

# Ontario Association of Impact Assessment

2013 Annual Conference, Ontario Science Centre

## Session 8 - Upper York Sewage Solutions Environmental Assessment Case Study



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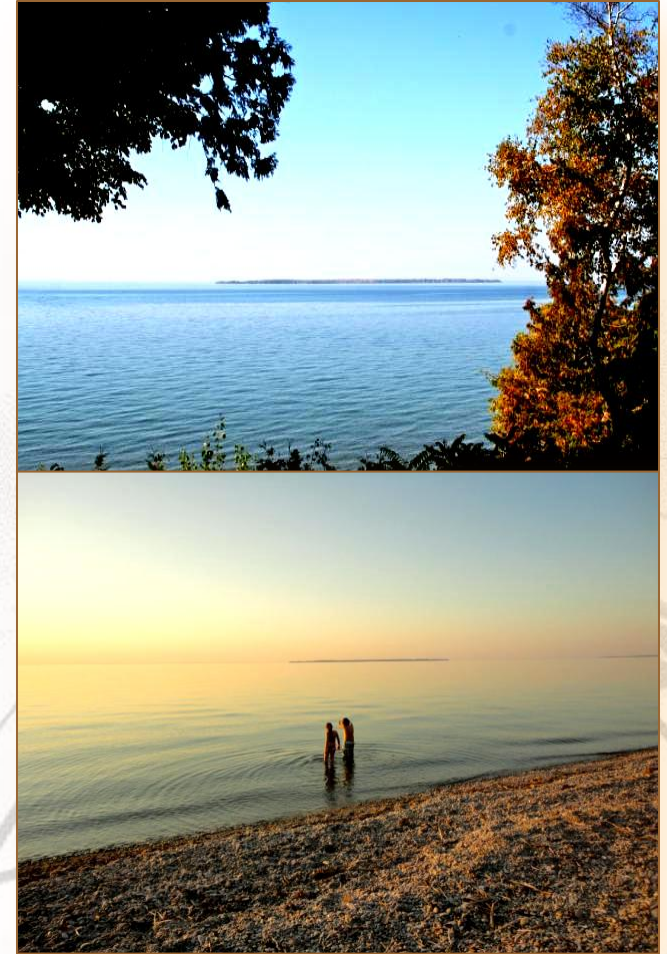
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# Session Overview

- ❑ Overview of the UYSS EA
- ❑ Minister of the Environment's Direction
- ❑ Impact Prediction and Mitigation Development
- ❑ Regulatory Support
- ❑ Panel Discussion
- ❑ Questions and Comments



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# Overview of the UYSS EA



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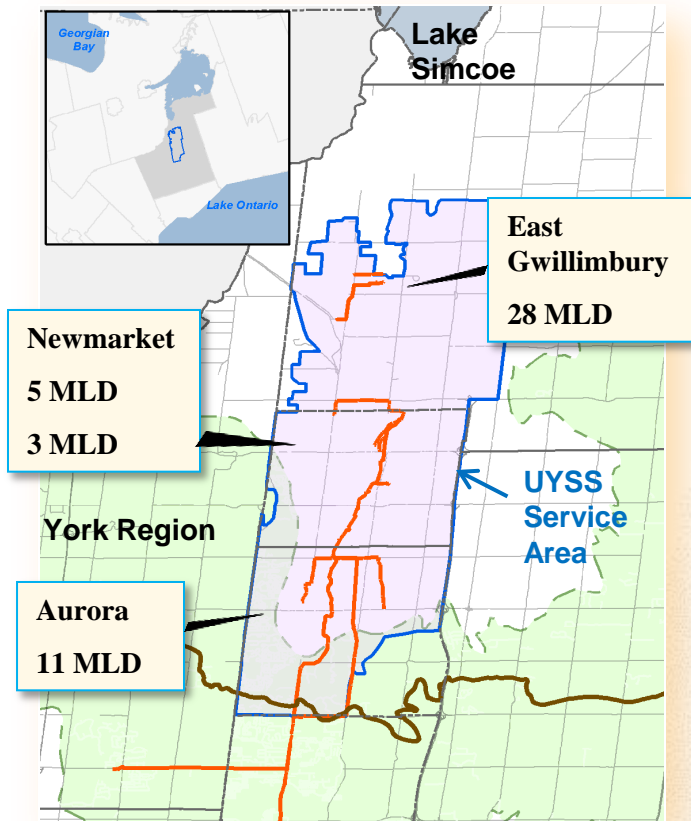
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# Purpose of the UYSS EA

- ❑ To develop *sustainable sewage servicing solution* to accommodate the provincially approved growth in the Upper York Sewage Solutions service area for the Regional Municipality of York by 2031





# EA Process



## Terms of Reference

The first step for approval under the *Environmental Assessment Act* (EA Act) is the submission of a Terms of Reference for the Environmental Assessment (EA). The approved Upper York Sewage Solutions (UYSS) Terms of Reference provides a framework/work plan for the UYSS EA.

## Purpose/Rationale

Provides the need and justification for the proposed undertaking.

## Alternatives To the Undertaking

Functionally different ways of approaching a problem or opportunity, from which a preferred Alternative To the Undertaking is selected.

## Alternative Methods of Carrying Out the Undertaking

Different ways of implementing the preferred Alternative To the Undertaking.

## Impact Assessment of the Preferred Undertaking

Potential effects on the environment (both positive and negative) are identified, and avoidance/mitigation measures are developed/applied to the negative environmental effects.

## Environmental Assessment Report Submission

The second step for approval under the *EA Act* is the submission of a EA Report to the Minister of the Environment for review and approval.



