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Underground Construction Technology
International Conference & Exhibition



Design Considerations and Benefits of Pipe Bursting



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What is Pipe Bursting?

- Trenchless rehabilitation & replacement technology - staying in the existing pipe and utility corridor
- Fracture or split existing pipe while simultaneously installing a new “factory manufactured” pipe
- Replace aged, deteriorating, and capacity deficient mainline and lateral systems w/ same size or larger diameter pipes
- 4 inches to over 36 inches in diameter

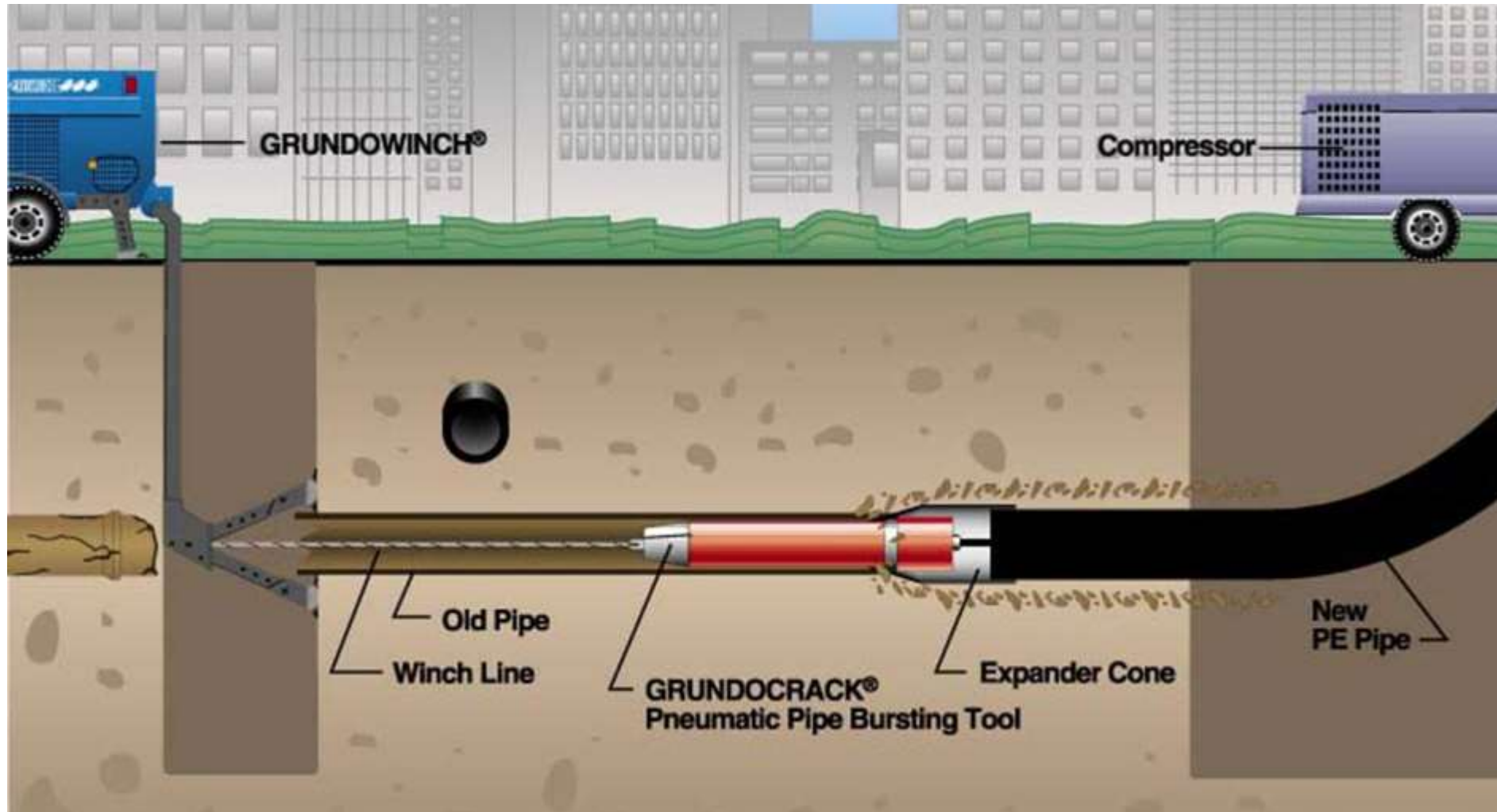


Two Main Types of Pipe Bursting Systems

- Pneumatic Systems
- Static Systems



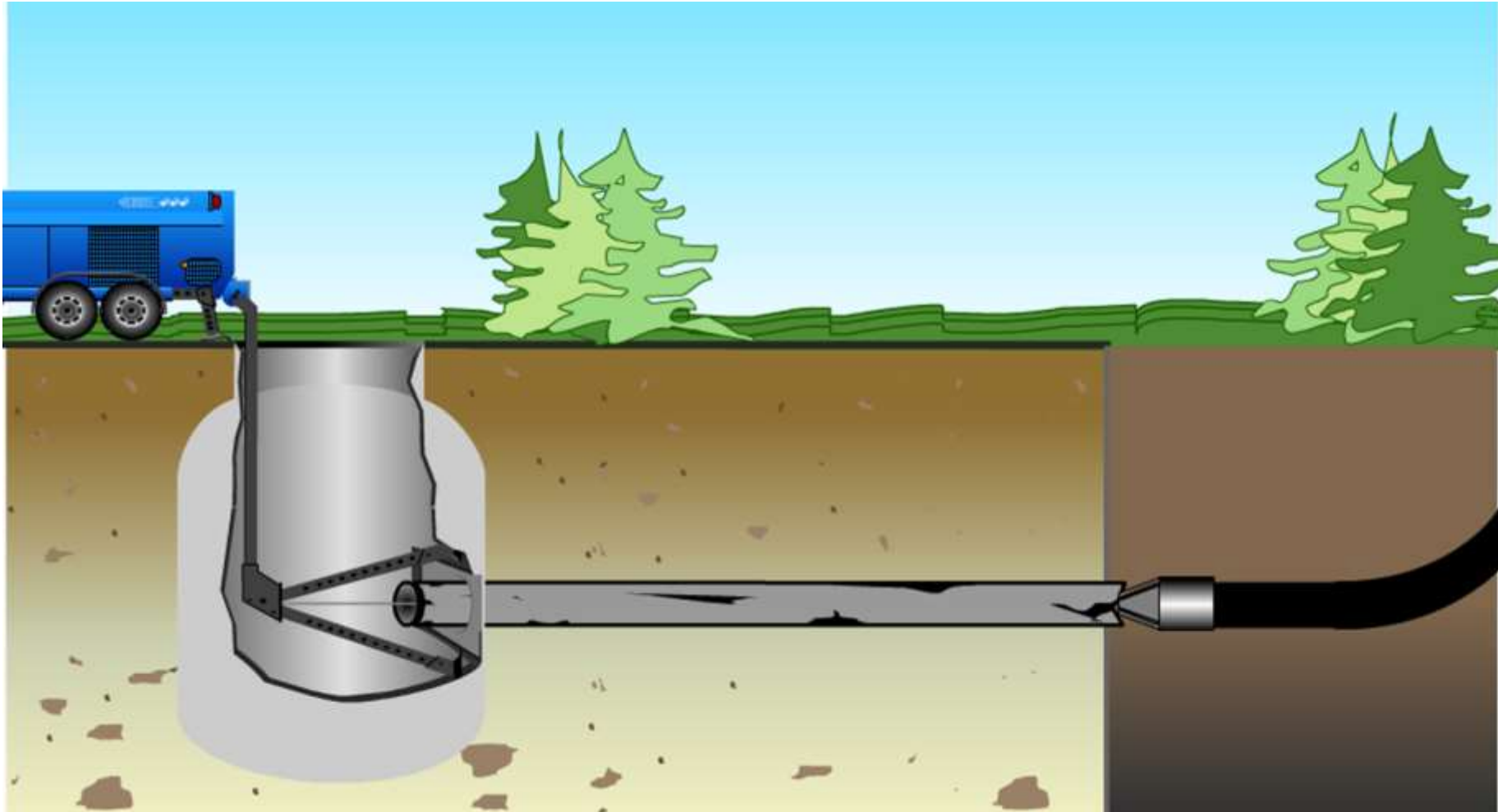
