# INTERIM USES FOR FORMER BULK PLANT: PHYTOREMEDIATION

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# INTERIM USES FOR FORMER BULK PLANT: PHYTOREMEDIATION

- Site is a decommissioned Shell Agency Plant, Peterborough
- Former underground storage tanks have been removed and limited excavation of heavily impacted soils historically undertaken
- Petroleum Hydrocarbon impacts exceeding allowable standards still exist on Site and subsequently found to extend offsite onto City lands in dissolved phase
- Phytoremediation was undertaken to bring Site into environmental compliance over a period of approximately 5-10 years

# PHYTOREMEDIATION

**Phytoremediation is a broad term that describes the use of plants to reduce the volume, mobility, or toxicity of contaminants in soil, groundwater, or other contaminated media (McCutcheon 2003).**

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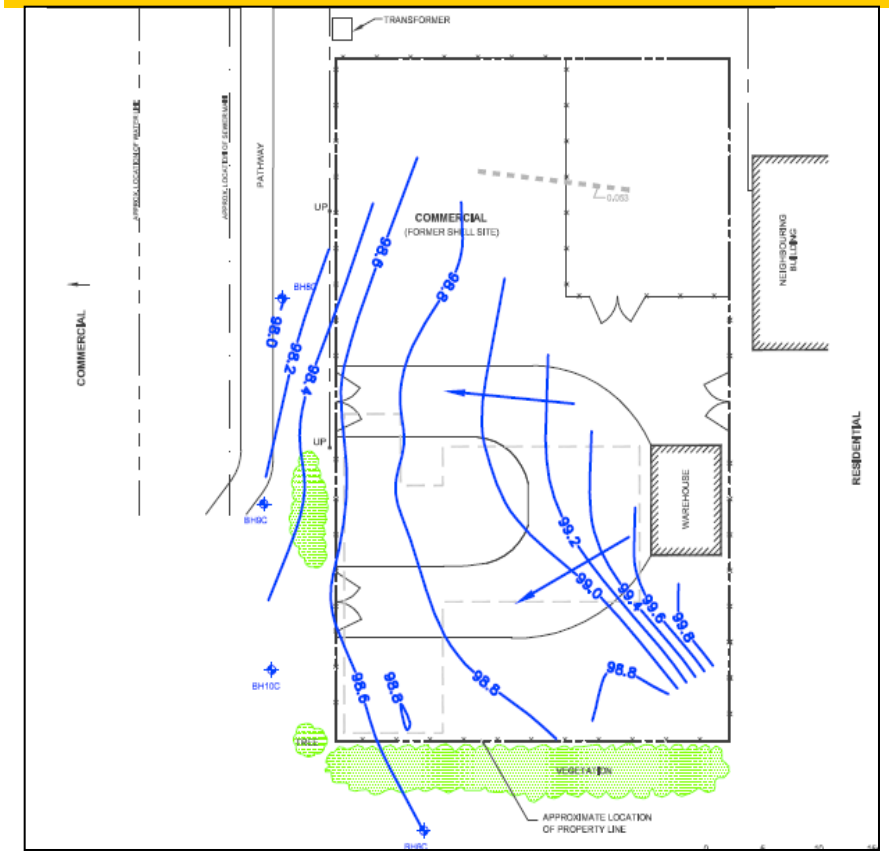
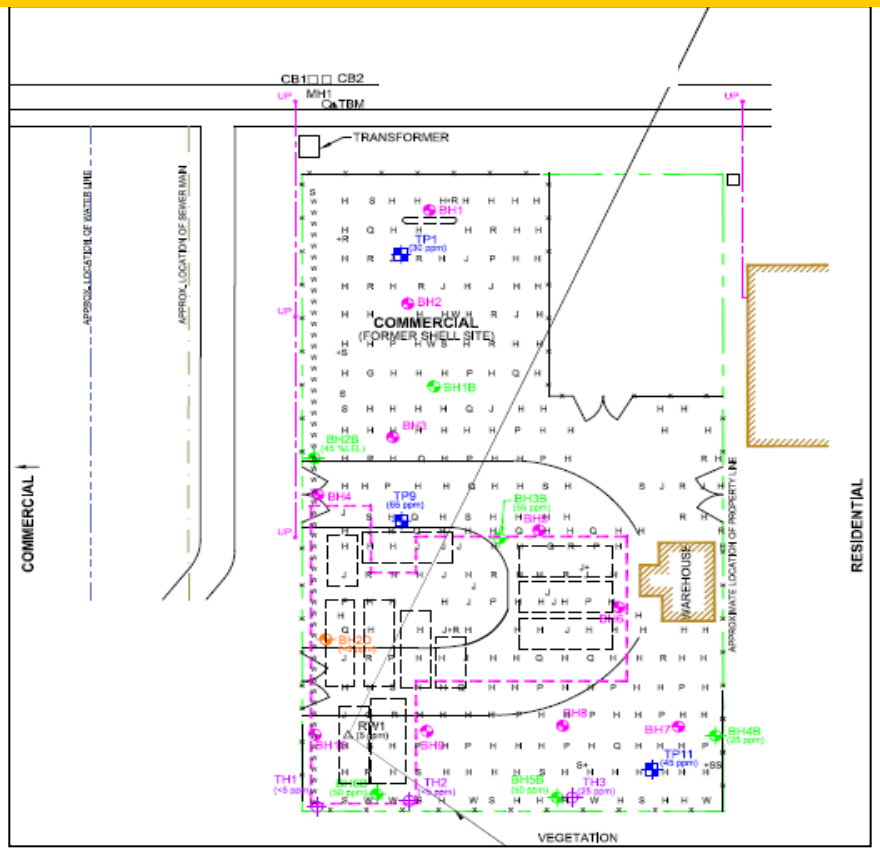



