

Strategies for Mitigation of Environmental Impacts from a Closed Municipal Landfill

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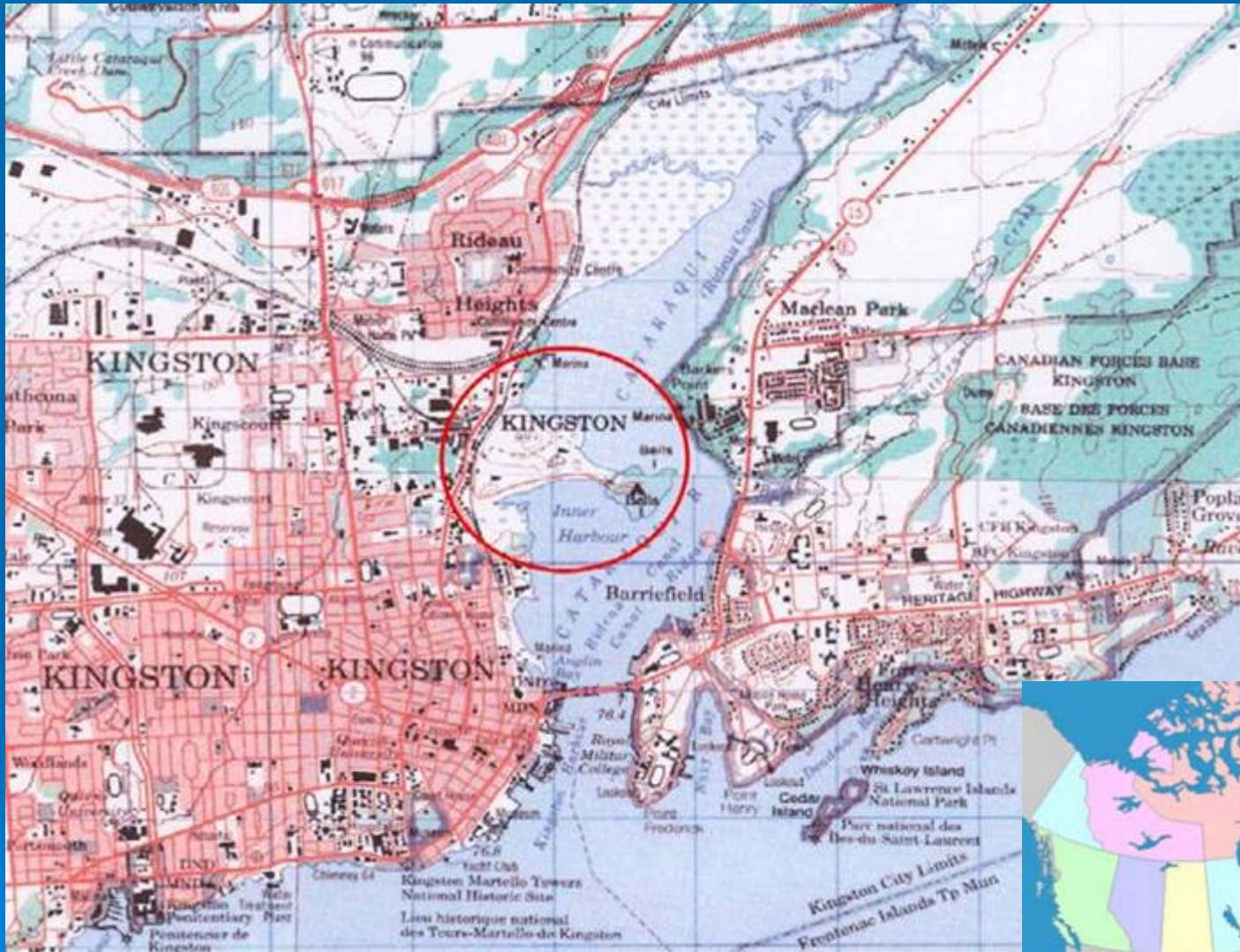
Environment
Canada

Environnement
Canada

Outline

- Site Location / Setting / History
- Site Characterization & Contaminants
- Current Site Management / Long-Term Objectives
- Feasibility Studies
- Complementary Studies

