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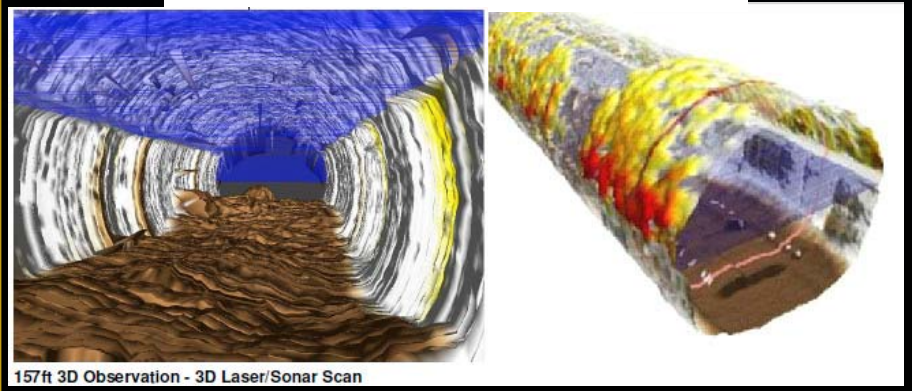
157ft 3D Observation - 3D Laser/Sonar Scan

# Cleanflow/Fly Eye Inspection of Large Diameter Sewers

## Northern California Pipe Users Group

## January 19, 2010

**Jeffrey Graham, P.E. 502-548-8965**

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# PRESENTATION OUTLINE

- Who is Hydromax USA
- Cleanflow/Fly Eye Equipment Description
- Project Descriptions
- Example Data
- Questions

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# GOAL OF HYDROMAX USA

**Hydromax USA is a “Professional Services” company that provides accurate and easily interpreted data, empowering the engineer and owner to make the right decisions regarding their buried infrastructure.**

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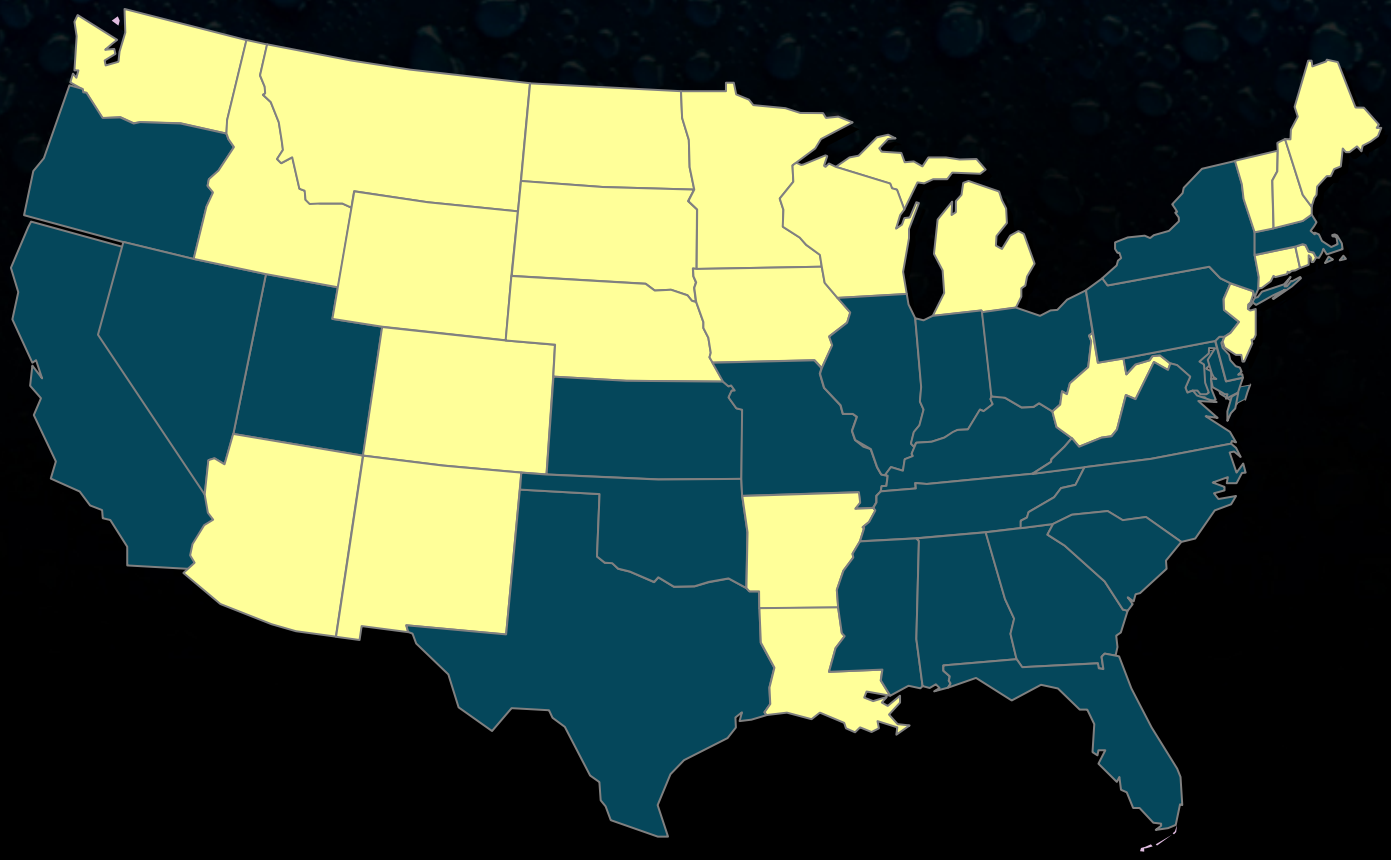
# PROJECT LOCATIONS

**In the last 6+ years our clients entrusted HUSA to work in 25+ states.**



**Our growth is the result of having experienced people, understanding client needs, providing better than expected data, and performing work at a reasonable cost.**

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# OUR SERVICES

- System Monitoring and Metering
- Sanitary Sewer System Inspections
- Storm Sewer System Inspections
- Water Distribution System Services

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# SEWER COLLECTION SYSTEM SERVICES

