



# Petra's Introduction

Kim Abrams, Introducing Petra & Roberto Zillante, CTO of Petra

A photograph showing a utility pole engulfed in flames during a wildfire. Thick, dark smoke rises from the fire, filling the upper portion of the frame. The background shows a hazy, overcast sky. The foreground is filled with dark, charred trees and brush. A teal-colored text box is overlaid on the center of the image.

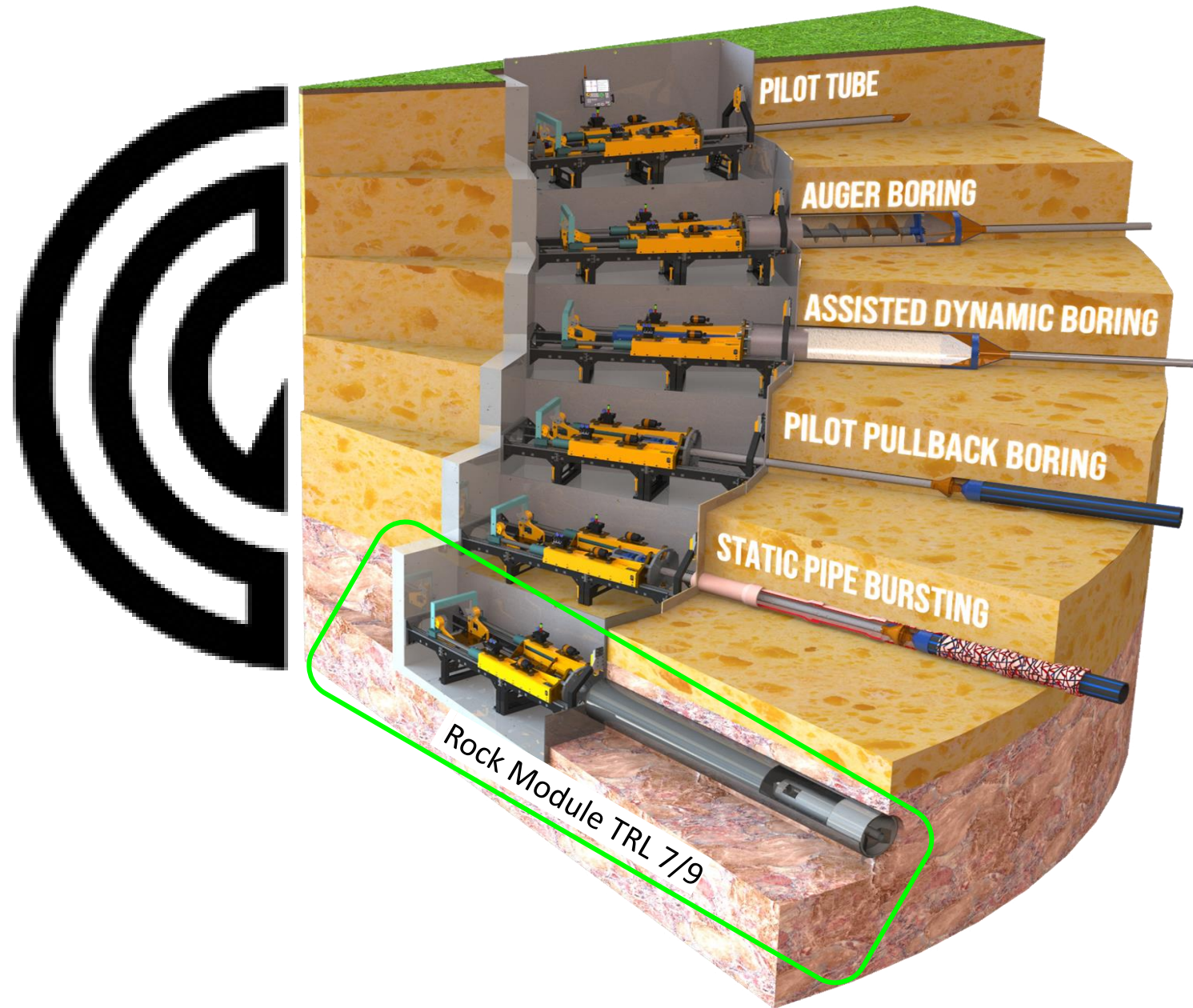
**We can save lives and property by burying critical infrastructure.**

An aerial photograph of a construction site, heavily tinted with a dark teal color. A large, deep trench has been excavated, with a long, dark pipe or tunnel section lying horizontally across its width. Several pieces of heavy machinery, including excavators and tracked vehicles, are positioned around the site. The ground is uneven and shows signs of recent excavation.

We don't have the right tools to bury our infrastructure cost effectively.

The biggest risk in underground utility is changing ground conditions.

6 tools,  
1 package  
The  
“Ai1”



