
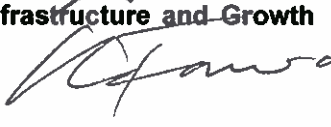





## Environmental Services Department MEMORANDUM

**TO:** Mayor J. Lehman and Members of General Committee

**FROM:** J. F. Thompson, P.Eng., PMP, Director of Environmental Services  13.06.20  
J.F. Thompson

**NOTED:** R. Forward, MBA, M.Sc., P.Eng., General Manager of Infrastructure and Growth Management   
C. Ladd, Chief Administrative Officer 

**RE:** Historic Waste Disposal Sites – Summary

**DATE:** June 24<sup>th</sup>, 2013

The purpose of this Memo is to provide General Committee with information relating to the historic waste disposal sites in the City of Barrie and associated environmental works.

The City of Barrie ('City') was required by the Province of Ontario to undertake environmental impact studies of historic waste disposal sites within the City limits to delineate the extent of contamination (ground water, surface water, soil and landfill gas) currently present. The City was then to determine appropriate remediation if required and create environmental policies in its Official Plan.

The requirement was initiated through the Province's review and approval process for the City's 2009 Official Plan Amendment Application. The Ministry of Municipal Affairs and Housing (MMAH) and the Ministry of Environment (MOE) agreed that a "non-decision" regarding environmental policies in the Official Plan would be appropriate to allow the City, together with the MOE, time to investigate the condition of the historic waste disposal sites located within the City. The "non-decision" was associated with environmental policies for assessment areas around former waste disposal sites, due to the absence of detailed environmental information related to potential off site impacts from the historic waste disposal sites. This non-decision is reflected in the Barrie Official Plan at Schedule "A" (attached as Schedule "A").

In addition to any more specific planning policy that may arise out of the above exercise, currently the MOE requires by provincial guideline that a "D4" Study be completed for any new developments or re-development of land within 500 m of the historic waste disposal sites. A D4 Study is a report to be completed by the owner of property within 500 m of an active or non-operating waste disposal site. The purpose of the D4 Study is to determine if there will be any negative impacts to persons and/or property due to the proximity of the waste disposal site. The D4 Study is to be completed based on the provincial Guideline D4 Land Use On or Near Landfill and Dumps. The D4 Study is to be submitted to the City upon an application for an official plan amendment and/or zoning by-law amendment for a change of land use to a more sensitive use. The City peer reviews the study as part of the planning analysis in support or opposition to the proposed development. The property owner has the right to appeal to the Ontario Municipal Board from the City's decision.

Since 2010, the City of Barrie has been developing a work plan in consultation with the MOE to complete a comprehensive review of the Sites to determine the current environmental conditions and appropriate mitigation measures if required. As evidenced by Schedule "A", the historic waste disposal sites in Barrie exist predominantly along Bunker's and Dymont's Creeks. These historic waste disposal areas lie in the heart of the City's Urban Growth Centre and are identified as a key intensification area.

The investigation of the historic waste disposal sites began in the latter part of 2011 and the first phase was completed in the Spring of 2013. The work included horizontal and vertical delineation of waste, characterization of waste, and the assessment of groundwater, surface water and extent of potential off-Site landfill gas migration. Information to date concludes that the D4 Assessment Areas have been

significantly reduced from the initial 500 m radius originally imposed by MMAH guideline. This initial work did not include the environmental characterization of any privately owned property.

In April 2013, the City received the final reports related to the work completed to date prepared by the City's consultant, Golder Associates Ltd. ('Golder'), entitled:

- "D-4 Study and Environmental Assessment – Final Report. Bunker's Creek Landfills – City of Barrie"; and
- "D-4 Study and Environmental Assessment – Final Report. Dyment's Creek Landfills – City of Barrie".

The investigative works associated with the above noted reports were limited to City owned lands on seven (7) historic waste sites along the aforementioned Creeks. The estimated extent of waste on privately owned lands was based on the historical data review.

The soil and groundwater samples collected from all sites were compared to standards established by regulation under the Environmental Protection Act for land use in a residential/parkland/institutional potable groundwater situation. It is important to note that the City's municipal drinking water supply is derived from deep aquifers which are greater than 66 m (200 ft) in depth below ground surface. The depths to groundwater in observation wells installed as part of this project ranged from 2.60 m to 4.92 m below ground surface.

In addition, the soil samples were collected at shallow depths either above or below the waste to better understand and evaluate soil conditions at the sites.

