

YDiG?



BC's Magazine for Trenchless Construction

Trenchless at Shuswap Lake

ALSO INSIDE:

- Pipe Bursting in Maple Ridge
- Utility Locating versus SUE
- Ensuring Damage Prevention
- Coming Events... and More!

2018

Official Publication of the North American Society for
Trenchless Technology • British Columbia Chapter

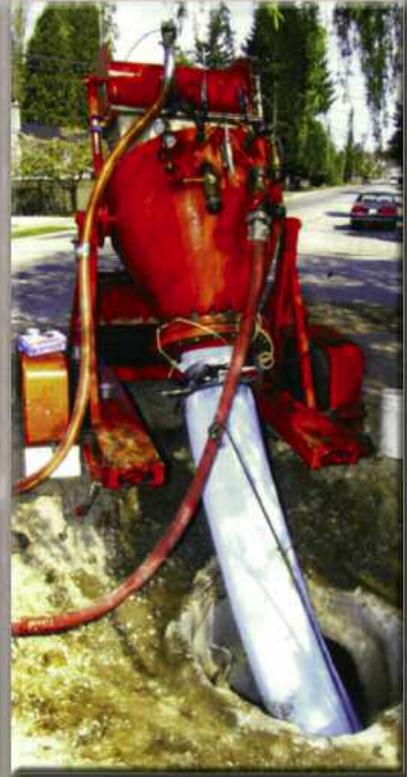
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YDiG?



North American Society for Trenchless Technology - BC Chapter



FEATURED...

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Trenchless pipe rehabilitation was performed in a sensitive area treasured by bird watchers and nature lovers

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**KARL
MUELLER**
NASTT-BC
CHAIR

Another Busy Year

It has been an exciting year in British Columbia for trenchless technologies. This past year, the NASTT-BC board of directors has continued with the good work from last year and actively promoting the benefits of trenchless technologies across the province. This year's board is well represented with members of the contracting, supplier, consulting engineering, and municipal and regional government communities, with the latter-most representing 40 percent of the board.

The society increased its efforts in providing trenchless technology education, hosting the Trenchless Road Show, a two-day trade show preceded by a full-day training program. The pre-Road Show training included sessions on Trenchless 101, Watermain Renovation with Structural and Non-Structural Liners, Horizontal Directional Drilling, and a half-day session on Planning Trenchless Projects with Subsurface Utility Engineering. The Road Show and pre-conference training sessions were very well received, and planning is underway for a 2019 conference.

The association also presented several "Trenchless 101" courses throughout the

**"The market
can still use
additional
expertise and
there is capacity
for more
contractors in
the market"**

province and more are scheduled for the new year. Moving forward this year we plan to host more informal half-day educational seminars as well as the longer two-day training seminars throughout the province.

There is increasing demand in municipalities to use trenchless technologies. The Lower Mainland area continues to be the largest user of trenchless technologies with CIPP lining and pipe bursting being the predominant rehabilitation techniques.

Horizontal directional drilling has seen increasing use for the installation of sewers and watermains, particularly in the interior

of B.C. and northern B.C.

Trenchless technologies are definitely a part of the design and construction toolbox in the Lower Mainland and across the rest of the province.

Previous president's messages highlighted the need for additional trenchless contractors in the province and particularly the interior. This need still exists. The traditional CIPP lining and pipe bursting contractors are still serving the Lower Mainland well, and an established Albertan contracting company that does pipe bursting has made inroads into the province with looking at projects in the interior. However, the market can still use additional expertise and there is capacity for more contractors in the market.

In the 2018/2019 year, the society will again be working closely with the national organization to bring training seminars and other learning opportunities to you. I would like to thank the board for all its efforts this year presenting and hosting events throughout the province. I would also like to thank our many volunteers and speakers without whom the events would not be the successes they have been. It looks like 2018/2019 will be a busy year for the industry and the society.

Grassroots Growth



**FRANK
FIRSCHING**
NASTT
CHAIR

Hello, British Columbia Chapter members! As the year develops we're looking forward to the continued growth of the trenchless industry and our Society. We've just wrapped up another impressive conference as NASTT's 2018 No-Dig Show in Palm Springs, California, was very successful on all accounts. The exhibit hall featured close to 190 exhibitors and we welcomed more than 2,000 attendees from all over the world who came to experience the world-class technical sessions and networking events that our No-Dig Show is known for. NASTT's 17th Annual Educational Fund Auction was, once again, the trenchless social event of the year and we were able to raise nearly

\$100,000 for our educational programs! Thank you, everyone, for your generous support.

NASTT exists because of the dedication and support of our volunteers and our 11 regional chapters. Our No-Dig Show Program Committee members volunteered their time and industry knowledge to peer-review the 2018 abstracts. These committee members ensure that the technical presentations are up to the standards we are known for. This year we had 160 technical presentations over the course of three days on all aspects of trenchless technology. We also featured three industry forums hosted by trenchless experts in their fields and encouraged input from audience members. These topics included Water Main CIPP, Owner Differing Site Conditions Claims, and Close Fit Sliplining Technology.

Plans are now underway for the 2019 No-Dig Show in Chicago. If you would like to join the

2019 Program Committee to help us develop the technical sessions and special events for next year's No-Dig Show, meet us in Chicago this summer! Please contact us at info@nastt.org for more information.

The North American Society for Trenchless Technology is a society for trenchless professionals. Our goal is to provide innovative and beneficial initiatives to our members. To do that, we need the involvement and feedback from our professional peers. If you are interested in more information, please visit our website at nastt.org/volunteer. There you can view our committees and learn more about these great ways to stay active with the trenchless community and have your voice heard.

