Bringing Innovation into the Smart City

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TEXAS ASSOCIATION OF CLEAN WATER AGENCIES
TACWA
A CLEAR COMMITMENT TO TEXAS WATERS

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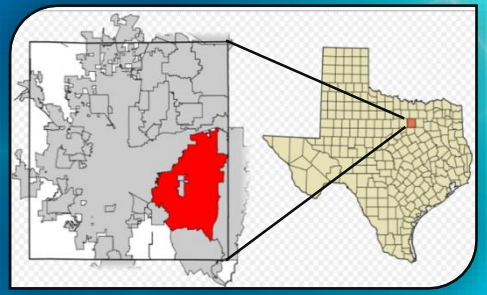
The City Of Arlington

- Centered in Dallas/Fort Worth metropolitan area
- Population over 370,000 (7th Largest in Texas)
- Daily Water Demands 35 MGD to 105 MGD
- Rated Water Production Capacity of 172.5 MGD
- 1,425 Miles of Public Water Main
- 1,222 Miles of Public Sewer Main
- Home to:
  - Texas Rangers and Dallas Cowboys
  - The University of Texas at Arlington
  - General Motors
  - Six Flags & Hurricane Harbor



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Arlington Water AM Utility Goals

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

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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

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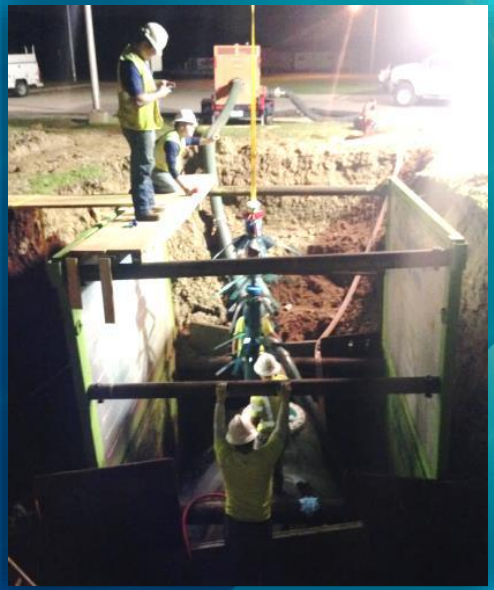
Water Main Condition Assessment

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



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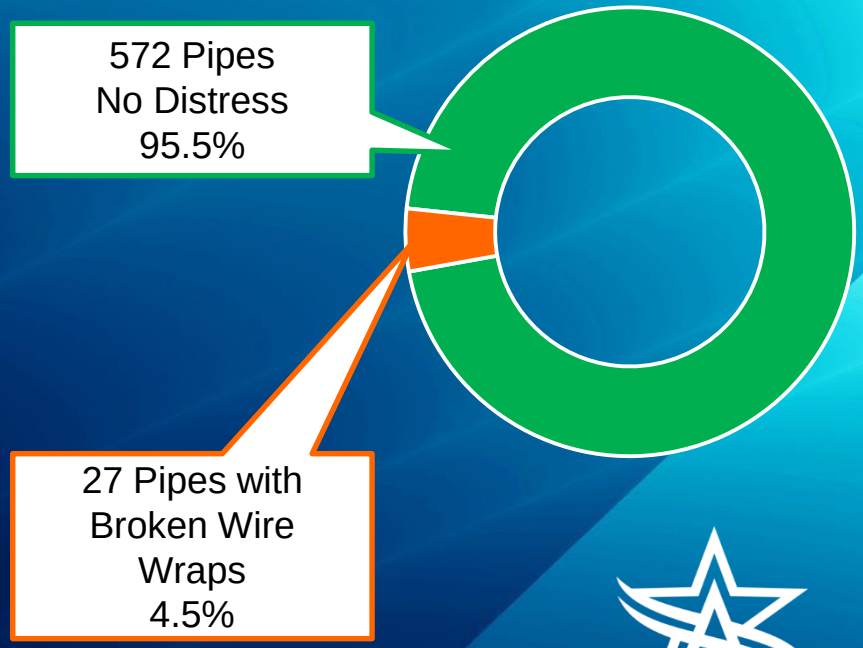
Water Main Condition Assessment

- 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



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Large Sewer Main Failure

- 35 Year old Main
- 66-inch RCP Sanitary Sewer
- 50% of the City's Flow

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Large Diameter Sanitary Sewer Assessment Program

