



NORTHEAST JOURNAL

OF TRENCHLESS TECHNOLOGY PRACTICES

NASTT-NE Trenchless Conference 2023

Dugway Brook Culvert Replacement

Mitigating Risk of New Installations

Safeguarding Fragile Ecosystems

2023 FALL EDITION



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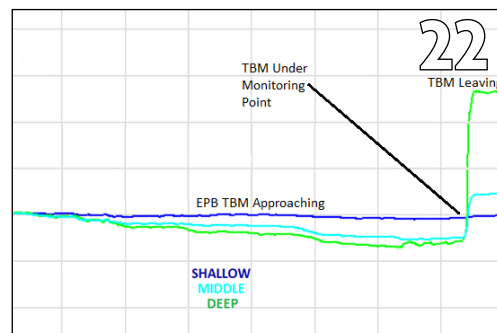
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**NORtheast REGIONAL CHAPTER
TRENCHLESS CONFERENCE**
November 13 - 14, 2023



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By: Dennis J. Doherty, P.E., F. ASCE,
Rabi Yadava, Ph.D., P.E., M. ASCE,
Terracon Consultants



Dugway Brook Route 30 Emergency Culvert Replacement

By: Tom Loyer,
Vice President, Trenchless Division
ECI – Engineers Construction Inc.



Safeguarding Fragile Ecosystems Using HDD in Environmentally Sensitive Areas

By: Shrey Arora, P.E. &
Dennis M. Walsh, P.E.,
Kilduff Underground Engineering

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MESSAGE FROM NASTT-NE CHAIR

Eric G. Schuler, P.E., NASTT-NE Chair

Welcome to the 15th edition of the *Northeast Journal of Trenchless Technology Practices*! Thank you for taking the time to open this publication and check out the content that our Chapter has pulled together for this Fall 2023 edition. A lot of hard work goes into pulling these magazines together, and our Publisher does a great job keeping us volunteers looking good. I hope that you find the content in this publication to be forward-thinking and practical.

Publication Thoughts:

I remember (and still have) the inaugural publication that NASTT-NE released around the time of our first conference in Lowell, MA. That was nearly 8 years ago. We have had some Board member turnover since then as the Chapter has grown and evolved, but our messaging and high-quality magazine production has stayed the same. We have also expanded our offerings by sponsoring a Trenchless for Gas Infrastructure publication as well. Our success with these publications would not be possible without our publisher (A to B Publishing) and the companies that advertise in this publication. That ad revenue has been a consistent source of income for us and is a significant contributor to the financial needs of our annual conferences. We are not a “for profit” entity, but we do have bills to pay for these events!

Earlier this year, the Board of Directors chose to enter in a new contractual agreement with A to B Publishing. This ensures the quality and consistency of our product for years to come. Consistency breeds Success.

“CONSISTENCY BREEDS SUCCESS!”

2024 No-Dig:

NASTT is hosting the annual No-Dig Conference in Providence, RI for 2024. This is shaping up to be a great event and early numbers for vendor/sponsor participation are remarkable. In July I was fortunate to be able to get a sneak peak of the event venue through my participation on the No-Dig 2024 Planning Committee. Downtown Providence is truly a beautiful area and the venue is top-notch for this event. This is the first No-Dig in the Northeast Region, so we are hoping to draw new attendees from the large municipal centers that are just a short drive from Providence (NYC, Boston, etc).

If you have never attended one of these National events, I highly recommend you attend this one. You will not be disappointed with the networking and educational opportunities that are offered.

Chapter News & Self-Reflection:

2024 will bring in leadership changes to the Chapter, as we stay committed to changing Executive Committee and Board Roles/Responsibilities on a two-year cycle. I will be phasing out into a “Past Chair” role, with the current Vice Chair, Treasurer, and Secretary being elevated. We will be welcoming Tom Loyer into the Executive Committee as the Secretary starting in 2024. Please see the section of this publication that highlights the changes in the Executive Committee and Board of Directors for 2024.

Speaking of Tom, him and Bill Jeffery remain such integral pieces in making our

annual conferences successful. They lead our efforts for vendor/sponsor participation and venue coordination. This is something they have been doing for several years for us and are really the driver for us as a Chapter having such successful events. Thank you again Tom and Bill!

Bill is the one I have to thank for getting me into this organization. After the first NASTT-NE event, Bill recruited me to join the Board of Directors...and for whatever reason I was voted in. Since that time I have been fortunate to learn how to lead and run an organization such as this from household names such as George Ragula, Dennis Doherty, Matt Timberlake, Ian Mead, and Babs Marquis. I would say that is a pretty good group to learn from. Babs handed me the keys after the West Point NY event, and I am happy to hand the keys off to the next group that will be leading this Chapter. Jonathan Kunay will be at the helm and carry this forward for the next couple of years.

Leading this Chapter the last two years has been a nice leadership development tool for my career. It was a learning experience, as everything in life should be. I just turned 35, so hoping there are several other volunteer organizations that I will have the opportunity to lead before I call it a career. I’m thinking my experience with this Chapter will set me up well for that.

On that note, I’ll close this introductory message with another Thank You! Thank you for being a part of our Chapter’s journey, thank you for letting *ME* be a part of this Chapter’s story and hopefully I see you at No-Dig in 2024. Enjoy the Day!

Eric Schuler

Eric G. Schuler, P.E.
Chair, NASTT-NE



MESSAGE FROM NASTT CHAIR

Matthew Wallin, PE, NASTT Chair

The 2024 No-Dig Show Heads to the Northeast!

Hello Northeast Chapter Members & Associates! We are in the thick of planning for the 2024 No-Dig Show which meets in your region in Providence, Rhode Island next April. We are so excited to head to Providence as it is a great central location within the heavily populated northeast corridor, just a short drive or train ride from Boston, and within reasonable drive from Philadelphia, New York City, Hartford, and many other cities in between. Our Show motto is **Green Above, Green Below** as it is important that our industry is a steward of our precious natural resources, so we welcome the opportunity to provide a forum for learning about the latest in innovative trenchless products and services that help us all accomplish that lofty goal. We would love to encourage everyone from the Northeast Region to help us spread the word about the upcoming conference. If you'd like to be involved, contact us at info@nastt.org and learn more about all the No-Dig Show has to offer at www.nodigshow.com.

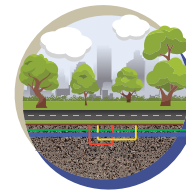
In the coming months we have many additional events planned to bring the underground infrastructure community together. Our ever-popular NASTT Good Practices Courses are being held both virtually and in-person throughout the year. Visit www.nastt.org/training/events to find a course that fits your schedule.

.....

**“OUR
VOLUNTEERS
AND COMMITTEE
MEMBERS ARE
WHAT KEEP
US MOVING
IN THE RIGHT
DIRECTION!”**

.....

If you have attended an NASTT event (national or regional) you probably left feeling excited and eager to get more involved. I ask that you consider getting engaged in one of the many NASTT committees that focus on a wide variety of topics. Some of our committees that are always looking for fresh ideas and new members are the Training and Publications Committee, the individual topic Good Practices Course Sub-Committees, the Educational Fund Auction Committee, the No-Dig Show and No-Dig North Planning Committees and Technical Program Committees. There are many opportunities for you to consider where



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your professional expertise can be put to use through networking with other motivated volunteers. With education as our goal and a strong drive to provide valuable, accessible learning tools to our community, we are proud of our continued growth as both an organization and as an industry. Our volunteers and committee members are what keep us moving in the right direction.

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! And we hope you are planning to join us in Providence for the 2024 No-Dig Show April 14-18!

Matthew Wallin

Matthew Wallin, PE
NASTT Chair

INTRODUCING THE NASTT-NE BOARD 2024-2025

JONATHAN KUNAY – CHAIR



Jonathan Kunay, P.E., PMP is an Associate Engineer and the global Conveyance Market Discipline Leader for CDM Smith in Boston, MA. He has 19 years of experience working as a design engineer and project manager on a variety of trenchless projects including infrastructure assessment with traditional and state-of-the-art investigative techniques, rehabilitation

using CIPP, HDD and pipe bursting, facilities planning and master planning, leak detection of water distribution systems, enterprise asset management and risk/criticality studies.

