Effective Monitoring and Adaptive Management Plans

Tied to Amending Procedures in Environmental Assessment Procedures

Case Study: Toronto-York Spadina Subway Extension Project

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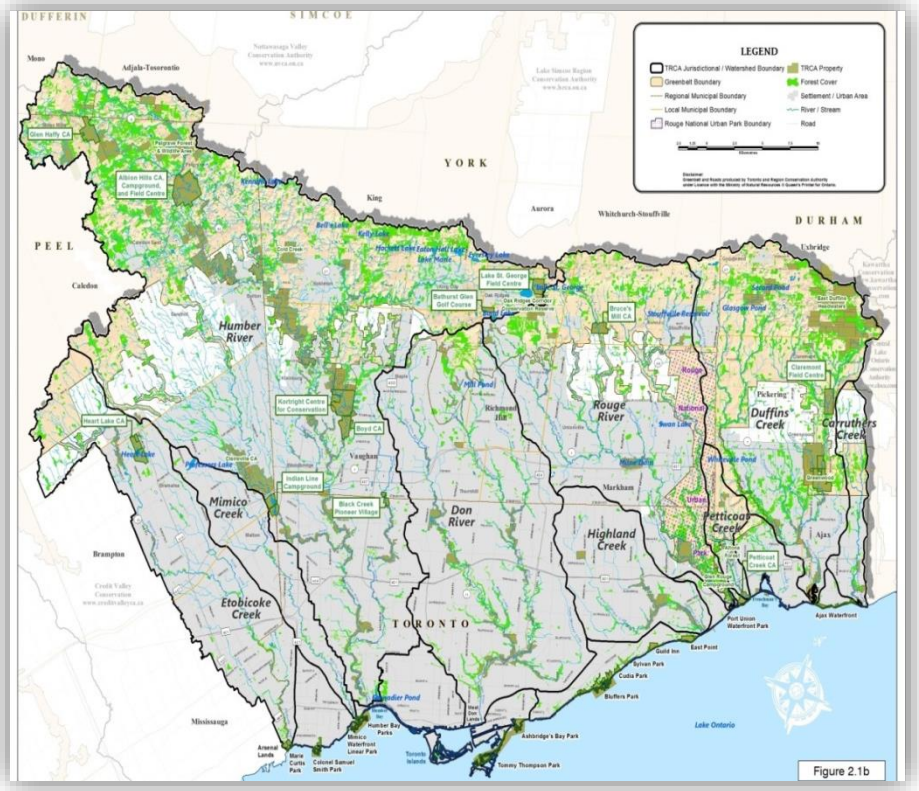
October 17, 2018

Toronto and Region Conservation Authority

AGENDA

1. TRCAs EA Review and Legislative Foundation
   Beth Williston (BW)
2. Overview - TYSSE Project
   Beth Williston (BW)
3. EMP - Monitoring & Mitigation
   Manirul Islam (MI)
4. Test of Some Hypotheses
   Manirul Islam (MI)
5. Lessons Learned
   Beth Williston and Manirul Islam
6. Open Discussion
   All



ENVIRONMENTAL ASSESSMENT ACT

Under the *EA Act*

Purpose of *EA Act*

… is for the betterment of the people … by providing for the protection, conservation and wise management in Ontario of the environment

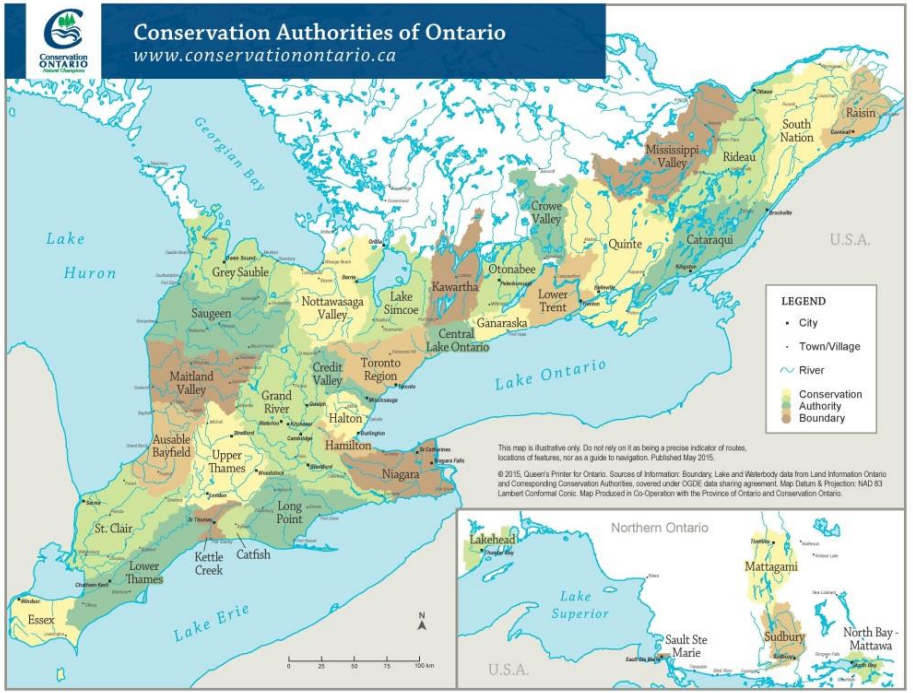
Obligation to consult

the proponent shall consult with such persons as may be interested

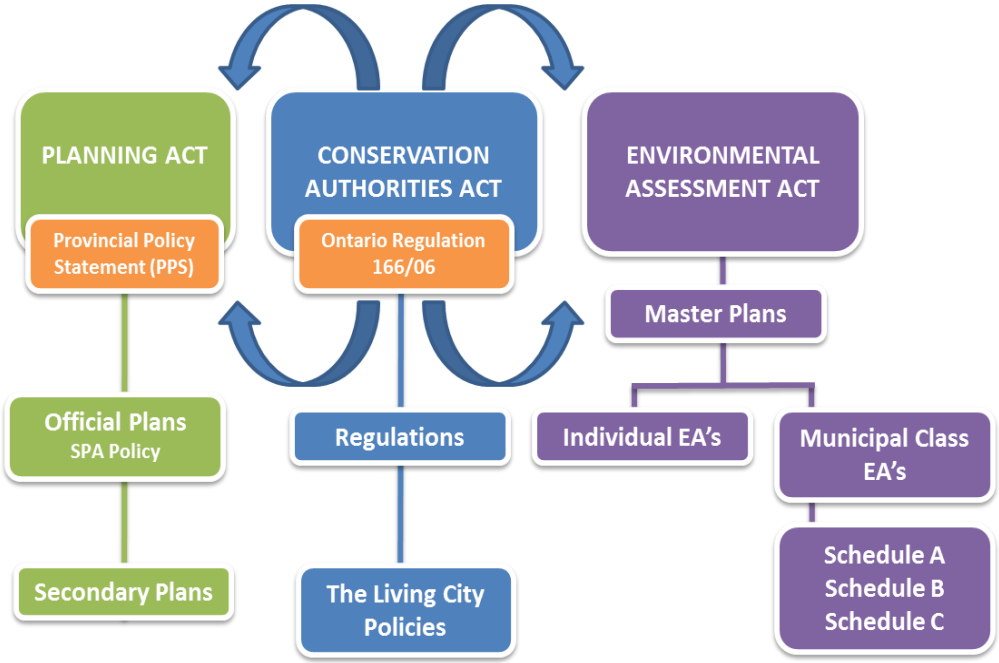
Provincial EAA – CAs are to provide technical clearance for natural resources

Municipal Class Environmental Assessment

90% of Ontario's population lives in a watershed managed by a Conservation Authority



