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Let's Solve Water

From Risk
Proactive
Assessme
Prioritized

Crofton Mill's Critical Water Supply Pipeline

November 03, 2025

Crofton Mill Water Supply Pipeline

1200mm Pipe Diameter

14 km Inspection Length

AWWA C303 BWP/Steel
Pipe Material

40-120 psi Pressure

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Inspection History

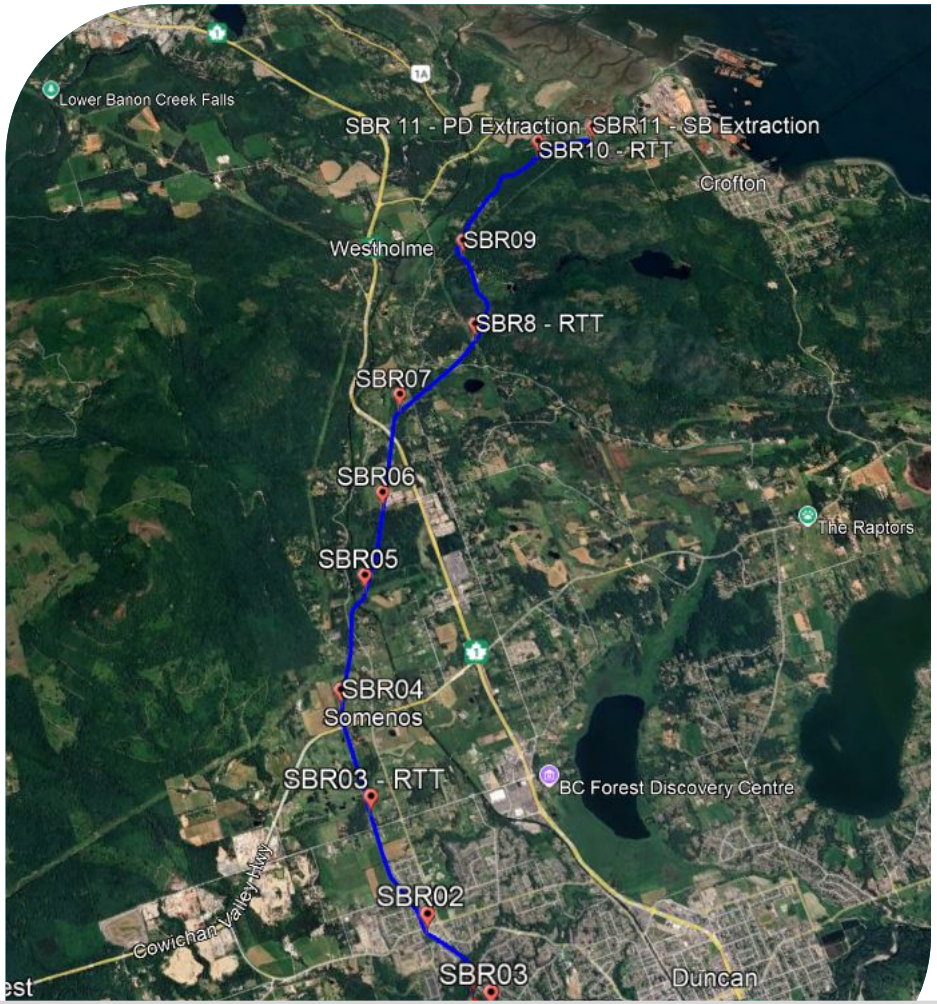
2005-2023

0.8km/86 Pipes Inspected in 2005
PureRobotics

14km/1,252 Pipes Inspected in 2018/2023
SmartBall/PipeDiver

1 Air Pocket/1 Entrained Air

02 pipes in 2005
30 pipes in 2018
18 pipes in 2023



Inspection result represents the distress rate of 1.43 percent, close the Canadian average distress rate for BWP of 1.5 percent.