# Swappable modules to bore difficult geologies for different applications



Basalt



Granite



Dolostone



Quartzite



Cobbles & Boulders



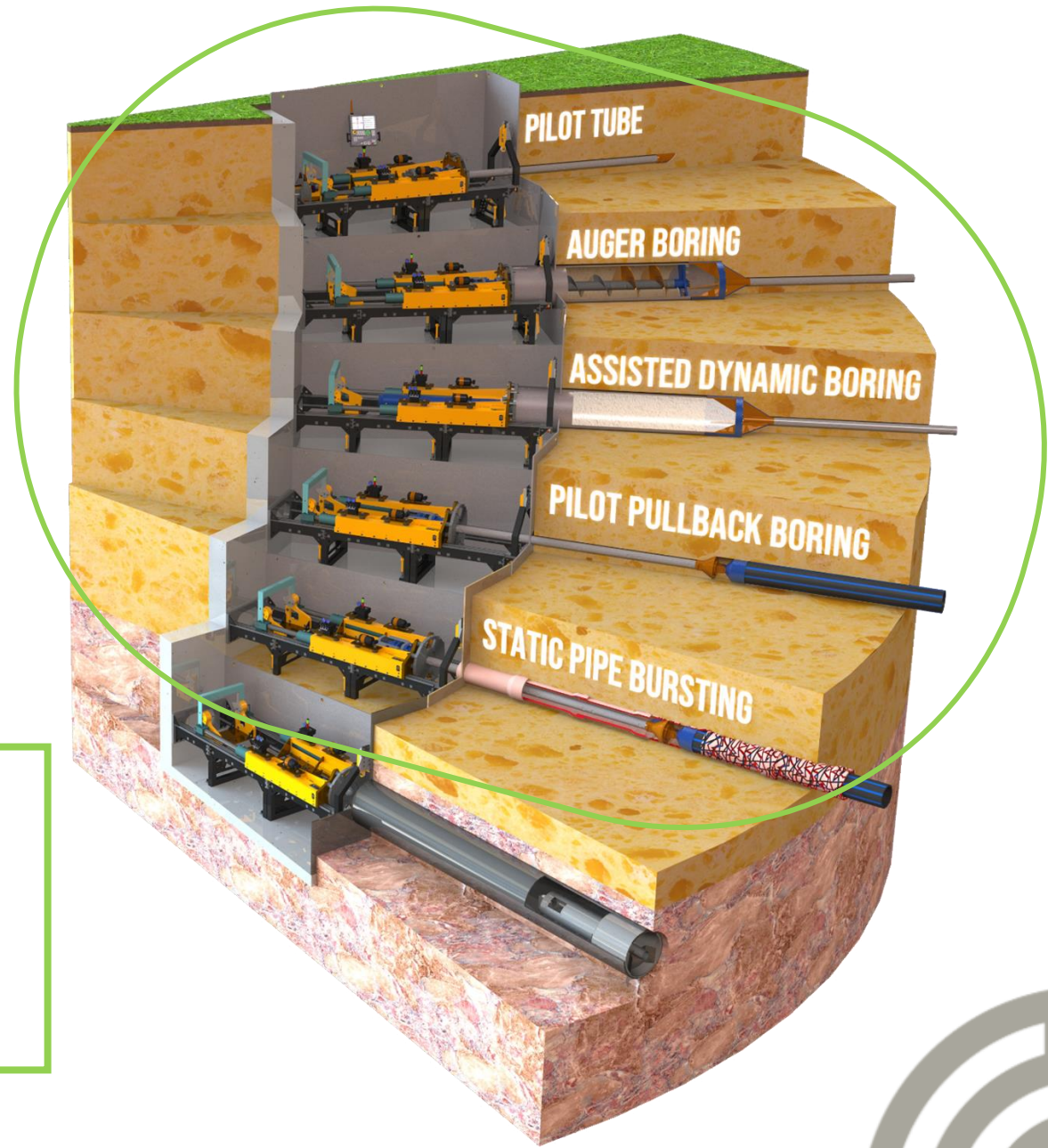
Water-logged Ground



Sand



Mud & Swamp



# Out of R&D in 2022 and completed 28 crossings in difficult geologies



Project Rescue  
Nightmare Mud



Drive: 46m  
Application: Sewer  
Metal Casing, 42"  
Guided Boring Machine  
Cohesive Clay + High water table



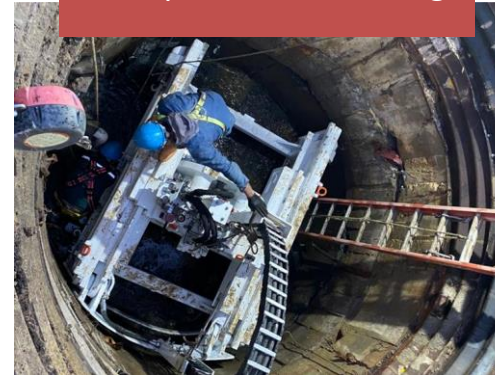
Rescued \$2M Machine



Drive: 2x 19m (38m total)  
Application: Sewer  
Metal Casing, 44"  
Assisted Dynamic Boring  
Cohesive Clay + High water table



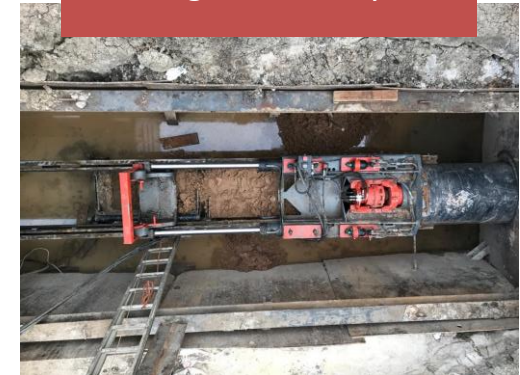
Cheaper than trenching



Drive: 2x 40.2m (201m total)  
Application: Pressure Water  
HDPE, 14"  
Pilot Pullback  
Very consolidated clay



Nightmare Clay



24" Drive: 40.2m, 19.8m  
36" Drive: 24m, 52m, 25m  
Application: Pressure Water  
Metal Casing, 24" and 36"  
Auger Boring  
Very consolidated clay