LEGISLATION & PERMITTING



Federal Environmental Assessment Legislation and Exemptions

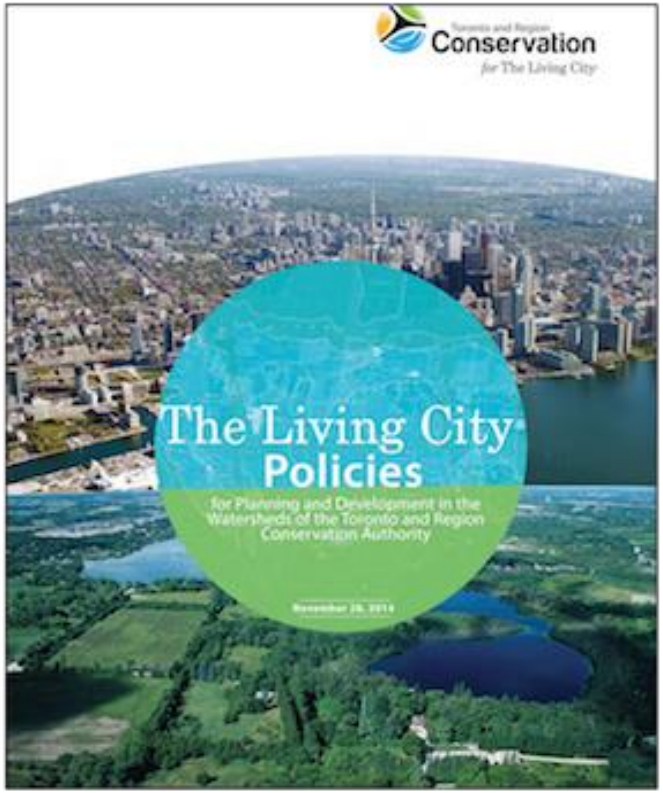
GO Transit & MTO Class EAs

TPAP

Group A
Group B
Group C

LIVING CITY POLICIES

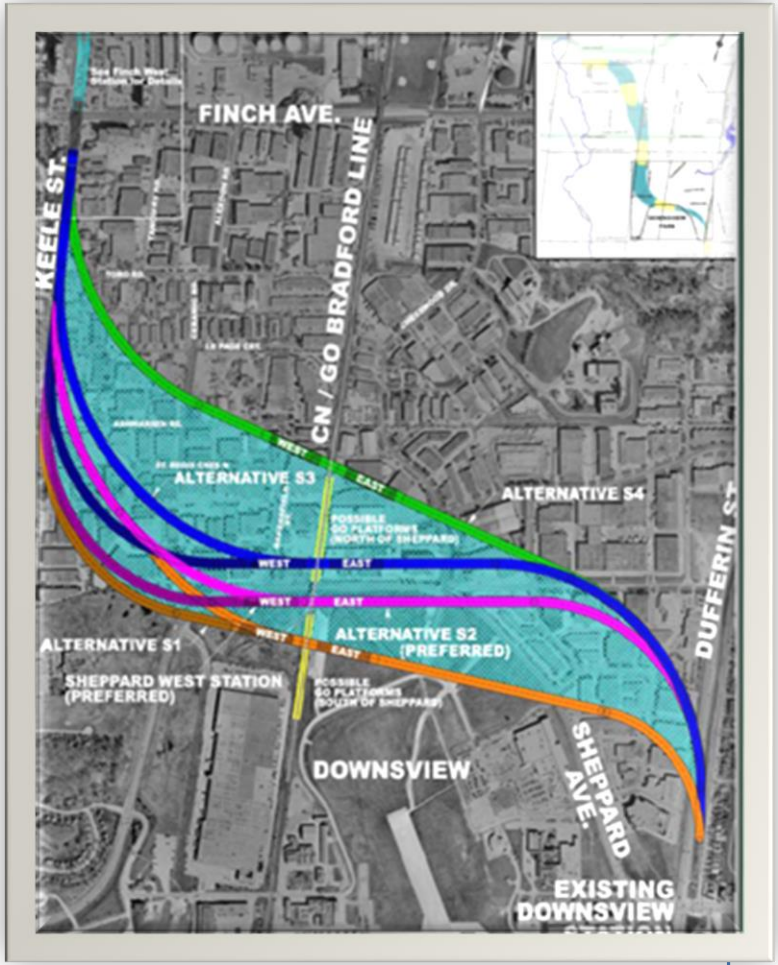
- Guide TRCA review of Planning Applications, EAs, Permit Applications under CA Act
- TRCA's advocacy role for The Living City in the planning and development process
- Assist and enable TRCA's partners and stakeholders contributions to building The Living City



EA REVIEW - SELECTION OF ALTERNATIVES

In consideration of TRCA's *Living City Policies*, Ontario Regulation 166/06, and TRCA's other programs and policies, staff requires that the preferred alternative method & design meets the following criteria:

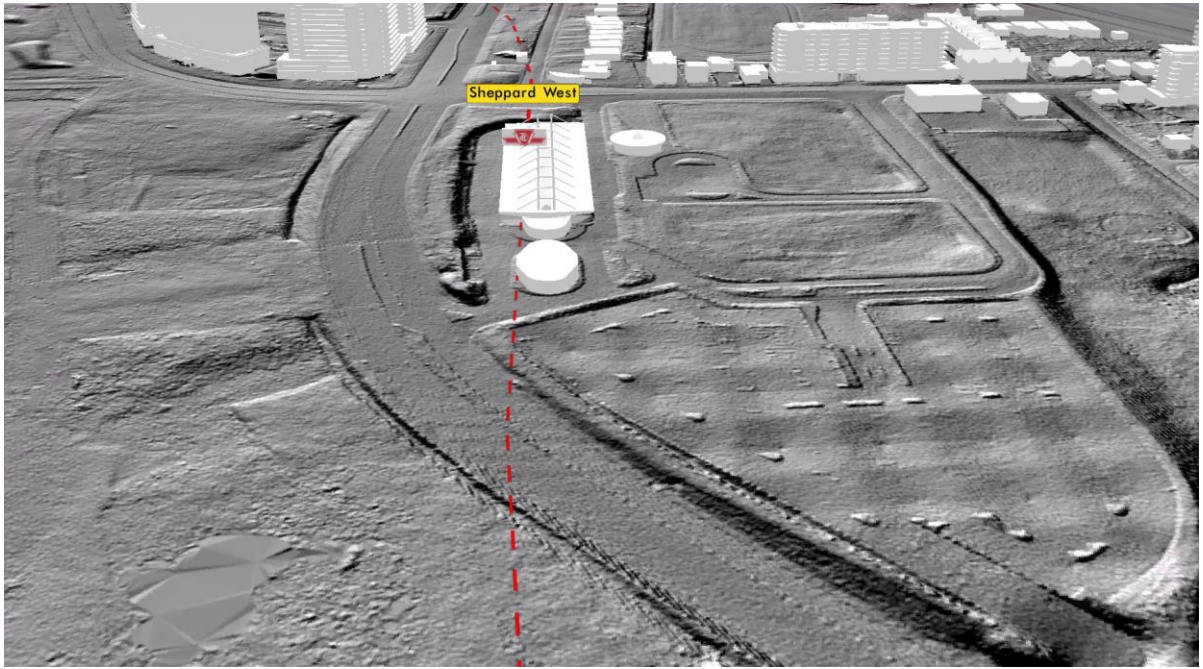
- Prevents the risk associated with flooding, erosion or slope instability.
- Protects and rehabilitates existing landforms, features Aquifers and Hydrogeological Features, Aquatic Species and Habitat, Wetlands, Watercourses, and functions.
- Provides for aquatic, terrestrial passage and human access.
- Addresses TRCA property and cultural heritage resource concerns



