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SPRING 2026 – VOLUME 16, ISSUE No. 2

21

NASTT 2026 NO-DIG SHOW

WELCOME Trenchless Colleagues! The NASTT No-Dig Show is returning to beautiful Palm Springs for the first time since 2018. The 2026 Show is shaping up to be the most successful yet with record attendance projected, and 7 full tracks of technical sessions over the course of 3 days . Full conference information, including the full Technical Program Schedule and networking events highlights are inside. Join us to celebrate the largest trenchless technology conference in the world!

MARCH 29-APRIL 2 | PALM SPRINGS, CA
NASTT NO-DIG SHOW 2026

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WELCOME TO THE SPRING 2026 NO-DIG SHOW EDITION OF TRENCHLESS NORTH AMERICA

An Exciting Moment for NASTT

Dear NASTT Members and Trenchless Advocates:

This spring marks an exciting moment for NASTT. I am honored to step into the role of Executive Director and grateful for the opportunity to serve an organization that has had such a meaningful impact on my own career and on the trenchless technology industry as a whole.

NASTT is a volunteer-driven community built around education, collaboration, and the advancement of trenchless technology. Having served on the Board of Directors and worked alongside many of you through committees and conference programming, I have seen firsthand the dedication that makes this organization so strong. That perspective will continue to guide my approach as Executive Director: keeping our focus on delivering meaningful value to our members and supporting the volunteers who make our work possible.

This year also marks an evolution in how NASTT's leadership is structured. As the organization continues to grow, we have refined our leadership model to strengthen both our strategic focus and our operational support. I will be partnering with Jessie Clevenger, our new Vice President of Operations and Conferences, to ensure that NASTT continues to deliver high-quality programs, conferences, and resources for the industry.

Of course, the highlight of the spring is the No-Dig Show, and I look forward to seeing many of you in Palm Springs. This event remains one of the most important gatherings in the trenchless technology community, bringing together engineers, contractors, manufacturers, owners, and suppliers to share knowledge, strengthen relationships, and advance our industry.

In the months ahead, I will represent NASTT at a number of industry conferences and events. These interactions are an important way for us to stay connected with the broader trenchless community, listen to emerging challenges, and ensure that NASTT continues to play an active role in advancing trenchless technology.

As we look ahead and begin the process of shaping NASTT's next Strategic Plan, input from our members, chapters, volunteers, and industry partners will be essential in guiding that work. This organization has always been strongest when our community leans in, and I look forward to hearing your perspectives as we chart the path forward together.

To all who volunteer your time, share your expertise, and support NASTT's mission – thank you. Your commitment is what allows this organization to thrive.

Enjoy the issue, and I hope to see many of you at the No-Dig Show.

Kim Hanson

Kim Hanson PE, Executive Director
North American Society for Trenchless Technology (NASTT)
khanson@nastt.org

"NASTT has always been strongest when our community leans in."

"I am honored to serve an organization that has had such a meaningful impact on my career and on the trenchless technology industry."

"Our focus remains on delivering meaningful value to members."

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"Thank you for being part of the NASTT community."

WELCOME TO THE 2026 NASTT NO-DIG SHOW IN PALM SPRINGS!

Dear NASTT Members, Volunteers and Trenchless Advocates,

It is my great pleasure to welcome you to the NASTT 2026 No-Dig Show in beautiful Palm Springs, California. Each year, our community gathers for this event with a shared purpose: to exchange knowledge, strengthen relationships, and advance trenchless technology across North America and around the world. Whether this is your first No-Dig Show or you are one of our many returning attendees, we are delighted to have you join us for what promises to be an exceptional week of learning, collaboration, and connection.

A highlight of this year's program is the opportunity to participate in NASTT's renowned **Good Practices Courses**. These courses are designed to provide practical, real-world knowledge directly from experienced industry professionals and subject matter experts. For many attendees, these sessions are among the most impactful parts of the No-Dig Show, offering hands-on expertise and meaningful discussion in a focused learning environment.

Of course, education at the No-Dig Show extends far beyond the classroom. Our **technical program** features an impressive lineup of peer-reviewed papers and presentations covering the latest research, project case studies, and technological innovations shaping the trenchless industry today. The technical sessions are carefully organized into focused tracks, allowing attendees to dive deeper into topics most relevant to their work. From advances in installation and rehabilitation methods to lessons learned from complex projects, the technical program reflects the ingenuity and dedication of our industry professionals. (see pgs 28-33).

This year we are also excited to introduce **reimagined networking opportunities** designed to help attendees connect in new and meaningful ways. The No-Dig Show has always been known for its strong sense of community, and these refreshed networking events will make it easier than ever to meet new colleagues, reconnect with longtime partners, and spark conversations that lead to future collaborations. Throughout the week, you will find opportunities to gather, exchange ideas, and build relationships that extend well beyond the conference itself (see pgs 21-27).

Saving the best for last, our vibrant **exhibition hall** will showcase the cutting-edge equipment, products, and services that are driving trenchless innovation forward. Exhibitors from across the industry will be on hand to demonstrate new technologies, answer questions, and discuss solutions to today's infrastructure challenges. Be sure to spend time exploring the exhibit floor and engaging with the companies that help power the advancement of our field.

None of this would be possible without the dedication of the many volunteers who contribute their time and expertise to NASTT. From the technical program committee to course instructors, chapter leaders, and countless other contributors, our volunteers play an essential role in shaping the No-Dig Show and supporting the growth of our association. Their commitment reflects the collaborative spirit that defines our organization.

Thank you for being part of the NASTT community and for joining us at the 2026 No-Dig Show. We hope you have an engaging, productive, and enjoyable experience in Palm Springs.

Sincerely,

Greg Tippett

Greg Tippett P. Eng., Board Chair
North American Society for Trenchless Technology (NASTT)

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Q&A with Maureen Carlin

GARVER

Maureen Carlin, Ph.D., Trenchless & Tunneling Infrastructure Practice Leader at Garver has more than 20 years' experience in construction engineering and project management for bothvertical and trenchless pipeline construction. Her areas of expertise are in advanced project planning and market analysis for Horizontal Directional Drilling, Direct Pipe®, microtunneling, pipe jacking and conventional tunneling methods engineering and construction projects both domestically and internationally.

An enthusiastic and knowledgeable proponent of trenchless methods, Maureen first encountered the world of trenchless at the NASTT 2012 No-Dig Show in Nashville TN. She served a six-year term on the NASTT Board of Directors and is this year's proud Chair of the No-Dig Show Planning Committee.

Maureen shares her well informed perspective on the current state of the trenchless technology industry.

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

I always knew I wanted to be an engineer. I enjoy problem solving and the creativity associated with building. excelled in math and science but was less interested in humanities. This continued through college where I studied both architectural and civil engineering studies an minored in art at Missouri- Rolla. You can probably guess my age referencing "Rolla" instead of Missouri University of Science and Technology.

I think the first time I went to Las Vegas in college was an eye opener. There was a city of spectacular architecture, massive structures and incredible lighting... all in the middle of the desert with virtually no natural resources other than the rocks that were crushed up and poured into the foundations of skyscrapers. It was a completely engineered city. So my love for construction and engineering started above ground than rather than below.

My senior year I was set on moving to Vegas and was thrilled to receive an offer from a large general contractor to work on a tower expansion for the Palms Casino. We worked 60+ hour weeks regularly and construction was 24/7. I didn't learn to work at that pace of play – I didn't know there was any other pace of play. I also came to the realization that I knew very little about business basics like accounting, taxes, payroll, finance etc. I started night school at UNLV in the fall of 2008 and graduated in 2010 with my MBA in marketing. By that time I was ready to move out of the crazy pace of Vegas which was hard impacted by the recession. I decided it was time for my next adventure and took a graduate teaching position at Arizona State University.

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

I moved to Phoenix, AZ and started Arizona State in 2011. My first semester I took was Dr. Sam Ariaratnam' s trenchless technology class and I was interested – even when Dr. Jason Leuke (ASU professor then – academic brother and friend today) put my end of semester project through the ringer. Look how far we have come. The next semester Sam bribed me with a trip to the No-Dig Show in Nashville in exchange for coming to work for him, both of which were no brainers. It was an amazing event and I left even more interested in trenchless industry. I was also the big $10 winner taking 3rd place in the student CCTV competition.

Sam later helped me secure a highly respected NSF fund for international research. I used it to fund a summer-long trip to China where I partnered with students from the Chinese University of Geosciences in Wuhan to collect data for my dissertation. This was my home base as I travelled around the country in planes, trains and highly questionable automobiles to a variety of HDD sites as well as mega projects. It was a fascinating and eye opening experience into a wildly different culture which has made me better at what I do today.

The next summer I switched gears and went to work in Houston for Laney Directional Drilling. I had met Alan Snider and convinced him to let me be a high-priced intern for the summer while I completed my dissertation. Laney was a small company by number but a leading driller at the time by volume and experience. They were not doing the one-man-band sidewalk fiber installation. They were doing 10,000-foot steel crossings beneath the Houston Ship Channel – big kid

"I always knew I wanted to be an engineer."

stuff. I worked in estimating, engineering and on proposals. I was sent out on jobsites and managed geotechnical investigations – one from a small dinghy in the middle of the gator-infested Kissimmee River – pretty much all the things engineering wise.

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

It has been an adventure. 2012 was my first No-Dig in Nashville. I stayed involved as a student until 2014 which I think was my first year on the program committee and later spent 6 years on the NASTT Board of Directors. This organization has grown by leaps and bounds since I first started which has come with both success and growing pains. Keeping the momentum going from last year's successful No-Dig in Denver through Palm Springs will be critical in helping the organization maintain strength.

I am currently serving on the industry committees for NASTT which is really doing good work engaging with both industry partners as well as complementary organizations such as NUCA, ASCE, SME and APWA to prioritize how the organizations can move forward effectively in the mission to improve knowledge and acceptance of trenchless technologies. This has historically been a challenge, but it seems like we are finally making progress and having conversations.

Additionally, education has always been my jam. I would like NASTT to figure out how to put more content in the classroom at all levels to attract young professionals to our industry. We tried to figure out a way to develop a Trenchless Technology class offered by NASTT similar to a program run by the Construction Industry Institute. Through this effort we surveyed dozens of Universities in the United States with mixed results. We received feedback from the Chair of a Tier-1 research college that they had "never heard of" trenchless technologies which is unacceptable. This has proved challenging, however, it has promise if we can identify champion professors that want to initiate trenchless in their programs and give them the industry mentorship and resources to support it.

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

The trenchless industry appears to be in a very strong position right now. At Garver, we primarily focus on water and wastewater pipelines and in many regions we are seeing a significant amount of trenchless activity with no signs of slowing down, particularly in Texas and the Mid-Atlantic/ Carolinas regions. Aging infrastructure, population growth, and the need to minimize surface disruption continue to drive demand for trenchless solutions.

Beyond water and wastewater, there is also substantial activity in other utility sectors. I have several friends who work strictly in the power industry, and they are extremely busy as utilities work to underground power lines to improve reliability and resiliency. That effort alone is creating a large amount of trenchless work.

Data centers are another major driver. Many of these facilities are being constructed on the outskirts of communities where infrastructure is limited or nonexistent. As a result, they require significant new utility infrastructure including water, wastewater, power, and communications all of which are well suited for trenchless construction methods. We are also seeing significant improvements in trenchless technologies coming from across the globe. Equipment continues to modernize, steering technologies are becoming more precise, and new pipe materials are expanding the range of applications. In addition, innovative trenchless methods for both utility rehabilitation and new construction are continuing to emerge, making trenchless solutions more efficient and viable for an even broader range of projects.

Overall, the combination of infrastructure renewal, utility modernization, technological advancement, and rapid development is creating sustained demand for trenchless technologies.

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

We are slowly beginning to see more curriculum at the university level that relates to trenchless technologies, although much of it is still somewhat regional. Integrating trenchless into university programs can be challenging due to state approval requirements and limited space in already full degree plans. This is particularly difficult at larger, research-focused universities where creating new stand-alone courses can be a lengthy and complex process. Ideally, we will continue to see more underground infrastructure content incorporated into existing geotechnical, civil, and environmental engineering courses so that students at least gain exposure to trenchless methods during their studies.

Where I believe we have the greatest opportunity for growth is in trade education and workforce development. The trenchless industry relies heavily on highly skilled field crews who operate sophisticated equipment and make critical decisions during construction. Hiring, training, and retaining those skilled workers is one of the biggest challenges contractors face today. Expanding trade programs that focus on underground

construction, equipment operation, and trenchless installation methods would be extremely beneficial. These programs could help develop a stronger pipeline of trained workers entering the field and ultimately improve overall project quality, reduce rework, and strengthen the industry as a whole.

"Trenchless construction remains both an art and a science."

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 has made meaningful progress in attracting young professionals, but there is still room for improvement. One organization that has done an exceptional job is the Underground Construction Association (UCA). Their "Down for That" program has become very successful under the leadership of Everett Litton and a dedicated team of industry champions across the country. These professionals are actively engaging students by organizing tunnel tours, guest lecturing at universities, and generally helping to expand awareness of underground construction and trenchless technologies.

While things are improving, the industry still faces a visibility challenge. Underground infrastructure, by nature, is out of sight, which makes it harder for students to recognize and connect with the work being done. In contrast, larger general contractors and engineering firms focused on transportation or vertical construction often recruit more effectively because students regularly see their logos on trucks, jobsites, and hard hats. Those visible reminders help create familiarity and interest.

One of the best opportunities to further engage students and young professionals is to strengthen relationships between industry professionals and universities. Having professional champions tied to specific school whether through regional proximity, alumni connections, or relationships with professors can make a significant difference. These individuals can provide guest lectures, mentor students, facilitate field visits, and introduce real-world trenchless applications into the classroom. Building those connections helps students better understand the industry and see trenchless as an exciting and viable career path within civil engineering and underground construction.

Biggest challenges facing the trenchless industry today?

Like many industries, one of the biggest challenges facing the trenchless industry today is managing the transition between generations of professionals. We are seeing many highly experienced individuals nearing retirement, and with them goes decades of practical knowledge gained through real-world projects. The challenge is not just retaining that knowledge but successfully transferring it to the next generation of engineers, operators, and field crews.

Trenchless construction, particularly new installations, is heavily driven by field decision-making. Crews and operators frequently have to respond in real time to changing ground conditions, equipment performance, and unforeseen obstacles. Much of this expertise comes from experience lessons learned through years of solving problems in the field. While education, training programs, and technology can support the industry, a large portion of this knowledge simply cannot be taught in a classroom, through a manual or ChatGPT..... It must be developed through hands-on work and mentorship from experienced professionals.

Skilled labor, particularly equipment operators, is another critical challenge. Trenchless equipment is highly specialized, and the success of a project often depends on the judgment and skill of the operator. Cross-training crews so that individuals understand multiple aspects of the operation from drilling to steering to fluid management is extremely valuable. However, there are only a limited number of contractors and consultants who consistently develop this depth of expertise. In many ways, trenchless construction remains both an art and a science, and very few would claim to have fully mastered it.

Has acceptance and understanding of trenchless technology improved?

Acceptance and understanding of trenchless technology have definitely improved over the years, but there are still challenges when it comes to educating owners, regulators, and even some engineers about the capabilities and limitations of the technologies.

One common challenge is helping clients understand where trenchless methods are appropriate and where they may not be the best fit. On one end of the spectrum, you may have an owner who assumes you can simply "drill" a 5,000-foot sewer line at a 0.025 percent grade without appreciating the technical challenges involved. On the other end, some owners are hesitant about a 1,000-foot drill under a creek even when that type of crossing is well within the capabilities of modern equipment and experienced contractors. Bridging that knowledge gap requires ongoing education and communication.

Material perception can create similar challenges. In HDD applications especially, some stakeholders remain apprehensive about pipe materials such as HDPE or FPVC because they remember a project that went sideways years ago. However, both pipe materials and installation practices have improved significantly. Pipe quality, fusion methods, and contractor experience have all advanced, making these systems more reliable than ever.

At the same time, regulatory environments continue to evolve. In many areas, restrictions are increasing, particularly around environmental protection. Just because something was done a certain way 20 years ago doesn't necessarily mean it can or should be done that way today.

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

Oh, where to start. There are many reasons I enjoy working in the trenchless technology field. One of the most interesting aspects is how many engineering disciplines come together on a single project. Even on one crossing, you may rely on geotechnical engineering to understand how the ground will behave during installation, mechanical engineering for the design and capabilities of the equipment, and material science for selecting the right pipe and tooling. There are many interconnected components that must come together for a project to succeed, which requires strong coordination and collaboration between engineers, contractors, manufacturers, and vendors.

That collaboration leads to another aspect: I truly enjoy the people in the trenchless industry. Because projects are complex and often high risk, there is a shared understanding that we all benefit when trenchless projects are executed successfully. A project gone bad reflects on the entire industry. Even competitors will often step in to help one another by providing equipment, expertise, or crews when needed. Of course, there is usually a price involved, but the willingness to help is still there.

