



Delivering Infrastructure Innovation: From Pilot to Practice

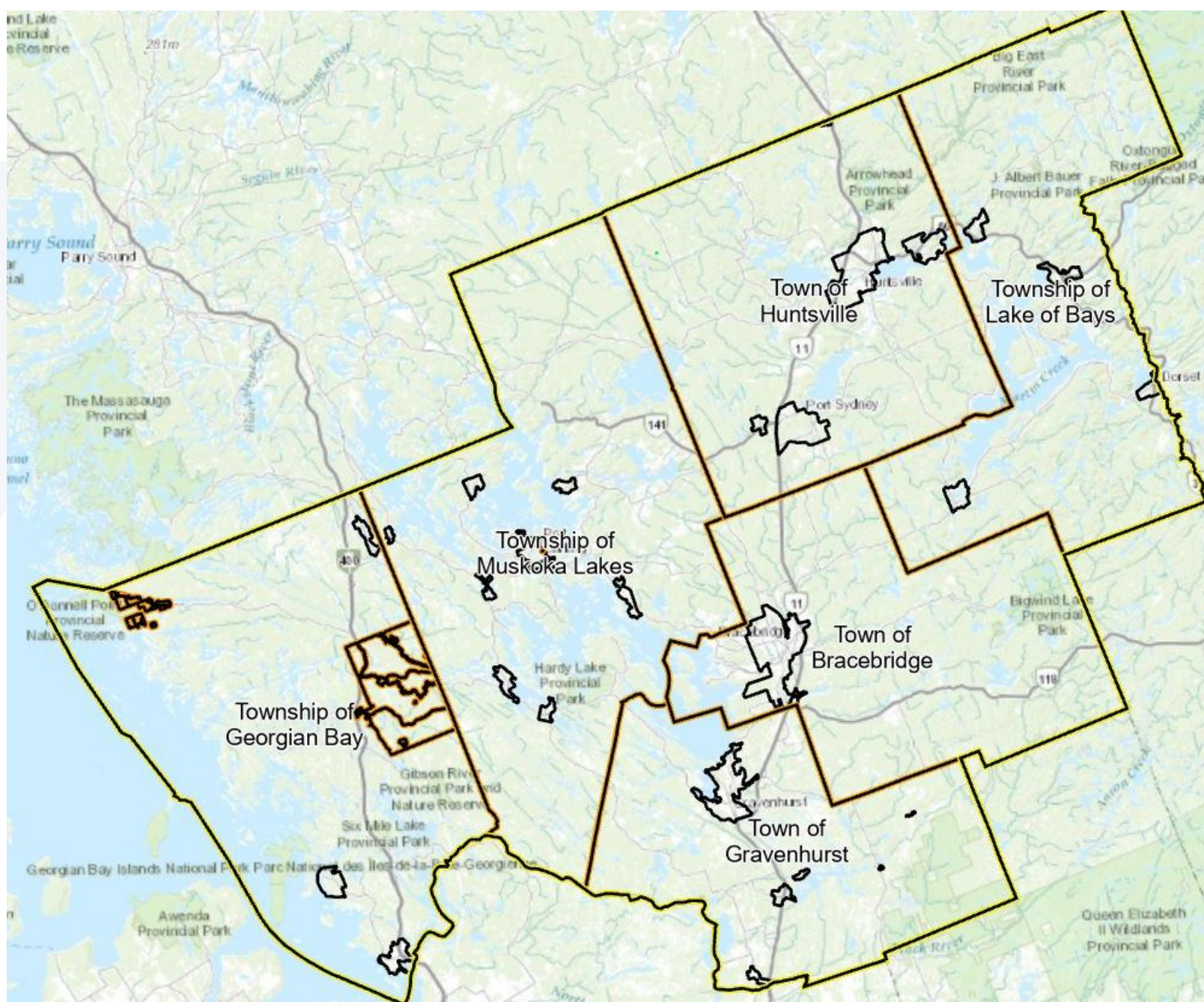
2026 AMO Annual Conference Concurrent Session

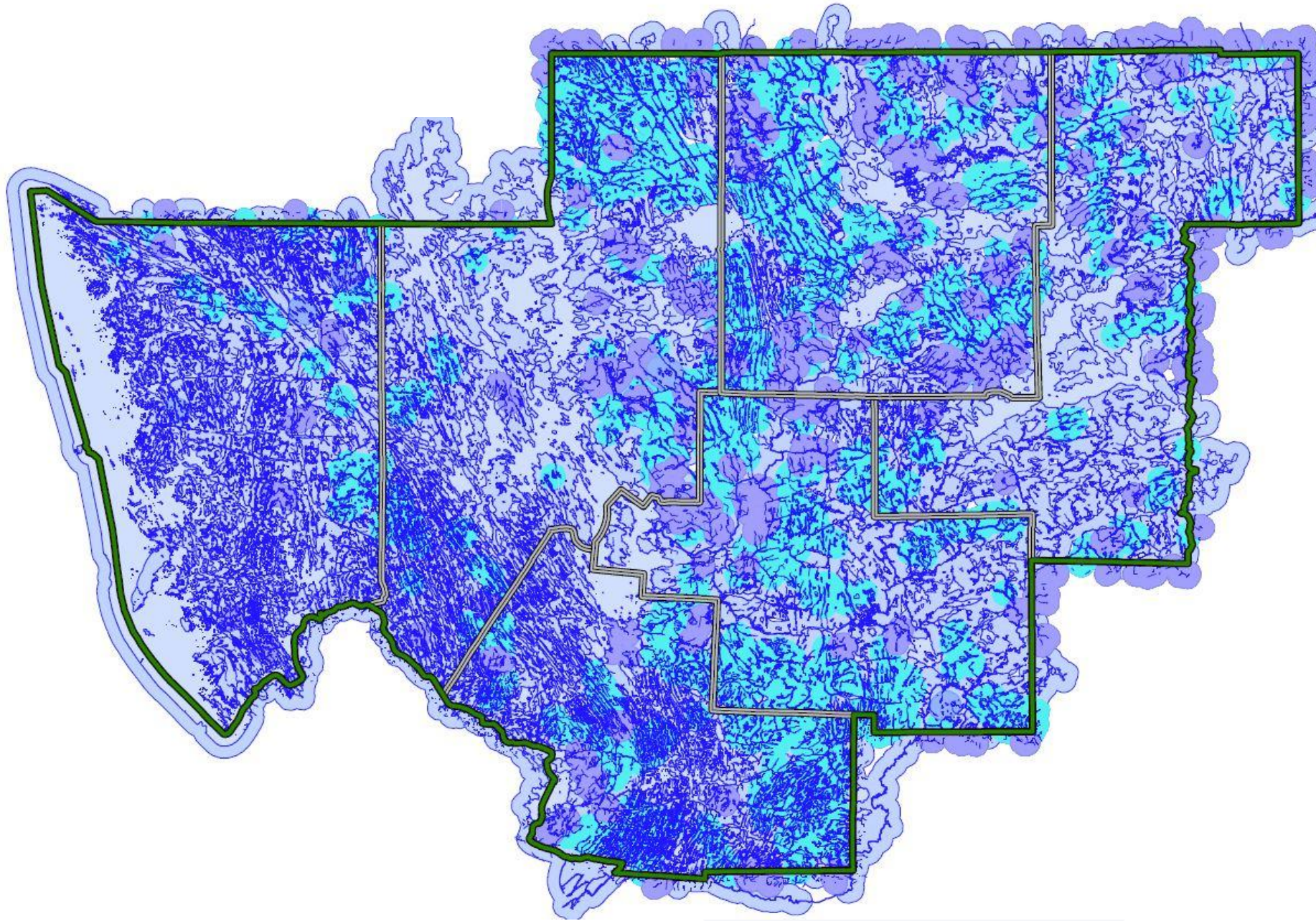


AMO Conference Concurrent Presentation

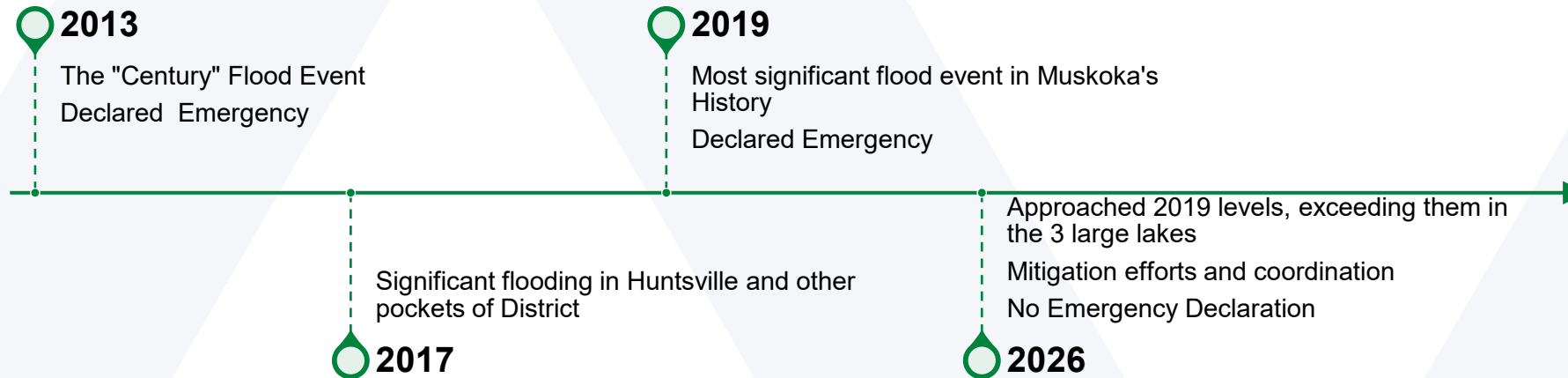
Delivering Infrastructure Innovation:
From Pilot to Practice

AUGUST 18, 2026





Historical Flooding Events - Muskoka



- Fourth major flood since 2013
- The 2026 water levels approached or exceeded 2019 in some areas
- Rapid snowmelt + significant rainfall





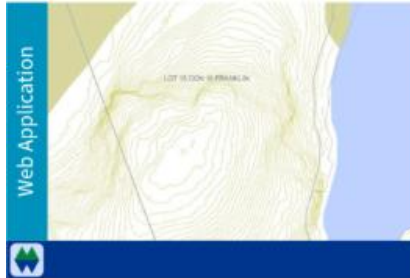


Muskoka GeoHub

Search and Visualize GIS Data, Maps and Applications

[Browse Open Data](#)

[Help Video](#) | [GeoHub Login](#)



Topographic Map

View the new 50cm contours derived from the Muskoka...