Site Location



SoftMap Technologies Inc., Topo 50, Southern Ontario

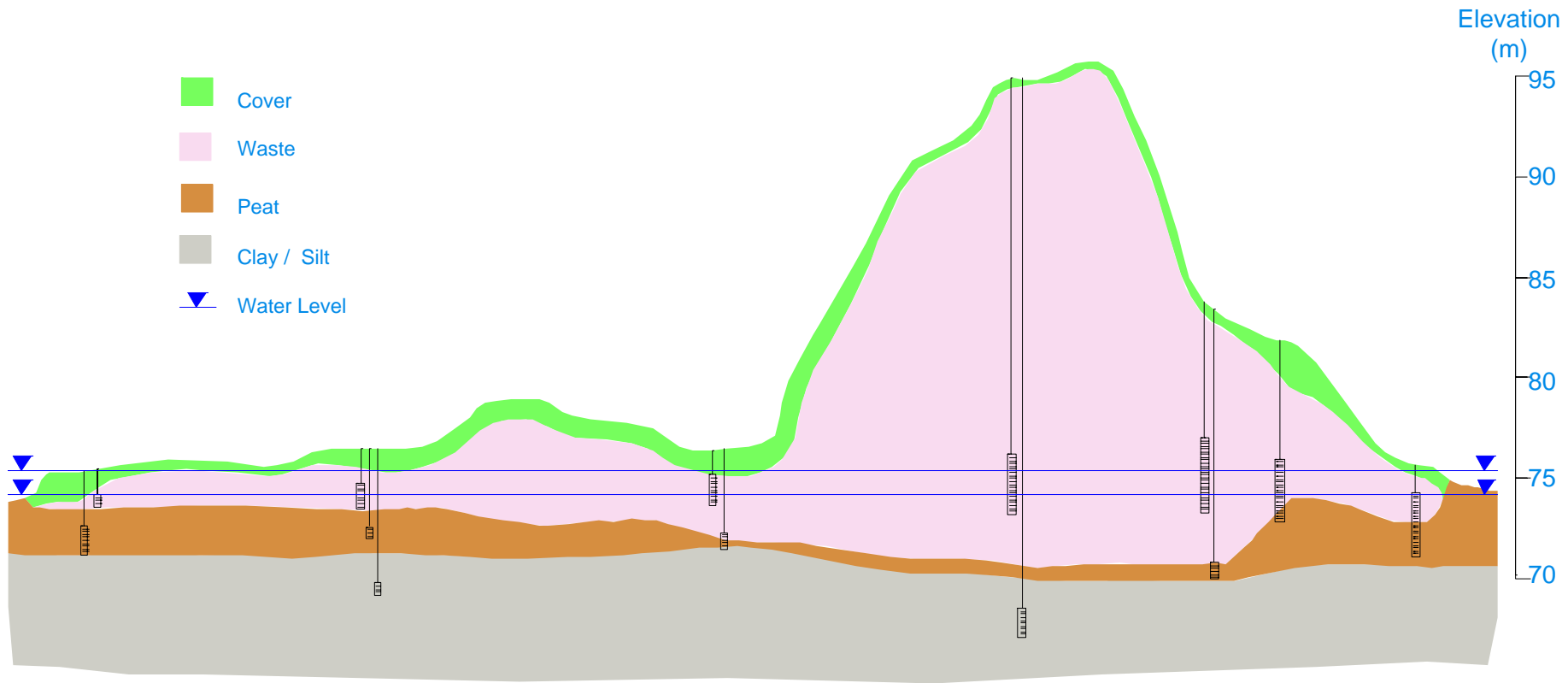




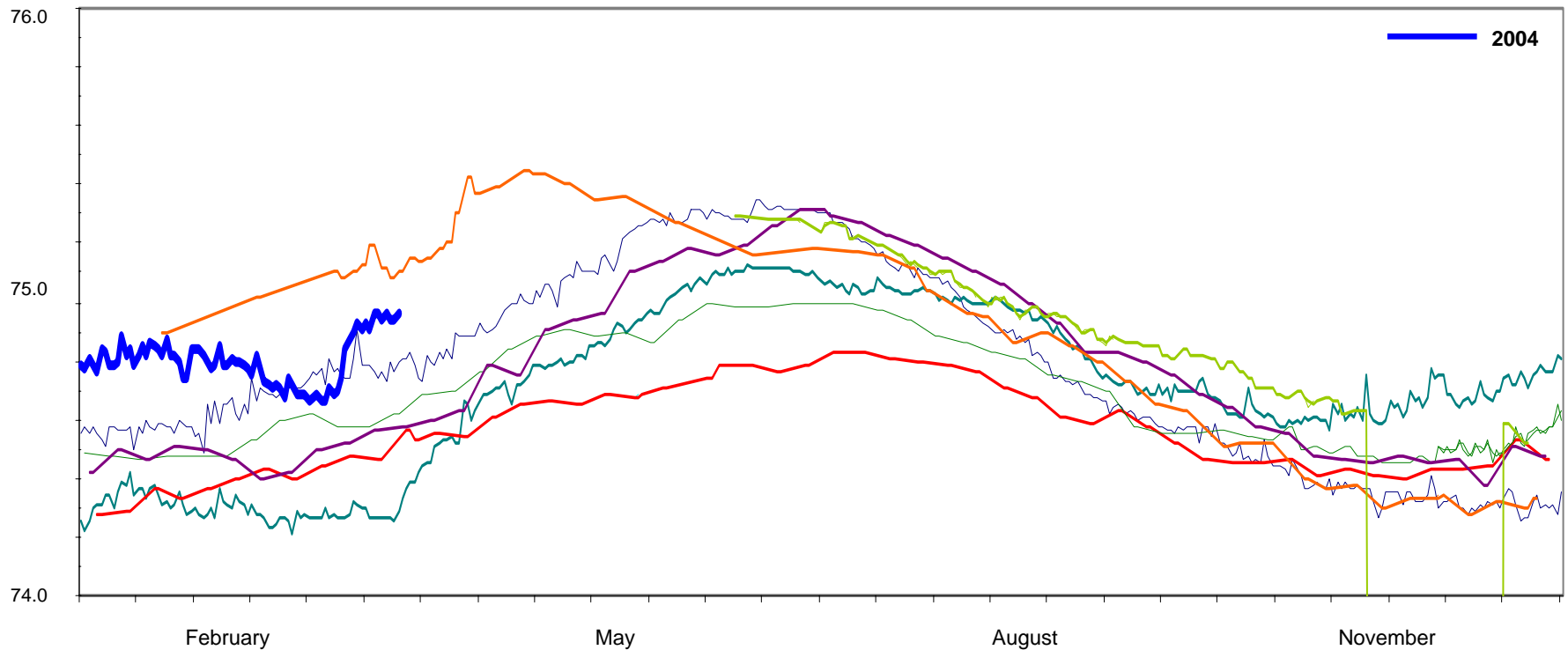
courtesy of City of Kingston



Site Characterization

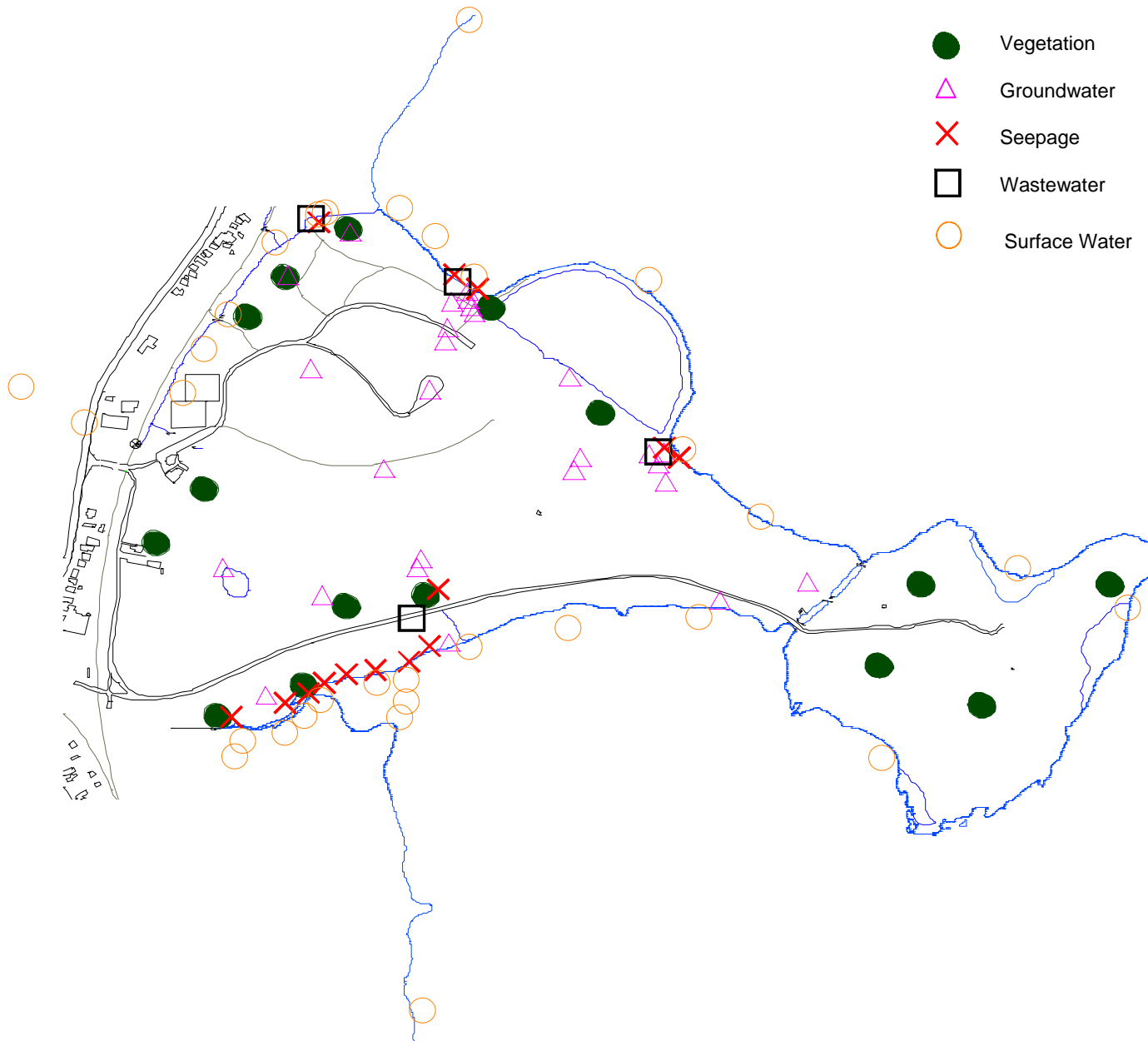


