



# 14 Mile Road Transmission Main Management

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# Key Take Aways

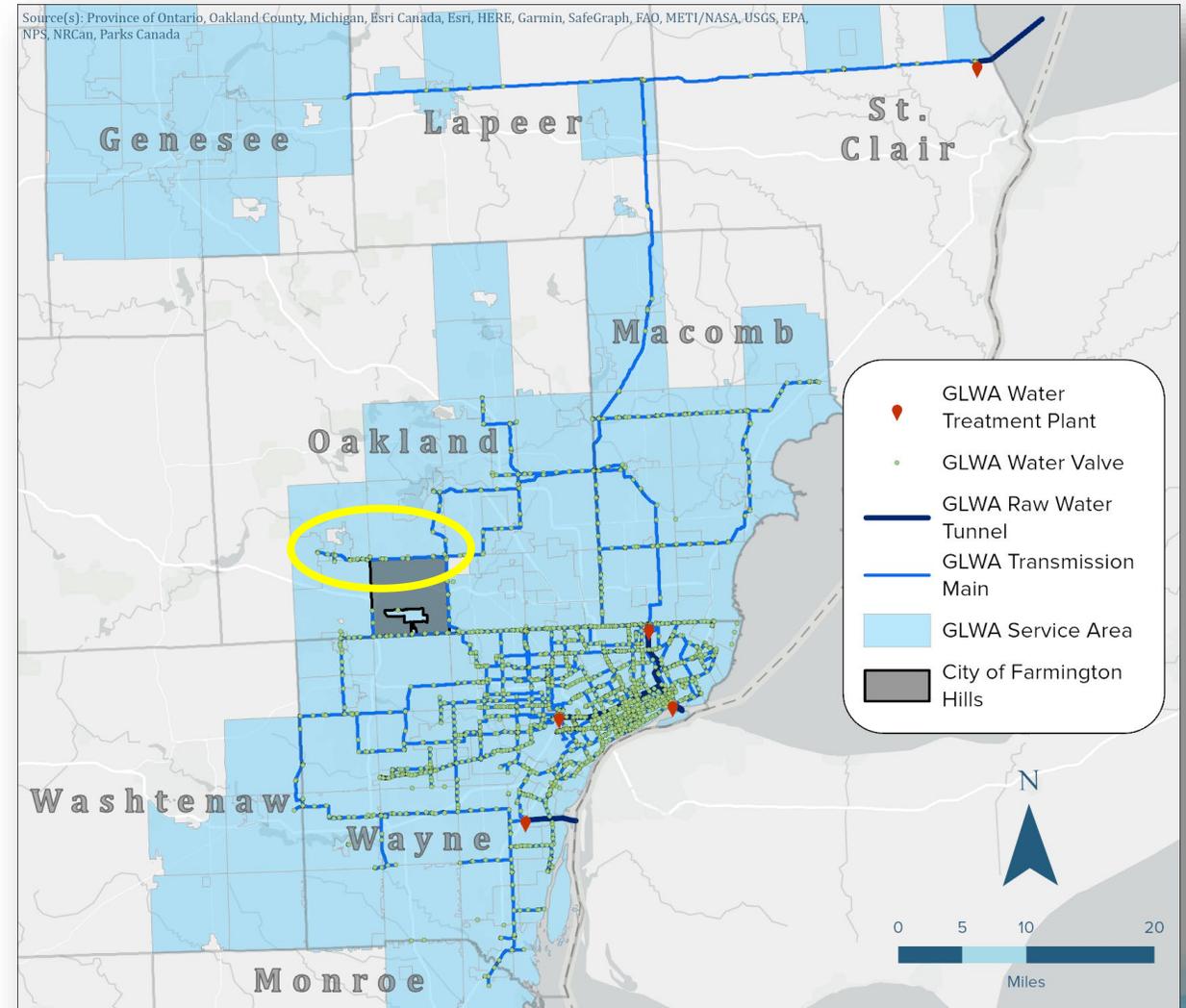
- ◆ Proactive pipeline management of the 14 Mile Road Transmission Main has averted multiple catastrophic failures
- ◆ Piloted technologies used to assess the condition of this main have proven successful
- ◆ The risk of another pipeline disruption on this main is greatly reduced....but is not zero
- ◆ Additional reoccurring condition assessments and future renewals will be required to continue to manage and reduce risk

A dynamic background image featuring a horizontal splash of clear water with numerous bubbles and droplets, set against a light blue gradient. The water splash is centered horizontally and spans most of the width of the image.

