TRENCHLESS ASIA 2026
THAILAND

KEYNOTE:
LESSONS LEARNED IN TRENCHLESS TECHNOLOGY – CASE STUDIES IN THE U.S.

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LESSONS LEARNED IN TRENCHLESS TECHNOLOGY – CASE STUDIES IN THE US

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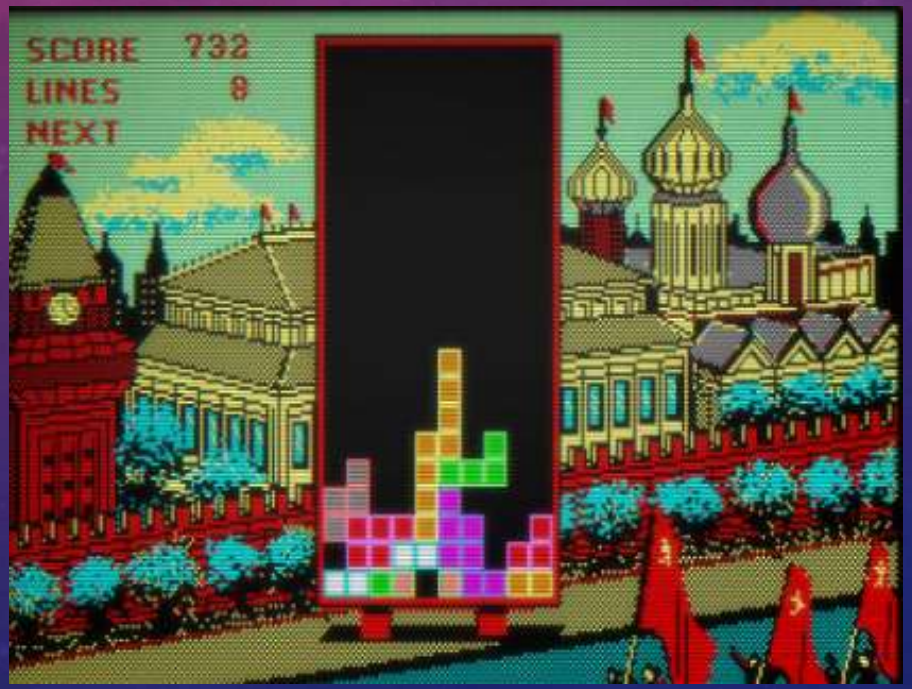
TRENCHLESS ASIA 2026 THAILAND

JUNE 11, 2026

QUEEN SIRIKIT NATIONAL CONVENTION CENTER, BANGKOK, THAILAND



TRENCHLESS ASIA 2026
THAILAND

AGENDA

Introduction

Infrastructure Report Cards

Case Studies and Lessons Learned

Best Practices

Future Of Trenchless

Conclusion

TRENCHLESS ASIA 2026 THAILAND

WHAT IF THIS HAPPENS TO YOUR UTILITY?

Story and Photos Credit: DC Water, Washington, DC USA

"On January 19, 2026, a major collapse of the 54-mile Potomac Interceptor sewer line near the Clara Barton Parkway in Maryland released roughly 240–300 million gallons of raw sewage into the Potomac River. This incident, ranking among the largest in U.S. history, necessitated a massive, multi-agency response"

"Emergency bypass through a dry section by DC Water and National Park Service to mitigate flow. Federal assistant from the EPA and FEMA following the emergency declarations, the flow was restored on March 14"

WHAT IF THIS HAPPENS TO YOUR UTILITY?

Story and Photos Credit: City of Detroit, Detroit, Michigan USA

"On February 17, 2025, a massive 54-inch water transmission main built in the 1930s ruptured at Beard and Rowan streets in Southwest Detroit. The catastrophic break and subsequent flooding forced over 150 families out of their homes, prompted boat and machinery rescues, and caused freezing damage across a 15-block radius"

"The Great Lakes Water Authority (GLWA) and the Detroit Water and Sewerage Department (DWSD) isolated the break and installed a new 15-ft segment of pipe by February 21. The break was blamed on an unprecedented weld failure in the aging steel pipe"

