

# ESRI WATER CONFERENCE 2015



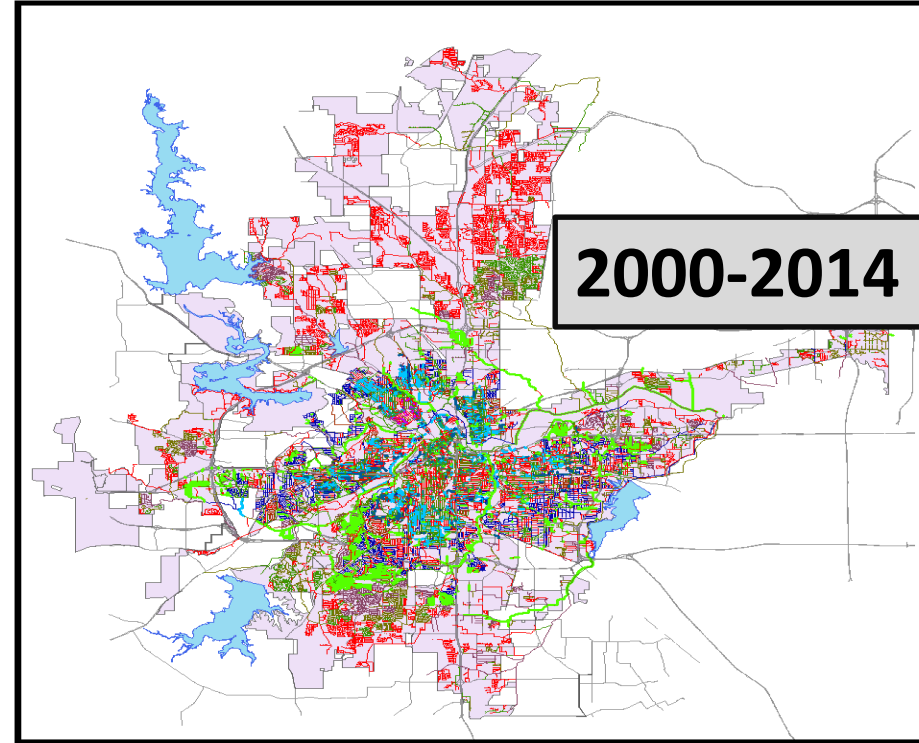
## Turn Your Pipeline Inspections into Actionable Intelligence with ITpipes and Esri

Mark Shell  
Darrell Gadberry  
City of Fort Worth, Texas  
Water Department

ESRI Water  
Conference 2015  
Portland Oregon  
February 11, 2015

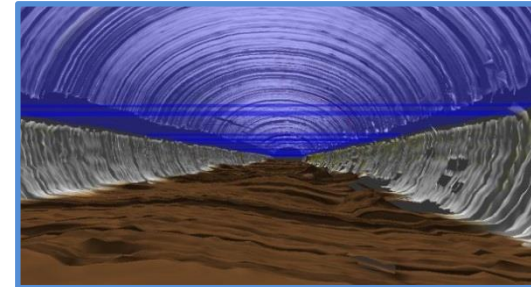
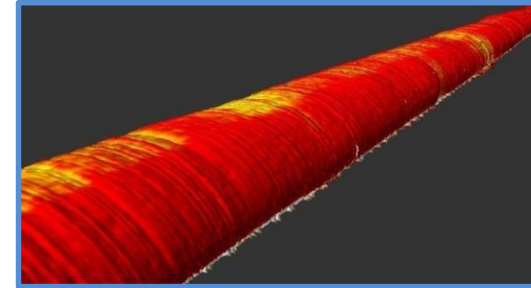
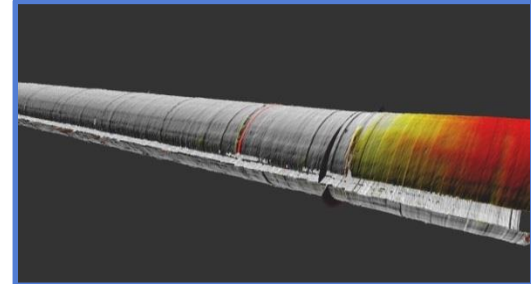
# Fort Worth Collection System (3,046 miles)

