Credit Valley Conservation
inspired by nature

Making the Case for Investing in Climate Resiliency

Asset Management Ontario (AMONTario)
November 20, 2019

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Risks of not including Climate Change into planning, operations, and budgets

Environmental, Health & Safety

Legal

Economic

Risks

How does risk disclosure apply to Stormwater?

Hurricanes and Thunderstorms

You can’t separate the water from the watershed

Stormwater is more than just flooding…

Riverine flooding (Surface)

Source: Toronto Region Conservation Authority, 2019

Urban flooding (overland)

Sanitary sewer backup

Source: Minneapolis Basement Flood Damage Restoration

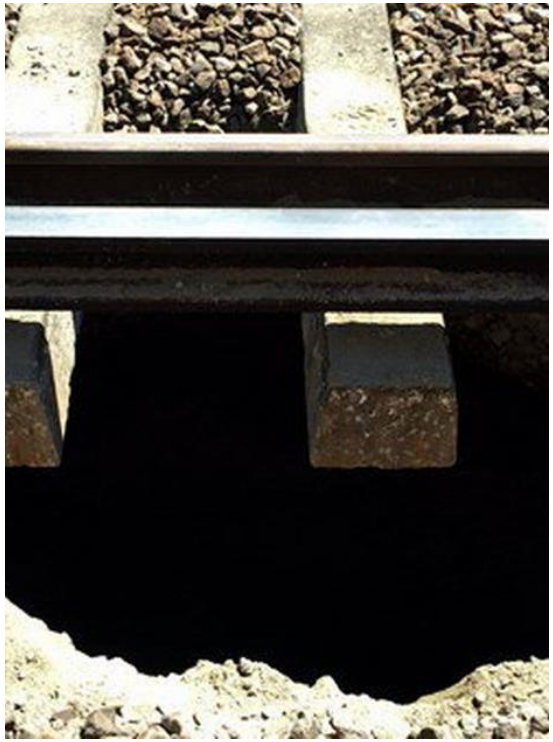
Erosion

Water quality

Drought

Flooding does not only impact infrastructure, there are other municipal and community risks that need to be considered

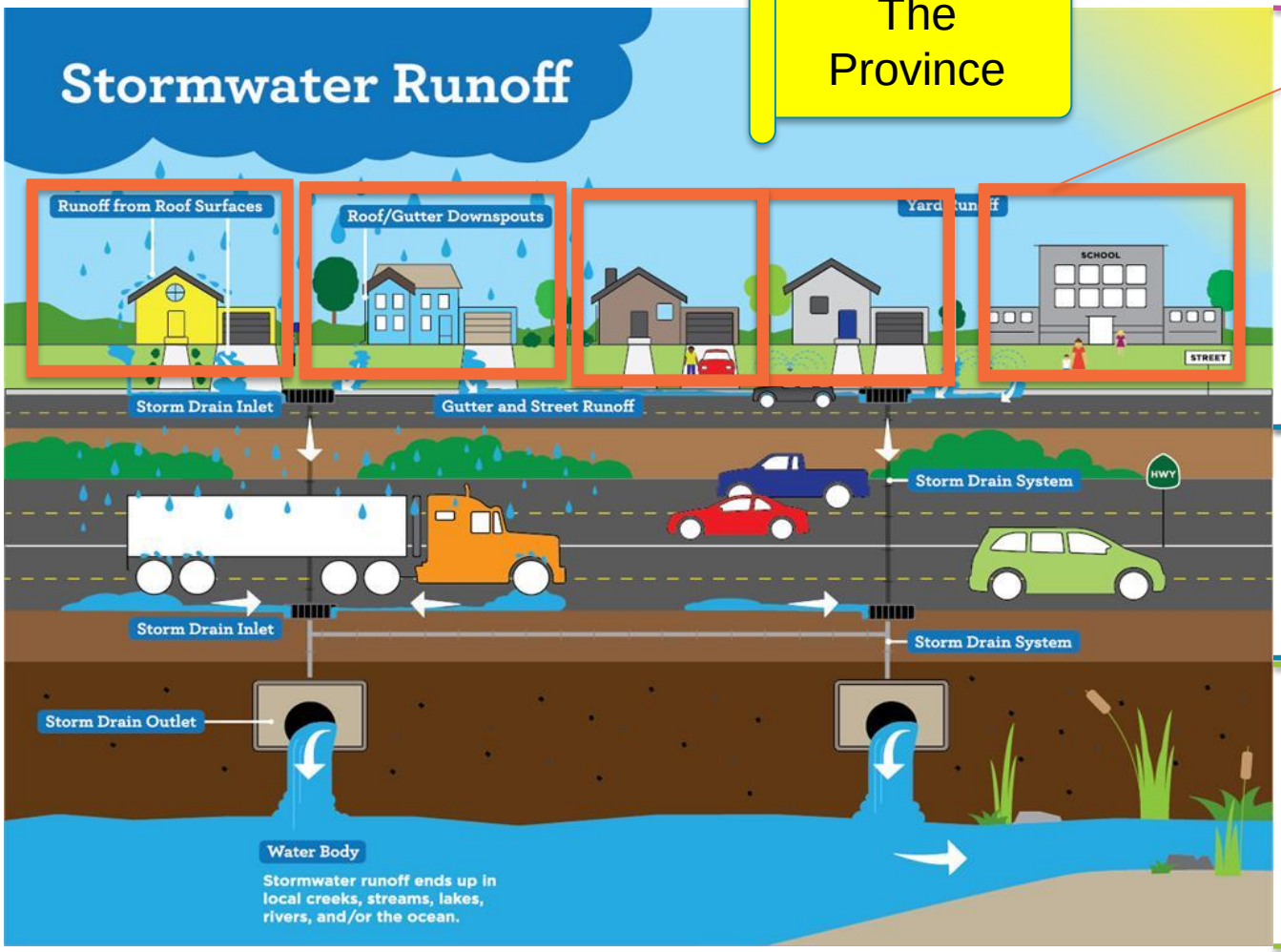
Evacuation Plans do not consider flooding