## Traditional Services

- Flow Monitoring (w/gps)
- CCTV
- Smoke Testing (w/gps)
- MH Inspection (w/gps)
- Line Walking
- Dye Flooding

## New Technologies

- Laser Scanning (Large Pipe)
- Sonar (Large Pipe)
- HD Camera (Large Pipe)
- Lateral Cameras
- MHI Zoom Cameras
- Side Scanning Technology
- Focused Electrode Leak Locator (FELL)

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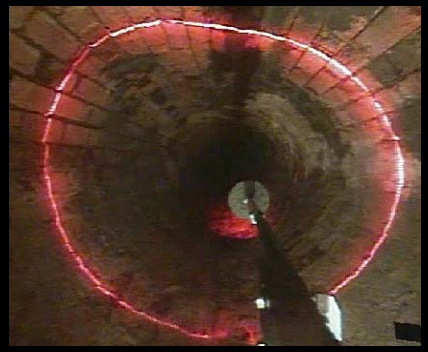
# Inspection of Large Diameter Sewers

- HD Image, Laser and Sonar data continuously collected


- Sewers >30 inches in diameter
- Bypass pumping is not needed
- Capable of performing continuous inspections for more than a mile



- Easy to interpret data
- Viewer software provided
- Reports provided 30 to 40 days after field work completed

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# Inspection of Large Diameter Sewers

## ABOVE THE WATER SURFACE WITH LASER AND HIGH DEFINITION IMAGING

- Laser identifies loss of pipe wall from corrosion
- Laser calculates ovality
- Laser calculates deflection versus design
- HD Images

## BELOW THE WATER SURFACE WITH SONAR

- Sonar determines lost capacity by calculating debris levels and volumes
- Major structural anomalies

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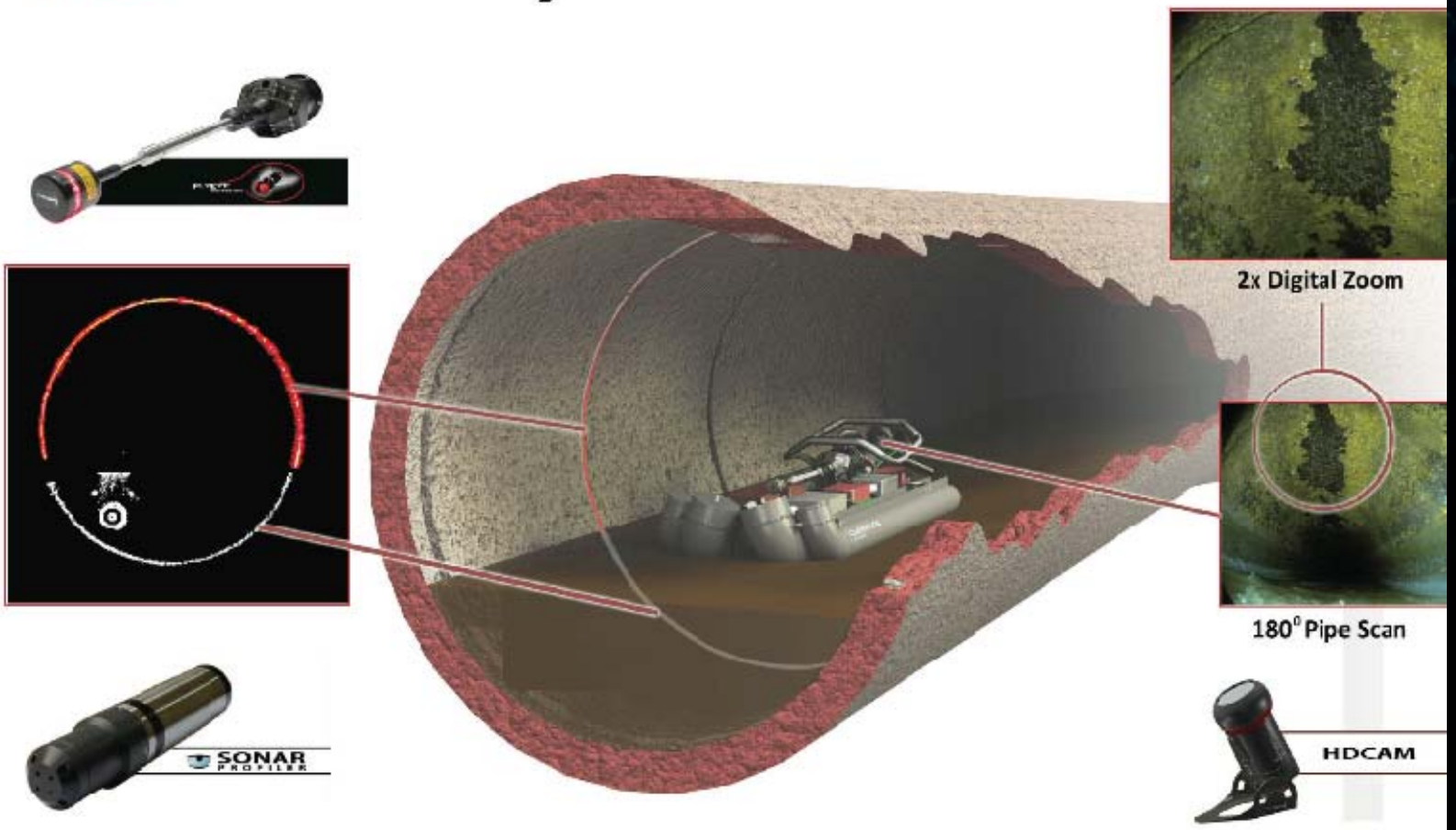
## HDProfiler System