Air Photos of Muskoka

Experience the changing landscape of Muskoka through...



Muskoka Votes

The citizens of Muskoka are heading to the polls Monday...



Muskoka Zoning

View the zoning for each municipality in the District of...



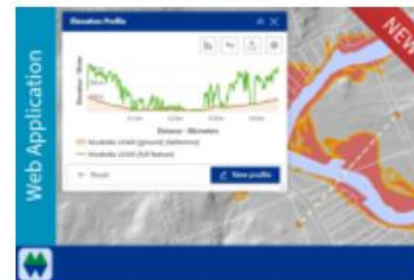
Trails Explorer

3D trails map including elevation profiles



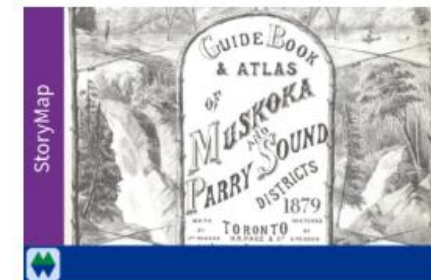
EDI Dashboard 2023

Early Development Instrument is a questionnaire that...



Floodline and LiDAR Mapping

View flood zones in 2D, 3D, and in an interactive dashboard



1879 Muskoka Atlas

Interactive historical view of Muskoka through maps,...

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Muskoka's Natural Capital Inventory

A part of the Integrated Watershed Management...



PlanHub Dashboard

View planning applications submitted to the Muskoka...



Muskoka 3D Buildings

A 3D scene showing the buildings of Muskoka with...



Historical Towns of Muskoka

Fire insurance maps of Muskoka's three main urban...



Forest Fire Preparedness

See current forest fire information and know what to...



Muskoka Flood 2019

View the videos captured by OPP helicopters during the 20...



Muskoka Transit

View the public transit bus routes and bus stops made...



LiDAR Discovery

Explore the amazing detail of the Muskoka LiDAR surveys

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MWC Algae Monitoring Program

2019 Pilot Project



Public Works

App showing certain Public Works information for Muskoka



Watersheds and Water Sampling

View the watersheds in the Muskoka region as well as the...



Shoreline Videos

View videos for the shorelines of many of the major lakes in the..



Building Permits: Muskoka Lakes

This app shows the locations and details of building permits..



Planning Activity: Muskoka Lakes

View the locations and details of planning applications within th...

Floodline and Lidar Mapping App

**Floodline and Lidar Mapping 2.0**

2D

3D

Dashboard

Hydrographs

Download LiDAR:

DTM

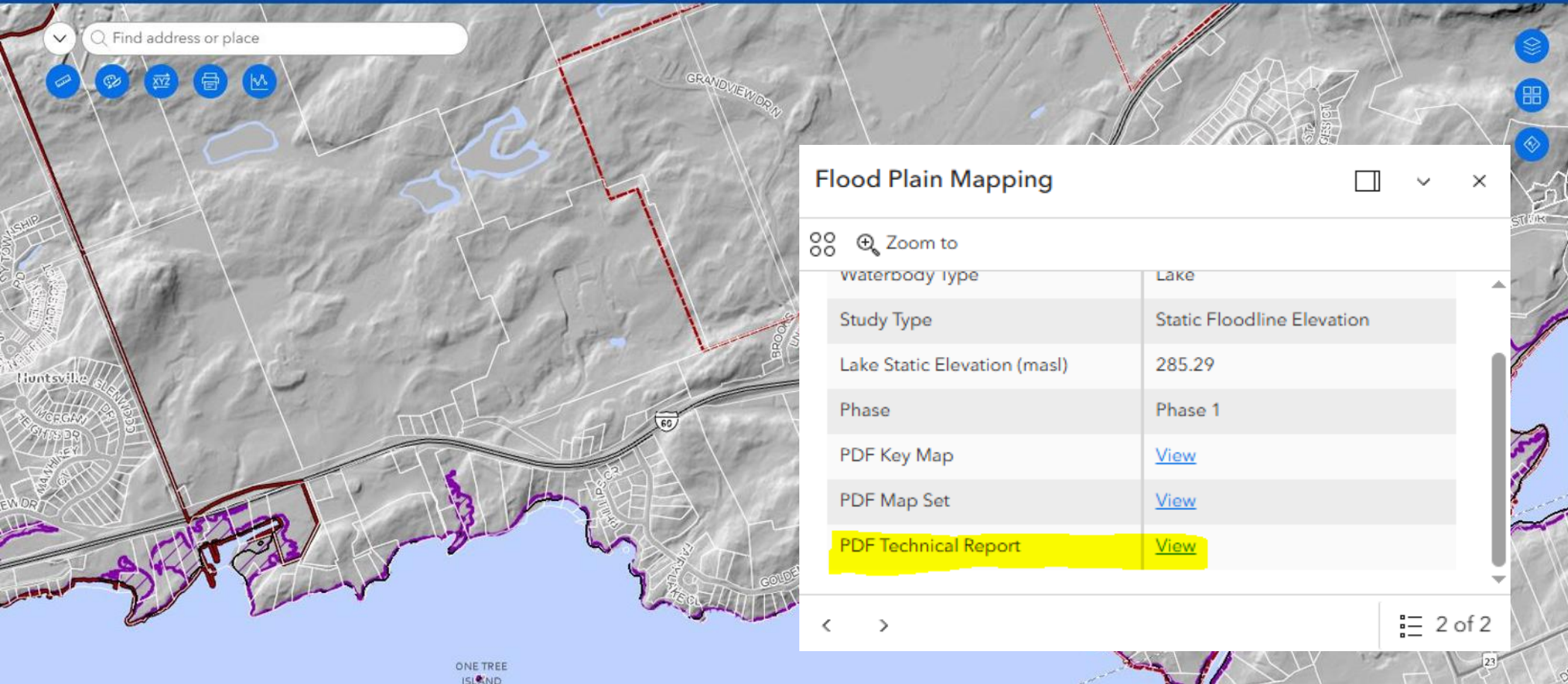
DSM

Flooding resources:

Webpage

Factsheet

Find address or place



Flood Plain Mapping

Zoom to

waterbody type

Lake

Study Type	Static Floodline Elevation
Lake Static Elevation (masl)	285.29
Phase	Phase 1
PDF Key Map	View
PDF Map Set	View
PDF Technical Report	View

<

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2 of 2

Live Lake Levels (approximate)

Live River/Lake Gauges

Historically Flooded Roadways

Floodline Mapping (2020's)

Floodway

Floodline

Static Floodline Elevation

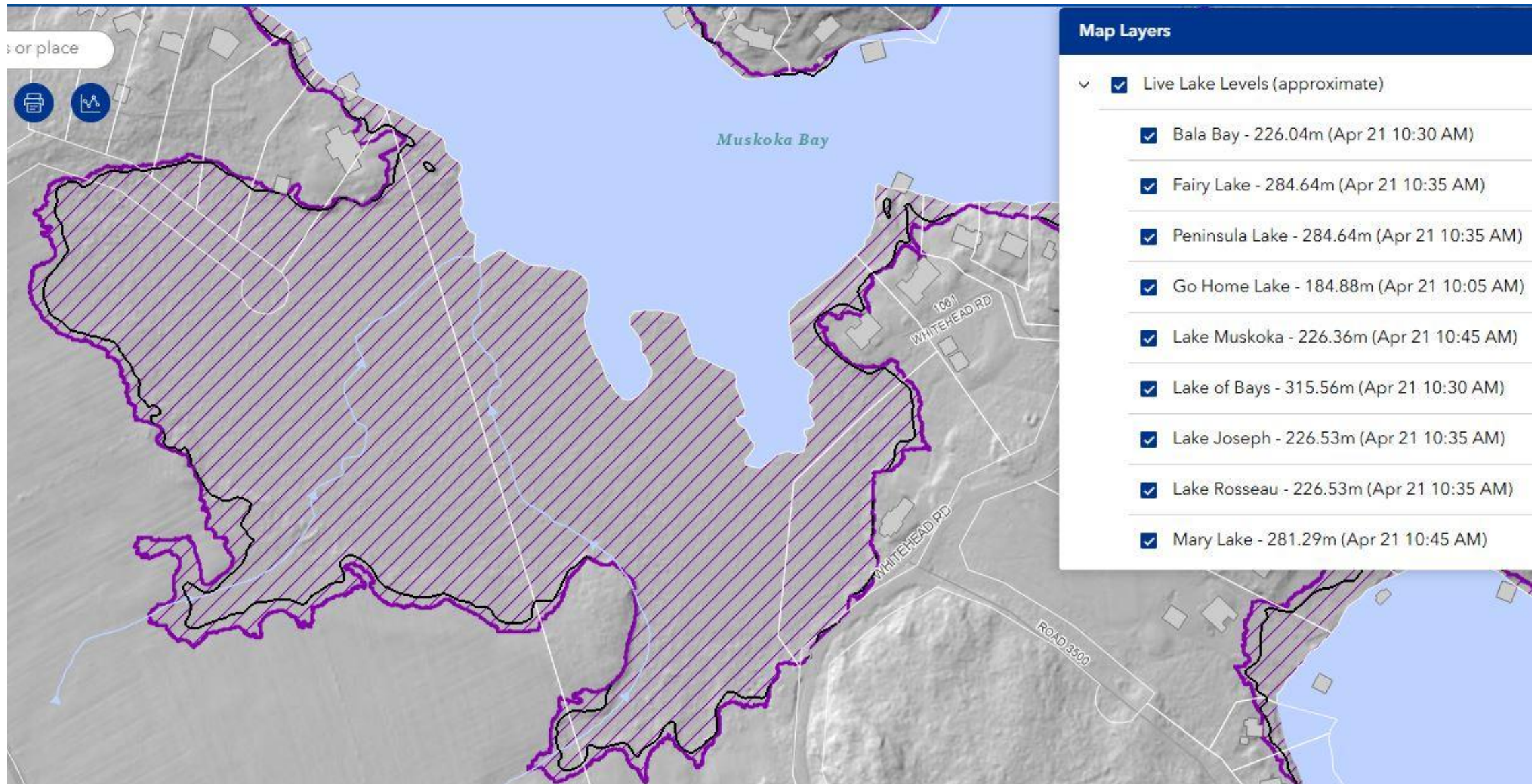
100 Year Flood Elevation

Horizontal Wave Allowance

Floodline Mapping FDRP (1980's)