While trenchless technologies have been his primary focus over the past 16 years, he also has worked on civil site design for commercial developments and municipalities, navigated Consent Order driven long-term programs, designed new pumping stations and developed alternatives for sewer separation projects. Jonathan is based in New England; however, his diverse project experience has brought him many places to experience unique perspectives in the trenchless marketplace. He has worked on trenchless projects all over the United States including California, Texas, Illinois, Tennessee, Louisiana, South Carolina, Nebraska, Virginia, Florida and Georgia. He has also implemented trenchless projects and programs internationally in the Middle East, China, South America, the Pacific Islands and Europe.

Jonathan was the project manager and design engineer responsible for helping to bring service lateral lining into the New England market in 2008 as part of a comprehensive sewer system rehabilitation program. This comprehensive model has now been adopted across the country as a proven methodology by which infiltration and inflow can be removed in large quantities from the sewer collection system. This comprehensive approach has been presented at conferences to showcase the validity of utilizing a holistic trenchless methodology when large percentages of I/I by volume must be eliminated.

Jonathan has a Bachelor of Civil Engineering and a Minor in Environmental Engineering from the University of Cincinnati, is certified in NASSCO's Pipeline Assessment and Certification Program (PACP), Manhole Assessment and Certification Program (MACP), and Lateral Assessment and Certification Program (LACP), and is involved in multiple committees in the National Association of Sewer Service Companies (NASSCO)..

CHARLES TRIPP – VICE CHAIR



Charles Tripp, P.E. is a Technical Manager focusing on Pipeline Rehabilitation Design and Condition Assessment for the New England Water Business Line at AECOM in Chelmsford, MA. He has 17 years of experience working as a design engineer and project manager on a variety of trenchless projects including pipeline rehabilitation, condition assessment,

risk modeling, and general asset management. His varied design experience also includes collection systems design and peer review, wastewater treatment, water resources, and site-civil design to improve municipal infrastructure.

Charles was first introduced to trenchless technologies through his involvement in multiple sanitary sewer rehabilitation projects starting early in his career. He also briefly served as a Field Engineer for a world leading CIPP construction company. This experience provided a wealth of exposure and instilled a desire to pursue and advocate for the use of trenchless technologies in projects as a way of mitigating the impacts of excavation in urbanized areas, but also as a means of cost-effective design.

Charles studied Civil Engineering at the University of Massachusetts Amherst earning his B.S. and went on to receive his M.S. in Environmental Engineering from the Worcester Polytechnic Institute. He is a licensed professional engineer across New England and the Tri-State area. He is also PACP/MACP certified by NASSCO.

As Vice Chair for the Northeast Chapter of NASTT, Charles continues to capitalize on his devotion to trenchless technologies and in advocating for its use in the local construction market. He continues to apply his experience in the management of the Executive Committee and in ensuring the organization meets its goals and obligations.

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EXECUTIVE COMMITTEE

JOHN ALTINYUREK – TREASURER



John Altinyurek is a Project Engineer with the New York, NY, office of Delve Underground Engineering, PLLC. During his career in the underground industry, John has worked on major tunneling and trenchless projects in the New York City area, including his continued work on the Newtown Creek CSO Tunnel project for the New York City Department of Environmental

Protection. He has also been involved on projects for clients such as the New York State Department of Environmental Conservation; NYC Department of Design and Construction; New York City MTA Transit; Port Authority of New York and New Jersey; Amtrak; and Nassau County.

For the past nine years, John has focused on underground construction management, design and construction of water and wastewater projects, and tunnel and conveyance design projects. He has worked on various pipeline projects utilizing tunneling, microtunneling, pipe jacking, horizontal directional drilling, and other tunnel rehabilitation methods.

John recognizes the importance of the NASTT NE Chapter in its promotion of the rapidly growing trenchless design and construction methods in the United States. As a young professional, one of John's goals is to engage his peers in the NASTT NE Chapter to become involved in the trenchless industry early in their careers.

TOM LOYER – SECRETARY



Thomas Loyer is Vice President of Engineers Construction Inc. Trenchless Division, in Williston VT. He oversees all aspects of the operations pertaining to directional drilling, pipe ramming, auger boring, tunneling, and pipe bursting.

Tom's career has been focused on the underground construction industry for over 30 years. Prior to joining ECI, Tom owned and operated Trenchless Technologies of New England, Inc. During his nineteen years at TTNE he worked alongside his brother, Mike, to promote and develop the trenchless industry in New England. He studied business at Champlain College in Burlington, VT.

Tom has served on several boards, including The Associated General Contractors of Vermont, where he chaired the legislative committee, and volunteered with associations such as the Fraternal Order of Eagles Aerie #793, Shelburne Little League, CSB Youth Hockey, and the CVU Football Boosters Board.

For the last twelve years, he has been the President of The Classic Mike Loyer Foundation, a non-profit, whose primary mission is to assist Vermont families who are dealing with the accidental worksite death of a loved one. Tom, and his wife, Lori, live in Shelburne, VT.



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NASTT-NE BOARD 2024-2025 EXECUTIVE COMMITTEE

ERIC SCHULER – PAST CHAIR



Eric Schuler is a Deputy Commissioner for a public wastewater system serving a population of roughly 350,000 residents. In his leadership role, he oversees all of Capital Programming, Construction, Asset Management, Fleet, and Inventory Control. Mr. Schuler has over 10 years of experience in both the private and public sectors. He earned his Bachelor of Science in Civil Engineering degree from Clarkson

University in Potsdam, NY and has primarily been involved in wastewater, drinking water, civil-site, and stormwater sectors. Eric is a licensed Professional Engineer in New York whose design, project management, and construction-related experiences have helped successfully execute many “trenchless”-focused projects.

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

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

2024-2025 NASTT-NE BOARD OF DIRECTORS

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NASTT Northeast Chapter Technical Sessions - Albany, NY, November 13 & 14, 2023

Time	Presentation	Speaker	Presentation	Speaker
7:30 AM	Registration Desk Opens			
7:30-8:15	Breakfast and Networking - Vendor Area Open			
8:15-8:45	Opening Remarks - NASTT-NE Chair, NASTT Executive Director			
	AM Track 1 - Advances in Trenchless		AM Track 2 - Trenchless things you should be aware of	
	Sahar Kunay - Moderator		Raj Gondle - Moderator	
9:00am-9:25am	HDD Drill Fluid Can Improve Production	Brian Dorwart, PE, PG, Brierley Associates	Program Based Use of the Complete Water Main Rehabilitation Toolbox – Innovative Solutions to the Problem	C. Macey PEng, and C. Tripp, PE, AECOM
9:30am-9:55am	Structural vs. Semi-Structural Pressure Liners – Be Careful What You Wish For	George Ragula, RagulaTech	Development of a Prix Fixe Sewer Rehabilitation Menu	Laurie Perkins, PE, Lindsey Sylvester, PE, Wright-Pierce
9:55am-10:35am	Principles and Benefits of Horizontal Down The Hole (DTH) Hammer Boring	Richard Revolinsky, Geonex Inc.	Design Practices for Rehabilitation of Pipelines Using Today's Materials	Brian Dorwart, PE, PG, Brierley Associates
	Live Outdoor Demonstration			
10:35am-11:15am	Manhole Lining Demonstration Ryan Bridegroom Precision Trenchless, LLC.		Pipe Bursting Demonstration Andy Hoffman Centerline Trenchless	
11:15am-11:55pm	Break - Vendor Time			
12:00pm-1:00pm	Lunch Keynote Speaker: Katie McKittrick, P.E., City of Albany Department of Water and Water Supply			
1:00pm-1:25pm	Vendor Time			
	PM Track 1 - HDD and Microtunneling Applications		PM Track 2 - Sanitary/Storm Sewer Applications	
	Charles Tripp - Moderator		Claudia Law - Moderator	
1:30pm-1:55pm	HDD under I-495 Interchange, Lowell, MA	Jesse Lubbers, National Grid	Diverting combined frow from a diversion and regulatior and lining sewer in NYC	Ketty P. Paulino, PE, NYC DDC
2:00pm-2:25pm	Successful HDD Design and Installation, Yankee Run River	Ryan Calhoun GHD, Inc.	Sanitary System Rehabilitation Norwich Public Utilities, Norwich, CT	Larry Sullivan, PE (NPU), Peter von Zweck, PE Larry Murphy, PE (Jacobs)
2:30pm-2:55pm	Design and Construction of 5,100 LF of Soft Ground Locust Grove 84-inch Microtunnel	Michael Bisignani PE and David Woolley, GHD.	Rehabilitation of Somerville's 1895 85x90" Brick Combined Sewer Interceptor	Gus O'Leary, PE KLEINFELDER
3:00pm-3:55pm	Development of HDD Designs for the Champlain Hudson Power Express (CHPE) Project	Zach Dobrovolny,Kiewit Nick Strater, Brierley Associates	Utilizing Directional Drilling to Consolidate Wastewater Systems	Charles Prior, EDR