River Elevations (masl)

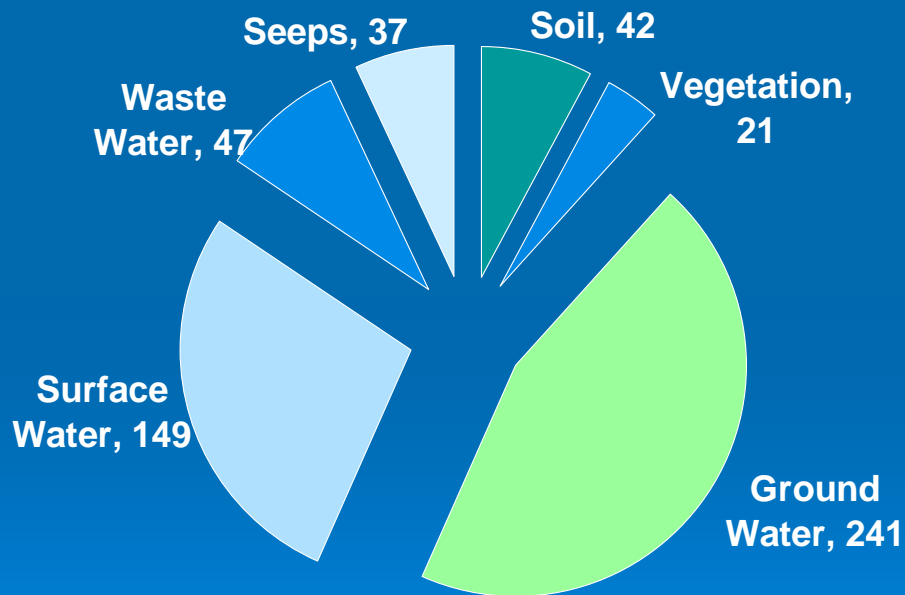


Groundwater Flow





Site Chemistry ~ 540 Samples



➤ Contaminants of Concern

- Iron
- Ammonia

Current Site Management

- Weekly Site Observation Visits
- Periodic Sampling
- Active Groundwater Pumping