Critical Infrastructure failure poses potential threat to public

Community and municipal service needs

SWM Challenges: Jurisdictions



The Province

Private Owners

Local municipality level

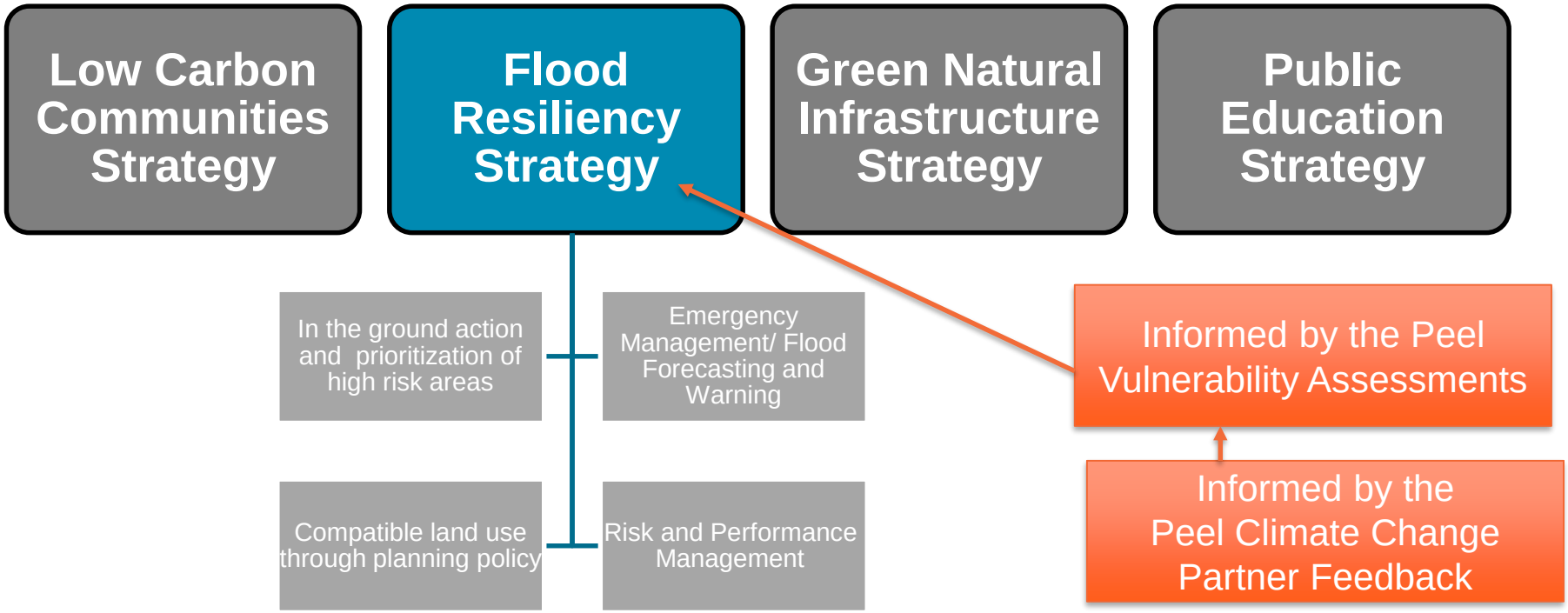
Region of Peel

CVC/TRCA-CA Level

Source: Adapted from Municipality of Middlesex, 2015 (https://www.middlesexcentre.on.ca/Public/Stormwater)

Peel Climate Change Partnership Plan: Four Strategies 2018-2022

Mandate: Working together to adapt to and mitigate the effects of climate change as we transition to low carbon and resilient communities within Peel Region.