I also believe this is an industry with long-term staying power. My dad was a traveling Yellow Pages salesman, and my mom worked as a reservationist for Trans World Airlines which are careers that no longer exist today. While trenchless technology will certainly continue to evolve and improve, as long as people need clean water and functioning sewer systems, there will be a need for the work we do.

Finally this is a high-risk, high-reward industry that isn't for everyone. It takes a certain type of person to enjoy solving problems in the field and managing that level of uncertainty. I guess I'm just one of those trenchless nerds who truly enjoys the work.

Close Tolerance Pipe Slurrification (CTPS):

The EPA Approved Trenchless Path Forward for Asbestos Cement Pipe at the End of Its Service Life

By: Andrew Costa, Vice President of Sales & Strategy - CTPS/Pressure Pipe, Azuria Water Solutions

Introduction

For much of the last half century, asbestos cement pipe (ACP) has occupied a difficult place in municipal infrastructure management. Installed extensively from the 1940s through the 1970s, ACP once represented innovation – lightweight, corrosion resistant, and cost effective. Today, it represents one of the most deferred and avoided segments of underground infrastructure, due primarily to the hazardous nature of the material and the regulations involved in disturbing it.

Across North America, over 600,000 miles of asbestos cement water, sewer, and storm pipe remain in service, often well beyond their intended design life. These assets are now failing at a time when regulatory oversight, public health awareness, and risk tolerance have fundamentally changed. For decades, owners and engineers delayed intervention, not because the problem was unknown but because the available solutions carried unacceptable environmental, regulatory, and community consequences.

Close Tolerance Pipe Slurrification (CTPS) was developed specifically to address this reality. It is a trenchless asbestos replacement process designed for the safe, controlled removal of asbestos cement pipe in compliance with modern environmental regulations. More importantly, it addresses the portion of buried infrastructure that has been avoided for years and has now reached the unavoidable end of its useful life.

CTPS and EPA Approval

Recognizing the need for a compliant trenchless alternative, the EPA reviewed and approved Close Tolerance Pipe Slurrification as an Alternate Work Practice (AWP) under the Asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP).

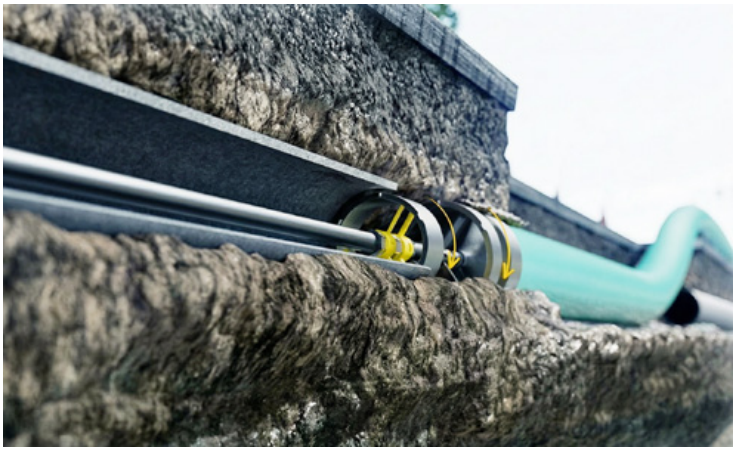

Figure 1. The CTPS process simultaneously grinds the existing pipe while pulling in new fused pipe

On May 30, 2019, the EPA formally approved CTPS as a method for removing and replacing asbestos cement pipe that is as protective of human health and the environment as traditional open cut removal. This approval has since been reaffirmed through subsequent EPA memoranda and state level regulatory guidance.

Importantly, CTPS is currently **the only EPA approved trenchless method** for asbestos cement pipe removal and replacement. Other trenchless methods – such as pipe bursting or breaking – have not received AWP approval and therefore cannot be used without triggering full asbestos NESHAP demolition and disposal requirements for active/inactive waste disposal sites (e.g., fencing, signage, burial requirements, and deed notification in perpetuity).

This distinction is not academic. It defines what engineers and utilities can ethically and legally permit, design, and construct.

Figure 2. Guide Reamer, Back Reamer (cutting head), and Pull Head/New Fused Pipe components of CTPS installation process

A Regulatory Line Has Been Drawn

Historically, some utilities relied on pipe bursting as a trenchless means of replacing asbestos cement pipe assets. While pipe bursting remains an excellent solution for other pipe materials, that option has now been effectively removed from the table for ACP assets.

The U.S. Environmental Protection Agency has clearly determined that pipe bursting of asbestos cement pipe renders the material friable, transforming it into Regulated Asbestos Containing Material (RACM) under the Asbestos NESHAP, 40 CFR Part 61. Once ACP is crushed or pulverized during bursting, it is subject to demolition and waste disposal requirements that make abandonment of the material in place non compliant. Once asbestos is made friable, it must be removed and disposed of in accordance with the asbestos NESHAP.

EPA guidance further clarifies that **ACP pipe bursting is not an approved Alternate Work Practice (AWP)** and that burying burst ACP in place constitutes an active asbestos waste disposal site under NESHAP. As a result, state environmental agencies now explicitly prohibit ACP pipe bursting or require full asbestos abatement procedures that eliminate its feasibility as a trenchless solution.

In April 2022, the EPA reiterated that approved methods for asbestos cement pipe replacement are limited to open cut removal, abandonment in place (without disturbance), and Close Tolerance Pipe Slurrification (CTPS). Pipe bursting was notably excluded, being listed as a "not-approved" process for AC pipe remediation.

For municipal owners and engineers, this represents a pivotal regulatory shift: the most commonly assumed trenchless replacement option for ACP is no longer permitted.

What Makes CTPS Different

CTPS is a process that specifically targets asbestos pipelines. The process removes existing asbestos cement pipe underground while maintaining a continuously wet environment, a fundamental requirement for handling asbestos containing material. The existing pipe is ground into a cementitious slurry that is removed from the ground in a controlled manner, while a new fused pipe is simultaneously pulled into place.

Because CTPS eliminates the uncontrolled crushing and dispersion of friable material associated with pipe bursting, the EPA determined that it does not create RACM left in place and fully encapsulates all asbestos fibers through the process. This finding is central to its regulatory acceptance. The removal of AC pipe from the ground is considered a superior option to abandoning in place, which still leaves deteriorating asbestos assets in the ground and brings future remediation considerations or potential removal legislation into play.

For engineers, CTPS provides a clear compliance pathway. For asset owners, it provides certainty that the selected method aligns with federal and state environmental requirements.

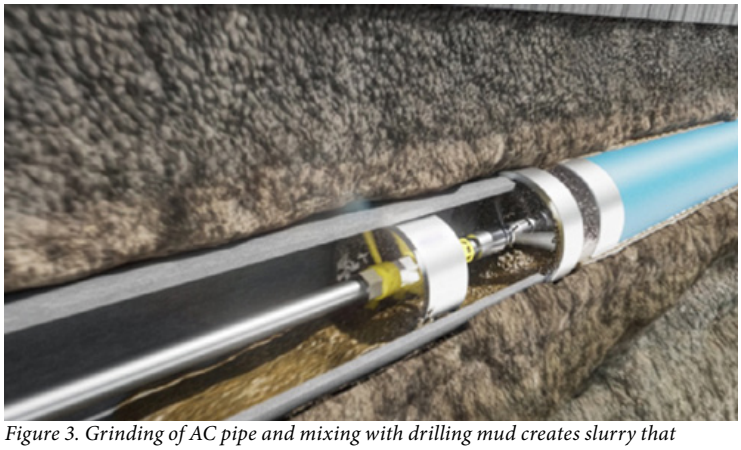

Figure 3. Grinding of AC pipe and mixing with drilling mud creates slurry that encapsulates all asbestos fibers during the process

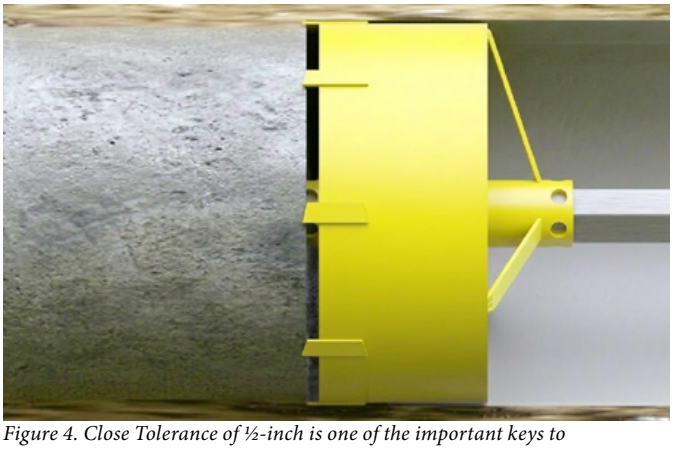

Figure 4. Close Tolerance of ½-inch is one of the important keys to the slurrification removal

Trenchless replacement of
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Figure 5. The slurry mix is vacuum excavated from the access pit and hauled away for disposal

Why This Matters Now

Most asbestos cement pipe installed in North America was designed for a service life of approximately 50-60 years. Much of that inventory has now exceeded that threshold. Break rates are increasing, emergency repairs are becoming more frequent, and the risk of continued deferral is worsening.

At the same time, regulatory agencies are no longer willing to accept "legacy practices" that disturb asbestos without clear, approved controls and that now violate updated regulatory guidelines. Utilities can no longer assume that trenchless methods traditionally used on other pipe materials will be permitted for ACP.

CTPS fills this gap. It allows owners to finally address high risk ACP segments, often located beneath major roadways, dense urban corridors, or environmentally sensitive areas without triggering the cascading impacts of open cut asbestos abatement.

Implications for Municipal Owners and Engineers

From an asset management perspective, CTPS changes the conversation around ACP.

Rather than categorizing asbestos cement pipe as a deferred or "last resort" asset class, utilities can now integrate ACP into capital improvement programs with an EPA approved trenchless solution. Engineers can design replacement projects knowing that the selected method has already been vetted at the federal level.

For municipalities facing consent decrees, regulatory audits, or increasing public scrutiny, CTPS offers a way to demonstrate proactive, compliant management of asbestos infrastructure rather than continued postponement.

Conclusion

Asbestos cement pipe has reached the end of its practical and regulatory tolerance. Pipe bursting is no longer an acceptable trenchless solution, and open cut removal remains costly, lengthy, disruptive, and involves heavy restoration and social impacts.

Close Tolerance Pipe Slurrification stands apart not simply as an emerging technology, but as **the only EPA approved trenchless method** for asbestos cement pipe replacement. It directly addresses the infrastructure that asset owners have avoided for decades and provides a path forward that aligns with modern environmental regulation, public health expectations, and municipal risk management.

For utilities confronting aging ACP networks, CTPS is no longer an alternative. It is the trenchless solution that regulatory reality has made necessary and is positioned to service the industry's AC pipe replacement needs.

Andrew Costa *has worked in the trenchless water/wastewater industry since 2006. He is currently the Vice President of Sales & Strategy for Azuria Water Solutions. His expertise in the water/wastewater markets includes CIPP rehabilitation, manhole rehabilitation, specialty coatings, carbon fiber remediation, geopolymer solutions, and Close Tolerance Pipe Slurrification (CTPS). Andrew currently serves on the NASTT Board of Directors and is actively involved in the SESTT regional chapter.*

Regulatory Timeline: ACP Remediation in the U.S.

- **1940s–1970s** – Asbestos cement pipe widely installed for water infrastructure
- **1980s** – ACP manufacturing discontinued; installed systems remain in service
- **2000s** – Utilities begin trenchless ACP replacement; regulatory clarity and enforcement limited
- **2019** – EPA approves Close Tolerance Pipe Slurrification (CTPS) as an Alternate Work Practice (AWP) under Asbestos NESHAP
- **2022** – EPA clarifies that approved ACP replacement methods are limited to open cut, abandonment in place, and CTPS, and lists pipe bursting as "not approved"
- **Today** – CTPS remains the only EPA approved trenchless method for ACP removal and replacement

North American Society for Trenchless Technology Appoints New Executive Director

Formal Introduction at the NASTT Annual General Meeting (AGM) Sunday, March 29, 4:00 pm

"Kim brings continuity, institutional knowledge, and a clear vision for the future."
– NASTT Board Chair Greg Tippett

Following a comprehensive and independent search process, the North American Society for Trenchless Technology (NASTT) is excited to announce the appointment of Kim Hanson PE as its next Executive Director.

Kim has served on the NASTT Board of Directors for more than three years, including as Secretary, and was recognized as NASTT's 2024 Volunteer of the Year. She has also contributed to both the Technical Program Committee and Planning Committee over multiple years. Her long-standing volunteer service not only reflects a strong understanding of NASTT's mission, culture, and strategic priorities, but also demonstrates her dedication and enthusiasm for its members and those they serve.

"Kim's dedication and leadership within NASTT make her exceptionally well-positioned to guide the organization forward. She brings continuity, institutional knowledge, and a clear vision for the future," said Board Chair Greg Tippett.

Kim will begin her role as Executive Director on March 23, 2026, stepping into the position ahead of NASTT's No-Dig Show in Palm Springs, CA.

Recognizing NASTT's significant growth, the Board has implemented an updated leadership structure intended to strengthen both the organization's internal operations and its engagement within the trenchless technology industry. Under this structure, the Executive Director will focus on strategic leadership and industry engagement.

To support this structure, Jessie Clevenger has been promoted to Vice President of Operations and Conferences, overseeing NASTT's operational functions and conference programs. In this role, Jessie will lead day-to-day organizational operations and event execution while working closely with the Executive Director.

The leadership change, along with Kim's formal introduction as the new Executive Director, will be presented during NASTT's Annual General Meeting (AGM) on Sunday, March 29. For questions, please contact NASTT at **info@nastt.org**.

About NASTT
The North American Society for Trenchless Technology (NASTT) is a not-for-profit professional organization dedicated to advancing the science and practice of trenchless technology. Founded in 1990, NASTT provides education, training, and industry events for infrastructure professionals across the United States, Canada, and Mexico, including the annual No-Dig Show and No-Dig North conferences. Learn more at **www.nastt.org**.


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NASTT NO-DIG SHOW 2026

Conference Showguide

NASTT 2026 NO-DIG SHOW | MARCH 29-APRIL 2 | PALM SPRINGS, CA

Visit **nastt.org/no-dig-show** to learn more

Call for Abstracts

SUBMISSION DEADLINE: June 30

The North American Society for Trenchless Technology (NASTT) is now accepting abstracts for its 2027 No-Dig Show in Raleigh, NC at the Raleigh Convention Center, March 21-25, 2027. 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 by June 30 online:

nastt.org/no-dig-show

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.

MARCH 29-APRIL 2 | PALM SPRINGS, CA
NASTT NO-DIG SHOW 2026

WELCOME Trenchless Colleagues!

Maureen Carlin, Garver
NASTT 2026 No-Dig Show
Planning Committee Chair

"I've been a member of NASTT since 2011 when I was a student, and I'm honored to be this year's Chair of the Show. This is going to be the premier event for No-Dig. I've been to 15 of these and this is looking to be the best of all of them! I'm super excited and proud to support the Western Region of NASTT and to explore all things trenchless in the desert!"

- Maureen Carlin, Ph.D. Trenchless & Tunneling Infrastructure Practice Leader, Garver, 2026 No-Dig Planning Committee Chair

The largest trenchless technology conference in the world returns to Palm Springs in 2026 for the first time since 2018! Known for its incomparable beauty and stunning scenery, Palm Springs is a unique and highly accessible destination for the world's premiere trenchless technology conference – the NASTT No-Dig Show. We are excited to join together in the beautiful Sonoran Desert to celebrate the continued growth of trenchless technology as the most cost effective and environmentally friendly approach to underground infrastructure construction.

The 2026 show promises to be the most successful yet, with 7 tracks of technical sessions over the course of three days, highlighting innovative trenchless projects and applications from around the world. A unique opportunity to connect with the Contractors, Manufacturers, Engineers, Educators, and Utility Owners who have helped shape the trenchless industry.

The pages following feature a comprehensive overview of the 2026 No-Dig Show including highlights of the key networking events, full technical program schedule, and the NASTT Awards celebrating the innovators, champions, volunteers and emerging leaders including the Hall of Fame inductee. Enjoy and 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.

The NASTT No-Dig Show is returning to Palm Springs for the first time since 2018!

The overall No-Dig program is focused on one objective: helping you maximize your investment in trenchless technologies, services and applications. Enjoy the show!

- EVENTS & NETWORKING SYNOPSIS
- NETWORKING HIGHLIGHTS
- TECHNICAL PROGRAM SCHEDULE GRID
- NASTT AWARDS PROGRAM
- CHAIR AWARD FOR DISTINGUISHED SERVICE
- HALL OF FAME INDUCTEES

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.

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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 Trenchless Classic on Tuesday, March 31

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 Trenchless Classic on Tuesday, March 31.

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 General Session & Awards Ceremony on Monday March 30.

NASTT Volunteer Award

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 General Session & Awards Ceremony on Monday March 30.

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 at the General Session & Awards Ceremony on Monday March 30.