Our continued growth relies on the grassroots involvement of our regional chapter advocates.

Thank you again for your dedication to NASTT and the trenchless technology industry.



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Y-Join NASTT BC?

THE BRITISH COLUMBIA CHAPTER OF THE NORTH AMERICAN SOCIETY FOR TRENCHLESS TECHNOLOGY (NASTT)

NASTT BRITISH COLUMBIA CHAPTER: Leaders in Innovation

Formed in 1997 as part of the original NASTT Northwest Chapter, the BC Chapter was established separately in 2005. It exists to promote the use of trenchless technology in B.C. through education and standards. NASTT-BC has worked hard over the years to have trenchless standards adopted throughout the Province. In 2008, work began by the Chapter to develop a tool for accurately determining the reduced carbon footprint that various trenchless technologies offer - the Carbon Calculator! Use this program to estimate the tons of carbon emissions that were eliminated by the trenchless construction method that you have chosen for your project. Watch for the posting of the latest version of this useful tool to enhance sustainability in British Columbia.

- In the MMCD's new Platinum book, CIPP and Pipe Bursting are included, with remaining trenchless methods to follow.
- NASTT-BC held one seminar in 2015 on trenchless rehabilitation of laterals and one three-day Trenchless Road Show. NASTT-BC hosted the Trenchless Road Show again in 2017.
- NASTT-BC has worked to be a leader in promoting the use of trenchless as a low cost /low carbon method of construction.
- Since 2005, the chapter has published their annual magazine Y-DIG?
- The chapter and Y-DIG? Magazine are a great way for consultants to promote their successes, for cities to learn about the projects, methods, lessons and experiences of other cities, and for all 3 partners (owners, consultants and contractors) to share information.

WHAT IS NASTT?

Founded in 1990, NASTT is a not-for-profit educational and technical society. As the North American component of the ISTT (International Society for Trenchless Technology), NASTT is dedicated to promoting the benefits of trenchless technology through education, training and research. NASTT is the definitive resource for trenchless professionals like you, who are concerned with underground systems and the applications of trenchless technology.

Trenchless Technology

By using trenchless technology methods, you are reducing the impact of underground construction on your community. The benefits of trenchless technology are priceless:

- Minimizes surface disruption & trenching
- Reduces public inconvenience
- Cost-effective methods
- Less traffic congestion
- Widely utilized & accepted
- And this all adds up to - REDUCING CARBON FOOTPRINT BY UP TO 90%!

Membership

If you're interested or concerned in underground systems and the application of trenchless technology, then NASTT membership is right for you.

NASTT connects you to the people and businesses involved in the trenchless industry.

NASTT is your link to thousands of trenchless professionals and leaders working in regional, national and international levels. Membership is open to individuals, agencies and companies involved with providing gas, water, sewage, communications and electrical services.

Your Regional Chapter - NASTT-BC

A major contribution the NASTT-BC Chapter has made to the global trenchless effort is the promotion of trenchless technology as a low carbon option.

For more recent information on Trenchless Construction in British Columbia and BC Chapter activities, go to www.nastt-bc.org.

JOIN NASTT and NASTT-BC TODAY!

To become a member of NASTT-BC, contact Charlotte Wong at charlottenapwong@gmail.com

Events & Training Opportunities



May 13-15, 2018

BCWWA Annual Conference
 Penticton Trade & Convention Centre
 Penticton, British Columbia
 Information: bcwwa.org

May 15-17, 2018

Trenchless Technology Road Show 2018
 London Convention Centre
 London, Ontario
 Information: catttrenchlessroadshow.ca

May 17, 2018

NASTT's HDD Good Practices Course
 Montreal, Quebec
 Information: nastt.org/training/events/

June 24-27, 2018

North American Tunneling Conference
 Washington Marriott Wardman Park
 Washington, D.C.
 Information: natconference.com

August 26-29, 2018

APWA's Public Works Expo
 Kansas City Convention Centre
 Kansas City, Missouri
 Visit NASTT in Booth # 947

March 17-21, 2019

NASTT's 2019 No-Dig Show
 Stephens Convention Center
 Rosemont, Illinois
 Information: nodigshow.com

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NASTT's
**NO-DIG
SHOW**



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CALL
for Abstracts

Submissions Deadline: June 30, 2018

The North American Society for Trenchless Technology (NASTT) is now accepting abstracts for its 2019 No-Dig Show in Chicago, Illinois at the Donald E. Stephens Convention Center on March 17-21, 2019. Prospective authors are invited to submit a 250-word abstract outlining the scope of their paper and the principal points of benefit to the trenchless industry. **The abstracts must be submitted electronically at NASTT's website by June 30, 2018: nastt.org/no-dig-show.**

Abstracts from the following subject areas are of interest to the No-Dig Show Program Committee:

Potable Water and Pressure Systems

- Pipeline Inspection, Locating, and Condition Assessment
- Pipe Rehabilitation
- Pipe Bursting
- Emerging Technologies
- Case Studies

Wastewater, Storm water, and Non-pressure Systems

- Advanced Pipeline Condition Assessment
- I&I and Leak Detection
- Pipeline and Laterals Rehabilitation
- Pipeline Inspection, Locating, and Condition Assessment
- Cured-in-Place Pipe Lining
- Sliplining
- Pipe Bursting
- Spray Applied Linings
- Grouting
- Manhole Rehabilitation
- Case Studies

Energy Pipeline Systems

- Pipeline Inspection, Locating, and Condition Assessment
- Aging System Rehabilitation
- New Trenchless Installation
- Standards and Regulations

