Former Sabiston Landfill Site
INFORMATION & STATUS UPDATE

Presentation to General Committee

March 23, 2009

Asset Management Department

Purpose of Presentation

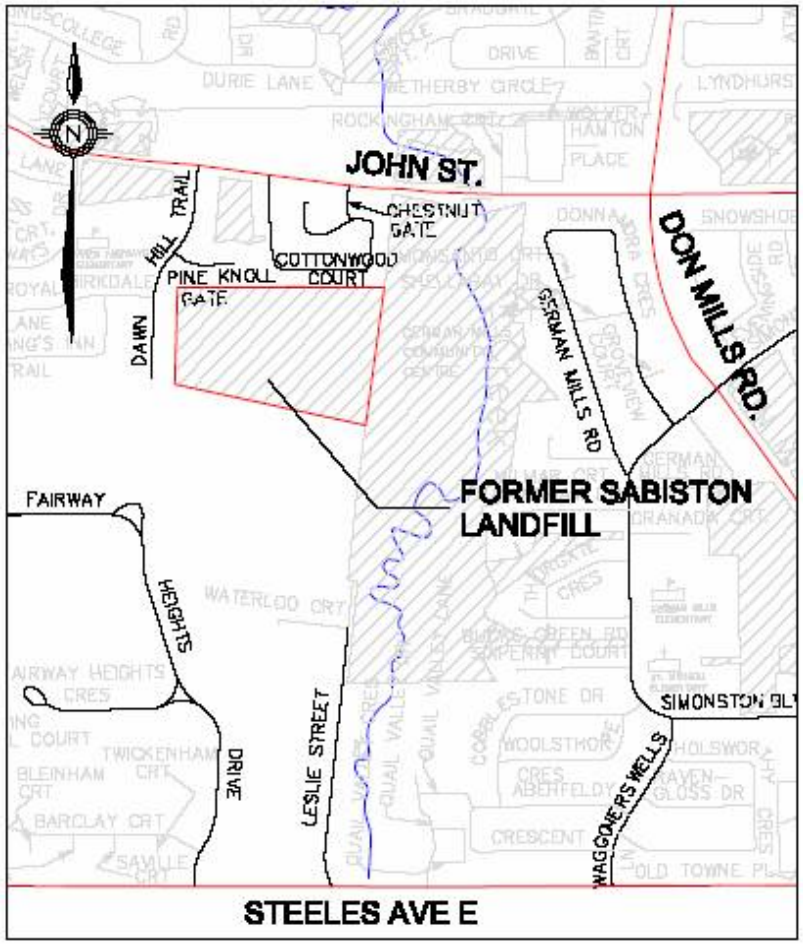
- Resolution:
  - That “Former Sabiston Landfill Site – Information & Status Update” presentation be received.
  - That Staff be authorized to host a public meeting with the Ward Councillor on the remedial options for the Former Sabiston Landfill
  - That Staff report back to General Committee with the results of the public information meeting and recommendations on the remedial options, including the leachate collection system for the landfill

- Purpose of the Presentation:
  - To provide information status update on the management of the Former Sabiston Landfill Site
  - To obtain preliminary comments from Members of Council on potential remedial options for the Former Sabiston Landfill

Agenda

- Background of the former Sabiston Landfill site
- Short, medium and long term landfill management strategies
- Examine Future remedial options, discussions and next steps

Background of Former Landfill: Location



Background of Former Landfill: Location and Size

Located on the western portion of the German Mills Settlers Park

Landfill is approx.
9 hectares;
18 metres deep;
9 – 15 metres from adjacent houses

Background of Former Landfill: History and Composition

- Aggregate extraction ended in 1960's
- Landfill operated by James Sabiston Ltd until 1975
- Spring 1983 Sabiston installed methane gas collection system based on MOE requirements
- Transferred to Town of Markham October 1983
- 1-2m (3-6') landfill cap and no liner under/around landfill
- Borehole tests (1996) identified typical dry household waste (e.g. newspaper, kitchen waste etc.), building rubble (e.g. wood, concrete, bricks etc.) and various types of earth fill (e.g. topsoil, sand, clay etc.). No hazardous substances have been identified in the tests.
- All solid wastes safely contained within landfill
- East of the landfill filled with inert clean material and not used for waste disposal

