

# Remediating a Natural Attenuation Landfill

1

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Durham Region is east of the City of Toronto and encompasses 2,590 km<sup>2</sup> (1,000 square miles)

Population 633,130

Works Department is responsible for the management of seven landfills



## Regional Municipality of Durham

# Natural Attenuation Landfills

3

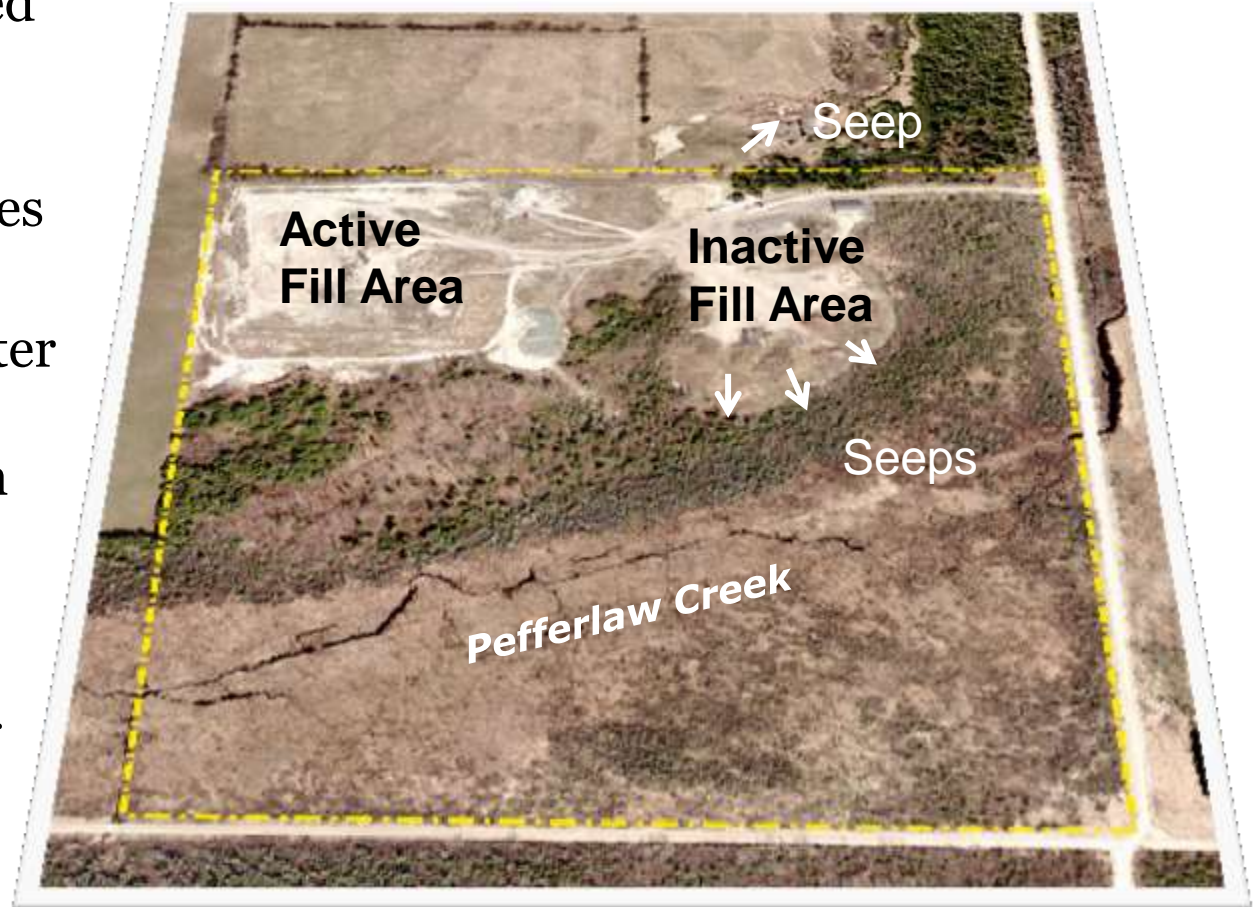
## Initial Conditions

- High natural attenuation capacity
- Semi-permeable base
- Waste fill area near natural surface water features (wetlands, creeks)

## Current Conditions

- Lower natural attenuation capacity
- Seep discharges into wetlands, creeks
- Concerns from local residents

- 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



## Brock Landfill – History



## 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

# Brock Landfill Public Liaison Committee

6



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 m<sup>3</sup> additional waste capacity

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

Base liner installed on Stage 4 waste area



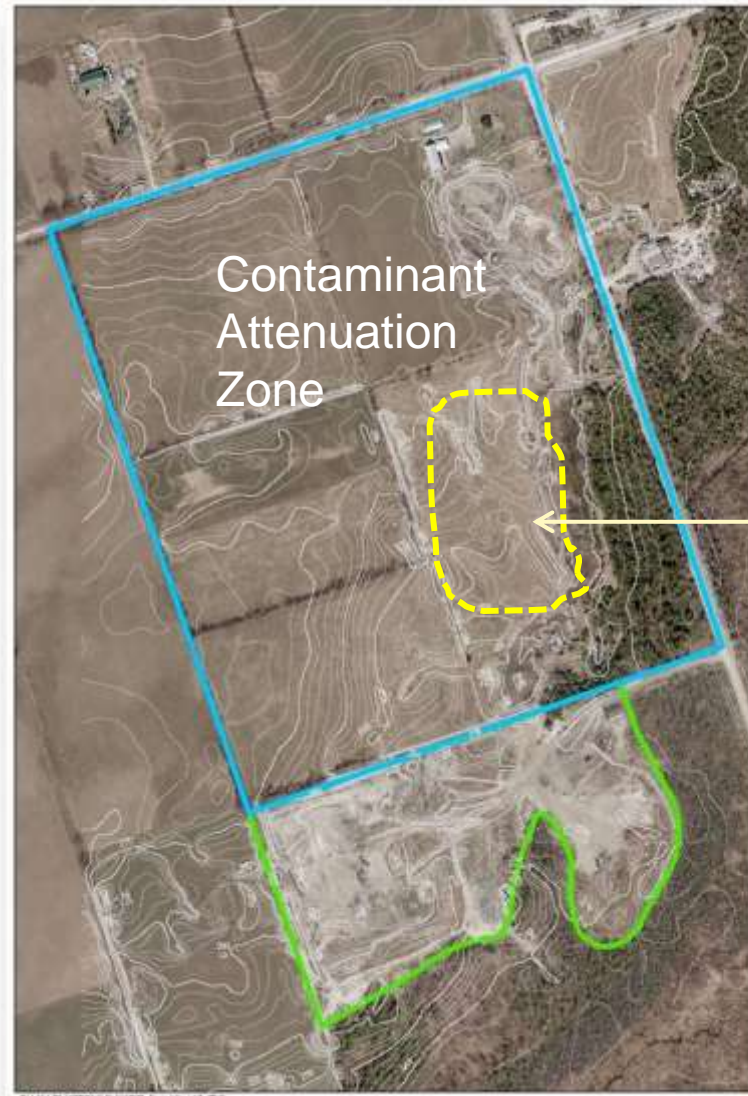
## Waste Placement Plan

## 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



Excavation Area

# CAZ Rehabilitation

12



## Final Cover System

- 0.15 m topsoil and vegetative cover
- 0.3 m general fill layer
- 0.3m drainage layer
- geomembrane liner (67,000 m<sup>2</sup>)
- 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



# Summary

15



- 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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