# BACKGROUND PCCP, Inspection & Renewal Technologies

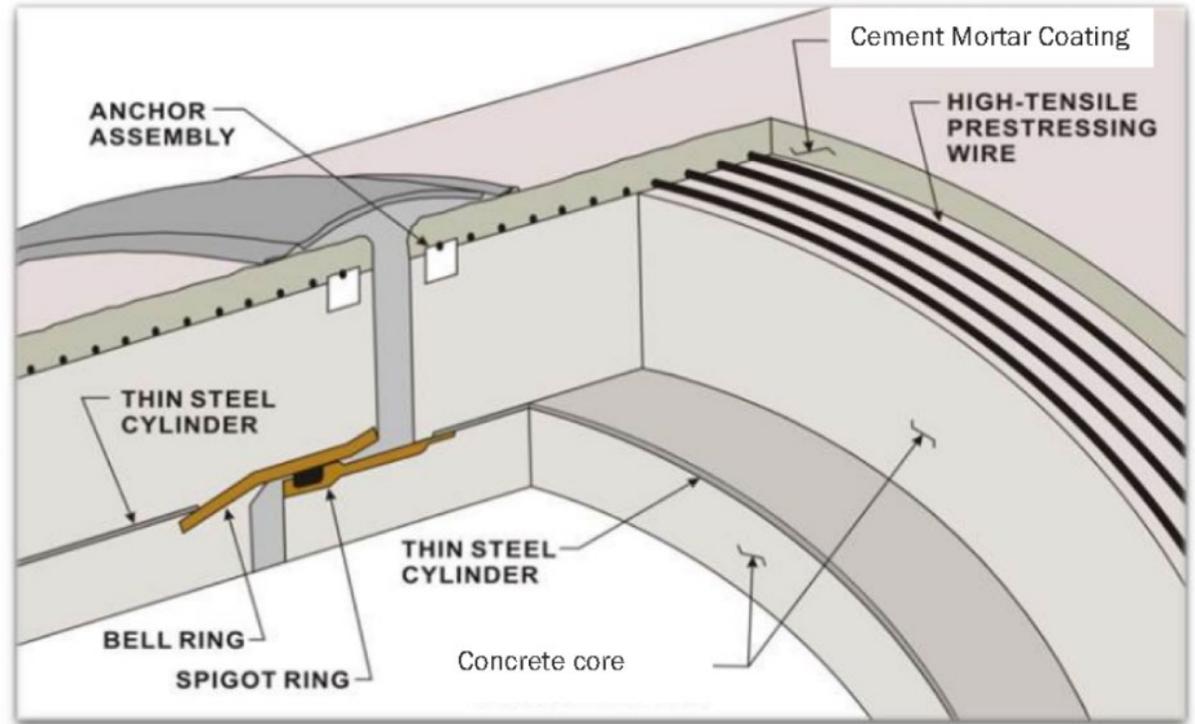
# 14 Mile Transmission Main

- 💧 Prestressed Concrete Cylindrical Pipe (PCCP) constructed in 1960's & 1970's
- 💧 Condition assessment is challenging:
  - 💧 14 Mile Road main is singly fed
  - 💧 Large diameter (42-inch to 54-inch)
  - 💧 High operating pressures
  - 💧 Pipeline access is difficult



# Prestressed Concrete Cylindrical Pipe (PCCP)

- 💧 Custom built “Pipe System”
- 💧 Primary failure mode is broken wire wraps due to corrosion and/or hydrogen embrittlement
- 💧 Determination of the number of broken wire wraps in each pipe segment is critical to understanding the remaining pipe strength



