

# Mitigating Risk Through Condition Assessment

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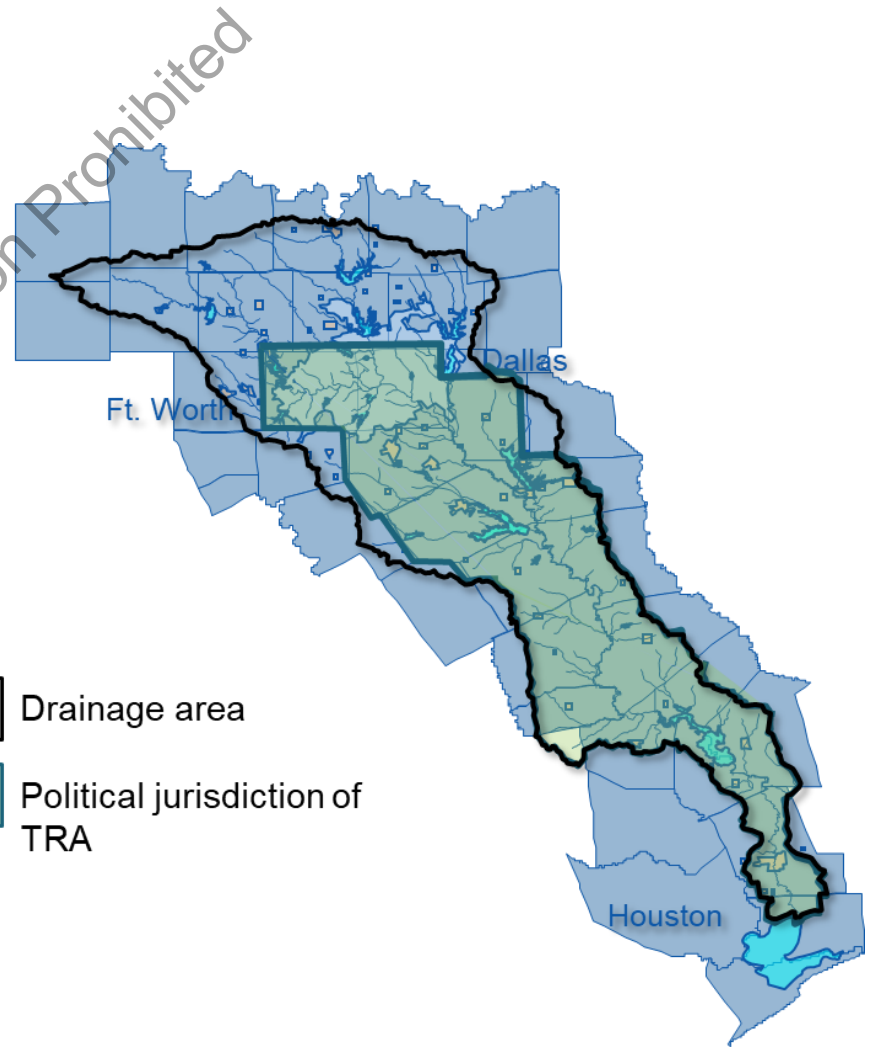
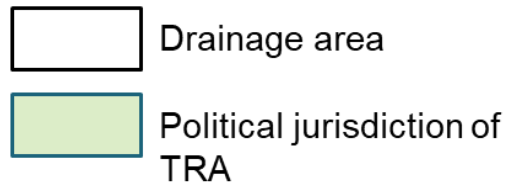
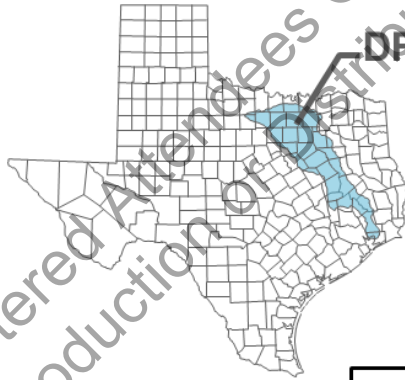
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# Trinity River Authority of Texas (TRA)

- Created by State in 1955
- 25 Board members appointed by Governor
- 18,000-square-mile Trinity River basin