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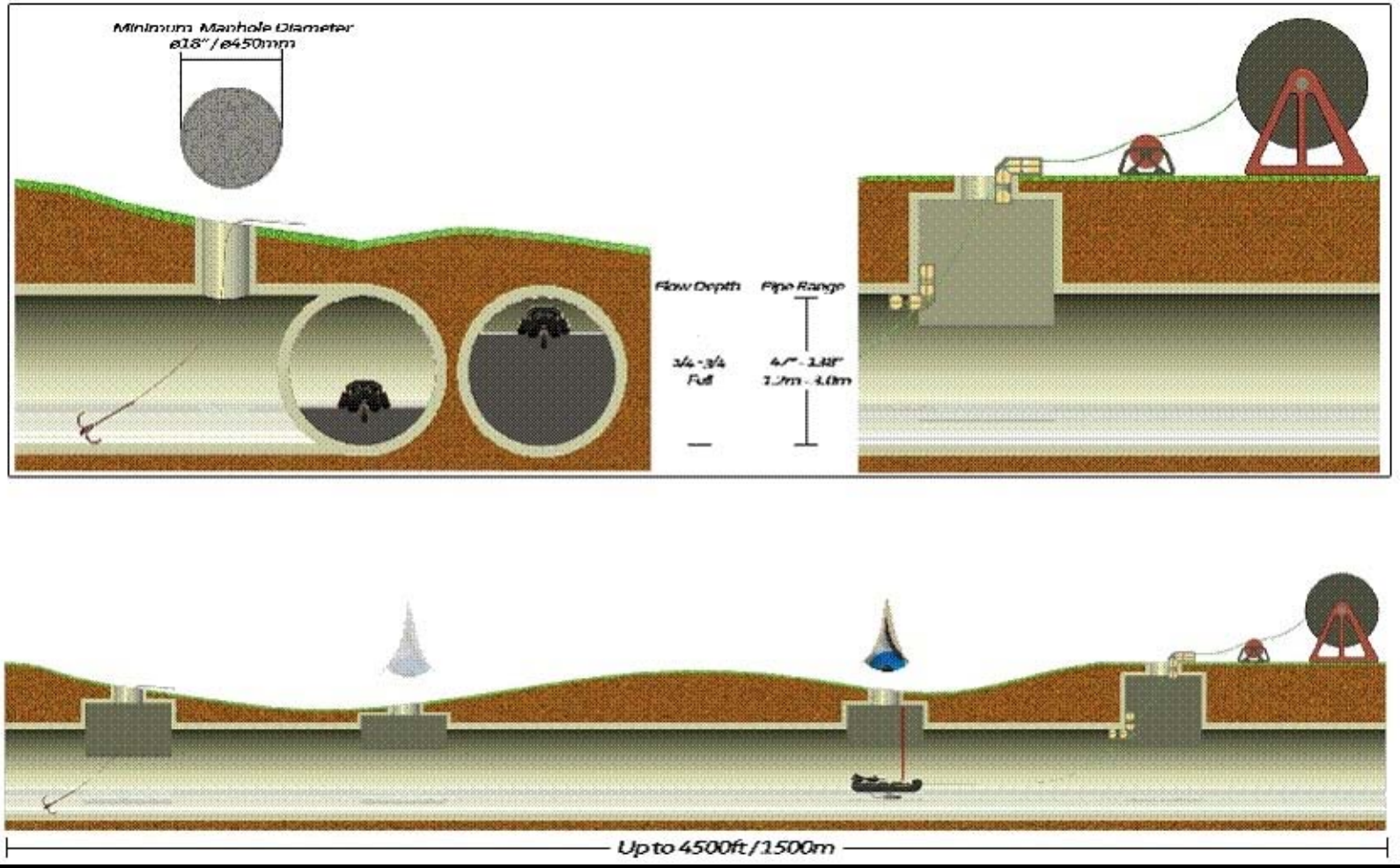
# CLEANFLOW DEPLOYMENT

## Rope Winch Inspections with HDFloat up to 1500m (4500ft)



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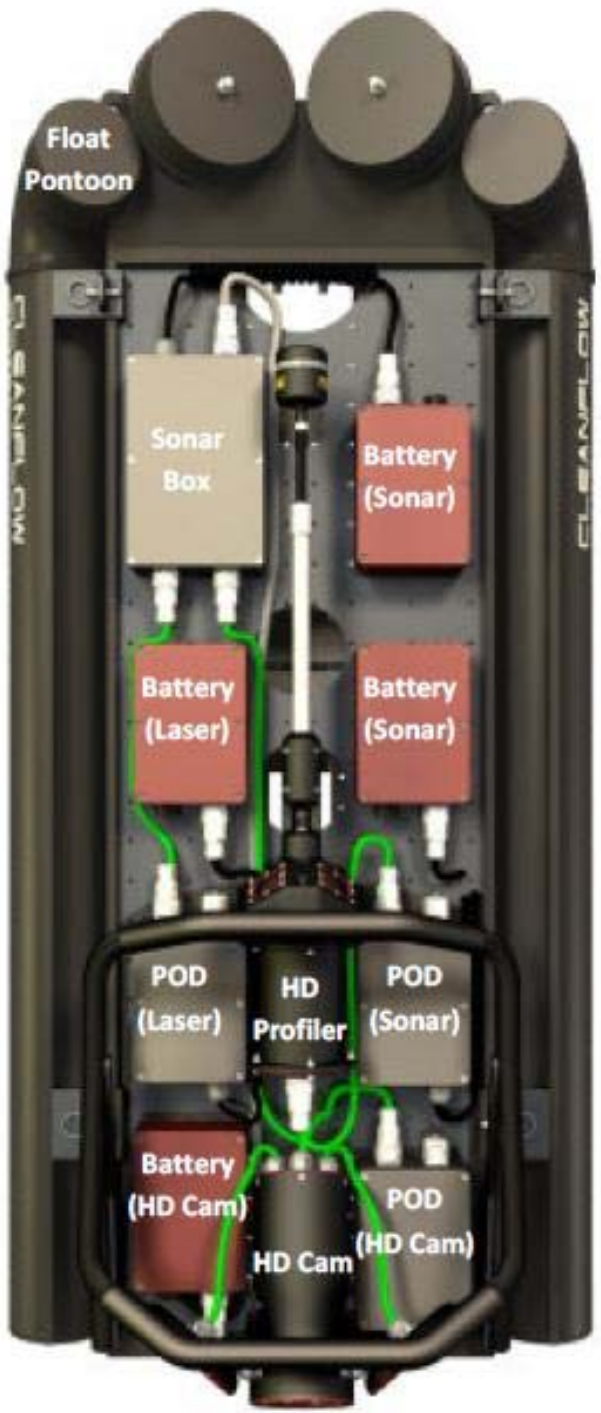
## COLLECTION & PRESENTATION OF DATA