NASTT-NE TRENCHLESS TECHNOLOGY CONFERENCE 2023

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KEYNOTE SPEAKER



Katie McKittrick, P.E., is currently an Engineer with the City of Albany's Department of Water & Water Supply where she oversees and assists with a variety of water, sewer, and stormwater infrastructure projects and programs. Katie is a Professional Engineer and graduate of The Ohio State University with a B.S. in Environmental Engineering and specialization in Sustainability. She currently serves as Albany Water's liaison for Albany's Sustainability Advisory Committee's Water Subcommittee and is a member of the Industry Advisory Board for the Trenchless Technology Center out of Louisiana Tech University. As a public servant, Katie is motivated to implement infrastructure solutions that maintain or improve quality of life in Albany's urban environment, where trenchless technology can play a crucial role.

WELCOMING NORTH AMERICA'S UNDERGROUND INFRASTRUCTURE COMMUNITY TO THE POPULOUS NORTHEAST!



The Northeast Chapter of the The North American Society for Trenchless Technology looks forward to hosting the 2024 No-Dig Show in Providence, Rhode Island April 14-18. Hosting North America's premier trenchless educational and networking event in the Northeast for the first time, presents a golden opportunity for the Northeast Trenchless community to showcase the progress it has made in utilizing trenchless applications as the preferred method for underground infrastructure construction in the Northeast.

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NO-DIG SHOW

2024

Within an easy day's drive from most cities in the populous northeast – Providence is just a few hours' drive from Portland ME, Philadelphia, PA, NY, NJ, VT and CT – the 2024 NASTT No-Dig Show promises to draw significant attention from top infrastructure decision-makers across the Northeast including municipal authorities, utilities, engineers, contractors, suppliers and policy-makers.

The 2024 NASTT No Dig Show motto "Green Above, Green Below" exemplifies the trenchless industry's position as an important steward of our environment and natural resources, utilizing approaches that have significant environmental and social benefits. Trenchless Technology is at the forefront of ongoing efforts to reduce GHG emissions.

As our planning kicks into high gear, check the website www.nodigshow.com for updates and further information.

The excitement and anticipation is building – be a part of the excitement as a presenter, sponsor and exhibitor!

Babs Marquis CCM

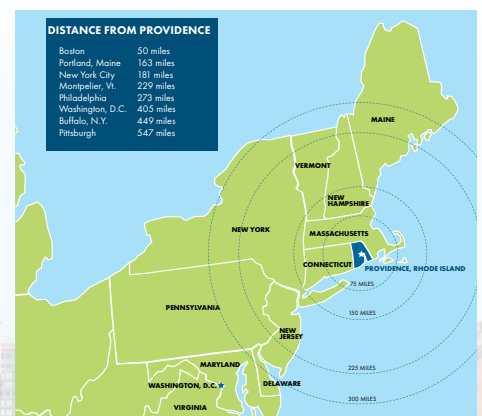
Delve Underground
2024 No-Dig Show Planning
Committee Chair
Secretary, NASTT Board of Directors
Past Chair, NASTT-NE Chapter



The NASTT No-Dig Show is being hosted in the Northeast for the first time



Rhode Island Convention Center



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2024

DUGWAY BROOK ROUTE 30 EMERGENCY CULVERT REPLACEMENT

Deteriorated Culvert nearby Duane NY Requires Rapid Response

By: A2B Publishing Inc.

INSPECTION REPORT RED FLAG

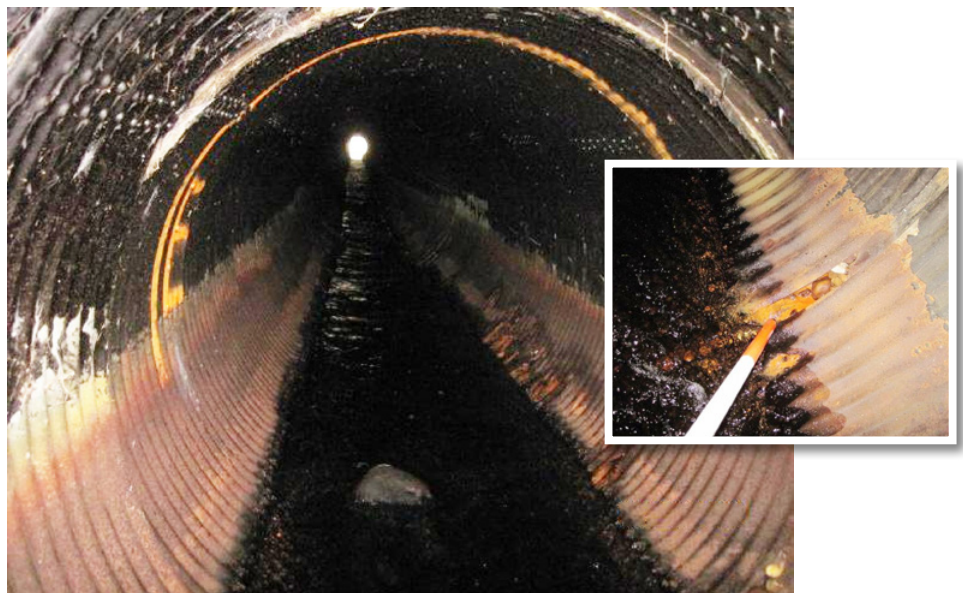
Routine NYDOT inspections red-flagged a large 84-inch culvert which channels Dugway Brook under Route 30 near the town of Duane, Franklin County in central New York State, roughly 3 hours north of Albany. Inspections revealed severe deterioration in the CMP steel culvert's 210-foot span, with numerous holes, heavy rust, and near complete failure of the culvert floor. Buckling of the crown was evident directly under the travel lanes, raising concerns the culvert was in danger of collapse.

Closing this major state highway which threads north-south through the Adirondacks to excavate the culvert was out of the question, so planning began investigating repair or replacement options. It was quickly determined that the best approach was to replace the existing culvert and install a new culvert parallel and to the immediate north. Given the steep slope and need to keep the roadway open, there was no option to do this other than using trenchless methods.

Design work on the culvert replacement was expedited and the project was let out to bid in June 2022. Local heavy civil contractor Friend Commercial Contracting in nearby Malone NY was awarded the job and subcontracted the trenchless portion of the work with ECI (Engineers Construction Inc.), based in Williston, Vermont. ECI has a well-deserved reputation for completing complex technical projects under all



Culvert under Route 30 travel lanes was in danger of collapse



Severe deterioration in the 210-foot CMP culvert

kinds of challenging conditions on very time limited schedules. They had done several projects with Friend Commercial Contracting before, were on very good terms and familiar. ECI was well positioned, poised and well equipped to take on this job, and get it done quickly.

MOBILIZATION TO REPLACEMENT

At first, the plan was to replace the culvert with new precast 84-inch RCP. While it was available at slightly less cost, using this thicker-walled pipe with a 102-inch OD RCP would have entailed a year-long wait for ECI to obtain the TBM equipment capable of this diameter. ECI can bore up to 94.5 inches with existing equipment. Instead the thinner walled fiberglass/mortar 84-inch HOBAS pipe was selected with an 87.5 inches OD. Though substantially lighter than RCP, the HOBAS pipe still had the stiffness necessary to withstand the pipe jacking forces during installation and the compressive loading from the 22-foot of embankment above the pipe.

ECI quickly mobilized crew and its equipment to the site on Monday November 7, 2022, and began set up of the launch pit on the downstream end and east side of the highway embankment. A coffer dam was constructed around the launch pit to divert considerable flow from Dugway Brook around the worksite before installation started.