- 2000 – 2014 growth increased system footage by 37% (1,132 miles or 81 miles per year)
- However, 21% of the wastewater system is still over 50 years old (6" to 96")
- Recent growth has placed increased burden on existing aging infrastructure



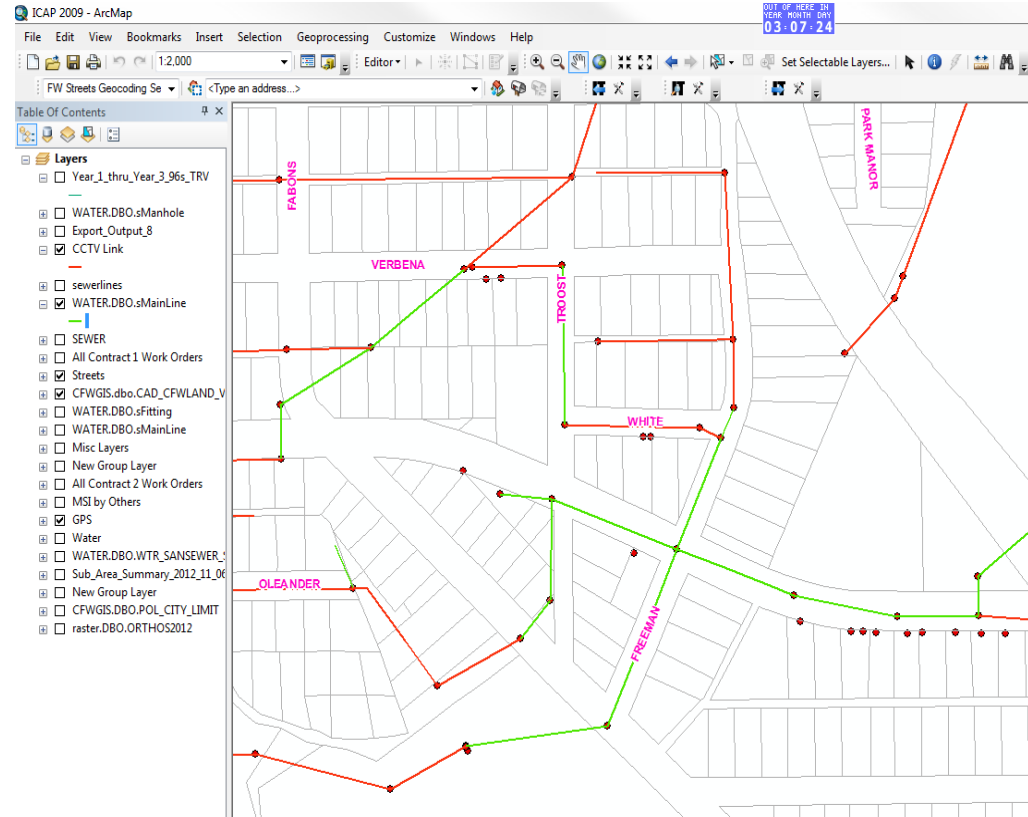
# Fort Worth Water Department

- **3,046 miles of sanitary sewer pipe and 8 CCTV crews**
- **Sanitary Sewer Condition Assessment (SSCS) Program;**
  - Inspect 284 miles of small diameter ( $\leq 21$ " ) of pipe per year
- **Interceptor Condition Assessment Program (ICAP);**
  - Outsource 36 miles of large diameter ( $> 21$ " ) pipe inspection per year (ICAP)



# Fort Worth Water Department

- Fort Worth utilizes ESRI's model for water and wastewater geodatabase design
- Allows for interface with ESRI business partners for "off-the-shelf" integration
- Minimum customization, if any



# Fort Worth Water Department

- **ITpipes since 2009, digital since 2003**
- **Inspection data is SQL**
- **Dedicated 4TB server for all media**
- **All CCTV data and media is integrated with GIS**
- **All CCTV inspection projects are created in GIS**
- **ITpipes' Send export's GIS asset information into ITpipes inspection projects**
- **ITpipes' ViewIT allows any user to access CCTV data, pictures and videos**



