

# Introduction to No-Dig Technologies and the ISTTT

28 JANUARY 2026



**International Society for Trenchless Technology**

## WEBINAR INFORMATION – HOUSEKEEPING RULES



- This webinar will be **recorded and made available “on-demand”** on the [IWA Connect Plus](#) platform and IWA Network website, with relevant information.
- The **speakers** are responsible for **securing copyright permissions** for any work that they will present of which they are not the legal copyright holder.
- The opinions, hypothesis, conclusions or recommendations contained in the presentations and other materials are the **sole responsibility of the speaker(s)** and do not necessarily reflect IWA opinion.

# WEBINAR INFORMATION – HOUSEKEEPING RULES



- **‘Chat’ box:** please use this for general requests and for interactive activities.
- **‘Q&A’ box:** please use this to send questions to the panelists. (We will answer these during the discussions)

*Please Note: Attendees’ microphones are muted. We cannot respond to ‘Raise Hand’.*

# AGENDA



- **Introduction**

*Moderator - Andreas Gross, Member of ISTTT's working group on strategic alliances (Germany)*

- **Introduction to the scope and activities of ISTTT ; Overview of Trenchless Technologies**

*Speaker – Iain Naismith, Chair of UK Society for Trenchless Technology T&E Committee (UK)*

- **Q & A from audience**

*Moderator - Andreas Gross, Member of ISTTT's working group on strategic alliances (Germany)*

- **Closing remarks**

*Afia Siddiqui - IWA*

# Introduction to No-Dig Technologies and the International Society for Trenchless Technology

DR IAIN NAISMITH, ISTT

## Content:

1. Introduction to the scope and activities of ISTT
- 2 Overview of Trenchless Technologies

**inspiring change**



# WHAT DOES A UTILITY NETWORK OWNER ACTUALLY OWN?



In reality, a network owner owns:

**a linear hole in the ground, that is connected at intervals to the surface by shafts** and through which it conveys its product by various means.

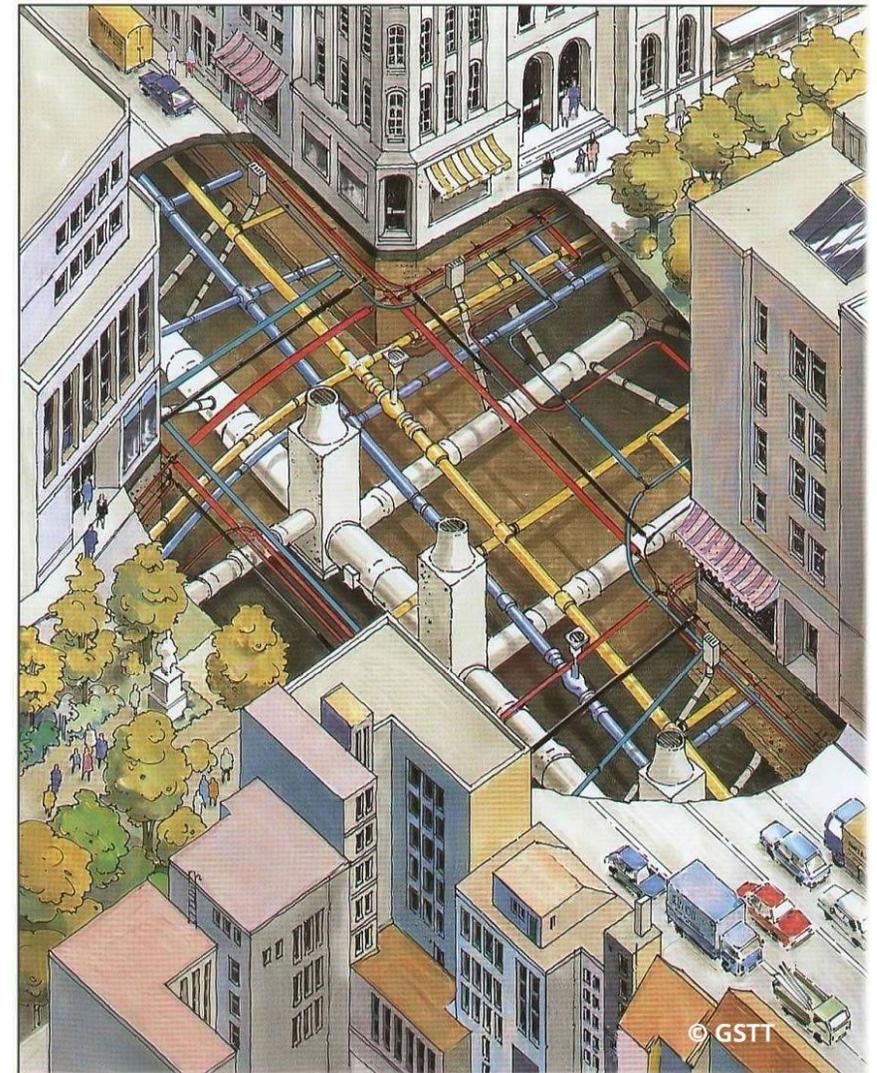
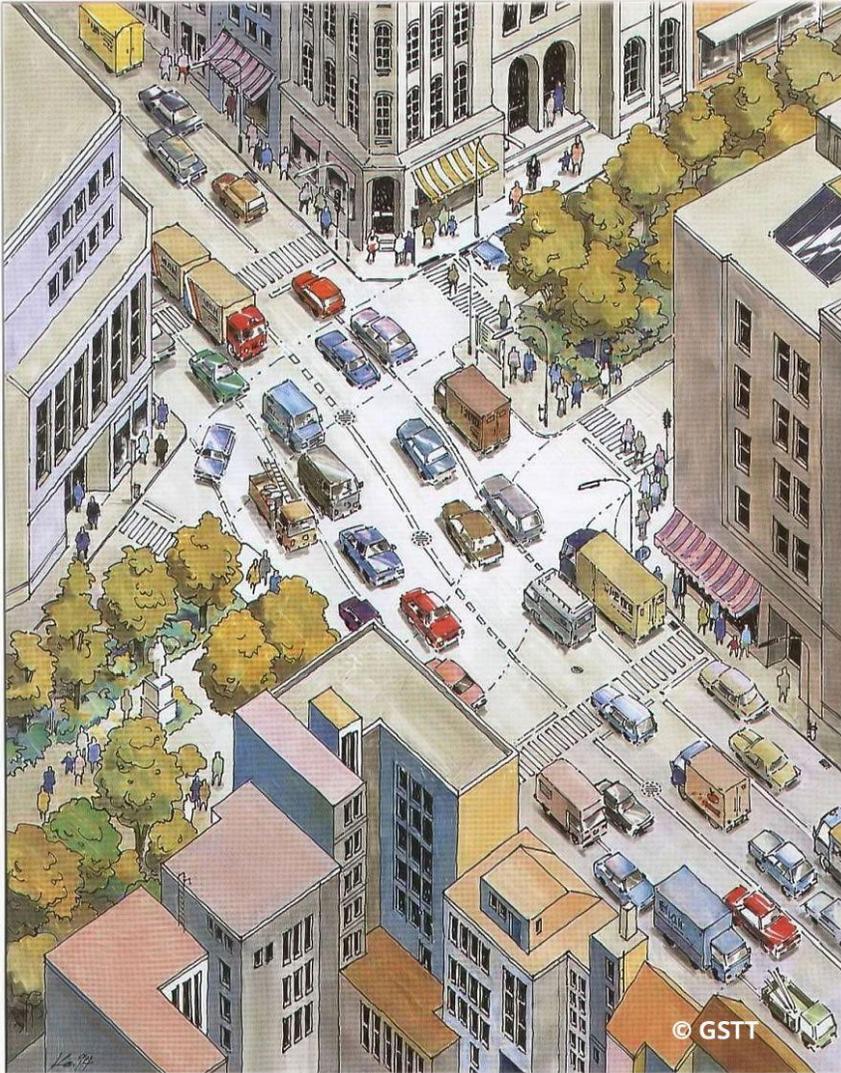
**It needs to:**

maintain **sufficient transmission** of product/waste and to do this it needs to **keep the hole open**, indefinitely.

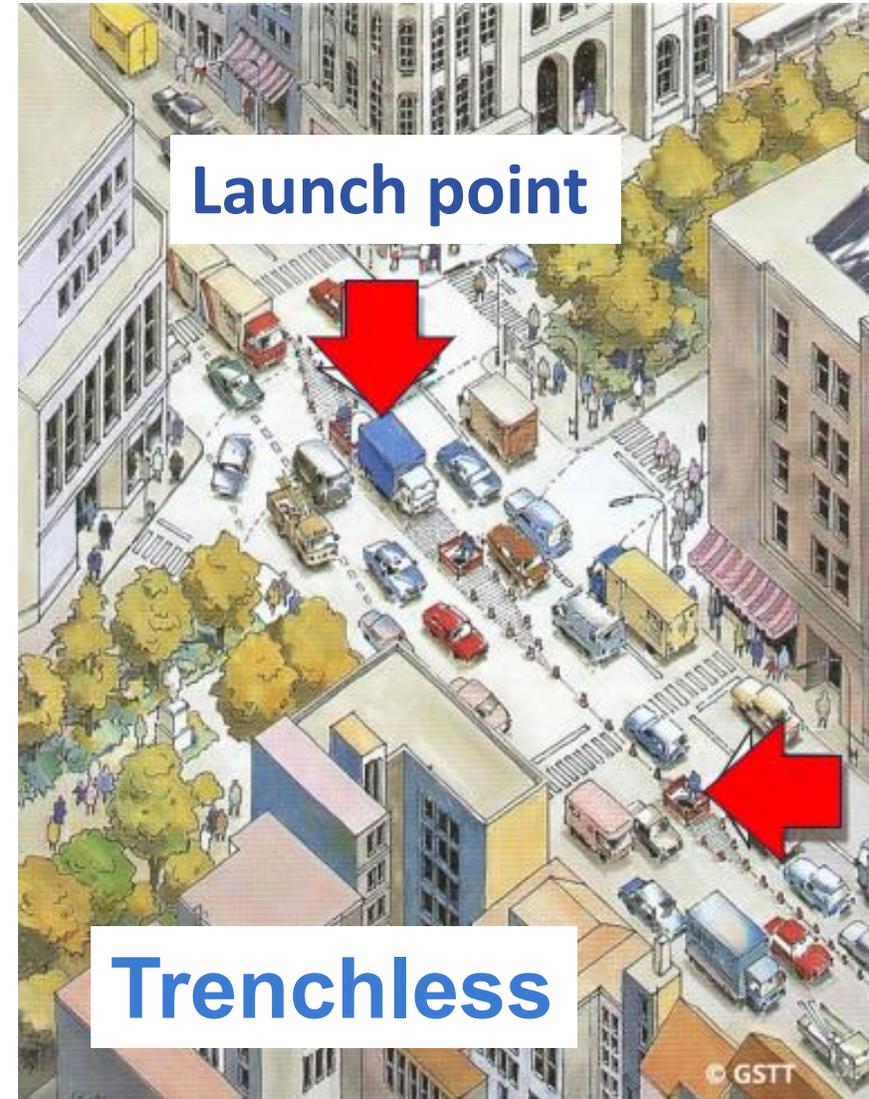
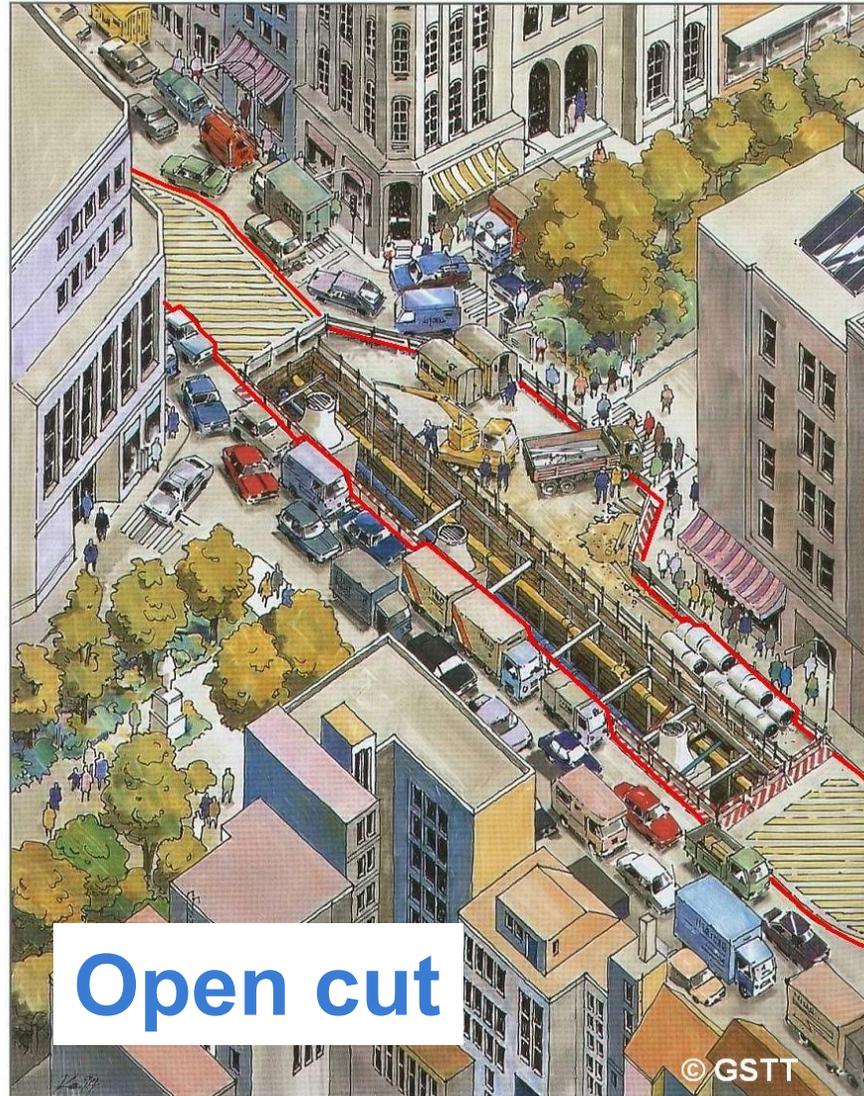
**Most networks are <100 years old.**

Most flow/transmission **products have an expected life of 50 to 100 years**, but they and holes in the ground may be needed for **thousands of years**.

