



PROVEN TECHNOLOGIES, NEW WAYS OF THINKING

City of Arlington
Water Utilities Department

Rethinking Renewal Prioritization



- Age rarely correlates with condition (Water Research Foundation)
- 70% to 90% of replaced pipelines have remaining life (US EPA)
- “New” technology may be proven technology
- Failure of large mains cause biggest impact

Rethinking Renewal Prioritization



- Move beyond age, material and failure focus
- Assess actual pipe condition
- Savings from focused pipe replacement fund transition to proactive replacement

Goals



- Maximizing useful life of assets
- Efficient spending of replacement dollars
- Avoid major unplanned repairs
- Make better design decisions for new mains



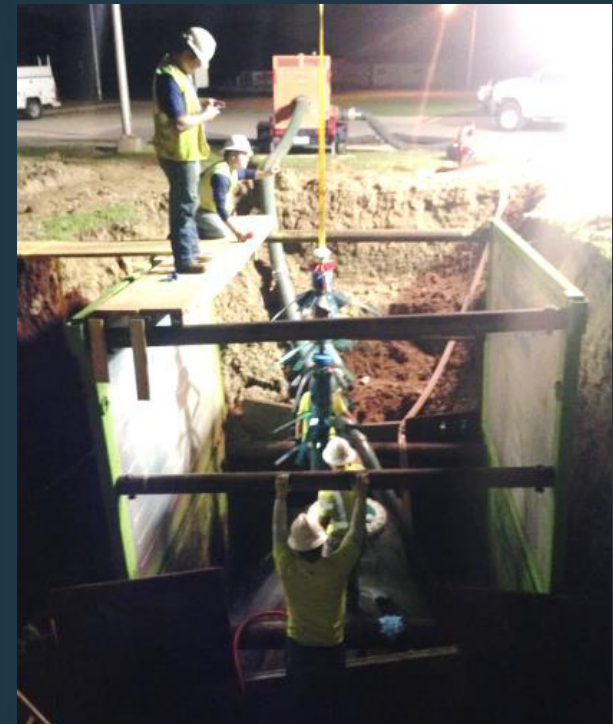
CONCRETE WATER MAIN CONDITION ASSESSMENT PROGRAM

Case Study

Green Oaks Water Transmission Main 2016 Condition Assessment



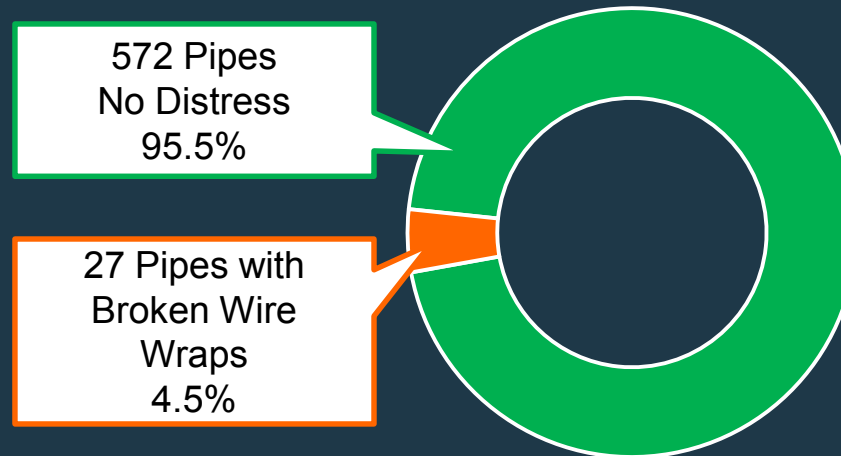
- 2.6 miles, 42", 48" & 54", Prestressed Concrete Cylinder Pipe (C301), 1982
- Estimated Replacement Cost \$10,500,000
- Assessment Cost \$286,500