Pneumatic Pipe Bursting System



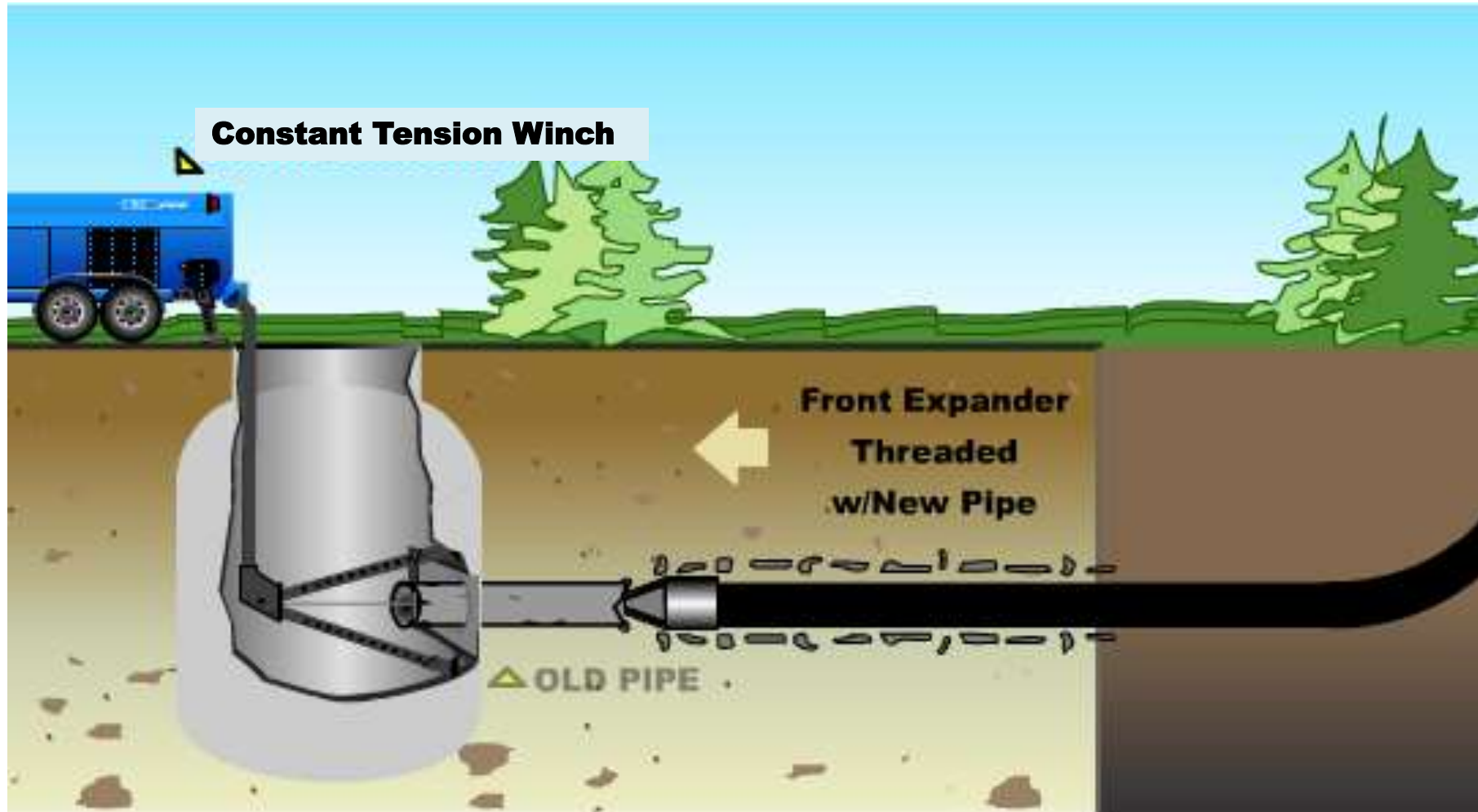
Pneumatic Pipe Bursting System



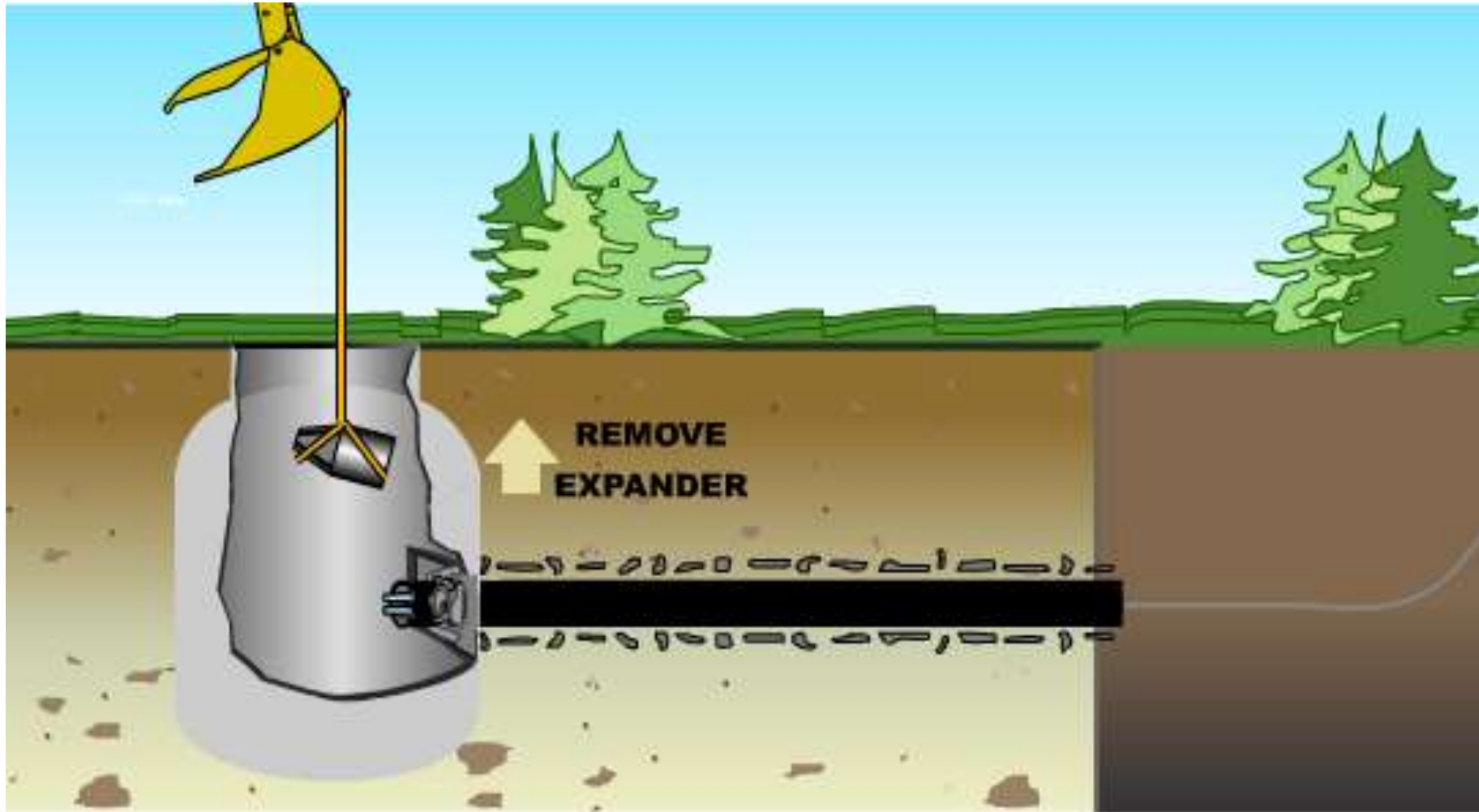
Reversible Pneumatic Systems



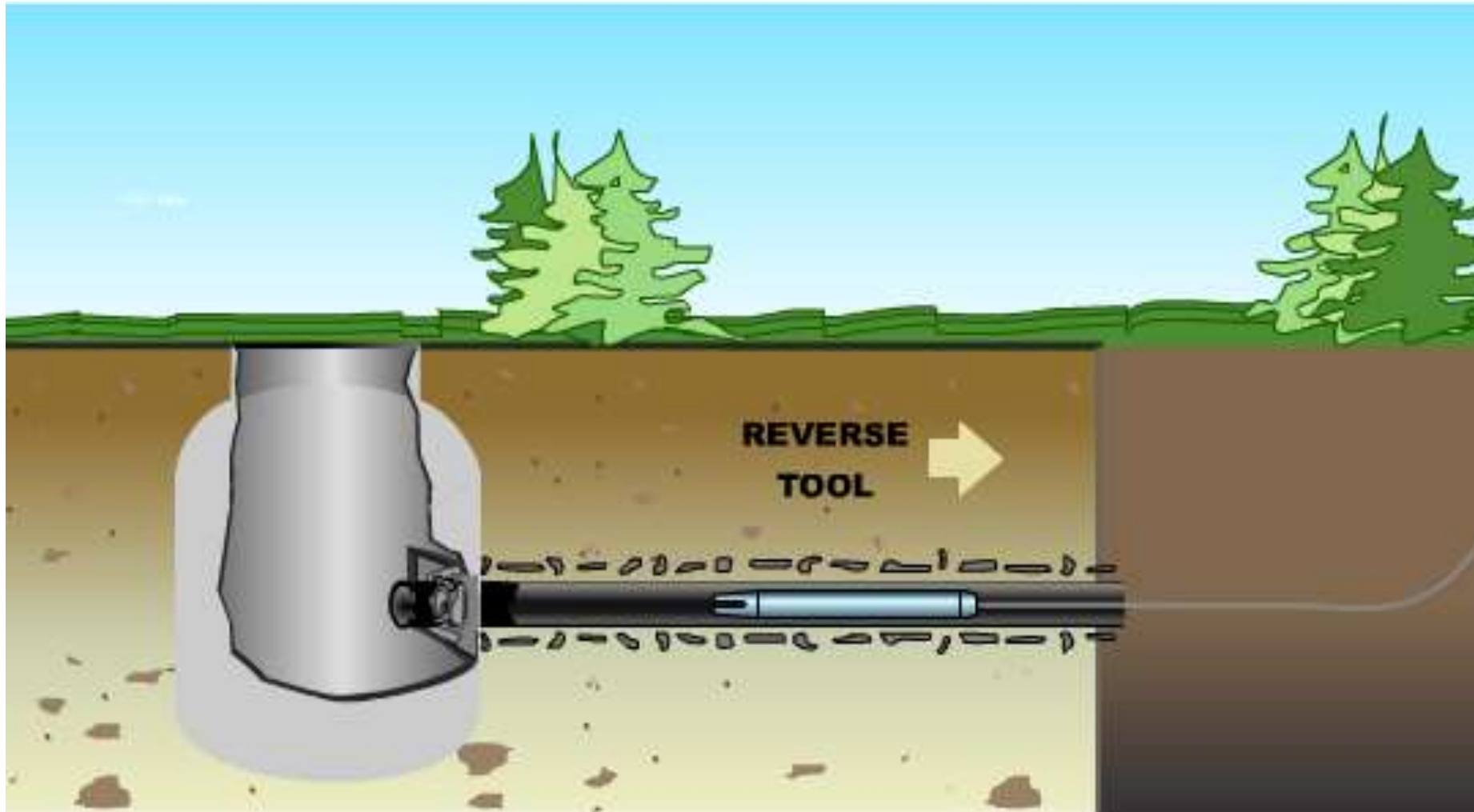
Reversible Pneumatic Systems



Reversible Pneumatic Systems



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Reversible Pneumatic Systems

