
NASTT
SOUTHEAST CHAPTER
SOUTHEAST JOURNAL OF
TRENCHLESS TECHNOLOGY 2022-2023
OFFICIAL PUBLICATION OF THE SOUTHEAST SOCIETY FOR TRENCHLESS TECHNOLOGY
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No Man's Land

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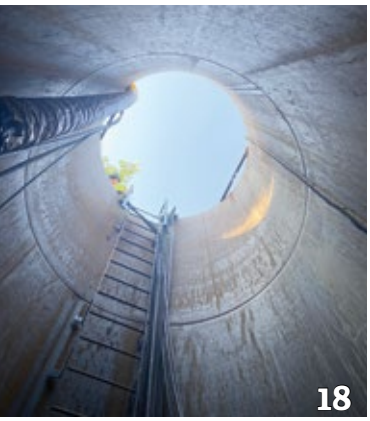

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SESTT CHAIRMAN MESSAGE 2022 - 2023

Moving Trenchless Technology Forward in Our Region

John Matthews, Ph.D. , SESTT Chairman

Though we have now gotten beyond the dreaded Corona virus, its impact on the global economy and supply chain remain. This along with growing labor shortages is creating opportunities for even more innovation in our industry. As an educator, we see these challenges as a chance to spread the word about opportunities in trenchless to our students and also look to innovate with our research to help meet the growing technology needs. Because despite all of these challenges, citizens still expect utilities to supply them with clean water, adequate collection and processing of sewerage, and maintain and upgrade all other essential utilities and public services. Trenchless technology providers play a vital role in helping municipalities manage these challenges now and in the future.

We look forward to meeting in Portland Oregon at the NASTT No-Dig Show on April 30 – May 4 to learn about new and existing innovations in Trenchless Technologies and underground construction services. We will also have the opportunity to visit booths and exhibits with forward looking technologies and innovations.

Moving forwards, the trenchless technology industry must continue highlighting the need to not only to maintain our infrastructure but also to upgrade it to the next level for future generations in order to maintain a healthy nation. One of government's foremost obligations is to provide its people with clean and safe drinking water and an efficiently functioning infrastructure. It will challenge us all to the core to create the necessary new materials, processes, and technologies to achieve this.

We thank everyone involved in the Southeast Society for Trenchless Technology (SESTT), participants in our regional Trenchless Technology seminars, and the advertisers and editorial contributors in this magazine for their ongoing support in promoting Trenchless Technologies. As we continue assessing and upgrading infrastructure to promote healthier lives, and improved social and environmental conditions, your efforts and dedication are vitally important!

> ***"Trenchless technology providers play a vital role."***

Sincerely,

John Matthews, Ph.D.
SESTT Chairman

SESTT SITE

GREETINGS FROM THE EXECUTIVE DIRECTOR

Leonard E. Ingram, Sr., PWAM, Executive Director, SESTT

"Thanks for your support!"

I am the Executive Director for the Mid Atlantic (MASTT), Midwest (MSTT) and Southeast (SESTT) Societies for Trenchless Technology. Coronavirus 19 has been a large factor in the last three years when trying to organize and conduct one of our "Trenchless Technology, SSES and Buried Asset Management" seminars. Municipal guest presenters, municipal attendees and others, sometimes, have not been allowed to attend and hotels have had layoffs and are now short of staff. I never thought I would call several hotels for a seminar venue and they would not return my call. Some are busy and some just do not have the staff to return the calls or no staff to support the seminar for a day. It is not like it used to be. But, when I do get someone in the sales and finalize a deal, I have been getting better deals for the seminars until very recently. And this is not to mention the airline problems we have. Hotel and airline problems have gotten better this year.

So far this year, I have conducted successful seminars in Nashville, Cincinnati, Baltimore, Atlantic City and St. Louis. Due to conflicts I had to postpone the December 2022 seminar for Baton Rouge until January 25, 2023. The Nashville seminar had as the Guest Presentation, "Innovation In Asset Management", by Mr. Fadi Khayatt, Metro Water Services (Nashville) and Mr. Taylor Hagood, LDA Engineering at the Four Points by Sheraton Nashville-Brentwood , Brentwood TN hotel.

Please review the **MASTT, MSTT AND SESTT PROPOSED 2023 SEMINAR AND JOURNAL PUBLICATION SCHEDULE** below and plan to support the SESTT seminars and journal as much as possible. There is **always** a lot of networking and learning at the seminars and with the journal.

Thanks for your support!

Leonard E. Ingram, Sr., PWAM
Executive Director, MASTT, MSTT & SESTT

THE 128 "TRENCHLESS TECHNOLOGY, SSES AND BURIED ASSET MANAGEMENT" SEMINARS SINCE 2001, HAVE OFFERED A LOT OF INFORMATION, A LOT OF NETWORKING AND A LOT OF LEARNING!!!