# Swappable modules to bore difficult geologies for different applications



Basalt



Granite



Dolostone



Quartzite



Cobbles & Boulders



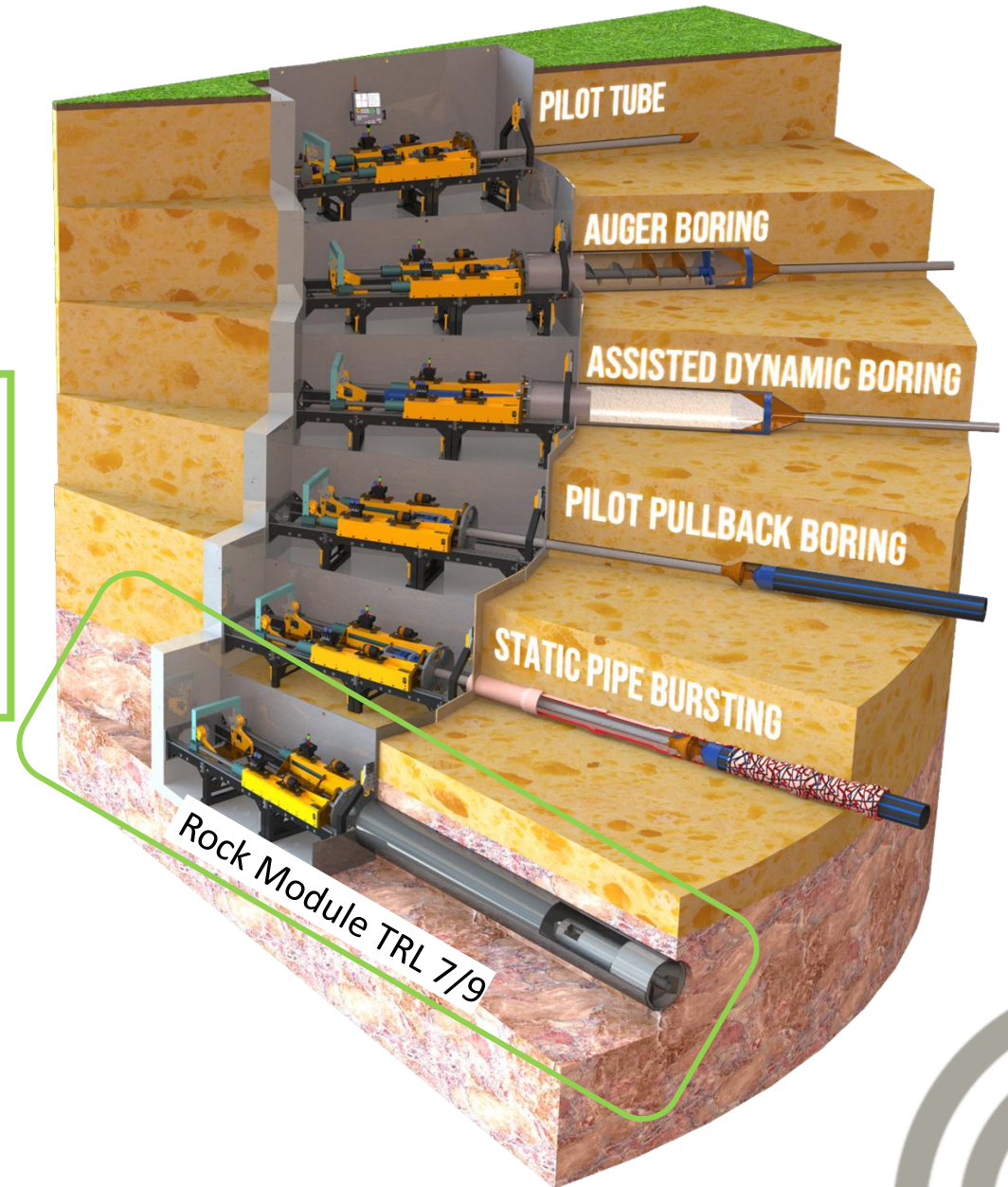
Water-logged Ground



Sand



Mud & Swamp



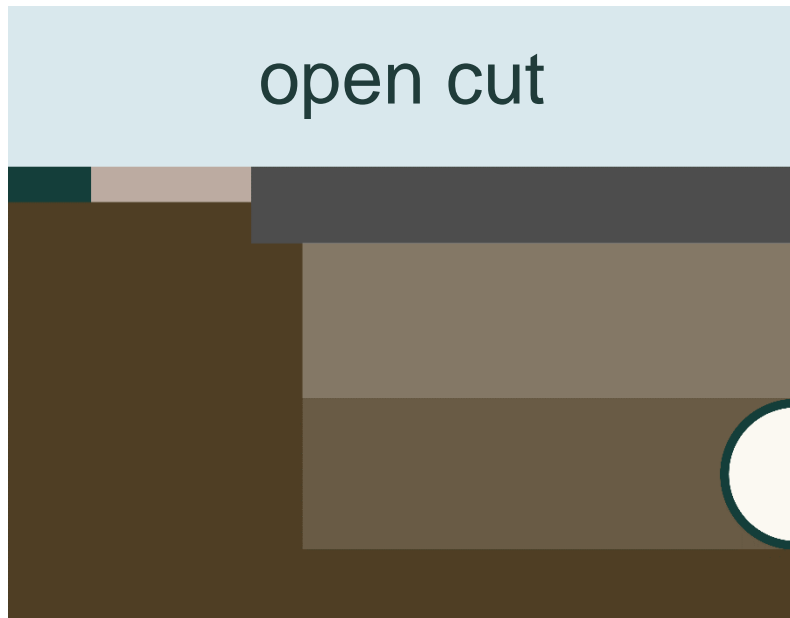






# Digging Deeper

How trenchless technology is revolutionizing  
infrastructure development



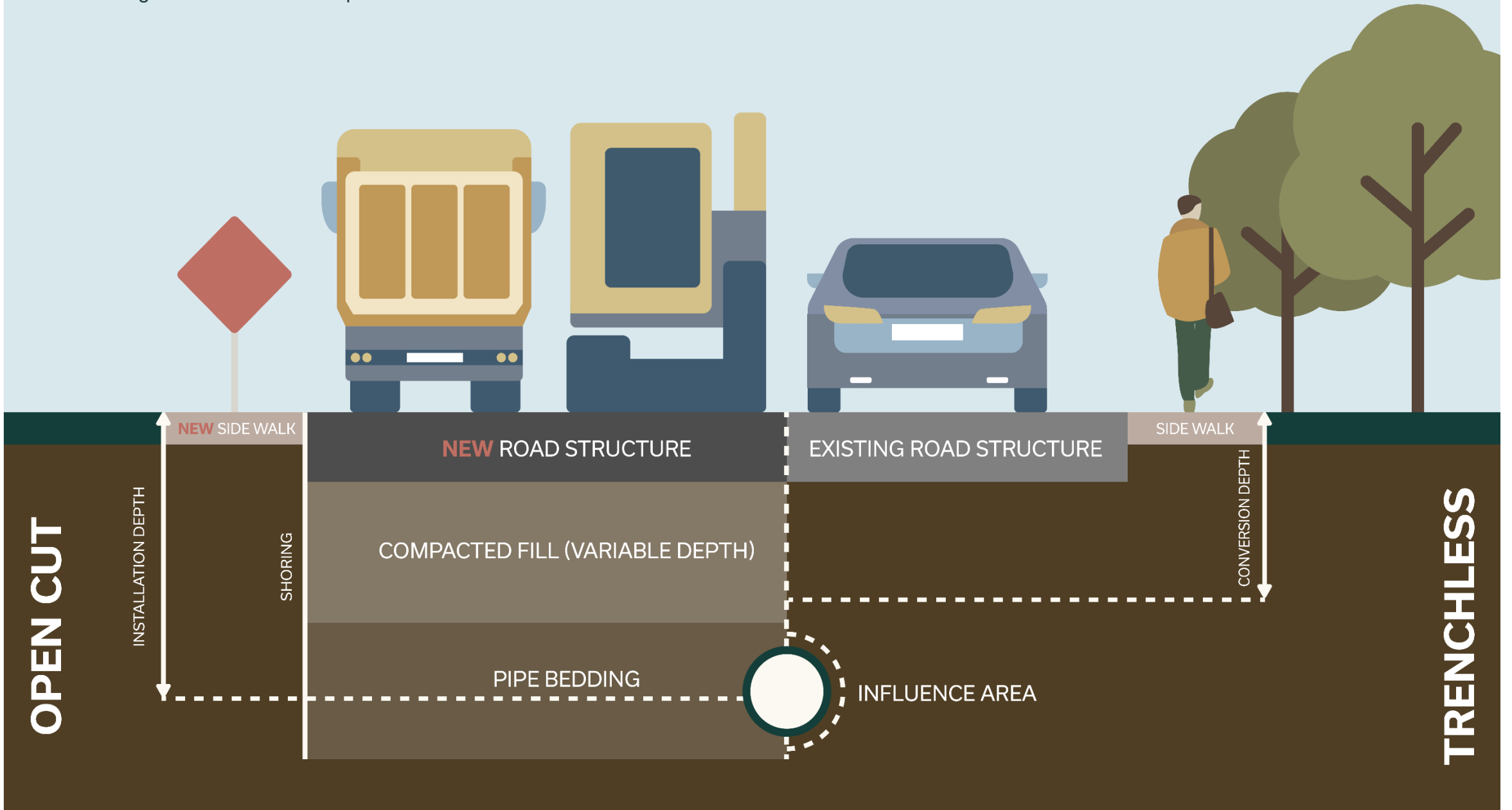
