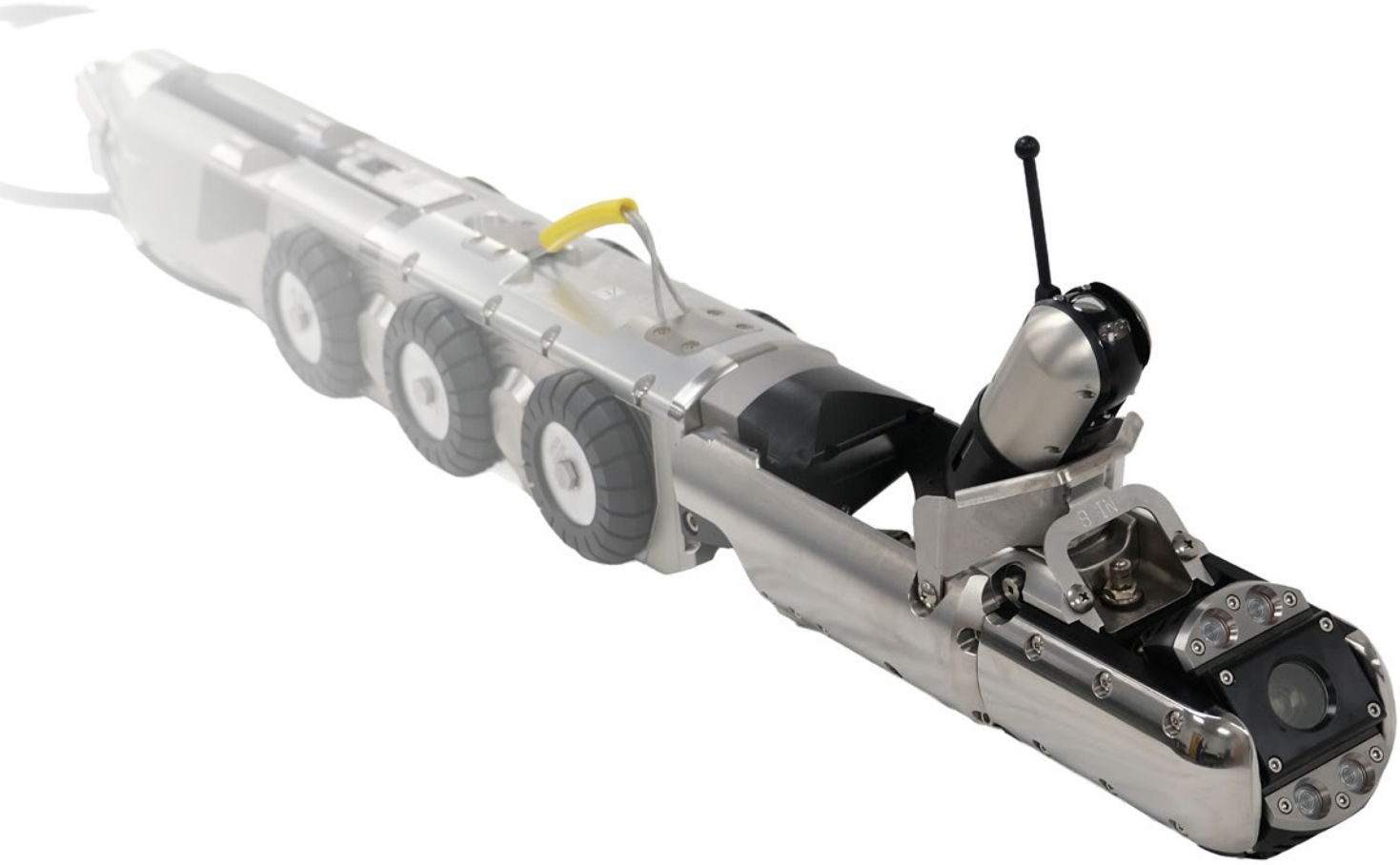


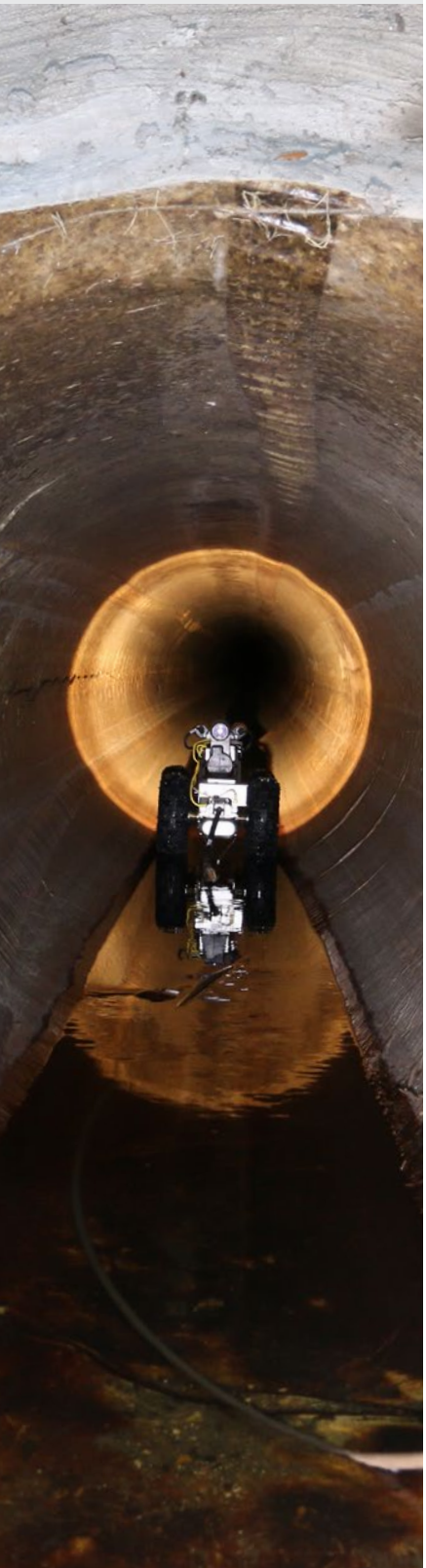
CUES Maintenance Series

LATERAL INSPECTION MAINTENANCE BOOKLET

with an emphasis on cross bores

CUES

More Locations To Serve You



Contact CUES for all of your pipeline inspection, rehabilitation, condition assessment, and pipe profiling needs. With rugged, reliable equipment to ensure a return on your investment, we will help you meet any challenge with a full line of standard and customized units, including truck-mounted systems, laser/sonar pipe profiling systems, transporters, cameras, lateral reinstatement cutters for the relining industry, and asset inspection/ decision support software. Superior customer service and support is an integral part of our job. Contact CUES for a discussion and free demonstration!