MASTT, MSTT AND SESTT 2023 PROPOSED SEMINAR AND JOURNAL PUBLICATION SCHEDULE:

SOCIETY	LOCATION/PUBLISH	PROPOSED DATE	STATUS
SESTT SEMINAR	BATON ROUGE LA	JAN 25, 2023 - WED	CONDUCTED
MSTT	LOUISVILLE KY	MAY 16, 2023 - WED	PROPOSED
MASTT JOURNAL	PUBLISH (DEADLINE MAY 26, 2023)	JUN 16, 2023 - FRI	PUBLISH DATE
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SESTT JOURNAL	PUBLISH (DEADLINE NOV 3, 2023)	NOV 24, 2023 - FRI	PUBLISH DATE
MASTT	RICHMOND VA	DEC 6, 2023 - WED	PROPOSED

To Exhibit, Food Sponsor, or Present at the 2023 Seminars:

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To Get Your Advertising Message to Trenchless Professionals into the Upcoming 2023 Journal:

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MESSAGE FROM NASTT CHAIR

Matthew Wallin, P.E., NASTT Chair

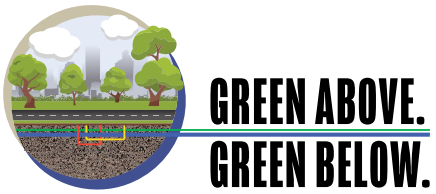
In Person Events are Back and Better Than Ever!

Hello Southeast Chapter Members. It feels like we are embarking on a fresh start now that restrictions are lifting across North America. We are excited as we look forward to the future! We're riding high on the successes of the NASTT 2022 No-Dig Show held in Minneapolis in April and the 2022 No-Dig North conference held in Toronto in October. The No-Dig Show hosted over 1,700 attendees and record-breaking sponsorships. No-Dig North hosted over 800 attendees and a SOLD-OUT exhibit floor! The trenchless industry is ready to be back to in person with networking and education leading the way.

Be sure to mark your calendars and save the date for the **NASTT 2023 No-Dig Show in Portland, OR, April 30 – May 4**. The city of Portland is a perfect location for our industry to come together to celebrate and educate with the theme, ***Green Above, Green Below***. It is important that our industry is a steward of our precious natural resources, and we welcome the opportunity to provide a forum to learn about the latest in innovative trenchless products and services. Learn more at www.nastt.org/no-dig-show.

> ***"Riding high on the success of the NASTT 2022 No-Dig Show!"***

If you or your company has attended a NASTT Conference (National or Regional) you may leave that conference wondering how you could get more involved. I ask that you consider getting engaged in one of the many NASTT committees that focus on wide variety of topics. Everything from Publications Committee, Good Practice Course Committee, No Dig Planning Committee with many others for you to consider. With education as our goal and striving to provide valuable, accessible learning tools to our community, one of the things of which we are most proud at NASTT is that we have been able to grow. In keeping with our mission of education and training, we are offering our Good Practices Courses in a live, virtual format throughout the year. For the latest information on upcoming events, visit our website at www.nastt.org/training/events.



For more information on our organization, committees, and member benefits, visit our website at www.nastt.org and please feel free to contact us at info@nastt.org.

We look forward to seeing you at a regional or national conference or training event soon!

Matthew Wallin, P.E.

NASTT Chair

SOUTHEAST SOCIETY FOR TRENCHLESS TECHNOLOGY
BOARD OF DIRECTORS 2022 - 2023

Dr. John Matthews - *Chairman*

Dr. John Matthews has over 18 years of experience in the installation, rehabilitation, and inspection of infrastructure systems. He is the Director of the Trenchless Technology (TTC) and Eminent Scholar Chair in Construction at Louisiana Tech. Previously, he served as the Program Manager at Pure. Prior to joining Pure, he served as Water Infrastructure Lead at Battelle for five years, and as a Researcher at the TTC for six years, where he led numerous research studies related to pipeline infrastructure. He also has experience as a field inspector on numerous trenchless projects. He has given over 200 conference presentations and authored more than 290 technical publications. He is an active member of NASTT and ASCE and currently serves on the ISTT Board of Directors. He was named the Trenchless Technology Person of the Year Award by *Trenchless Technology* magazine in 2023 and has won three ISTT Awards (2005, 2012, 2022).

Jimmy Stewart - *Vice Chairman*

Jimmy Stewart has over 25 years' experience working in consent order driven cities, where he has been involved in full-service environmental assessments, technical water/wastewater evaluations and rehabilitation processes for water wastewater and storm water systems.
Through CPM Pipelines they currently provide inspections and rehabilitation for "Pressure Pipe" applications, asset management programs and digital solutions for utilities and engineers primarily across the United States.
Jimmy is a past NASSCO Board Member, the past WEF Collection System Committee Chair. He is also recipient of WEF and WEF Member associations Golden Manhole and 5S Society awards. He is currently Vice Chair of the Southeast Society of Trenchless Technology (SESTT). And Serves on the BAMI-I Board of Directors

Chris Ford - *Secretary*

Chris Ford is Principal and Vice President of Operations at Highfill Infrastructure Engineering, PC, a Carolinas engineering consulting firm specializing in community and municipal water and wastewater infrastructure engineering. With over 30 years of experience, Chris serves as a leading trenchless technologies resource for public utilities in the Carolinas. Over the last 15 years he has focused on the use of trenchless technologies for condition assessment, evaluation, renewal, and replacement of both pressure and gravity pipelines. His experience includes large diameter ductile iron pipe splitting, pipeline renewal with high pressure liners, various methods of gravity sewer rehab, and new installations via horizontal directional drilling. A graduate of NCSU with a BS in Civil Engineering-Construction, Chris regularly presents at conferences including NC AWWA-WEA, NASTT No-Dig, and UCT.