PREFERRED ALTERNATIVE: TYSSE PROJECT

- Length of subway extension 8.6 KM
  - Toronto 6.2 KM
  - York Region 2.4 KM
- Traversed Humber River & Don River watersheds
- 6 New Stations
  - 4 in Toronto (Sheppard West, Finch West, York University, and Pioneer Village)
  - 2 in York Region (Highway 407 and Vaughan Metropolitan Center)
- Commuter Parking Space
- Funded by Government of Canada, Province of Ontario, City of Toronto and Regional Municipality of York
- Opened for Service - December 17, 2017

LANDSCAPE ALONG ALIGNMENT

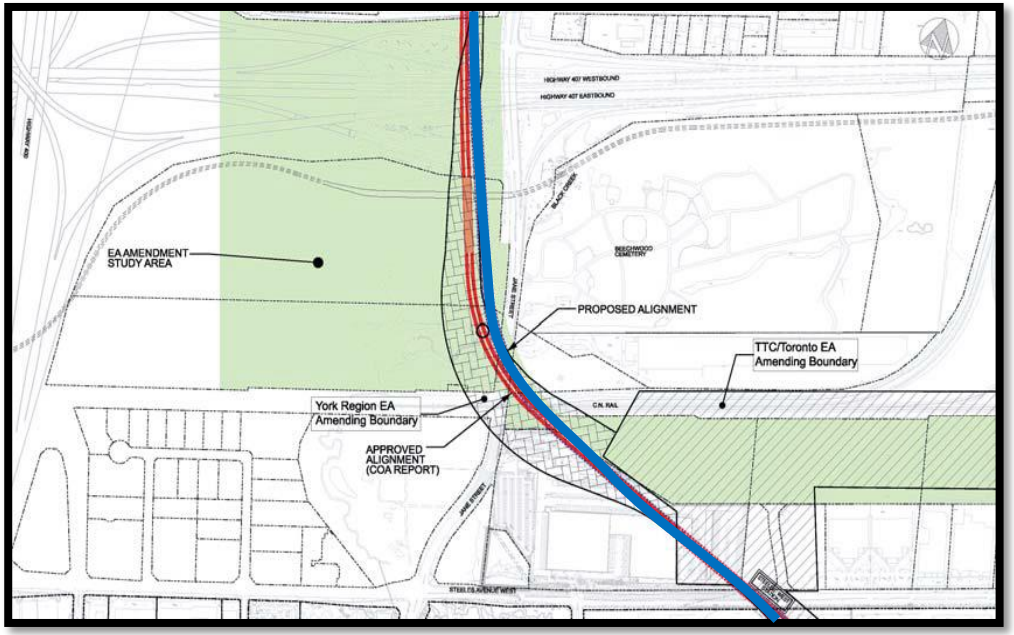


Environmental Assessments

- Provincial EA for Sheppard West to Steele West Station - 2007
- Provincial EA for Steele West to Vaughan Metropolitan Centre -2007
- Federal EA for Entire Project -2008
- Amendment- Hydro Tower 158 Avoidance

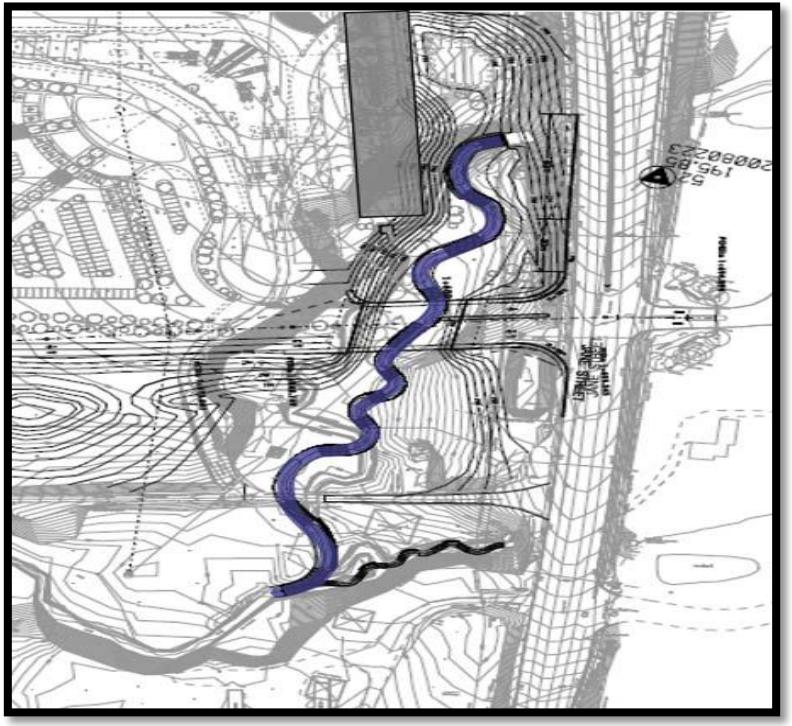
EA AMENDMENT –HYDRO TOWER 158 AVOIDANCE

- Alignment Passed Directly Underneath the Hydro Tower 158 (500KV) Foundation
- Posed a Major Technical Risk
- HONI Approval Risk
- Deeper 407 Station Box



EA AMENDMENT

- Eastward Shift of Tunnel Alignment
- Eastward Shift of 407 Station Box
- Realignment of the Black Creek



TRCA'S INTEREST IN THE PROJECT

Water Resources:

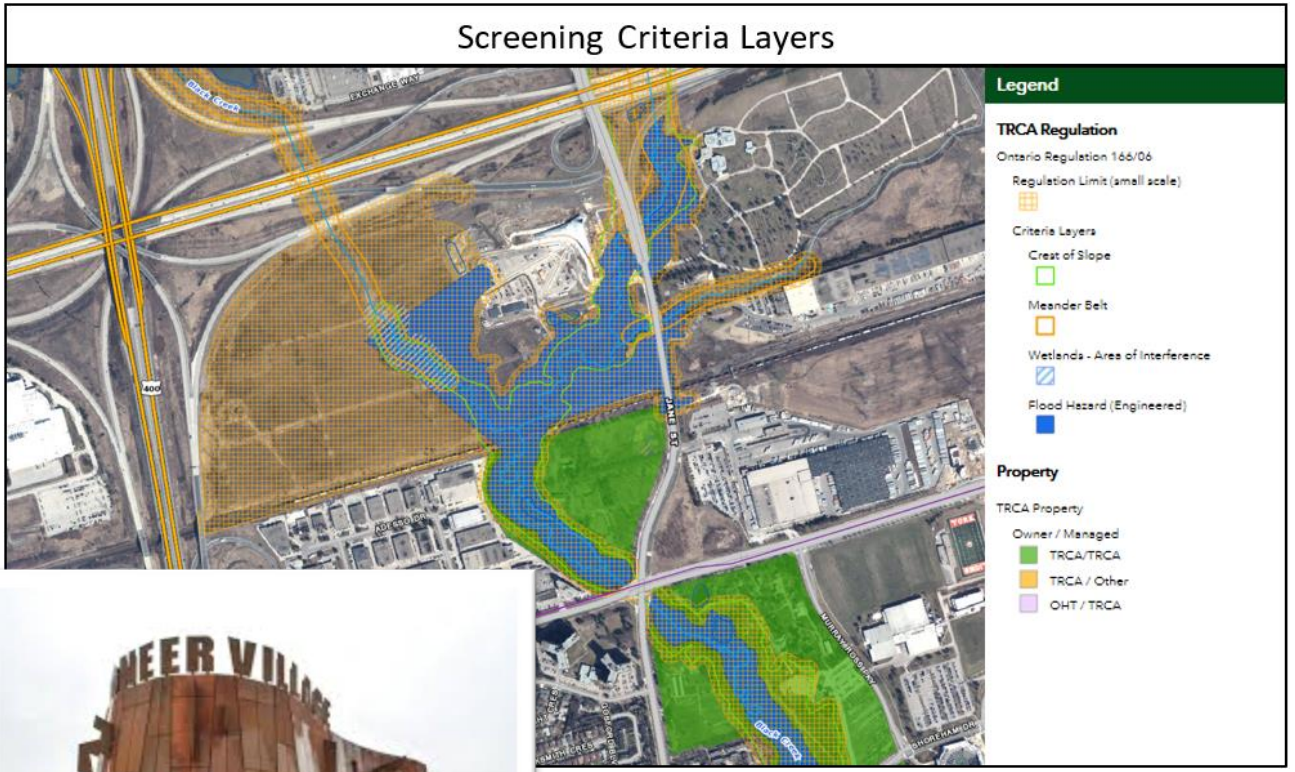
- ✓ Groundwater
- ✓ Watercourses
- ✓ Regulatory Flood Plain