No-Dig Show Events & Networking *Synopsis*

Saturday, March 28, 2026

NASTT Board Meeting
8:00 AM – 3:00 PM – Mesquite C

Sunday, March 29, 2026

Attendee & Exhibitor Registration
7:00 AM – 5:00 PM – Lobby Registration Area

NASTT Golf Tournament
8:00 AM – 2:00 PM - Offsite: Cimmaron Golf Course

Introduction to Trenchless Technology – New Installations
8:00 AM – 12:00 PM – Mohave

Introduction to Trenchless Technology – Rehabilitation
8:00 AM – 12:00 PM – Catalina

NASTT Chapter Chair and Vice Chair Meeting
12:00 PM – 1:00 PM – Mesquite E

Pipe Bursting Center of Excellence
12:00 PM – 1:00 PM – Pasadena

Western Chapter Meeting
3:00 PM – 4:00 PM - Mesquite C

Midwest Board & Chapter Meeting
3:00 PM – 4:00 PM - Mesquite D

Rocky Mountain Chapter Meeting
3:00 PM – 4:00 PM - Mesquite E

Pacific Northwest Chapter Meeting
3:00 PM – 4:00 PM - Mesquite F

Northeast Chapter Meeting
3:00 PM – 4:00 PM - Mesquite G

Southeast Board & Chapter Meeting
3:00 PM – 4:00 PM - Mesquite H

Annual General Meeting
(Current NASTT Membership Required)
4:00 PM – 5:00 PM - Mohave

Student Orientation Meeting
4:00 PM – 5:30 PM – Catalina

Party in the Palms *(Ticketed Event)*
5:00 PM – 7:00 PM – Renaissance East Pool Deck

NASTT Past Chair Dinner *(Private Ticketed Event)*
7:00 PM – 10:00 PM – Offsite

Monday, March 30, 2026

Attendee & Exhibitor Registration
7:00 AM – 5:00 PM – Lobby Registration Area

General Session & Awards Ceremony
(Pre-registration Required)
8:00 AM – 10:15 AM - Primrose Ballroom

Technical Paper Session (Tracks 1-7)
10:30 AM – 11:55 AM - (see pgs 28-29)

Exhibit Hall Ribbon Cutting Ceremony
12:00 PM – 12:10 PM – Lobby Registration Area

Exhibit Hall Open & Lunch
12:10 PM – 2:30 PM – Oasis Halls

Trenchless Research Competition
12:30 PM – 2:30 PM – Oasis Halls

Technical Paper Session (Tracks 1-7)
2:30 PM – 3:55 PM - (see pgs 28-29)

Exhibit Hall Open
4:00 PM – 6:30 PM – Oasis Halls

Underground Mixer – Networking Event
5:30 PM – 6:30 PM – Oasis Halls

Tuesday, March 31, 2026

Attendee & Exhibitor Registration
7:00 AM – 5:00 PM – Lobby Registration Area

Morning Wake Up Station
7:30 AM – 8:30 AM - Renaissance Ballroom Foyer

Technical Paper Sessions (Tracks 1-7)
8:00 AM – 10:55 AM - (see pgs 30-31)

Exhibit Hall Open & Lunch
11:00 AM – 1:30 PM – Oasis Halls

Technical Paper Sessions (Tracks 1-7)
1:00 PM – 2:55 PM - (see pgs 30-31)

Exhibit Hall Open
3:00 PM – 5:00 PM – Oasis Halls

Trenchless Classic *(Ticketed Event)*
6:00 PM – 10:00 PM – Jackie Lee Houston Plaza

Wednesday, April 1, 2026

Attendee & Exhibitor Registration
7:00 AM – 12:00 PM – Lobby Registration Area

Morning Wake Up Station
7:30 AM – 8:30 AM - Renaissance Ballroom Foyer

Technical Paper Sessions (Tracks 1-7)
8:00 AM – 9:55 AM - (see pgs 32-33)

Exhibit Hall Open & Lunch
9:00 AM – 12:00 PM – Oasis Halls

South Central Chapter Meeting
12:00 PM – 1:00 PM - Mesquite F

Mid Atlantic Board & Chapter Meeting
1:00 PM – 2:00 PM - Mesquite H

CIPP Good Practices Course
1:00 PM – 5:00 PM – Mohave

HDD Good Practices Course
1:00 PM – 5:00 PM – Catalina

New Installation Methods Good Practices Course
1:00 PM – 5:00 PM – Madera

Direct Steerable Pipe Thrusting Good Practices Course
1:00 PM – 5:00 PM – Sierra/Ventura

Thursday April 2, 2026

CIPP Good Practices Course (Continued)
8:00 AM – 12:00 PM – Mohave

HDD Good Practices Course (Continued)
8:00 AM – 12:00 PM – Catalina

New Installation Methods Good Practices Course (Continued)
8:00 AM – 12:00 PM – Madera

Direct Steerable Pipe Thrusting Good Practices Course (Continued)
8:00 AM – 12:00 PM – Sierra/Ventura

MARCH 29-APRIL 2 | PALM SPRINGS, CA

NO-DIG SHOW 2026

nastt.org/no-dig-show

The NASTT No-Dig Show offers numerous **networking events** and a chance to enjoy a little fun with industry leaders in addition to extensive track sessions, educational opportunities and exhibit floor.

NASTT Golf Tournament

(SOLD OUT!!!)

Sunday, March 29
8:00 AM – 1:30 PM
Cimmaron Golf Course – Palm Springs, CA

Party in the Palms

(Ticketed Event)

Sunday, March 29
5:00 PM – 7:00 PM
Renaissance East Pool Deck

General Session & Awards Ceremony

(Pre-registration Required)

Monday, March 30
8:00 AM – 10:15 AM
Primrose Ballroom

Ribbon Cutting Ceremony & Exhibit Hall Opening

Monday, March 30
12:00 – 12:10 PM
Lobby Registration Area

Underground Mixer – Networking Event

Monday, March 30
5:30 – 6:30 PM
Oasis Halls

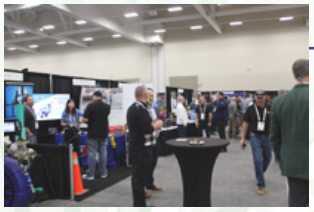


Exhibit Hall Social Hours

(Cash Bars)

Tuesday, March 31
3:00 – 5:00 PM
Oasis Halls

Trenchless Classic

(Ticketed Event)

Tuesday, March 31
6:00 – 10:00 PM
Jackie Lee Houston Plaza Outdoor Event Space

NETWORKING EVENTS | EXHIBIT HALL | TECHNICAL SESSIONS

MARCH 29-APRIL 2 | PALM SPRINGS, CA
NASTT NO-DIG SHOW 2026

Maximize Your Experience at the NASTT No-Dig Show

Attending a trenchless technology conference is an invaluable opportunity to expand your knowledge, discover new innovations, and connect with industry professionals. To get the most out of your experience, it's essential to approach the event with a strategy. Here are some key tips to ensure you make the most of your time at the conference.

1. Plan Ahead
Before the conference begins, review the schedule and select sessions that align with your interests and professional goals. Prioritize technical presentations, panel discussions, and workshops that offer insights into the latest trenchless methods, materials, and case studies. The NASTT No-Dig Show offers a mobile app and an online schedule—use them to organize your itinerary.

2. Engage in Technical Learning
Trenchless technology is constantly evolving, and the No-Dig Show provides a platform to stay updated on the latest trends and advancements. Attend technical sessions and take notes on innovative techniques, best practices, and emerging challenges in the field. If a speaker mentions a resource or reference, follow up with additional research to deepen your understanding.

3. Participate in Hands-On Demonstrations
Many exhibitors will feature live demonstrations of trenchless equipment and methods. These sessions offer a valuable chance to see technology in action and ask experts about real-world applications. Take advantage of these opportunities to understand new machinery, tools, and materials up close.

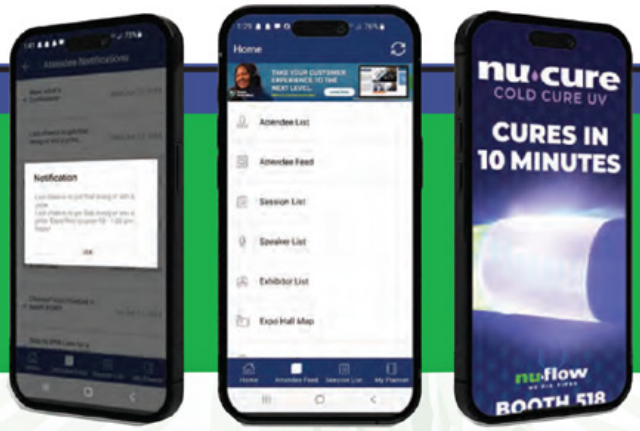
4. Network with Industry Professionals
One of the greatest benefits of attending the No-Dig Show is the chance to connect with peers, industry leaders, and potential business partners. Strike up conversations during networking events, social gatherings, and exhibit hall visits. Bring plenty of business cards and follow up with new contacts after the event to maintain relationships.

5. Visit the Exhibit Hall
Exhibitors showcase cutting-edge products, services, and innovations in trenchless technology. Take time to explore booths, ask questions, and gather materials from companies offering solutions relevant to your work.

6. Engage on Social Media
Join the conversation on LinkedIn by tagging North American Society for Trenchless Technology (NASTT) on the platform. Share insights, connect with other attendees, and stay informed about real-time updates.

By preparing in advance, engaging in technical sessions, and actively networking, you can maximize the value of attending a trenchless technology conference and stay ahead in the industry.

DOWNLOAD THE SHOW APP!



Visit nastt.org/no-dig-show/show-app/ for more info!

NASTT 2026 No-Dig Show Technical Program

Monday March 30 - Morning

Schedule accurate at time of printing. For the most up to date information download the conference app

TRACK ▪ ROOM	TRACK 1 ▪ MOHAVE	TRACK 2 ▪ CATALINA	TRACK 3 ▪ MADERA
TRACK TITLE	Microtunneling	HDD	Emerging Technologies
10:30-10:55	MM-T1-01 Design of the Lower Alemany Area Stormwater Improvements Project in San Francisco, California	MM-T2-01 Using All the Tools in the Trenchless Toolbox: Navigating Karst and Site Constraints for a Large-Diameter Water Pipeline Project	MM-T3-01 Bridging the Experience Gap: How Common Controls and Onboard Automation are Redefining the HDD Operator Role
11:00-11:25	MM-T1-02 Ducking Pitfalls at West Windsor's 48-Inch Interceptor Sewer	MM-T2-02 Quantifying the Pull and Thrust Resistance of Deadman Anchors: A Design Framework for HDD Operations	MM-T3-02 Utah Pipe Ramming with the Permalok® PR Joint – A Case Study on Improved Production
11:30-11:55	MM-T1-03 Cost-Effective Microtunneling to Minimize Community and Environmental Impacts: College Hill 7.5 MG Storage Tanks Project	MM-T2-03 18,000 of HDD Sewer Force Main Installation in Valdez, Alaska (Design, Construction, Lessons Learned)	MM-T3-03 Close Tolerance Pipe Slurrification (CTPS) Case Study 30,000+ LF of AC Pipe Replaced Using the Award-Winning and EPA-Approved CTPS Method.

Monday March 30 - Afternoon

TRACK ▪ ROOM	TRACK 1 ▪ MOHAVE	TRACK 2 ▪ CATALINA	TRACK 3 ▪ MADERA
TRACK TITLE	Pipe Jacking	HDD	HDD/Wind
2:30-2:55	MA-T1-01 Trenchless Tactics with Big Impact on the Big Creek Tunnel Project	MA-T2-01 Estimating Rock Penetration Rate For HDD	MA-T3-01 Advanced Trenchless Construction for the Coastal Virginia Offshore Wind (CVOW) Project
3:00-3:25	MA-T1-02 Pollution Reduction Through Microtunneling at the Westchester Pumping Station	MA-T2-02 Owner's Perspective: Trenchless Construction and Collaborative Project Delivery to Create a New Water Supply for East San Diego County	MA-T3-02 Innovative Shore Approach HDD Successfully Installs Conduits for Future Wind Farm
3:30-3:55	MA-T1-03 Efficient and eco-friendly installation of district heating lines in urban area by long and compound Microtunnelling (case study)	MA-T2-03 Using Trenchless Technologies to Underground Electric Power Lines for Resilient Communities	

NASTT 2026 No-Dig Show Technical Program

TRACK 4 ▪ PASADENA	TRACK 5 ▪ SIERRA/VENTURA	TRACK 6 ▪ SMOKETREE CDE	TRACK 7 ▪ SMOKETREE AB
Auger Boring	**CIPP**	**Water Main Rehabilitation**	**Project Planning & Delivery**
MM-T4-01 Short Crossings Have Problems Too	**MM-T5-01** Navigating Construction Challenges in Large Diameter Pressure CIPP Lining: A Case Study from OC San's 7-65 Project	**MM-T6-01** Advances in Spray in Place Pipe (SIPP) Materials for Water main Rehabilitation	**MM-T7-01** Threading the needle... Tight planning and execution of a short but challenging HDD in an existing USACE easement
MM-T4-02 Geotechnical Baseline Report Usage and Construction Challenges with a 400+LF Guided Auger Bore beneath an airport taxiway	**MM-T5-02** Experience Leads to Success on Challenging 54-inch UV CIPP Installations In North Carolina	**MM-T6-02** Reinforcing the Rockies: Carbon Fiber Repair of the Homestake Transmountain Pipeline	**MM-T7-02** Building Trenchless Mega Projects: Lessons in Multi-Rig Planning, Execution, and Risk Management
MM-T4-03 Lessons Learned from a $2.2 Million with 50% in Change Orders	**MM-T5-03** Aggarwal & Cooper to Present Day and Beyond- Flexible Close-Fit Liner Design on the Planet Earth and a little more	**MM-T6-03** Unlocking the Full Potential of Spray-In-Place Polymeric (SIPP) Liners: Addressing Industry Gaps and Advancing Standardization Through ASTM F3182 Revision	**MM-T7-03** Trenchless in Northern California's Telecom Valley: the Petaluma PIPS Parallel Forcemain

TRACK 4 ▪ PASADENA	TRACK 5 ▪ SIERRA/VENTURA	TRACK 6 ▪ SMOKETREE CDE	TRACK 7 ▪ SMOKETREE AB
Rehabilitation	**Condition Assessment**	**Manhole**	**Annual Contractor Forum**
MA-T4-01 "Bridging the Gap" Proactive Bypass Planning and the Execution for Large-Diameter Sewer Rehabilitation	**MA-T5-01** Fayetteville PWC 20-inch Force Main Condition Assessment	**MA-T6-01** From Assessment to Action: Customized Manhole Rehabilitation Strategies	**MA-T7-01-03** Annual Contractor Forum
MA-T4-02 Advances in SIPP Design and Service Capabilities	**MA-T5-02** Case Study: Incorporating In-line Pipe Inspection Data into Trenchless Pressure Pipe Rehabilitation Planning	**MA-T6-02** Greeneville Sanitary Sewer Rehabilitation	
MA-T4-03 Pump Station Pipeline Inspections Using Rope Access	**MA-T5-03** The Role of Artificial Intelligence in Sewer Condition Assessment Programs: How to Incorporate AI into Your Workflow and Lessons Learned	**MA-T6-03** Utilization of Fiber Reinforced Polymers (FRP) – The Final Piece in the Evolution of Manhole Rehabilitation	

NASTT 2026 No-Dig Show Technical Program

Tuesday March 31 - Morning

TRACK ▪ ROOM	TRACK 1 ▪ MOHAVE	TRACK 2 ▪ CATALINA	TRACK 3 ▪ MADERA
TRACK TITLE	DSTP/Direct Pipe	HDD/Project Planning & Delivery	Trenchless 101-106
8:00-8:25	TM-T1-01 A Project-Tailored Direct Pipe® Strategy for a Challenging Shore Approach Installation	TM-T2-01 Boring Through Barriers: A Railroad Crossing Rescued by Horizontal Hammer Boring	TM-T3-01 It's More than Just a Line on the Page: Important Distinctions of Trenchless Design
8:30-8:55	TM-T1-02 Multiple 48-inch Trenchless Crossings in Texas	TM-T2-02 Drilling Through Downtown: HDD Solutions Under Denver's Urban Core	TM-T3-02 Why "No Geotech" Is Not a Value Engineering Strategy
9:00-9:25	TM-T1-03 Latest trends and special use cases in Direct Pipe	TM-T2-03 HDD Curve Geometry in Practice: Avoiding Compound Curves and Risky Alignments	TM-T3-03 Common Trenchless Differing Site Conditions – A Colorado Front Range Case History
9:30-9:55	TM-T1-04 Collaborative Solutions for Complex Infrastructure: Trenchless Delivery of the Tri-City WRRF Outfall	TM-T2-04 Trenchless Under Pressure: Delivering HDD Success Beneath the Coachella Valley Stormwater Channel	TM-T3-04 Power Up to Increase Chances of Successful Hard-Rock HDD's
10:00-10:25	TM-T1-05 Finite Element Analysis of Fusible PVC for Direct Pipe Application	TM-T2-05 Navigating an Underwater Rollercoaster Through Long Island – Connecting Long Beach to the South Shore WRF with HDD	TM-T3-05 Vacuum Microtunnelling vs Open Cut: A Smarter Approach to Gravity Sewer Installation
10:30-10:55	TM-T1-06 Innovative Trenchless Technologies Allow for the Successful Crossing of the Willamette River		TM-T3-06 ASTM F3706 - Reviewing the Key Points of the Newly Published ASTM Standard for Spray Applied Mortar Linings