Ed Diggs - *Treasurer*

Ed Diggs has been involved with CCTV inspection equipment for nearly 30 years, working with municipalities, contractors and engineers, insuring their specific needs. He began his career in the sewer business as a senior manager with R.S. Technical Services and for the past twenty years has been employed by SPX Cues, Inc. in various positions. Currently Ed's role is with SPX Cues' sister company PIPC (Pipeline Inspection Partners Corp.), a purveyor of Cues High Technology products, where he develops business for 2D and 3D multi-sensor platforms and reports. Ed is a member of NASTT, SESTT, WEF, FWEA, WEAT, APWA, and AWWA.

SOUTHEAST SOCIETY FOR TRENCHLESS TECHNOLOGY
BOARD OF DIRECTORS 2022 - 2023

Jerry Trevino - *Past President*

Jerry Trevino is President of Mechanical Jobbers Marketing, Inc. and Protective Liner Systems, Inc. He is also the principal owner of other consulting and real estate companies. Jerry is an engineering graduate from the University of Texas in Austin. Before specializing in infrastructure rehabilitation, he worked as a project engineer and in research and product development for Procter and Gamble and Mobil Oil. He now specializes in the development, manufacturing and installation of all types of polymeric and cementitious coatings, liners and FRP composites used to rehabilitate infrastructure for municipalities and the industrial sector. He has expanded his business to include assessment of pipes and manholes to help his municipal and industrial clients to be able to pinpoint and get ahead of deterioration. He strongly believes that trenchless technologies offer numerous methods to maintain and upgrade aging infrastructure.

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2023 SEMINAR & JOURNAL SCHEDULE

MASTT - MID ATLANTIC SOCIETY FOR TRENCHLESS TECHNOLOGY
MSTT - MIDWEST SOCIETY FOR TRENCHLESS TECHNOLOGY
SESTT - SOUTHEAST SOCIETY FOR TRENCHLESS TECHNOLOGY

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Or call (204) 275-6946 to advertise in the journal or discuss an article for the journal.

Our 128 "Trenchless Technology, SSES and Buried Asset Management" seminars since 2001 have offered a lot of information, a lot of networking and a lot of learning. The journal and webinar are a great source for advertising, learning and teaching.

For registration and updated information on the 2023 "Trenchless Technology, SSES and Buried Asset Management" Seminars and Trenchless Journals, please visit:

Mid Atlantic: www.mastt.org | Midwest: www.mstt.org | Southeast: www.sestt.org

FORT LAUDERDALE'S SUCCESSFUL SEWER PIPE FIGHT

Two-Pronged Attack Using HDPE Pipe Saves the 'Venice of America' and Wins Top Industry Award

By: Plastics Pipe Institute, Inc. (PPI)

When Fort Lauderdale's seven-mile sewer transmission main broke, 200 million gallons of raw sewage spilled into streets and waterways. To fix the disaster, the city declared an emergency to put in two separate underground runs of high-density polyethylene (HDPE) pipe by two different contractors that totaled 7.5 miles of the pipe. Each string was installed using mostly horizontal directional drilling (HDD) through the congested downtown and picturesque residential areas of the city. Approximately six miles - nearly 85 percent of the total length - of HDPE pipe was installed using 17 horizontal directional drills that included going under three rivers. The project is part of the city's program to replace all of its decaying cast iron and ductile iron sewer pipes which have become weakened by the area's corrosive high saltwater table.

Murphy Pipeline Contractors, Inc. (Jacksonville, FL) put in 3,400 feet of 48-inch diameter DR 13.5 HDPE PE 4710 pipe from the north that included 1,500 feet drilled 60 feet deep across the intracoastal waterway. At the same time, David Mancini & Sons, Inc. (Pompano Beach, FL) installed 3,100 feet of 54-inch diameter DR 11 HDPE PE 4710 pipe from the south, which is one of the biggest HDD installations of large diameter HDPE pipe to date. Other sections that were installed using HDD ranged from 1,100 to 1,300 feet. The city worked with consulting

Scale of the project and the technology that was used impressed residents and field staff alike

> ***This is an unprecedented feat of engineering and use of HDPE pipe…it solved a pressing problem for City of Fort Lauderdale and its citizens.***
>
> -David M. Fink, President, Plastics Pipe Institute (PPI)

engineering firm Hazen and Sawyer which served as owner's representative on the project and provided technical advice.