Ecological:

- ✓ Aquatic Species & Habitat
- ✓ Woodlots
- ✓ Terrestrial Species & Habitat
- ✓ Endangered Species

TRCA Restoration Projects

Black Creek Pioneer Village



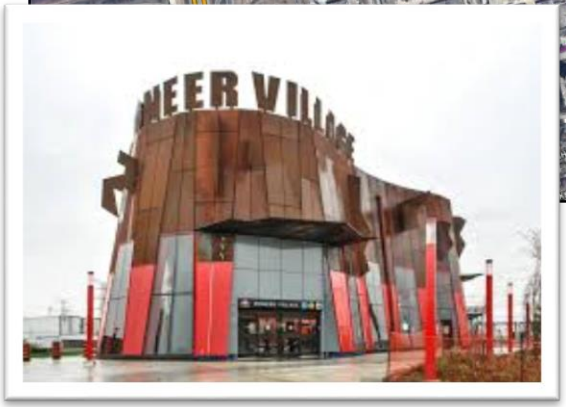


Photo Credit: Urban Toronto

MAJOR CONSTRUCTION CONCERNS

- Dewatering
- Discharge from construction sites
- Restoration - valley land and creek corridor
- Erosion and sediment control (ESC)
- Stormwater management

EA APPROVAL WITH FUTURE COMMITMENTS

EA Commitments:

- ❑ Prepare Environmental Management Plan
- ❑ Prepare Erosion and Sediment Control (ESC) Plan
- ❑ Prepare and implement groundwater management strategy

WHY AND WHEN AN EMP IS REQUIRED?

- **The Ontario Environmental Assessment Act**
  - Individual Environmental Assessment
- **Section 9 (1) (b) – Requirement to prepare plan and implement monitoring and mitigation measures**
  - Phase 4 Step 1 (g), Phase 5 Step 3 – Requirement for Monitoring of Environmental Provisions
- **The Canadian Environmental Assessment Act**
  - Section 53 (4) (a) (b) – Requirement for Mitigation Measures and Follow–Up Program

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

- EMP - Living and action-oriented document
- Collect background data
- Identify potential impacts
- Develop monitoring programs & mitigation measures
- Develop communication protocols

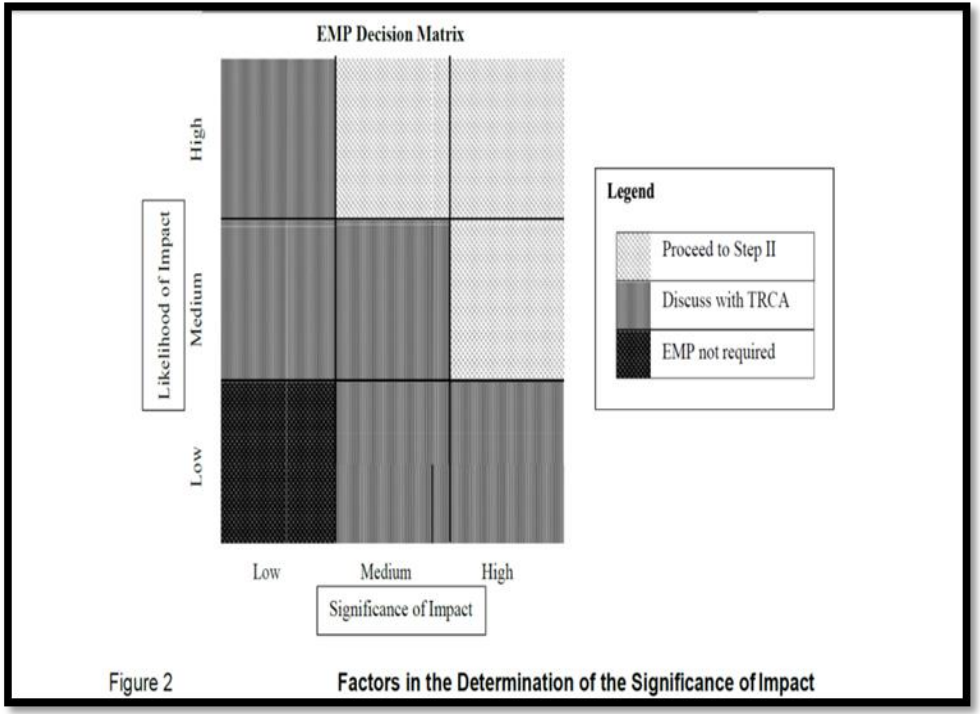
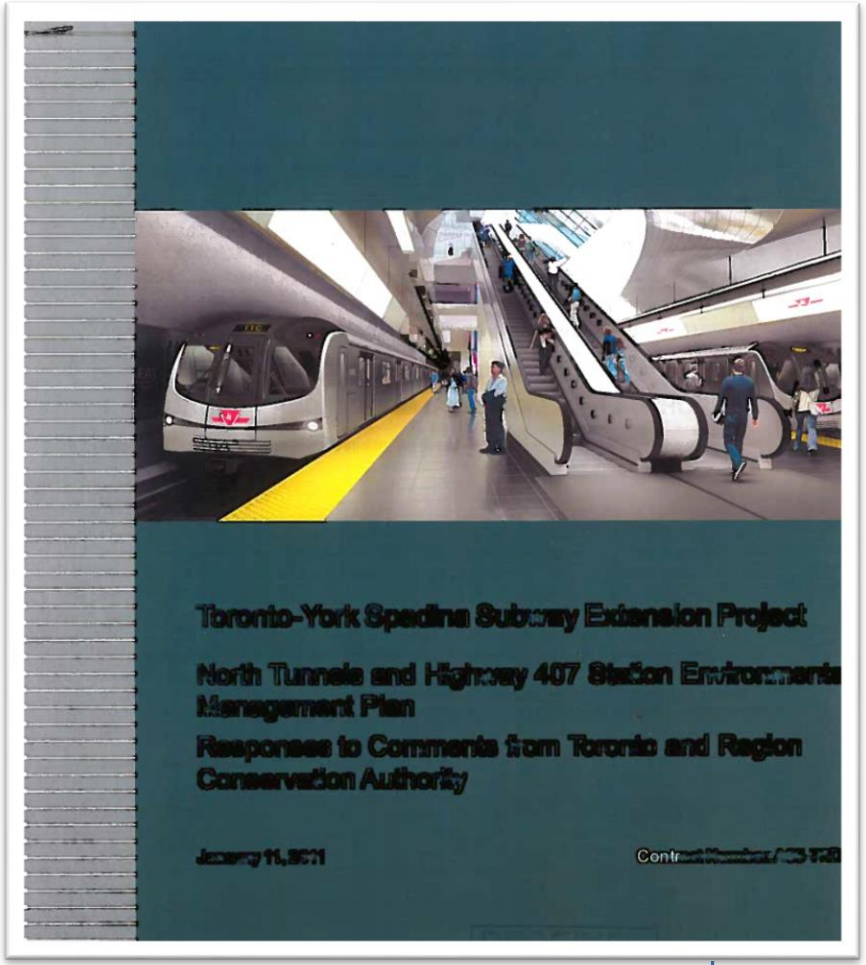