Tuesday March 31 - Afternoon

TRACK ▪ ROOM	TRACK 1 ▪ MOHAVE	TRACK 2 ▪ CATALINA	TRACK 3 ▪ MADERA
TRACK TITLE	Large Diameter Tunneling	HDD/Oil/Gas Transmission	Geotechnical Issues
1:00-1:25	TA-T1-01 Tunneling & HDD Integration in El Paso, Texas – A Collaborative Success	TA-T2-01 A Short Story of a Long Mississippi River Crossing	TA-T3-01 Prior to Launch – Installation of Ground Support/Modification for MTBM Launching and Retrieval on the Southerly Tunnel Project
1:30-1:55	TA-T1-02 Boxed In, Moving Forward: Structural Jacking of Large Precast Tunnels Under Live Rail and Road Networks for Strategic Urban Crossings	TA-T2-02 Challenging HDD Crossing in Northern Alberta: NPS 48 Product Pipe Installation with over 70m (230 ft) in Elevation Change	TA-T3-02 Encountering Flowing Non-plastic Silts and Fine Sand Conditions in a Utility Laden Hand Mining Operation on the Shoreline Storage Tunnel.
2:00-2:25	TA-T1-03 Creating Ground Improvement Zones within Glacial Soils for the Lower Olentangy Tunnel – Columbus, OH	TA-T2-03 Changing Paradigms: A New Approach to Overcut and Reaming Diameters for HDD Installations	TA-T3-03 Type II Differing Site Conditions - Theory and Application to Trenchless Work
2:30-2:55	TA-T1-04 Going Deep, Saving More: A Tunnel Deep Under the Heart of Texas	TA-T2-04 From Regulation to Reality: Navigating FERC Noise Requirements in Trenchless Construction	TA-T3-04 Compound Centipede-Root-Vortex Mechanisms for Next-Generation Micro-Tunneling Devices

NASTT 2026 No-Dig Show Technical Program

TRACK 4 ▪ PASADENA	TRACK 5 ▪ SIERRA/VENTURA	TRACK 6 ▪ SMOKETREE CDE
Wastewater Pipeline Rehabilitation	**CIPP**	**Asset Management**
TM-T4-01 Collaborative Delivery and Innovation Pass the Test of an At-Risk Wastewater Interceptor Rehabilitation Challenge	**TM-T5-01** A safer, Easier Liquid Initiator System for CIPP applications	**TM-T6-01** So we have a Pipe Rehabilitation Strategy- now what? Adapting Seattle's Wastewater Rehabilitation Capital Improvements Plan in a Changing Market
TM-T4-02 Construction Challenges of Pressure Lining Wastewater Pipelines and Facilities	**TM-T5-02** Ultra-Violet Cured-In-Place-Pipe Lining of Deer Creek Trunk, a Large Diameter Sewer with Complex Site Constraints	**TM-T6-02** New Resiliency in an Old Inter-Agency Sewage Collection System
TM-T4-03 Formidable Geography & Emergency Drought Conditions for a 9,100-ft Pressure Pipeline Trenchless FFRP Rehabilitation	**TM-T5-03** Building Capacity and Resilience: City of Chandler's Largest Sewer Interceptor Rehabilitation in a Thriving Business District	**TM-T6-03** Going Beyond CCTV Images: Case Studies on Bringing Engineering into Sewer Condition Assessment
TM-T4-04 Wilkes-Barre, Pennsylvania Sewer Spiraling Under Control	**TM-T5-04** Decision Making Framework for Selecting CIPP Design Standards in Sewer Pipe Rehabilitation	**TM-T6-04** Leveraging a High-Resolution Force Main Inspection for Selective Flexible Fabric-Reinforced Rehab
TM-T4-05 Evaluating Ultrasonic Inspection of Wastewater Force Mains: Case Study from Massachusetts	**TM-T5-05** Lining Charlotte's 78" Sewer: 64 Feet Deep, ½-Mile Between Manholes, Bridges Over Roads, Busy Shopping Mall, and 57 MGD	**TM-T6-05** Developing a Regionally Adaptable Cost Estimation Guide for Pipeline Renewal and Replacement Using Trenchless Technologies
TM-T4-06 Testing the Enhanced Structural Capability of Polymeric Lined Reinforced Concrete Pipes by Three-Edge Bearing Test	**TM-T5-06** Overcoming Design and Delivery Challenges in Gravity and Pressure CIPP Applications	**TM-T6-06** Preserving Mid-Century Water Infrastructure: CFRP Upgrade of a 1949 Cast Iron Pipe Beneath Cedar Springs Road Culvert

TRACK 4 ▪ PASADENA	TRACK 5 ▪ SIERRA/VENTURA	TRACK 6 ▪ SMOKETREE CDE	TRACK 7 ▪ SMOKETREE AB
Wastewater Pipeline Rehabilitation/CIPP	**Sliplining**	**Trenchless Research**	**POY**
TA-T4-01 Accelerated Sewer Infrastructure Rehabilitation: Renewing Infrastructure and Reduce CSOs	**TA-T5-01** Getting another 100 years of Life out of the Sunrise Highway Aqueduct for the Bay Park Conveyance Project	**TA-T6-01** Enhancing Buckling Stability of PE Liners in Insertion-Lining Applications: Effects of Spacer Configuration Under External Grouting Pressure	**TA-T7-01** Trenchless Technology New Installation Project of the Year: Champlain Hudson Power Express (CHPE) Terrestrial Project – Trenchless Crossings
TA-T4-02 Revitalizing Joliet's Century-Old Sanitary Sewer with CIPP Lining Technology	**TA-T5-02** The Tale of Two Cities and a Large Diameter Deteriorated Pipe with In-Line Geometric Transitions Continued….	**TA-T6-02** The Effect of Porosity & Degree of Cure in Needled Felt CIPP on Short-Term and Long-Term Flexural Properties	**TA-T7-02** Trenchless Technology Rehabilitation Project of the Year: North Outfall Sewer (NOS) Unit 10, Los Angeles
TA-T4-03 100 Miles of Sewer Rehabilitation in Less than Four Years	**TA-T5-03** Slipline Replacement Accelerates Hibbing's Pipe Replacement Schedule	**TA-T6-03** Dewatering, Elliptical Shafts, and Unfavorable Ground during Municipal Micro-Tunneling, in the Twin Cities, Minnesota	**TA-T7-03** George T. Lohmeyer WWTP Force Main Microtunnel through a Needle
TA-T4-04 A Marsh-Velous Adventure! - Cohasset, MA Coastal Resiliency Sewer Improvements	**TA-T5-04** Avoiding Major Disruption within Boston Common through Pipelining Technology	**TA-T6-04** The Variability of Flexural Properties Within CIPP Field Samples	**TA-T7-04** Utility-Focused Innovations in PCCP Inspection: Multi-Sensor Data with Operational Benefits

Wednesday April 1 - Morning

TRACK ▪ ROOM	TRACK 1 ▪ MOHAVE	TRACK 2 ▪ CATALINA	TRACK 3 ▪ MADERA
TRACK TITLE	Microtunneling/Project Planning & Delivery	HDD/Geotechnical Issues	Pipe Bursting
8:00-8:25	WM-T1-01 Digging Deep for Calgary's Future: 11-year Inglewood Sanitary Trunk Project is Now Complete	WM-T2-01 Revisions to the Delft Equation and the Implications on Electrical HDD Design	WM-T3-01 Rewriting History Underground Using Pipe Bursting
8:30-8:55		WM-T2-02 Design Challenges and Engineering Solutions for a 54-inch Horizontal Directional Drill (HDD) Transition from Soft Ground to Rock	WM-T3-02 Planning and Design of Urban Underground Pipelines Installation using Pipe Bursting Trenchless Construction Method
9:00-9:25	WM-T1-03 Squeezing the Pot: Maximizing Value Through CMAR Engagement	WM-T2-03 Keeping Cool Under the Aqua Fria: Design and Construction of Two HDD Crossings in Challenging Ground Conditions in Arizona	WM-T3-03 No Dig, No Disruption: Sewer Upsizing on a High-Traffic Artery
9:30-9:55	WM-T1-04 Microtunneling Beneath the Tualatin River for a New Seismically Resilient Water Line	WM-T2-04 Constructing with Surgical Accuracy: Overcoming Subsurface and Spatial Constraints on the Venetian Causeway	WM-T3-04 Fast-Track Fix: Accelerated Water Main Rehab with Pipe Bursting & FFRP

TRACK 4 ▪ PASADENA	TRACK 5 ▪ SIERRA/VENTURA	TRACK 6 ▪ SMOKETREE CDE	TRACK 7 ▪ SMOKETREE AB
Stormwater Rehabilitation	**CIPP**	**Inspection**	**Project Planning & Delivery**
WM-T4-01 From Collapse to Comeback: Trenchless Triumph in a 12-Foot CMP Catastrophe	**WM-T5-01** Air Quality Monitoring During CIPP Rehabilitation: Assessing VOC Emissions for Water Pipe Projects Using Hot Water Curing	**WM-T6-01** CCTV of Pressurized Water Mains? Why This Is Now an Important Tool in the Water Industry Condition Assessment Toolbox!	**WM-T7-01** Understanding Pressure Pipe Rehabilitation Design and Needs
WM-T4-02 Pipe Ramming Selected for Replacing Two Failing 72-inch CMPStorm Drains Under San Pablo Dam Road	**WM-T5-02** Emergency CIPP Rehabilitation of a 30-inch PCCP Water Main Beneath CSX Rail in Anacostia Park	**WM-T6-02** Mitigating Risk Through Condition Assessment The L-301 PCCP1	**WM-T7-02** To Bid or Not to Bid. Why is This Still a Question for Specialty Trenchless Construction?
WM-T4-03 A Time-Critical SAPL Culvert Rehab in Alaska	**WM-T5-03** Oregon's Forgotten Infrastructure Using Trenchless Technologies to Repair Oregon's Aging Culverts	**WM-T6-03** Shaping Tomorrow's Pipes Today: CIPP Lining of Elliptical HDPE in Omaha	**WM-T7-03** Owner Insights on Delivering a Progressive Design-Build MTBM Outfall: Lessons from the Tri City Outfall Project
WM-T4-04 Structural Rehabilitation of Large Concrete Culvert Sections of Strawberry Creek in Berkely CA with Inspection, Design, Enviromental Permitting to Installation	**WM-T5-04** Implementation of Trenchless Under an Active Rail System – Central Business District (CBD) Sewer Rehabilitation Units 13 and 14	**WM-T6-04** Historic Combined SewerSevere Invert Loss, Imminent Failure Grade, Structural Integrity Maintained	**WM-T7-04** From Battlefield to Bore Path: Applying Military Supply Chain Models to HDD Rig Sustainment in Upstate New York

2026 No-Dig Show Planning Committee

Maureen Carlin (CHAIR)
Garver

Brian Avon
Carollo

Kim Hanson
NASTT

Mike Jaeger
Tanner Pacific

Marya Jetten
AECOM

Chris Knott
BT Construction

Andrea Long
City of Aurora

Rick Melvin
TT Technologies

Tiffanie Mendez
Sunbelt Rentals

Drew Sparks
Laney Directional Drilling

Craig Vandaelle
Michels

Ryan Ward
J.D. Hair & Associates

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Maureen Carlin
Garver

Norman Chen
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Brad Conder
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Insituform Technologies

Andrew Costa
Azuria Water Solutions

Jake Crowe
Hinterland Group Inc

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FER-PAL Infrastructure

Anil Dean
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Brian Dorwart
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World HQ

Chris Knott
BT Construction

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College of Computing,
Engineering and Construction

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Phill Perron
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Ragula Tech

Kaleel Rahaim
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Inland Empire Utilities Agency

Sam Wilbur
Delve Underground

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WSP

Blake Wyatt
Sunbelt Rentals, Inc.

■ Chair ■ Vice Chair ■ Track Leaders

Celebrate Trenchless Awards
Outstanding Trenchless Leadership

NASTT Celebrate Trenchless Awards recognize the exemplary efforts, dedication and stellar achievements of individuals and companies that contribute time, energy, creativity and intellect to developing and advancing trenchless technology.

The awards celebrate innovators, champions, volunteers, emerging leaders and the employers who support them in their exceptional contributions to driving industry progress. NASTT applauds their ongoing initiatives which promote the best practices, cost savings, sustainability, efficiency, and versatility of trenchless technology.

- **Chair Award for Distinguished Service**
- **Volunteer Award**
- **Ralston Young Trenchless Achievement Award**
- **Abbott Innovative Products & Services Finalists**
- **NASTT Hall of Fame**

Celebrate Trenchless Award recipients are recognized at the NASTT No-Dig Show and promoted through NASTT communication outlets which include nastt.org, social media, NASTT E-News, and NASTT's Trenchless North America.

For more information and to find out how to apply or nominate a deserving candidate, visit:

www.nastt.org/awards

CINDY PREUSS P.E.
Associate Water Conveyance Practice Leader
CDM Smith

Chair Award for Distinguished Service

The North American Society for Trenchless Technology (NASTT) is proud to present Cindy Preuss, P.E., Associate Water Conveyance Practice Leader at CDM Smith, with the NASTT Chair Award for Distinguished Service. This prestigious award recognizes trenchless professionals whose meritorious and prominent service to NASTT and the North American trenchless industry is marked by consistent engagement, impactful leadership, and an enduring commitment to the association and its members.

Cindy returned from vacation to a busy schedule of meetings, only to receive the news of her award. "Really? I'm so honored. Really?" she said. For members whose passion for the industry drives their engagement, such recognition can be both humbling and unexpected.

The Chair Award for Distinguished Service celebrates members like Cindy whose dedication, leadership, and selfless service strengthen NASTT, advance the trenchless industry, and inspire others to follow their example. 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.

"Over the years, I've seen Cindy step up time and time again with enthusiasm and energy that inspires others to get involved. We have a lot of great members who serve NASTT, but Cindy's contributions to the No-Dig Show, technical programs, the Abbott Award for Innovation, the WESTT Regional Chapter and more will truly leave a legacy."

– Greg Tippett, P.Eng., Chair, 2026 Board of Directors

Chair Award for Distinguished Service Recipients:

2004	Trent Ralston	2013	Richard Thomasson	2020	Greg Tippett
2005	Bernard (Bernie) P. Krzys	2014	Chris Brahler	2021	John Matthews. Ph.D.
2006	Tom Iseley	2015	Dave Krywiak	2022	Tiffanie Mendez
2008	William (Bill) W.S. Gray	2016	Derek Potvin	2023	Craig Vandaelle
2009	Raymond (Ray) L. Sterling	2017	Jim Rankin	2024	Babs Marquis
2010	Marlin Gonzales	2018	Kimberlie Staheli	2025	Chris Knott
2011	Jim Hoggatt	2019	Frank Firsching	2026	Cindy Preuss
2012	John Hemphill				

CHRIS KNOTT
Director of Business Development and Estimating
BTrenchless

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. Selected by NASTT staff.

The North American Society for Trenchless Technology (NASTT) is proud to announce Chris Knott, Director of Business Development and Estimating at BT Construction, as the recipient of the NASTT Volunteer Award. This award recognizes members who exemplify NASTT's mission, vision and core values, demonstrating extraordinary commitment through outstanding volunteer service and steadfast support of NASTT programs and operations over the past year.

As NASTT expands its relationships with organizations such as NUCA, staff noted that "Chris contributes innovative ideas and rolls up his sleeves to turn them into action."

All staff agreed that what sets Chris apart is not just his reliability, but the spirit in which he serves. He consistently goes above and beyond to support NASTT programs, members, and the team. His volunteerism is steady, generous and impactful, strengthening every initiative he touches. Staff summed up with "What's great about Chris is he has always been a great volunteer. This year, he's been exceptional."

The NASTT Volunteer Award celebrates members like Chris who embody the heart of the association through selfless service and dedication to advancing the trenchless technology industry.

"Chris has been instrumental in supporting the NASTT team throughout the past year. From chairing the Denver No-Dig Planning Committee to championing the profession and consistently checking in with staff during No-Dig North, his leadership and sincerity have been energizing and deeply appreciated."
– NASTT Staff

"What's great about Chris is he has always been a great volunteer. This year, he's been exceptional."
– NASTT Staff

"Chris contributes innovative ideas and rolls up his sleeves to turn them into action."
– NASTT Staff

Volunteer Award Recipients:

2021	Jeff Maier	2023	Brian Avon	2025	Kim Hanson
2022	Edward Alan Ambler	2024	Craig Vandaelle	2026	Chris Knott

GLEN WHEELER
Chief Tunnel Engineer
J.W. Fowler

NASTT Ralston Young Trenchless Achievement Award

The North American Society for Trenchless Technology (NASTT) is proud to present Glen Wheeler, Chief Tunnel Engineer at J.W. Fowler, with the Ralston Young Trenchless Achievement Award. This award recognizes talented members under 36 who have demonstrated excellence early in their careers through significant contributions to the trenchless technology industry, noteworthy professional success, and active participation in NASTT and its regional or student chapters. With their talent and ability, recipients are recognized as the future leaders of the trenchless industry.