# SCOPE OF TRENCHLESS AND ISTT



# SCOPE OF TRENCHLESS AND ISTTT



# WHAT IS IN SCOPE – TRENCHLESS TECHNOLOGIES

## New Installation

## Rehabilitation

- Replacement
- Renovation
- Repair



## Investigation/ Assessment

- Site Investigation
- Asset Condition Assessment

Photo: widely used image,  
source not identifiable

# ADVANTAGES OF TRENCHLESS TECHNOLOGIES

**Reduced disruption** – traffic/ pedestrians/ businesses/ other utilities/ drainage

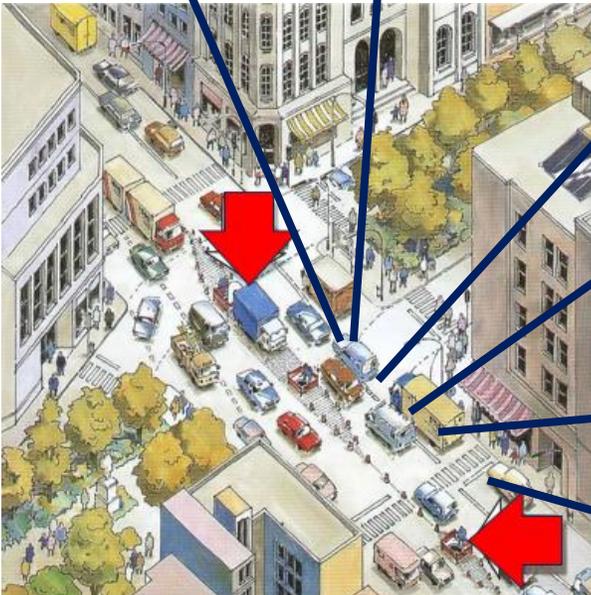
**Fewer complaints**

**Health and safety** – for staff and the public

**Reduced environmental damage** – air and noise pollution/ waste/ tree root damage

**Reduced Carbon Footprint** - less road opening / less traffic congestion / re-use of existing infrastructure / less replacement

**Reduced costs** - Project costs/ road rental/ reinstatement/ compensation claims



**Trenchless Advantages**  
**Listed on ISTT Website**



# ISTT'S OBJECTIVES

- To advance the science and practice of Trenchless Technology for the public benefit, and;
- To promote education, training, study and research in the said science and practice for the public benefit, and to publish the useful results of the same.





## Horizontal Directional Drilling (HDD)

HDD is an extremely versatile trenchless technology that is used for the installation of everything from service connections to residences and buildings, to pipes and installing pressure pipes and conduits where precise are: (1) a directional drill rig sized for the job at hand; advancing the drill bit and for pulling back reamers c recording the location of the drill and product; (4) a t circulating the drilling fluid. Other components of an heads.

Resources on this v not responsible for



ISTT Whisperer



Deutsch

English ✓

Español

Français

Português (Portugal)

Suomi

Svenska

Türkçe

中文

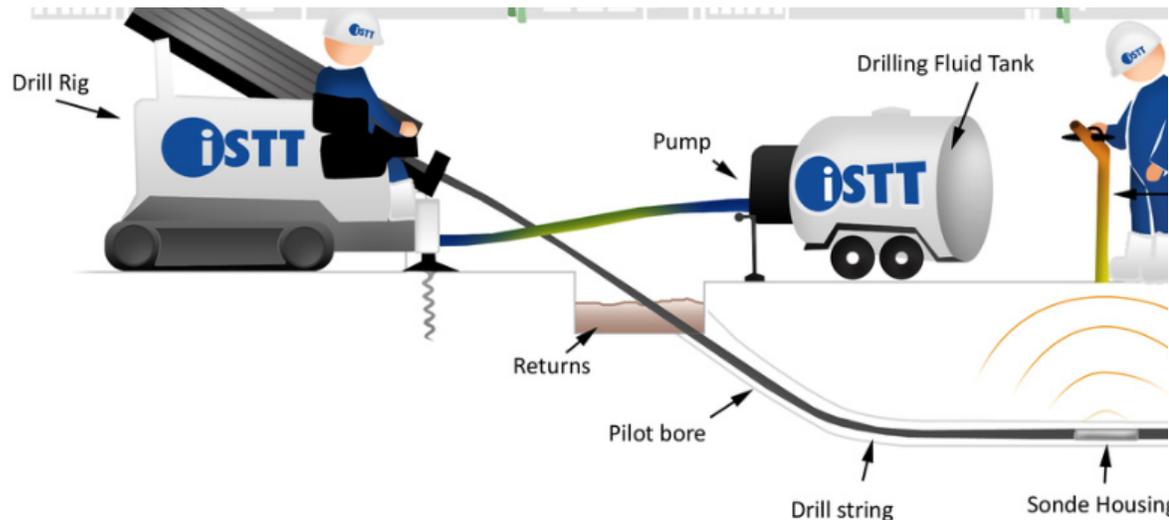
日本語

Corporate Members of Horizontal Directional Drilling (HDD)

Technical Papers

g (HDD)

- Trenchless Installa
- Hybrid Methods
- Direct Steerable
- Ram-assist Tech
- Pilot Tube Assist



## 2. OVERVIEW OF TRENCHLESS TECHNOLOGIES

**New Installation**

**Rehabilitation**

- Replacement
- Renovation
- Repair

**Investigation/  
Assessment**

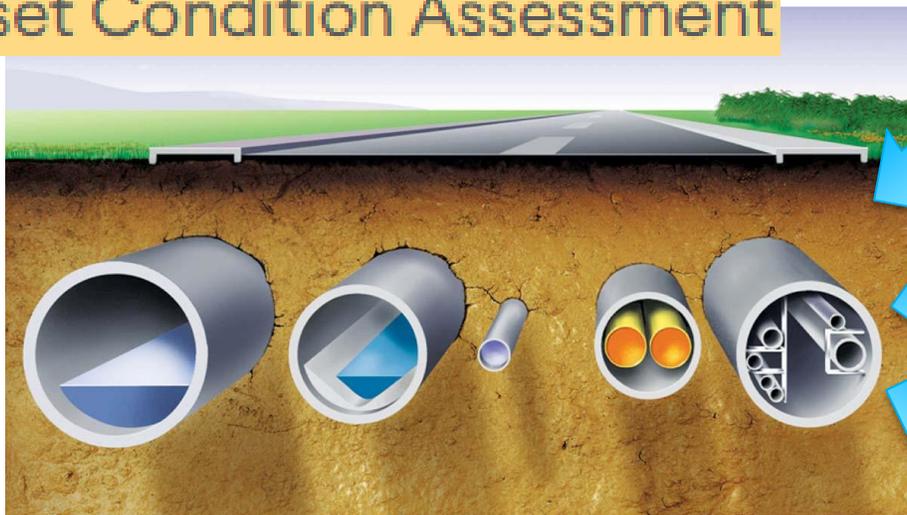
- Site Investigation
- Asset Condition Assessment

- From within the pipe
- From the surface



# CONDITION ASSESSMENT TECHNOLOGIES

## Asset Condition Assessment



Visual/lazer inspection

Structural condition assessment

Operational performance assessment

Inspection can be:

- **Periodic**
- **Continuous / automatic**
- **Autonomous**

Accurate understanding of **condition** together with predicted **deterioration rate** facilitates **decision making and financial planning** for maintenance repair, rehab or replacement.