# Actionable Intelligence – CCTV Basics

## An Observation & Defect Manual is a Must

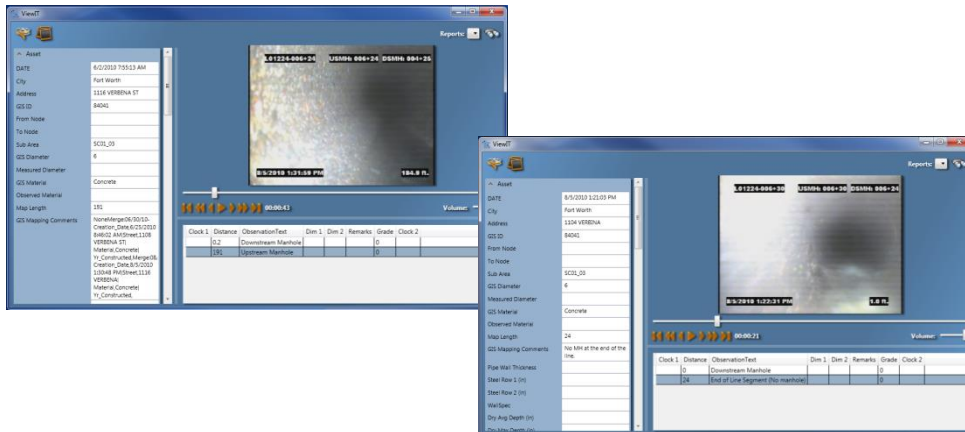
CODE: X OBSERVATION: COLLAPSE RATING: 5 (severe)  
DESCRIPTION: REFERS TO A SECTION OF PIPE THAT HAS LOST STRUCTURAL INTEGRITY  
ALLOWING BACKFILL TO ENTER THE PIPE



NOTE: THE PIPE DEFECT AND RATING LEVEL SHOWN ON THE PICTURES ABOVE MAY NOT BE APPLICABLE TO THE EXAMPLE PICTURES SHOWN

# Actionable Intelligence – End Users

- ITpipes' Send export's GIS asset information into ITpipes inspection projects
- ITpipes' ViewIT allows any user to access CCTV data, pictures and videos



All	Asset	Inspection	Media	Plot
<b>Category:</b>				
<b>Category: Default</b>				
DATE	3/1/2011			
City				
Address				
GIS ID	65812			
From Node	39059			
To Node	39120			
Sub Area	BF01_04			
GIS Diameter	54			
Measured Diameter	55			
GIS Material	Concrete			
Observed Material				
Map Length	672			
GIS Mapping Comments				
MainLat#	M00402A-072+77			
<b>Category: Flow Model</b>				
Dry Avg Depth (in.)	25.4			
Dry Max Depth (in.)	30			
Wet Avg Depth (in.)	59			
Wet Max Depth (in.)	129.6			
Dry Avg Velocity (fp/s)	3.1			
Dry Max Velocity (fp/s)	3.3			
Wet Avg Velocity (fp/s)	3.3			
Wet Max Velocity (fp/s)	4.5			
<b>Category: Legacy IDs</b>				
CFW Map Grid	N09E11			
USID	072+77			
DSID	066+05			
Mapsc	65G			
Object ID	914998			
Constructed Date	7/7/1982			
<b>Category: Pipe Wall</b>				
Pipe Wall Thickness	9.75			
Steel Row 1 (in.)	2.5			
Steel Row 2 (in.)	8.75			
Wall_Spec	Thickwall			

All	Asset	Inspection	Media	Plot
<b>Category:</b>				
<b>Category: Default</b>				
#	51136			
Crew No				
Operator Name				
Operators Comments				
Reason	Contractor Inspection			
Equipment Number				
Camera Travel Dir.	Downstream			
Inspected Length (ft)	650			
QC_Status				
<b>Category: FTW REVIEW</b>				
<b>Trenchless Point Repair</b>				
Open Point Cut Repair				
Replace				
TV Review Comments	RT OBS ADWF 23" MINOR			
Structural Rating	3			
SSD Rating				
Structural Recommend...				
O_M Recommendations	None at this time			
Add Review Comments	SEGMENT NEEDS REHAB OR			
<b>Category: LASER SONAR</b>				
Large Dia. Cleaning Ne...	No			
Average Debris (in.)	0.71			
Total Debris (cf)	57.68			
Max_Corrosion	4.9			
Maximum Flow Level (in.)	0			
Average Flow Level (in.)	0			
Minimum Flow Level (in.)	0			
<b>Category: Project Info</b>				
Work Order Number	ICAP 2009_ORIGINAL			
City Project Number	ICAP09-1			
Consultant Contact Name #	CITY SECRETARY NO 40125			
DDE/TPW #	PO-11-000636143			
Consultant Company N...	WHITE ROCK CONSULTANTS			
Consultant Contact Na...	ROD THORNHILL			
Consultant Contact PH #	214-725-8976			
Contractor Company N...	ACE PIPE CLEANING			
Contractor Contact	BRUCE JAMESONBRUCE			
Contractor Contact PH #	817-401-3639			