Trenchless Research and Development

- University and Industry Initiatives
- Education and Training

Industry Issues

- Subsurface Utility Engineering
- Submittal Requirements and Quality Assurance/Quality Control
- Project Budgeting and Prioritization
- Funding for "Green" Technologies
- Selection Criteria for Contractors
- Social Costs and Impacts
- Carbon Footprint Reduction
- Sustainable Construction Practices
- Industry Trends, Issues and Concerns
- Differing Site Condition Claims

New Installations – Tunneling, Boring and Pipe Ramming

- New Concepts or Trenchless Equipment, Materials and Methods
- New Applications for Boring Techniques (Auger Boring and Pipe Ramming)
- Pilot Tube Boring (Tunneling)
- Case Studies

Horizontal Directional Drilling (HDD)

- New Concepts and Applications for Horizontal Directional Drilling Equipment, Materials and Methods
- Case Studies

Microtunneling

- New Concepts and Applications for Microtunneling Equipment, Materials and Methods
- Case Studies

For more information visit
NODIGSHOW.COM

Questions? Please contact:

Michelle Hill | NASTT Program Director

E: mhill@nastt.org

P: 888-993-9935



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

Trenchless Pipe Rehabilitation Among the Birds of Shuswap Lake

KATHERINE
LEPINE, BFA
R.F. BINNIE &
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Known as the “houseboat capital of Canada,” Shuswap Lake is a popular destination during the summer months where B.C. residents and tourists from afar come to the lake for swimming, boating, fishing and bird watching. In fact, in 2017 Salmon Arm Bay was recognized by BC Nature magazine as the best birding location in the province.

Wildlife in the area include osprey, eagles, coots, geese, turtles, snakes, salamanders, toads and, most notably, waterfowl. In particular, Western grebe activity along the foreshore of Shuswap Lake have made this spot a recognized tourist destination worldwide. People travel to the lake hoping to spot some of the 291 recorded bird species, of which 166 are known to breed in the area. Red-winged blackbirds nest within the cattails and great blue herons can be spotted through the marsh grass. Least sandpipers migrate to Shuswap Lake to feed along the muddy nearshore wharf areas. Local monitors recorded 530 ring-billed gull nests in

2015; in other years they have recorded as many as 1,000 nests.

The City of Salmon Arm, along with the Shuswap Naturalists and the Salmon Arm Bay Nature Enhancement Society (SABNES)—who manage The Nature Trust foreshore lands—have been working hard to protect the Western grebe from disturbance in Salmon Arm Bay, which has been recognized as having the largest

breeding numbers in British Columbia. Having webbed feet set back along their bodies much like loons, Western grebes may be awkward when walking on land, but are effective when swimming after fish. Males have an unusual courtship routine that is described as dancing on the water—and bird watchers travel to Lake Shuswap for the sole purpose of witnessing this “bird boogie.” Protection measures



Western grebes are active along the shore of Shuswap Lake. (Photo © Clive Bryson)



CIPP liner is installed in a sanitary trunk sewer line.

include offshore buoys identifying no-entry areas to keep all boaters, kayakers, and even paddle-boarders, from entering the Western grebe's prime nesting area. The City also has prohibited fireworks while the brood are rearing in the summer.

A Break in the Sewer Line

In the 1970s, the City installed a sanitary trunk sewer along the foreshore with a buried gravity pipe to service the community. In early 2012, while near-record freshet water levels were recorded, the City experienced a break in the sewer line. Crews observed a high volume of water being received at the City's sewage treatment facility—much higher than normal levels typically provided by the City's potable water supply. The break was located and patched immediately.

When water levels dropped, the City undertook a thorough investigation to determine the cause of the break and the

condition of the entire sewer. The break in the sewer line was a sign of deterioration in the 40-year-old sewer, and the City determined that hundreds of metres of sewer pipeline needed to be upgraded within the foreshore and near residences along the lakefront.

Paragon Engineering Ltd. (now a part of R.F. Binnie & Associates Ltd.) designed the engineering plans to rehabilitate a one-kilometre section of the foreshore sewer line. Binnie took over the contract during construction, with Paragon principal John Kupskey remaining as project manager, and Binnie's Ron Deo as senior inspector. Lawson Engineering of Salmon Arm provided inspection of open-trench portions of the project, while Webb Construction was the prime contractor

The construction activities were not without challenges. The team had to work around high water levels, frigid tempera-

tures, trains crossing, delicate habitat and bird nesting.

The high flushing rate of Shuswap Lake causes water level fluctuation up to five metres annually. When the lake is at its greatest height in June, the sewer line is below the water and inaccessible. When the lake recedes, thousands of migrant birds flock to the foreshore to feed. Well aware of the environmental sensitivities, the City of Salmon Arm restricted access to the foreshore between April and September. This required that John and his team schedule construction works during the low-water, frozen conditions from January to mid-March—a time when temperatures hover around minus-15 degrees Celsius.

Further complicating construction, crews had to cross a Canadian Pacific Railway mainline to access the foreshore. They were seeing up to four long inter-provincial trains passing through per hour,



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causing delays in moving construction equipment.

As works were in the foreshore of Shuswap Lake, all construction waste had to be hauled off site. Access for heavy construction vehicles required a solid base so that they did not damage the foreshore. Crews lay down over 900 swamp mats so that they could do their work without scarring the land. This also helped to avoid damage to grasses such as cattails—a favoured habitat for the red-winged blackbird.

Instead of digging up the area which was surrounded by sensitive wetland habitat, engineers chose to repair approximately 1,000 metres of pipe using trenchless installation technologies. They relined the pipe using the cured-in-place (CIP) method—sliding a liner through an open cut and then using extremely hot steam to affix the liner to the interior of the corroded pipe. Due to the environmentally sensitive location of the project, it was agreed to use only steam to cure the liner, and not the chemicals often used with the CIP method. In order to maintain the temperature of the steam along the length of the pipe in sub-zero conditions, crews excavated additional access holes to the pipeline every 120 metres.