City of Arlington, Redzone, and University of Texas at Arlington Collaboration

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Inspection Project Scope

- Inspect 47 miles of 24-inch to 72-inch Sanitary Sewer Main
  - Pre-Inspection Research
  - HD CCTV, Sonar and Laser Inspection
  - Data Analysis and Report Summarizing Findings
  - Laboratory Materials Testing
  - CIP Development/Risk Based Assessment

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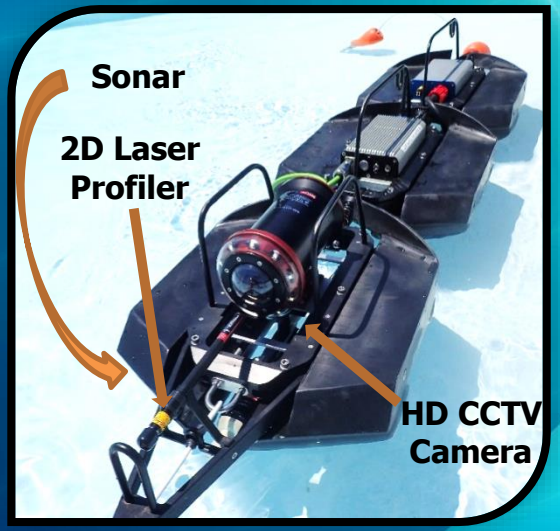
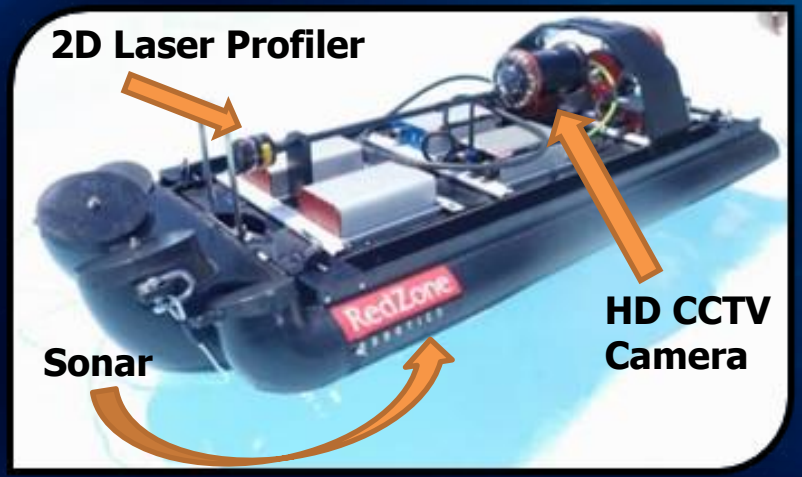
MSI Inspection Equipment

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





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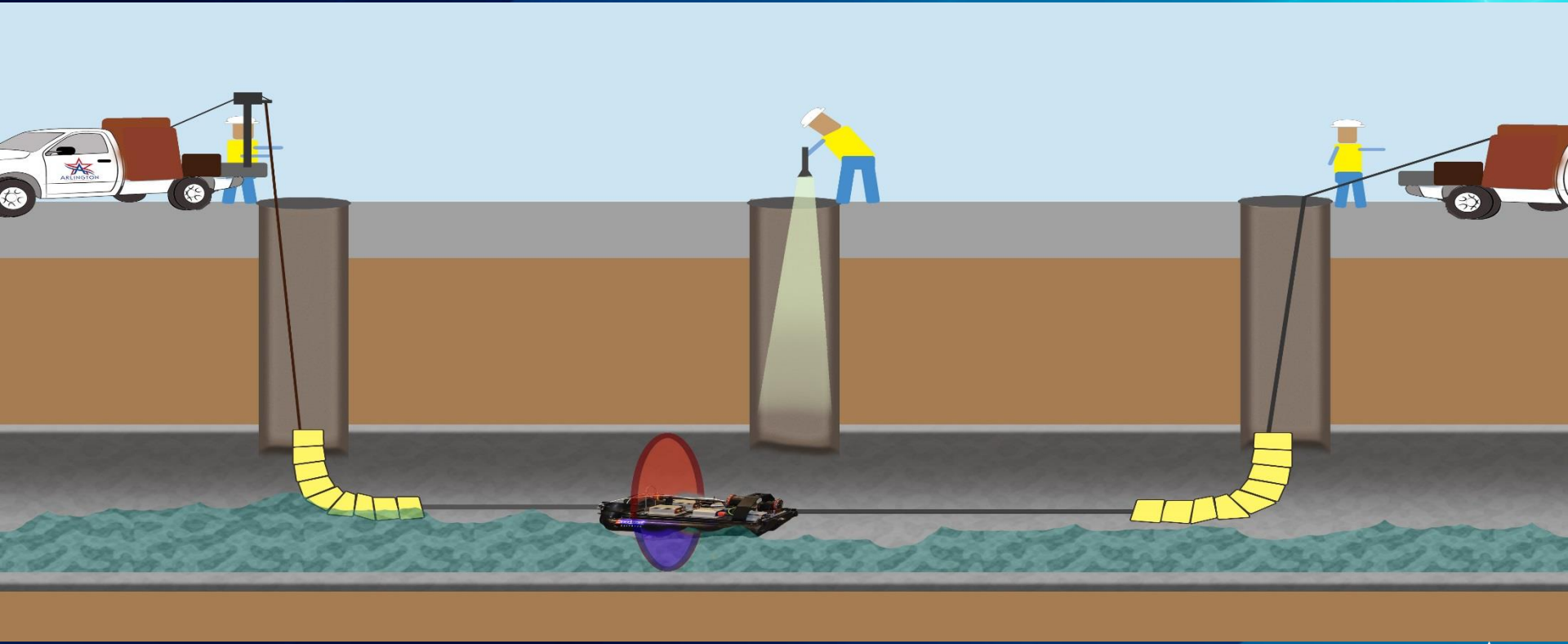
Inspection Process