Partners: Brampton Flower City, Town of Caledon, Credit Valley Conservation, Mississauga, Region of Peel, Toronto and Region Conservation

Legislative Carrots and Sticks

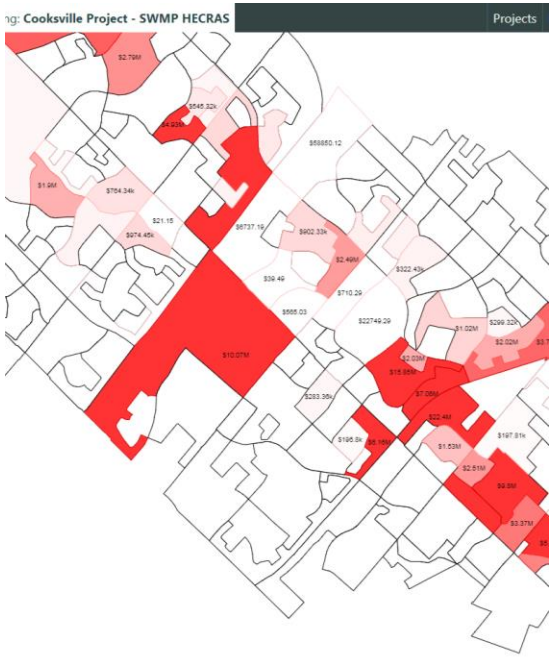
Federal Funding Requirements

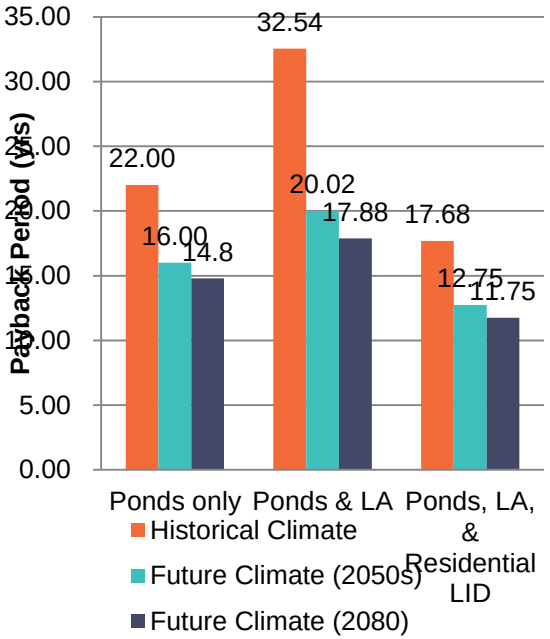
- Disaster Mitigation Action Funding (DMAF)
- NDMP Stream 3 for Flood Mitigation Planning
- Infrastructure Canada- Climate Change Lens

Provincial Requirements

- Building Together Guidance/ Reg 588/17
- Growth Plan and Provincial Policy Statement