Green Oaks Water Transmission Main 2016 Condition Assessment



- Assessment Results
 - 599 pipe segments
 - 27 segments with wire breaks (4.5%)
 - 6 segments with 25+ wire breaks (1.0%)
 - Cost avoidance of \$7,000,000





LARGE DIAMETER SANITARY SEWER CONDITION ASSESSMENT PROGRAM

City of Arlington and
University of Texas at Arlington
Collaboration

66-Inch Sanitary Sewer Failure



- Installed in 1983
- 66-inch RCP Sanitary Sewer
- Repair Cost \$138,000



Project Scope

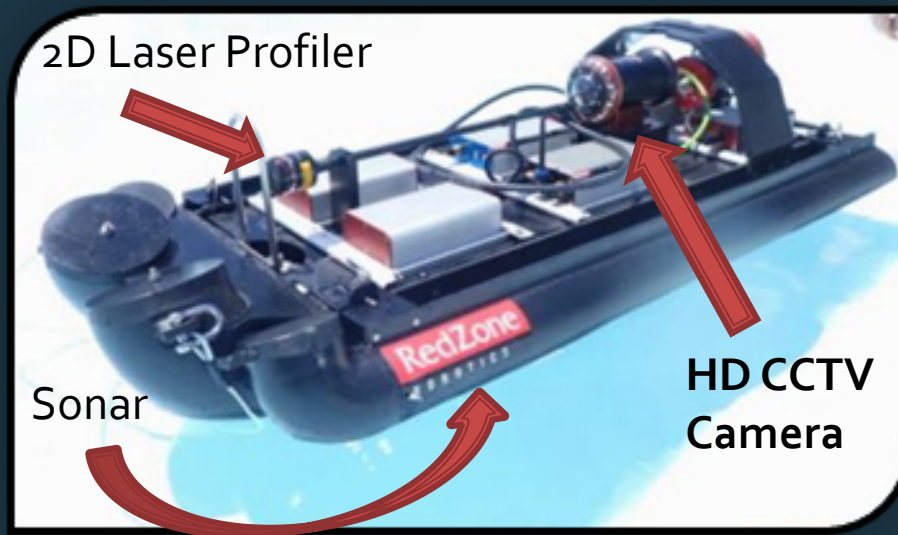


- Inspect 48 miles of 24-inch & larger
- COA / UTA partnership
Data analysis (UTA)
 - Pre-Inspection Research (COA)
 - HD CCTV, Sonar and Laser Inspection (COA/UTA)
 - Program Management & CIP Development (COA)
 - Laboratory Materials Testing (UTA)
 - Report Summarizing Findings (UTA)
 - Risk Based Assessment (COA)



Inspection Equipment

- Multi-Sensor Inspection Platform
- HD CCTV Camera
- Laser Ring Profiler
- Sonar



Inspection Process



Inspection Process



Inspection Process



Inspection Process



- Manhole Dangers...
 - Too Much H₂S
 - Presence of Flammable Gases
 - Lack of Oxygen
 - Presence of Carbon Monoxide
 - Heavy Flow