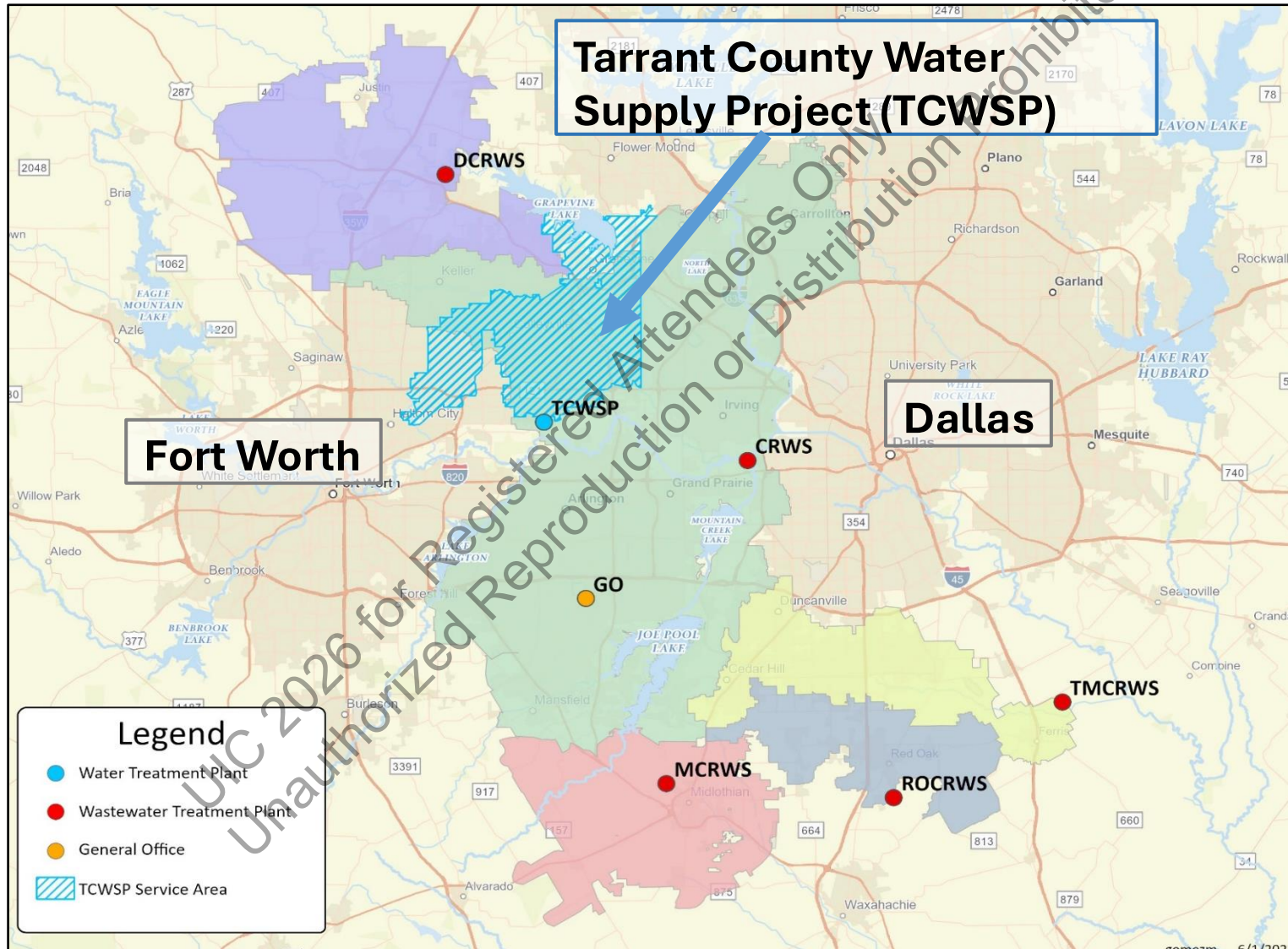


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# TRA Northern Region Operating Systems



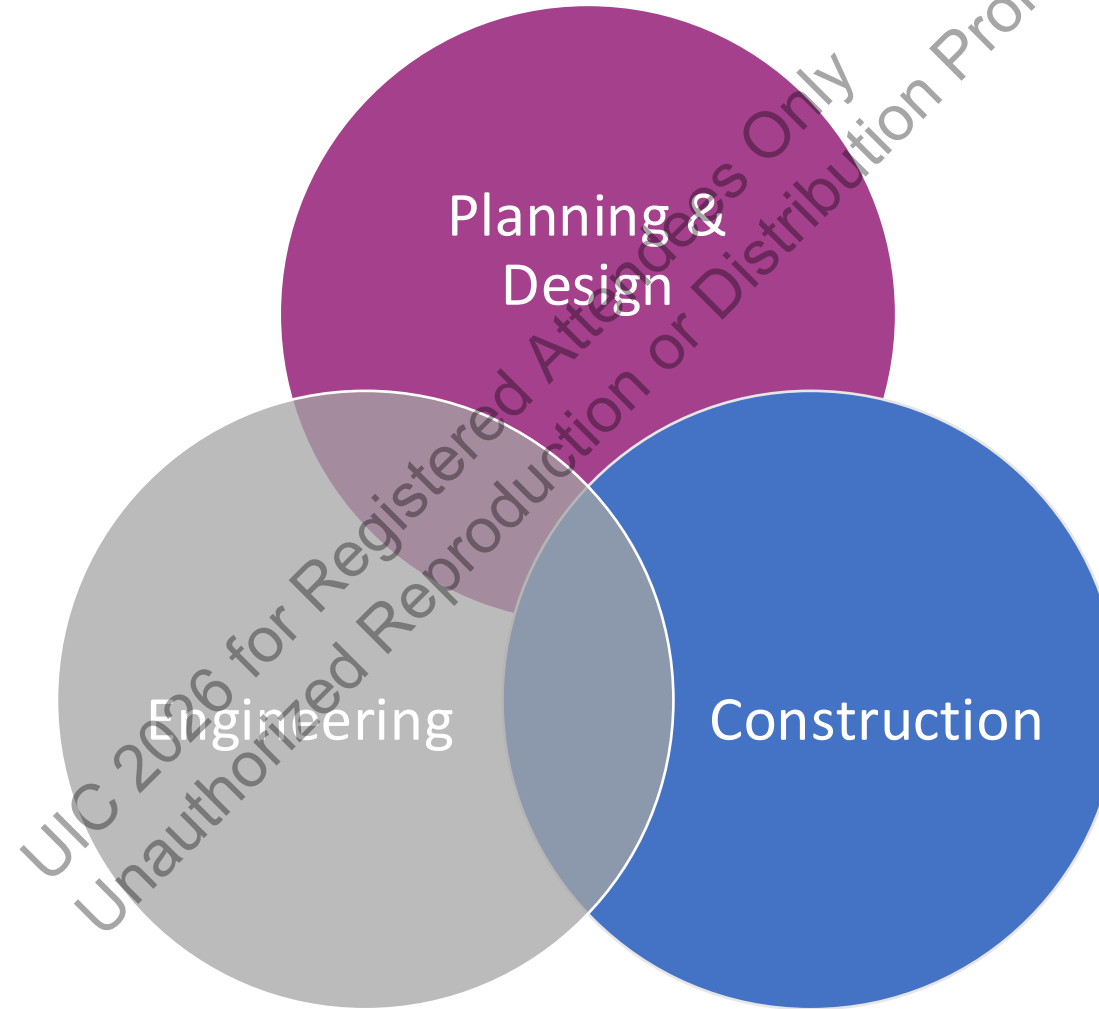
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# Planning, Design and Construction Administration

(PDCA)



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# TRA Planning/Design/ Construction Administration (PDCA)

## Planning

- Hydraulics Group
- Collection System Master Plans
- Flow Monitoring
- Regional Sewer Service Studies



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# TRA Planning/Design/ Construction Administration (PDCA)

## Condition Assessment Group

- Corrosion Studies
- Remaining Useful Life Studies



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# TRA Planning/Design/ Construction Administration (PDCA)

## Engineering Design – Pipelines and Facilities

- \$4.0+ Billion, 5-Year CIP
- 100+ Engineering Consultant Contracts
- \$256 Million in ESAs



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# TRA Planning/ Design/ Construction Administration (PDCA)