From his start as J.W. Fowler's first college intern, assisting on a King County tunneling project while studying Mining Engineering at the Colorado School of Mines, Glen has shown a steadfast commitment to underground construction and a passion for fostering innovation. From field engineer to his current role as Chief Tunnel Engineer, Glen has distinguished himself not only through technical mastery, but by elevating others, mentoring young engineers, and promoting teamwork and collaboration.

Glen has contributed extensively to NASTT, including serving as Chair of the Pacific Northwest Chapter. Under his leadership, regional participation has grown, connections across public agencies, consultants, and contractors have strengthened, and chapter events have been reinvigorated. He has shared his expertise through numerous technical papers, case studies, and presentations at both the No-Dig Conference and the PNW Trenchless Symposium, as well as through student outreach at Oregon State University and other educational programs.

Joseph Louis, Ph.D., Associate Professor at Oregon State University, shared, "Glen reached out directly to help re-establish our NASTT student chapter, volunteering his time to visit campus, deliver guest lectures, and mentor students. He has organized site visits, inspired student engagement, and helped ensure members can attend the No-Dig Conference. His ongoing support has been instrumental in building awareness and excitement for trenchless methods among our students."

Glen's colleagues describe him as steady, thoughtful, and passionate, a leader who influences through authenticity, collaboration, and generosity. His impact is evident not only in the projects he has delivered, but in the many engineers and students he has guided and inspired.

The Ralston Young Trenchless Achievement Award celebrates professionals like Glen Wheeler, whose early-career accomplishments, leadership, and dedication strengthen NASTT, advance the trenchless industry, and set the standard for the next generation of trenchless leaders.

Ralston Young Trenchless Achievement Award Recipients:

2012	Dan Willems	2015	Alireza Bayat	2018	Charles Tripp	2024	Tucker Toelke
2013	John Matthews, Ph.D.	2016	Rory Ball	2019	Brendan O'Sullivan	2025	Kyle R. Friedman
2013	Ashley Rammeloo	2016	Mary Neher	2020	Kalyan R. Piratla	2025	Phill Perron
2014	Abhinav Huli	2017	Amana Arayan	2021	Patrick Moskwa	2026	Glen Wheeler
2014	Laura Wetter	2017	Chris Larson	2022	Matthew Oleson		
2015	Alison St. Clair	2018	Matt Smith	2023	Marya Jetten		

Meet the Competitors for the 2026 Abbott Award for Innovation

Celebrating companies whose recently launched and proven innovative products, technology or service (either as a new, redesigned or repurposed innovation) is making a significant impact in the advancement of trenchless industry.

Award founder, the late Joseph L. Abbott, Jr., championed innovation – all innovation. "We believe broadening the scope of the award to include redesign and repurposing will bring more innovations and the teams producing them to the forefront of the trenchless community."

This year's competitors showcase new, redesigned or repurposed innovations that deliver greater efficiency, enhanced reporting capabilities, faster returns, cost savings and more. From Inspection tools and data analytics to a joint system, polymeric adhesives and a horizontal directional drill, these solutions are poised to move trenchless technology forward. Presentations explaining each product are available in the NASTT Trenchless Knowledge Hub online at https://knowledgehub.nastt.org/. Winners will be announced at the NASTT 2026 No-Dig Show, with full coverage in the upcoming Summer/2026 edition of NASTT Trenchless North America.

Visit these Abbott Award Competitors at their booths for more information.

Abbott Innovative Product & Services Award Competitors:

CPM Pipelines | cpmpipelines.com | Booth 551
The Aquarius Tool
Submitted by Chris MacDonald, President

Footage Tools | footagetools.com | Booth 349
C2400 Squeeze Boss
Submitted by Jim LaChapelle, Marketing Manager

SewerAI | sewerai.com | Booth 252
Risk & Rehab With Smart Project Builder
Submitted by Eric Sullivan, Director of Strategic Development

SIPP Americas LLC | sippamericas.com | Booth 283
Resiline 320
Submitted by Randall Cooper, President

Thompson Pipe Group | thompsonpipegroup.com
Booth 401 - *Platinum Sponsor
Weldable Curve Joint (WCJ)
Submitted by Carl Pitzer, Director – Trenchless Markets

Vermeer Corporation| vermeer.com | Booth 329 - *Silver Sponsor
Automated Rod Exchange (ARE) on the Vermeer D24 Horizontal Directional Drill
Submitted by Clint Recker, Product Manager, Utility HDD Equipment

Warren Environmental & Coatings
warrenenviro.com| Booth 420 - *Silver Sponsor
301-CF Carbon Fiber-Reinforced Epoxy
Submitted by Brian Brandstter, President

NASTT Hall of Fame Honors Class of 2026

A Legacy of Trenchless Technology Leadership

Honoring NASTT members who have garnered outstanding accomplishments and made 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. 2027 nominations are now open! Visit ***www.nastt.org/no-dig-show/hall-of-fame*** *for details.*

Congratulations to the 2026 Hall of Fame inductee DEREK POTVIN P.ENG. who will be celebrated at the 2026 No-Dig Show in Palm Springs CA.

DEREK POTVIN P.ENG.
Executive Chair
Robinson Consultants Inc.

"Derek Potvin's career exemplifies NASTT's mission by advancing trenchless technology through education, training, and knowledge sharing while strengthening the Society as a trusted voice for the industry."

– Kevin Bainbridge, C.E.T., Vice President, Robinson Consultants, Inc.

Derek Potvin's career reflects a deep commitment to advancing trenchless technology through education, mentorship, and volunteer leadership. A civil engineering graduate of the University of Ottawa's co-op program, Potvin joined Robinson Consultants Inc. (RCI) in 1990 and built a distinguished career spanning more than three decades. He served as President of RCI from 2010 to 2024 and currently holds the role of Executive Chair of the Board of Directors, continuing to guide the firm's strategic direction and mentor future leaders.

Potvin was introduced to trenchless technology in 1995 at his first NASTT No-Dig Show in Toronto which was an experience that sparked a lifelong dedication to trenchless solutions as sustainable alternatives for infrastructure renewal. Early in his career, he helped deliver a landmark sliplining project of a 36-inch water main in downtown Ottawa, demonstrating the economic, environmental, and community benefits of trenchless rehabilitation at a time when such methods were still gaining acceptance.

"Derek Potvin's career exemplifies NASTT's mission by advancing trenchless technology through education, training, and knowledge sharing while strengthening the Society as a trusted voice for the industry," Kevin Bainbridge, who nominated his co-worker, said.

Potvin's influence extends beyond North America. He has represented NASTT at ISTT No-Dig events worldwide, participated on expert panels in Brazil, and delivered municipal infrastructure and trenchless technology training in Cairo, Egypt helping elevate NASTT's reputation as a global leader in trenchless education.

Equally impactful is Potvin's role as a mentor. At RCI, he encouraged engineers to engage with NASTT, volunteer, present technical papers, and contribute to knowledge sharing. His leadership helped establish a culture of sustained involvement, including nearly two decades of continuous representation on the GLSLA chapter board.

Potvin's contributions have been recognized with numerous honors, including NASTT's Outstanding Paper Award (2002), the NASTT Chair's Award (2016), and being named Trenchless Technology Person of the Year in 2021. His induction into the NASTT Hall of Fame reflects not only his technical achievements, but also his enduring commitment to volunteerism, education, and leadership in service to the public good.

Supported by his wife Shelley and their children, Potvin has balanced professional excellence with family and community values embodying the principles that NASTT seeks to advance.

NASTT Hall of Fame Inductees (2012 – 2026)

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

2025
Dr. Kimberlie Staheli, P.E

2026
Derek Potvin, P.Eng.
Robinson Consultants Inc.

Call for Abstracts

SUBMISSION DEADLINE: APRIL 8

The North American Society for Trenchless Technology (NASTT) is now accepting abstracts for its 2026 No-Dig North conference in Calgary, AB at the Calgary TELUS Convention Centre, November 2-4, 2026. 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 by April 8 online:

nastt.org/no-dig-north

No-Dig North 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.

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INTRODUCING THE

NASTT 2026 BOARD OF DIRECTORS

LEADING THE WAY TO A

BRIGHT TRENCHLESS FUTURE!

The 2026 NASTT Board of Directors continues to skillfully navigate the rapid growth that NASTT and the trenchless industry have experienced. As the organization leading and promoting the trenchless technology industry in North America, 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 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. The twenty members of the NASTT Board of Directors generously volunteer 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 2026 are: Joe Royer, PhD, Director of Innovation & Technology, Critical Infrastructure, Henkel Corporation, and Glen Wheeler, Chief Tunnel Engineer, James W. Fowler Co. Welcome Joe and Glen to the 2026 NASTT Board of Directors!

MEET AND GREET YOUR NASTT BOARD OF DIRECTORS FOR 2026

Executive Officers

CHAIR

Greg Tippett, P.Eng.

Program Delivery Lead, Western Canada Water Group, Stantec Consulting Ltd.

Greg Tippett is a Program Delivery Lead within the Western Canada Water Group at Stantec Consulting Ltd. He is currently responsible for the delivery of one of the largest infrastructure programs in North America. Greg graduated from Lakehead University in 2003 and has been working as a consulting engineer in Western Canada 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 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.

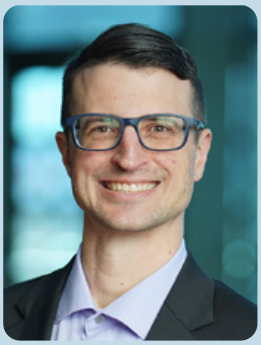
VICE CHAIR

Andrea L. Long, PE, PMP

Principal Engineer, Capital Projects, Wastewater and Stormwater Programs, 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.



TREASURER

Eric Schuler

Infrastructure Solutions, Business Development - Project Director, Navitas

Eric Schuler is the Business Development – Project Director at Navitas. Prior to this he served as a Deputy Commissioner for a public wastewater system serving a population of roughly 350,000 residents. In his leadership role he oversaw all of Capital Programming, Construction, Asset Management, Fleet, and Inventory Control. Mr. Schuler has over 16 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 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.

OFFICER-AT-LARGE

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 19 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 WESTT 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.

IMMEDIATE PAST CHAIR & INTERNATIONAL REPRESENTATIVE

Matthew Wallin, P.E.

Principal Partner & Senior Project Manager, Bennett Trenchless Engineers

Matthew Wallin is Principal Partner and Senior Project Manager with Bennett Trenchless Engineers, located in Folsom, California. BTEs' engineering practice is focused entirely on trenchless technology design, construction management, and claims assistance with clients and projects located throughout California and Texas, as well as Florida, Utah, Nevada, and Canada. Mr. Wallin is currently licensed as a Professional Engineer in California, Texas, New York, and Utah.

Matthew holds both bachelor's and master's degrees in civil engineering from Case Western Reserve University in Cleveland, Ohio. He has been involved in trenchless design and construction management since 2000 and has worked on a wide variety of projects and in many different capacities. With an emphasis on geotechnical considerations, his experience includes the design and

implementation of trenchless technology construction, geotechnical analysis and design, construction management and observation, and trenchless technology consulting expert services. Specific focus is applied to new pipeline construction using horizontal directional drilling (HDD), auger boring, pilot-tube guided methods, pipe ramming, open-shield pipejacking, microtunneling, and conventional tunneling. He has provided claims evaluation and consulting expert services to Owner agencies, engineering firms, contractors, and third parties on disputes involving HDD, microtunneling, pipe reaming, utility strikes, and geotechnical differing site conditions. He has provided consulting expertise to various municipalities, government agencies, engineering firms, and contractors.

Matthew actively participates in trenchless industry education through NASTT's Good Practices Guidelines courses, taught throughout the US and Canada, and currently serves as the Immediate Past Chair of the NASTT Board of Directors. He has authored or co-authored over 20 technical papers on various aspects of trenchless technology, tunneling, and geotechnical engineering.

Directors

Kevin Bainbridge, A.Sc.T

Vice President,
Robinson Consultants Inc.

Kevin Bainbridge is Vice President of Robinson Consultants Inc. Kevin has been with RCI for over 15 years and has over 29 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.

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.

Jeff Boschert, P.E., BC.PLW, F.ASCE

President, National Clay Pipe Institute

Jeff is the President of the National Clay Pipe Institute (NCPI), a not-for-profit organization dedicated to research, education, and leadership in the vitrified clay pipe sanitary sewers industry for more than 100 years. In the thirteen years since he stepped into that role, Jeff has significantly grown the impact of the Institute's educational outreach. Jeff joined NCPI from Missouri DOT in 2004 to serve as the leader of NCPI's trenchless initiatives and has become a leading expert in the field of pilot tube guided boring. He consults with design engineers, utility contractors and municipalities on both conventional open-cut installation methods and trenchless technology options for pipeline installations.

Jeff represents the industry on multiple ASCE and ASTM committees. He is past president of the Midwest Society for Trenchless Technology (MSTT) and was one of the principal authors of the ASCE/ Utility Engineering and Surveying Institute (UESI) Manual of Practice (MOP No. 133) on Pilot Tube and Other Guided Boring Methods. He has served on the ASCE/ UESI Pipelines Division Executive Committee (ExCom) and is the past Chairman of the UESI Pipelines Division Technical Committee -Trenchless Installation of Pipelines (TIPs). He served as Conference Chairman of the ASCE/ UESI Pipelines 2022 Conference held in Indianapolis.

In July of 2024, Jeff became a Board-Certified Pipeline Engineer-Water (BC.PLW) of the Utility Engineering & Surveying Certification Board (UESCB), a subsidiary of Civil Engineering Certification Inc. and the American Society of Civil Engineers.

Jeff holds a Bachelor of Science in Civil Engineering from Missouri University of Science and Technology (S&T).

Andrew Costa

Vice President of Sales & Strategy
Azuria Water Solutions

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 & Strategy for Azuria Water Solutions – the leading worldwide provider of CIPP and other technologies/services for the rehabilitation of gravity and pressure pipeline systems.

Andrew has been with Azuria Water Solutions 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.

Todd Kilduff, P.E.

President/Principal Engineer,
Kilduff Underground Engineering, Inc.

Todd has been involved in the design and construction of underground projects for 26 years. He obtained a bachelor's of science in civil engineering from the Ohio State University in 1996. Following graduation he worked in the geotechnical department for Malcolm Pirnie, Inc. where he supported the geotechnical aspects of pipeline, pump station and wastewater treatment plant projects. He returned to the

Virginia Polytechnic Institute for a master's degree in civil/geotechnical engineering graduating in 2000.

Todd specializes in geotechnical/underground design and construction. He has spent about half of his working career as a design engineer on 100's of underground projects facilitating the generation of geotechnical reports, and preparation of construction documents for bidding purposes. He has provided construction oversight in the field on many of those design projects. The remainder of his career has been spent as a project manager for two large general contractors where he has managed the construction of over a dozen underground construction projects with Contract values ranging from $5M to $70M.

With KUE Todd is responsible for all aspects of management including technical review and quality control. The company primarily provides design consultation for the installation and support of deep shafts and design of conduits utilizing Trenchless Technologies such as Microtunneling, Auger Boring, Horizontal Directional Drilling and Pipe Ramming.

John J. Kraft IV Ph.D.

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

John Kraft is a Researcher and Director of Special Schools at the Trenchless Technology Center. He is also a Lecturer of Civil Engineering and Construction Engineering Technology at Louisiana Tech University. John holds a Master of Science and a Ph.D. in Civil Engineering and a Bachelors 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 Buckling Analysis, 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.

George Mallakis

Regional Manager, TT Technologies

George Mallakis has over 35 years of experience in the Pipeline Industry including design, construction, and manufacturing specializing in trenchless methods as a Municipal Engineer with the Los Angeles Department of Water and Power, as a Contractor with J. Fletcher Creamer & Son, and as Manufacturer with TT Technologies, Inc. He holds a Bachelor of Science in Civil Engineering and a Master of Business Administration.

George is an active and/or past Board Member, Trustee, Chair, and member with various industry associations including NASTT, ASCE, AWWA, NUCA, and NASSCO. This involvement includes authoring or co-authoring publications of manual of practice or guidelines within these organizations.

George regularly presents and educates on various trenchless methods mostly pipe bursting and pipe ramming at association conferences, with municipalities, engineers, and contractors. He is a volunteer instructor of NASTT's Pipe Bursting Good Practices Course.

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 25 years!

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. In addition to NASTT, Stephanie is a member of the American Society of Civil Engineers, and the Associated General Contractors (AGC).

WELCOME TO THE BOARD!