CUES ® Corporate Office
3600 Rio Vista Avenue
Orlando, Florida 32805
800-327-7791
8am - 6pm EST M-Fri

CUES ® Atlanta
2390 Satellite Blvd NE
Suite G
Buford, GA, 30518
770-945-8674
7:30am-4:30pm EST M-Fri

CUES West
1943 S. Augusta Ct.
Ontario, CA 91761
909-923-2001
7^{AM} - 6^{PM} PST M-Fri

CUES Mid-Atlantic
50 McCullough Drive
New Castle, DE 19720
Main Office: 302-322-4800
Cell: 941-900-9905
8am – 5pm EST M-Fri

CUES Northwest
1000 NW Commerce Ct.,
Suite B
Estacada, OR 97023
Phone: 971.369.6201

CUES ® Canada
1675 Sismet Rd., #2
Mississauga, Ontario
Canada L4W 1P9
905-238-9178
8^{AM} - 5^{PM} EST M-Fri

MAINTENANCE SERIES

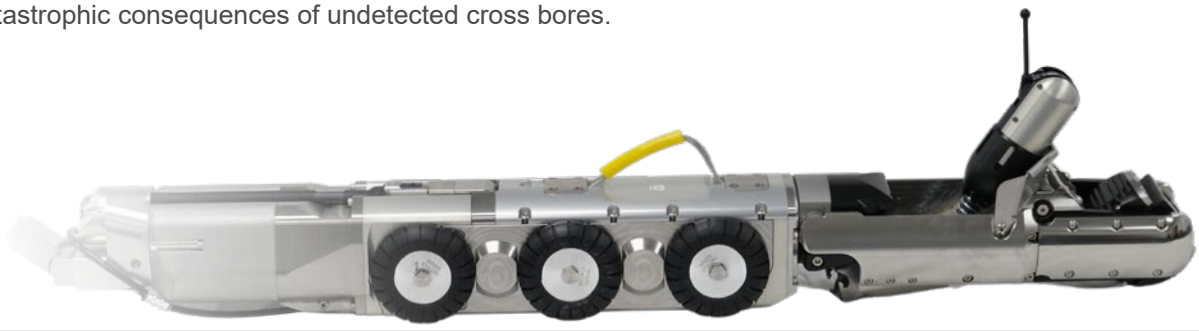
Lateral Inspection Maintenance
with an emphasis on cross bores

Underground infrastructure plays a critical role in public safety, yet much of it remains out of sight and often out of mind until a problem occurs. Among the most serious hidden threats in sewer systems are cross bores, where utilities such as gas lines unintentionally intersect sewer laterals. These conditions can go undetected for years, creating a dangerous situation where routine maintenance activities may trigger gas leaks, explosions, or other life-threatening events. As municipalities and contractors place greater emphasis on safety, the need for proactive lateral inspection has never been more important.

This Lateral Inspection Maintenance Booklet is designed to support operators, technicians, and decision-makers in identifying, preventing, and managing these risks. By combining best practices in inspection and maintenance with a strong focus on cross bore awareness, this guide provides practical steps to improve system reliability and protect both infrastructure and the public.

CUES pipeline inspection equipment and GraniteNet Software play a vital role in this process. Advanced camera systems, such as lateral launch and push camera solutions, allow operators to visually inspect both mainlines and laterals with precision, identifying defects and potential cross bores in real time. Integrated locating technology enables accurate tracking and mapping of underground assets, even in systems without tracer wires. In addition, CUES's GraniteNet software solutions support data collection, reporting, and GIS integration, ensuring that critical inspection data is captured, organized, and easily accessible for future planning and risk mitigation.

Together, these tools empower utilities and contractors to move from reactive maintenance to proactive asset management, reducing risk, improving efficiency, and most importantly, helping prevent the potentially catastrophic consequences of undetected cross bores.

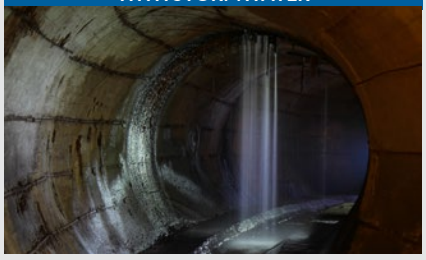


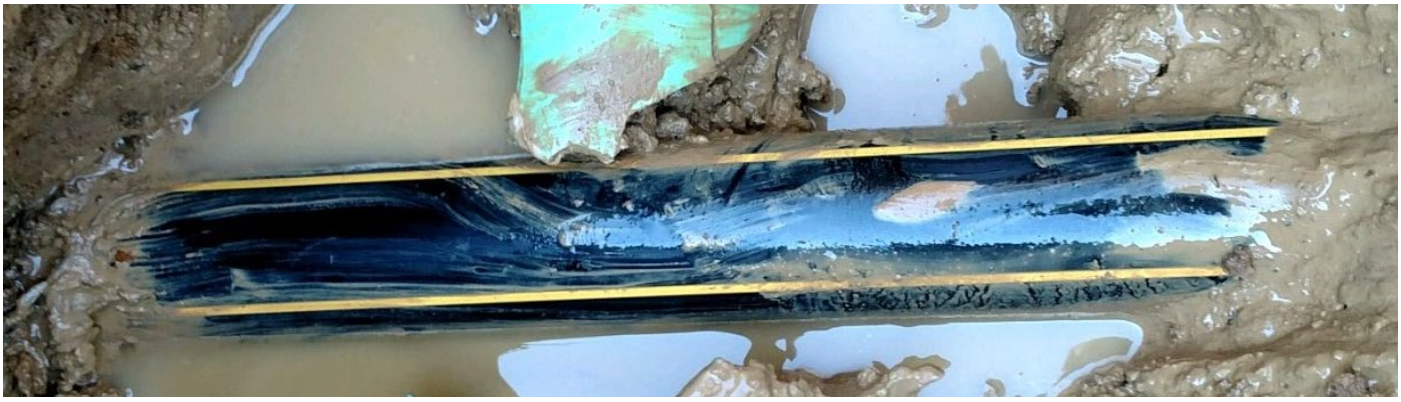
Normal Aging Afflictions - what goes wrong with laterals?

