleaning and condition ratings are as follows:

### Cleaning Ratings

- 0% to 10% Diameter Restriction
- 10% to 20% Diameter Restriction
- 20% to 30% Diameter Restriction
- 30% to 35% Diameter Restriction
- 35% or Greater Diameter Restriction

### Condition Ratings

- Zero Anomalies
- Low Risk Anomalies
- Low Risk Anomalies, Structure Deterioration
- Medium to High-Risk Anomalies
- Numerous High-Risk Anomalies



## 2023 No-Dig Paper – Rehabilitation

Force mains with large sections of diameter restrictions due to deposits should be pigged to restore hydraulic capacity. Pigging structures should be installed as well as cleanout structures at low points in the force main's profile, for future maintenance.

There are two types of pigging operations: ice pigging and conventional pigging. Ice pigging is recommended for smaller diameter pipes as it provides all the advantages of solid conventional pigging but none of the risks involved. It has 100 times the scouring power of flushing and will flow like a liquid through obstructions such as changes in diameter, bend, and valves, and it can be inserted and ejected from the pipe using small diameter fittings. If an ice pig does become stuck it can be left to melt and flushed out after a few hours. Ice pigging yields a high-quality clean comparable to more intrusive methods. However, ice

igging is only suitable for diameters smaller than 14 inches. For pipes with diameters larger than 14 inches, conventional mechanical pigging is recommended. In order to navigate turns, multiple access pits and pigging structures may need to be installed along the line.

### 6.3 Magnetic Flux

The last set of data collected during SLAs is the magnetic flux analysis. The magnetic flux can provide insights along the pipeline and is intended to identify bends, areas of potential deterioration, material changes, air release valves, flow meters, cleanout structures, and additional metallic fittings along the force main. As seen in Figure 6, magnetic anomalies are identified where spikes occur between joints. The gray bands represent joints, the green band indicates the

characteristic spread in the magnetic flux, and the orange highlights indicate magnetic outliers that fall outside the characteristic spread. As an overall condition assessment, pipelines with wider spread in the magnetic flux are expected to be in worse condition compared to those with narrower spread and smoother magnetic flux. Magnetic flux data should be plotted along the profile of a force main to determine if any large anomalies occur at high-risk locations or locations where an acoustic anomaly was located. Similarly, to acoustic anomalies, the size of the force main should dictate whether rehabilitation or further inspection is warranted for a magnetic flux anomaly. Large magnetic anomalies located at high-risk locations in larger diameter metallic pipes should be further inspected in a second phase. Conversely, replacement may be a more feasible option on smaller diameter force mains.

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Depending on the results from these phase two assessments, force main rehabilitation may need to be prioritized. Force mains can be rehabilitated via partial replacement, full replacement, and trenchless pressure lining. Each force main is unique and each method's advantages and disadvantages are compared. For example, partial replacement of pipe will create new sections of pipe that have a fresh design life of 50 years but other original sections of the force main may still be deteriorating and susceptible to a break in the future. For full open-cut

replacement, it offers a new design life of 50 years to an entire force main but has drawbacks with regards to traffic control, resident disruption, restoration efforts, and expensive costs.

## 7. CASE STUDIES

### 7.1 Naperville, IL

The City of Naperville has taken a proactive approach and has performed five (5) force main inspections and plan to inspect the remaining eighteen (18) force mains over the next four years.

Following a successful pilot force main deployment in 2021 of the City's Cinnamon Creek force main, four additional force mains were chosen for SLAs in 2022. These four (4) force mains were the Country Lakes, Hobson Oaks, Rivermist, and Riverwoods force mains and their features are listed in Table 1.

In all five (5) force mains, the SLAs produced actionable data for the City. In total six (6) acoustic anomalies were identified and two force mains were found to be running below full capacity. Partial replacement was recommended for the Cinnamon Creek force main at road crossings with large magnetic flux anomalies. An ARV was located at this location but was inoperable for an unknown number of years before 2006. The large magnetic anomalies potentially represent wall loss due to an old gas pocket. Due to the smaller 6-inch diameter and advanced age, 200 LF of 6-inch DIP was recommended to be removed and replaced from the Cinnamon Creek force main.

The overall ratings were determined based upon the cleaning and condition ratings to identify force mains that require more attention than others. The condition rating, which considers a force main's age, past breaks, and anomalies, is weighted heavier than the cleaning rating. The Hobson Oaks and Rivermist force mains were both DIP force mains that exhibited signs of corrosion and concern for failure. The Hobson Oaks force main was found to have a low scouring velocity and potential tuberculation buildup restricting the diameter by up to 32.5 percent in some sections of pipe. Two acoustic anomalies and numerous magnetic flux anomalies were identified along the pipe. The Rivermist force main was found to not be running at full capacity and potential tuberculation buildup restricted the diameter by 37.5 percent in some sections. Given the smaller sizes and lengths of both force mains, trenchless rehabilitation was recommended for both the Hobson Oaks



Figure 7: Submerged Air Release Valve

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and Rivermist force mains. Pressure lining reduces the bypass times and cost, environmental footprint, traffic control, and public disruption all while restoring the integrity of the force main and resetting their design lives to 50 years.