Risk and Return on Investment Tool





Identify Flood, Water Quality and Erosion Risks

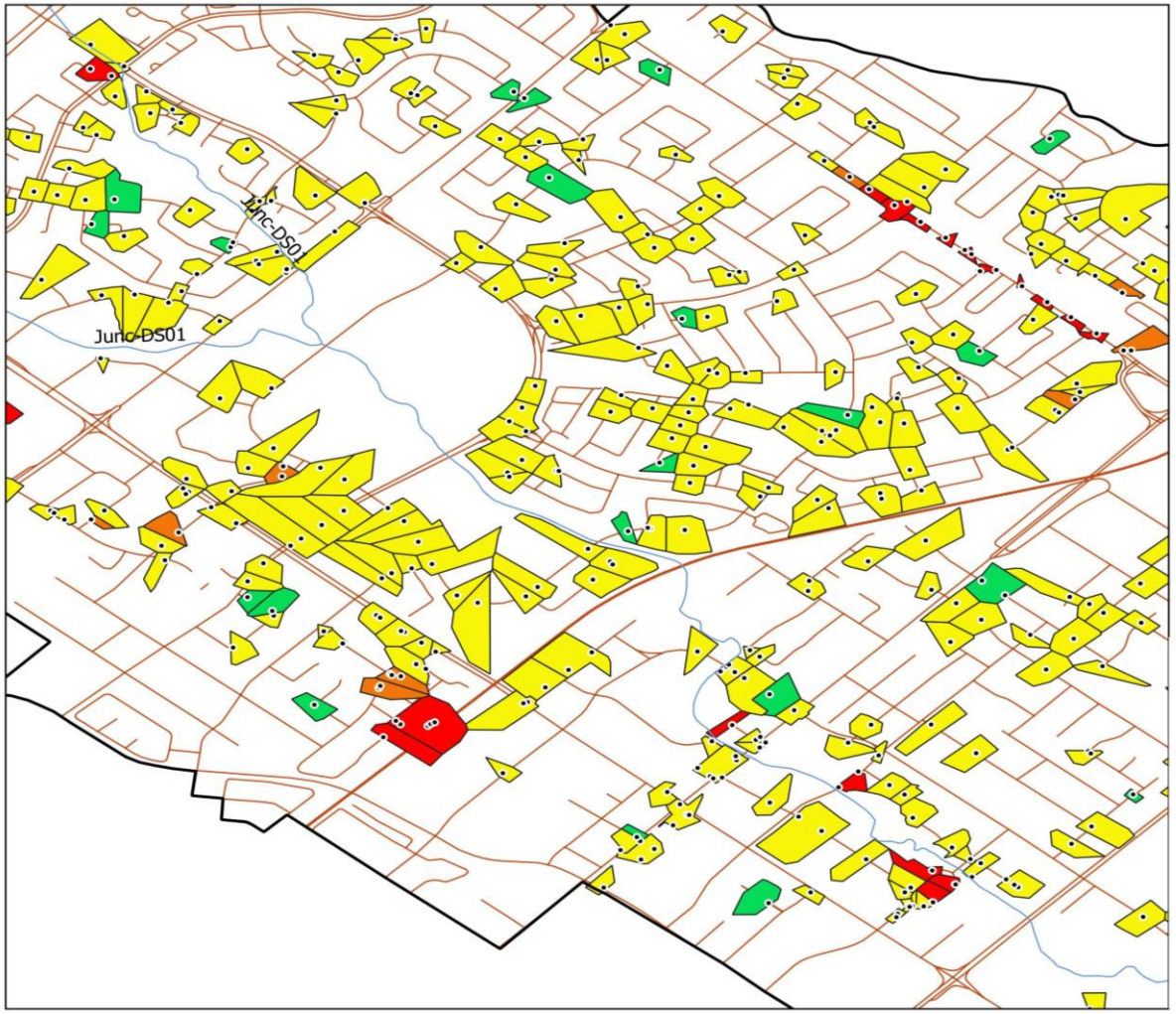
Identify Potential Damages

Evaluate Options for greatest ROI

Direct Damages to Buildings due to flooding

'do nothing' baseline climate scenario (100 yr return period)

High Risk Inflow Areas due to Urban Overland Flooding



LEGEND

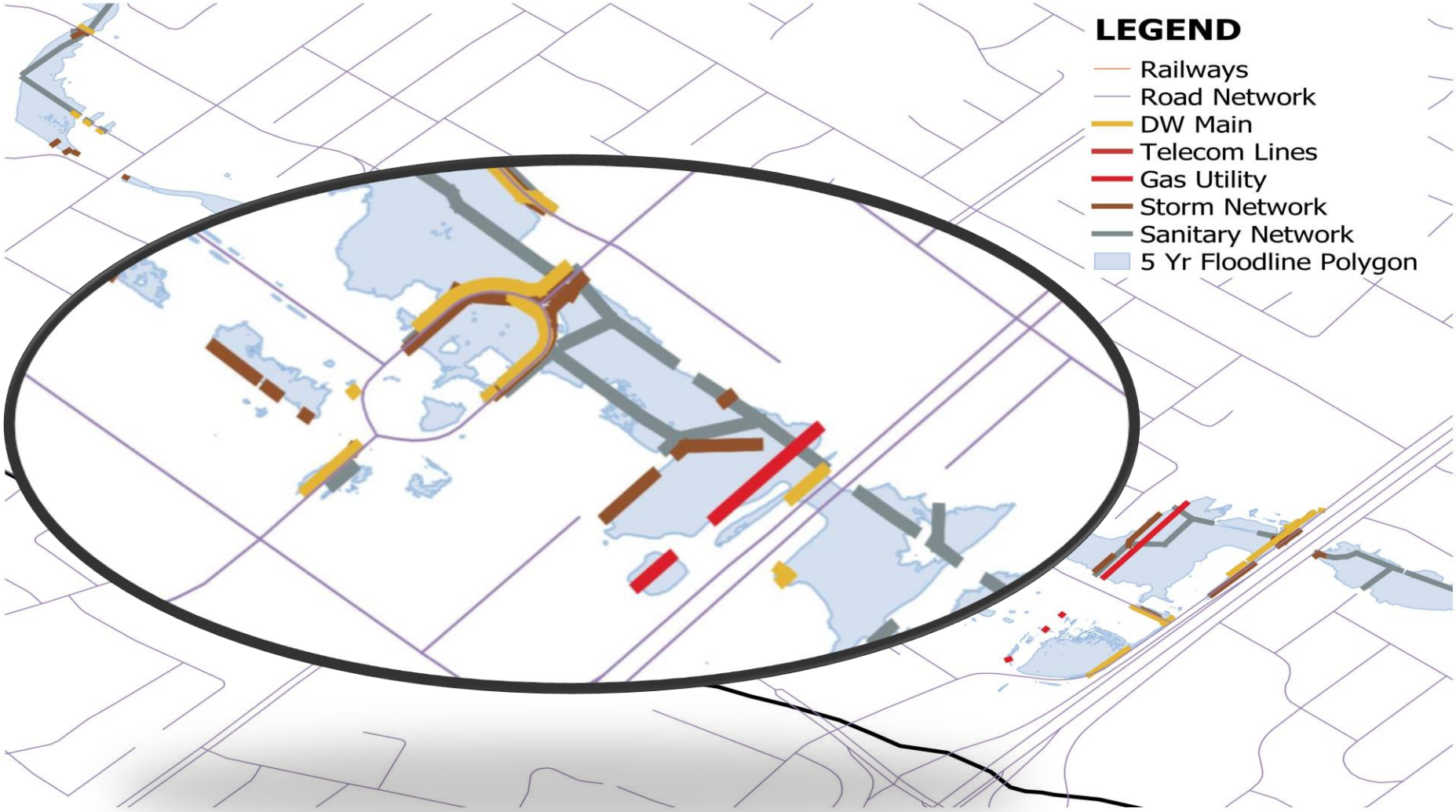
- Cooksville Stream Network
- Cooksville_Boundary