## Construction Administration

- Manages 28 Active  
Contracts over \$932  
Million

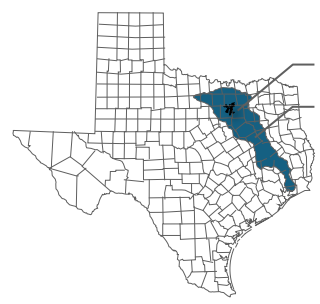


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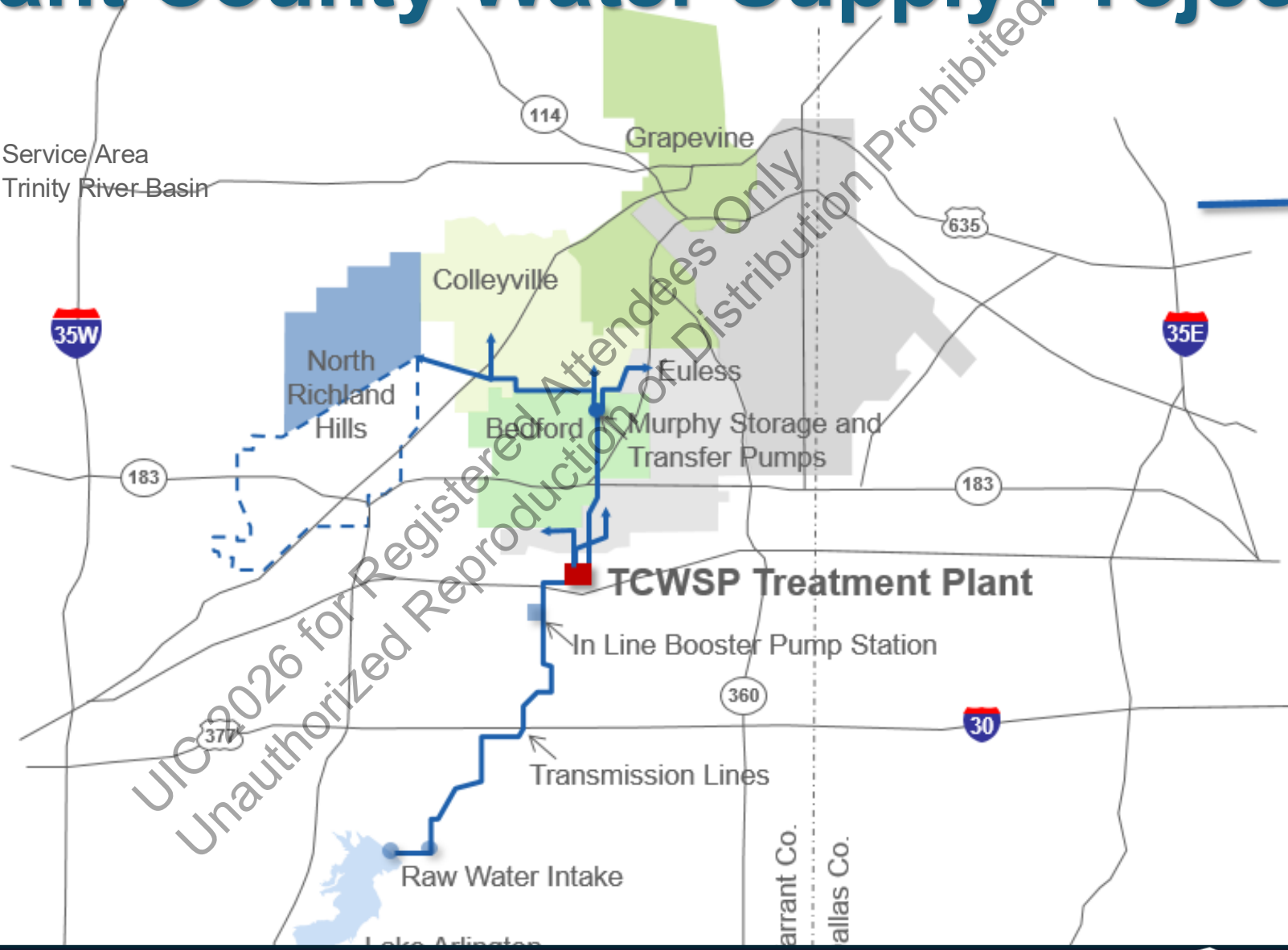
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# Tarrant County Water Supply Project



Service Area  
Trinity River Basin



Raw Water  
and  
Distribution  
System



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# Project Overview: Trinity River Authority (TRA)

Project Dates: Feb 10 – 25<sup>th</sup>, 2025

- Condition Assessment of 48" LCP (L-301) Main with Remote Field Testing (RFT)
- Total Inspection: 2 miles (10,558 ft.)
- Large-diameter transmission main; critical to regional service & growth



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# Project Overview: Trinity River Authority (TRA)

- Aging LCP with unknown internal condition (cylinder corrosion/wire break risks)
- Objective: screen for distress to prioritize rehab and monitoring



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# Project Overview: Trinity River Authority (TRA)

Project Dates: Feb 10 – 25<sup>th</sup>, 2025

Preparations:

- Transmission line isolated and dewatered
- Contractor for top-side support
  - Lifting/loading
  - Confined Space Rescue
- Access Locations opened, ARVs removed