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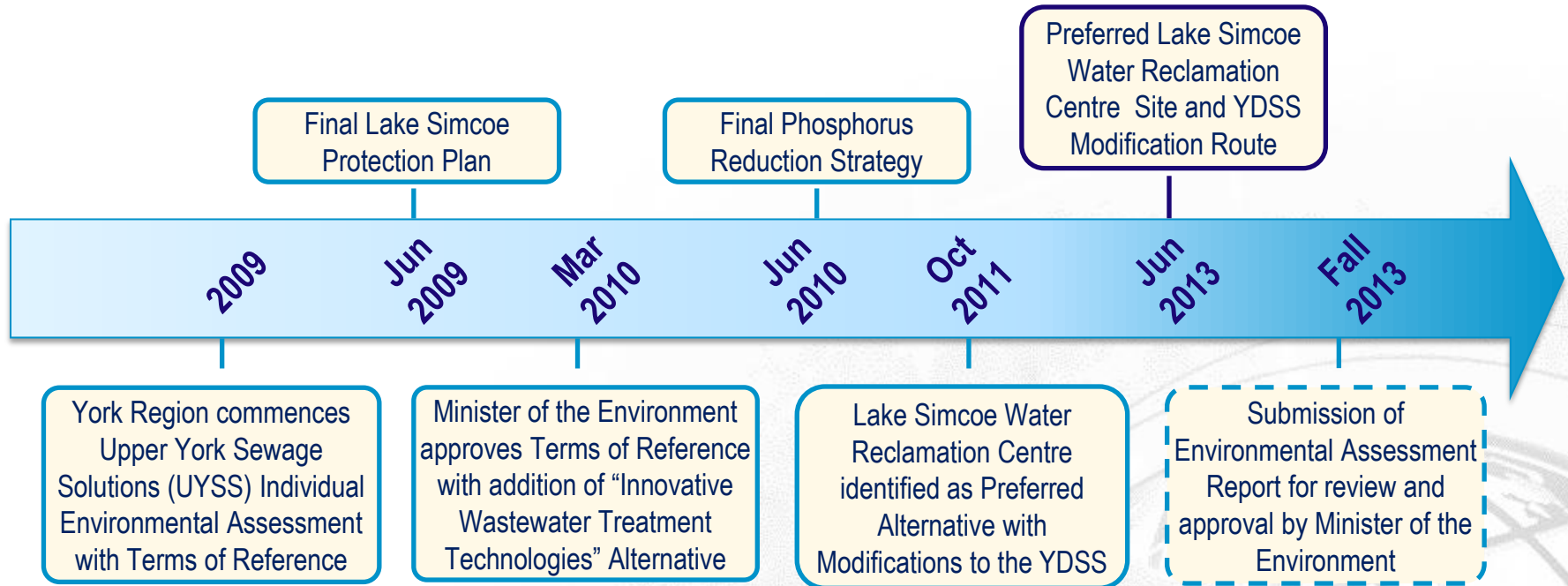


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# How We Got Here & Where We're Going



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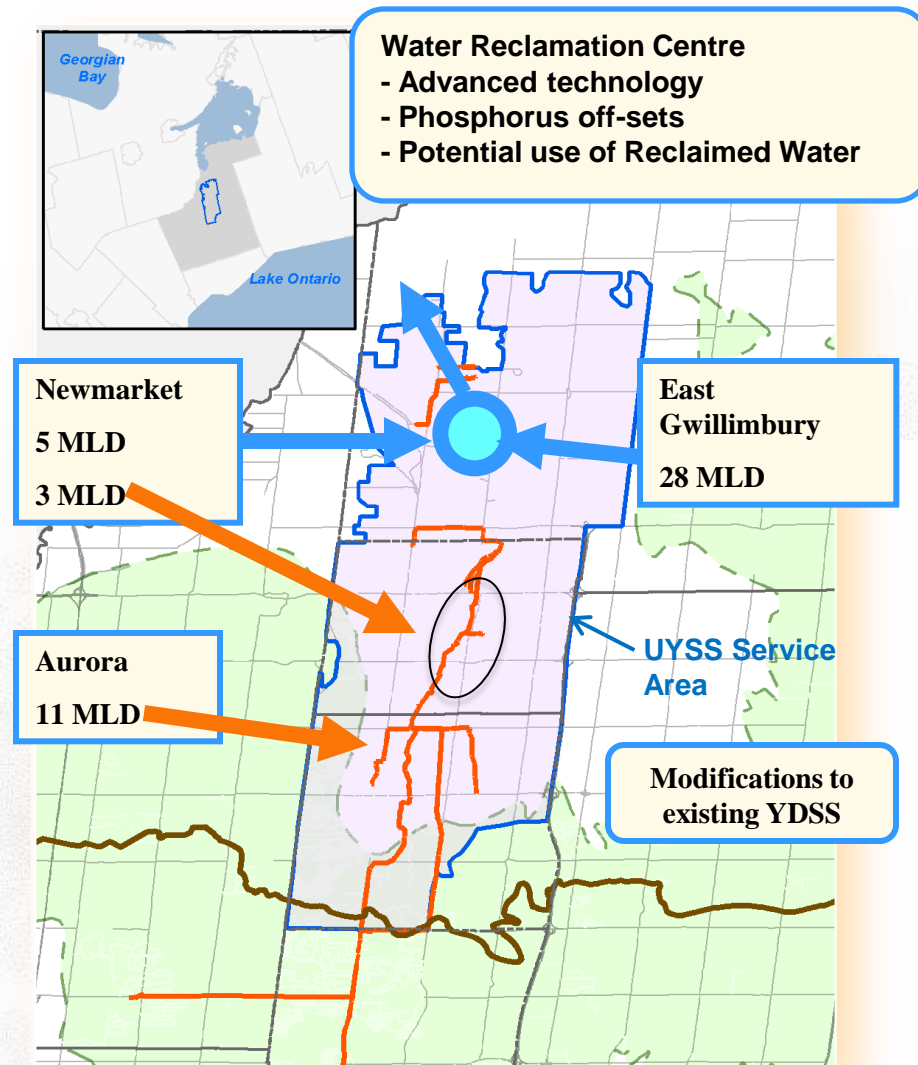
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# A Sustainable Servicing Solution