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Inspection Process

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Inspection Process

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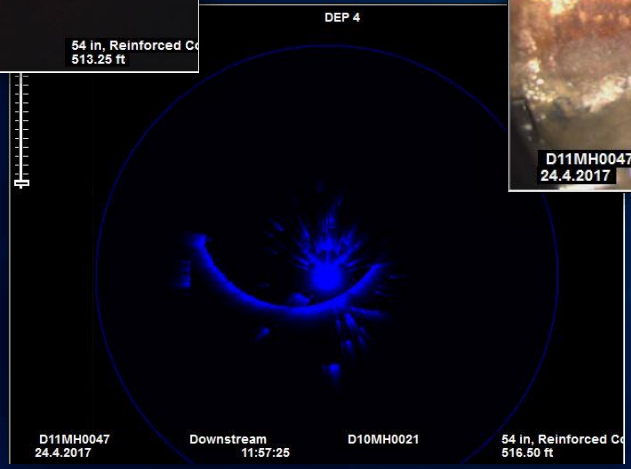
Raw Data (Good Condition)



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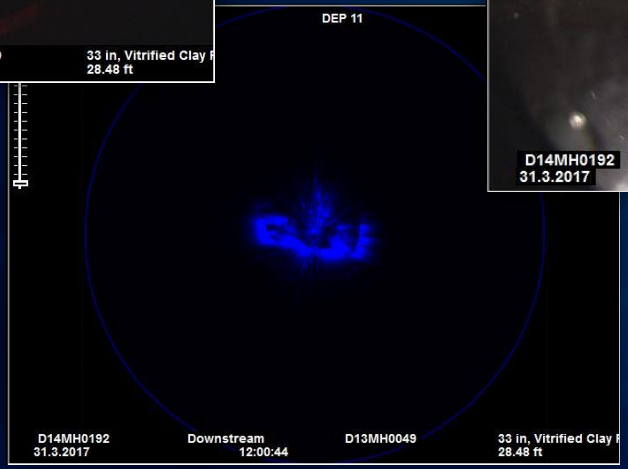
Raw Data (Bad Condition)



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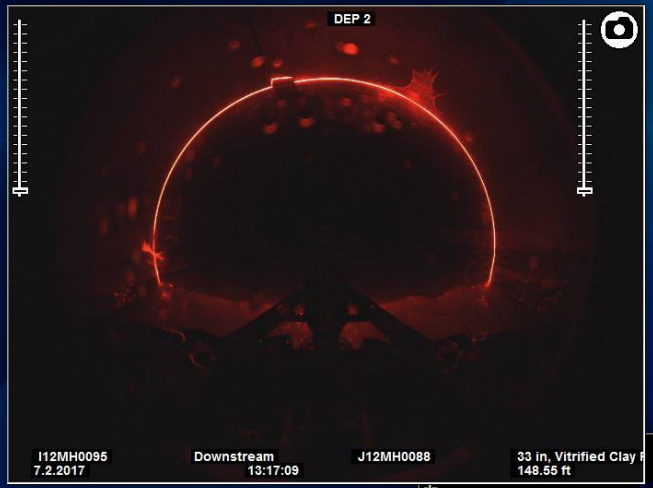