This new $65 million wastewater transmission line from the George T. Lohmeyer (GTL) Wastewater Treatment Plant on SE 18 Street to a wastewater lift station located near Bayview Drive and NE 37 Street was completed in April 2021, months before it was expected. The project will enable the city to repair its existing 50-year-old force main that was experiencing frequent breaks during the past several years. Because of the complexity and scope, it was named Project of the Year for the Municipal & Industrial Division of the Plastics Pipe Institute, Inc. (PPI), the North American trade association representing the plastics pipe industry. The award was presented to PPI member companies JM Eagle (Los Angeles, CA) and AGRU America, Inc. (Georgetown, S.C.). Both Murphy and Mancini are contractor members of the Municipal Advisory Board, an independent, non-commercial adviser to the Municipal & Industrial Division of the PPI.

"This is an unprecedented feat of engineering and use of HDPE pipe," stated David M. Fink, president of PPI. "Not only did it encompass thousands of feet of pipe, it solved a pressing problem for City of Fort Lauderdale and its citizens. The city is to be congratulated for its innovative use of design-build, engineering, construction and HDPE, the number one piping system for HDD. This enormous project created only minimal disturbance for vehicles and the daily living of the people because of the use of trenchless technology and the expertise of engineers and contractors. Also, the trenchless technology provided the way to expedite approvals from the regulatory agencies and permits from Federal, State, and County agencies

Contractors moved at unparalleled speed to build an entire new line, completing the job months ahead of schedule

> ***HDPE pipe has been used in municipal water applications for more than 50 years…a recent industry survey showed that HDPE pipe continues to be the most common type of pipe used in trenchless installations.***
>
> -Camille Rubeiz, P.E., F. ASCE, Senior Director of Engineering, PPI - Municipal and Industrial Division

Four of the HDD segments required unique compound curves due to roadway geometry and field conditions

including the United States Army Corps of Engineers, Florida Department of Environmental Protection, and the Florida Department of Transportation. Using trenchless technology, the City of Fort Lauderdale was able to complete this project significantly ahead of schedule to add a reliable force main to supplement its existing infrastructure."

In December 2019, the City of Fort Lauderdale experienced numerous breaks to its aging seven-mile major sewer transmission main resulting in more than 200 million gallons of raw sewage spilling into streets and waterways. This led to the city declaring an emergency and awarding two design-build contracts. Using this delivery method, the project was split into multiple phases to design, permit, and construct each phase concurrently. The majority of the city's sewer system is six decades old and consists of ductile and cast-iron pipe. According to a South Florida Sun Sentinel newspaper article, "Rio Vista, the first neighborhood hit by a tidal wave of sewage on Dec. 10 (2020) when a giant 54-inch pipe made of ductile

> ***"Directional boring was a solution that minimized the interruption to the lives of surrounding homeowners."***
>
> - Dean J. Trantalis, Mayor, Fort Lauderdale

iron gave way. In two months alone, Fort Lauderdale's crumbling sewer pipes have spewed 211.6 million gallons of raw sewage into waterways and streets."

Fort Lauderdale's mayor, Dean J. Trantalis said, "Mancini and Murphy came into an emergency situation facing our city in which one of the main sewer lines was repeatedly rupturing because of its age and deteriorating condition. They moved at unparalleled speed to build an entire new line so our residents could continue to receive service without the threat of more and more breaks. The methodology they used with directional boring was a solution that minimized the interruption to the lives of surrounding homeowners. Their tremendous work illustrates the city's commitment to thoroughly address our infrastructure needs and have a system that serves our growing city for decades to come."

Part of the problem Fort Lauderdale had experienced was due to the many weak points in the sewer line that would keep breaking. "Patching just meant putting more stress on other areas in the pipeline, which would then burst," stated Camille George Rubeiz, P.E., F. ASCE, senior director of engineering for the Municipal and Industrial Division of PPI and is also the co-chair of the HDPE Municipal Advisory Board. "Plus, these voids in the pipeline would allow infiltration of predominantly sandy soil into the pipeline which would reduce the inside diameter thus increasing the pressure inside the pipe, leading to more stress on the fragile sections of the cast iron pipe.

"HDPE pipe has been used in municipal water applications for more than 50 years. HDPE's heat-fused joints create a leak free, self-restraint, monolithic piping system that can be pulled from one area to another with minimum disruption to traffic or the surrounding communities. The fused joint also eliminates infiltration into the pipe and exfiltration into the environment. HDPE pipe has other benefits which include resistance to water hammer, fatigue, ground movements, freezing temperatures, earthquakes, corrosion and tuberculation."

Rubeiz also said that HDPE pipe is versatile and can be used in methods of

HDPE's heat-fused joints create a leak free, self-restraint, monolithic piping system

underground installation such as HDD or open cut. "A recent industry survey showed that HDPE pipe continues to be the most common type of pipe used in trenchless installations. Properly designed, installed and fused, HDPE has a 100-year design life, zero allowable leakage, largest internal diameter and is the best water piping solution for open cut and trenchless installations. Plus, it has a larger flow capacity per PPIPACE.com, C coefficient of 150 – up to 50 percent higher C than others, corrosion and tuberculation resistance, lowest initial cost and lowest life cycle cost."