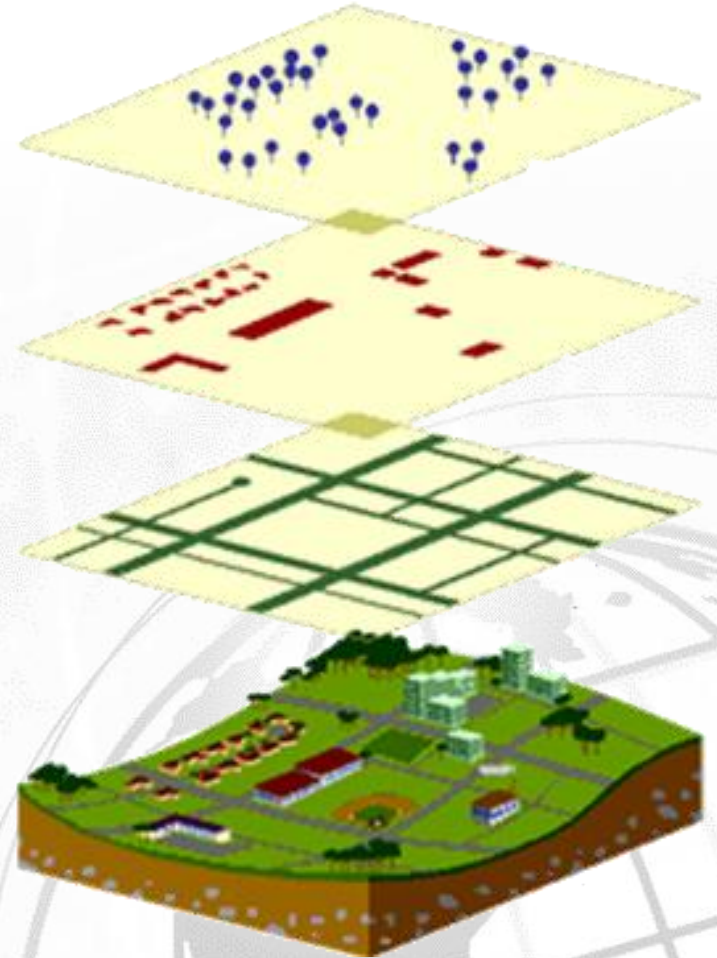
- ❑ Wastewater from growth in East Gwillimbury and a portion of Newmarket will be conveyed to an innovative sewage treatment plant (Water Reclamation Centre)
- ❑ Wastewater from growth in Aurora and a portion of Newmarket will be conveyed to the existing York Durham Sewage System (YDSS) for discharge to Lake Ontario
- ❑ Modifications to existing YDSS include additional forcemain connecting Newmarket, Aurora and Bogart Creek Pumping Stations



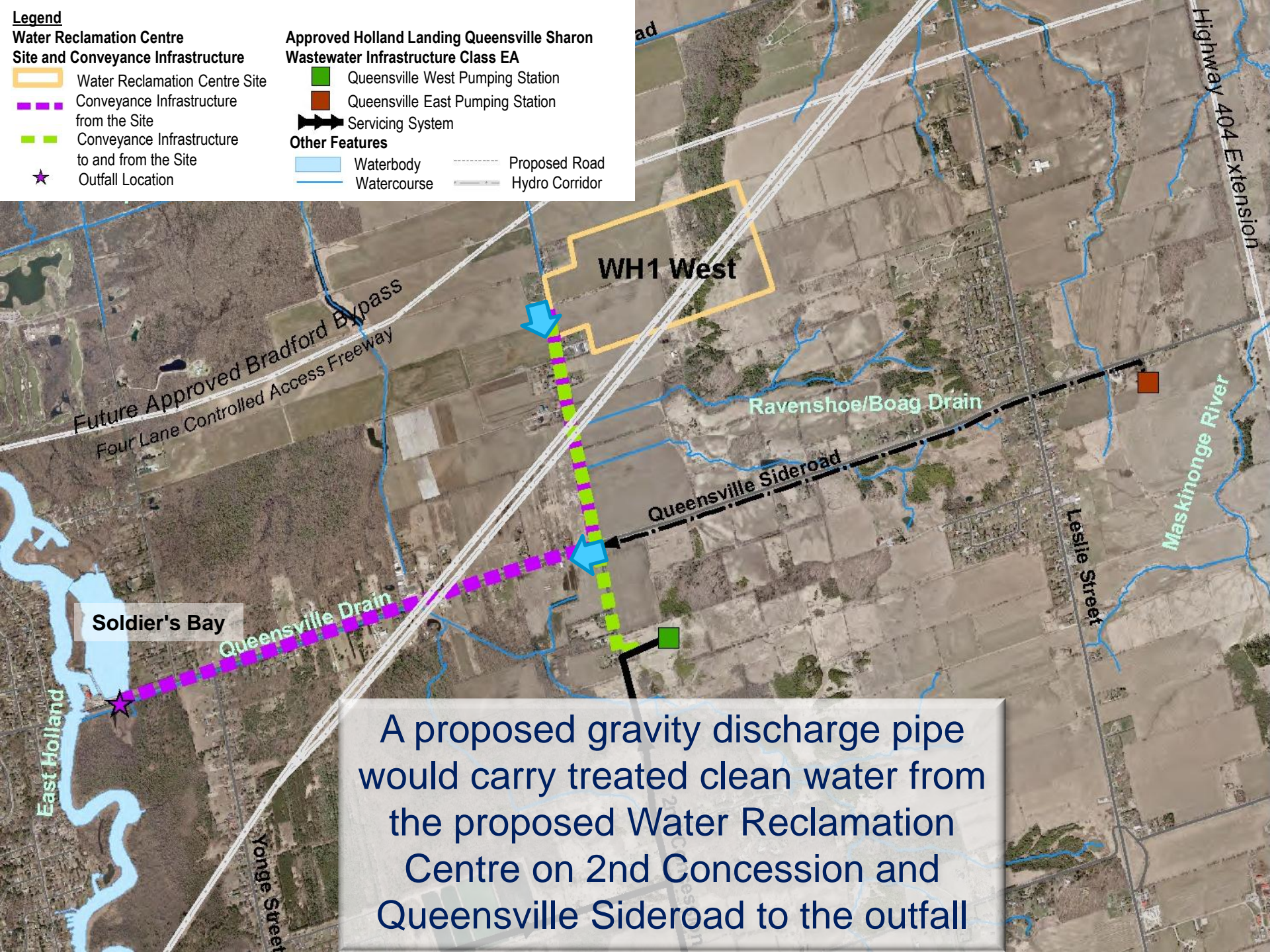


# Generating a Long List of Sites

- ❑ UYSS EA specific Geographic Information System (GIS) model used
- ❑ Database for model incorporated existing information sources:
  - Project team files
  - York Region GIS database
  - Current data from Provincial Ministries, Lake Simcoe Region Conservation Authority, local municipalities
- ❑ Application of mandatory, avoidance and site suitability criteria via GIS computer model







A proposed gravity discharge pipe would carry treated clean water from the proposed Water Reclamation Centre on 2nd Concession and Queensville Sideroad to the outfall





Soldier's Bay

Marina

The treated clean water would be discharged to the Queensville Sideroad drainage ditch via an outfall pipe immediately south of the Queensville Sideroad Bridge