Both Friend Commercial Contracting and ECI have extensive experience working in conditions similar to this in projects throughout New England and upper state New York. The crews pay careful attention to maintaining a high standard of safety and carefully follow any applicable environmental regulations when working in sensitive areas like the Dugway Brook watershed.

It was challenging moving the equipment, lowering the TBM and setting up down the steeply sloped 30-foot embankment from the highway – far enough below the highway that the work was barely visible to the vehicles passing above. In fact, there was zero impact on traffic the entire time ECI was onsite, with no need at all for any lane closures or traffic control.



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TBM lowered into launch pit. ECI crews maintain a high standard of safety

The ECI crew deployed the Akkerman Model 5000 Series II Pump System from its equipment fleet to install bore the alignment for the new 216 LF culvert. This jacking/pumping system can deliver a maximum 400 tons of thrust, so it was more than enough for the expected task. After 3 days of set up the crew began advancing pipe on Thursday, November 10.

GROUND CONDITIONS

There were some challenges at the outset. While jacking the first 20-foot segment of pipe into place, the soft silty soil at the foot of the embankment began collapsing onto the top of the TBM. This was rectified by packing down heavy wet clay at the point of entry to stabilize the soil and prevent further collapse. Once the TBM progressed further into the embankment there was sufficient ground cover for the boring to proceed

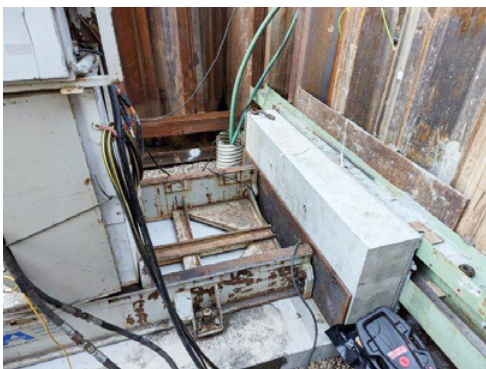
with the surrounding cover intact.

Up to 280 tons of force was needed to jack and bore the 20-foot segments of 84-inch pipe into place through moderately demanding ground conditions. Heavy cobbles and boulders were often encountered along the entire borepath, and at one point the reaction wall almost gave way from the thrusting forces being employed. The thrust block sat right against the coffer dam wall, and if it had failed completely the entry pit would have been under water in less than a minute.

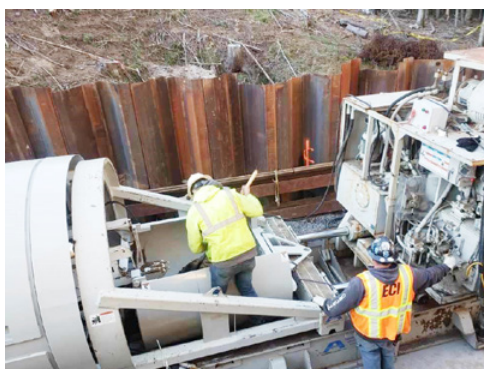
With additional bracing in place for the reaction wall the rest of the tunneling proceeded smoothly without any further delay. The pipe advanced at a rate of approximately 15-20 feet per day, and by Monday December 5 the tunneling was complete, and the new pipe in place. While ECI demobilized from the site, Friend Commercial Contracting installed the precast headwalls at



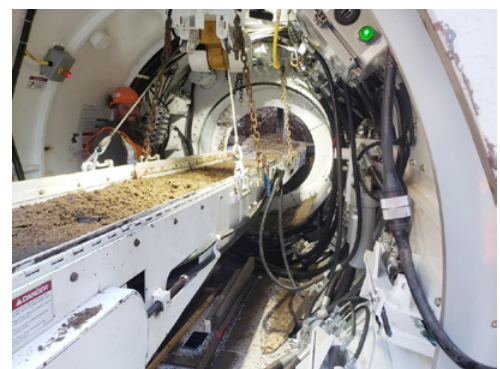
Replacement was installed to the immediate north of existing culvert



Thrust block required extra bracing



Spoils conveyor and muck cart



Soft silty sand at point of entry later gave way later on to heavy cobbles and small boulders



84-inch HOBAS pipe was jacked in 20-foot segments

**“VERY IMPORTANT TO GET A GOOD
GEOTECHNICAL BASELINE REPORT FOR A
PROJECT OF THIS MAGNITUDE.”**

– TOM LOYER, VICE PRESIDENT, TRENCHLESS DIVISION, ECI

both ends, and then backfilled the old culvert with cementitious grout.

Because the ground conditions were anticipated ahead of time, they were factored in to the project design, planning and equipment selection. This was crucial for completing the smooth and timely installation of the replacement culvert, thereby averting the potential for more serious damage and disruption to the highway that would have resulted from the collapse of the existing culvert. The best kinds of projects are always the most uneventful, and prior knowledge of the ground conditions was the key element in this success.



Worksite was barely visible to the traffic passing above



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As Tom Loyer, Vice President of the ECI Trenchless Division notes, the Dugway Brook culvert replacement demonstrated again how it is “very important to get a good geotechnical baseline report for a project of this magnitude.” ✚

ABOUT ECI:

ECI

ENGINEERS CONSTRUCTION INC.

ECI – Engineers Construction Inc., is a family-owned general contractor specializing in civil, sitework, concrete construction, paving, railroad construction, and directional drilling. ECI was founded by Alan Pidgeon in 1965, and in 2004 Alan’s sons, Ken and Scott, assumed ownership of the company. ECI strives to provide a quality project at a fair price, and is a preferred contractor for technical projects in tough working conditions on a tight schedule. Central to the company’s mission is the belief that high quality safe workmanship adds value to both the owner’s asset and to the contractor’s effort.



Completion on December 5, anticipating ground conditions was a key element to success



Demobilizing from site - ECI is used to handling tough projects on a limited schedule



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MITIGATING THE RISK OF NEW TRENCHLESS INSTALLATIONS

The cost of risk is real regardless of tolerance to the risk

By: Dennis J. Doherty, P.E., F. ASCE, Rabi Yadava, Ph.D., P.E., M. ASCE, Terracon Consultants

It really comes down to 'Pay me now or pay me later.' This begs the question: which is more expensive? Risk mitigation is in many ways insurance against a costly event.

The design and construction of projects using one or more trenchless installation methods is more than just a line on a piece of paper. It does not require just a good survey plan, it requires an understanding

of the geological conditions, an understanding of just how the selected trenchless method excavates and removes the ground and installs the pipe, and the required equipment within a specific work zone. It also requires an understanding of existing other issues such as contaminated ground, former and existing building foundations, other utilities in the ground, traffic volumes, egress/ingress points,

social issues, and various other factors.

There is risk and not all risks are equal. The cause or trigger of the risk event occurring for a specific trenchless method is dependent on engineering and human error from operations in engineering and construction that can be controlled through change in design and construction operations. These events could include ground settlement, ground heaving, large voids, movement of sensitive buildings, inadvertent returns, changed ground conditions, broken downhole tooling, and even loss of life. So, it requires managing the risk. The risk to the owner to pay for legitimate change orders due to defective designs or changed conditions; the risk of contractor financial losses caused by defective work or underestimating production rates or use of incorrect tooling for the ground conditions; and the risk to third parties.

All new trenchless installation methods carry risk. The monetary value of risk is generally negative, adding to project cost when a risk event occurs. This negative cost can be limited to clean up of an inadvertent return to settlement of surface features or even cross bores resulting in death.

As noted, not all risk values are equal. Geographical locations of a project influence the cost of risk. In rural areas where long pipelines are installed, partially with trenchless methods, the infrastructure, both above ground and below ground, is limited. The biggest concern is an inadvertent return into an environmentally sensitive area, settlement



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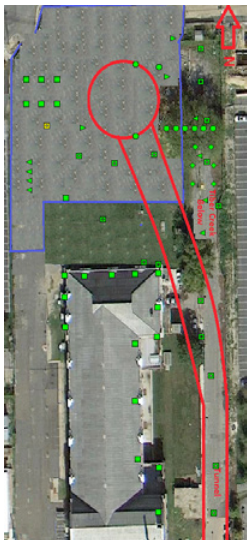


of surface features with rail lines being the most critical, or subsurface conditions that are problematic to a specific trenchless installation method such as large natural obstructions, nested cobbles, or karstic conditions.