U.S. INFRASTRUCTURE – ASCE 2025 REPORT CARD – DRINKING WATER

Source: American Society of Civil Engineers (ASCE)

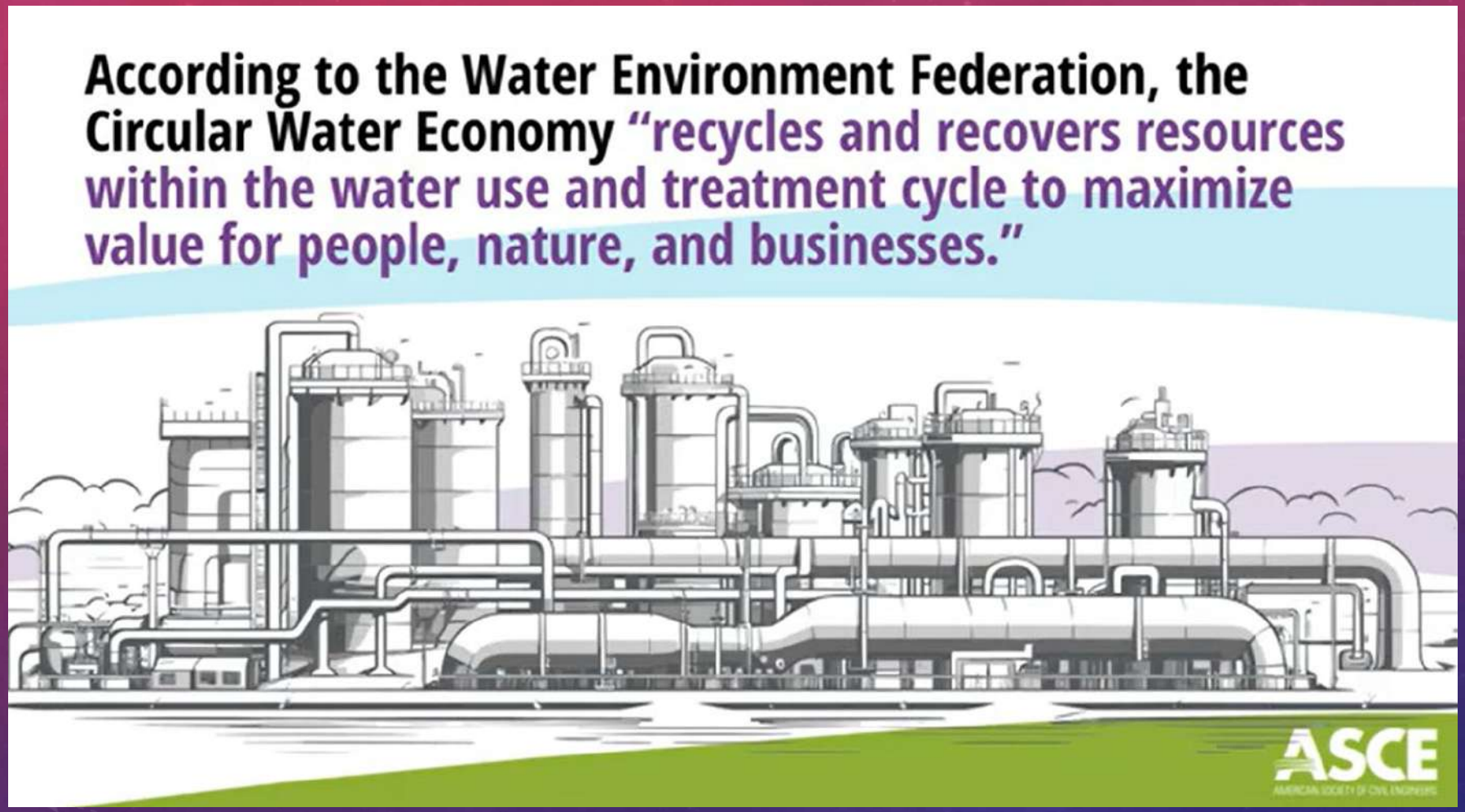
Average Infrastructure Life Span 75-100 Years

Challenges: Aging Infrastructure, Emerging Contaminants, Extreme Weather

Funding Shortfalls – EPA Predict $625 billion over 20 years

Reduce Reactive & Increase Proactive Replacements ~Suggest 65% Scheduled vs. 35% Reactive