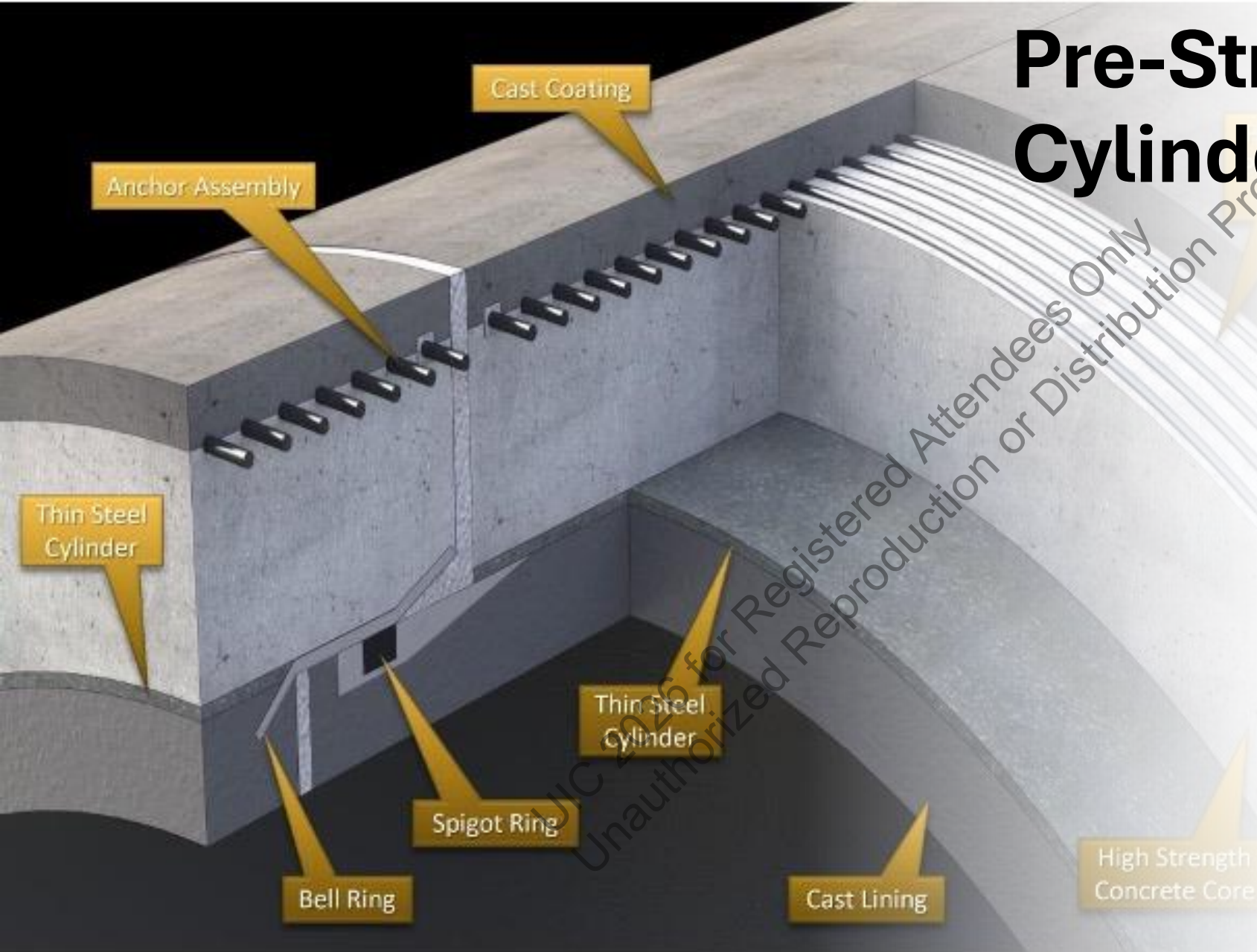


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# Pre-Stressed Concrete Cylinder Pipe (PCCP)



## 3 key components

- High strength concrete core
- Thin steel cylinder
- High tensile pre-stressing wires
- Found in both lined (LC-PCCP) & embedded (EC-PCCP) formats

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# Mechanisms of Failure

- Cracks allow water to corrode pre-stressing wires
- Corrosion continues to the steel cylinder; more water and oxygen accelerate the process
- When enough adjacent wires break, the cylinder fails

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# PCCP Failures

Can be catastrophic and lead to:

- Extended service interruptions
- Sink holes
- Property damage
- Local flooding

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# Inspection Methodology

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# PICA's Advanced NDT Tool

- Remote Field Testing (RFT) technology
- RFT creates a strong electromagnetic (EM) field, with multiple sensors
- RFT non-destructively penetrates to gain high-resolution condition assessment of metallic components



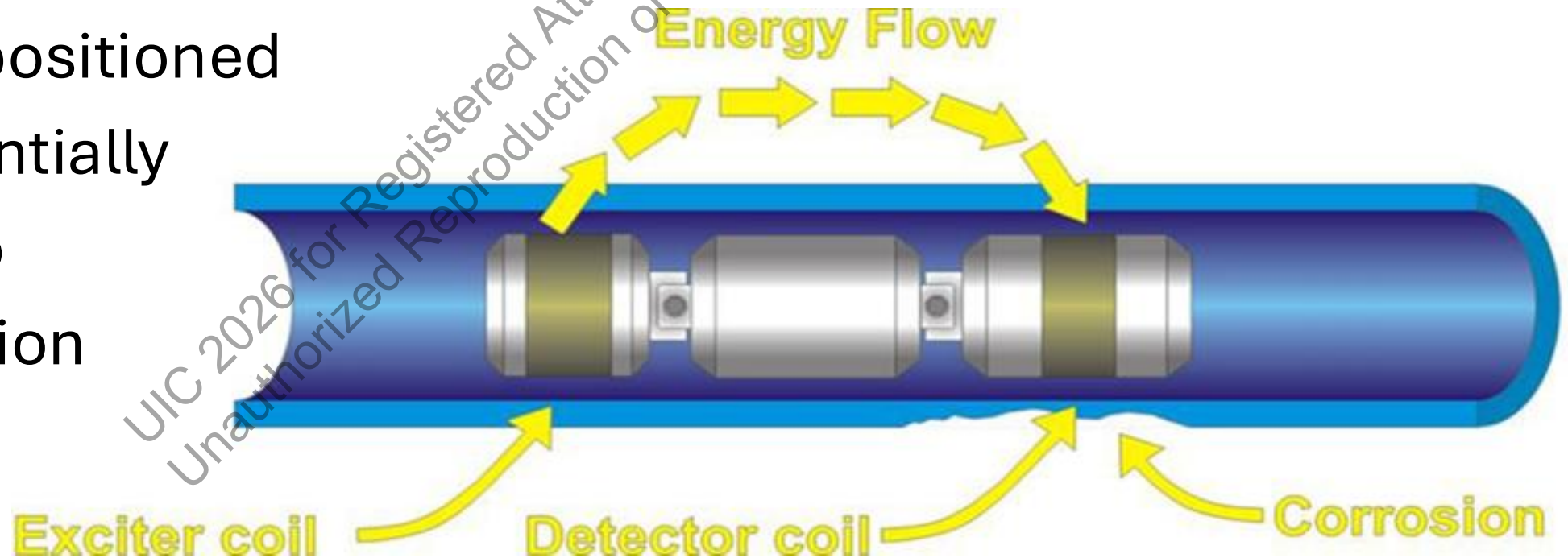
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# PICA's Advanced NDT Tool

- Exciter & detector coil separated by distance  $\geq 2 \times$  pipe diameter
- Measures “time of flight” (phase shift) and strength (amplitude)
- Receivers positioned circumferentially sensitive to clock location