In suburban areas, surface features become more complex with a mix of residential, commercial, and institutional land use and integrated underground utilities. In highly urbanized areas, the risks multiply and the cost of risk increases significantly. This is especially true in older established urban areas where land use has evolved, sometimes resulting in abandoned underground manmade structures and long-forgotten utilities. Older buildings may be sensitive to movement or changes to geological conditions. For example, in the Back Bay section of Boston, many of the old brownstone residential buildings are on wood piles that need to be constantly submerged in groundwater to prevent structural deterioration of the piles. To mitigate the issue of dewatering from long term dewatering for trenching in a highly urbanized environment, the Boston Water and Sewer Commission elected to use several trenchless methods, including microtunneling, to replace or rehabilitate sewers and storm drains in the area. Not only is dewatering for construction purposes add risk to the buildings. It also adds risk to all underground utilities which are also not equal. Old clay or cast-iron

pipes with leaded joints typically are sensitive to movement, whereas welded steel pipe and fused HDPE or PVC can tolerate some movement. In addition, thrust reaction from jacking operations needs to be transmitted into the ground without damaging old brick manholes.

In addition to the geographical



Instrumentation to monitor TBM mining towards a shaft

“DESIGN AND CONSTRUCTION OF TRENCHLESS PROJECTS...IS MORE THAN JUST A LINE ON A PIECE OF PAPER.”

risk, each trenchless method carries its own set of technical issues that influence the cost of risk. Risk can arise from open-face versus closed-face trenchless methods, running sands with less than 20 percent

finer, very soft or loose soils, above or below groundwater, nested cobbles and gravel, man-made fill, natural or man-made obstructions, and mixed face conditions. For example, when tunneling

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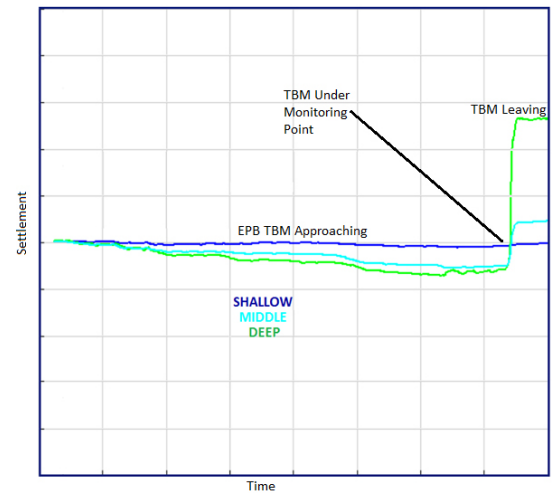
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in loose-running sand with less than 20 percent fines below groundwater, control of ground movement and mitigation of same is best achieved using a closed-face system, e.g.- slurry microtunnel.

Another example is Horizontal Directional Drilling (HDD) in an urban area. It can be done, but the larger the product pipe, the larger the borehole, and the higher the risk of ground movement. To mitigate the risk, a settlement evaluation should be conducted, and critical surface points and subsurface utilities monitored with set movement criteria. In some situations when bedrock is relatively shallow (30 to 50 feet below ground surface), it may be an advantage to identify the interface of hard and soft ground. Both were the case on a project in downtown Atlanta where Georgia Power was required to relocate an existing high voltage line from underneath a planned

new Atlanta Streetcar system. The alignment was approximately 2,500 feet long uphill HDD with historical buildings in the lower reaches of the alignment and high-rise buildings in the upper reaches. Drilling in the hard abrasive rock would triple construction time. It was decided to put the alignment in the softer overburden, as close to the interface between hard and soft ground, even with increased risk of ground movement. To determine the interface between hard and soft, the geophysical method of seismic refraction was used. To monitor ground movement, critical surface and subsurface features were monitored with a remote system. Other than one unplanned drill mud inadvertent return (IR), and some minor issues with groundwater flows during rain events, the project was a success. This is an example of a positive risk mitigation as it saved on cost and schedule.

Understanding where these risks are and mitigating through the design process will greatly reduce the cost of risk. Risk mitigation methods that can be used during the design process include identification of surface features such as wetlands and other environmentally sensitive areas and identifying potential geohazards and property rights issues. This is typically done at a pre-field investigation, commonly known as a desktop study. This is followed by a detailed geotechnical investigation in accordance with recommended best



Settlement Trough vs. TBM Advancement

practices for each trenchless method. This data should be consistent across the U.S., regardless of geographical location, with lab tests per industry good practices and standards.

As noted by the above examples, geophysical methods for deep subsurface condition characterization may need to be employed. Other methods include:

- Ground penetrating radar (GPR) may be used to identify unmapped utilities and obstructions (both manmade and natural).
- Roto sonic investigations in glacial till and geology with large boulders
- Pre (and post) Condition assessment of surface features, structures, and buildings using drones and lidar.

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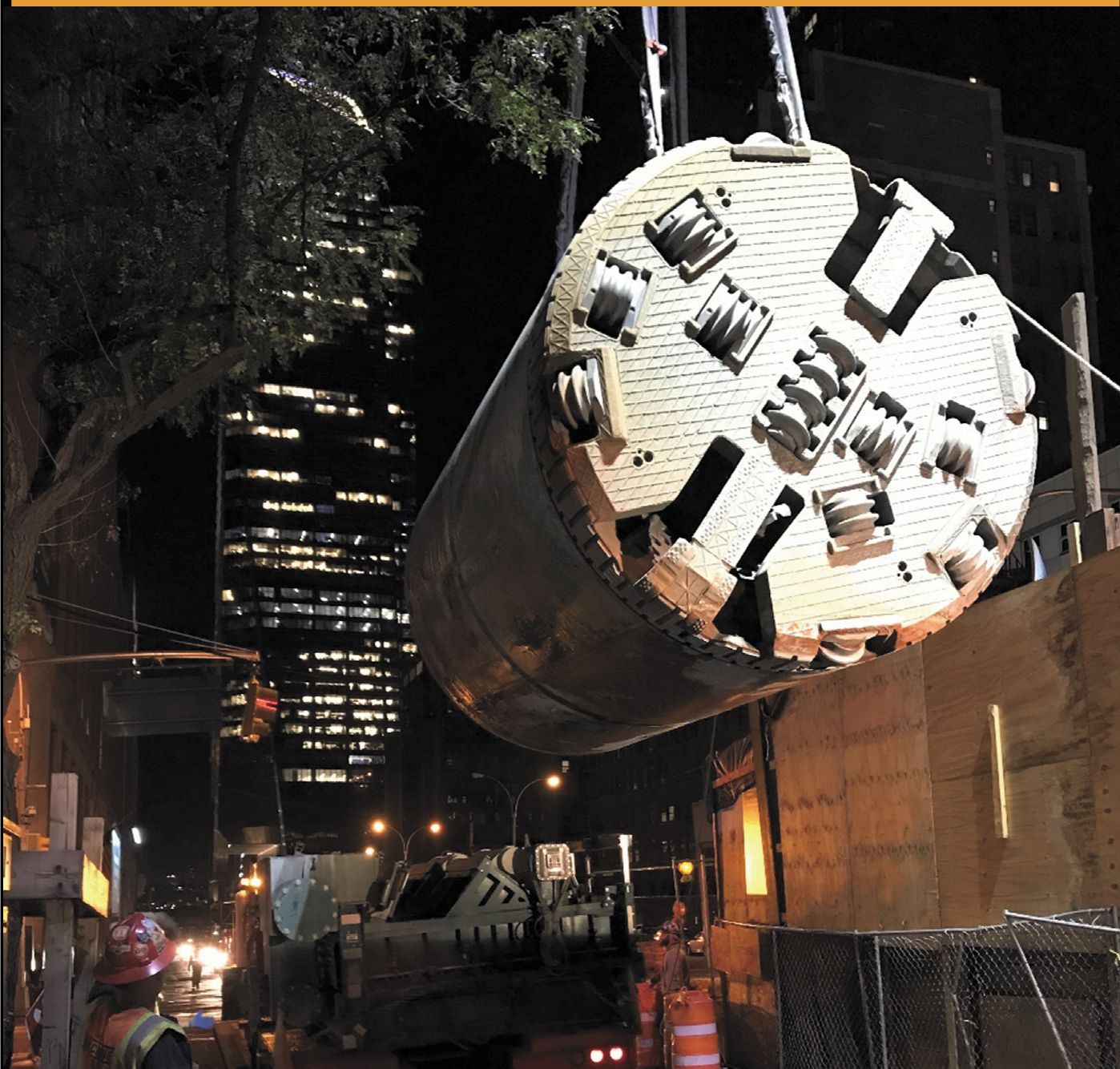
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Risk mitigation that can be employed during construction include:

- (Pre) and post Condition assessment of surface features, structures, and buildings using drones and lidar.
- Geotechnical instrumentation to

monitor ground, utility, building, and other structures movement.