VS

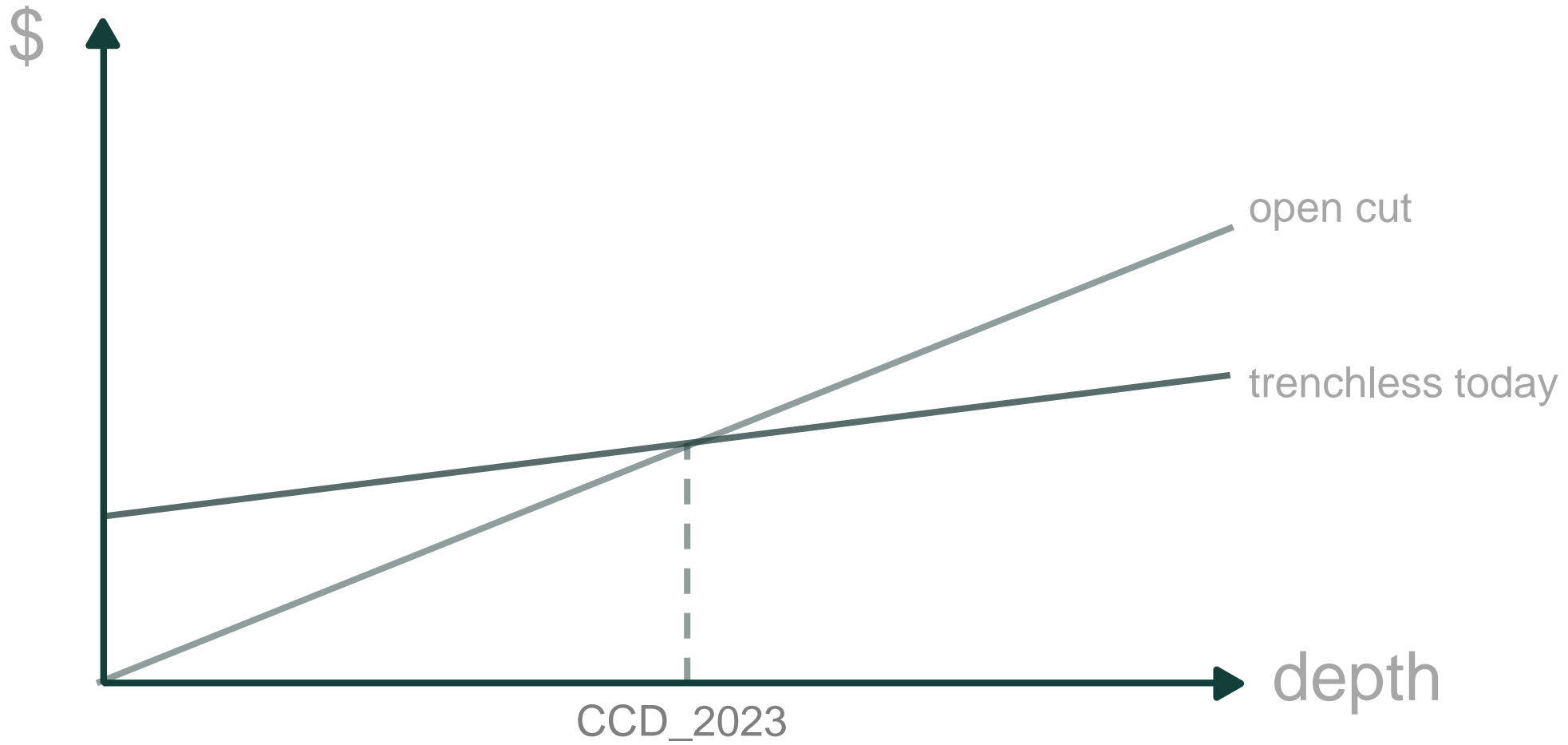




Understanding critical

# conversion depth







Why so  
**important?**

— why so important?

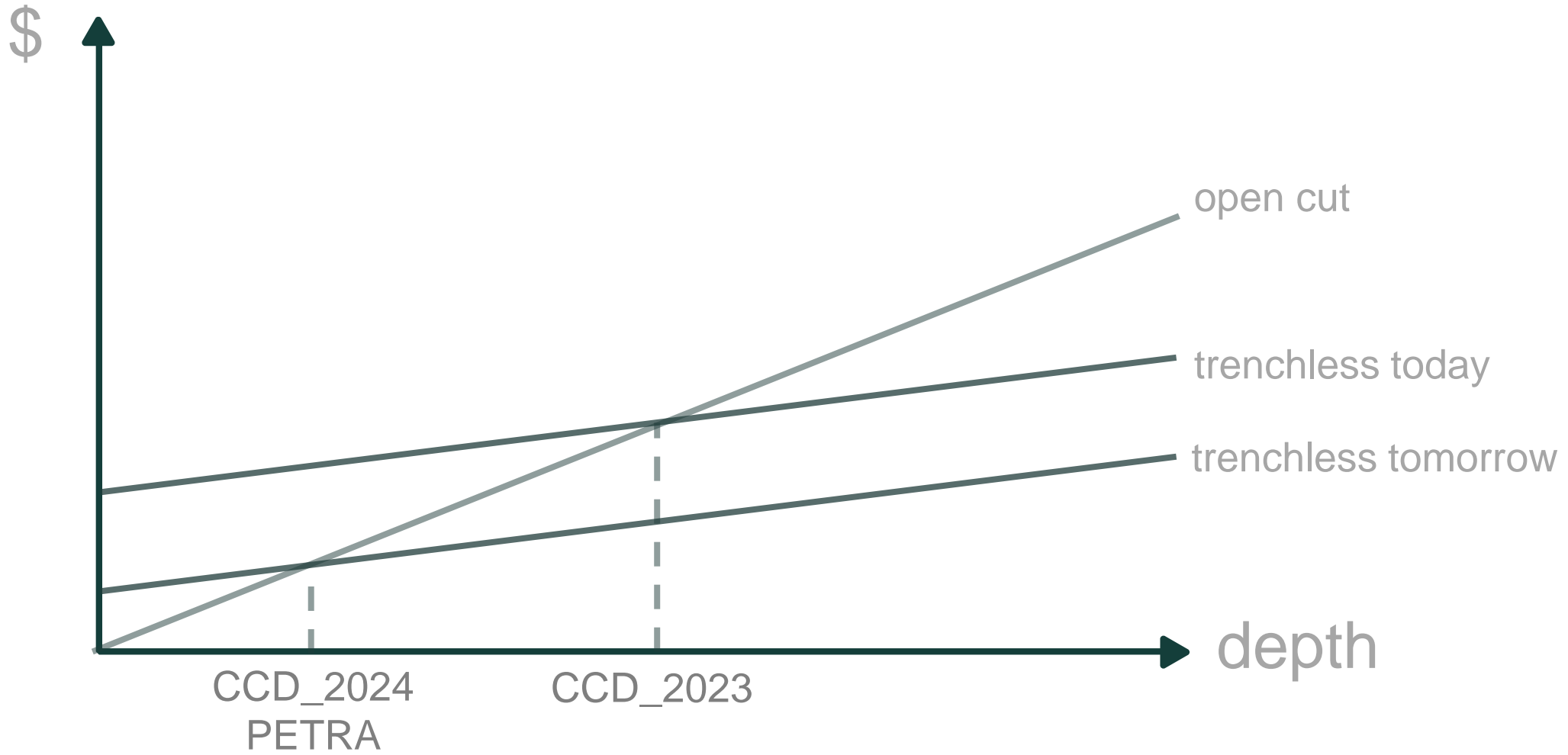
Installing new  
underground infrastructure is  
messy and costly





Why so  
**messy and costly?**





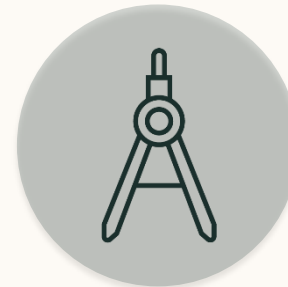
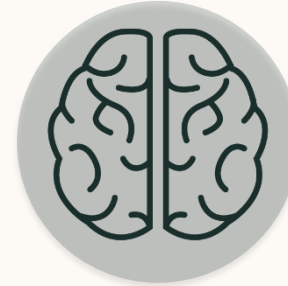
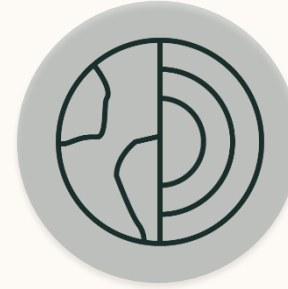


