

Replacement of a Large Diameter Transmission Pipeline Using Slip Lining

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Agenda

- Pipeline History
- Discovery of Issue
- Possible Solutions
- Design Coordination
- Installation Challenges
- Take Aways



Issue

- Potential leaks under I-215 discovered
- Existing 36-inch diameter MLCP pipe
- Discovered by District Asset Management
- Discovered using Echo Logics equipment
- Section immediately isolated via existing valves
- Inspected via CCTV

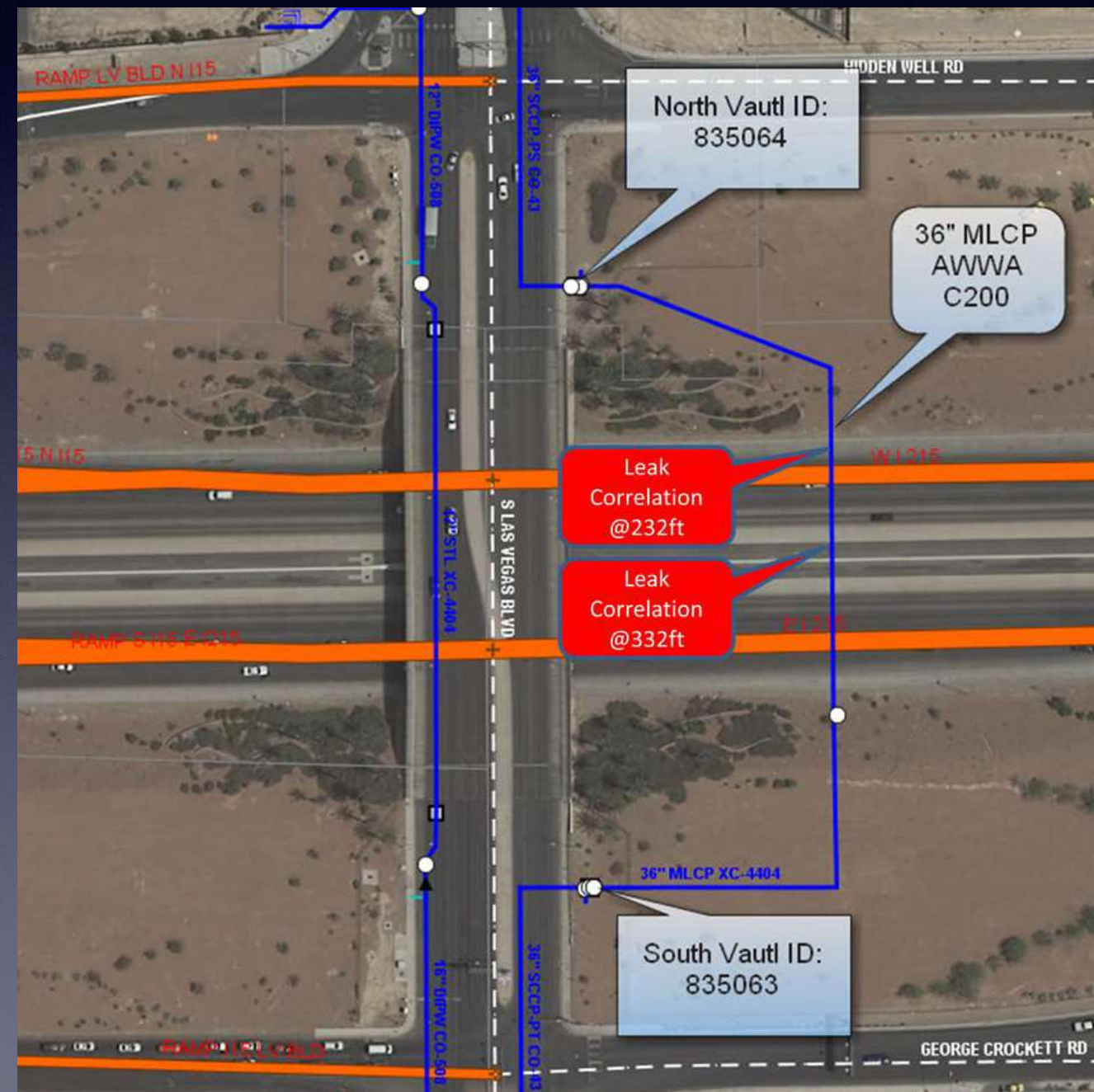


Pipeline History

- Originally located in Las Vegas Boulevard (constructed in 1962 C43)
- Relocated in 1993 to allow for construction of I-215
- Constructed under County Beltway Project – Airport Connector Utility Relocation
 - Limited LVVWD inspection during construction