- Ground stabilization methods, and
- On-site inspectors monitoring trenchless construction activities.

An example of the use of ground movement monitoring is the tunnel work in Washington, DC. The Blue Plains Tunnel (BPT) and First Street Tunnel (FST) project are part of DC Water control of Combined Sewer Overflows to the Anacostia River. The construction included multiple shafts, excavated to

.....
***“ALL NEW TRENCHLESS
 METHODS CARRY RISK.
 NOT ALL RISKS
 ARE EQUAL.”***

depths up to 200 feet. It also included approximately five miles of approx. 26-foot diameter reinforced concrete tunnel excavated using Earth Pressure Balance (EPB) Tunnel Boring Machine (TBM) in soft ground under and adjacent to the Potomac and Anacostia Rivers.

A comprehensive “Automated Monitoring System” was implemented to monitor, evaluate, and document how the tunnel and the shaft construction activities were affecting the surrounding ground, groundwater, and existing adjacent structures and facilities. The instruments installed and monitored were in-place inclinometers, piezometers, extensometers, tiltmeters, structural and utility monitoring points using traditional surveying and robotic total stations, concrete and rebar strain gauges, earth pressure cells, concrete hydration monitoring thermistors, curing pumps, and vibration and noise monitoring using multiple seismographs. The project involved thorough pre- and post-construction condition assessment. Many sensors were monitored in real-time using a large number of dataloggers at every 30-60 minutes. A ground loss of approximately 0.25 percent was minimal and considered an overwhelming success. The BPT project received ENR 2016 Best Project award in the Mid-Atlantic Region for Water/Environment. It was awarded on basis of overcoming challenges, contribution to industry and community, safety, and quality.

The cost of risk mitigation versus a risk event is scalable. The cost to mitigate risk in rural open range areas compared to the cost of the project are minimal because the risk is minimal. Whereas in highly urbanized areas the cost of a risk event can be greater than the cost of the project. This is where the cost of risk should be compared to the cost of mitigation. Is it worth the cost of conducting a geophysical survey as compared to the

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need to dig up an unforeseen abandoned building foundation in the middle of a busy intersection? Or from a political standpoint, the owner required geoinstrumentation of critical infrastructure such as in Washington, D.C. Many large regional utility authorities such as the Northeast Ohio Regional Sewer District (NEORS) and the Massachusetts water resources Authority require risk mitigation efforts both during the design process as well as during construction.

This is primarily because of the sum of dollars being invested by the public agencies, and as good stewards of public funds, it is prudent to invest in risk mitigation. However, this is also true for private companies working in the offshore wind industry when it comes to shore approaches and inland connections to the grid. The same risk exists, but the cost of risk belongs to the private investors and not the public. As in with public agencies, private companies have a certain tolerance to risk. Public agencies tolerance to risk is somewhat governed by their duties to the public rate and taxpayers, whereas private

companies' tolerance to risk is somewhat governed by the investors and public regulatory requirements.

The cost of risk is real regardless of tolerance to the risk. It is good practice to implement risk mitigation practices during the design and construction process, regardless of the scale of cost of risk. Remember, it really comes down to 'Pay me now or pay me later.' The cost of risk mitigation is just another insurance policy against unfortunate risk events. †

ABOUT THE AUTHORS:



Rabi Yadava, Ph.D., P.E., M.ASCE is a Principal Engineer for Terracon with 33 years of experience in managing both super-structure and sub-structure designs.

He has extensive experience in the fields of geodesign engineering, structural engineering, instrumentation, noise and vibration monitoring. His specific expertise in the field of underground construction /

trenchless work includes risk assessment and web-based automated monitoring for large projects. He received B.Tech degree from IIT Kharagpur, M. Tech and Ph.D Degrees from IIT Bombay, India.



Dennis J. Doherty, P.E., F. ASCE is a veteran manager with deep understanding of everything from sales to operations. He was inducted into the North American

Society for Trenchless Technology Hall of Fame (Class of 2022) because of his involvement in the trenchless industry in general and trenchless industry standardization. Dennis has worked on five different award-winning Trenchless Projects of the Year (4 microtunnel, 1 HDD), as well as several runner ups and honorable mentions. He is the founding member of the NASTT Northeast Chapter and started a student chapter in Trenchless Technology at UMass Lowell. He is a Senior Engineer with Terracon Consultants.

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SAFEGUARDING FRAGILE ECOSYSTEMS USING HDD IN ENVIRONMENTALLY SENSITIVE AREAS

By: Shrey Arora, P.E. & Dennis M. Walsh, P.E., Kilduff Underground Engineering

Horizontal Directional Drilling (HDD) has emerged as a viable solution for installing underground infrastructure projects in environmentally sensitive areas. With a growing focus on maintaining our infrastructure and preserving and protecting delicate ecosystems, traditional excavation methods can be impractical and pose significant environmental risks, including soil erosion, habitat destruction, and water contamination. In response to these concerns, HDD offers an innovative approach that minimizes the environmental footprint while effectively installing pipelines, cables, and other underground structures. This article explores the significance of HDD projects in environmentally sensitive areas, highlighting their benefits, potential environmental challenges, and the importance of adopting sustainable

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***“HDD SIGNIFICANTLY REDUCES THE RISK OF
DISTURBING SENSITIVE AQUATIC HABITATS.”***
.....

practices to ensure the preservation of these fragile ecosystems.

HDD is a trenchless technology that involves drilling a borehole from the surface horizontally underground, allowing for infrastructure installation without requiring extensive excavation. This method is particularly valuable in environmentally sensitive areas, such as wetlands, wildlife habitats, or protected landscapes, where the disturbance caused by traditional open-cut methods could have far-reaching ecological consequences. By utilizing HDD, construction activities can be conducted with minimal disruption

to the surface environment, reducing the risk of soil erosion, loss of vegetation, and disturbance to wildlife populations.

One of the significant advantages of HDD in environmentally sensitive areas is its ability to minimize the impact on water bodies. Traditional methods often require crossing rivers, streams, or lakes, resulting in sedimentation, alteration of water flow patterns, and potential contamination. In contrast, HDD allows for the installation of pipelines or utility lines beneath water bodies, preserving the integrity of aquatic ecosystems and safeguarding water quality. This method significantly reduces



Careful design and construction measures can help alleviate Inadvertent Fluid Return concerns



HDD offers an innovative approach that minimizes the environmental footprint

Get the Lead Out.

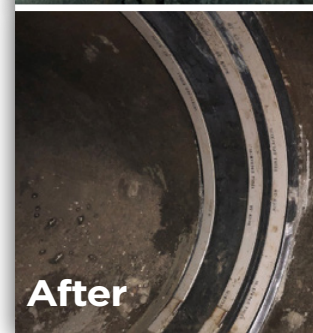
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HDD can effectively protect delicate ecosystems while meeting societal and infrastructure needs

the risk of disturbing sensitive aquatic habitats, protecting the diverse species that rely on these environments for survival.

However, despite the numerous benefits, HDD projects in environmentally sensitive areas also pose unique challenges that must be carefully addressed. One such concern is the potential for inadvertent fluid return (IFR). These fluids, usually consisting of bentonite and water, are used to lubricate and cool the drilling process and transport the drilled material to the mud pit at the drill location. They can also contain additives and chemicals that may be harmful to the environment if

released. Therefore, stringent containment and management practices must be implemented during drilling operations to prevent any accidental spills or leaks. Additionally, drilling waste disposal, including cuttings and fluids, should adhere to strict guidelines to avoid the contamination of nearby ecosystems.

