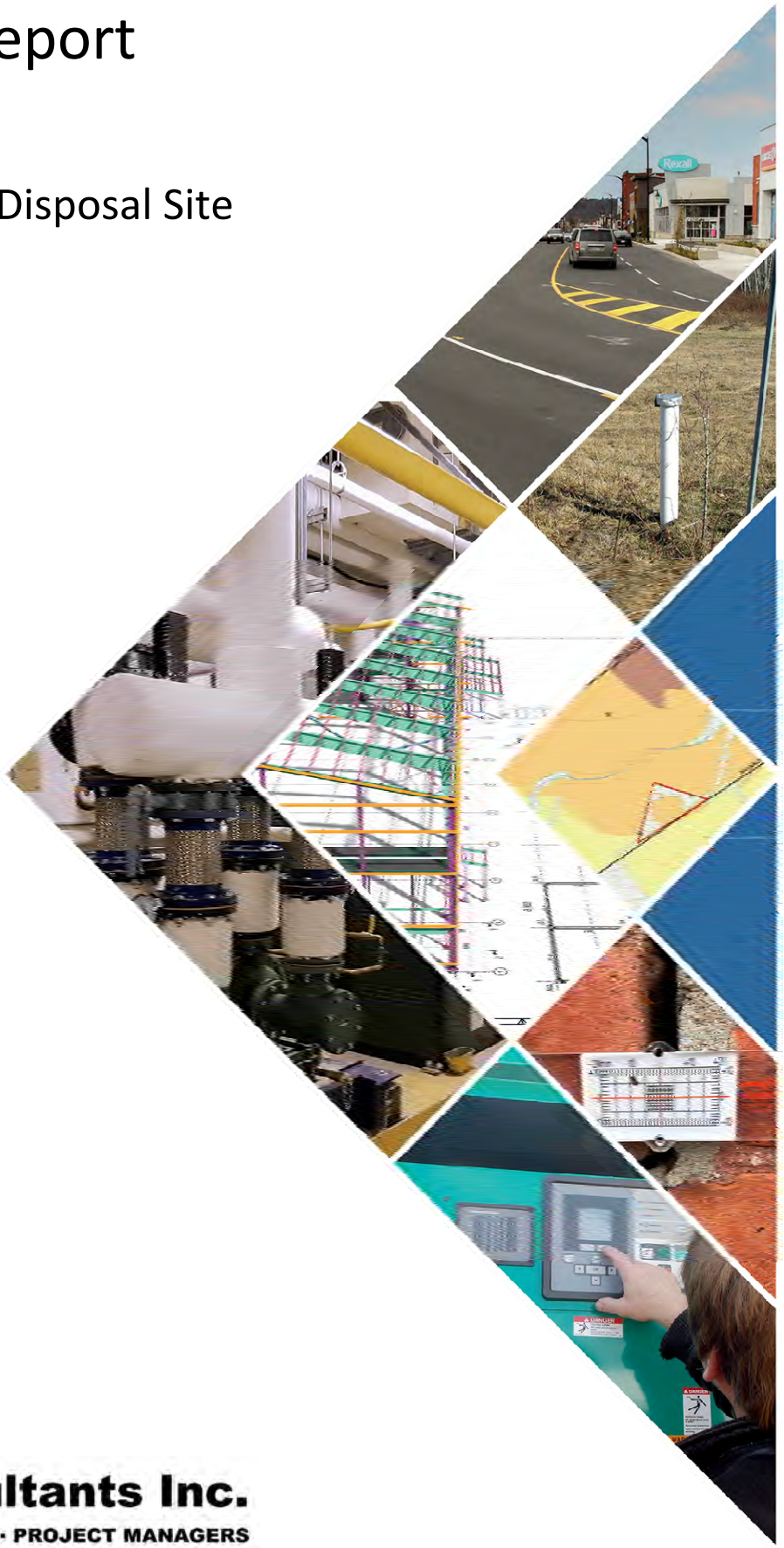
2023 Annual Report

Final

Black Donald Waste Disposal Site
ECA No. A411902

March 26, 2024

Jp2g Project # 22-6213C



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EXECUTIVE SUMMARY

Jp2g Consultants Inc. (Jp2g) was retained by the Township of Greater Madawaska to conduct the 2023 ground and surface water monitoring at the Black Donald Waste Disposal Site (WDS or landfill), located on part of Lot 9, Concession 2 and 3 within the geographic Township pf Brougham, in the amalgamated Township of Greater Madawaska, in the County of Renfrew. This annual report summarizes the results of the 2023 monitoring program. This report provides the results of the groundwater and surface water sampling that was completed at the site in June, August, and November 2023, and the results are compared to historical results dating from 2016 to 2022.

The groundwater flow direction at the site was similar to historical interpretations with predominant groundwater flow direction to the southeast of the site.

Groundwater immediately downgradient from the site at monitoring wells BH1 and BH4 are interpreted to be impacted from landfill-related activities in 2023. At monitoring wells BH1 and BH4, all parameters met the ODWQS except for field pH, alkalinity, hardness, TDS, DOC, manganese, aluminum, and iron. Results from monitoring well BH1 were interpreted to be most representative of leachate quality at the Black Donald site at this time. As per the ECA, samples were last collected for VOC analysis from BH1 in 2023, and all values were below ODWS limits. Samples are collected at BH1 every five (5) years, and the next sampling event for VOC analysis at monitoring well BH1 is scheduled for 2028.

In 2023, all parameters met the Reasonable Use Criteria (RUC) at MW08-7S, therefore the Black Donald site was interpreted to meet the intent of Ministry Guideline B-7 at the downgradient eastern CAZ boundary in 2023.
In 2023, all parameters met the Reasonable Use Criteria (RUC) at MW23-7D except for TDS and DOC during the fall sampling event. No RUC exceedances were documented in results from downgradient monitoring well BH4 in 2023 except for alkalinity, TDS, DOC, manganese, and sulphate (June only). Given the considerable distance of BH4 to the downgradient southwestern CAZ boundary (approximately 170 m), and naturally occurring concentrations of alkalinity, aluminum, DOC, hardness, manganese, and TDS in the background (BH2), the Black Donald site was interpreted to meet the intent of Ministry Guideline B-7 and was interpreted to be in compliance with RUC at the southwestern CAZ boundary.

Based on the surface water quality results in 2023, and the significant distance of each sampling location from the approved waste disposal area (AWDA) of the Black Donald site, the surface water system northeast and southeast of the Black Donald site were not interpreted to be impacted from landfill-related activities.

Based on a review of five (5) year time trend analysis for parameters un-ionized ammonia, barium, boron, chloride, chromium, COD, iron, nitrate, sodium, sulphate, TKN and total phosphorus, the Trigger Mechanism was not interpreted to be activated in 2023.

The volume of processed construction and demolition (C&D) and bulky wastes received at the site in 2022 and landfilled at the site in the fall of 2023 was approximately 850 m^3. Based on a capacity survey completed December 20, 2023, the remaining lifespan of the site based on a total remaining capacity of approximately 2718m^3 and annual landfilling rate of 857m is approximately 3 years as of December 2023, based on an average (mean) five (5) year fill rate (2018 to 2023) of 857 cubic metres. All other municipal waste generated within the Township was directed to the Township's transfer stations at the Griffith, Norway Lake, and Mount St. Patrick Waste Disposal Sites for management.

Based on Township of Greater Madawaska records, no C&D and bulky wastes were received at the Black Donald Waste Disposal Site in 2023.

2024 Monitoring Recommendations

In view of 2023 and historical results, Jp2g does not recommend any changes to the monitoring program in 2024 other than sampling the newly installed wells. Ground and surface water should continue to be sampled bi-annually (May/June and October/November) for the same list of parameters as analyzed in 2023.

1 INTRODUCTION

This report was prepared by Jp2g Consultants Inc. (Jp2g) for the purposes of presenting and interpreting the results of the 2023 ground and surface water monitoring program completed at Black Donald Waste Disposal Site (WDS). The site is located centrally in the Township of Greater Madawaska, and according to the Township's long- term waste management plan, the Black Donald WDS was identified for the landfilling of waste received from the Griffith, Norway Lake, and Mount St. Patrick transfer stations. The site was closed to the public on April 5, 2010, with disposal operations available for municipal vehicles and Township-approved haulers only for construction and demolition (C&D) and bulky wastes, with other municipal waste generated within the Township directed to the Township's existing transfer stations for transfer and disposal to GFL Environmental Inc.

Jp2g Consultants Inc. completed the environmental monitoring program in 2023, previously Greenview Environmental provided this service. For consistency in reporting, details previously provided by Greenview (2023) have been repeated in part or in whole in this report.

1.1 Site Location

A detailed description of the site location is as follows:

- The site is located on part of Lot 9, Concession 2 and 3 within the geographic Township of Brougham, in the Township of Greater Madawaska as shown on **Figure 1**.
- The civic address of the site is 34 Hydro Dam Road.
- The site coordinates are:
    - 45°14’00” N 76°52’13”W
    - NAD 1983 UTM Zone 18 – 353188E 5010581N
- Access to the site is provided by Hydro Dam Road, located off County Road 508, approximately fifteen (15) kilometers (km) southwest of the Village of Calabogie.
- The site is situated on Township-owned lands and consists of a 1.2-hectare (ha) waste disposal site within a total licensed property area of 21.36 ha, inclusive of lands used for operational buffer and contaminant attenuation zone (CAZ) purposes.
- The site is operated as a solid waste landfill for the Township of Greater Madawaska (Township) under Environmental Compliance Approval (ECA) A411902 as most recently amended on January 24, 2013. A copy of the ECA is included in **Appendix A**.

1.2 Site Ownership and Key Personnel

Site operations are directed by the Township of Greater Madawaska. Contacts for the municipality and the Competent Environmental Practitioner (CEP) for both groundwater and surface water as defined by the Ministry (2010) are as follows:

Municipal Contact
Township of Greater Madawaska
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CEP Contact
Jp2g Consultants Inc.
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Sr. Hydrogeologist
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Email: andrewb@jp2g.com

1.3 Description and Development of the Waste Disposal Site

The following section provides a general description of the site, including operational details:

Environmental Compliance Approval:
The site operates under ECA No. A411902 dated March 27, 1980 as amended October 22, 2001, July 12, 2002 and January 24, 2013 (**Appendix A**).

Site Status:
The site is currently operational, with disposal operations available for municipal vehicles and Township-approved haulers only for construction and demolition (C&D) and bulky wastes.

Site Capacity:
Under Condition 18 of the current ECA, the approved total waste disposal volume is 46,785m^3.

Projected Site Life:
Based on a capacity survey completed December 20, 2023 the remaining lifespan of the site based on a total remaining capacity of approximately 2718m^3 and annual landfilling rate of 857m is approximately 3 years as of December 2023.

Area of current waste cell footprint and approved footprint:
The current ECA recognizes a 1.2 ha landfilling area within a total site area of 21.36ha.

Dates when the site opened, operated and closed as applicable:
The site was opened in the 1960's and ceased receiving municipal solid waste and was closed to the public on April 5, 2010. Under the current ECA the site receives construction and demolition (C&D) and bulky wastes.

Information on final cover, slopes and engineering controls:
Details are found in the Site Design, Operations and Development Plan dated December 22, 2010 (Greenview 2010). Final cover was applied to portions of the landfill site and the side slopes.

Any Permits To Take Water associated with the site:
There are no permits to take water associated with the site.

Other authorizing and/or control instruments associated with the site:
There are no storm water management facilities associated with the site.

Description of any leachate collection systems; and any sewage works, including the C of A number of the works:
The Black Donald Waste Disposal Site is designed for the natural attenuation of leachate. There are no collection systems or sewage works at the site.

Any site developments which occurred during the year of the monitoring report:

- Three (3) new monitoring wells were installed in 2023 (BH23-7D, BH23-8S, and BH23-8D) to support an application to expand the capacity of the landfill site.

Any new developments in the vicinity of the site of relevance from a monitoring perspective:
None.

Historical Site Overview

Environmental Baseline Investigations which were undertaken:
Investigations of the Black Donald Waste Disposal Site have been carried out since 1999. Reports have been submitted annually to the Ministry.

Design and Construction of the Site:
The site design, development and operational requirements for the current waste disposal site are outlined in Greenview (2010) listed as item 7 in Schedule A of the ECA.

Development of environmental monitoring systems:
Environmental monitoring is conducted annually in accordance with Condition 26 and Schedule "B" of the ECA and recent TSS review comments on the expansion feasibility study.

Conceptual site model:
Infiltrating groundwater at the site will migrate vertically through more porous overburden material until intersected by the shallow groundwater table over bedrock. Groundwater flow is governed by local topography predominantly to be downhill to the southeast and southwest.

Initial placement of waste materials:
Within the 1.2 landfilling area.

Filling, closure and placement of final cover over waste cells:
The processed C&D and bulky waste is ground on site and is applied to the waste mound as cover as required.

Problems associated with of final cover over waste:
There have been no documented issues with operation of the waste disposal site. On occasion there has been Fill Beyond Approved Limits (FBAL) which has been addressed with the site operator.

Date of site closure, actual or projected, including any closure plans:
There are no closure plans. The Township wishes to expand the capacity.

1.4 Ministry Consultation

Further to the Ontario Ministry of the Environment, Conservation, and Parks (MECP and or the Ministry) Technical Support Section (TSS) groundwater review comments (March 17, 2008) three (3) additional monitoring wells were installed at the Black Donald WDS in June 2008 to more adequately interpret groundwater quality southeast, southwest and west of the site, and to establish the site's conformance with the Reasonable Use Concept (RUC) and Guideline B-7 near the site and CAZ boundaries. One of the new monitoring wells (MW08-6) was installed west of the site on Crown Land, with authorization from the Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (Greenview, 2023).

On November 16, 2010, the Township responded to the Ministry regarding the Township's intent to submit an application to amend the ECA and supporting technical documentation in the form of a *Design, Operations and Development Plan* (DOOP) for the Black Donald WDS by December 31, 2010 (Greenview, 2023). On December 22, 2010, the Township submitted the DOOP (Greenview, 2023) to the Environmental Assessment and Approvals Branch (EAAB) and the Ottawa District Office, and confirmation of receipt was received by the Township from the Ministry on January 17, 2011. The Township received surface and groundwater review comments dated April 30, 2012 and May 30, 2012, respectively. The Ministry TSS accepted the surface water and groundwater Trigger Mechanisms presented in the DOOP (Greenview, 2023).

In addition, the Township received a request for additional information with respect to the DOOP application from the Ministry's Operations Division, in correspondence dated May 2012. The Township provided a response to the Ministry to address TSS surface water and groundwater review comments and the request for additional information. The application to amend the ECA and approve the DOOP for the Black Donald was approved by the Ministry with an Amendment to the ECA, issued January 24, 2013 (Greenview, 2023).

The Black Donald WDS was inspected by the Ministry Ottawa District Office on May 26, 2015, and a related Inspection Report was provided to the Township dated July 6, 2015. Action items were required by the Inspection Report, and the Township provided a Compliance Action Plan to the Ministry dated October 1, 2015. The Township committed to completion of the compliance items in accordance with the dates identified in the Compliance Action Plan. All actions were understood to have been completed by November 15, 2015 (Greenview, 2023).

As part of the 2015 Annual Report, the Township requested that the Ministry consider removing the requirement for surface water sampling as part of the environmental monitoring program for the Black Donald WDS, given that historical surface water quality data was not interpreted to be impacted by landfill-related activities. The Ministry at this time recommended that surface water monitoring continue consistent with historical practices. A subsequent letter from the Ministry Ottawa District Office dated July 7, 2016, reiterated that surface water monitoring should continue as part of the annual environmental monitoring program for the Black Donald site (Greenview, 2023).

On October 16, 2019, the Township received an Inspection Report from the Ministry's Ottawa District Office regarding the Black Donald site. The Inspection Report included action items to be addressed by the Township and accordingly an Action Plan was prepared (Greenview dated November 25, 2019) and submitted to the Ministry Ottawa District Office on November 26, 2019. Confirmation of completion of the action items was received from the Ministry dated February 6, 2020. As part of the response, the Township was required to submit photographs to the Ministry in accordance with their request. The Township submitted their response to the Ministry Ottawa District Office on February 14, 2020, which was approved by the Ministry in an electronic communication dated February 18, 2020 (Greenview, 2023).

An Inspection Report dated November 21, 2022 was received by the Township from the Ministry Ottawa District Office. The only issue of concern was that the site may not have the remaining capacity as stated in the 2021 Annual Report prepared by Greenview (2022), the Inspection Report was not acknowledged by Greenview (2023). A copy of the Inspection Report is included in **Appendix B**.

The Township retained Jp2g to determine the feasibility of expanding the capacity of the Black Donald WDS. An Expansion Feasibility Study dated October 25, 2022, was filed with the Ministry Ottawa District Office. Ministry Technical Support Section comments (Groundwater January 6, 2023, and Surface Water January 11, 2023) were addressed by Jp2g in a letter dated January 23, 2023. Jp2g filed a follow up letter dated December 29, 2023, describing the activities completed to support the expansion including additional monitoring well installation, enhanced monitoring program and assessment of surface water control requirements. Copies of this documentation are included in **Appendix B**.

1.5 Purpose and Scope

The purpose of this report is to provide an overview of the annual monitoring, environmental compliance, and operations at the Black Donald WDS, in accordance with Condition 27 of the ECA (A411902), including the following:

- Groundwater quality assessment and RUC (Guideline B-7) compliance
- Surface water quality assessment
- Trigger Mechanism review
- Site operational overview and capacity assessment.
- Preparation of an annual report that summarises the results of the monitoring program and submitting the report to the Ministry.

1.6 Assumptions and Limitations

In preparing this annual monitoring report, Jp2g has relied on information provided by the Township of Greater Madawaska and details provided in the 2022 Annual Landfill Monitoring Report (Greenview Environmental, 2023).

2 SITE DESCRIPTION

The following sections present a summary of the physical characteristics for the Black Donald WDS and is based in part on the descriptions in the Annual Monitoring Reports 2008-2022 prepared by Greenview (2009-2023). The Black Donald site is bordered on the south and east by forested lands, and by a utility corridor to the west as shown on **Drawing 1** and **Figure 2**.

2.1 Topography and Drainage

The site is located on a topographic bedrock high with slopes extending from the waste pile to the southeast and east towards Hydro Dam Road. Topography south and west of the site slopes to the south and then east towards Hydro Dam Road as shown on **Drawing 1**.

Surface water drainage patterns at the site were altered in 2001 with the construction of drainage ditches along the northeastern boundary of the site adjacent to Hydro Dam Road and at the southwest corner of the site. The drainage ditches were constructed in the fall of 2001 to avoid on-site surface water ponding and to promote runoff. Historically, surface water at and adjacent to the site was monitored three (3) times annually, in the spring, summer, and fall, at seven (7) established surface water monitoring locations. Following receipt of TSS surface water review comments in October 2009, three (3) surface water locations were removed from the

environmental monitoring program (Greenview, 2023). In 2023 two (2) surface water monitoring locations were removed from the environmental monitoring program as requested by Jp2g October 25, 2022 and approved by the Ministry January 11, 2023. As part of the expansion design, new surface water monitoring locations representative of run-off from the landfill site may be established. Relevant correspondence provided in **Appendix B**.

2.2 Hydrogeological Conditions

The Black Donald site is located on terrain consistent with rugged aspects of the Canadian Shield. Groundwater flow is governed largely by local topography and the presence of a dense bedrock unit beneath a more permeable overburden unit (Gartner Lee, 1999). The predominant pathways of groundwater flow were interpreted to be downhill towards to the southeast and southwest.

Overburden geology at the Black Donald Waste Disposal Site is characterized by a thin veneer of sandy overburden materials, approximately 0.3 to 1.5 metres (m) in thickness, overlying a fractured marble bedrock unit (Golder, 2007). Bedrock outcrops, knolls, and knob hills are prevalent in the vicinity of the Black Donald site, which confirms the shallow nature of overburden soils and the proximity of the bedrock contact to surface near the site (Gartner Lee, 1999).

A site reconnaissance was conducted further to the Ministry TSS groundwater review comments dated December 18, 2006. Following approval from the MNRF to install a monitoring well on Crown Land to the northwest of the site, monitoring well (MW08-6) was installed on June 5, 2008, to assist in establishing the site's conformance with Guideline B-7 at the western CAZ boundary. Monitoring wells MW08-5 and MW08-7 were installed on June 5, 2008, to the southwest and southeast of the site to assess conformance with the Ministry Guideline B-7 at the respective CAZ boundaries. MW08-7 was extended 7.5m into a sand and gravel deposit. All other monitoring wells were installed through a thin sand overburden layer into bedrock.

Historical groundwater elevations recorded at the site indicate that a shallow groundwater divide is present in the vicinity of the waste mound and that predominant directions of groundwater flow are to the southeast and southwest (Golder, 2007; SGS Lakefield Research Ltd. [SGS], 2005). In 2008, an eastward trending groundwater flow direction was interpreted in the vicinity of MW08-6. Based on the upgradient location of MW08-6 relative to the waste mound, groundwater quality at MW08-6 was interpreted to be characteristic of background groundwater quality at the site. A north-south oriented groundwater basin was also interpreted to exist in the vicinity of BH4 and MW08-5, based on groundwater elevations and contours measured and calculated from field measurements.

2.3 Land Use

The Black Donald WDS is designated as Active Waste Disposal Site on Schedule "A", of the County's Official Plan. Adjacent land use is designated as Rural, Mineral Aggregate and Crown Land. On Schedule "B" of the Township of Greater Madawaska Zoning By-Law the site is zoned as Waste Disposal (WD) and Extractive Industrial (EM). A utility corridor with an overhead electricity transmission line exists west of the site, in a northeasterly-southwesterly orientation.

There are no residential drinking water or commercial wells near the Black Donald WDS. The closest residential well is located approximately 700 m northwest and upgradient of the site, on Black Donald Road.

2.4 Operational Setting

The Black Donald WDS currently consists of a 1.2 ha waste disposal site within a total licensed property area of 21.36 ha, inclusive of lands used for operational buffer and CAZ purposes as shown on **Figure 2**. The Black Donald WDS was closed to the public for waste and recycling operations on April 5, 2010 as detailed in correspondence to the Ministry dated March 9, 2010 regarding a waste management plan update from the Township.

The Black Donald WDS is approved to accept waste from the entire Township, and currently operates as an active waste disposal site receiving municipal C&D and bulky wastes for processing and disposal. As part of the waste management plan for the site, disposal operations at the site are currently available for municipal vehicles and Township-approved haulers only, under the supervision of Township operations staff. Bentonite clay material was emplaced at the site and used for regular and/or final cover in 2021. In 2023 no waste was accepted at the site, only C&D and bulky waste stockpiled from 2022 was ground and landfilled.

3 ENVIRONMENTAL MONITORING PROGRAM

3.1 Monitoring Locations

Table 1 summarizes the location of monitoring wells and surface water monitoring stations. All monitoring locations including groundwater wells and the surface water monitoring stations are provided in **Figure 2**. Borehole logs are provided in **Appendix C**, and **Appendix D** contains photographs of the wells and surface water monitoring stations in Fall 2023.

3.1.1 Groundwater Monitoring Locations

Seven ground water wells were installed at and around the Black Donald WDS in 2001, 2002, 2008, and 2023. Details are as follows:

- **Monitoring Well BH1**
  A bedrock well at a depth of 8.83 m located approximately 25 m east and downgradient of the landfilling area on the northwest side of Hydro Dam Road.
- **Monitoring Well BH2**
  A bedrock well at a depth of 7.91 m located north and upgradient of the site.
- **Monitoring Well BH3**
  A bedrock well at a depth of 8.83 m. This well was destroyed by site equipment in 2021 (Greenview, 2023). No samples were collected from this well in spring and fall 2023.
- **Monitoring Well BH4**
  A bedrock well at a depth of 7.80 m located adjacent to the western corner of the landfilling area. It is interpreted to be located downgradient of the waste mound and in the immediate direction of the western portion of groundwater flow from the site.
- **Monitoring well MW08-5**
  A bedrock well at a depth of 13.52 m situated approximately 140 m southwest of the landfilling area, and approximately 15 m from the western CAZ boundary in an area of elevated topography.

- **Monitoring Well BH08-6**
  A bedrock well at a depth of 23.8 m on Crown land approximately 90 m west and upgradient of monitoring well **BH4.** This well was installed in 2008 to determine whether impacts resultant of landfill-related activities were occurring west of the site. This location was subsequently interpreted to be upgradient of the direction of flow and more representative of background conditions.
- **Monitoring Well BH08-7S**
  An overburden well at a depth of 8m located approximately 180 m southeast and downgradient of the landfilling area, along the eastern CAZ boundary (installed in 2008).
- **Monitoring Well BH23-7D**
  A bedrock well at a depth of 16.56 m located approximately 180 m southeast and downgradient of the AWDA, along the eastern CAZ boundary, was installed in November 2023.
- **Monitoring Well BH23-8S**
  A bedrock well at a depth of 14.35 m located approximately 40 m southwest of the landfilling area, was installed in November 2023.
- **Monitoring Well BH23-8D**
  A bedrock well at a depth of 20.5 m located approximately 40 m southwest of the landfilling area, was installed in November 2023.

3.1.2 Surface Water Monitoring Locations

As part of the spring, summer and fall 2023 surface water sampling events, physical characteristics of sampling locations SW4 (background), SW5 were recorded. SW3 and SW6 were removed from the 2023 Sampling events. Historically, SW3 and SW6 have not been interpreted to be impacted by landfill related activities (Greenview, 2023), and results from SW3 and SW6 were interpreted to be generally consistent with background surface water quality results at SW4.

In 2023, surface water samples were collected at two locations:

- **Monitoring Location SW4**
  Background surface water station located approximately 500 m northeast and upstream of the AWDA of the Black Donald site.

- **Monitoring Location SW5**
  Surface water location SW5 was relocated prior to the 2007 surface water monitoring program as per the Ministry TSS surface water review comments (Greenview, 2023). SW5 was relocated downstream of SW4, at a wetland area northeast of the site, at approximately the mid-point between background location SW4 and the furthest downstream sampling location SW3, and approximately 600 m southeast of the AWDA of the Black Donald Site.

3.2 Monitoring Procedures and Methods

All sampling was completed in general accordance with Jp2g Consultants Inc. standard operating procedures. Sampling methods and quality assurance measures are summarized and provided in **Appendix E**.

3.3 Monitoring Program 2023

Three (3) environmental monitoring events were completed by Jp2g in 2023 (June 21, August 31, and November 2). Ground and surface water sampling was completed in June and November and surface water sampling only was completed in August. The monitoring included the collection of groundwater levels and the collection of water quality samples from selected ground and surface water monitoring stations. **Table 2** summarizes the sampling completed in 2023.

During the spring and fall 2023 sampling events, MW08-5 was documented to have insufficient groundwater for sampling purposes. MW08-5 has not been sampled due to low water conditions since October 2008. Monitoring well BH3 was observed to have been destroyed in fall 2021 (Greenview, 2023).

Three (3) new monitoring wells were installed in November 2023 in support of an application to amend the ECA for additional landfilling capacity. Details will be included with the application.

Based on the approved groundwater monitoring program for the Black Donald site, analysis of volatile organic compounds (VOCs) is conducted every five (5) years and accordingly sample analysis for VOCs was completed in the spring of 2023. The next sampling event for VOCs is scheduled for 2028.

3.4 Analytical Laboratory Accreditation

Groundwater and surface water samples were submitted for analysis to the Caduceon Environmental Laboratories (Caduceon), located in Ottawa, Ontario. Caduceon is accredited by the Canadian Association for Laboratory Accreditation (CALA), for specific environmental testing procedures listed in the scope of accreditation and is assessed biannually by CALA to the ISO/IEC 17025 standard. ISO/IEC 17025 is an international standard for both quality management and technical aspects of operating a testing laboratory. Caduceon is licensed by the Ministry to perform analysis on drinking water in Ontario in accordance with the Safe Drinking Water Act.

3.5 Landfill Gas Monitoring

Landfill gas monitoring is not part of the current environmental monitoring program for the site. The waste mound at the Black Donald WDS is covered with porous soil materials, allowing natural gas flux to the atmosphere. These overburden and bedrock characteristics, coupled with the extended distance to the nearest residence, provide a minimal risk of landfill gases impinging off-site receivers.

3.6 Operational Monitoring

Operational monitoring at the Black Donald site by Township staff is conducted regularly to document routine waste disposal activities at the site. As no waste was received in 2023 no records are available.

Jp2g attended the site on various occasions with Township staff and a topographic survey was completed on December 20, 2023, which was used to determine the current capacity status at the site.

The Township submits annual reports in accordance with the Municipal Data call, inclusive of the Black Donald site, to the Resource Productivity and Recovery Authority (RPRA).

4 ENVIRONMENTAL MONITORING RESULTS

4.1 Historical Data

Historical static water level and sampling results are presented in earlier reports completed by Greenview Environmental and are summarized in **Appendix F.**

4.2 Groundwater Flow Monitoring

Static water levels were measured in June and November 2023, and are summarized in **Appendix G**. Ground water flow patterns are provided in **Figures 3a** and **3b** for the June and November sampling events respectively. The water levels were referenced to a local datum. While there are minor fluctuations in the water levels, the overall direction of groundwater flow is consistent with historical measurements. Historically, it was speculated that an east/west groundwater divide is present in the vicinity of the waste mound, with groundwater flow to the east, west, and to the southeast (Greenview, 2023).

In 2023, the interpreted groundwater flow at the site was interpreted to be consistent with historical results, as groundwater was interpreted to flow generally to the southeast of the CAZ boundary.

4.3 Groundwater Quality Assessment

4.3.1 Groundwater Assessment Criteria

Groundwater at landfill sites is generally assessed with regard to the criteria specified in the Ontario Drinking Water Quality Standards (ODWQS). The ODWQS is split into health and non-health related parameters. Non-health related parameters are in turn split into aesthetic objectives and operational guidelines.

4.3.2 Groundwater Quality 2023

The accredited laboratory Certificates of Analysis are presented in **Appendix H,** and the results of the 2023 groundwater monitoring program are presented in **Appendix I**. Analytical data were compared to the Ontario Drinking Water Standards (ODWS; MECP, 2006) and Ministry Guideline B-7 and RUC (Ministry, 1994a).

Historically, background groundwater quality was calculated using the median of the previous ten (10) sampling events results from background monitoring wells BH2 and MW08-6. In 2023, the median of the previous ten (10) sampling event results from background monitoring well BH2 was used to determine background groundwater quality at the site.

Background Monitoring Well BH-2

In 2023, all parameters met the ODWQS at BH-2. High aluminum, dissolved organic carbon (DOC), and hardness concentrations have been documented in historical results at this location. High hardness concentrations are likely due to the underlying marble bedrock as identified through borehole logs for the majority of wells, and from local bedrock exposure in the vicinity of the site. Similarly, high aluminum and DOC concentrations were interpreted to be result of naturally- occurring conditions and/or off-site sources in the vicinity of the site.

Monitoring Well BH08-6

In 2023, all parameters met the ODWQS at BH08-6. The high historical concentrations for aluminum, DOC, and hardness, and to a lesser extent iron and manganese at MW08-6 (and BH2) were interpreted to be due to the natural environment conditions in the area and/or off-site sources upgradient of the site.

Monitoring Well BH1

In 2023, all parameters met the ODWQS except for Field pH (June only), alkalinity, Hardness (November only), TDS, DOC, manganese, and iron (November only). Groundwater at BH1 was interpreted to be the most representative of leachate quality at the Black Donald site. Consistent with historical assessments (Greenview, 2023), groundwater in the vicinity of BH1 was interpreted to be impacted from landfill-related activities at the site. High parameter concentrations were expected given the location of the monitoring well immediately downgradient of the waste mound. Given the proximity of BH1 to Hydro Dam Road, impacts related to winter road maintenance activities were also interpreted in groundwater quality results at BH1.

Monitoring Well BH3

No samples were collected from BH3 in 2023. The well was destroyed by site equipment in 2021 (Greenview, 2023). The sampling of this well is not critical at this time and the well should be properly decommissioned in accordance with Regulation 903.

Monitoring Well BH4

In 2023, all parameters met the ODWQS except for Field pH (June only), alkalinity, hardness, TDS, DOC, manganese, and aluminum (June only). Based on 2023 results, groundwater at BH4 was interpreted to be impacted by landfill-related activities: however, to a lesser extent than at leachate monitoring well BH1.

Monitoring Well BH08-5

MW08-5 was observed to have insufficient groundwater for sampling purposes during the spring and fall 2023 sampling events, and groundwater samples could not be collected.

Monitoring Well BH08-7S (Historically MW08-7)

In 2023, all parameters met the ODWQS at MW08-7S. When compared with groundwater results from BH1, that is located immediately downgradient from the waste mound, and interpreted to be impacted by the waste disposal site, results from MW08-7S in 2023 suggest that significant attenuation is occurring between BH1 and the eastern CAZ boundary. No significant impacts related to the waste disposal activities were interpreted to be occurring in the vicinity of MW08-7S in 2023.

Monitoring Well MW 23-7D

Monitoring well MW23-7D was installed in November 2023, and is located approximately 180 m southeast and downgradient of the AWDA, along the eastern CAZ boundary. During the fall 2023 sampling event, all parameters met the ODWQS except for DOC.

Monitoring Wells MW23-8S&D (Installed in Nov. 2023)

Monitoring wells MW23-8S&D were installed in November 2023, and located approximately 40 m southwest of the landfilling area. During the fall 2023 sampling event, both wells were dry, and groundwater samples could not be collected.

VOC Sampling

Testing for VOC was completed in 2023 (Schedule B of the ECA). VOCs were sampled for all wells during the 2023 spring event and all parameters were below the reporting limit of the laboratory analysis (R.L.). The next sampling event for VOC at the Black Donald WDS is scheduled for 2028 (**Table 7**).

4.3.3 Reasonable Use Concept Assessment

The Reasonable Use Concept was developed by the Ministry to address the levels of off-site contaminants that are considered acceptable. The Reasonable Use Criteria allows for the definition of the level of contamination in the groundwater beyond which mitigative action should be undertaken. The acceptability of the landfill in terms of its impact on groundwater has been assessed in terms of the Reasonable Use Criteria (RUC). The RUC established the acceptability of change in groundwater quality (C_m) as follows:

Aesthetic Parameters

Degradation of less than 50% of the difference between the background quality and the established objective for the particular health related parameter.

Health Related Parameters

Degradation of less than 25% of the difference between the background quality and the established objective for the particular health related parameter. Acceptable concentrations are based on background levels and water quality guidelines (i.e. drinking water objectives).

The chosen background values are utilized to calculate the RUC allowable concentrations for specific parameters, as per the following formulas:

Health Related: $C_{allow} = P_b + (C_m - P_b) \times 25\%$

Non-Health Related: $C_{allow} = P_b + (C_m - P_b) \times 50\%$

where:

C_{allow} = Maximum allowable concentration of parameter as per the RUC guidelines.

C_m = Maximum acceptable concentration (MAC) of parameter as per the ODWS/OG.

P_b = Chosen background value of parameter

For the purposes of determining the Reasonable Use Concept (RUC) criterion at the property boundary, groundwater quality from monitoring well **BH2** is considered to be a representative of background conditions at the site. Historically, background groundwater quality was calculated using the median of the previous ten (10) sampling events results from monitoring wells **BH2** and **MW08-6**. In 2023, the median of the previous ten (10) sampling event results from background monitoring well **BH2** was used to determine background groundwater quality at the site.

Table 3 outlines the median calculation for background concentrations, and **Table 4** outlines the Reasonable Use Criteria.

4.3.4 Reasonable Use Conclusions 2023

The reasonable use conclusions and the indicator parameters that exceed the RUC for the June and November 2023 sampling events are presented in **Table 5.** Based on the direction of groundwater flow, the RUC assessment at the southwestern CAZ boundary should be conducted using results from monitoring well MW08-5. However, since MW08-5 could not be sampled in 2023, monitoring well BH4 that is located upgradient of MW08-5 was used as an indication of compliance with RUC and conformance with Ministry Guideline B-7. Monitoring wells MW08-7S & MW23-7D which are located approximately 180m southeast and downgradient of monitoring well BH1 are also used to assess compliance with Guideline B-7.

BH4:
Results indicate that the following parameters to exceed the RUC criteria in 2023.

boron and sulphate (June only)
alkalinity, TDS, DOC and manganese (June and November)

The noted RUC non-conformances at BH4 in 2023 were generally consistent with historical results (**Appendix F**) and were interpreted to be partially resultant of landfill-related activities, naturally occurring conditions and/or off-site sources upgradient of the site. Groundwater quality results in 2023 at BH4 were interpreted to be of improved quality in comparison to recent years.

MW08-7S:
Results indicate that all parameters met the RUC criteria in 2023.

MW23-7D:
Results indicate that all parameters met the RUC criteria in November 2023 except for TDS and DOC.

The noted RUC non-conformance for DOC in fall 2023 is attributed to naturally occurring conditions upgradient of the site and/or off-site sources, and not to landfill-related factors.

4.4 Surface Water Quality Assessment

4.4.1 Surface Water Assessment Criteria

Surface water at landfill sites is generally assessed with regard to the criteria specified in the Provincial Water Quality Objectives (PWQO). The PWQOs are a set of ambient surface water quality criteria. In addition to the PWQOs, surface water quality results are, where relevant, compared to select Canadian Water Quality Guidelines (CWQGs).

4.4.2 Surface Water Monitoring 2023

Photos of the monitoring stations are included in **Appendix D,** the accredited laboratory Certificates of Analysis are presented in **Appendix H,** and the results of the 2023 surface water monitoring program are presented in **Appendix I**. All surface water monitoring stations are provided in **Figure 2.**

Background surface water quality was determined using the 75th percentile of a minimum of the previous ten (10) sampling events from SW4.

Monitoring Location SW4

This station was dry during summer and fall 2023 sampling events. In June 2023, all parameter concentrations were below the PWQOs and other ambient surface water criteria.

Consistent with historical results, surface water quality at SW4 was interpreted to be representative of background surface water quality at the site. Background surface water quality at this location has been observed to have historically high concentrations of phenols, phosphorus, and zinc, and low DO concentrations, attributed to naturally occurring conditions and/or off-site sources.

Monitoring Location SW5

Beaver activity in the vicinity of SW5 has historically been observed; however, no specific beaver activity was noted in the vicinity of SW5 in 2023. In 2023, all parameter concentrations were below the PWQOs and other ambient surface water criteria except for phosphorous and iron during summer sampling event, and field pH during fall sampling event.

Historically, SW5 has not been interpreted to be impacted by landfill related activities (Greenview, 2023), and in 2023 the noted PWQO non-conformances in results were interpreted to be consistent with expected results in a low to no-flow wetland environment. Given the significant distances of the surface water sampling locations (SW4 and SW5) from the Black Donald site, impacts as a result of the landfill site are not anticipated.

In 2023, no parameter concentrations at SW5 were above 75th percentile background surface water quality except as indicated in **Table 6** and include:

- June: Chemical oxygen demand COD.
- August: Phosphorus, iron, barium, COD, and total kjeldahl nitrogen (TKN).
- November: Sulphate

4.5 Trigger Mechanism Review

The review of the groundwater and surface water Trigger Mechanism for the Black Donald Waste Disposal Site is provided below.

Consistent with the Trigger Mechanism as outlined in the DOOP (Greenview, 2023) issued on December 22, 2010, the twelve (12) key trigger parameters included in the Trigger Mechanism were reviewed in detail including ammonia (un-ionized), barium, boron, chloride, chromium, chemical oxygen demand (COD), iron, nitrate, sodium, sulphate, total kjeldahl nitrogen (TKN) and total phosphorus. Based on the 2023 review, the Trigger Mechanism was not interpreted to be activated.

The following is a detailed review of each of the key trigger parameters used in the Trigger Mechanism evaluation. Generally, seasonal variations in concentrations are apparent.

4.5.1 Un-ionized Ammonia

The highest concentrations of un-ionized ammonia were noted in leachate characterization monitoring well BH1, while concentrations at all other key trigger locations appear to be relatively low and generally stable over time. With the exception of an increasing trend for un- ionized ammonia in results from leachate monitoring well BH1, no increasing trends were noted for concentrations of un-ionized ammonia at any of the other key trigger locations following inclusion of 2023 results. All un-ionized ammonia concentrations in surface water were below the PWQO limit.

4.5.2 Barium

The highest concentrations of barium were noted in leachate characterization monitoring wells BH1 and BH4, while low concentrations of barium were noted at the groundwater background locations (BH2 and MW08-6). The highest barium concentrations for the surface water monitoring locations were noted at background monitoring location SW5 in summer 2023. No increasing trends for concentrations of barium were noted at any of the key trigger groundwater locations following inclusion of 2023 results, and all barium concentrations were below the ODWS and RUC limits. A decreasing trend was interpreted in results from leachate monitoring well BH1 following inclusion of 2023 results. The trend analysis indicated that barium concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to barium in 2023.

4.5.3 Boron

The highest concentrations of boron were noted in leachate characterization monitoring wells BH1 and BH4, while low concentrations of boron were noted at the groundwater background locations (BH2 and MW08-6), groundwater receptor trigger location MW08-7S&D, and background surface water location SW4. No increasing trends for concentrations of boron were noted at any of the key trigger locations following inclusion of 2023 results. All recent groundwater-related boron concentrations, with the exception of leachate monitor BH4 during the spring 2023, have been below RUC limits, while all concentration at all locations have been below the ODWS limits. All recent surface water results have been below the PWQO limits. The trend analysis indicated that boron concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to boron in 2023.

4.5.4 Chloride

The highest concentrations of chloride in groundwater were noted in results at leachate well BH4 in spring 2023, and in surface water at background surface water location SW4 in spring 2023, while low concentrations of chloride were noted at background groundwater locations BH2 and MW08-6. Following inclusion of 2023 results, chloride concentrations were generally stable downgradient and downstream of the Black Donald site, with the exception of an interpreted decreasing trend for chloride at leachate monitoring well BH1. All recently documented chloride concentrations have been below ODWS and RUC limits for both groundwater and surface water. The Trigger Mechanism was not interpreted to be activated with respect to chloride in 2023.

4.5.5 Chromium

All chromium concentrations in groundwater and surface water were noted to be below the detection limit. No increasing trends were noted for concentrations of chromium at any of the key trigger locations following inclusion of 2023 results. All concentrations in groundwater monitoring wells were significantly below the ODWS and RUC limits in 2023. Similarly, no concentrations in surface water were above the PWQO limit in 2023. The trend analysis indicated that chromium concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to chromium in 2023.

4.5.6 Chemical Oxygen Demand (COD)

The highest concentrations of COD were noted at leachate monitoring well MW08-7D, while the lowest concentrations of COD were noted at background groundwater location BH2. No increasing trends were noted for concentrations of COD at any of the key trigger locations following inclusion of 2023 results. The trend analysis indicated that some seasonal variability of COD concentrations downgradient and downstream of the Black Donald site is occurring. The Trigger Mechanism was not interpreted to be activated with respect to COD in 2023.

4.5.7 Iron

The highest concentrations of iron were noted at leachate characterization monitoring well BH1 and in surface water at SW5 in summer 2023, while significantly lower concentrations of iron were noted at all other groundwater and surface water sampling locations in 2023. Historically, iron concentrations in leachate monitoring well BH1 were significantly higher than concentrations documented for all other sampling locations. No increasing trends for concentrations of iron were noted at any of the other key trigger locations following inclusion of 2023 results, while decreasing trends were interpreted in results from BH1 based on 2023 results. Historically, only leachate monitoring well BH1 was noted to have concentrations of iron consistently in non-conformance with ODWS and RUC limits, while surface water locations were noted to have higher iron concentrations during summer and fall sampling events, which were attributed to low-water / low-flow environments at the sampling locations. Surface water location SW5 was documented to have iron concentrations above the PWQO (and ODWS) in summer 2023. The trend analysis indicated that iron concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to iron in 2023.