H – Hybrid Poplar
S – White Spruce
P – White Pine
Q – Black Oak

J – Eastern Red Cedar
W – Hybrid Willow
R – Black Locust

# INTERIM USES FOR FORMER BULK PLANT: PHYTOREMEDIATION

- 0.2 hectare planting area
- 342 trees
- Multiple species
  - Predominantly hybrid poplars and willows
    - Mature willows deep-planted (1m) to rapidly intercept water table
  - Other remediation species included to ensure:
    - Long term efficient phytoremediation
    - Ecological diversity
  - Post-remediation species

# Phytoremediation Species

- Predominant Species:
  - » Hybrid poplars
  - » Hybrid willows

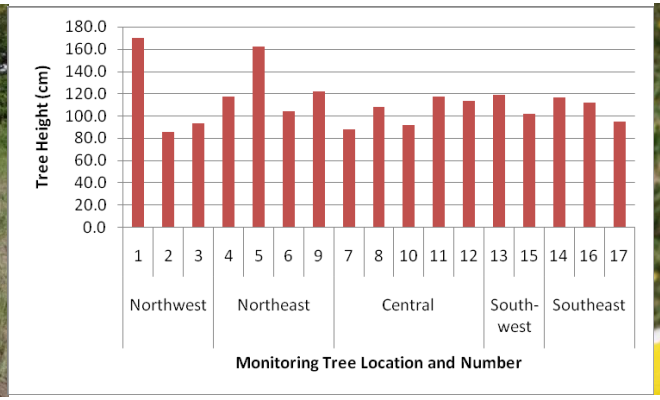
  - – Other species:
    - » Black Locust
    - » Eastern Red Cedar
    - » White Spruce
    - » White Pine

# Post-Remediation Species

- White and Red Pine
- Black Oak

# INTERIM USES FOR FORMER BULK PLANT: PHYTOREMEDIATION

- Performance Monitoring
  - Two Seasonal Monitoring Events
  - Ecological monitoring canopy growth development and health
  - Groundwater monitoring  and Trend Analysis
  - Develop recommendations for phytoremediation system



# INTERIM USES FOR FORMER BULK PLANT: PHYTOREMEDIATION

- Establishment of a phytoremediation system greatly improved the area by taking into considerations the social and ecological benefits to the existing natural habitat
- Presentation of data ground water data through Mann-Kendall trend analysis supports conclusion that onsite and offsite groundwater quality is relatively stable and generally decreasing

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- The MOE provided comments that groundwater results from both onsite and offsite show only marginal exceedances **“since the results in general have shown a stable to decreasing trend, neither additional monitoring wells nor additional remedial actions are required at this time...”**

- This shift in approach could be considered a change in the framework employed for evaluating remedial options and interim uses, reaching beyond the consideration of human health or ecological risks

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- In 2011 MOE has revised generic site condition standards (O. Reg. 511/09). As a result, the previously delineated offsite plume is no longer delineated
- A site specific risk assessment is now being considered at the site to facilitate the sale of the land and redevelopment as a commercial facility
- Benefits:
    - The remediation of a property using an approach that is reflective of the market conditions and land values
    - Provided a significant improvement in the visual gap of downtown setting and provided ecological benefits that outweigh those of excavation or other remedial options
    - High public acceptance
    - Effective interim use until the redevelopment occurs

**Credits:**

**Doug Gladysz, P.Eng.**
**Shell Canada Products**

**LandSaga Biogeographical**

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