- Laser data collected 12x per second
- Sonar readings taken 1x per second
- HD Images captured 6x per second
- Cross sections and images every 50 feet and at problem areas



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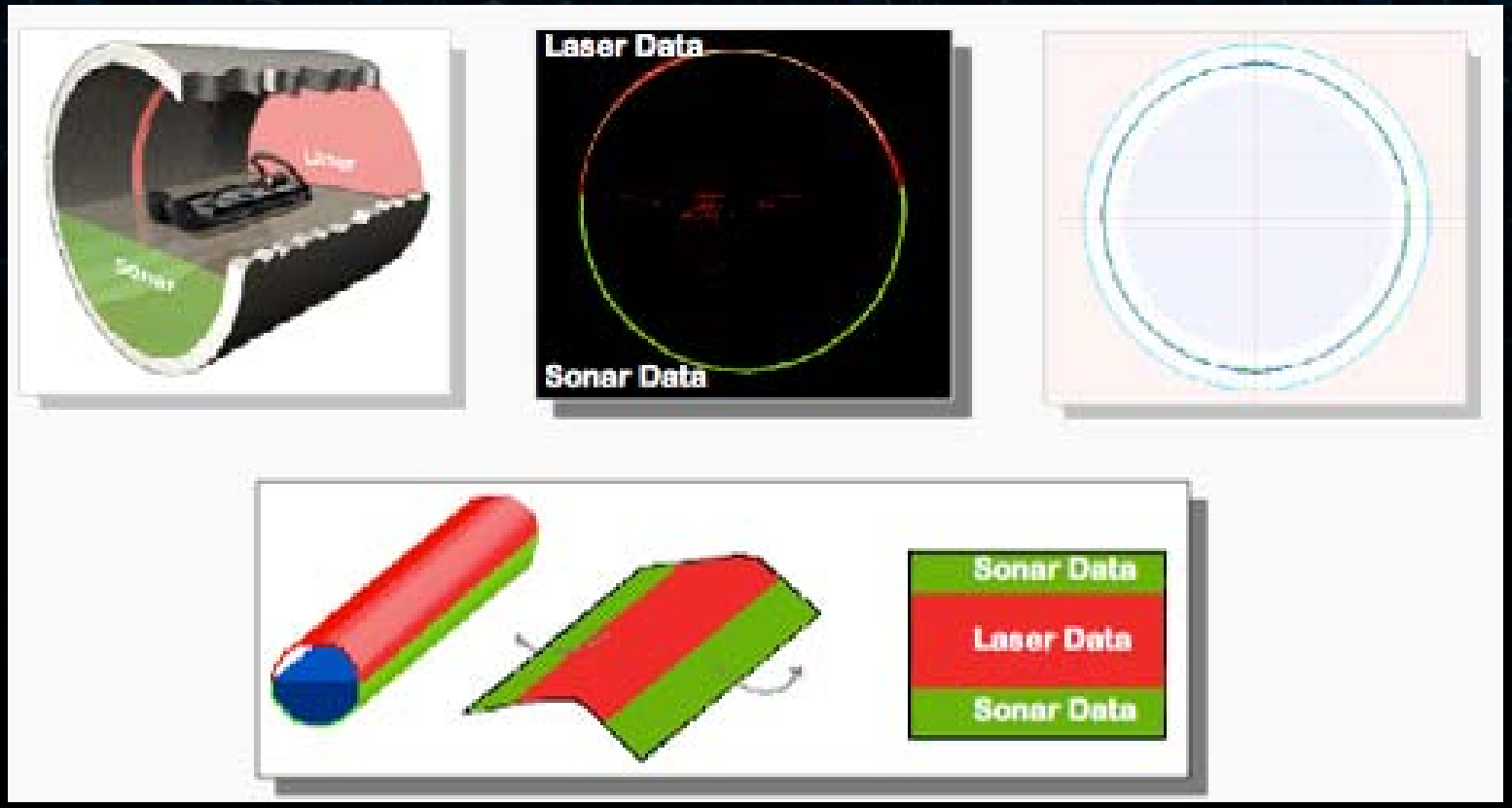
# Combining Laser & Sonar Data




**Sonar and laser data is combined identifying debris and corrosion locations throughout the entire pipe**

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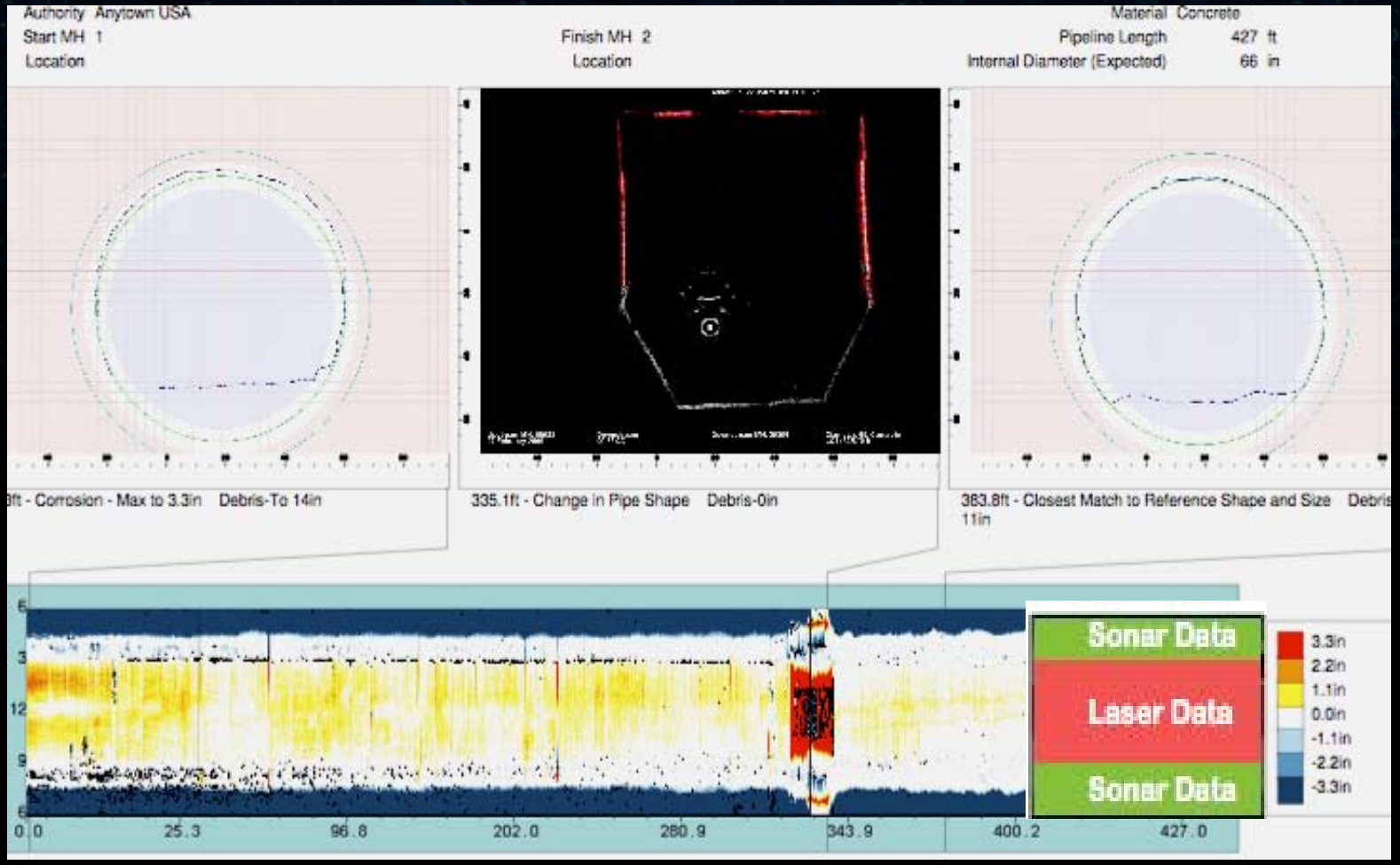
# Laser Component