# CONDITION ASSESSMENT – VISUAL/LAZER

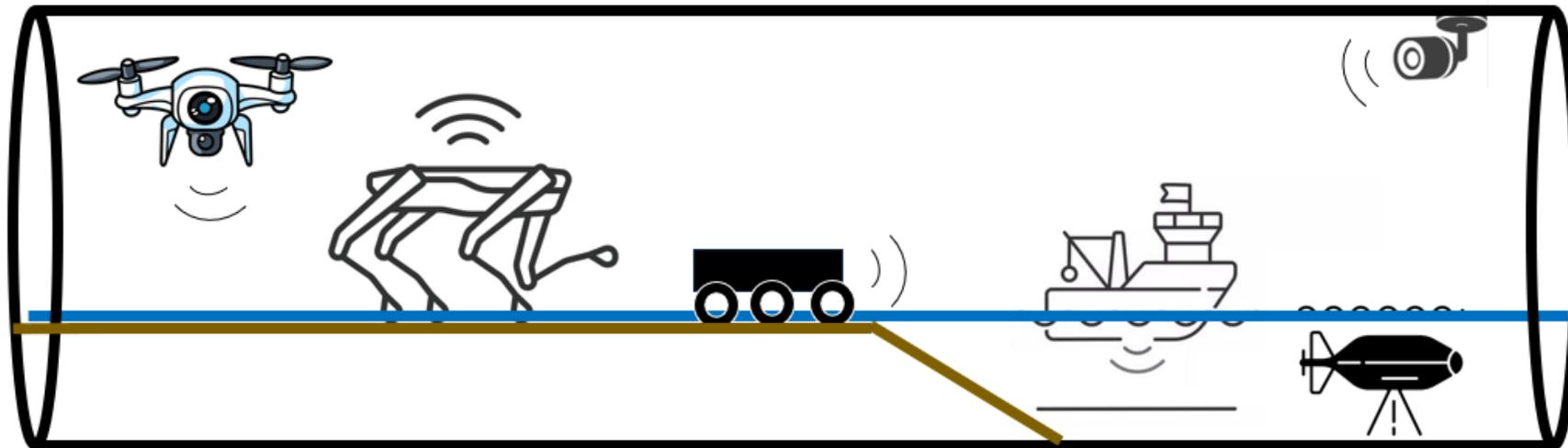
## Visual/Laser Inspection

### Sensors

- CCTV, lazer profiling, dimensional analysis, lidar, sonar

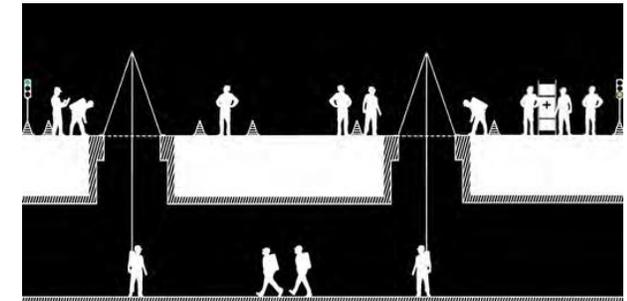
### Delivery platforms

Active - Fly, walk, crawl, float, dive

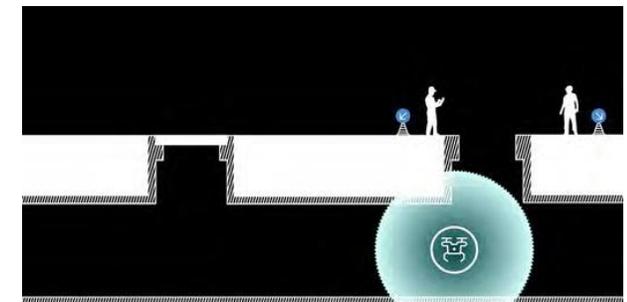


Passive – pushed, dragged, fixed

Image:  
Environmental  
Techniques



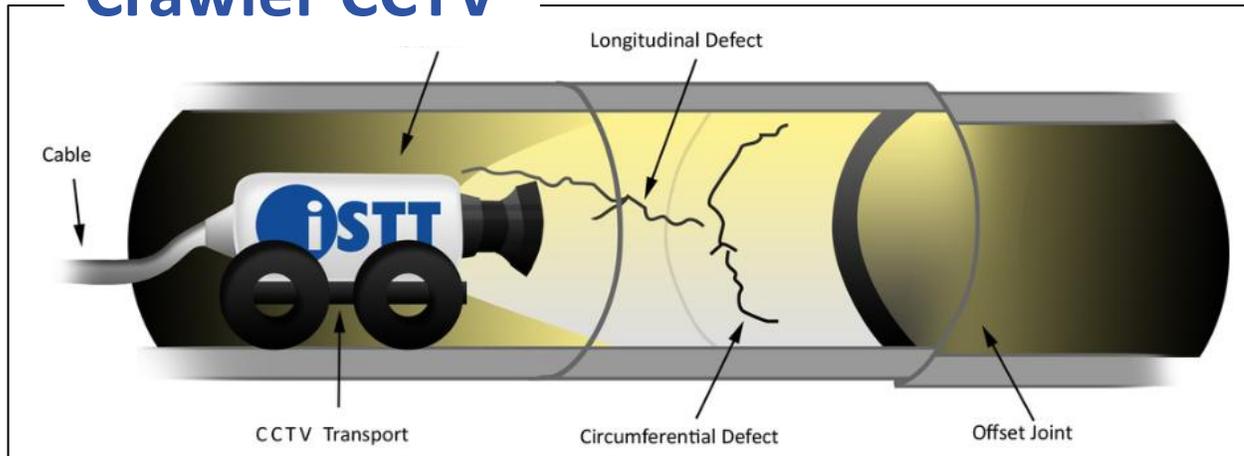
Man access



Drone access

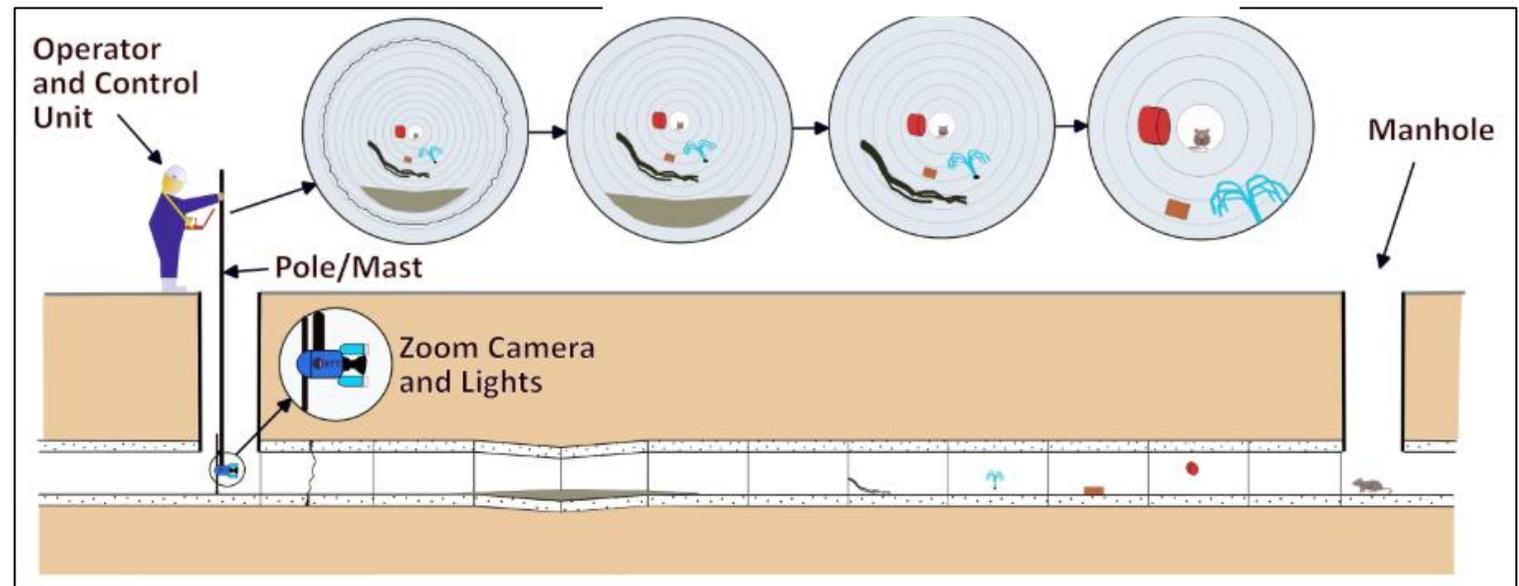
# CONDITION ASSESSMENT – VISUAL/LAZER

## Crawler CCTV



Visual/Laser Inspection  
Examples of technologies

## Pole zoom camera

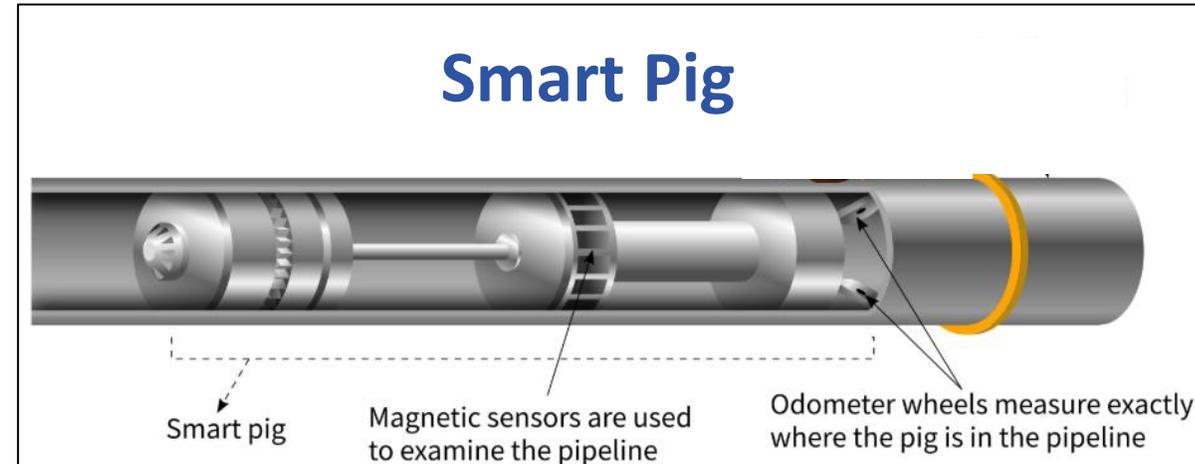


# STRUCTURAL CONDITION ASSESSMENT

## Structural Condition Assessment

### Wall thickness

- Electromagnetic methods
- Acoustic techniques
- Infrared scanning
- Wall impact methods
- Nuclear methods



### Structural response

- Crack width gauges
- Strain gauges
- Acoustic and vibration sensors
- Fibre optic sensor systems

### External void detection

- hammering on the wall
- Acoustic wave methods
- Infrared scanning
- Ultrasound

# OPERATIONAL PERFORMANCE ASSESSMENT



## Operational Performance Assessment

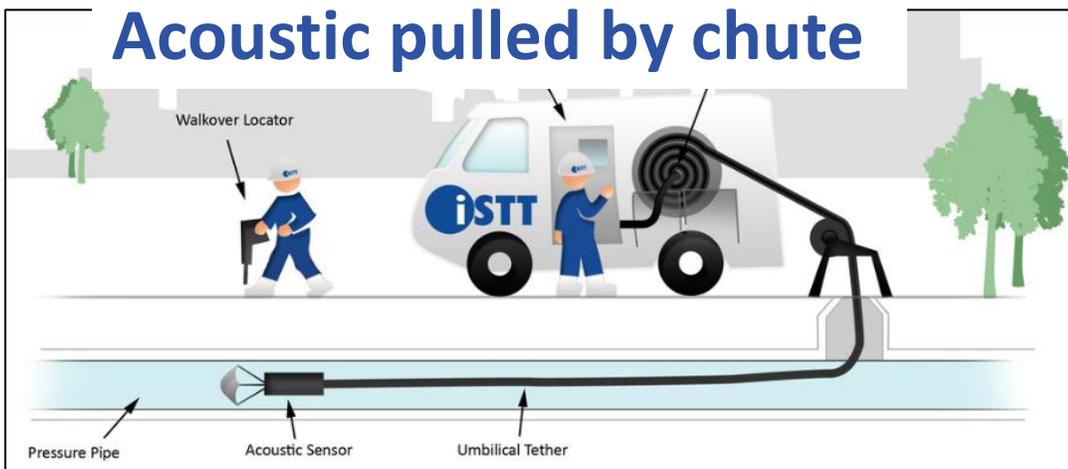
### Infiltration/Inflow (Gravity pipe)

- System flow monitoring
- Flow quality (chemical/biological)
- In-pipe visual observation
- Smoke and dye testing
- Overflow detection

### Smoke detection



### Acoustic pulled by chute



### Leak detection (pressure pipes)

- Flow quality monitoring
- Leak signature detection
- Pressure monitoring
- Above ground surveys

# SITE INVESTIGATION

## Site Investigation

### Asset location

What structures or utilities exist on the proposed route for the new installation of an underground asset



Image: UK Govt Geospatial Commission

### Asset environment

What are the ground conditions on the proposed route for a new installation of an underground asset or around it when trenchless rehabilitation is being considered

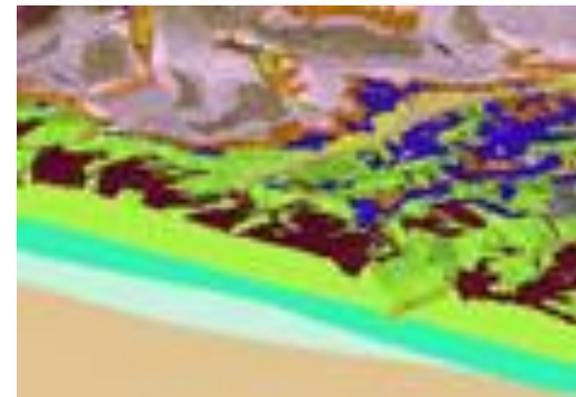


Image: British Geological Survey

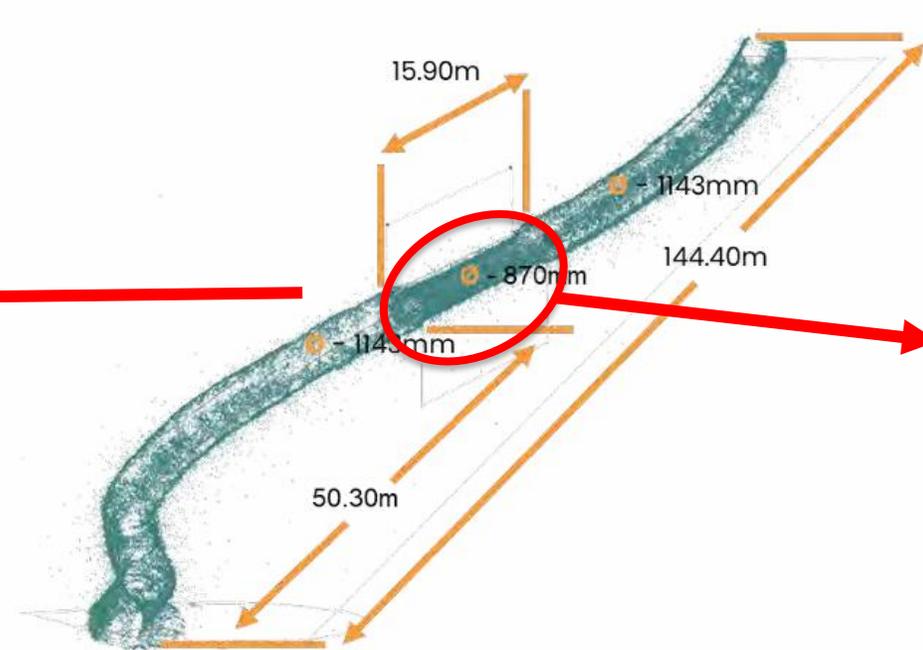
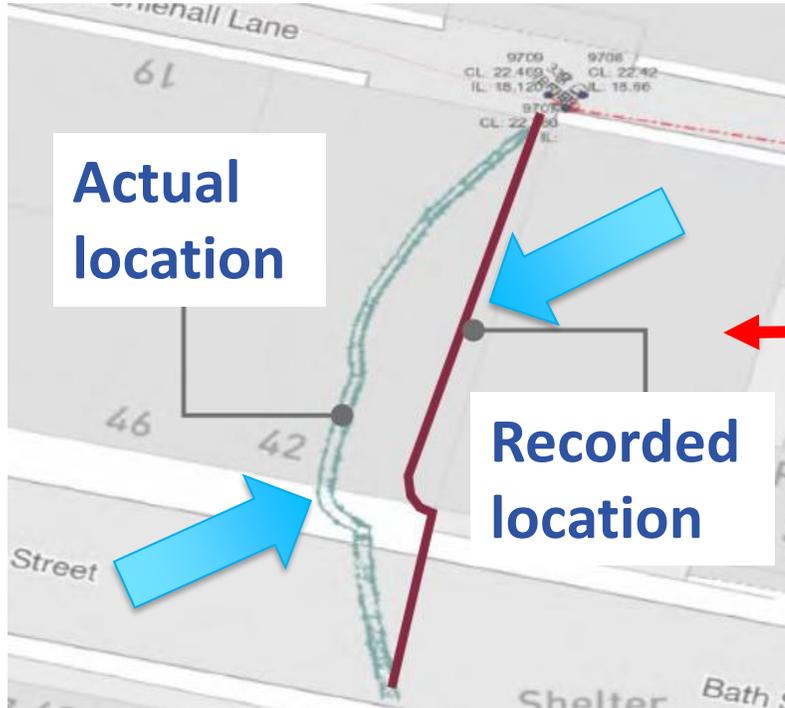
# ASSET LOCATION - EXAMPLE

## Asset Location

Example

### Actual vs recorded location

### Drone Lidar model with GPS



Unexpected smaller diameter brick section

Images: Environmental Techniques

# ASSET LOCATION - TRACING FROM WITHIN THE PIPE

- Asset Location
  - Asset Tracing **from within the pipe**
    - Sonde Techniques
    - Impressed Signal Techniques
    - Internal Survey Techniques
    - Smoke and Dye Testing