Overland Flood Depth (m)

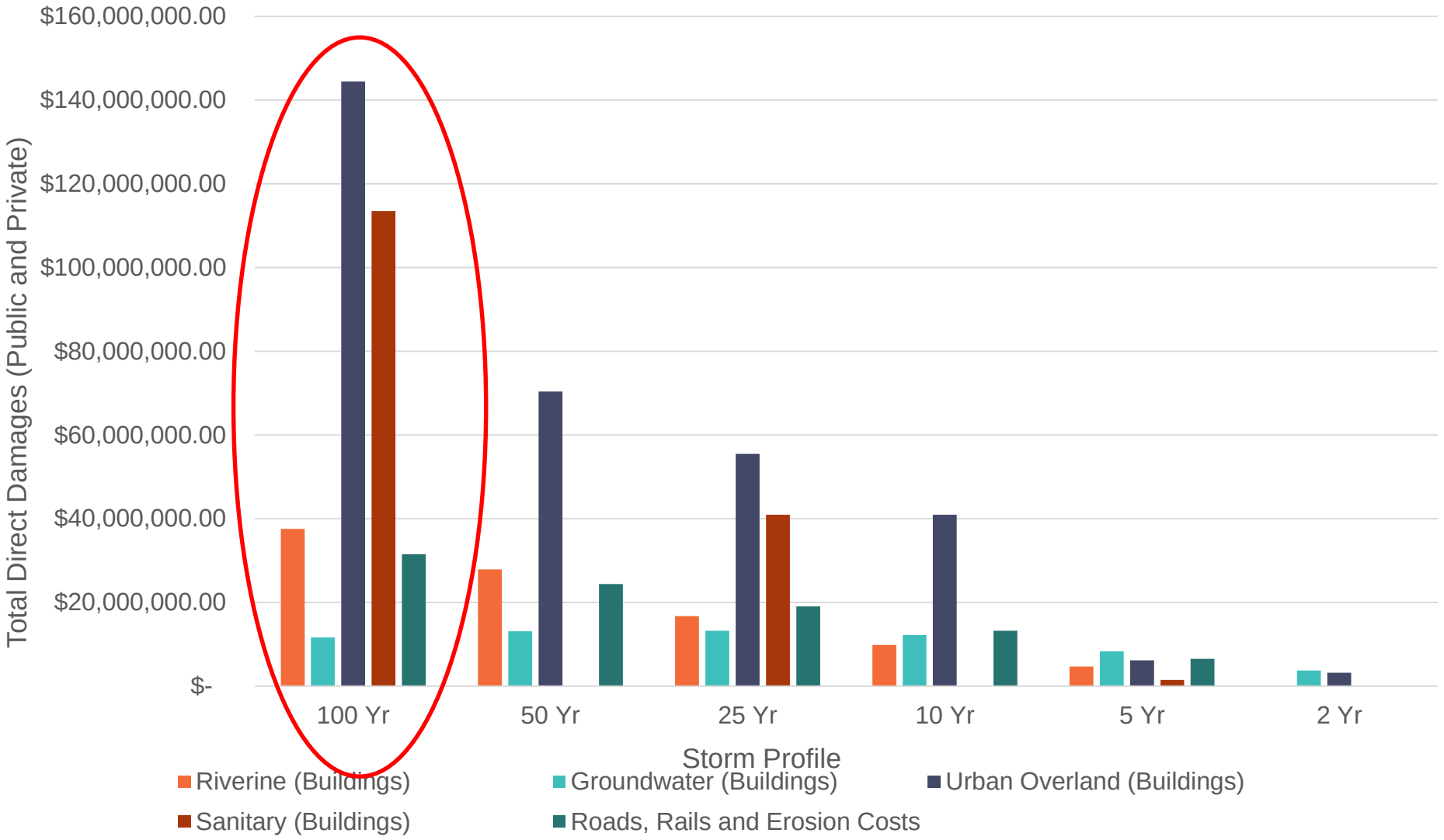
- < 0.24
- 0.24 - 0.80
- 0.80 - 1.20
- >1.2
- Sanitary Manholes
- Road Network

Direct Damages to Buried Infrastructure (including Roads and Railways) due to Stream Erosion

'do nothing' baseline climate scenario (5 yr return period)