Why so  
**expensive?**



# Imagine the next generation of trenchless machines

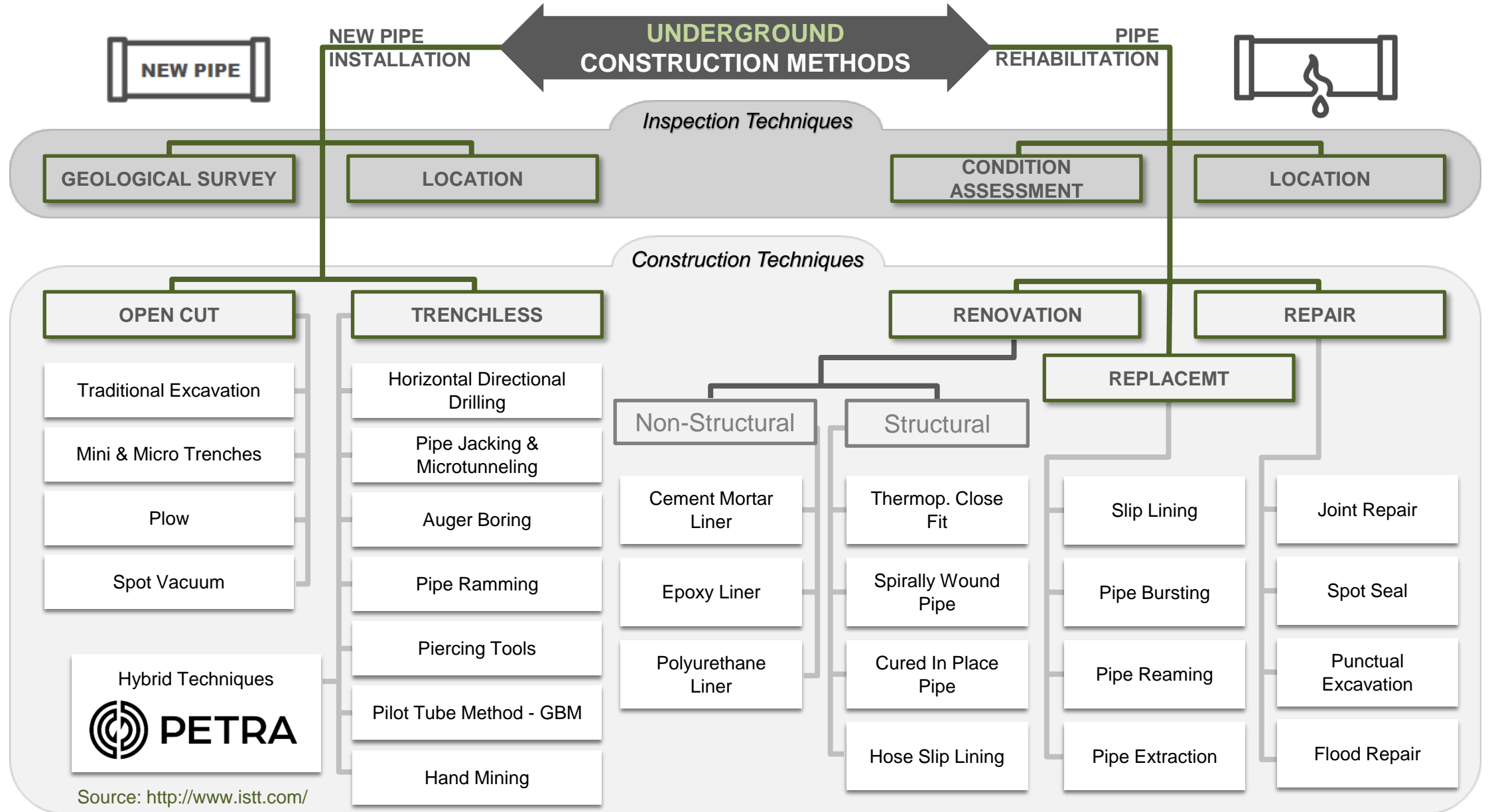
Multi-geologies  
Robot operated  
Multi diameters





What is  
**out there?**

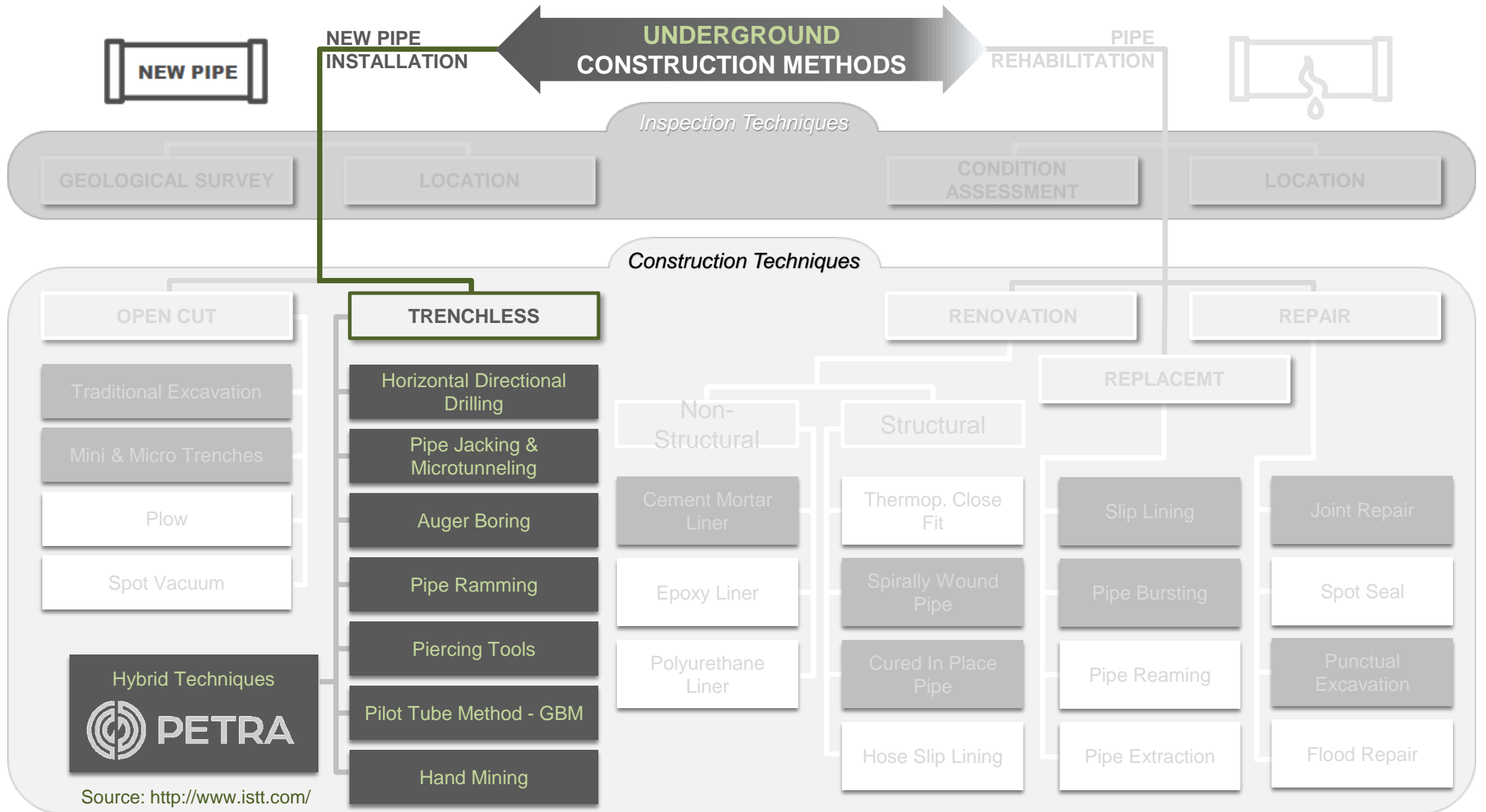
what is out there?