4.5.8 Nitrate

The highest concentrations of nitrate were noted at leachate characterization monitoring wells BH1 and BH4 in spring 2023, while low concentrations of nitrate were noted at all other groundwater and surface water sampling locations. With the exception of a minor increasing trend for concentrations of nitrate at leachate well BH-1, no increasing trends for concentrations of nitrate were noted at any of the key trigger locations following inclusion of 2023 results. All recent concentrations of nitrate from all sampling locations are significantly below the ODWS and RUC limits. The trend analysis indicated that nitrate concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to nitrate in 2023.

4.5.9 Sodium

The highest concentrations of sodium were noted in leachate characterization monitoring well BH1, while low concentrations of sodium were noted at the groundwater background locations (BH2 and MW0B-6). The dominant source of sodium in the vicinity of the site is interpreted to be road salt (sodium chloride) from winter road maintenance and not landfill-related activities. All recent concentrations of sodium from all sampling locations were below the ODWS and RUC limits. The trend analysis indicated that sodium concentrations were interpreted to be generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to sodium in 2023.

4.5.10 Sulphate

The highest concentrations of sulphate were noted in leachate monitoring well BH4, while low concentrations of sulphate were noted at the background groundwater locations (BH2 and MW08-6), groundwater receptor trigger location MW08-7S&D, and background surface water location SW4. All recent groundwater-related sulphate concentrations, with the exception of leachate monitor BH4 during the spring 2023, have been below RUC limits, while all concentration at all locations have been below the ODWS limits. The trend analysis indicated that sulphate concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to sulphate in 2023.

4.5.11 Total Kjeldahl Nitrogen

The highest concentrations of TKN were noted in results from leachate characterization monitoring well BH1, while low concentrations of TKN were noted at the groundwater background locations (BH2 and MW08-6), groundwater leachate characterization well BH4, groundwater receptor trigger location MW08-7, and background surface water location SW4. A decreasing trend was interpreted in results from leachate monitoring well BH1. The trend analysis indicated that TKN concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to TKN in 2023.

4.5.12 Total Phosphorus

The highest concentrations of total phosphorus have historically been documented in results from monitoring wells MW08-7S (previously MW08-7). The high total phosphorus concentrations in 2023 at MW08-7S&D did not coincide with high concentrations at any upgradient monitoring wells or surface water locations, and therefore it was interpreted that phosphorus concentrations at MW08-7 were not attributed to landfill-related factors. High concentrations of phosphorus were noted in results from background surface water location SW4 and at SW5. No increasing trends for concentrations of total phosphorus were noted at any of the key trigger locations following inclusion of 2023 results. The trend analysis indicated that total phosphorus concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to total phosphorus in 2023.

4.5.13 Trigger Mechanism Review Summary

Based on a review of five (5) year time trend analysis for parameters un-ionized ammonia, barium, boron, chloride, chromium, COD, iron, nitrate, sodium, sulphate, TKN and total phosphorus, the Trigger Mechanism was not interpreted to be activated in 2023. Routine monitoring of groundwater and surface water should continue in 2024 at the Black Donald site.

4.6 Operations Summary

4.6.1 Site Operations

The site is operated as a municipal solid waste landfill, accepting C&D and bulky wastes for disposal, in accordance with ECA A411902 and the most recent amendment dated January 24, 2013 (**Appendix A**). The Black Donald site was closed to the public on April 5, 2010; with disposal operations available to municipal vehicles and Township-approved haulers only, under the supervision of Township operations staff.

Access to the site is provided by Hydro Dam Road, located off Calabogie Road County Road 508, approximately 15 km southwest of the Village of Calabogie. Site access is restricted by a lockable gate at the site entrance, and the site is surrounded by forested lands, which provide adequate screening and restricted access for vehicular traffic.

4.6.2 Waste Disposal Summary

The Black Donald site is used only to stockpile C&D and bulky wastes generated from within the Township for processing (size-reduction) and disposal. No waste was received at the site in 2023, the C&D and bulky waste was sent to the other sites. The 2022 C&D and bulky waste stockpile was ground and applied at the site in fall 2023. No recycling operations were conducted at the Black Donald site in 2023.

To calculate the volume of waste disposed at the site in 2023, Jp2g conducted a topographic survey on December 20, 2023 which was compared to the 2022 Existing Conditions Plan (Greenview, 2023) and the approved design contours (Greenview, 2010). As a result of AutoCAD files for these drawings not being available the accuracy for this year may be considered limited. The ground pile of C&D and bulky waste spread over the waste mound in 2023 is estimated to be 857m^3 (the average mean of fill rate 2008 to 2022). Based on a December 2022 remaining capacity of 3575m^3 (Greenview, 2023), the 2023 remaining capacity is estimated to be 2718m^3.

As processed C&D and bulky wastes are approved as alternative daily no aggregate-based cover materials (i.e. sand, etc.) were utilized as part of operations in 2023. Bentonite clay material was emplaced at the site in 2021 for use as regular and/or final cover.

4.6.3 Site Inspections and Maintenance

In spring 2014, the Township planted one hundred (100) red pine seedlings along the northeastern AWDA boundary at the Black Donald site, in order to provide a visual buffer for the site from Hydro Dam Road (Figure 2). Additionally, in late 2012, 2013, 2014 and 2015, the Township installed large boulders in specific areas along the northwestern property boundary and in the vicinity of the site in order to restrict access to the site from unauthorized persons.

Site inspections of the waste disposal area and property at the Black Donald WDS were conducted by Jp2g during the spring, summer, and fall sampling events. Jp2g also conducted a site inspection on December 20, 2023 during the annual capacity survey. The Township also conducted periodic investigations to verify the compliance status of the site.

With the exception of monitoring well BH3, which was observed to have been destroyed in fall 2021 by site equipment (Greenview, 2023) all monitoring wells at the Black Donald Waste Disposal Site were observed to be in good condition in 2023, in accordance with O.Reg. 903 (Wells).

4.6.4 Monitoring and Screening Checklist

Appendix J contains a groundwater and surface water Monitoring and Screening Checklist. Based on the 2023 results no contingency measures are required to be implemented.

5 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the 2023 environmental monitoring program completed for the Black Donald Waste Disposal Site, the following conclusions are provided:

- The groundwater flow direction at the site in 2023 was interpreted to be similar to historical interpretations with the direction of groundwater flow to the southeast to the CAZ boundary.
- Groundwater immediately downgradient from the site at monitoring wells BH1 and BH4 was interpreted to be impacted from landfill-related activities in 2023. At monitoring wells BH1 and BH4, all parameters met the ODWQS except for field pH, alkalinity, Hardness, TDS, DOC, manganese, Aluminum, and iron. Results from monitoring well BH1 were interpreted to be most representative of leachate quality at the Black Donald site at this time.
- Per the ECA, samples were last collected for VOC analysis from BH1 in 2023, and all values were below ODWS limits. Samples are collected at BH1 every five (5) years, and the next sampling event for VOC analysis at monitoring well BH1 is scheduled for 2028.
- No RUC exceedances were documented in results from downgradient monitoring well MW08-7S in 2023 that were attributed to landfill-related factors. Based on the above, the Black Donald site was interpreted to meet the intent of Guideline B-7 at the downgradient eastern CAZ boundary in 2023.
- No RUC exceedances were documented in results from downgradient monitoring well BH4 in 2023 except for alkalinity, TDS, DOC, manganese, and sulphate (June only). Given the considerable distance of BH4 to the downgradient southwestern CAZ boundary (approximately 170 m), and naturally occurring concentrations of alkalinity, aluminum, DOC, hardness, manganese, and TDS in the background (BH2), the Black Donald site was interpreted to meet the intent of Guideline B-7 and was interpreted to be in compliance with RUC in 2023 at the southwestern CAZ boundary.
- Based on the surface water quality results in 2023, and the significant distance of each sampling location from the AWDA of the Black Donald site, the surface water systems northeast and southeast of the Black Donald site were not interpreted to be impacted from landfill-related activities.
- Based on a review of five (5) year time trend analysis for parameters un-ionized ammonia, barium, boron, chloride, chromium, COD, iron, nitrate, sodium, sulphate, TKN and total phosphorus, the Trigger Mechanism was not interpreted to be activated in 2023. Routine monitoring of groundwater and surface water should continue in 2024 at the Black Donald site.

5.1 Groundwater Monitoring

No changes to groundwater monitoring are recommended for 2024. Groundwater monitoring should continue to occur twice per year (May/June and October/November) and consist of the following (see **Table 7**):

- Water levels at all locations should be collected.
- Any wells that are found to be damaged should be repaired or replaced.
- Groundwater samples should be collected from all locations in May/June and October/November and include appropriate duplicate samples; and
- Samples should be analyzed for the parameters listed in **Table 7**.

5.2 Surface Water Monitoring

No changes to surface water monitoring are recommended for 2024. Surface water monitoring should continue to occur three times per year (May/June, July/August, and October/November) and consist of the following (see **Table 7**):

- Collect surface water from SW4 and SW5.
- Collect samples in May/June, July/August, and October/November.
- Samples should be analyzed for the parameters listed in **Table 7.**
- Un-ionized ammonia should be calculated using field results.

6 REFERENCES

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LIMITATIONS AND USE OF THE REPORT

This report was prepared for the exclusive use of Township of Greater Madawaska. Any use which a third party makes of this report, or and reliance on, or decisions to be made based on it, are the responsibilities of such third parties. Jp2g Consultants Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This landfill impact report involves a limited sampling of locations to assess the probability of contamination on site. The test data, chemical analyses, and conclusions given herein are the results of analyzing the groundwater encountered during the sampling programs. Based upon the total number of test holes performed, these are considered to be fairly representative of the groundwater conditions within each area tested. It should be noted, however, that any assessment regarding the presence of contamination on the property is based on interpretation of conditions determined at specific locations and depths. Chemical results are limited to those parameters tested.

Tables

THE TOWNSHIP OF GREATER MADAWASKA

Table 1: Groundwater Monitoring Well and Surface Water Sampling Locations
Black Donald Waste Disposal Site

Groundwater			
Monitor	**Zone**	**Northing**	**Easting**
BH1	18T	5010512	353241
BH2	18T	5010578	353185
BH3	18T	5010421	353188
BH4	18T	5010428	353115
MW08-5	18T	5010294	353052
MW08-6	18T	5010427	353017
MW08-7	18T	5010522	353374

Surface Water			
Monitor	**Zone**	**Northing**	**Easting**
SW-3	18T	5009153	353021
SW-4	18T	5010921	353450
SW-5	18T	5009774	353354
SW-6	18T	5009323	353300

Notes:

Global Positioning System (GPS) point locations acquired by Greenview using a Garmin eTrex Venture HC.

Table 2: Monitoring Program 2023

Station ID	Monitorign Location	Spring 2023	Summer 2023	Fall 2023	Notes
Groundwater					
BH1	Leachate well northwest side of Hydro Dam Road	√	--	√	
BH2	North and upgradient of the landfill	√	--	√	
BH3	South of the landfill	NS	--	NS	Destroyed in 2021
BH4	Adjacent to the western corner of the landfill	√	--	√	
MW08-5	Southwest of the landfill	Dry	--	Dry	
MW08-6	West of the landfill	√	--	√	
MW08-7S	Southeast and downgradient of the landfill	√	--	√	Previously called MW08-7
MW23-7D	Southeast and downgradient of the landfill	--	--	√	Installed in Nov. 2023
MW23-8S	Southeast of the landfill	--	--	Dry	Installed in Nov. 2023
MW23-8D	Southeast of the landfill	--	--	Dry	Installed in Nov. 2023
Surface Water					
SW4	Background northeast and upstream of the landfill	√	Dry	Dry	
SW5	Southeast and downstream of landfill area	√ + DUP	√ + DUP	√ + DUP	

Notes:

1. √ = samplled for the required parameters, field parameters and water level
2. DUP = Duplicate Sample taken
3. NS: Not sampled

Table 3: Median Background Concentrations (Using BH2 Results)

Parameters (mg/L)	19-May	19-Oct	20-Apr	Oct 20	21-May	21-Nov	22-May	22-Oct	23-Jun	23-Nov	Median
Alkalinity	220	207	208	201	221	240	238	224	244	228	**223**
Chloride	0.8	1.1	1.1	1.1	0.9	0.7	<0.5	0.7	0.7	0.7	**0.80**
Nitrate	0.18	0.14	0.12	0.06	0.11	<0.05	0.09	0.16	<0.05	0.11	**0.12**
Sulphate	12	17	13	17	13	16	15	10	12	16	**14**
TDS	231	229	225	234	233	242	251	235	253	252	**235**
DOC	3.2	2.1	2.6	2	2.1	5.7	2.2	0.8	0.8	2.6	**2.15**
Barium	0.02	0.017	0.018	0.019	0.019	0.021	0.02	0.02	0.031	0.02	**0.02**
Boron	0.055	0.01	0.01	<0.005	0.01	0.01	0.012	0.005	0.009	0.006	**0.010**
Iron	0.035	<0.005	0.007	<0.005	<0.005	0.021	<0.005	0.005	0.015	<0.005	**0.015**
Manganese	0.03	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	**0.02**
Sodium	4.6	2.7	3	2.8	2.6	3.2	3.3	2.2	2.3	2.8	**2.80**

Table 4: Reasonable Use Determination 2023 (Using BH2 results)

Parameter (mg/L)	Pb	Cm	F	Callow
Alkalinity	223	500	0.5	**362**
Chloride	0.8	250	0.5	**125**
Nitrate	0.12	10	0.25	**2.6**
Sulphate	14	500	0.5	**257**
TDS	235	500	0.5	**368**
DOC	2.15	5	0.5	**3.6**
Barium	0.02	1	0.25	**0.3**
Boron	0.01	5	0.25	**1.26**
Iron	0.015	0.3	0.5	**0.16**
Manganese	0.02	0.05	0.5	**0.04**
Sodium	2.8	200	0.5	**101**

Table 5: Reasonable Use Conclusions 2023

Parameters	ODWS	C_{allow}	BH4		MW08-7S		MW23-7D	
			Jun-23	Nov-23	Jun-23	Nov-23	Jun-23	Nov-23
Health Related								
Nitrate	**10**	**2.60**	0.47	0.06	<0.05	0.07	NS	0.12
Barium	**1**	**0.30**	0.101	0.099	0.034	0.048		0.094
Boron	**5**	**1.26**	**2.11**	0.862	<0.005	<0.005		0.371
Aesthetic Parameters								
Alkalinity	**500**	**362**	**623**	**533**	176	203		320
Chloride	**250**	**125**	45.5	20.2	31	38.3		37.1
Sulphate	**500**	**257**	**295**	228	7	4		23
TDS	**500**	**368**	**1090**	**894**	229	267		**407**
DOC	**5**	**3.6**	**5.6**	**13.4**	2	3.3		**6.4**
Iron	**0.3**	**0.16**	0.007	0.012	0.007	<0.005		0.005
Manganese	**0.05**	**0.04**	**0.532**	**1.06**	<0.001	<0.001		0.009
Sodium	**200**	**101**	48.3	25.6	20.9	26.1		24.7

NS : Not Sampled

Exceeds Resonable Use Criteria

Table 6: Surface Water Triggers Assessment 2023

Parameters	PWQO (CWQG)	SW4 75th Percentile	SW5		
			Jun-23	Aug-23	Nov-23
Primary Surface Water Trigger Parameter[1]					
Chloride	**120**	**NA**	5.7	9.7	11.2
Unionized Ammonia	**0.02**	**NA**			
Nitrate	**13**	**NA**	<0.05	0.06	0.05
Phosphorus	**0.02**	**NA**	0.01	**0.04**	0.02
Boron	**1.5**	**NA**	0.021	0.0018	0.014
Iron	**0.3**	**NA**	0.192	**1.93**	0.238
Secondary Surface Water Trigger Parameter[2]					
Barium	**NV**	**0.065**	0.053	**0.082**	0.051
Chromium	**NV**	**0.001**	<0.001	<0.001	<0.001
Chemical Oxygen Demand (COD)	**NV**	**21**	**34**	**39**	22
Sodium	**NV**	**37**	--	6.4	6.4
Sulphate	**NV**	**7.15**	1	<1	**9**
Total Kjeldahl Nitrogen (TKN)	**NV**	**0.50**	0.5	**0.7**	0.5

NA : Not Applicable NV: No Value

Exceeds PWQO/CWQO Trigger Criteria

[1] Primary Surface Water Tigger uses the Provincial Water Quality Objective (PWQO)

- Since there is no PWQO for Chloride, the Canadian Water Quality Guideline (CWQG) of 120 mg/L is used
- For Boron, the CWQG of 1.5 mg/L is used since it is based on more up to date literatur

[2] Secondary Surface Water Trigger parameters do not have a PWQO.

- The running 75th Percentile of the (2016-2023) sampling events of the background (SW4) concentration is used as the trigger

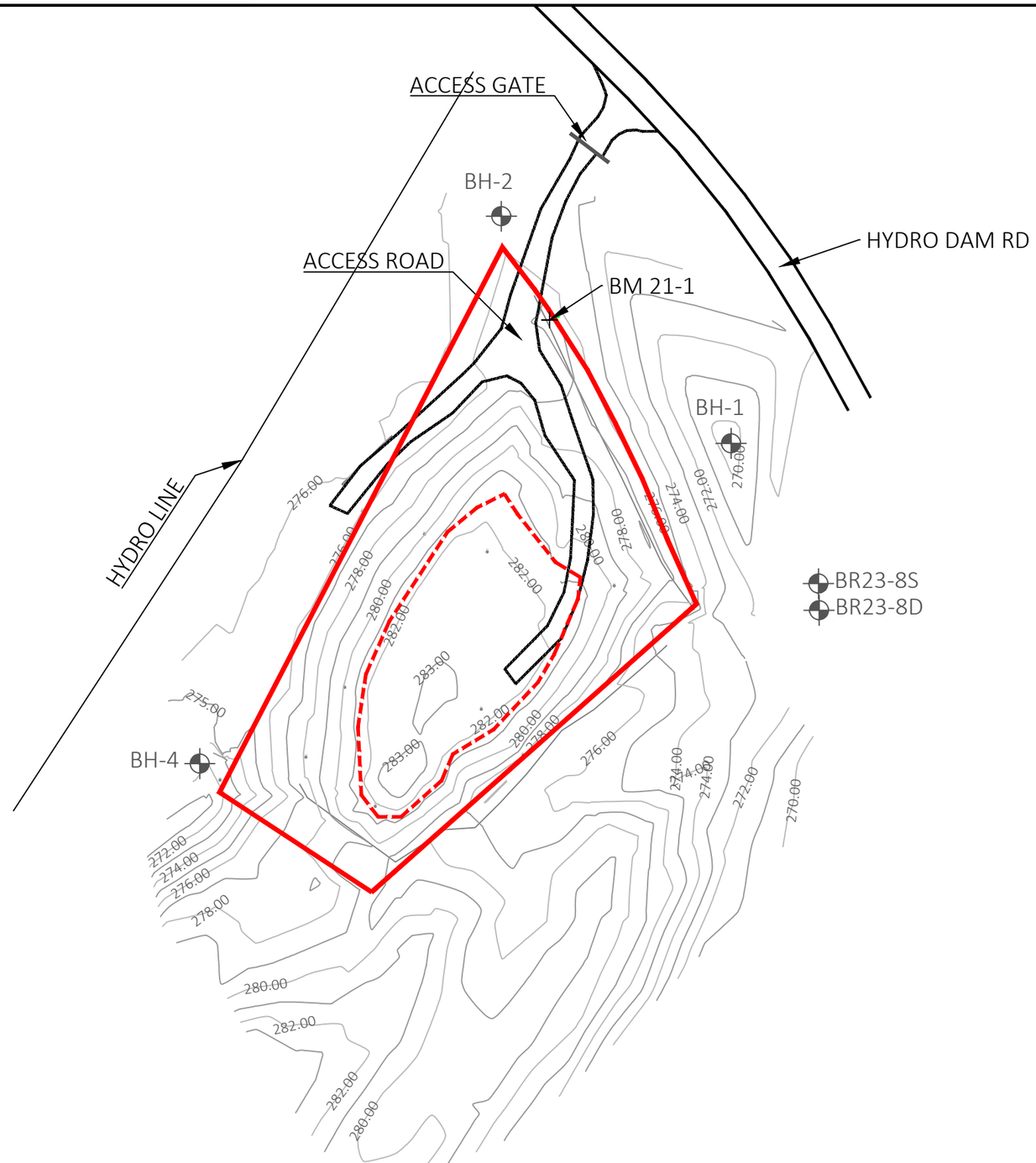
Table 7 : Proposed Monitoring Program 2024

Station ID	Task	Spring 2024	Summer 2024	Fall 2024	Analytical Parameters
Groundwater					
BH1	Measure water levels / Sample groundwater	√	--	√	- Major and minor ions (Ca, Na, Cl, SO4, B, K, Mg, Ba) - Trace metals (Fe, Mn, Cu, Sr, Al, Cd, Cr, Co, Si, Zn) - Nitrogen species (NO3, NO2, NH3, TKN) - General parameters (alkalinity, COD, phenols, total dissolved solids, phosphorous, hardness, dissolved organic carbon) - Field measurements of pH, conductivity, Dissolved Oxygen, and water tempreture - EPA 624 Volatile Organic Compounds VOC sample collected every Five years from BH1. Next VOCs sampling will be in Spring 2028
BH2	Measure water levels / Sample groundwater	√	--	√	
BH3	Measure water levels / Sample groundwater	√	--	√	
BH4	Measure water levels / Sample groundwater	√	--	√	
MW08-5	Measure water levels / Sample groundwater	√	--	√	
MW08-6	Measure water levels / Sample groundwater	√	--	√	
MW08-7S	Measure water levels / Sample groundwater	√	--	√	
MW23-7D	Measure water levels / Sample groundwater	√	--	√	
MW23-8S	Measure water levels / Sample groundwater	√	--	√	
MW23-8D	Measure water levels / Sample groundwater	√	--	√	
Surface Water					
SW4	Sample Surface water	√	√	√	- Major and minor ions (Ca, Na, K, Cl, total phosphorous, Ba, B, Mg, SO4) - Trace metals (Fe, Mn, Cu, Cd, Cr, Co, Sr, Zn) with detection limits to PWQO - Nitrogen species (NH3, TKN) - General parameters (alkalinity, COD, Total suspended solids, phenols, total dissolved solids, hardness, biochemical oxygen demand) - Field measurements of dissolved oxygen, pH, conductivity, water temperature, and Un-ionized ammonia (calculation)
SW5	Sample Surface water	√	√	√	

Notes:

One Duplicate Sample to be collected during each sampling event.

Drawings



BM 21-1

EASTING: 353197.573
NORTHING: 5010544.812
ELEVATION:
100.818m (Assumed)
277.224m (Geodetic)

Legend

- 1.2ha Landfilling Area
- Roadway
- Approximate Active Landfilling Area
- 2023 Ground Contours
- MW08-6 Monitoring Wells
- BM Benchmark

NOTES :

WELL LOCATIONS AND CONTOURS IN THE LANDFILL AREA ARE FROM DECEMBER 20, 2023 JP2G SURVEY

CONTOURS OUTSIDE OF LANDFILL AREA ARE SOURCED GREENVIEW 2022 AMR AND APRIL 17 2023 JP2G SUVERY FOR REFERENCE ONLY

No.	DATE		
	2024-03-25		

Jp2g PROJECT No.: 22-6213A

PROJECT
BLACK DONALD WDS
TOWNSHIP OF GREATER MADAWASKA

DRAWING
2024 - EXISTING CONDITIONS PLAN

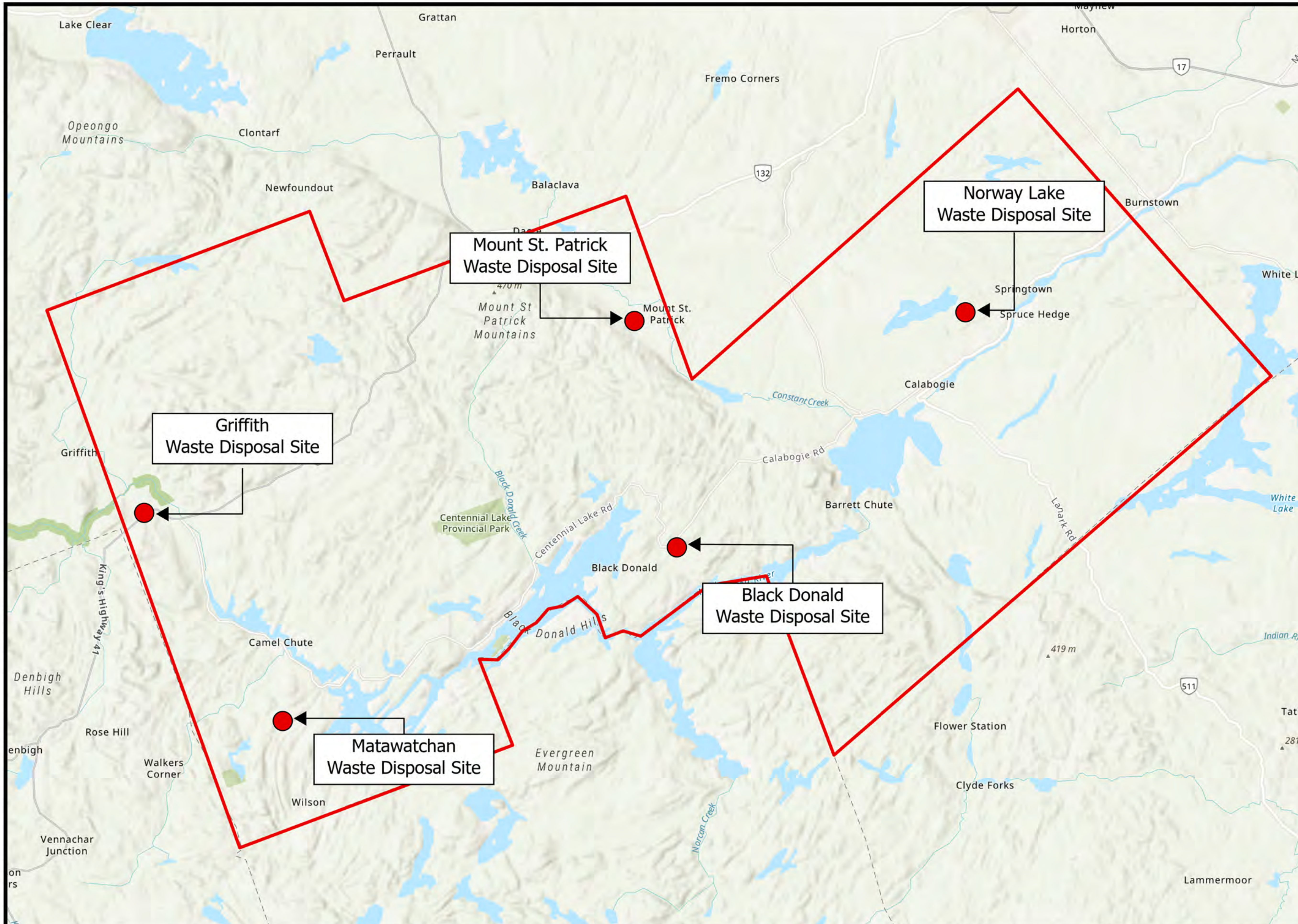
PROJECT No.: 22-6213A
DRAFTED: QS
DESIGNED: QS
REVIEWED: KM
APPROVED: KM

NORTH
TRUE NORTH

SCALE
1:1,250
0 m 10 20 30 40 50 m

SHEET#
Drawing 1

Figures


Norway Lake Waste Disposal Site
Mount St. Patrick Waste Disposal Site
Griffith Waste Disposal Site
Black Donald Waste Disposal Site
Matawatchan Waste Disposal Site
Lake Clear
Grattan
Perrault
Horton
Fremo Corners
Opeongo Mountains
Clontarf
Balaclava
Newfoundout
Burnstown
Mount St. Patrick
Mount St Patrick Mountains
Springtown
Spruce Hedge
White Lake
Calabogie
Constant Creek
Calabogie Rd
Griffith
Barrett Chute
Centennial Lake Provincial Park
Black Donald Creek
Centennial Lake Rd
Lanark Rd
Black Donald
Black Donald Hills
King's Highway 41
Camel Chute
Denbigh Hills
Indian River
419 m
Rose Hill
Flower Station
Walkers Corner
Evergreen Mountain
Wilson
Clyde Forks
Vennachar Junction
Norcan Creek
Lammermoor
132
17
511

N

Township of Greater Madawaska

Waste Disposal Sites

LEGEND

Waste Disposal Site

Township Boundary

1:250 0000

0 2,500 5,000 10,000 Meters

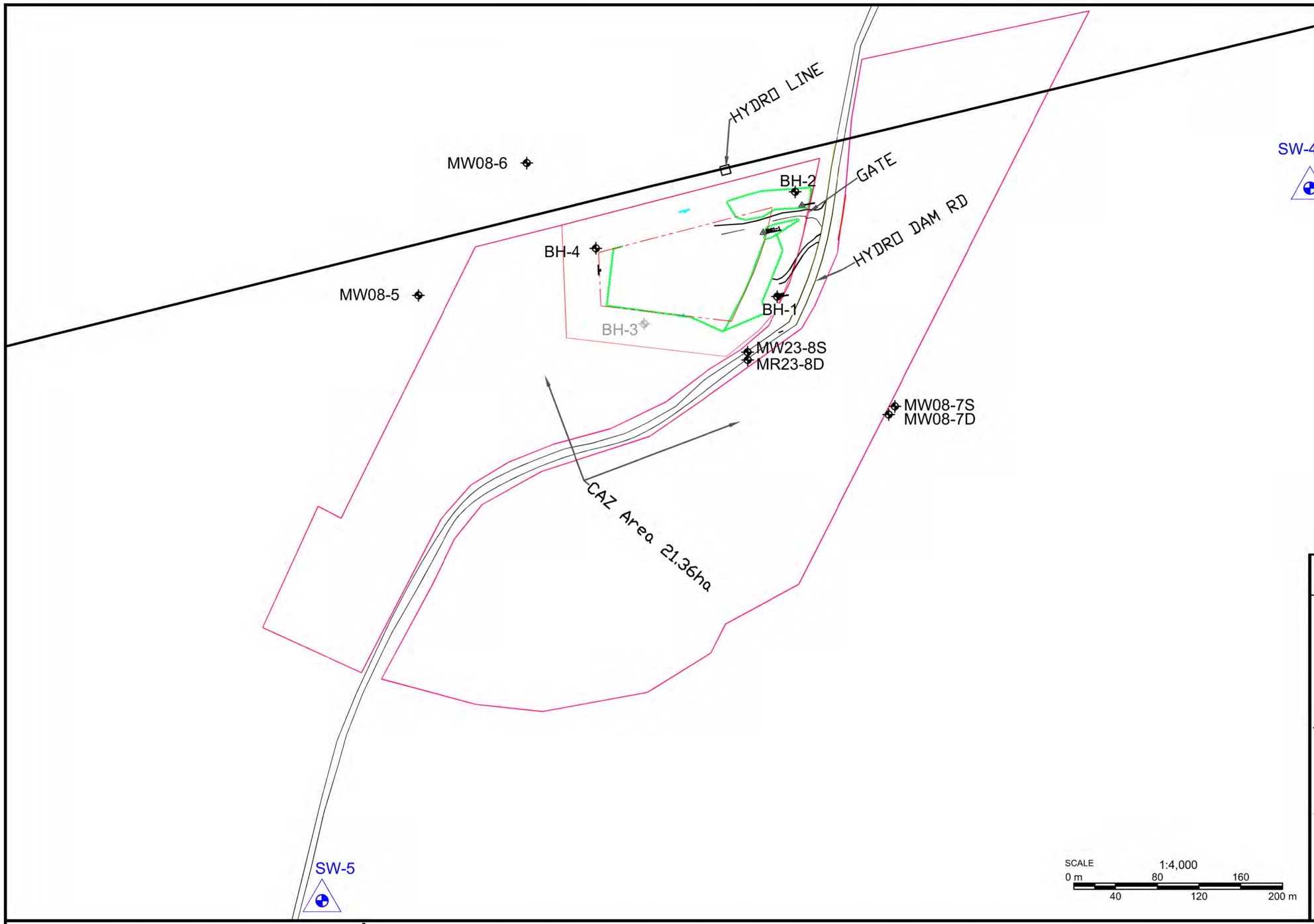
Regional Location Plan

Project No. 22-6213C Greater Madawaska

Date:3/12/2024	Drawn By: HV
	Checked By: KM

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

Notes:
Map Layers Obtained from LIO
Waste Disposal Site Locations Sourced from Greenview Environmental Management (2023)



Legend

- 1.2ha Landfilling Area
- Roadway
- Vegetation
- 30m Buffer
- MW08-6 Monitoring Wells
- SW-4 Surface Water Locations
- Contamination Attenuation Zone (CAZ)
- MW08-6 Destroyed Well

TRUE NORTH

NOTES :
WELL LOCATION FROM HANDHELD GPS DURING THE SPRING 2023 SAMPLING
SOURCE GREENVIEW 2022 AMR
FOR REFERENCE ONLY

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

12 INTERNATIONAL DRIVE, PEMBROKE, ON
Phone: (613)735-2507, Fax:(613)735-4513

1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON
Phone: (613)828-7800, Fax: (613)828-2600

Black Donald Landfill Site - Greater Madawaska

~

Site Plan with Monitoring Locations

DRAFTED: QS		PROJECT No.: 22-6213C
CHECKED: KM		REVISION DATE: 2024-03-25
CHECKED: KM	APPROVED: KM	REVISION No.: .
SCALE: Approx Scale 1: 4000		Figure : 2

Legend

- 1.2ha Landfilling Area
- Existing Design Contours
- Roadway
- Vegetation
- Contamination Attenuation Zone (CAZ)
- 30m Buffer
- Groundwater Contours
- MW08-6 Wells Labels
- (92.13) GW Elevation

NOTES : WELL LOCATION BASE OFF HANDHELD GPS DURING THE SPRING 2023 SAMPLING

TRUE NORTH

MW08-6 (97.72)

MW08-5 (92.55)

BH-4 (93.10)

BH-2 (95.36)

BH-1 (88.97)

BH-3

BM21-1

MW23-8S (Nov 2023)
MR23-8D (Nov 2023)

MW08-7S (77.52)
MW23-7D (Nov 2023)

95 m

90 m

85 m

80 m

SCALE 1:1,250
0 m 20 40
10 30 50 m

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

12 INTERNATIONAL DRIVE, PEMBROKE, ON
Phone: (613)735-2507, Fax:(613)735-4513

1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON
Phone: (613)828-7800, Fax: (613)828-2600

Black Donald Landfill Site - Greater Madawaska

~

Monitoring Locations with Groundwater Flow

DRAFTED: QS		PROJECT No.: 22-6213C
CHECKED: KM		REVISION DATE: 2024-03-25
CHECKED: KM	APPROVED: KM	REVISION No.: .
SCALE: 1:1250		Figure : 3A

DWG NAME: J:\6-ENVIRONMENTAL\ACTIVE\2022\22-6213B - GREATER MADAWASKA WDS 2023\05 DRAWINGS\BLACK DONALD\2023\FIGURES AMR 2023.DWG LAYOUT: FIG 3A SAVED ON March 25, 2024

Legend

- 1.2ha Landfilling Area
- Existing Design Contours
- Roadway
- Vegetation
- Contamination Attenuation Zone (CAZ)
- 30m Buffer
- Groundwater Contours
- MW08-6 Wells Labels
- (92.13) GW Elevation

NOTES : WELL LOCATION BASE OFF HANDHELD GPS DURING THE SPRING 2023 SAMPLING

TRUE NORTH

HYDRO

GATE

HYDRO DAM R

MW08-6
(97.72)

MW08-5
(DRY)

BH-4
(92.13)

BH-2
(94.71)

BM21-1

BH-1
(87.08)

BH-3

MW23-8S (DRY)
MR23-8D (DRY)

MW08-7S
MW23-7D
(75.42)
(Nov 2023)

95 m

95 m

90 m

90 m

85 m

85 m

80 m

80 m

SCALE 1:1,250
0 m 20 40
10 30 50 m

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

12 INTERNATIONAL DRIVE, PEMBROKE, ON
Phone: (613)735-2507, Fax:(613)735-4513

1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON
Phone: (613)828-7800, Fax: (613)828-2600

Black Donald Landfill Site - Greater Madawaska

~

Monitoring Locations with Groundwater Flow

DRAFTED: QS		PROJECT No.: 22-6213C
CHECKED: KM		REVISION DATE: 2024-03-25
CHECKED: KM	APPROVED: KM	REVISION No.: .
SCALE: 1:1250		Figure : 3B

DWG NAME: J:\6-ENVIRONMENTAL\ACTIVE\2022\22-6213B - GREATER MADAWASKA WDS 2023\05 DRAWINGS\BLACK DONALD\2023\FIGURES AMR 2023.DWG LAYOUT: FIG 3B SAVED ON March 25, 2024

Appendix A
Environmental Compliance Approval and Certificate of Requirement

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A411902
Notice No. 3
Issue Date: January 24, 2013

The Corporation of the Township of Greater Madawaska
1101 Francis St
Post Office Box, No. 180
Greater Madawaska, Ontario
K0J 1H0

Site Location: Black Donald Waste Disposal Site
34 Hydro Dam Rd
Greater Madawaska Township, County of Renfrew

You are hereby notified that I have amended Approval No. A411902 issued on March 27, 1980, and amended on October 12, 2001 and July 12, 2002 for the use and operation of a 1.2 hectare waste disposal site , as follows:

This Notice of Amendment updates the Approval to reflect current site operations, approves alternative daily cover and the Site Trigger and Contingency Plan.

The following definitions are added:

"Approval" means this Environmental Compliance Approval and any Schedules to it, including the application and supporting documentation listed in Schedule "A".

"Construction and Demolition and Bulky Waste" or "C&D waste" means wastes resulting from construction, and includes the following: asphalt shingles, mattresses, furniture, carpet, tree stumps, drywall, wallboard, wood (painted and unpainted).

The following Conditions are revoked and replaced:

(15) (a) The Owner shall develop the Site in accordance with the Site Design, Operations and Development Plan, dated December 22, 2010, item 7 of Schedule "A".

(b) The Site shall be constructed, operated and maintained in an environmentally safe manner, which minimizes the impacts of dust, odour, noise, litter, vector and vermin on the general public, Site

personnel, and the natural environment.

(16) (a) The Site shall only receive only non-hazardous solid Construction and Demolition and Bulky Waste, and leaf and yard waste, generated from within the Township of Greater Madawaska.

(b) The Site may receive non-hazardous solid domestic waste from within the Township of Greater Madawaska, on a temporary basis, only with prior written authorization from the District Manager.

(c) Prior notification of 48-hours must be provided to the District Manager for receipt of any domestic waste.

(23) The Owner shall conduct weekly inspections of the equipment and facilities at the Site to ensure that they are maintained in good working condition at all times. Any deficiencies, which might negatively impact the environment, which are detected during these inspections shall be recorded in a log, and promptly corrected.

(26) The Owner shall implement the Site surfacewater and groundwater monitoring program as described in Schedule "B" of this Approval.

Site Trigger and Contingency Plan

(29) The Owner shall establish the surfacewater and groundwater trigger and contingency plan, as described in Section 6.2 of the Design, Development and Operations Plan, item 7 of Schedule "A".

The following Conditions are added:

Waste Processing

(35) (a) The Owner shall ensure that only Ministry-approved contractors carry out the processing of the Construction and Demolition and Bulky Waste at the Site.

(b) The Owner shall ensure that Construction and Demolition and Bulky Waste is stored and processed within the landfill footprint, as shown in Figure 6, Proposed Site Design, of item 7 of Schedule "A".

Leaf and Yard

(36) (a) The Owner shall ensure that leaf and yard storage and composting is conducted as described in the Site Design, Operations and Development Plan, item 7 of Schedule "A".

(b) A maximum of 1000 cubic metres of leaf and yard waste may be temporarily stored within the staging area.

(c) Leaf and yard wastes shall be moved to the established composting area within three months of arrival

at the Site.

(d) A maximum of 500 cubic metres of leaf and yard waste may be processed within the composting area at any time.

(d) Composted leaf and yard waste may only be used as alternative daily cover at the Site; it may not be re-used by the public.

Cover

(37)(a) The Owner shall ensure that cover material is applied at the Site as follows:

- Intermediate - Once every six (6) months, across the entire working face, and/or in areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 0.3 metre of soil or an approved thickness of alternative cover material shall be placed; and
- Final -In areas where landfilling has been completed to final contours, a minimum of 0.6 metre thick layer of final cover soil shall be placed, followed by 0.15 metre of topsoil.

(b) In the event that domestic waste is received at the Site on a temporary basis, daily cover shall be applied, at the end of each working day, consisting of a minimum of 0.15 m of soil.

Alternative Daily Cover

(c) The Owner may apply the following materials as alternative intermediate cover, in the same thicknesses as described in Condition 37 (a):

- leaf and yard waste mixed with soil cover and/or wood chips;
- composted or partially-composted leaf and yard waste;
- asphalt shingles;
- clean wood chips;
- contaminated soil - non-hazardous;
- processed C&D and bulky waste materials.

Schedule "A"

The following items are added to Schedule "A".

7. Report entitled "Design, Operations and Development Plan, Black Donald Waste Disposal Site (A411902), Township of Greater Madawaska, County of Renfrew, Ontario", prepared by Greenview Environmental Management Limited, dated December 22, 2010.

8. Letter dated July 30, 2012, from Dan Hagan, Greenview Environmental Management, to Lynda Mulcahy, MOE, RE: Application for Approval of Waste Disposal Sites, Black Donald Waste Disposal Site (A411902), Township of Greater Madawaska, County of Renfrew, MOE reference number: 3866-CTJ5V, with responses to waste review comments and questions.

9. e-mail from Dan Hagan, Greenview Environmental Management Limited, to Lynda Mulcahy, MOE, sent August 22, 2012, 9:57am, Subject: RE TGM - Black Donald WDS - Application for Approval of Waste Disposal Sites - MOE Request for Additional Information (MOE Reference Number: 3866-8CTJ5V)

Schedule "B" is added to the Approval

Site Groundwater and Surfacewater Monitoring Program

Location	Frequency	Parameters
Groundwater BH1, BH2, BH3, BH4, MW08-5, MW08-6, MW08-7 1 QA/QC	Twice per year (Spring, Fall)	Alkalinity, aluminum, ammonia, barium, boron, cadmium, calcium, chromium, cobalt, chloride, COD, copper, DOC, hardness, iron, magnesium, manganese, nitrate, phenols, potassium, silicon, sodium, strontium, sulphate, total phosphorus, TKN, TDS, zinc field measurements (pH, conductivity, temperature), water levels
BH1	Once every 5 years (Spring)	VOCs - EPA 624
Surface Water SW-3, SW-4, SW-5, SW-6 1 QA/QC	Three Times (Spring, Summer, Fall)	Alkalinity, ammonia, BOD, boron, cadmium, calcium, chloride, COD, copper, DOC, hardness, iron, magnesium, manganese, nitrate, nitrite, phenols, potassium, sodium, strontium, sulphate, total phosphorus, TKN, TDS, zinc, TSS Field Measurements (pH, conductivity, dissolved oxygen, temperature, unionized ammonia (calculation))

The reasons for this amendment to the Approval are as follows:

Condition 15 was revised to reflect the updated Design, Operations and Development plan for the Site, and to ensure the Site does not cause nuisance or impacts.

Condition 16 was revised to clarify the currently-approved wastes that may be received at the Site.

Condition 23 was revised to update the Site inspection requirement.

Condition 26 was revised to reflect the updated Site monitoring programs.

Condition 29 was added to approve the Site trigger and contingency plan.

Condition 35 is added to ensure that storage and processing of construction and demolition wastes are carried out as described in the updated Design, Operations and Development plan, and are carried out in an environmentally-safe manner.

Condition 36 is added to ensure that leaf and yard waste storage and composting is carried out as described in the updated Design, Operations and Development plan, and are carried out in an environmentally-safe manner.