Joe Royer, PhD

Director of Innovation & Technology, Critical Infrastructure, Henkel Corporation

Joe Royer is currently the Director of Innovation and Technology for Critical Infrastructure, Henkel Corporation, for which GeoTree Solutions and Fyfe are key brands. Joe has been with GeoTree Solutions since it was originally purchased in 2012 and is now owned by Henkel Corporation. Joe began his career as a Research Engineer at Milliken Research in 2002 following a post-doctoral fellowship at North Carolina State

University. Joe holds degrees a B.S. in Chemical Engineering from the University of Notre Dame ('95) and a Ph.D. in Chemical Engineering from North Carolina State University ('00).

Joe has 25 years of experience in Engineering, Research and Product development, the last 15 focused on Civil Infrastructure repair. He has written numerous papers and presented design details for structural pipe rehabilitation systems using geopolymer mortars. In addition, he has supervised installations in North America, South America, Europe and Asia.

Chris Schuler

Vice President Operations, Underground Solutions

Chris Schuler joined Miller Pipeline in 1984 as a laborer. Over the years, he served the company in many capacities, including equipment operator, foreman, superintendent of vacuum excavation services and manufacturing, and project manager. In 2009, he was promoted to General Manager of Municipal Services where he oversaw Miller Pipeline's water and wastewater markets. In February 2021, he assumed his current role of VP.

In 2024, Miller Pipeline's CIPP division and WEKO-SEAL® product were acquired by Azuria Water Solutions. Chris currently serves as Vice President of Operations for Underground Solutions, an Azuria portfolio company.

In his 40 years in the industry he has overseen several large HDD, CIPP and Fold and Form lining, Internal Joint Seal, and gas distribution projects and experienced vast changes in the trenchless world.

Schuler attended Indiana University focusing on Economics and Business from 1983-1986. He graduated from the University of Missouri with a Bachelor of Science degree in Commercial Economics in 2001. Schuler is a current representative for the Indiana Chapter of NUCA. He served on planning committee for the 2022 ASCE Pipeline Conference. He is also a member of the Program Committee for North American Society for Trenchless Technologies (NASTT). He is the President of the Board of Directors of the Midwest Society of Trenchless Technologies (MSTT) and has served in some capacity on that board for over ten years.

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 22 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.

Tucker Toelke

Director of Alternative Delivery, Michels Preconstruction Services, Inc.

Tucker Toelke is a passionate trenchless professional who utilizes his combined understanding of contracting and engineering principles to positively impact the trenchless industry through the execution of trenchless projects from conception to completion. Tucker has been involved in the trenchless industry since 2015 where he was first exposed to trenchless new installation technologies, working as an intern for the execution of a 4,039-foot Direct Steerable Pipe Thrusting (DSPT) installation beneath the Dow Barge Canal in Freeport, Texas. Enthusiastic about his first trenchless experience, Tucker not only decided to begin a career in the trenchless industry, but quickly became involved in industry functions, speaking at his first No-Dig show at the age of 22 (2017 – Washington, D.C.).

Following graduation from Gonzaga University in the spring

of 2017, Tucker joined Michels. Serving as a Project Engineer, Trenchless Engineer and Manager, he traveled the United States, Canada, Caribbean, and Asia, developing and executing trenchless projects. Through years of field experience, Tucker has obtained a diverse understanding of the available trenchless technologies and the proper application of each from both technical and commercial perspectives. Tucker has used this knowledge to mentor his peers in the industry, as well as help many owners and engineers understand the potential benefits of utilizing trenchless methods when multiple alternatives were being evaluated.

WELCOME TO THE BOARD!

Glen Wheeler

Chief Tunnel Engineer,
James W. Fowler Co.

Glen Wheeler is the Chief Tunnel Engineer at James W. Fowler Co., based in Dallas, Oregon. With more than 10 years of experience in the trenchless and tunneling industry, he leads the technical development and delivery of the company's most challenging projects, specializing in microtunneling, hard rock tunneling, pipe ramming, earth pressure balance tunneling, and deep shafts.

He holds a Bachelor of Science in Mining Engineering and a Graduate Certificate in Underground Construction and Tunneling from the Colorado School of Mines. Glen has remained actively engaged in advancing the trenchless industry through ongoing education, technical authorship, and leadership within professional societies. He has authored and presented numerous technical papers and case studies at NASTT No-Dig and regional trenchless symposia, covering topics such as microtunneling, progressive design-build delivery, and large-diameter pipe ramming. In addition, Glen shares his expertise with future engineers as a guest lecturer at Oregon State University, supporting education and research in underground construction and trenchless technologies.

Glen most recently served as Chair of the Pacific Northwest Chapter of NASTT and now continues his service as Immediate Past Chair. At the national level, he contributes as Chair of the NASTT Pipe Ramming Good Practices Committee, member of the NASTT Pipe Jacking Good Practices Committee, and participant on the ASCE 36-20 Microtunneling Committee. His active involvement in technical publications, standards development, and committee leadership reflects his commitment to advancing trenchless technology and supporting the next generation of tunneling professionals.

Jim Williams, P.E., PMP

Senior Associate,
Brierley Associates

Jim Williams' experience includes 30 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 a Past Chair of the South Central Regional Chapter of NASTT.

New Vermeer VXT400 and VXT500 Vacuum Truck Models Deliver Enhanced Hydrovac Performance for Urban Construction

The new Vermeer VXT400 and VXT500 vacuum trucks feature a 25-ft (7.6-m) boom with 330-degree rotation, dual digging capability that lets two operators work simultaneously.

The VXT400 delivers 4,131 cfm (117 m³/min) airflow and 18 in Hg (0.61 bar) vacuum with spoil tank options of 8, 10 or 12 yd3 (6.1, 7.6 or 9.2 m³) starting at 32,500 lb (14,741 kg) dry weight. The VXT500 features 5,018 cfm (142 m³/min) airflow and 27 in Hg (0.91 bar) vacuum with 10 and 12 yd3 (7.6 or 9.2 m³) configurations starting at 35,300 lb (16,011 kg). These Vermeer vacuum trucks also feature 3,000 psi (206 bar) water pressure and a patent-pending camera system with boom reach radius overlay.

"We designed these vacuum truck models based on years of customer feedback and lessons learned from our previous hydrovac equipment," said TJ Steele, product manager for Vermeer MV Solutions. "The VXT400 brings together the reliability contractors need with the performance to handle demanding jobs, while the VXT500 delivers more airflow and vacuum for higher production. These vacuum excavator models help contractors move more material, finish more jobs and work in more places."

Dual digging boosts vacuum excavator efficiency

These Vermeer vacuum trucks feature dual digging capability, allowing two operators to work simultaneously from separate dig points to push daily output and complete projects faster. The side-stow boom allows the dig tube to stay connected during transport, minimizing setup time between job sites and maximizing hydrovac operational efficiency.

The patent-pending optional camera system with boom reach radius overlay shows vacuum excavator operators exactly where they can dig before parking the truck, eliminating wasted setup time and helping crews position for maximum coverage. The 25-ft (7.6-m) boom offers 330-degree rotation for improved positioning flexibility.

Hydrovac reliability for demanding applications

The VXT400 and VXT500 feature a hydraulically driven water system that automatically shuts off when water flow stops and operates only at the speed required. This eliminates unloader valve wear and reduces maintenance while delivering longer system life and improved energy efficiency. The 3,000 psi (206 bar) water pressure at 10 gpm (38 L/min) with optional 19.4 gpm (73 L/min) provides consistent cutting power in tough soil conditions.

Built-in interlocks protect both components and operators by catching issues early and helping equipment run longer with fewer interruptions. For year-round operation, these vacuum truck models include winterization capabilities that maintain operation and longevity during freezing conditions.

Quiet vacuum truck operation for urban job sites

Designed for quiet operation, these Vermeer vacuum trucks promote a more comfortable working environment with less neighborhood disturbance, enabling contractors to work confidently in residential areas. Advanced controls provide intuitive operation that simplifies machine interaction and shortens the learning curve.

A common platform across Vermeer vacuum truck models minimizes onboarding and training time, improving operational efficiency across an entire fleet. Operators familiar with one Vermeer vacuum truck can efficiently operate others in the lineup.

- **VXT400**: 4,131 cfm (117 m³/min) airflow and 18 in Hg (0.61 bar) vacuum. Available in three GVWR options: 58,000 lb (26,308 kg), 76,000 lb (34,473 kg) or 86,000 lb (39,009 kg) with spoil tank capacities of 8, 10 or 12 yd3 (6.1, 7.6 or 9.2 m³). Boom options include 6-in (15.2-cm) or 8-in (20.3-cm) diameter with telescoping or hose handling configurations.
- **VXT500**: 5,018 cfm (142 m³/min) airflow and 27 in Hg (0.91 bar) vacuum with 10 and 12 yd3 (7.6 or 9.2 m³) spoil tank options. Available in 76,000 lb (34,473 kg) and 86,000 lb (39,009 kg) GVWR configurations. 8-in (20.3-cm) diameter boom with telescoping or hose handling configurations.

Both vacuum excavator models feature a 50-degree spoil tank tilt with cam-over hydraulic rear door for fast dumping and tight cycle times.

About Vermeer Corporation
Vermeer delivers a real impact on the way important work gets done through the manufacture of high-quality agricultural, underground construction, surface mining, tree care and environmental equipment. With a reputation for being built tough and built in a better way, Vermeer equipment is backed by localized customer service and support provided by independent dealers around the world. To learn more about Vermeer, products, the dealer network and financing options, visit vermeer.com.

Robbins celebrates TBM acceptance for Ellicott City North Tunnel

Veteran TBM rebuild for major flood mitigation project

Robbins marked a major project milestone in October 2025 with the substantial completion of the factory acceptance test (FAT) for a refurbished Main Beam TBM at its Solon, Ohio manufacturing facility. The veteran machine, rebuilt in partnership with contractor Kiewit, is set to excavate the 1.5 km (0.9 mi) long Ellicott City North Tunnel, a critical flood mitigation project in Howard County, Maryland, USA.

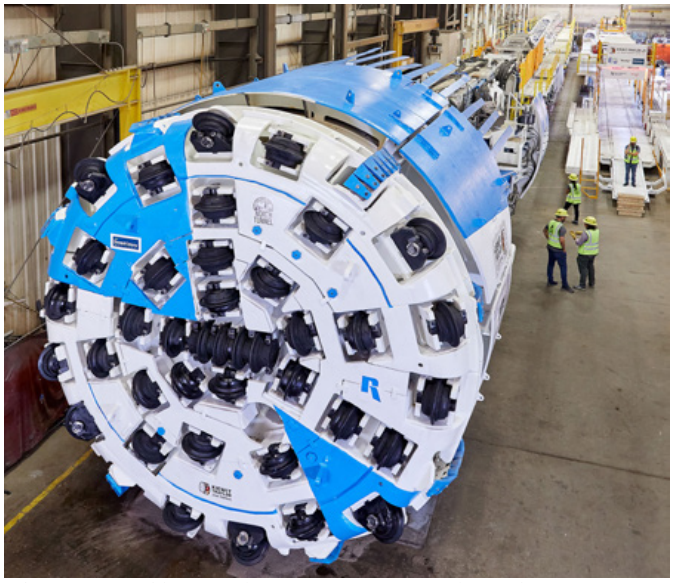
The 5.6 m (18.4 foot) diameter TBM, originally manufactured by Robbins in 1991, has a distinguished global track record. The machine has successfully excavated multiple tunnels totaling more than 18 km (11 mi) and is now entering its next chapter as part of Maryland's largest stormwater infrastructure project to date.

"Robbins and Kiewit share a long-standing partnership focused on quality TBM rebuilds and performance," said Doug Harding, Robbins Vice President. "We are marking not only the acceptance of the machine, but also a continued commitment to delivering durable tunneling solutions that meet the evolving demands of major infrastructure projects."

The 5.6 m (18.4 foot) diameter TBM, originally manufactured by Robbins in 1991, was rebuilt by Robbins and Kiewit in the Solon, Ohio manufacturing facility

In Brief:

- *Robbins marked a major project milestone in October 2025 with the substantial completion of the factory acceptance test (FAT) for a refurbished Main Beam TBM.*
- *The 5.6 m (18.4 foot) diameter Robbins TBM is set to excavate the 1.5 km (0.9 mi) long Ellicott City North Tunnel, a critical flood mitigation project in Howard County, Maryland, USA.*
- *Robbins and Kiewit have worked together at Robbins' plant in Solon on a daily basis over the last year to achieve this milestone of substantial completion of the FAT.*
- *The TBM is expected to begin tunneling in early 2026 following TBM assembly and launch shaft construction in Maryland.*

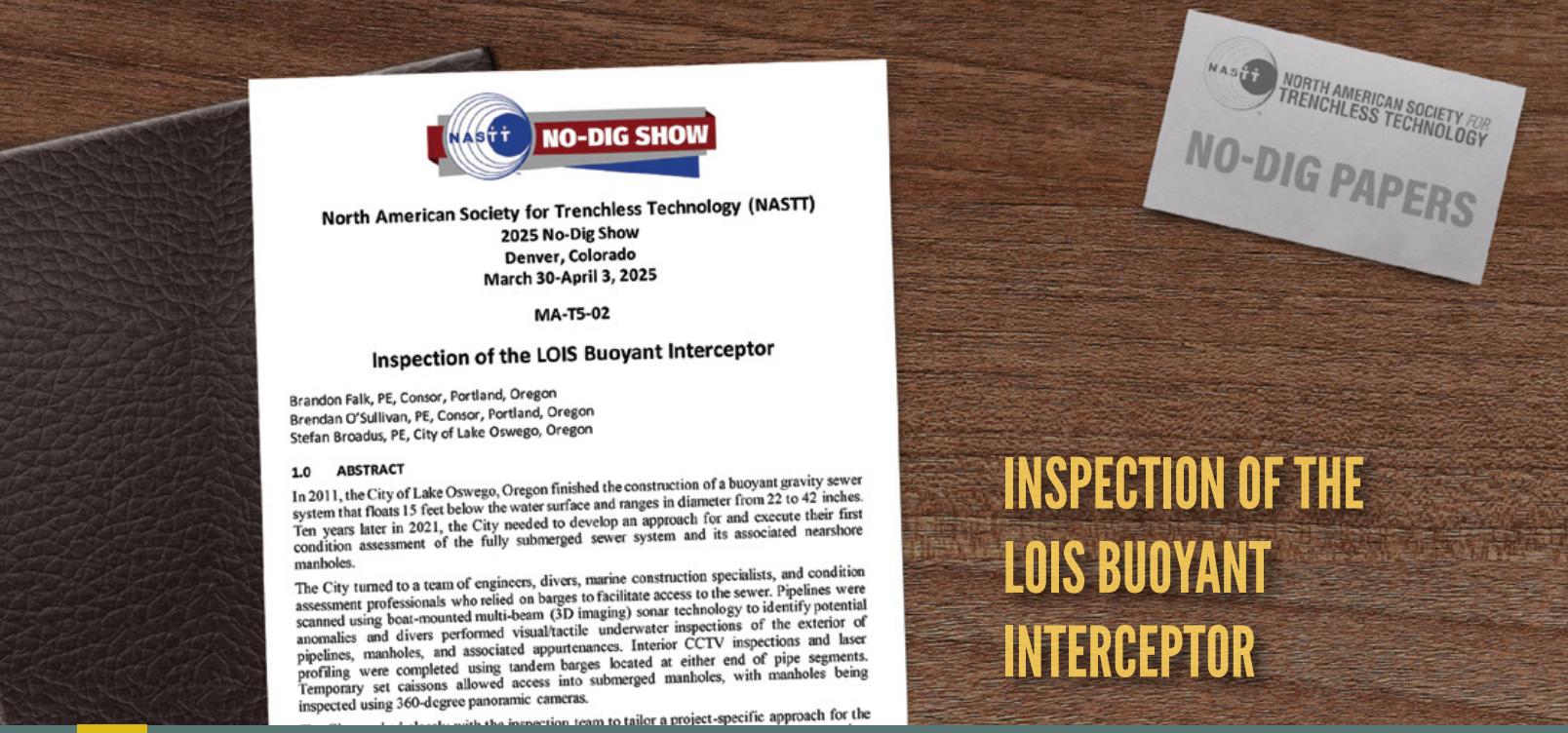


The veteran Robbins machine is set to excavate the 1.5 km (0.9 mi) long Ellicott City North Tunnel, a critical flood mitigation project in Howard County, Maryland, USA

The Ellicott City North Tunnel is a centerpiece of Howard County's Ellicott City Safe and Sound plan. Designed to divert stormwater runoff away from the historic downtown area—an area hit by multiple catastrophic floods in recent years—the tunnel will convey up to 26,000 gallons (98,000 liters) of water per second during major storm events. The TBM will bore through a mix of granitic rock beneath Ellicott City, minimizing surface disruption in the densely built, heritage-rich area.