Figure 2 Factors in the Determination of the Significance of Impact

TYSSE PROJECT EMPs

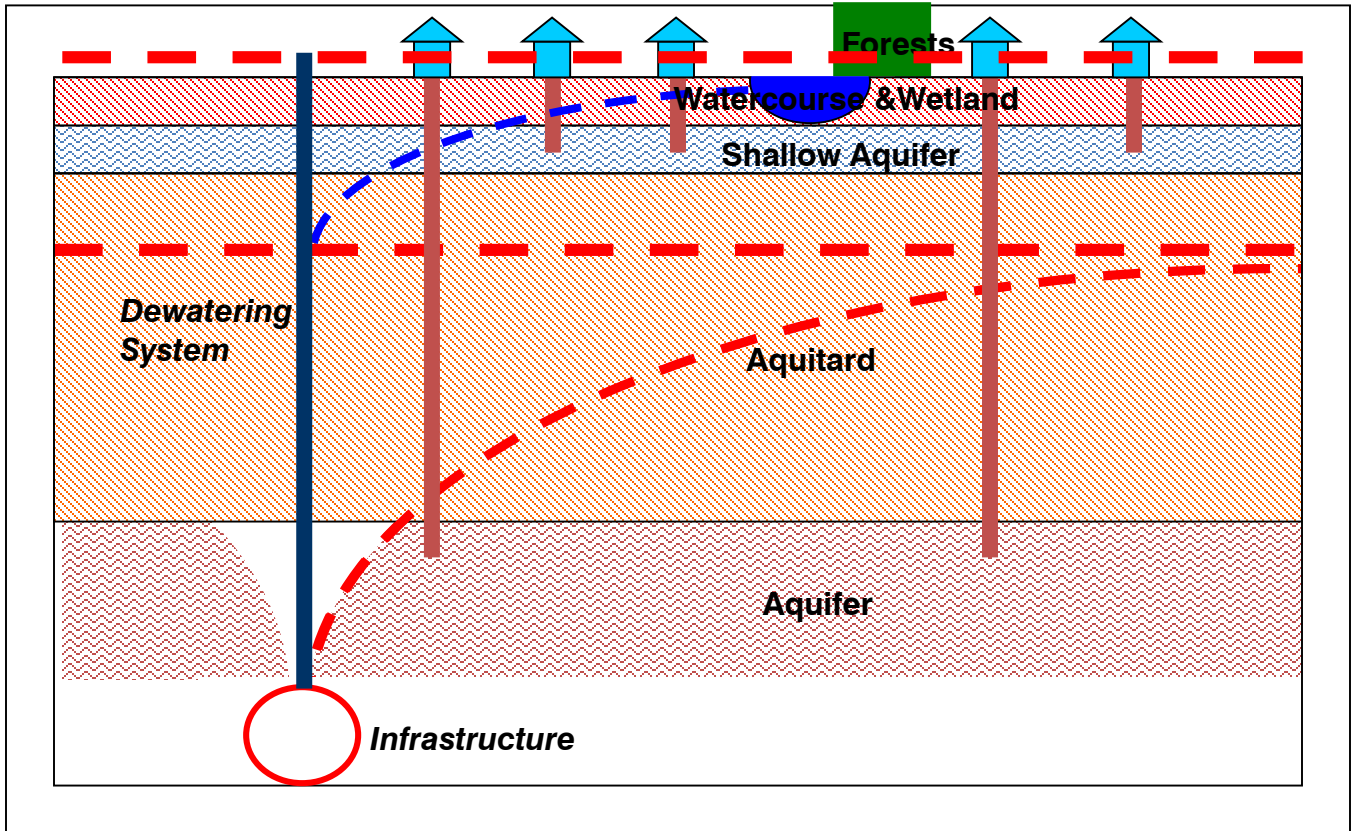
1. Sheppard West Station and South Tunnels
2. York University Woodlots, York University, Finch West and Pioneer Village Stations
3. North Tunnels and Highway 407 Station
4. VMC Station



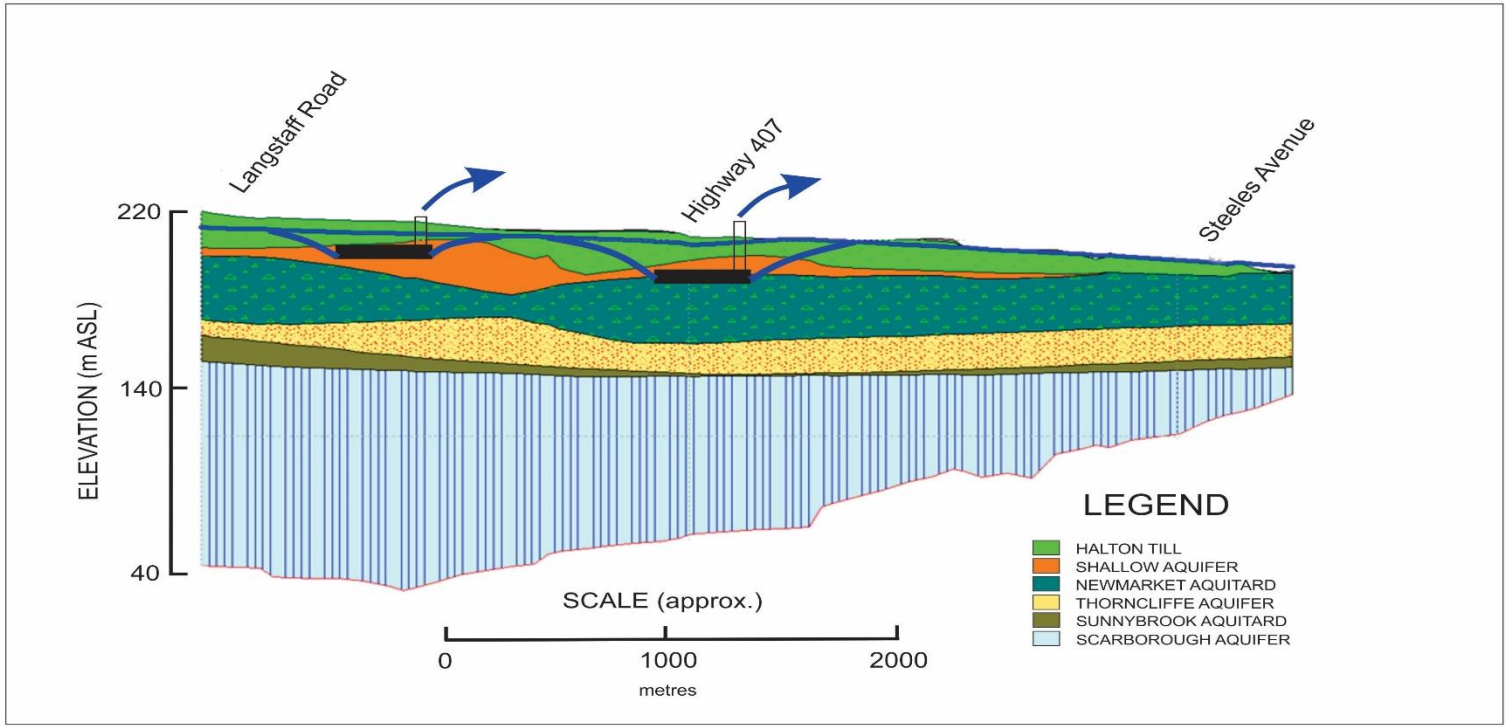
HYPOTHESIS 1

An EMP Supports Regulation Compliances, Environmental Due-Diligence & Appropriate Mitigation