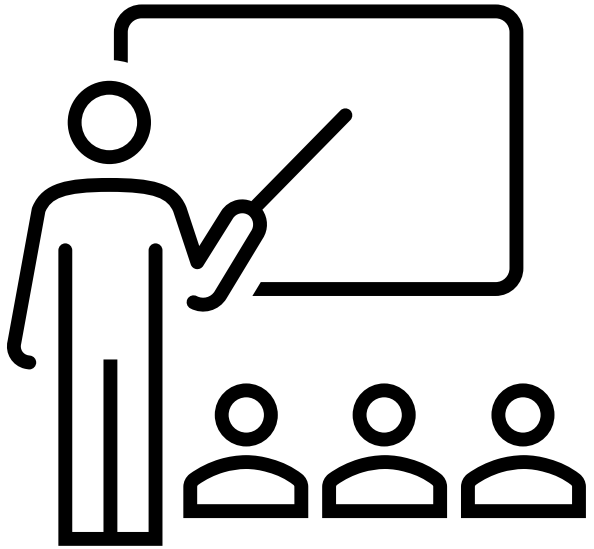
U.S. INFRASTRUCTURE – ASCE 2025 REPORT CARD – WASTEWATER



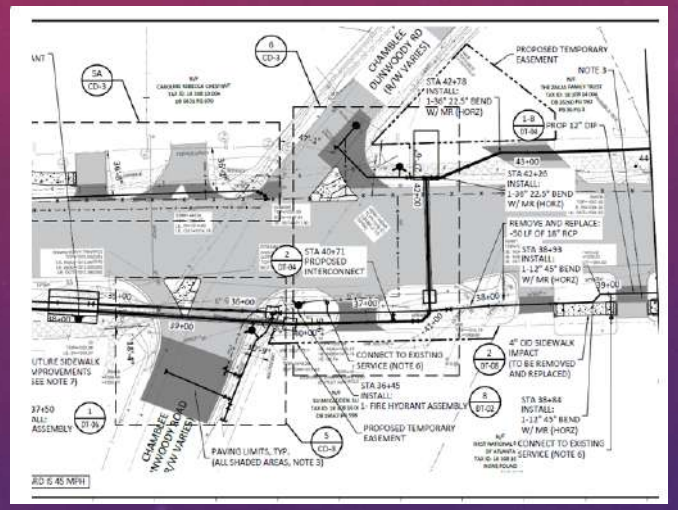
Source: American Society of Civil Engineers (ASCE)

- Most Wastewater Treatment Plants – Avg. Life Span 40-50 Years
- Collection Systems Failures Increases from 2 to 3.3/100 Miles of Pipe
- Funding Shortfalls – Only 30% of Infrastructure Capital Needs Are Being Met
- Maximize the Abilities of Existing Systems to Extend Performance

CASE STUDIES AND LESSONS LEARNED



JACK AND BORE TECHNOLOGY – DESIGN/CONSTRUCTION



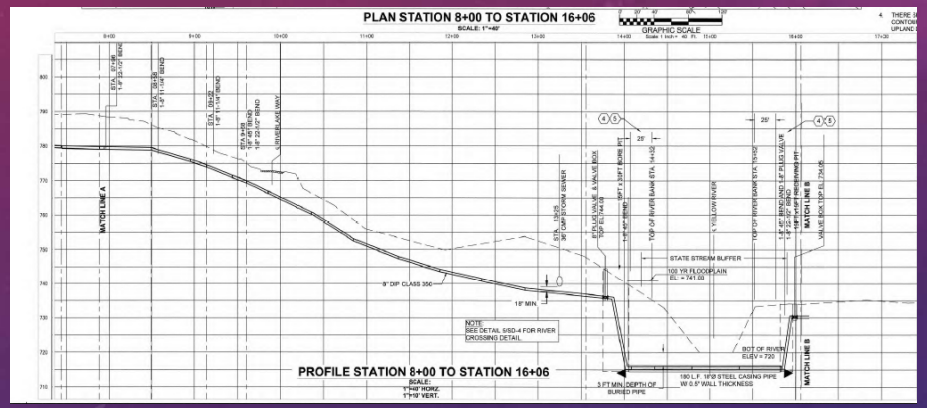
Photos: DeKalb County Peachtree Boulevard Water Main Replacement (EOR: Freese and Nichols; Contractor: Ruby Collins)