# Pipeline Condition Assessment Technologies

- 💧 Electromagnetic Inspection
  - 💧 Free-Swimming Xylem PipeDiver
  - 💧 Piloted Xylem PipeWalker
- 💧 Acoustic Inline Leak & Air Pocket Detection - Xylem SmartBall
- 💧 Visual & Sounding Inspection
- 💧 Engineering Analysis

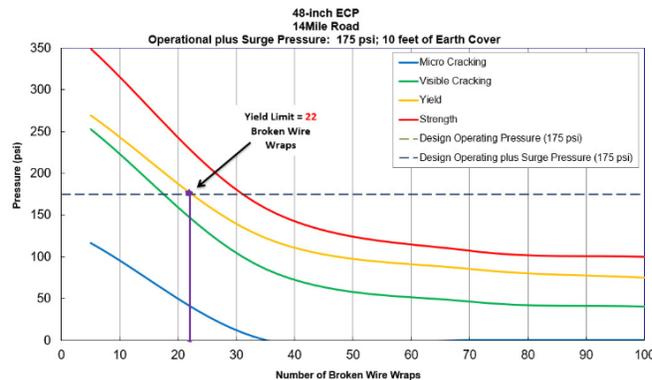
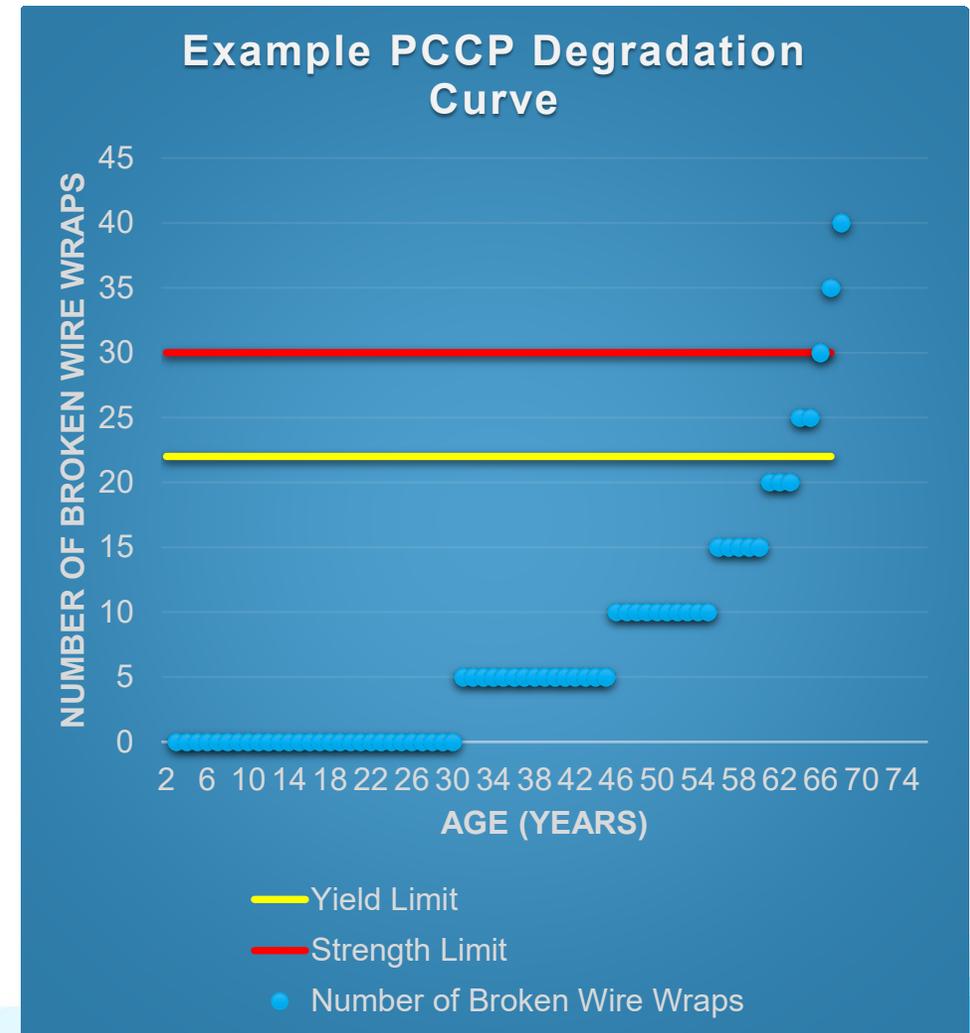


