Water and Wastewater

Roadmap for Climate Change Resilience

York Region's Environmental Services Department (ENV) recognizes that climate change is an consideration in immediate and long-term planning of water and wastewater infrastructure.

To support greater resilience to climate change in the Region's water and wastewater assets, a Water and Wastewater Climate Change Adaptation Study was undertaken to develop an enhanced understanding of the potential impacts of climate change and to guide management and adaptation strategies. This study was completed in progressive stages as follows:

Establish Understanding

Task 1: Review of Background Information (past Regional climate change reports/studies) Climate Change Reports

Task 2: Case Studies on Past Climate-Caused Infrastructure Failures in Other Jurisdictions

Task 3: Local Historical Climate Analysis and Data Collection of Past Climate-Related Incidents

Analysis of Climate Change Impacts on York Region's W&WW System

Task 4a: Screening-Level Vulnerability Assessment by Asset Type

Task 4b: Assessment of Highest Risks in Regional Water and Wastewater System

Task 5: Review of Design Criteria/ Guidelines and Recommendations

Task P1: Identification of Climate Change

Planning for Action

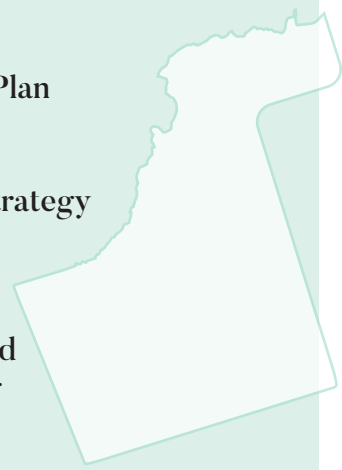
Task 6: Future Climate Analysis Report (to be used as climate forecast and refer-ence document)

Task 7: Development of Roadmap for Climate Change Resilience

Implementation

This project built on existing initiatives within York Region to address climate change and support a resilient water and wastewater system, including:

- Corporate Climate Change Action Plan (Completed Concurrently)
- Inflow and Infiltration Reduction Strategy
- IMS Process and Risk Assessment
- Standard Operating Procedures and Drinking Water Quality Monitoring



Highest Climate Risks to Regional Water and Wastewater Infrastructure

Trigger	Impact	Risk	Affected Asset
Temperature Increase and Extreme High Temperatures	Increased Biofilm Regrowth and Disinfectant Decay	Impaired Treated Water Quality	Water Pumping Stations, Transmission Mains, Storage Facilities
	Poor Raw Water Quality	Impaired Treated Water Quality	Water Treatment Plants
	Power Outages/ Equipment Failure	Loss of Service	Water Pumping Stations, Treatment Plants
	Corrosion/Breaks	Odour Events	Trunk Sewers
	Corrosion/Breaks	Spill to the Environment	Trunk Sewers
	Increased Microbial Activity	Odour Events	Sewage Pumping Stations
Extreme Rainfall	Increased Biofilm Regrowth and Disinfectant Decay	Impaired Treated Water Quality	Water Pumping Stations, Transmission Mains, Storage Facilities
	Poor Raw Water Quality	Impaired Treated Water Quality	Water Treatment Plants
	Power Outages/ Equipment Failure	Loss of Service	Water Pumping Stations, Treatment Plants
	Corrosion/Breaks	Odour Events	Trunk Sewers
	Corrosion/Breaks	Spill to the Environment	Trunk Sewers
Drought	High Demand	Decreased Water Availability	Groundwater Wells (GUDI)

A key outcome of the project is the **Water and Wastewater Roadmap for Climate Change Resilience,** which includes **33 proposed actions**, developed with the aim of improving resilience to climate risks in water and wastewater infrastructure. The recommendations in the Roadmap focus on addressing the highest future climate risks to York Region's water and wastewater infrastructure that were identified by this project.

Water & Wastewater Roadmap for Climate Change Resilience

High Priority Actions

1. Identify Integration Points for Climate Change Consideration in All Existing Processes
2. Incorporate Climate Resilience Considerations and Recommendations in Design Guidelines
3. Incorporate Climate Change Considerations in Master Plan
4. Integrate Climate Change Adaptation Considerations and Evaluation into Class EA Process
5. Develop Requirements for Climate Change Consideration in Capital Project RFPs
6. Update Operational Procedures and Emergency Preparedness Plans to Address Highest Risks
7. Review HVAC Sufficiency at Critical Facilities and Performance in High Temperature Conditions
8. Leverage Existing Work to Enable Collaborative Effort in Implementing Climate Actions
9. Raise the Profile and Awareness of Climate Change Within York Region
10. Develop Performance Indicators to Measure Progress Implementing Climate Change Adaptation Recommendations

11A. Update Operational Procedures and Emergency Preparedness Plans to Address Highest Climate Risks

11B. ENV to work with Corporate Business Continuity to implement updated Corporate policy and other business continuity measures, to ensure employee safety during extreme weather events. Department-specific policies, plans, or procedures may be required under the Corporate Policy.

12. Leverage Partnerships with CAs and LMs to Share Information and Research on Climate Change, Changes to Raw Water Quality, etc.
13. Complete Detailed Flood Impact Assessment of ENV Assets Through Corporate-Led Vulnerability Assessment of all Regional Assets
14. Conduct Interdependency and Vulnerability Study for Critical Infrastructure and Services
15. Leverage and Improve Documentation for Climate Events to Determine Appropriate Response Actions
16. Assess Spill Risk at Sewage Pumping Facilities and Evaluate Methods to Reduce Spill Risk
17. Continue Implementing I&I Initiatives and Leverage Program Information to Improve Modelling of Different Storm Event Scenarios
18. Consider Opportunities to Expand I&I Program Scope and Targets

Items for Future Action

19. Develop a strategy to strengthen existing standby power approach for emergency back-up power
20. Assess sufficiency of adaptive capacity in the water system and consider improvements to operational flexibility
21. Invest in improvements to the Georgina and Keswick water treatment plants to increase resilience to changes in raw water quality
22. Review and improve maintenance strategies for mechanical and electrical equipment to improve performance and climate change resilience climate conditions
23. Integrate consideration for highest climate change vulnerability areas and populations when prioritizing actions to undertake
24. Build a water quality model to improve understanding of water distributions system performance. (In Progress
25. Conduct annual reviews and documentation of raw surface water quality monitoring programs
26. Develop method for capturing institutional memory and capacity to address climate-related threats.
27. Assess interdependency and cascading impacts between all levels of built and natural assets to identify areas of high vulnerability.
28. Building on existing practices to ensure that climate change is considered in all risk assessments at various stages in the asset lifecycle
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30. Review the frequency of flood monitoring and erosion inspections of buried infrastructure at or near water crossings
31. Conduct climate-focused review of stormwater storage capacity and flow management at wastewater treatment facilities
32. Identify areas where odours are probable for new wastewater infrastructure and apply appropriate odour mitigation measure
33. Complete climate change risk assessments for all water and wastewater infrastructure, starting with high criticality / high risk assets