**Yellows, oranges, and red colors along the length of the pipe indicate the location and degree of corrosion**

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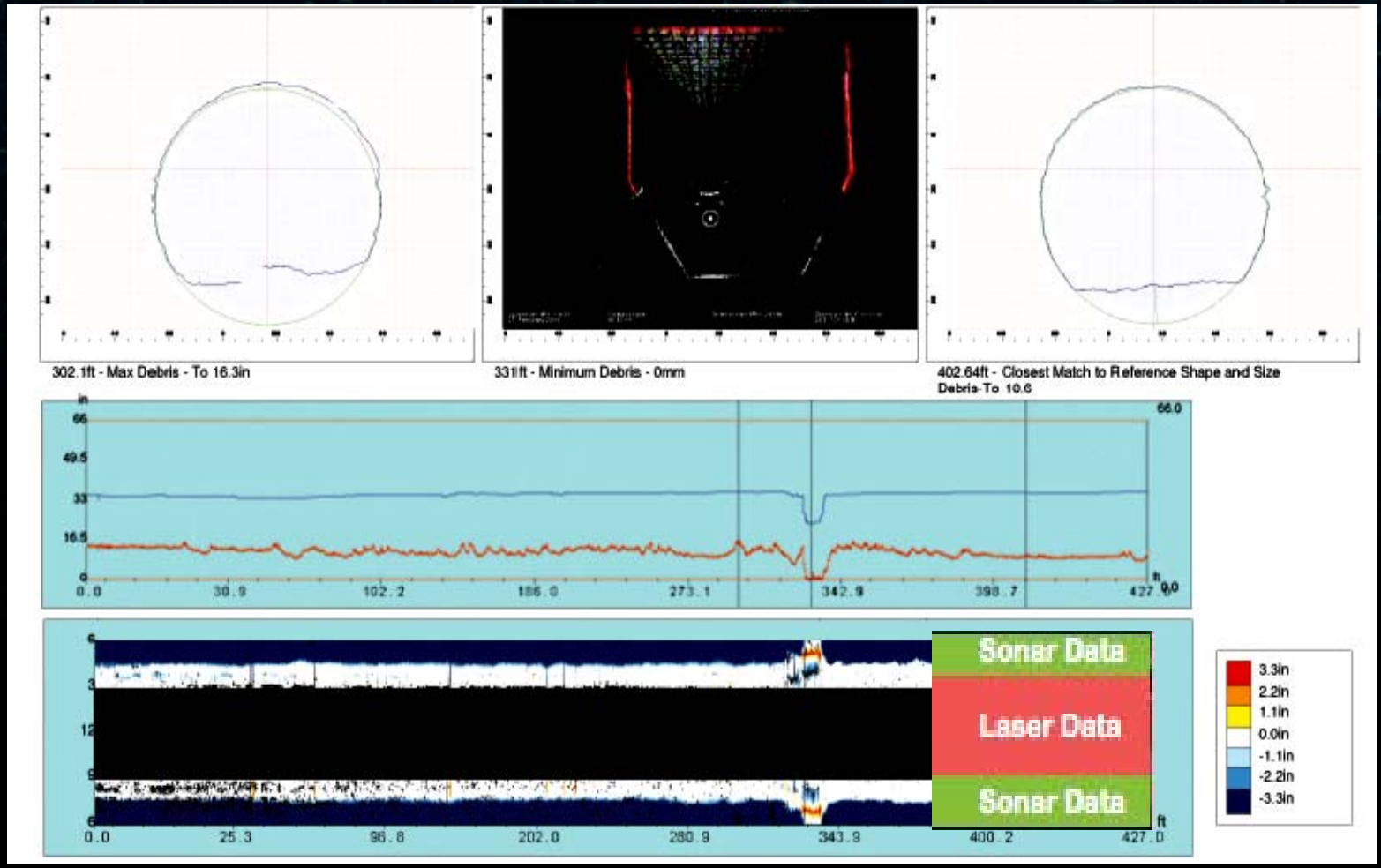
# Sonar Component