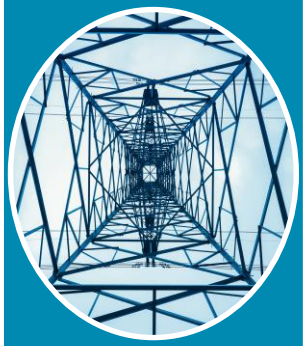


Total Direct Damages – Historic Climate, Do Nothing Scenario



Level of Service Needs to Consider Full Life Cycle

Planning



Design

Monitoring, Inspection & Maintenance

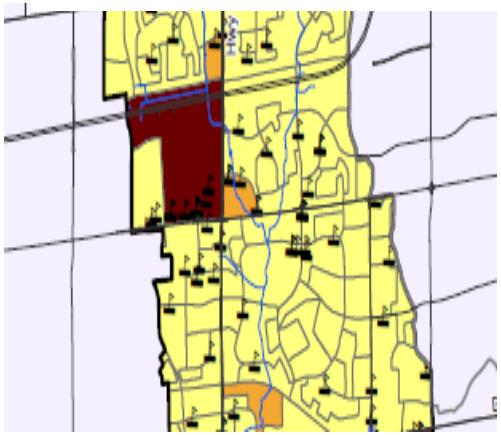
Flood Forecasting, Warning Systems & Emergency Management

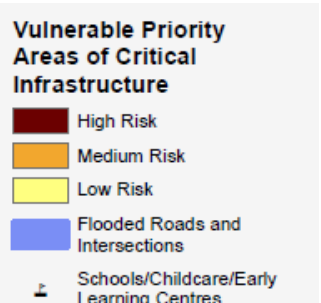
Audit & Adaptive Management

Level of Service

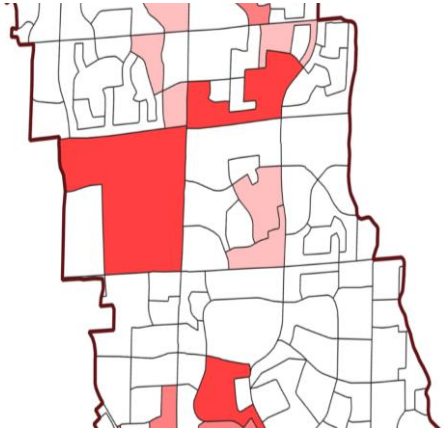
Moving towards a risk-based approach to Stormwater Master Planning

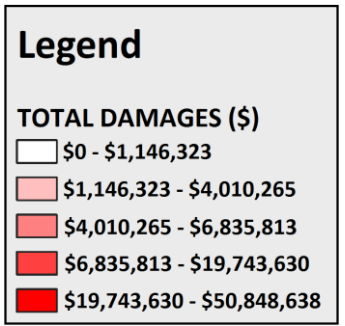
Prioritize Investment Based on Age and Condition of Infrastructure



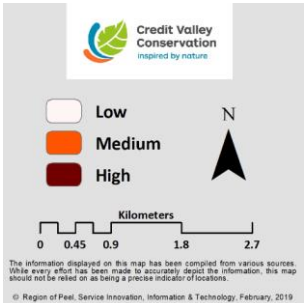


Prioritize Investment Based on Damage Costs





Prioritize Investment Based on Potential Social Risks



What Climate Will Our Systems Need to Perform Under?

24 Hour Storm – 2050s		
Current Return Period (years)	Current Annual Probability (%)	RROIT - 2050s Annual Probability (%)
2	50%	65%
5	20%	30%
10	10%	15%
25	4%	10%
50	2%	5%
100	1%	3%
150	0.7%	2%
325	0.3%	1%

24 Hour Storm – 2080s		
Current Return Period (years)	Current Annual Probability (%)	2080s Annual Probability (%)
2	50%	63%
5	20%	36%
10	10%	23%
25	4%	13%
50	2%	9%
100	**1%**	**6%**
140	0.71%	4%
340	0.29%	2%
835	0.12%	1%