Background of Former Landfill: Post purchase history

- Currently operates as anerobic landfill (no oxygen)
- Town operates the gas collection system: 18 gas wells along north & west perimeter; connected to header pipes and pumped to fan house

Background of Former Landfill: Post purchase history

- Town conducted numerous studies / tests / maintenance activities
- Work included repairing the existing gas collection system, and monitoring the water quality in German Mills Creek and gas levels
- Decomposition of waste found to be very slow
- Since 1983 various monitoring studies have been completed (1994, 1999, 2001, 2002, 2003, 2004, 2005, 2007, 2008)
- Identified two key environmental impacts:
  - Methane Gas
  - Leachate

Background of Former Landfill: Methane Gas Impacts

- What is methane? A colorless, odorless, gaseous saturated hydrocarbon; It is less dense than air; It is combustible and can form explosive mixtures with air; It is formed by the decomposition of plant and animal matter.
- Off site migration of methane around the perimeter of the site (adjacent to private properties) are contained and below MOE levels
- Large quantities of methane generated (1000 to 2000 tonnes per year equivalent to 21,000 to 42,000 tonnes of CO2)

Background of Former Landfill: Leachate Impact

- What is leachate? Leachate is defined as groundwater that has been impacted by decomposition of waste
- In 2002 a resident identified leachate along the creek bed.
- Town's investigations (including consultation with TRCA) have concluded that the leachate is highly diluted with minimal effects
- Leachate migration can be eliminated with groundwater recovery wells

Photo 1 - Iron-stained Groundwater Seepage
West Bank, near SS3

Landfill Management Strategy 2006 Activities

- May 23, 2006 Council approved the award of engineering services for the design / tender of the aerobic technology
- Urban Design Staff conducted a Public Open House on Aug 22, 2006 - Future vision of German Mills Settlers Park
- Asset Management Staff conducted a Public Open House on Oct 4, 2006 – updated current status and introduced options around aerobic technology
- Public Response:
  - Concerns with the proposed aerobic technology

Landfill Management Strategy 2006 Activities – Cont'd

- Following the public consultations in October 2006, AM staff conducted extensive research to answer the concerns raised. However, as this is a new emerging technology, all concerns cannot be fully answered at this time.

- November 2006 – a Q & A document was sent via mail to area residents including information on history and operations of the landfill, studies completed to date, additional information on aerobic landfill technology and its potential impacts

- Dec 2006 a site visit with residents to Donlands Landfill site (aerobic) was completed

Landfill Management Strategy 2007 Activities

- Jan 2007 - Inspected gas collection system
  - 18 gas wells,12 gas probes, gas collection piping and fan house with exhaust – Recommended rehabilitation
- Jan 2007 - Obtained samples from creek
  - Minimal effects from leachate found in creek samples
- April 2007 - Repaired and rebuilt parts of system (wells & header pipes)
- Nov 2007 – Further adjustments (probes) completed to the system
- Dec 2007 - Monitored gas probes and gas wells
  - No instances of methane above MOE standards at boundary gas probes

Landfill Management Strategy 2008 Activities

- Jan 2008 – Video inspection gas wells
  - Results: Gas well are in good condition
- 2008 - Monitored gas probes (Jan., Apr., May, Jul., Sep., Nov.) and gas wells (May and July)
  - No instances of methane above MOE standards at boundary gas probes
- April 2008 - Obtained samples from creek
  - Minimal effects from leachate found in creek samples
- May 2008 - Staff met with MOE to address regulatory requirements
- July 2008 – Adjustments made to increase the suction pressure in the pipes