The 48-inch diameter DR 13.5 HDPE PE 4710 pipe was manufactured by JM Eagle. It has a pressure rating of 160 psig at 80oF and can handle total pressure during recurring surge of 240 psig and total pressure during an occasional surge of 320 psig. The working pressure on average was approximately 37 psi with a flow rate of 20,700 gpm. AGRU America made the 54-inch DR 11 pipe that carries a pressure rating of 200 psi at 800F used by Mancini.

According to Krishan Kandial, P.E., the project manager for the City of Fort Lauderdale, "This project afforded me a unique professional opportunity to work alongside two contractors and an owner's representative to deliver a much-needed redundant force main for our residents and visitors. Throughout construction, we had unmatched support from city leadership and residents in each of the neighborhoods we worked in. The scale of this project and the technology that was used impressed residents and field staff alike who had never seen a project of this type be completed so efficiently."

Four of the HDD segments required unique compound curves on 48-inch HDPE DR 13.5 pipe due to roadway geometry and field conditions, and three of the area's rivers also had to be addressed. Reaching depths under the riverbed of up to 60 feet, 1,800 feet of pipe was drilled under the Tarpon River, which was next to a bridge and had only eight feet of available right-of-way between the bridge and adjacent properties. A precise compound curve was utilized in the design to achieve the constrained alignment. The crew pulled 2,500 feet of pipe under the New River and 1,600 feet under the Middle River. Due to the depth and soil conditions, 48-inch DR 11 pipe was used in the Middle River crossing, making it one of the first projects in the country to utilize this pipe size and DR.

The project also had four HDDs with tight-radius compound curves using 48-inch HDPE DR 13.5 pipe, which included a 2,600 foot and a 1,400-foot S-curve. Other compound curves were required due to

This enormous project created only minimal disturbance

roadway geometry and field conditions.

Kandial described another situation, "Due to space limitations, a 60-inch borehole at the lift station was drilled only a few feet away from professional-grade clay tennis courts at the Coral Ridge Country Club that have a unique subsurface irrigation system and were at risk of being undermined by the trenchless installation. In response, the team developed a soil stabilization treatment plan, which required the injection of rigid structural geotechnical polymers at 68 locations that prevented soil movement or collapse."

Fort Lauderdale has geotechnical conditions common for a coastal city. Geotechnical investigations found loose material - sand and limestone - in the first 30 feet below land surface (BLS) and very dense cemented sand below that. The crew had to carefully adjust the HDD alignment to address the change in ground conditions, particularly where the HDD was deeper than 30 feet.

"It's not only Fort Lauderdale facing this problem. Pressure from groundwater

Fused joints eliminate infiltration and exfiltration

and also the corrosive nature of saltwater found in sandy soil will continue to destroy the old piping infrastructure," stated PPI's Rubeiz. "This project shows how Fort Lauderdale has taken steps to not only correct the problem but to also give its citizens a high-integrity solution that will serve the city for a hundred years. The Venice of America can now say good-bye to raw sewage flowing in its streets."

ABOUT PPI:

The Plastics Pipe Institute, Inc. (PPI) is the major North American trade association representing the plastic pipe industry and is dedicated to promoting plastic as the materials of choice for pipe and conduit applications. PPI is the premier technical, engineering and industry knowledge resource publishing data for use in the development and design of plastic pipe and conduit systems. Additionally, PPI collaborates with industry organizations that set standards for manufacturing practices and installation methods.

More information can be found at www.plasticpipe.org/municipal_pipe or www.plasticpipe.org.

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MAINTAINING A SLOPE OF JUST 0.20 PERCENT:

West Royster Creek Sewer Outfall Project

By: Steve Matheny P.E., Logan Clay Products LLC

As problems arise in older sewer systems, the challenges are becoming more and more common. A developed area with existing utilities, a need to maintain access to residences and businesses, mature trees and landscaping, and a need to replace and enlarge an existing collection line – these are some of the issues we are seeing more frequently. But the West Royster Creek Sewer Outfall project added a few extra challenges. One of the added challenges was the creek causing significant head-cutting near the existing pipeline.

The existing 12-inch main was originally placed in service in the 1970s prior to the annexation of the area by the city of Millington, TN. Since annexation, the city has invested in various stabilization efforts that proved to be short-term solutions. For the past ten years, the stream has been encroaching on the sewer main. The changes to the stream alignment have required that Millington provide short-term protection to the stream embankment in an effort to protect this sewer and the environment.

They feared that this large stream would ultimately undercut the sewer. The line would need to be moved.

Available right of way was limited to the roadway in many parts of the project

Short (1-meter) VCP-J pipe lengths make the 8-foot shafts functional

> ***The average compression strength of this clay pipe is 18,000 psi.***
>
> Tim Verner, P.E.
> Fisher & Arnold Engineers

To further compound problems, the existing 12-inch sewer was not adequately sized to handle additional flows from new upstream development. Without additional capacity, new growth in the area would be stymied.

The lack of adequate room to install this new line between the existing high-density housing and the top of the creek bank required Fisher & Arnold engineers to explore alternative locations for the new sewer main with increased capacity. Installation using standard "open-cut" methods would be very disruptive to traffic patterns, existing utilities, and emergency access to the residents. Resurfacing the roadway would have also significantly impacted the final cost of the installation in this neighborhood consisting of fairly dense housing with sidewalks and mature trees on all lots. The best option was to install the new sewer within an existing roadway in an established neighborhood.