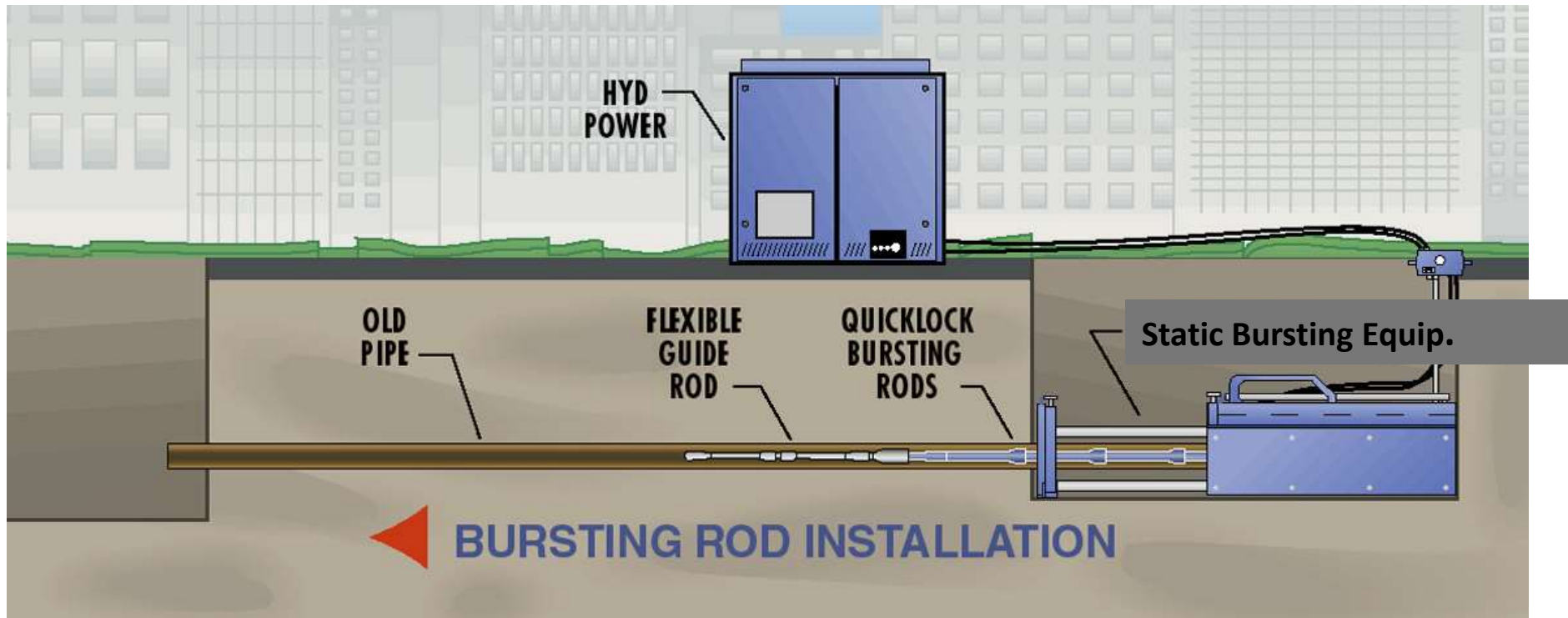


CAPABILITIES: PNEUMATIC SYSTEMS

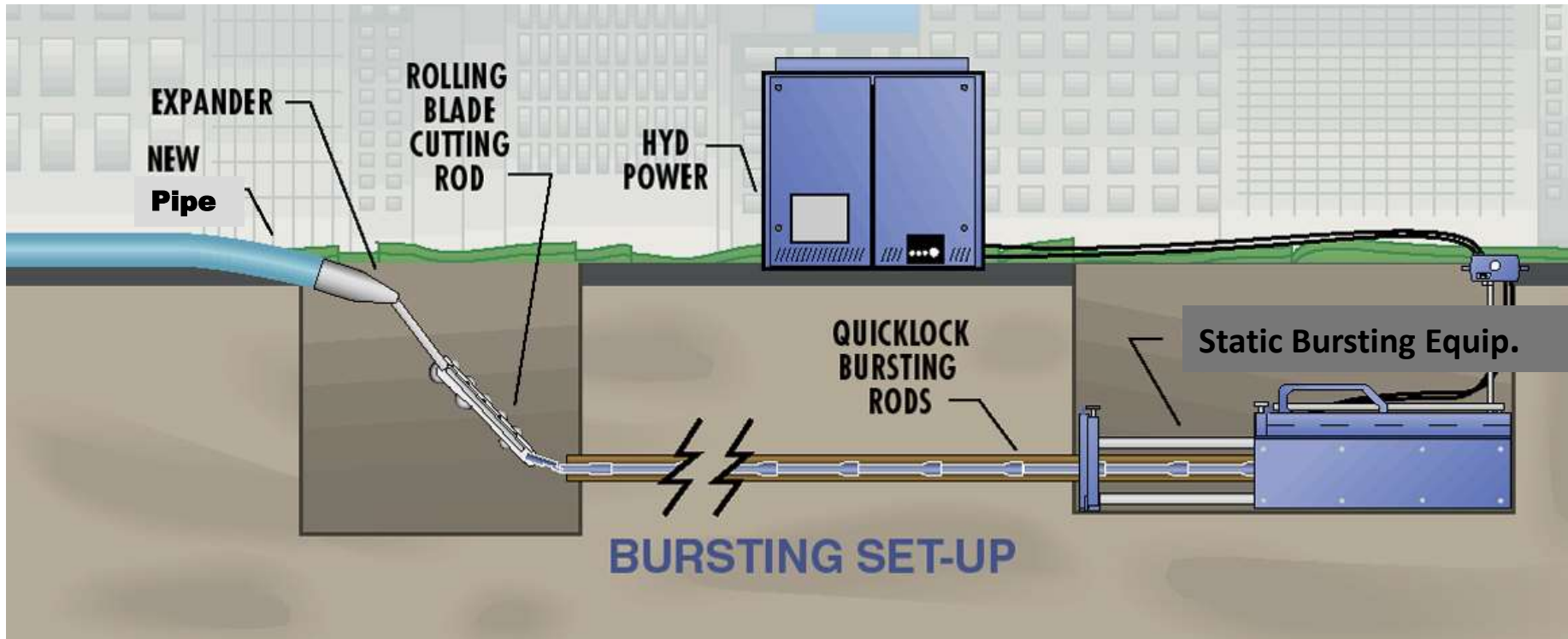
- **Pipe Burst Existing Fracturable pipes only
(VCP, Concrete, Cast Iron, PVC and Asbestos
Cement “Transite”)**
- **New Pipe - HDPE only**