Groundwater Pumping



Groundwater Extraction

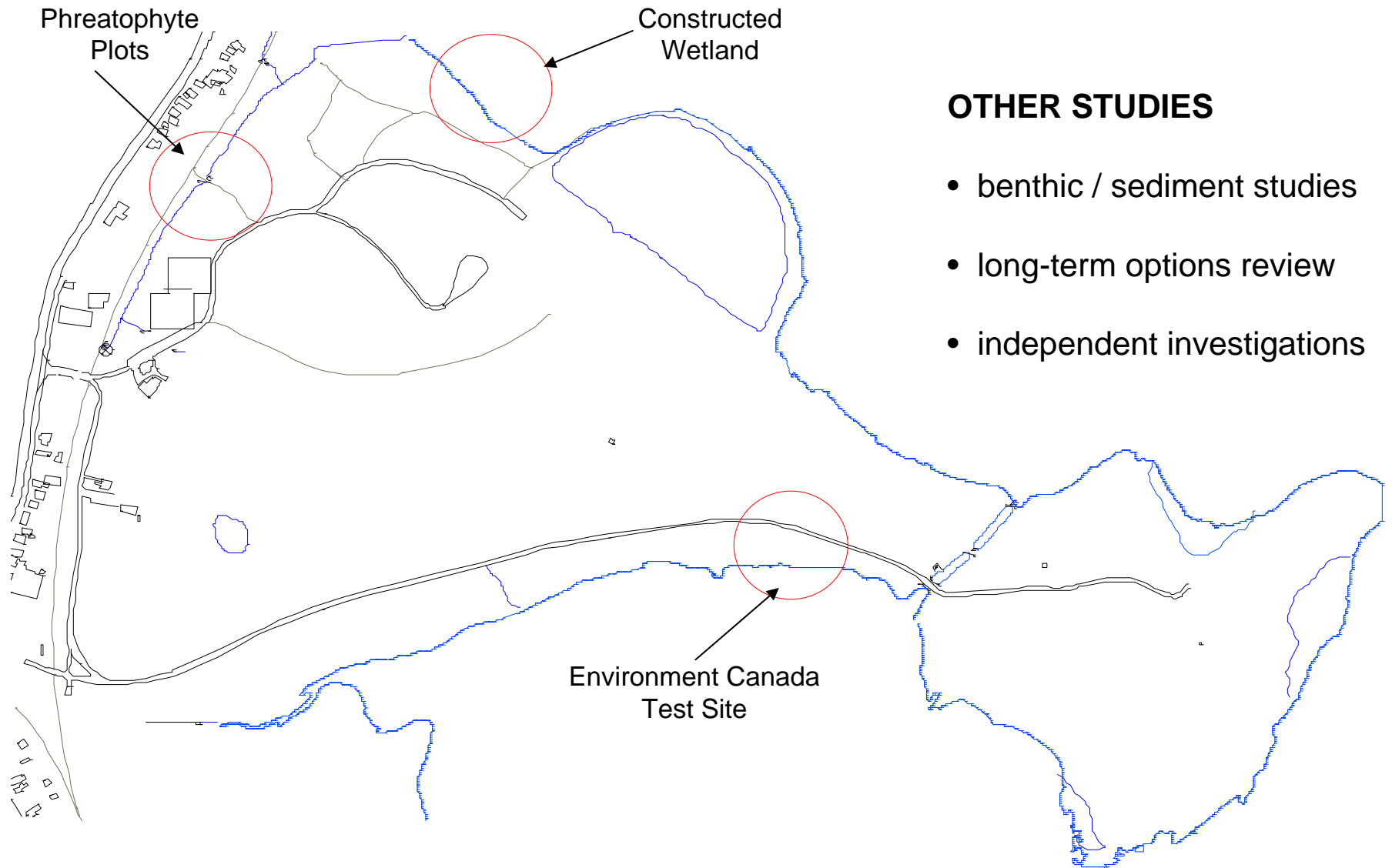
- active seepage management
- labour intensive
- water taking by permit
- costly



Long-Term Management Objectives

- maintain site use
- less active (more passive) site management
- mitigated environmental impacts
- regulatory compliance
- public acceptance

Feasibility Studies

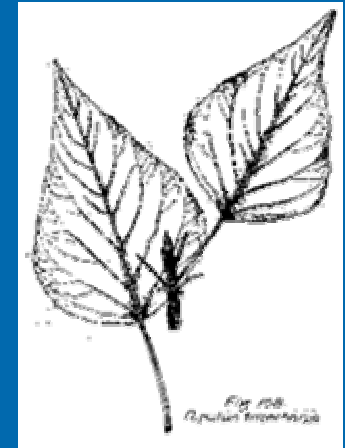
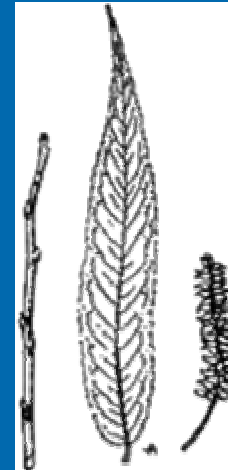