Figure C.2: FEA Performance Curve for a 48-inch WS-196 ECP

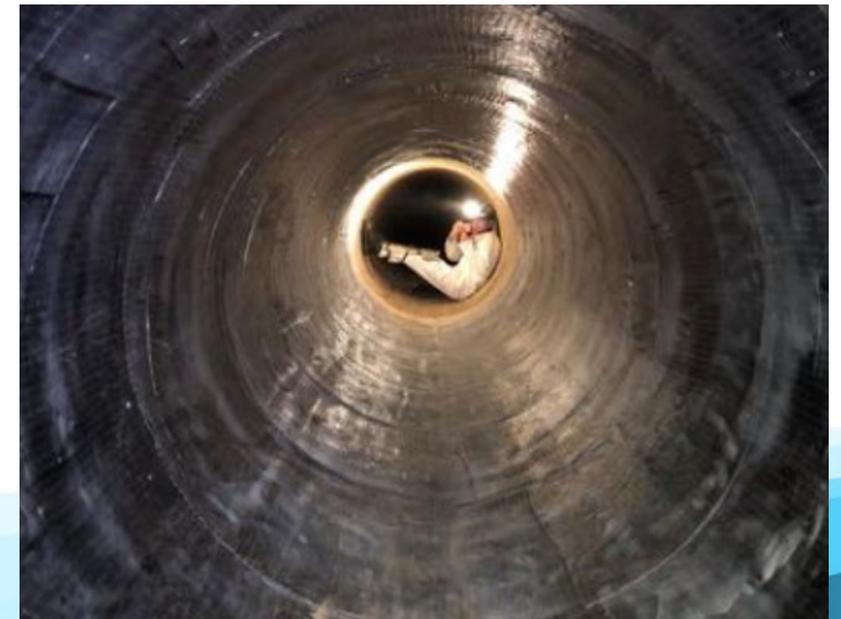
# Making Sense Of Broken Wire Wraps

- 💧 Inspection results provide an estimate of the number of broken wire wraps
- 💧 Based on the pipe design, wire breaks are acceptable up to a certain limit
- 💧 Once the pipe reaches a critical number of wire breaks, intervention (renewal) is needed
- 💧 An accelerated rate of wire breaks over time indicates that a pipe segment may be nearing the end of its useful life



# Pipeline Renewal/Strengthening Technologies

- 💧 Carbon Fiber Reinforced Polymer (CFRP)
- 💧 Targeted Pipe Segment Renewal Based on Inspection Results & Engineering Analysis
- 💧 Extend the Effective Useful Life >50 Years