Condition 37 is included to specify cover requirements for the Site, to ensure operations to not cause impacts or nuisance.

Schedule B was added to the Approval to include the updated Site monitoring program.

This Notice shall constitute part of the approval issued under Approval No. A411902 dated March 27, 1980

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;

7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 24th day of January, 2013

THIS NOTICE WAS MAILED
ON Feb. 20, 2013
9 C
(Signed)

Tesfaye Gebrezghi, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

LM/
c: District Manager, MOE Ottawa
Tyler H. Peters, Greenview Environmental Management Limited ✓

K Hebert
SIREBMC03250

Ontario

Ministry of the Environment / Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A411902
Notice No. 2

The Corporation of the Township of Greater Madawaska
1101 Francis Street
Bagot, Blythfield And Brougham, Ontario
K0J 1H0

Site Location: Black Donald Waste Disposal Site
34 Hydro Dam Road
Greater Madawaska Township, County of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A411902 issued on March 27, 1980, and amended on October 22, 2001 for submission of development and operations report as per Condition No. (14) of October 22, 2001 amendment, as follows:

Condition No. (14) is hereby revoked.

The following conditions of approval are added to the Provisional Certificate of Approval:

SITE OPERATIONS:

(15) The Site shall be constructed, operated and maintained in an environmentally safe manner, which minimizes the impacts of dust, odour, noise, litter, vector and vermin on the general public, Site personnel, and the natural environment, all in accordance to the Development and Operations Plan, Items 4, 5 and 6 of Schedule "A".

(16) The Site shall only receive non-hazardous municipal waste that is generated from within the Township of Greater Madawaska.

(17) The normal daily hours of operation for receiving waste at the Site are 7 am to 9 pm.

(18) The total volumetric capacity of the Site, including waste, daily, interim and final cover, is 46,785 cubic meters.

(19) The Owner shall ensure that there is no burning of waste, trees, brush and or clean wood piles at the Site.

(20) All incoming waste shall be inspected prior to being received at the Site to ensure that the Site is approved to accept such a waste.

(21) The Owner shall ensure that all wastes at the Site are managed and disposed of in accordance with Ontario Regulation 347, R.R.O. 1990, as amended.

(22) The Owner shall maintain records of the results of all inspections and monitoring and a summary of all activities associated with the Site (e.g. spills, maintenance work) in a record book located at the Site.

(23) The Owner shall conduct daily inspections of the equipment and facilities at the Site to ensure that they are maintained in good working condition all the times. Any deficiencies, which might negatively impact the environment, detected during these inspections shall be recorded in a log, and promptly corrected.

(24) (a) A sign shall be posted in a prominent location at the entrance of the Site stating the hours of operation, the Owner's name, staff contact and telephone number to call in the event of an emergency or any complaints;

(b) Complaints received from the public or adjacent neighbours shall be recorded in a log book created and maintained for this purpose.

(25) (a) The Owner shall immediately take all measures necessary to contain and clean up any spill or leak which may result from the operation at this Site;

(b) All spills and upsets shall be immediately reported to the Ottawa District Office or the Ministry's Spills Action Centre at 416-325-3000 or 1-800-268-6060, and the Municipality, and shall be recorded in a log book as to the nature of the spill or upset, and the action taken for clean-up, correction and prevention of future occurrences; and

(c) All waste material resulting from a spill or process upset, shall be managed and disposed of in accordance with Ontario Regulation 347, R.R.O. 1990, as amended.

MONITORING AND REPORTING REQUIREMENTS

(26) Surface and groundwater monitoring shall be conducted in accordance to Section 9.1 and 9.2, Item 4 of Schedule "A" provided that the following conditions are met:

(a) Prior to the development of the Site, the Owner shall establish that the seasonal high water table is at least one meter below the proposed excavation bottom;
(b) In addition to the parameters listed in Table 2, Section 9.1, Item 4 of Schedule "A", Nitrate and Ammonia shall be included for groundwater monitoring; and
(c) The background groundwater monitoring well (BH-1) shall be established further away from the waste pile, and one groundwater monitoring well shall be established at the midway point of the Site's southern boundary.

(27) By March 31, 2003, and on an annual basis thereafter, the Owner shall submit to the District Manager, an annual report on the development, operation and monitoring of the Site, including any

recommendations or changes to the annual monitoring program, in accordance to Section 10.1, Item 4 of Schedule "A".

(28) A written approval from the District Manager shall be obtained for any changes to the annual monitoring program prior to these changes being implemented.

(29) (a) In accordance to the Phased Plan outlined in Section 9.1, Item 4 of the Schedule "A", and by March 31, 2003, included in the annual monitoring report, the Owner shall submit to the District Manager for written approval, trigger levels for initiating investigative activities into the cause of an increase in contaminant concentrations as established by the surface and ground water monitoring programs along with appropriate investigative activities and contingency measures;

(b) Within six (6) months from exceedance of the established trigger levels, the Owner shall submit to the Director for approval, the design of appropriate contingency measures and provide detailed plans, specifications and description for the design, operation and maintenance for the appropriate remedial actions; and

(c) The remedial actions shall be implemented within nine months from the approval by the Director.

BUFFER AREA AND CONTAMINANT ATTENUATION ZONE

(30) Within 60 days of issuance of this Amendment, the Owner shall arrange for a legal survey of the Site and required buffer area, as specified in Items 4 and 5 of Schedule A, to be conducted by an Ontario Land Surveyor registered under the Surveyors Act.

(31) (a) By June 30, 2003, the Owner shall acquire the lands required for the contaminant attenuation zone in accordance to Figure 2 and Drawing 1, Item 4 of the Schedule "A". Alternatively, the Owner shall propose, by June 30, 2003, to the Director for approval, other methods for bringing the Site into compliance with respect to Guideline B-7, Reasonable Use Criteria and other applicable Ministry Regulations, Guidelines and Policies.

(b) (i) By June 30, 2003, the Owner shall acquire lands required for the 30 meter southern and western buffer areas in accordance to Drawing 1, Item 4 of the Schedule "A". Alternatively, the Owner shall propose, by June 30, 2003, to the Director for approval, other Site development methods to allow for a 30 meter southern and western buffer within the current Site boundary.

(ii) The Owner shall not commence waste disposal activities on the southern and western Site boundary until Condition (31)(b)(i) has been met.

(c) Within 30 days of purchase of lands noted in Condition (31)(a) and (31)(b), the Owner shall submit to the Director an updated legal survey of these lands for addition of these lands to the Certificate of Approval.

(32) The Owner shall ensure that no wastes are deposited within the designated 15 meter northern buffer area and the 30 meter eastern buffer area after the date of issuance of this Certificate of Approval.

PROHIBITION AND REGISTRATION ON TITLE

(33) Pursuant to Section 197 of the EPA neither the Owner nor any person having an interest in the Site shall deal with the Site in any way without first giving a copy of this Certificate to each person acquiring an interest in the Site as a result of the dealing.

(a) The Owner shall:

(i) Within sixty (60) calendar days of the date of this Certificate, submit to the Director for the Director's signature two (2) copies of a completed Certificate of Prohibition containing a registerable description of the Site, in accordance with Form 1 of O. Reg. 14/92 (Document General- Form 4- Land Registration Reform Act); and

(ii) Within ten (10) calendar days of receiving the Certificate of Prohibition signed by the Director, register the Certificate of Prohibition in the appropriate Land Registry Office on title to the Site and submit to the Director immediately following registration the duplicate registered copy.

SITE CLOSURE

(34) Within 2 years prior to the Site reaching its final capacity specified in this Amendment, the Owner shall submit to the Director, for approval, a plan for closure, post closure monitoring and maintenance of the Site. The plan shall include but not be limited to the final contours of the Site, completion, inspection and maintenance of the final cover, an assessment of the adequacy of the monitoring and contingency plans and any other post closure monitoring and care.

The following items are added to SCHEDULE "A":

4. Township of Greater Madawaska, Black Donald Waste Disposal Site, Site Development and Operations Plan, Prepared by Jp2g Consultants Inc. dated January 2001.

5. Letter and accompanying documents dated November 13, 2001, from Brian Whitehead, Jp2g Consultants Inc., addressed to John Kaasalainen, MOE.

6. Letter dated March 13, 2002, from Nafiseh Pourhassani, P. Eng., MOE, addressed to Cathy Reddy, The Corporation of the Township of Greater Madawaska.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A411902 dated March 27, 1980 and amended on October 22, 2001.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 12th day of July, 2002

THIS NOTICE WAS MAILED
ON July 15/2002
J.C.
(Signed)

Ian Parrott, P.Eng.
Director
Section 39, *Environmental Protection Act*

NP/
c: District Manager, MOE Ottawa District Office
Andrew Polley, MOE, Ottawa District Office
Bruce Harman, Lakefield Research Ltd.

A. P[illegible] / File
Pls establish tracking of compliance dates. [illegible]

Ministry of the Environment | Ministère de l'Environnement

Ontario

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A 411902
Notice No. 1

OCT 25 2001
OTTAWA

Corporation of the Township of Greater Madawaska
P.O. Box 180
1101 Francis Street,
Calabogie, Ontario
K0J 1H0

Site Location: Black Donald Waste Disposal Site
Pt. Lot 9, Conc. 3, 34 Hydro Dam Road
Geographical Township of Brougham
Township of Greater Madawaska, County of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A 411902 issued on March 27, 1980 for an increase in the site service area to include the Township of Greater Madawaska, as follows:

The following conditions of approval are added to the Provisional Certificate of Approval:

DEFINITIONS

(2) For the purpose of this Certificate of Approval, unless the contrary intention appears, the following words and phrases shall have the following meaning attributed to them:

2.1 "Adverse Effect" is as defined in the Environmental Protection Act, R.S.O. 1990.
2.2 "Applicant" and/or "Owner" means the Township of Greater Madawaska.
2.3 "Certificate" means the Provisional Certificate of Approval No. A 411902, as amended from time to time, including all schedules attached to and forming part of the Certificate.
2.4 "Crown" means Her Majesty the Queen in Right of Ontario.
2.5 "Director" means the one or more persons who from time to time are so designated for the purpose of Part V of the Environmental Protection Act.
2.6 "District Manager" means the District Manager of the Ministry's Ottawa District Office.
2.7 "EPA" means the Environmental Protection Act, R.S.O. 1990, Chapter E.19, as amended.
2.8 "Ministry" and/or "MOE" means the Ontario Ministry of the Environment.
2.9 "ODWS" means the Ontario Drinking Water Standards, as amended.
2.10 "OWRA" means the Ontario Water Resources Act, R.S.O. 1990, as amended.

2.11 "PWQO" means the Provincial Water Quality Objectives, as amended.

2.12 "Site" means the entire waste disposal site including the landfilling area and the buffer lands as listed in Schedule "A" of the Certificate and consisting of approximately a 1.2 hectare landfill site.

2.13 "Supporting Documentation" refers to the reports listed in Schedule "A" of the Certificate.

GENERAL

(3) The requirements specified in this Provisional Certificate of Approval are the requirements under the **Environmental Protection Act**, R.S.O. 1990. The issuance of this Provisional Certificate of Approval in no way abrogates the Applicant's legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.

(4) The requirements of this Provisional Certificate of Approval are severable. If any requirement of this Provisional Certificate of Approval, or the application of any requirement of this Provisional Certificate of Approval to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this Provisional Certificate of Approval shall not be affected in any way.

(5) The Applicant shall ensure compliance with all the terms and conditions of this Provisional Certificate of Approval. Any non-compliance constitutes a violation of the **Environmental Protection Act**, R.S.O. 1990 and is grounds for enforcement.

(6) (a) The Applicant shall, forthwith upon request of the Director, District Manager, or Provincial Officer (as defined in the Act), furnish any information requested by such persons with respect to compliance with this Provisional Certificate of Approval, including but not limited to, any records required to be kept under this Provisional Certificate of Approval; and

(b) In the event the Applicant provides the Ministry with information, records, documentation or notification in accordance with this Provisional Certificate of Approval (for the purposes of this condition referred to as "Information"),

(i) the receipt of Information by the Ministry;
(ii) the acceptance by the Ministry of the information's completeness or accuracy; or
(iii) the failure of the Ministry to prosecute the Applicant, or to require the Applicant to take any action, under this Provisional Certificate of Approval or any statute or regulation in relation to the Information;

shall not be construed as an approval, excuse or justification by the Ministry of any act or omission of the Applicant relating to the Information, amounting to

non-compliance with this Provisional Certificate of Approval or any statute or regulation.

(7) The Applicant shall allow Ministry personnel, or a Ministry authorized representative(s), upon presentation of credentials, to:

(a) carry out any and all inspections authorized by Section 156, 157 or 158 of the **Environmental Protection Act**, R.S.O. 1990, Section 15, 16 or 17 of the **Ontario Water Resources Act**, R.S.O. 1990, or Section 19 or 20 of the **Pesticides Act**, R.S.O. 1990, as amended from time to time, of any place to which this Provisional Certificate of Approval relates; and,

without restricting the generality of the foregoing, to:

(b) (i) enter upon the premises where the records required by the conditions of this Provisional Certificate of Approval are kept;

(ii) have access to and copy, at reasonable times, any records required by the conditions of this Provisional Certificate of Approval;

(iii) inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this Provisional Certificate of Approval; and

(iv) sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this Provisional Certificate of Approval.

(8) (a) Where there is a conflict between a provision of any document referred to in Schedule "A", and the conditions of this Provisional Certificate of Approval, the conditions in this Provisional Certificate of Approval shall take precedence; and

(b) Where there is a conflict between documents listed in Schedule "A", the document bearing the most recent date shall prevail.

(9) The Applicant shall ensure that all communications/correspondence made pursuant to this Provisional Certificate of Approval includes reference to the Provisional Certificate of Approval number A411902.

(10) The Applicant shall notify the Director in writing of any of the following changes within thirty (30) days of the change occurring:

(a) change of Applicant or operator of the Site or both;

(b) change of address or address of the new Applicant;

(c) change of partners where the Applicant or operator is or at any time becomes a partnership, and a copy of the most recent declaration filed under the **Business Names Act**, 1991 shall be included in the notification to the Director;

(d) any change of name of the corporation where the Applicant or operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (form 1 or 2 of O. Reg. 182, Chapter C-39, R.R.O. 1990 as amended from time to time), filed under the **Corporations Information Act** shall be included in the notification to the Director; and

(e) change in directors or officers of the corporation where the Applicant or operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" as referred to in 9(d), supra.

(11) In the event of any change in ownership of the Site, the Applicant shall notify, in writing, the succeeding owner of the existence of this Provisional Certificate of Approval, and a copy of such notice shall be forwarded to the Director.

(12) Any information relating to this Provisional Certificate of Approval and contained in Ministry files may be made available to the public in accordance with the provisions of the **Freedom of Information and Protection of Privacy Act**, R.S.O. 1990, C. F-31.

(13) All records and monitoring data required by the conditions of this Provisional Certificate of Approval must be kept on the Owner's premises for a minimum period of two (2) years from the date of their creation.

DEVELOPMENT AND OPERATIONS

(14) Within 3 months of the date of this Notice, the Applicant shall submit to the Director for approval an updated development and operations report and supporting hydrogeological study outlining how the remaining capacity of the Site is to be utilized. These reports shall include the following information

- site plans showing the waste disposal footprint, buffer zones, and contaminant attenuation zones, if required, including the ownership of such lands;
- site operation and development plans;
- daily/intermediate/final cover requirements;
- security, fencing, signage, site supervision, housekeeping and screening requirements;
- surface drainage plans, leachate and gas control plans;
- a proposed monitoring program for landfill gas, leachate, groundwater, and surface water including trigger mechanisms and contingency plans;
- reporting requirements; and
- closure plans.

All in accordance with the following plans and specifications which are added to Schedule "A" of the Certificate:

1. The Application for a Provisional Certificate of Approval for a Waste Disposal Site dated January 11, 2001 as signed by Cathy Reddy, Clerk Treasurer of the Township of Greater Madawaska.

2. The letter dated January 31, 2001 to Mr. A. Dominski of the Ministry of the Environment, Environmental Assessment and Approvals Branch from Mr. Brian Whitehead of Jp2g Consultants Inc. providing the purpose and basis for this amendment.

3. The letter dated March 1, 2001 to Mr. A. Dominski of the Ministry of the Environment, Environmental Assessment and Approvals Branch from Mr. Brian Whitehead of Jp2g Consultants Inc. requesting that the proposed amendment be split into two parts, one for the service area change and another for the site development aspects as well as the reasons for this request.

The reasons for this amendment to the Certificate of Approval are as follows:

The reasons for this amendment are to allow for an increase in service area for the waste disposal site and to update the Certificate to meet the Ministry's current requirements.

The reasons for each of the conditions of approval are as follows:

1) *The reason for Condition (2) is to define the specific meaning of terms used to simplify the conditions in this Certificate.*

2) *The reason for Conditions (3), (4), (5), (8), (9), (10), (11), (12) and (13) is to clarify the legal rights and responsibilities of the Owner.*

3) *The reason for Condition (6) and (7) is to ensure that the appropriate Ministry staff have ready access to information and the operations of the Site which are approved under this Provisional Certificate of Approval. Condition (7) is supplementary to the powers of entry afforded a Provincial Officer pursuant to the **Environmental Protection Act**, the **Ontario Water Resources Act**, and the **Pesticides Act**, as amended.*

4) *The reason for Condition (14) is to ensure that the continued use and operation of the Site is done in an environmentally acceptable manner.*

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No.A 411902 dated March 27, 1980, as amended.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Appeal Board
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Appeal Board's requirements for an appeal can be obtained directly from the Board at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 12th day of October, 2001

THIS NOTICE WAS MAILED
ON Oct. 22, 2001
DC
(Signed)

Ian Parrott, P.Eng.
Director
Section 39, *Environmental Protection Act*

JK/
c: District Manager, MOE Ottawa
Brian Whitehead, Planner, Jp2g Consultants Inc.

Ontario

Ministry
of the
Environment

133 Dalton St., Box 820
Kingston, Ontario
K7L 4X6

March 27, 1980

Township of Brougham
Dacre, Ontario
NOJ 1NO

RE: Dump Site
Lot 9, Concession III
Township of Brougham
County of Renfrew

The enclosed revised Provisional Certificate of Approval contains a condition requiring it be registered on title. The reason for this condition is attached to the Certificate.

Two copies of the Certificate and reasons are on long paper to facilitate registration. Both of these should be taken to the Land Registry Office and one returned to the Director with registration particulars.

If your Certificate does not contain sufficient legal description for registration because you have not given one to the Director, you will have to provide one under Section 23(1). (e) of The Registry Act or in your application under The Land Titles Act.

In the event that the site including its buffer, is part of a larger parcel of land and you do not wish to prepare a new survey at this time, you may register the Certificate against the larger parcel of land. If you do so, the Director is prepared, if requested in the future.

1. In the case of land recorded under The Land Titles Act, to consent to an application to delete the registration from the title of lands not within the site including its buffer zone, and

2. In the case of land recorded under The Registry Act, to issue a Certificate that lands not used for the actual disposal of waste or buffer zone have not been so used.

Such documents would be issued after suitable draft documents including legal description were submitted by you or your successor. The purpose of such documents would be to assure subsequent purchasers that the lands in question were not affected by section 46 of the Environmental Protection Act.

Yours very truly

Director

Ministry of the Environment
Ontario

Provisional Certificate No. A 411902

PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE

Under The Environmental Protection Act, 1971 and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Township of Brougham
Dacre, Ontario
NOJ 1NO

for the use and operation of a 1.2 hectare dump site

all in accordance with the following plans and specifications:

Located: Lot 9, Concession III
Township of Brougham
County of Renfrew

which includes the use of the site only for the disposal of the following categories of waste (NOTE: Use of the site for additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval) domestic and 5% other wastes, limited to scrap metal, brush, lumber and construction debris.

and subject to the following conditions:

1. No operation shall be carried out at the site after sixty days from this condition becoming enforceable unless this Certificate including the reasons for this condition has been registered by the applicant as an instrument in the appropriate Land Registry Office against title to the site and a duplicate registered copy thereof has been returned by the applicant to the Director.

THIS IS A TRUE COPY OF THE ORIGINAL CERTIFICATE MAILED ON Apr 9/80

M.P
(Signed)

Dated this 27th day of March, 19 80.

Director, Section 39,
The Environmental Protection Act, 1971

Ministry of the Environment

Ontario

NOTICE

TO: Township of Brougham
Dacre, Ontario
NOJ 1NO

You are hereby notified that Provisional Certificate of Approval No. A 411902 has been issued to you subject to the conditions outlined therein.

The reasons for the imposition of these conditions are as follows:

The reason for the condition requiring registration of the Certificate is that Section 46 of The Environmental Protection Act, 1971 prohibits any use being made of the lands after they cease to be used for waste disposal purposes in order to protect future occupants of the site and the environment from any hazards which might occur as a result of waste being disposed of on the site. This prohibition and potential hazard should be drawn to the attention of future owners and occupants by the Certificate being registered on title.

You may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board.

This Notice should be served upon:

The Secretary,
Environmental Appeal Board,
1 St. Clair Ave. West,
5th Floor,
Toronto, Ontario.
M4V 1K7

AND

The Director,
Section 39
Ministry of the Environment,

DATED this 27th day of March , 1980 .

Province of Ontario

Document General

Form 4 — Land Registration Reform Act, 1984

Abs ✓

Dye & Durham Co. Limited Form No. 985

D

FOR OFFICE USE ONLY

R 0429866

CERTIFICATE OF REGISTRATION
CERTIFICAT D'ENREGISTREMENT
RENFREW (49) PEMBROKE

Feb '06 28 AM 9 41

New Property Identifiers — Additional: See Schedule ☐

Executions — Additional: See Schedule ☐

(1) Registry ☒ Land Titles ☐

(2) Page 1 of 2 pages

(3) Property Identifier(s)

Block	Property
57375	0029 (R)
57375	0030 (R)

Additional: See Schedule ☐

(4) Nature of Document CERTIFICATE OF PROHIBITION FOR WASTE DISPOSAL SITE, CERTIFICATE OF APPROVAL NO. A411902 SECTION 197(2), ENVIRONMENTAL PROTECTION ACT

(5) Consideration

Dollars $

(6) Description

Part of Lot 9, Con 2 &
Concession 3
Geographic Township of Brougham, Township of Greater Madawaska
being Parts 1 to 4, Plan 49R-15646

(7) This Document Contains: (a) Redescription New Easement Plan/Sketch ☐ (b) Schedule for: Description ☐ Additional Parties ☐ Other ☒

(8) This Document provides as follows:

See Schedule

Continued on Schedule ☐

(9) This Document relates to instrument number(s)

(10) Party(ies) (Set out Status or Interest)

Name(s)	Signature(s)	Date of Signature Y	M	D
MINISTRY OF THE ENVIRONMENT By one of its Directors Appointed under s.5 Environmental Protection Act	[signature] GREG WASHUTA	2006	2	24

(11) Address for Service 2 St. Clair Avenue West, Floor 12A, Toronto, Ontario, M4V 1L5

(12) Party(ies) (Set out Status or Interest)

Name(s)	Signature(s)	Date of Signature Y	M	D

(13) Address for Service

(14) Municipal Address of Property

not assigned

(15) Document Prepared by:

HOWARD A. LITHWICK
Barrister & Solicitor
300-39 Roberston Road
Ottawa (Nepean), ON K2H 8R2

FOR OFFICE USE ONLY

Fees and Tax	
Registration Fee	60.00
Total	

10174 (12/94)

(12)

Province of Ontario

Schedule

Form 5 — Land Registration Reform Act

DYE & DURHAM CO. INC.—Form No. 980 Amended NOV. 1982

S

Page 2

Additional Property Identifier(s) and/or Other Information

CERTIFICATE OF PROHIBITION

s. 197(2) Environmental Protection Act

This is to certify that pursuant to an Amendment to Provisional Certificate of Waste Disposal Site Number A411902, dated July 12, 2002, relating to the landfill site more particularly described in Box (6) on page one of this instrument, the following person, namely The Corporation of the Township of Greater Madawaska is prohibited from dealing with the property described in the aforesaid Box (6) on page one without first giving a copy of the Amended Provisional Certificate of Approval to each person acquiring an interest in the property as a result of the dealing.

Under subsection 197(3) of the Environmental Protection Act, the prohibition applies to each person who, subsequent to the registration of this certificate, acquires an interest in the property.

FOR OFFICE USE ONLY

Appendix B
MOE Correspondence

BLACK DONALD WASTE DISPOSAL SITE

,

Inspection Report

System Number:	A411902
Entity:	THE CORPORATION OF THE TOWNSHIP OF GREATER MADAWASKA
Inspection Start Date:	10/07/2022
Inspection End Date:	11/21/2022
Inspected By:	Thandeka Ponalo
Badge #:	1718

_____
(signature)

NON-COMPLIANCE/NON-CONFORMANCE ITEMS

The following item(s) have been identified as non-compliance/non-conformance, based on a "No" response captured for a legislative or best management practice (BMP) question (s), respectively.

Question Group: Other Inspection Findings

Question ID	949100	**Question Type**	Legislative
Question: Were the inspection questions sufficient to address other identified non-compliance items?			
Legislative Requirement	Not Applicable		
Observation/Corrective Action(s)			
The following instances of non-compliance were also noted during the inspection: At time of the inspection, Township staff stated that the site likely has an operational capacity of only two (2) years instead of five (5) years as stated in the 2021 Annual Report. This would require the submission of a Closure Plan as outlined in Condition 34 of the ECA. Furthermore, staff stated that some areas of the landfill have exceeded their contours by an estimated 2.4 metres which may further reduce the operational capacity of the landfill. Township staff stated that the Township is exploring submitting an expansion request to extend the life of the site that would also increase the final contours of the landfill to accommodate areas where final contours have been exceeded. ACTION 1. The Township shall conduct an assessment of the approved waste disposal area to determine the accurate remaining capacity of the site. 2. The Township shall submit to the Ministry a drawing of the landfilling area that shows the areas that have been overfilled in relation to the approved final contours. 3. The Township shall submit to the Ministry an action plan to address how the site will be brought back into compliance in relations to the approved landfill design and capacity limits.			

INSPECTION DETAILS

This section includes all questions that were assessed during the inspection.

Ministry Program: WASTE | **Regulated Activity:** Landfills

Question ID	NOL 1	**Question Type**	Legislative
Question: Does the Open landfill site have an Environmental Compliance Approval (ECA)?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes ECA Number A411902 was issued on March 27, 1980 and amended, October 12, 2001, July 12, 2002 and January 24, 2013.			

Question ID	NOL 3	**Question Type**	Legislative
Question: Does the holder of the landfill ECA own the entire site?			
Legislative Requirement	EPA | 27 | (1); EPA | O. Reg. 232/98 | 3;		
Observation			
Yes The site is approved for a 1.2 ha landfill site within a total licensed property area of 21.36 ha, inclusive of lands used for operational buffer and contaminant attenuation zone (CAZ) purposes.			

Question ID	NOL 4	**Question Type**	Information
Question: Does the landfill have a Contaminant Attenuation Zone (CAZ)?			
Legislative Requirement	Not Applicable		
Observation			
Yes			

Question ID	NOL 13	**Question Type**	Information

Question: Are access roads and on-site roads provided so that vehicles hauling waste to and on the site may travel readily on any day under all normal weather conditions?	
Legislative Requirement	EPA | 27 | (1);
Observation	
Yes Access to the site is provided by Hydro Dam, located off County Road 508 near Black Donald Lake approximately 15 km southwest of the Village of Calabogie. The 2021 Annual Report states that the site access road extending from Hydro Dam has sufficient width at the entrance and within the site to allow for unimpeded winter travel and access for emergency and snow removal equipment. At time of the inspection, the access road was well maintained and in good condition.	

Question ID	NOL 14	**Question Type**	Legislative
Question: Is site access limited to times when an attendant is on duty?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes The site was closed to the public on April 5, 2010, however, disposal operations at the site are currently available for municipal vehicles and Township-approved haulers only under supervision of Township operations staff. The 2021 Annual Report states that the site is restricted by a lockable gate at the entrance, and the site is surrounded by forested lands which provides adequate screening and restricts access for vehicular traffic. At time of the inspection, Township staff confirmed that the site gate is kept locked and only Township approved commercial vehicles are allowed on site when the site attendant is present.			

Question ID	NOL 15	**Question Type**	Legislative
Question: Does the site only receive waste from within its approved service area?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes In accordance with Condition 16 of the ECA, the site only receives waste from the Township of Greater Madawaska.			

Question ID	NOL 16	Question Type	Information
Question: Is the site required to have a ground water monitoring program by the ECA?			
Legislative Requirement	Not Applicable		
Observation			
Yes Groundwater requirements are outlined in Conditions 26 to 29 and in Schedule "B" of the ECA. It is the responsibility of the Township to ensure the site's groundwater parameters at the property boundary meet those as calculated by Guideline B-7: Reasonable Use Guideline (RUG). The 2021 Annual Report states that groundwater configuration at the site was consistent with historical interpretations with the east-west oriented groundwater divide evident in the vicinity of the waste mound, and predominant flow directions to the east, west and southeast. The report states that based on 2021 results, it is interpreted that the site meets the intent of Guideline B-7 and is interpreted to be in compliance with RUC in 2021 at the southwestern CAZ boundary. At the time of the inspection, no leachate seeps or odours were observed at the site. The 2021 Annual Report has not been reviewed by the Technical Support Section.			

Question ID	NOL 20	Question Type	Information
Question: Is there ongoing abatement to address any concerns the ministry has with the ground water monitoring?			
Legislative Requirement	Not Applicable		
Observation			
No			

Question ID	NOL 21	Question Type	Information
Question: Is the site required to manage leachate by the ECA?			
Legislative Requirement	Not Applicable		
Observation			

No
There is no leachate control system at this landfill site. The site is a natural attenuating landfill.

Question ID	NOL 26	Question Type	Information
Question: Is the site required to manage landfill gas by the ECA?			
Legislative Requirement	Not Applicable		
Observation			
No There is no methane gas control system at the site.			

Question ID	NOL 31	Question Type	Information
Question: Is the site required to have a surface water monitoring program by the ECA?			
Legislative Requirement	Not Applicable		
Observation			
Yes Surface water requirements are outlined in Conditions 26 to 29 and in Schedule "B" of the ECA. It is the responsibility of the Township to ensure the site's surface water parameters on and off-site meet those as stated in the Provincial Water Quality Objectives (PWQO). The 2021 Annual Report states that based on the surface water quality results in 2021, and the significant distance of each sampling location from the approved waste disposal area of the site, the surface water systems south and southeast of the site is not interpreted to be impacted from landfill-related activities. Non-conformances of PWQO for concentrations of DO (low), phosphorus, iron and zinc noted in 2021 at select sampling locations for select sampling dates were attributed to be naturally occurring in the background (SW-4), as well as to low-flow surface water conditions. The high pH value in the summer of 2021 at location SW-6 was interpreted to be anomalous. The 2021 Annual Report was no reviewed by the Technical Support Section.			

Question ID	NOL 36	Question Type	Legislative
Question: Is proper equipment available for the compaction of waste and applying cover material?			

Legislative Requirement	EPA | 27 | (1);
Observation	
Yes	

Question ID	NOL 37	**Question Type**	Legislative
Question: Is the landfill able to accurately determine the amount of waste received?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes A specialized survey and design technique referred to as digital terrain modelling (DTM) is used to determine waste landfilled at the site. The DTM method is a computer-based process that compares two (2) topographic surfaces or digital terrain models and calculates the prismoidal volumetric difference. The 2021 Annual Report states that the topographical survey was completed on December 14, 2021 and it was estimated that the remaining site capacity is 4,400 cubic meters.			

Question ID	NOL 38	**Question Type**	Legislative
Question: Are all disposal operations at the site adequately and continually supervised?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes Disposal operations at the site are currently available for municipal vehicles and Township-approved haulers only under supervision of the site attendant. To address previous dumping concerns, cameras were installed at the site.			

Question ID	NOL 39	**Question Type**	Information
Question: Does the landfill operator have a site inspection program as required by the ECA?			
Legislative Requirement	Not Applicable		
Observation			
Yes			

As per Condition 23 of the ECA, weekly inspections of the equipment and facilities shall be conducted to ensure that they are maintained in good working condition at all times. Any deficiencies, which might negatively impact the environment, which are detected during these inspections shall be recorded in a log and promptly corrected.

At time of the inspection, weekly inspection reports were requested and provided.

Question ID	NOL 40	**Question Type**	Legislative
Question: Does the landfill operator have a procedure in place to address issues identified by staff during the site inspection?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes Staff record any deficiencies and corrective actions identified during weekly inspections in the weekly inspection form.			

Question ID	NOL 41	**Question Type**	Legislative
Question: Is the waste being compacted adequately?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes			

Question ID	NOL 42	**Question Type**	Legislative
Question: Is Daily cover applied to the waste at the end of each working day or as otherwise specified in the ECA?			
Legislative Requirement	EPA | 27 | (1); EPA | O. Reg. 232/98 | 7;		
Observation			
Yes Condition 37(c) of the ECA states that processed C&D waste and bulky waste materials can be used as alternative cover. At time of the inspection, staff stated they used C&D waste as alternative cover.			

Question ID	NOL 43	**Question Type**	Legislative
Question: Are procedures implemented to control rodents or other animals and insects at the site?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes Condition 15 of the ECA requires the site shall be constructed, operated and maintained in an environmentally safe manner, which minimizes the impacts of dust, odour, noise, litter, vector and vermin on the general public, site personnel, and the natural environment, all in accordance to the Development and Operations Plan, Items 4, 5 and 6 of Schedule "A". At time of the inspection, staff stated that as they only accept C&D waste, leaf and yard waste, and non-hazardous domestic waste only during emergencies, they have not had problems with rodents and other animals.			

Question ID	NOL 44	**Question Type**	Legislative
Question: Is site access restricted by use of a gate, fence, or physical barrier when the site is not operating?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes The site is surrounded by forested lands, and they have a gate they keep locked when Township staff are not on site.			

Question ID	NOL 45	**Question Type**	Legislative
Question: Is the waste disposal area adequately screened from public view?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes The site is surrounded by forested lands that screen the site from public view.			

Question ID	NOL 47	Question Type	Legislative
Question: Has the annual operations report been submitted to MECP or available on site as required by the ECA?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes In accordance with Condition 27 of the ECA, the Annual Report was provided to the District Manager by March 31st.			

Question ID	NOL 48	Question Type	Legislative
Question: Is scavenging being prevented?			
Legislative Requirement	EPA | 27 | (1); EPA | O. Reg. 232/98 | 23;		
Observation			
Yes In accordance with section 11(19) of the EPA, scavenging is not permitted at the site.			

Question ID	NOL 49	Question Type	Information
Question: Has a closure plan been submitted to the MECP?			
Legislative Requirement	Not Applicable		
Observation			
No Condition 34 of the ECA requires that two (2) years prior to the site reaching its final capacity, the Township shall submit to the Director, for approval, a plan for closure, post closure monitoring and maintenance of the site. The plan shall include but not be limited to the final contours of the site, completion, inspection and maintenance of the final cover, an assessment of the adequacy of the monitoring and contingency plans and any other post closure monitoring and care. The 2021 Annual Report states that the remaining operating life of the site is 4,400 cubic meters or five (5) years. At time of the inspection, Township staff stated that the site only has two (2) years of operating capacity left not five (5) years.			

Compliance actions are addressed in different section of this inspection report.

Question ID	NOL 51	Question Type	Legislative
Question: Is the landfill only accepting the types of waste that they are approved to receive?			
Legislative Requirement	EPA | 27 | (1);		
Observation			

Yes
In accordance Condition 16(a) of the ECA, the site only accepts C&D waste, bulky waste, and leaf and yard waste.

Condition 16(b) of the ECA states that the site may receive non-hazardous solid domestic waste from within the Township of Greater Madawaska, on a temporary basis, only with prior written authorization from the District Manager. Condition 16(c) of the ECA requires that prior notification of 48-hours must be provided to the District Manager for receipt of any domestic waste.

A file review did not show any notifications to the District Manager were received at the Ottawa District Office in the last two years. The 2021 Annual Report states that in 2021, the site was only used to stockpile C&D and bulky waste for processing and disposal. No recycling operations were conducted at the site. It noted that a significant quantitiy of bentonite clay material from a nearby construction project was received at the site and it was emplaced at the site as final cover and as regular cover in areas of the approved waste disposal area

The Township shall ensure that before accepting non-hazardous waste at the site, notification is provided to the District Manager as outlined in the ECA.

Question ID	NOL 55	Question Type	Legislative
Question: Does the landfill have emergency contingency plan as required by the ECA?			
Legislative Requirement	EPA | 27 | (1);		
Observation			

Yes
Condition 25 of the ECA requires the Township shall immediately take all measures necessary to contain and clean up any spill or leak which may result from the operation at this site. All spills and upsets shall be immediately reported to the Ottawa District Office or the Ministry's Spills Action Centre at 416-325-3000 or 1-800-268-6060, and the

Municipality, and shall be recorded in a log book as to the nature of the spill or upset, and the action taken for clean-up, correction and prevention of future occurrences.

At time of the inspection, Township staff stated that there had been no spills, fires or emergencies in the last two years.

Question ID	NOL 56	**Question Type**	Information
Question: Is there an ECA condition requiring financial assurance?			
Legislative Requirement	Not Applicable		
Observation			
No Financial assurance is not required for municipally operated waste disposal/transfer sites.			

Question ID	NOL 59	**Question Type**	Legislative
Question: Does the landfill have a procedure in place to address complaints?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes As per Condition 24(b) of the ECA, any complaints received from the public or adjacent neighbours shall be recorded in a logbook created and maintained for this purpose. The 2021 Annual Report states that there were no complaints received at the site in 2021. At time of the inspection, Township staff stated that there were no complaints received in 2022.			

Question ID	NOL 61	**Question Type**	Information
Question: Has the landfill operator developed a Design and Operations Manual?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes			

Question ID	NOL 63	Question Type	Legislative

Question:

Does the landfill operator have training procedures for site personnel?

Legislative Requirement	EPA | 27 | (1);

Observation

Yes
There are no requirements for training outlined in ECA. The 2021 Annual Report states that waste operations training was conducted by Greenview on June 12, 2017. No training was conducted in 2021.

At time of the inspection, Township staff stated that training was planned for before the end of the year, and the training would be documented in the 2022 Annual Report.

Question ID	949100	Question Type	Legislative

Question:

Were the inspection questions sufficient to address other identified non-compliance items?

Legislative Requirement	Not Applicable

Observation

The following instances of non-compliance were also noted during the inspection:

At time of the inspection, Township staff stated that the site likely has an operational capacity of only two (2) years instead of five (5) years as stated in the 2021 Annual Report. This would require the submission of a Closure Plan as outlined in Condition 34 of the ECA. Furthermore, staff stated that some areas of the landfill have exceeded their contours by an estimated 2.4 metres which may further reduce the operational capacity of the landfill. Township staff stated that the Township is exploring submitting an expansion request to extend the life of the site that would also increase the final contours of the landfill to accommodate areas where final contours have been exceeded.

ACTION

1. The Township shall conduct an assessment of the approved waste disposal area to determine the accurate remaining capacity of the site.
2. The Township shall submit to the Ministry a drawing of the landfilling area that shows the areas that have been overfilled in relation to the approved final contours.
3. The Township shall submit to the Ministry an action plan to address how the site will be brought back into compliance in relations to the approved landfill design and capacity limits.

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

Jp2g No. 22-6213A

October 25, 2022

Ministry of the Environment, Conservation and Parks
2430 Don Reid Drive
Ottawa, ON K1H 1E1

Attention: Thandeka Ponalo
Sr. Environmental Officer

Re: Black Donald Landfill Site
Township of Greater Madawaska
ECA No. A411902
Expansion Feasibility Study

Dear Thandeka:

On behalf of the Township of Greater Madawaska, we are pleased to provide this feasibility assessment regarding the potential for an expansion at the Black Donald Landfill Site. This report provides the preliminary steps to obtain approval for an expansion and is intended to provide the Township with a foundation for waste management decision making pending Ministry comments.

1.0 INTRODUCTION

The Black Donald Landfill Site located on part of Lot 9, Concession 2 and 3, geographic Township of Brougham in the Township of Greater Madawaska, Ontario, currently operates under ECA No. A411902 issued March 27, 1980, as amended which is included in **Attachment 1**. The following provides the additional Notices issued under the ECA:

Notice No. 1 October 22, 2001	Amended to reflect the increase in site service area to include the Township of Greater Madawaska.
Notice No. 2 July 12, 2002	Amendment to include the submission of the development and operations report as per Condition 14.
Notice No. 3 January 24, 2013	Amended to reflect site operations, approval of alternate daily cover and Site Trigger and Contingency Plan.

The environmental monitoring compliance program is based on the ECA Schedule “B” dated January 24, 2013. Operations compliance is based on a Design, Operations and Development Plan by Greenview Environmental Management, dated December 22, 2010 (Greenview, 2010).

2.0 LANDFILLING CAPACITY

The following has been compiled from various sources to estimate the total approved waste disposal volume and the remaining landfilling capacity. Recent Greenview documents have stated the current volume in place is unknown.

2.1 Total Design Capacity

Under ECA Notice No. 2 dated July 12, 2002 the Site Development And Operations Plan by Jp2g Consultants Inc. dated January 2001 (Jp2g, 2001) as item 4 in Schedule "A" provided the following site capacity figures:

- theoretical maximum capacity of a 1.2 ha site to a pyramidal peak 54,200m^3
- preliminary design capacity of a 0.9 ha landfilling area with a 30m buffer along the Township road 25,550m^3
- detailed design capacity of 34,250m^3 (excluding final cover) with a remaining capacity of 29,350m^3 as of January 1, 2001
- the total landfilled in place volume was approximately 4900m^3 as of January 1, 2001

The ECA Condition (18) dated July 12, 2002 stated the total capacity including final cover is 46,785m^3

2.2 Remaining Capacity

The Preliminary Landfill Expansion Feasibility Studies prepared by Greenview dated August 31, 2007 (Greenview, 2007) cited two (2) remaining capacities.

- As of October 27, 2006 (Golder, 2007) there was an estimated 22,300m^3, excluding final cover, remaining capacity.
- Using the revised final contours to accommodate the proposed waste transfer station as presented in the proposed 2007 application to amend the ECA, the remaining capacity was approximately 8,400m^3.

The latter was not implemented, as the Black Donald Site was not selected as one of the waste transfer sites.

Under ECA Notice No. 3 dated January 13, 2013 the Design, Operations And Development Plan (Greenview, 2010) as item 7 in Schedule "A" provided the following remaining capacity figures:

- remaining capacity as of October 20, 2009 is 14,926m^3
- remaining capacity as of November 2, 2010 is 12,442m^3

As of December 14, 2021 the remaining capacity was 4400m^3 (Greenview, 2022). The life expectancy could be 2 to 5 years depending on the annual landfilling rate. Based on the annual surveys completed to determine the annual landfilling rate and remaining capacity, the following summarizes the results based on available reports in the Township records.

Year	Annual Landfilled (m3)	Remaining Capacity (m3)	Estimated Years	Waste Summary
2009	4909	14,926	3	2393 cars 2494 trucks 1145 trailers 27 single axle 11 tandem 16 tri-axle
2010	2484	12,442	5	690 cars 505 trucks 67 trailers 4 single axle 3 tandem 4 tri-axle
2011	11,341			
2012	1087 with cover	10,337	9	33 tri-axles 1 trailer
2013	1197	9140	7.6	28 tri-axles 4 trailers
2014				
2015	256	9320	9	12 tri-axles 1 bin
2016	382	8937	10	3 bins 510m^3
2017				
2018				
2019				
2020	759	6478	12	25 tri-axles 2 bins 410m^3
2021	2078	4400	5	52 tri-axles 786m^3

3.0 LEGISLATIVE REQUIREMENTS

Under Ontario Regulation 101/07, made under the EA Act, a proponent may increase the capacity by 40,000m^3 or more but not more than 100,000m^3 subject to fulfilling the Environmental Screening Process (ESP). A change of less than 40,000m^3 is exempt from the EA Act.