DIGGING DEEPER



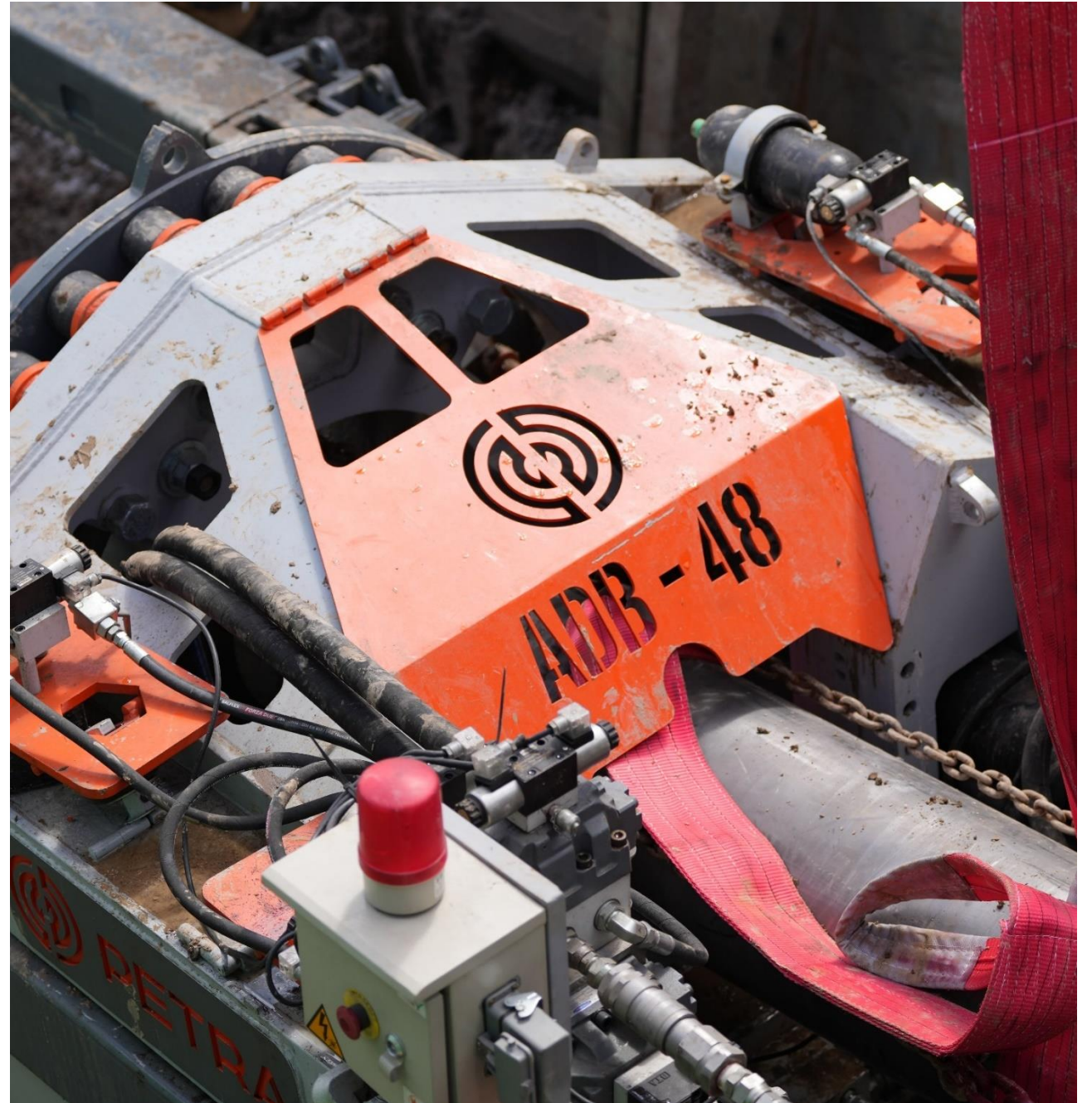
what is out there?

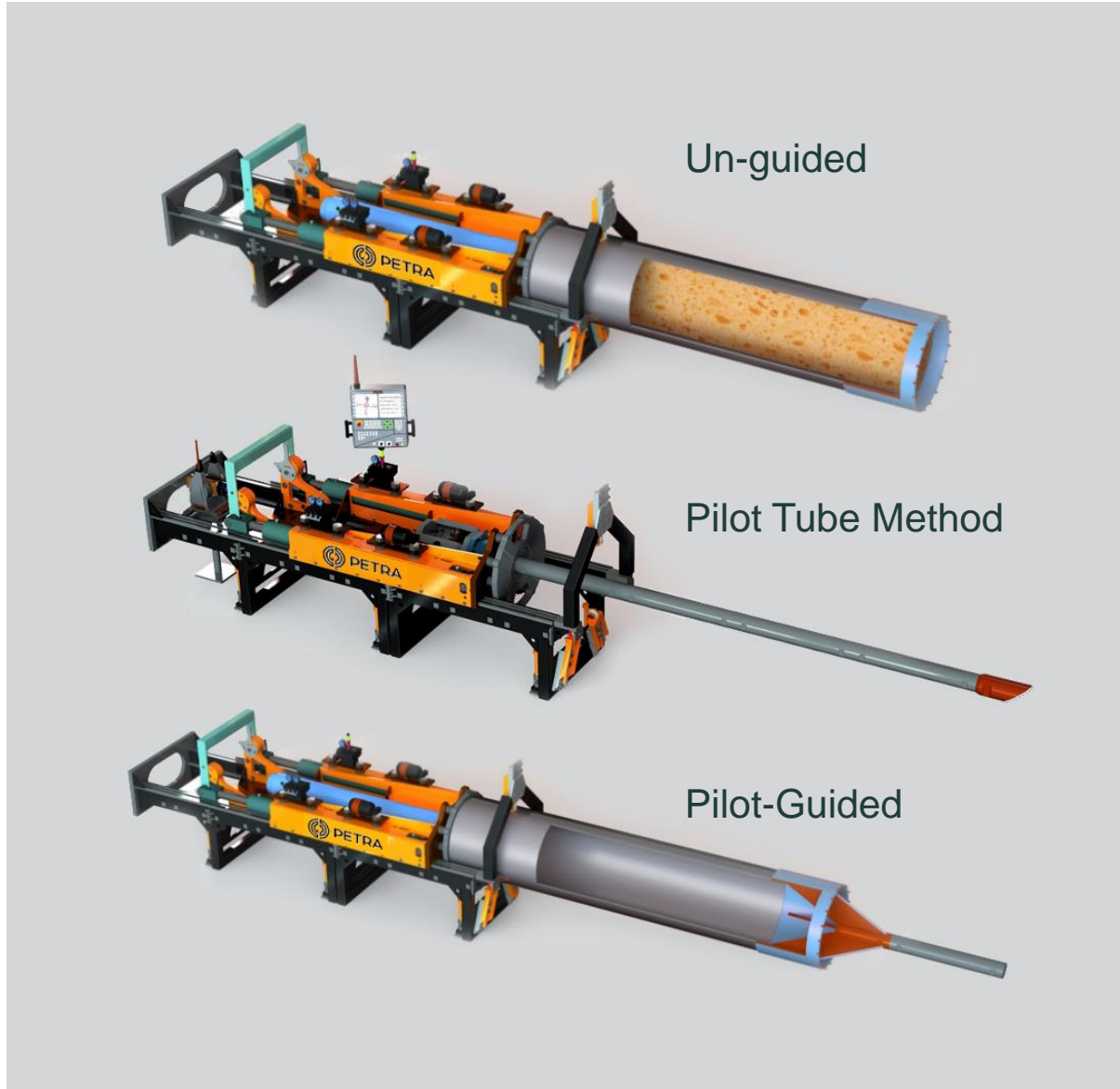


DIGGING DEEPER

Introducing a new  
trenchless technology

# Assisted Dynamic Boring

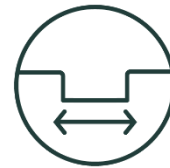




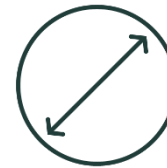
# PETRA

Hybrid techniques - ADB

## Specifications



6 - 120ML



8" - 72"

## Common applications



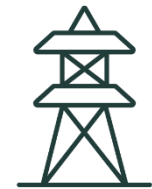
water



sewer



elec & telecom



oil & gas



# ZILPER



Introducing a new  
trenchless technology  
**Jet bore**<sup>TM</sup>



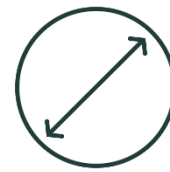


# PETRA

## JET BORE

A proprietary trenchless method that uses a non-contact cutterhead to excavate bedrock for installing underground utilities, making it the only economically viable method for small diameter pipelines in such conditions.