Binnie engineers selected a 4-to-6-millimetre-thick, fibreglass-reinforced composite liner. New manholes were supplied with a corrosion-resistant PVC liner. Overall, the team rehabilitated 36 m of 200-mm, 290 m of 350-mm, 1,280 m of 400-mm, and 195



The sewer rehabilitation project was completed without significant harm to Shuswap Lake wildlife habitat.

m of 500-mm-diameter sanitary main. This method allowed for sewer line upgrades at a substantially lower cost than full replacement, with minimal environmental impact.

Building and Buffering Wetland Habitat

Gerry Leering, R.P.Bio., of Environmental Compliance Services, provided environmental monitoring during construction, working closely with Binnie

and Lawson inspectors. He came up with an idea for the back-filled access holes that remained following construction: installing rock riprap on top of bedding sand on the access holes. This provided additional habitat complexity by creating turtle nesting habitat and basking rocks for snakes and skinks. Additionally, 16-foot unfinished timbers were placed into the soft foreshore adjacent to the access holes, allowing for bird and bat boxes to be installed by the Shuswap Naturalists.

A champion of the natural habitat of Shuswap Lake, Gerry saw opportunity in this pipe repair project. On behalf of SABNES, he submitted a grant application to the Habitat Conservation Trust Foundation for funds to add more biodiversity to the foreshore. He was successful in securing over \$60,000. Gerry and volunteers created hand-shaped hummocks which are raised, rounded mats of vegetation that waterfowl can nest in. They then organized a week-long tree-planting event during which 300 local children came to the foreshore to plant 10,000 native trees, potted stock, and live stems.

Due to a collaborative effort between the City of Salmon Arm, engineers, and environmental monitors, the surrounding wildlife habitat was protected from significant harm while essential upgrades to the City's infrastructure were completed. Final site enhancements included complex native plantings, rock riprap travel corridors, and foreshore trail improvements. These efforts provided habitat diversification along the sensitive foreshore of Shuswap Lake, owned and protected by The Nature Trust.

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Maple Ridge Project Sets a New Standard

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It's like the plot of a Hollywood movie, albeit a decidedly niche one aimed at engineers. The City of Maple Ridge needed to upsized its 36-year-old sewage system to accommodate growth and development, but the project was too daunting for almost every contractor.

"No one wanted to touch it," says City of Maple Ridge Project Manager Velimir Stetin. "It is an environmentally sensitive area. Open cut would have involved removing a forest from the Kanaka Creek

Regional Park, so that was not an option, and upgrading the existing pipe meant going from 15 inches to 34, which had never been done before. But it was an absolutely essential project."

Enter Surrey-based PW Trenchless Construction, an old hand at complex trenchless projects. Even they weren't totally confident. "Typically, anything over a 50 per cent upsized is considered experimental. Add to that the depth – up to six metres in some places – and the potential for groundwater, and you start to understand the challenge,"



says Carl Donnelly, estimator at PW Trenchless who worked on the project.

However, the company had successfully upsized from 12 inches to 20 along that stretch of road, so the PW team had some understanding of the terrain and conditions. They decided to take on the project.

“It was all down to trust and planning,” says Greg Deacon, the PW Trenchless project manager who oversaw the upgrade. “We have a great relationship with the City of Maple Ridge, and they were prepared to

assume some of the risk involved in the project because they understood that an upsize of this scale had never been done before. We planned ahead, discussing everything with Velimir and our machinery provider, TT Technologies, and we had contingency plans for any setbacks.”

Some of those didn’t come to pass – for example, there was none of the anticipated heaving on the surface – but rising water levels could have scuppered the job. “Meltwater from the surrounding mountains came down

earlier and faster than expected and the water level of the adjacent river increased rapidly,” says Donnelly.

Quick thinking was required and the team ended up building a dam to keep the site dry, and moving onto an upstream area of the job in the meantime. This meant there was only minimal delay in the timeline. “PW Trenchless has a very low staff turnover, so our teams have seen everything and can cope with almost anything,” says Donnelly. “The main guys in the crews have been here from



AT A GLANCE

- 15 to 34 inches: The scale of the upgrade
- 250 tonnes: Size of the pipe-bursting machine
- 20 feet: Length of the pipe-splitting assembly
- 3.5 months: Total duration of the project





the start, so nothing fazes them.”

All in all, despite the potential for drama, things went smoothly. “We pulled each of the seven sections of pipe into position in one day, and that was always a bit nerve-racking. We were using the biggest pipe-bursting machine in the world at 250 tonnes and a few times we were nearly maxing it out, but we were watching carefully for pressures and there were no really hairy moments at all,” says Deacon.

Maple Ridge’s Stetin is delighted with the results. “It was completely successful, with no disturbance to existing utilities, and was awarded Honorable Mention in Trenchless Technology’s Rehabilitation Projects of the Year for 2017,” he says.

“The new upgrade will be good at least till 2041, whatever development happens in the area, so we have achieved what we set out to – a system that can accommodate everything for decades to come.”

The team at PW Trenchless is satisfied

too. “It’s given us a lot of confidence that this kind of big bursting is doable and that there’s a need for it,” says Deacon. “We’ve ended up purchasing the pipe-bursting machine because there is definitely a demand for this

scale of project. What was once thought impossible is actually possible, so I wouldn’t say no to anything at this point.”

Now how’s that for a happy ending?

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Subsurface Utility Engineering and Utility Locating: What's the Difference?