Detailed information pertaining to the Sites and a summary of the findings of the aforementioned reports are provided below:

#### **Bunker's Creek Landfills**

- The Bunker's Creek Landfills consist of four (4) historical waste disposal sites operating between 1947 to 1964 and identified as Sites 1, 2, 3 & 7 (Attached as Figure 1):
  - Site 1 is located north of and along Vespra Street between Anne and Innisfil Streets;
  - Site 2 is located between Vespra and Perry Streets (Milligan's Pond). Investigative works completed on this Site were limited due to forest cover;
  - Site 3 is located in the area of Vespra and Innisfil Streets;
  - Site 7 is located north of Vespra Street between Innisfil and Bradford Streets;
- Waste thickness in the aforementioned areas ranged from 0.05 m to 2.59 m;
- Waste encountered ranged in depth from 1.32 metres below ground surface (mbgs) to 7.21 mbgs. The material mainly consisted of construction debris and household waste such as paper, plastic, glass, metal, fabric, organics and/or wood;
- Concentrations of boron, lead, zinc, electrical conductivity and sodium absorption ratio identified in the soil samples collected of the fill material exceed maximums established in the regulations to the Environmental Protection Act. Most of the locations sampled have a minimum of 1.2 m of cover above the top of fill and direct human contact to waste is not likely;
- Shallow groundwater exceedances of volatile organic compounds (VOC's), metals, and/or polycyclic aromatic hydrocarbons (PAHs) which are all related to buried waste were identified and limited to the identified waste fill areas;
- Local groundwater flow is towards the Creeks and ultimately the Bay. Surface water samples were collected from the Creek which identified exceedances of the MOE Provincial Water Quality Objectives for iron and vanadium; and
- Elevated levels of methane gas generated from the buried waste are present within the waste fill areas in the central or southern portions of the former landfill waste fill areas.

**Dyment's Creek Landfills**

- The Dyment's Creek Landfills consist of three (3) historical waste disposal sites operating between 1960 and 1963 and identified as Sites 4, 5 & 6 (Attached as Figure 2):
  - Site 4 is located on privately owned lands east of Sanford Street between John and Brock Streets and immediately south of Dyment's Creek;
  - Site 5 is located between Innisfil and Sanford Streets, between John and Brock Streets;
  - Site 6 is located at the dead end of Frederick Street, west of Innisfil Street and immediately north of Dyment's Creek;
- Waste thickness in the aforementioned areas ranged from 0.05 m to 4.37 m;
- Waste encountered ranged in depth from 2.24 mbgs to 7.87 mbgs. The material consisted of household waste such as paper, plastic, glass, metal, fabric, animal hides and wood and construction debris;
- Concentrations of petroleum hydrocarbons (PHCs), several PAHs and metals identified in the soil samples collected of the fill material exceed maximums established in regulations to the Environmental Protection Act. Most of the locations sampled have a minimum of 1.0 m of cover above the top of fill and direct human contact to waste is not likely;
- Shallow groundwater exceedances of sodium, chloride, VOCs, PHCs, metals, and/or PAHs which are all related to buried waste were identified and limited to the waste fill area;
- Local groundwater flow is towards the Creeks and ultimately the Bay. Surface water samples were collected from the Creek which identified exceedances of the MOE Provincial Water Quality Objectives for iron; and
- Elevated levels of methane gas generated from the buried waste were identified in Site 6. Although there are no reported elevated levels of methane gas in the vicinity of Site 4 (east of Sanford Street), historical documentation suggests reports of methane gas in close proximity to the building located at 111 Sanford Street.

The work completed to date has provided the City with detailed information pertaining to the historic waste sites such as: waste characterization; extent of waste – both vertical and horizontal; surface and ground water conditions in the areas formerly used for waste disposal; extent and concentrations of landfill gas and potential options for future remediation.

Based on the findings summarized above, the D4 Assessment Areas have been significantly reduced from the initial 500 m radius originally imposed by MMAH guideline. Figures 1 and 2 illustrate the locations of the historic waste sites, years of operation of each landfill site and current D4 Assessment Areas.

Based on findings of the initial D4 Studies and Environmental Assessments for both the Dyment's and Bunker's Creek sites, Golder provided the following recommendations:

- Confirm extent of landfill gas impact in the areas of Site 1;
- Confirm extent of waste and associated impacts on Site 4;
- Install additional gas probes at Site 6 to better assess the extent of landfill gas;
- Install a groundwater monitoring well east of Site 7 and east of Site 4 to better assess potential groundwater impacts;
- Prepare a risk assessment in areas where public accessibility is an accepted land use, such as Brock Park and Milligan's Pond area; and
- Continue monitoring of gas, surface water and groundwater conditions in these areas and re-assess once annual monitoring is complete.