Floodway Boundary: FDRP

Floodline and Lidar Mapping App



Floodline and Lidar Mapping App



Floodline and Lidar Mapping 2.0

[2D](#)[3D](#)[Dashboard](#)[Hydrographs](#)

Download LiDAR:

[DTM](#)[DSM](#)

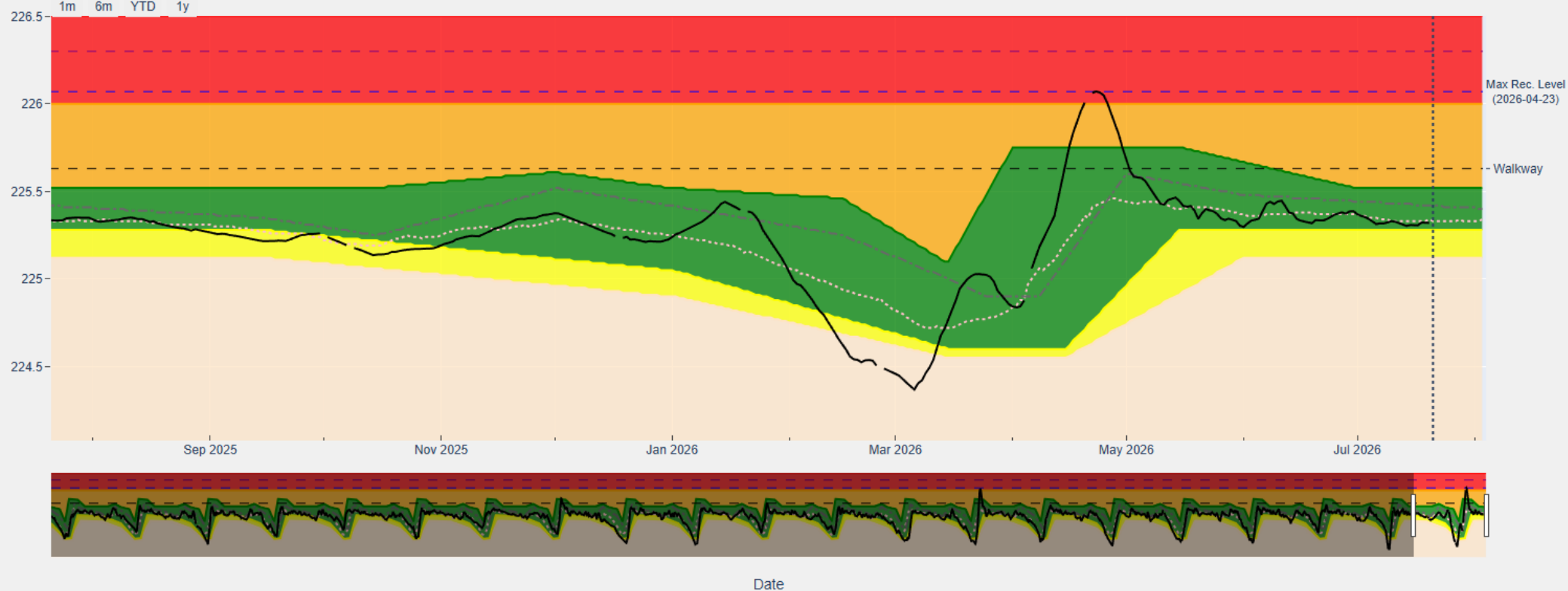
Flooding resources:

[Webpage](#)[Factsheet](#)[Lake Muskoka - Bala Bay](#)[Lake Muskoka - Beaurmaris](#)[Lake Joseph/Rosseau](#)[Lake of Bays](#)[Mary Lake](#)[Fairy/Peninsula Lake](#)[Go Home Lake](#)[MRNF Flood Bulletin](#)

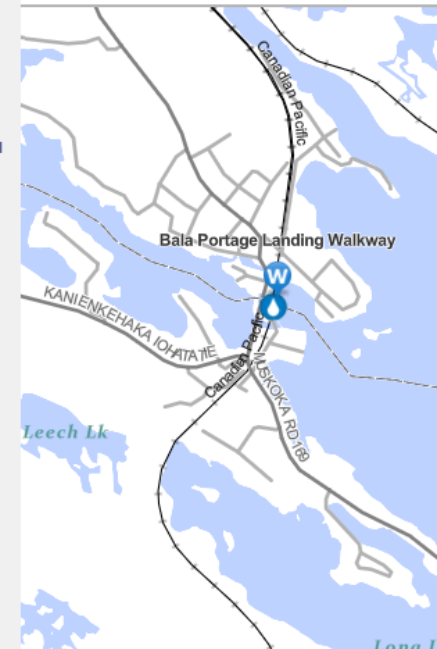
- Observed Daily Mean Water Level
- Max Recorded Level (2026-04-23)
- Normal Operating Zone
- Static Flood Elevation
- Community Reference Elevation (Walkway)
- Lower Operating Zone
- Target Operating Level
- High Water Zone
- Low Water Zone
- Recorded Historical Mean Water Level
- Upper Operating Zone



Today (2026-07-21)



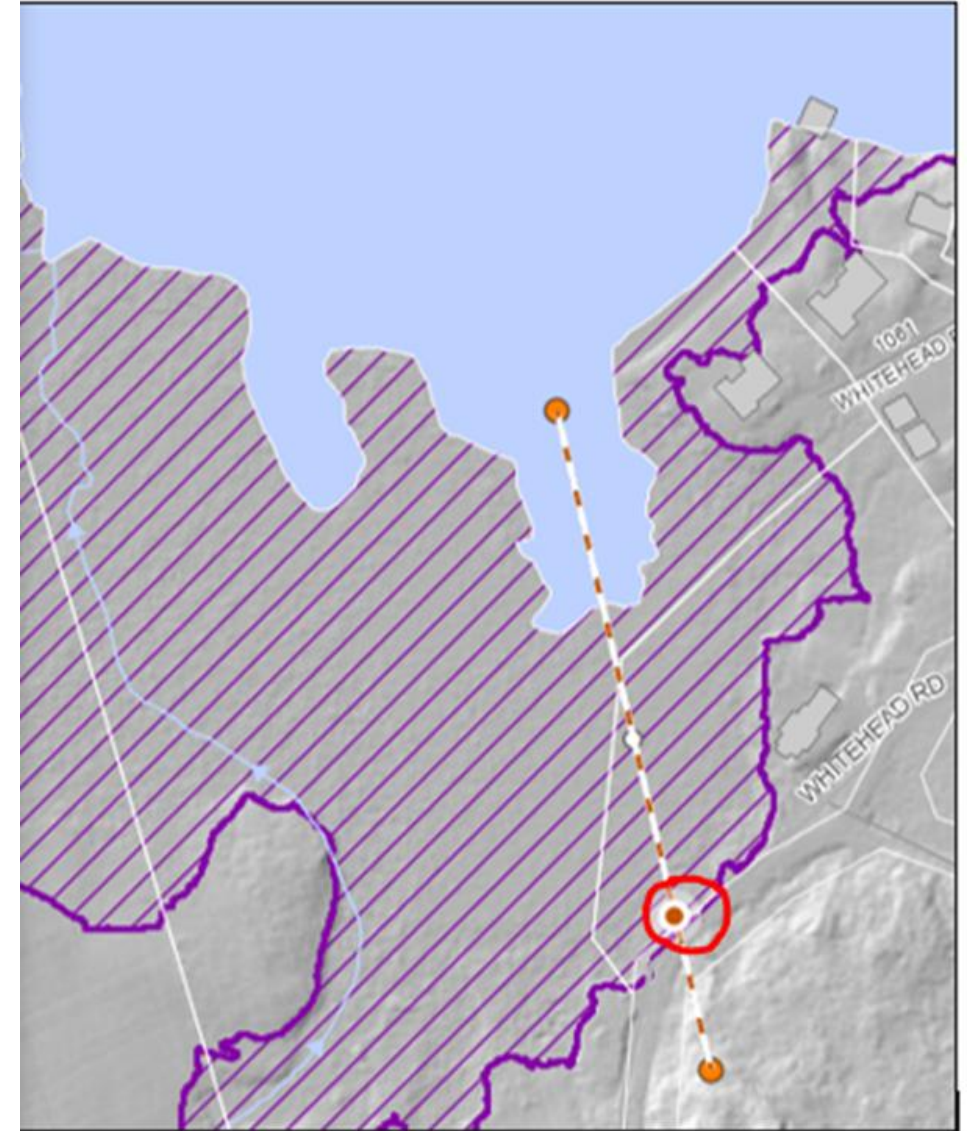
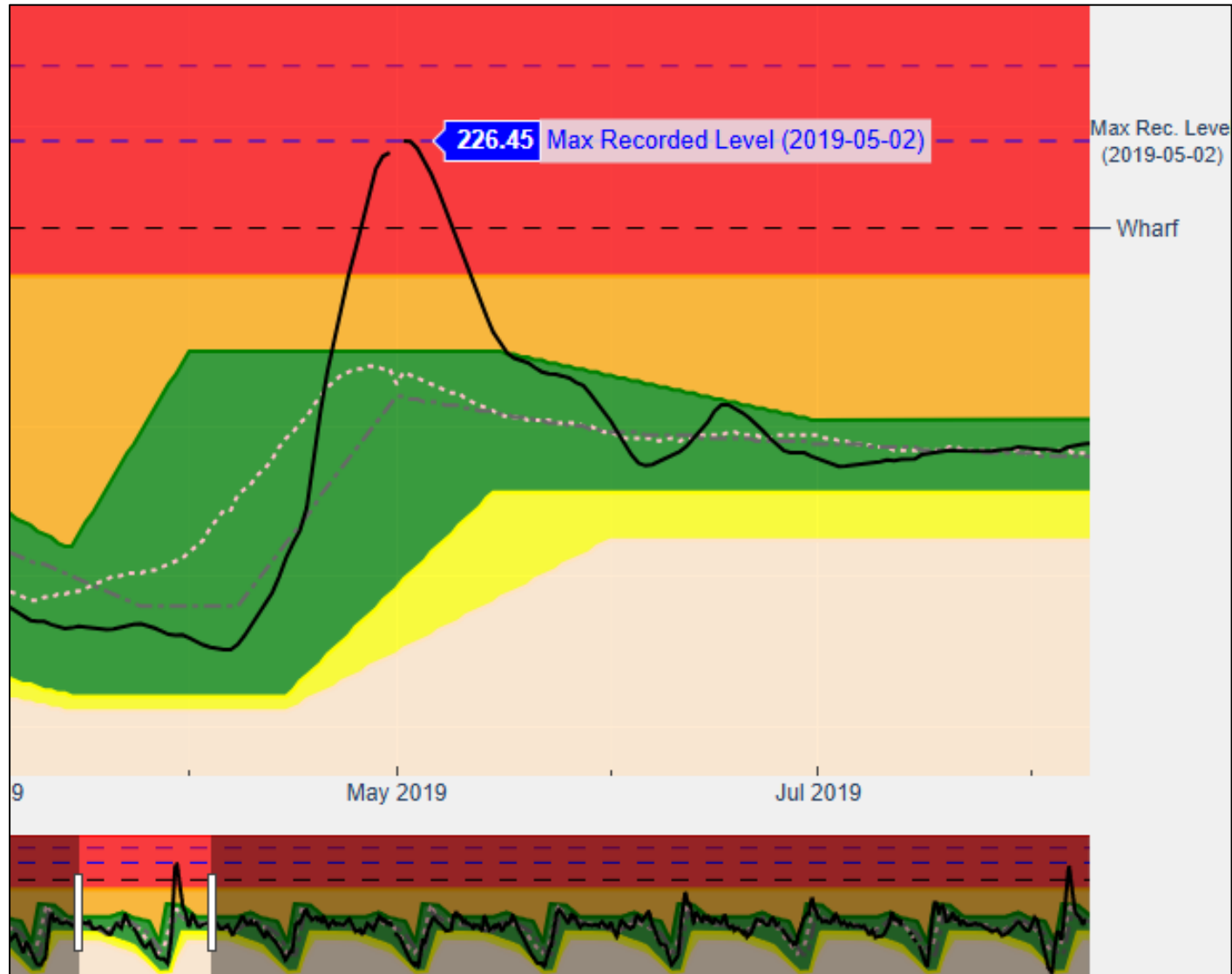
Bala Bay Monitoring Station



