About Us

• WBENC Certified since 2012
• Detroit-based business since 2015
• Approx. 450 Employees (mostly Michigan-based)
  • All field employees are QEW-trained (Qualified Electrical Worker)
  • Most field employees are OQ Qualified (Operator Qualification)
Michigan Locations

2021 S. Schaefer Hwy., Detroit, MI 48217

6001 Schooner St., Belleville, MI 48111

45345 Five Mile Rd., Plymouth, MI 48170

7929 E. M-36, Whitmore Lake, MI 48119
Multi-year contracts with Michigan utilities:

DTE Energy (Electric/Gas/Streetlighting/Major Enterprise Projects)
- Blanket contracts which include joint service and commercial feeder work with numerous utilities including CMS Energy, AT&T, Comcast, etc.

AT&T
- Copper and fiber underground and aerial placing, repair and maintenance

CMS Energy
- Distribution operations – new business and rehabilitation

MDOT
- Directional drilling, lighting, communications and traffic control/signaling services

Various cities and municipalities
- Water and sewer services
- Streetlighting
- Pipeline rehabilitation and inspection (bursting, lining, CIPP, chemical grouting, cctv, etc.)
CES is an infrastructure solutions provider, specializing in:

**Trenchless Utility Construction**
- Horizontal Directional Drilling
- Cured-in-Place-Pipe (CIPP)
- Slip Lining
- Pipe Bursting

**Traditional Excavation and Site Work**
- Infrastructure Construction/Rehabilitation/Renewal

**Design/Build**
- Complete EPC capabilities with our affiliated firms (includes engineering, survey, permitting, procurement, warehousing, construction)
Slope Restoration
Pipeline Renewal Methods
Critical Steps to Trenchless Pipe Projects

- Define the problem in the piping system via various methods or procedures
- Select alternatives that are considered appropriate for the repair the pipes (Cost + Quality = Value)
- Determine the method of procurement?
Trenchless Technologies

- Pipe bursting
- Cured-in-Place-Pipe
- Fold & Formed / UltraLiner
- Horizontal Directional Drilling
- Grouting / CCTV Inspection / Cleaning
- Engineering / Design Build
- Sliplining
- Large Diameter Pipe Rehabilitation
- Excavation / Open Cut
Pipebursting
Some Trenchless Project Owners

- City of Warren
- City Jacksonville
- City of Livonia
- City of Monroe
- City of Auburn Hills
- City of Grosse Pointe Woods
- City of Center Line
- Chesterfield Township
- City of Fraser
- City of Saint Clair Shores
- City of Traverse City
- City of Ann Arbor
- City of Ypsilanti
- City of Grosse Pointe Farms
- City of Detroit
- Watertown Township
- City of St. Petersburg
- City of Live Oak
- City of Houston
- City of Austin
- City Jacksonville
- City Fort Oglethorpe
- City of Dallas
- City of Seattle
- City of San Antonio
- City of Atlanta
- City of South Lyon
- City of Lansing
- City of Orlando

Departments of Transportations

- Michigan
- Indiana
- Alabama
- Arkansas
- New York
- Florida

Universities

- Michigan State University
- University of Michigan
- University of Notre Dame
- University of Arlington
- Louisiana Tech
Pipebursting:  *Today vs. Then*

- Greater recent advancement providing wider application / project history
- More reliable today than five years ago
- More cost-effective
- Wider acceptance and more usage
- Better Equipment and Materials
- Increased knowledge of successful equipment, means, methods and materials
- Better understanding from the owner and engineering communities of benefits
Advantages to Trenchless Technologies

- 85% less carbon footprint than open-cut
- **Pipe Bursting** “Green Technology”
- Owner gets compliments instead of complaints from the public
- Cost savings average 30% less than open excavation
- Less public disruption than open-cut
- Utilizing existing conduit in easements
- Less risk to owner & contractor for safety issues.
- Normally change orders don’t exist unless more work added
- Reduce project duration
Large Diameter Pipe Bursting Considerations

- Depth
- Existing pipe material
- Ground water
- Existing Soils
- Age of Construction
- Back fill materials
- Shoring and Bracing machine
Pipebursting Upsize Capabilities

- **0-25% Common**
- **25-50% Challenging**
- **50-125% Experimental**
Static Pipe Bursting Step 1

- Inspect existing sewer by CCTV
- Excavate machine and new pipe insertion pits
- Excavate service pits if required
- All pits to be properly shored and maintained dry
Static Pipe Bursting Step 2

- Prepare machine pit
- Set up Static pipe bursting machine in pit
- Push rod string through host pipe (existing sewer)
- From machine pit to new pipe insertion pit
Static Pipe Bursting Step 3

- The rod string emerges at new pipe insertion pit
- Attach pipe bursting head and new replacement pipe to
- The rod string
- In this case HDPE pipe already fused into a single Continuous length is shown and the set up is ready for
- The actual pull back replacement process
Static Pipe Bursting Step 4