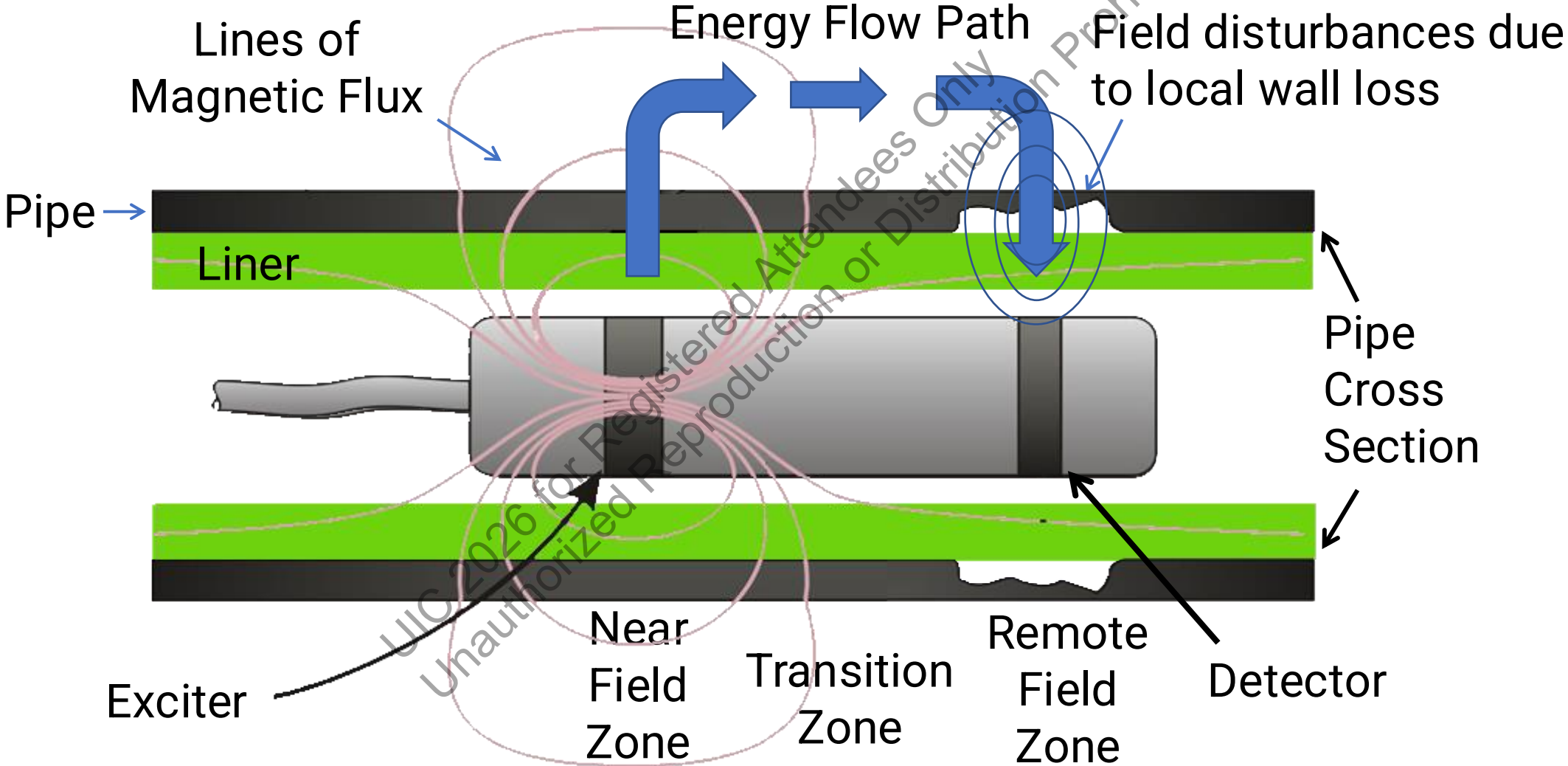


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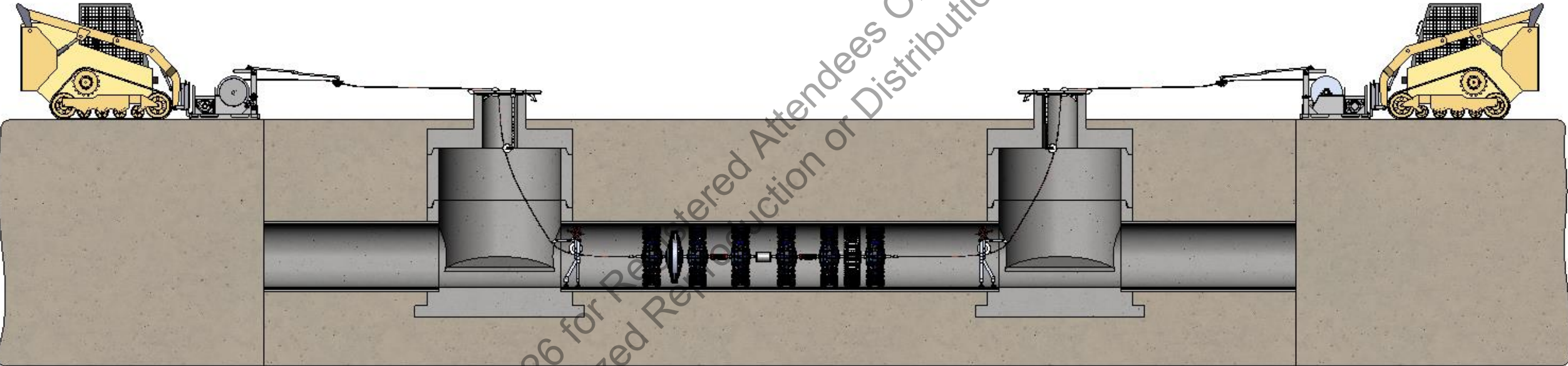
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# PICA's Advanced NDT Tool



# Deployment Method



## Challenges:

- Winch line limited to 6,000'
- Maximum cumulative bends: 270 degrees

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# Deployment Method

## Challenges:

- Accessibility of the pipe at locations needed.
- Access were created to break up inspection length.
- Inspection planning crucial.



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# Deployment Method

## Access Locations:

- 5 vaults
- 4" Air Release Valves (ARVs) with manholes
- Modular RFT tool inserted and built within manhole



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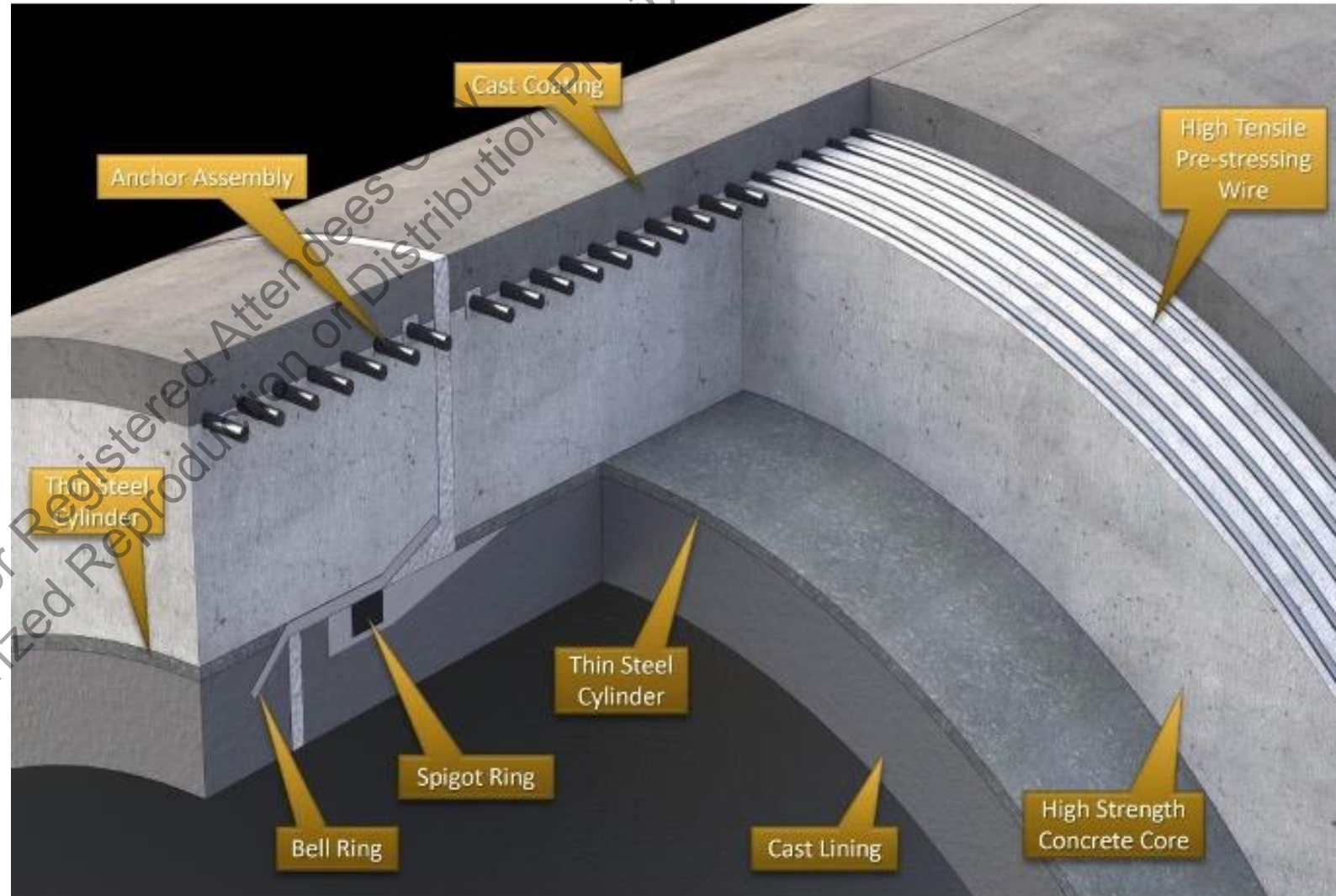
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# PICA's Advanced NDT Tool