Current Conditions

Water Level (m.a.s.l.): **225.33**Status: **Normal Operating Zone**

Floodline and Lidar Mapping App



Floodline and Lidar Mapping Demo:

Better Information, Better Coordination, Better Decisions

Operational Awareness

- real-time intelligence
- common operating picture

Public Information

- trusted public updates
- interactive mapping

Regional Coordination

- stronger MERC collaboration
- improved information sharing

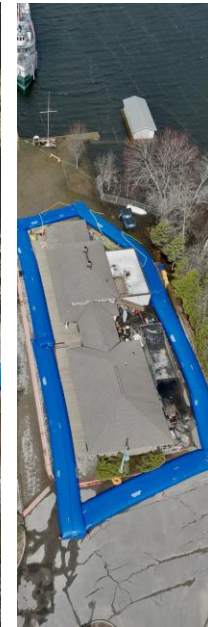
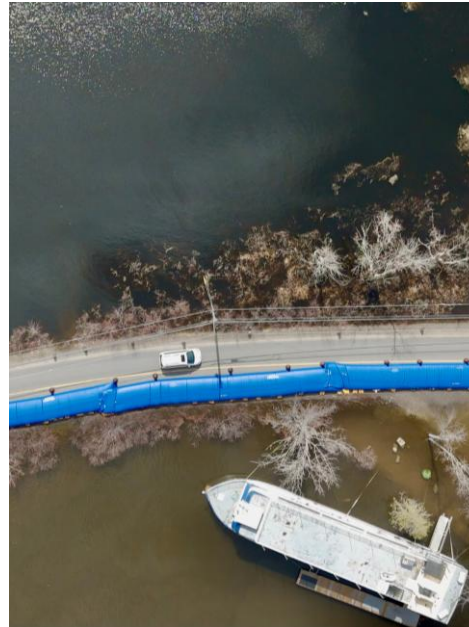


Investment since 2019 Made a Difference



Flood Protection

- Cofferd Dams/Swamp Mats
- Risk identification
- Early deployment









Muskoka's Natural Capital Inventory

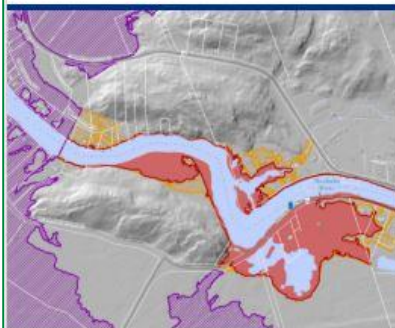
A part of the Integrated Watershed Management initiative

DM GIS Admin (DM)

Muskoka's Natural Capital Inventory

District of Muskoka EnviroHub

Are You in a Floodplain? Find Out and Prepare



Muskoka's Climate Action



Managing Muskoka's Watershed



What's in Muskoka's Water? See the Latest Data



Don't forget to **subscribe to Climate Corner** - our monthly newsletter highlighting ways you can get involved in taking action on climate!

CLIMATE CORNER

Monthly Newsletter

Climate Corner July 2026: Connect Kids with Nature This Summer
July 27, 2026

Climate Corner June 2026: From Floods to Fire Bans - How Climate Impacts Are Affecting Muskoka
June 24, 2026

Climate Corner May 2026: Muskoka Youth Eco-Fest June 7th - Youth Council Applications now Open!



Listen to the newest "Plants Always Win Podcast" episode featuring Lauren Saville, Community Climate Initiatives Coordinator.

<https://www.muskoka.on.ca/en/environment/EnviroHub.aspx>



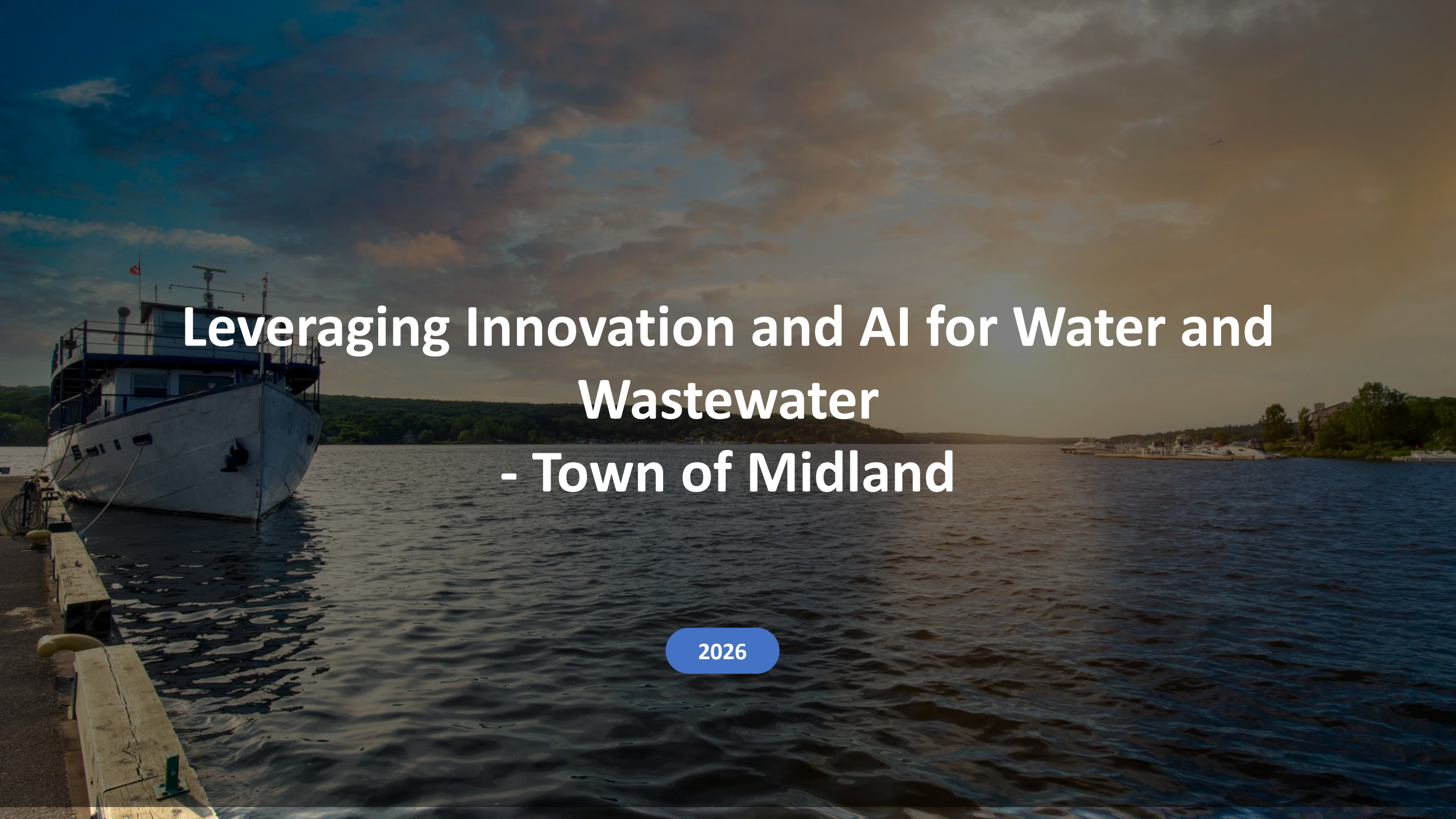
Thank You!

Graham Good, Manager of Geomatics

graham.good@muskoka.on.ca

<https://map.muskoka.on.ca/>

AUGUST 18, 2026

A large white ship with a blue stripe is docked at a concrete pier on the left side of the frame. The ship has a radar dome and various antennas on its upper decks. The water is dark blue with gentle ripples. In the background, a line of green trees marks the far shore. The sky is filled with large, textured clouds, with a hint of sunset or sunrise light on the right side. The overall mood is serene yet powerful.

Leveraging Innovation and AI for Water and Wastewater - Town of Midland

2026



► Introduction



Overview of developing a life-cycle management strategy for Midland's water and wastewater infrastructure.



Combines Likelihood of Failure (LoF) and Cost of Failure (CoF) to improve network reliability and make data-driven decisions for future investments.

➤ Data Collection and Quality Control

Data sources

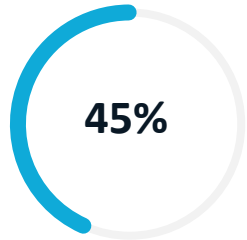
Water Network Data, Break History,
Sanitary Sewer Inspections.

Extensive quality control was
performed based on industry standards
to prevent data errors.