Static Pipe Bursting Systems

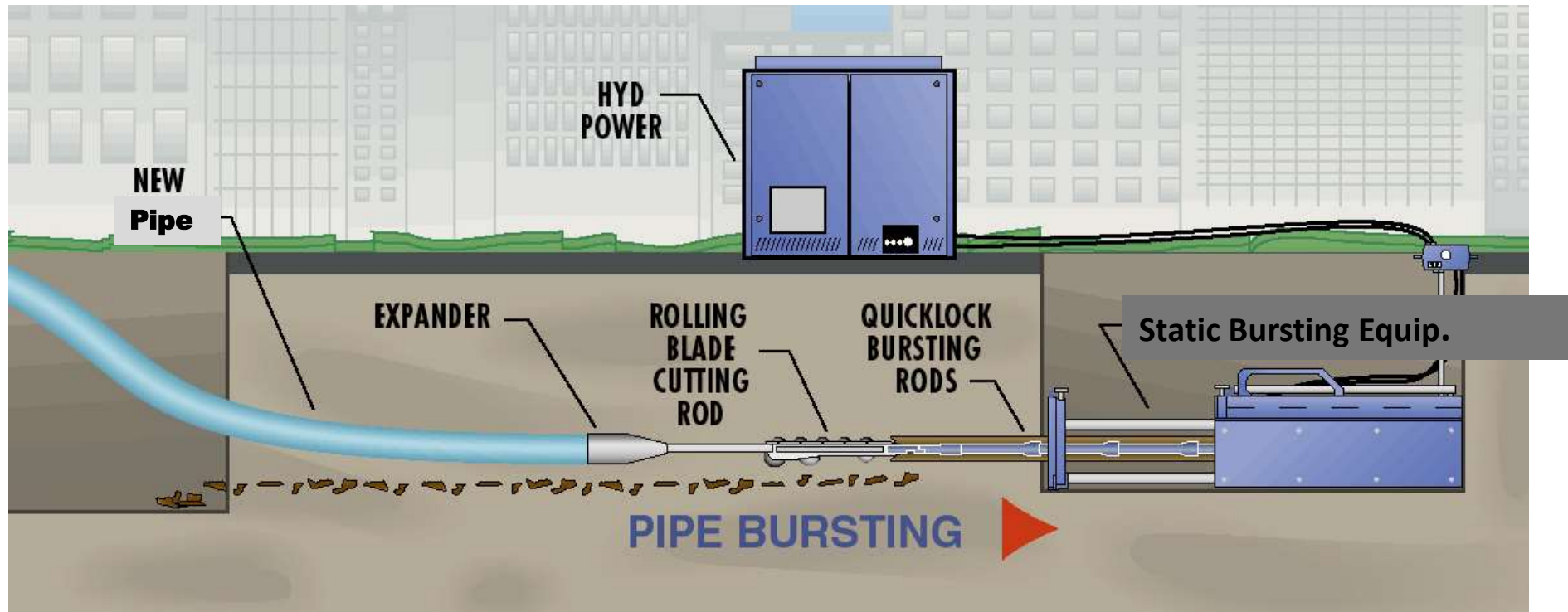
Static Bursting Step 1



Static Bursting Step 2



Static Bursting Step 3



Static Bursting









Capabilities: Static Systems

- **Pipe Burst not only Existing Fracturable Pipe but, also Non-Fracturable Pipe (HDPE, Ductile Iron, Steel)**
- **Accessories used to help split mechanical repairs & fittings**
- **New Pipe - All types (FPVC, HDPE, Restrained Joint PVC, Ductile Iron, VCP)**

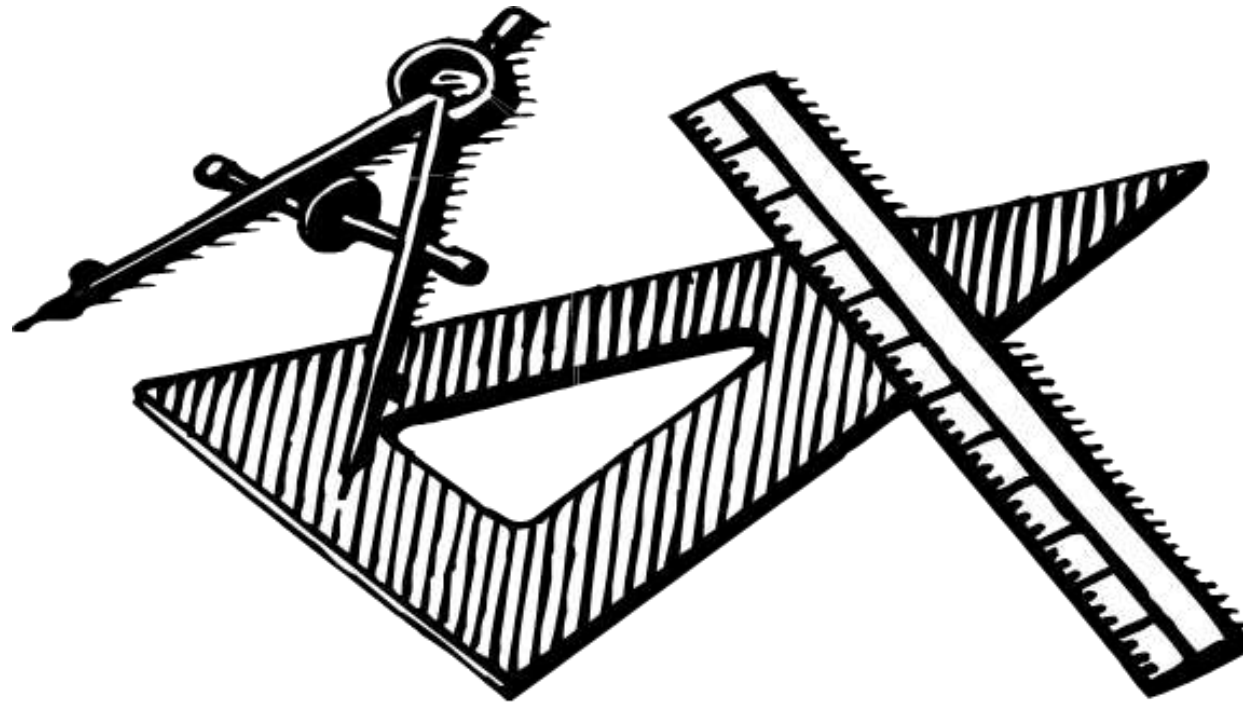
Specialized Tooling



New Factory Manufactured Pipe



Design Considerations



Classifications of Difficulty and Increase of New Pipe Diameter

		Degree of Difficulty	Depth of Pipe (ft)	Existing Pipe ID (in)	New Pipe Diameter Comparative to Existing Pipe	Burst Length (ft)	Original Trench Width	Soil Type
IPBA CLASSIFICATION	A	Minimal	<12	2 – 12	Size on Size	0 – 350	Relatively wide trench compared to expander head outside diameter.	Compressible soils outside trench (loose sand, gravel, soft clay).
	B	Moderate	>12 to <18	12 – 18	Single Upsize	350 – 500	Trench width less than 4" wider than the expander head outside diameter.	Moderately compressible soils outside trench (medium dense to dense sand, medium to stiff clay).
	C	Comprehensive	>18 +	20 – 36	Double / Triple Upsize	500 – 1,000	Incompressible soils outside trench.	Constricted trench geometry (width less than or equal to outside diameter of burst head).
	D	Developmental						

Expansion – Where does it go?