OTHER STUDIES

- benthic / sediment studies
- long-term options review
- independent investigations

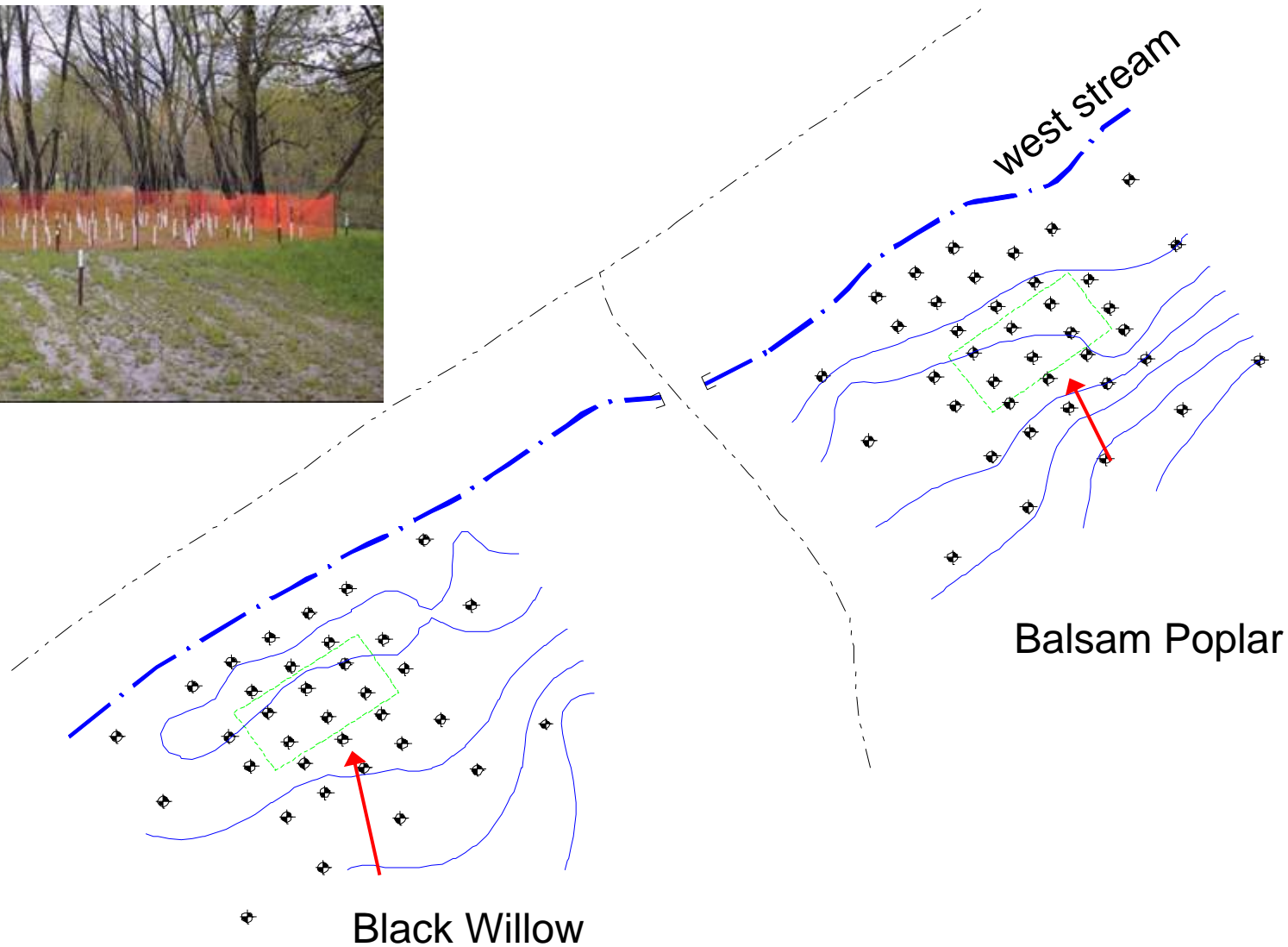
Phreatophyte Tree Plots

- *Salix nigra*
(black willows)
- *Populus balsamifera*
(balsam poplars)



- hydraulic control of shallow groundwater
- native species
- willows already on-site