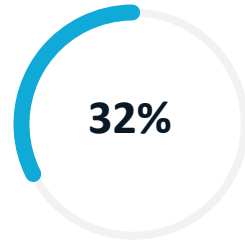


▶ Drinking Water Network Overview

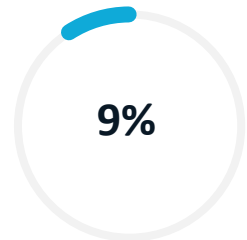
Midland's water infrastructure is mainly:



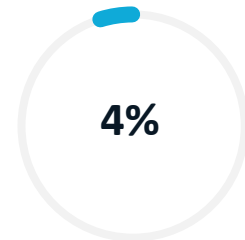
PVC



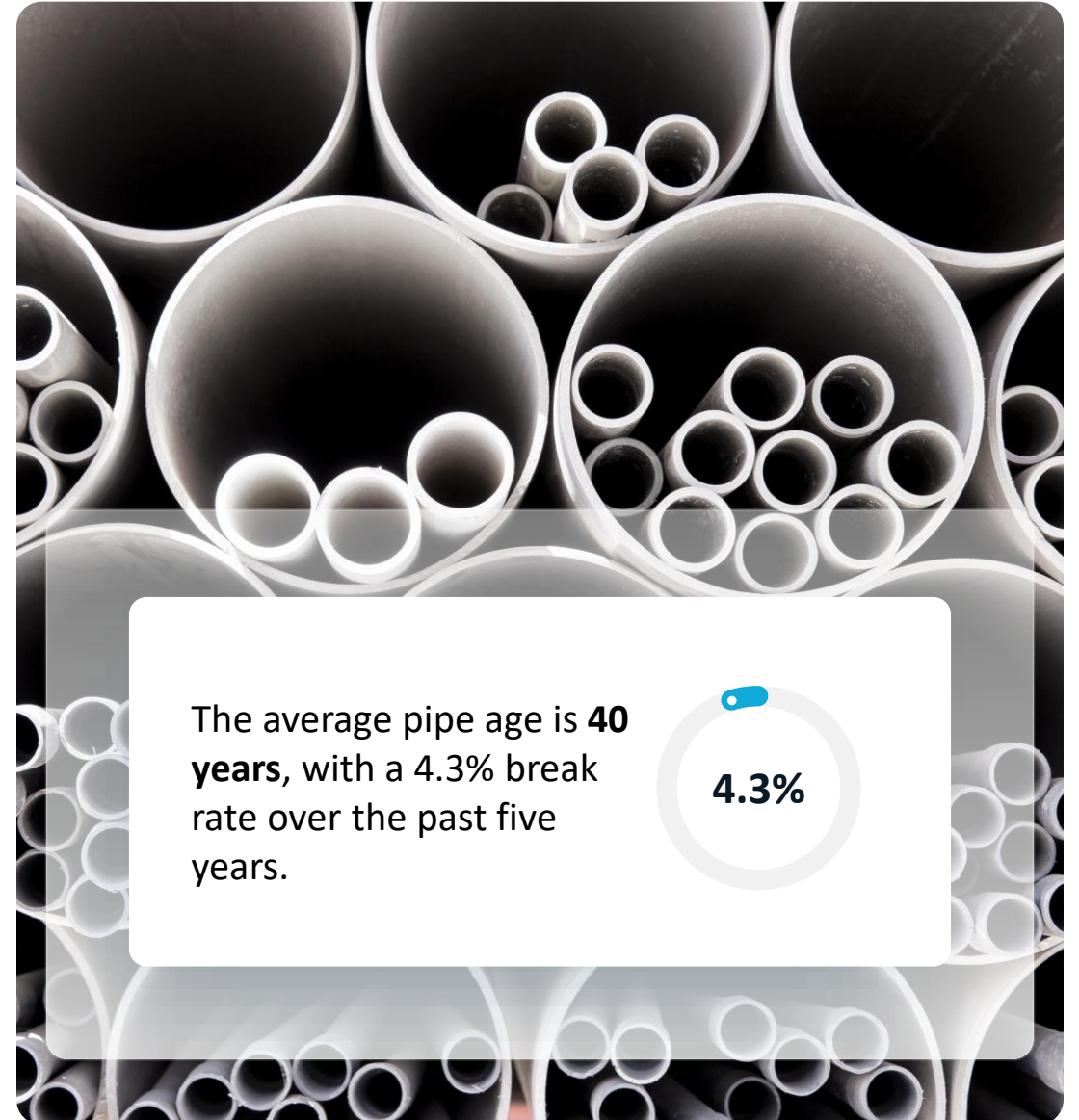
Ductile Iron



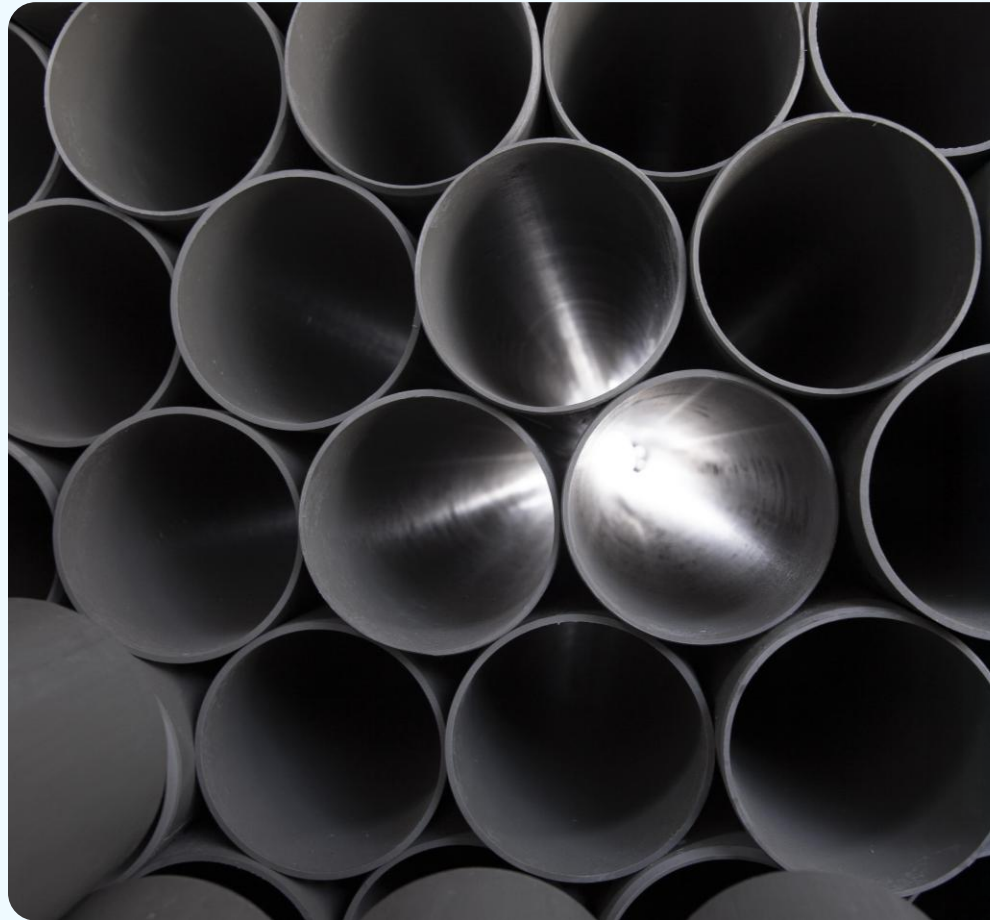
Cast Iron



Asbestos Cement



➤ Wastewater Network Overview



The wastewater network consists of:

49 km PVC

34 km
Asbestos
Cement

15 km
Vitrified Clay



SL-RAT inspections between 2020 and 2022 revealed various blockages and pipe conditions.



➤ Likelihood of Failure (LoF)



LoF calculated using physical, operational, and environmental factors.



Machine learning models were used to identify pipe cohorts at risk of failure. Key parameters include material type, pipe age, and seasonal effects.

➤ Consequence of Failure (CoF)

CoF is evaluated using the Triple Bottom Line (TBL) approach:



Economic
(repair costs)



Social
(service impact)



Environmental
(effects on water bodies).

➤ Key Results



91.5%

of the water network is
in 'Very Good'
condition.

Water Network



3.2 km rated
'Fair' and



0.7 km
rated 'Very Poor',
requiring urgent
attention.

➤ Key Results



38%

of the wastewater network is in 'Good' condition

Wastewater Network



50%

is in 'Fair' condition



1.6%

is in 'Very Poor' condition, with a high risk of failure.



► Conclusion



Leveraging data and machine learning allows proactive management of the water and wastewater networks.



Targeted interventions can reduce failure risk and ensure long-term sustainability.