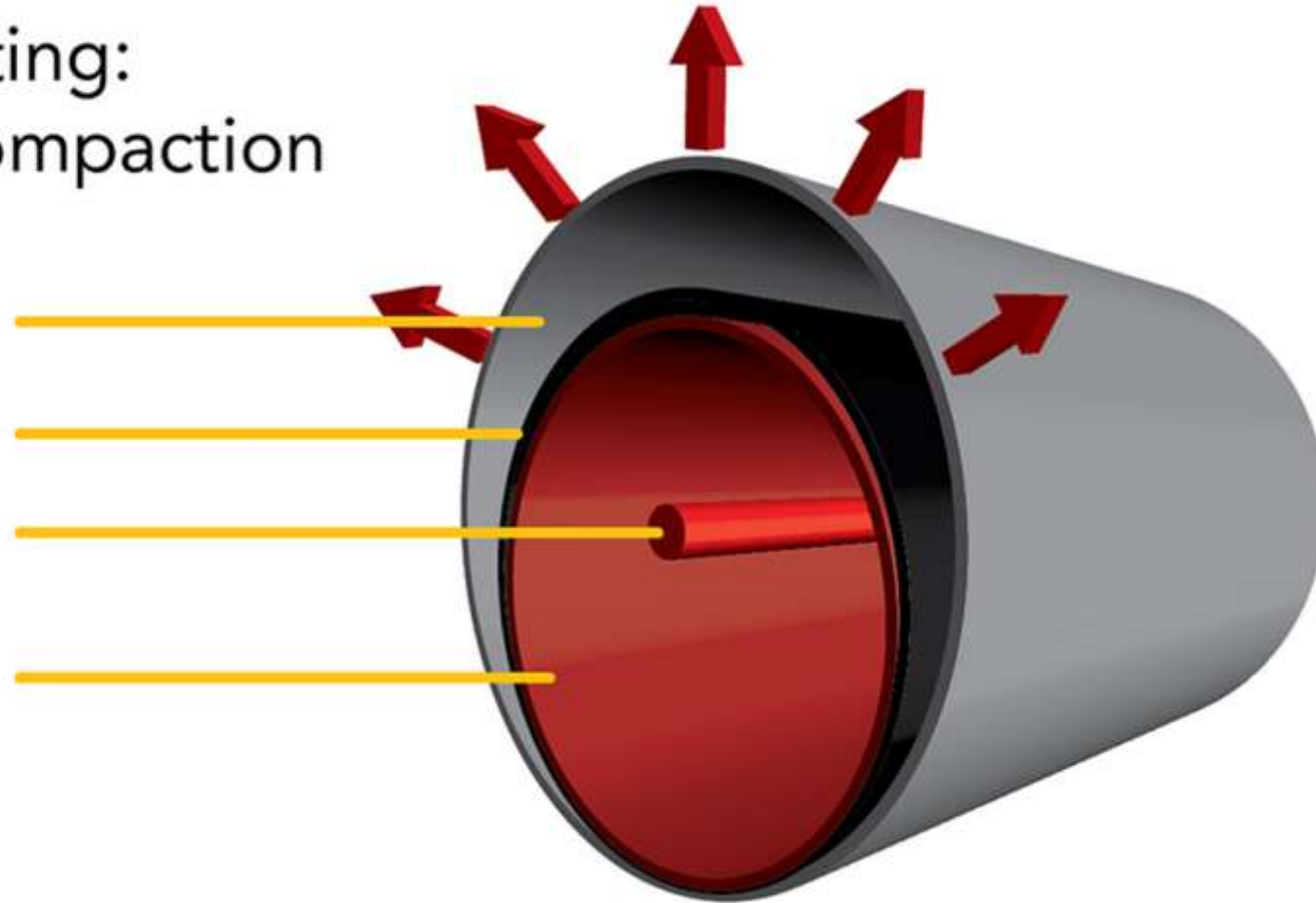
Pipe Bursting:
Typical Compaction

Expander

New pipe

Connection
center point

Existing pipe



Expansion – Where does it go?

Class A Pipe Burst

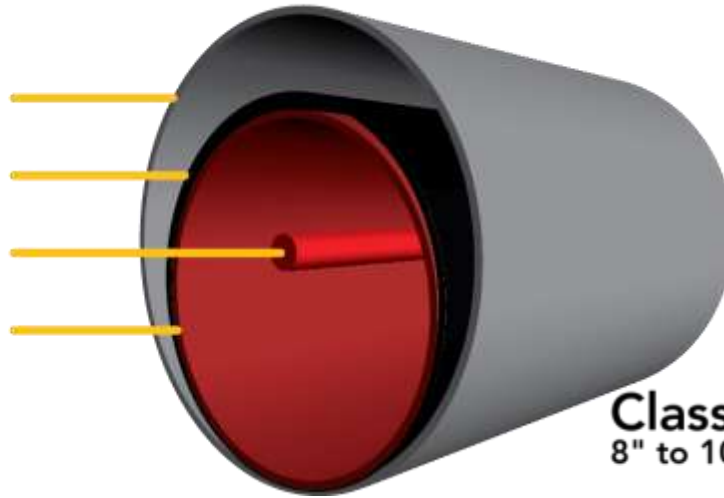
8" to 8" (size on size)

Expander OD: 10.35"

New pipe OD: 8.625"

Connection center point

Existing pipe ID: 8.00"