After eliminating an open-cut project from the methods under consideration, Tim Verner, P.E with Fisher and Arnold explored trenchless installation methods. The goal was to identify the best installation method to address all the challenges presented. Using trenchless methods would allow the contractor to excavate shafts at 300 to 400-foot intervals. Different technologies require different shaft sizes, and some require a permanent casing to be installed.

Verner evaluated three technologies that could accommodate 20-foot depths and a minimal slope (0.20 percent) to maintain flow for the gravity sewer:

- Jack and Bore
- Pipe Bursting
- Pilot Tube Method (PTM)

Jack and Bore would require large shafts (20 x 40-foot) and the installation of a permanent casing with the carrier pipe inside. Maintaining the required slope would require a larger casing to ensure the slope. The expense of the steel casing was a significant consideration.

Pipe Bursting would require large shafts to allow the final line to start at 20 feet below grade. To eliminate the traffic disruption this would cause, this pipe alignment would only replace the existing 12-inch sewer where it currently exists. Stabilization of the bank would become a major component of the project. Upsizing from 12-inch to 21-inch was determined to be beyond the practical limits of this technology given the challenges of this project.

PTM would allow limiting the size of shafts (8- to 12-foot in diameter) and the final installation would not require a permanent

The depth needed to tie in to the existing sewer was one of the challenges that made the Pilot Tube Method of guided boring the right choice for this project

casing. PTM is a 3-step process that installs Vitrified Clay Jacking Pipe (VCP-J) on grade and on target.

Accurate control of the line and the small footprint required, led to the selection of PTM for this project. It was deemed the best value for the community, minimizing disruption to the residents, impacts on existing utilities, and restoration at the conclusion of the project.

After doing due diligence on both the installation method and the pipe material, Verner commented, "This is not the clay pipe that got the bad reputation for being brittle. The average compression strength of this clay pipe is 18,000 psi."

In this neighborhood, the existing utilities included an 8-inch sanitary sewer, 36- and 18-inch storm drains, an 8-inch water main, and an 8-inch gas line. The depth of these utilities varied from just below the surface to 12 feet below grade.

Installation of the new pipeline would utilize just six access shafts at an average depth of 25 feet. The deepest shaft was 29 feet. Three of the shafts were round and 8 feet in diameter. The VCP-J pipe was ordered in one-meter lengths to make the smaller shafts practical. Memphis Road Boring (MRB), the contractor, was able to jack pipe in two directions from these shafts and in three directions from one shaft. Three of the shafts were used for reception only, and these shafts used 10 x 10-foot trench boxes. This arrangement lessened the impact on traffic circulation and maintained all existing services during construction. The ability to control the slope throughout the drive enabled MRB to achieve the specified 0.20 percent slope that minimized the required depth of the line.

The project was designed using PTM and went to bid in 2020. MRB had the winning bid of approximately $2.6 million. The work was awarded in December of 2020 and completed in 2021 on time and on budget.

The Akkerman Guided Boring Machine (GBM) 308 system used for this project can operate in an 8-foot diameter shaft and can jack up to 21-inch VCP-J. The GBM includes a digital theodolite with an integrated camera mounted independent of the jacking frame, a battery-powered LED illuminated target housed in the slant-faced steering head, and a computer monitor screen. This guidance system gives the operator a "real-time" view of the location and steering head orientation of the pilot tubes. This "real-time" view, together with the ability to continuously make adjustments during the entire pilot tube drive, results in pinpoint accuracy. In a three-step installation process, driving the pilot tube to the next shaft is step one.

In the second step, a reaming head attached to the final pilot tube and in front of temporary thrust casings, cuts and removes soils. Thrust (auger) casings advance the pilot tubes to the reception shaft where pilot tubes are removed (pilot tubes are reused on future projects). The spoils are transported by the auger to the jacking shaft for removal. The thrust casings are temporary casings that maintain the line while transporting any soils removed as the borehole is upsized from the four-inch pilot tube to approximately 11 inches.

> ***PTM would allow limiting the size of shafts (8- to 12-foot in diameter) and the final installation would not require a permanent casing.***

Step three is installation of the carrier pipe. Taking advantage of the average compressive strength of VCP-J (18,000 psi) means that no casing is needed in the final installation. The pipe itself can resist the high jacking forces generated as the pipe is thrust through the ground, replacing the temporary casings and augers and eliminating the need for an external casing pipe. The carrier pipe is jacked with an additional power reaming head (PRH) in front of the pipe. The PRH matches the OD of the VCP-J and removes excess soils in the area between the 11-inch hole created in step 2 and OD of the carrier pipe. The VCP-J pipe pushes the thrust casing to the reception shaft where it is removed. With a PRH, the augers within the casings are reversed and soils are transported to the reception shaft.

The project is complete when the carrier pipe enters the reception shaft. These shafts then become manholes (access holes) when the contractor has completed the sanitary sewer runs. The accuracy of the installation method meant MRB was able to tie the new alignment into the existing system at existing access holes.