Based on the findings and recommendations provided in the reports, the Environmental Operations Branch of the Environmental Services Department has proceeded with the next phase of work as approved in the 2013 Business Plan. This work includes accessing additional publicly-owned lands to better understand the existing environmental conditions and to refine the delineation work completed to

date, as well as, continued monitoring of landfill gas, surface water and groundwater associated with all seven (7) sites along both Dymont's and Bunker's Creeks. It is anticipated that this phase of work will be completed in spring 2014. Upon conclusion of these works, Staff will update Council accordingly.

The works completed to date and future works proposed have full concurrence of local MOE representatives.

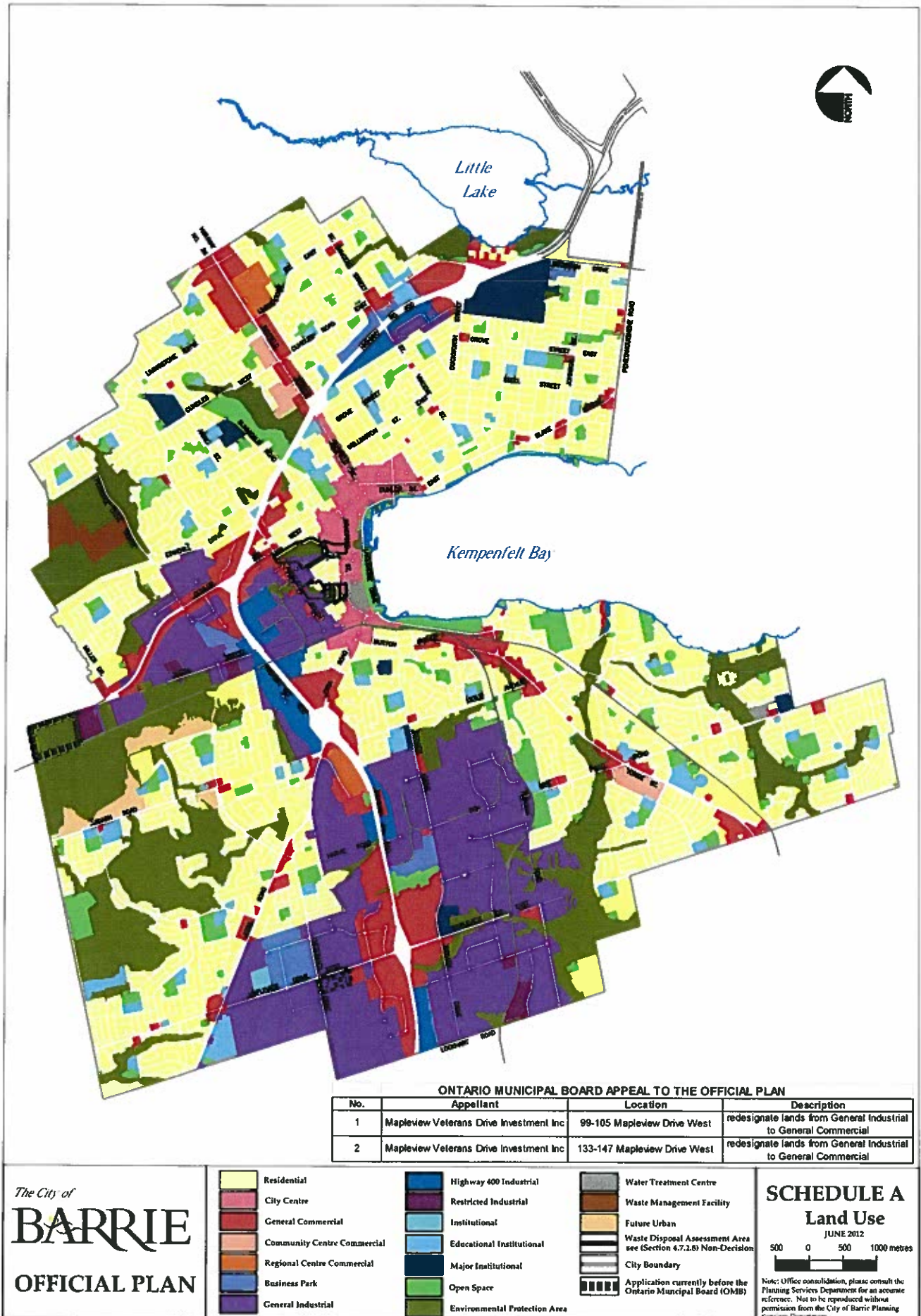
Should members of Council have any questions or require further details, please contact Sandy Coulter, Manager of Environmental Operations at extension 5826.