THE PIPES BECOME BLOCKED BY ROOTS

THE PIPES FILL AND CLOG WITH GREASE

THE PIPES CRACK, BREAK, AND FILL WITH STORMWATER





Cross Bores: A Hidden Threat

Cross bores represent one of the most serious and often underestimated hazards in underground utility systems. A cross bore occurs when one utility, most commonly a natural gas line, unintentionally intersects a sewer lateral. Because these intersections are hidden underground and frequently go undetected during installation, they can remain in place for years without immediate signs of a problem. This creates a dangerous condition where routine maintenance activities, such as sewer cleaning or inspection, can unknowingly disturb or damage the intersecting utility.

The real danger arises when a cross bore involves a pressurized gas line. If a sewer cleaning tool or cutter penetrates a gas pipe, it can release natural gas into the sewer system or surrounding soil. Gas can then migrate into homes or structures through plumbing systems, creating an extremely volatile environment. In many documented cases, this has led to explosions, fires, severe property damage, and even loss of life. What makes cross bores particularly hazardous is that the triggering event, such as routine maintenance, often appears harmless until the damage has already occurred.

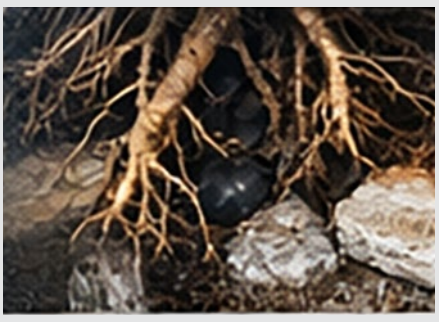
Because cross bores are not visible from the surface and sewer pipes typically lack tracer wires, traditional locating methods alone are not sufficient to identify them. This makes proactive inspection critical. Utilizing camera systems and proper locating equipment allows operators to detect these dangerous intersections before they become incidents. Ultimately, identifying and addressing cross bores is not just about maintaining infrastructure; it is a vital step in protecting public safety, utility workers, and property.

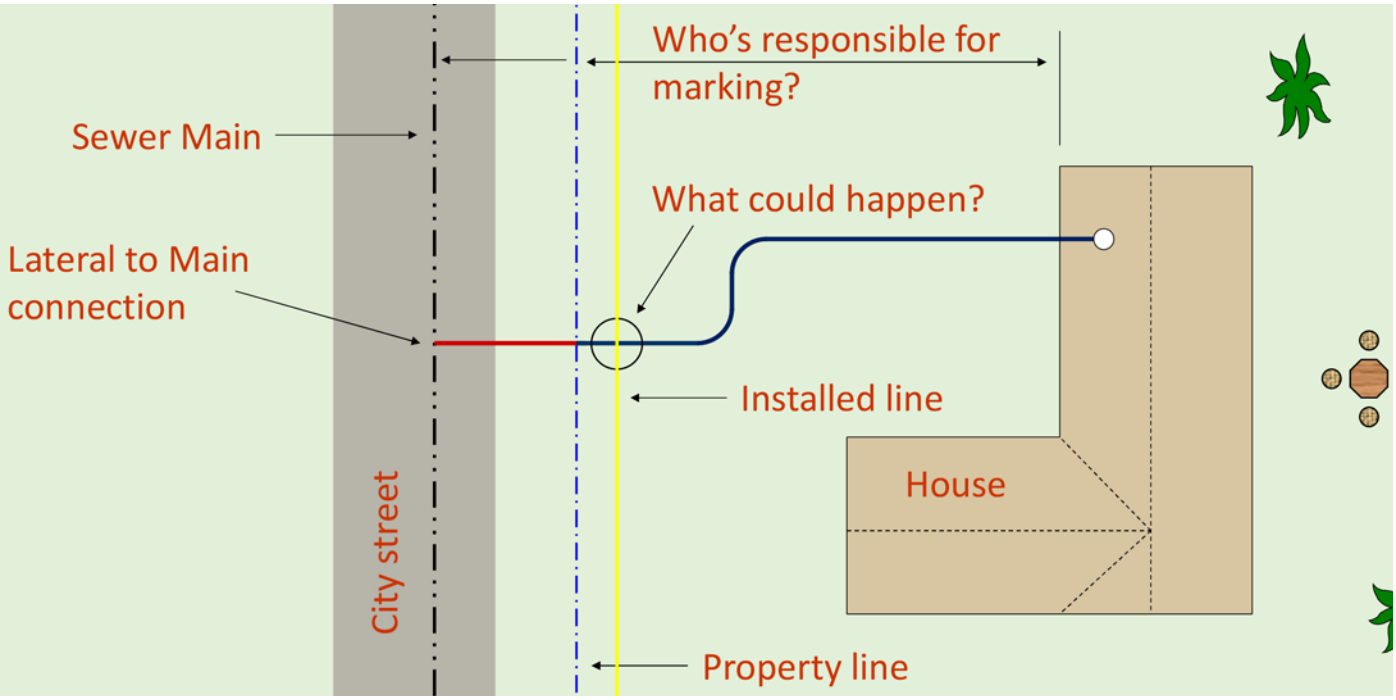
Why Inspect Laterals?