Landfill Management Strategy Current Activities

- Finalizing MOE Certificate of Approvals (Air)
- Prepare documents to satisfy the updated MOE Certificate of Approval (Air)
- Winter 2009 – further rehabilitation to system planned
- Continue regular monitoring of the former Landfill in 2009

Short Term Remedial Actions

- Install Leachate Collection System to intercept discharge to German Mills Creek
  - Collect the leachate and dispose (discharged into sanitary sewers) according to provincial regulations
  - Positive effect on the natural environment
  - Design (2009) and cost estimate will need to be determined
  - Potential implementation winter 2009/2010

Examine Medium / Long Term Remedial Options

- Option 1: Continuation of Existing Status
- Option 2: Mine and Recover (recycling buried material)
- Option 3: Aerobic Landfill technology (for a small pilot study area)
- Other options reviewed however will not be considered: Excavate and ship the waste to another landfill

Examine Medium / Long Term Remedial Options
Option 1: Continuation of Existing Status

- Continuous monitoring/ maintenance/ rehabilitation required ($200,000 per year)
- Methane production will continue at current levels
- Continue to monitor methane gas levels at landfill boundaries
- Leachate at diluted levels will continue into creek
- Slow decomposition / stabilization of the site
- Land will be left in existing natural state without disturbance to wildlife habitat
- Limited usage for future park

Examine Medium / Long Term Remedial Options
Option 2: Mine and Recover (Recycle)

- Significant disruption to local residents and impact on local roads: Noise, heavy traffic, vibration, dust
- Landscape and wildlife habitat will be severely affected
- Large costs ~ $310 million. The estimate is based on:
  - 9 hectares x 18 metres deep
  - Assumed density of 1900 kg / cu m results in 3.1 million tonnes
  - $100 / tonne to excavate, transport and dispose within Canada
  - Requires a sorting facility
- MOE approval process needs to be determined
- Potential significant environmental impacts