## Sonar sonde

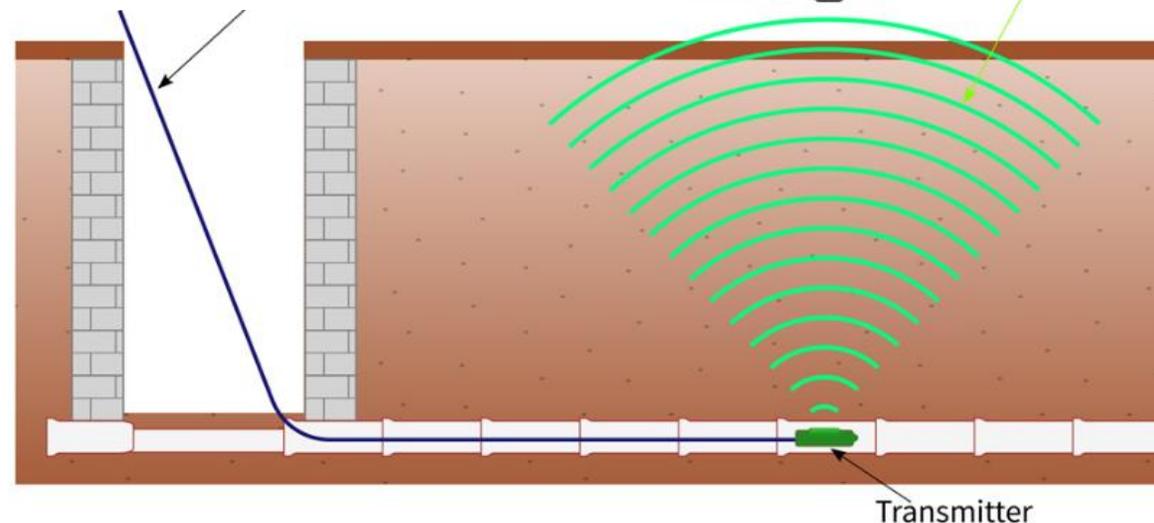


Photo: Trenchless  
technology  
Magazine

# ASSET LOCATION - TRACING FROM THE SURFACE

- Surface-based Techniques
- Ground Penetrating Radar (GPR)
- Seismic / Sonar Techniques
- Other Methods
- Potholing

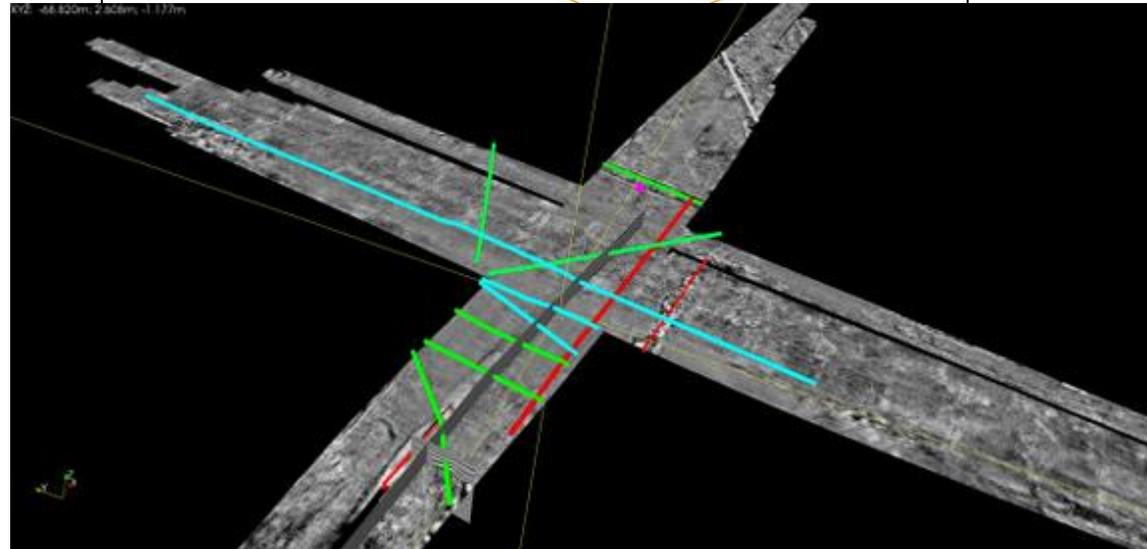
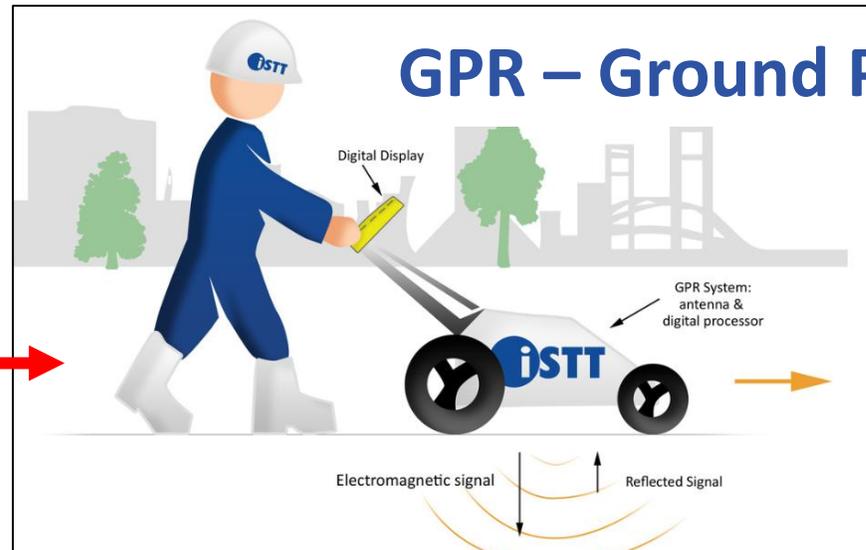


Photo: ISTT  
Paper ReF: 120

# ASSET ENVIRONMENT

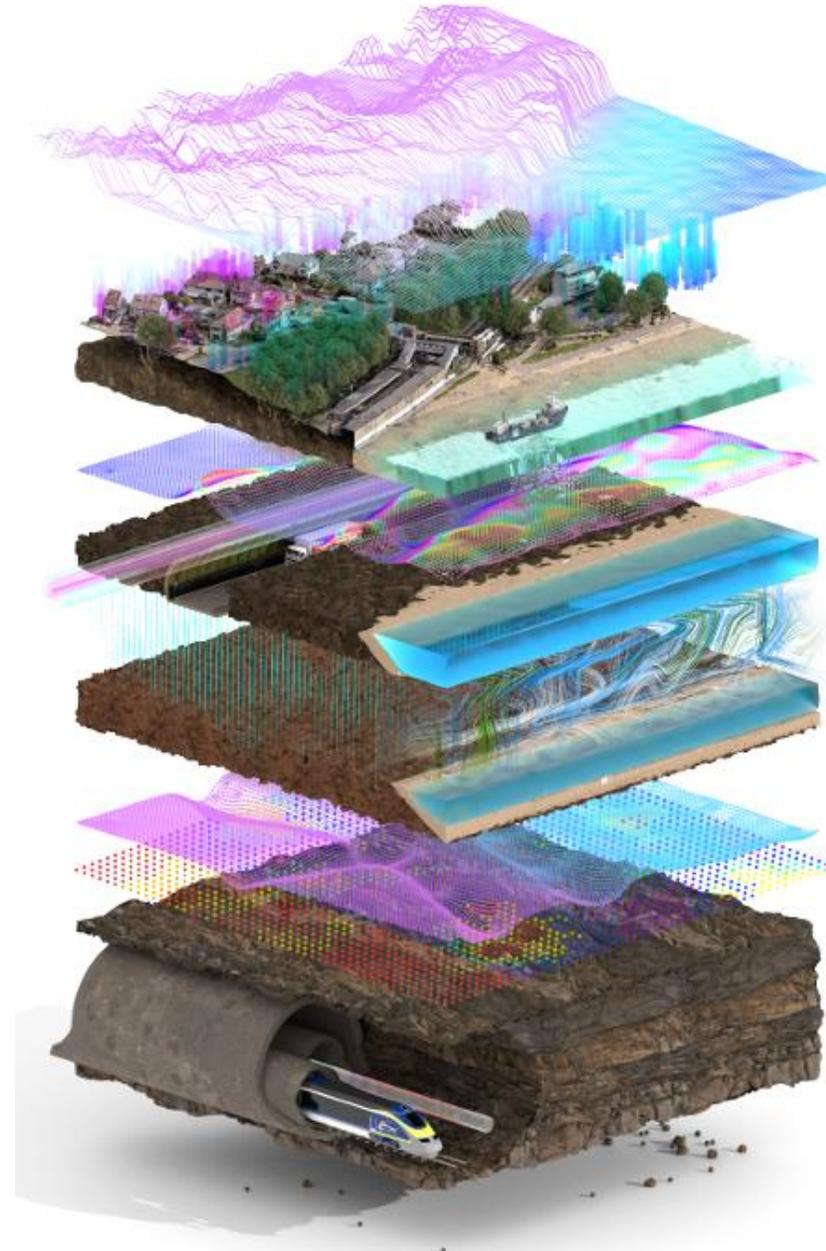
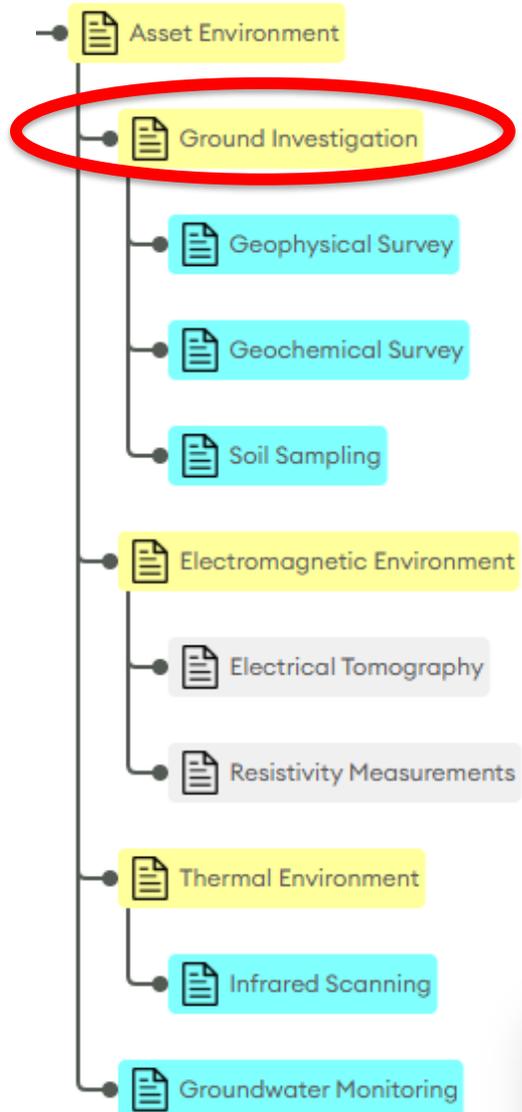
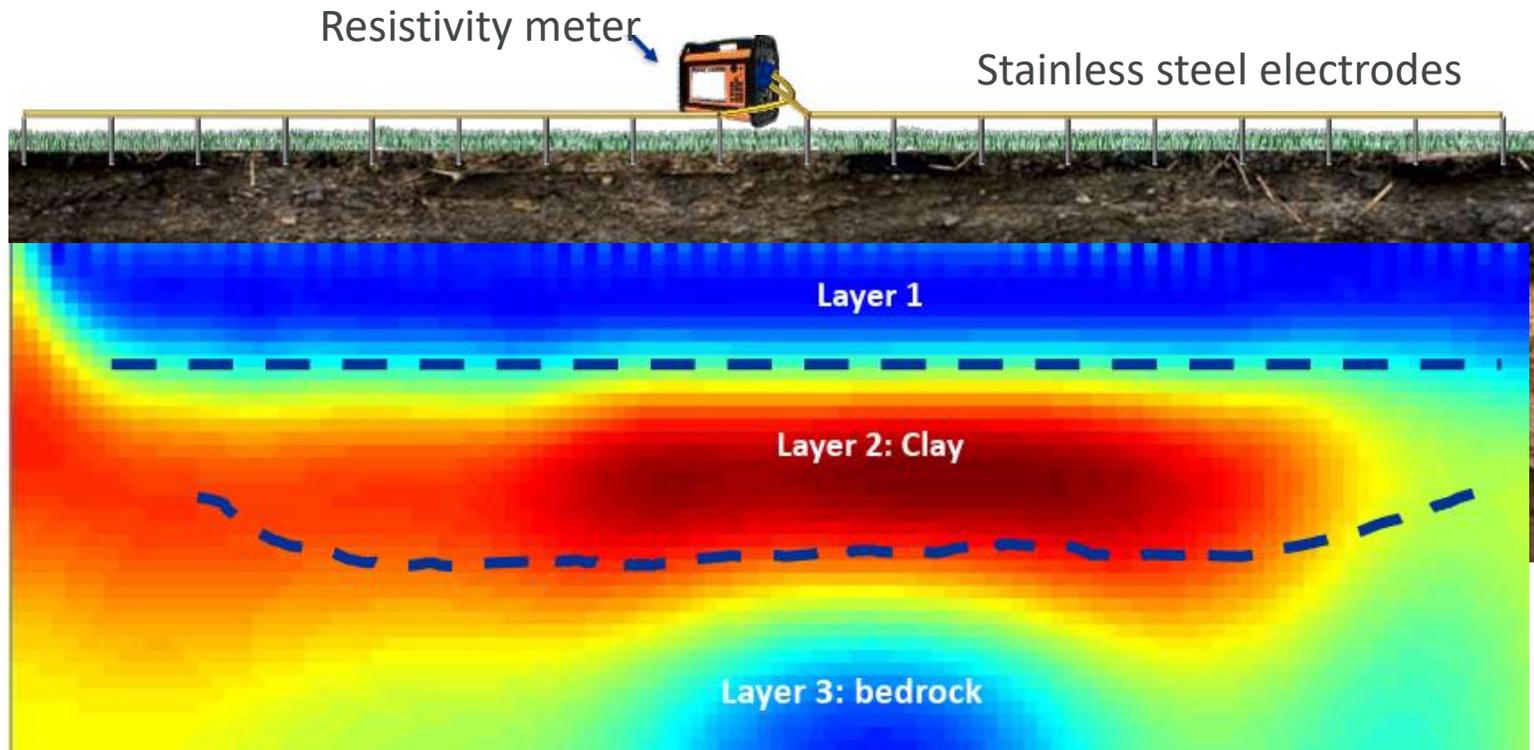