Tommy Sander, P.E, of MRB said, "This project went seamlessly. We were able to install both 21-inch and 12-inch VCP in the middle of the streets, through a residential area, without 'open-cutting' the roadway while maintaining the slope specified of just 0.2 percent. NO resident was affected by this operation – meaning residents were able to use their streets and driveways throughout this project."

ABOUT THE AUTHOR:

Steve Matheny P.E. *is a sales engineer for Logan Clay Products. He is a Board Member for ASCE and has authored a number of papers and articles. He is currently consulting on multiple PTM projects. His bachelor's and master's degrees in civil engineering are both from Wayne State University. Steve is also a Board Member for the MSTT Chapter.*

NO MAN'S LAND: CROSSING THE SAVANNAH RIVER

By: Tyler Price, Underground Magnetics

UMagHDD.com

With a few techniques borrowed from oil diggers, Martin Cherrington may very well be the first contractor to bore under a river, and he did so without any electronic guidance. Cherrington and his crew did the unthinkable when they crossed the Pajaro River, drilling approximately 500 ft in one month. Jobs such as this paved the way for generations of HDD contractors to come. Fortunately, boring under a river is no longer considered "no man's land" and the introduction of electronic guidance systems like HDD locators as well as advancements in drilling equipment have made jobs like this more practical and efficient.

In July of this year, Sirman's Underground, out of Homerville, Georgia, was contracted to bore approximately 1800 ft across the Savannah River. Due to the reconstruction of the Houlihan Bridge in Port Wentworth, a new fiber line was required and going under the river was the best option. Faron, of Sirmans Underground, chose to use a combination of the Ditch Witch JT40 and the Underground Magnetics Mag 9 locating system paired with the Echo 90 transmitter to tackle the project. With that, they were able to locate to depths of 65 ft, while also using the Underground Magnetics' "drill-to" function to track and guide the drill head from the receiver 90 ft out in front of the head.

Coupled with the expertise of the Sirmans crew, the Mag 9 locating system played a pivotal role in ensuring the accuracy and completion of this project. It enabled them to not only locate, but also adjust as needed to ensure a straight and efficient bore path. Trusting the capabilities of your equipment is one of the key components when considering taking on a project like this. While accuracy is a requirement, efficiency is what enables your business and the horizontal directional drilling industry as a whole, to grow.

With today's advancements, Sirmans drilled approximately 1800 ft and located to depths of 65 ft. The Savannah River crossing took roughly one week to drill and pull back a 2" steel pipe. We appreciate the opportunity to provide hard-working contractors like Sirmans Underground with state-of-the-art equipment and congratulate their crew on a job well done!

Tyler Price is the marketing director at Underground Magnetics Inc.

Job Details
Total length of bore: 1800 feet (1500 ft of water)
Product pulled back: 2" steel

Deepest depth: 60ft
Furthest distance out in front of drill to: 90ft
Drill: JT40

Locator: Mag 9
Transmitter: Echo 90
Company: Sirmans Underground
Contact: Faron Sirmans

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BNSF MEMPHIS RAIL YARD REHABILITATION

Liner's increased hydraulic flow capacity allowed a slightly smaller 96-inch diameter to be sliplined

- **Owner:** BNSF Railway Company
- **Engineer:**BNSF Railway Company
- **Contractor:** LRL Construction Co.
- **Technical Description:** DuroMaxx SRPE Liner Pipe, 96-inch, 7,200 LF

By: Don Herbert, Contech Engineered Solutions

Located in Tennessee, the BNSF Memphis Rail Yard is a bustle of activity. With over 30 tracks, 25 of which are actively running, this is a critical yard that connects the east and the west coast Class One railroads. There is constant activity. Scheduling is a critical aspect to the performance of the yard.

Directly beneath this hub, are seven large culverts, each one 114-inch diameter and 1,436 LF. While these culverts have far exceeded their service life design, it had been determined that they were in need of replacement or repair. Most were experiencing some form of deflection and significant deterioration at the invert. Sink holes were starting to appear in between the tracks, which created great concern for the railroad. Given the prohibitive costs to replace these culverts, the rail looked at repair options and determined that a reline solution would be most effective, both structurally and cost-efficiently. A replacement would require a complete shutdown of the yard for an indeterminate period of time to allow for an open-cut and replacement of the existing culverts running directly beneath the central location of the yard. It was critical this scenario be avoided as the cost deficits would be astronomical and the impact to the yard and freight transportation would be devastating. However, a solution that would provide a long-term structural repair and meet the hydraulic requirements was also critically needed.

Because of the age, deformed condition, and close spacing of the host structures, an experienced tunneling contractor, LRL Construction Co., was selected to perform this reline job. They had experience working in confined spaces around the rail. Based on a detailed review of available options and long term requirements of the project, a steel reinforced polyethylene solution was selected to reline five of the existing culverts. Manufactured by Contech Engineered Solutions, the DuroMaxx® SRPE liners conform to the specifications in the AREMA Manual for Railway, Section 4.17, for design and load rating requirements. Due to the low Manning's n, the DuroMaxx SRPE reline solution also provided an increased hydraulic flow capacity allowing for a slightly smaller diameter of

> ***A reline solution was the most effective, both structurally and cost-efficiently.***

The DuroMaxx SRPE Liner Pipe offered a fully structural reline solution

96-inch to be sliplined into the 1,436 LF length of each of the five host pipes for a total of 7,200 LF, nearly a mile and a half of pipe end to end!