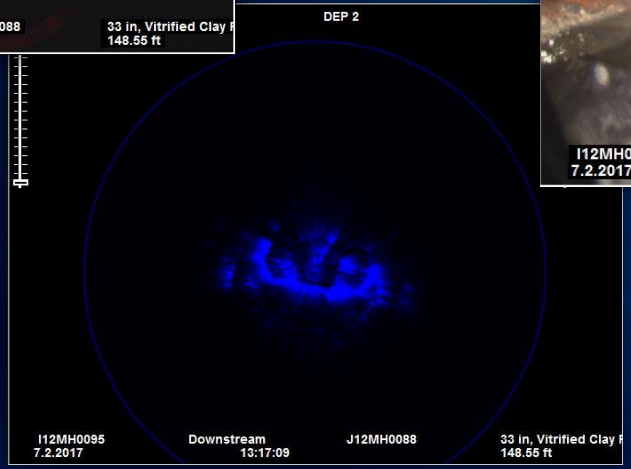

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Results We Can Act On

Debris and Deposit Blockage

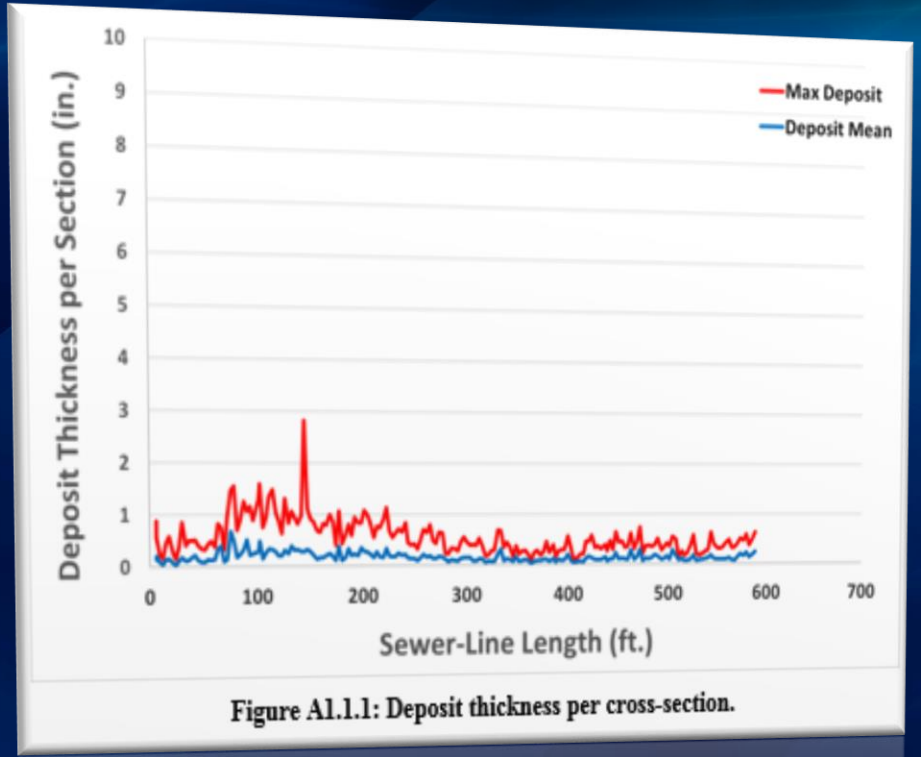


Figure A1.1.1: Deposit thickness per cross-section.