"Excellent Engineers, Craft and Managers of Robbins and Kiewit have worked together at Robbins' plant in Solon on a daily basis over the last year to achieve this milestone of substantial completion of the FAT. Synergy efforts were required and well delivered to get the TBM to increased technical and safety standards," said Christof Metzger, Area Manager for Kiewit.

The TBM is expected to begin tunneling in early 2026 following TBM assembly and launch shaft construction in Maryland. Its performance will be supported by Robbins' field service team to ensure smooth operations throughout the project's duration.



INSPECTION OF THE LOIS BUOYANT INTERCEPTOR

AUTHORS

Brandon Falk, PE
Consor, Portland, Oregon

Brendan O'Sullivan, PE
Consor, Portland, Oregon

Stefan Broadus, PE
City of Lake Oswego, Oregon

1.0 ABSTRACT

In 2011, the City of Lake Oswego, Oregon finished the construction of a buoyant gravity sewer system that floats 15 feet below the water surface and ranges in diameter from 22 to 42 inches. Ten years later in 2021, the City needed to develop an approach for and execute their first condition assessment of the fully submerged sewer system and its associated nearshore manholes.

The City turned to a team of engineers, divers, marine construction specialists, and condition assessment professionals who relied on barges to facilitate access to the sewer. Pipelines were scanned using boat-mounted multi-beam (3D imaging) sonar technology to identify potential anomalies and divers performed visual/tactile underwater inspections of the exterior of pipelines, manholes, and associated appurtenances. Interior CCTV inspections and laser profiling were completed using tandem barges located at either end of pipe segments. Temporary set caissons allowed access into submerged manholes, with manholes being inspected using 360-degree panoramic cameras.

The City worked closely with the inspection team to tailor a project-specific approach for the unique condition assessment and to mitigate risks and navigate difficult access constraints while providing comprehensive data collection. The amassed data reviewed under NASSCO PACP and MACP standards was summarized in an Assessment Report, and it was later used to develop a Capital Improvements Plan that will enable the City to proactively manage their asset with confidence moving forward. The paper will discuss the project approach, execution, outcomes, and rehabilitation design.

This paper was rated as Exceptional, from all the presentations at the NASTT 2025 No-Dig Show in Denver CO. NASTT No-Dig Papers are available for download, free to members, at www.nastt.org

2.0 PROJECT BACKGROUND AND OVERVIEW

"The LOIS inspection project exemplifies the importance of proactive infrastructure management."

The Lake Oswego Interceptor Sewer (LOIS) is located in Oswego Lake, Lake Oswego and construction was completed in 2011. The City of Lake Oswego (City) retained a consultant team comprised of engineers and marine contractors to perform its 10-year inspection of LOIS and the Near Shore Sewer System. Inspection was completed between September 2021 and January 2022 and included submerged pipes along with associated tethers, anchors, and fittings, as well as floating and non-floating manholes on the interceptor sewer, and certain submerged precast concrete manholes along the shoreline (known as Near Shore Manholes (NSMH)).

For all inspected pipes, interiors were inspected using closed-circuit television (CCTV). For buoyant and pile-supported pipes, a routine underwater inspection of the exteriors along with associated tethers, anchors, and fittings was completed by a four-person team of divers. Multi-Beam sonar scanning was also completed for these pipes. For all inspected manholes, interiors were scanned using a 360-degree panoramic camera. For floating and some non-floating main lake manholes and NSMH, a routine underwater inspection of their exteriors was completed by the same team of divers. For all inspected pipes and manholes, see Figure 1.

The purpose of this inspection project was to collect inspection data of the exterior and interior of the system to assess the condition of LOIS and the Near Shore Sewer System and identify system deficiencies.

3.0 PIPE INSPECTION AND CONDITION ASSESSMENT

The pipe condition assessment of LOIS included a visual/tactile inspection of the exterior of 14,280 linear feet (LF) of submerged pipe along with associated tethers, anchors, and fittings. In addition to the tactile inspection, Multi-Beam sonar scanning was completed for 13,740 LF of submerged pipe. The interior of 20,770 LF of pipe was inspected utilizing conventional CCTV crawler equipment and multi-sensor platforms.

3.1 Multi-Beam Sonar

Multi-Beam sonar scanning for submerged pipe segments was completed using Coda Octopus Echoscope UIS to verify the location and characteristics of the sewer as well as confirm system appurtenances prior to performing the tactile inspection. The results of the multi-beam sonar scanning yielded an average slope percent difference between the designed and observed slopes of -4 percent across all the pipe segments scanned, indicating

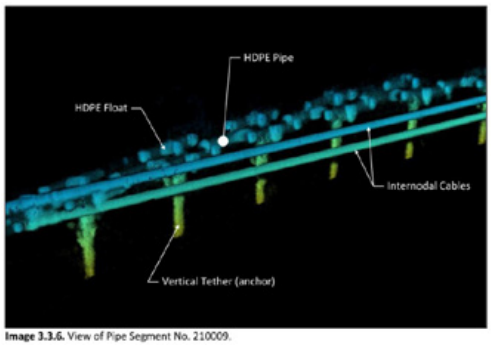


Figure 2. Typical Sonar Imaging

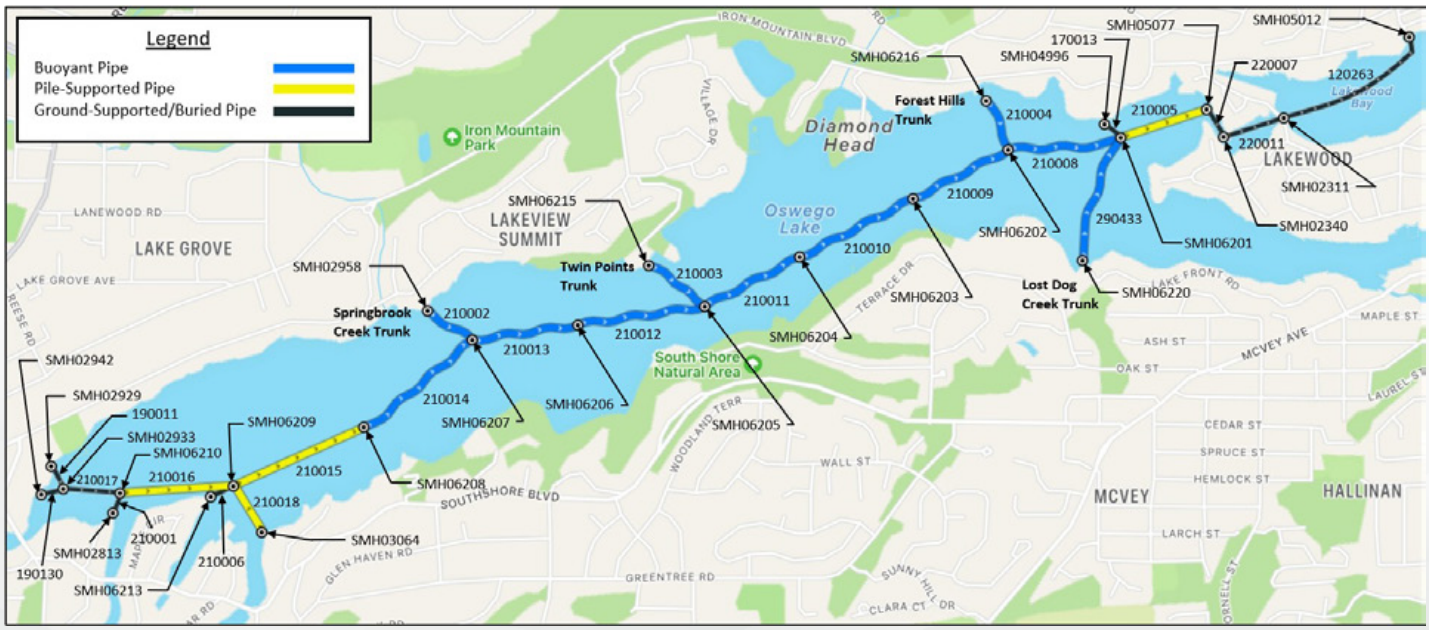


Figure 1. LOIS System Overview Map

"This career-defining inspection project... will surely never be forgotten by those involved."

that LOIS's slope is slightly steeper than designed on average. The average slope of the buoyant section of the main lake pipeline is approximately two percent greater than the designed slope. This translates into an observed vertical drop of 6.1 feet between SMH06208 and SMH06202 versus the designed drop of 6 feet. Additionally, the sonar scanning process located eight wind/wave anchors. The remaining 39 anchor blocks are assumed to be buried except for the associated retrieval buoys which could not be detected by sonar. Diving inspection confirmed that the retrieval buoys are intact, and it is reasonable to assume that the buried anchors can be located by these devices in the future. Buried anchors were not uncovered during the inspection to concerns that disturbed sediment would increase turbidity such that any visual inspection would be unworkable.

3.2 Exterior Inspection

A visual/tactile inspection of the exterior of submerged pipe segments along with associated tethers, anchors, and fittings from the waterline to the mudline was completed by engineer divers. This inspection technique was selected as it allowed for the removal of organic growth on system appurtenances to facilitate the inspection process that couldn't be done using remote operation vehicles. Overall, the pipe segments and associated components are in satisfactory condition. Widespread corrosion was found of the mild steel elements with minor section loss such as pipe piles and brackets. Intermittent corrosion of the stainless-steel components was also found. The stainless-steel hardware and wire rope comprising the tethers and internodal cables exhibit minor defects in the form of corrosion with no measurable section loss. The pipe flange connections exhibit minor defects due to corrosion with no measurable section loss. The high-density polyethylene (HDPE) pipe segments are in good condition with minimal defects and no points of infiltration were observed.

The LOIS system included/wind wave anchors to secure the buoyant pipe sections to the lake bottom. The five wind/wave anchors inspected are in good condition overall with minimal defects isolated to the mild steel bolt stocks. Of the five anchors inspected, all exhibited minor corrosion of the top bolt stocks. However, the bolt stocks' only use was for lifting the blocks in place; thus, their deterioration does not affect the overall integrity of the anchors. The concrete blocks are sound with no spalling or signs of deterioration. The stainless-steel bolt stocks and wire rope tethers are in good condition with no visible defects.

3.3 Interior Inspection

The interiors of pipe segments were inspected using CCTV and multi-sensor floating platforms when sewage levels dictated it. Most inspections were conducted by barge. The on-water set-up consisted of two barges, Alpha and Bravo, to set watertight caissons on submerged manholes to facilitate access to the interior of LOIS.

3.3.1 Methodology

To evaluate CCTV videos, the NASSCO Pipeline Assessment Certification Program (PACP) was used. PACP provides a standardized system to convert collected inspection data into meaningful condition grading information. The pipe graphic and tabular reports for inspected pipe segments were developed to accompany and support the CCTV video data.

3.3.2 Defect Documentation

In PACP, each defect is assigned a defect code. PACP defect codes are separated into two classifications: structural and operation and maintenance (O&M).

1. **Structural defects** occur when a pipe has been damaged or is otherwise defective. They include

Figure 4. Alpha and Bravo Barges In Action

Figure 3. Alpha Barge

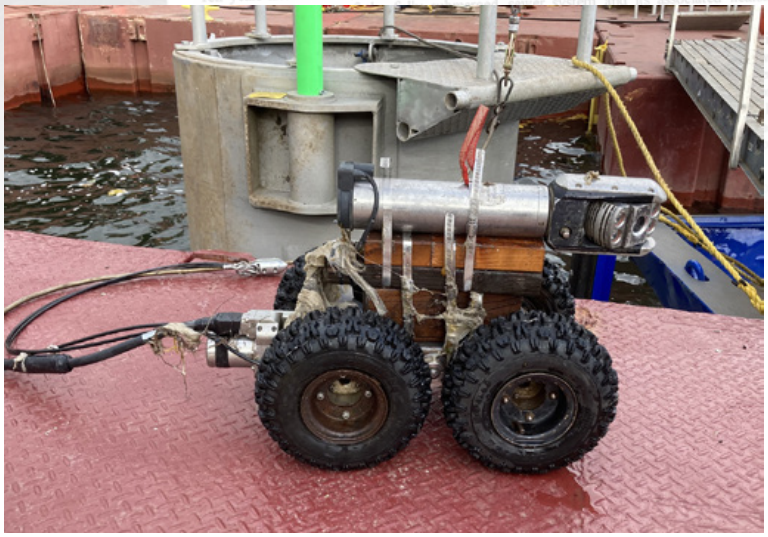


Figure 5 & 6. CCTV Crawler and Multi-Sensor Platform

wrinkled lining features, surface spalling, and cracking, among others.

2. **O&M defects** include conditions that either directly affect the performance of the pipe or are indicators of potential structural defects such as infiltration, attached deposits, and settled deposits, among others.

In addition to the defect code classifications, PACP also includes codes for construction features and miscellaneous features.

1. **Construction features** document access points, lines, and taps, among others.
2. **Miscellaneous features** document material changes, general observations, and water marks, among others.

3.3.2.1 Condition Grades

Each PACP defect code corresponds to a condition grade. Structural defects correspond to structural grades and O&M defects to O&M grades. It is possible for a condition grade to be zero, but structural defects and O&M defects with a condition grade of zero were omitted from the summary of defects for each inspected pipe segment.

A construction feature was included, only if the PACP code corresponded to an O&M grade of 1 or greater. Likewise, a miscellaneous feature was included only if the PACP code corresponded to a structural or O&M grade of 1 or greater. Condition grades vary from 1 to 5 depending on the severity of the defect (see Table 1).

Table 1. Condition Grades

Condition Grade	Severity
5	Most Significant
4	Significant
3	Moderate
2	Minor to Moderate
1	Minor

3.3.3 Findings

In one pipe segment a location with corroded surface reinforcement was recorded in the pipe graphic and tabular report: a structural defect with a condition grade of 5. After reviewing the CCTV video however, it is apparent that there is not corroded surface reinforcement, but rather pipe staining and the defect score was reduced based on engineering judgement. For all other pipe segments, structural defects correspond to condition grades of 3 or below.

An infiltration gusher and infiltration runner were recorded at multiple connections between pipe segments and a NSMH on the west end of the lake, O&M defects with condition grades of 5 and 4, respectively. For all other pipe segments, excluding water marks, O&M defects correspond to condition grades of 3 or below.

Table 2. Water Marks

Segment ID	Percentage of Pipe Barrel (%)	Condition Grade
210001	55	4
210017	50	4
210018	50	4
100632	50	4
210004	50	4
290432	50	4
220011	65	4
120263	75	5
160087	80	5

Note:
1. The percentage of pipe barrel is the highest value recorded for the pipe segment.

A water mark greater than 50 percent of the pipe barrel is a potential indicator of system capacity issues and pipe segments where this was observed are aggregated in Table 2.

4.0 MANHOLE INSPECTION AND CONDITION ASSESSMENT

The manhole condition assessment included the visual/tactile inspection of the exterior of 16 submerged NSMH as well as six buoyant manholes. Inspection of NSMH and buoyant manholes were performed by certified engineer divers. Additionally, the interiors of 31 manholes located on land, upstream of LOIS were also inspected.

4.1 Exterior Inspection

A visual/tactile inspection of the exterior of submerged NSMH from the waterline to the mudline was completed. Overall, the NSMH are in fair condition, as described in Table 3, due to spalled joints and failed joint wraps. The joints typically exhibit wrap failure with spalling and deteriorated grout. Two NSMH have large spalls with exposed rebar and exposed gasket material. The concrete upper risers are in good condition with no defects. Each manhole cover has light surface corrosion with no other obvious damage. The NSMH continue to perform the required function of providing safe access to the Near Shore Sewer System; however, repairs are recommended to improve the condition and durability of the manholes.

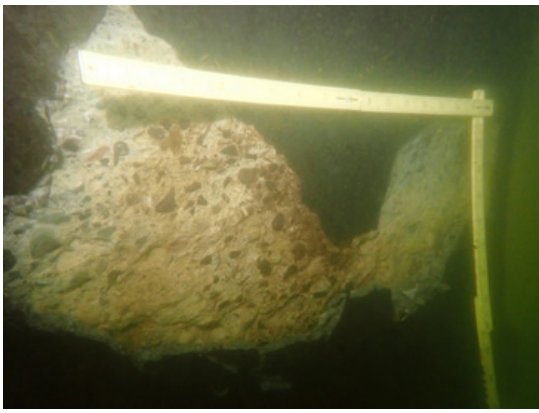


Figure 7. NSMH Concrete Spalling

The NASSCO Manhole Assessment Certification Program (MACP) standards don't take into consideration exterior condition as the standards were developed for buried infrastructure. To assess the exterior of NSMH, ASCE Condition assessment ratings were used.

The six buoyant manholes are in satisfactory condition due to widespread minor corrosion of the hardware at the bolted flange connections and severe corrosion of cotter pins located on the turnbuckle/tether assembly. All pipe flange connections at the buoyant manholes exhibit rust nodules at the bolt locations. Rust nodules were observed forming at the crevice between the head of the bolt and the flange as well as at the washer interfaces with the nut and flange.