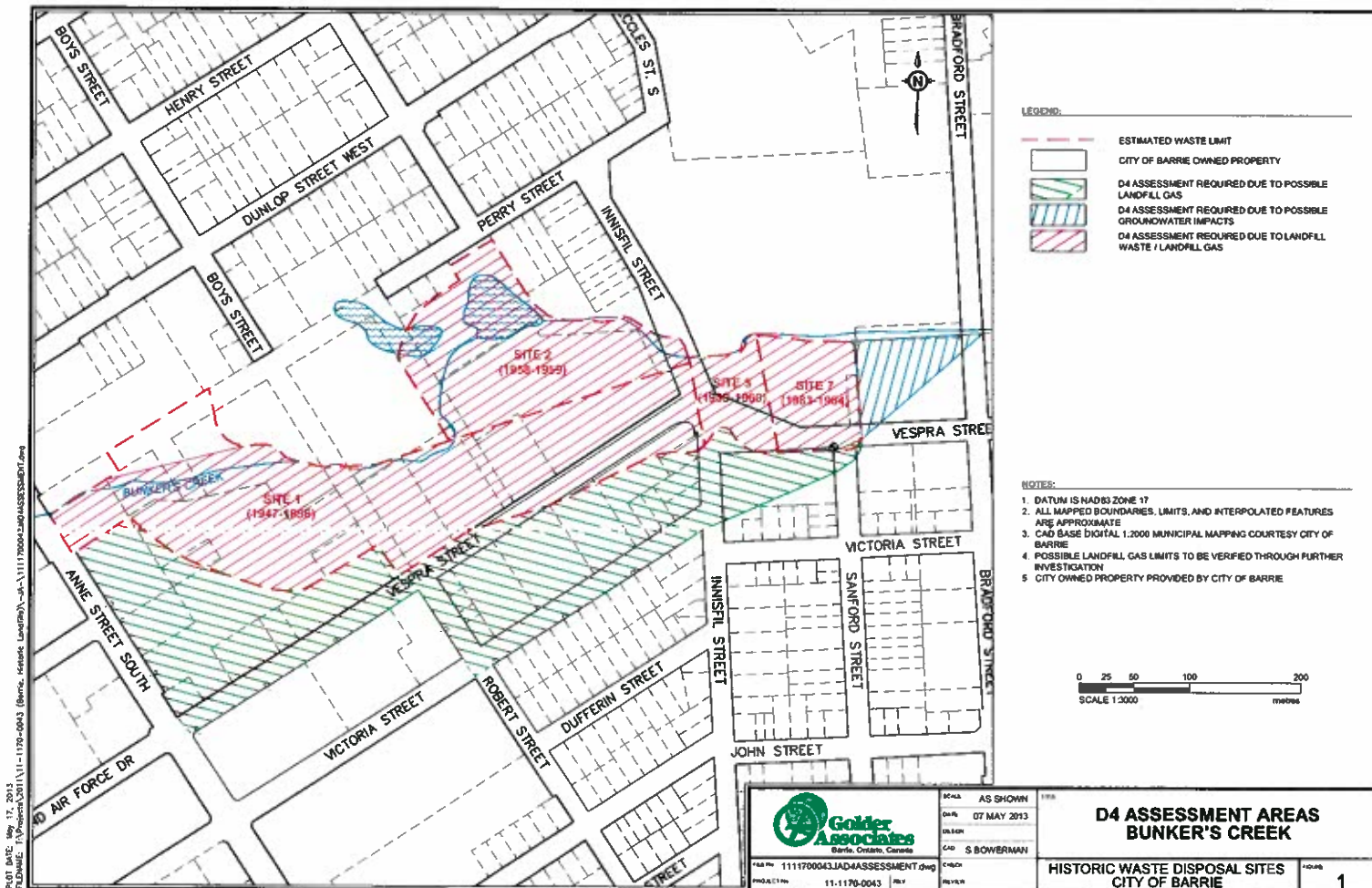


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Sandy Coulter, B.Sc.  
Manager of Environmental  
Operations