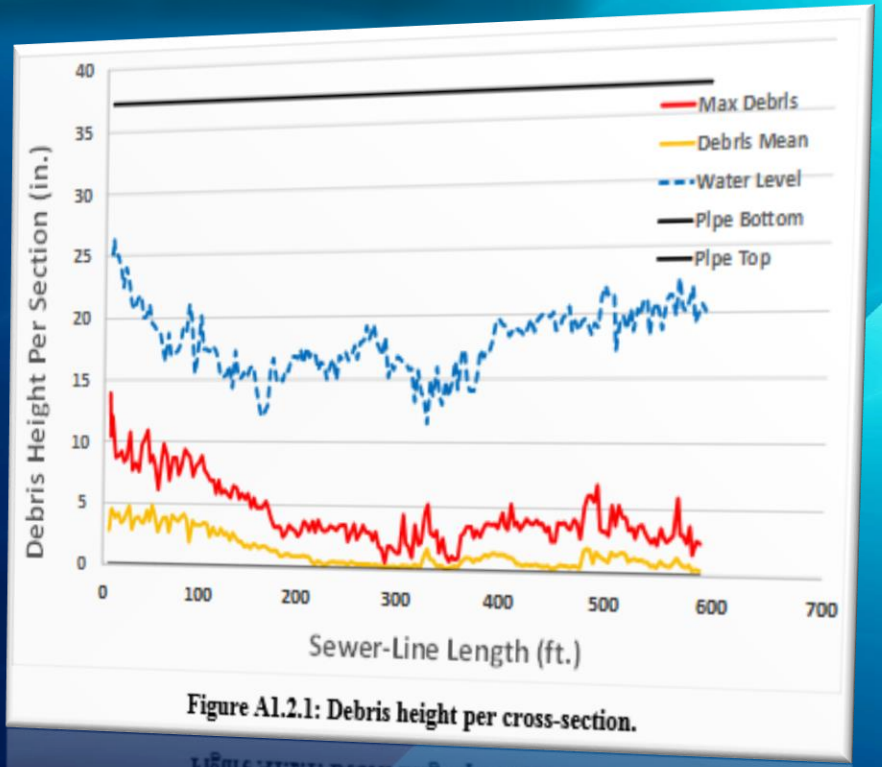


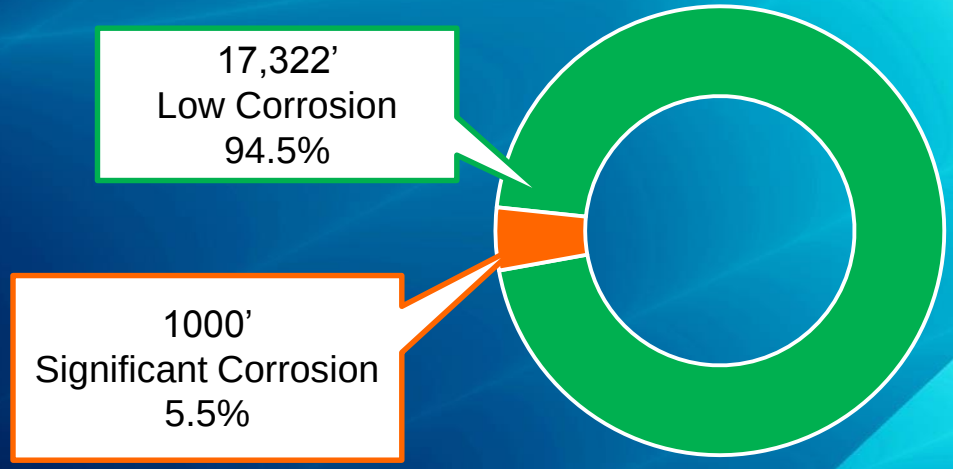
Figure A1.2.1: Debris height per cross-section.