Approvals for changes to waste disposal sites is obtained under Part V of the Environmental Protection Act (EPA) and reviewed under the Environmental Compliance Approval (ECA) process. Under the Ministry's Requirement for Fees with ECA's (formerly O.Reg 363/98 Section 27 EPA) the province applies fees to review applications.

The July 2020 amendments to the EA Act are proposing changes to O.Reg 101/07 under a new regulation, but not to the above approvals process.

To include the approved total waste disposal volume of 46,785m^3 which includes final cover (Note O.Reg 232/98 defines total waste disposal volume without final cover) by <100,000m^3 the ESP is intended to identify potential environmental effects, concerns and/or issues to be addressed through a phased investigation and consultation process.

Greenview (2007) completed a preliminary landfill expansion feasibility study which included a review of natural heritage features, cultural heritage features and physical environmental features. The report included an Initial Environmental Impact Study by Snider's Ecological Services to assess significant natural features including threatened and endangered species habitat. Additional studies were recommended. The report also included a Stage 1 Archaeological and Cultural Heritage Assessment by The Central Archaeological Group for C.R. Murphy Archaeology. It was determined the potential for significant archaeological sites was low. The scope of work to support an ESP would be much more extensive and requires agency review and comment. In our experience an ESP would cost in the order of $100,000 to $200,000 and take approximately 5 years to complete. This cost range depends on the requirements to enhance the current landfill site monitoring program. The Greenview report identified topographical constraints which will limit the expansion of the current landfilling area south and east while maintaining the existing buffers from the Hydro Transmission line and Hydro Dam Road. An expansion to increase the total waste disposal volume by <40,000m^3 maybe acceptable as shown on **Drawing No 1**.

To determine the feasibility of expansion <40,000m^3, pre-submission consultation with the MECP Ottawa District Office and MECP Technical Support Section (TSS) Regional Office is required prior to the application. This letter combined with the recent Annual Report is anticipated to facilitate this review.

4.0 BLACK DONALD LANDFILL SITE ASSESSMENT

In order to assess the feasibility of a successful expansion application three (3) main issues need to be considered in consultation with the Ministry.

Legal – the status of the ECA, the adequacy of the landholdings and the municipality's compliance with the conditions.

- correct description of the site defining the landfilling area and total site
- correct legal survey or description of the site
- adequate contaminant attenuation zone (CAZ)
- outstanding ECA conditions to be satisfied
- submissions to satisfy a condition requiring Ministry review and approval

Environmental – the status of the water quality and landfill gas monitoring program and any measured or potential impacts on the surface and groundwater, and the potential impact to other natural environmental features.

- groundwater quality impacts
- surface water quality impacts
- adequacy of surface water flow control/stormwater management
- adequacy of the landfill gas monitoring program
- proximity to environmentally sensitive areas (ESA)
- potential impact on rare or endangered species and habitat (SAR)
- outstanding actions to address any Ministry Technical Support Section (TSS) review comments

Operations – the status of site operations and the potential impact on adjacent land uses and the local community.

- any record of negative effects on-site or on adjacent land uses, i.e. litter, dust, noise, odour, landfill gas
- any record of operational concerns
- outstanding actions to address Ministry inspection reports
- outstanding ECA Conditions to be satisfied

4.1 Legal

The ECA No. A411902 last amended January 24, 2013 describes the Site as a 1.2 hectare waste disposal site. ECA Section (2) 2.12 defines the Site as 'the entire waste disposal site including the landfilling area and the buffer lands as listed in Schedule "A" of the Certificate and consisting of approximately 1.2 hectare landfill site'. Upon review of the documents in Schedule "A" the Site comprises a 0.9m landfilling area within a total site area of 27.2 ha.

ECA Condition (33) required that a Certificate of Prohibition be registered on title. Based on available records it was registered on lands located in Part of Lot 9, Concession 2 and 3, Brougham, being Parts 1 to 4 Plan 49R-15646. As detailed in Section 4.2 the current operation has an adequate CAZ which should be satisfactory for a modest sized expansion. In Section 4.2 and 4.3 it is noted there are no ECA Conditions outstanding regarding environmental monitoring or site operations respectively.

4.2 Environmental

The monitoring program approved under the current ECA is to satisfy Condition 27. The monitoring program as detailed in ECA Schedule "B" consists of the bi-annual collection of static water levels and groundwater samples from seven (7) monitoring wells, and surface water samples collected three times per year from four (4) locations. The following provides an overview of the Environmental Monitoring program based on the work activities and laboratory data from the 2021 Monitoring period.

Overview

For the purpose of this submission, we have included the figures from the 2021 Annual Report by Greenview (2022) in **Attachment 2** and Borehole Logs in **Attachment 3**. The groundwater configuration at the site in 2021 was consistent with historical interpretations with an east-west oriented groundwater divide evident in the vicinity of the waste mound, and predominant groundwater flow directions to the east, west, and southeast as shown on Figures 4 and 5 in **Attachment 2**. Additionally, groundwater in the vicinity of the monitoring well MW08-6 was interpreted to flow to the east.

Groundwater immediately downgradient from the site at monitoring wells BH1, BH3, and BH4 was interpreted to be impacted from landfill-related activities in 2021. Most parameter concentrations were above median background groundwater quality results, with non-conformances of ODWS for concentrations of alkalinity, DOC, hardness, iron, manganese, and TDS noted at select monitors. The generally lower parameter concentrations at monitoring well BH3 compared to those at monitoring wells BH1 and BH4 were attributed to its location partially cross-gradient to the waste mound and along the groundwater divide at the site. Results from monitoring well BH1 were interpreted to be most representative of leachate quality at the Black Donald site at this time.

No RUC non-conformances were documented in results from downgradient monitoring well MW08-7 in 2021 that were attributed to landfill-related factors. The noted RUC non-conformance in fall 2021 at MW08-7 for DOC was consistent with DOC concentrations observed in background wells BH2 and MW08-6. Based on the above, the Black Donald site was interpreted to meet the intent of MECP Guideline B-7 at the downgradient eastern CAZ boundary in 2021. Based on 2021 results, it was extrapolated that given the considerable distance of BH4 to the downgradient southwestern CAZ boundary (approximately 170 m), and naturally-occurring concentrations of alkalinity, aluminum, DOC, hardness, manganese, and TDS in the background (BH2 and MW08-6), the Black Donald site was interpreted to meet the intent of MECP Guideline B-7 and was interpreted to be in compliance with RUC in 2021 at the southwestern CAZ boundary.

Based on the surface water quality results in 2021, and the significant distance of each sampling location from the Black Donald site, the surface water systems south and southeast of the Black Donald site were not interpreted to be impacted from landfill-related activities. Non-conformances of PWQO for concentrations of DO (low), phosphorus, iron and zinc noted in 2021 at select sampling locations for select sampling dates were attributed to naturally occurring conditions in the background (SW-4), as well as to low-flow surface water conditions.

In 2021, PWQO non-conformances at key trigger locations SW-3 and SW-6 for concentrations of iron were attributed to low water/ low-flow conditions, and not to landfill-related activities. Similarly, PWQO non-conformances for concentrations of phosphorus at key trigger location SW-3 were generally consistent with concentrations observed at background location SW-4 and were therefore not attributed to landfill-related factors. No RUC non-conformances were noted for any of the key trigger parameters at key trigger location MW08-7 following inclusion of 2021 results. Based on a review of five (5) year time trend analysis for parameters un-ionized ammonia, barium, boron, chloride, chromium, COD, iron, nitrate, sodium, sulphate, TKN and total phosphorus, the Trigger Mechanism was not interpreted to be activated in 2021.

Part of the feasibility study for the landfill expansion has included a critical review of the monitoring program including:

- enhancement of the groundwater quality sampling with the potential for further delineation of the leachate plume in the overburden and bedrock aquifers
- modify the surface water program by enhancing the sampling and review locations at a significant distance from the fill area

It is anticipated that a proposed expansion will not impact Environmentally Sensitive Areas (ESA) or Species At Risk (SAR), or their habitat as the expansion of the landfilling area is immediately adjacent to the operating fill area.

Revised Groundwater Monitoring Program

The existing monitoring program was reviewed to assess groundwater and quality and locations, and where feasible bolster the program to accurately address necessary impacts from the landfill. **Attachment 4** indicates the existing, and proposed revision of the monitoring program. As shown, monitoring wells are to be sampled on an annual basis for the full set of parameters as per Schedule 5 Column 1 of the Landfill Standards (1998). This increase in parameters will help establish a more comprehensive data set for the boundary compliance wells, to compare with the background and leachate wells.

The updated program will continue to sample the monitoring wells as per ECA Schedule "B", with the proposed addition of the following as shown on **Drawing No 2** (a Greenview base plan)

- one (1) bi-level monitoring well within the overburden (if available) and bedrock aquifers east of the landfilling area to further delineate the plume within the groundwater towards MW08-7;

- compliance well MW08-7 is installed in the overburden (sand material), see borehole log in **Attachment 3**, therefore it is recommended to also install a bedrock monitoring well in this location to delineate leachate in the bedrock aquifer in this direction; and

- monitoring well BH3 was destroyed in 2021 due to landfilling activities; this well should be reinstated to aid in assessing leachate migration south of the fill area.

The water quality analysis to be expanded to Schedule 5 Column 1 of the Landfill Standards (1988). Upon installation and sampling it is further recommended to update the trigger mechanism and contingency plan to reflect a proposed expansion.

Revised Surface Water Monitoring Program

The original program included surface water monitoring locations SW-1, SW-2, SW-4, SW-4, SW-5 and SW-7. SW-4 was relocated and represents background surface water quality at the site. In 2009 the Ministry agreed to remove SW-1, SW-2 and SW-7 from the monitoring program as they were typically observed to be dry. In the 2015 Annual Report the Township requested that surface water sampling be deleted from the monitoring program. The MECP letter dated July 7, 2016 reiterated that it should continue. Locations SW-3 and SW-6 are located a significant distance from the landfilling area as shown on **Figure 3** in **Attachment 2** and could be removed from the program.

Upon completion of a more detailed topographic survey and review of surface water drainage from the expanded landfilling area, additional sampling locations may be considered. The proposed analysis is to be expanded to Schedule 5 Column 3 of the Landfill Standards (1998).

To establish a more comprehensive water quality data base, in accordance with ECA Condition 28 we request District Manager approval to alter the groundwater and surface water monitoring program as shown in **Attachment 4**.

4.3 Operational

Landfilling at the Black Donald WDS initially involved a trench, burn and cover operation in the 1970s. Based on a test pit program conducted in 1998 a landfilling area of approximately 0.4ha was identified within the 1.2 ha site and an estimated in place waste volume of 4400m^3. A copy of the plan is included in **Attachment 5**. The base elevations were developed from an assumed elevation.

At the time of the 2001 application to amend the Certificate an estimated in place volume of 4900m^3 was stated. The Site Development and Operations Plan, January 2001 presented a design with final contours providing a remaining capacity of 34,250 m^3 excluding final cover. A copy of the 2001 design drawings are included in **Attachment 5**.

Landfilling operations included an area method of landfilling over the former waste disposal area and towards Hydro Dam Road within the limits of a 0.9 ha landfilling area which applied a 30m buffer from Hydro Dam Road and a 15m buffer from the Hydro One easement limit.

On April 5, 2010 the Black Donald site was closed to the public for waste and recycling operations. The Greenview Design, Operations and Development Plan, December 2010 design utilized the Jp2g concept and detailed a five (5) staged approach for landfilling. A copy of the 2010 Stage 5 drawing up to final contours without final cover is included in **Attachment 5**.

Landfilling Operations

The Greenview 2010 report details the current landfilling procedures. The site is approved to receive leaf and yard waste, bulky and construction & demolition (C&D) waste from municipal vehicles and Township approved haulers only, under the supervision of Township staff. The bulky and C&D waste is stockpiled on the active landfilling area and is ground by a licensed contractor for use as an alternative cover material source as per ECA Conditions 16(a) and 35(a) and (b). ECA Conditions 16(b) and (c) permit the Site to receive non-hazardous solid domestic waste on a temporary basis, i.e. in the event waste from the transfer stations cannot be received elsewhere.

Waste Diversion

There is no curb side collection of household waste and recyclables in the Township unless contracted directly by a homeowner or business. Currently waste received at the three (3) waste transfer sites are hauled to Moose Creek for disposal. Blue box recyclables are transferred to Emterra in Renfrew, cardboard is hauled to OVWRC near Pembroke. Other recyclable materials are picked up be licenced haulers. Household hazardous waste is accepted at the Renfrew Landfill Site facility.

ECA Operations Review

All waste deliveries to the Site are inspected by trained municipal employees and records maintained of the waste disposal operations. The following ECA conditions are being satisfied.

15 (a) The Owner shall develop the Site in accordance with the Site Design, Operations and Development Plan, dated December 22, 2010, item 7 of Schedule “A”.

(b) The Site shall be constructed, operated and maintained in an environmentally safe manner, which minimizes the impacts of dust, odour, noise, litter, vector and vermin on the general public, Site personnel, and the natural environment.

20 All incoming waste shall be inspected prior to being received at the Site to ensure that the Site is approved to accept such a waste.

21 The Owner shall ensure that all wastes at the Site are managed and disposed of in accordance with Ontario Regulation 347, R.R.O. 1990, as amended.

22 The Owner shall maintain records of the results of all inspections and monitoring and a summary of all activities associated with the Site (e.g., spills, maintenance work) in a record book located at the Site.

23 The Owner shall conduct weekly inspections of the equipment and facilities at the Site to ensure that they are maintained in good working condition at all times. Any deficiencies, which might negatively impact the environment, detected during these inspections shall be recorded in a log, and promptly corrected.

24 (a) A sign shall be posted in a prominent location at the entrance at the Site stating the hours of operation, the Owner's name, staff contact and telephone to all in the event of an emergency or any complaints.

(b) Complaints received from the public or adjacent neighbours shall be recorded in a logbook created and maintained for this purpose.

25 (a) The Owner shall immediately take all measures necessary to contain and clean up any spill or leak which may result from the operation at this Site.

(b) All spills and upsets shall be immediately reported to the Ottawa District Office or the Ministry's Spills Action Centre at 416.325.300 or 1.800.268.6060, and the Municipality, and shall be recorded in a logbook as to the nature of the spill or upset, and the action taken for clean-up, correction and prevention of future occurrences.

(c) All waste material from a spill or process upset, shall be managed and disposed of in accordance with Ontario Regulation 347, R.R.O. 1990, as amended.

35 (a) The Owner shall ensure that only Ministry-approved contractors carry out the processing of the Construction and Demolition and Bulky Waste at the Site.

(b) The Owner shall ensure that Construction and Demolition and Bulky Waste is stored and processing within the landfill footprint, as shown in Figure 6, Proposed Site Design, of item 7 of Schedule "A".

36 (a) The Owner shall ensure that leaf and yard storage and composting is conducted as described in the Site Design, Operations and Development Plan, item 7 of Schedule "A".

(b) A maximum of 1000 cubic meters of leaf and yard waste may be temporarily stored within the staging area.

(c) Leaf and yard wastes shall be moved to the established composting area within the three months of arrival at the Site.

(d) A maximum of 500 cubic meters of leaf and yard may be processed within the composting area at any time.

37 (a) The Owner shall ensure that cover material is applied at the Site as follows:

- Intermediate – Once every six (6) months, across the entire working face, and/or in areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 0.3 meters of soil or an approved thickness of alternative cover material shall be placed.
- Final – In areas where landfilling has been completed to final contours, a minimum of 0.6 meters thick layer of final cover soil shall be placed, followed by a 0.15 meter of topsoil.

(b) In the event that domestic waste is received at the Site on a temporary basis, daily cover shall be applied, at the end of each working day, followed by 0.15 meters of soil.

(c) The Owner may apply the following materials as alternative intermediate cover, in the same thicknesses as described in Condition 37(a):
- leaf and yard waste mixed with soil cover and/or wood chips
- composted or partially-composted leaf and yard waste
- asphalt shingles
- clean wood chips
- contaminated soil, non-hazardous
- processed C&D and bulky waste materials

Ministry Site Inspections

According to Township records a site inspection was completed May 26, 2015. A site inspection report dated July 6, 2015 requested the following:

1. Weekly inspections as per Condition 23 of the ECA.
2. Records of inspections as per Condition 22 of the ECA
3. Signage to be improved as per Condition 24(a) of the ECA
4. Access by unauthorized person is prevented by better fencing as per Section 11(6) of the O.Reg 347 of the EPA.

In reference to the 2021 Annual Report (Greenview, 2022) the Township received a site inspection report dated October 9, 2019. The report includes the following action items:

1. Township shall begin keeping weekly record of the equipment and facilities at the Site as per Condition 23 of the ECA
2. Recommend posting a No Dumping sign at the entrance and take further steps to prevent dumping as required by Section 11(16) of O.Reg 347

An Action Plan was filed by Greenview dated November 25, 2019. The Township submitted photos of the signage on February 14, 2020.

Jp2g Site Review

Jp2g conducted a site inspection on September 16 and 29, 2022 to review current operations and assess the feasibility of an expansion to the landfilling area. All signage was in good condition and the gate was locked. The access road to the fill area was in satisfactory condition. A large stockpile of unprocessed bulky and C&D waste was deposited on the waste mound, the ground waste has been spread and there was little wind-blown litter. Areas of the waste mound had received earth/granular material final cover and some slopes were fairly steep. Overall, the waste mound needed re-grading to achieve the 4:1 side slopes and final contours where landfilling was completed.

5.0 EXPANSION PROPOSAL

The existing landfilling area is located on a topographic bedrock high with slopes southeast and east. Overburden is characterized by a fine to medium sand of approximately 0.3 to 1.5m in thickness with local bedrock outcropping near the fill area. MW08-7 located to the east on the opposite side of Hydro Dam Road has over 8m of overburden thickness.

Based on groundwater elevation measurements over the past 20 years there is a shallow groundwater flow to the east, west and southwest which is generally consistent with the slope of the ground topography.

MW08-6 is considered the background well installed on Crown Land on the opposite side of the Hydro transmission line. BH1 is located approximately 25m east and downgradient of the fill area and the water quality is characterized by elevated concentrations of landfill leachate parameters. Given the proximity to Hydro Dam Road, road salting may also be a factor.

A RUC assessment was completed at MW08-7 which is located to the southeast of the fill area and 180m southeast of BH1 at the easterly limit of the CAZ. No RUC exceedances were documented, as the elevated DOC concentration was also detected in the background well.

In support of the proposed expansion, we propose the installation of additional overburden and bedrock monitoring wells. Water quality analysis to be expanded to Schedule 5 Column 1 of the Landfill Standards. We propose to maintain the current surface water sampling locations SW-4 (background) and SW-5 and expand the analysis to include the parameters in Schedule 5 Column 3 of the Landfill Standards. Upon further detailed topographic survey of the expansion area additional locations may be identified.

Due to the Hydro transmission line and Hydro Dam Road the expansion of the fill area is limited to the south and southeast. **Drawing No. 1** illustrates a conceptual expansion which could add another 30,000 to <40,000m^3 of waste disposal capacity. The final design requirements for the proposed expansion will require additional field elevation survey.

We trust this summary is satisfactory and will be considered by the Ottawa District Office and TSS in their review of the latest Annual Report. Should you have any questions please do not hesitate to contact the undersigned.

Yours very truly,
Jp2g Consultants Inc.
Engineers • Planners • Project Managers

Kevin Mooder, MCIP, RPP
Principal I Environmental Services

Andrea Sare, C.Tech, EP.
Environmental Consultant

Andrew Buzza, P.Geo
Sr. Hydrogeologist

KM/AS/AB/jlp

cc Leonard Emon Facilities Manager

Drawings

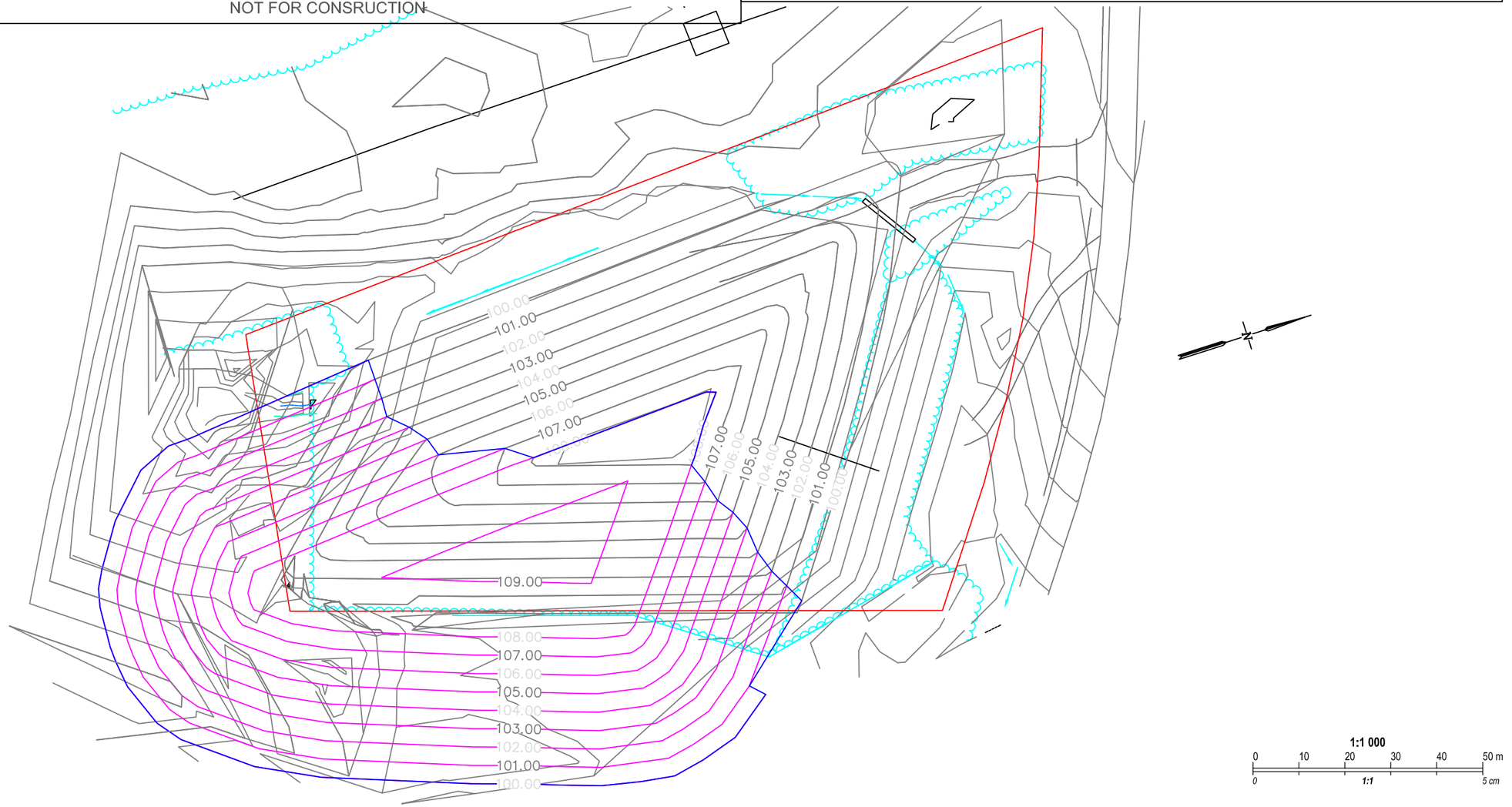
NOTES

1. EXPANSION DESIGN CONTOURS START AT 96.5M A 4:1 SLOPE TO ELEVATION 109M
2. EXPANSION DESIGN CONTOURS AT 12:1 SLOPE FROM ELEVATION 109m TO TIE IN. PEAK ELEVATION= 110.00m.
3. EXPANSION DESIGN ESTIMATED CAPACITY= 36500m³. (Base on flat plane of 100m elv.)
4. ELEVATIONS ARE APPROXIMATE BASE ON JP2G (2001) DRAWINGS AND GREENVIEW DRAWING (2010)
5. EXPANSION DESIGN CONTOURS SHOWN ARE TO TOP OF WASTE.

NOT FOR CONSRUCTION

Legend

- 0.9ha Landfilling Area
- Existing Contours
- Proposed Contours
- Roadway



Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

12 INTERNATIONAL DRIVE, PEMBROKE, ON
Phone: (613)735-2507, Fax:(613)735-4513

1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON
Phone: (613)828-7800, Fax: (613)828-2600

Black Donald - Greater Madawaska

~

Expansion design and designed Phase 5

DRAFTED: QS		PROJECT No.: 22-6213A
CHECKED: KM		REVISION DATE: 2022-10-11
CHECKED: KM	APPROVED: KM	REVISION No.: .
SCALE: 1:1000		SHEET No.: 1 of 1

DWG NAME: J:\6-ENVIRONMENTAL\ACTIVE\2022\22-6213A - GREATER MADAWASKA WDS\DRAWINGS\BLACK DONALD\CAD FILES\EXPANSION 2022 FEASIBLE.DWG LAYOUT: PHASE 5 + EXPANSIONS SAVED ON October 21, 2022

LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- EXISTING LIMIT OF WASTE
- APPROXIMATE ACTIVE DISPOSAL AREA
- CONTAMINANT ATTENUATION ZONE
- MAJOR TOPOGRAPHIC CONTOUR (2m)
- MINOR TOPOGRAPHIC CONTOUR (0.5m)
- ON-SITE ROAD
- RIGHT-OF-WAY
- FENCELINE
- ELECTRIC BEAR FENCE
- APPROXIMATE TREE LINE
- HYDRO ONE EASEMENT
- OVERHEAD UTILITIES
- BH4 GROUNDWATER MONITORING WELL
- BM BENCHMARK
- UNPROCESSED C&D & BULKY WASTE
- Proposed limits of Expansion
- Additional monitoring wells

CROWN LANDS
HYDRO TOWER
HYDRO ONE EASEMENT
MW08-6
GATE
TRAILER
RAMP
ACCESS ROAD
BH2
BM21-1
GATE
SITE
BH4
GROUNDWATER DIVIDE
ACCESS ROAD
ACTIVE AND PROPOSED DISPOSAL AREA (2021-2022)
UNPROCESSED C&D & BULKY WASTE
BH1
HYDRO DAM ROAD
TO COUNTY ROAD 508/CALABOGIE
BH3
Replace
MW08-5
Additional Bi-level Bedrock well
LOT 10
LOT 9
CONTAMINANT ATTENUATION ZONE
TOWNSHIP PROPERTY
CONCESSION 3
GEOGRAPHIC TOWNSHIP OF BROUGHAM
LOT 9
LOT 8
Additional Bedrock well
MW08-7
CONCESSION 3
GEOGRAPHIC TOWNSHIP OF BROUGHAM

GRAPHIC SCALE (IN METERS)
10 0 5 10 20 30 40 50
1:1500

NOTES

1. BENCHMARKS
   BM21-1
   IB ALONG FENCE LINE HEADING UP TO ACTIVE DISPOSAL AREA.
   ELEVATION = 100.818mm
2. DRAWING BASED ON DIGITAL INFORMATION BY GOLDER ASSOCIATES, 2006.
3. UPDATED TOPOGRAPHIC SURVEYS OF ACTIVE AREA COMPLETED BY GREENVIEW ON DECEMBER 14, 2021.

Greenview ENVIRONMENTAL MANAGEMENT
13 Commerce Court
Bancroft, Ontario
613.332.9057
greenview-environmental.ca

No.	DATE	BY	REMARKS
1	MAR18-22	MAG	ISSUED FOR MECP REVIEW
0	JAN25-22	MAG	ISSUED FOR CLIENT REVIEW

DRAWN BY: MAG | CHECKED BY: DMH
DESIGNED BY: MAG | APPROVED BY: DMH
SCALE: 1:1500 | DATE: MAR 2022

CLIENT: THE TOWNSHIP OF GREATER MADAWASKA

PROJECT:
EXISTING SITE CONDITIONS PLAN
2021 ANNUAL MONITORING REPORT
BLACK DONALD WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

PROJECT No: 102.21.014
FIGURE: 2

G:\AutoCAD\102 Greater Madawaska\014 Block Donald WDS\dwg\102.21.014 - TDM - BLACK DONALD WDS - 2021 AR FIGURES - FINAL.dwg

Attachment 1
ECA

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A411902
Notice No. 3
Issue Date: January 24, 2013

The Corporation of the Township of Greater Madawaska
1101 Francis St
Post Office Box, No. 180
Greater Madawaska, Ontario
K0J 1H0

Site Location: Black Donald Waste Disposal Site
34 Hydro Dam Rd
Greater Madawaska Township, County of Renfrew

You are hereby notified that I have amended Approval No. A411902 issued on March 27, 1980, and amended on October 12, 2001 and July 12, 2002 for the use and operation of a 1.2 hectare waste disposal site , as follows:

This Notice of Amendment updates the Approval to reflect current site operations, approves alternative daily cover and the Site Trigger and Contingency Plan.

The following definitions are added:

"Approval" means this Environmental Compliance Approval and any Schedules to it, including the application and supporting documentation listed in Schedule "A".

"Construction and Demolition and Bulky Waste" or "C&D waste" means wastes resulting from construction, and includes the following: asphalt shingles, mattresses, furniture, carpet, tree stumps, drywall, wallboard, wood (painted and unpainted).

The following Conditions are revoked and replaced:

(15) (a) The Owner shall develop the Site in accordance with the Site Design, Operations and Development Plan, dated December 22, 2010, item 7 of Schedule "A".

(b) The Site shall be constructed, operated and maintained in an environmentally safe manner, which minimizes the impacts of dust, odour, noise, litter, vector and vermin on the general public, Site

personnel, and the natural environment.

(16) (a) The Site shall only receive only non-hazardous solid Construction and Demolition and Bulky Waste, and leaf and yard waste, generated from within the Township of Greater Madawaska.

(b) The Site may receive non-hazardous solid domestic waste from within the Township of Greater Madawaska, on a temporary basis, only with prior written authorization from the District Manager.

(c) Prior notification of 48-hours must be provided to the District Manager for receipt of any domestic waste.

(23) The Owner shall conduct weekly inspections of the equipment and facilities at the Site to ensure that they are maintained in good working condition at all times. Any deficiencies, which might negatively impact the environment, which are detected during these inspections shall be recorded in a log, and promptly corrected.

(26) The Owner shall implement the Site surfacewater and groundwater monitoring program as described in Schedule "B" of this Approval.

Site Trigger and Contingency Plan

(29) The Owner shall establish the surfacewater and groundwater trigger and contingency plan, as described in Section 6.2 of the Design, Development and Operations Plan, item 7 of Schedule "A".

The following Conditions are added:

Waste Processing

(35) (a) The Owner shall ensure that only Ministry-approved contractors carry out the processing of the Construction and Demolition and Bulky Waste at the Site.

(b) The Owner shall ensure that Construction and Demolition and Bulky Waste is stored and processed within the landfill footprint, as shown in Figure 6, Proposed Site Design, of item 7 of Schedule "A".

Leaf and Yard

(36) (a) The Owner shall ensure that leaf and yard storage and composting is conducted as described in the Site Design, Operations and Development Plan, item 7 of Schedule "A".

(b) A maximum of 1000 cubic metres of leaf and yard waste may be temporarily stored within the staging area.

(c) Leaf and yard wastes shall be moved to the established composting area within three months of arrival

at the Site.

(d) A maximum of 500 cubic metres of leaf and yard waste may be processed within the composting area at any time.

(d) Composted leaf and yard waste may only be used as alternative daily cover at the Site; it may not be re-used by the public.

Cover

(37)(a) The Owner shall ensure that cover material is applied at the Site as follows:

- Intermediate - Once every six (6) months, across the entire working face, and/or in areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 0.3 metre of soil or an approved thickness of alternative cover material shall be placed; and
- Final -In areas where landfilling has been completed to final contours, a minimum of 0.6 metre thick layer of final cover soil shall be placed, followed by 0.15 metre of topsoil.

(b) In the event that domestic waste is received at the Site on a temporary basis, daily cover shall be applied, at the end of each working day, consisting of a minimum of 0.15 m of soil.

Alternative Daily Cover

(c) The Owner may apply the following materials as alternative intermediate cover, in the same thicknesses as described in Condition 37 (a):

- leaf and yard waste mixed with soil cover and/or wood chips;
- composted or partially-composted leaf and yard waste;
- asphalt shingles;
- clean wood chips;
- contaminated soil - non-hazardous;
- processed C&D and bulky waste materials.

Schedule "A"

The following items are added to Schedule "A".

7. Report entitled "Design, Operations and Development Plan, Black Donald Waste Disposal Site (A411902), Township of Greater Madawaska, County of Renfrew, Ontario", prepared by Greenview Environmental Management Limited, dated December 22, 2010.

8. Letter dated July 30, 2012, from Dan Hagan, Greenview Environmental Management, to Lynda Mulcahy, MOE, RE: Application for Approval of Waste Disposal Sites, Black Donald Waste Disposal Site (A411902), Township of Greater Madawaska, County of Renfrew, MOE reference number: 3866-CTJ5V, with responses to waste review comments and questions.

9. e-mail from Dan Hagan, Greenview Environmental Management Limited, to Lynda Mulcahy, MOE, sent August 22, 2012, 9:57am, Subject: RE TGM - Black Donald WDS - Application for Approval of Waste Disposal Sites - MOE Request for Additional Information (MOE Reference Number: 3866-8CTJ5V)

Schedule "B" is added to the Approval

Site Groundwater and Surfacewater Monitoring Program

Location	Frequency	Parameters
Groundwater BH1, BH2, BH3, BH4, MW08-5, MW08-6, MW08-7 1 QA/QC	Twice per year (Spring, Fall)	Alkalinity, aluminum, ammonia, barium, boron, cadmium, calcium, chromium, cobalt, chloride, COD, copper, DOC, hardness, iron, magnesium, manganese, nitrate, phenols, potassium, silicon, sodium, strontium, sulphate, total phosphorus, TKN, TDS, zinc field measurements (pH, conductivity, temperature), water levels
BH1	Once every 5 years (Spring)	VOCs - EPA 624
Surface Water SW-3, SW-4, SW-5, SW-6 1 QA/QC	Three Times (Spring, Summer, Fall)	Alkalinity, ammonia, BOD, boron, cadmium, calcium, chloride, COD, copper, DOC, hardness, iron, magnesium, manganese, nitrate, nitrite, phenols, potassium, sodium, strontium, sulphate, total phosphorus, TKN, TDS, zinc, TSS Field Measurements (pH, conductivity, dissolved oxygen, temperature, unionized ammonia (calculation))

The reasons for this amendment to the Approval are as follows:

Condition 15 was revised to reflect the updated Design, Operations and Development plan for the Site, and to ensure the Site does not cause nuisance or impacts.

Condition 16 was revised to clarify the currently-approved wastes that may be received at the Site.

Condition 23 was revised to update the Site inspection requirement.

Condition 26 was revised to reflect the updated Site monitoring programs.

Condition 29 was added to approve the Site trigger and contingency plan.

Condition 35 is added to ensure that storage and processing of construction and demolition wastes are carried out as described in the updated Design, Operations and Development plan, and are carried out in an environmentally-safe manner.

Condition 36 is added to ensure that leaf and yard waste storage and composting is carried out as described in the updated Design, Operations and Development plan, and are carried out in an environmentally-safe manner.

Condition 37 is included to specify cover requirements for the Site, to ensure operations to not cause impacts or nuisance.

Schedule B was added to the Approval to include the updated Site monitoring program.

This Notice shall constitute part of the approval issued under Approval No. A411902 dated March 27, 1980

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;

7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 24th day of January, 2013

THIS NOTICE WAS MAILED
ON Feb. 20, 2013
SC
(Signed)

Tesfaye Gebrezghi, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

LM/
c: District Manager, MOE Ottawa
Tyler H. Peters, Greenview Environmental Management Limited ✓

K Kebrck
SIREBMC03 250

Ministry of the Environment | Ministère de l'Environnement

Ontario

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A411902
Notice No. 2

The Corporation of the Township of Greater Madawaska
1101 Francis Street
Bagot, Blythfield And Brougham, Ontario
K0J 1H0

Site Location: Black Donald Waste Disposal Site
34 Hydro Dam Road
Greater Madawaska Township, County of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A411902 issued on March 27, 1980, and amended on October 22, 2001 for submission of development and operations report as per Condition No. (14) of October 22, 2001 amendment, as follows:

Condition No. (14) is hereby revoked.

The following conditions of approval are added to the Provisional Certificate of Approval:

SITE OPERATIONS:

(15) The Site shall be constructed, operated and maintained in an environmentally safe manner, which minimizes the impacts of dust, odour, noise, litter, vector and vermin on the general public, Site personnel, and the natural environment, all in accordance to the Development and Operations Plan, Items 4, 5 and 6 of Schedule "A".

(16) The Site shall only receive non-hazardous municipal waste that is generated from within the Township of Greater Madawaska.

(17) The normal daily hours of operation for receiving waste at the Site are 7 am to 9 pm.

(18) The total volumetric capacity of the Site, including waste, daily, interim and final cover, is 46,785 cubic meters.

(19) The Owner shall ensure that there is no burning of waste, trees, brush and or clean wood piles at the Site.

(20) All incoming waste shall be inspected prior to being received at the Site to ensure that the Site is approved to accept such a waste.

(21) The Owner shall ensure that all wastes at the Site are managed and disposed of in accordance with Ontario Regulation 347, R.R.O. 1990, as amended.

(22) The Owner shall maintain records of the results of all inspections and monitoring and a summary of all activities associated with the Site (e.g. spills, maintenance work) in a record book located at the Site.

(23) The Owner shall conduct daily inspections of the equipment and facilities at the Site to ensure that they are maintained in good working condition all the times. Any deficiencies, which might negatively impact the environment, detected during these inspections shall be recorded in a log, and promptly corrected.

(24) (a) A sign shall be posted in a prominent location at the entrance of the Site stating the hours of operation, the Owner's name, staff contact and telephone number to call in the event of an emergency or any complaints;

(b) Complaints received from the public or adjacent neighbours shall be recorded in a log book created and maintained for this purpose.

(25) (a) The Owner shall immediately take all measures necessary to contain and clean up any spill or leak which may result from the operation at this Site;

(b) All spills and upsets shall be immediately reported to the Ottawa District Office or the Ministry's Spills Action Centre at 416-325-3000 or 1-800-268-6060, and the Municipality, and shall be recorded in a log book as to the nature of the spill or upset, and the action taken for clean-up, correction and prevention of future occurrences; and

(c) All waste material resulting from a spill or process upset, shall be managed and disposed of in accordance with Ontario Regulation 347, R.R.O. 1990, as amended.

MONITORING AND REPORTING REQUIREMENTS

(26) Surface and groundwater monitoring shall be conducted in accordance to Section 9.1 and 9.2, Item 4 of Schedule "A" provided that the following conditions are met:

(a) Prior to the development of the Site, the Owner shall establish that the seasonal high water table is at least one meter below the proposed excavation bottom;
(b) In addition to the parameters listed in Table 2, Section 9.1, Item 4 of Schedule "A", Nitrate and Ammonia shall be included for groundwater monitoring; and
(c) The background groundwater monitoring well (BH-1) shall be established further away from the waste pile, and one groundwater monitoring well shall be established at the midway point of the Site's southern boundary.

(27) By March 31, 2003, and on an annual basis thereafter, the Owner shall submit to the District Manager, an annual report on the development, operation and monitoring of the Site, including any

recommendations or changes to the annual monitoring program, in accordance to Section 10.1, Item 4 of Schedule "A".

(28) A written approval from the District Manager shall be obtained for any changes to the annual monitoring program prior to these changes being implemented.

(29) (a) In accordance to the Phased Plan outlined in Section 9.1, Item 4 of the Schedule "A", and by March 31, 2003, included in the annual monitoring report, the Owner shall submit to the District Manager for written approval, trigger levels for initiating investigative activities into the cause of an increase in contaminant concentrations as established by the surface and ground water monitoring programs along with appropriate investigative activities and contingency measures;

(b) Within six (6) months from exceedance of the established trigger levels, the Owner shall submit to the Director for approval, the design of appropriate contingency measures and provide detailed plans, specifications and description for the design, operation and maintenance for the appropriate remedial actions; and

(c) The remedial actions shall be implemented within nine months from the approval by the Director.

BUFFER AREA AND CONTAMINANT ATTENUATION ZONE

(30) Within 60 days of issuance of this Amendment, the Owner shall arrange for a legal survey of the Site and required buffer area, as specified in Items 4 and 5 of Schedule A, to be conducted by an Ontario Land Surveyor registered under the Surveyors Act.

(31) (a) By June 30, 2003, the Owner shall acquire the lands required for the contaminant attenuation zone in accordance to Figure 2 and Drawing 1, Item 4 of the Schedule "A". Alternatively, the Owner shall propose, by June 30, 2003, to the Director for approval, other methods for bringing the Site into compliance with respect to Guideline B-7, Reasonable Use Criteria and other applicable Ministry Regulations, Guidelines and Policies.

(b) (i) By June 30, 2003, the Owner shall acquire lands required for the 30 meter southern and western buffer areas in accordance to Drawing 1, Item 4 of the Schedule "A". Alternatively, the Owner shall propose, by June 30, 2003, to the Director for approval, other Site development methods to allow for a 30 meter southern and western buffer within the current Site boundary.

(ii) The Owner shall not commence waste disposal activities on the southern and western Site boundary until Condition (31)(b)(i) has been met.

(c) Within 30 days of purchase of lands noted in Condition (31)(a) and (31)(b), the Owner shall submit to the Director an updated legal survey of these lands for addition of these lands to the Certificate of Approval.

(32) The Owner shall ensure that no wastes are deposited within the designated 15 meter northern buffer area and the 30 meter eastern buffer area after the date of issuance of this Certificate of Approval.

PROHIBITION AND REGISTRATION ON TITLE

(33) Pursuant to Section 197 of the EPA neither the Owner nor any person having an interest in the Site shall deal with the Site in any way without first giving a copy of this Certificate to each person acquiring an interest in the Site as a result of the dealing.

(a) The Owner shall:

(i) Within sixty (60) calendar days of the date of this Certificate, submit to the Director for the Director's signature two (2) copies of a completed Certificate of Prohibition containing a registerable description of the Site, in accordance with Form 1 of O. Reg. 14/92 (Document General- Form 4- Land Registration Reform Act); and

(ii) Within ten (10) calendar days of receiving the Certificate of Prohibition signed by the Director, register the Certificate of Prohibition in the appropriate Land Registry Office on title to the Site and submit to the Director immediately following registration the duplicate registered copy.

SITE CLOSURE

(34) Within 2 years prior to the Site reaching its final capacity specified in this Amendment, the Owner shall submit to the Director, for approval, a plan for closure, post closure monitoring and maintenance of the Site. The plan shall include but not be limited to the final contours of the Site, completion, inspection and maintenance of the final cover, an assessment of the adequacy of the monitoring and contingency plans and any other post closure monitoring and care.

The following items are added to SCHEDULE "A":

4. Township of Greater Madawaska, Black Donald Waste Disposal Site, Site Development and Operations Plan, Prepared by Jp2g Consultants Inc. dated January 2001.

5. Letter and accompanying documents dated November 13, 2001, from Brian Whitehead, Jp2g Consultants Inc., addressed to John Kaasalainen, MOE.

6. Letter dated March 13, 2002, from Nafiseh Pourhassani, P. Eng., MOE, addressed to Cathy Reddy, The Corporation of the Township of Greater Madawaska.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A411902 dated March 27, 1980 and amended on October 22, 2001.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 12th day of July, 2002

THIS NOTICE WAS MAILED
ON July 15 / 2002
J.C.
(Signed)

Ian Parrott, P.Eng.
Director
Section 39, *Environmental Protection Act*

NP/
c: District Manager, MOE Ottawa District Office
Andrew Polley, MOE, Ottawa District Office
Bruce Harman, Lakefield Research Ltd.