**OPHIR WAINER
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T2 UTILITY ENGINEERS

Subsurface utility engineering (SUE) and utility locating may appear to be similar, but each serve a different purpose. In reality, both may utilize electro-magnetic (EM) locating equipment to identify the location of underground utilities, but the similarities generally end there.

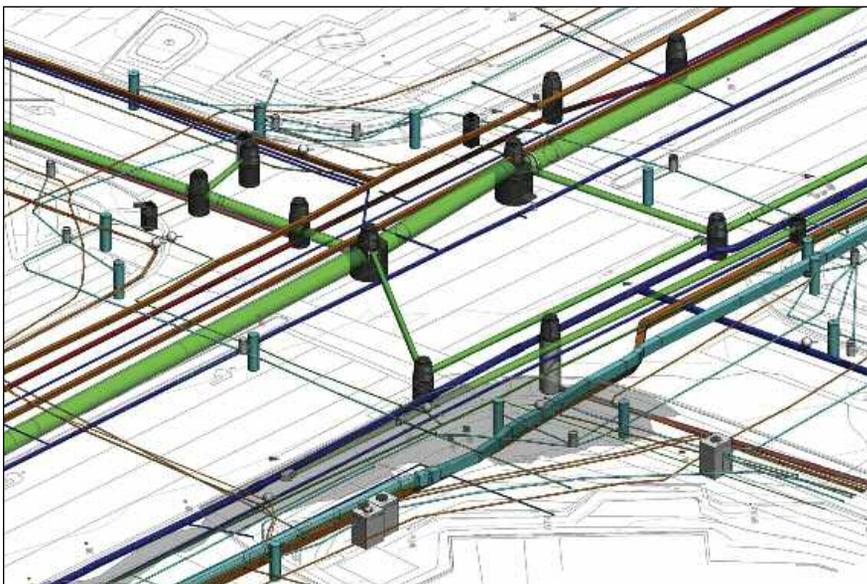
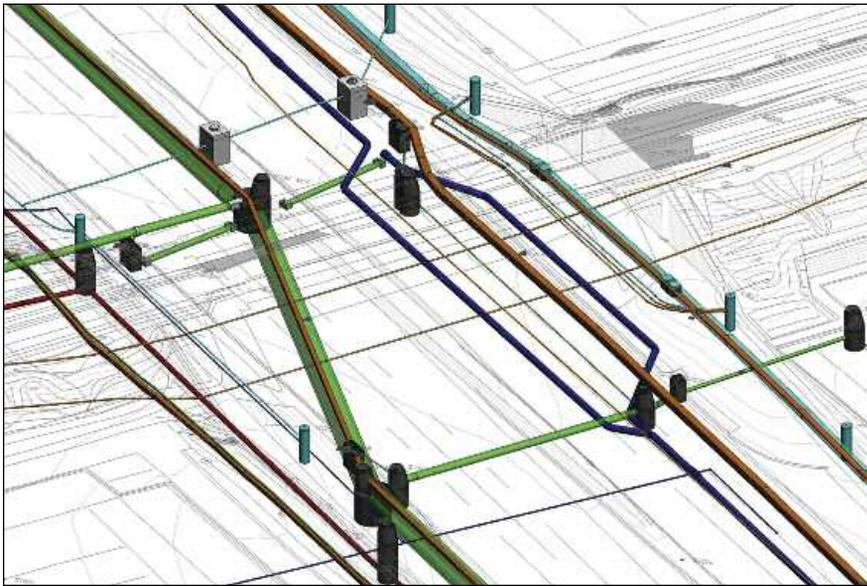
The practice of SUE was formalized in

2002 with the creation of ASCE 38-02 — the Standard Guideline for Collection and Depiction of Existing Subsurface Utility Data. It promotes the use of field investigations and records research to determine the most likely location of underground infrastructure. Most importantly, the ASCE 38-02 provides a process to identify the quality of the results, and allow

users to determine the degree of uncertainty of the information depicted. The standard was created to provide reliable information to engineers to aid in the design process, plan for utility relocations, reduce overall project costs and aid in improving project safety during construction.

Utility locating has been around since





infrastructure has been buried. It was once a survey function and did not have a great deal to do with infrastructure protection, but rather for layout of ongoing infrastructure projects. A large push to have utilities buried occurred and utility locating for damage prevention as an industry took shape. Third-party contract locating began in the early 1980s when So-Deep, Inc. began marking all utilities in the planned routing for a large CATV build in suburban Washington, D.C. Private locates were brought to the forefront in the late 1990s when utility providers stopped

assuming liability of their plant past the demarcation points and the private locate industry evolved for damage prevention on private utilities. In most regions of North America, one-call services are a government-mandated requirement prior to any excavation and are governed by municipal bylaws.

The EM locator is a go-to tool in both industries, but its application and end results are very different. The EM locator is actually a very sophisticated geophysical tool, but when the science of geophysics is not taught with the use of the tool, a vast

majority of its usefulness is limited. When used in the damage prevention industry it is called locating, but when used in the SUE industry it is referred to as designating (as defined in ASCE 38-02). The EM locator determines the location of magnetic fields either naturally present on conductors or through induction with the use of transmitters. The location of the buried conductive plant is marked on the surface of the ground. The utility locator will place marks on the ground using colour-coded paint specific to each utility. Sometimes the marks for SUE investigation are placed using pink paint (temporary markings) to avoid confusion with locating markings. The interpretation of the signals and an understanding of the geophysical properties of the earth and conductive elements is key to producing reliable data in both industries.