Results We Can Act On

Asset Number	Upstream Manhole	Downstream Manhole	Inspection Number	Inspection Direction	GIS Material	Observed Material	GIS Pipe Length (ft.)	Observed Pipe Length (ft.)	GIS Diameter (in.)	Observed Pipe Diameter (in.)	Distance Inspectable (ft.)	Total Fractures Multiple	Total Fractures Hinge	Total Fractures Longitudinal	Total Fractures Circumferential	Broken	Deformed Rigid	Joint Offsets	Total Roots Occurrences	Collapsed Pipe	Level 5 Defects	Level 4 Defects	Level 3 Defects	Level 2 Defects	Level 1 Defects	Total Defects	Total Defect Score per Foot of Pipe	Number of Defects per Foot of Pipe	Total Pipe Deposits Volume (in^3)	Maximum Pipe Deposit Thickness (in)	Mean Pipe Deposit (in)	Total Pipe Debris Volume (ft^3)	Total Debris Volume (ft3) per Foot of Pipe	Maximum Pipe Debris Height (in.)	Mean Pipe Debris Height (in)	Maximum Pipe Blockage (%)	Mean Pipe Blockage (%)	Maximum Pipe Erosion (in)	Mean Pipe Erosion (in)
D09SL0101	D09MH0047	D09MH0048	2	DOWNSTREAM	VCP	VCP	376	353.4	36	36	353.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	4232	0.9	0.3	6.6	0.0187	4.9	1.2	6.8	0.78	0.5	0.2
D09SL0105	D09MH0045	D09MH0108	2	DOWNSTREAM	VCP	DI	592	590.8	36	36	590.85	0	0	0	0	0	0	0	0	0	0	2	2	14	0	18	0.623	0.030	15295.6	1.8	0.6	41.4	0.0701	11.7	6.2	37.1	0.40	1.4	0.5
D09SL0222	D09MH0108	D09MH0047	2	DOWNSTREAM	VCP	DI	750	747.2	36	36	747.2	0	0	0	0	0	0	0	0	0	0	0	1	14	0	15	0.252	0.020	12891	1.7	0.4	17.3	0.0232	6.2	2.2	15.5	0.75	0.9	0.3
F15SL0161	F15MH0086	F15MH0187	2	DOWNSTREAM	RCP	RCP	289	384.8	33	33	384.8	0	0	0	0	0	0	0	0	0	0	0	0	7	0	7	0.036	0.018	3989.8	1	0.4	1.7	0.0044	4	2.1	4.5	0.36	0.8	0.4
F15SL0347	F15MH0188	F15MH0189	2	DOWNSTREAM	RCP	RCP	117.5	86.3	36	36	86.3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.023	0.012	1644.7	1.4	0.4	0.1	0.0012	1.8	0.4	3.8	1.48	0.7	0.2
F15SL0346	F15MH0187	F15MH0188	2	DOWNSTREAM	RCP	RCP	62.4	48.5	36	36	48.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	743.8	1.5	0.4	0.2	0.0041	2.2	0.2	3.1	1.40	0.7	0.2
E17SL0093	E17MH0064	E17MH0062	2	DOWNSTREAM	PVC	PVC	88	87.9	8	8	87.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	1214	2.9	0.4	10.2	0.1214	4.9	2.7	26.1	1.08	1.1	0.5
E17SL0094	E17MH0065	E17MH0064	2	DOWNSTREAM	PVC	PVC	88	87.9	8	8	87.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0	0	0	0	0.0000	0	0	0	4.6	3.97	0.4	0.2
E17SL0138	E17MH0098	E17MH0065	2	DOWNSTREAM	PVC	PVC	88	87.9	8	8	87.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0	0	0	0	0.0000	0	0	0	4.84	5.56	0.5	0.2
E17SL0140	E17MH0100	E17MH0190	2	DOWNSTREAM	PVC	PVC	88	87.9	8	8	87.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0	0	0	0	0.0000	0	0	0	7.1	4.55	0.9	0.4

66-Inch Sanitary Sewer Failure Survey Results

- Total Replacement Scope
  - 14,875’ of 66” Main
  - 3,450’ of 60” Main



- Assessment Results
  - 1,000’ Pipe with Measurable Wall Loss
  - Abandoned Meter Station (H2S Point Source)
    - Cost avoidance of $17,097,000