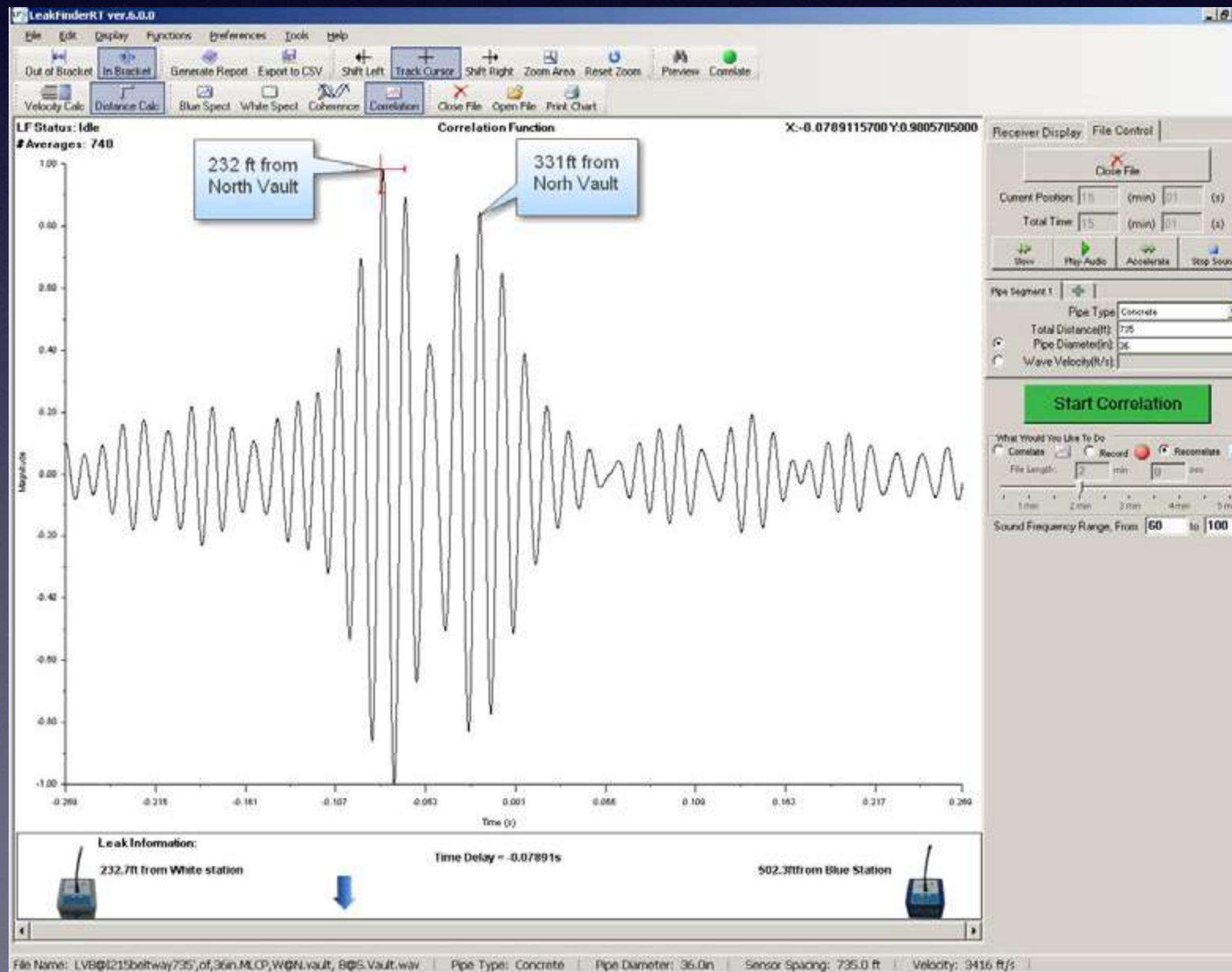
Issue

- Potential Leaks under I-215 Discovered
 - Discovered while trying to isolate a leak in a different location.
 - Background noise was such that known leak could not be isolated.