Courtice Transit-Oriented Community District Energy System

Ian McVey, Director, Climate & Environment

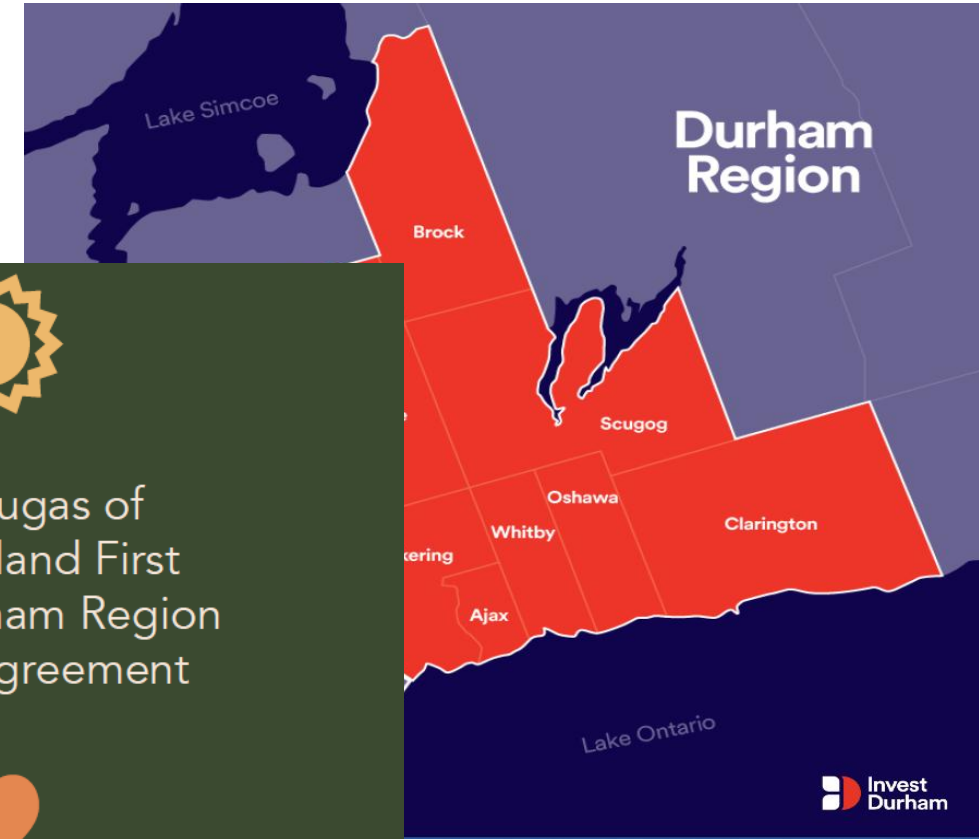
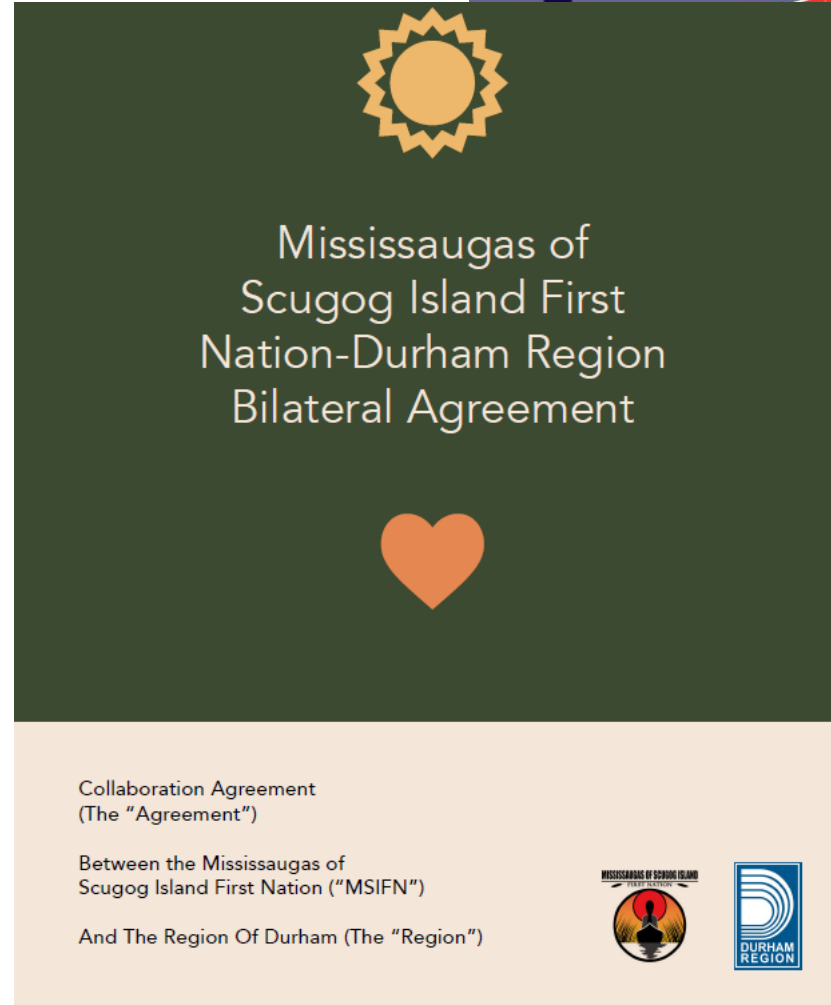
About Durham Region

- Eastern GTA region experiencing major population and employment growth.
- Planning for growth from more than 812,000 residents today to approximately 1.3 million over the next 30 years.
- Major clean energy assets, including nuclear generation, grid investment, and a growing clean energy workforce.
- Courtice is located at the intersection of growth planning, transit investment, and low-carbon energy opportunity.

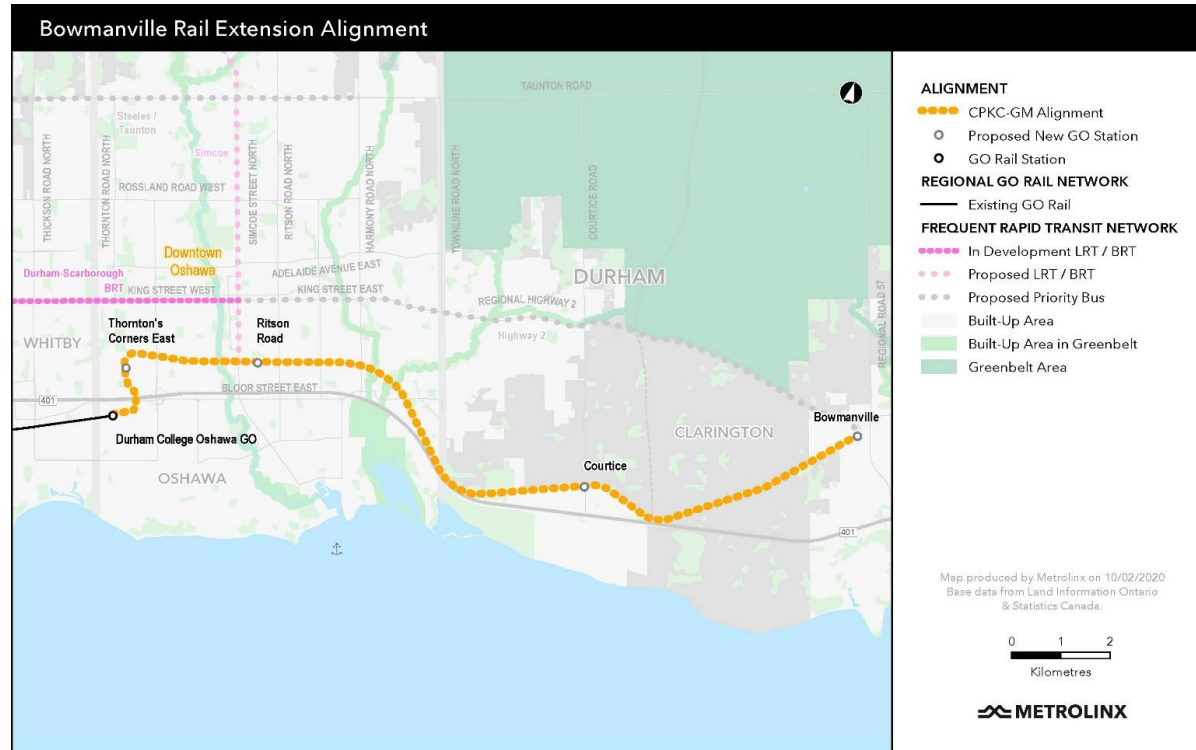


Partnership with Mississaugas of Scugog Island First Nation

- 2025 Bi-lateral Agreement forms the foundation for government-to-government collaboration
- Agreement supports reconciliation, environmental protection and clean energy partnership opportunities
- The Courtice District Energy System is an opportunity to put that partnership into practice



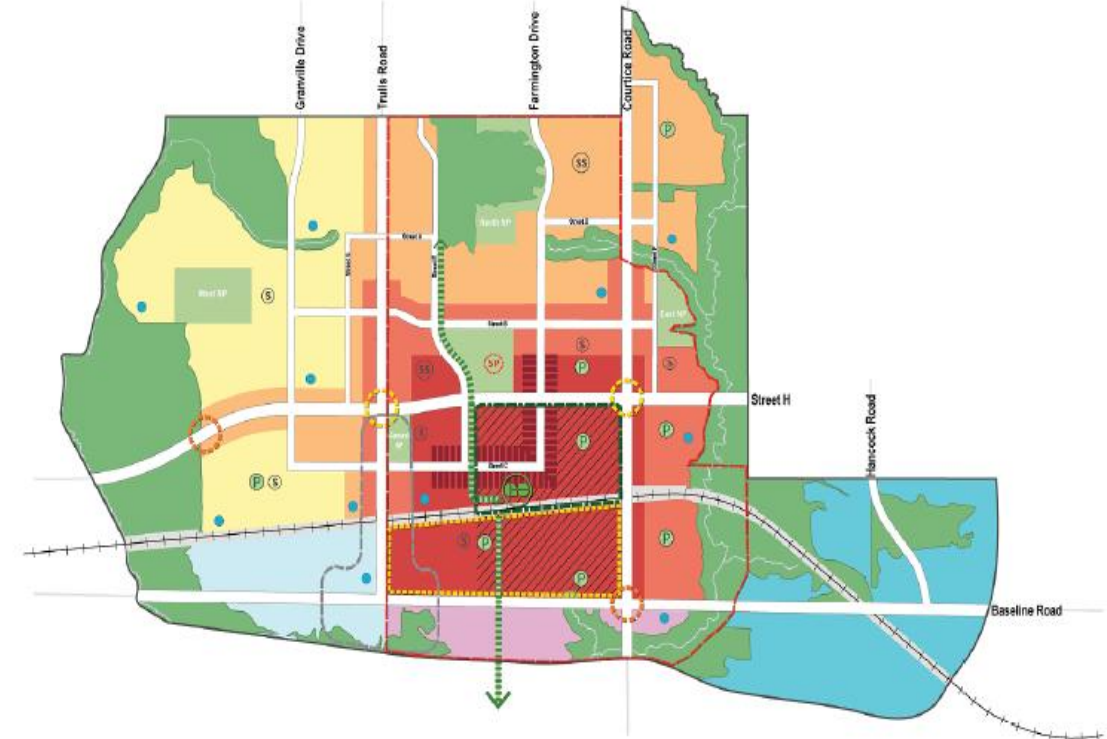
Courtice Transit Oriented Community (CTOC) – Context



District Energy and the CTOC

- The GO service has resulted in the CTOC Secondary Plan – estimated 29,000 residents & 8,000 new jobs.
- MTSA designation - minimum density of 150 people and jobs per gross hectare (secondary plan targets minimum density of 325 units per net hectare within Mixed Use Core)
- Region led GO Station Funding Act – working collaboratively with MX to ensure the GO station gets built
- The higher densities that surround the GO station in the MTSA make the District Energy project feasible