QUEENSVILLE SIDEROAD

East Holland River

WETLAND PLANTINGS

ROCK CLUSTERS

ROOT WADS

OUTFALL MAINTENANCE ROAD

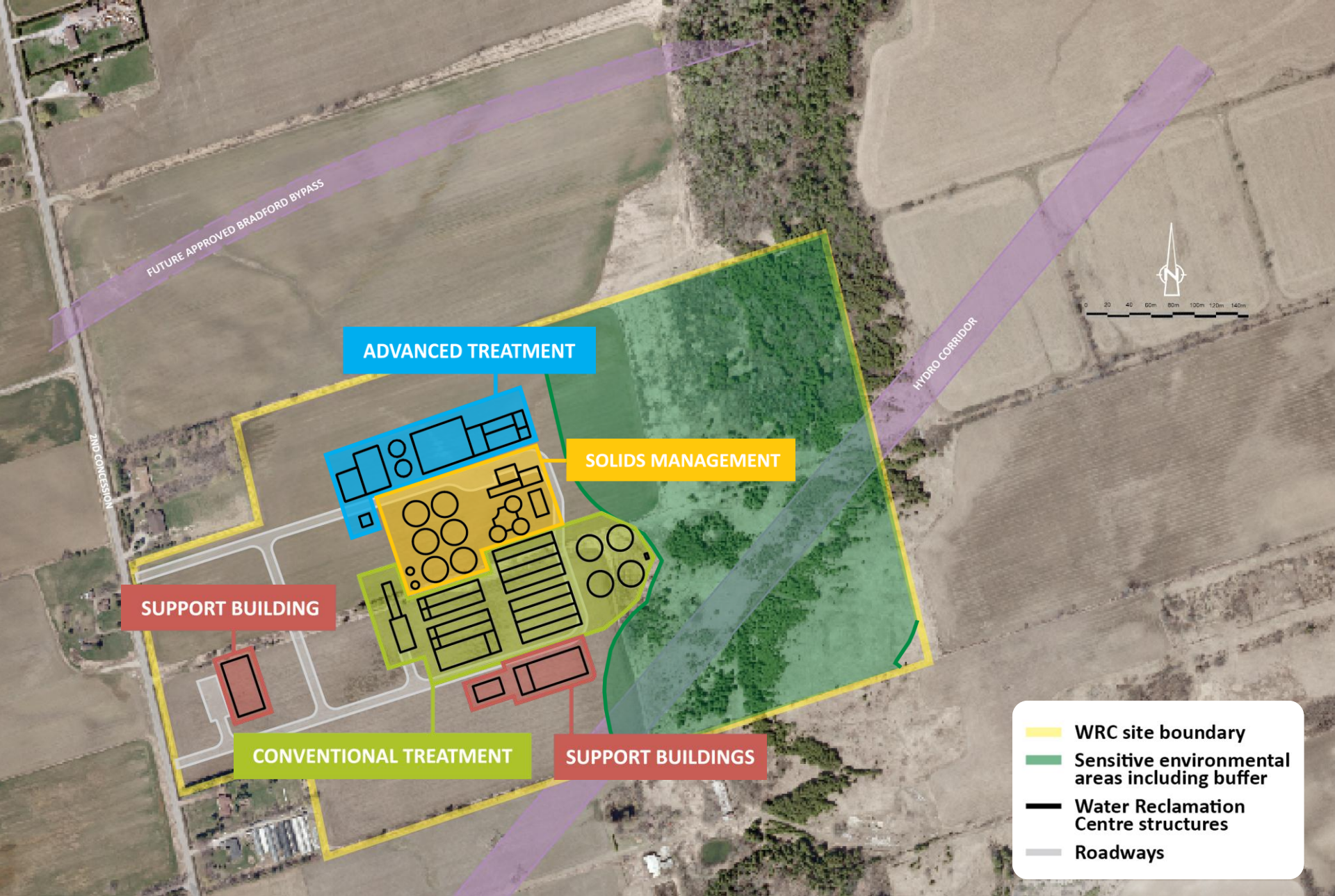
PROPOSED AREA OF PERMANENT EASEMENT (APPROXIMATE)

ROUNDED RIVER ROCK

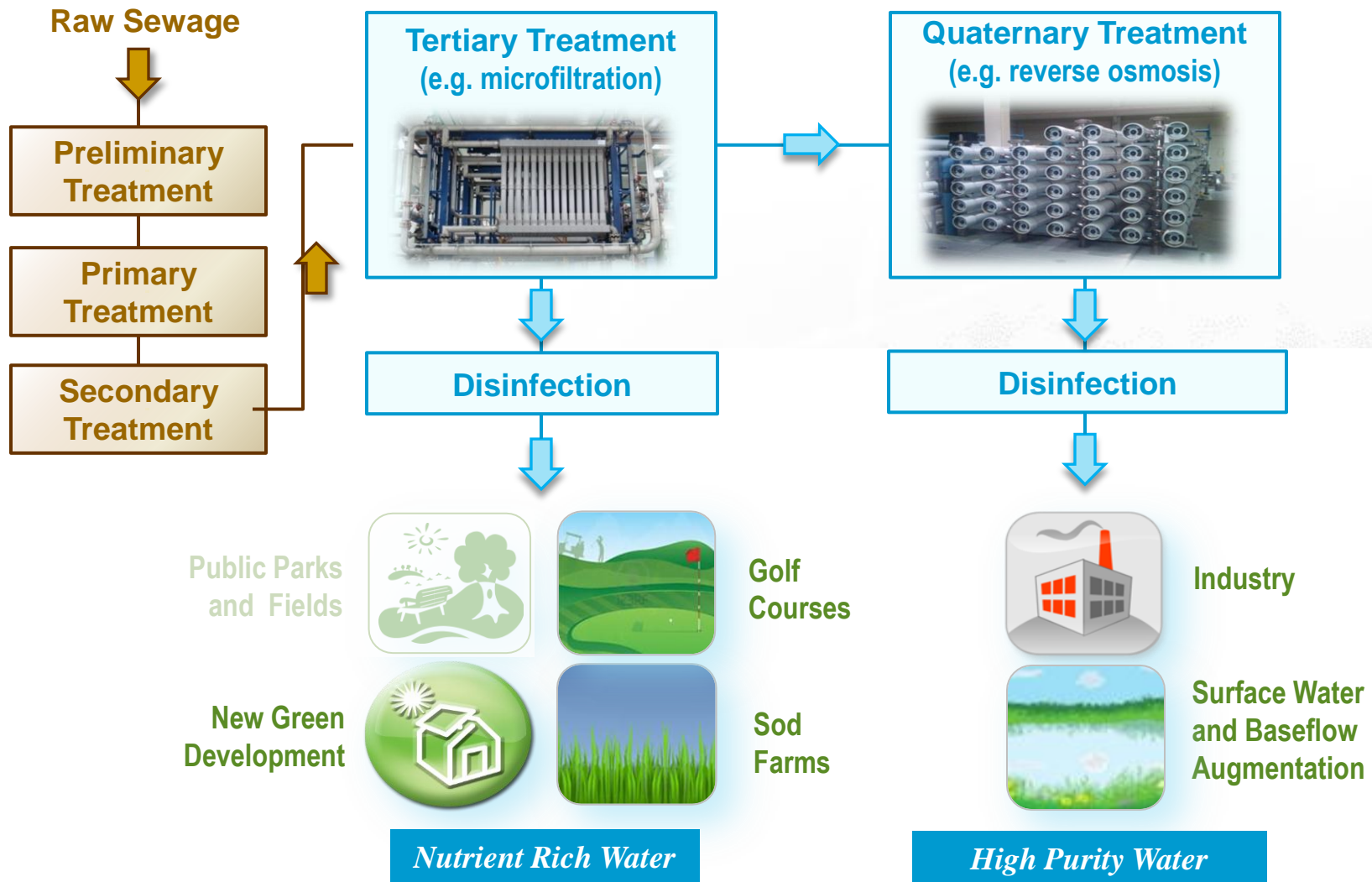
PROPERTY LINE (APROX)