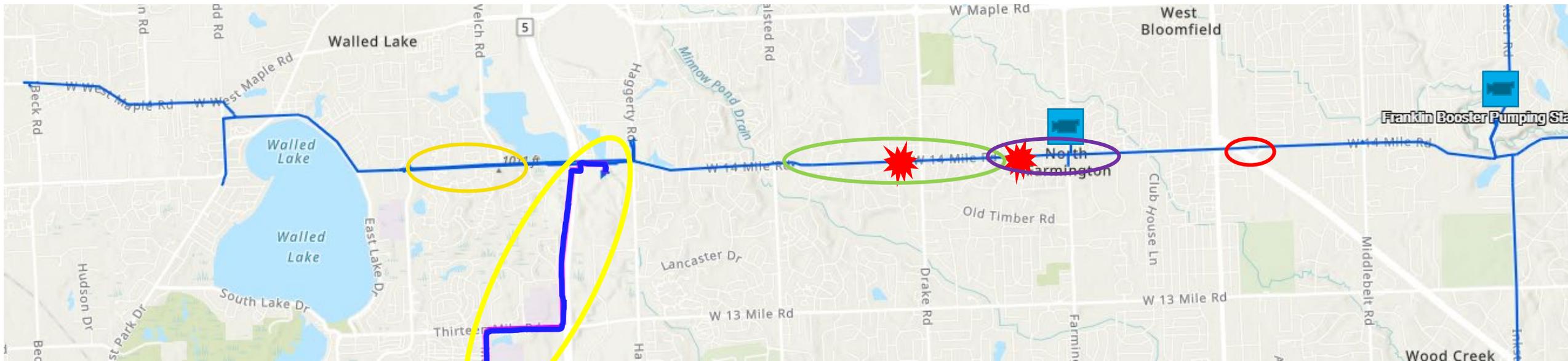


A dynamic background image featuring a horizontal splash of clear water against a light blue gradient. The water is captured in mid-air, with numerous droplets and bubbles visible, creating a sense of movement and freshness. The overall color palette is various shades of blue, from light to deep navy.

# 14 MILE TRANSMISSION MAIN SUMMARY OF EVENTS

# 14 Mile Road Transmission Main Recent Events

- ◆ Fall 2016: 14 Mile Loop Project Considered in 2017 CIP
- ◆ Fall 2017: Main Disruption
- ◆ 2019: Piloted Pipe Inspections
- ◆ 2019: 14 Mile Loop Project Expedited
- ◆ Fall 2021: Main Disruption
  - ◆ Nov 2021: Reinspection Confirming Results of Previous Inspection
  - ◆ Nov 2021: Performed Pipeline Renewals Within Shutdown Area
- ◆ Fall 2022: Performed Pipeline Renewals Coordinated with 14 Mile Loop Project
- ◆ Winter 2023: Performed Pipeline Renewals as Part of a Large-Scale Coordinated Effort
- ◆ Winter 2024 Planned Completion of 14 Mile Loop



# 2019: 14 Mile Condition Assessment Results

## 💧 2019 Condition Assessment Results

### 💧 SmartBall assessment (9.3 Miles)

- 💧 Identified 3 leaks at appurtenances that have been repaired

### 💧 PipeDiver Inspection (2,623 Pipes)

- 💧 3.9% Pipes with broken wire wraps (Same as industry average of 3.9%)

## 💧 Expedite 14 Mile Loop

# 2021: 14 Mile Condition Assessment Results

- Disruption of service allowed for a partial reinspection

- 2021 Partial Reinspection

  - Piloted PipeWalker Inspection

    - Confirmed results of 2019 Inspections

  - Visual & Sounding Inspection

    - Identified a pipe in “Incipient” Failure

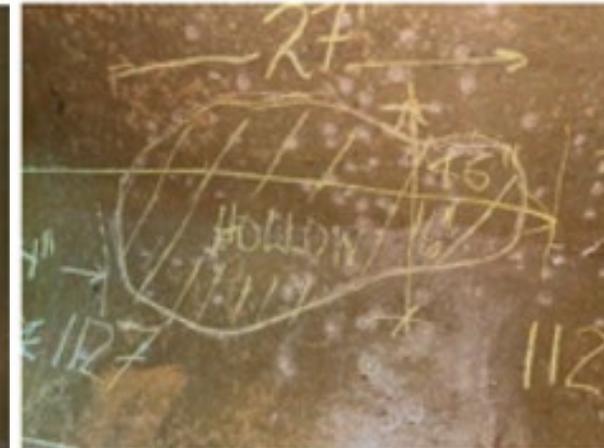
    - Longitudinal cracking and hollows

- Results:

  - Immediate renewals necessary

  - Plan for renewals prior to loop

**incipient** adjective  
in-'cip-i-ent (in-'si-pē-ent)  
Synonyms of *incipient* >  
: beginning to come into being or to become apparent



# 2023: 14 Mile Expedited Renewals In-Progress

- Due to the recent disruptions, inspection results, and consequence of this pipeline failing, these renewals were prioritized & expedited
- Without the 14 Mile Loop in service, operational challenges were overcome which required:
  - Modifications of GLWA and member partner operations
  - Temporary booster pump station within Farmington Hills
- Renewals completed March 2023
  - 4 segments of 48-inch and
  - 632 feet of 54-inch renewed
  - Using Carbon Fiber Reinforced Polymer (CFRP)
- Pipeline is anticipated to be back into service by April 1, 2023