**Capable of measuring  
3 variables in PCCP:**

- Steel Wall Thickness
- Broken Wires
- Loss of preload



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# Inspection Results

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# Inspection Results

<i>Analysis Results Summary</i>	
<b>Number of Pipe Segments (excluding features):</b>	<b>652</b>
<b>Number of Analyzed Pipe Segments:</b>	<b>607</b>
<b>Total Number of Defects Reported:</b>	<b>186</b>
• <i>Number of indications with &lt;20% RW</i>	<i>0</i>
• <i>Number of indications with 21-40% RW</i>	<i>24</i>
• <i>Number of indications with 41-60% RW</i>	<i>95</i>
• <i>Number of indications with 61-80% RW</i>	<i>67</i>
<b>Number of Pipes with Wire Break (WB) Indications:</b>	<b>3</b>
<b>Total Number of WB Regions Identified:</b>	<b>4</b>
• <i>Number of indications with 1-5 WB</i>	<i>4</i>
• <i>Number of indications with 5-10 WB</i>	<i>0</i>
• <i>Number of indications with &gt;10 WB</i>	<i>0</i>
<b>Total Number of Anomalous Indications Identified:</b>	<b>1</b>

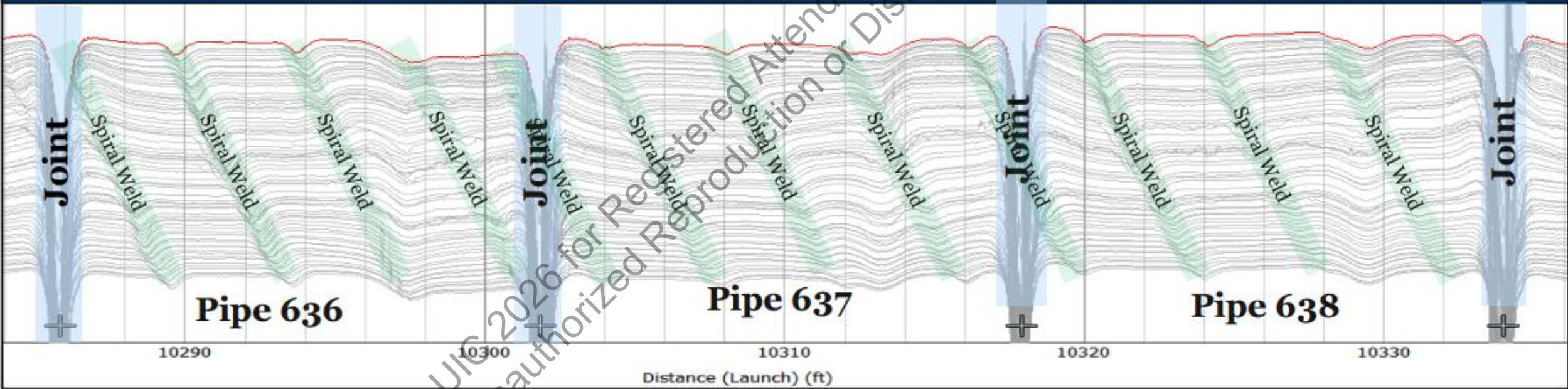
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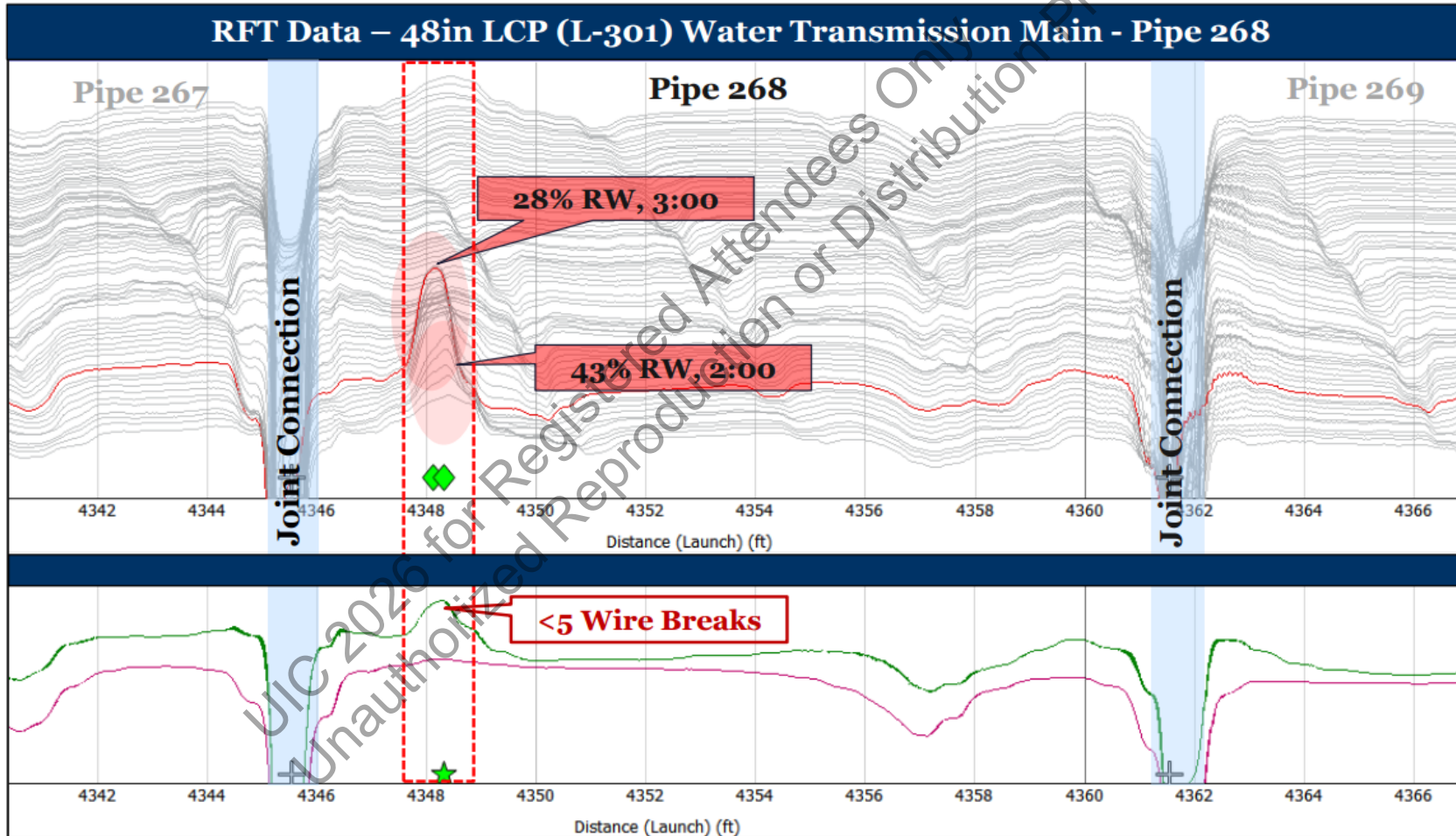