**Information collected identifies the water level and debris volume throughout the entire length of pipe**

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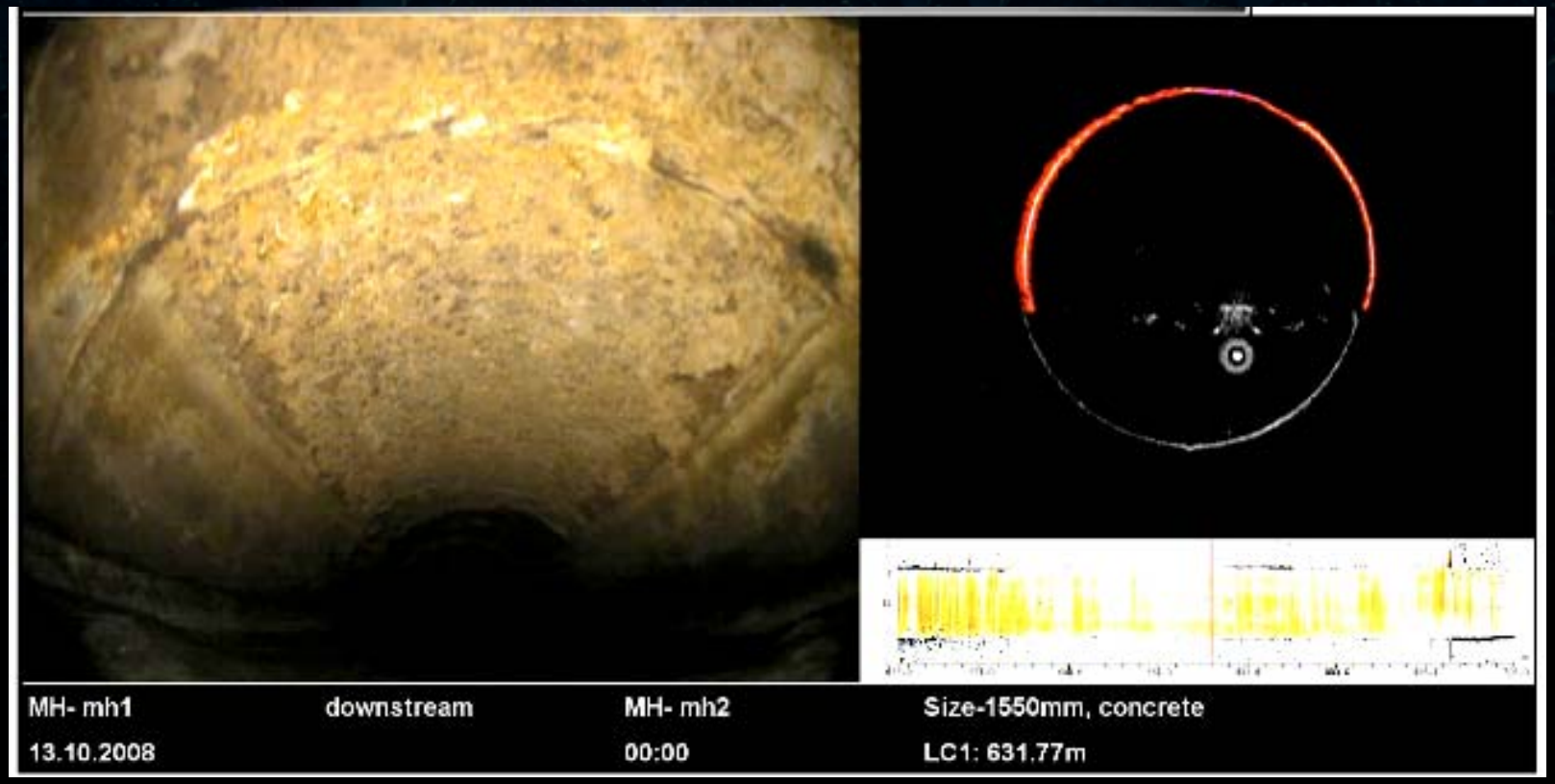
# HD Image With Corresponding Sonar & Laser




**Watch the entire HD/Sonar/Laser images or use the color coded pipe overview to prioritize the review process**

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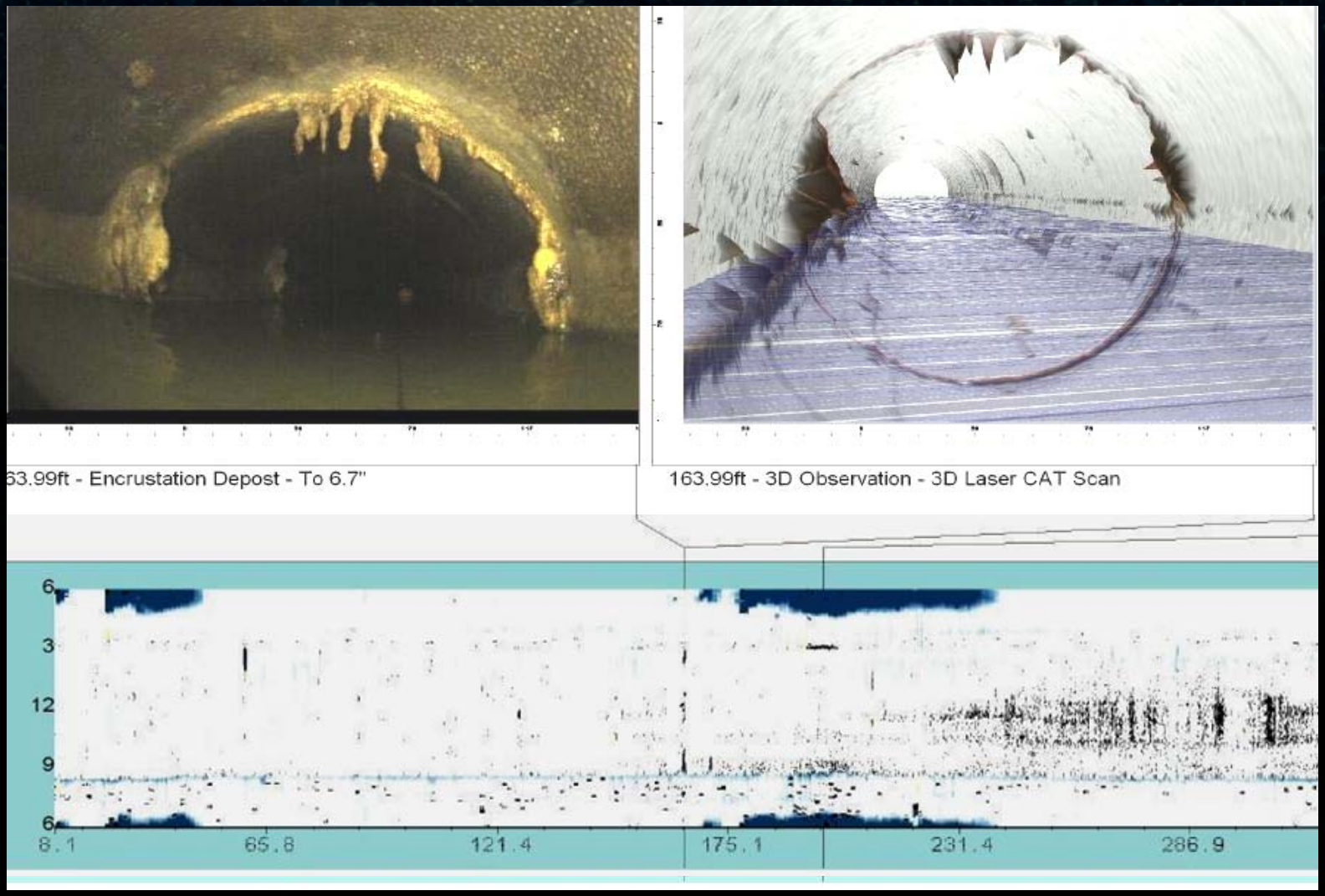
# HD Image With 3D Laser CAT Scan