The SUE investigation will use EM locators as well as a variety of other geophysical technologies to determine the location of known utilities and unknown signals during the designation phase. For SUE investigation, the information collected in the field is surveyed, and integrated using CAD software onto a utility mapping drawing. Other site investigations and field observations related to the utility infrastructure that may be present are collected from the site. SUE investigation includes a review of the record information (construction drawings, for example) and resolves discrepancies that may be found. The SUE utility-mapping drawing includes all utilities either identified in the field or identified on records, even if they could not be designated in the field. In many projects the construction methods and sequencing may be reviewed to better understand the presence of abandoned or removed utilities. The engineer responsible for the investigation reviews all information and makes a professional judgment as

to the quality of the information and how to depict it on the drawing. The distinction between how utilities are identified is made using quality levels according to ASCE 38-02. To make this distinction, the engineer uses judgment regarding the likely validity of the designating marks and the methods used, as well as the survey data; the engineer also compares record drawings and checks the probability of the alignment based on known installation practices. The engineer will also provide a SUE report which outlines the methodology used for the investigation (including geophysical equipment used), the findings of the investigation and how they may impact the project. Often, there will also be recommendations for any additional investigations suggested to further identify the location of utilities in critical locations. The focus of additional investigations is specific to the project.

Risk Reduction

SUE is a design service, and is used to reduce risks during design. Once construc-

tion begins, the results of the SUE investigation may help the contractors understand the risks associated with the buried utilities prior to excavation. Private/ Public locates would still be required prior to any physical excavation.

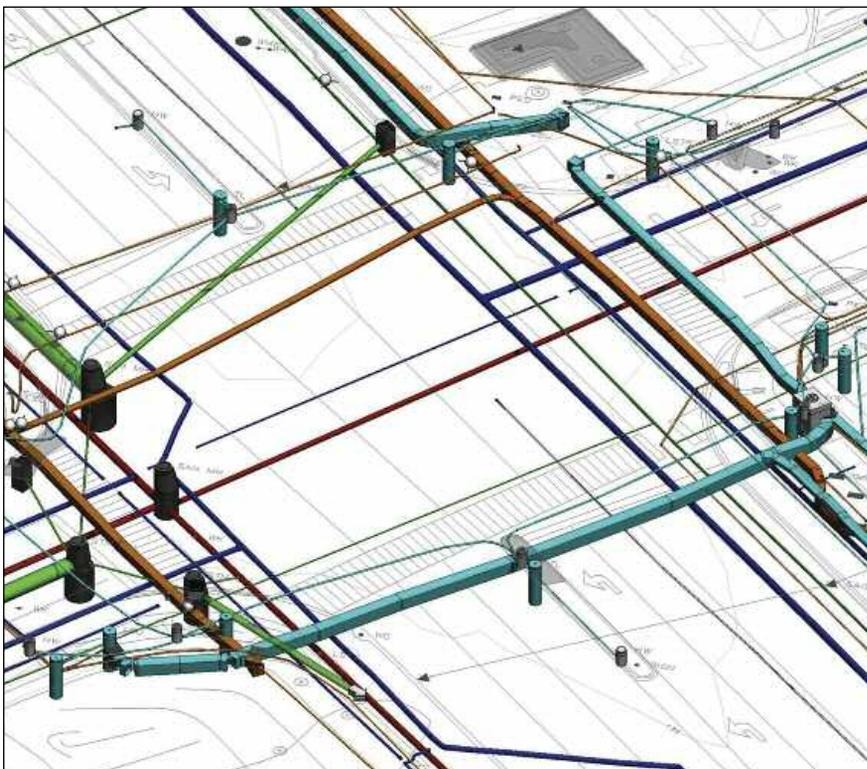
Utility locating (one-call or private locating) is primarily focused on public safety and damage prevention during construction. Utility locating allows excavators to understand the location of the known underground utilities in the field, which is a necessity for safe excavation. In one-call or private locating, the EM locator is used to verify alignments of known active in service utilities shown on the utility company records. In many jurisdictions, they are performed by third-party contract locate companies. The utility locator places marks on the ground using colour-coded paint to indicate the horizontal alignment of the known utility and creates a no-dig zone, stating that a utility lies beneath the marked area. In the damage prevention industry, the information is most commonly conveyed on a locate

sheet with a sketch showing the specific utility in the target area. If a locator is responsible for multiple utilities, multiple utilities may be shown on the same sketch. Sketches are commonly provided on-site or can be transmitted via email. Typically, once a locate is completed, there is no independent technical or practical review of the sketch produced prior to providing it to the end user, which is the contractor. A "locate" has no accuracy associated with it; the mark on the ground is only a statutory mechanism to determine who is going to pay for the cost of the repair of the utility if it is damaged during construction.

Although their purposes and executions are different, both subsurface utility engineering and one-call or private utility locating provide important valuable information for their end users. One call and/or private locate are commonly mandatory and even legislated in some jurisdictions. They are required and necessary even when a SUE investigation is completed. SUE is recognized as a best practice in the Canadian Common Ground Alliance Best Practices Manual, the Transportation Association of Canada's Guideline for the Coordination of Utility Relocations and other key documents. SUE is a valuable tool for any engineer to manage utility risks on their project.

Together SUE and one-call or private utility locating are an effective one-two punch that can be used to ensure your project's overall success.

Ophir Wainer is responsible for developing new business and leading the strategic direction for T2 Utility Engineers in major markets across Canada. Lawrence Arcand is president of T2 Utility Engineers. Blaine Hunt is a licensed engineer in Alberta and Ontario.



Facilitating Better Asset Management in Sewer Systems

MARGARET JERONIMO
ANDREWS.ENGINEER

Andrews.engineer's (A.E's) mission is 'To provide sewer asset management expertise that empowers its clients through an empowered workforce.'