# Actionable Intelligence – Power Users

- Inspection data (Sonar, Laser, & HD Video) stored in ITPipes Software
- Integrates HDTV, 3D, Laser and Sonar data, and Hydraulic model results into one software package

The screenshot displays the 'Mainline' view of an asset inspection. The top table lists inspection details:

Object ID	DATE	Main Lateral	USID	DSID	Map Length	Inspected Length (ft)	GIS Diameter
1	2/26/2011	M00402A-080+58	080+58	080+58	19	14	54"
2	2/26/2011	M00402A-080+58	079+58	072+77	759	738	55"

Below this, a 'Remarks' table provides a detailed log of observations:

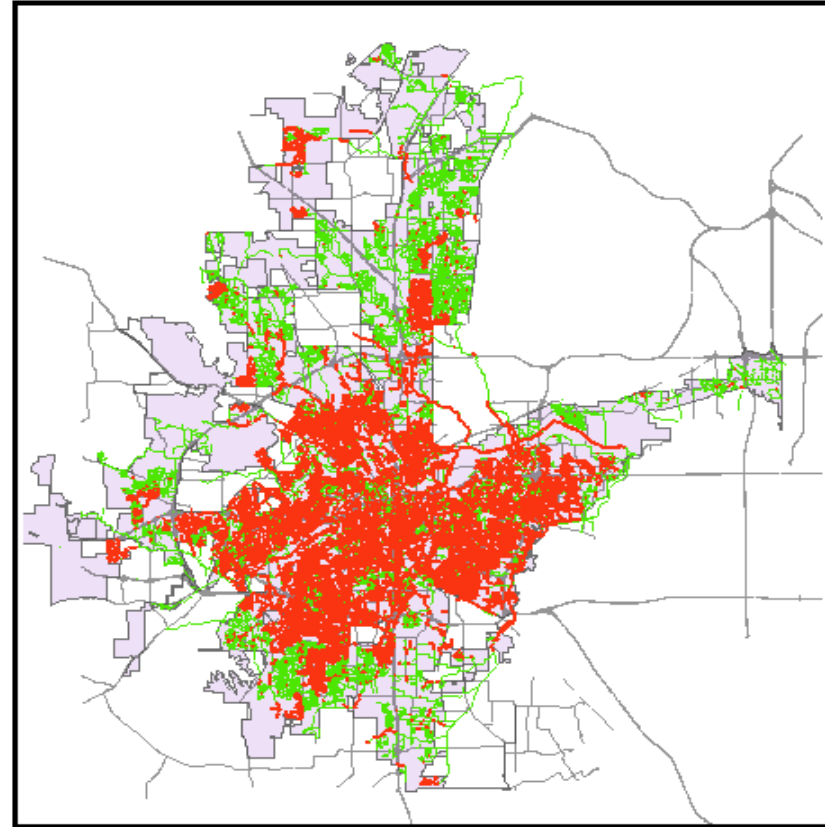
Distan...	Code	Dim. 1	Remarks
1	LSD	0	Water on lens at 11 o'clock - Throughout line
2	LISC	2	General Observation - Corrosion to 2.5"
3	LISC	3	General Observation - Corrosion to 2.5"
4	LISC	3	General Observation - Corrosion to 3.2"
5	LSD	0	Point of Interest - Splashing blocks later briefly
6	LISC	5	Maximum Corrosion - to 4.9"
7	LSD	0	Point of Interest - Intruding seal
8	LSD	0	Point of Interest - Intruding seal
9	LSD	0	Point of Interest - Rebar evident
10	LISC	2	General Observation - Corrosion to 1.8"
11	LSD	3	Debris to 2.7"
12	LISC	2	General Observation - Corrosion to 1.8"
13	LISC	2	General Observation - Corrosion to 2.0"

- Quick access to previous inspections allows the "life" of an asset to be viewed for "Benchmarking"
- Future inspection efforts can be focused on specific pipe segments instead of entire interceptors; reducing inspection cost