Class C Pipe Burst

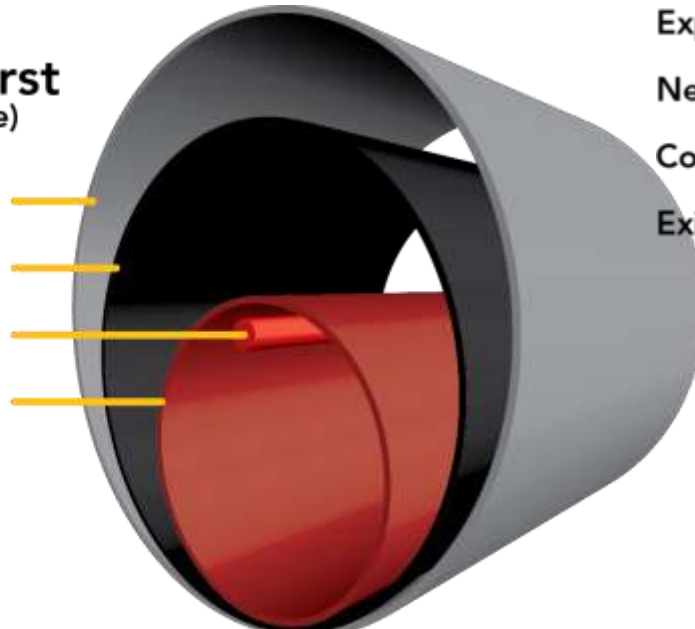
8" to 12" (Double Upsize)

Expander OD: 15.30"

New pipe OD: 12.75"

Connection center point

Existing pipe ID: 8.00"



Class B Pipe Burst

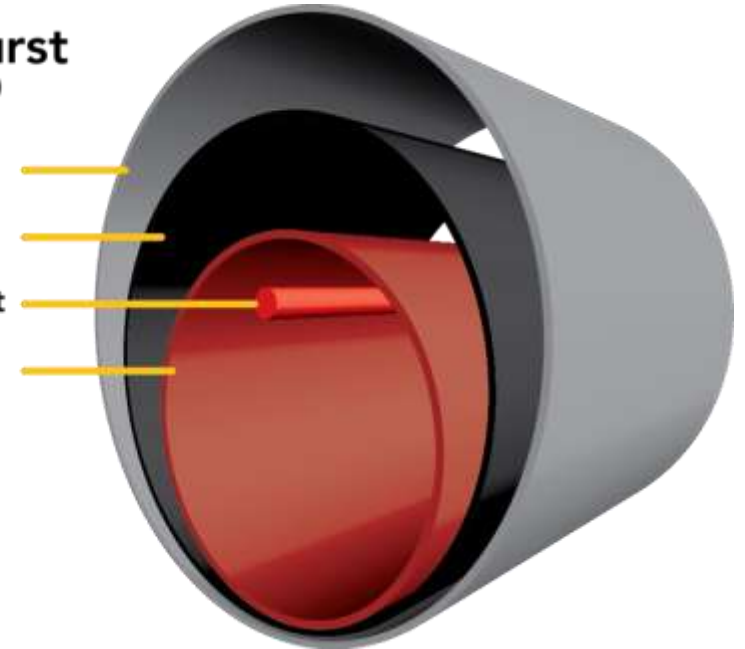
8" to 10" (single upsize)

Expander OD: 12.90"

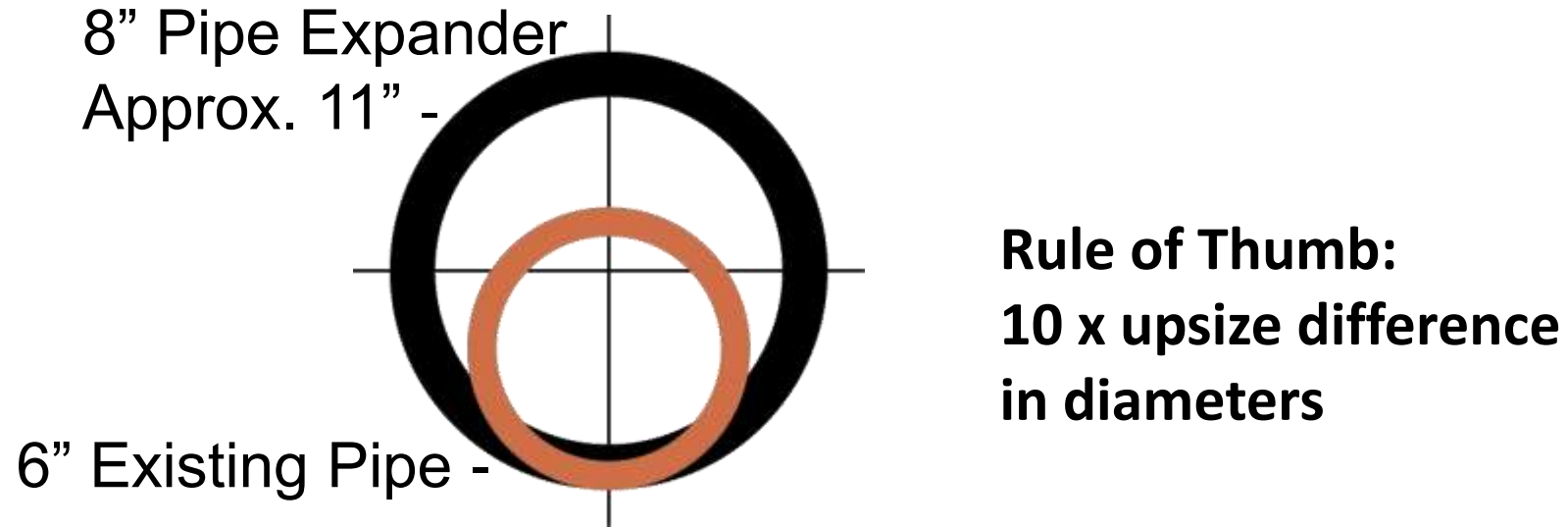
New pipe OD: 10.75"

Connection center point

Existing pipe ID: 8.00"