A. Pollie / File
Pls establish tracking of compliance dates.

Ministry of the Environment | Ministère de l'Environnement
Ontario

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A 411902
Notice No. 1

OCT 25 2001
OTTAWA

Corporation of the Township of Greater Madawaska
P.O. Box 180
1101 Francis Street,
Calabogie, Ontario
K0J 1H0

Site Location: Black Donald Waste Disposal Site
Pt. Lot 9, Conc. 3, 34 Hydro Dam Road
Geographical Township of Brougham
Township of Greater Madawaska, County of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A 411902 issued on March 27, 1980 for an increase in the site service area to include the Township of Greater Madawaska, as follows:

The following conditions of approval are added to the Provisional Certificate of Approval:

DEFINITIONS

(2) For the purpose of this Certificate of Approval, unless the contrary intention appears, the following words and phrases shall have the following meaning attributed to them:

2.1 "Adverse Effect" is as defined in the Environmental Protection Act, R.S.O. 1990.
2.2 "Applicant" and/or "Owner" means the Township of Greater Madawaska.
2.3 "Certificate" means the Provisional Certificate of Approval No. A 411902, as amended from time to time, including all schedules attached to and forming part of the Certificate.
2.4 "Crown" means Her Majesty the Queen in Right of Ontario.
2.5 "Director" means the one or more persons who from time to time are so designated for the purpose of Part V of the Environmental Protection Act.
2.6 "District Manager" means the District Manager of the Ministry's Ottawa District Office.
2.7 "EPA" means the Environmental Protection Act, R.S.O. 1990, Chapter E.19, as amended.
2.8 "Ministry" and/or "MOE" means the Ontario Ministry of the Environment.
2.9 "ODWS" means the Ontario Drinking Water Standards, as amended.
2.10 "OWRA" means the Ontario Water Resources Act, R.S.O. 1990, as amended.

2.11 "PWQO" means the Provincial Water Quality Objectives, as amended.

2.12 "Site" means the entire waste disposal site including the landfilling area and the buffer lands as listed in Schedule "A" of the Certificate and consisting of approximately a 1.2 hectare landfill site.

2.13 "Supporting Documentation" refers to the reports listed in Schedule "A" of the Certificate.

GENERAL

(3) The requirements specified in this Provisional Certificate of Approval are the requirements under the **Environmental Protection Act**, R.S.O. 1990. The issuance of this Provisional Certificate of Approval in no way abrogates the Applicant's legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.

(4) The requirements of this Provisional Certificate of Approval are severable. If any requirement of this Provisional Certificate of Approval, or the application of any requirement of this Provisional Certificate of Approval to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this Provisional Certificate of Approval shall not be affected in any way.

(5) The Applicant shall ensure compliance with all the terms and conditions of this Provisional Certificate of Approval. Any non-compliance constitutes a violation of the **Environmental Protection Act**, R.S.O. 1990 and is grounds for enforcement.

(6) (a) The Applicant shall, forthwith upon request of the Director, District Manager, or Provincial Officer (as defined in the Act), furnish any information requested by such persons with respect to compliance with this Provisional Certificate of Approval, including but not limited to, any records required to be kept under this Provisional Certificate of Approval; and

(b) In the event the Applicant provides the Ministry with information, records, documentation or notification in accordance with this Provisional Certificate of Approval (for the purposes of this condition referred to as "Information"),

(i) the receipt of Information by the Ministry;
(ii) the acceptance by the Ministry of the information's completeness or accuracy; or
(iii) the failure of the Ministry to prosecute the Applicant, or to require the Applicant to take any action, under this Provisional Certificate of Approval or any statute or regulation in relation to the Information;

shall not be construed as an approval, excuse or justification by the Ministry of any act or omission of the Applicant relating to the Information, amounting to

non-compliance with this Provisional Certificate of Approval or any statute or regulation.

(7) The Applicant shall allow Ministry personnel, or a Ministry authorized representative(s), upon presentation of credentials, to:

(a) carry out any and all inspections authorized by Section 156, 157 or 158 of the **Environmental Protection Act**, R.S.O. 1990, Section 15, 16 or 17 of the **Ontario Water Resources Act**, R.S.O. 1990, or Section 19 or 20 of the **Pesticides Act**, R.S.O. 1990, as amended from time to time, of any place to which this Provisional Certificate of Approval relates; and,

without restricting the generality of the foregoing, to:

(b) (i) enter upon the premises where the records required by the conditions of this Provisional Certificate of Approval are kept;

(ii) have access to and copy, at reasonable times, any records required by the conditions of this Provisional Certificate of Approval;

(iii) inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this Provisional Certificate of Approval; and

(iv) sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this Provisional Certificate of Approval.

(8) (a) Where there is a conflict between a provision of any document referred to in Schedule "A", and the conditions of this Provisional Certificate of Approval, the conditions in this Provisional Certificate of Approval shall take precedence; and

(b) Where there is a conflict between documents listed in Schedule "A", the document bearing the most recent date shall prevail.

(9) The Applicant shall ensure that all communications/correspondence made pursuant to this Provisional Certificate of Approval includes reference to the Provisional Certificate of Approval number A411902.

(10) The Applicant shall notify the Director in writing of any of the following changes within thirty (30) days of the change occurring:

(a) change of Applicant or operator of the Site or both;

(b) change of address or address of the new Applicant;

(c) change of partners where the Applicant or operator is or at any time becomes a partnership, and a copy of the most recent declaration filed under the **Business Names Act**, 1991 shall be included in the notification to the Director;

(d) any change of name of the corporation where the Applicant or operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (form 1 or 2 of O. Reg. 182, Chapter C-39, R.R.O. 1990 as amended from time to time), filed under the **Corporations Information Act** shall be included in the notification to the Director; and

(e) change in directors or officers of the corporation where the Applicant or operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" as referred to in 9(d), supra.

(11) In the event of any change in ownership of the Site, the Applicant shall notify, in writing, the succeeding owner of the existence of this Provisional Certificate of Approval, and a copy of such notice shall be forwarded to the Director.

(12) Any information relating to this Provisional Certificate of Approval and contained in Ministry files may be made available to the public in accordance with the provisions of the **Freedom of Information and Protection of Privacy Act**, R.S.O. 1990, C. F-31.

(13) All records and monitoring data required by the conditions of this Provisional Certificate of Approval must be kept on the Owner's premises for a minimum period of two (2) years from the date of their creation.

DEVELOPMENT AND OPERATIONS

(14) Within 3 months of the date of this Notice, the Applicant shall submit to the Director for approval an updated development and operations report and supporting hydrogeological study outlining how the remaining capacity of the Site is to be utilized. These reports shall include the following information

- site plans showing the waste disposal footprint, buffer zones, and contaminant attenuation zones, if required, including the ownership of such lands;
- site operation and development plans;
- daily/intermediate/final cover requirements;
- security, fencing, signage, site supervision, housekeeping and screening requirements;
- surface drainage plans, leachate and gas control plans;
- a proposed monitoring program for landfill gas, leachate, groundwater, and surface water including trigger mechanisms and contingency plans;
- reporting requirements; and
- closure plans.

All in accordance with the following plans and specifications which are added to Schedule "A" of the Certificate:

1. The Application for a Provisional Certificate of Approval for a Waste Disposal Site dated January 11, 2001 as signed by Cathy Reddy, Clerk Treasurer of the Township of Greater Madawaska.

2. The letter dated January 31, 2001 to Mr. A. Dominski of the Ministry of the Environment, Environmental Assessment and Approvals Branch from Mr. Brian Whitehead of Jp2g Consultants Inc. providing the purpose and basis for this amendment.

3. The letter dated March 1, 2001 to Mr. A. Dominski of the Ministry of the Environment, Environmental Assessment and Approvals Branch from Mr. Brian Whitehead of Jp2g Consultants Inc. requesting that the proposed amendment be split into two parts, one for the service area change and another for the site development aspects as well as the reasons for this request.

The reasons for this amendment to the Certificate of Approval are as follows:

The reasons for this amendment are to allow for an increase in service area for the waste disposal site and to update the Certificate to meet the Ministry's current requirements.

The reasons for each of the conditions of approval are as follows:

1) *The reason for Condition (2) is to define the specific meaning of terms used to simplify the conditions in this Certificate.*

2) *The reason for Conditions (3), (4), (5), (8), (9), (10), (11), (12) and (13) is to clarify the legal rights and responsibilities of the Owner.*

3) *The reason for Condition (6) and (7) is to ensure that the appropriate Ministry staff have ready access to information and the operations of the Site which are approved under this Provisional Certificate of Approval. Condition (7) is supplementary to the powers of entry afforded a Provincial Officer pursuant to the **Environmental Protection Act**, the **Ontario Water Resources Act**, and the **Pesticides Act**, as amended.*

4) *The reason for Condition (14) is to ensure that the continued use and operation of the Site is done in an environmentally acceptable manner.*

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No.A 411902 dated March 27, 1980, as amended.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Appeal Board
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

* **Further information on the Environmental Appeal Board's requirements for an appeal can be obtained directly from the Board at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 12th day of October, 2001

THIS NOTICE WAS MAILED
ON Oct. 22, 2001
DC
(Signed)

Ian Parrott, P.Eng.
Director
Section 39, *Environmental Protection Act*

JK/
c: District Manager, MOE Ottawa
Brian Whitehead, Planner, Jp2g Consultants Inc.

Ontario

Ministry
of the
Environment

133 Dalton St., Box 820
Kingston, Ontario
K7L 4X6

March 27, 1980

Township of Brougham
Dacre, Ontario
NOJ 1NO

RE: Dump Site
Lot 9, Concession III
Township of Brougham
County of Renfrew

The enclosed revised Provisional Certificate of Approval contains a condition requiring it be registered on title. The reason for this condition is attached to the Certificate.

Two copies of the Certificate and reasons are on long paper to facilitate registration. Both of these should be taken to the Land Registry Office and one returned to the Director with registration particulars.

If your Certificate does not contain sufficient legal description for registration because you have not given one to the Director, you will have to provide one under Section 23(1). (e) of The Registry Act or in your application under The Land Titles Act.

In the event that the site including its buffer, is part of a larger parcel of land and you do not wish to prepare a new survey at this time, you may register the Certificate against the larger parcel of land. If you do so, the Director is prepared, if requested in the future.

1. In the case of land recorded under The Land Titles Act, to consent to an application to delete the registration from the title of lands not within the site including its buffer zone, and

2. In the case of land recorded under The Registry Act, to issue a Certificate that lands not used for the actual disposal of waste or buffer zone have not been so used.

Such documents would be issued after suitable draft documents including legal description were submitted by you or your successor. The purpose of such documents would be to assure subsequent purchasers that the lands in question were not affected by section 46 of the Environmental Protection Act.

Yours very truly

Director

Ministry of the Environment
Ontario

Provisional Certificate No. A 411902

PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE

Under The Environmental Protection Act, 1971 and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Township of Brougham
Dacre, Ontario
NOJ 1NO

for the use and operation of a 1.2 hectare dump site

all in accordance with the following plans and specifications:

Located: Lot 9, Concession III
Township of Brougham
County of Renfrew

which includes the use of the site only for the disposal of the following categories of waste (NOTE: Use of the site for additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval) domestic and 5% other wastes, limited to scrap metal, brush, lumber and construction debris.

and subject to the following conditions:

1. No operation shall be carried out at the site after sixty days from this condition becoming enforceable unless this Certificate including the reasons for this condition has been registered by the applicant as an instrument in the appropriate Land Registry Office against title to the site and a duplicate registered copy thereof has been returned by the applicant to the Director.

THIS IS A TRUE COPY OF THE ORIGINAL CERTIFICATE MAILED ON Apr. 9/80

M.P.
(Signed)

Dated this 27th day of March, 19 80.

Director, Section 39,
The Environmental Protection Act 1971

Ministry of the Environment

Ontario

NOTICE

TO: Township of Brougham
Dacre, Ontario
NOJ 1NO

You are hereby notified that Provisional Certificate of Approval No. A 411902 has been issued to you subject to the conditions outlined therein.

The reasons for the imposition of these conditions are as follows:

The reason for the condition requiring registration of the Certificate is that Section 46 of The Environmental Protection Act, 1971 prohibits any use being made of the lands after they cease to be used for waste disposal purposes in order to protect future occupants of the site and the environment from any hazards which might occur as a result of waste being disposed of on the site. This prohibition and potential hazard should be drawn to the attention of future owners and occupants by the Certificate being registered on title.

You may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board.

This Notice should be served upon:

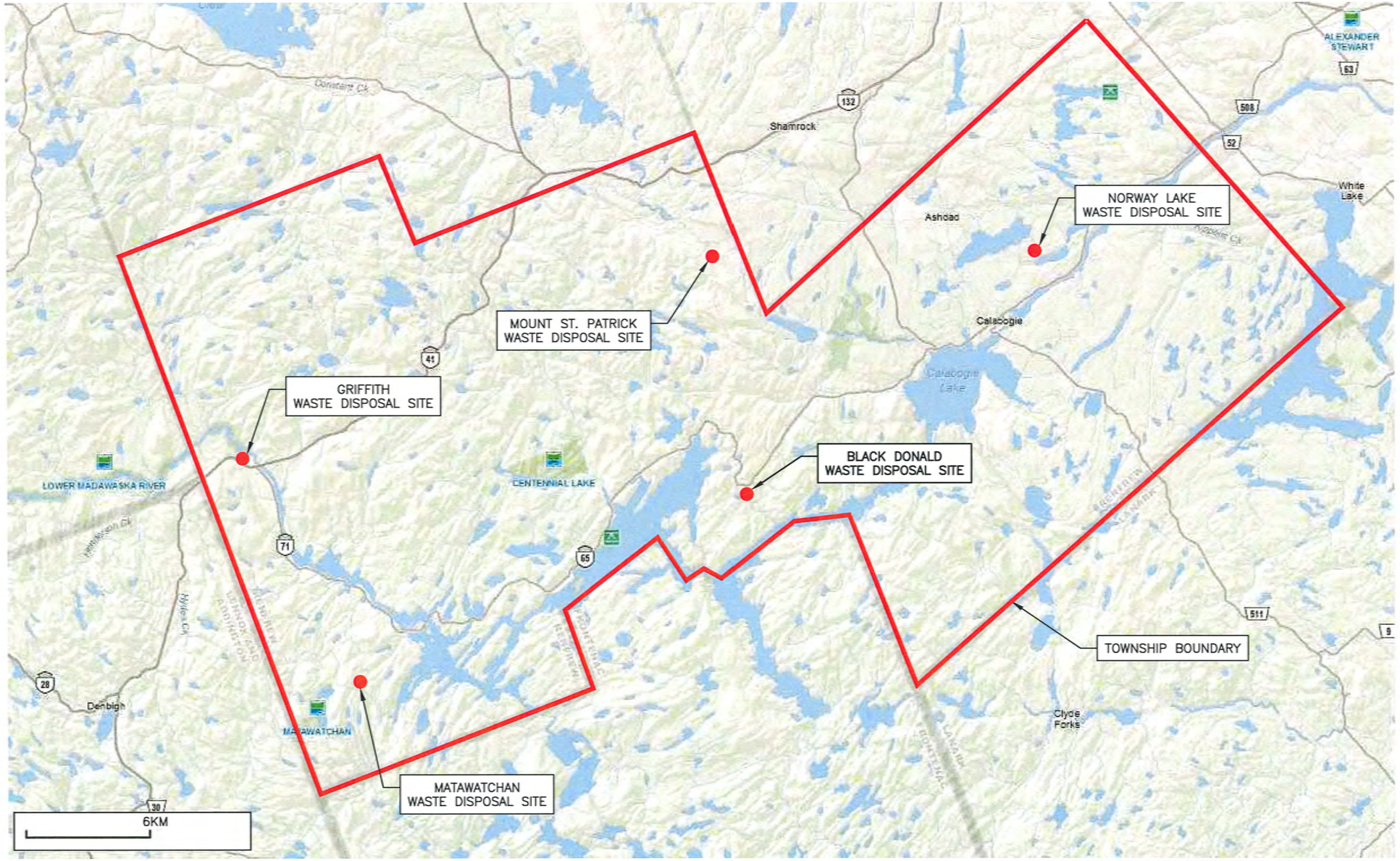
The Secretary,
Environmental Appeal Board,
1 St. Clair Ave. West,
5th Floor,
Toronto, Ontario.
M4V 1K7

AND

The Director,
Section 39
Ministry of the Environment,

DATED this 27th day of March , 1980 .

Attachment 2
2021 Annual Report Figures



SOURCE: ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY, LAND INFORMATION ONTARIO, 2016.

Greenview
ENVIRONMENTAL MANAGEMENT
13 Commerce Court
Bancroft, Ontario
613.332.0057
greenview-environmental.ca

No.	DATE	BY	REMARKS
1	MAR18–22	MAG	ISSUED FOR MECP REVIEW
0	JAN25–22	MAG	ISSUED FOR CLIENT REVIEW

DRAWN BY: MAG	CHECKED BY: DMH
DESIGNED BY: MAG	APPROVED BY: DMH
SCALE: AS NOTED	DATE: MAR 2022

CLIENT: THE TOWNSHIP OF GREATER MADAWASKA

PROJECT:

REGIONAL LOCATION PLAN
2021 ANNUAL MONITORING REPORT
BLACK DONALD WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

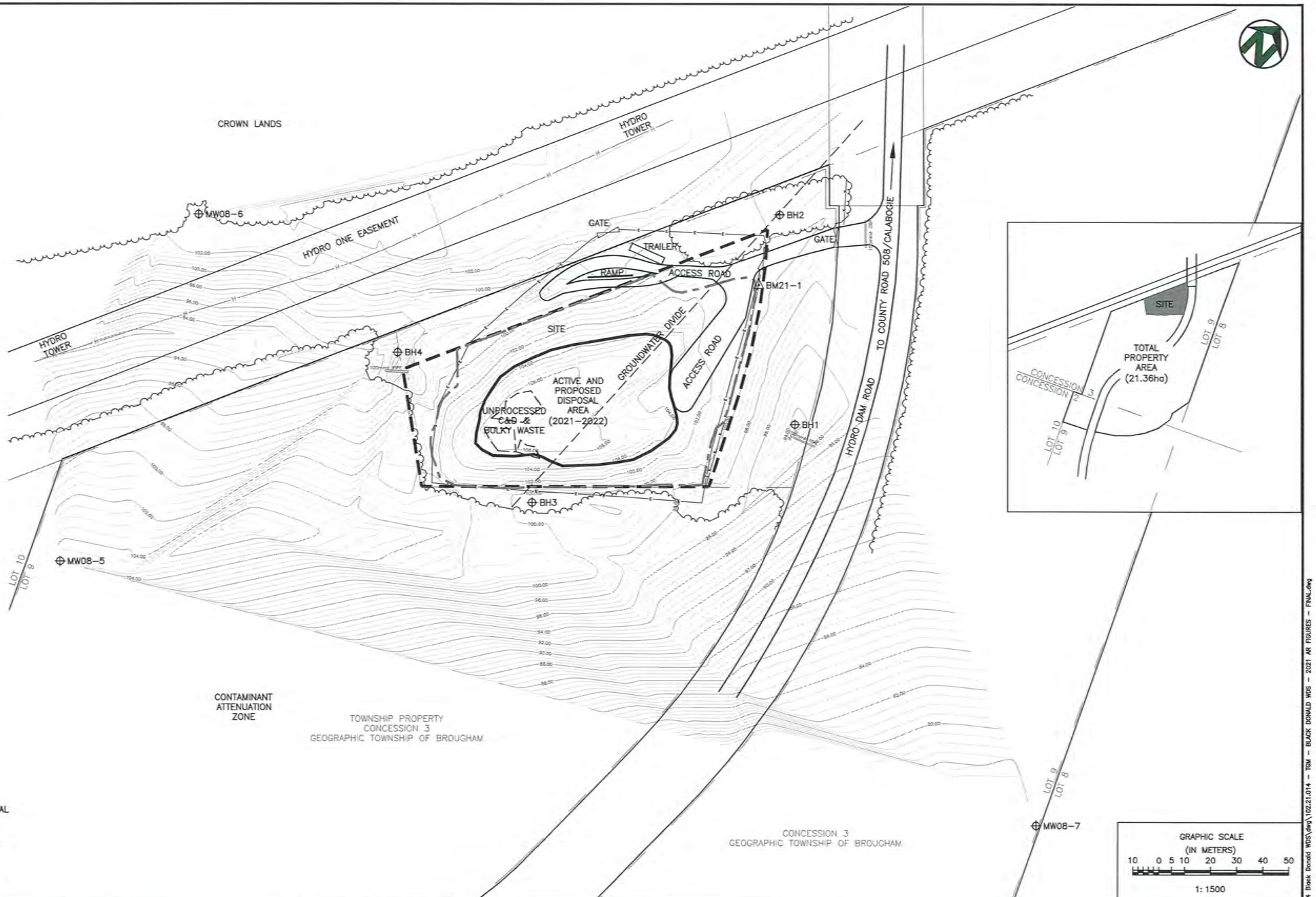
PROJECT No: 102.21.014

FIGURE: 1

G:\AutoCAD\102 Greater Madawaska\014 Black Donald WDS\dwg\102.21.014 – TSM – BLACK DONALD WDS – 2021 AR FIGURES – FINAL.dwg

LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- EXISTING LIMIT OF WASTE
- APPROXIMATE ACTIVE DISPOSAL AREA
- CONTAMINANT ATTENUATION ZONE
- MAJOR TOPOGRAPHIC CONTOUR (2m)
- MINOR TOPOGRAPHIC CONTOUR (0.5m)
- ON-SITE ROAD
- RIGHT-OF-WAY
- FENCELINE
- ELECTRIC BEAR FENCE
- APPROXIMATE TREE LINE
- HYDRO ONE EASEMENT
- OVERHEAD UTILITIES
- BH4 GROUNDWATER MONITORING WELL
- BM BENCHMARK
- UNPROCESSED C&D & BULKY WASTE



NOTES

1. BENCHMARKS
   BM21-1
   IB ALONG FENCE LINE HEADING UP TO ACTIVE DISPOSAL AREA.
   ELEVATION = 100.818mm
2. DRAWING BASED ON DIGITAL INFORMATION BY GOLDER ASSOCIATES, 2006.
3. UPDATED TOPOGRAPHIC SURVEYS OF ACTIVE AREA COMPLETED BY GREENVIEW ON DECEMBER 14, 2021.

Greenview
ENVIRONMENTAL MANAGEMENT
13 Commerce Court
Bancroft, Ontario
613.332.0057
greenview-environmental.ca

No.	DATE	BY	REMARKS
1	MAR18-22	MAG	ISSUED FOR MECP REVIEW
0	JAN25-22	MAG	ISSUED FOR CLIENT REVIEW

DRAWN BY: MAG | CHECKED BY: DMH
DESIGNED BY: MAG | APPROVED BY: DMH
SCALE: 1:1500 | DATE: MAR 2022

CLIENT: THE TOWNSHIP OF GREATER MADAWASKA

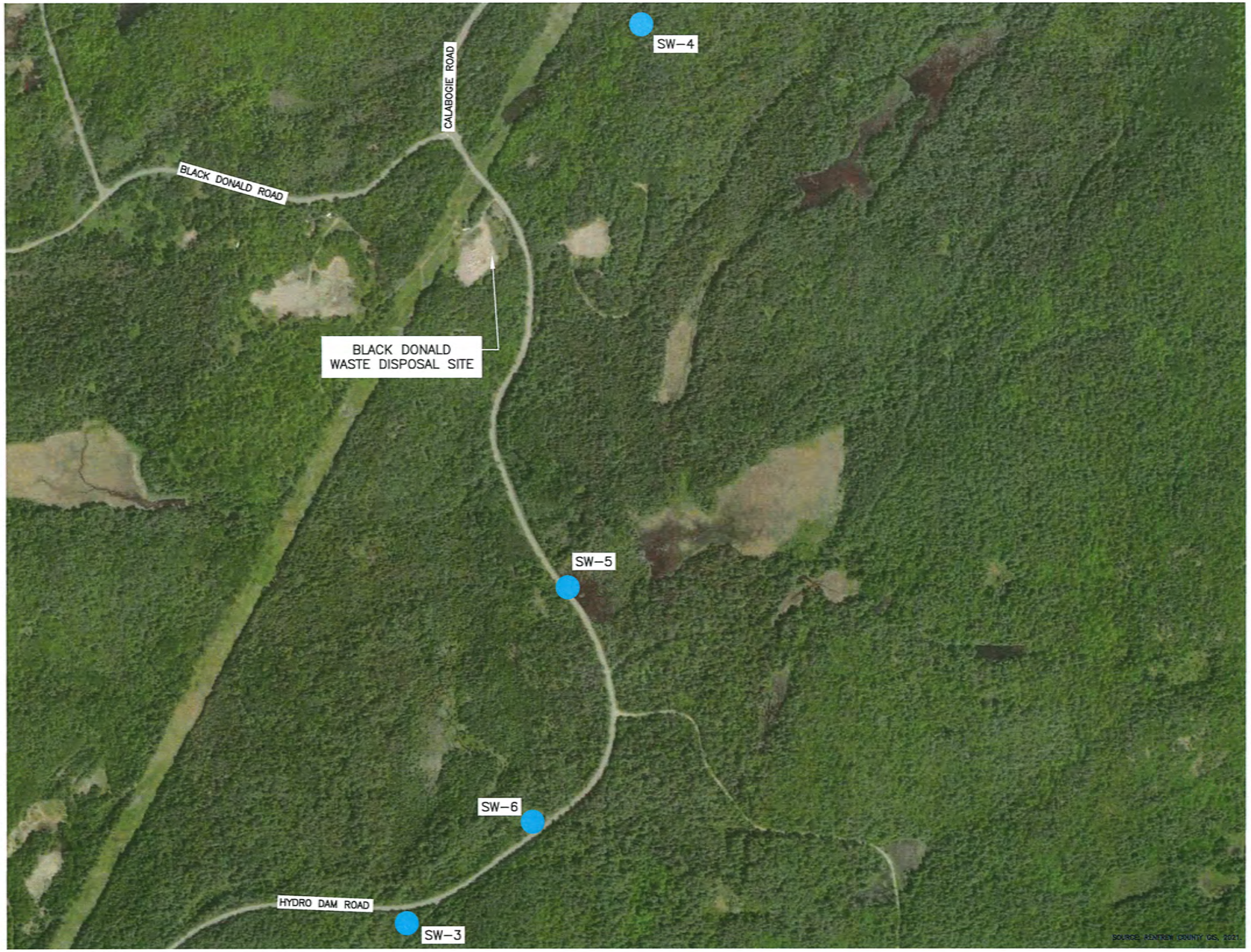
PROJECT:

EXISTING SITE CONDITIONS PLAN
2021 ANNUAL MONITORING REPORT
BLACK DONALD WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

PROJECT No: 102.21.014

FIGURE: 2

G:\AutoCAD\102 Greater Madawaska\014 Black Donald WDS\dwg\102.21.014 - TDM - BLACK DONALD WDS - 2021 AR FIGURES - FINAL.dwg



NOTE: ALL LOCATIONS APPROXIMATE.

Greenview
ENVIRONMENTAL MANAGEMENT
13 Commerce Court
Bancroft, Ontario
613.332.9057
greenview-environmental.ca

No.	DATE	BY	REMARKS
1	MAR18-22	MAG	ISSUED FOR MECP REVIEW
0	JAN25-22	MAG	ISSUED FOR CLIENT REVIEW

DRAWN BY:	CHECKED BY:
MAG	DMH
DESIGNED BY:	APPROVED BY:
MAG	DMH
SCALE:	DATE:
NTS	MAR 2022

CLIENT: THE TOWNSHIP OF GREATER MADAWASKA

PROJECT:

SURFACE WATER MONITORING LOCATION PLAN
2021 ANNUAL MONITORING REPORT
BLACK DONALD WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

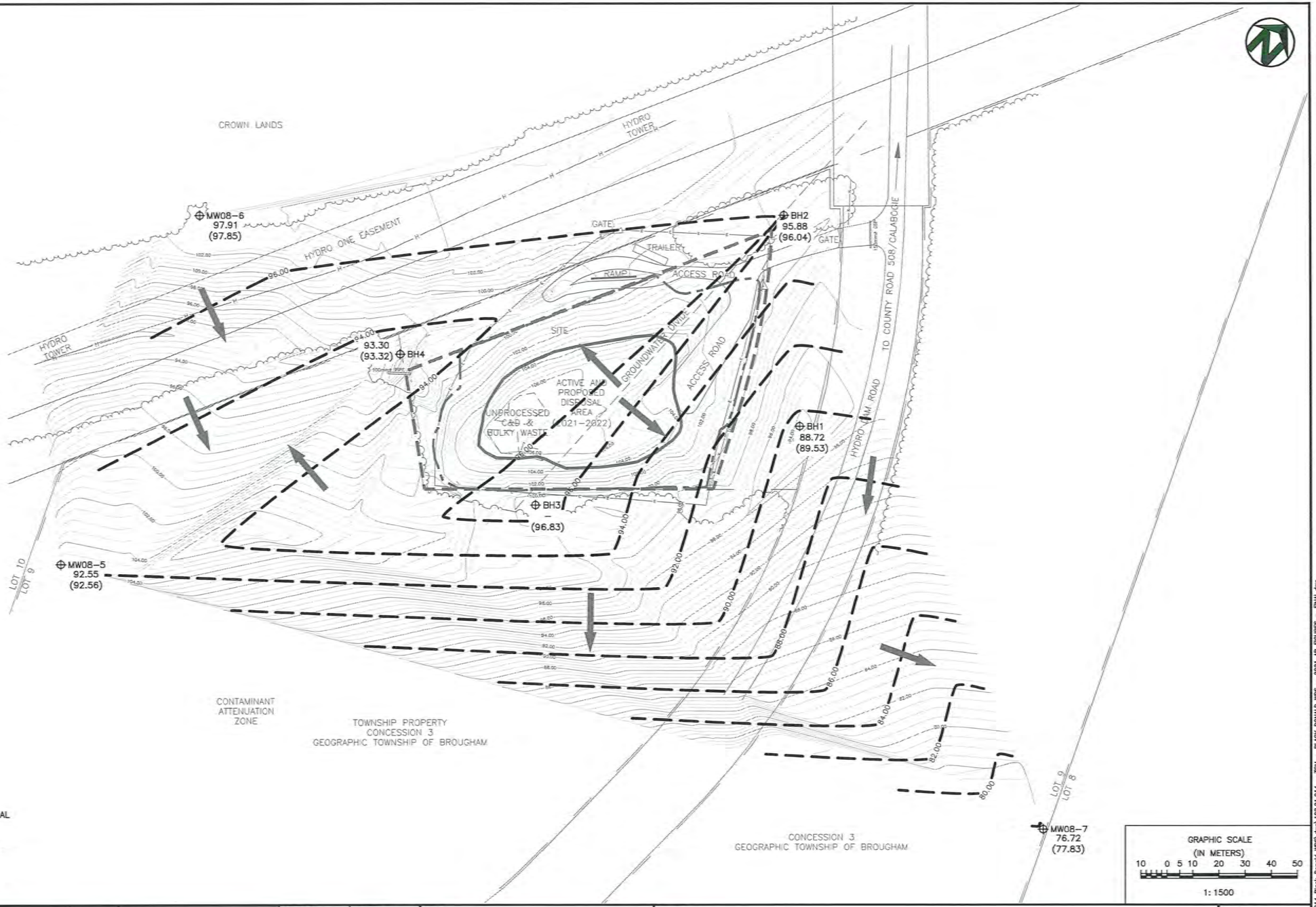
PROJECT No: 102.21.014

FIGURE: 3

G:\AutoCAD\102 Greater Madawaska\014 Black Donald WDS\dwg\102.21.014 - TDM - BLACK DONALD WDS - 2021 AR FIGURES - FINAL.dwg

LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- EXISTING LIMIT OF WASTE
- APPROXIMATE ACTIVE DISPOSAL AREA
- CONTAMINANT ATTENUATION ZONE
- 100.00 TOPOGRAPHIC CONTOUR LINE
- ON–SITE ROAD
- RIGHT–OF–WAY
- FENCELINE
- ELECTRIC BEAR FENCE
- APPROXIMATE TREE LINE
- HYDRO ONE EASEMENT
- OVERHEAD UTILITIES
- ⊕ BH4 GROUNDWATER MONITORING WELL
- 96.00 EQUIPOTENTIAL CONTOUR (MAY 18, 2021)
- 88.18 (89.16) GROUNDWATER ELEVATIONS NOVEMBER 04, 2021 (MAY 18, 2021)
- GROUNDWATER FLOW DIRECTION
- △ BM BENCHMARK
- UNPROCESSED C&D & BULKY WASTE



GRAPHIC SCALE (IN METERS)
10 0 5 10 20 30 40 50
1: 1500

NOTES

1. BENCHMARKS
   BM21–1
   IB ALONG FENCE LINE HEADING UP TO ACTIVE DISPOSAL AREA.
   ELEVATION = 100.818mm
2. DRAWING BASED ON DIGITAL INFORMATION BY GOLDER ASSOCIATES, 2006.
3. UPDATED TOPOGRAPHIC SURVEYS OF ACTIVE AREA COMPLETED BY GREENVIEW ON DECEMBER 14, 2021.

Greenview ENVIRONMENTAL MANAGEMENT
13 Commerce Court
Bancroft, Ontario
613.332.0057
greenview-environmental.ca

No.	DATE	BY	REMARKS
1	MAR18–22	MAG	ISSUED FOR MECP REVIEW
0	JAN25–22	MAG	ISSUED FOR CLIENT REVIEW

DRAWN BY: MAG | CHECKED BY: DMH
DESIGNED BY: MAG | APPROVED BY: DMH
SCALE: 1:1500 | DATE: MAR 2022

CLIENT: THE TOWNSHIP OF GREATER MADAWASKA

PROJECT:
ENVIRONMENTAL MONITORING LOCATION PLAN – SPRING
2021 ANNUAL MONITORING REPORT
BLACK DONALD WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

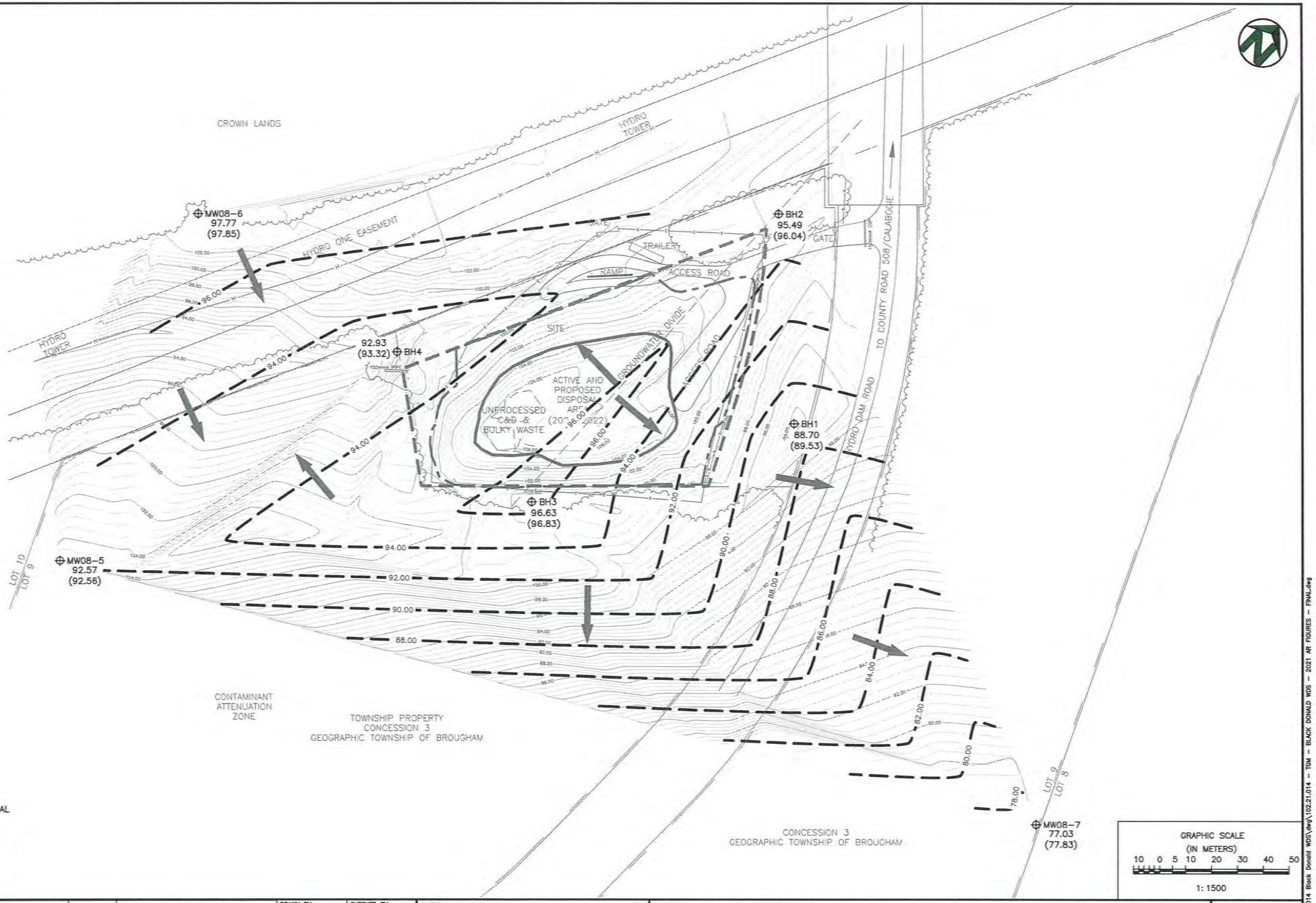
PROJECT No: 102.21.014

FIGURE: 4

G:\AutoCAD\102 Greater Madawaska\014 Black Donald WDS\dwg\102.21.014 – TOM – BLACK DONALD WDS – 2021 AR FIGURES – FINAL.dwg

LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- EXISTING LIMIT OF WASTE
- APPROXIMATE ACTIVE DISPOSAL AREA
- CONTAMINANT ATTENUATION ZONE
- 100.00 TOPOGRAPHIC CONTOUR LINE
- ON–SITE ROAD
- RIGHT–OF–WAY
- FENCELINE
- ELECTRIC BEAR FENCE
- APPROXIMATE TREE LINE
- HYDRO ONE EASEMENT
- OVERHEAD UTILITIES
- ⊕ BH4 GROUNDWATER MONITORING WELL
- 96.00 EQUIPOTENTIAL CONTOUR (AUGUST 19, 2021)
- 88.18 (89.16) GROUNDWATER ELEVATIONS AUGUST 19, 2021 (MAY 18, 2021)
- GROUNDWATER FLOW DIRECTION
- △ BM BENCHMARK
- UNPROCESSED C&D & BULKY WASTE



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(IN METERS)
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1: 1500

NOTES

1. BENCHMARKS
   BM21–1
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Greenview ENVIRONMENTAL MANAGEMENT
13 Commerce Court
Bancroft, Ontario
613.332.0057
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No.	DATE	BY	REMARKS
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0	JAN25–22	MAG	ISSUED FOR CLIENT REVIEW

DRAWN BY: MAG | CHECKED BY: DMH
DESIGNED BY: MAG | APPROVED BY: DMH
SCALE: 1:1500 | DATE: MAR 2022

CLIENT: THE TOWNSHIP OF GREATER MADAWASKA

PROJECT:
ENVIRONMENTAL MONITORING LOCATION PLAN – SUMMER
2021 ANNUAL MONITORING REPORT
BLACK DONALD WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

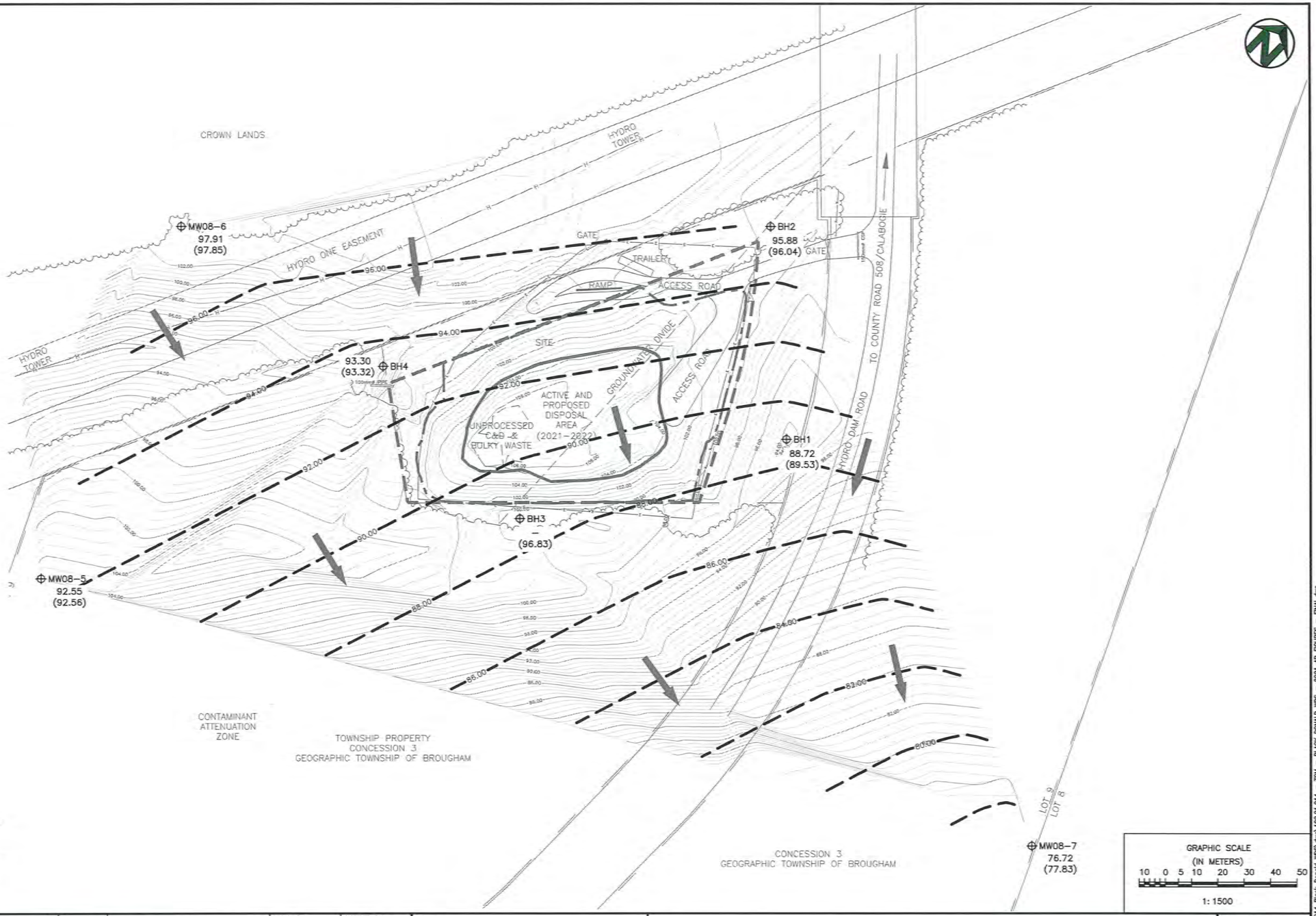
PROJECT No: 102.21.014

FIGURE: **5**

G:\AutoCAD\102 Greater Madawaska\014 Black Donald WDS\dwg\102.21.014 – TOM – BLACK DONALD WDS – 2021 AR FIGURES – FINAL.dwg

LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- EXISTING LIMIT OF WASTE
- APPROXIMATE ACTIVE DISPOSAL AREA
- CONTAMINANT ATTENUATION ZONE
- 100.00 TOPOGRAPHIC CONTOUR LINE
- ON-SITE ROAD
- RIGHT-OF-WAY
- FENCELINE
- ELECTRIC BEAR FENCE
- APPROXIMATE TREE LINE
- HYDRO ONE EASEMENT
- OVERHEAD UTILITIES
- ⊕ BH4 GROUNDWATER MONITORING WELL
- 96.00 EQUIPOTENTIAL CONTOUR (NOVEMBER 04, 2021)
- 88.18 (89.16) GROUNDWATER ELEVATIONS NOVEMBER 04, 2021 (MAY 18, 2021)
- GROUNDWATER FLOW DIRECTION
- △ BM BENCHMARK
- UNPROCESSED C&D & BULKY WASTE



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NOTES

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DRAWN BY: MAG	CHECKED BY: DMH
DESIGNED BY: MAG	APPROVED BY: DMH
SCALE: 1:1500	DATE: MAR 2022

CLIENT: THE TOWNSHIP OF GREATER MADAWASKA

PROJECT:

ENVIRONMENTAL MONITORING LOCATION PLAN – FALL 2021 ANNUAL MONITORING REPORT BLACK DONALD WASTE DISPOSAL SITE TOWNSHIP OF GREATER MADAWASKA

PROJECT No: 102.21.014

FIGURE: 6

G:\AutoCAD\102 Greater Madawaska\014 Black Donald WDS\dwg\102.21.014 - TOM - BLACK DONALD WDS - 2021 AR FIGURES - FINAL.dwg

Attachment 3
Borehole Logs

BOREHOLE LOG	PROJECT: 21-373	BOREHOLE: 1 1 of 1
HYDROGEOLOGICAL INVESTIGATION Black Donald Landfill FOR: Township of Brougham		DATE: 13 July 2001 GEOLOGIST BJS ELEVATION 93.4 m

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
		SAND Reddish and medium brown fine sand, trace to some medium and coarse sand, trace fine and coarse gravel, trace silt, subtle laminations, moist, compact.		1		SS	20	2	80			
1		-occasional cobbles observed below 0.6 m.		2		SS	25	3	70			
1.5		-heavy oxidation observed below 1.2 m.		3		SS	37/0.08m	8	50			
		MARBLE BEDROCK Light grey to whitish marble bedrock, massive, pepper appearance, some oxidation along fractures between about 1.7 m and 3.1 m. Weathered section - broken rock between about 1.7 m and 1.9 m. Open fracture with oxidation at about 2.10 m to 2.12 m. Minor oxidation along fracture at about 2.8 m.		4		HQ			100	78		
2												
3				5		HQ			96	100		
4												
				6		HQ			106	96		
5												
6												
				7		HQ			100	82		
7												
7.7		Borehole terminated at 7.69 m in marble bedrock.										