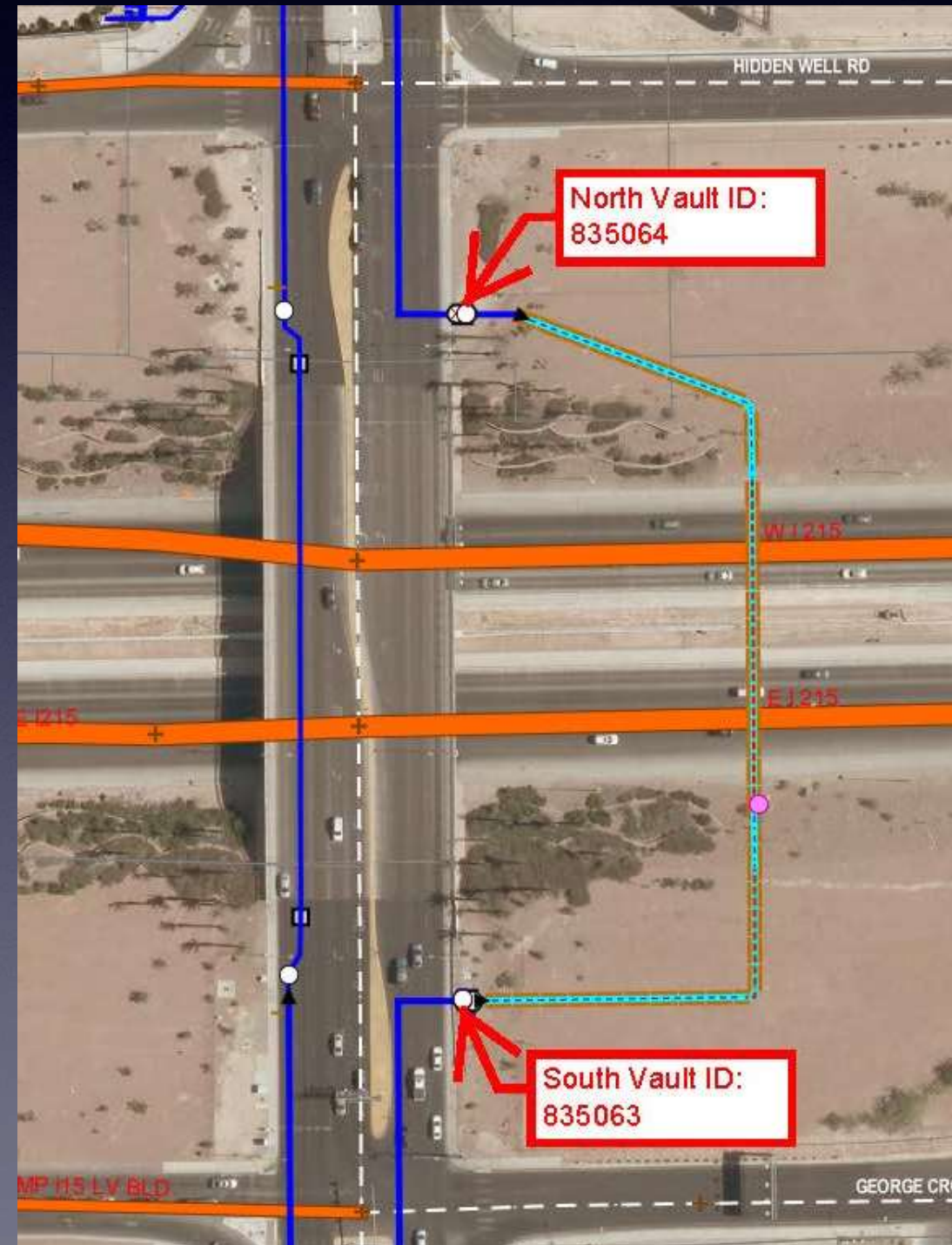
Issue

- Echo Logics Attenuation Data



Issue

- Section immediately isolated via existing valves
- Inspected via CCTV



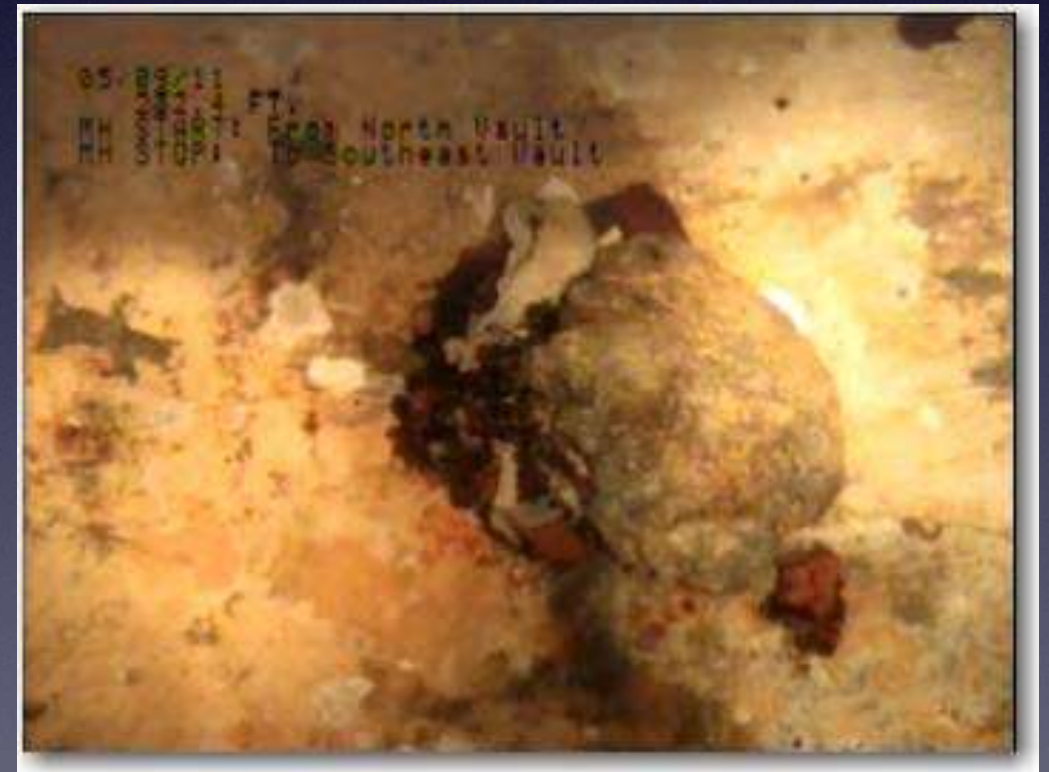
Inspection Results

- Closed circuit TV was used to attempt to identify source of leaks.
- May be able to identify leaks and do spot repairs on the line.



Inspection Results

- Video indicated potential corrosion issues



Inspection Results

- Video indicated blocked blow-off



Inspection Results

- No definitive leak location was discovered from video allowing a local repair
- Review of construction reports indicated potential weld issues
 - Daily reports indicated that welder was working hours in excess of 12 hours per day and that there were quality issues with some welds.

Possible Solutions

- Local Repair
 - Numerous areas of corrosion were determined
 - Unclear which, if any area was cause of leak
- New MLCP Installation
 - Requires new casing installation
- Cured In-Place Pipe
 - No previous installation with Class IV liner at this diameter of potable water pipeline

Possible Solutions

- Slip Lining
 - Able to reduce diameter to 30 inches
 - Eliminated restrained ductile and PVC
 - Restrained Joints are in excess of 36 inches in diameter
 - HDPE eliminated due to 30-inch minimum
 - 36" DR11 (160PSI) ID 29.062" OD 35.608"
 - Fusible PVC most viable option
 - 30" DR25 (165 psi) ID 29.29" OD 32"

Design Coordination