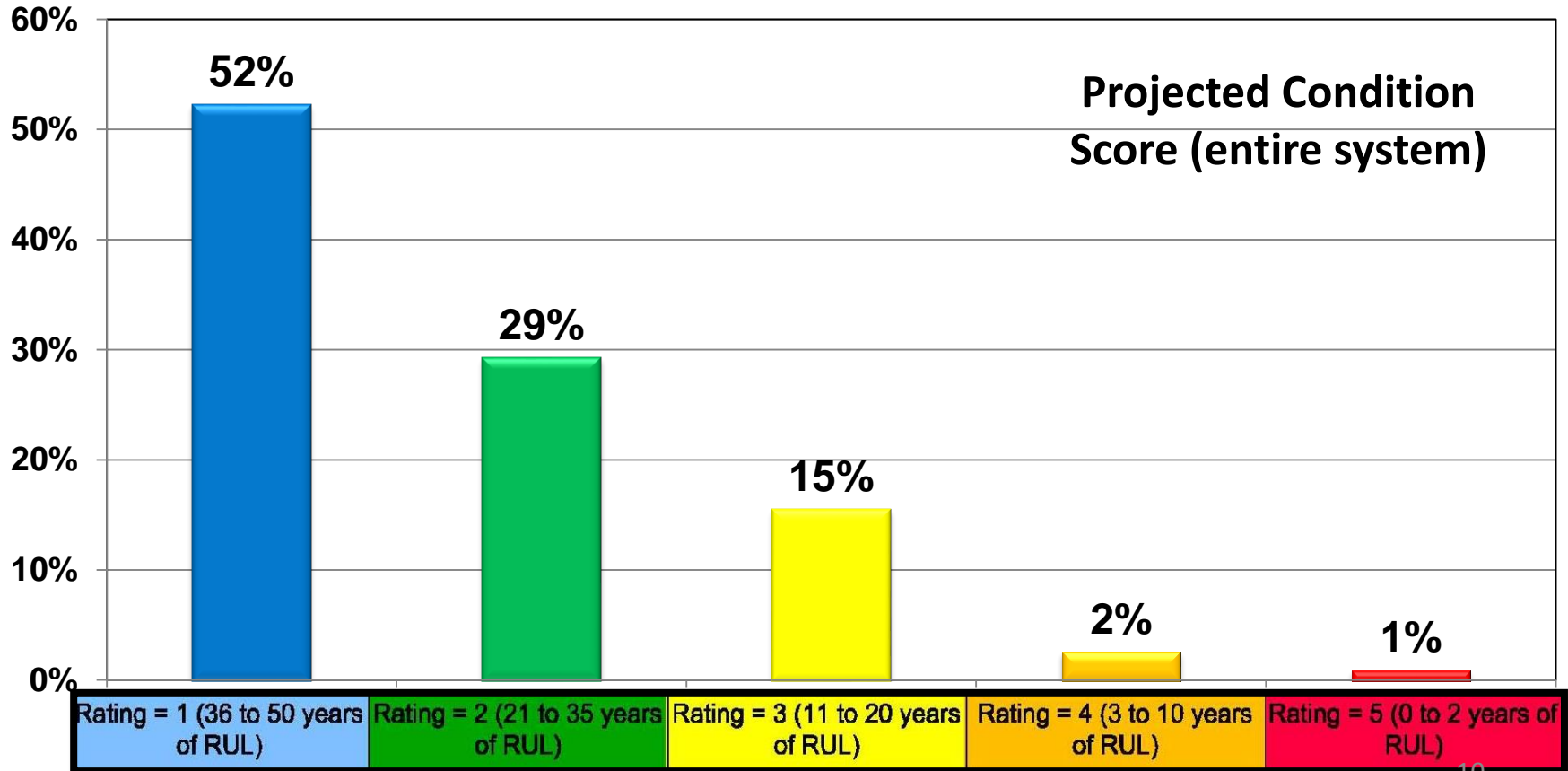


# Actionable Intelligence – Data Mining

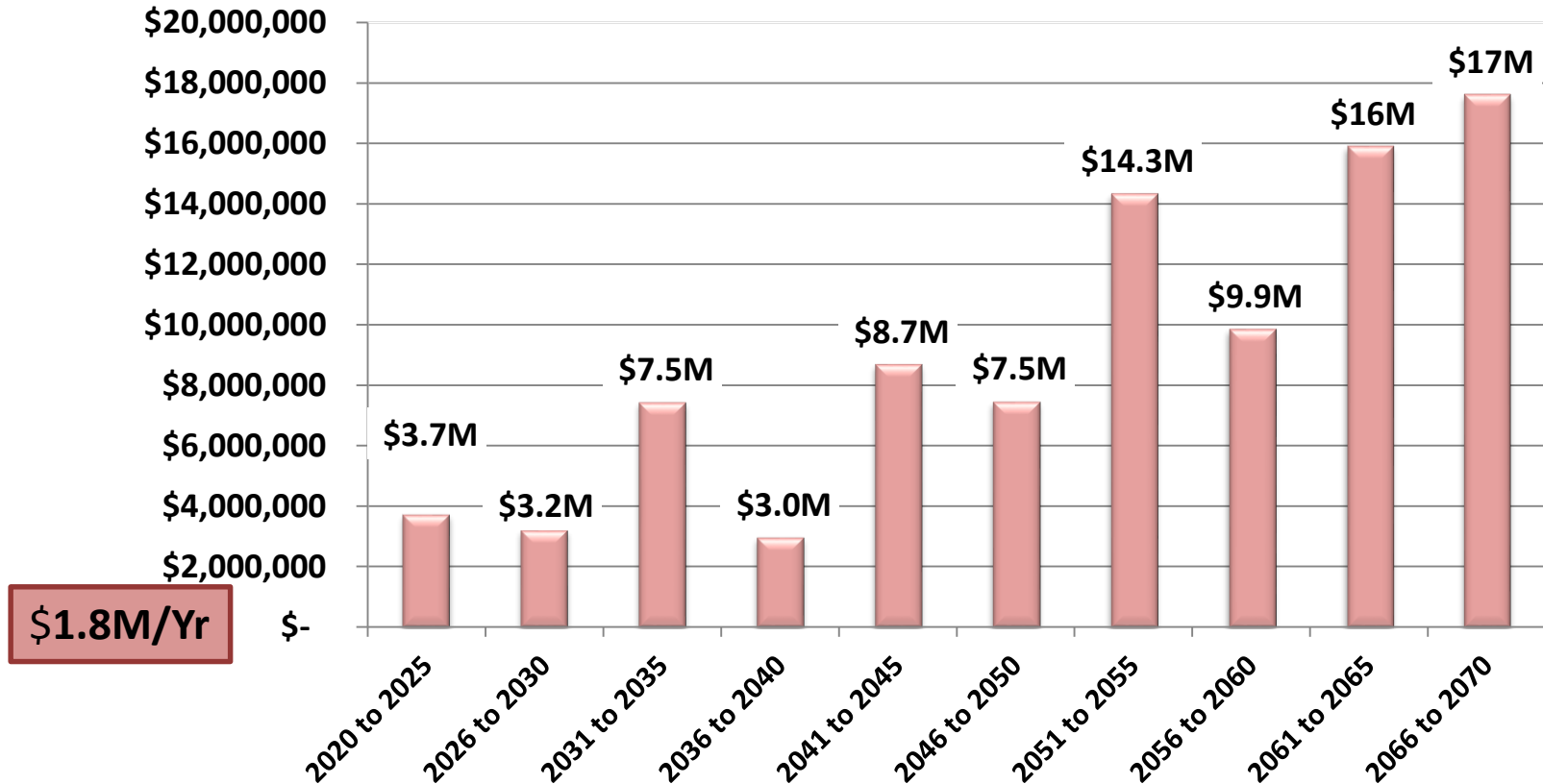
- To date 53% of the entire WW collection system has an actual condition score
- 3% of the Entire WW Collection System is Projected to Have a RUL score of 4 or 5
- By 2019 +/- approximately 100% of the system will have an actual condition score