Inspection Process



Inspection Process



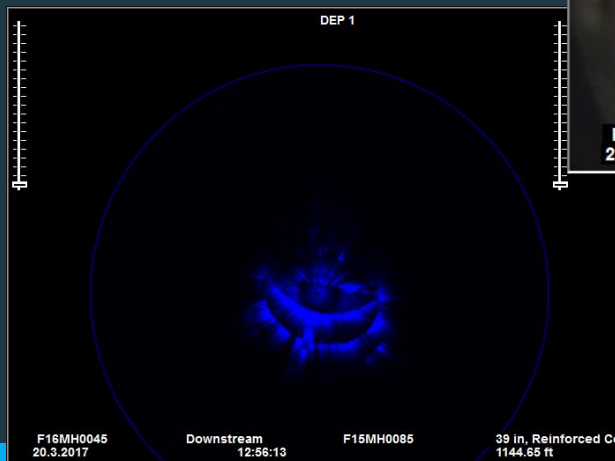
Inspection Process



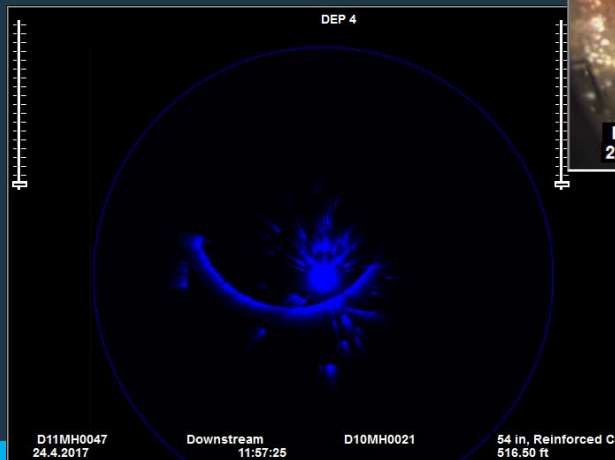
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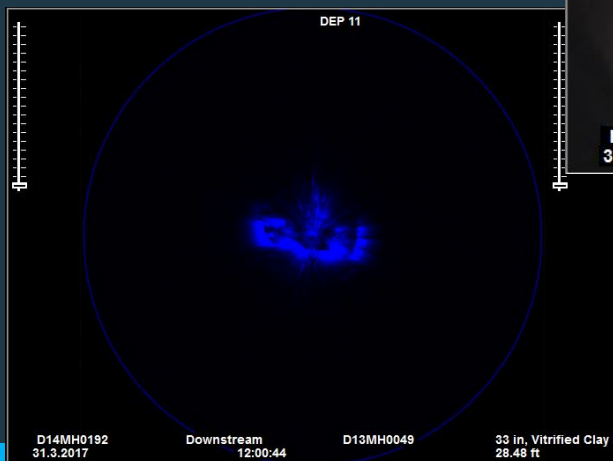
Collected Data - PVC



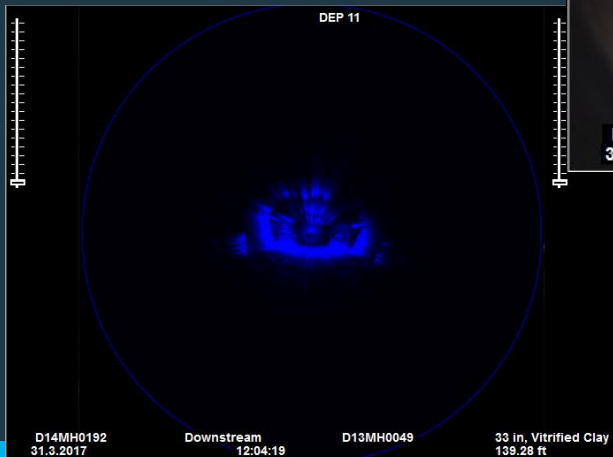
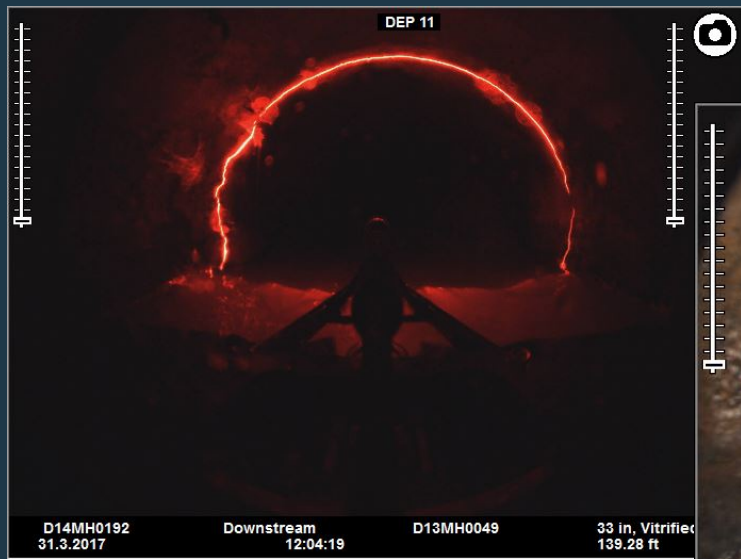
Collected Data - RCP