- Static pipe bursting machine in machine pit is
- Set up for pull back operation
- The rod string pulls the bursting head towards the Machine pit
- The bursting head breaks the existing sewer and Pushes the broken pieces into the surrounding Ground, away from the center and creating a new Tunnel
- The bursting head advances towards the machine pit
- And installs the new HDPE pipe in-place
Pipe Bursting Case Study

University of Notre Dame

- Bursting 7,000 ft of 12” VCP existing VCP upsizing to 18” HDPE SDR 17.
- Depth 25’ to 35’
- 1,200’ pulls thru existing manholes
- 225-Ton Static Pipe Burst Machine
By-pass
Female Dorm
Support of Main Electric Conduit
Set-up of Pipe-Burst Machine
Pipe Fused Across Campus
Entry Pit
Supporting Pipe at Entry Pit
Supporting Pipe at Entry Pit
Entry Existing 12” VCP OD
22” Expander
Pushing Down on Pipe to Maintain Grade
Bursting Machine Inside 12’X12’ Manhole Box
Pipe Exit
Entry pit
Burst Machine Removed
Burst-Head Removed
Manhole Set to Connect Two Pipe-Burst Installations
Removing Invert to Burst Through Existing Manhole
Pipe-Rammed Under Discovered Fiber-Optic Vault
Pipe Through Rammed Casing
Burst Entering Through Existing Manhole - 1,000’ pull.
Ready to Begin Burst
Pipe Train
Pipe Bursting Case Study

- Pipe Bursting existing 3 layer 30” brick sewer upsizing to 36” HDPE SDR 17.
- Depth 20’ to 25’ in deep
- 800’ pulls thru existing manholes
- 225-Ton Static Pipe Burst Machine
Burst Head Attached
Pipe Train
Burst Machine Pit
Burst Head Entering Existing 30” RCP
Entering Existing Pipe
Bursting Through Manhole in Road
Entering Exit Pit
Burst complete
Fort Oglethorpe, Georgia

Design Build

- Pipe Burst and CIPP 9,000 LF of 24” RCP
- Sanitary Sewer
- CCTV/Cleaning
- Static Burst System
Pipe-Burst Equipment
Pipe-Burst Head
HDPE Pipe Entry Pit
HDPE Pipe Entry Pit
Pipe Bursting-Case Study

MDOT Project on I-94 East bound lanes, at Sprinkle Road Exit.

- There was a collapse in the center of the east bound lanes.
- Existing pipe was 16” RCP. Stayed with same size HDPE as end product.
- Burst was completed in one night never closing I-94.
- Using static burst system.
- 225 Ton Static Pull
Sink Hole in Fast Lane
Sink Hole
Burst Machine Set
Maintained Traffic Flow
Fused HDPE on Shoulder
Burst Head
Entry Pit
Bursting Through Existing Catch Basin
Pipe-Burst Head Reaching Machine
Pipe-Burst Case Study

Michigan Department of Transportation Project on M-13

- Failing 30” Reinforced Concrete Pipe Burst 30” HDPE
- Bay City, Michigan
Setting-Up
Inside Existing 30” RCP
Driving I-Beams
During Pipe-Burst Pull Back
Above Pipe
Pipe Train

May 10, 2022
Burst Head Enters Burst Pit
Pipe Bursting-Case Study

42” Culvert Metal Pipe

- Wolverine, Michigan
- Existing 42” CMP 35’ in depth
- TRS-225 Ton pipe bursting machine
Outfall Pipe – Tar Lined CMP
Burst Machine Set Back to Allow Pipe to Enter Pit
Case Study
48 in. CMP Pipe Burst

- Emergency 48 inch Collapse under Michigan Department of Transportation Highway M-106
Sink hole on upstream side
Pipe Collapse in shoulder
Upstream end
Down stream end of pipe
Pull head fused on
Notice gas pipeline marker for 12 high pressure steel
Pipe installed exit side
Machine side pipe installed
Completed
Sliplining
Sliplining

- 4” thru 120” diameters
- Continuous or segmental
- With flow or by-passed
- HDPE Pipe
- Bulk Head
- Grout annulus
Slip-Line Case Study

Tanner Creek 84” Culvert

- 520’ Slip-line with 72’’ HDPE
- 60’ under 1-94 mile marker 16

BERRIEN COUNTY DRAIN COMMISSION
Michigan Department of Transportation
Existing Outfall
Downstream End 84” CMP Bottom
Rotted Out
Up-stream – Bend in Pipe
Adding Sections of Pipe
By-Pass Run Through Pipe
Adding 50’ Section of Pipe
Aligning Pipe for Welding
Extrusion Welding Pipes Together
Pipe Installed - Grout Tubes
Bulk Head Complete and Grouted
Rip-Rap Installed
Slip-Line Case Study