# Actionable Intelligence – Asset Management

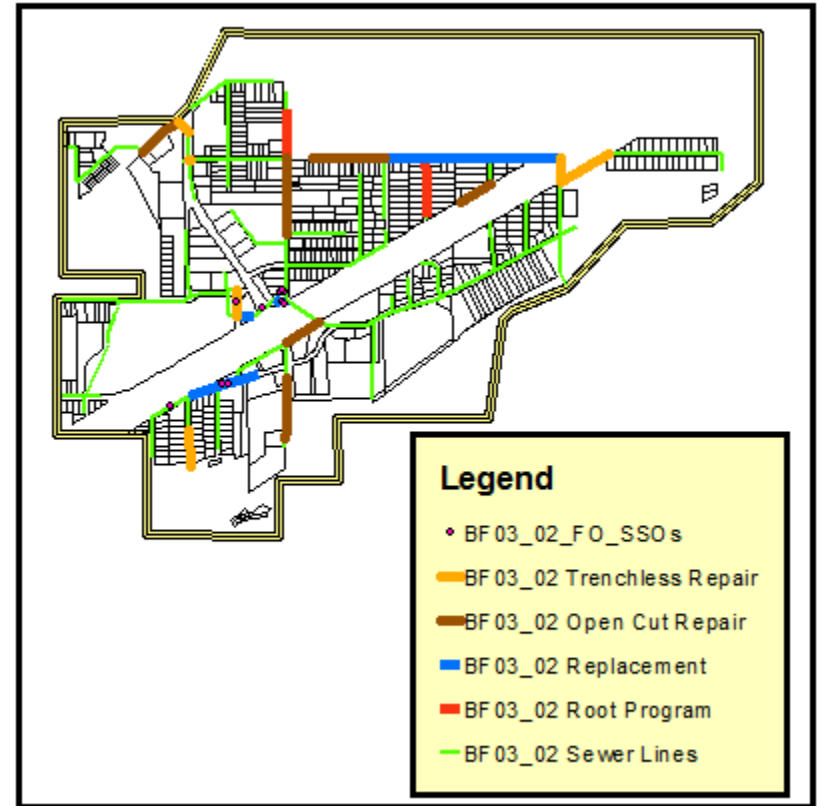


# Actionable Intelligence – CIP Planning



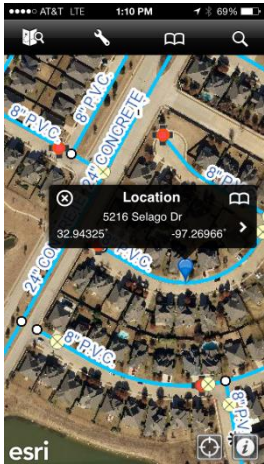
# Actionable Intelligence – Spatial Analysis

- Inspections are interfaced with GIS
- CCTV queries such as:
  - Replacement recommendations
  - Open Cut Spot Repairs
  - Trenchless Spot Repairs
  - Roots
  - Grease
  - Etc.
- Historical O&M work orders:
  - Stoppages/blockages
  - Sanitary Sewer Overflow (SSO)
  - Etc.

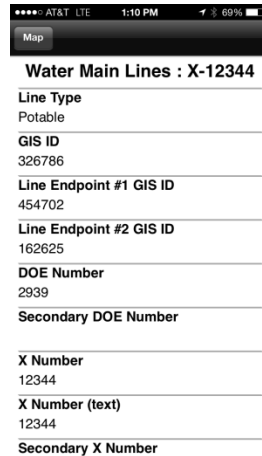


# Fort Worth's ArcGIS Online iPhone

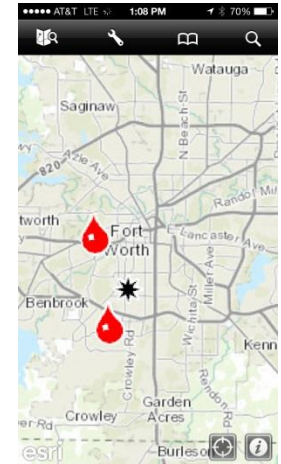
## Water lines with imagery



## Ability to display attribute table and other documents



## Displays active work orders



# Return on Investment (ROI) / Cost Saving

- **Our Field Operation Division saves approximately \$50,000 annually**
- **Instant access for outside users; engineering, development, new service request GIS mappers, customer requests, etc. results in approximately \$50,000 annually**
- **Paper maps verses GIS Online \$150,000 annually**
- **Beginning stages of rolling out ITpipes' Sync Tool. Eliminate hard drive data transfers. Automated network connection and “sync” from office to CCTV unit and CCTV unit to office. Estimated annual savings equals \$150,000**

# Questions?