Evaluate Different Management Solutions

Rain Gardens

Green Roofs

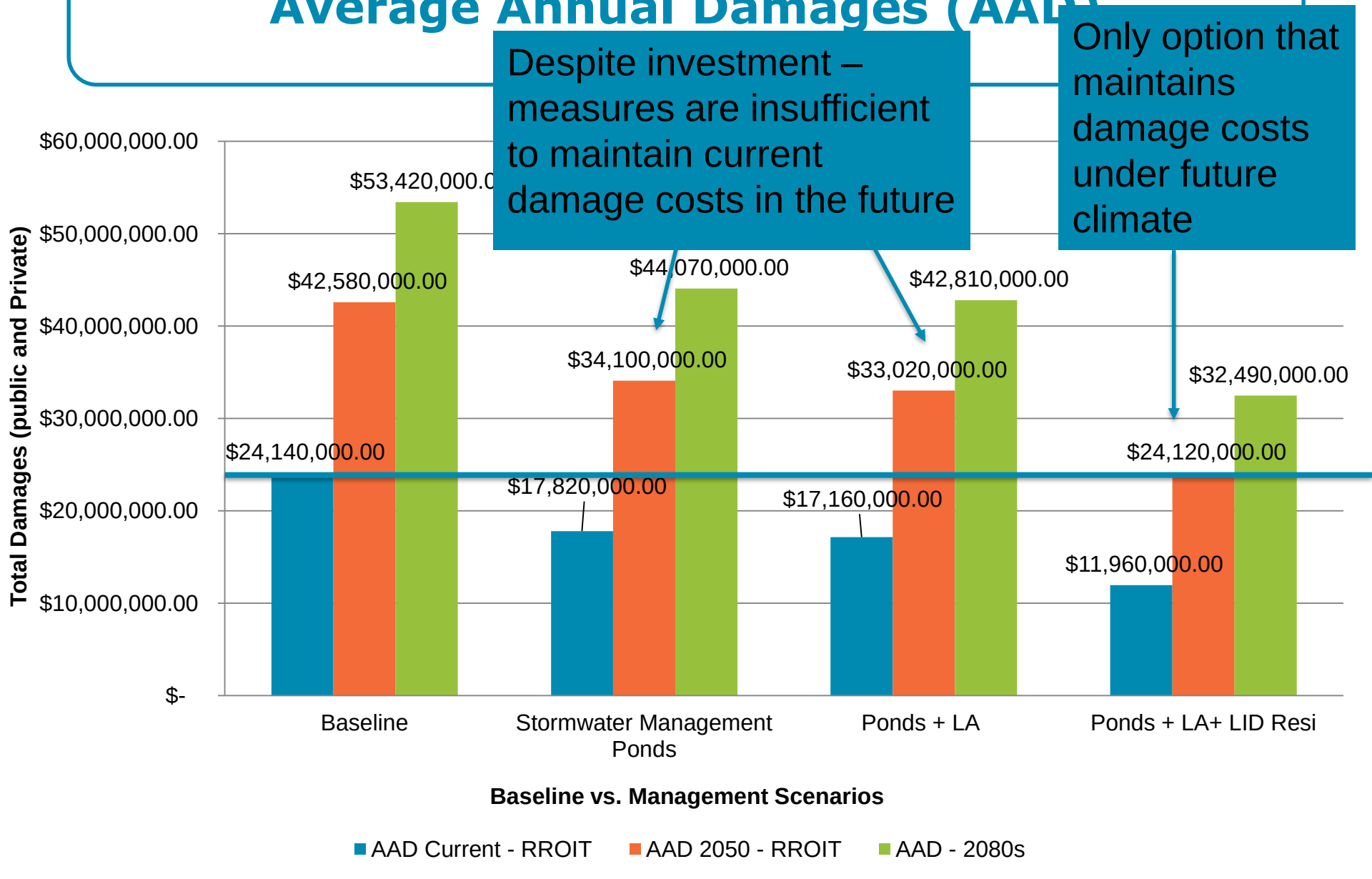
Ponds

Wetlands

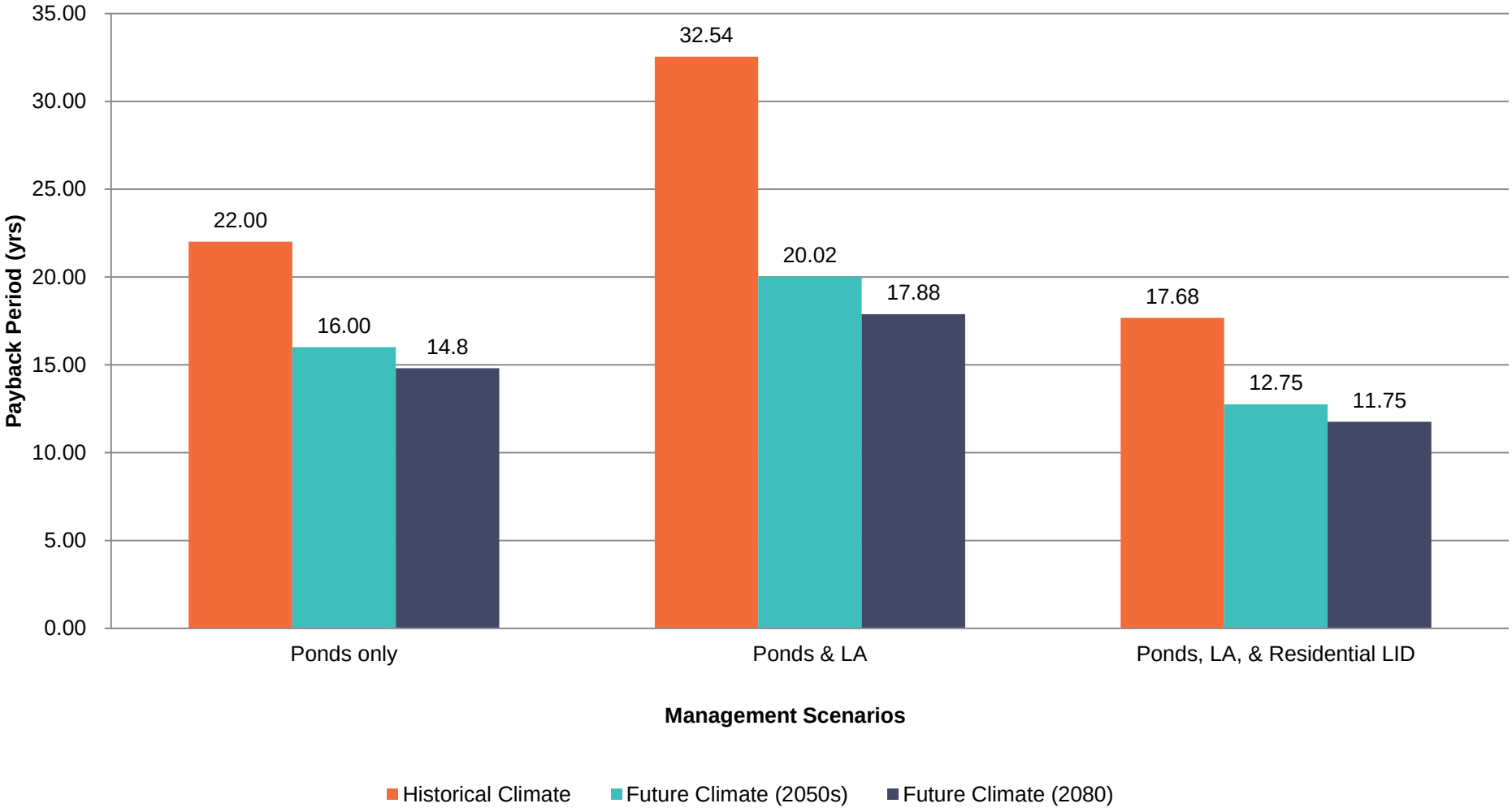
Forests

Gabion Baskets

Average Annual Damages (AAD)



Payback Period



How the Risk Tool Fits into the Flood Strategy

- Identifies High Priority areas for Partners
- Identifies management options for upgrades
- Informs Master Plans, Watershed Plans, Asset Management Plans, Flood Mitigation Plans
- Meets Federal and Provincial grant requirements (Climate Change Lens, considers social vulnerability, ROI and life cycle costing)

2020 Deliverables

- Run RROIT in Mississauga (Cooksville) and Caledon (Bolton, Alton) to inform Flood Mitigation Plans – Dec 2020

- Release Technical Manual Dec. 2020

2020 -2021 Upgrades

- *Incorporate groundwater flood modules to determine areas at risk* of *Infiltration*.