# Inspection Results

RFT Data – 48in L-301 Water Transmission Main – Spiral Welds



# Inspection Results



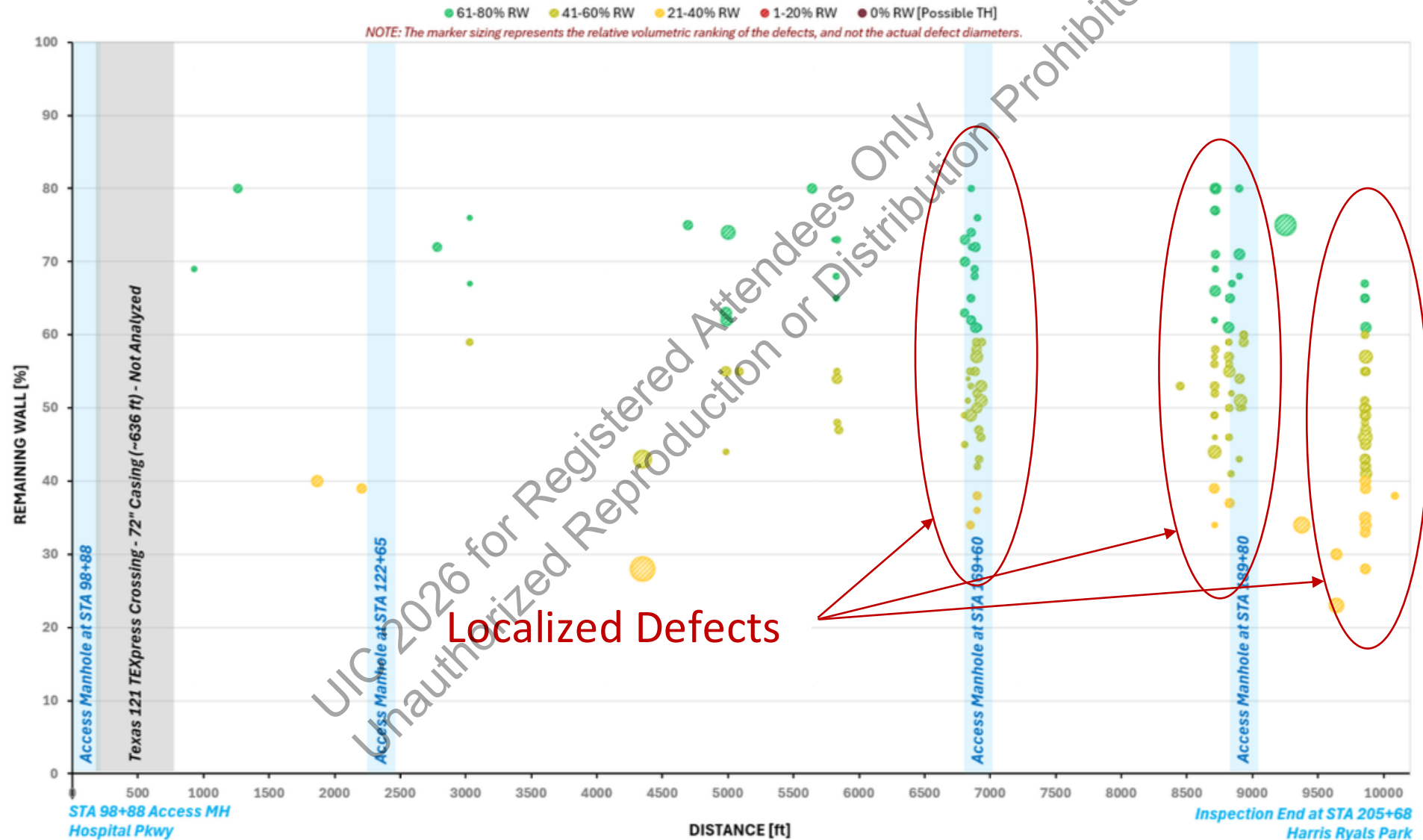
RFT data for Pipe 268, with a distress region identified containing two (2) cylinder defects