Maintain existing drainage channel connectivity with the East Holland River





# Water Reclamation Centre





# Minister of the Environment's Direction



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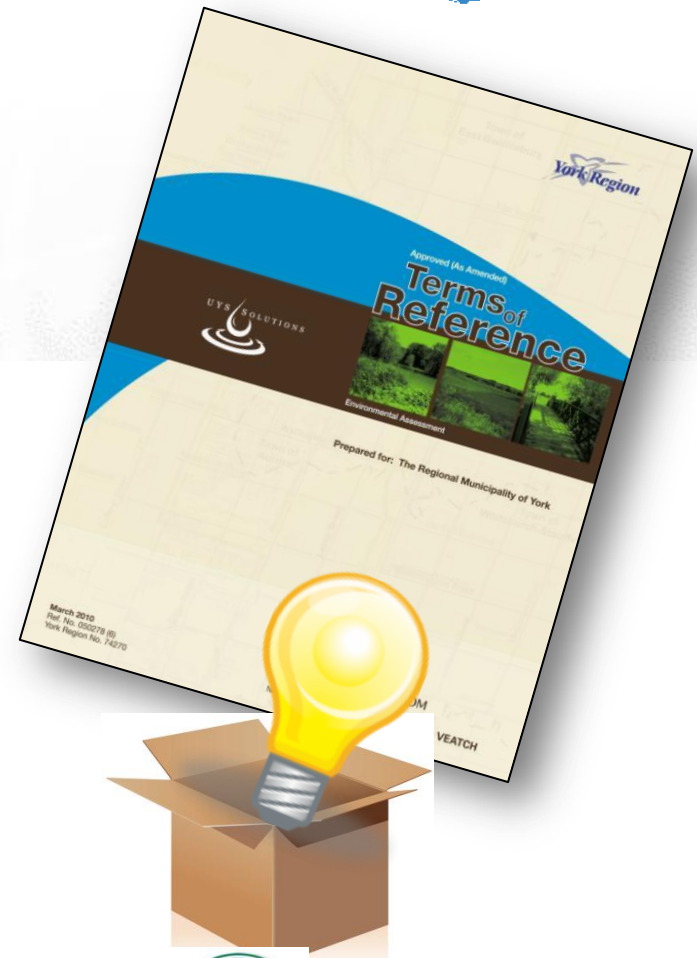
  
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# Minister's Direction to York Region



- ❑ Made in York Solution
- ❑ Innovation and creativity
  - Amended Terms of Reference requires that York Region consider innovative wastewater treatment technologies in their assessment of:
    - “alternatives to” the undertaking
    - “alternative methods” of implementing the undertaking
- ❑ Sustainability

**Out of the box thinking!!**



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# Commitments Received from the Ministry of the Environment

- ❑ Recognize technology to achieve low total phosphorus (TP) levels (0.01 to 0.02 mg/L)
- ❑ Adopt effluent TP compliance based on annual mass loadings
- ❑ Recognize project specific TP off-sets
- ❑ Establish reclaimed water reuse guidelines
- ❑ Confirm use of Holland Landing Lagoons site (C of A and TP cap)

# Impact Prediction and Mitigation Development



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# Natural Environment Studies

## ❑ East Holland River Studies

- Effects of the WRC Discharge on Flooding Potential
- Hydrodynamic Modeling Study of Outfall
- Aquatic Habitat Assessment
- Geomorphologic Assessment
- Comprehensive Assimilative Capacity Study
- Thermal Effects

## ❑ Natural Environment Baseline Conditions

## ❑ Natural Environment Impact Assessment



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# Natural Environment Baseline Conditions and Impact Assessment Reports

**Baseline Conditions** summarizes existing Natural Environment in the UYSS EA Study Area, including the East Holland River, using available secondary sources and field investigations.