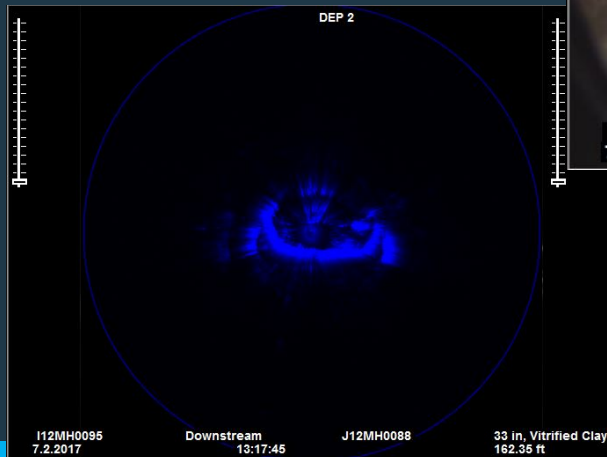
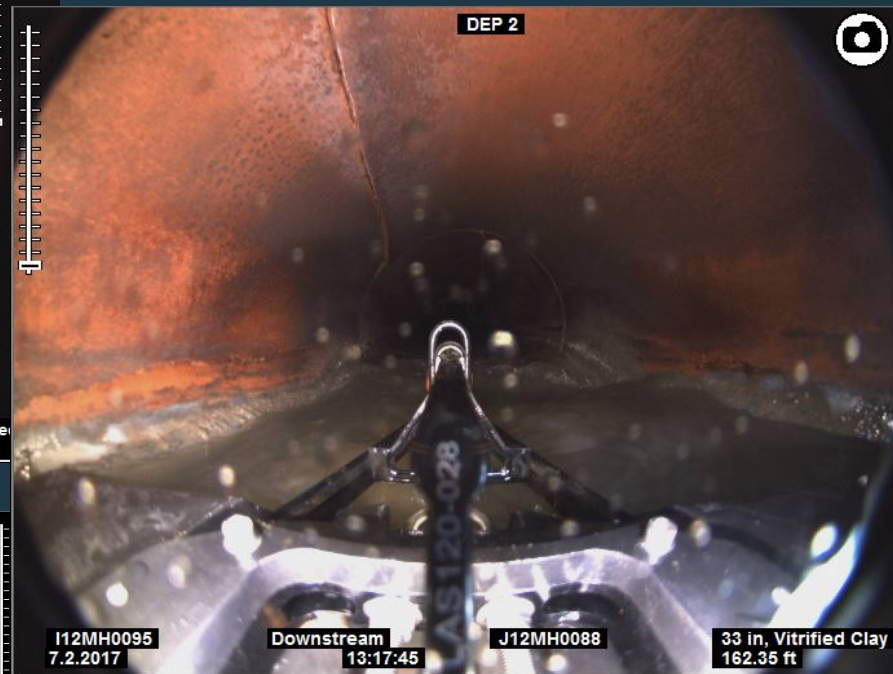
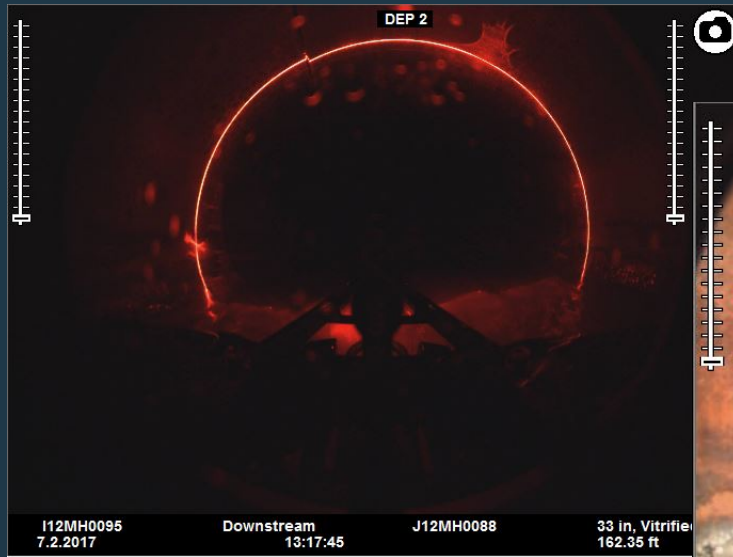
Collected Data - DIP