Due to the critical nature of this project for BNSF, and the installation methods required to make it a success, it was determined that weekly calls be set up to track manufacturing, delivery and installation. This high level of communication also included pre-construction meetings with the contractor and the railroad. There could be no impact to the train schedule, and safety was extremely important. The host pipes, originally

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installed in the early 1960s, had experienced heavy bed loads and high flow velocities over the span of their service lives. In a few barrels, the host pipe was starting to roll up on itself in some areas due to loss of backfill between the culverts. There was concern of void spaces between and over the culverts as well as the host pipes continuing to move over time from the massive loads over the top of these structures. The culverts needed to be accurately measured to ensure that the 96-inch steel reinforced polyethylene reline pipe would fit. This needed to be done fairly quickly before further storm events and the train loading compounded this situation. Concern had to be taken to ensure that the liners were installed correctly even as parts of the host had to be removed.

The liner pipe was shipped directly to the site in 41-foot and 45-foot sections from the manufacturing facility located in Montgomery, Alabama. Grout ports and skid tubes were attached to each section of pipe. The skid tubes would aid in installation to avoid surface abrasion or damage during installation. There were four rail yard drain tie-ins that also had to be reconnected on the site. The contractor was able to use top-hat risers specifically made to meet site conditions and install them once the main barrel was relined. The contractor devised a very ingenious method whereby they were able to push each length of pipe through the inlet end. Many days the contractor was able to get more than 10 pieces (more than 450 feet of pipe) in a single day while also installing internal bands on each section.

Randy Zeiger, P.E., senior operations manager at LRL Construction Co., commented, "The pipes installed much quicker than we originally thought. We had anticipated installing up to four pipes a day but were able to average about 10 pipes instead. The installation went very smoothly."

Liner pipe was shipped directly to the site in 41-foot and 45-foot sections

As each section was completed, a multi-stage grouting process was performed to set the pipe liner into the host pipe. A cellular grout was used to backfill the void space between the liner pipe and the host. During one weekend between sliding the DuroMaxx into the host pipe and grouting it into place, there was a significant rain event dropping approximately eight inches of rain over the weekend. The experienced reline contractor was able to avert disaster with some additional suggestions made by Contech.

Three of the seven culvert pipes were eventually fully grouted for a completely structural solution that allowed for an extended service life with a possibility of 100-years or more. The rehabilitation of these three culverts running under the rail yard was complete with no interruption to the ongoing rail services of the Memphis yard. The remainder of the project will be complete after the rainy season in 2020. The success of this project led to two other relines with BNSF.

ABOUT THE AUTHOR:

Don Herbert *is the Account Manager and Director for Rail Markets at Contech Engineered Solutions. He joined Contech in June of 1991 and has held many positions within Contech including sales engineer, regional sales engineer, area technical manager and most recently - area manager drainage. Don has a B.S. degree in Civil Engineering from Manhattan College and M.S. degree in Civil Engineering from Texas A&M University.*

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In 2022 SESTT held a very successful, well-attended **Trenchless Technology, SSES and Buried Asset Management Seminar** in the Nashville area at the Four Points by Sheraton Nashville-Brentwood, renewing optimism that effective in-person can now be held again in the wake of the post-COVID era.The SESTT Nashville Trenchless Technology seminar highlighted a joint presentation from Mr. Fadi Khayatt, Nashville Metro Water Services, and Mr. Taylor Hagood, LDA Engineering on "Innovation in Asset Management". There were eight other presentations by industry professionals on a wide range of trenchless technology topics. Since 2003, SESTT has been hosting **Trenchless Technology, SSES and Buried Asset Management Seminars** in various cities across the SESTT Chapter's ten state area. These seminars have engaged over 2100 underground infrastructure professionals over this period, facilitating meaningful direct networking between industry and owner groups. As part of the SESTT mandate to "promote Trenchless Technology through education for the public benefit", the seminar programs are designed to inform public officials, engineers, utility company personnel, designers, and contractors involved with the construction, rehabilitation, and management of underground infrastructure assets, in the Southeastern US. They are great venues for educating decision-makers on the many social and economic benefits of using trenchless technology in their infrastructure renewal and new construction programs.As the success of the Nashville seminar demonstrates, SESTT will again be conducting educational, informative and well attended seminars across the Southeast in 2023!Special thanks to our loyal SESTT seminar exhibitors, sponsors, presenters and attendees! **THANKS FOR YOUR ONGOING SUPPORT!!!**

SESTT Trenchless Technology seminars are great networking and educational opportunities

"SESTT Seminars facilitate meaningful direct networking between industry and owner groups."

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Pilot Tube Method (PTM) Of Guided Boring For New Pipeline Installations,
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