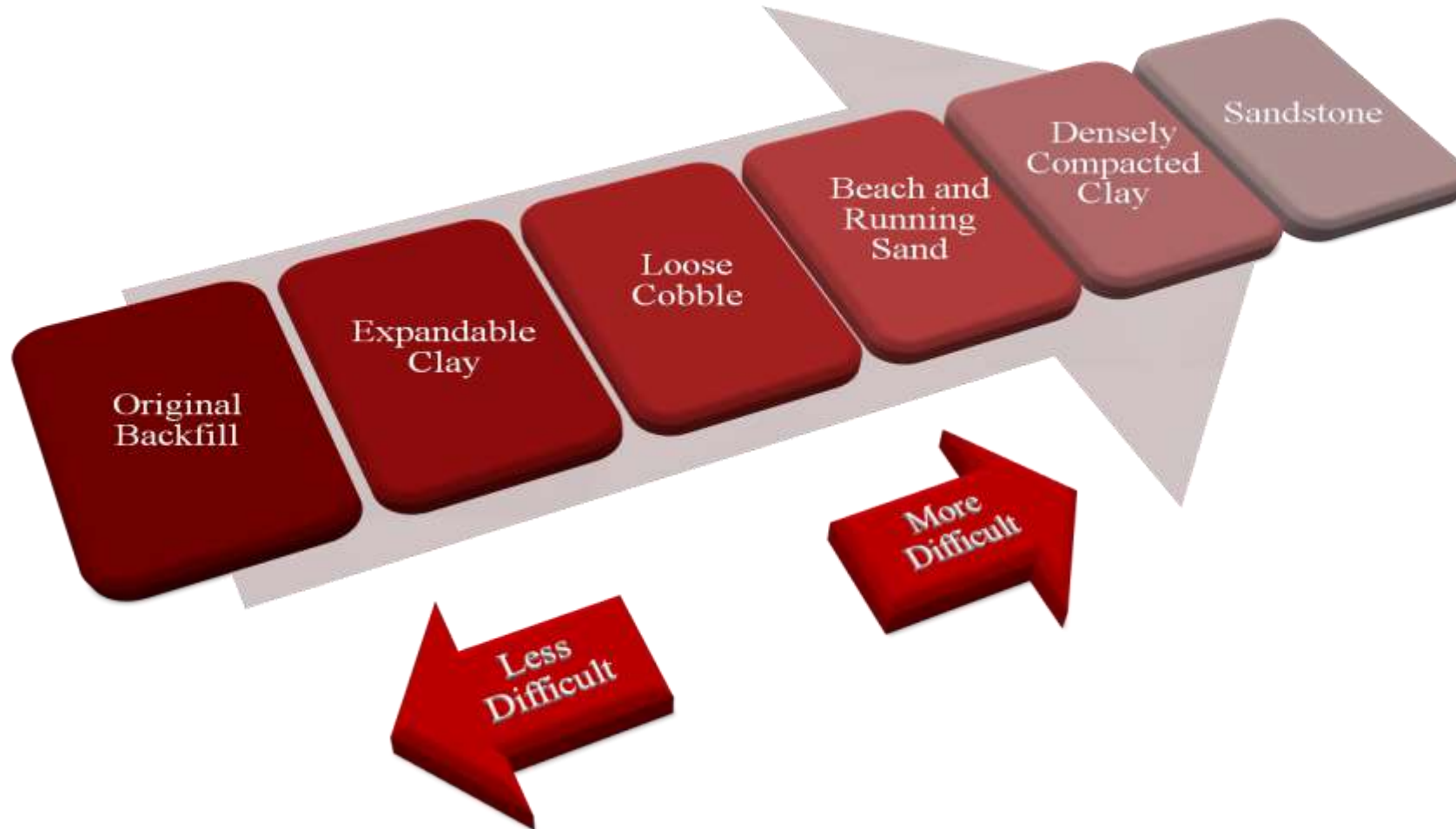


Burst Depth of Cover



- 6" to 8" requires an 11" O.D. expander
- The differential is 5" (11" expander – 6" pipe)
- 5" x 10 = 50" or 4'-2" min. depth to prevent "heaving"

Soil Conditions



Lubrication Port - Pipe Bursting



Lubrication Port - Pipe Bursting



Construction



Bypass Systems



Service Connections - Laterals



Crossing Utilities



Fuse Pipe



Pipe Burst



New Factory Manufactured Pipe



Service and Manhole Reconnect



Mainline Connections

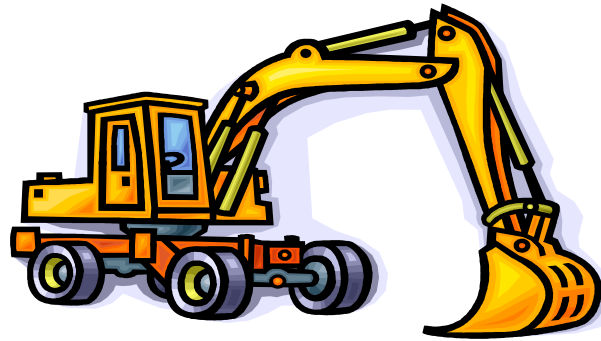


Resurface



Bursting vs. Open Cut “Direct Costs”

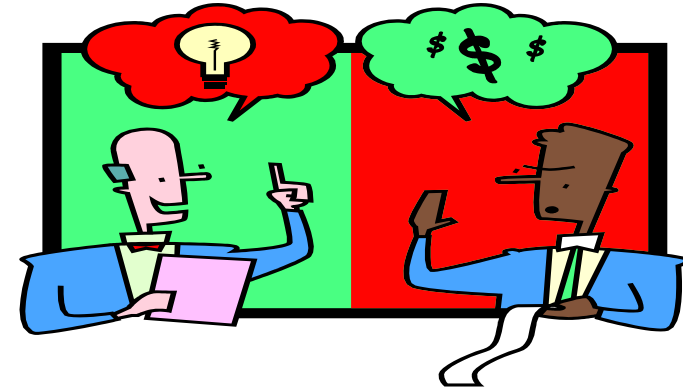
- Less material removed and replaced
- Less Dewatering
- Less equipment and labor
- Utilizes existing pipe, utility corridor and ROW
- Lower cost overall



Bursting vs. Open Cut

“Direct Costs”

- Smaller work zone or “footprint”
- Less disturbance to traffic
- Less time
- Less Impact to businesses
- Less emissions – lower carbon foot print “Green Benefits”



Bursting vs. other rehabilitation options (Slip-lining, CIPP, etc.)

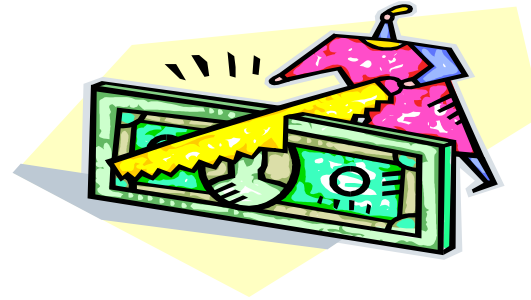
- No reduction in inside diameter (improved hydraulic capacity)
- Same size or Increased pipe diameters
- Factory Manufactured Pipe (vs. “field manufactured” CIPP, epoxy, and CML, etc.)
- Hard service reconnects (not simply “reinstated”)
- Better return on investment - engineering economic life (new pipe)



Summary

Pipe Bursting is...

- Proven, has history, and widely used (not new, you will not be the first!)
- Effective (it works!)
- Costs less
- Lower impact to all
- New factory manufactured pipe
- “Green Technology” – environmentally friendly



Questions?



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