**Courtice Transit-Oriented Community Secondary Plan
Schedule A - Land Use Plan**



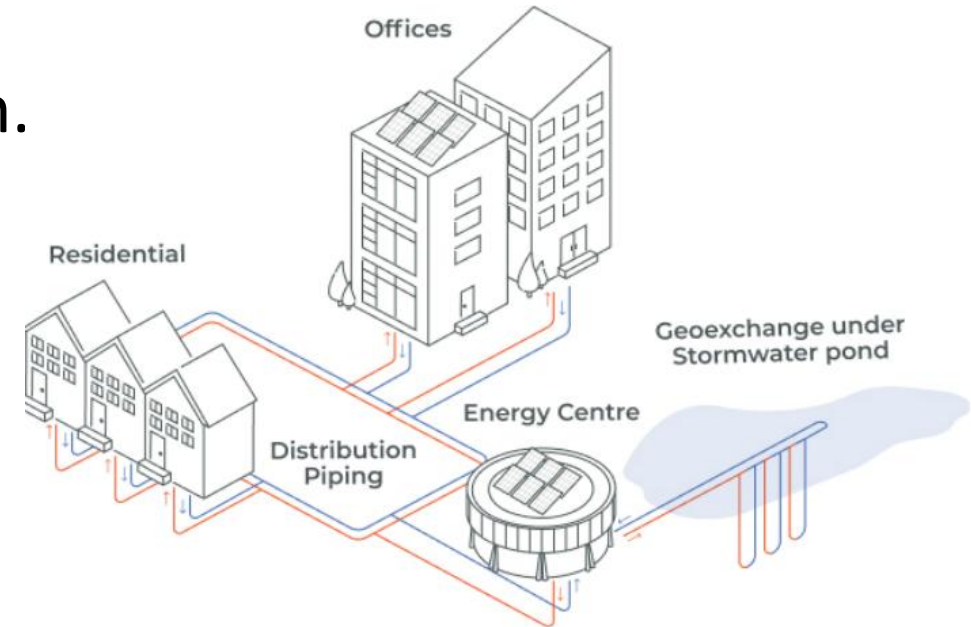
LEGEND

 Environmental Protection Area	 General Industrial	 Other Neighbourhood Parks or Parkettes	 Courtyce GO Station
 Mixed Use Core	 Utility	 Stormwater Management Facilities	 Protected Major Transit Station Area
 Mixed Use Transition Area	 Commercial Frontage	 Elementary School	 South Core Redevelopment Area
 Medium Density Residential	 Transit Facilities Zone	 Secondary School	 Special Study Area
 Low Density Residential	 Areas Where Office Uses Required	 Special Park	 Secondary Plan Boundary
 Business District	 North-South Active Transportation Corridor	 Gateway	
 Light Industrial	 Neighbourhood Park	 Prominent Intersection	



District Energy 101

- District energy systems provide heating and cooling to multiple buildings from a shared central system.
- Underground pipes distribute thermal energy across a neighbourhood, campus or downtown district.
- These systems can improve efficiency, reduce emissions and support local energy resilience.
- In Courtice, district energy allows low-carbon energy planning to be integrated before development is built.



Why Courtice is Ready for District Energy

Policy Foundation

- **Community Host Agreement (2015):** commitment to promote district heating from Energy-From-Waste (EfW) Facility.
- **Durham Community Energy Plan (2018):** identifies district energy as a strategic climate priority.
- **CTOC Secondary Plan (2025):** supports district energy connection in high-density mixed-use core

Technical Foundation

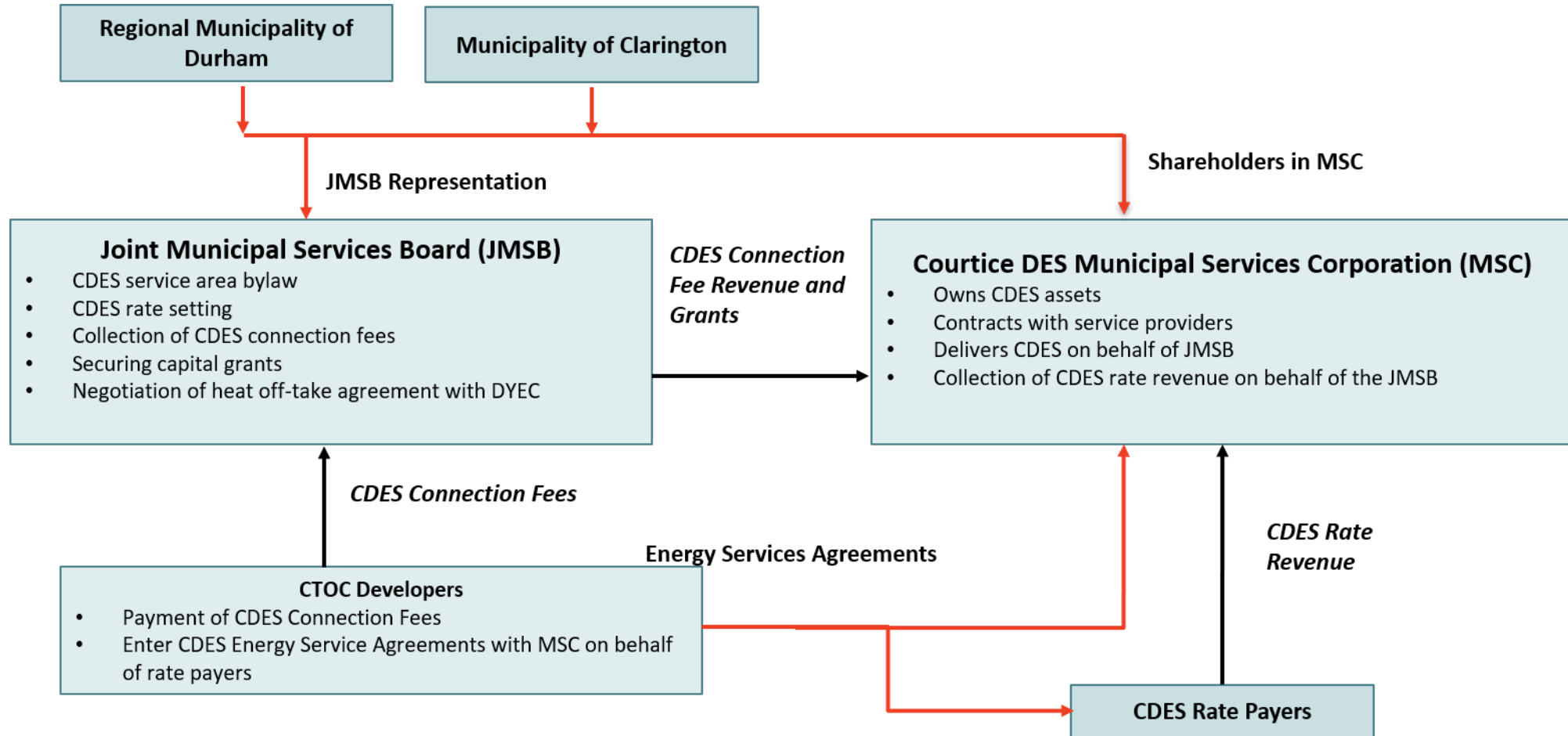
- **Emissions Reductions:** 70% reduction in GHG emissions compared to “business as usual”
- **Cost effective:** Lowest cost per tonne of avoided GHG emissions
- **Energy security & reliability:** reduces electrical grid requirements and supports system stability



Council Direction: Move from Concept to Implementation

- Test municipal ownership through a Municipal Services Corporation model.
- Confirm private-sector market interest through a Request for Expressions of Interest.
- Explore public, private and Indigenous investment pathways.
- Refine costs, phasing and landowner assumptions.
- Return to Council with a final business plan in 2027.

Ownership and Governance Model



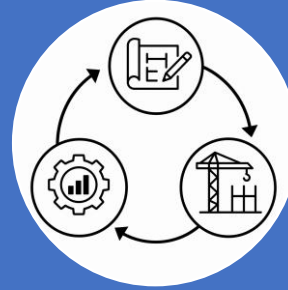
Legend

- Contractual Relationship / Governance
- Financial Transactions

Project Delivery Models



Design-Bid-Build
(DBB)



Design, Build,
Operate, Maintain
(DBOM)



Design, Build,
Finance, Operate,
Maintain (DBFOM)



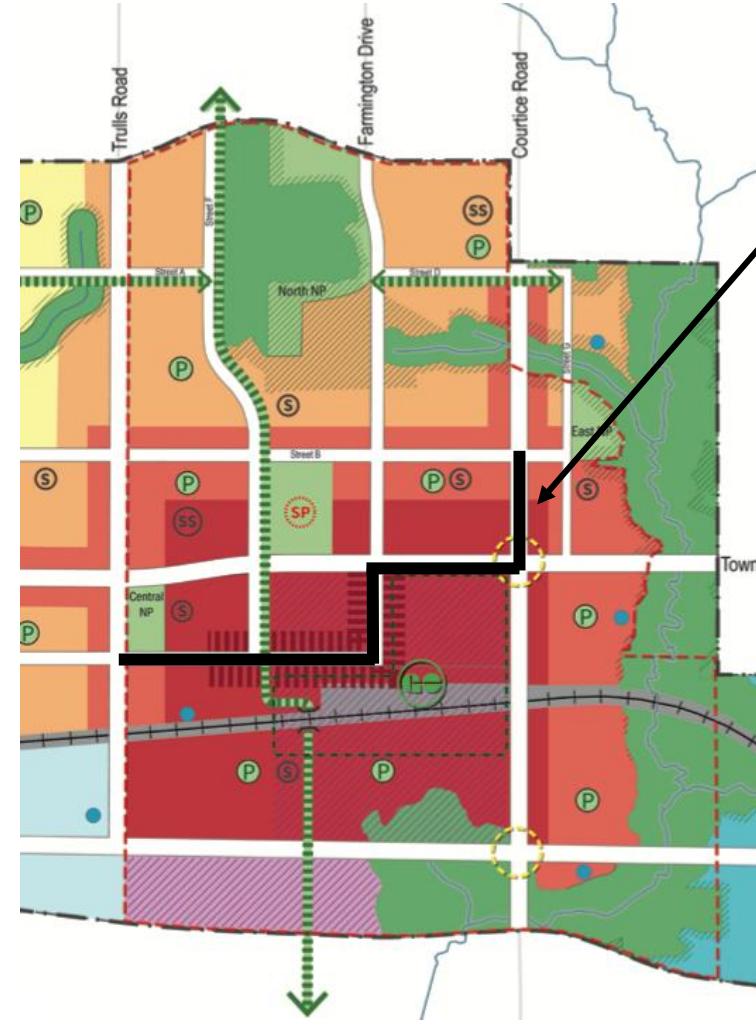


Market Sounding Confirmed a Financeable Pathway

What the market told us:

- **Risk allocation matters** – preference for availability-style structures
- **Clarity drives pricing** – governance, roles, timelines critical
- **Strong interest in Indigenous partnership** – openness to equity participation