Phreatophyte Tree Plots



Phreatophytes - Challenges & Stressors



Weather

Shoot Blight

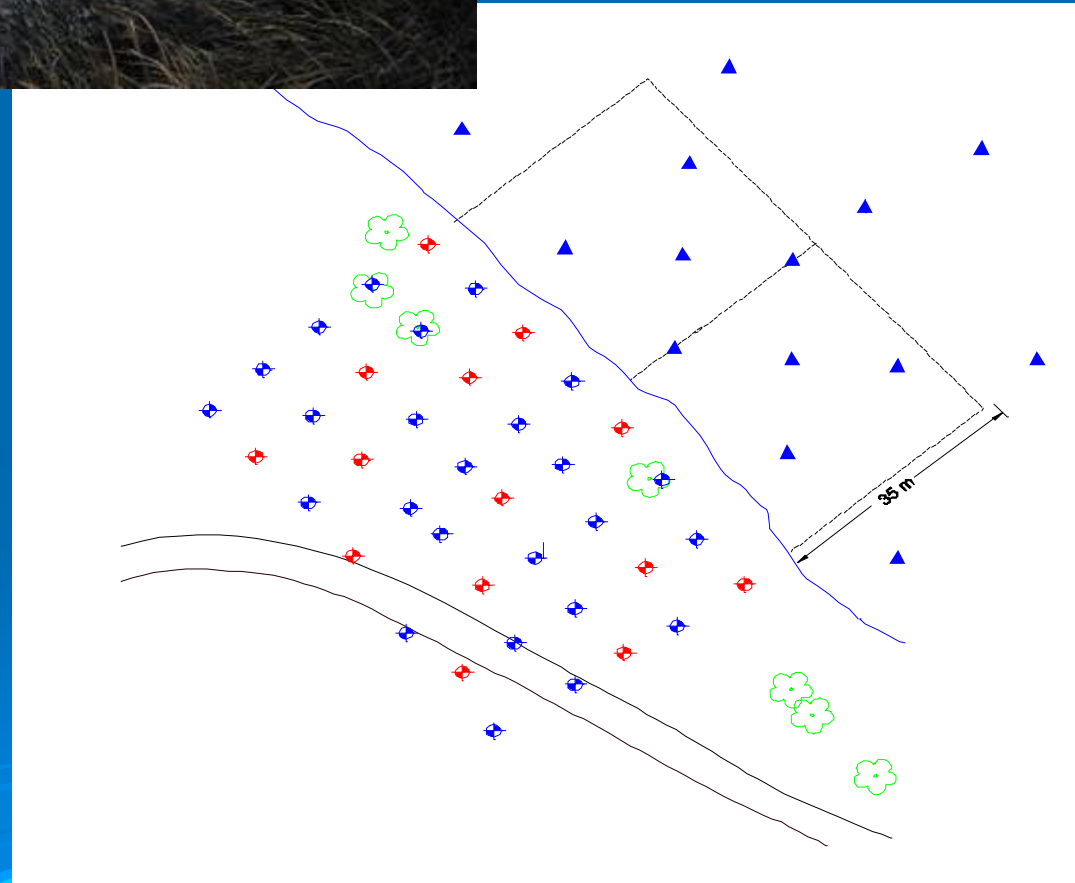
Caterpillars

Vandalism

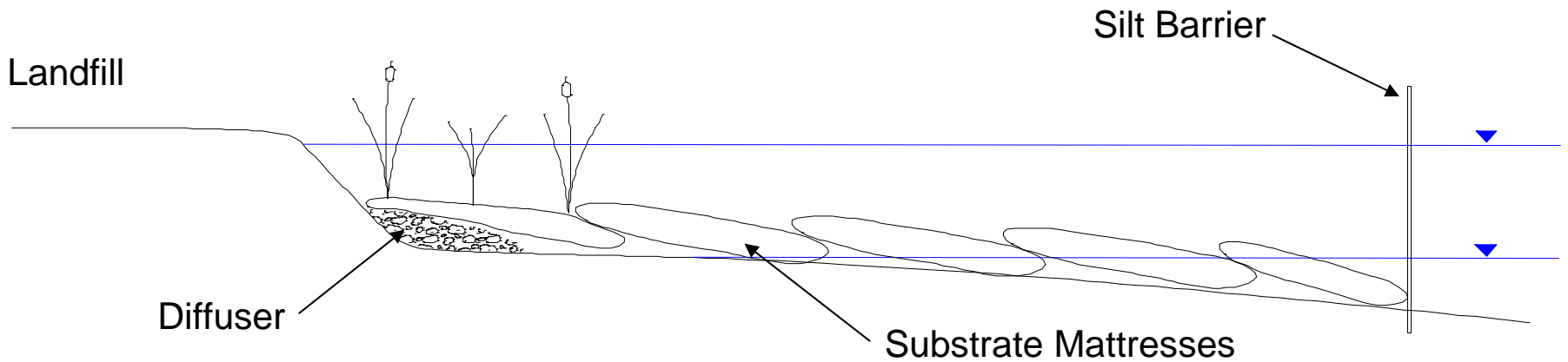
Constructed Wetland



- shallow fringe wetland
- in-water construction
- 2 - 35 m x 35 m cells
- cattails vegetation