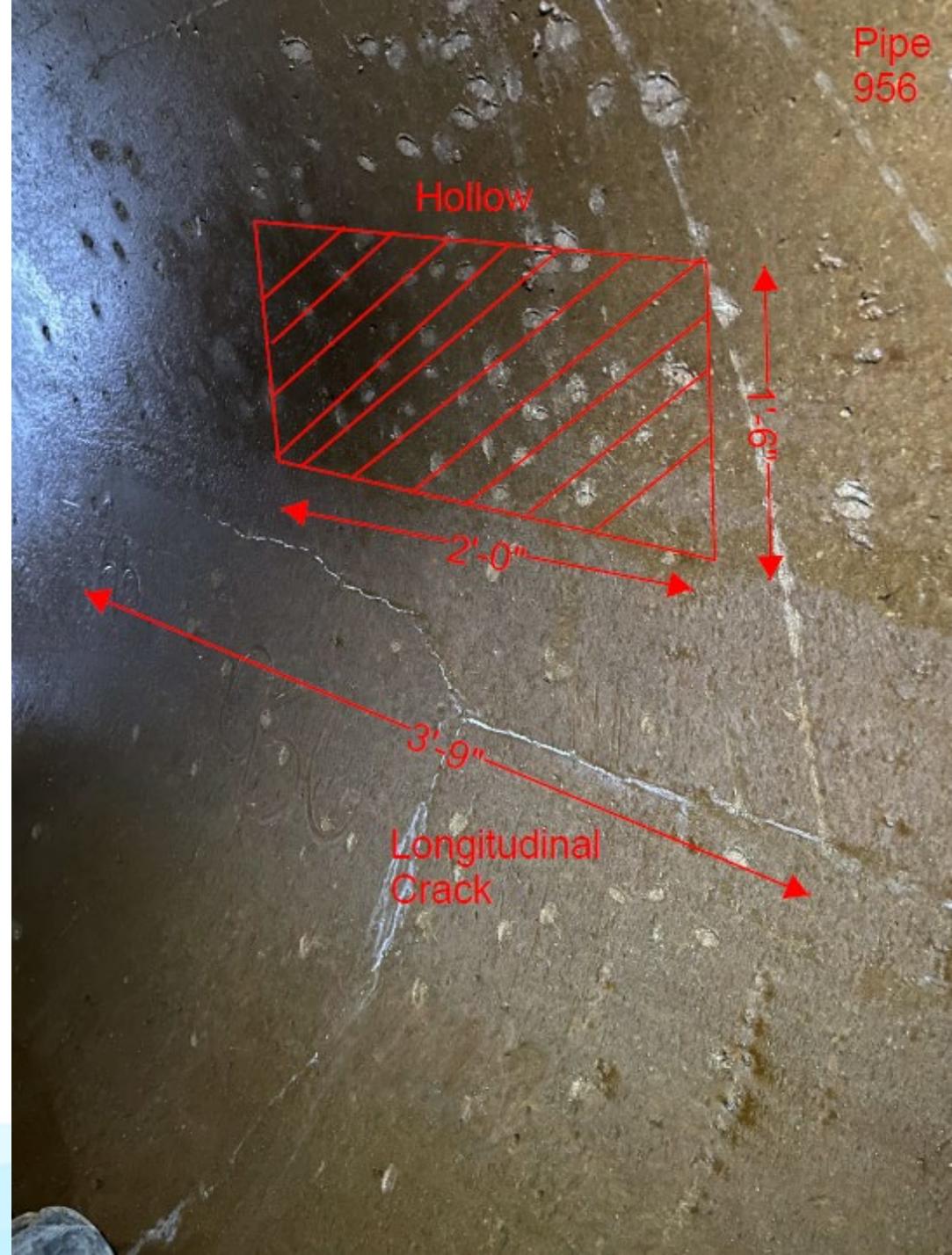
# 14 Mile Condition Assessment Results

## 💧 2023 Partial Visual & Sounding Inspection

- 💧 Identified a pipe in “Incipient” Failure
- 💧 Longitudinal cracking and hollow