- Replacement of ~2.2 Miles of 1954 30 Inch Cast Steel Water Main with 36 Inch DIP
- Multiple Failures Over the Past 10 Years
- Main Large Transmission Mains Servicing the County (Population ~750K)

CHALLENGES & LESSONS LEARNED

- Major Highway – Georgia DOT Right-Of-Way
- Existing 30 Inch Must Remain in Service While Installing new 36 Inch
- Utility Congestion Area –Sewer/Storm/Gas Utility Locating is Key Before Excavation
- Protect Utilities from Damages – More Cost Effective than Repair
- Secure Contractor Before Finalizing Design When Possible

HORIZONTAL DIRECTIONAL DRILL (HDD) – DESIGN/CONSTRUCTION



HDPE Fusing

- Environmental Sensitive Crossing of Sewer Under Yellow River

CHALLENGES & LESSONS LEARNED

- River Crossing/Rock
- Acquire Qualified Contractor/Subcontractor to Avoid Re-Work
- Constructability Review During Design is Key
- Involve Construction Manager Early On

Photos: DeKalb County Norris Reserve River Crossing (EOR: Atkins, Contractor – Garney)

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PIPE BURSTING TECHNOLOGY - CONSTRUCTION

- Sewer Upsizing from 8 Inch to 16 Inch (3 Size Increase) via Pipe Bursting
- Design Build Project Delivery – Designer-Led Sewer Upsizing
- Shallow Depth – Ground Heave/ Landscape Areas

CHALLENGES & LESSONS LEARNED

- Ensure Contractor's Qualification
- Restoration in Well-Maintained Lanscaping Areas Challenges
- Early Engagement with Private Properties
- Tight Schedule Due to Consent Decree Deadline
- Number of Service Connection is Key in Selecting Pipe Bursting Technology

Photos: DeKalb County Consent Decree Package 1/2 (Design Builder Team: Brown and Caldwell/Ruby Collins)

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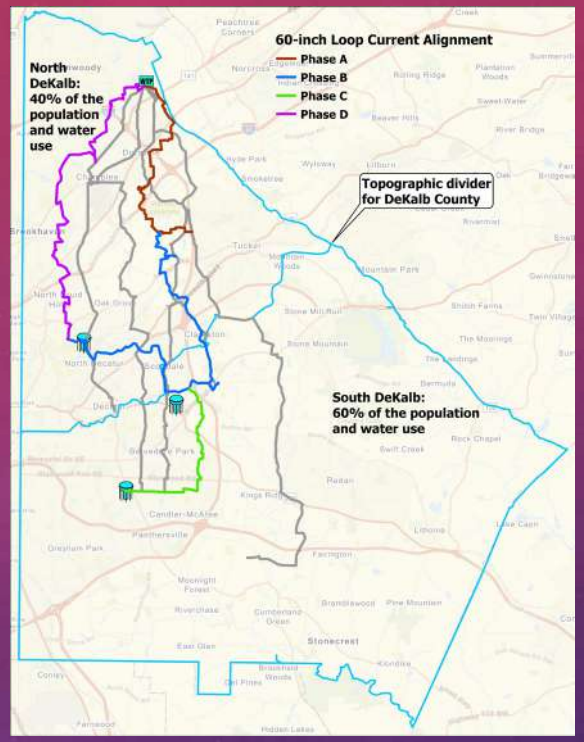
MICRO TUNNELING TECHNOLOGY – PLANNING/DESIGN