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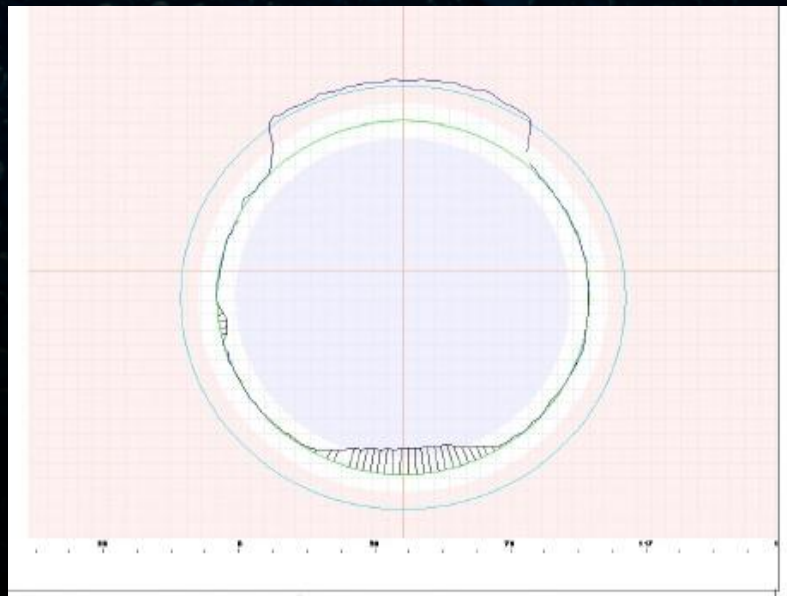
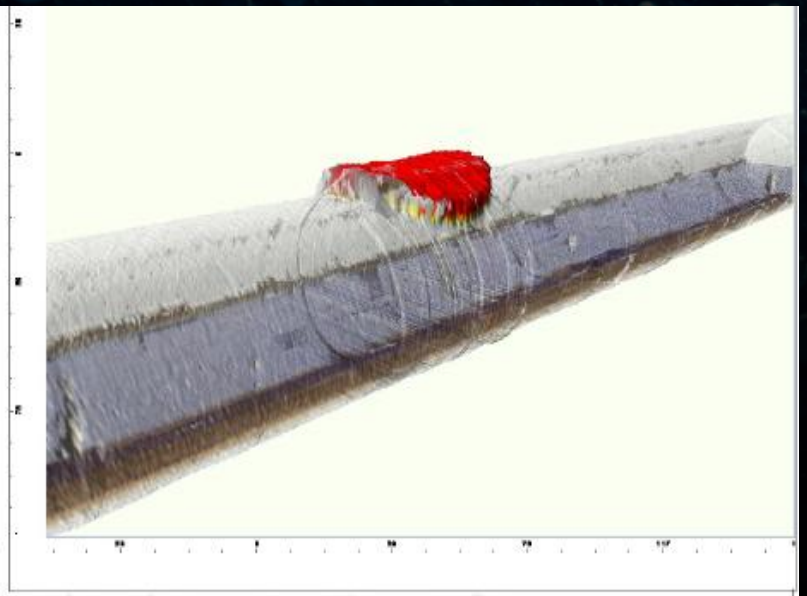
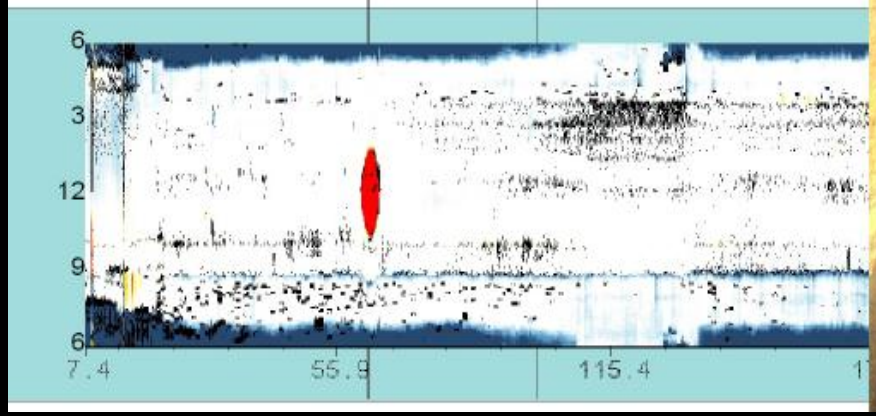
# Cross Section With HD Image and 3D Laser Cat Scan