Largely recognized as a leader and mentor in sewer asset management, A.E is actively engaged in the engineering community through various events and industry associations (e.g., NASTT and the

Centre for Advancement of Trenchless Technologies) — keeping abreast of global advancements in techniques, methods and applications. In-house training programs are just one way in which they partner with clients to help improve system operation and provide the best return on taxpayer investment.

"At Andrews.engineer, we've always endeavoured to build a foundation of trust

with our clients by empowering them with the knowledge they need to choose the best and right solutions,"

says Mark Andrews, the firm's founder and owner.

Celebrating their 25th anniversary by building upon a long tradition of providing clients with educational opportunities, A.E has enhanced its training offerings to help clients better understand asset recom-



mendations and make best-informed decisions regarding their own systems. Over the past two years, they have delivered educational seminars at their facility in Toronto as well as on-site at various municipalities. These seminars have included Cured-in-Place Pipe (CIPP) Design, CIPP QA/QC, Sewer Inspection and Condition Assessment Methods, and Sewer and Appurtenance Rehabilitation Techniques.

Considering the overwhelming client demand for local and easily accessible educational opportunities, A.E envisioned and

recently completed construction of an ambitious, full-scale trunk sewer model, training facility and classroom at their Toronto location.

Upon entering the A.E warehouse, it's hard not to notice the impressive setup along the back wall. Backdropped by a fluid, water-inspired mural, the full-scale trunk sewer model consists of a five-metre-high 1.8-metre-wide concrete maintenance hole (MH) connected to 900-mm and 1,050-mm concrete trunk sewer pipes. The aforementioned artwork then flows behind the structure — empty-

ing out into a painted, egg-shaped brick sewer aligned with the trunk sewer's 1,050-mm terminus. Access to the MH is provided via a metal staircase and mezzanine that is constructed flush with the MH opening. To facilitate training, a winch with an integrated fencing system surrounds the MH opening while an aluminium ladder has been constructed within the MH. The MH cover itself is built of lightweight aluminium to facilitate handling of same during training exercises.

The classroom, located immediately adjacent to the trunk sewer model, is



equipped with a large screen TV capable of receiving live video feeds from the top of the MH and/or from inspection equipment inserted into the MH and/or trunk sewers.

From February 13th to 15th, 2018, this new facility was used to host a mid-winter, climate-controlled training opportunity for over 50 of A.E's municipal clients. Daily 'live' demonstrations enabled attendees to witness (and touch if desired) some of the latest developments in sewer and chamber inspection technology (Panoramio, 3D Faro Laser Scanning, CCTV/Sonar/Laser), as well as a sampling of the latest sewer, lateral and maintenance hole rehabilitation products and techniques (including UV-cured CIPP, trenchless lateral spot repairs, tophat

installations, maintenance hole sealing and mechanical cleaning).

"The municipal event at Andrews.engineer was exceptional and was well attended by decision makers from many cities and Municipalities from South Central Ontario," said Michael O'Toole, national sales manager at Fernco Connectors. "The professionals at A.E put on an exceptional show that was well planned out by everyone involved."

These training sessions also included a presentation regarding the management and integration of large datasets. With extensive experience managing massive amounts of data and recognizing the importance of utilizing data to make informed and transparent decisions, A.E is playing a key role in centralizing and inte-

grating data across multiple platforms to enhance decision making, planning and programming. Using non-proprietary advanced infrastructure management systems, they have developed a comprehensive set of automated validation tools to improve the accuracy and efficiency of field data collection, data processing and analysis. Clients are updated regarding project progress with custom-tailored dashboard systems.

Given the wealth of positive client feedback, A.E plans to organize similar training opportunities in the future — continuing to showcase some of the most promising sewer asset management options from around the globe.

ABOUT A.E

Founded in 1993 with extensive international experience in all stages of sewer asset management, A.E pioneered the introduction of specialized 'live' trunk sewer inspection and evaluation techniques, including sonar and long survey lengths, without diversion or bypass pumping. Over the past several years, A.E has expanded its service offerings to include sewer rehabilitation planning, design and contract administration. With offices in Ottawa and Toronto, A.E has established a reputation as the sewer asset management specialist that can be counted upon by municipal clients to provide them with knowledge of the latest and best global technologies accompanied by the highest levels of service and support.



Carbon Calculator is a Credit to B.C.

NASTT-BC's Calculator Gets Provincial Seal of Approval

AILEEN LALOR

In 2008, The British Columbia Chapter of the North American Society For Trenchless Technology (NASTT-BC) launched a carbon calculator on its website to help companies estimate the carbon emissions during open-cut and trenchless construction methods, and demonstrate that the latter has substantially lower emissions than the former. A decade on, the calculator has been submitted to the British Columbia provincial government by Metro Vancouver, and approved as a method of proving carbon reductions and thereby raising carbon credits.

To use the calculator, you input data about factors like surface conditions, length and depth of back fill, and traffic flow. Calculations can be shown for open cut and horizontal direction drilling (HDD), sliplining and pipe bursting (CIPP) and cured-in-place pipe (CIPP) lining, point repair and grouting. This allows you to demonstrate the emissions for your trenchless method versus an open-cut one, and in British Columbia the difference between the two can be used as a carbon credit.

"Everyday operations in British Columbia's cities have been required to be carbon-neutral since 2012," explains David O'Sullivan, President of Surrey-based PW Trenchless Construction and an advocate of the carbon calculator for many years. "Construction is exempted from this,

"With a few tweaks, the calculator can be a tool for those using trenchless construction throughout Canada"

which means any carbon credits raised through using trenchless techniques can be used to offset emissions from day-to-day operations."