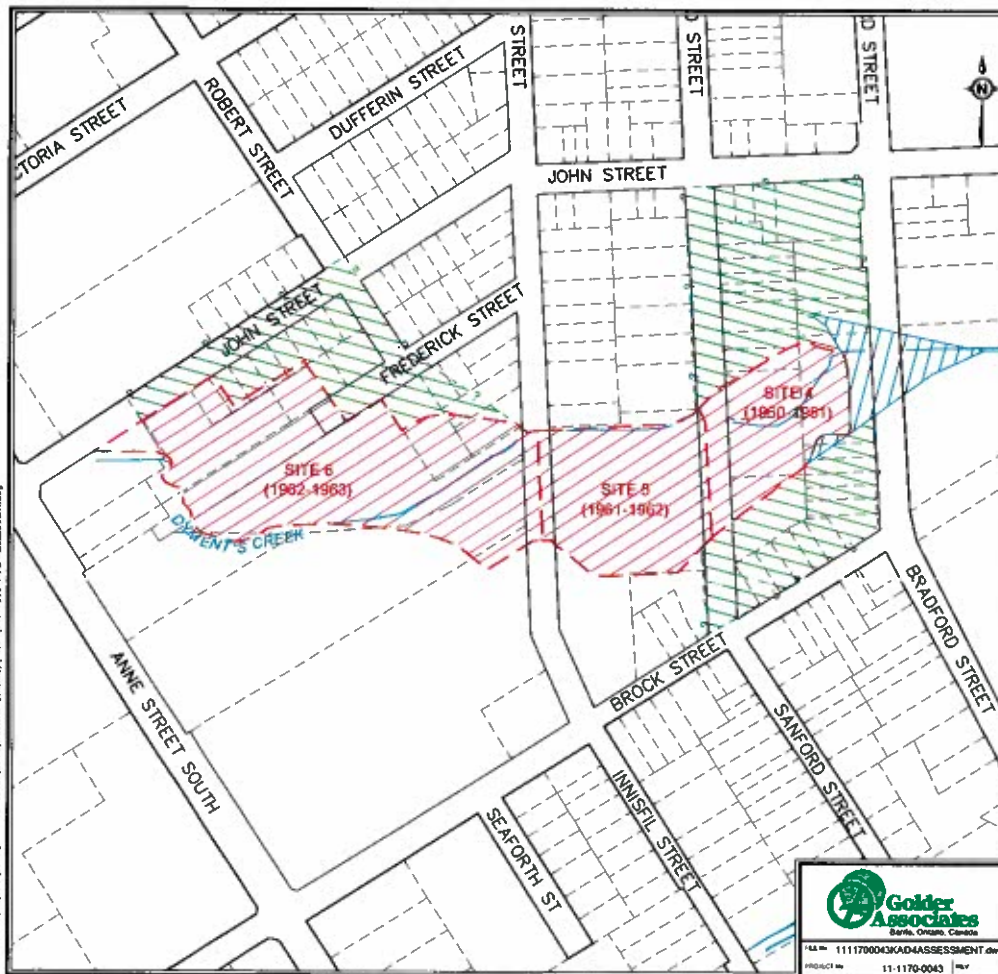








PLOT DATE: May 12, 2013  
 FILENAME: I:\Projects\2011\11-1170-0043 (Barrie, Historic Landfill) - rd-11170009.dwg\ASSSMD1.dwg



LEGEND:

- ESTIMATED WASTE LIMIT
- CITY OF BARRIE OWNED PROPERTY
- D4 ASSESSMENT REQUIRED DUE TO POSSIBLE LANDFILL GAS
- D4 ASSESSMENT REQUIRED DUE TO POSSIBLE GROUNDWATER IMPACTS
- D4 ASSESSMENT REQUIRED DUE TO LANDFILL WASTE / LANDFILL GAS

NOTES:

1. DATUM IS NAD83 ZONE 17
2. ALL MAPPED BOUNDARIES, LIMITS, AND INTERPOLATED FEATURES ARE APPROXIMATE
3. CAD BASE DIGITAL 1:2000 MUNICIPAL MAPPING COURTESY CITY OF BARRIE
4. POSSIBLE LANDFILL GAS LIMITS TO BE VERIFIED THROUGH FURTHER INVESTIGATION
5. CITY OWNED PROPERTY PROVIDED BY CITY OF BARRIE



FILE NO: 111700043\AD4ASSESSMENT.dwg  
 PROJECT NO: 11-1170-0043

SCALE: AS SHOWN  
 DATE: 07 MAY 2013  
 DESIGN:  
 CAD: S BOWERMAN  
 CHECK:  
 REVIEW:

**D4 ASSESSMENT AREAS  
 DYMENT'S CREEK**

HISTORIC WASTE DISPOSAL SITES  
 CITY OF BARRIE