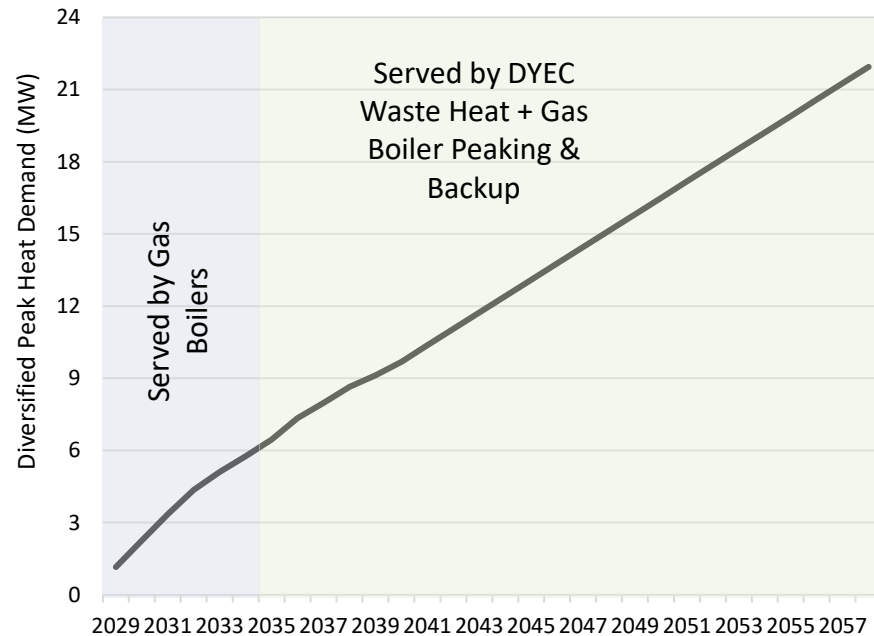
Delivery Approach - Phase 1 Distribution Piping Plan for DES



- First phase of distribution piping system
- Estimated to be 1400 m
- Service connections to buildings not shown

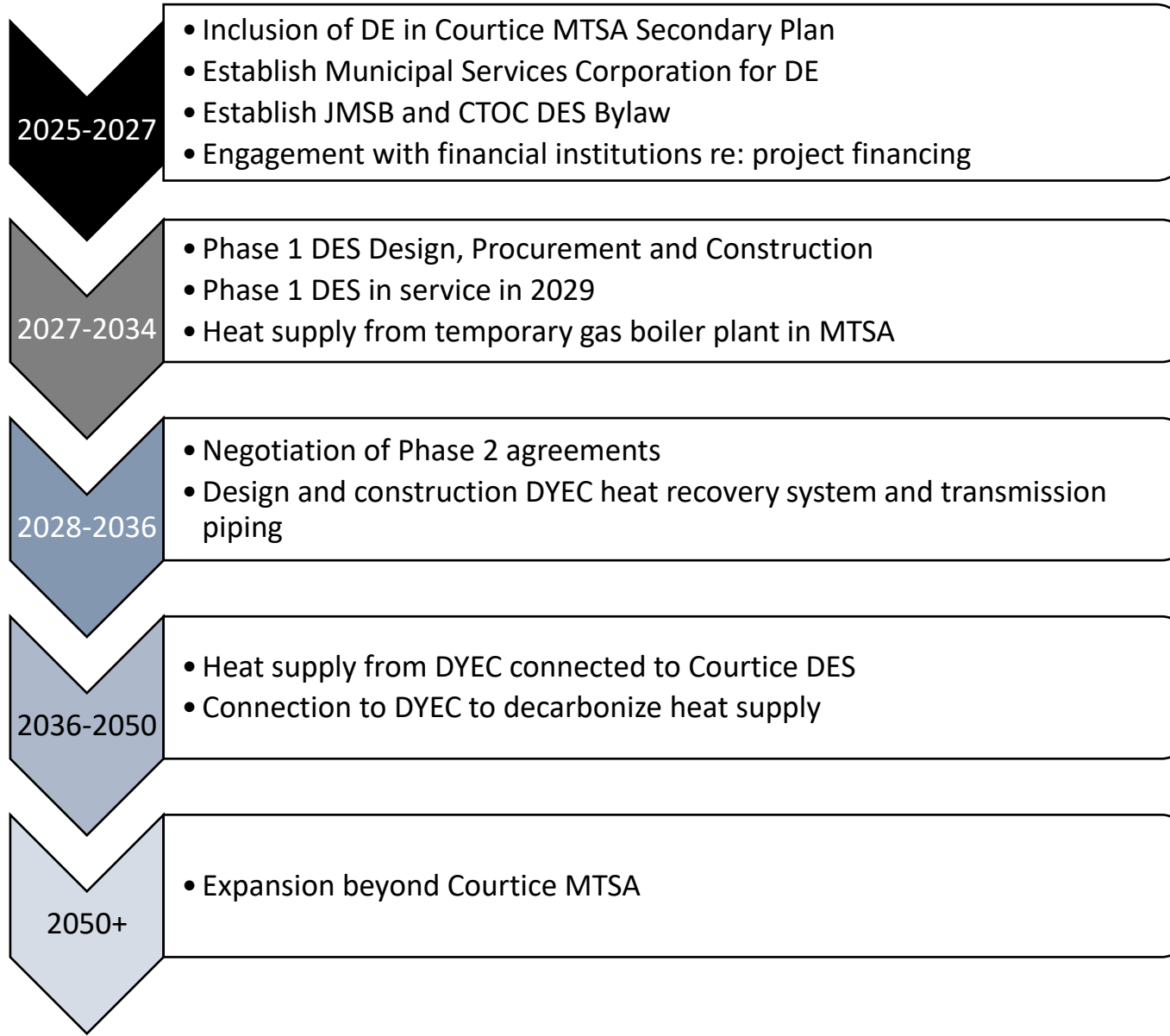
Delivery Approach - Phase 1 Temporary Energy Centre

- First phase of the DES will be heated by a ~8 MW Temporary Energy Centre (TEC)
- Once there is sufficient development in CTOC, connection to DYEC will be initiated



Temporary Energy Centre at the UBC Neighbourhood District Energy System (Corix Utilities)

Target Project Development Timeline & Process

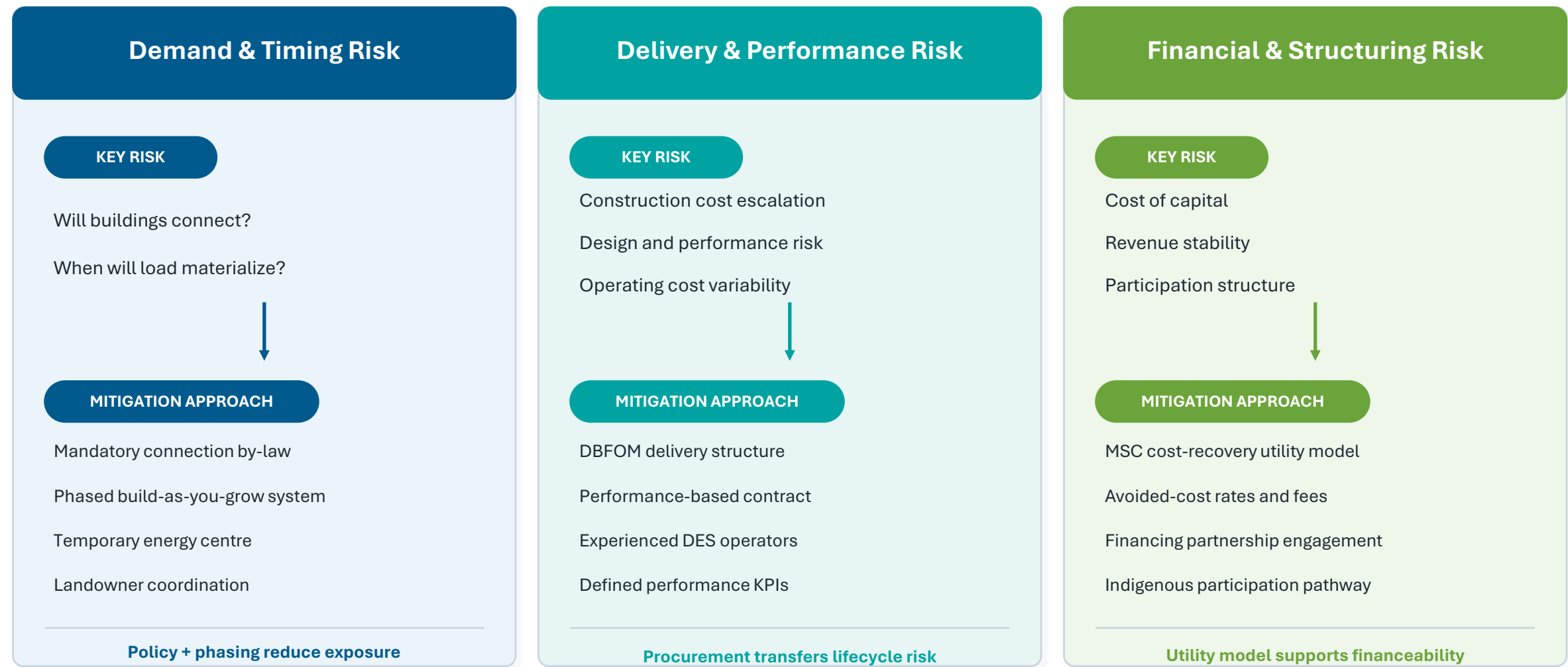


Implementation Principles:

- Align district energy with land-use planning before development is locked in.
- Build the system in phases as demand materializes.
- Use a temporary energy centre to manage early-stage investment risk.
- Connect to Durham York Energy Centre waste heat once sufficient load is established.

Risk Mitigation Framework

Courtice District Energy System: de-risking the path from pilot to practice



Implementation risk is addressed through policy, phasing, procurement, and financing structure.

Lessons for Moving Infrastructure Innovation from Pilot to Practice

- **Plan early:** Align land use, corridors, utility needs, and enabling policies early.
- **De-risk demand:** Mandatory connection tools and build-as-you-grow delivery reduce exposure.
- **Create a financeable model:** Governance, revenue, risk allocation, and procurement structure matter as much as technology.
- **Use partnerships deliberately:** Market sounding, Indigenous participation, public accountability, and private-sector expertise all shape implementation.



Thank You!

Ian McVey, Director, Climate &
Environment

Ian.McVey@durham.ca

durham.ca

@RegionofDurham