- ✓ Grease Buildup
- ✓ Root Intrusion
- ✓ Structural Defects
- ✓ Cross Bores

Hazards Include:

- ✓ Sewage Leaks
- ✓ Infilitration
- ✓ Environmental Risks





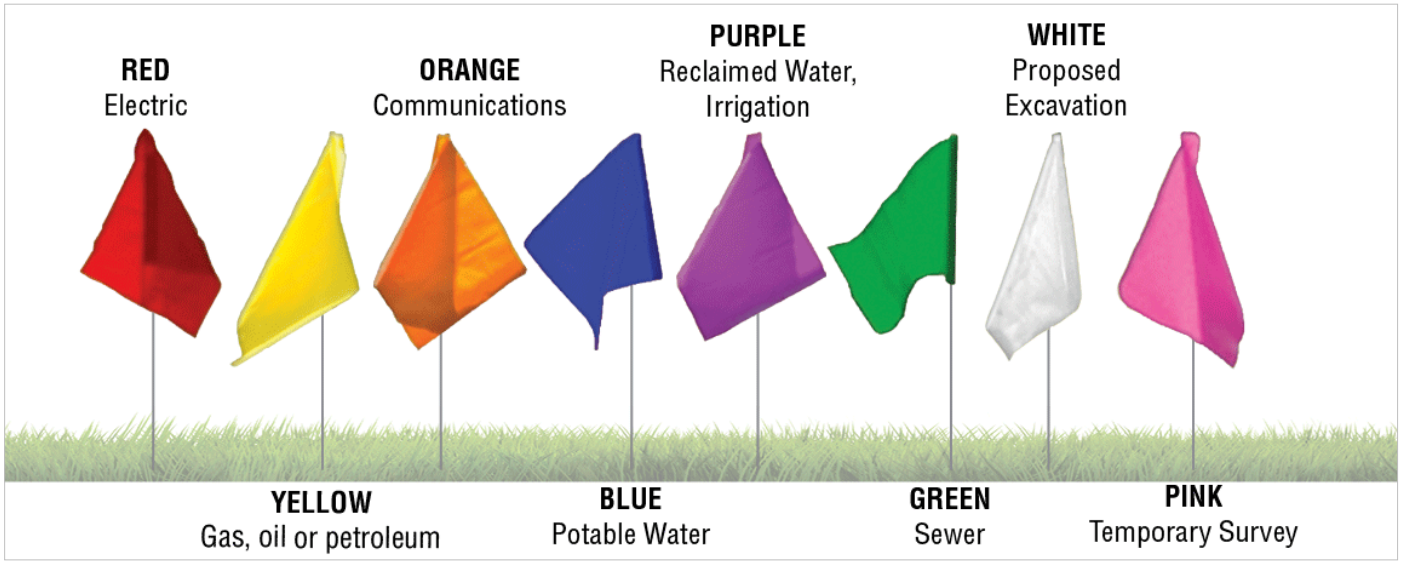
Do We Have A Problem?

Some cross bores are a time-bomb ready to explode.

How Often Do Explosions Happen?
Known Explosions In The Past 10 Years

- Austell, GA
- Bellwood, IL
- Burlington, VT
- Cincinnati, OH
- Clayton County, GA
- Fairfax, OK
- Gilbert, AZ
- McKinney, TX
- Madill, OK
- Massena, NY
- Merriam, KS
- Middletown, OH
- Mobile, AL
- Phoenix, AZ
- Rochester, MN
- St. Paul, MN
- Tucson, AZ
- White Bear Lake, MN

Utility Markers



Utility Markers Provide a Critical Window

Utility markers provide a critical window into what is happening, or about to happen, below the surface. These color-coded markings indicate the presence and approximate location of underground utilities such as gas, electric, water, and telecommunications lines. For inspection crews and contractors, markers are often the first and most visible sign that excavation, maintenance, or installation activity is either planned or already underway. Understanding and recognizing these markings helps teams anticipate potential conflicts, avoid damaging existing infrastructure, and operate more safely in shared utility corridors.

In the context of lateral inspection and cross bore prevention, utility markers play an important role. They help identify areas where multiple utilities may be in close proximity, increasing the likelihood of unintended intersections. When combined with camera inspection and locating technology, markers provide valuable context, allowing operators to correlate what they see underground with what has been marked above ground. This layered awareness improves decision-making in the field and reduces the risk of striking or damaging a critical utility during cleaning, cutting, or inspection activities.

It's also important to understand the responsibilities surrounding utility marking. In most regions, owners and operators of underground facilities are required by law to mark their infrastructure prior to excavation, typically through a "call before you dig" or 811 system. However, requirements can vary depending on jurisdiction, utility type, and whether the work is being performed on public or private property. For example, while public utilities are generally required to mark their lines, private laterals (such as sewer laterals on private property) may not always be included. This gap reinforces the need for thorough inspection and verification, rather than relying solely on surface markings.

Ultimately, while utility markers are an essential safety tool, they are only one part of a comprehensive approach. Operators should always verify markings with proper locating equipment and inspection methods. By combining visual markers with advanced pipeline inspection technology, teams can gain a more complete and accurate understanding of underground conditions: helping to prevent damage, improve efficiency, and reduce the risks associated with cross bores.

Location Challenges When Pipeline Tracer Wires Are Missing

The absence of tracer wires on sewer pipes creates a significant risk because it makes those assets difficult, often impossible, to accurately locate from the surface. Unlike many gas, electric, or telecommunications lines that include conductive tracer wires for detection, most sewer laterals are non-metallic and non-conductive. This means traditional locating equipment cannot easily track their exact path, depth, or connection points. As a result, operators are often working with incomplete or assumed information about what lies underground.

This lack of visibility becomes especially dangerous in areas where multiple utilities share the same corridor. Without a reliable way to trace sewer laterals, there is a higher likelihood of unintended utility crossings, including cross bores. Crews installing or maintaining other utilities may not realize they are intersecting a sewer line, and inspection teams may not know when a sewer lateral has already been compromised. Over time, these unknown intersections can create hazardous conditions, particularly when gas lines are involved.