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AWWA C303 Bar Wrapped Pipe (BWP)

- BWP is a semi-rigid pipe that has a composite structure consisting of an inner lining, a steel cylinder, steel reinforcing bar wraps, and an outer coating..
- In BWP, the pipe is designed according to a flexible pipe design
- Deterioration can begin on the bars or on the cylinder
- The integrity of the mortar coating is essential to protect the steel against corrosion and premature failure

Pipeline Failure History

1961-2020

April 2016 Failure

Location: STA 324 + 64 (Section 2)

June 2017 Failure

Location: STA 17 + 96 (Section 1)

February 2020 Failure

Location: Upstream of Somenos Road Crossing

Cause of Failure

2016: Farming area, low depth of cover, external corrosion
2017: Pipe was identified with distress in 2005
2020 : Failed near anomalous pipe

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Pure Technologies' approach to pipeline management

Full lifecycle asset management planning

01 System risk analysis & planning

Prioritize pipelines for assessment

02 Inspection & monitoring

Understand current condition

03 Engineering & advanced analytics

Understand structural condition & forecast future condition

04 Risk mitigation & asset management

Address risk & protect the pipeline into the future

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Condition Assessment Scope of Work

The 2023 condition assessment covered the same inspection scope as the 2018 inspection

PipeDiver

Purpose: Pipe Wall Assessment (quantify and locate broken bar wraps)

SmartBall

Purpose: Leak and Gas Pocket Detection

Transient Pressure Monitoring

Purpose: To collect actual operating pressure data for 30 days

Condition Assessment Engineering

Purpose: Provide Actionable Recommendations
Finite Element Analysis (FEA)

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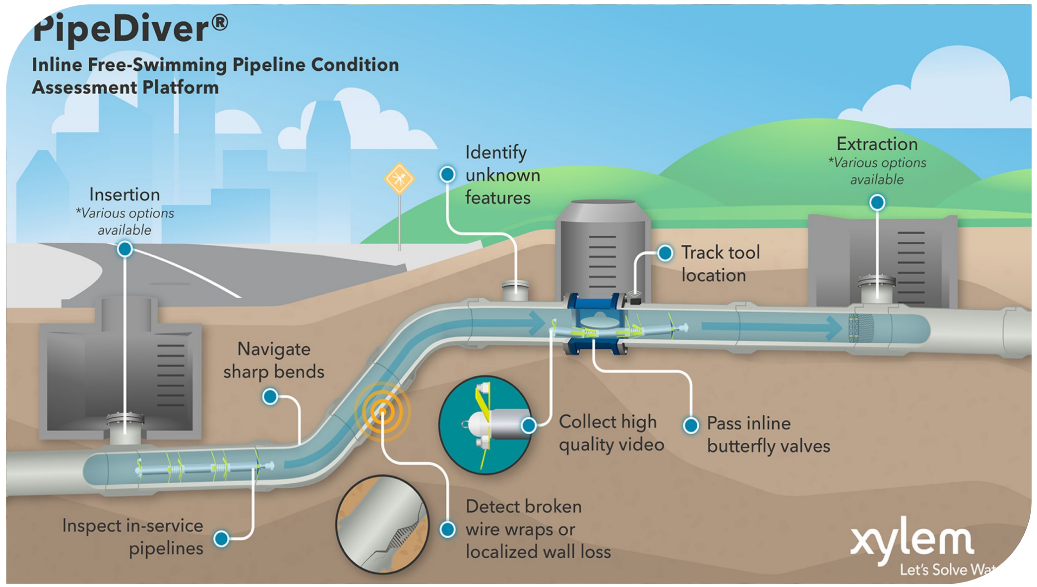
Overview of Inspection Tools