## 💧 Results:

- 💧 Confirmed the urgent need to proactively renew these pipe segments prior to the completion of the 14 Mile loop



# 14 Mile Road Transmission Main Summary of Renewals

## 💧 Distressed Pipes

- 💧 102 of 2,623 pipes with broken wire wraps (3.9%)
- 💧 Renewals recommended for 48 of those pipes

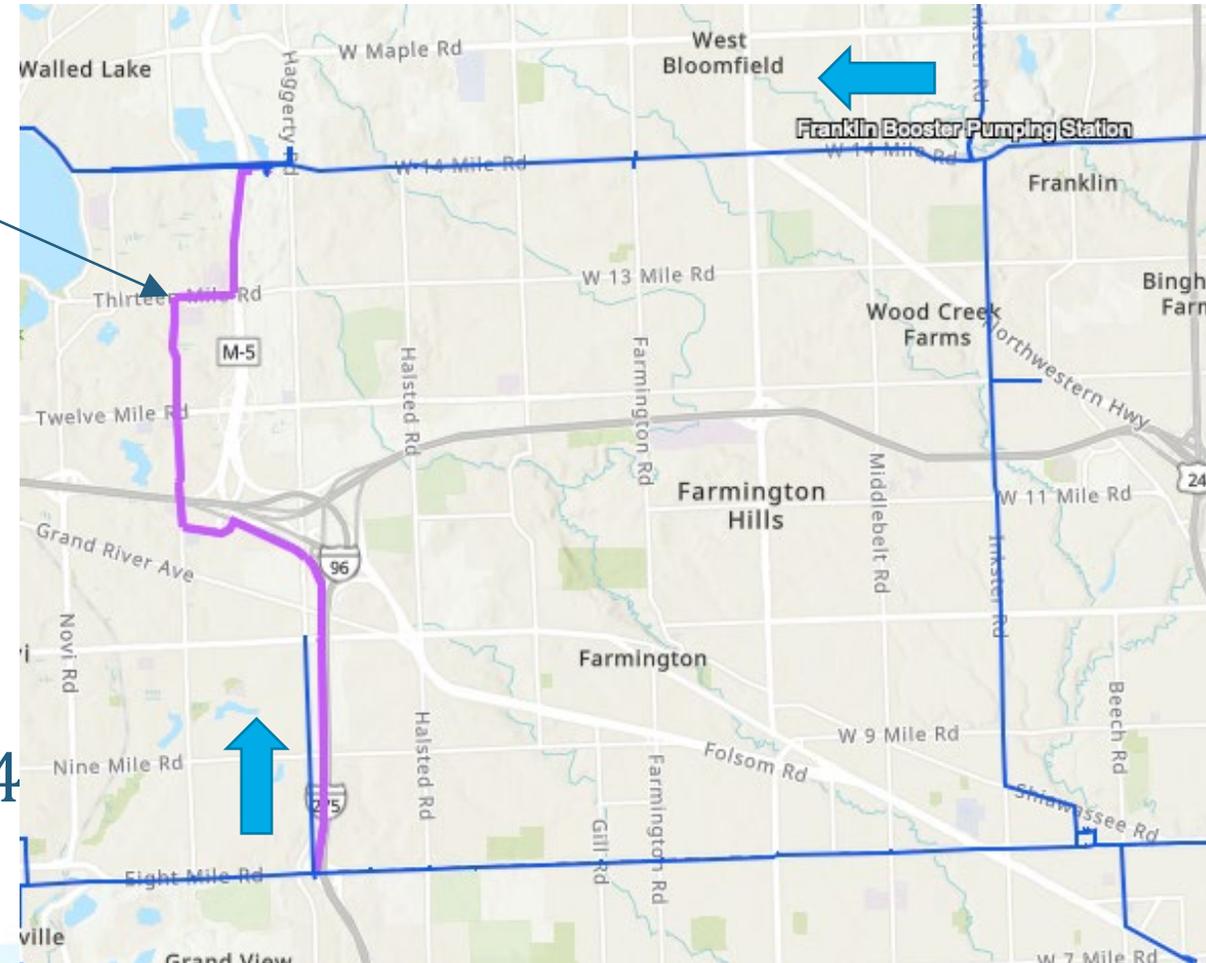
## 💧 Total Proactive Renewals

- 💧 66 pipes renewed
  - 💧 Additional pipes strengthened near the DTE high-pressure gas facility
- 💧 54 pipes remaining with acceptable levels of broken wire wraps to manage into future



# 14 Mile Road Added Resiliency & Redundancy

- 💧 8 Mile Road to 14 Mile Road loop will provide redundancy