Constructed Wetland – Schematic Section



Constructed Wetland - Monitoring

➤ Quarterly sampling

- surface water
- substrate
- groundwater

➤ Chemical Analyses

- nitrogen
- iron
- indicators

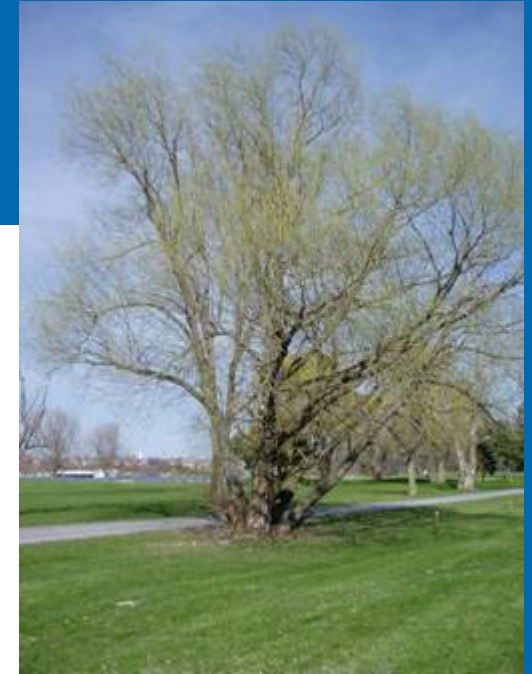
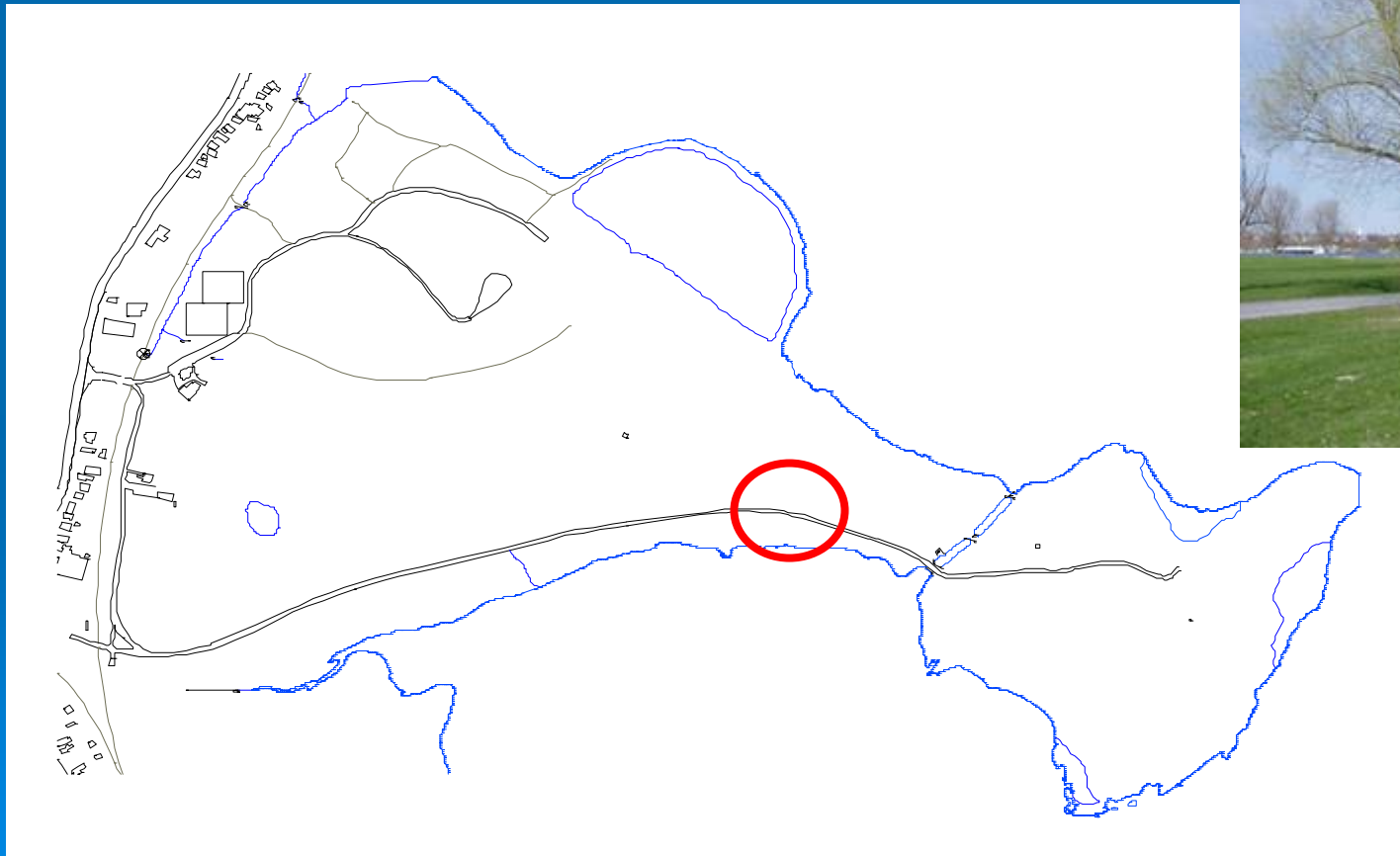


Constructed Wetland – First Season Growth

- little growth before late July
- cattails (from seeds & rhizomes)
- grasses, sedges, rushes
- populated by birds, fish, amphibians