The risk escalates further during routine maintenance activities such as cleaning or cutting. If a cross bore exists and the sewer lateral cannot be accurately located beforehand, crews may unknowingly damage an intersecting utility. In the case of a gas line, this can lead to leaks, gas migration into structures, and potentially catastrophic explosions. What makes this scenario particularly dangerous is that the triggering action, such as standard maintenance, can appear routine until the damage has already occurred.

Without tracer wires, utilities must rely on alternative methods such as camera inspection, sondes, and advanced locating equipment to identify and map sewer laterals. While these technologies are highly effective, they require deliberate use and proper training. Ultimately, the absence of tracer wires increases uncertainty, and in underground infrastructure, uncertainty directly translates to risk.

Locating is Simple with CUES Equipment & GraniteNet Software

Step 1: Locate & Capture Underground Infrastructure Data

The image on the opposite page shows a coordinated workflow using CUES' inspection, locating, and data management tools to identify cross bores and map underground infrastructure accurately. Here's how the pieces work together:

1. CCTV Inspection with Sonde

- A pipeline inspection camera, like the CUES LAMP II (Lateral & Mainline Probe) travels through the sewer line.
- It includes an electromagnetic sonde that emits a signal from underground. This allows operators to pinpoint the exact location of the pipe and identify potential cross bores (e.g., where a gas line intersects a sewer).

2. Surface Locator & GPS

- A technician on the surface uses a locator, like the CUES Accupoint Locator, to detect the sonde signal.
- GPS equipment captures precise coordinates of the pipe and any detected crossings. This provides both horizontal location and estimated depth of underground assets.

3. Depth Estimation

- The electromagnetic signal from the sonde is used to estimate how deep the pipe (or cross bore) is. This is critical for assessing risk and planning safe excavation or remediation.

4. Wireless Data Transfer

- The collected field data is transmitted wirelessly to a computer that has CUES' GraniteNet Software. This eliminates manual data entry and reduces errors, speeding up the workflow.

5. GIS Integration & Permanent Records

- All location and inspection data is stored in GIS.
- This creates a permanent, visual record of underground infrastructure, including flagged cross bore risks.
- Utilities can use this data for future maintenance, planning, and damage prevention.

Step #1 combines inspection (CUES' camera + LAMP II), detection (CUES' sonde + locator), positioning (GPS), and data management (GIS + CUES' GraniteNet Software) to accurately locate underground utilities and identify dangerous cross bores before excavation or failure occurs.

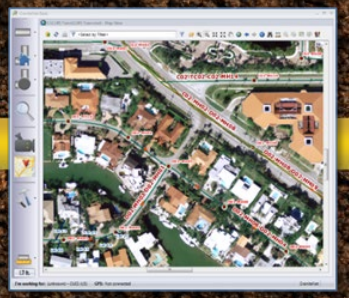
STEP #1

GPS Coordinates for underground and above ground

Moves wirelessly into the computer

Use the CUES LAMP II (Lateral & Mainline Probe) to pinpoint the exact location of the pipe and identify potential cross bores

Depth measurements can be estimated using an electromagnetic sonde built into a CUES camera



Data is stored permanently in GIS

GraniteNet

Locating is Simple with CUES Equipment & Software

Step 2: Wirelessly Capture, Transmit, and Map Location Data

The image on the opposite page highlights how field data is transferred and integrated in real time to support accurate cross bore and underground infrastructure mapping:

1. Wireless GPS Data Collection

- A field technician uses a wireless GPS receiver to capture precise surface coordinates above the sewer line or suspected crossing point. This ensures accurate positioning of underground assets identified during inspection.

2. RF Wireless Transmission (500–1500 ft range)

- The GPS data is sent via an RF modem wireless link over distances of 500 to 1500 feet. This allows continuous data flow from the field to the inspection vehicle without needing physical connections.

3. Base Unit & Truck Integration

- The transmitted data is received by a base unit inside the inspection truck.
- Using a direct connection (e.g., RS-232), the GPS coordinates are fed into the truck's GraniteNet Software.

4. Sonde-Based Depth Verification

- A technician uses a sonde locator to determine the depth of the sewer line and confirm the vertical position of potential cross bores.
- This complements the horizontal GPS data for a complete 3D understanding.

5. Real-Time Visualization & Recording

- The truck's GraniteNet Software integrates GPS coordinates, inspection video, and depth data. Operators can view, document, and store this information immediately for mapping and analysis within the GraniteNet Software.

Step #2 connects the field and the office by wirelessly transmitting accurate GPS and depth data into the inspection system, enabling real-time mapping and documentation of underground infrastructure and cross bore risks within the GraniteNet Software.

STEP #2

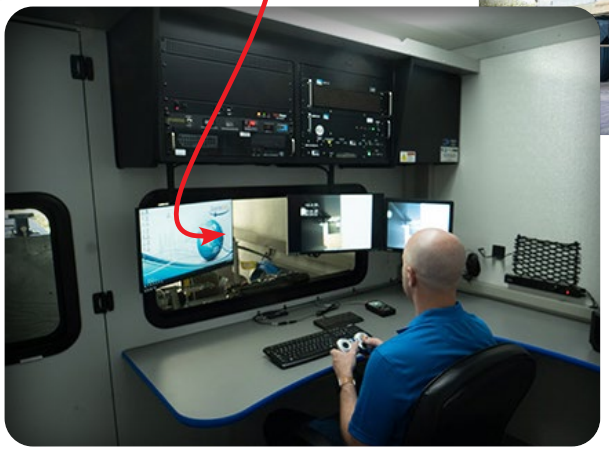
The depth of the sewer system will be determined by using a sonde device, like the CUES Accupoint Locator.

Wireless GPS Receiver -
GPS data will be fed into the RF Modem and then the data will be transmitter to the other end of the wireless link

500’ to 1500’ Wireless Link

RS-232 Cable

Antenna



The GPS coordinates will be fed to the truck computer through the wireless GPS receiver.