- *Incorporate Source Protection module to inform SWM selection.*
- *Water Quality Module to determine high sediment load catchments to inform life cycle costing and pathogen load*
- *Enhance Social Vulnerability Mapping (include public health-mental health, disease impacts*)

Priority Case Studies

2020-2021

- Cooksville (Mississauga)
- Alton and Bolton (Caledon)
- Calgary
- Kitchener – 1 creek
- London – 1 creek

2021- 2022

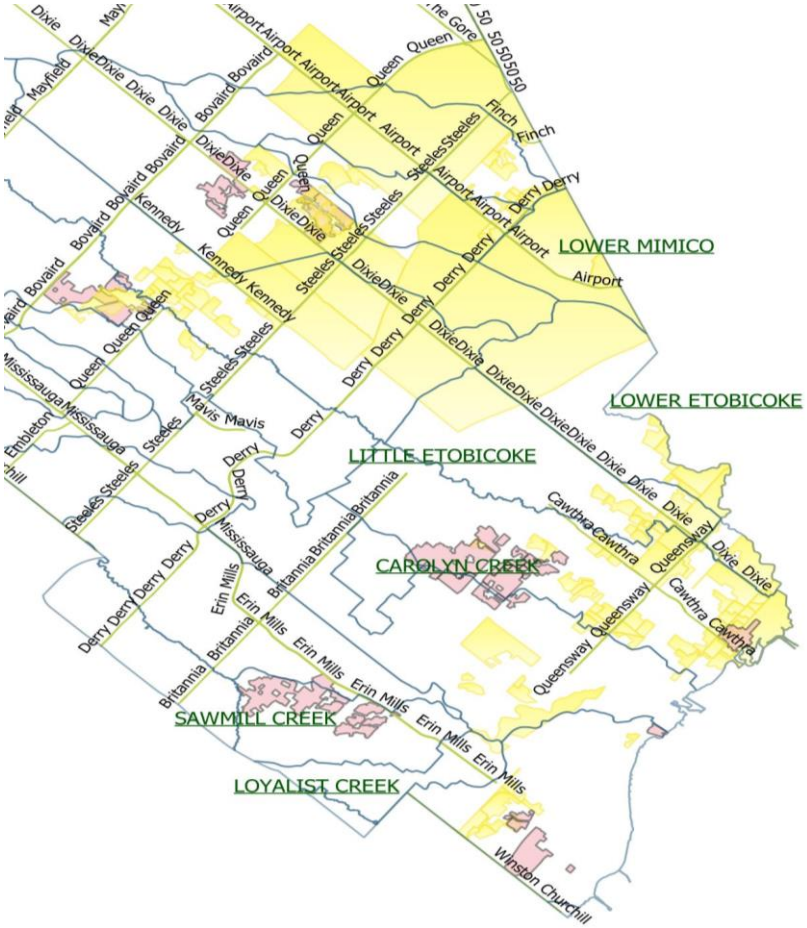
- Fletchers Creek (Brampton)
- Sawmill Creek (Mississauga)

2022-2023

- Mayfield West (Caledon)
- Cawthra Creek (Mississauga)

2023-2024

- Sheridan Creek and Avonhead



Funders and Contributors

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Sécurité publique Canada

THE CITY OF CALGARY

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