Image:  
UK Govt  
Geospatial  
Commission

# ASSET ENVIRONMENT – ELECTROMAGNETIC ENVIRONMENT

- Electromagnetic Environment
- Electrical Tomography
- Resistivity Measurements

## Resistivity Measurement



# ASSET ENVIRONMENT – THERMAL & INFRARED

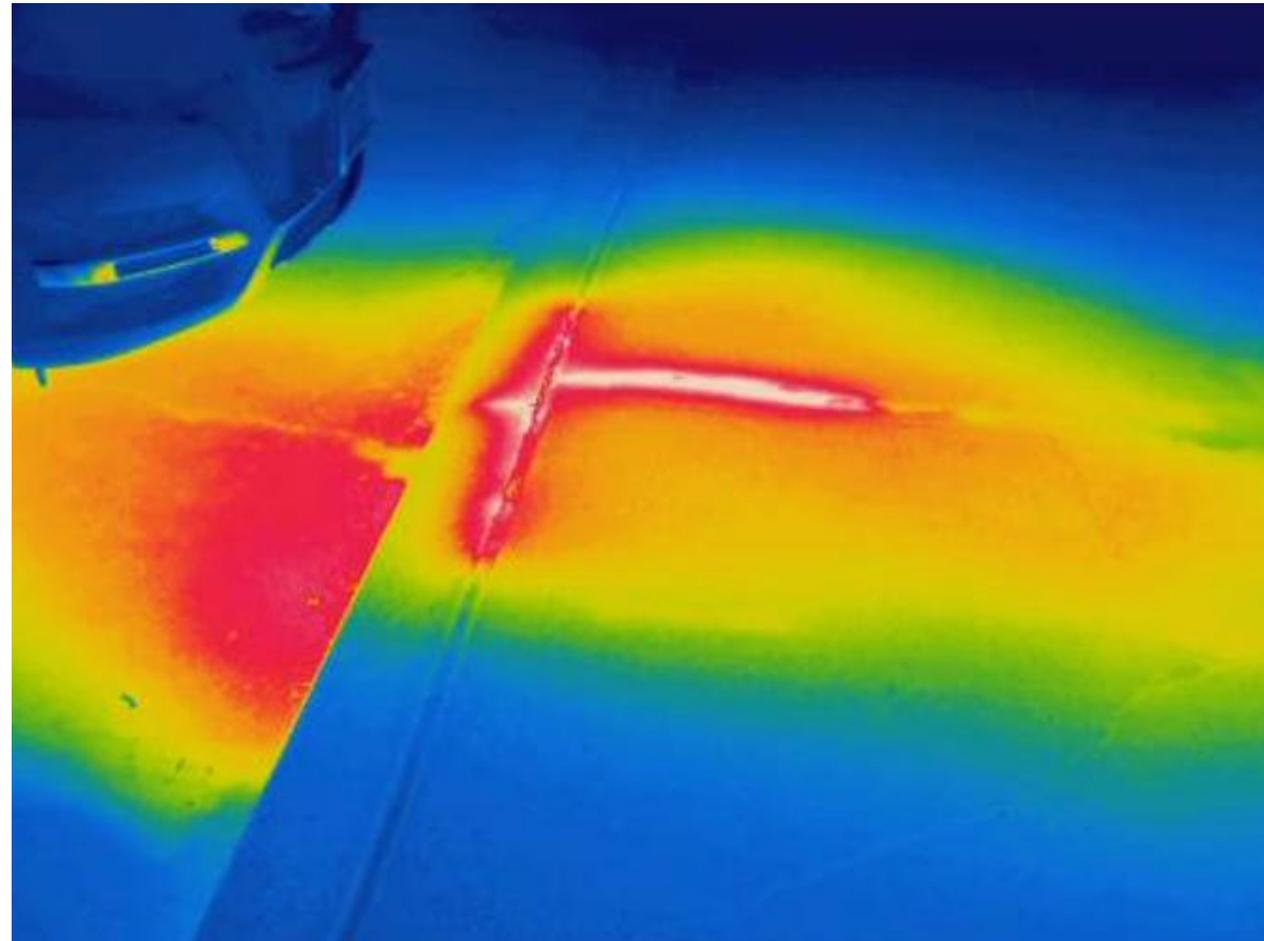
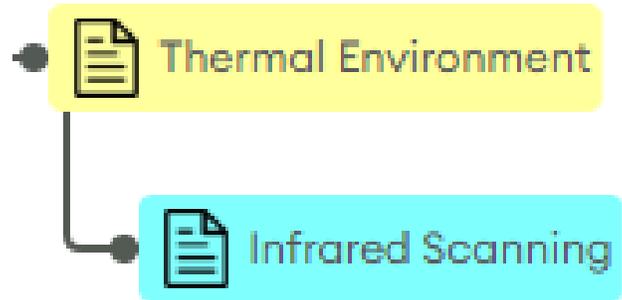


Image:  
<https://theramreview.com/infrared-inspection-tips-detecting-leaks-in-underground-piping/>