GraniteNet

Locating is Simple with CUES Equipment & Software

Step 3: Data Integration, Analysis & Reporting with GraniteNet

The image below shows how all collected field data is brought together inside CUES' GraniteNet Software to identify cross bores, map infrastructure, and generate actionable reports:

1. Automated Data Import

- Inspection video, sonde-based depth data, and GPS coordinates are automatically transferred into the computer running CUES' GraniteNet Software. Wireless transmission eliminates manual entry and ensures accurate, synchronized data.

2. Data Alignment & Mapping

- GraniteNet Software aligns CCTV footage with GPS coordinates and depth measurements. Operators can visually see where the pipeline is located and pinpoint potential cross bores in real-world positions.

3. Cross Bore Identification & Verification

- Inspection observations (e.g., lateral connections, intruding utilities) are tagged within the software. These observations are tied directly to location and depth, allowing precise identification of cross bore risks.

4. GIS Integration & Asset Management

- Data is stored and overlaid within CUES' GraniteNet Software to create a permanent digital record of underground infrastructure. Utilities can track assets, monitor risk areas, and plan maintenance or remediation.

5. Reporting for Operators & Management

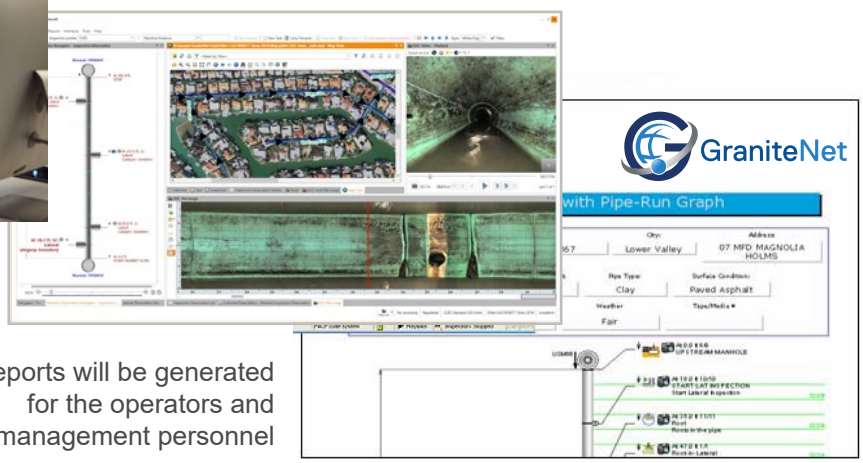
GraniteNet Software generates clear, detailed reports that include:

- Inspection findings
- GPS coordinates and depth data
- Cross bore locations and risk assessments
- Reports support field crews with actionable insights and give management the documentation needed for compliance, planning, and decision-making.

Step 3 transforms raw field data into organized, mapped, and reportable intelligence, enabling utilities to confidently locate cross bores, protect infrastructure, and make informed operational decisions.

STEP #3

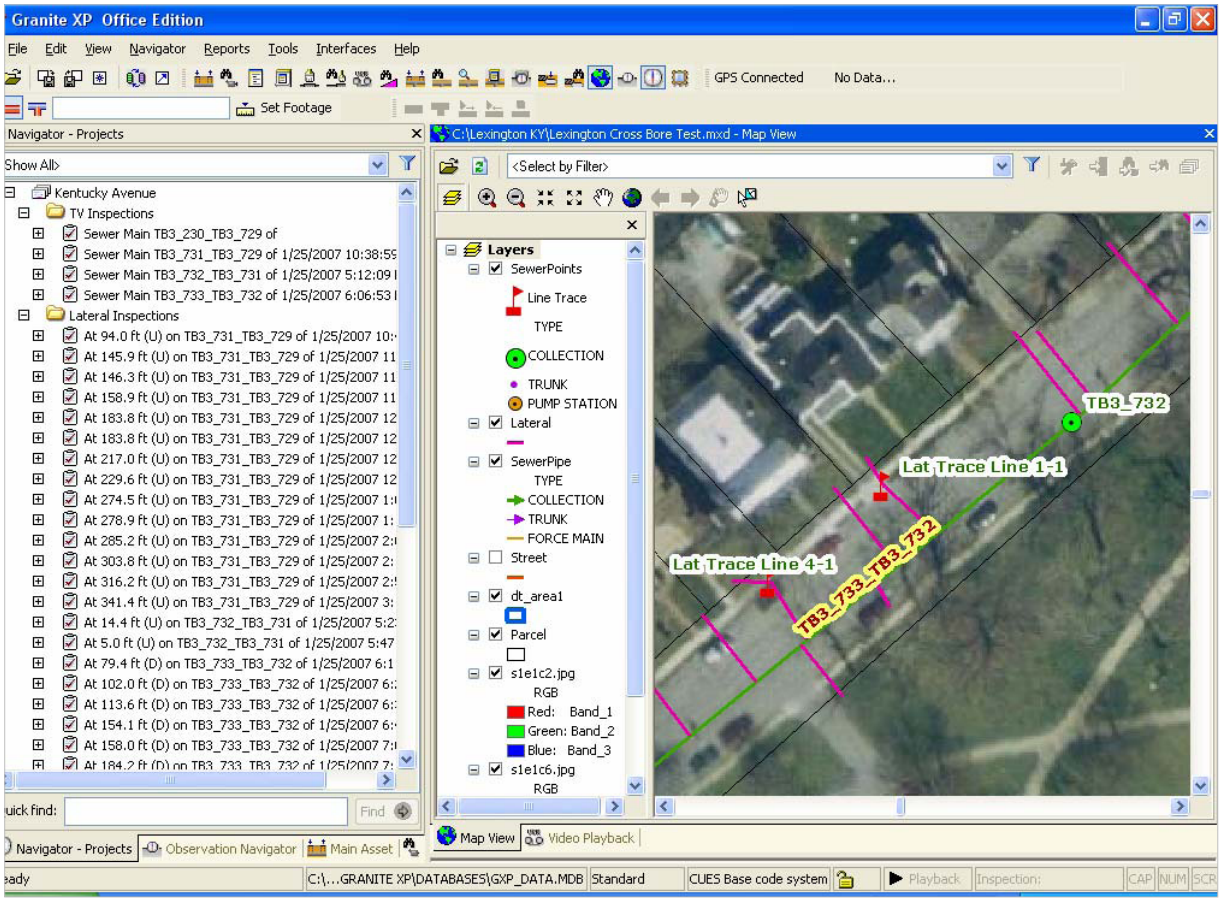
After reviewing data, the existing asset information will be updated and the new assets will be populated in the map.