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# Inspection Results

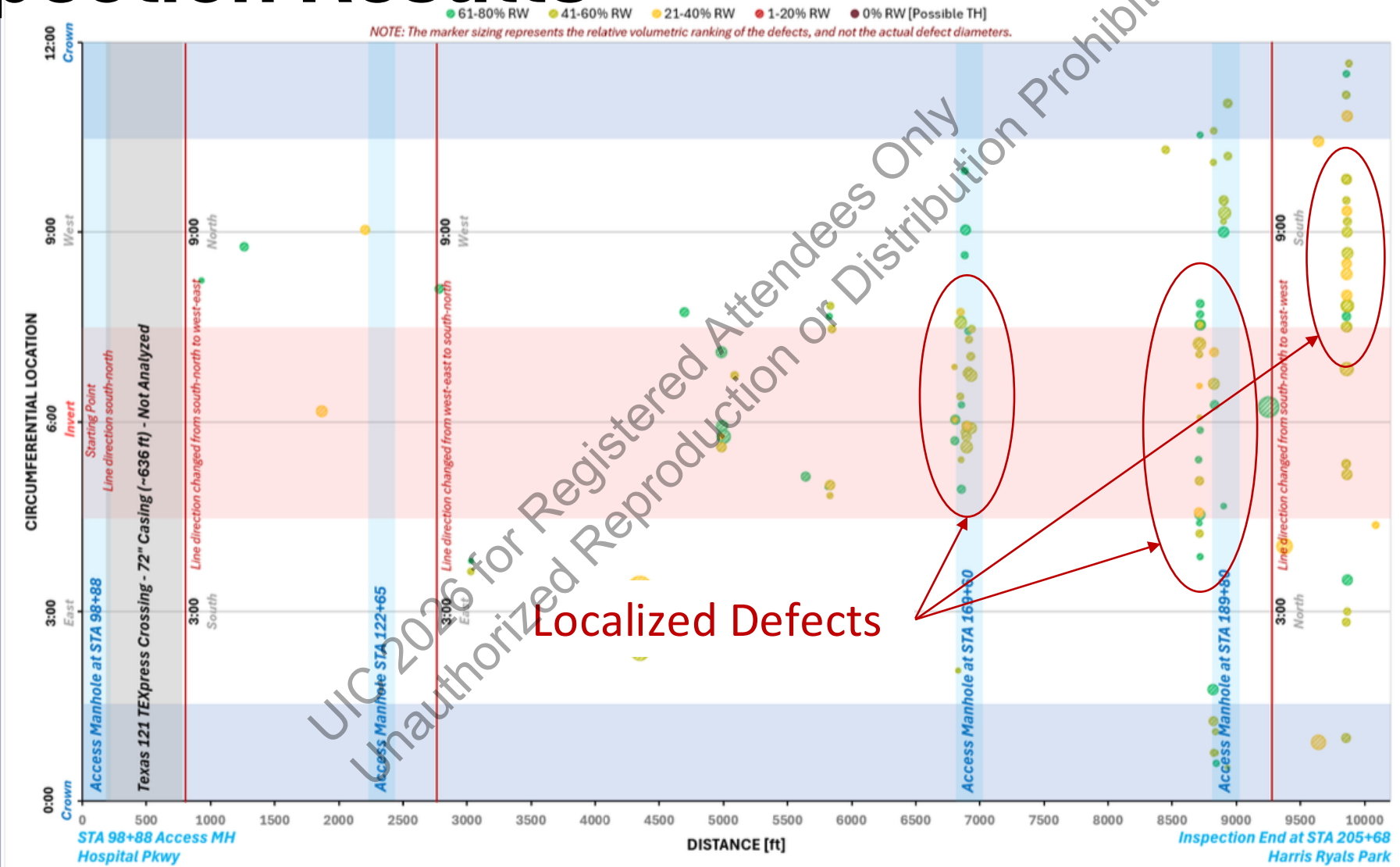


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# Inspection Results



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# Lessons Learned

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# Lessons Learned

- Isolation proving conducted early
- Dewatering and traffic control are schedule critical
- Lack of sufficient access points creates inspection complexities
- Prepare for the unknowns



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# Lessons Learned



6" pump brought in



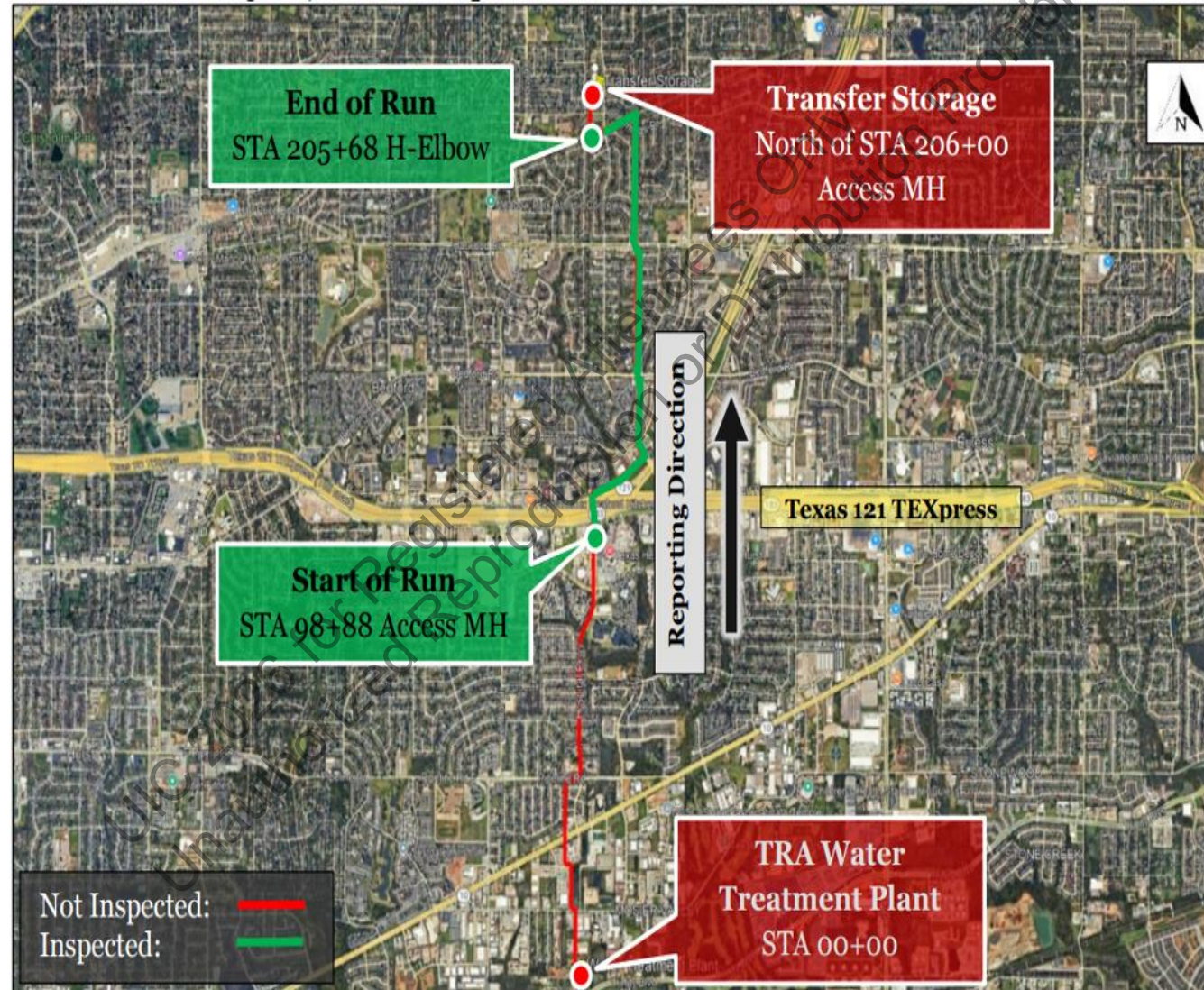
High water level



Open gate valve



# Pipeline Map



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# Questions?



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