The Riverwoods and Country Lakes force mains exhibited signs of force mains operating as they were intended. The Riverwoods DIP force main had one smaller acoustic anomaly at a localized high point where an ARV was recommended to be installed at. The Country Lakes force main was also found to be running below full capacity. There is probably too much air entrapped in the force main for a single air release valve to remove prior to the next pump cycle turning on. However, since Country Lakes is PVC, H<sub>2</sub>S corrosion is not an issue as it is with iron force mains, but hydraulic capacity is still a concern.


Additional ARVs as well as pigging structures were recommended to be installed on the line. Both force mains were recommended for continued monitoring and inspection. Magnetic flux anomalies can be monitored and evaluated more thoroughly with multiple SLAs. Just as consecutive deployments on the same pipe during one deployment provides accuracy for the magnetic flux analysis, multiple deployments over a multi-year span paints a much clearer picture on these actual anomalies and their significance.

### 7.2 Glenbard Wastewater Authority, IL

In June 2022, an SLA was performed on the Glenbard Wastewater Authority's (Authority) 10-inch PVC Valley View force main which travels underneath and then parallel to Illinois Route 53 (I-53). I-53 is scheduled to undergo construction for the addition of a bike path along the force main's route. This portion of the force main is DIP within a steel casing.



Figure 8: October 2022 ARV #1 Break



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Replacement of this section would be especially significant due to the cost of traffic control and construction to replace or repair a force main underneath a major road. The Authority decided to proactively perform an internal inspection of the force main to determine its condition and if any rehabilitation could be done while construction was underway and access to the force main was available.

The Valley View force main was predominantly PVC but still had two sections of DIP and three metallic ARVs and their associated structures along its route which are susceptible to H2S corrosion. The SLA revealed little concern with the DIP sections of force main but all three ARVs were found to be inundated with infiltration and damaged by corrosion. The force main is located within the floodway of the East Branch DuPage River. These ARVs are placed at high points along the force main so

that trapped air can escape. Submerged ARVs can lead to deterioration, causing them to not function properly and leave this air trapped. These ARVs, their adjacent DI piping, and their structures were recommended to be rehabilitated and replaced. In addition, ice pigging was recommended to remove buildup along the force main.

In October 2022, the Valley Force Main suffered a break at the first ARV along its line. As seen in Figure 8, the failure occurred at the ARV piping where corrosion had caused severe wall loss. The Authority was proactive in its inspection but it is difficult to estimate the true remaining life of the pipeline if no rehabilitation were to occur. A break or leak could be months or years away. Being proactive for force main maintenance, rather than reactive, is highly recommended when considering a budget. An emergency force main repair can be incredibly expensive.

## 8. CONCLUSIONS

Force main conditions are not necessarily uniform throughout the length of the entire pipeline. SLAs provide insight to owners on potential options for their force mains and helps plan a budget. Pipeline characteristics evaluated individually, especially age, is not an accurate method for determining the pipeline condition. Force mains can break at any time so proactive management and budget planning is crucial. Assessing a force main is a highly specialized service, but that does not mean it has to be a massive effort or require an exorbitant budget. Using the appropriate pre-planning assessment strategies and coupling those efforts with the most advantageous technologies will deliver actionable information. The results of a successful SLA provide system owners with three primary courses of action: targeted recommendations for follow-up studies, rehabilitation recommendations, or conditions warrant no further action.

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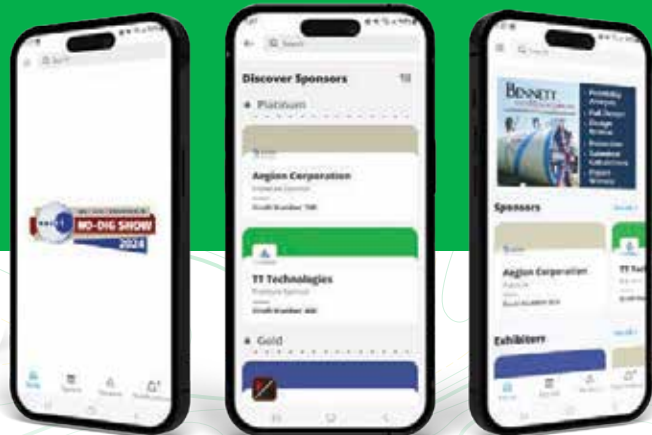
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| Emagineered Solutions .....             | www.theshootercipp.com .....           | 43     |
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| Iowa Trenchless .....                   | www.iowatrenchless.com .....           | 37     |
| Kilduff Underground Engineering .....   | www.kilduffunderground.com .....       | 55     |
| Michael Byrne Mfg .....                 | www.byrnegroup.com .....               | 46     |
| Michels .....                           | www.michels.us .....                   | 53     |
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| OBIC LLC .....                          | www.obicproducts.com .....             | 33     |
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