- Clark County Department of Aviation owns land
- NDOT operates and maintains I-215
- Pipe Manufacturer
 - Design Considerations
 - Pit Locations
 - Fusing Location



Design Coordination

- In Pit vs. Above-Grade Fusing
 - Length of Pipe Segments Based on Site Geometry
 - 10-Foot Segments Fused in Pit
 - 40-Foot Segments Fused Above Grade



Design Coordination

- In Pit vs. Above-Grade Fusing
 - 40-Foot Lengths of Pipe



Installation Challenges

- New Technology for Contractors



Installation Challenges

- Site Geometry and Pipe Profile
 - Numerous bends that could not be sliplined
 - Require insertion pits



Installation Challenges

- Site Geometry and Pipe Profile
 - Numerous angle points that could not be sliplined
 - Require insertion pits



Installation Challenges

- Proximity of I-215
- Steep Side Slopes



Take Aways

- Echologics and video inspection valuable tools
- Pit excavations can be large
- Sliplining viable option when jack and bore or open cut methods are impracticable
 - Reduction in pipe diameter must be acceptable



Take Aways

- Short Construction Duration For Slip Lining
 - 150 Days Total Contract
 - 108 Days of Field Activities
 - 37 Days of Pipe installation
- Less Expensive than Installing New Casing with MLCP
 - New Casing Approximately \$750,000
 - Slip Lining \$500,000
- Use of Standard Ductile Fitting
 - Easy connections to existing steel pipe
 - Easy installation of appurtenances (i.e. blow-off)

Questions