ENVIRONMENTAL ISSUES: DEWATERING



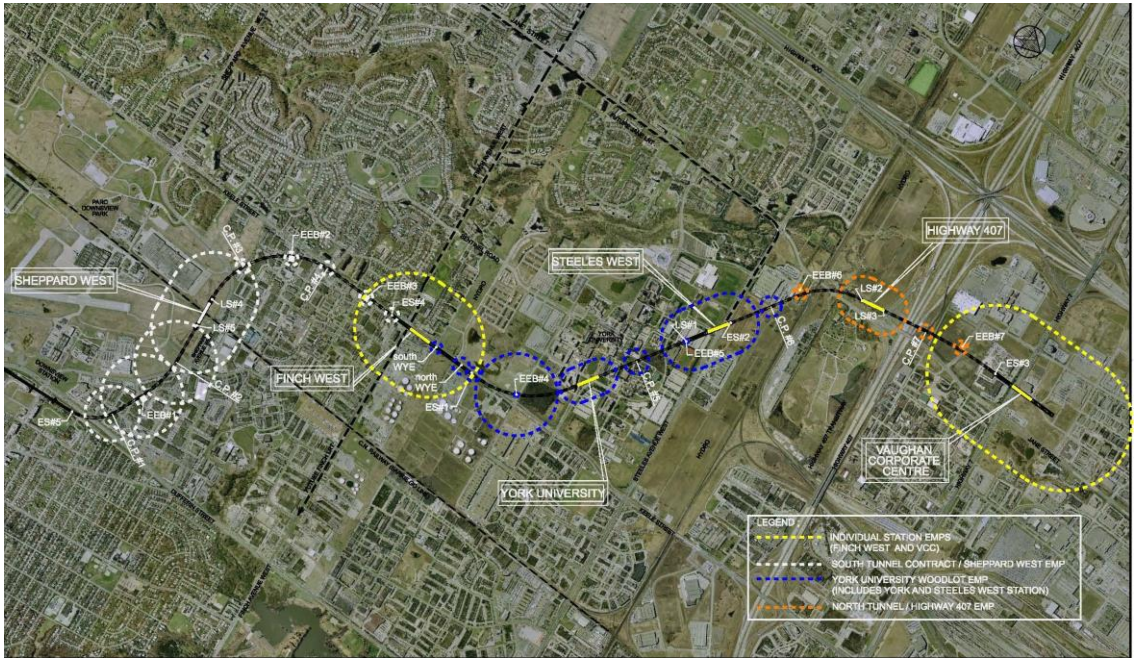
GEOLOGICAL FORMATION AT 407 AND VMC STATIONS



DEWATERING: ESTIMATED ZONE OF INFLUENCE (ZOI)

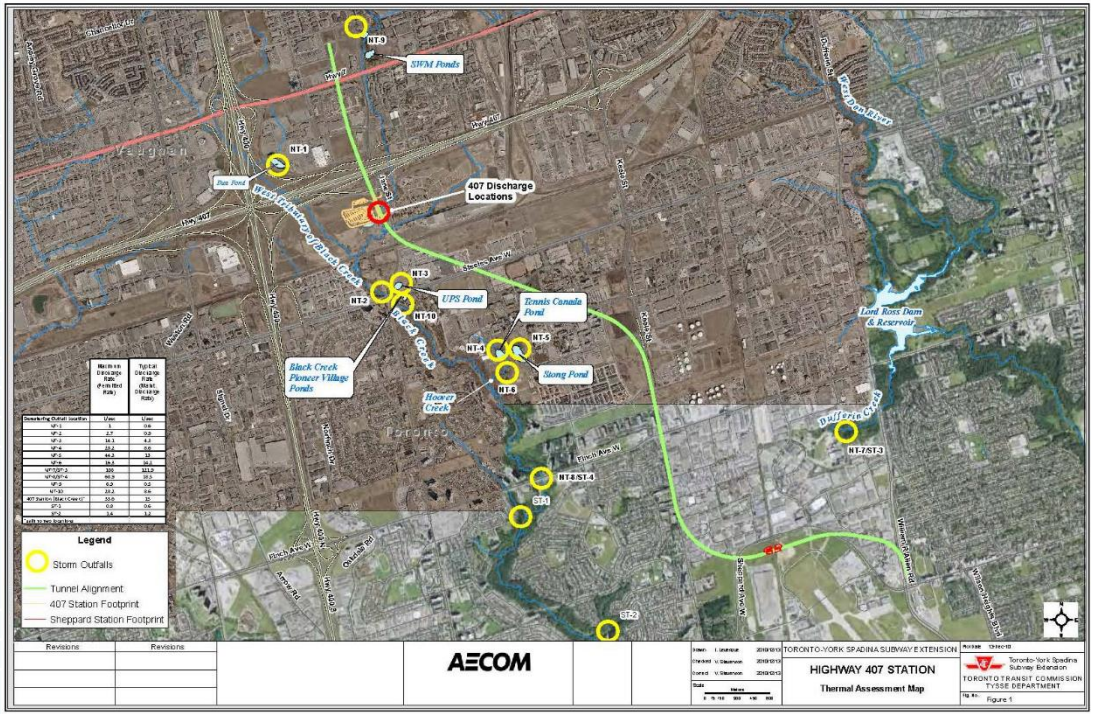
Site	Estimated Zone of Influence (m)
South Wye (DEPTHS)	70
North Wye (DEPTHS and ES1)	50
EEB4	350
CP5	350
LS1	225
Steeles West Station (incl. cross-over tracks, ES2, and EEB5)	265
CP6	130
EEB6	<50
LS2	70
407 Stn	70-190
LS3	70
CP7	<50
EEB7	<50
ES3	20

ESTIMATED ZONE OF INFLUENCE (ZOI)