As of June 2017, data from the calculator has to be audited before the provincial government will approve it, but O'Sullivan is hopeful that it will soon be possible to submit the data without audit. "It's like filing your own taxes versus having them audited by an accountant," he says. "It'll obviously be a great time-saver for municipal engineering and financial departments to file this information and gain their credits automatically. When that happens we'll be the first jurisdiction in the world to have trenchless construction officially recognized as a source of carbon credits."

O'Sullivan believes that, with a few tweaks, the calculator can be a tool for those using trenchless construction throughout Canada and even around the world, since being carbon neutral is a global goal. To try it out, visit www.utilitycarboncalculator.com.

HOW DOES TRENCHLESS REDUCE CARBON EMISSIONS?

Trenchless construction is typically quicker than open cut, which means less fuel-burning equipment is needed, and traffic is disrupted or stopped for shorter periods. When techniques like CIPP are used there's no need to bring metres and metres of pipe to a site on trucks, and invariably, less digging means less waste. So overall, there are fewer vehicles coming to and from the site to bring resources or remove fill. According to a 2007 report from the Centre for the Advancement of Trenchless Technologies at the University of Waterloo, Ontario, trenchless pipe-repair delivers more than 78 per cent lower greenhouse gas emissions than open cut.

The Journey to Effective and Reliable Damage Prevention Legislation

MIKE SULLIVAN
CANADIAN COMMON
GROUND ALLIANCE

On May 2, 2017, the Underground Infrastructure Safety Enhancement Act was adopted by the Senate and quickly followed the path to the House of Commons where it is being

supported by Ontario MP Lloyd Longfield. No sooner had it arrived in the lower chamber than it was challenged as a “money bill,” meaning it involves an appropriation of public revenue or a new charge on the public



80%
of damages
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disruption

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damages were
voluntarily
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revenue. Longfield's response to the challenge was thorough, with supporting arguments dating back to the 1800s, and at the end of the spring 2017 session of Parliament, the Speaker of the House was left to determine whether S229 is properly considered a money bill.

Once Parliament resumed following the summer break, damage prevention supporters across Canada waited to learn the Speaker's decision. Finally, on October 31 – Hallowe'en – the Speaker determined S229 was not, in fact, a money bill and could continue along the usual legislative process. It was a good day – but it also meant that it was "game on."

Even though S229 will simplify existing processes to identify and protect underground infrastructure from uncontrolled excavation (i.e., digging without first knowing what's below), the proposed legislation is challenging because multiple departments governing federally regulated underground

infrastructure would be affected by it.

At a time when the public expects simplicity, speed and effectiveness, S229 makes it easier for whomever is digging to protect themselves, their family, friends and their community from the perils of damaging buried utilities by ensuring all underground infrastructure is registered with a notification centre. That way, when a locate request is made, the diligent person excavating can proceed with the knowledge that they have done everything reasonable to protect what lies beneath the surface.

We need your help right now.

You have a voice, and the CCGA wants to help connect you with your Member of Parliament to express your support.

The microsite "www.icandigsafe.ca" dedicated to Bill S229 is available to the public. From that site, you can select a pre-written letter of support to send to your MP underlining the imperative need for S229.

I also encourage you to follow

@CanadianCGA on Twitter and retweet S229 posts using the #SupportS229 hashtag. Get your family and your friends to do the same. We will only have one shot at this.

Your voice and your support matters, and it will help move S229 forward.



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2018 BUYER'S GUIDE

Preparing for the Future of Water

B.C. WATER & WASTE ASSOCIATION

What does the future water utility look like? How can we accommodate the growing needs of a community?

Water and wastewater professionals face an ever-increasing number of concerns that affect their ability to deliver safe and reliable water services. Internal factors such as aging infrastructure, limited budgets and workforce retirements create increased stress and demands on systems. External factors such as increasing populations, adverse events, climate change, security threats, and provincial and federal policy decisions all directly contribute to stress and demand as well.

Join the B.C. Water & Waste Association (BCWWA) in Penticton on May 13-15 for its 46th Annual Conference & Trade Show to explore the concerns and risks going into the future as well as the optimism and innovation that ensures the long-term success of the water and wastewater industry. The BCWWA conference is British Columbia's premier water and wastewater industry event and one of the largest trade shows of its kind in western Canada. The two-day event features educational presentations, multiple panel sessions and tours, and networking events, business development opportunities, and more.

Keynote speaker and futurist Nikolas Badminton will deliver his vision for water in the year 2030, including the role it will play in:

- Big data, artificial intelligence, and automation;
- The Industrial Internet of things, digital twins, and workflow optimization;



Last year's BCWWA Conference & Trade Show in Victoria was a great success.

- Sustainability, smart cities, and future utilities companies;
- The food supply chain; and
- New modes of energy generation, climate change initiatives, and energy storage.

The education program includes panel sessions on the Water Sustainability Act, WorksafeBC Confined Spaces Regulation, and System Risk Management, as well as targeted sessions for small water systems and water and wastewater operators. Industry suppliers will be demonstrating the latest in water and wastewater technologies and there will be technical tours available of the Penticton Wastewater Treatment Plant and the Agriculture & Agri-Food Canada Summerland Research and Development Centre.

More information on the BCWWA Annual Conference & Trade Show is available online at www.bcwwa.org/events.

The BCWWA is a not-for-profit organization representing over 4,000 water professionals who are responsible for ensuring safe, sustainable and secure water, sewer and stormwater systems in B.C. and the Yukon. Our members work every day to keep our water systems clean and safe – from source to tap to drain and back to the environment. They work in jobs that range from water and wastewater facility operators and utility managers, to engineers, technicians and technologists, to consultants, to government policy and regulatory staff, to backflow assembly testers and cross connection control specialists, to researchers and suppliers.

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