Gartner Lee Limited

Project No: 10392-001

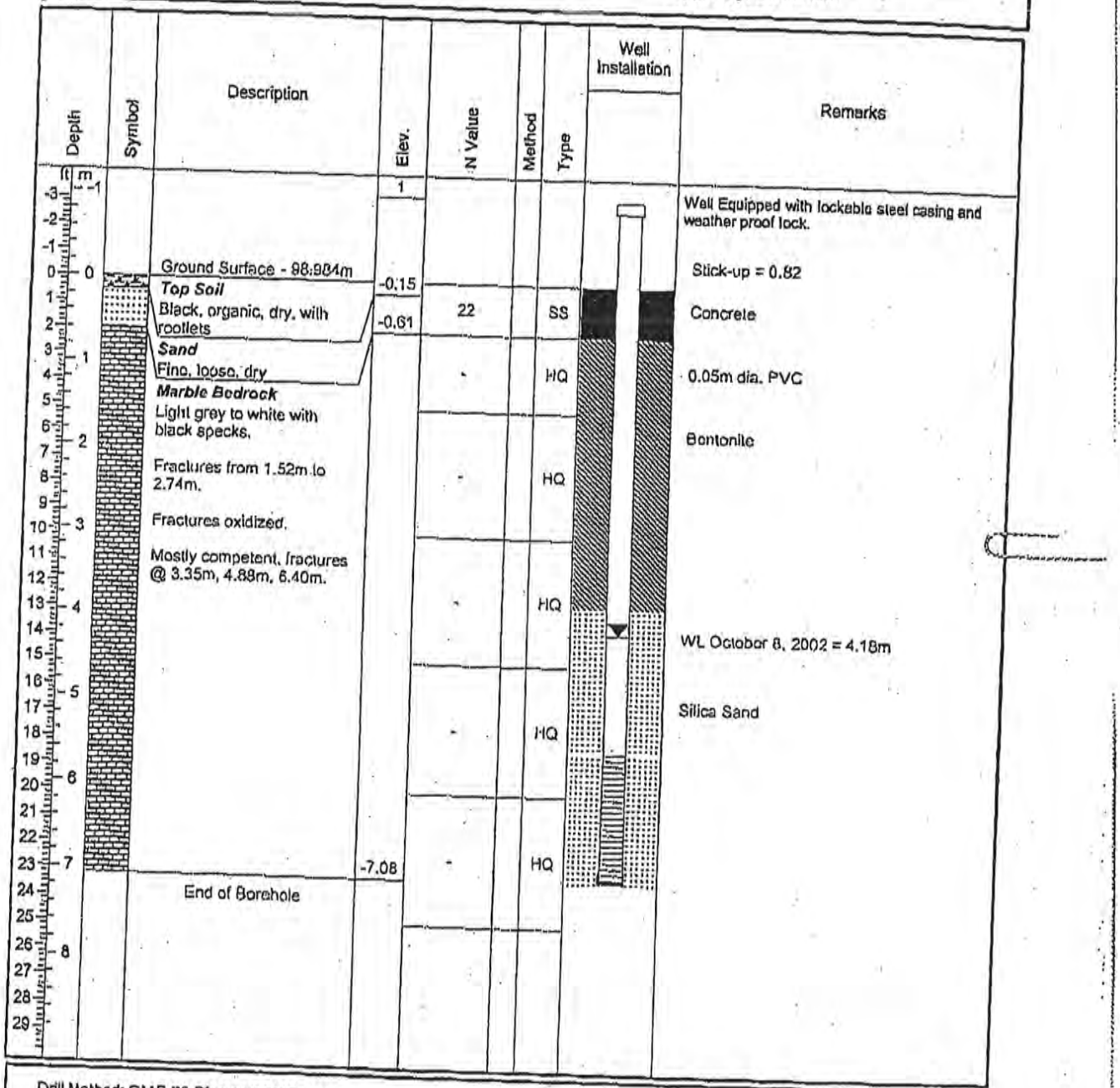
Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: Black Donald

Log of Borehole: BH2

Logged By: D.Bucholtz



Drill Method: CME 75 Diamond Bit Coring

Drill Date: September 23, 2002

Checked by: B.Harman

Sheet: 1 of 1

185 Concession Street
Lakefield, ON, Canada
K0L 2H0

Project No: 10392-001

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: Black Donald

Log of Borehole: BH3

Logged By: D.Bucholtz

Depth (ft / m)	Symbol	Description	Elev.	N Value	Method	Type	Well Installation	Remarks
			1					Well Equipped with lockable steel casing and weather proof lock.
		Ground Surface - 99.004m						Stick-up = 0.86
0 / 0		***Sand***	-0.3	50		SS		Concrete
1		Fine, brown, loose, dry						
2		***Marble Bedrock***						
3 / 1		Light grey to white with black specks.		-		HQ		0.05m dia. PVC
4								
5		Fractures with sand and root from 0.30m to 2.85m.						Bentonite
6 / 2								
7		Fractures oxidized.						
8				-		HQ		
9		Mostly competent, fractures @ 4.17m, 5.94m, 7.01m, 7.47m.						
10 / 3								
11								
12				-		HQ		WL October 8, '02 = 3.53m
13 / 4								
14								
15								
16 / 5				-		HQ		
17								
18								
19								
20 / 6								
21								
22				-		HQ		Silica Sand
23 / 7								
24								
25								
26				-		HQ		
27 / 8			-8.53					
28								Screen = 1.52m x 0.052m
29		End of Borehole						

Drill Method: CME 75 Diamond Bit Coring

Drill Date: September 25, 2002

Checked by: B.Harman

Sheet: 1 of 1

185 Concession Street
Lakefield, ON, Canada
K0L 2H0

Project No: 10392-001

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: Black Donald

Log of Borehole: BH4

Logged By: D.Bucholtz

Depth (m)	Description	Elev.	N Value	Method	Type	Remarks
-1		1				Well Equipped with lockable steel casing and weather proof lock.
						Stick-up = 0.84
0	Ground Surface - 95.962m					
0 – 0.61	***Sand*** Medium, brown, dry, with rootlets in top 0.10m	-0.61	50 (0.15m)		SS	Concrete
0.61 – 7	***Marble Bedrock*** Light grey to white with black specks. Heavily fractured from 0.61m to 3.04m. Soft, brittle, verticle fracture with sand from 3.66m to 4.27m. Fractures oxidized. Mostly competent, fractures @ 4.72m, 5.64m, 6.25m.		-		HQ	0.05m dia. PVC
			-		HQ	Bentonite
			-		HQ	WL October 8, 02 = 4.08m
			-		HQ	Silica Sand
			-		HQ	
7	End of Borehole	-7				

Drill Method: CME 75 Diamond Bit Coring

Drill Date: September 23, 2002

Checked by: B.Harmon

Sheet: 1 of 1

185 Concession Street
Lakefield, ON, Canada
K0L 2H0

Greenview
ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
69 Cleak Avenue, P.O. Box 100
Bancroft, Ontario K0L 1C0
t: (613) 332-0057
f: (613) 332-1767
e: solutions@greenview-environmental.ca

Log of Monitoring Well: MW08-5

Project No.: 102.08.014

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: See Site Plan

Depth (ft / m)	Symbol	Description	No.	Type	% R	SPT N-Value (0 15 30 45 60)	Well Completion Details	Comments
		Ground Surface						Stick-up = 0.89 m
0		**Top Soil** Dark brown, organic, dry, loosely compacted.	1	AS	40			Concrete
2		**Fine to Medium Sand** Light brown to grey, fine to medium sand, dry, loosely compacted.	2	HQ	80			Bentonite Chips
4 / 1		**Marble Bedrock** Light grey to white with black specks, marble bedrock.	3	HQ	100			
6		Oxidized fractures from 1.83 m to 2.82 m, and from 11.25 m to 12.50 m.	4	HQ	90			
8 / 3		Mostly competent, fractures from 6.55 m to 11.12 m.	5	HQ	100			Silica Sand
10			6	HQ	100			
12 / 5			7	HQ	100			
14			8	HQ	100			Well screen = 3.05 m x 0.05 m
16 / 7			9	HQ	100			
18			10	HQ	100			Water level June 5, 2008 = 12.85 m.
20 / 9								
22								
24 / 11								
26								
28 / 13		End of Borehole						

Drilled By: Lantech Drilling Ltd.

Drill Method: CME 75 Diamond Bit Coring

Drill Date: June 2, 2008

Logged By: J. Bailey

Checked By: T. Peters

Sheet: 1 of 1

Greenview
ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
69 Cleak Avenue, P.O. Box 100
Bancroft, Ontario K0L 1C0
t: (613) 332-0057
f: (613) 332-1767
e: solutions@greenview-environmental.ca

Log of Monitoring Well: MW08-6

Project No.: 102.08.014

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: See Site Plan

SUBSURFACE STRATA PROFILE			SAMPLE				Well Completion Details	Comments
Depth (ft / m)	Symbol	Description	No.	Type	% R	SPT N-Value (0 15 30 45 60)		
0 / 0		Ground Surface						Stick-up = 0.87 m
0 / 0		**Top Soil** Dark brown, organic, dry, loosely compacted.	1	AS	25			Concrete
2 / 1		**Fine to Medium Sand** Light brown, fine to medium sand, dry, loosely compacted.	2	HQ	100			Bentonite Chips
6 / 2		**Marble Bedrock** Light grey to white with black specks, marble bedrock. Heavily fractured from 0.05m to 1.45m. Oxidized fractures @ 3.81m, 4.17m, 5.28m, 5.59m, and 7.48m.	3	HQ	100			
10 / 3			4	HQ	100			Silica Sand
16 / 5			5	HQ	95			Water level June 5, 2008 = 5.50 m
22 / 7			6	HQ	100			
28 / 9			7	HQ	100			
32 / 10			8	HQ	100			
36 / 11								

Drilled By: Lantech Drilling Ltd.

Drill Method: CME 75 Diamond Bit Coring

Drill Date: June 3, 2008

Logged By: J. Bailey

Checked By: T. Peters

Sheet: 1 of 2

Greenview
ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
69 Cleak Avenue, P.O. Box 100
Bancroft, Ontario K0L 1C0
t: (613) 332-0057
f: (613) 332-1767
e: solutions@greenview-environmental.ca

Log of Monitoring Well: MW08-6

Project No.: 102.08.014

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: See Site Plan

SUBSURFACE STRATA PROFILE			SAMPLE					
Depth	Symbol	Description	No.	Type	% R	SPT N-Value (0 15 30 45 60)	Well Completion Details	Comments
38			9	HQ	100			
40 – 12								
42			10	HQ	100			
44								
46 – 14			11	HQ	100			
48								
50								
52 – 16			12	HQ	100			
54								
56								
58			13	HQ	100			
60 – 18								
62								
64			14	HQ	100			
66 – 20								
68			15	HQ	100			
70								
72 – 22			16	SS	100			Well screen = 6.10 m x 0.05 m
74								
76		End of Borehole						

Drilled By: Lantech Drilling Ltd.

Drill Method: CME 75 Diamond Bit Coring

Drill Date: June 3, 2008

Logged By: J. Bailey

Checked By: T. Peters

Greenview
ENVIRONMENTAL MANAGEMENT
Greenview Environmental Management Limited
69 Cleak Avenue, P.O. Box 100
Bancroft, Ontario K0L 1C0
t: (613) 332-0057
f: (613) 332-1767
e: solutions@greenview-environmental.ca

Log of Monitoring Well: MW08-7

Project No.: 102.08.014

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: See Site Plan

Depth (ft / m)	Symbol	Description	Sample No.	Type	% R	SPT N-Value (0 200 400 600)	Well Completion Details	Comments
		Ground Surface					Stick-up = 0.85 m	
0		**Medium Sand and Gravel** Brown, medium sand with small to medium gravel, wet, compacted.	1	AS			Concrete	
2 / 1		**Fine to Medium Sand and Gravel** Light brown, fine to medium sand with small to medium gravel, wet, compacted.	2	SS	10		Water level June 5, 2008 = 0.91 m	
6			3	SS	5		Bentonite Chips	
8			4	SS	15			
10 / 3		**Fine to Medium Sand** Light brown, fine to medium sand, wet, compacted, small to medium cobble at 3.05 m.						
12			5	SS	50		Silica Sand	
14								
16 / 5								
18			6	SS	10			
20								
22								
24 / 7			7	SS	75		Well screen = 3.05 m x 0.05 m	
26		End of Borehole						
28								

Drilled By: Lantech Drilling Ltd.

Logged By: J. Bailey

Drill Method: Hollow Stem Augers

Checked By: T. Peters

Drill Date: June 5, 2008

Sheet: 1 of 1

Attachment 4
Current vs Proposed Monitoring Program

ATTACHMENT 4
Current vs. Proposed Monitoring Program

Current Program: Schedule B, ECA A411902

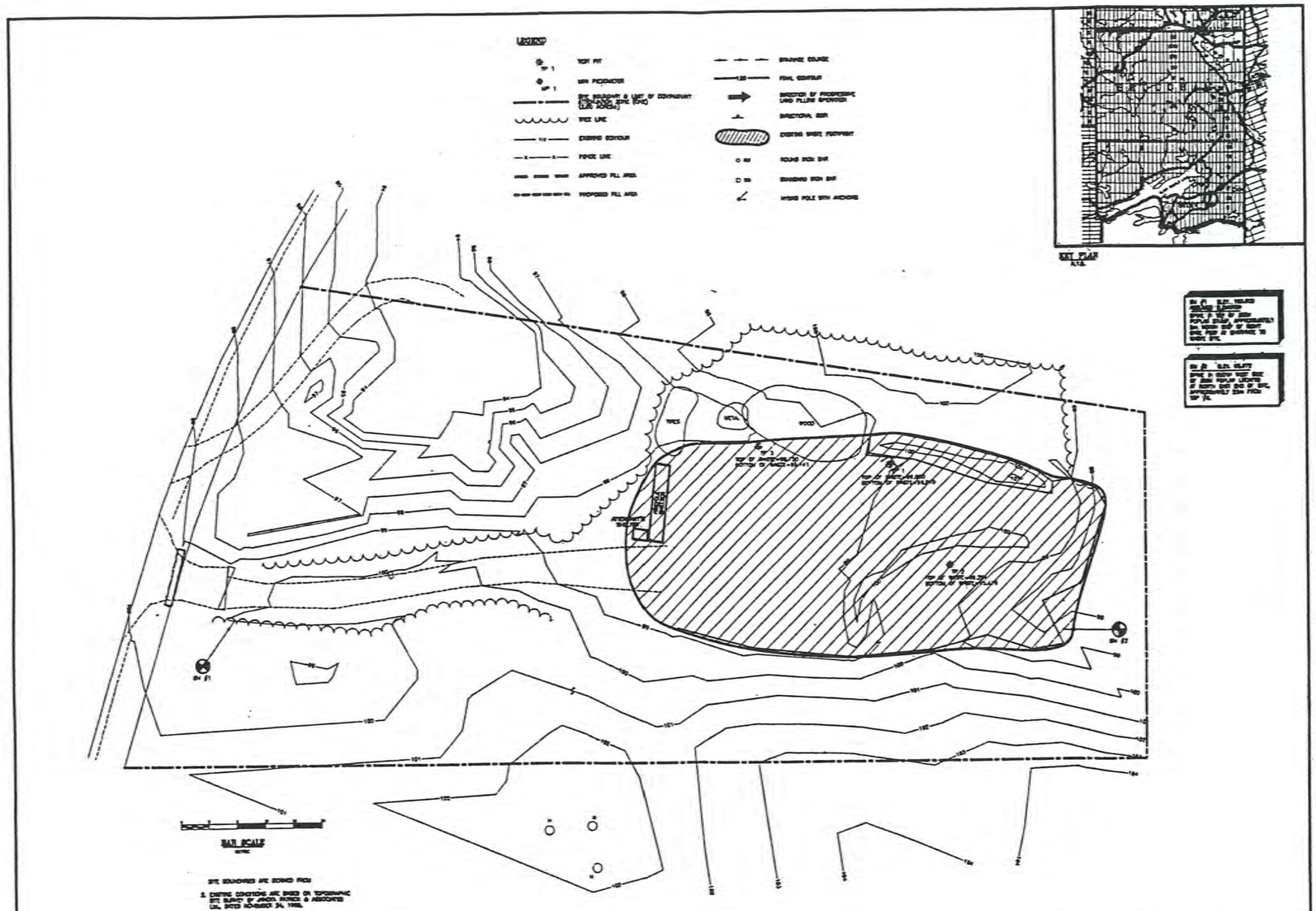
Site Groundwater and Surface water Monitoring Program:

Location	**Frequency**	**Parameters**
<u>Groundwater</u> BH1, BH2, BH3, BH4, MW08-5, MW08-6, MW08-7 1 QA/QC	Twice per year (Spring, Fall)	Alkalinity, aluminum, ammonia, barium, boron, cadmium, calcium, chromium, cobalt, chloride, COD, copper, DOC, hardness, iron, magnesium, manganese, nitrate, phenols, potassium, silicon, sodium, strontium, sulphate, total phosphorus, TKN, TDS, zinc. Field measurements (pH, conductivity, temperature), water levels
BH1	Once every 5 years (Spring)	VOCs- EPA 624
Surface Water SW-3, SW-4, SW-5, SW-6 1 QA/QC	Three Times (Spring, Summer, Fall)	Alkalinity, ammonia, BOD, boron, cadmium, calcium, chloride, COD, copper, DOC, hardness, iron, magnesium, manganese, nitrate nitrite phenols, potassium sodium, strontium, sulphate total phosphorus, TKN, TDS, zinc, TSS Field measurements (pH, conductivity, dissolved oxygen, temperature, unionized ammonia (calculation))

Proposed Program:

Location	Frequency	Parameters
Groundwater BH1, BH2, BH3, BH4, MW08-5, MW08-6, MW08-7 + 1 bilevel monitoring well + 1 bedrock monitoring well (possible replacement of BH3) 1 QA/QC	Twice per year (Spring, Fall)	Alkalinity, aluminum, ammonia, barium, boron, cadmium, calcium, chromium, cobalt, chloride, COD, copper, DOC, hardness, iron, magnesium, manganese, nitrate, phenols, potassium, silicon, sodium, strontium, sulphate, total phosphorus, TKN, TDS, zinc *Add: conductivity, pH, mercury, arsenic, lead, nitrite, TSS (leachate), BOD5 (leachate)* Field measurements (pH, conductivity, temperature), water levels. *Add: landfill gas measurements*
BH1 (leachate)	Once every 5 years (Spring)	VOCs- EPA 624
Surface Water SW-4, SW-5 1 QA/QC	Three Times (Spring, Summer, Fall)	Alkalinity, ammonia, BOD, boron, cadmium, calcium, chloride, COD, copper, DOC, hardness, iron, magnesium, manganese, nitrate nitrite, phenols, potassium sodium, strontium, sulphate, total phosphorus, TKN, TDS, zinc, TSS *Add: conductivity, pH, lead, mercury, arsenic, barium, chromium* Field measurements (pH, conductivity, dissolved oxygen, temperature, unionized ammonia (calculation)), *Add: flow*

Attachment 5
Drawings



TOWNSHIP OF BAGOT, BLYTHFIELD, & BROUGHAM
PART OF LOT 9, CONCESSION III

JANOTA PATRICK & ASSOCIATES LTD.
Engineers · Planners · Architect
955 MacKay Street, Pembroke, Ontario K8B 1A2

1:250

TOWNSHIP OF BAGOT, BLYTHFIELD, & BROUGHAM
Black Donald Waste Disposal Site
EXISTING CONDITIONS PLAN

1

BM #1 ELEV. 100.000
ASSUMED ELEVATION

SPIKE IN TOP OF 300ø POPLAR STUMP, APPROXIMATELY 5m NORTH EAST OF RIGHT GATE POST AT ENTRANCE TO WASTE SITE.

BM #2 ELEV. 98.572

SPIKE IN SOUTH WEST SIDE OF 300ø POPLAR LOCATED AT NORTH EAST END OF SITE, APPROXIMATELY 22m FROM TSP #3.

LEGEND

- TREE LINE
- 99.0 EXISTING CONTOUR NOV. 2001
- CULVERT
- DRAINAGE COURSE
- BENCHMARK
- MANAGEMENT AREA 2001
- RIP RAP
- FOOTPRINT

BAR SCALE
METRIC

EXISTING CONDITIONS ARE BASED ON TOPOGRAPHIC SITE SURVEY BY Jp2g CONSULTANTS INC. DATED NOVEMBER 6, 2001.

No.	DATE	BY		REVISIONS

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS
PEMBROKE · OTTAWA

DESIGNED	
DRAWN	MOC
CHECKED	
APPROVED	
SCALE	HORIZ. 1:400

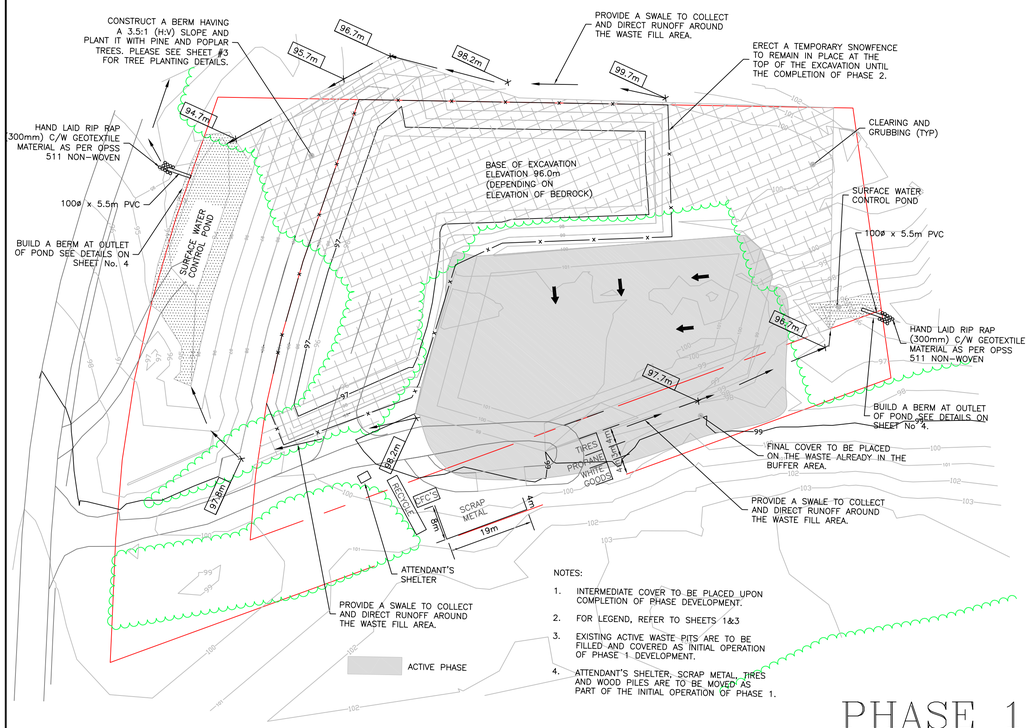
TOWNSHIP OF GREATER MADAWASKA
BLACK DONALD LANDFILL SITE

EXISTING CONDITIONS PLAN

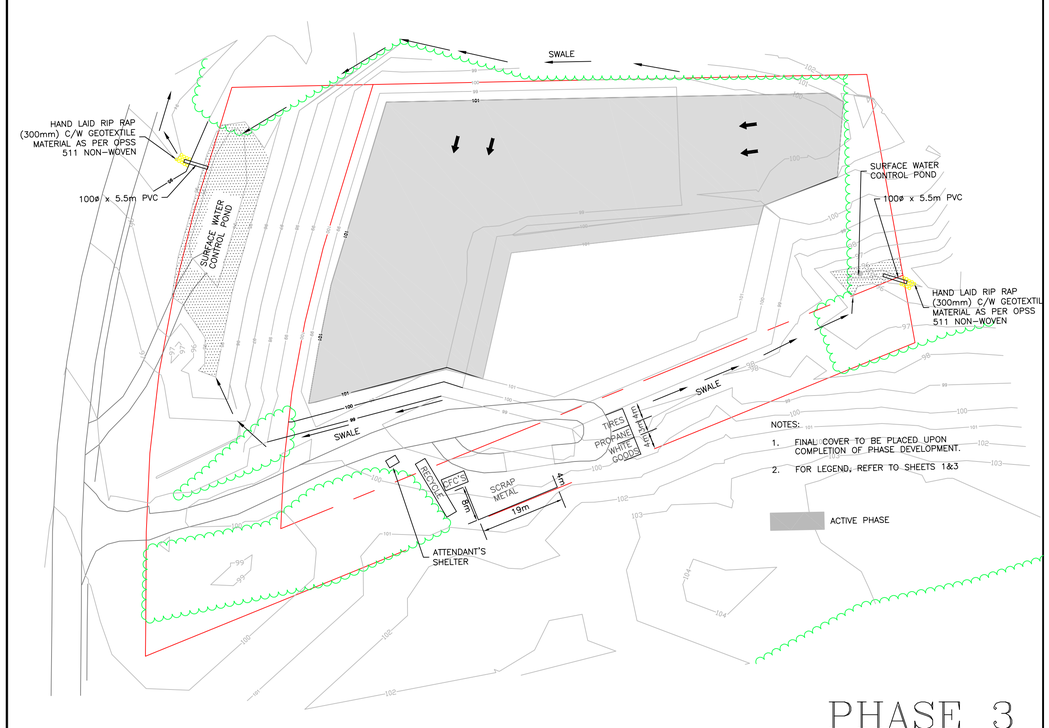
DATE	MAY 2002
PROJECT	2006017
PLOTTED	May 07/2002
DRAWING	1

Existing2001.dwg

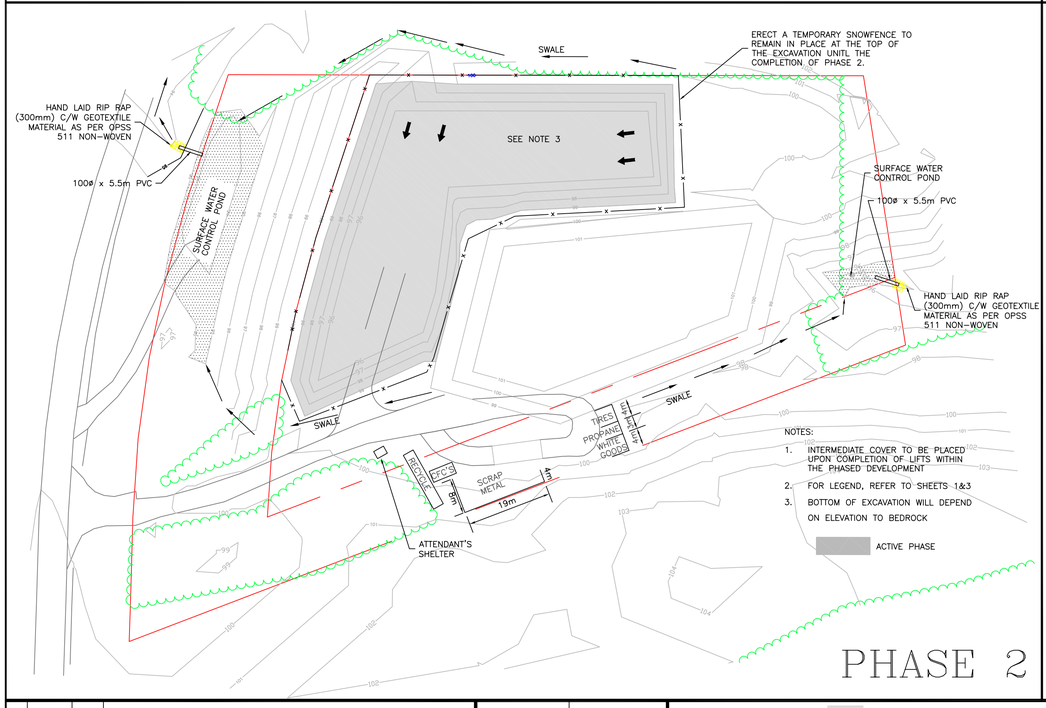
P:\DRAWINGS\6 – Environment\2006017\Dwg\Existing2001.dwg Layout(Layout1), 05/07/02 11:14pm



PHASE 1



PHASE 3



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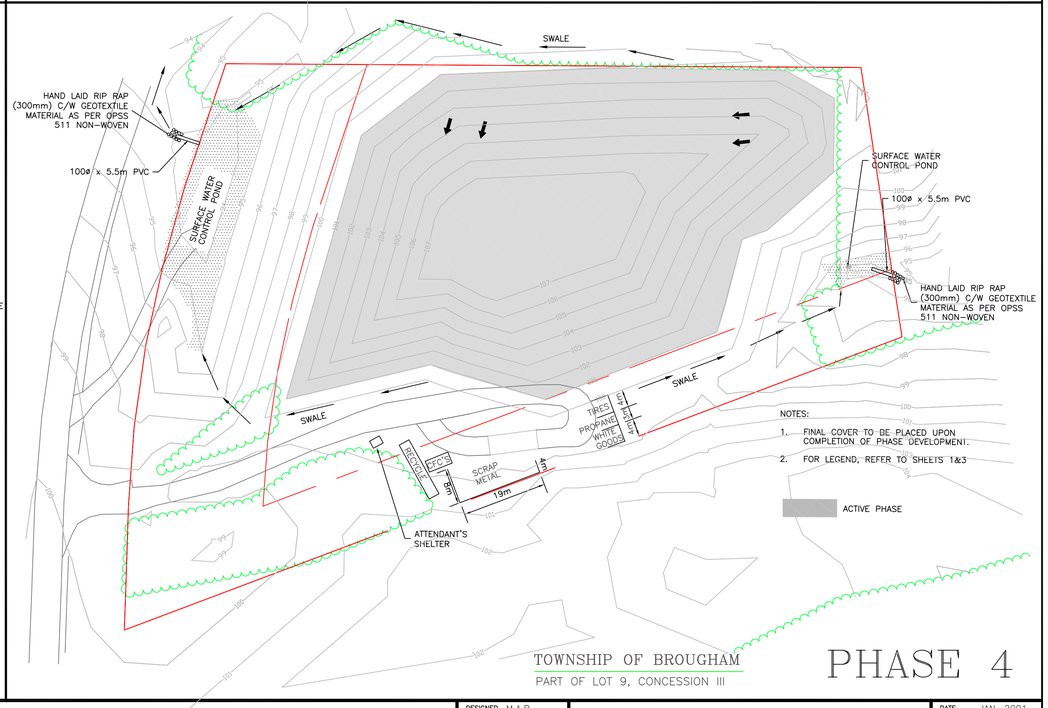


PHASE 4

TOWNSHIP OF BROUGHAM
PART OF LOT 9, CONCESSION III

No.	DATE	BY	REVISIONS
1	10/31/01	MAB	REVISED FOR EXTRA WASTE VOLUME

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS
PEMBROKE · OTTAWA

DESIGNED	M.A.B
DRAWN	M.A.B/K.J.K
CHECKED	KM
APPROVED	
SCALE	1:500

TOWNSHIP OF GREATER MADAWASKA
Black Donald Waste Disposal Site
LANDFILL PHASING & SEQUENCING

DATE	JAN. 2001
PROJECT	2006017A
PLOTTED	01/09/01
DRAWING	2

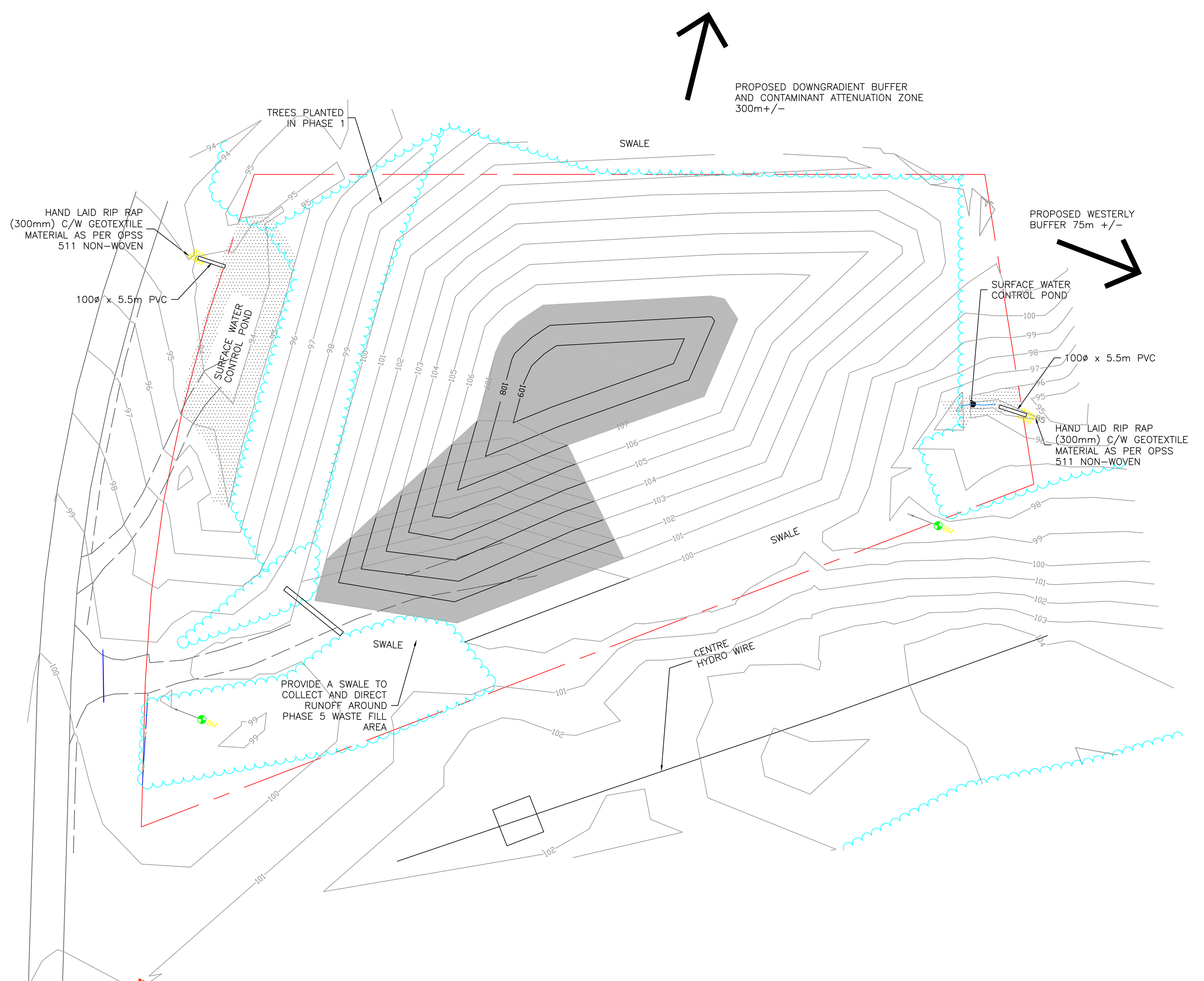
PHASES.DWG

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

P:\DRAWINGS\6 – Environmental\2006017a\dwg\Final.sm.dwg

LEGEND

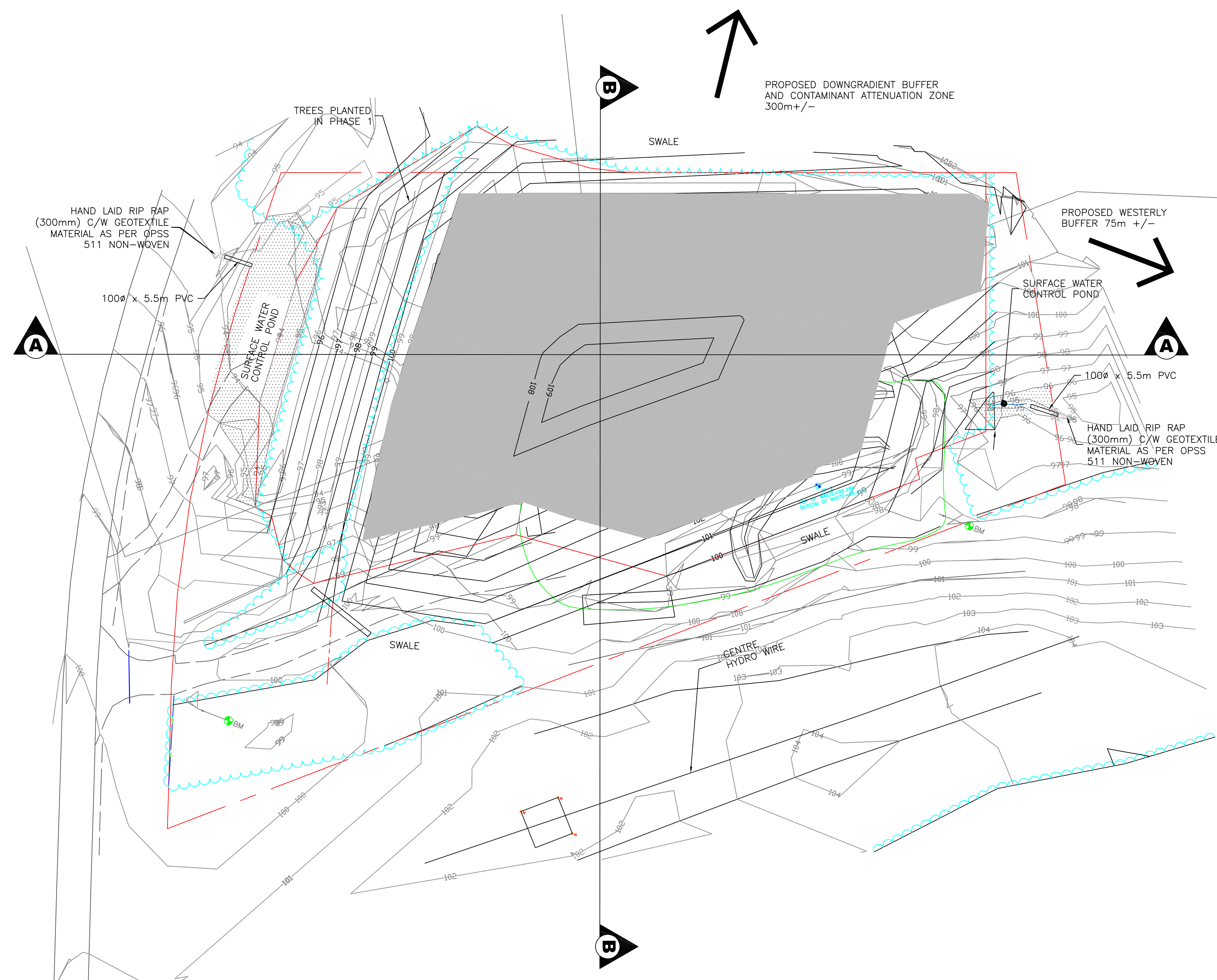
- TEST PIT (TP 1)
- MINI PIEZOMETER (MP 1)
- SITE BOUNDARY
- TREE LINE
- EXISTING CONTOUR
- FENCE LINE
- PROPOSED WASTE FILL AREA
- DRAINAGE COURSE
- ACTIVE PHASE (PHASE 5)
- FINAL CONTOUR (120)
- DIRECTION OF PROGRESSIVE LAND FILLING OPERATION
- DIRECTIONAL SIGN
- EXISTING WASTE FILL AREA
- ROUND IRON BAR (RIB)
- STANDARD IRON BAR (SIB)
- HYDRO POLE WITH ANCHORS
- PROPOSED BOTTOM OF SWALE GRADE (95.7)



PHASE 5

NOTES

1. FINAL COVER TO BE PLACED UPON COMPLETION OF PHASE DEVELOPMENT.
2. ATTENDANT'S SHELTER, SCRAP METAL, TIRES, WHITE GOODS, AND CFC'S TO BE REMOVED FROM THE SITE.



FINAL

1. SITE BOUNDARIES ARE DERIVED FROM MINISTRY OF NATURAL RESOURCES SKETCH.
2. EXISTING CONDITIONS ARE BASED ON TOPOGRAPHIC SITE SURVEY BY JANOTA PATRICK & ASSOCIATES Ltd., DATED NOVEMBER 24, 1998 AND OCTOBER 7, 1999.
3. PROPOSED WASTE INCLUDES INTERIM COVER.
4. FINAL COVER AND VEGETATION TO BE PLACED PROGRESSIVELY AS THE DEVELOPMENT OF EACH PHASE IS COMPLETED.
5. INTERIM PORTION OF FINAL COVER TO BE REMOVED & REUSED FOR DAILY COVER.
6. FOR CROSS SECTIONS A–A AND B–B, REFER TO SHEET #4.

No.	DATE	BY		REVISIONS
1	10/31/01	MAB		REVISED FOR EXTRA WASTE VOLUME

Jp2g Consultants Inc.