# ASSET ENVIRONMENT – GROUNDWATER MONITORING

## Groundwater Monitoring

**Depth** – design and construction  
**Quality** – long term performance

**Rainfall**  
**Saline intrusion**

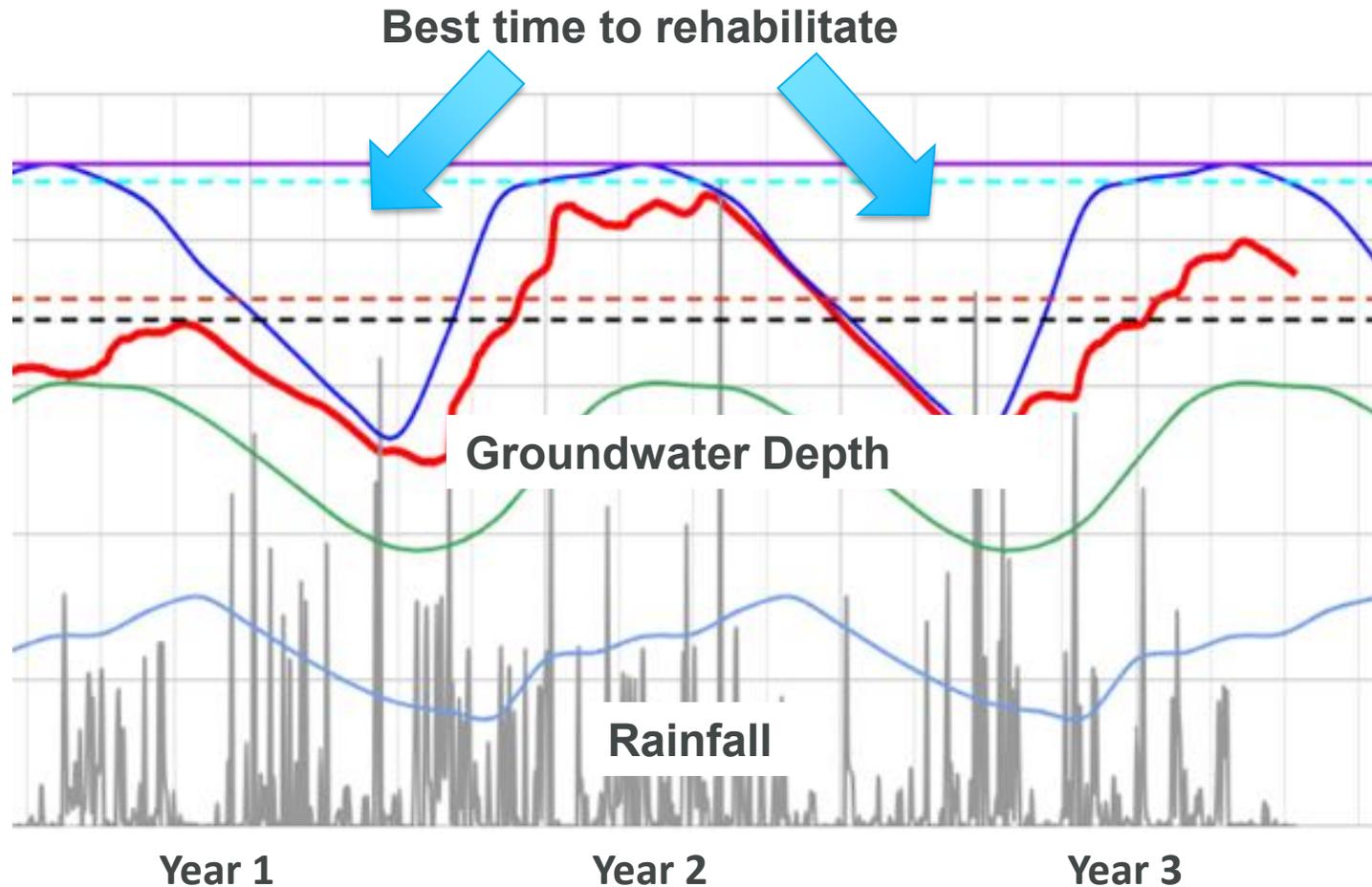


Photo: South West Water

Graphic: Environment Agency, UK

# REHABILITATION

## Rehabilitation

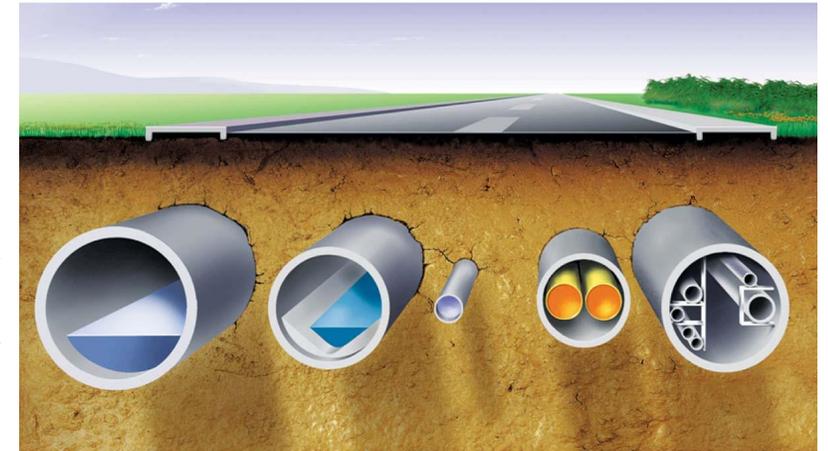
**“Repair”** – of localised defects

- structural or non-structural

**“Renovation”** – upgrades to structure,  
protection or performance

- inserted liner or surface applied liner

**“Replacement”** - - a **new pipe** or the functional  
equivalent along the same alignment as the  
existing pipe



# NON STRUCTURAL REPAIR

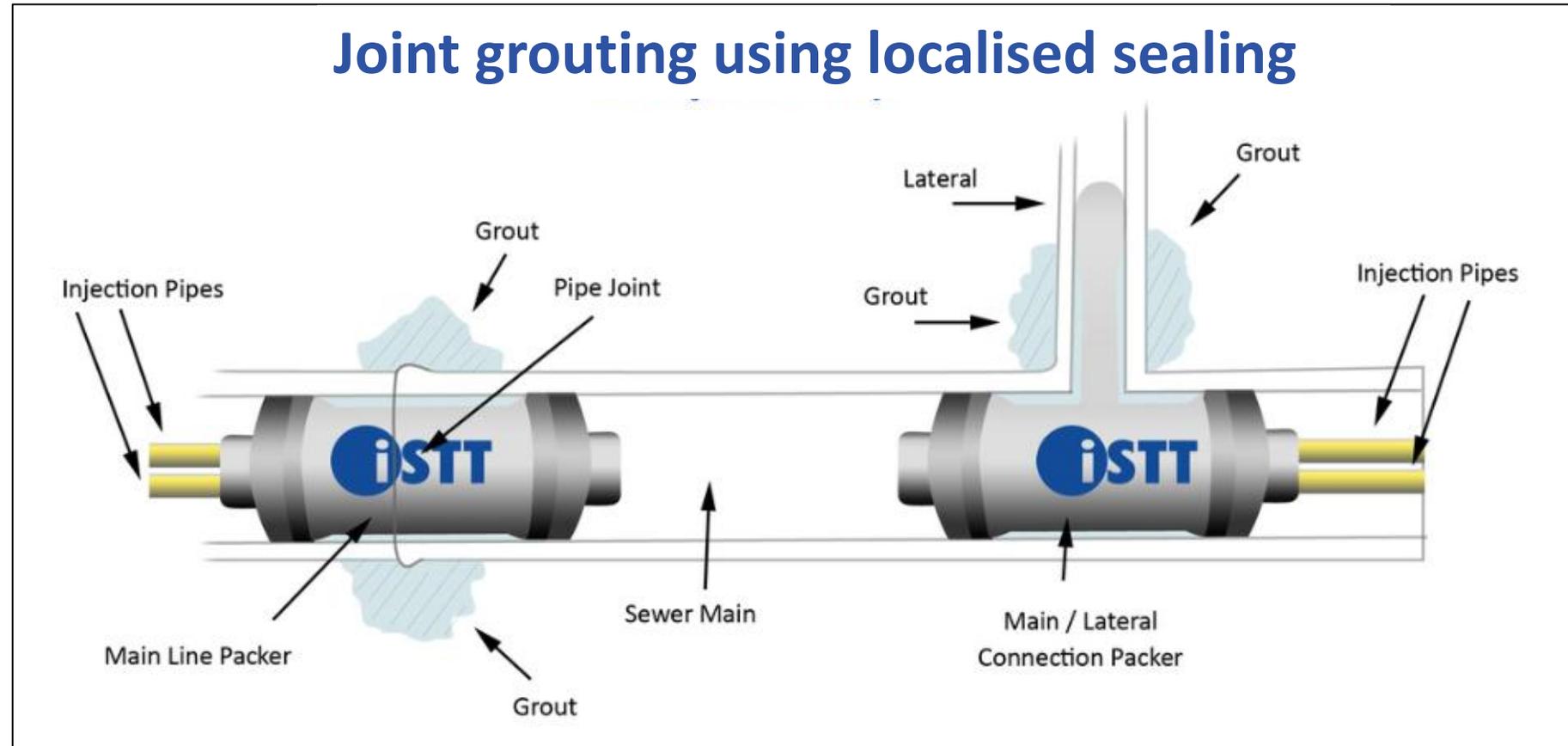
Repair

Non-structural (Sealing)

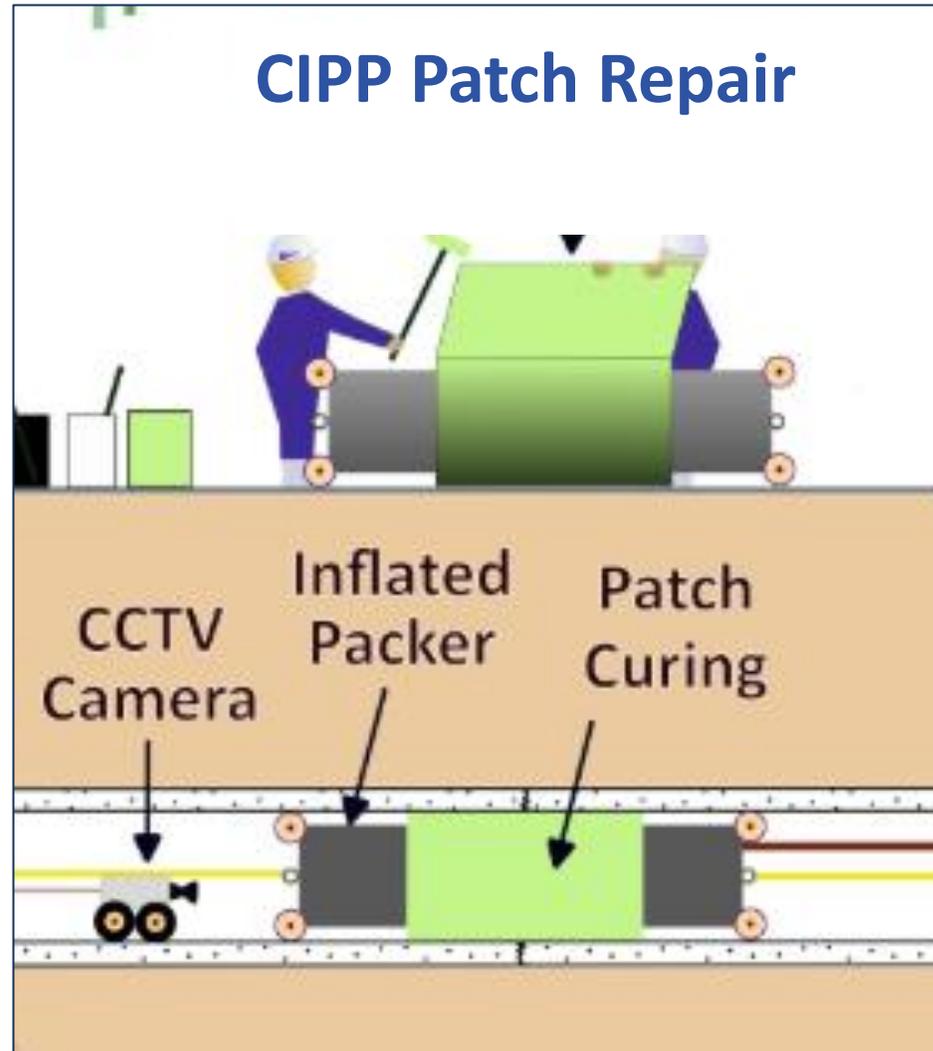
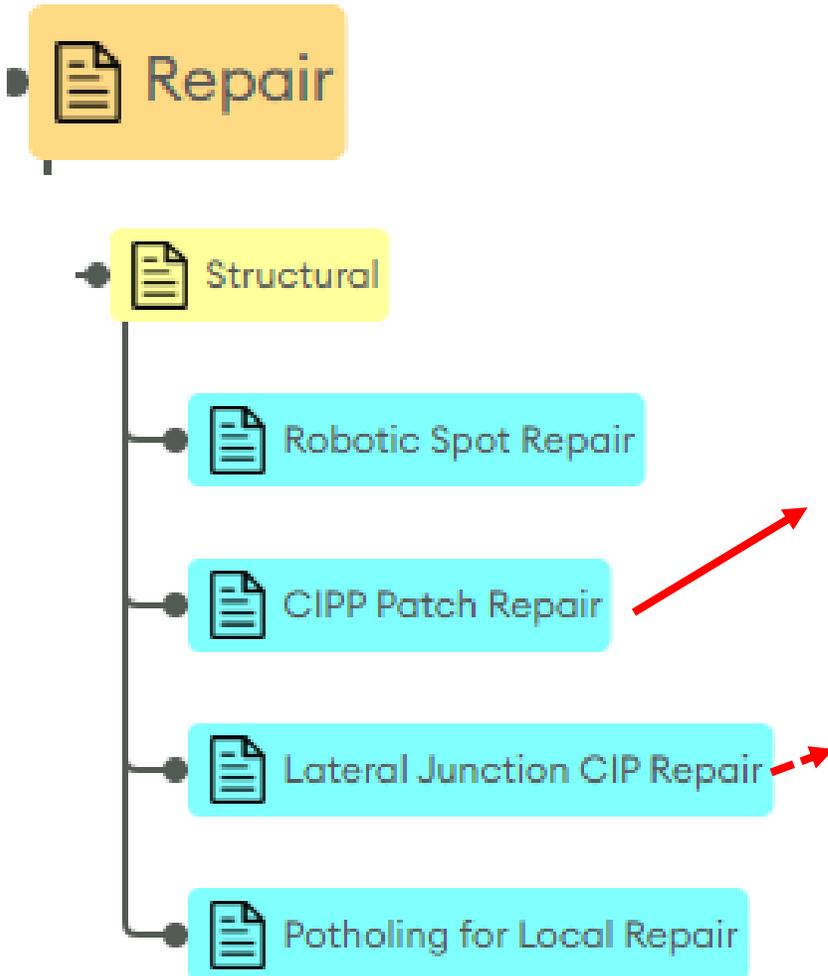
Joint Grouting