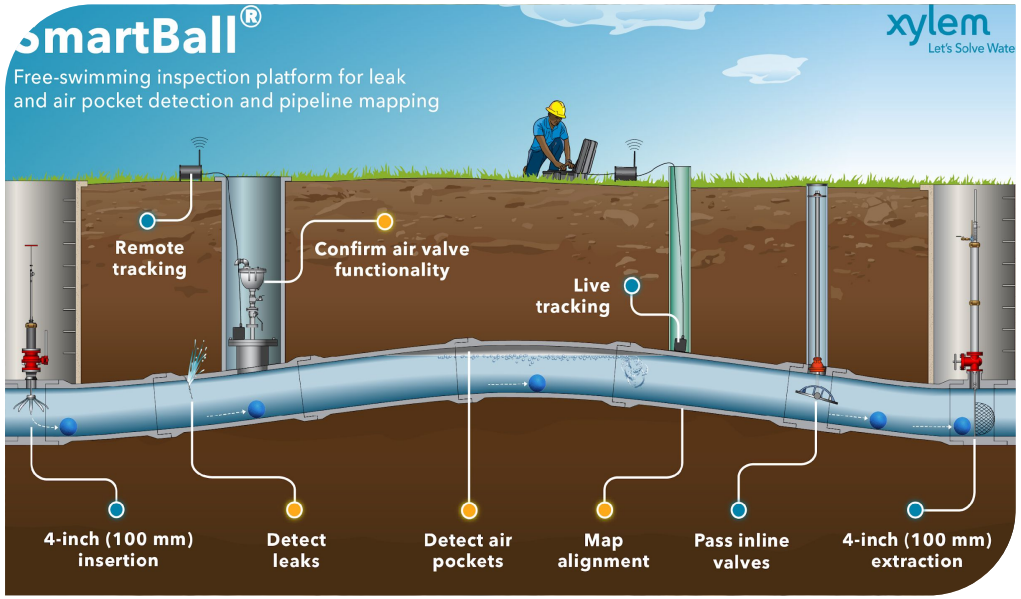
PipeDiver Inspection



PipeDiver Access

16inch (400mm)
Pressurized/Depressurized Options Available

SmartBall Inspection



SmartBall Access

4inch (100mm)
Pressurized/Depressurized Options Available

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SmartBall Insertion, Extraction and Tracking (2 Runs)

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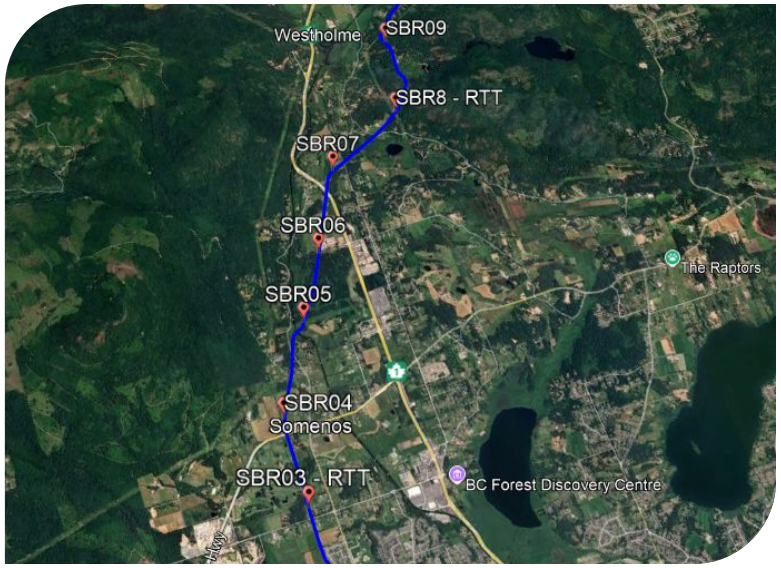
PipeDiver Insertion, Extraction and Tracking (2 Runs)