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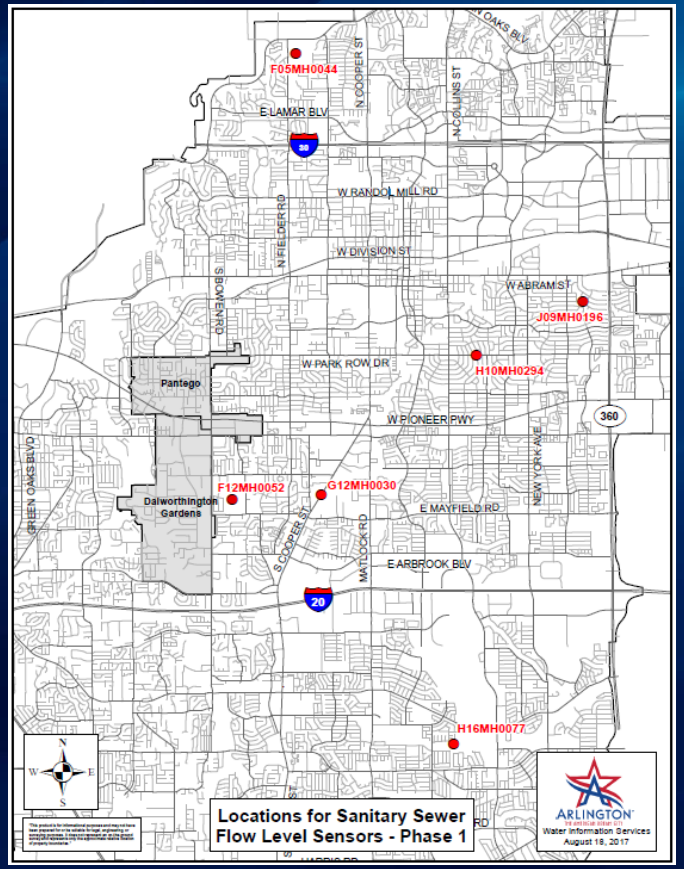
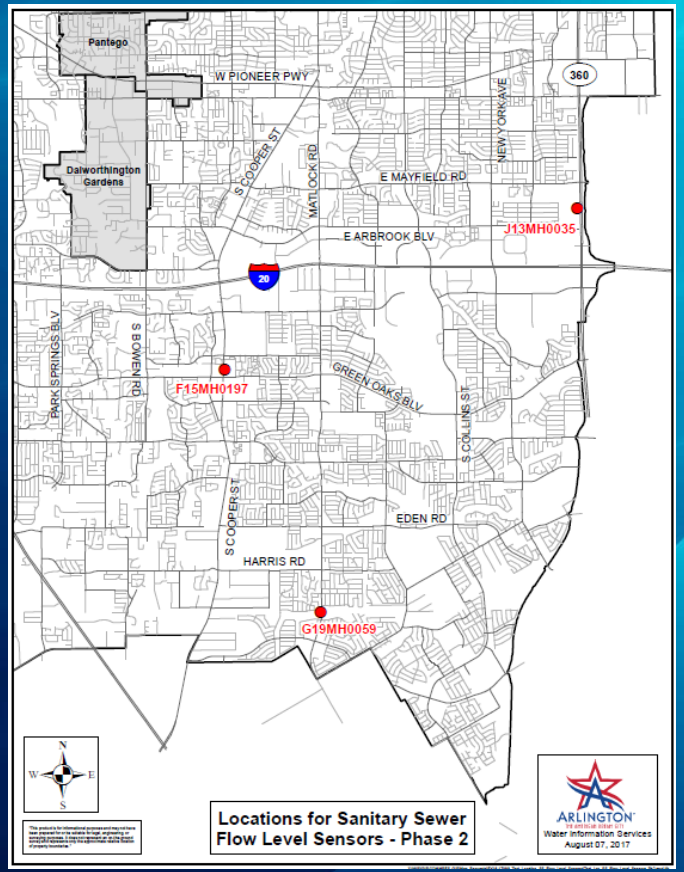
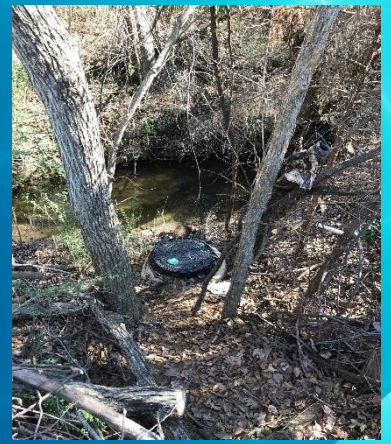
SMARTCOVER MANHOLE LEVEL MONITORING