Flood Grouting

Mechanical Seals



# REPAIR - STRUCTURAL



## Lateral Junction CIP Repair



Photo: Naismith - of Picote product

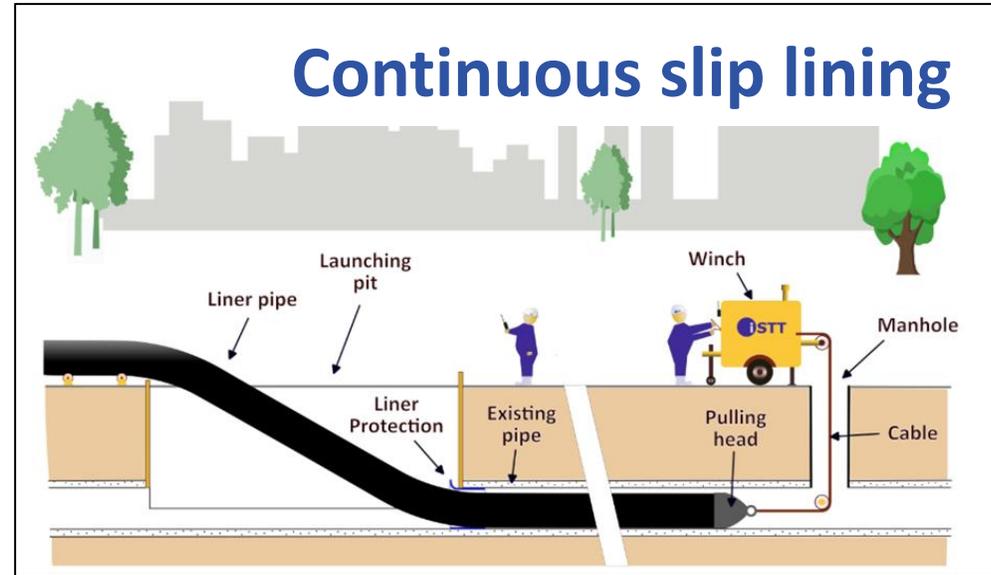
# RENOVATION – LOOSE FIT LINER

Renovation

Inserted Liner

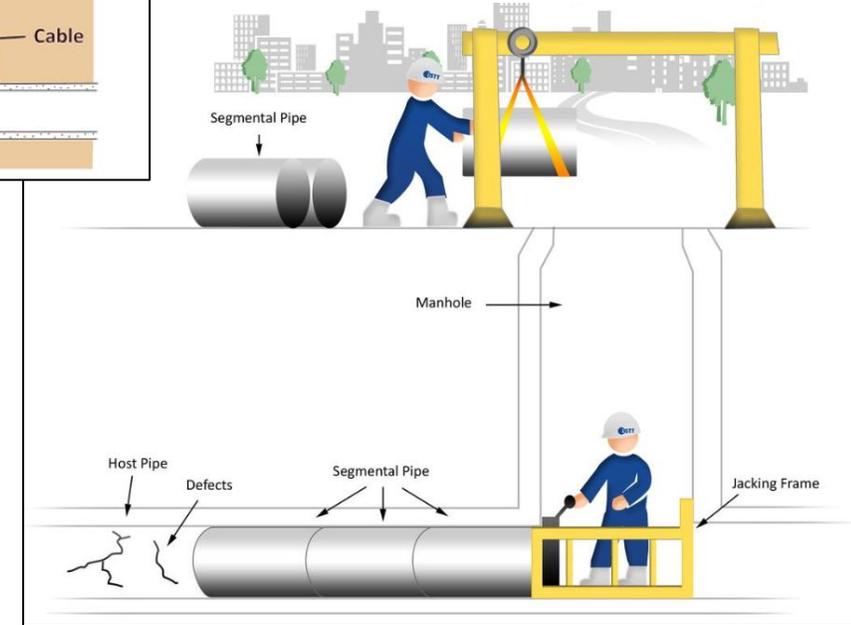
Loose-fit or Close-fit Lining

Renovation Slip Lining



Pipe or hose

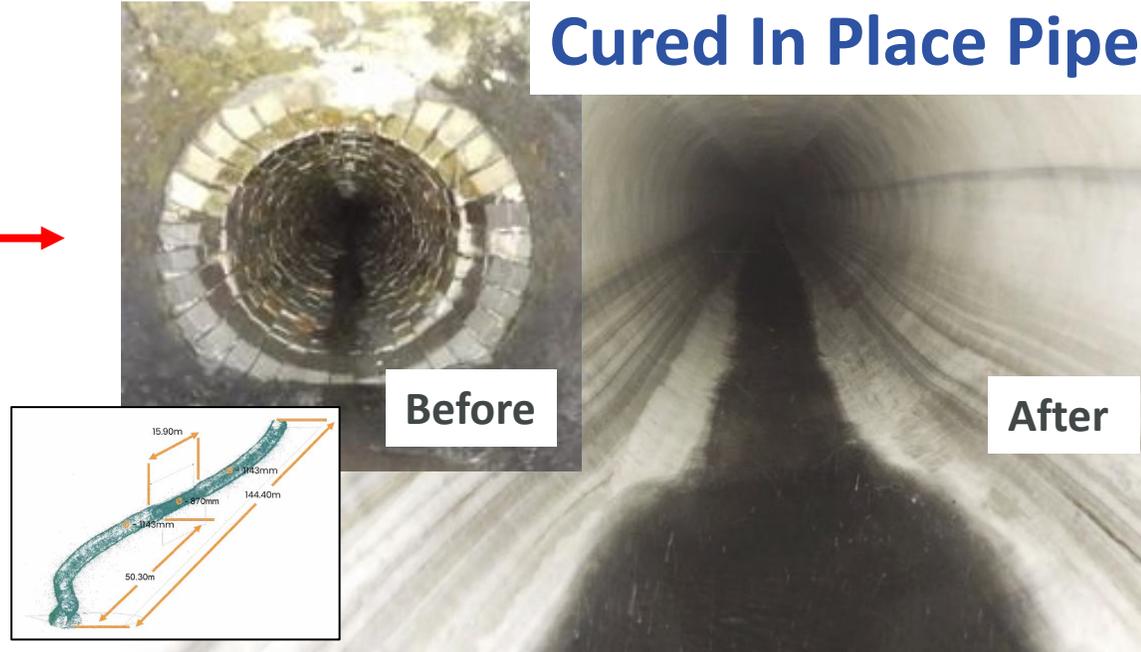
**Segmental slip lining**



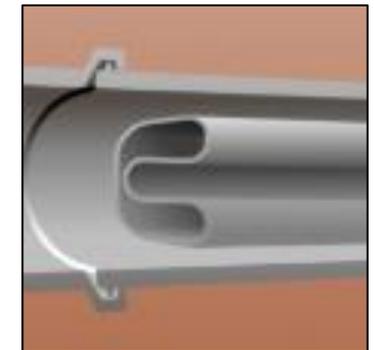
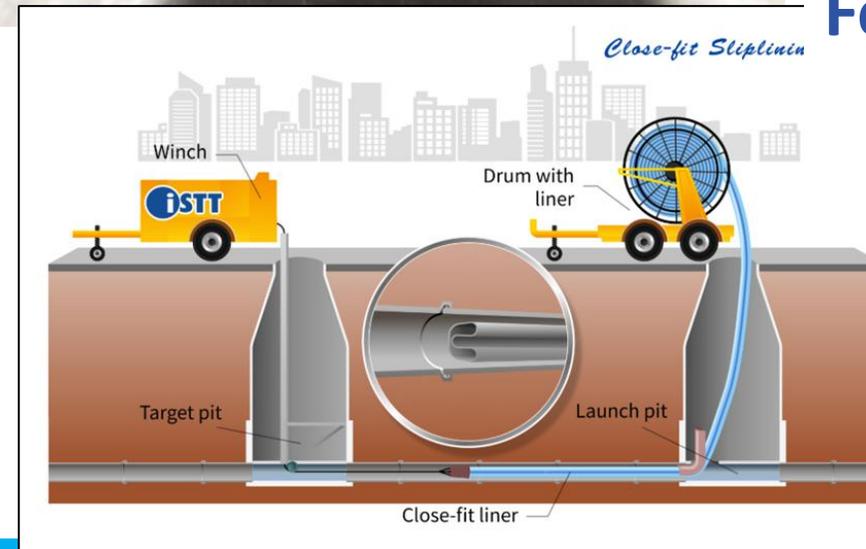
# RENOVATION – CLOSE FIT

## Cured In Place Pipe - CIPP

- Close-fit Lining
  - Cured-in-Place Pipe (CIPP)
  - Other Close-fit Lining
    - Swaged Lining
    - Rolled Down Lining
    - Fold-and-Form
    - Melt-in-Place-Pipe (MIPP)
    - Spiral-Wound
    - Grout-in-Place Hose



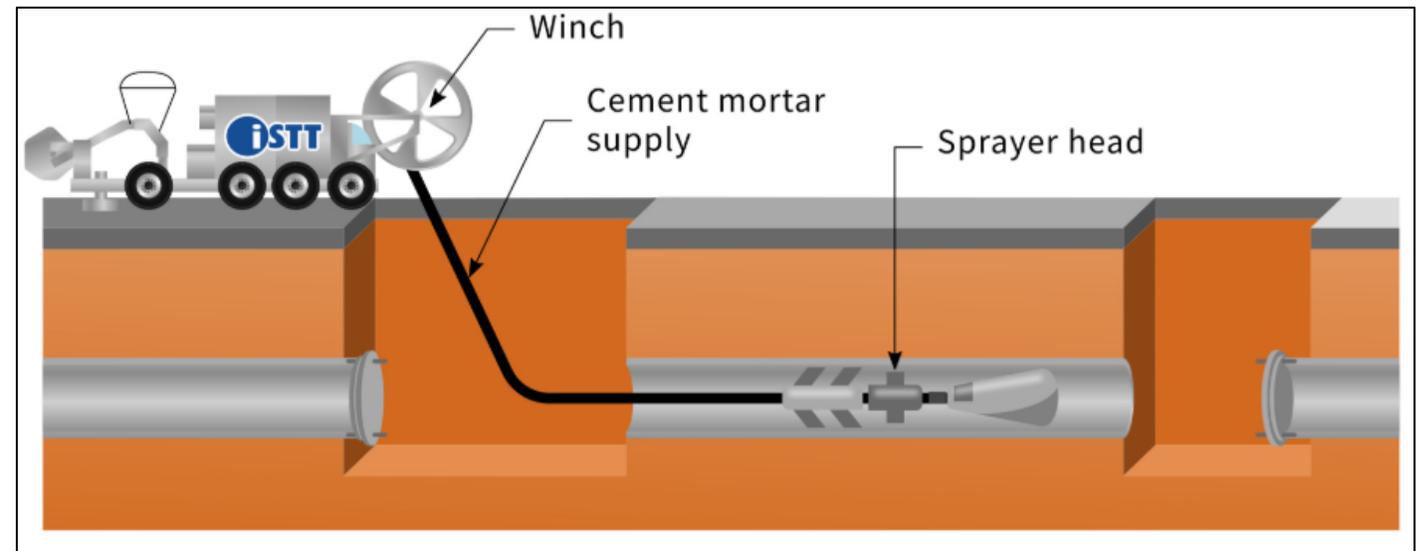
## Fold and form



# RENOVATION – SURFACE APPLIED COATINGS

- Surface-applied Lining
  - Cement / Mortar Lining
  - Polymeric Coating / Lining
  - Panel Lining
  - Troweled or Sprayed Structural Lining

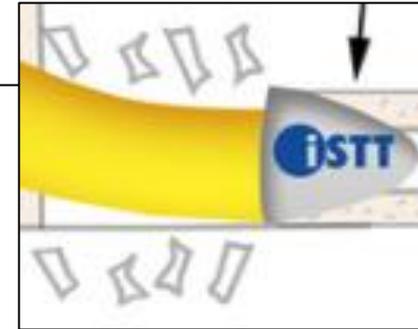
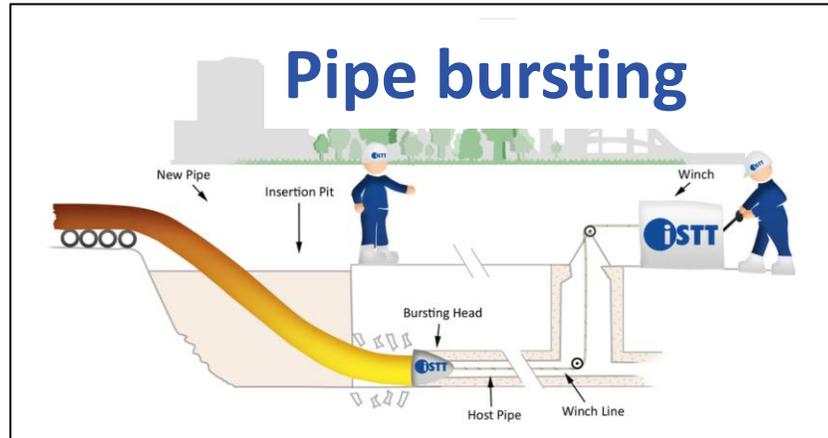
## Cement mortar lining



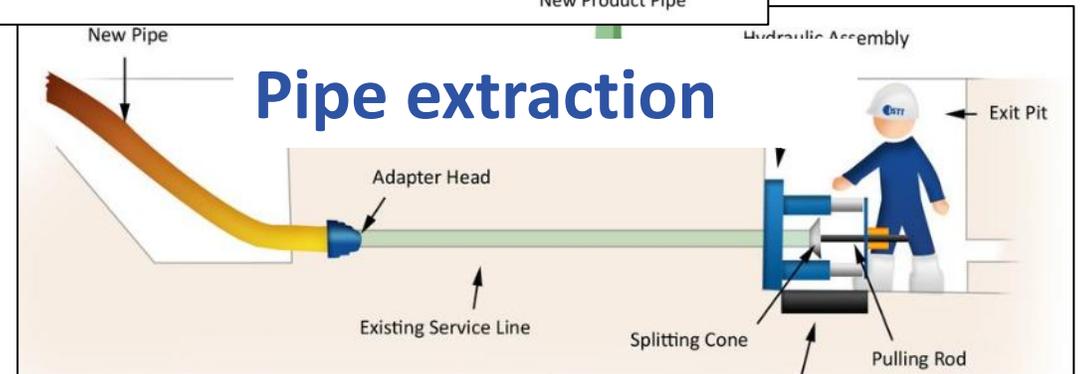
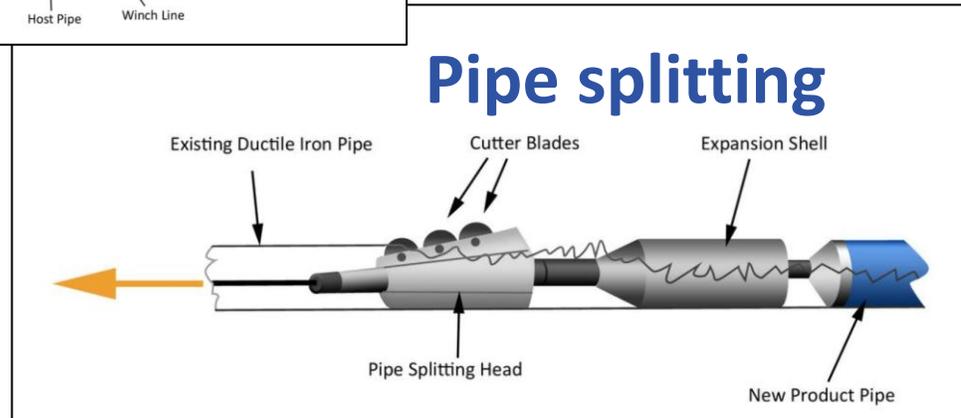
Renovation

# REPLACEMENT

- Replacement
  - Within Existing Pipe
    - Fully-independent Rehabilitation
    - Replacement Slip Lining
  - Existing Pipe Displaced
    - Pipe Bursting
    - Pipe Splitting
  - Existing Pipe Removed
    - Pipe Reaming
    - Pipe Eating
    - Pipe Extraction



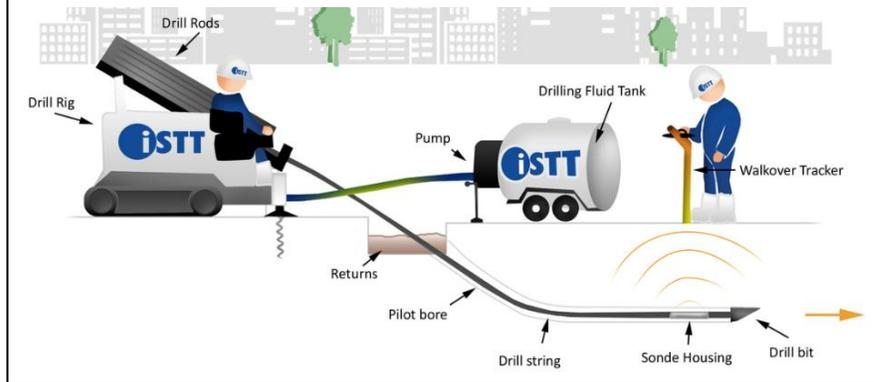
Replacement



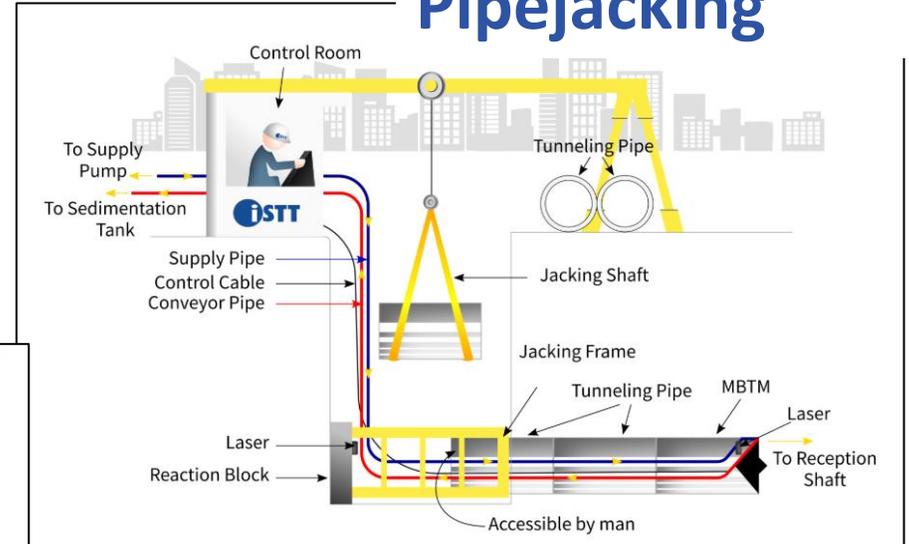
# NEW INSTALLATION

- Trenchless Installations
  - Horizontal Directional Drilling (HDD)
  - Pipe Jacking / Microtunnelling
  - Auger Boring
  - Direct Steerable Pipe Thrusting (DSPT)
- Ramming / Impact
  - Pipe Ramming
  - Impact Molding
- Hybrid Methods
  - Pilot Tube Assist Technologies
  - Ram-assist Technologies
  - Keyhole Drilling