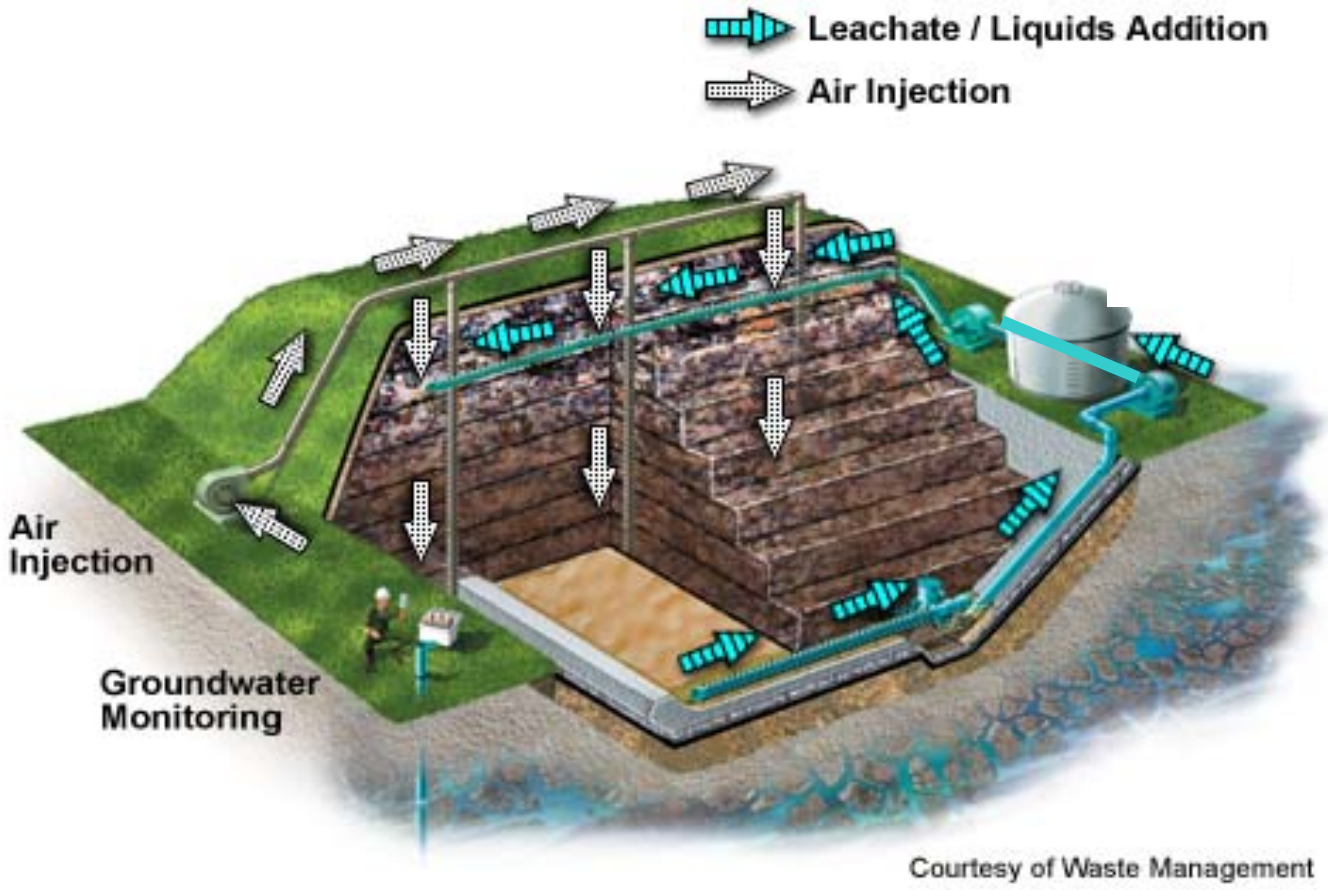
- However, based on preliminary borehole tests the landfill is composed of typical dry household waste (e.g. newspapers, etc.), building rubble (e.g. wood, concrete, brick etc.) and various types of earth fill (e.g. topsoil, sand, clay, etc.).

- Therefore, there is limited material (e.g. metals) that can be mined and recovered

Examine Medium / Long Term Remedial Options
Option 3: Aerobic Technology

- Small pilot test area located at the furthest point from residents is being considered
- It is a new emerging technology that will be closely monitored for it's impacts and performance
- How does Aerobic work?
  - Moisture and air (oxygen) is injected into the landfill
  - Heat is generated within the landfill
  - Methane and most of the odourous gases are largely eliminated
  - A system of air injection wells and Leachate recirculation wells below ground

Examine Medium / Long Term Remedial Options
Option 3: Aerobic Technology



Examine Medium / Long Term Remedial Options
Option 3: Aerobic Technology

- Potential impacts
  - Generated heat will be contained within the landfill and will not migrate to the surface
  - No impact on current vegetation layer and wildlife
  - Settlement at an increased rate is expected to occur (from the decomposition of the waste) with possible effects to adjacent properties
  - Improve air quality and eliminate odour and toxic vapour emission
  - Decrease methane production and green house gas emissions
  - Potential for carbon credits
  - Improve stream quality and fish habitat

Examine Medium / Long Term Remedial Options
Option 3: Aerobic Technology

- Aerobic Technology is currently in operation at the Don Land Landfill
- MOE is currently implementing the aerobic technology at one of their landfills (Innisfil)
- Canadian Centre of Excellence (Town partnership with Seneca College) indicated interest to provide funding to review aerobic technology for a small pilot area at this landfill
- The estimated cost of an aerobic pilot test site (and the leachate collection system) is $400,000. A budget is available for this project.

Next Steps

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Former Sabiston Landfill

- If you have any questions, please contact:
  - Steve Andrews, Director, Asset Management (Ext. 4703)
  - Or Phoebe Fu, Manager, Capital Right of Way, Asset Management (Ext. 3010)