62ft - Covered Manhole - 7.5" above reference ring



62.54ft - 3D Observation - 3D Laser CAT Scan

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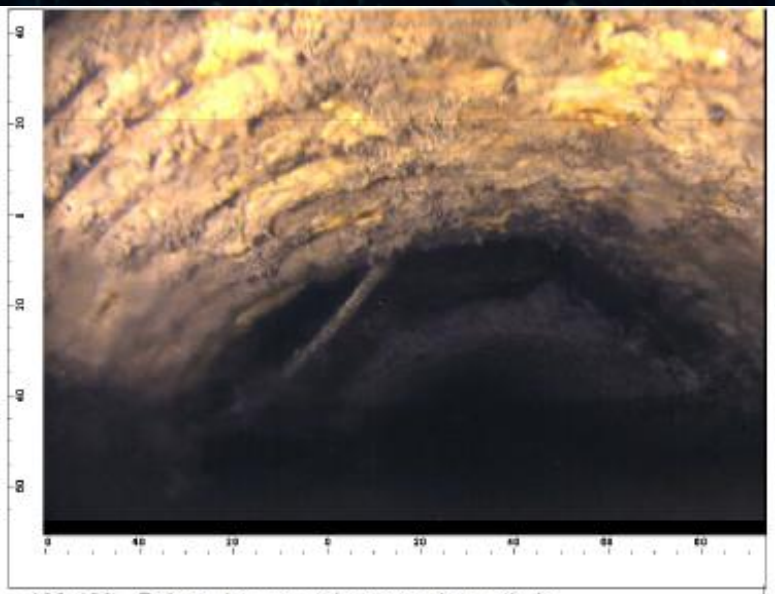
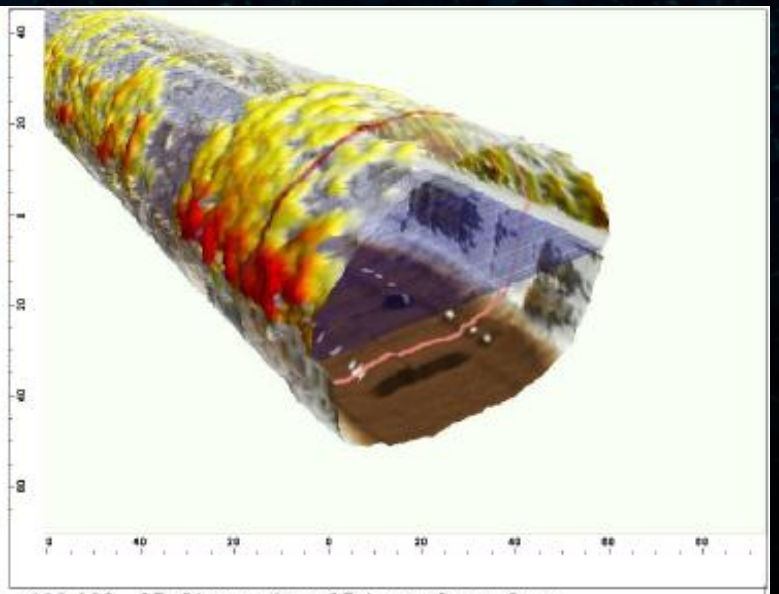
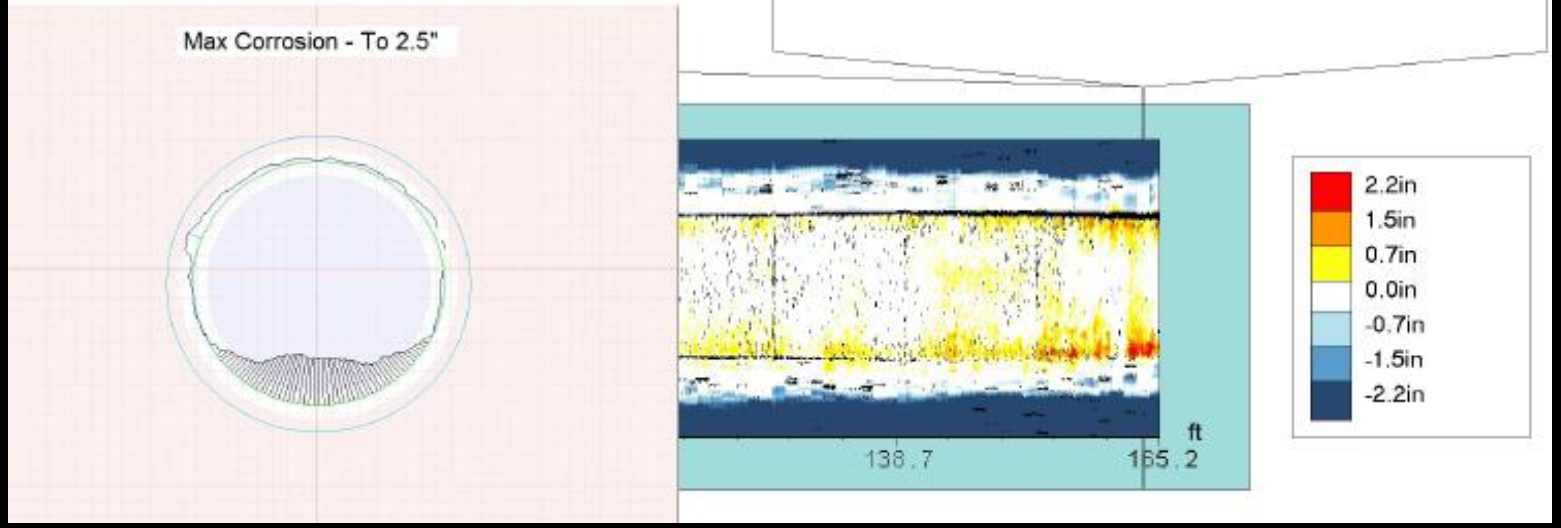
# Cross Section With HD Image and 3d Laser Cat Scan



163.48ft - Rebar - Loose gasket towards manhole



163.82ft - 3D Observation - 3D Laser-Sonar Scan



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# Project Descriptions & Findings

- **Salt Lake City – 25,000 LF of 36” to 72” Separate Sewers**
- **Broken Arrow, OK – 20,000 LF of 36” to 54” Separate Sewers**
- **Los Angeles – 1,000 LF of Separate Sewer**
- **Springfield, MA – 70,000 LF of Combined & Separate Sewers**

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# Final Data Submittal

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# Questions?