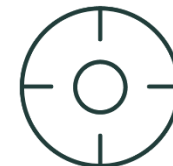
### Specifications



18" - 48"



100 ft

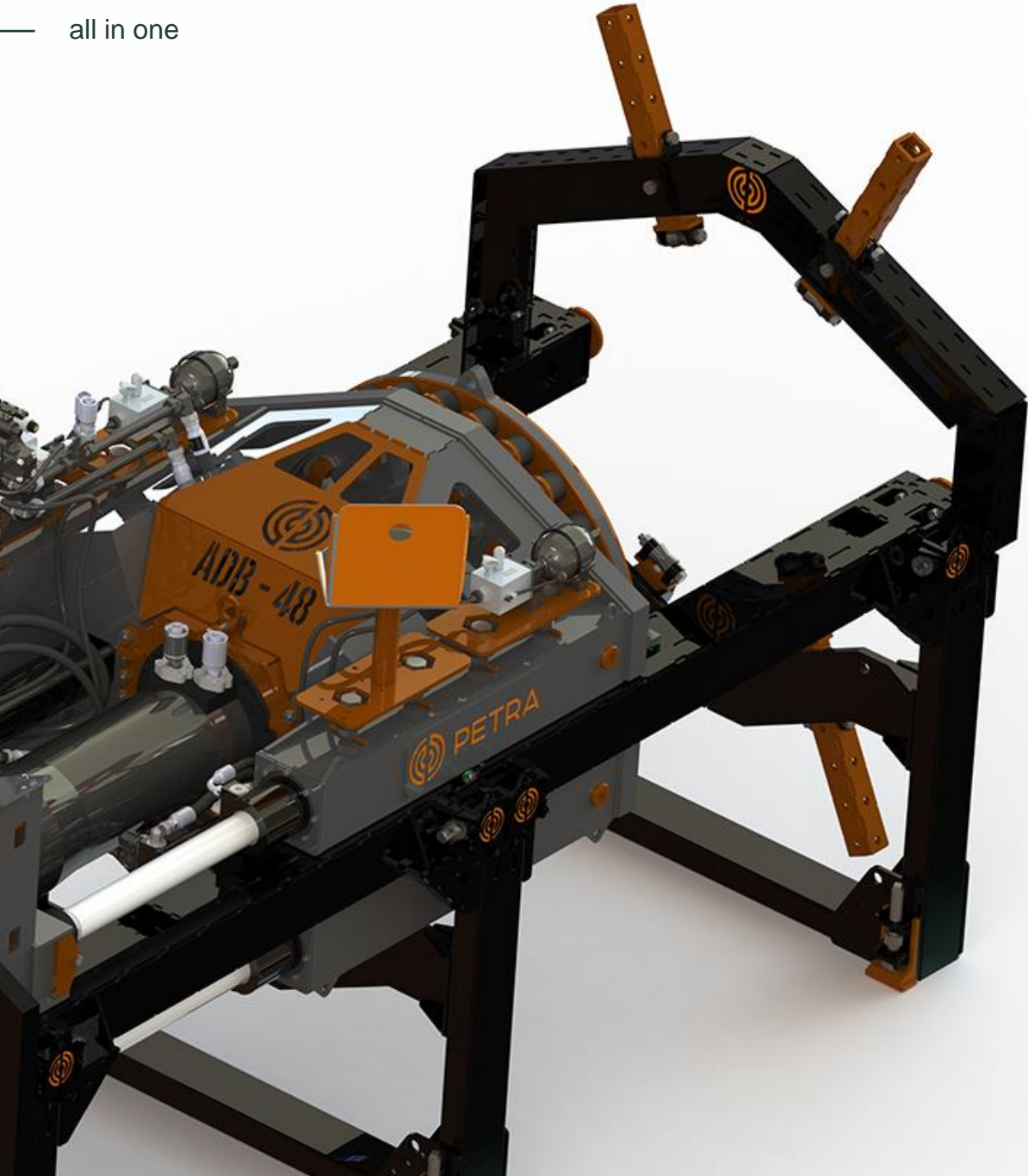


+/- 0.5%

But what if you can have  
multiple trenchless methods

**in just one platform?**

all in one

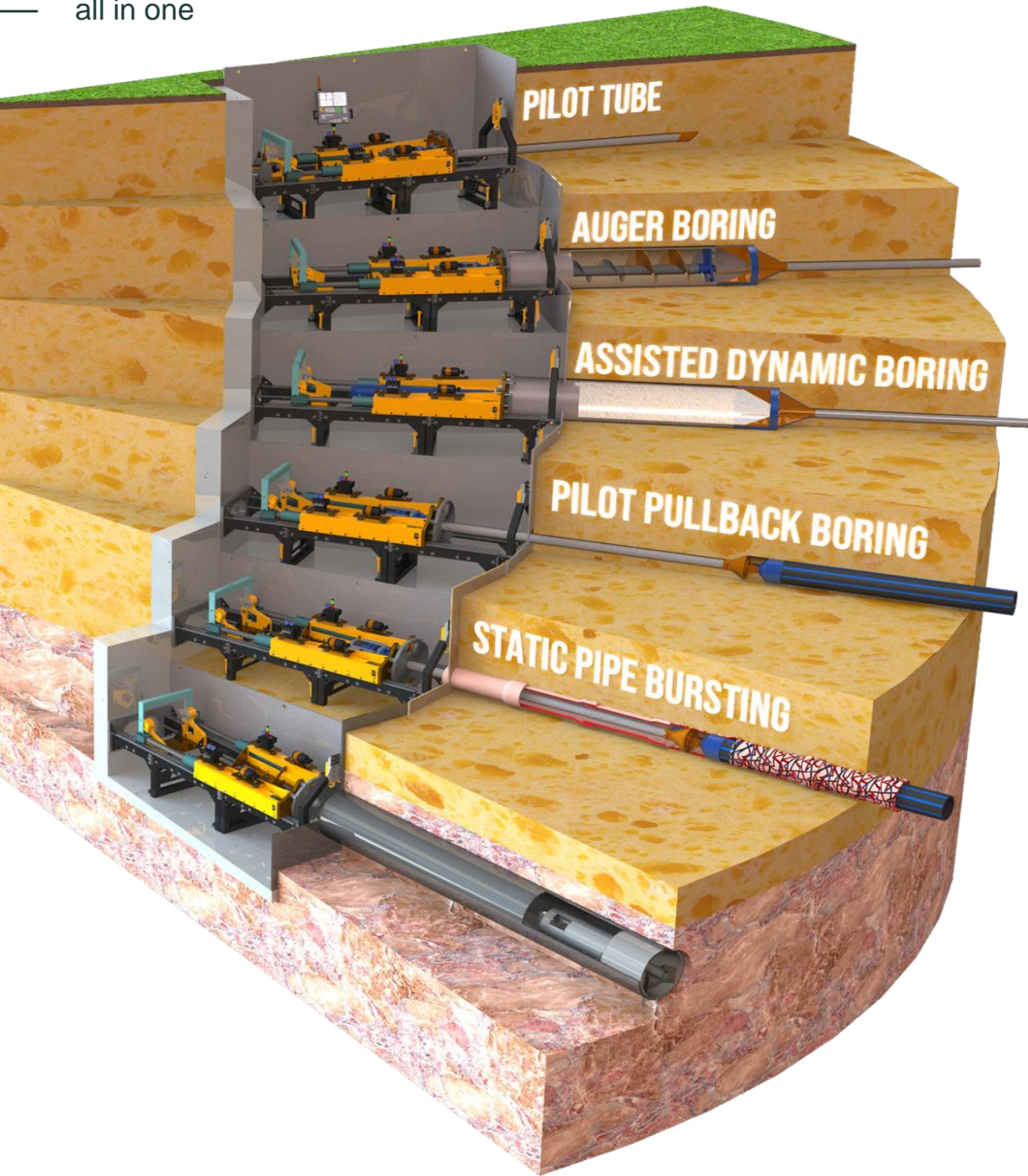


Introducing the first  
multiplatform ever

# AI1

DIGGING DEEPER

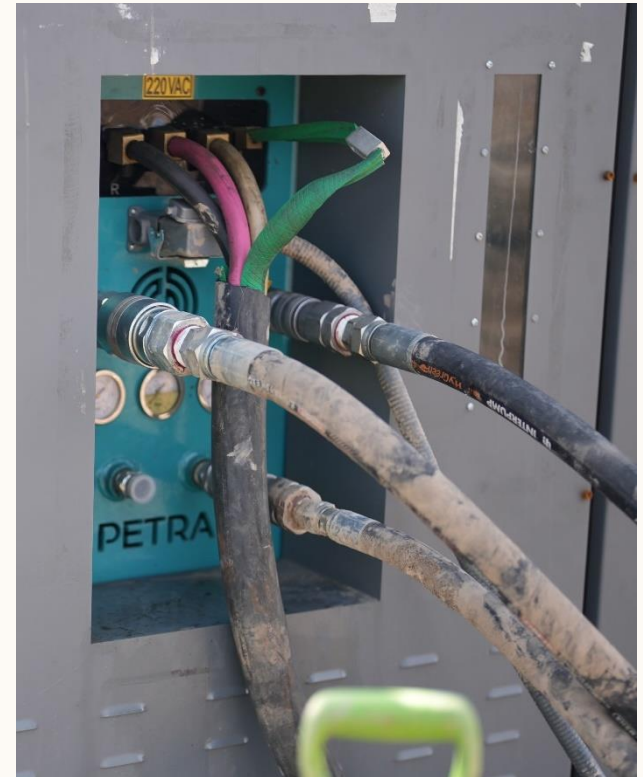
all in one



Six tools,  
one package

# AI1

DIGGING DEEPER

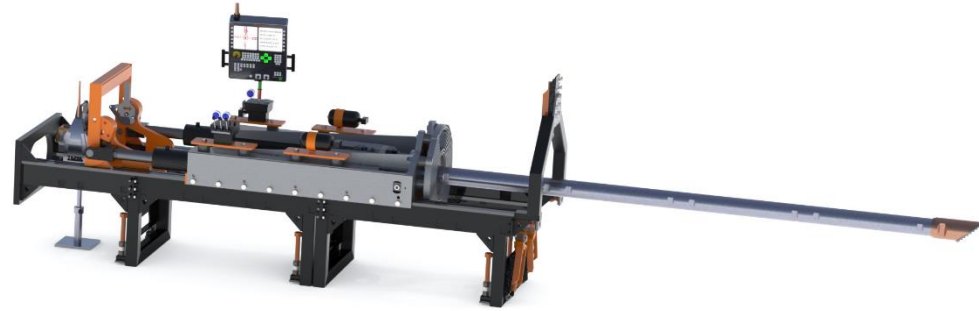


DIGGING DEEPER








DIGGING DEEPER





## Pilot Bore

Piloting, the process of creating a small diameter borehole using a guidance system and steerable drill head, can be utilized to accurately establish the path and depth of installation before pulling a final product pipe (such as High-Density Polyethylene (HDPE) pipes) through the pilot borehole via the pilot pullback technique.

Power Sources		Specifications
 Grid	 Renewable Diesel	 Diameters 4.5"
		 Max Drive 300+ feet
		 Accuracy +/- 0.05%



## Auger Boring

Auger and Guided Boring is a trenchless method that combines the use of a piloting system with Auger boring, which involves jacking a casing pipe into the ground while helical augers rotate to remove the excavated spoil.

### Power Sources



Grid



Renewable  
Diesel

### Specifications



Diameters  
12" - 48"



Max Drive  
400 feet



Accuracy  
+/- 0.05% - 0.5%



## Assisted Dynamic Boring (ADB)

Assisted Dynamic Boring is our proprietary trenchless method that combines hydraulic force and high-frequency percussive impacts to install underground utilities with significantly increased penetration force.