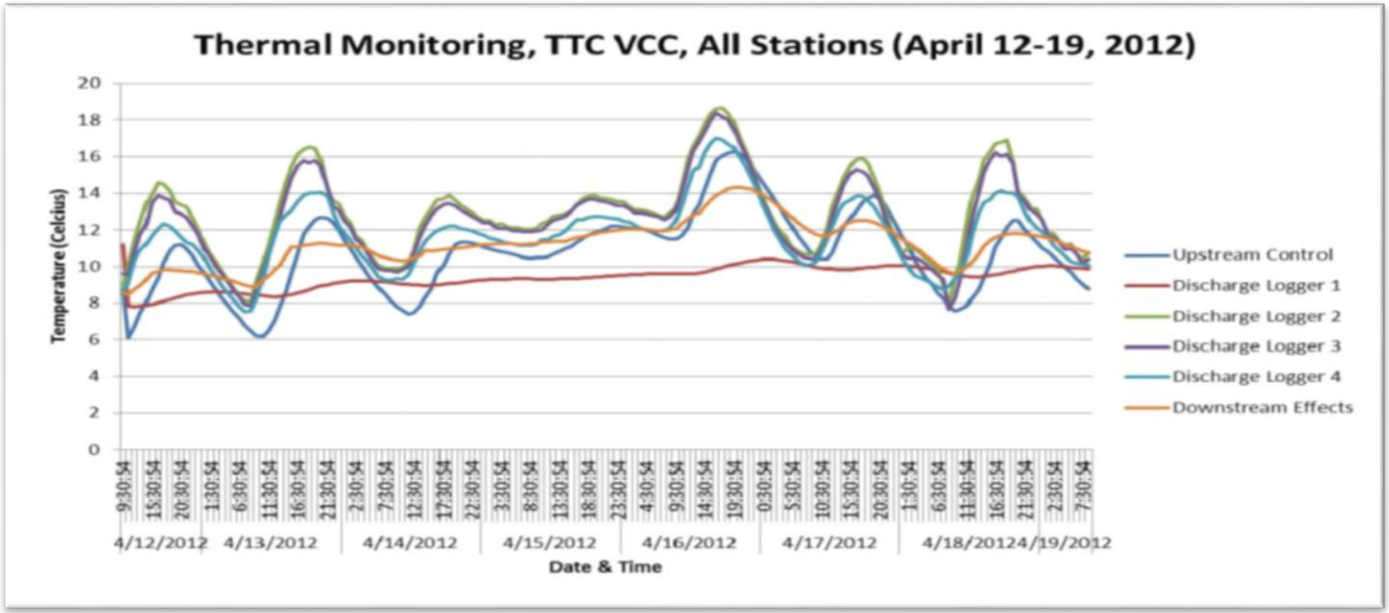


GROUNDWATER DISCHARGE LOCATIONS

Outfall Location	Receiver	Stormwater Pond Discharged Into (if applicable)	Initial Dewatering Rate –Permitted (L/s)
NT-1	Black Creek	Ikea Pond	1.0
NT-2	Black Creek	n/a	2.7
NT-3	Black Creek	UPS Pond	14.1*
NT-4	Hoover Creek	Tennis Canada Pond	28.2*
NT-5	Hoover Creek	Stong Pond	44.3
NT-6	Hoover Creek	n/a	16.3
NT-7/ST-3	Dufferin Creek	n/a	188.0
NT-8/ST-4	Black Creek	n/a	68.9
NT-9	Black Creek	Unnamed SWM Pond	6.9
NT-10	Black Creek	Black Creek Pioneer Village Pond	28.2*
ST-1	Black Creek	n/a	0.8
ST-2	Black Creek	n/a	1.4
407 Station – Point 1	Black Creek	n/a	16.8
407 Station – Point 2	Black Creek	n/a	16.8



MONITORING: THERMAL IMPACTS

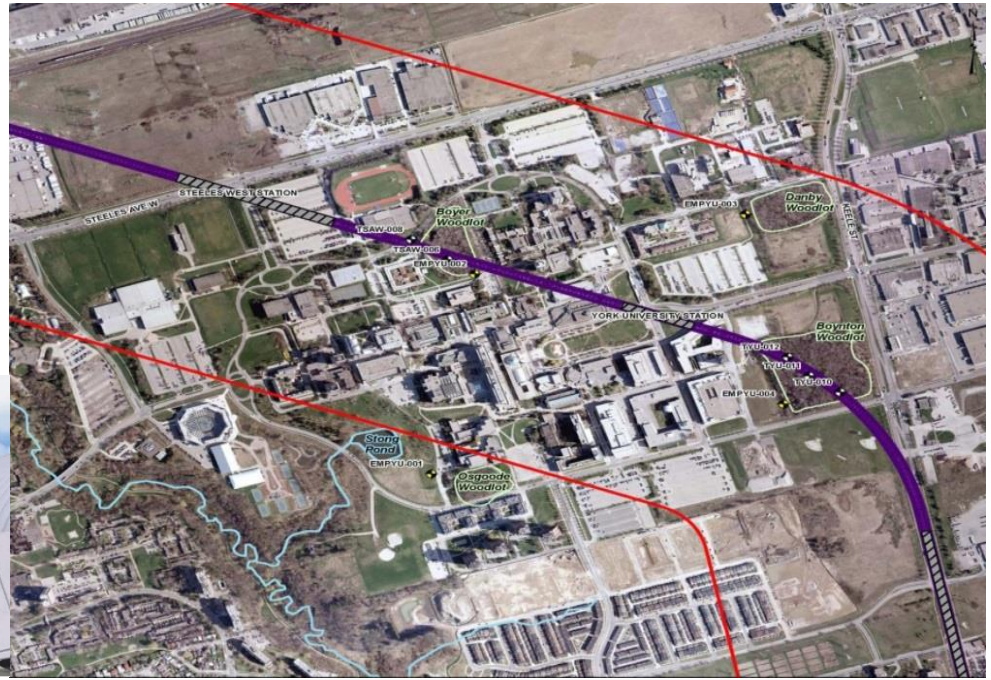


MONITORING: WATER QUALITY PARAMETERS

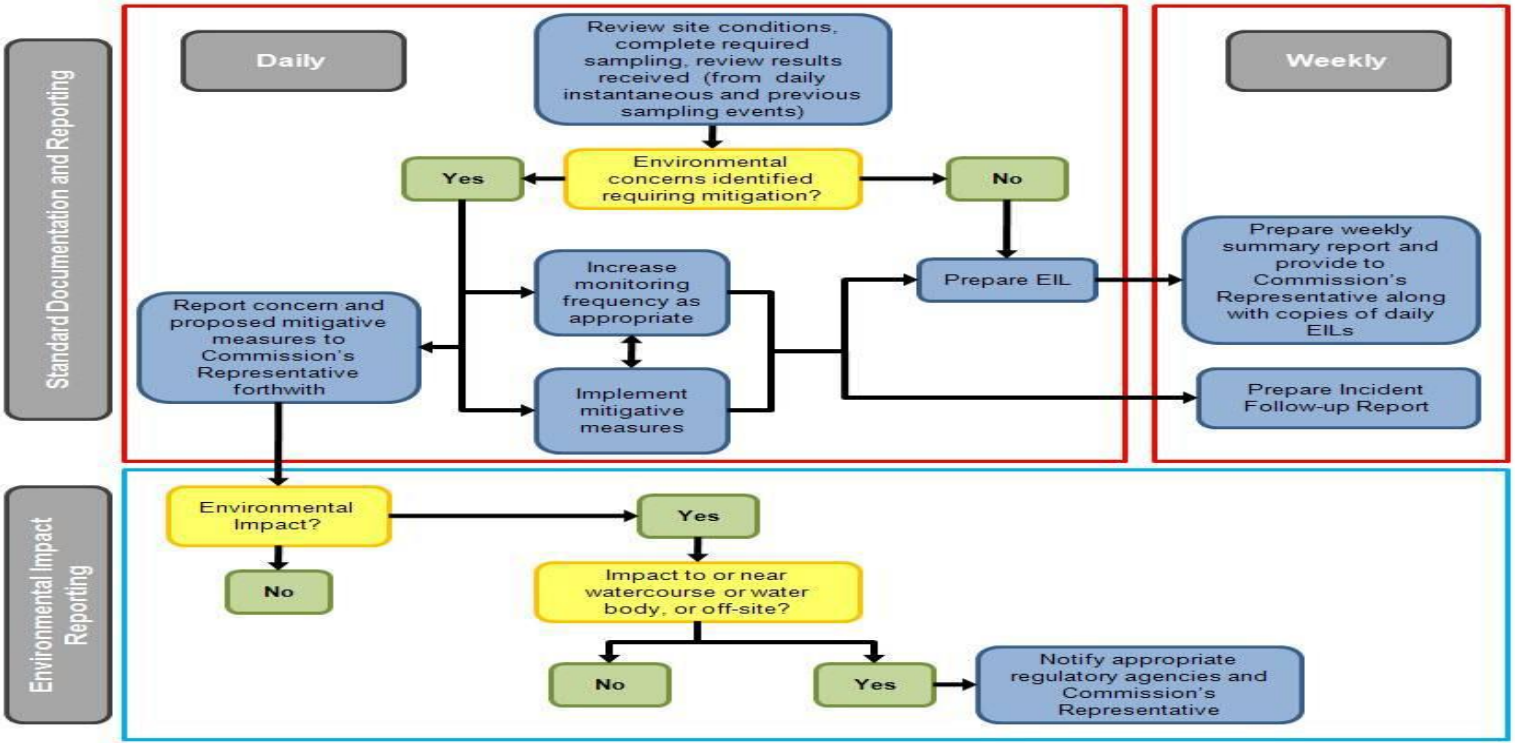
INSPECTING: EROSION AND SEDIMENT CONTROLS (ESCs)

MONITORING: WOODLOTS

- Boyer and Boyton woodlots are within dewatering zone
- TRCA reviewed monitoring plans
- TYSSE implemented monitoring plans
- No major impacts identified