- ❑ Assessed Natural Areas designated by provincial and LSRCA policy, climate, geology, hydrogeology, surface water geomorphology, vegetation aquatic species and habitat, wildlife significant species and species at risk



**Impact Assessment** describes potential effects, mitigation measures and net effects of the undertaking

- ❑ Water Reclamation Centre Site WH1 West, including the associated conveyance infrastructure and outfall
- ❑ Alternative York Durham Sewage System (YDSS) Modifications Route A



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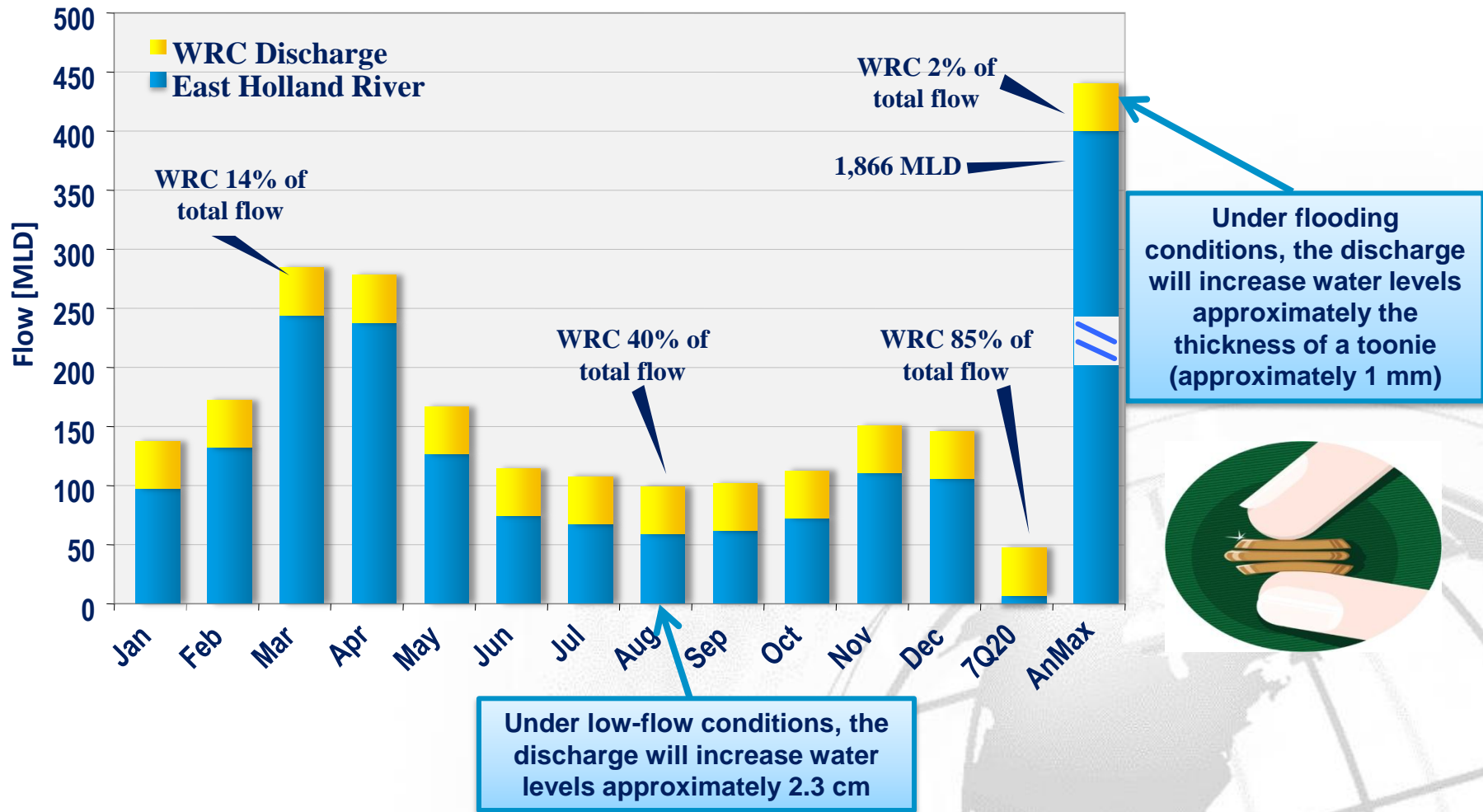
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# Water Reclamation Centre Discharge (2031) as a Percentage of East Holland River Flows





# Hydrodynamic Analysis

**The Proposed Water Reclamation Centre discharge will have negligible effects on East Holland River water levels and flow velocities**

- ❑ The discharge will improve water circulation in the river near and downstream of the discharge location
- ❑ The effect of the clean water discharge on water levels in the East Holland River diminishes after connecting with the West Holland River
- ❑ “Back-water effects” of the Water Reclamation Centre outfall upstream will benefit water levels during low flow (stress) conditions
- ❑ Channel improvements in the Queensville drainage ditch will be implemented to accommodate water levels and velocities





# Aquatic Species and Habitat Conditions in the East Holland River

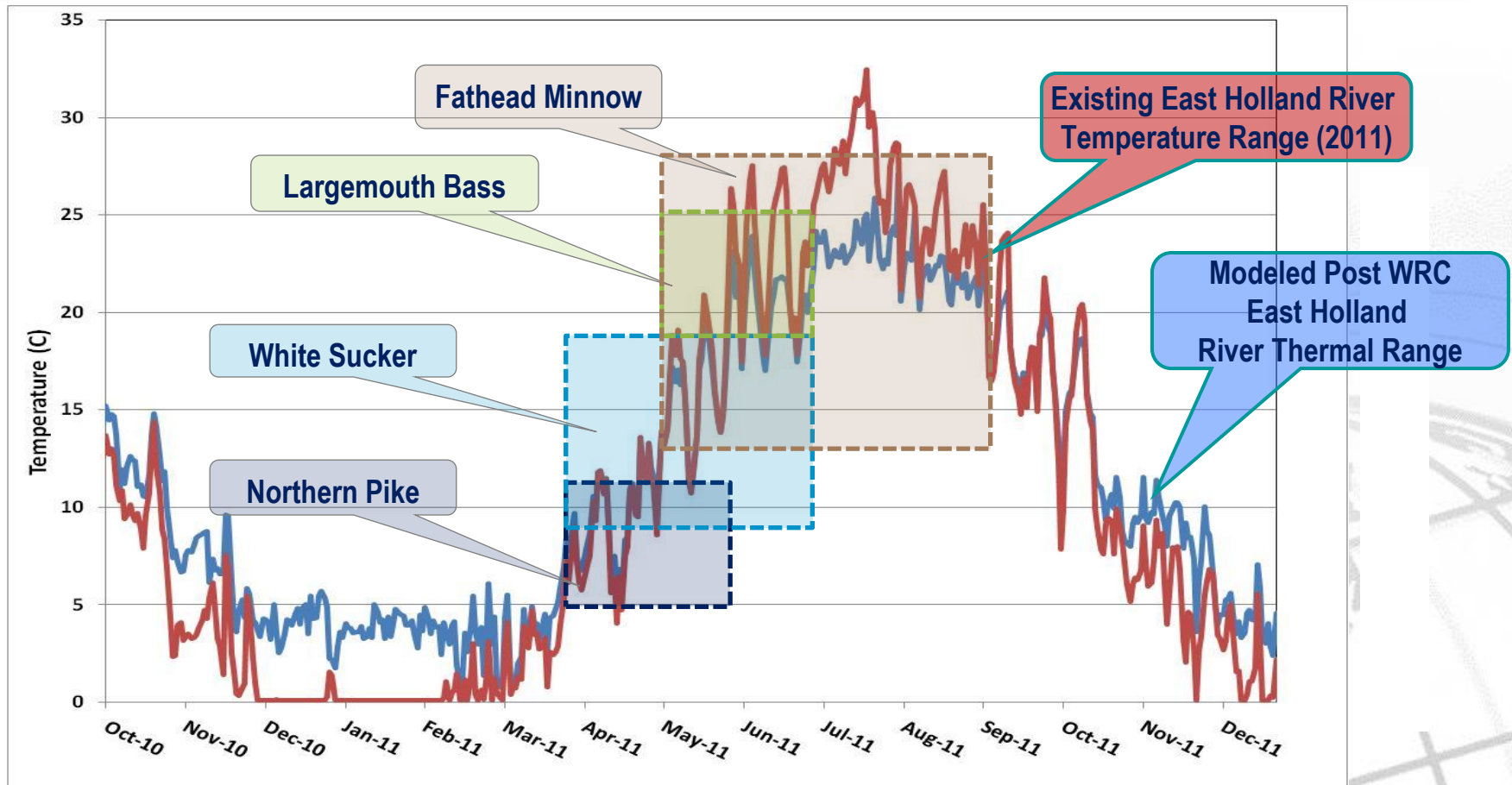
- ❑ Shoreline aquatic habitat conditions consist of deciduous swamp, cattail marsh and residential/marina habitat types
- ❑ Fish community dominated by warm to cool water fish species such as:
  - Northern Pike
  - Bluegill
  - Fathead Minnow
  - White Sucker
  - Large and Smallmouth Bass
  - Brook Stickleback
- ❑ No Aquatic Species At Risk (SAR) identified in the East Holland River