GraniteNet

Reports will be generated for the operators and management personnel

STEP #4 - Review location information in the GraniteNet Office Edition Software:



The Benefits of Proper Pipeline Locating CUES Sewer Inspection Equipment & GraniteNet Software

- ✓ Once collected and retained in GIS, future utility construction will be easier and SAFER
- ✓ Water utilities can ascertain probable Inflow and Infiltration (I&I) problems
- ✓ Reduction of groundwater and soil contamination
- ✓ Homeowners will experience fewer service issues when lines are jetted
- ✓ Illegal taps can be identified

CUES Has The Tools For The Job

Cross bores pose a serious and often hidden risk within underground infrastructure, occurring when a utility line, such as a gas service, is inadvertently drilled through an existing sewer pipe. Left undetected, these intersections can lead to catastrophic consequences, including gas leaks, explosions, property damage, and severe injury. That's why having the right inspection technology isn't just beneficial, it's critical.

CUES pipeline inspection equipment is purpose-built to help utilities and contractors accurately identify and address cross bores before they become dangerous. With advanced camera systems, high-resolution imaging, and precision locating capabilities, CUES solutions allow operators to thoroughly inspect sewer lines and laterals with confidence. Whether it's pre-construction verification, post-installation inspection, or routine maintenance, these tools provide the clarity needed to detect even the most subtle intrusions.

By leveraging CUES' cross bore inspection and detection equipment, municipalities and contractors can take a proactive approach to infrastructure safety. Early detection not only prevents costly emergency repairs but also protects communities from preventable hazards. With the right technology in place, crews can work smarter, respond faster, and ensure that underground systems remain safe, compliant, and reliable for years to come.

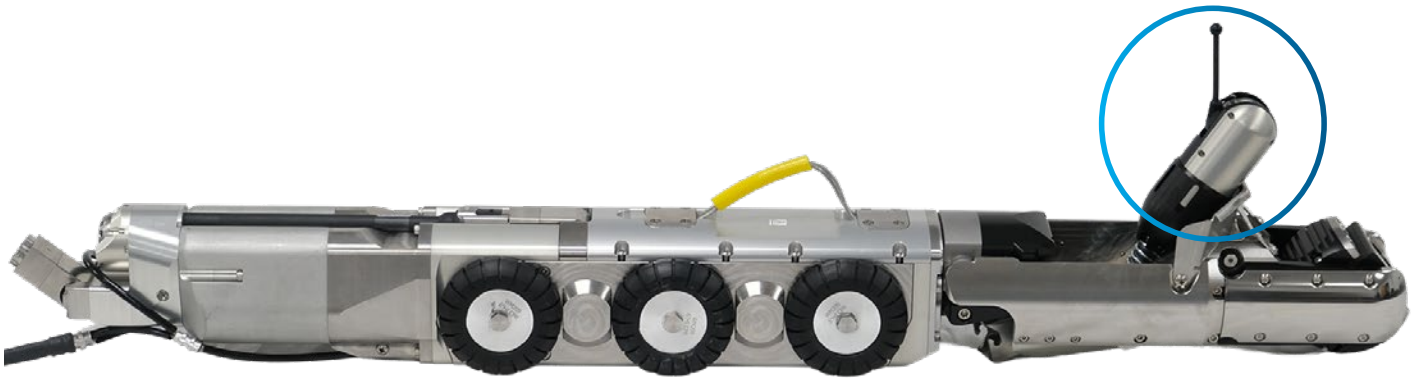
Discover some of our most effective cross bore detection tools by exploring the subsequent pages.

CUES offers pre-built TV/LAMP (mainline and lateral probe) inspection vehicles to help locate electric lines, water lines, cross bores, gas lines, sewer lines, and other pipes in the path of boring machines to avoid penetrating or damaging the pipes. Prior to the initiation of horizontal boring, use the CUES TV/LAMP truck system to perform pan and tilt inspections of the mainline sewer pipe while viewing and locating lateral services. CUES PRE-BUILT TV LAMP vehicles can include a variety of inspection equipment based on your specific needs.

The Smarter Way To Inspect Pipelines.

The CUES LAMP II is a rugged, self-propelled CCTV inspection system for identifying infiltration and inflow, potential cross bores, pipe defects, and structural conditions in lateral services and mainlines.

Designed to help municipalities and contractors do more with less, LAMP II can inspect both mainlines and lateral services in a single run, saving time, reducing costs, and improving safety across inspection projects.



CUES LAMP II (Lateral & Mainline Probe)

- Easily launches with or against the flow
- Inspect mainlines and laterals with one inspection run
- Front-mounted pan and tilt / zoom camera (40:1 optical/digital zoom): Completes mainline inspection and monitors lateral camera; Articulates to facilitate invert entry; Automatic centering
- Traverse up to 1000’ (305 m) of mainline pipe while still being able to launch into laterals
- Self-leveling lateral camera with built in sonde; optional CUES Micro Pan & Tilt Camera
- Supplied with 4 sets of wheels for 6”- 30” (152 mm - 762 mm) lines
- Traverses 45 and 90 degree bends in lateral services
- Fiberglass push cable: up to 150’ (46 m) push cable
- Rear tip-up connector

CUES Micro Pan & Tilt Camera

- Rotation: Continuous 360 degree rotation;Pan: Continuous 360 degree rotation
- Illumination: White LED Lighting
- Scratch-resistant sapphire window
- Ability to direct the camera and lights to observe all defects, including joint separations, cracks, offsets, spotting, and roots
- Built-in multi-frequency sonde transmitter; 512 Hz or 8 kHz
- Detachable steering wand provides the ability to navigate through multiple wyes
- Built in lens wiper
- Self-leveling camera head
- LED lighting with variable intensity
- Rugged carrying case

CUES Has The Tools For The Job

CUES flexiprobe PT Portable System

The CUES flexiprobe PT is a rugged pushrod inspection system built for municipal crews and contractors who need reliable performance, clear video, and fast reporting in a portable format. Based on CUES' proven C550 controller platform, it delivers consistent results without the complexity of a full TV truck.