42”” Culvert

- 485’ Slip-line
- 30’ under US-127 and M-10

Michigan Department of Transportation
Sliplining Existing 42” Culvert
Pipe laid out
Slip-Line Case Study

66” Culvert

- 360’ Slip-line
- 70’ under I-196

*Micigan Department of Transportation*
Case History 1

Existing Structure:
140’ - 7’-8”x 5’-5” MULTI-PLATE Pipe-Arch, 10 gage
- 73"x55", Aluminum, 10 gage, Ultra Flo
- Mannings “n”=0.012
- Service Design Life 100 years plus
- Supplied with 3 stage grout ports, skid rails, leveling rods, internal 10-C bands and flat gaskets, zinc chromate primer exterior.
- Match marked sections
Pulling block
Internal bands w/ flat gasket

Day 2
Bypass piping

Day 3
Flotation bracing

Day 4
Bracing to through 12 o’clock grout port
Vent through Bulkhead
Grout
Grout Port

Day 8 – Last grout lift. Grouting procedure complete.
Grout through vent
Outlet

Lane closure to replace failed roadway slabs. If relines are installed prior to severe deterioration and road failure, all work can be completed with little or no road closure.
Joint Seals
Flat Bottom Arch Invert Repairs
Barry County Road Commission
Cured-in-Place-Pipe

- 30-year plus history of the product
  - Most extensively used trenchless product
- 4” thru 108” diameter
- Gravity/Pressure applications
  - Mainlines and laterals
  - Manholes
- Predominately used within sewers
  - Industrial applications
- Independently verified
CIPP can be utilized for various pipeline concerns:

- Structural
- Environmental
- Strength Enhancement (New construction)
- Infiltration
- Pressure / Gravity Applications
- Lateral Connections
- Point Repairs
CIPP Can Respond quickly!

- Local Installers
- Local Wet out Operations
- In stock materials for standard sizes
- Water / Air Installations
- Most Tube Manufacturing is performed off site in Factory.
Tube Manufacturing
(ISO Certified)
Tube Wet Out Process

In-Line Mixer

Gap Rollers

Conveyor

Serial Vacuum
CCTV
Inversion Process

- Water / Air
- Water is most reliable
- Air can offer increased efficiencies
Installation head is typically 4 to 8 psi to produce tight-fitting mechanical locking.
Tube Inversion
Once in-place, the process water is heated to cure the thermosetting resins and create a "Cured-in-Place-Pipe"
NEXT GENERATION – UDI
Requirements for a Successful Project

- Having appropriate Polymer for Highway work.

- Gather Soils Reports, Construction Drawings, and Visit Site to compile information to create a repair plan.

- Have Experienced Technicians with Robust DCP unit to test subgrade soils to minus 30 feet, so they can adjust injection plan when on site if necessary.
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POLYURETHANE MATERIAL

- Low viscosity
- 2-component: Resin & Hardener (1:1 by volume)
- Formulated to resist water intrusion into the reaction
- Exothermic chemical reaction generates CO2 gas
- CO2 gas causes expansion of the polymer and creates pressure on the surrounding environment
POLYURETHANE MATERIAL

- Rapid Cure –
  - Reaction complete in < 1 minute
  - Can support traffic after 20 minutes
  - Full strength in 24 hours
- Rigid Structural Polyurethane created as the material cures
- Installed density range – 4 to 10 lbs / CF
- Strength varies with density
TYPICAL INJECTION LAYOUT

PLAN VIEW

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<td>TYPICAL HIGHWAY LAKES</td>
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<tr>
<td>12''</td>
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<tr>
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</table>

LEGEND:
- **URETEK DEEP INJECTIONS up to 4'**
- **URETEK DEEP INJECTIONS up to 8'**
- **URETEK DEEP INJECTIONS up to 12'**

Polymer grout bulb - shape is for illustration only; shape varies based on soil conditions, density, etc.

NOTES:
All dimensions, slopes, thickness of gravels and slabs, etc. are approximate. DCP testing will be performed on site to finalize injection layout.

PROFILE VIEW

INJECTION TUBING
- 4' URETEK DEEP INJECTION
- 8' URETEK DEEP INJECTION
- 12' URETEK DEEP INJECTION

TOP OF PAVEMENT

TYPICAL 2 LANE HIGHWAY - TAPERED INJECTIONS AROUND CULVERT

URETEK USA
P.O. Box 1029
Tomball, TX 77377

Sheet 1
Injection inside steel reinforced, plexi-glass box so material flow could be observed
Stabilized soil mass was free-standing after box removed
EXPEDIENT REPAIR OF ANDREWS AFB RUNWAY 01L/19R

Vertical load applied using an excavator
Soil mass would not crush, but excavator was lifted 11 inches
Bridgman - Culvert

4. Culvert apron 7' X 22' - two injection to 5' depth

Calculation: Deep Injection - apron

100# per injection X $10.00 X 2 = $2000.00
Bridgman – Culvert Base