- 💧 Will provide service from both the east and the south in the event of a disruption
- 💧 Significantly lowers the consequence of failure of a disruption
- 💧 Expected completion by early 2024

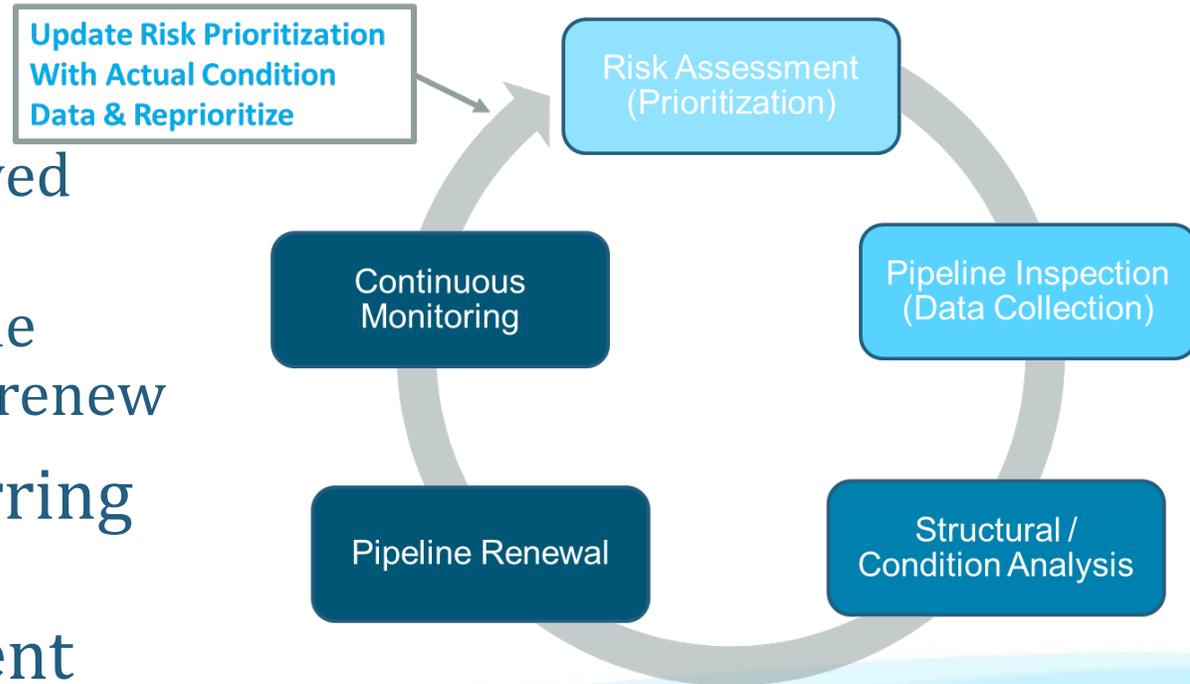


# 14 Mile Road Future Pipeline Management

💧 14 Mile transmission main will require periodic reinspection

- 💧 Address future degradation of pipe segments
- 💧 Inspect condition of the CFRP renewed segments
- 💧 Will be significantly easier to take the pipeline out of services to inspect & renew

💧 Included in the long-term, reoccurring Linear System Integrity Program cyclical process of pipe management



# Key Take Aways

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Thank You!  
Questions and Comments?