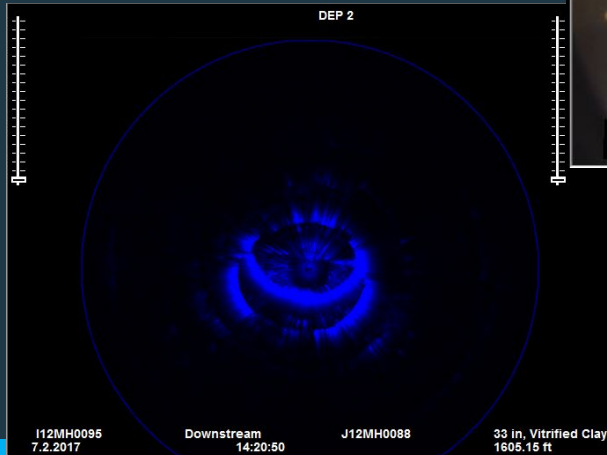
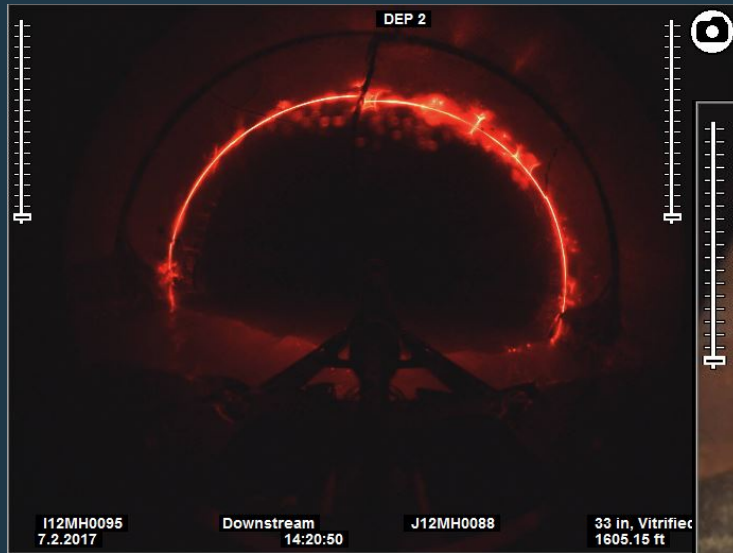
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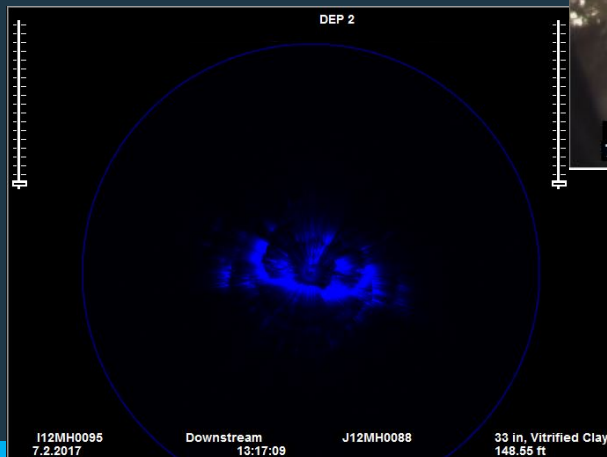
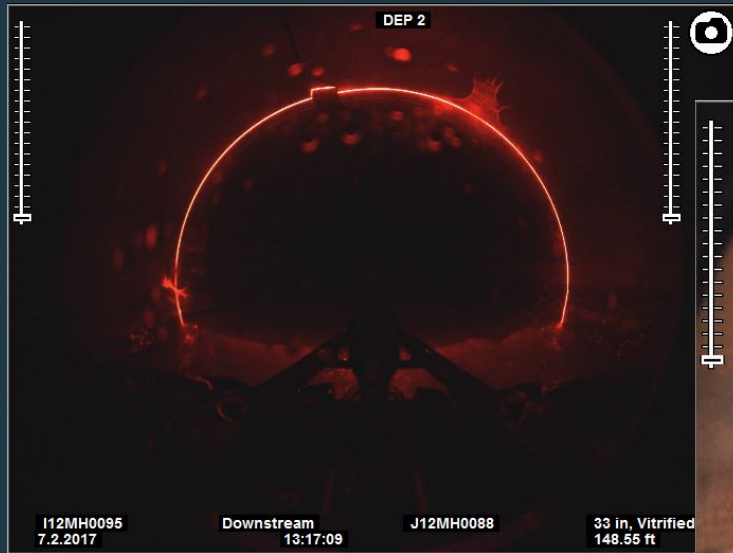
Collected Data – VCP