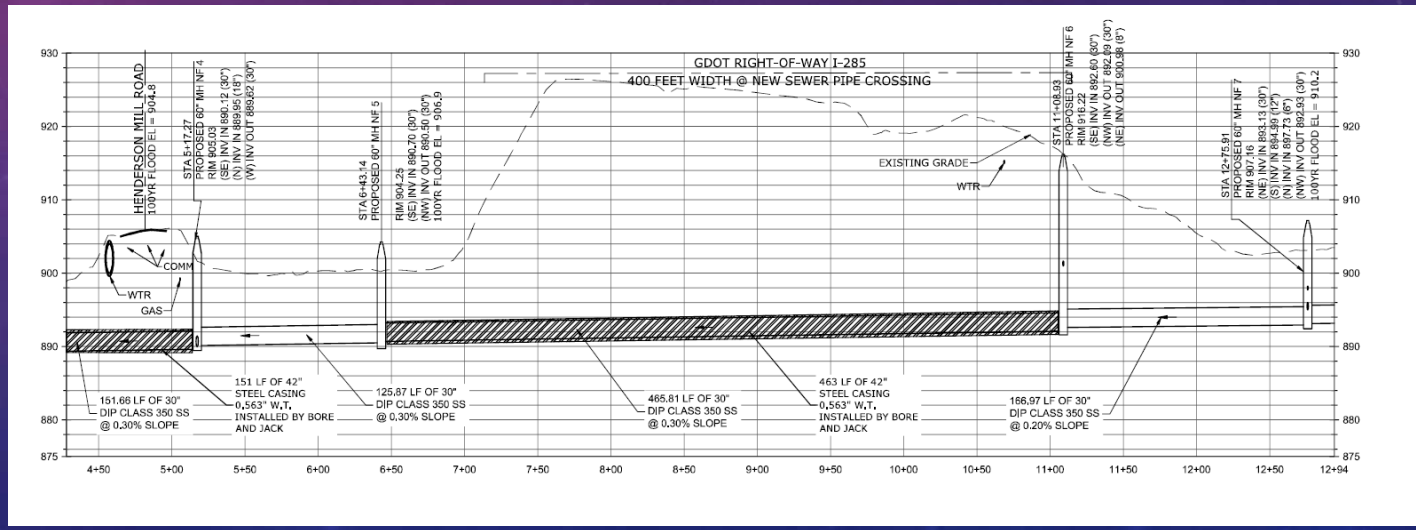
- 50 Miles of 60 Inch Transmission Main – Capacity for Future Growth, Redundancy & Resilience (Top Photos)
- ~8,000 LF of Sewer Upsizing to Accommodate Future Flow (Bottom Photo)
- Trenchless Chosen for Wetland & Creek Crossing/Interstate Crossing
- Bedrock Identified in the Area

CHALLENGES & LESSONS LEARNED

- Residential/Commercial/Industrial Land Uses
- Explore Different Trenchless Options During Design
- Access Roads in Heavily Vegetated Area
- Bypass Pumping in Flowing Creeks - Permits
- Stream/Wetland Mitigation – US Army Corps of Engineers



Photos: DeKalb County 60” Transmission Main Phase 1A Loop (EOR: Freese and Nichols)



Photos: DeKalb County Northfork Peachtree Creek Interceptor – I-285 (EOR: Arcadis/R2T)

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MICRO TUNNELING TECHNOLOGY - CONSTRUCTION

- Hand Tunneling ~ 320 LF of 24 Inch DIP – Pipe Encased in 66 Inch Tunnel Lining Plate
- Tunnel Boring Machine (TBM) ~2,600 LF of 24 Inch DIP Inside 66 Inch Casing Under Interstate 85

CHALLENGES & LESSONS LEARNED

- Deep Sewer in Urbanized Area – Routing /Technology Alternative
- Thorough Geotechnical Investigation Needed
- Early Community Engagement
- Early Coordination with Permitting Agency (Georgia DOT)
- Traffic Control – Minimize Road Closure

Photos: DeKalb County Consent Decree Package 7/4 (EOR: Arcadis, Contractor: Ruby Collins)