- Rugged, Field-Ready Design - Heavy-gauge stainless-steel coiler, durable push cables up to 500 ft, and industrial components are built for daily use in tough environments. Designed to travel easily and work reliably on every job.
- Proven C550 Control Platform - The 12.1-inch daylight-readable monitor and familiar CUES interface provide clear video, simple operation, and fast startup. Minimal training, dependable performance.
- Fast, Built-In Reporting - Onboard reporting software supports quick review, recording, and data transfer via WiFi, USB, or HDMI. Crews produce consistent, defensible reports with less downtime.
- Mainline-Capable Pushrod - Heavy-duty pushrod design extends inspection reach into longer laterals and select small-diameter mains, reducing the need for crawlers or full inspection trucks. sizes and inspection needs, improving visibility and coverage.

CUES Accupoint Locator

Locating and tracing sewer and storm lines can be challenging, especially when rubber seals, insulators, or gaps between pipe sections make detection difficult. The Accupoint Precision Locating System from CUES takes the guesswork out of the job, helping crews work faster, safer, and with complete confidence.

The Accupoint locator and transmitter are designed with the sewer and stormwater industry in mind. Built tough for on-site use, Accupoint delivers accuracy, reliability, and ease of use, every time.

Accupoint MS611 Locator

- Detects 3 sonde frequencies for all types of non-metallic pipe
- Locates 4 active line frequencies
- Peak+ Mode with Guidance Arrows, specifically designed for CCTV inspection system users
- Powered by two long-lasting LR20 D-cell alkaline batteries
- Rugged, IP65-rated casing protects against dust, water, shocks, and drops
- On-Site Ready
- Heavy-duty, shock-resistant design

Accupoint MS620 Transmitter

- 5W transmitter with 90V output for deeper, longer-distance locates
- Automatic impedance matching for strong, reliable signals
- Ingress protection against dust and water
- Portable kit with base tray and accessories

CUES's GraniteNet Software -

The Next Generation Asset-Inspection and Decision Support Software

GraniteNet is the next-generation infrastructure Inspection and Decision Support software for Water, Wastewater and Municipal Public Works asset management. Whether used in the field on tablets or via a Web browser to review and analyze inspections, GraniteNet embraces the Cloud for media storage while enabling simple, precise data collection with integrated GIS mapping and GPS.

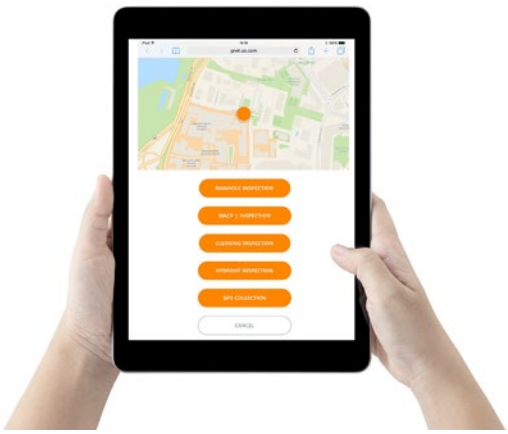
Tired of looking at pipeline videos? Outsource this tedious work to the GraniteNet Defect Coding Service and let its machines process the video using Artificial Intelligence (AI) for consistent accuracy, speed-to-completion, and final review done by PACP-certified inspectors. Get caught up and allow your staff and Engineers to focus on more inspiring and productive work and let the machines do most of the work. Call for a discussion or demo to learn how this new software is helping contractors and municipal asset managers to lower their operating costs and increase efficiency across departments.

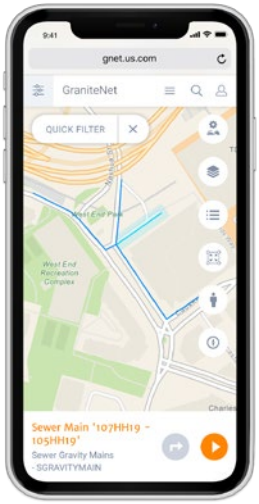
CUES Has The Tools For The Job

GraniteNet Asset Inspection Software plays a critical role in identifying and locating laterals and detecting potential cross bores, one of the leading causes of underground utility damage and gas-related explosions. By integrating inspection data with GIS mapping and GPS-enabled positioning, GraniteNet gives operators a precise, real-time view of where laterals tie into the mainline. This level of accuracy allows crews to confidently map underground infrastructure and avoid dangerous conflicts with other utilities during excavation or installation work.

Using high-resolution video, detailed condition coding, and synchronized distance tracking, GraniteNet enables inspectors to document lateral connections and flag anomalies that may indicate a cross bore, such as an unexpected utility intrusion into a sewer line. These findings can then be quickly reviewed, shared, and analyzed within the platform, helping municipalities and contractors take proactive steps before a situation escalates into a safety hazard.

By centralizing inspection data in the Cloud, GraniteNet also supports long-term asset management and risk mitigation strategies. Historical records of lateral locations and past inspections make it easier to verify conditions prior to new construction or trenchless installations, significantly reducing the likelihood of accidental gas line strikes. In doing so, GraniteNet not only helps protect critical infrastructure but also plays a vital role in safeguarding communities from costly damage, service disruptions, and potentially catastrophic explosions.





CUES equipment is designed to be easy to use during day to day operation. However, it is powered electrically and thus must be operated with care and safety.

Care was taken in the design of this product and in the production of this document and related materials. However, CUES makes no warranty for the use of its products and assumes no responsibility for any errors or omissions in this document or for incidental or consequential damages resulting from the use of the products or the information contained in this document. Specifications may change without notice.

We would be pleased to hear from you. If you see any errors or desirable extensions or improvements, please email us at the following: cuesnews@cuesinc.com