Collected Data – VCP



Collected Data – VCP



UTA Research Enhancements



- Validated life cycle analysis
- Core sample confirmation
- Customized output
- Partnering with a nationally recognized pipe research institution

ASSESSMENT OF PIPELINE SYSTEM IN THE CITY OF ARLINGTON

TECHNICAL REPORT

Principal Investigator
Professor Ali Abolmaali

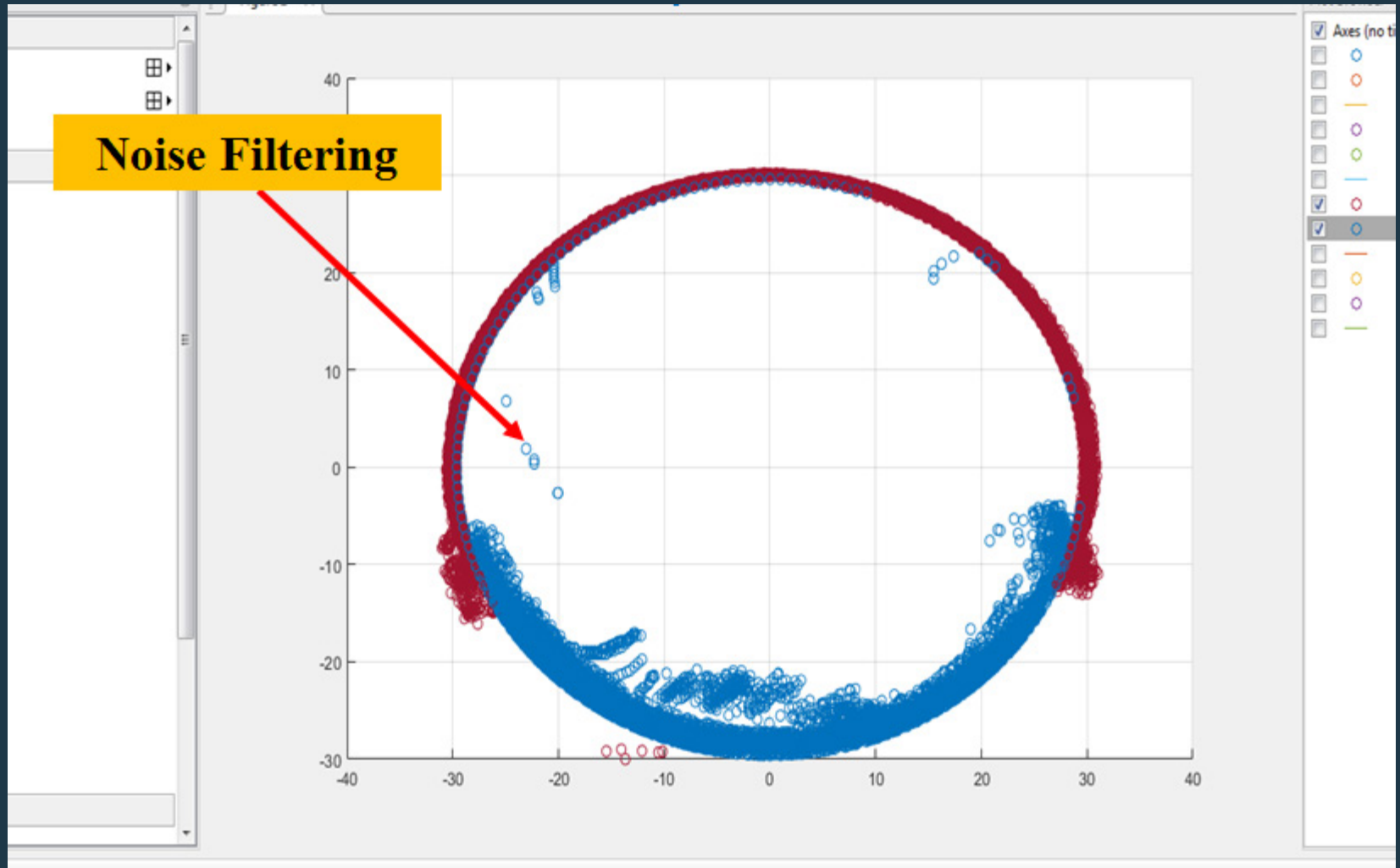
Co - Principal Investigator
Mohammed Al Asadi, Ph.D. Candidate