**Common fish species and no aquatic species at risk**

# Fish Community Spawning Ranges

Clean water from outfall will improve aquatic habitat through augmented baseflows, cooler water temperatures and increased dissolved oxygen in the summer. Changes in water temperature will be within spawning ranges (temperature and time of year) of fish in the East Holland River.





# Geomorphologic Assessment

Flowing water energy from Water Reclamation Centre outfall dissipated and potential geomorphic changes (sediment removal and erosion) minimized

River rock and wetland plantings would be used to ensure the channel is protected



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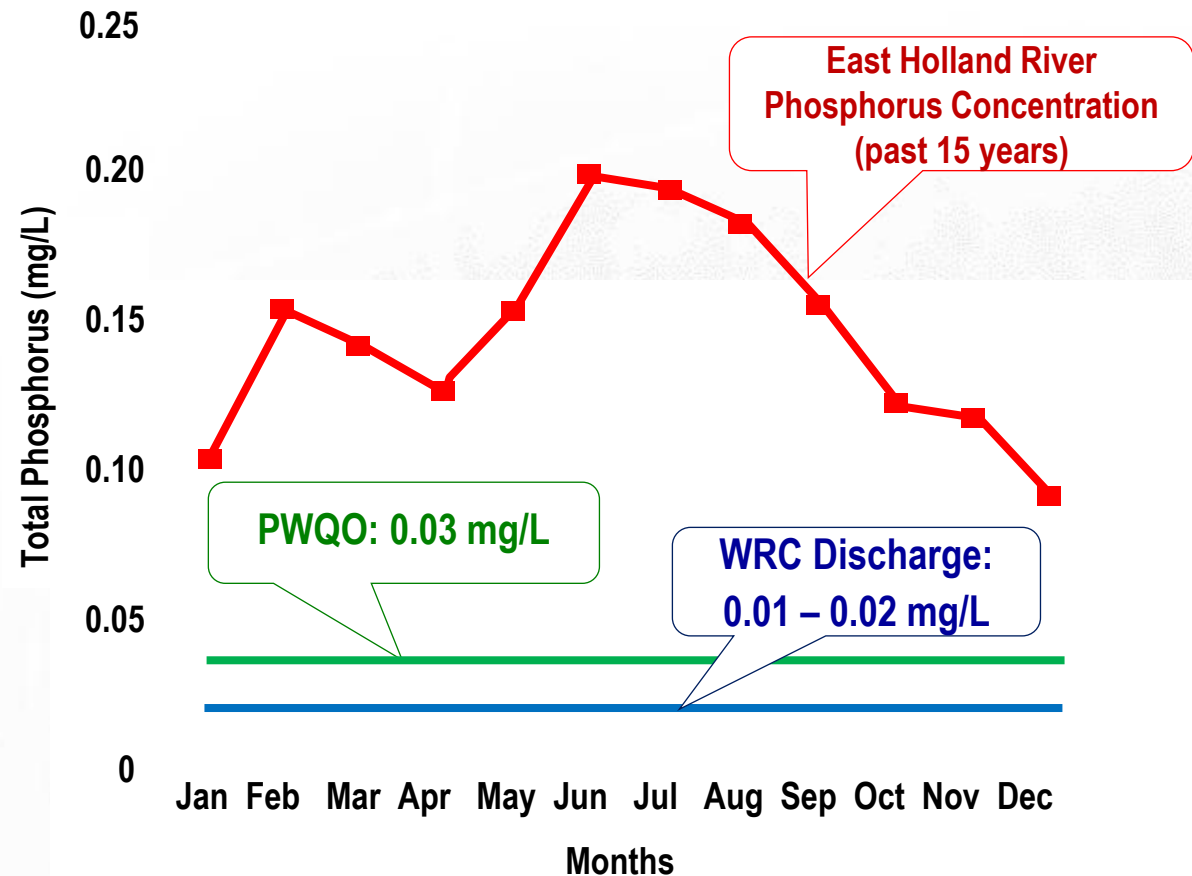


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# Assimilative Capacity Study

Improved water quality in the East Holland River due to reduced phosphorus, total dissolved solids and turbidity

- ❑ Historical phosphorus concentration in East Holland River exceeds Provincial Water Quality Objectives (PWQO)
- ❑ Water Reclamation Centre (WRC) discharge would reduce phosphorus concentration in the East Holland River