Table 3. ASCE Condition Assessment Ratings and Descriptions

Condition Assessment	Description
Good	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs are required.
Satisfactory	Limited to minor to moderate defects or deterioration observed, but no overstressing observed. No repairs are required.
Fair	All primary structural elements are sound, but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present, but do not significantly reduce load-bearing capacity of the structure. Repairs are recommended, but the priority of the repairs is low.
Poor	Advanced deterioration or overstressing observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
Serious	Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of the primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority basis with urgency.
Critical	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur, and load restrictions should be implemented as necessary. Repairs may need to be carried out on a very high-priority basis with strong urgency.

The manhole frames are generally in good condition with no damage except for intermittent minor corrosion of the frame welds isolated to SMH06206 and SMH06207. The bridal assemblies that secure the manhole frames to the tethers are intact. The cotter pins preventing sliding of turnbuckle pins typically exhibit minor to severe deterioration. One cotter pin at each of four different manholes are completely disintegrated due to severe corrosion. The four missing cotter pins located within manhole bridal assemblies should be replaced on a routine basis during the next scheduled dive maintenance activity or prior to a draw down that would expose the manholes. Additionally, minor corrosion of cables and bridal plate welds was observed at isolated locations. Similar to conditions present on the internodal cables, the bridal assembly cables exhibited minor corrosion at the swage and cable interface.

At inspection, SMH06208 was in serious condition due to severe section loss isolated to the anchoring hardware (bolt heads and nuts were absent). Due to the severity of the defect and the risk of potential failure, the defect was repaired during the inspection phase of the project and corrosion resistant bolts, nuts, and washers were installed to replace the failed hardware.

Table 4. Condition Grades

Condition Grade	Severity
5	Most Significant
4	Significant
3	Moderate
2	Minor to Moderate
1	Minor

4.2 Interior Inspection

The interiors of manholes were scanned using a 360-degree panoramic camera. Most inspections were conducted by barge.

4.2.1 Methodology

To evaluate manhole scans, the MACP was used. MACP provides a standardized system to convert collected inspection data into meaningful condition grading information. A Level 2 MACP Inspection was completed for each inspected manhole and includes four forms.

1. **The Manhole Inspection Header Form** records general inspection data identifying the manhole, general site conditions, and location information.
2. The **Manhole Component Observation Form** records information about the manhole construction.
3. The **Manhole Pipe Connection Form** records information about all pipe connections at the manhole.
4. The **Manhole Component Defect Form** is used to record defects (and is omitted if no defects are identified).

4.2.2 Defect Documentation

The MACP separates manholes into eight components: cover, frame, chimney, cone, wall, bench, channel, and pipe connections. Depending on the component, defects are recorded on different forms.

1. **The Manhole Component Observation Form** is used to record defects for the cover and frame.
2. **The Manhole Pipe Connection Form** is used to record defects for pipe connections.
3. **The Manhole Component Defect Form** is used to record defects for the chimney, cone, wall, bench, and channel.

Many defects found in pipes and described using PACP defect codes are also found in manholes. For defects recorded in the Manhole Component Defect Form, PACP defects codes are used.

4.2.2.1 Defect Codes

Defects recorded using PACP defects codes are separated into two classifications: structural and O&M.

1. **Structural Defects** occur when the manhole has been damaged or is otherwise defective and include visible surface aggregate, wrinkled lining features, and cracking. among others.
2. **O&M Defects** include conditions that either directly affect the performance of the manhole or are indicators of potential structural defects such as attached deposits, settled deposits, and obstacles/ obstructions among others.

4.2.2.2 Condition Grades

Each PACP defect code corresponds to a condition grade. Structural defects correspond to structural grades and O&M defects to O&M grades. It is possible for a condition grade to be zero.

Condition grades vary from 1 to 5 depending on the severity of the defect (see Table 4).

4.2.3 Findings

The condition of the cover, cover insert (if present), frame, and frame seal for all manholes was sound. Staining was observed at the frame seal for most manholes; however, evidence of active infiltration was not apparent. At SMH05077 and SMH02340, the cover is oversized for the frame. Staining was observed at the frame seal for SMH05077.

For all manholes except for SMH02958, the structural and O&M defects for the chimney, cone, wall, bench, and channel correspond to condition grades of 3 or below. At SMH02958, five locations with missing surface aggregate were recorded in the Level 2 MACP Inspection: a structural defect with a condition grade of 4. However, after reviewing the manhole scan, it was apparent that surface aggregate was not missing. Rather, there was staining at the documented locations.

At SMH02929, infiltration was observed at both pipe connections. The infiltration at the downstream pipe connection was recorded as a gusher in the NASSCO PACP review of the downstream pipe segment 190011: an O&M defect corresponding to a condition grade of 5. The infiltration

at the upstream pipe connection appears to be a runner: an O&M defect corresponding to a condition grade of 4. At SMH02340, the 6-inch pipe entering from the west for the inside drop does not appear to be perpendicular with the barrel of the manhole and the pipe appears to contain settled deposits. It is difficult from the manhole scan to discern the presence or severity of defect(s) and another scan may be necessary to adequately identity defects. At SMH05137, flow from the 8-inch pipe entering from the north drops approximately 23 feet to the manhole channel. A drop manhole, per Section 4.3.3 of the City Engineering Design Standards, is required for drops in excess of 24 inches.

Spray from the existing drop structure at SMH05012 prevented scanning with the panoramic camera. The installed inside drop structure is atypical and appears to be undersized to handle flows and is being clogged with debris.

Table 5. Cathodic Protection System Summary

System		Amperage (amp)	Type	Depth/location
System 1 (ICCP)	Anode bed 1	40	Deep anode ground bed	25 feet below lakebed
	Anode bed 2			
	Anode bed 3			
System 2 (ICCP)	Anode bed 1	8	Direct buried anode	In lakebed mud
	Anode bed 2	4		
System 3 (ICCP)	Single anode bed	8	Direct buried anode	
System 4 (ICCP)	Single anode bed	8	Direct buried anode	
System 5 (ICCP)	Anode bed 1	15	Vertical anode bed	
	Anode bed 2	7.5		
	Anode bed 3			
System 6 (CACP)	Galvanic Anode bed 1	n/a	Galvanic anodes	SMH05012
	Galvanic Anode bed 2			SMH05139

5.0 CORROSION INSPECTION AND CONDITION ASSESSMENT

An operation performance check of the LOIS cathodicprotection (CP) systems was completed. The CP systems were initially installed with the purpose of protecting the steel piles from corrosive conditions. The CP system was also found to mitigate corrosion due to various galvanic cells within the LOIS system. Galvanic cells existing within the system include:

1. Electrical connections between steel bare piles, pile cap brackets, and coated steel micro-piles
2. Connection between the coated steel micro-piles and the concrete encased rebar in the manhole MH caps
3. Steel piles installed within different environments (mud and water)

5.1 Inspection and Assessment

Inspection included the five impressed current (ICCP) systems numbered 1 through 5, and the galvanic anode system numbered 6. System 1 and System 5 are semi-deep anode ground beds and Systems 2 through 4 are direct buried anode beds. Table 5 displays a summary of the amperage, anode type, and depth/location of each of the systems. Each ICCP system was checked, and the potentials were measured using the existing permanent copper/copper sulfate electrodes (CSE) and portable CSE electrodes in the water. The CSE electrodes were tested while performing the survey by measuring the mV (millivolt) difference between the permanent and calibrated portable CSE electrodes.

The inspection results indicate that the current output at rectifiers in four out of the five ICCP systems need to be increased to provide adequate protection. Also, some CSE electrodes in the anode beds of two ICCP systems should be replaced and CSE electrodes for two other ICCP systems should be considered for replacement soon. There exists a possible discontinuity in Systems 1, 2, and 5 and further investigation is required to confirm the location of the discontinuities. System 6 anode beds are below adequate protection levels and additional galvanic anodes are needed.

6.0 FINDINGS

6.1 Pipe Condition Assessment

The exterior of inspected pipe segments along with associated tethers, anchors, and fittings are in satisfactory condition. There is evidence of widespread corrosion of the mild steel elements with minor section loss, such as pipe piles and brackets and intermittent corrosion of the stainless-steel components. The exteriors of HDPE pipe segments are in good condition with minimal defects. No leaks or infiltrations were observed. The five wind/wave anchors inspected are in overall good condition with minimal defects isolated to the mild steel bolt stocks.

The results of the multi-beam (3D imaging) sonar scanning yielded an average slope percent difference between the designed and observed slopes of -4 percent across all the pipe segments scanned, indicating that LOIS's slope is slightly steeper than designed on average. The average slope of the buoyant section of the main lake pipeline is approximately two percent greater than the designed slope. This translates into an observed vertical drop of 6.1 feet between SMH06208 and SMH06202 versus the designed drop of 6 feet.

Inspection of pipe segment interiors did not document any greater than moderate structural defects. O&M defects for inspected pipe segments are moderate, at worst, except for high-water marks in some pipe segments and a significant infiltration defect in pipe segment 190011. A high-water mark, exceeding 50 percent of the pipe diameter, is a potential indicator of system capacity issues.

6.2 Manhole Condition Assessment

The exterior of inspected NSMH are in fair condition due to spalled joints and failed joint wraps. The exteriors of the six buoyant manholes are in satisfactory condition with widespread minor corrosion of the hardware at the bolted flange connections and severe corrosion of cotter pins located on the turnbuckle/tether assembly. The cotter pins preventing sliding of turnbuckle pins typically exhibit minor to severe deterioration. One cotter pin at each of four different manholes are gone due to severe corrosion.

The condition of the cover, cover insert (if present), frame, and frame seal for all manholes was sound. Inspection of manhole interiors did not document any greater than moderate structural or O&M defects. Two significant infiltration defects were observed at the pipe connections for SMH02929. A drop manhole is required to comply with City Engineering Design Standards at SMH05137 and the west pipe connection at SMH02340 may need to be scanned again.

SMH06208 is in serious condition due to severe section loss isolated to the anchoring hardware. Due to the severity of the defect and the risk of potential failure the defect was repaired during the inspection phase of the project and corrosion resistant bolts, nuts, and washers were installed to replace the failed hardware.

6.3 Correction Inspection and Assessment

The inspection results indicate that the current output at rectifiers for a majority of ICCP systems need to be increased. Also, some CSE electrodes in the ICCP systems should be replaced or considered for replacement soon. It needs to be determined if and where discontinuities exists in Systems 1, 2, and 5. Additional galvanic anodes are needed in System 6.

7.0 CAPITAL IMPROVEMENT PLAN

Based on the inspection findings, a five-project CIP was developed to guide future upgrades. The CIP projects were established based on the noted defects and lake location/zone.

1. CIP-1: Manhole Infiltration Rehabilitation
   a. Address infiltration points to prevent lake water intrusion.
2. CIP-2: Manhole Concrete Rehabilitation
   a. Repair and reinforce external concrete spalling of NSMHs.
3. CIP-3: Additional Inspections and Drop Structure Improvements

a. Conduct further inspections to refine understanding and fix drop structure issues.

4. CIP-4: Corroded Hardware Replacement
   a. Replace anchor hardware showing signs of corrosion.
5. CIP-5: Cathodic Protection Improvements
   a. Upgrade systems to ensure optimal protection against corrosion.

8.0 CONCLUSION

8.1 Next Steps

The path forward for the project involves several key actions aimed at ensuring its successful execution. First, securing funding for the recommended improvements through the adoption of the CIP budget will be crucial. Following this, procurement and design phases will begin, where contractors and designers will be engaged to carry out detailed planning and execution of the CIP projects. Construction coordination will also play a vital role, with efforts focused on aligning construction activities with the 2023 lake drawdown to maximize efficiency and minimize disruptions.

8.2 Stakeholders And Partners

The success of the LOIS inspection project relied on collaboration among various stakeholders and partners. The City provided oversight and ensured that the project was in line with municipal goals. Consor and Advanced American Construction, Inc. contributed their specialized expertise in condition assessment, exterior condition assessment divers, and underwater construction, while Pro Pipe provided the interior inspection and Lake Corporation provided logistical and operational support for lake access.

LOIS is the only known buoyant sanitary sewer system in the world which required a tailored approach to inspection. The inspection and assessment team members were assembled for their expertise and reputation to complete an inspection that had never been performed before in the world. With constant communication, collaboration, transparency, and respect the team exceeded City expectations on this career-defining inspection project. One that will surely never be forgotten by those involved.

8.3 Conclusion

The LOIS inspection project exemplifies the importance of proactive infrastructure management. By conducting a thorough condition assessment and development of a robust CIP, the City is poised to maintain the reliability of its buoyant interceptor sewer for decades to come. This assessment gives the City the peace of mind that the large, $110 million investment made in the construction of LOIS was worth the cost and the system will serve the City and their residents in its important task of managing sanitary flows in a reliable and safe manner for the betterment of the community in an ever changing world. This project not only underscores the value of regular maintenance and operation-forward design but also highlights the role of innovative techniques and collaborative efforts in ensuring sustainable urban development.

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The Best Choice For Water Systems

	TOP 10 Features and Benefits	HDPE	D. Iron
1	**Applications:** Potable Water (Lead Free), Raw Water, Reclaimed Water, and Wastewater	✓	✓
	References: AWWA C901, C906, C151, & NSF 61 + Health Effects of HDPE Pipes and Fittings for Potable Water Applications, NSF 2024		
2	Open Cut Construction: Design and install per AWWA Standards and Manuals eliminating thrust blocks	✓	✓
	Ref: AWWA M55, M41 + MAB-3, MAB-6		
3	Trenchless Construction: Material of choice for HDD, Pipe Bursting, Sliplining, and Compression Fit	✓	X
	Ref: ASTM F585, F1962, F3508 + MAB-5, MAB-7, MAB-11		
4	**Fully Restrained Joint-Free System:** Minimize need for fittings to facilitate horizontal and vertical deflections	✓	X
	Ref: AWWA M55, M41		
5	**Longevity & Corrosion:** Pipes, Fittings, and Joints have the least potential for corrosion or tuberculation	✓	X
	References: Durability and Reliability of Large Diameter HDPE Pipe for Water Main Applications, EPA/WRF/WERF 2025 + Critical Need for Corrosion Management in the Water Treatment Sector, NACE 2019 + PPIPACE.com + Long-Term Aging of Polyethylene Pipes, UKWIR 2020		
6	**Flow Capacity:** New pipes have similar flow capacity per AWWA Standards and Manuals	✓	✓
	References: AWWA M55, M41 and PPIPACE.com		
7	**Water & Energy Conservation:** Fused Joints have zero allowable water leakage and zero infiltration	✓	X
	Refrences: AWWA M55, M41 + ASTM F2620, F3190, F3565 and MAB-1, MAB-2, MAB-8		
8	**Cost Effective:** Has the lowest initial cost, lowest life cycle cost, and lowest restoration cost for trenchless installations	✓	X
	References: Life Cycle Analysis of Water Networks, CSIRO 2008 + Annual Drinking Water Quality Report for 2014, Kittery Water District, 5/31/15		
9	**Resilient:** Ability to resist water hammer and ground movements due to droughts, freeze/thaw, earthquakes and hurricanes with the ability for flow control and squeeze off	✓	X
	References: Recent Earthquakes: Implications for U.S. Water Utilities, WRF 2012 + Polyethylene Pipeline Performance Against Earthquake, Kubota 2018 and MAB-9, MAB-10		
10	**Permeation/BTEX:** Pipes and elastomeric joints need to be properly engineered for contaminated conditions	X	X
	References: AWWA C901/C906 and C111/C151, Sec. 4		

MUNICIPAL ADVISORY BOARD

Additional information including MAB-3 Model Spec Guide can be found at www.plasticpipe.org/mabpubs

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Upcoming Conferences, Courses & Events

March 29 - April 2, 2026
NASTT 2026 No-Dig Show
Palm Springs, California, USA

March 29
Introduction to Trenchless Technology – New Installations
Palm Springs, California, USA

March 29
Introduction to Trenchless Technology – Rehabilitation
Palm Springs, California, USA

April 1 - 2
CIPP Good Practices Course
Palm Springs, California, USA

April 1 - 2
HDD Good Practices Course
Palm Springs, California, USA

April 1 - 2
New Installation Methods Good Practices Course
Palm Springs, California, USA

April 1 - 2
Direct Steerable Pipe Thrusting Good Practices Course
Palm Springs, California, USA

May 20 - 21
NASTT HDD Good Practices Course
Virtual

November 2 - 4, 2026
NASTT 2026 No-Dig North
Calgary, Alberta, Canada

November 9-10
10th Annual Northeast Trenchless Conference
Saratoga Springs, New York, USA

March 21 – March 25, 2027
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Raleigh, North Carolina, USA

For more information and the latest course offerings, visit nastt.org/training/events.

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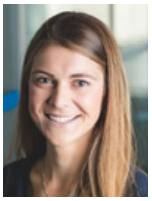
~ Joe Lane, Azuria Water Solutions



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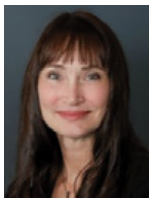
~ Marya Jetten, AECOM



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~ Cindy Preuss, PE, CDM Smith

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~ Jim Murphy, UniversalPegasus International

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