University of Texas at Arlington

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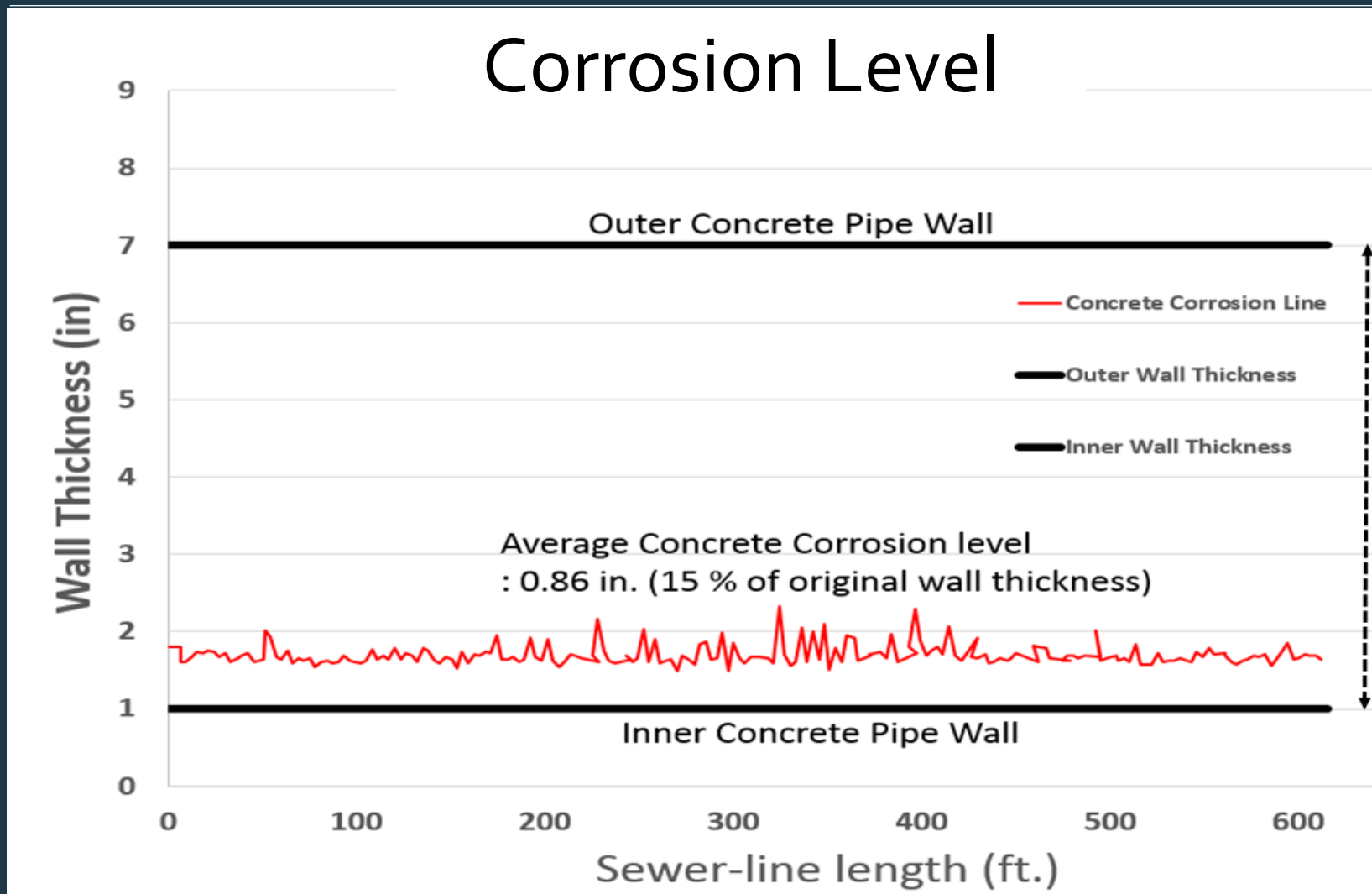
UTA Research Enhancements



UTA Research Enhancements



Corrosion Level





MANHOLE CORROSION PROTECTION NEEDS ASSESSMENT

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Collaboration

Manhole Corrosion Protection Needs Assessment



- Measure multiple liquid & gas phase parameters and manhole corrosion rates
- Determine conditions requiring corrosion protection
- Cost-benefit analysis of available corrosion protection options
- Recommend pipe slopes to reduce H₂S generation & H₂S release





PUTTING TECHNOLOGY TO WORK

Trenchless technology
Advanced Metering Infrastructure
Leak detection
Ozone upgrades

Trenchless water main replacement



- Pipe-bursting replaces break-prone mains with HDPE pipes. Fused pipes are jointless and have zero allowance for water loss.
- Shorter project duration, less impact on residents
- 35 % less expensive than traditional open cut methods
- 13,125-feet of pipe bursting projects in 2016
- In April 2017, AWU operations crews began learning pipe-bursting process. Demonstration project saved the city \$125,000 replacing 800 feet of water main.



Increasing efficiency, controlling costs



- Full time proactive leak detection program since 2014. Uses advanced sensors and software to determine where underground main leaks are before crews start digging.



- 47,000 AMI meters installed (30,000 with in-house labor)
- \$14 million equipment upgrade at two treatment plants. Replacing ozone generators and installing advanced control systems will make the plants more efficient and less costly to run.





AWU BOLDLY GOING WHERE NO UTILITY HAS GONE BEFORE