### Power Sources



Grid



Renewable  
Diesel

### Specifications



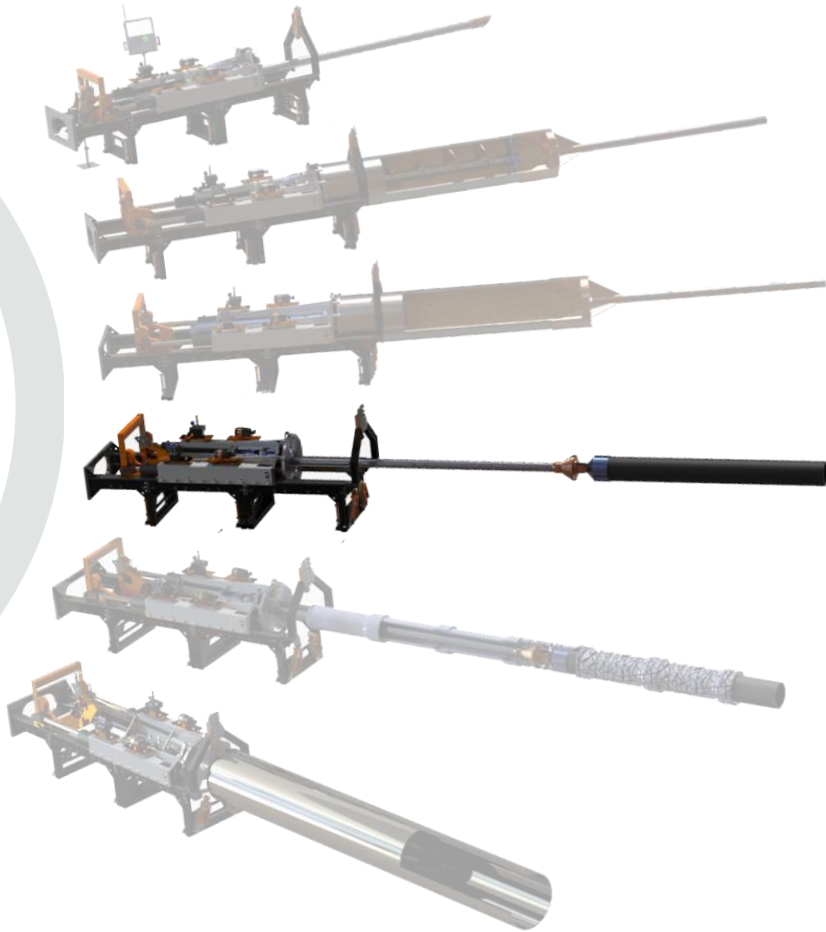
Diameters  
8" – 48"



Max Drive  
300+ feet








Accuracy  
+/- 0.05% - 1%



## Pilot Pullback

Piloting, the process of creating a small diameter borehole using a guidance system and steerable drill head, can be utilized to accurately establish the path and depth of installation before pulling a final product pipe (such as High-Density Polyethylene (HDPE) pipes) through the pilot borehole via the pilot pullback technique.

Power Sources		Specifications
 Grid	 Renewable Diesel	 Diameters 6" – 14"
		 Max Drive 300+ feet
		 Accuracy +/- 0.05%



## Pipe Bursting

Pipe rehabilitation is a trenchless method of rehabilitating existing pipelines using various techniques such as slip lining and pipe bursting to improve their structural integrity and extend their service life without the need for extensive excavation.

### Power Sources



Grid



Renewable  
Diesel

### Specifications



Diameters  
4" – 16"



Max Drive  
300+ feet



## Jet Bore

Jet Boring is a proprietary trenchless method that uses a non-contact cutterhead to excavate bedrock for installing underground utilities, making it the only economically viable method for small diameter pipelines in such conditions.

### Power Sources



Diesel



Renewable  
Diesel

### Specifications



Diameters  
18" – 48"



Max Drive  
100 feet



Accuracy  
+/- 0.5%



QUESTIONS?