TRENCHLESS ASIA 2026 THAILAND

AUGER BORING/HAND-TUNNELING TECHNOLOGY - CONSTRUCTION

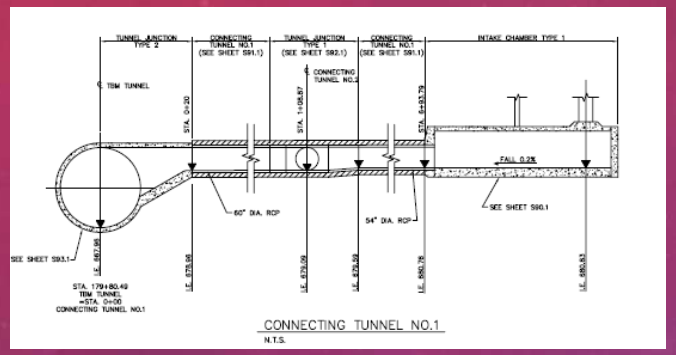
Photos: Gwinnett County Department of Water Resources – Gwinnett Place Mall Ph. 2 (CA Services: Hazen and Sawyer)

- 30-Inch Dia Gravity Sewer Extension Across Interstate
- Goal – Decommission Lift Station & Convert to Gravity
- 460 LF of Trenchless Across Interstate (17 Lanes of Traffic)
- Jack and Bore (Auger Bore) Converts to Hand-Tunnel (Rock Encounter)

CHALLENGES & LESSONS LEARNED

- Limit Geotech Info. (underneath Interstate)
- Rock Encounter – Prohibited Jack and Bore Operation – Convert to Hand-Tunneling (332 LF Hand Mining)
- 60 Inch Steel Casing & Hand Dig Out Debris
- The More Geotech During Design – Reduce Risks
- DO NOT specify Means & Methods for Contractors

TUNNELING TECHNOLOGY - CONSTRUCTION



Photos: City of Atlanta Department of Watershed Management: Nancy Creek Tunnel/West Side Reservoir

Nancy Creek Tunnel Pump Station – Discharge Pipes to Treatment Facility

Johnson Ferry Rd. Access Shaft with Odor Control Equipment

- Nancy Creek Tunnel – 16 Foot Diameter Sewage Conveyance in City of Atlanta
- 160 LF Below Grade from R.M. Clayton Water Reclamation Center ~8.3 Miles to DeKalb County
- 60 MGD, 8 Wastewater Intake, Pump Stations, Odor Control Systems
- TBM (18 Foot Dia), Lined with Concrete Liner
- 3 Years Construction (Completed 2005), Over $160M (Tunnel & Pump Station)

CHALLENGES & LESSONS LEARNED

- Get Conveyance Tunnel Flows Out Fast to Avoid Sediment Build Up
- Use Vent Shaft for Air Inflow/Outflow
- Ensure No Gap in Lined Vs. Unlined Segments – Avoid Maintenance Issue
- Emphasize Important of Geotech
- Performed Probe Drilling & Grouting Exploration Ahead of Tunnel Mining Operations
- Subsurface Easement – More Simple/Less Expensive

REHABILITATION TECHNOLOGY – CURED-IN-PLACE PIPE LINER – DESIGN/CONSTRUCTION

- Cured-In-Place Pipe (CIPP) Lining – Most Common Rehabilitation
- NSF61 Certified for Potable Water Main Lining
- 30 Inch of ~475 LF Water Main Lining Under Interstate 85 – Water Seeps through Highway – Lane Shut Down

CHALLENGES & LESSONS LEARNED

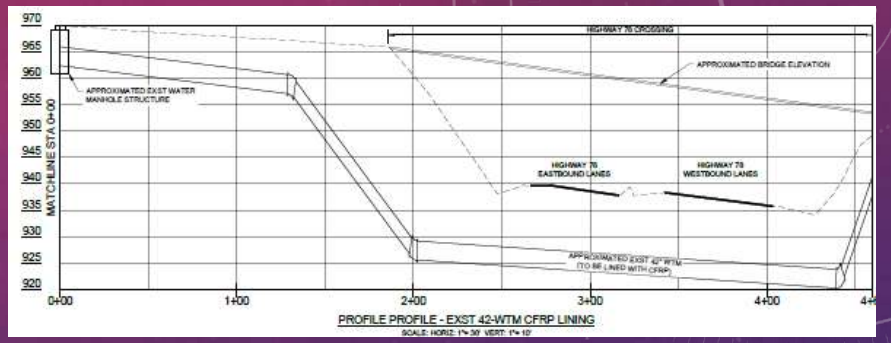
- CCTV to Confirm Service Laterals – Reconnect/Reinstate
- Ensure Host Pipe is Properly Clean/Clear – Jet/Vac
- Interstate Crossing – Staging Areas/Traffic Control
- Night Work to Avoid Disruption
- Post Installation Issue – Cracked Liner
  - Groundwater Presence (Hydrostatic Head)
  - Increase Liner Thickness/Additional Layer of Glass