Environment Canada Test Site



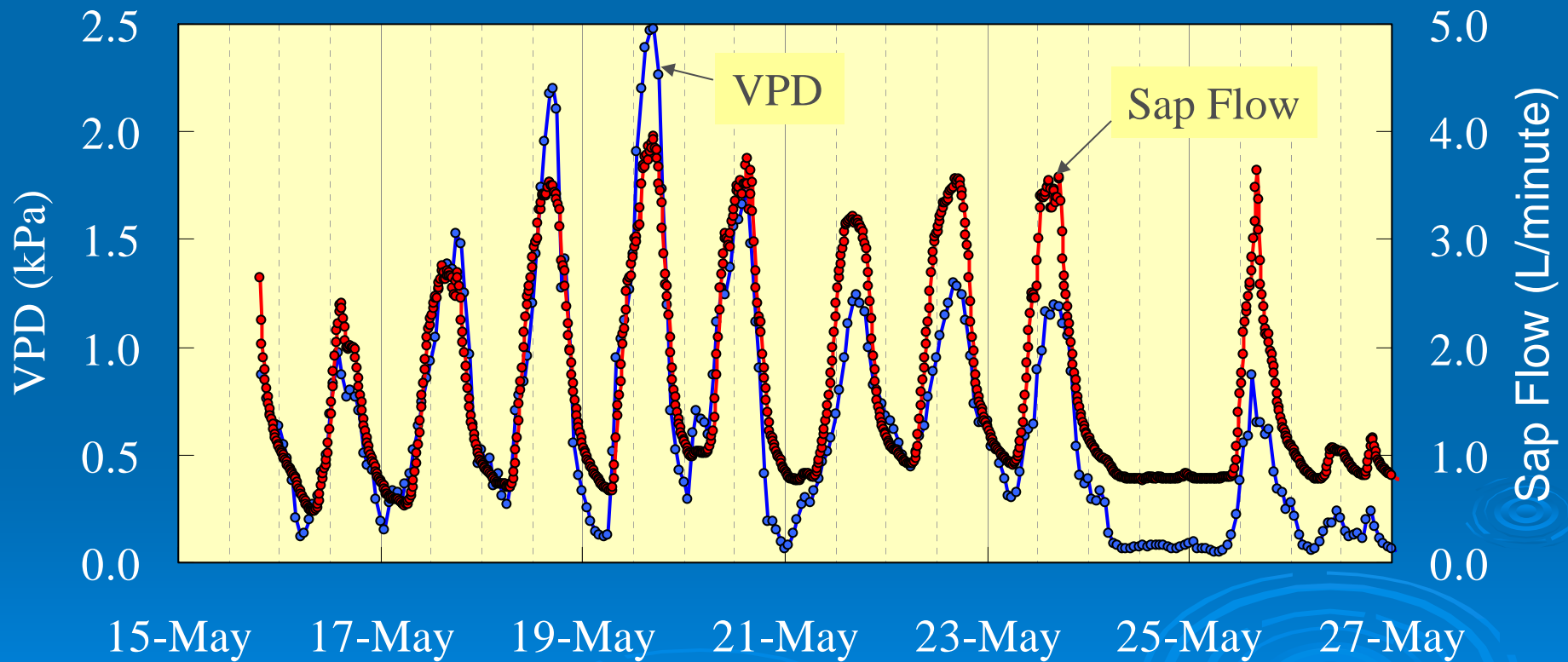
Sap Flow Probes



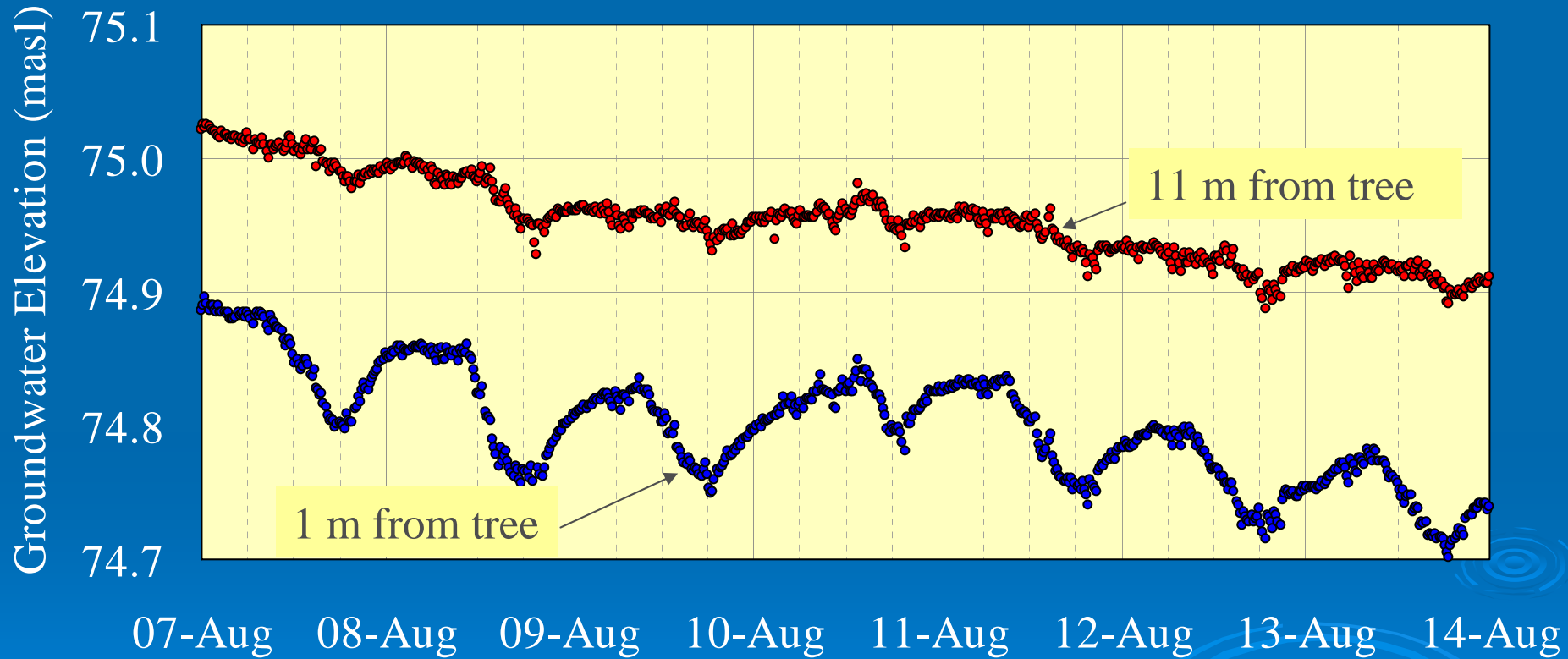
Monitoring Well with LeveLogger



Sap Flow & Vapour Pressure Deficit



Water Level Fluctuations



Future Work

- Continued Evaluation of Feasibility Technologies
- Assessment of Near Shore Impacts
- Evaluation of Long-term Management Options
- Public Consultation

Additional Information

➤ www.cityofkingston.ca/

residents/
environment/
bellepark/
index.asp

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