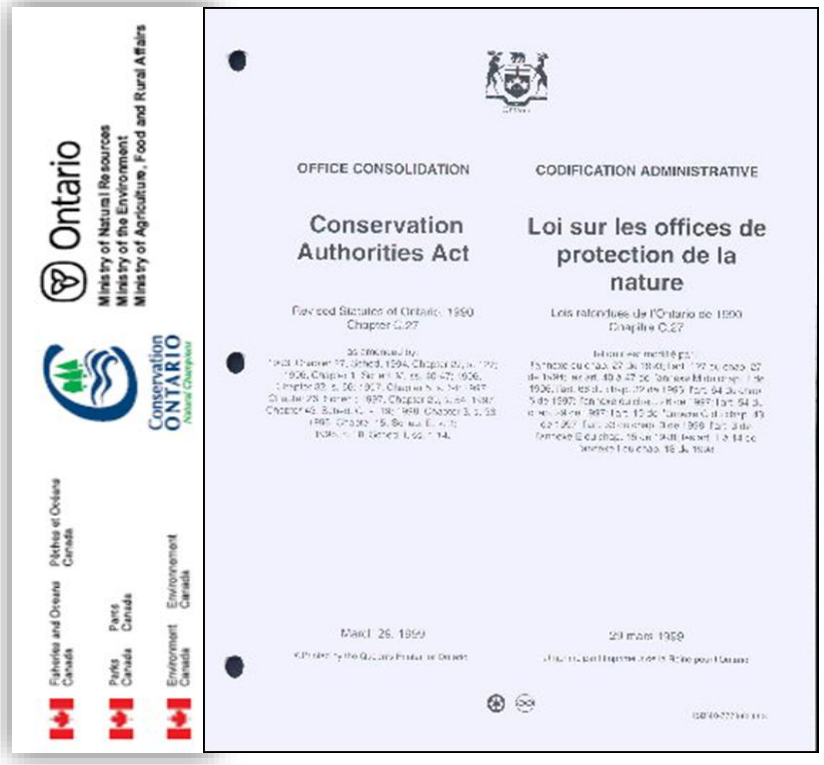
COMMUNICATION PROTOCOL



HYPOTHESIS 1: AN EMP SUPPORTS REGULATION COMPLIANCES , ENVIRONMENTAL DUE DILIGENCE & APPROPRIATE MITIGATION

- Seamless monitoring of surface water
- Monitored woodlots
- Maintained communication with regulators and approval authorities
- Built Good partnerships

THE ASSESSMENT AND OBSERVATION CONFIRMED THAT THE HYPOTHESIS 1 IS VALID



HYPOTHESIS 2

An EMP Minimizes Enforcement and Enhances Transparency

Dedicated Staff - Monitoring and Mitigation Specialist

- Reviewed Environmental Monitoring Reports
- Assessed Mitigation Measures and Effectiveness
- Maintained Effective Communication
  - Formal (emails, comments letters, inspection reports); and
  - Informal (chat, telephonic discussion, etc.)
- Remained aware of progress of construction, changing site conditions and surrounding environment;
- Responded promptly to environmental incidents such as spills, failures to comply with conditions, ESC and water quality issues;
- Discuss issues with Enforcement Officer

MINIMIZE ENFORCEMENT'S INVOLVEMENT

- No Major environmental occurrences
- Fewer enforcement site inspections

Enhance Transparency

- Assessed accuracy of EA Predictions
- Maintained effective erosion and sediment control (ESC) practices
- Enhanced public support for the project

HYPOTHESIS 2: An EMP Minimizes Enforcement and Enhances Transparency

THE ASSESSMENT AND OBSERVATION CONFIRMED THAT THE HYPOTHESIS 2 IS VALID

HYPOTHESIS 3

EMP- a living document, reduces review time and enhances restoration opportunity

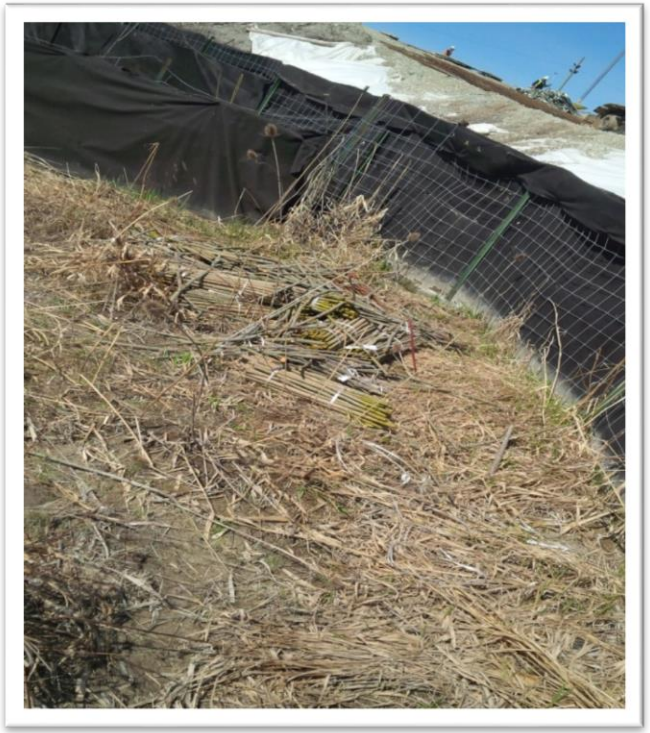
SLA: REDUCED REVIEW TIME FOR PERMIT APPROVAL, PERMIT REVISION AND REISSUANCE, SITE PLAN AND MONITORING REPORTS REVIEW

- Reviewed Technical Details: Stations, CPs, EEBs, etc.
- Reviewed Site Plans
- Issued TRCA permit for
  - Pioneer Village Station Access Driveway
  - 407 station – Advanced Contracts
  - Creek Relocation
  - Platform Building, Bank Rehabilitation
  - Issued Letter of Advice (LOA) for VMC, Highway 407 and Pioneer Village Stations
- Reduced review time significantly
- Reviewed unlimited number of submissions
- Kept staff available for site visits, meetings and consultation
- Reduced construction loss time
- No construction delays related to TRCA permit;
- EMP played significant role on permit approval and review process

REALIGNED BLACK CREEK

- Realigned to the east
- Obtained DFOs authorization under the *Fisheries Act*
- Built with Natural Channel Design Concept
- Implemented 5 Years Monitoring Plan
- Creek experienced significant lateral movement, erosion and bank failures multiple times
- Bank stabilization and valley land restoration still an issue
- Valuable infrastructure (station box, access bridge, pipeline) beside the creek

CREEK AND VALLEY LAND REHABILITATION- MULTIPLE BANK FAILURE



CREEK IS MOVING AND INFRASTRUCTURE IS AT RISK

CREEK AND VALLEY LAND REHABILITATION

BUTTERNUT TREES REMOVAL AND RESTORATION

- Identified two Butternut Trees and one sapling at 407 Station Site
- Received Permit for Removal under the *Endangered Species Act* 2007
- Planted 32 Butternut Trees and Companion Plantings
- TRCA Implemented Compensation and 5-Year Monitoring Plan
- 28 Butternut Trees Showed Good Growth and Vigor
- Successful Restoration and Monitoring Plan

Hypothesis 3: EMP- a living document, reduce review time and enhance restoration opportunity

THE ASSESSMENT AND OBSERVATION CONFIRMED THAT THE HYPOTHESIS 3 IS VALID

LESSONS LEARNED

- TYSSE is one of the most complex projects with an Adaptive Management Plan to be undertaken in TRCAs jurisdiction
- The Adaptive Management Plan worked well for issues related to surface water, ESCs, Restoration and communication
- The Adaptive Management Plan became basis for site inspections and follow-up mitigation measures
- Review time for permits and permit revisions, site plans and monitoring plans were significantly reduced
- Natural channel design is good ecologically, but may not be the best option in tight valley conditions constrained by multiple infrastructure; the creek is still stabilizing
- Resulted in enhanced transparency and built partnerships

Thank You
&
Open for Discussion

Toronto and Region Conservation Authority