Photos: DeKalb County Find and Fix Assessment/Rehab (CDPMT: Jacobs, CM: Benchmark: Contractor: Various)

Photos: DeKalb County Shallowford@I-85 Water Main Lining (Contractor: SAK) – Sekisui Nordi Tube

STRUCTURAL LINER AND SPIRAL WOUND TECHNOLOGY – DESIGN/CONSTRUCTION

- ~430 LF of 42 Inch Carbon Fiber Reinforced Polymer (CFRP) of PCCP Transmission Main Crossing Highway (Top Photos)
- Breaks of PCCP are Catastrophic - Replacement with DIP
- Trenchless Rehab of ~15 Miles Interceptor of 60 Inch RCP in Detroit, Michigan (Bottom Photos)



Photos: DeKalb County McLendon Dr. Transmission Main Replacement/Rehab (EOR: Tetra Tech)

CHALLENGES & LESSONS LEARNED

- Limited Right-of Way – Highway 78 Crossing with Steep Embankments/Utility Congestion
- CFRP Liner Design – Gravity Load & Internal Pressure
- Ensure Proper Testing – Bond Strength/Tensile Strength Testing per ASTM Standard
- Depth Challenge – High Strength Cellular Grout to Fill Annular Space
- Temp Control Due to Extreme Cold Weather
- If Combined Sewer – Temp Bypass Needed to Lower Flow where Otherwise Live Flow

Photos: Macomb Interceptor Drain Drainage District, Detroit MI (Sekisui Spiral Wound PVC, Contractor: Ruby Collins)

BEST PRACTICES ACROSS ALL TECHNOLOGIES

PLANNING/DESIGN PHASE

- **DESIGN-PHASE INTELLIGENCE**
  - Invest in Geotech, SUE, Survey to reduce risks
- **CONTRACT CLARITY**
  - Determine Project Delivery
  - Secured qualified consultants/contractors
- **PROACTIVE PUBLIC OUTREACH**
  - Start at Planning
- **EARLY PERMITTING COORDINATIO**
- **EARLY EASEMENT ACQUISITION**
  - @60% Design
- **DO NOT SPECIFY MEANS AND METHODS**