Adopting a comprehensive approach that encompasses effective environmental impact assessments, rigorous regulatory frameworks, and robust monitoring and mitigation measures is crucial to ensure the success and sustainability of HDD projects in environmentally sensitive

areas. Engaging with environmental experts and stakeholders throughout the planning and implementation stages can help identify potential risks and develop appropriate strategies to minimize adverse effects. Furthermore, ongoing monitoring and regular inspections during and after project completion can provide valuable data on the effectiveness of mitigation measures and inform future practices.

During the design phase, multiple factors are considered to minimize the potential for IFR. First and foremost, a thorough site investigation is carried out to understand the subsurface geology, including the presence of aquifers, faults, and other sensitive formations. This information helps identify the “path of least resistance” or potential pathways for fluid migration and assess the risk of IFR. Based on the geotechnical information, designers perform an iterative hydrofracture analysis using the Delft Equations to arrive at an optimized HDD borepath with the least IFR risk.

Projects today require an “Inadvertent Fluid (Frac Out) Release Contingency Plan” as part of the contractual document. The plan is a comprehensive strategy designed to address and mitigate potential spills or leaks of drilling fluids or other hazardous substances during the drilling process. It outlines the necessary actions and procedures to promptly respond to and manage such incidents, minimizing their impact and ensuring a swift and effective response.



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The plan is a collaborative effort between multiple design leads on a project and should encompass the following key objectives:

- The plan should provide a detailed overview of the HDD process, specifically focusing on drilling fluids' composition, management, and utilization. By understanding the characteristics and properties of the fluids involved, appropriate measures can be implemented to prevent and control inadvertent releases. A Safety Data Sheet (SDS) information for all proposed drilling fluid should be provided.
- The plan must identify a range of controls to be implemented during construction to minimize the potential for IFR. These controls may include the use of appropriate drilling techniques, regular equipment maintenance and inspections, proper training for personnel involved in the drilling process, and adherence to industry best practices and regulatory requirements.

"HDD IS PARTICULARLY VALUABLE IN ENVIRONMENTALLY SENSITIVE AREAS."

- To facilitate early detection of inadvertent fluid releases, the plan should outline planned means of monitoring. This may involve the use of real-time monitoring systems, visual inspections, pressure monitoring, and other appropriate techniques to identify and respond to any potential releases promptly. Monitoring the mud flow/circulation and the drilling head pressure will also minimize the possibility of IFR.
- Contingency plans should address the step-by-step procedure in the event of an IFR. On past jobs with our staff, we had to establish communication protocols with several water companies downriver so that if we did have an IFR, they would immediately take steps to minimize the impact on its operations.

This was an essential requirement of the permit issued by the Army Corp of Engineering and the state's Department of Environmental Protection.

- Bore abandonment may be considered necessary when exhaustive measures to control IR within the current directional bore have been unsuccessful. The plan will encompass specific criteria used to assess the requirement for drill hole abandonment, along with a comprehensive strategy for sealing the drill hole if the decision to abandon is made.
- The plan must identify ways to protect environmentally sensitive areas, such as rivers, wetlands, biological resources, and cultural sites. This may involve implementing buffer zones, utilizing containment measures, employing

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HDD has emerged as a viable utility installation method in environmentally sensitive areas

sediment control practices, and adhering to specific guidelines for working in proximity to these sensitive areas.

- Prior to, during, and following drilling and pipe installation activities, site-specific environmental protection measures are established to minimize

and control erosion and sediment releases into adjoining wetlands or watercourses. This may include implementing soil erosion sediment control measures, sedimentation ponds, and the proper disposal of excavated material.

- At the start of construction, all field crews establish and understand site-specific preplanned general response programs. These programs ensure that personnel can take immediate action in the event of an inadvertent release of drilling fluid. Clear protocols and communication channels are established to enable an efficient and coordinated response. All required training by the government agencies and the client should be completed. Some companies will require daily checklists to be completed, ensuring all safety steps are taken, the equipment is maintained, and all staff on site are trained.
- As previously stated, establishing a Chain of Command for Reporting and Notifying is critical. Pre-job drills should be run to ensure all staff are



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prepared in the unlikely event of an incident affecting the environment. Daily safety tailgates should reinforce those safety and environmental protection requirements. In the event of an IFR, the plan must establish a transparent chain of command for reporting and notifying the construction management team, Certificate Holders, and relevant authorities promptly. This ensures that all necessary parties are promptly informed and that the preplanned actions can be implemented swiftly and effectively.

In closing, HDD projects offer a promising solution for developing infrastructure in environmentally sensitive areas. By minimizing surface disturbance, reducing the impact on water bodies, and employing responsible drilling practices, HDD can effectively protect delicate ecosystems while meeting our societal and infrastructure needs. However, it is essential to recognize and address the unique challenges associated with such projects, including the proper containment and disposal of drilling fluids and waste. Through careful planning, stringent

regulations, and continuous monitoring, we can strike a balance between development and environmental preservation, ensuring the sustainable coexistence of infrastructure and sensitive ecosystems. Finally, regardless of the design and other efforts, one can expect an HDD project in an environmentally sensitive area to take years of effort and will be met by environmental resistance. Enlisting the capabilities of a good design firm with a strong permitting staff and a professional trenchless contractor will provide the best opportunity to overcome the resistance and yield a successful outcome. †

ABOUT THE AUTHORS:



Shrey Arora, P.E., has been with Kilduff Underground Engineering since 2017, supporting their underground tunneling and trenchless projects with a multitude of design services. He received his undergraduate degree from India and a master's in Underground Construction and Tunneling from Colorado School of Mines.



Dennis M. Walsh, P.E., has been in the utility industry for over 40 years and involved in trenchless technology since 1990. Dennis is a 1972 graduate of the University of Dayton, Ohio with a B.S. in Civil Engineering and a 2002 graduate of the Polytechnic University of New York with a M.S. in Technology. He retired from KeySpan Energy Company in 2005 after a 28-year career in the gas utility field with a background in engineering, operations, construction, Quality Assurance, and HVAC.



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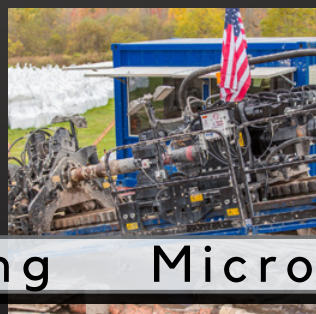
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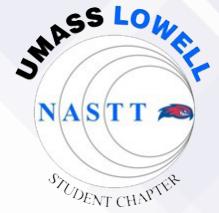
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TRENCHLESS: A CAREER UNSEEN TO UNDERGROUND UP



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UMass Lowell NASTT Student Chapter Report

By: Iverson Rodriguez, Meet Joshi, and Dr. Raj Kumar Gondle (Faculty Advisor)

Experiential learning is one of the ample opportunities that engineering students can get before entering professional practice. At UMass Lowell, the NASTT Student Chapter along with Prof. Gondle is building a civil underground curriculum and focused on providing hands-on training to students with inadequate engineering experience. For students ready to get their hands dirty in the field, it is quite an eye-opening experience to discover remarkable opportunities available in the trenchless engineering and underground construction – from a career unseen to underground up. The use of underground space has now become an absolute necessity to balance the quality of life and address infrastructure challenges faced by urban cities. More cities and towns are adopting underground solutions for transportation and utilities to secure the nation's critical infrastructure. Going underground for civil infrastructure requires a greater understanding of risks associated with the design and construction of the project. No two underground projects will be the same. At UML, the NASTT student chapter provides hands-on knowledge to students and train them to be work-ready engineers qualified for design and construction of civil underground with minimal surface disruption. We make career down, through, and out of the underground that is always exciting.