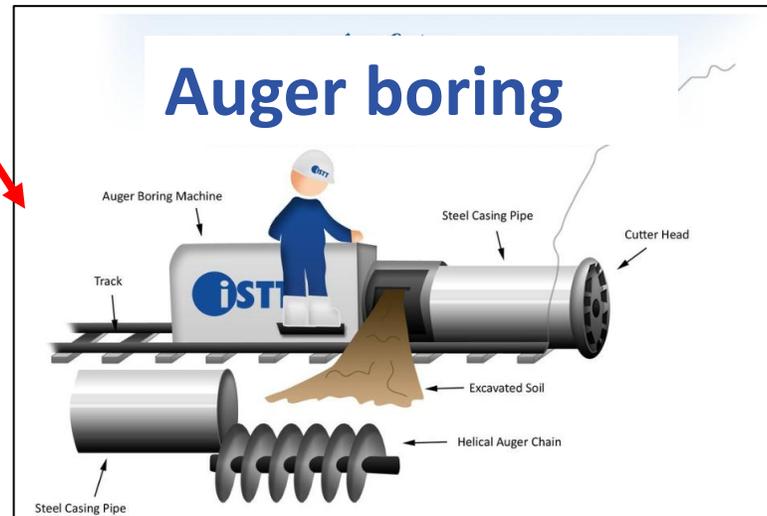
## Horizontal directional drilling



## Pipejacking



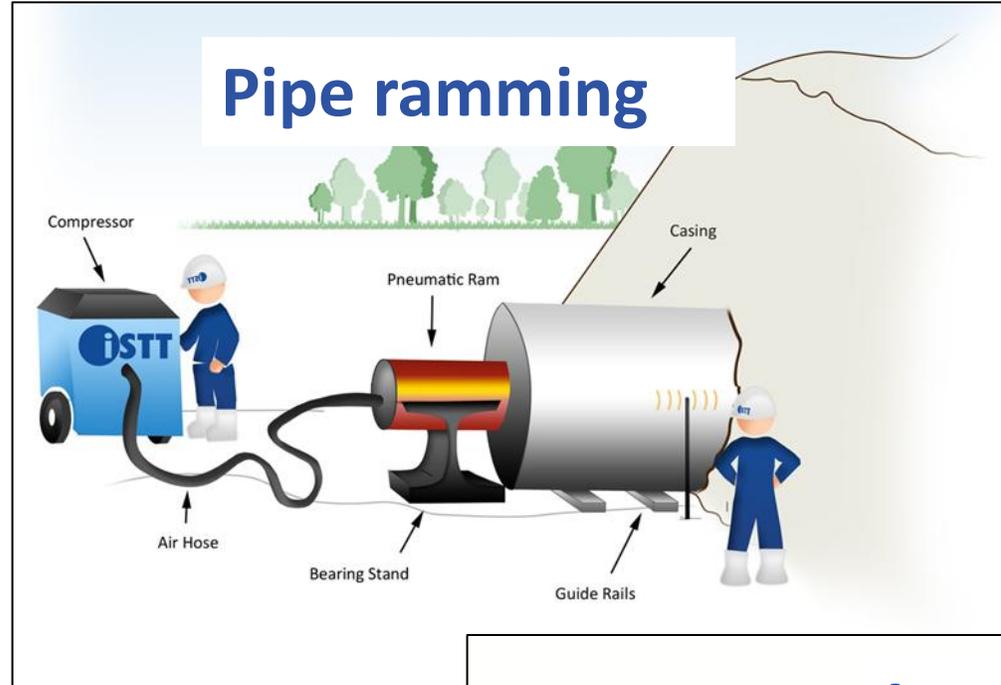
## Auger boring



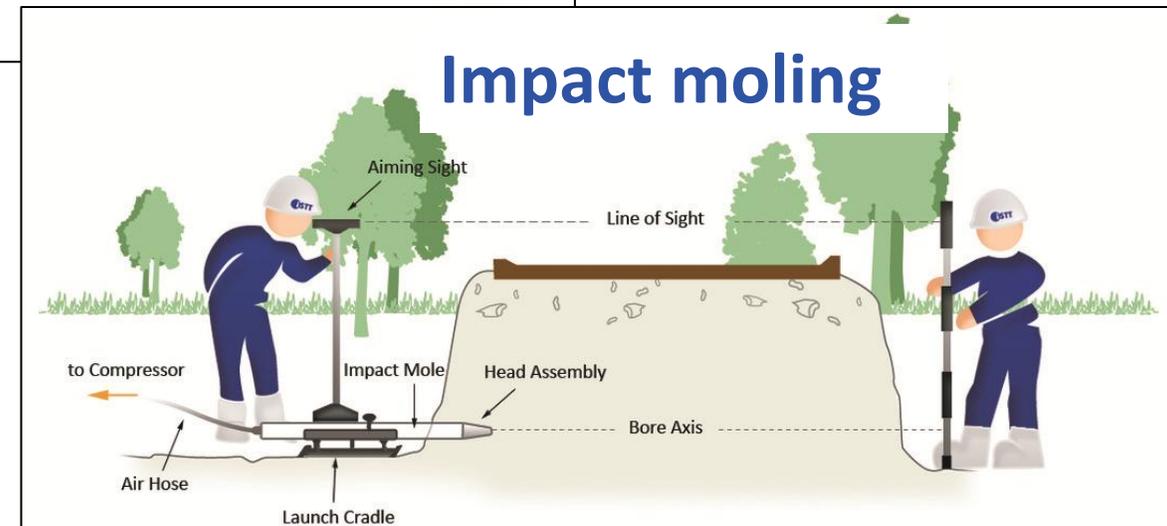
**New Installation**

# NEW INSTALLATION

- **Trenchless Installations**
  - Horizontal Directional Drilling (HDD)
  - Pipe Jacking / Microtunnelling
  - Auger Boring
  - Direct Steerable Pipe Thrusting (DSPT)
  - **Ramming / Impact**
    - Pipe Ramming
    - Impact Molding
  - Hybrid Methods
    - Pilot Tube Assist Technologies
    - Ram-assist Technologies
    - Keyhole Drilling



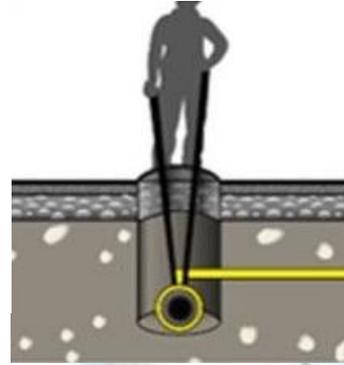
**New Installation**



# NEW INSTALLATION - KEYHOLE DRILLING



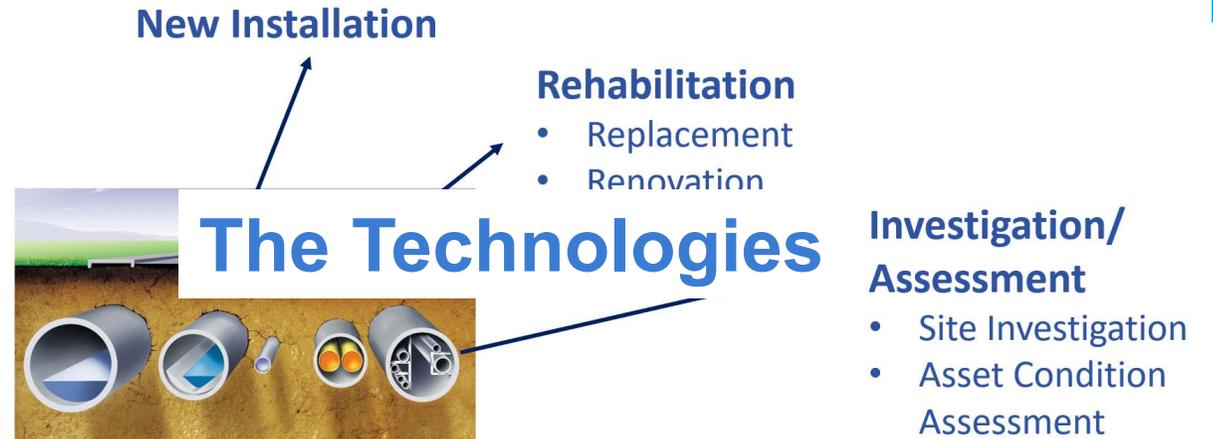
Long handled tools make new connection



 **New Installation**



# SUMMARY OF ISTTT AND TRENCHLESS TECHNOLOGIES



## Reduced disruption to customers

## Reduced disruption to traffic and pedestrians

## Reduced disruption to businesses

public and business complaints

road safety – less/no man access

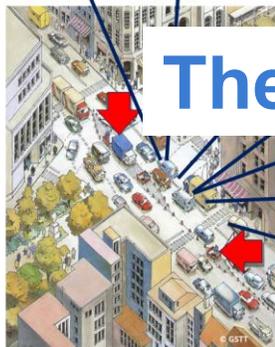
# The Benefits

## Reduced carbon footprint

Less road opening / less traffic congestion / re-use of existing infrastructure / less replacement, etc.,

## Reduced costs to network owners

Lane closures, project costs, etc.,



**Horizontal Directional Drilling (HDD)**

HDD is an extremely versatile trenchless technology that is used for the installation of everything from service connections to residences and buildings, to pipes an installing pressure pipes and conduits where precise are: (1) a directional drill rig sized for the job at hand; advancing the drill bit and for pulling back reamers c recording the location of the drill and product; (4) a t circulating the drilling fluid. Other components of an heads.

Resources on this v not responsible for

**ISTTT Whisperer**

**Ask Me**

**Technical Papers**

- Deutsch
- English
- Español
- Français
- Português (Portugal)
- Suomi
- Svenska
- Türkçe
- 中文
- 日本語

**The Resources**

Trenchless Installa  
Hybrid Methods  
Trenchless Installation  
Trenchless Installation  
Pipe Trenchless

Drill Rig  
Pump  
Drilling Fluid Tank  
Returns  
Pilot bore  
Drill string  
Sonde Housing  
Drill bit

**inspiring change**

■ [www.istt.com](http://www.istt.com)

- Presenter – **Dr Iain Naismith** – ISTT, Chair of UK Society for Trenchless Technology ISTT Technical & Education Committee and Senior Research Fellow at IKT – Institute for Underground Infrastructure - [naismith@ikt.institute](mailto:naismith@ikt.institute)
- Moderator – **Andreas Goss** – ISTT, German Association for Trenchless Technology (GATT) and Head of Business Unit - International Water Projects at Rädlinger primus line GmbH, Germany - [andreas.gross@primusline.com](mailto:andreas.gross@primusline.com)



the international  
water association

The background of the slide is a photograph of a water treatment plant. It shows large, white, cylindrical pipes running horizontally across the top. Below the pipes, there are several rectangular concrete basins or tanks. A metal walkway with railings runs along the edge of one of the basins. In the distance, a building with a corrugated metal roof and a bicycle parked on a platform is visible. The sky is overcast.

# Q&A AND PANEL DISCUSSION

**inspiring change**

# UPCOMING IWA WEBINARS & EVENTS

The poster has a blue background with a white line-art illustration of a village with houses and a water tower. The word 'WEBINAR' is written in large white letters at the top left. The IWA logo is in the top right corner. The title 'Scaling Water Safety Plans to Fit Small and Under-Resourced Systems' is centered in white text.

**WEBINAR**

**Scaling Water Safety Plans  
to Fit Small and Under-  
Resourced Systems**

**IWA**  
the international  
water association

 **03 February 2026**  
15:00 GMT

**REGISTER NOW**  
[www.iwa-network.org/iwa-learn](http://www.iwa-network.org/iwa-learn)

Co-organiser



**Learn more at**

<https://www.iwa-network.org/learn/scaling-water-safety-plans-to-fit-small-and-under-resourced-systems>

# UPCOMING IWA WEBINARS & EVENTS



25 February 2026  
07:00 GMT

REGISTER NOW

[www.iwa-network.org/iwa-learn](http://www.iwa-network.org/iwa-learn)

Co-organiser



SUSTAINABLE  
COASTAL AND  
ESTUARINE  
DEVELOPMENT

Learn more at

<https://www.iwa-network.org/learn/nb-s-in-coastal-environments-1>