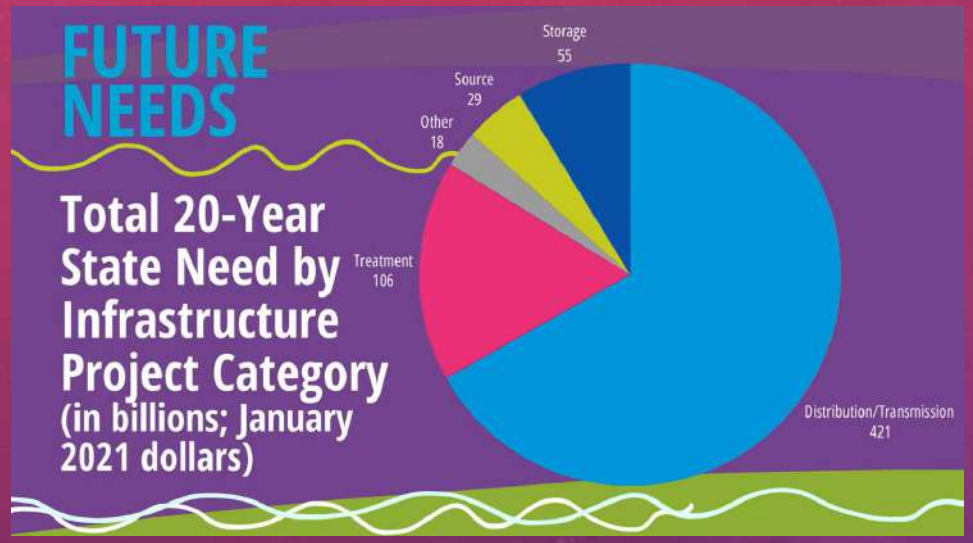
CONSTRUCTION PHASE

- **PRE-INSTALLATION**
  - Inspect Host-Pipe/Lateral Tie in
- **PROPER TRAFFIC CONTROL**
- **ENSURE QA/QC**
  - Liner Manufacturers/Wet Out Log
  - Optimize Operational Staging
- **PROPER BY-PASS PUMP SET UP**
- **PROTECT OTHER UTILITIES**
  - Locate and Mark
- **INSPECTOR/CM ON SITE**
- **SAME ALIGNMENT BENEFIT**
  - Existing Easement
  - Utility Conflict

POST CONSTRUCTION/EVALUATION PHASE

- **POST INSTALLATION TEST**
  - Ensure Proper Testing e.g. Tensile/Bond Strength
- **REINSPECTION PLAN**
  - Set Interval e.g. CCTV Re-Inspect
- **WARRANTY PERIO**
- **COST-BENEFIT EVALUATION**
  - Higher Cost for Trenchless Outweighs Benefit
  - Life Cycle Cost Evaluation
- **DOCUMENT LESSONS LEARNED FOR FURURE PROJECTS**

WHAT'S NEXT? BRIDGING THE GAP &RESILIENCE



Source: American Society of Civil Engineers (ASCE)

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- Design for Extreme Weather/ Natural Disaster
- Perform System Risk & Resilience Assessment
- Federal/ State Investment /Funding
- Continue to Act/ Snapback
- Implement Best Practices & Industry Standard
- Implement Digital Tools/Data-Driven/AI

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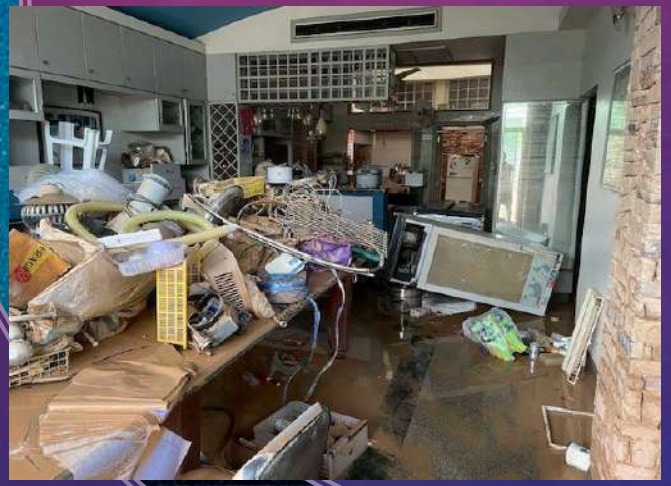
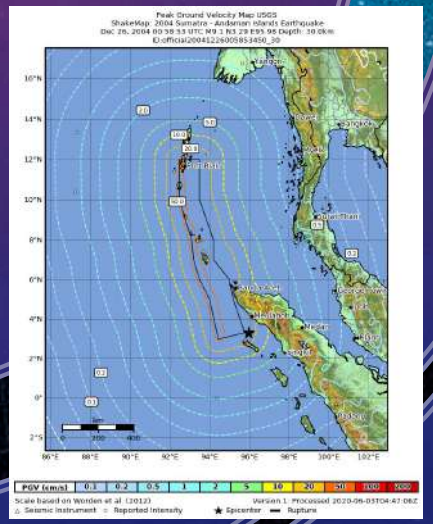
START TODAY!

Photos: Indian Ocean Tsunami, December 2004





Photos: Hatyai, Songkhla Thailand Flooding, November 2025

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SPECIAL THANKS

- DeKalb County Department of Watershed Management, Georgia, USA
- City of Atlanta Department of Watershed Management, Georgia, USA
- Gwinnett County Department of Water Resources, Georgia, USA
- Malcomb Drainage District, Detroit, Michigan
- American Society of Civil Engineers (ASCE)
- Prof. Samuel Ariaratnam
- Westrade Group Ltd|Trenchless Works

Photos: Alia's Family

THANK YOU!

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