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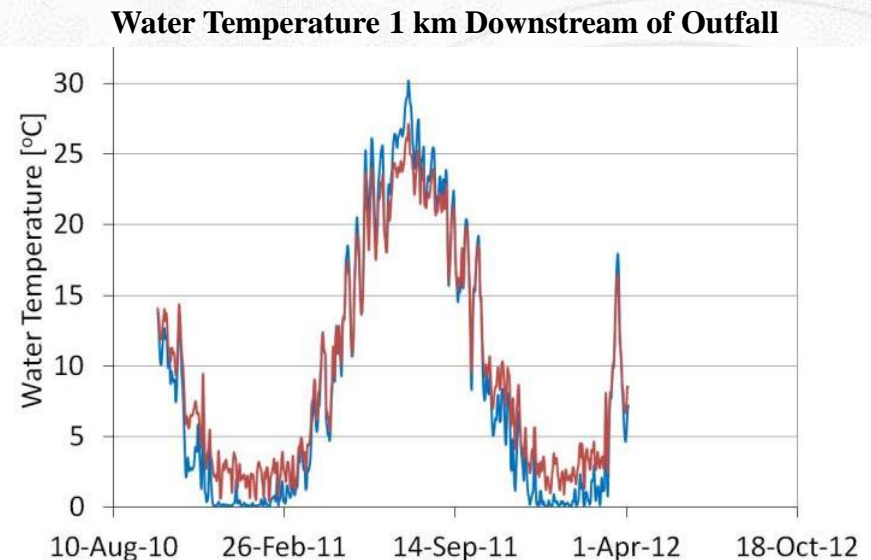
# Water Temperature

The Water Reclamation Centre discharge will provide a moderating effect on water temperatures during the summer low flow, high temperature receiver conditions

- Proposed Outfall Location:**
- Average increase of approximately  $4.1^{\circ}\text{C}$  in winter
  - Average decrease of approximately  $3.8^{\circ}\text{C}$  in summer
  - Minimal effects in spring and fall when the effluent and river temperatures are similar

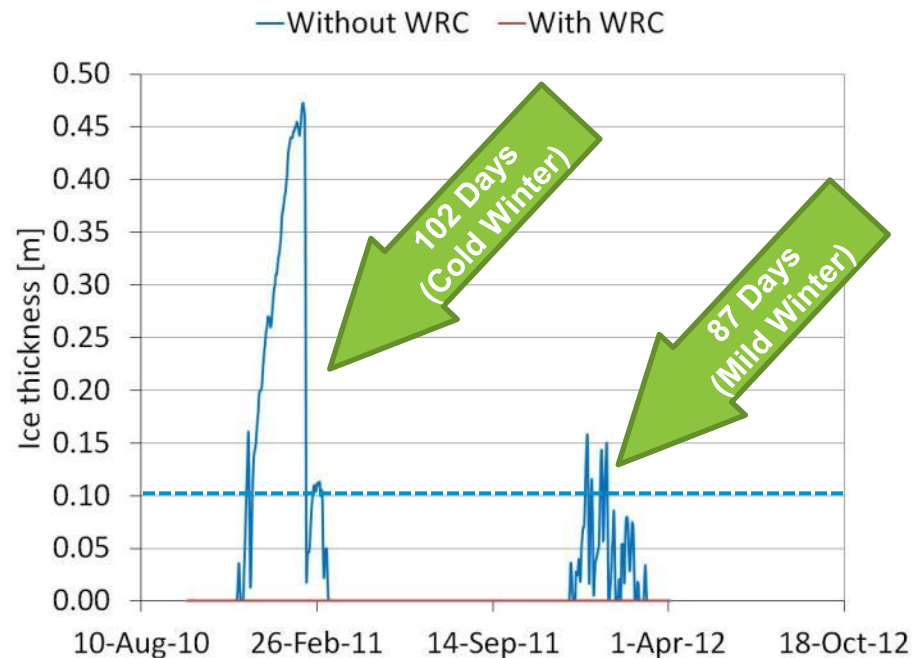
## Downstream:

- The effect on temperature will gradually diminish downstream from the outfall to the confluence with the West Holland River



# Ice Thickness & Duration

- ❑ In the winter, the water flowing out of the outfall will keep the river free of ice at the point of discharge
- ❑ Depending on ambient weather conditions and the volume of flow from the outfall, at full service capacity in 2031 the area of open water is approximately one kilometre downstream
- ❑ Minimal effects are expected downstream of the confluence with the West Holland River
- ❑ In response to these future conditions, York Region is proposing an outdoor community ice rink and support for an alternate snowmobile trail



**It is recommended to stay off ice if the thickness is less than 10 cm**

# Proposed Mitigation for Residents Unable to Use River for Winter Recreational Sports

In response to potential open water up to one kilometer downstream of the outfall York Region is proposing:

- 1) Support for a snowmobile trail proposed by the Holland Landing Snowmobile Club providing alternate access to Lake Simcoe
- 2) Commitment to monitor ice formation at outfall



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# Advanced Treatment Demonstration Facility

- ❑ To demonstrate that TP concentrations of 0.01 to 0.02mg/L could be achieved throughout all four seasons
- ❑ Uses secondary effluent from Mount Albert WPCP to demonstrate performance of:
  - Tertiary treatment: Low pressure membranes (microfiltration)
  - Quaternary treatment: High pressure membranes (reverse osmosis)
- ❑ Provides design information for Water Reclamation Centre



**Consistent results following reverse osmosis show phosphorus reduced by 97%  
- below goal of 0.01 mg/L**



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# Regulatory Support



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# Gaining Regulatory Agency Support

- ❑ Compliance with provincial plans and policies
- ❑ On-going collaborative regulatory agency meetings
- ❑ Seven East Holland River studies



- ❑ Full 12 month demonstration of Advanced Treatment Technologies
- ❑ Regulatory agency reviews of draft report submissions



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# Unparalleled Treatment Levels in Ontario

## Lake Simcoe the beneficiary of Innovative Wastewater Treatment Technologies

- ❑ Will improve water quality, clarity and augment baseflows in the East Holland River that flows into Lake Simcoe
- ❑ Compliance with the spirit and intent of the Lake Simcoe Protection Plan



**Supports Phosphorus Reduction Strategy's  
Long Term Actions for Sewage Treatment Plants**



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# Panel Discussion



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# Questions & Comments



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