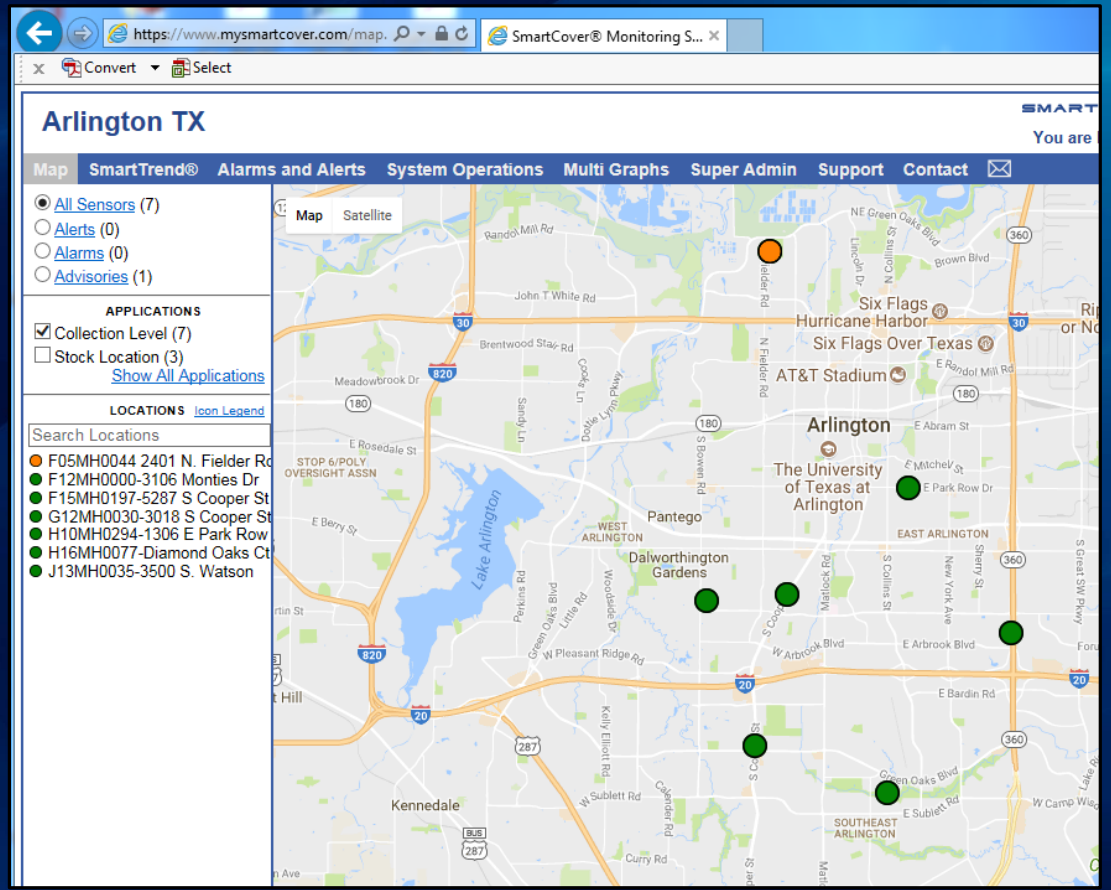


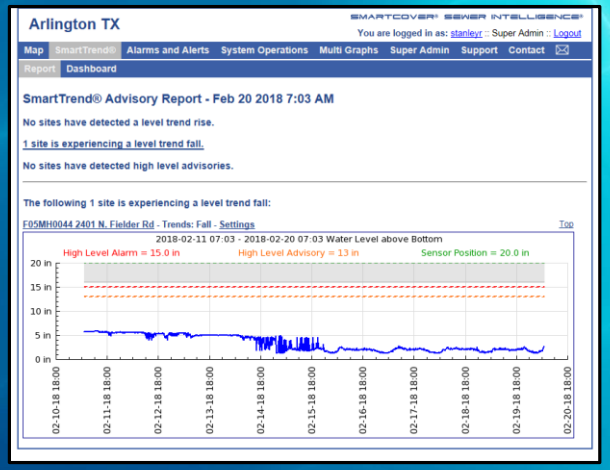


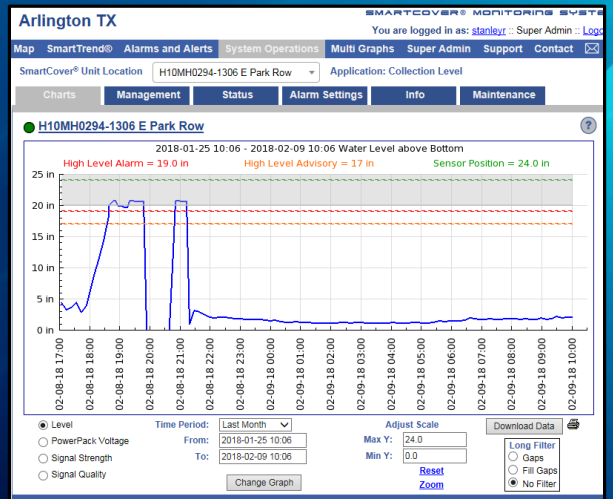
SMARTCOVER MANHOLE LEVEL MONITORING



SMARTCOVER MANHOLE LEVEL MONITORING







SMARTCOVER MANHOLE LEVEL MONITORING

- Three “High Level Alarms” in first 3 weeks (prevented SSOs)
- Easy installation and monitoring system
- Expanding system to monitor creek crossings, high impact locations & alternative to flow meter locations

PREVENTIVE MAINTENANCE: CLEANING "SMARTER" – NEW JETSCAN

JETSCAN HD VIDEO NOZZLE

PREVENTIVE MAINTENANCE: CLEANING "SMARTER" – NEW JETSCAN

- Crew able verify efficient cleaning performed
- Identify mains needing further assessment
- Immediate determine cause of most SSOs
  (without pulling CCTV rig off current task)

PREVENTIVE MAINTENANCE: CLEANING “SMARTER” – NEW JETSCANRTER

start recording
Press the record button on the camera. It will flash to indicate recording.

inspect pipe
Capture footage as JetScan advances though the pipe.

review footage
After inspection, stop recording and eject the memory card to view footage on a tablet or PC.

Asset Management!

Because You Don't Know What's out there Until You Look

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Questions?

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