ENGINEERS · PLANNERS · PROJECT MANAGERS
PEMBROKE · OTTAWA

DESIGNED	MAB
DRAWN	KJK/SPM
CHECKED	KM
APPROVED	
SCALE	1:500

TOWNSHIP OF GREATER MADAWASKA
BLACK DONALD WASTE DISPOSAL SITE

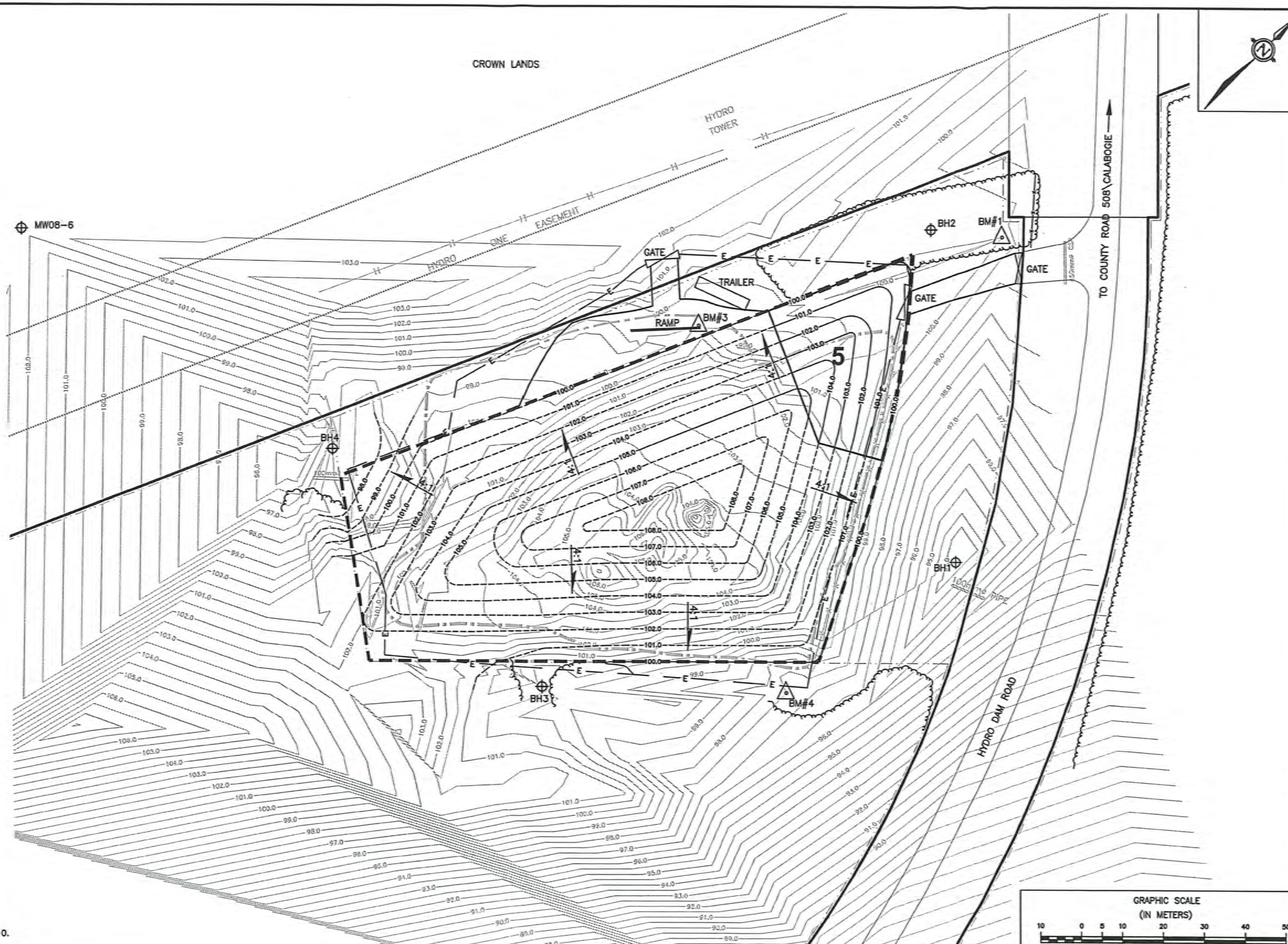
PHASE 5 AND FINAL CONTOURS

DATE	JAN. 2001
PROJECT	2006017A
PLOTTED	11/01/01
DRAWING	3

Final.sm.dwg

LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- EXISTING LIMIT OF WASTE (AS OF NOVEMBER 2010)
- CONTAMINANT ATTENUATION ZONE
- 101.0 — TOPOGRAPHIC CONTOUR LINE
- 108.0 — PROPOSED FINAL CONTOURS AT CLOSURE (TO TOP OF WASTE)
- 4:1 — PROPOSED MAXIMUM GRADE
- 5 — PROPOSED STAGE
- 102.0 — PROPOSED FINAL CONTOURS AT CLOSURE (TO TOP OF WASTE ACHIEVED WITHIN STAGE)
- ON-SITE ROAD
- RIGHT-OF-WAY
- X — FENCELINE
- E — ELECTRIC BEAR FENCE
- APPROXIMATE TREE LINE
- HYDRO ONE EASEMENT
- H — OVERHEAD UTILITIES
- BH3 — GROUNDWATER MONITORING WELL
- BM#1 — BENCHMARK



NOTES

1. BENCHMARKS
   - BM#1
     SPIKE IN TOP OF 300mmø POPLAR STUMP, APPROXIMATELY 5m NORTHWEST OF RIGHT GATE POST AT ENTRANCE TO WASTE SITE.
     ASSUMED ELEV. = 100.000m
   - BM#3
     CUT CROSS LOCATED ON NORTH END OF CONCRETE RETAINING WALL AT RAMP.
     ELEVATION = 99.570m
   - BM#4
     PAINTED ORANGE TARGET ON BEDROCK OUTCROP LOCATED AT BOTTOM OF SLOPE.
     ELEVATION = 99.500m
2. DRAWING BASED ON DIGITAL INFORMATION BY GOLDER ASSOCIATES, 2006.
3. NEW MONITORING WELLS (MW08-5, MW08-6 & MW08-7) INSTALLED, AND SURVEYED BY GREENVIEW (JUNE 2008).
4. UPDATED TOPOGRAPHIC SURVEYS OF ACTIVE AREA COMPLETED BY GREENVIEW ON OCTOBER 20, 2009, AND NOVEMBER 2, 2010.

No.	DATE	BY	REVISIONS

Greenview ENVIRONMENTAL MANAGEMENT
Greenview Environmental Management Limited
69 Cleak Avenue, PO Box 100
Bancroft, Ontario K0L 1C0
tel: (613) 332-0057
fax: (613) 332-1767
email: solutions@greenview-environmental.ca

DRAWN BY:	CHECKED BY:	CLIENT:	PROJECT:	PROJECT No:
HLB	THP	TOWNSHIP OF GREATER MADAWASKA	BLACK DONALD WASTE DISPOSAL SITE	102.10.014
DESIGNED BY:	APPROVED BY: THP		FIGURE: PROPOSED SITE DEVELOPMENT PLAN STAGE 5	FIGURE: 12
SCALE: 1:1000	DATE: DEC. 2010			

Ministry of the Environment, Conservation and Parks
Eastern Region
1259 Gardiners Road, Unit 3
Kingston ON K7P 3J6
Phone: 613.549.4000
or 1.800.267.0974

Ministère de l'Environnement, de la Protection de la nature et des Parcs
Région de l'Est
1259, rue Gardiners, unité 3
Kingston (Ontario) K7P 3J6
Tél: 613 549-4000
ou 1 800 267-0974

Ontario

M E M O R A N D U M

January 6, 2023

TO: Thandeka Ponalo
Senior Environmental Officer
Ottawa Area Office
Eastern Region

FROM: Alija Bos
Hydrogeologist
Water Resources Unit
Technical Support Section
Eastern Region

RE: Black Donald Waste Disposal Site A411902
2021 Annual Monitoring Report
ECHO Task #1-134990036

As requested, I have reviewed the following documents entitled:

- "*2021 Annual Report, Black Donald Waste Disposal Site (A362202), Township of Greater Madawaska, Count of Renfrew, Ontario"* dated March 21, 2022, prepared by Greenview Environmental Management (GEM)
- *"Black Donald Landfill Site Township of Greater Madawaska, ECA No. A411902, Expansion Feasibility Study" Prepared by JP2G Consultants Inc., dated October 25th, 2022.*

The Township of Greater Madawaska submitted an assessment on the feasibility to expand the site for continued disposal of bulky and Construction and Demolition (C&D) waste. Based upon the information provided in the document above, I submit the following comments for your consideration. I have provided main conclusions and recommendations in the "Summary" section of this memorandum and more detailed comments in the "Conclusions and Recommendations" section below.

Summary

- The migration of leachate is downward into a thin sand layer and into the fractured marble bedrock.

- A north-south trending groundwater divide is thought to exist beneath the waste mound causing landfill leachate to migrate west and east. groundwater level data confirms that a groundwater basin exists in and around BH4 which would limit the northwestward migration of leachate.

- The Black Donald site was interpreted to conform with MECP Guideline B-7 at the downgradient eastern and southwestern CAZ boundaries in 2021.

- I recommend that the report should be reviewed by the Surface Water Unit.

- I support the proposed expansion area from a groundwater perspective, provided additional multilevel downgradient monitoring wells are installed, monitoring well BH3 is replaced, and the monitoring program and trigger mechanism are updated as discussed below.

Site Description and Environmental Compliance Approval

The Black Donald Waste Disposal Site (WDS) is located on part of Lot 9, Concession 2 and 3, geographic Township of Brougham in the Township of Greater Madawaska, Ontario.

The Black Donald WDS operates under Environmental Compliance Approval No. A411902 last amended January 24, 2013, which describes the Site as a 1.2 hectare waste disposal site. ECA Section (2) 2.12 defines the Site as 'the entire waste disposal site including the landfilling area and the buffer lands as listed in Schedule "A" of the Certificate and consisting of approximately 1.2 hectare landfill site". Upon review of the documents in Schedule "A" the Site comprises a 0.9 ha landfilling area within a total site area of 27.2 ha.

The site received waste from the Township's Griffith, Norway Lake, and Mount St. Patrick Transfer Stations.

It was previously requested (2016) by Greenview and the Township that MECP consider removing the requirement for surface water sampling as part of the monitoring requirements, as surface water quality data did not indicate impacts related to landfill-related activities. Based on the MECP surface water technical support review, it was indicated that monitoring should continue as part of the environmental monitoring program.

Proposed Expansion

It is my understanding that the current site has a design waste capacity of 34,250m^3 (excluding final cover). The theoretical maximum capacity of a 1.2 ha site to a pyramidal peak is 54,200m^3.

The figure provided by GEM illustrates a conceptual expansion which could add another 30,000 to <40,000m^3. A change of less than 40,000m^3 is exempt from the EA Act. As such, JP2G has recommended the application be less than 40,000m^3. This represents a proposed expansion of ~73% from the current approval.

As of December 14, 2021, the remaining capacity was 4400m^3 (Greenview, 2022). The life expectancy could be 2 to 5 years depending on the annual landfilling rate.

The WDS was closed to the public on April 5th, 2010, with disposal available for municipal vehicles and Township-approved haulers only. Since 2010 the site has been used for the stockpiling of construction and demolition and bulky wastes prior to processing and disposal within the approved waste disposal area (AWDA). Bentonite clay material was placed at the WDS in 2021, as part of the regular and final cover requirements.

Topography and Drainage

The consultant described the area to be generally hilly and forested. The site is located on a topographic high, and a steep slope leading to a low-lying area is located at the south, west and southeast limit of the waste site. Drainage is through the surficial sand at the site following topography to roadside ditches along Hydro Dam Road.

Geological and Hydrogeological Conditions

Overburden geology is characterized by a thin veneer of sandy overburden, 0.3-1.5 metres thick, overlying the fractured marble bedrock unit. Bedrock outcrops, knolls, and knob hills are noted the be prevalent in the vicinity of the Black Donald site, which confirms the shallow nature of overburden soils and the proximity of the bedrock contact to surface near the site.

The hydrogeological conceptual model for the site is that landfill leachate moves down into the underlying native sand unit, then into groundwater in the fractured marble bedrock where it flows southeast and southwest. Groundwater was encountered in the shallow fractured marble bedrock.

It is interpreted that a groundwater divide exists at the waste mound, and predominant flow is southeast and southwest.

An eastward trending groundwater flow direction was interpreted in the vicinity of monitoring well MW08-6. Based on the upgradient location of MW08-6 relative to the waste mound, groundwater quality at MW08-6 was interpreted to be characteristic of background groundwater quality at the site. A north-south oriented groundwater basin depression was also interpreted to exist in the vicinity of BH4 and MW08-5, based on groundwater elevations and contours measured and calculated from field measurements.

The closest residential well is located approximately 700m northwest and upgradient from the site.

Groundwater – Surface Water Interaction

The groundwater is inferred to eventually discharge to surface water downgradient within the CAZ of the site.

Based on the surface water quality results in 2021, and the significant distance of each sampling location from the Black Donald site, the surface water systems south and southeast of the Black Donald site were not interpreted to be impacted from landfill-

related activities by GEM. Detailed review and interpretation of surface water conditions are provided by the ministry's surface water reviewer.

Groundwater Monitoring

The monitoring program approved under the current ECA is to satisfy Condition 27. The monitoring program as detailed in ECA Schedule "B" consists of the bi-annual collection of static water levels and groundwater samples from seven (7) monitoring wells, and surface water samples collected three times per year from four (4) locations.

GEM conducted spring (May 18), and fall (November 4) groundwater monitoring of the site in 2021. This was an approved reduction from the Spring, Summer and Fall sampling previously occurring. The Township with support from their consultant sampled and surveyed the monitoring wells and surface water stations.

Background Water Quality

MW08-6 is considered the background well installed on Crown Land on the opposite side of the Hydro transmission line. This well has shown DOC ODWS non-conformance and an increasing trend in the past 5 years.

BH2 is also considered a potential background location located approximately 25m east and downgradient of the fill area. Water quality is characterized by elevated concentrations of some landfill leachate parameters however given the proximity to Hydro Dam Road, road salting may also be a factor. There was one ODWS non-conformance for Dissolved Organic Carbon (DOC) at BH2. There appears to be an increasing DOC trend in this well. This well is not an ideal background location and MW08-6 should be used for background water quality assessment moving forward.

Leachate Quality

BH1 has historically been used for VOC sampling and can be considered the leachate characterization well at this site.

Groundwater at BH-1 was interpreted to be most representative of leachate quality at the Black Donald site. Non-conformances of ODWS and significant groundwater trends at groundwater monitoring location BH-1were as follows:

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2021	Fall 2021	Increasing	Decreasing
BH1	• Alkalinity • DOC • Hardness • Manganese • Total Dissolved Solids (TDS)	• Alkalinity • DOC • Hardness • Iron • Manganese • TDS	• Ammonia (un-ionized) • Nitrate • Sodium • Sulphate	• Aluminum • Barium • Calcium • Chloride • Hardness • Iron • Magnesium • Manganese • Potassium • Strontium • Total Kjeldahl Nitrogen (TKN)

These values are not surprising given the well location immediately downgradient of the waste mound. Older landfills often have nitrogen concerns as a result of the generation of ammonia, and nitrate, dissolved solids and the concentrations of these vary depending on the age of the landfill.

Based on 2021 results, groundwater at BH-4 was interpreted to be impacted by landfill-related activities: however, to a lesser extent than at leachate monitoring well BH-1. The interpretation that groundwater in the western portion of groundwater flow at the site was less impacted than the eastern component of groundwater flow at the site was supported by horizontal gradients calculated in spring, summer, and fall 2021 and documented groundwater quality. Considering the groundwater flow directions calculated following 2021 groundwater monitoring events and based on similar historical calculations, BH4 was interpreted to be the downgradient receiver of groundwater flow from the vicinity of the waste mound and from the northwest in the vicinity of background monitoring well MW08-6.

Downgradient Water Quality / Trigger Mechanism

Groundwater immediately downgradient from the site at monitoring wells BH1, BH3, and BH4 was interpreted to be impacted from landfill-related activities in 2021. Most parameter concentrations were above median background groundwater quality results, with non-conformances of ODWS for concentrations of alkalinity, DOC, hardness, iron, manganese, and TDS noted at select monitors. The generally lower parameter concentrations at monitoring well BH3 compared to those at monitoring wells BH1 and BH4 were attributed to its location partially cross-gradient to the waste mound and along the groundwater divide at the site. BH4 is the southwest CAZ boundary well.

It was interpreted that concentrations resultant of landfill-related factors originating in the vicinity of the waste mound would not likely migrate past the western CAZ boundary. Instead, groundwater was interpreted to flow in a southerly direction along the apparent groundwater basin towards MW08-5 and the downgradient southwestern CAZ boundary. Therefore, it is interpreted that given the considerable distance of BH4 to the downgradient southwestern CAZ boundary (approximately 170 m), and naturally-occurring high concentrations of alkalinity, aluminum, DOC, hardness, and TDS in the background, the site was interpreted to conform with MECP Guideline B-7 and was in

compliance with RUC in 2021 at the southwestern CAZ boundary. Given historical flow direction maps, I find this assumption to be reasonable. Groundwater flow directions calculated in fall 2021 are different than historical measurements as a result of BH3 being destroyed and therefore a weight bias for the model has shifted to the remaining wells. A replacement well for BH3 should be installed.

Guideline B-7

Guideline B-7 indicates that the groundwater quality cannot be degraded by an amount in excess of 50% of the difference between background and the Ontario Drinking Water Standards for non-health related parameters and in excess of 25% of the difference between background and the Ontario Drinking Water Standards for health-related parameters.

No RUC non-conformances were documented in results from downgradient monitoring well MW08-7 in 2021 that were attributed to landfill-related factors. The noted RUC non-conformance in fall 2021 at MW08-7 for DOC was consistent with DOC concentrations observed in background wells BH2 and MW08-6. Based on the above, the Black Donald site was interpreted to conform with MECP Guideline B-7 at the downgradient eastern CAZ boundary in 2021. Based on 2021 results, it was extrapolated that given the considerable distance of BH4 to the downgradient southwestern CAZ boundary (approximately 170 m), and naturally occurring elevated concentrations of alkalinity, aluminum, DOC, hardness, manganese, and TDS in the background (BH2 and MW08-6), the site was interpreted to conform with MECP Guideline B-7 at the southwestern CAZ boundary.

Based on the surface water quality results in 2021, and the significant distance of each sampling location from the Black Donald site, the surface water systems south and southeast of the Black Donald site were not interpreted to be impacted from landfill-related activities by the consultant. Non-conformances of PWQO for concentrations of DO (low), phosphorus, iron and zinc noted in 2021 at select sampling locations for select sampling dates were attributed to naturally occurring conditions in the background (SW-4), as well as to low-flow surface water conditions.

In 2021, PWQO non-conformances at key trigger locations SW-3 and SW-6 for concentrations of iron were attributed to low water/ low-flow conditions, and not to landfill-related activities. Similarly, PWQO non-conformances for concentrations of phosphorus at key trigger location SW-3 were generally consistent with concentrations observed at background location SW-4 and were therefore not attributed to landfill-related factors.

No RUC non-conformances were noted for any of the key trigger parameters at key trigger location MW08-7 following inclusion of 2021 results. Based on a review of five (5) year time trend analysis for parameters un-ionized ammonia, barium, boron, chloride, chromium, COD, iron, nitrate, sodium, sulphate, TKN and total phosphorus, the Trigger Mechanism was not interpreted to be activated in 2021.

Conclusions and Recommendations

The migration of leachate is downward into a thin sand layer and into the fractured marble bedrock.

A north-south trending groundwater divide is thought to exist beneath the waste mound causing landfill leachate to migrate west and east. groundwater level data confirms that a groundwater basin exists in and around BH4 which would limit the northwestward migration of leachate.

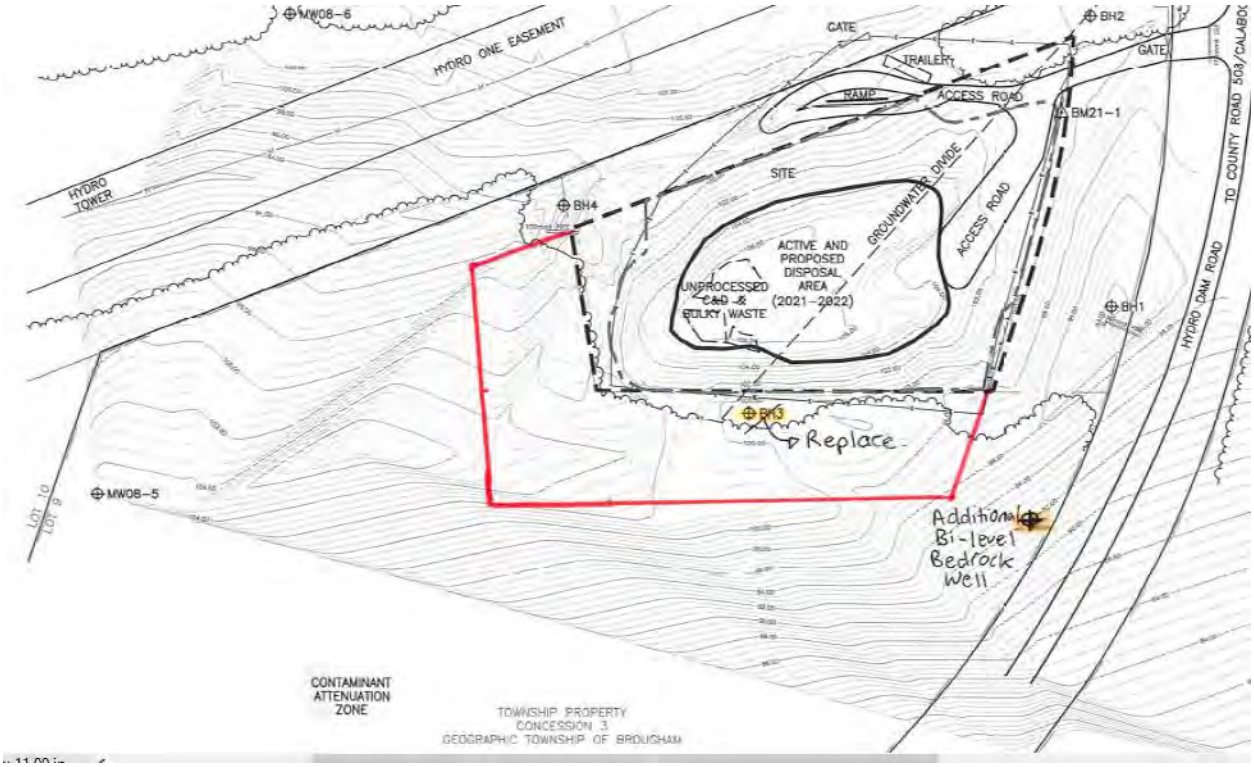
The Black Donald site was interpreted to conform with MECP Guideline B-7 at the downgradient eastern and southwestern CAZ boundaries in 2021.

I recommend that the report should be reviewed by the Surface Water Unit.

The consultant has provided the following recommendations in relation to the proposed expansion and my response to each recommendation is provided in bold typeface:

1. The updated monitoring program will continue to sample the monitoring wells as per ECA Schedule “B”, with the proposed addition of the following as shown on Drawing No 2 below (Greenview base plan)

> • one (1) bi-level monitoring well within the overburden (if available) and bedrock aquifers east of the landfilling area to further delineate the plume within the groundwater towards MW08-7; **I support this recommendation in order to evaluate the potential for offsite migration of leachate impacted groundwater downgradient of the expansion area.**
>
> • compliance well MW08-7 is installed in the overburden (sand material), therefore it is recommended to also install a bedrock monitoring well in this location to delineate leachate in the bedrock aquifer in this direction; **I support this recommendation. This is shown in the figure included below from the GEM report. The red line represents the proposed expansion areas.**
>
> **I would like to request an additional design drawing be submitted with the cross section of the waste areas (historical and proposed) including elevations.**



• monitoring well BH3 was destroyed in 2021 due to landfilling activities; this well should be reinstated to aid in assessing leachate migration south of the fill area. **I support this recommendation.**

2. The water quality analysis will be expanded to Schedule 5 Column 1 of the Landfill Standards (1988).

This includes the following parameters: Alkalinity, aluminum, ammonia, barium, boron, cadmium, calcium, chromium, cobalt, chloride, COD, copper, DOC, hardness, iron, magnesium, manganese, nitrate, phenols, potassium, silicon, sodium, strontium, sulphate, total phosphorus, TKN, TDS, zinc.

I support the proposed use of Schedule 5 Column 1 and also recommend that the following parameters are also added to the regular groundwater monitoring program: conductivity, pH, mercury, arsenic, lead, nitrite, TSS (leachate), BOD5 (leachate). I further recommend that the following field measurements are added to the regular groundwater monitoring program: pH, conductivity, temperature, water levels and landfill gas measurements.

Upon installation and sampling it is further recommended to update the trigger mechanism and contingency plan to reflect the proposed expansion and additional monitoring locations. **I support this recommendation.**

I support the proposed 73% expansion area from a groundwater perspective, provided additional multilevel downgradient monitoring wells are installed, monitoring well BH3 is replaced, and the monitoring program and trigger mechanism are updated as discussed above.

Alija Bos

P.Geo., Regional Hydrogeologist

ec: Mark Phillips, Surface Water Specialist
Thandeka Ponalo, Sr. Environmental Officer
V. Castro, Water Resources Unit Supervisor
C. Klein, Technical Support Section Manager

c: GW File RE GM 01 02 (Black Donald Waste Disposal Site)
AB / ECHO 1-134990036

Ministry of the Environment, Conservation and Parks
Eastern Region
1259 Gardiners Road, Unit 3
Kingston ON K7P 3J6
Phone: 613.549.4000
or 1.800.267.0974

Ministère de l'Environnement, de la Protection de la nature et des Parcs
Région de l'Est
1259, rue Gardiners, unité 3
Kingston (Ontario) K7P 3J6
Tél: 613 549-4000
ou 1 800 267-0974

Ontario

M E M O R A N D U M

January 11, 2023

TO: Thandeka Ponalo
Senior Environmental Officer
Ottawa District Office
Eastern Region, MECP

FROM: Mark Phillips
Surface Water Scientist,
Water Resource Unit,
Eastern Region, MECP

RE: **2021 Annual Monitoring Report and Expansion Feasibility Study**
Black Donald Waste Disposal Site
Part Lot 9, Concession 3, Geographic Township of Brougham
34 Hydro Dam Road, Township of Greater Madawaska, County of Renfrew
Certificate of Approval (ECA) No. A411902
ECHO #: 1-134948602

I have reviewed the following documents from a surface water impact perspective and provide the recommendations below for your consideration:

1. 2021 Annual Report (Greenview Environmental Management Limited; March 21, 2022);
2. Black Donald Landfill Site Expansion Feasibility Study (Jp2g Consultants Inc.; October 25, 2022);
3. Memorandum from B. Metcalfe on the 2015 Annual Monitoring Report – Black Donald Waste Disposal Site (Metcalfe; July 4, 2016); and
4. Memorandum from A. Bos on the 2021 Annual Monitoring Report (Bos; January 6, 2023).

Background

The Black Donald Waste Disposal Site (WDS) operates as an active waste disposal site and in accordance with the Provisional Certificate of Approval A411902. The Black Donald WDS was closed to the public on April 5, 2010. However, disposal operations at the site are currently available to municipal vehicles and Township-approved haulers only. The site is currently operating as a municipal solid waste landfill, accepting domestic, construction and demolition, and bulky waste for disposal. The landfill site currently consists of an approved fill area of 0.9 ha within a total licensed area of 21.36 ha, inclusive of lands used for operational buffer and CAZ purposes. The landfill site functions as a natural attenuating site.

Based on the 2021 fill rate, the remaining capacity at this site was calculated to be approximately 4,400 m^3 which equates to approximately 5 years of remaining capacity.

Surface Water Regime

The landfilling area is located on a topographical high bounded to the north by a bedrock ridge along the hydro transmission corridor. Site/area groundwater and surface water flow direction has been determined to be to the southeast and southwest. The primary pathway for groundwater flow is interpreted to flow downgradient towards discharge within the CAZ lands. Surface water sampling locations are located at the intermittent creek and wetland/bog complex approximately 500 metres downgradient from the site. The WDS is located within the Black Donald Lake watershed, Madawaska River Basin.

2021 Annual Monitoring Report

In 2021 surface water monitoring was conducted by Greenview on May 18, August 19, and November 4. Surface water samples were collected when water was present at sample stations SW3, SW4, SW5 and SW6. The collected surface water samples were analyzed for routine general chemistry parameters, a limited metals parameters analyses and phenols. Field measurements were taken for pH, conductivity, dissolved oxygen and water temperature for each surface water sampling event.

The 2021 surface water monitoring program measured PWQO exceedances at SW-4 for total phosphorus and zinc; for iron and low dissolved oxygen at SW-5; for total phosphorus and (high) pH at SW-6; and for total phosphorus, iron, manganese, and zinc at SW-3.

None of the exceedances have been attributed to landfill related impacts. The trigger mechanism was not triggered in 2021.

Expansion Feasibility Study

The proposed expansion at this site would involve the addition of 30,000 to < 40,000 m3 of waste disposal capacity.

The proposed expansion is to be completed in 5 phases, with final cover applied to completed areas following each phases' completion.

A sewage works consisting of swales for the collection and transmission of stormwater to one of two stormwater control ponds is being proposed. Both ponds will be affixed with outlet control structures.

Comments/Recommendations

- The consultants indicate that the PWQO exceedances measured in 2021 were minor and not attributed to the landfill related impacts. I agree with this assessment.
- The consultants have recommended a reduction in the surface water monitoring locations to include the background station (SW-4) and SW-5 only. I support this recommendation. Following the completion of the recommended topographic survey it would be preferable to establish a surface water monitoring station(s) down-gradient of the landfill in closer proximity to the waste disposal site. If a surface water monitoring location exists between SW5 and the landfill, then I would support removing SW-5 as well, since it is located a substantial distance from the WDS.
- The consultants have also recommended that the sampled parameters list be increased to match Schedule 5, Column 3 of the Landfill Standards. I support both these recommendations, however I recommend the inclusion of calculated unionized ammonia. I would also suggest that the surface water sampling program be reduced to twice per year (spring, fall) to match the groundwater sampling program.
- The consultants have recommended that a new topographic survey be completed and that additional surface water station locations will be identified as appropriate. I agree with this recommendation and would further add that a monitoring sample location be established at the outlet of the proposed surface water control ponds (sewage works outlets).
- The topographic survey should detail the outlet flow paths from the stormwater works.
- Specific design details for the stormwater works should be provided for review.

The existing waste disposal site has not been found to be causing a risk to surrounding surface water features. In my opinion the risk of surface water impacts to area surface waters from the proposed expansion is low. I support, in principle, the proposed expansion.

Please contact me if you have any questions regarding the above comments.

Original to be Signed

Mark Phillips

ec: C. Klein, Tech. Support Manager, MECP
V. Castro, (A)WRU Supervisor, MECP
E. Tieu, Ottawa District Supervisor, MECP
Groundwater Unit Files (A. Bos)
ECHO

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

Jp2g No. 22-6213A

January 25, 2023

Ministry of the Environment, Conservation and Parks
2430 Don Reid Drive, Unit #103
Ottawa, ON K1H 1E1

Attention: Thandeka Ponalo
Sr. Environmental Officer

Re: Black Donald WDS
ECA No. A362202
Expansion Feasibility Study

Dear Thandeka:

We acknowledge receipt of the Groundwater review comments dated January 6, 2023 and the Surface Water review comments dated January 11, 2023 on our October 25, 2022 submission.

The following conclusions and recommendations from the memorandums have been reproduced (in part) in **bold** for convenience, and our response provided:

Alija Bos Hydrogeologist January 6, 2023 review of:

- 2021 Annual Report March 21, 2022 by Greenview Environmental Management
- Expansion Feasibility Study October 25, 2022 by Jp2g

1. **The updated monitoring program will continue to sample the monitoring wells as per the ECA Schedule "B" with the addition of the following:**

    - **A bi-level monitoring well within overburden (if available) and bedrock located east of landfilling area towards MW08-7**
    - **A bedrock monitoring well in the MW08-7 location. Request a cross section drawing of the waste area (historical and proposed) including elevations**
    - **A replacement well for BH-3**

Jp2g have prepared an estimate of probable costs to complete the new well installations in 2023 for consideration of Council. Regarding the plan and cross section drawing, there is additional survey required of the expansion area scheduled in the spring 2023, these plans will be included in the 2023 Annual Report.

2. **The water quality analysis will be expanded to Schedule 5 Column 1 of the Landfill Standards (1998). Upon new well installation and sampling an updated trigger mechanism and contingency plan is recommended.**

Jp2g will conduct the 2023 monitoring with the more comprehensive set of parameters first with the existing wells and then to include the new wells when installed. The current trigger and contingency plan is detailed in Section 6.2 of the Design, Development and Operations Plan December 2010. An updated trigger mechanism and contingency plan will be provided based on the more recent sampling results and will be presented in the final Expansion Feasibility Study.

Mark Phillips Surface Water Scientist January 11, 2023 review of:

- 2021 Annual Report March 21, 2022 by Greenview Environmental Management
- Expansion Feasibility Study October 25, 2022 by Jp2g
- Memo by B. Metcalfe on the 2015 AMR
- Memo by A. Bos on the 2021 AMR

1. **I support the reduction of sampling locations to include SW-4 and SW-5. Following completion of the topographic survey it is preferable to establish a monitoring station(s) closer to the waste disposal site.**

Jp2g will conduct the survey in the spring 2023 and observe the spring freshet for potential locations.

2. **I would further add that a monitor sample location be established at the outlet of the proposed surface water control ponds (sewage works outlets).**

The Greenview Design, Development and Operations Plan December 2010 does not include control ponds but drainage ditches along the north-eastern portion of the fill area adjacent to Hydro Dam Road and at the southwest corner of the site. The final Expansion Feasibility Study will include an assessment of the requirement for new surface water controls.

3. **The topographic survey should detail the outlet flow paths from the stormwater works.**

Agreed.

4. **Specific design details for the stormwater works should be provided for review.**

The final Expansion Feasibility Study will provide adequate detail to confirm surface water flow paths and additional monitoring locations to assess environmental compliance.

Yours truly,
Jp2g Consultants Inc.
ENGINEERS • PLANNERS • PROJECT MANAGERS

Kevin Mooder, MCIP RPP
Principal | Environmental Services

cc Leonard Emon

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

Jp2g No. 22-6213A

December 29, 2023

Ministry of the Environment, Conservation and Parks
2430 Don Reid Drive
Ottawa, ON K1H 1E1

Attention: Thandeka Ponalo
Sr. Environmental Officer

Re: Black Donald Landfill Site
Township of Greater Madawaska
ECA No. A411902
Expansion Feasibility Study

Dear Thandeka:

In order to finalize a 2024 work plan and budget we request further MECP review to support an application to Amend the ECA for an additional <40,000m^3 landfilling capacity proposed for 2024.

Relevant copies of documentation are included in **Appendix 1**:

- October 25, 2022 Jp2g Feasibility Assessment
- January 6, 2023 TSS Groundwater Alija Bos
- January 11, 2023 TSS Surface Water Mark Phillips
- January 25, 2023 Jp2g Response

The purpose of this submission is to provide an update on the tasks completed in 2023 to address the issues identified by TSS. The proposed expansion of the landfilling area is illustrated on **Drawing 1**.

Monitoring Well Installations

On October 30 and 31, 2023 additional monitoring wells were installed as shown on **Figure 1**, copies of the well records are included in **Appendix 2.**

- BR23-85 (shallow) and BR23-8D (deep) installed between landfilling area and MW08-7
- MW23-7D installed near MW08-7S installed in the deep overburden
- BH-3 was located but it had been destroyed, a replacement well wasn't installed as the MW23-8 nest was located close by and out of the landfilling area expansion

Expanded Monitoring Program

The 2023 groundwater monitoring program involved the more comprehensive laboratory analysis of parameters listed in Schedule 5 Column 1 of the Landfilling Standards (1998) as agreed to by MECP.

Reduced Monitoring Program

The 2023 surface water monitoring program included SW4 and SW5 as agreed to by MECP. Based on Jp2g site reconnaissance and field survey of the proposed expansion area on April 18, 2023 and other site visits, there are no permanent watercourses where surface water flow may occur from the landfilling area. There is a natural depression feature at the northwestern corner of the existing landfilling area, however no intermittent flow was observed. Similarly, no flowing water was observed in the ditch along Hydro Dam Road.

Monitoring Stations at Sewage Works Outlets

The feasibility of a sewage works outlet at the northwestern corner of the fill area will be confirmed as part of the detailed design.

Outlet Flow Paths

Additional field survey will be conducted to identify any flow paths from any sewage work outlet.

Stormwater Design

Pending results of additional site survey future monitoring of the flow paths from the sewage works will be provided.

Yours truly,
Jp2g Consultants Inc.
ENGINEERS • PLANNERS • PROJECT MANAGERS

Kevin Mooder, MCIP RPP
Principal | Environmental Services

Encls.

cc. Leonard Emond, Facilities Manager

NOTES

1. BASE CONTOURS IN PROPOSED EXPANSION AREA FROM JP2G SURVEY DATED APRIL 18 2023
3. EXPANSION DESIGN CONTOURS AT 12:1 SLOPE FROM ELEVATION 109m TO TIE IN. PEAK ELEVATION= 110.00m.
4. EXPANSION DESIGN CONTOURS START AT 96.5M A 4:1 SLOPE TO ELEVATION 109M
5. EXPANSION DESIGN CAPACITY= 36500m³.
6. ELEVATIONS BEYOND LANDFILLING AREAS ARE APPROXIMATE BASED ON JP2G (2001) DRAWINGS AND GREENVIEW DRAWINGS (2010)
7. EXPANSION DESIGN CONTOURS SHOWN ARE TO TOP OF WASTE.

Legend

- 1.2ha Landfilling Area
- Existing Design Contours
- Proposed Expansion Contours
- Roadway
- Vegetation
- Property Line
- Expansion area

Graphic scale
0 5 10 20 30 40 50
1 : 1500

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

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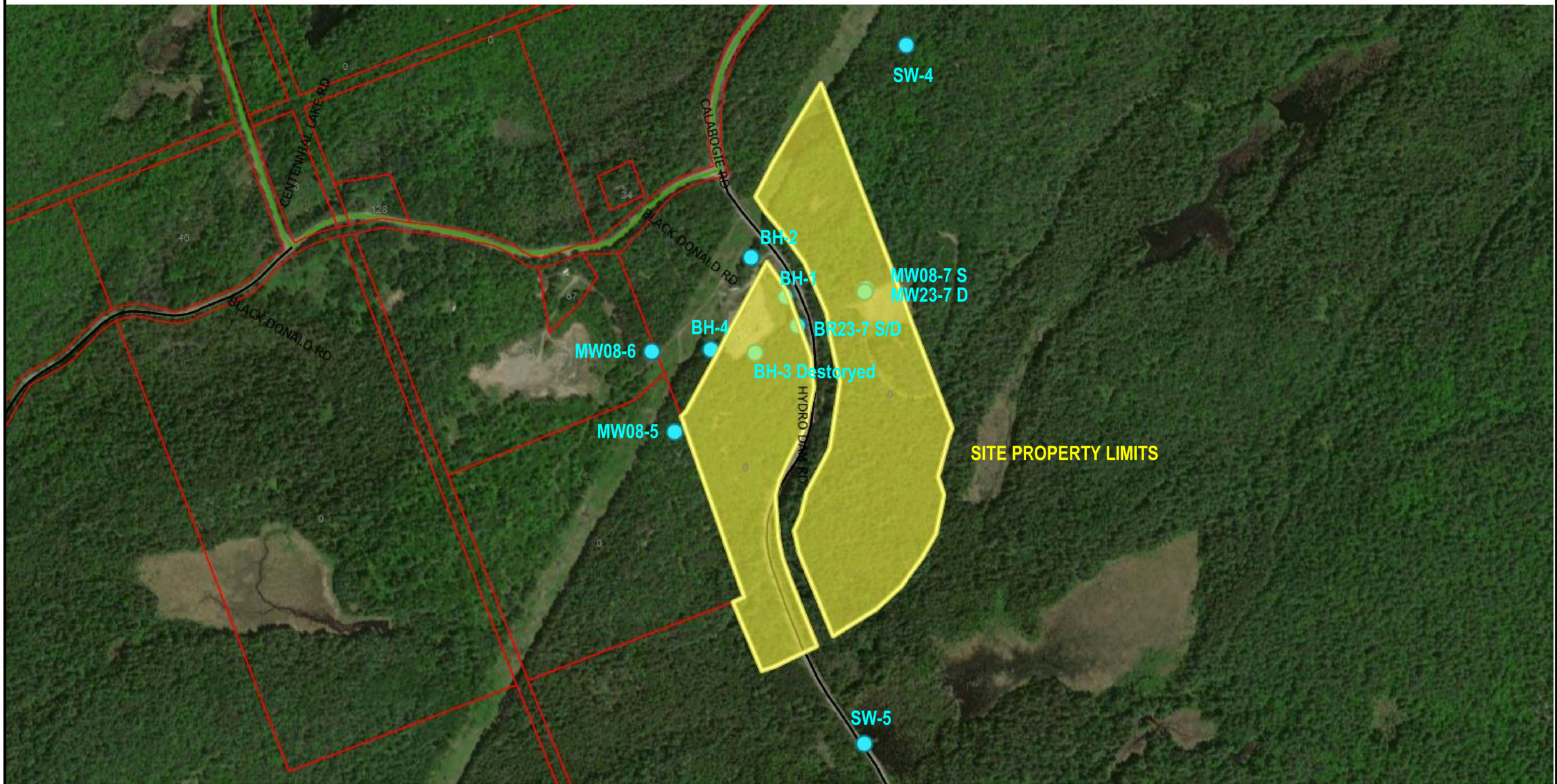
1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON
Phone: (613)828-7800, Fax: (613)828-2600

Black Donald - Greater Madawaska
~
EXPANSION FEASIBILITY STUDY

DRAFTED: QS		PROJECT No.: 22-6213A
CHECKED: KM		REVISION DATE: 2023-12-20
CHECKED: KM	APPROVED: KM	REVISION No.: .
SCALE: 1:1000		SHEET No.: 1 of 1

DWG NAME: J:\6-ENVIRONMENTAL\ACTIVE\2022\22-6213A - GREATER MADAWASKA WDS\DRAWINGS\BLACK DONALD\CAD FILES\EXISTING CONDITIONS QS BEST VERSION 2023 WITH EXPANSION.DWG LAYOUT: EXPANDSION FEASIBILITY STUDY SAVED ON January 2, 2024



Jp2g Consultants Inc.
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Black Donald Landfill Site - Greater Madawaska

~

Monitoring Locations with Site Property Limit

DRAFTED: QS		PROJECT No.: 22-6213A
CHECKED: KM		REVISION DATE: 2023-12-20
CHECKED: KM	APPROVED: KM	REVISION No.: .
SCALE: 1:9028		SHEET No.: 1 of 1

DWG NAME: J:\6-ENVIRONMENTAL\ACTIVE\2022\22-6213A - GREATER MADAWASKA WDS\DRAWINGS\BLACK DONALD\CAD FILES\EXISTING CONDITIONS QS BEST VERSION 2023 WITH EXPANSION.DWG LAYOUT: NEW WELL AERIAL SAVED ON January 2, 2024

Ontario — Ministry of the Environment, Conservation and Parks

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. (Place Sticker and/or Print Below) A386280

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
	Township of Chrester Madawaska		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
19 Parnell St. P.O. Box 180	Calabogie	ON	K0J 1H0	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
Hydro Dam Road			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Calabogie	Ontario	K0J 1H0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	353258	5011014		

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
brown	sand			0	11'
grey	granite			11'	65'
	2mw's set onsite in cluster				

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	54'	3/8 hole plug	
54'	65'	#2 silica sand	

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min/GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min/GPM)

Well production (l/min/GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down		Recovery	
	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☑ Boring ☐ Digging
☑ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
1.5"	PVC	sch 40	0	55'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
1.75	PVC	10	55'	65'

Status of Well

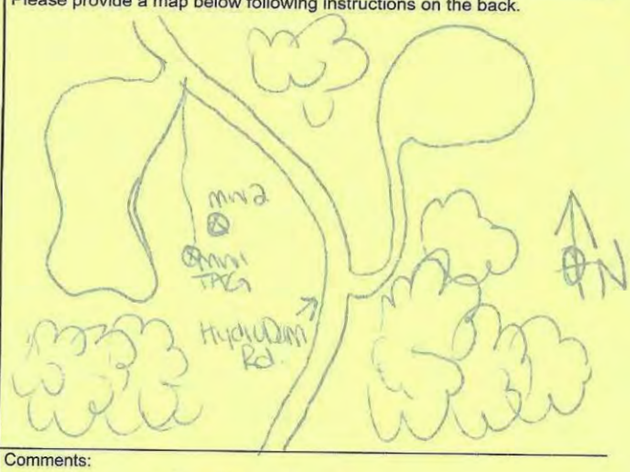
☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify	0	11'	9"
☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify	11'	65'	4"
☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify			

Map of Well Location

Please provide a map below following instructions on the back.