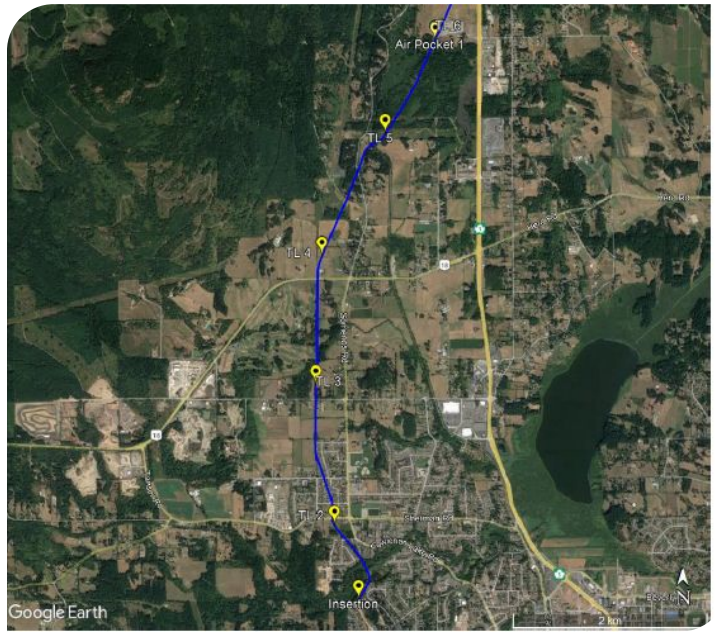


SmartBall Inspection Result

2023 Inspection

Section 1

Pipe Material	Total Length Inspected	Total Number of Leaks
BWP/Steel	918 meters	0



Section 2

Pipe Material	Total Length Inspected	Total Number of Leaks
BWP/Steel	13,186 meters	0

Section 1:
No leaks and air pockets.

SmartBall Inspection was completed within 5 hours

Section 2:
No leaks
01 air pocket and 1 entrained air.

Free-swimming technology minimizes service disruption.

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PipeDiver Inspection Result

2023 Inspection

Section 1

Pipe Material	Number of Inspected Pipes	Pipes with Broken Bar Wraps
BWP	73	01

Section 2

Pipe Material	Number of Inspected Pipes	Pipes with Brocken Bar Wraps
BWP	1179	17

Section 1:
01 pipe identified with broken bar wraps.

PipeDiver Inspection was completed with less than 5 hours

Section 2:
17 pipe identified with broken bar wraps.

Free-swimming technology cover long inspection runs in single deployment.

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Comparison of the Inspection Results

2018 v/s 2023

1. Four (4) pipes have become newly distressed since the 2018 inspection.

2. Four (4) pipes exhibited an increase in broken bar wraps due to distress growth since the 2018 inspection.

3. Total of 25 previously distressed pipes have been replaced with HDPE pipes.

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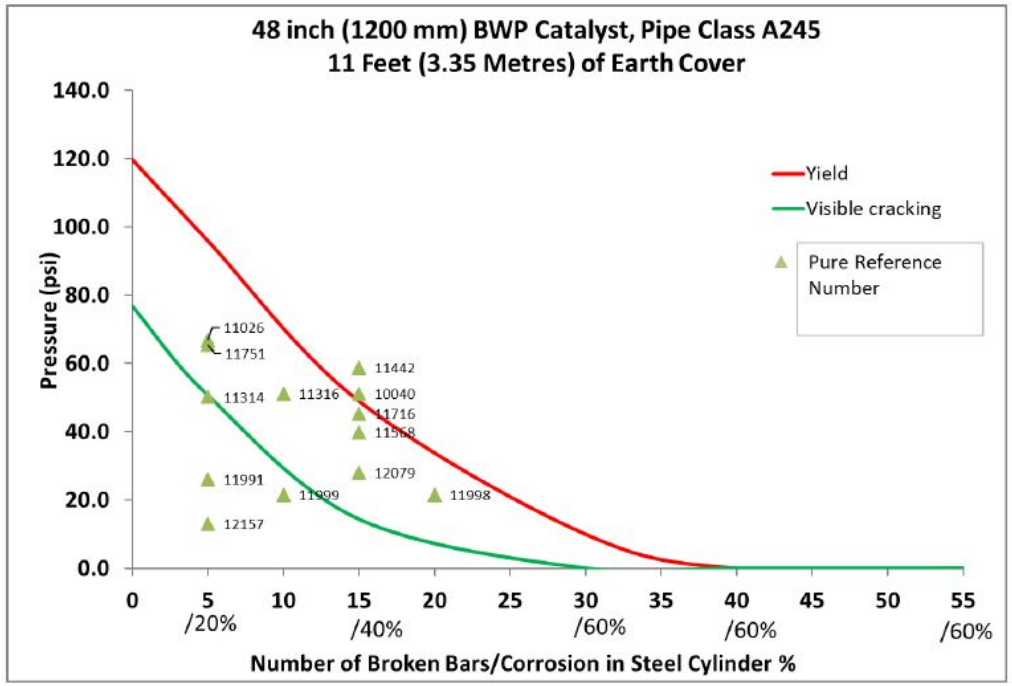
Condition Assessment Engineering

