Remediating a Natural Attenuation Landfill

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Durham Region is east of the City of Toronto and encompasses 2,590 km² (1,000 square miles)

Population 633,130

Works Department is responsible for the management of seven landfills

Regional Municipality of Durham
### Natural Attenuation Landfills

<table>
<thead>
<tr>
<th>Initial Conditions</th>
<th>Current Conditions</th>
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<tbody>
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<td>High natural attenuation capacity</td>
<td>Lower natural attenuation capacity</td>
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<tr>
<td>Semi-permeable base</td>
<td>Seep discharges into wetlands, creeks</td>
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<tr>
<td>Waste fill area near natural surface water features (wetlands, creeks)</td>
<td>Concerns from local residents</td>
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</tbody>
</table>
• Former aggregate pit
• Waste disposal started in 1950s
• Site for local waste disposal (5,000 tonnes per year)
• Voluntary groundwater and surface water monitoring started in 1980
• Leachate seeps discharging into wetland and north of property line
Remedial Action Plan

In 2006, the Region was issued a Provincial order to submit a RAP to assess and remedy:

- off-site leachate seeps north of the site boundary
- leachate seeps discharging into the wetland

Primary Objectives of the Remedial Action Plan

- Reduce surface water infiltration into the waste
- Install a leachate collection system to control seeps
- Enhance the site’s natural attenuation capacity with engineered controls
Established in 2008, the purpose of the PLC was to address residents concerns and facilitate information sharing.

Committee members were comprised of:

- Three (3) residents from different households living within a 2 km radius
- Three (3) residents living in Brock Township
- One (1) Chair – the Mayor or alternate official
Leachate Collection System - Pilot

Primary objective to determine:

- Effects on wetland water elevations from pumping
- Strength of leachate
- Volume of leachate
Leachate Collection System – Pilot Scale
Pilot Study Results

- Infiltration pond handled all pumped groundwater
- Relatively weak leachate can be readily attenuated with re-circulation into infiltration pond
- Pilot-scale system was effective in eliminating seeps
- System would only need to be operating in the spring
Final proposed contours allowed for 120,000 m³ additional waste capacity

Additional waste imported to attain pre-cover elevations in three years

Base liner installed on Stage 4 waste area
Contaminant Attenuation Zone

Northern property purchased to establish buffer zone

Source for general fill and sandy soil for engineered final cover

Space to align northern leachate collection trench
CAZ Rehabilitation
Final Cover System

- 0.15 m topsoil and vegetative cover
- 0.3 m general fill layer
- 0.3 m drainage layer
- geomembrane liner (67,000 m²)
- 0.3 m interim soil cover over waste
Brock Landfill PLC

Regular meetings held from 2008 – 2014

Three (3) newsletters distributed to Brock Township Residents

PLC members requested that the committee be disbanded after final cap installed
Enhanced site’s natural attenuation capacity with leachate re-circulation system and partial base liner
Decreased truck traffic to the site with on-site excavation for final cap soil materials
No change to historical groundwater monitoring trends
Leachate collection system used for 3-4 weeks in the spring to control seeps
2009 budget estimate was $10.5 million; actual cost ~$5.5 million
Thank You

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