Proposed Blue Line Extension project, UML

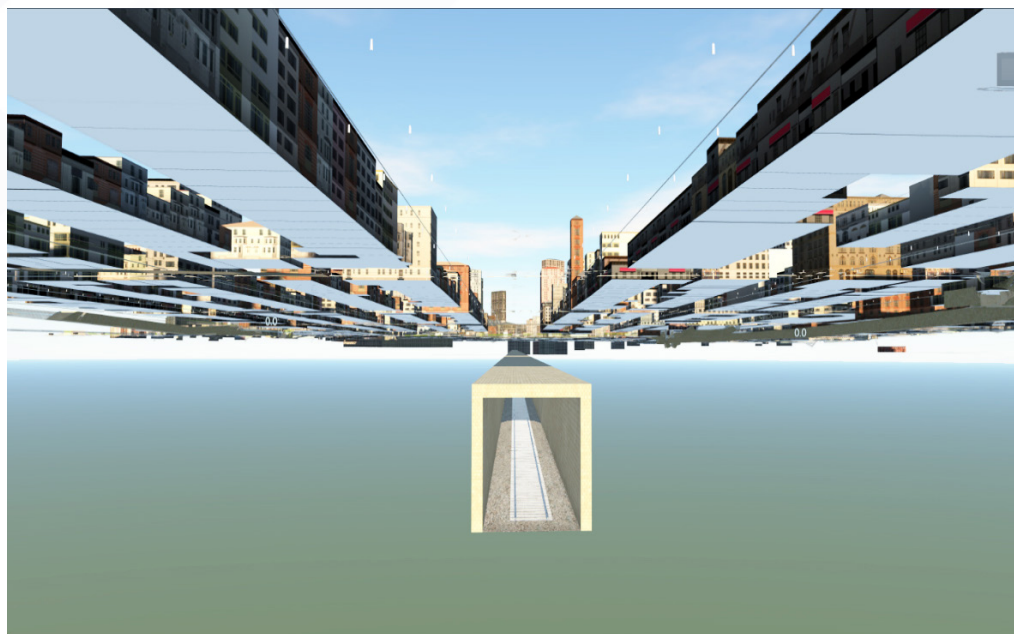
Liam Henderson, a recent graduate of the UML's NASTT Student Chapter and a Staff Professional working with Water Resources team at Kleinfelder, supports the constitution of the student chapter and is thankful to the continued efforts of NASTT that encouraged him to envision a future that suited him, and now he is living in it every day. The Student Chapter with support from industry leaders like NASTT is helping to provide exceptional educational opportunities and networking opportunities for our future leaders. Liam along with industry leaders like Dennis Doherty have been a constant support

to the student chapter for advancing the educational mission of the NASTT. The objective of the NASTT Student Chapter is to actively engage in trenchless activities and practice trenchless engineering. Students, faculty, and industry professionals are involved to promote learning of the leading-edge technologies and build opportunities to advance trenchless practices and underground engineering.

Moving on to the new academic year, the student chapter has announced a new student board which is exploring new avenues of student participation. Iverson

“WE MAKE CAREERS
DOWN, THROUGH,
AND OUT OF THE
UNDERGROUND THAT
ARE ALWAYS EXCITING.”

Rodriguez, a Junior from Environmental Engineering program, is leading the UML Student Chapter as President. He has been a part of the student chapter since early on in his freshman year. As an Environmental Engineering student, his initial interest came from the fact that Trenchless is a sustainable aspect of underground projects and it is a cleaner way to excavate. Since then, it has always been something that he found interesting, even more after visiting different dig-sites as well as the No Dig conventions and Northeast regional conferences. Iverson is excited to learn more about Trenchless and find an



Proposed Underground Tunnel, UML

area of work that is dedicated to making sure that the project is environmentally feasible and has the least disturbance to the ecosystem. After visiting an HDD field

site in his freshman year, he developed a feeling of the first essential skill required as an engineer to complete a magnitude of 5-mile massive project with minimal



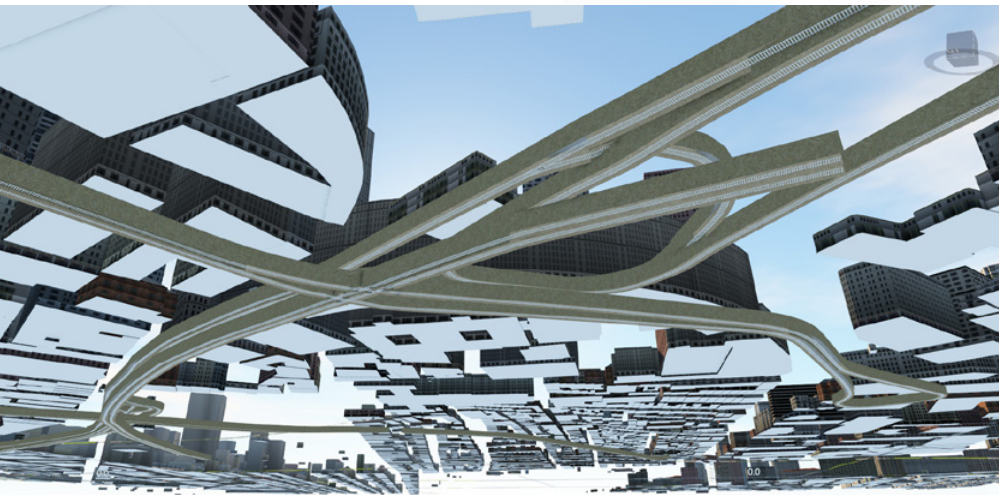
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What you see down below?

“TRENCHLESS REPRESENTS A DYNAMIC AND EVOLVING ENGINEERING FIELD.”

disruption. In his words “those are the things that excite me, becoming an engineer for me is trying to make what seems impossible, possible”.

Iverson in his hometown of Methuen was also excited to see the use of trenchless technology by an engineering company to search for lead in old water pipes with no disruption to traffic. Such projects are not only adventurous for students but also mind boggling how far we have come with engineering and technology. With challenges on every underground project, Iverson is excited and ready to explore a career in the trenchless field contributing to infrastructure development and environmental preservation. The student chapter advocates for innovative and sustainable solutions to underground construction. When considering new installations or rehabilitation of underground infrastructure, minimizing ground surface disruption and environmental impact of construction is paramount. Trenchless technology is a no dig underground solution providing

a great level of stewardship for the environment.

Iverson along with a group of other student members (Meet Joshi and Bradley Moore) participated in the 1st Annual student competition of the Constructions Industries of Massachusetts – Labor Relations Division (CIM-LRD) focused on Heavy Civil Infrastructure Design and Construction. Students experienced “T” tour under the Boston Common, the birthplace of public transit in America, and presented details related to design and construction of proposed MBTA’s Blue Line Western Extension using some of their experiential learning.

Trenchless represents a dynamic and evolving engineering field where engineers and professionals continuously develop new methods and technologies to solve underground issues, while simultaneously keeping factors like the environment and cost in their minds. This innovation-driven aspect of the industry draws young students like Iverson as it fosters continuous learning and the opportunity to work on challenging and critical infrastructure projects. The NASTT Student Chapter at UMass Lowell focuses on possible underground solutions to site-specific constraints, geotechnical challenges, construction issues, traffic impact, civil engineering systems, and socio, economic, and environmental factors involved. †



Iverson Rodriguez (R), Meet Joshi (M), and Bradley Moore (L) presenting the Proposed Blue Line Western Extension project using Trenchless Technologies at the 1st CIM-LRD competition (UML won 3rd place)

ABOUT THE AUTHORS:



Iverson Rodriguez is a junior from Environmental Engineering and the President of NASTT Student Chapter at UMassLowell. He has been part of the Student Chapter since 2021 and is hoping to learn even more about the industry.



Meet Joshi is a senior in Civil Engineering program at UML and serving as Vice President of the NASTT Student Chapter. He is fond of construction that takes place underneath and has keen interests in Tunnel design and TBM Machines that are in today’s Trenchless Technology.



Dr. Raj K. Gondle is an Associate Teaching Professor at UML and an outstanding educator who continues to push and inspire the young generation of civil engineering students to pursue a successful career in geotechnical engineering and underground construction. He is the recipient of the 2022 Boston Society of Civil Engineers Section (BSCES) College Educator Award, the CEE Teaching Excellence Awards (2020, 2022), and the 2022 Underground Construction Association (UCA) honorarium.



Prof. Gondle with the NASTT Student Chapter members



I-495/90 Ground Improvements

“THE OBJECTIVE OF THE NASTT STUDENT CHAPTER IS TO ACTIVELY ENGAGE IN TRENCHLESS ACTIVITIES AND PRACTICE TRENCHLESS ENGINEERING.”



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