Structural Analysis

1. FEA model to predicts that the pipe meets or exceeds the Yield Limit.
2. Other variables should be evaluated when determining the risk.
3. 02 pipes exceed their yield limits.
4. 10 pipes exceed their visible cracking limit



FEA Based Performance Curve

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Crofton Waterline Upgrade Strategies

Summary of the program

- Risk Register Developed Based on Xylem Report Findings
- Risk Register Used to Develop and Progress Multiyear Investment Strategy
- Total Mill Outage every 3 years for In-line repairs and Parallel Bypass Tie-ins
- Emergency Repair Kit on Standby

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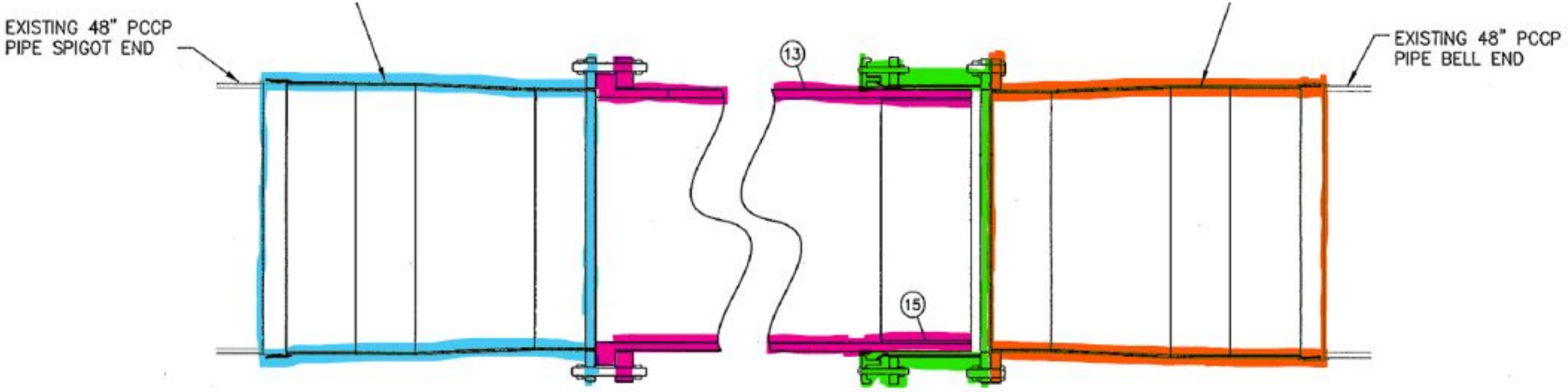
Crofton Waterline Upgrade Strategies

In-Line Pipe Replacement



Steel Bell Adapter → **HDPE Spool (Flange + Back Up Ring + Pipe)** → **Flanged Coupling Adapter (Robar)** → **Steel Spigot Adapter**

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Crofton Waterline Upgrade Strategies

In-line Pipe Replacement

In-line Pipe Replacement

Spigot Adapter Connection

Bell Adapter Connection

Total Mill Outage June 2025

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Crofton Waterline Upgrade Strategies

Paralleled Bypass Tie-ins

Gibbins Rd South Tie-in

Gibbins Rd North Tie-in

Surge Tower Tie-in Connection

Total Mill Outage June 2025

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Conclusion and Recommendation

2023 Inspection and Condition Assessment

1. **18 pipes between 5 and 25 broken bar wraps.** *(4 taken out of service in 2025)*
2. **02 pipes exceeded yield limts.** *(Both pipes were taken out of service in 2025)*
3. **Consider opportunistic repair on pipe nearing yield limits.** *(Planning in progress)*
4. **Inspect air release valves** *(Valves are on a periodic inspection route)*
5. **Reinspection in 5 years.** *(Reinspection being planned following the next TMO)*

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