Comments: mw1 holds the tag

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Can-Envir Drilling Contractors	7132

Business Address (Street Number/Name)	Municipality
4102 Perth Road, Inverary	S. Frontenac

Province	Postal Code	Business E-mail Address
ON	K0H 1X0	info@canedr.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
613 329 2631	Fullop, Jonathan

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3115		Y Y Y Y M M D D 2020/12/30

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☐ Yes ☐ No	Y Y Y Y M M D D	Audit No. Z414778
	Date Work Completed Y Y Y Y M M D D 2020/12/30	Received

Contractor's Copy

Ontario — Ministry of the Environment, Conservation and Parks

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. (Place Sticker and/or Print Below) A386271

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
Township of	Greater Madawaska		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
19 Russell St, P.O. Box 180	Calabogie	ON	K0J 1H0	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
74 Hydro Dam Road			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Calabogie	Ontario	K0J 1H0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	353369	5010518		

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
brown	cobbles	sand		0	3'
brown	sand			3'	25'
brown	wet sand			25'	32'
grey	granite			32'	55'
	1 min set on site				

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	41'	3/5" hole plug	
41'	55'	#2 silica sand	

Results of Well Yield Testing

After test of well yield, water was: ☐ Clear and sand free ☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min/GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min/GPM)

Well production (l/min/GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☑ Boring ☐ Digging
☑ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
15"	PVC	.25"	0	42'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
1.75"	PVC	10	42'	52'

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

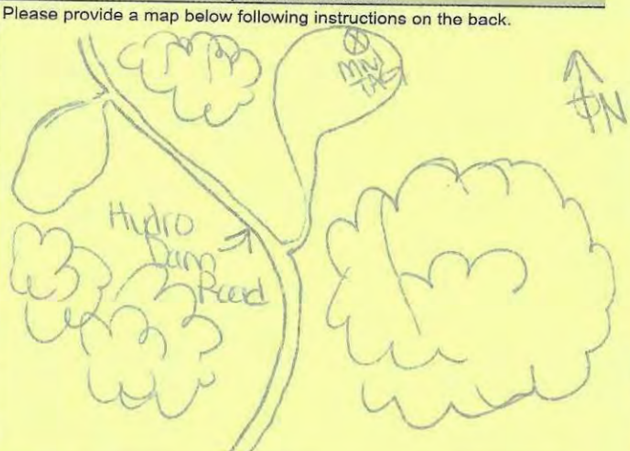
Water found at Depth (m/ft)	Gas	Kind of Water: Fresh	Untested	Other, specify
	☐	☐	☐	
Water found at Depth (m/ft)	☑ Gas	Kind of Water: ☐ Fresh	☐ Untested	☐ Other, specify
Water found at Depth (m/ft)	☐ Gas	Kind of Water: ☐ Fresh	☐ Untested	☐ Other, specify

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	32'	9"
32'	55'	4"

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Can-Envirodrilling Contractors Inc	7213

Business Address (Street Number/Name)	Municipality
4103 Perth Road, Inverary	S. frontenac

Province	Postal Code	Business E-mail Address
ON	K0H 1X0	info@canedc.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
6133532031	Filliol, Jonathan

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3115		2023/01/31

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2023/01/31

Ministry Use Only

Audit No. Z414777

Received

Contractor's Copy

Appendix C
Borehole Logs

BOREHOLE LOG	PROJECT: 21-373	BOREHOLE: 1 1 of 1
HYDROGEOLOGICAL INVESTIGATION Black Donald Landfill FOR: Township of Brougham		DATE: 13 July 2001 GEOLOGIST BJS ELEVATION 93.4 m

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	N VALUE	% WATER	% REC	% RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
		SAND Reddish and medium brown fine sand, trace to some medium and coarse sand, trace fine and coarse gravel, trace silt, subtle laminations, moist, compact.		1		SS	20	2	80			
1		-occasional cobbles observed below 0.6 m.		2		SS	25	3	70			
1.5		-heavy oxidation observed below 1.2 m.		3		SS	37/0.08m	8	50			
		MARBLE BEDROCK Light grey to whitish marble bedrock, massive, pepper appearance, some oxidation along fractures between about 1.7 m and 3.1 m. Weathered section - broken rock between about 1.7 m and 1.9 m. Open fracture with oxidation at about 2.10 m to 2.12 m. Minor oxidation along fracture at about 2.8 m.		4		HQ			100	78		
2												
3				5		HQ			96	100		
4												
5				6		HQ			106	96		
6												
7				7		HQ			100	82		
7.7		Borehole terminated at 7.69 m in marble bedrock.										

Gartner Lee Limited

Project No: 10392-001

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: Black Donald

Log of Borehole: BH2

Logged By: D.Bucholtz

Depth (ft)	Depth (m)	Symbol	Description	Elev.	N Value	Method	Type	Well Installation	Remarks
				1					Well Equipped with lockable steel casing and weather proof lock.
0	0		Ground Surface - 98.984m						Stick-up = 0.82
			Top Soil Black, organic, dry, with rootlets	-0.15					
2				-0.61	22		SS		Concrete
			Sand Fine, loose, dry						
4	1		***Marble Bedrock*** Light grey to white with black specks.				HQ		0.05m dia. PVC
6			Fractures from 1.52m to 2.74m.						Bentonite
8	2		Fractures oxidized.				HQ		
10			Mostly competent, fractures @ 3.35m, 4.88m, 6.40m.						
12	3						HQ		
14									WL October 8, 2002 = 4.18m
16	4						HQ		Silica Sand
18									
20	5						HQ		
22									
23	6			-7.08			HQ		
24			End of Borehole						
26	7								
28	8								

Drill Method: CME 75 Diamond Bit Coring

Drill Date: September 23, 2002

Checked by: B.Harman

Sheet: 1 of 1

185 Concession Street
Lakefield, ON, Canada
K0L 2H0

Project No: 10392-001

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: Black Donald

Log of Borehole: BH3

Logged By: D.Bucholtz

Depth (ft / m)	Symbol	Description	Elev.	N Value	Method	Type	Well Installation	Remarks
			1					Well Equipped with lockable steel casing and weather proof lock.
0 / 0		Ground Surface - 99.804m						Stick-up = 0.86
1 / 0		***Sand*** Fine, brown, loose, dry	-0.3	50		SS		Concrete
2 / 1		***Marble Bedrock*** Light grey to white with black specks. Fractures with sand and root from 0.30m to 2.85m. Fractures oxidized. Mostly competent, fractures @ 4.17m, 5.94m, 7.01m, 7.47m.		-		HQ		0.05m dia. PVC
7 / 2				-		HQ		Bentonite
10 / 3				-		HQ		WL October 8, '02 = 3.53m
16 / 5				-		HQ		
22 / 7				-		HQ		Silica Sand
26 / 8				-		HQ		
28 / 8.5		End of Borehole	-8.53					Screen = 1.52m x 0.052m

Drill Method: CME 75 Diamond Bit Coring

Drill Date: September 25, 2002

Checked by: B.Harman

Sheet: 1 of 1

185 Concession Street
Lakefield, ON, Canada
K0L 2H0

Project No: 10392-001

Log of Borehole: BH4

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: Black Donald

Logged By: D.Bucholtz

Depth (ft / m)	Description	Elev.	N Value	Method	Type	Remarks
-3 ft / -1 m		1				Well Equipped with lockable steel casing and weather proof lock.
						Stick-up = 0.84
0	Ground Surface - 95.962m					
0–2 ft	***Sand*** Medium, brown, dry, with rootlets in top 0.10m	-0.61	50 (0.15m)		SS	Concrete
2–23 ft (0.61–7 m)	***Marble Bedrock*** Light grey to white with black specks.		-		HQ	0.05m dia. PVC
	Heavily fractured from 0.61m to 3.04m.		-		HQ	Bentonite
	Soft, brittle, verticle fracture with sand from 3.66m to 4.27m					
	Fractures oxidized.		-		HQ	
	Mostly competent, fractures @ 4.72m, 5.64m, 6.25m.					WL October 8, 02 = 4.08m
			-		HQ	Silica Sand
		-7	-		HQ	
23 ft / 7 m	End of Borehole					

Drill Method: CME 75 Diamond Bit Coring

Drill Date: September 23, 2002

Checked by: B.Harman

Sheet: 1 of 1

185 Concession Street
Lakefield, ON, Canada
K0L 2H0

Greenview
ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
69 Cleak Avenue, P.O. Box 100
Bancroft, Ontario K0L 1C0
t: (613) 332-0057
f: (613) 332-1767
e: solutions@greenview-environmental.ca

Log of Monitoring Well: MW08-5

Project No.: 102.08.014

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: See Site Plan

SUBSURFACE STRATA PROFILE			SAMPLE					
Depth (ft / m)	Symbol	Description	No.	Type	% R	SPT N-Value (0 15 30 45 60)	Well Completion Details	Comments
0		Ground Surface						Stick-up = 0.89 m
0		**Top Soil** Dark brown, organic, dry, loosely compacted.	1	AS	40			Concrete
2 / 1		**Fine to Medium Sand** Light brown to grey, fine to medium sand, dry, loosely compacted.	2	HQ	80			Bentonite Chips
8		**Marble Bedrock** Light grey to white with black specks, marble bedrock.	3	HQ	100			
10 / 3		Oxidized fractures from 1.83 m to 2.82 m, and from 11.25 m to 12.50 m.	4	HQ	90			
16 / 5		Mostly competent, fractures from 6.55 m to 11.12 m.	5	HQ	100			Silica Sand
22 / 7			6	HQ	100			
26			7	HQ	100			
30 / 9			8	HQ	100			Well screen = 3.05 m x 0.05 m
36 / 11			9	HQ	100			
40			10	HQ	100			Water level June 5, 2008 = 12.85 m.
44 / 13		End of Borehole						

Drilled By: Lantech Drilling Ltd.

Drill Method: CME 75 Diamond Bit Coring

Drill Date: June 2, 2008

Logged By: J. Bailey

Checked By: T. Peters

Sheet: 1 of 1

Greenview
ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
69 Cleak Avenue, P.O. Box 100
Bancroft, Ontario K0L 1C0
t: (613) 332-0057
f: (613) 332-1767
e: solutions@greenview-environmental.ca

Log of Monitoring Well: MW08-6

Project No.: 102.08.014

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: See Site Plan

SUBSURFACE STRATA PROFILE			SAMPLE					
Depth	Symbol	Description	No.	Type	% R	SPT N-Value (0 15 30 45 60)	Well Completion Details	Comments
ft / m		Ground Surface						Stick-up = 0.87 m
0		**Top Soil** Dark brown, organic, dry, loosely compacted.	1	AS	25			Concrete
4 / 1		**Fine to Medium Sand** Light brown, fine to medium sand, dry, loosely compacted.	2	HQ	100			Bentonite Chips
10 / 3		**Marble Bedrock** Light grey to white with black specks, marble bedrock. Heavily fractured from 0.05m to 1.45m. Oxidized fractures @ 3.81m, 4.17m, 5.28m, 5.59m, and 7.48m.	3	HQ	100			Silica Sand
16 / 5			4	HQ	100			
18			5	HQ	95			Water level June 5, 2008 = 5.50 m
22 / 7			6	HQ	100			
28 / 9			7	HQ	100			
32			8	HQ	100			
36 / 11								

Drilled By: Lantech Drilling Ltd.

Drill Method: CME 75 Diamond Bit Coring

Drill Date: June 3, 2008

Logged By: J. Bailey

Checked By: T. Peters

Greenview
ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
69 Cleak Avenue, P.O. Box 100
Bancroft, Ontario K0L 1C0
t: (613) 332-0057
f: (613) 332-1767
e: solutions@greenview-environmental.ca

Log of Monitoring Well: MW08-6

Project No.: 102.08.014

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: See Site Plan

SUBSURFACE STRATA PROFILE			SAMPLE					
Depth	Symbol	Description	No.	Type	% R	SPT N-Value (0 15 30 45 60)	Well Completion Details	Comments
38			9	HQ	100			
40 – 12								
42			10	HQ	100			
44								
46 – 14			11	HQ	100			
48								
50								
52 – 16			12	HQ	100			
54								
56								
58			13	HQ	100			
60 – 18								
62			14	HQ	100			
64								
66 – 20								
68			15	HQ	100			
70								
72 – 22			16	SS	100			Well screen = 6.10 m x 0.05 m
74								
76		End of Borehole						

Drilled By: Lantech Drilling Ltd.

Drill Method: CME 75 Diamond Bit Coring

Drill Date: June 3, 2008

Logged By: J. Bailey

Checked By: T. Peters

Greenview
ENVIRONMENTAL MANAGEMENT
Greenview Environmental Management Limited
69 Cleak Avenue, P.O. Box 100
Bancroft, Ontario K0L 1C0
t: (613) 332-0057
f: (613) 332-1757
e: solutions@greenview-environmental.ca

Log of Monitoring Well: MW08-7

Project No.: 102.08.014

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: See Site Plan

Depth (ft / m)	Description	No.	Type	% R	SPT N-Value (0 200 400 600)	Well Completion Details	Comments
	Ground Surface						Stick-up = 0.85 m
0	**Medium Sand and Gravel** Brown, medium sand with small to medium gravel, wet, compacted.	1	AS				Concrete
2 / 1	**Fine to Medium Sand and Gravel** Light brown, fine to medium sand with small to medium gravel, wet, compacted.	2	SS	10			Water level June 5, 2008 = 0.91 m
6		3	SS	5			Bentonite Chips
8		4	SS	15			
10 / 3	**Fine to Medium Sand** Light brown, fine to medium sand, wet, compacted, small to medium cobble at 3.05 m.	5	SS	50			Silica Sand
16 / 5		6	SS	10			
22 / 7		7	SS	75			Well screen = 3.05 m x 0.05 m
26	End of Borehole						

Drilled By: Lantech Drilling Ltd.

Drill Method: Hollow Stem Augers

Drill Date: June 5, 2008

Logged By: J. Bailey

Checked By: T. Peters

Sheet: 1 of 1

Appendix D
Photographs

BH1

BH2

BH4

MW-08-5

MW 08-6

MW 08-7S (Previously MW 08-7)

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

Madawaska Waste Disposal Site

Fall 2023 Groundwater Monitoring Locations

DATE	November 2023
PROJECT	22-6213B
FIGURE	1

BH08-7D

BH 23-8S

BH 23-8D

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

Madawaska Waste Disposal Site

Fall 2023 Groundwater Monitoring Locations

DATE	November 2023
PROJECT	22-6213B
FIGURE	1

SW4

SW5

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

Madawaska Waste Disposal Site

Spring 2023 Surface Water Monitoring Locations

DATE	June 2023
PROJECT	22-6213B
FIGURE	1

Appendix E
Sampling Protocol

STANDARD SAMPLING PROTOCOL

The following is a description of the monitoring procedures and protocols used for groundwater and surface water monitoring for landfill sites.

Equipment Cleaning and Calibration

Regardless of matrix, prior to traveling to the site to be sampled, all equipment such as water level indicators and multi-parameter meters must be cleaned and calibrated as specified by the equipment manufacturer. Details of the cleaning and calibration should be recorded in the field notes.

GROUNDWATER

Monitoring Well Assessment

Provide an assessment of the status of all monitoring wells at the site.

Note any changes to the well and/or protective casing and record the physical condition of the well; and

Label all observation wells clearly and accurately on both the protective casing and well pipe.

Groundwater Monitoring

Maintain and use an accurate, up-to-date list of all observation wells to be monitored.

Check all field equipment for cleanliness; and

Wear personnel protective equipment as required (i.e., gloves, protective glasses, splash guards) during all phases of work, and follow any appropriate health and safety plan procedures.

Gas Detection in Wells (Prior to Measuring Water Levels)

Turn on gas meter and prepare for sampling atmospheric condition inside monitoring well.

Remove protective casing cover and well cap avoiding introduction of foreign materials into the well.

Immediately insert the probe attached to the gas meter into the well and wait for readings to stabilize.

Record the measurement in the appropriate column on the field data sheet or field book.

Water Level Measurements (Prior to Purging)

Record water level measurements prior to purging or sampling when required.

Do not move dedicated sampling devices such as the "Waterra" inertial pump prior to measuring the water level unless the well diameter dictates removal; reference the measurement from the same location each time (marked location or lowest point on pipe).

Lower the tape/probe into the wells - record the depth to water when the indicator (audible/visual) shows the water level has been reached.

Measure the water level twice by raising and lowering the tape/probe; and

Record the measurement to the nearest cm (0.5 cm) in the appropriate column on the field data sheet or field book.

Well Purging (Prior to Sampling)

The purpose of purging is to remove the stagnant water from within a monitor (removal of all stagnant water) so that a representative water sample may be collected. The procedures for purging are as follows.

Purge the well only after water levels have been confirmed.

Lift the tubing off the bottom of the well and "pump" at a minimum all stagnant water from the well into a graduated container such as a bucket, pail or cylinder so that the purged volume can be measured and recorded.

For low-yield wells, it is expected that either “no purge sampling techniques or low flow purging will be utilized (avoid purging well dry).

Under normal circumstances purged water may be discarded on the ground, away from the well to avoid the potential of water seeping back into the well; and

Allow a sufficient recovery period before sampling (not more than 48 hours).

Field Measurements

Field measurements are to be collected and recorded as outlined in the Environmental Compliance Approval or the approved monitoring program. Typically, these include at a minimum: temperature, pH and conductivity.

Well Sampling

Collect the water sample as soon as practical (not more than 48 hours) after purging starting at the least contaminated location and proceeding to the most contaminated.

Lift tubing and check valve off bottom of well to avoid introducing unnecessary sediment into the sample and transfer some representative sample water into a clean, well rinsed container to conduct measurements of field parameters.

Lift the tubing and gently transfer a sample into a clean container and thoroughly mix to form a single representative sample.

Transfer the sample into a pre-labelled sample bottle; labelling to consist of at a minimum, the project number, well ID and the date.

For samples that require filtering, attach the disposable filter onto the end of the tubing (typically a 0.45-micron membrane filter or as otherwise specified should be used).

Attempt to keep sample agitation to a minimum during sample transfer.

Store samples in a cooler, with ice packs to keep cool.

Transport samples to laboratory within the maximum hold time established by the laboratory (typically within a 48-hour period).

Volatile Organic Compound (VOC) Sampling

Volatile Organic Compounds (VOC) can be easily lost during sample collection, storage, and transportation. The following sampling and handling protocols are adhered to.

VOC samples are to be collected in special containers provided by the laboratory. These typically include glass vials, preferably amber, with a minimum capacity of 20 ml and sealed with Septum tops.

Vials must be filled just to overflowing in such a manner that no air bubbles pass through the vial as it is being filled (this is easier to accomplish by inserting a 4' length of ¼ " poly tubing into the existing Wattera tubing and filling the vial from the ¼" tubing).

Vials must then be sealed with the cap so that no air bubbles are entrapped within it; the septum is placed with the Teflon side face down toward the inside of the bottle.

Check for the presence of air bubbles by inverting the vial and tapping on hard surface; if air bubbles are present, discard the sample and re-sample.

All VOC samples must be preserved as specified by the laboratory (typically with 1 to 2 drops of Hydrochloric Acid (HCI)) and refrigerated or stored on ice until analysed; and

VOC samples should be submitted in duplicate at a ratio specified in the approved monitoring program (typically 1:10)

Surface Water Sampling (General)

Surface water samples should be collected at the same designated location during each sample event (do not collect samples from any station which is frozen, stagnant or otherwise not representative of normal conditions).

If you must stand in the stream, position yourself downstream of the sample location to avoid contaminating the sample with sediment, debris, and other floating materials.

All equipment must be thoroughly rinsed with distilled water at the beginning of each station to avoid cross-contamination.

Wear gloves as required to handle the sample bottles.

Fill all bottles using an unpreserved transfer bottle (to avoid overflowing pre-preserved bottles).

When sampling for dissolved metals, the sample must be filtered and placed in a separate metals bottle, while sampling for total metals, the sample is placed in a common bottle for metals that is provided by the laboratory.

Label and store all samples in the same manner as for groundwater samples; and

Conduct field measurements (these typically include temperature, pH, conductivity, Dissolved Oxygen and Flow).

Flow Measurements (General)

Discharge flow measurements must be taken at designated stations.

QA/QC Water Samples

A field quality assurance and quality control program for all monitoring events will be established as follows and or as dictated in the approved monitoring program.

Where groundwater or surface water samples are collected, and if stipulated in the approved monitoring program, a field blank in which a set of sample bottles is filled with distilled water at a known site or monitoring station is submitted to the laboratory for analysis along with the samples

Where VOC samples are taken, a trip blank, in which 1 set of VOC vials are filled with distilled water (at the laboratory or office) prior to going to the field and accompanies the sample bottles until they are returned to the lab; and

Duplicate of as outlined in the approved monitoring program or 1 duplicate for every 10 samples (do not identify the sample ID number to the laboratory, but have it recorded in the field notes) use the sampling technique as for observation wells.

SAMPLING

Station Sampling Order

The stations will be sampled beginning with those wells exhibiting the lowest chemical concentrations and then moving on to wells with greater chemical concentrations.

Monitoring Periods

The monitoring periods are as recommended in either the approved monitoring program or the Environmental Compliance Approval.

Analytical Parameters

Analysis will be as recommended in either the approved monitoring program and or the Environmental Compliance Approval.

Gas Detection of On-site Buildings

Gas detection in on-site buildings is to be included as part of regular monitoring.

Appendix F

Historic Static Levels, Ground and Surface Water Analysis

THE TOWNSHIP OF GREATER MADAWASKA

Table 3
Groundwater Elevations
Black Donald Waste Disposal Site

Monitor	Ground Elevation (m) [1]	Top of Pipe Elevation (m) [1]	Stick-Up (m)	Depth of Well (m) [2]	Well Diameter (mm)	Water Elevation (m)																			
						24-May-16	31-Aug-16	26-Oct-16	08-May-17	18-Sep-17	25-Oct-17	02-May-18	14-Aug-18	30-Oct-18	14-May-19	20-Aug-19	16-Oct-19	23-Apr-20	19-Aug-20	27-Oct-20	18-May-21	19-Aug-21	04-Nov-21	04-May-22	18-Aug-22	27-Oct-22
BH1	93.60	94.18	0.58	8.25	50.8	87.47	87.47	87.36	90.90	88.09	88.37	90.08	88.02	87.81	89.87	88.10	87.12	89.91	89.95	88.99	89.53	88.70	88.72	89.92	89.20	88.72
BH2	98.98	99.79	0.81	7.06	50.8	95.77	95.27	95.02	96.91	95.49	95.88	96.63	95.32	95.23	96.39	94.85	94.49	96.43	93.83	95.82	96.04	95.49	95.88	96.46	96.14	95.58
BH3	99.80	100.67	0.87	8.61	50.8	97.28	96.74	97.26	97.13	96.65	96.83	97.05	96.72	96.62	96.96	96.22	95.67	96.94	97.05	96.93	96.83	96.63	-	-	-	-
BH4	95.96	96.80	0.84	6.97	50.8	93.20	92.47	92.66	94.10	93.01	93.36	93.71	92.61	92.55	93.57	92.54	92.05	93.53	93.32	93.33	93.32	92.93	93.30	93.39	91.82	93.13
MW08-5	105.03	106.06	1.03	12.52	50.5	92.62	92.56	92.55	92.64	92.56	92.56	92.56	92.57	92.56	92.56	92.56	92.56	92.57	92.57	92.57	92.56	92.57	92.55	92.56	92.66	92.55
MW08-6	102.23	103.22	0.99	22.74	50.8	97.71	97.85	97.89	97.94	97.81	97.88	97.90	97.91	97.72	97.90	97.57	97.44	97.90	97.85	97.93	97.85	97.77	97.91	97.87	97.62	97.84
MW08-7	77.785	78.717	0.93	7.70	50.8	77.86	74.73	74.88	78.08	77.40	77.34	77.98	76.33	75.33	78.00	76.47	75.39	77.95	76.27	75.63	77.83	77.03	76.72	77.90	77.44	77.14

Notes:
1. Elevations surveyed by SGS Lakefield Research Ltd.
2. Depth of well below ground surface (m).
All elevations are relative to a site specific benchmark elevation of 100.00 m.
"-" indicates water level is not available.

THE TOWNSHIP OF GREATER MADAWASKA

Table 4
Groundwater Quality
Black Donald Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	BH1													5-year Trends (sparkline)
				24-May-16	26-Oct-16	08-May-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	16-Oct-19	23-Apr-20	27-Oct-20	18-May-21	04-Nov-21	04-May-22	27-Oct-22	
Alkalinity (as $CaCO_3$)	202	353	30 - 500	**780**	**815**	**773**	**790**	**733**	**680**	**703**	**670**	**613**	**724**	**722**	**800**	**602**	**646**	
Aluminum	0.03	0.065	0.1	0.060	**0.10**	**0.12**	**0.11**	**0.10**	**0.10**	**0.10**	**0.12**	***0.09***	0.06	***0.07***	***0.09***	0.06	***0.07***	
Ammonia, Total (as N)	0.02	N/L	N/L	7.27	8.79	6.23	7.20	6.48	5.94	5.85	2.66	5.03	1.39	6.03	5.54	5.27	1.91	
Ammonia, Un-ionized [3]	0.00022	N/L	N/L	0.01559	0.01119	0.00611	0.00915	0.00150	0.00686	0.01208	0.00579	0.01407	0.00646	0.01656	0.01735	0.00646	0.00464	
Barium	0.019	0.3	1	0.142	0.170	0.213	0.196	0.152	0.144	0.121	0.131	0.111	0.088	0.121	0.122	0.116	0.076	
Boron	0.01	1.3	5	1.19	***1.37***	***1.33***	***1.53***	***1.62***	***1.48***	***1.66***	***1.53***	1.20	0.911	***1.68***	1.14	***1.29***	0.610	
Cadmium	0.000015	0.0013	0.005	**< 0.00002**	**< 0.00002**	**< 0.000014**	**< 0.000014**	**< 0.000015**	**< 0.000015**	**< 0.000015**	0.000017	**< 0.000015**	**< 0.000028**	**< 0.000028**	**< 0.000028**	**< 0.000015**	0.000015	
Calcium	79	N/L	N/L	186	215	288	252	225	200	203	220	196	173	214	187	175	133	
Chloride	0.8	125	250	69.0	13.3	56.4	55.0	59.2	46.4	49.7	50.5	33.5	37.5	43.4	37.7	33.8	20.6	
Chromium	0.001	0.013	0.05	**< 0.002**	0.002	0.001	**< 0.001**	**< 0.002**	**< 0.001**	**< 0.001**	0.001	**< 0.001**	**< 0.002**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	
Cobalt	0.0004	N/L	N/L	0.0072	0.0053	0.0077	0.0050	0.0044	0.0097	0.0039	0.0072	0.0060	0.0026	0.0066	0.0054	0.0071	0.0019	
Chemical Oxygen Demand	5	N/L	N/L	62	61	62	69	66	48	58	40	45	29	63	33	32	15	
Conductivity (µS/cm) [4]	284	N/L	N/L	160	1170	1106	1150	1060	1041	1001	909	913	1086	1102	1044	741	924	
Copper	0.002	0.5	1	**< 0.002**	**< 0.002**	**< 0.002**	0.003	0.002	**< 0.002**	**< 0.002**	**< 0.002**	**< 0.002**	**< 0.002**	0.0015	**< 0.002**	0.0026	0.0015	
Dissolved Organic Carbon	2.1	3.6	5	**16.0**	**17.9**	**17.6**	**21.1**	**18.7**	**17.4**	**22.1**	**17.1**	**16.2**	**9.7**	**18.4**	**18.4**	**14.4**	**7.7**	
Hardness (as $CaCO_3$)	209	357	500	**592**	**684**	**886**	**784**	**705**	**621**	**644**	**687**	**614**	**544**	**672**	**596**	**550**	***445***	
Iron	0.007	0.2	0.3	**7.40**	**14.60**	**23.60**	**17.70**	**6.31**	**6.70**	**0.898**	**3.19**	**5.03**	**0.668**	0.014	**4.87**	**5.24**	**1.04**	
Magnesium	2.8	N/L	N/L	30.9	35.8	40.4	37.4	34.7	29.5	33.1	33.3	30.2	27.2	33.5	31.2	27.6	27.4	
Manganese	0.001	0.03	0.05	**1.80**	**1.97**	**3.68**	**2.10**	**1.15**	**1.25**	**1.06**	**1.10**	**1.07**	**0.190**	**1.27**	**0.917**	**1.17**	**0.315**	
Nitrate (as N)	0.10	2.6	10	0.2	**44.2**	0.10	0.32	0.73	0.05	1.06	0.60	0.89	0.48	1.88	0.31	0.27	0.63	
pH (units) [4]	7.65	6.5 - 8.5	6.5 - 8.5	7.11	6.84	6.81	6.83	**6.14**	6.81	7.15	7.08	6.94	7.44	7.19	7.25	6.86	7.13	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.018	< 0.001	0.001	0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	
Phosphorus, Total	0.03	N/L	N/L	0.04	0.04	0.05	0.02	0.06	0.02	0.05	0.02	0.02	0.03	0.03	0.03	< 0.01	0.02	
Potassium	2.4	N/L	N/L	15.0	17.8	18.6	17.4	16.9	15.4	15.3	15.2	13.7	10.4	14.1	12.5	11.9	7.8	
Silicon	4.38	N/L	N/L	9.24	11.10	12.30	11.80	9.69	8.63	9.10	8.78	9.90	9.02	9.80	10.9	10.4	7.44	
Sodium	3	101.3	200	75.2	82.4	76.3	76.3	86.8	71.3	71.3	60.2	70.0	***141***	96.8	***138***	86.3	***120***	
Strontium	0.26	N/L	N/L	0.509	0.625	0.680	0.665	0.618	0.521	0.595	0.592	0.500	0.467	0.585	0.554	0.473	0.417	
Sulphate	12	256	500	31	93	24	29	40	36	42	36	42	68	62	55	49	38	
Total Dissolved Solids	231	366	500	**895**	**946**	**875**	**909**	**818**	**806**	**823**	**773**	**703**	**872**	**848**	**857**	**707**	**715**	
Total Kjeldahl Nitrogen	0.2	N/L	N/L	10.4	13.6	8.8	8.9	8.2	7.7	7.3	3.4	5.8	1.9	6.0	5.9	5.9	2.3	
Zinc	0.005	2.5	5	**< 0.005**	**< 0.005**	**< 0.005**	0.007	**< 0.005**	0.005	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	0.006	0.005	

Notes:
1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L unless otherwise stated.
Bold and shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates No Limit.
"*" indicates results obtained from lab analysis
"-" indicates parameter not analyzed.

Greenview ENVIRONMENTAL MANAGEMENT

THE TOWNSHIP OF GREATER MADAWASKA

Table 4
Groundwater Quality
Black Donald Waste Disposal Site

Parameter	Background	RUC [1]	ODWS [2]	BH2 (Background)													5-year Trends
	(median)			24-May-16	26-Oct-16	08-May-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	16-Oct-19	23-Apr-20	27-Oct-20	18-May-21	04-Nov-21	04-May-22	27-Oct-22	(sparkline)
Alkalinity (as $CaCO_3$)	202	353	30 - 500	232	225	240	218	210	207	220	207	208	201	221	240	238	224	
Aluminum	0.03	0.065	0.1	0.02	**0.28**	***0.07***	0.05	0.05	0.03	0.05	0.06	0.05	0.02	0.03	0.06	0.03	0.05	
Ammonia, Total (as N)	0.02	N/L	N/L	< 0.01	< 0.01	< 0.01	< 0.01	0.03	0.03	0.04	0.02	0.03	0.01	0.01	0.02	0.01	< 0.01	
Ammonia, Un-ionized [3]	0.00022	N/L	N/L	0.00000	0.00006	0.00007	0.00008	0.00002	0.00021	0.00035	0.00035	0.00032	0.00029	0.00006	0.00010	0.00007	0.00005	
Barium	0.019	0.3	1	0.014	0.019	0.034	0.020	0.017	0.018	0.020	0.017	0.018	0.019	0.019	0.021	0.020	0.020	
Boron	0.01	1.3	5	**< 0.005**	0.007	**< 0.005**	0.019	0.009	0.005	0.055	0.010	0.010	**< 0.005**	0.010	0.010	0.012	0.005	
Cadmium	0.000015	0.0013	0.005	**< 0.00002**	**< 0.00002**	**< 0.000014**	**< 0.000014**	**< 0.000015**	**< 0.000015**	0.000016	**< 0.000015**	**< 0.000015**	**< 0.000015**	**< 0.000015**	**< 0.000015**	0.000016	0.000014	
Calcium	79	N/L	N/L	77.8	88.6	111	92.1	88.0	79.0	90.3	89.7	91.1	89.7	97.8	98.3	97.4	89.5	
Chloride	0.8	125	250	**< 0.5**	86.8	**< 0.5**	0.8	**< 0.5**	0.7	0.8	1.1	1.1	1.1	0.9	0.7	**< 0.5**	0.7	
Chromium	0.001	0.013	0.05	**< 0.002**	**< 0.002**	0.0009	**< 0.001**	**< 0.002**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.002**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	
Cobalt	0.0004	N/L	N/L	0.0002	0.0006	< 0.0001	< 0.0001	< 0.0001	0.0002	0.0002	0.0004	0.0003	0.0002	0.0002	0.0003	0.0002	0.0001	
Chemical Oxygen Demand	5	N/L	N/L	< 5	< 5	< 5	< 5	5	< 5	< 5	< 5	6	< 5	< 5	< 5	< 5	< 5	
Conductivity (µS/cm) [4]	284	N/L	N/L	320	319	298	322	156	286	275	277	248	306	299	401	260	324	
Copper	0.002	0.5	1	0.003	**< 0.002**	**< 0.002**	0.002	**< 0.002**	**< 0.002**	**< 0.002**	**< 0.002**	**< 0.002**	**< 0.002**	0.0012	0.002	0.0018	0.0009	
Dissolved Organic Carbon	2.1	3.6	5	1.3	1.3	1.5	2.7	1.5	2.3	3.2	2.1	2.6	2.0	2.1	**5.7**	2.2	0.8	
Hardness (as $CaCO_3$)	209	357	500	205	235	293	243	232	207	242	236	241	236	257	259	258	234	
Iron	0.007	0.2	0.3	**< 0.005**	0.016	**< 0.005**	0.007	0.009	0.058	0.035	**< 0.005**	0.007	**< 0.005**	**< 0.005**	0.021	**< 0.005**	0.005	
Magnesium	2.8	N/L	N/L	2.55	3.27	3.85	3.07	2.81	2.40	3.97	2.75	3.25	2.84	3.05	3.11	3.51	2.59	
Manganese	0.001	0.03	0.05	**< 0.001**	0.003	0.001	**< 0.001**	**< 0.001**	0.001	***0.030***	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	0.001	**< 0.001**	**< 0.001**	
Nitrate (as N)	0.10	2.6	10	**< 0.1**	0.1	**< 0.05**	0.12	**< 0.05**	**< 0.05**	0.18	0.14	0.12	0.06	0.11	**< 0.05**	0.09	0.16	
pH (units) [4]	7.65	6.5 - 8.5	6.5 - 8.5	**6.06**	7.60	7.69	7.65	6.70	7.62	7.81	7.97	7.89	8.28	7.56	7.46	7.64	7.51	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.005	< 0.001	< 0.001	0.006	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	
Phosphorus, Total	0.03	N/L	N/L	0.02	0.02	0.02	0.04	0.03	0.01	0.03	0.01	0.02	0.02	0.02	0.01	0.02	0.03	
Potassium	2.4	N/L	N/L	2.2	3.0	3.3	3.3	2.8	2.6	3.1	3.0	3.2	3.1	2.9	3.1	3.1	2.7	
Silicon	4.38	N/L	N/L	5.15	6.26	7.17	7.07	5.89	5.41	5.81	5.74	6.76	6.27	6.49	6.71	7.02	4.23	
Sodium	3	101.3	200	2.7	3.7	3.3	3.1	2.8	2.5	4.6	2.7	3.0	2.8	2.6	3.2	3.3	2.2	
Strontium	0.26	N/L	N/L	0.145	0.184	0.218	0.189	0.170	0.148	0.191	0.178	0.197	0.173	0.190	0.195	0.205	0.160	
Sulphate	12	256	500	12	31	11	11	12	17	12	17	13	17	13	16	15	10	
Total Dissolved Solids	231	366	500	237	256	261	245	221	230	231	229	225	234	233	242	251	235	
Total Kjeldahl Nitrogen	0.2	N/L	N/L	< 0.1	0.3	0.1	0.2	0.2	0.2	< 0.1	0.1	< 0.1	0.1	0.1	0.1	0.2	< 0.1	
Zinc	0.005	2.5	5	0.009	**< 0.005**	0.006	**< 0.005**	**< 0.005**	0.005	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	0.006	

Notes:
1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L unless otherwise stated.
Bold and shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates No Limit.
"*" indicates results obtained from lab analysis
"-" indicates parameter not analyzed.

THE TOWNSHIP OF GREATER MADAWASKA

Table 4
Groundwater Quality
Black Donald Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	BH3											5-year Trends (sparkline)
				24-May-16	26-Oct-16	08-May-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	16-Oct-19	23-Apr-20	27-Oct-20	18-May-21	
Alkalinity (as $CaCO_3$)	202	353	30 - 500	***379***	***405***	179	***452***	194	***413***	234	326	171	***407***	303	
Aluminum	0.03	0.065	0.1	0.04	0.05	0.04	***0.09***	0.05	**0.10**	0.05	**0.11**	0.05	0.06	0.04	
Ammonia, Total (as N)	0.02	N/L	N/L	< 0.01	0.01	< 0.01	0.04	0.01	0.02	0.02	0.02	0.02	< 0.01	0.01	
Ammonia, Un-ionized [3]	0.00022	N/L	N/L	0.000002	0.000013	0.000042	0.000075	0.000010	0.000026	0.000130	0.000136	0.000058	0.000055	0.000037	
Barium	0.019	0.3	1	0.077	0.107	0.035	0.116	0.029	0.091	0.037	0.092	0.033	0.135	0.083	
Boron	0.01	1.3	5	0.291	0.444	0.049	0.705	0.052	0.428	0.093	0.721	0.059	0.376	0.208	
Cadmium	0.000015	0.0013	0.005	0.00005	**< 0.00002**	**< 0.000014**	0.000030	0.000085	0.000043	**< 0.000015**	0.000029	**< 0.000015**	**< 0.000028**	**< 0.000015**	
Calcium	79	N/L	N/L	152	201	82.0	219	75.6	188	93.0	195	73.2	200	143	
Chloride	0.8	125	250	8.5	**< 0.5**	0.6	6.1	0.9	4.6	1.5	6.4	1.0	4.5	1.9	
Chromium	0.001	0.013	0.05	**< 0.002**	**< 0.002**	0.0005	**< 0.001**	**< 0.002**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.002**	**< 0.001**	
Cobalt	0.0004	N/L	N/L	0.0005	0.0019	0.0002	0.0006	< 0.0001	0.0007	0.0002	0.0008	0.0002	< 0.0002	0.0002	
Chemical Oxygen Demand	5	N/L	N/L	13	8	7	20	12	12	10	7	12	12	8	
Conductivity (µS/cm) [4]	284	N/L	N/L	691	773	325	730	298	717	426	668	283	649	528	
Copper	0.002	0.5	1	0.003	**< 0.002**	0.004	**< 0.002**	**< 0.002**	**< 0.002**	**< 0.002**	**< 0.002**	0.002	**< 0.002**	0.0021	
Dissolved Organic Carbon	2.1	3.6	5	**5.7**	**7.2**	***4.5***	**10.9**	***3.8***	**8.5**	**6.2**	**8.3**	***4.5***	**6.2**	**5.6**	
Hardness (as $CaCO_3$)	209	357	500	***436***	**576**	230	**624**	212	**538**	265	**559**	207	**571**	***409***	
Iron	0.007	0.2	0.3	**< 0.005**	0.027	**< 0.005**	0.011	**< 0.005**	0.015	0.005	0.008	**< 0.005**	**< 0.005**	**< 0.005**	
Magnesium	2.8	N/L	N/L	13.9	18.0	6.15	18.6	5.70	16.5	7.87	17.5	5.90	17.2	12.6	
Manganese	0.001	0.03	0.05	0.007	**0.067**	0.006	***0.048***	0.003	0.024	0.001	0.023	0.005	***0.036***	0.002	
Nitrate (as N)	0.10	2.6	10	0.4	0.1	0.10	0.55	0.07	0.82	0.28	0.11	0.09	0.83	0.75	
pH (units) [4]	7.65	6.5 - 8.5	6.5 - 8.5	**6.01**	6.89	7.45	7.00	6.78	6.86	7.64	7.59	7.25	7.50	7.34	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
Phosphorus, Total	0.03	N/L	N/L	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.02	
Potassium	2.4	N/L	N/L	1.8	2.3	0.9	3.3	0.8	2.3	1.0	2.1	0.9	2.0	1.8	
Silicon	4.38	N/L	N/L	3.01	3.32	2.41	4.38	2.30	3.43	2.36	3.23	2.52	3.80	3.40	
Sodium	3	101.3	200	11.6	15.2	2.8	15.7	2.3	9.5	2.7	11.7	2.1	6.4	4.0	
Strontium	0.26	N/L	N/L	0.310	0.433	0.153	0.469	0.149	0.387	0.192	0.420	0.154	0.446	0.324	
Sulphate	12	256	500	114	18	14	132	16	181	40	209	16	128	49	
Total Dissolved Solids	231	366	500	**531**	**607**	210	**608**	212	**590**	272	**526**	192	**547**	346	
Total Kjeldahl Nitrogen	0.2	N/L	N/L	0.3	0.5	1.7	0.4	0.2	0.3	0.1	0.3	0.1	0.3	0.2	
Zinc	0.005	2.5	5	0.033	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	

Notes:
1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L unless otherwise stated.
Bold and shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates No Limit.
"*" indicates results obtained from lab analysis
"-" indicates parameter not analyzed.

THE TOWNSHIP OF GREATER MADAWASKA

Table 4
Groundwater Quality
Black Donald Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	BH4													5-year Trends
				24-May-16	26-Oct-16	08-May-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	16-Oct-19	23-Apr-20	27-Oct-20	18-May-21	04-Nov-21	04-May-22	27-Oct-22	(sparkline)
Alkalinity (as $CaCO_3$)	202	353	30 - 500	**548**	***459***	**550**	***416***	***360***	***409***	**599**	**505**	**618**	**505**	320	***406***	***469***	251	
Aluminum	0.03	0.065	0.1	0.05	0.04	**0.11**	***0.09***	***0.08***	***0.09***	**0.11**	**0.13**	**0.12**	***0.08***	0.05	***0.09***	***0.08***	**0.14**	
Ammonia, Total (as N)	0.02	N/L	N/L	0.03	< 0.01	0.49	0.05	0.02	0.06	1.00	0.57	0.63	0.20	0.01	0.03	0.11	0.12	
Ammonia, Un-ionized [3]	0.00022	N/L	N/L	0.00004	0.00001	0.00091	0.00007	0.00013	0.00008	0.00347	0.00202	0.00170	0.00023	0.00002	0.00008	0.00019	0.00020	
Barium	0.019	0.3	1	0.078	0.068	0.127	0.095	0.059	0.059	0.099	0.090	0.120	0.110	0.062	0.067	0.091	0.117	
Boron	0.01	1.3	5	0.731	0.280	***1.42***	0.460	0.480	0.327	***2.21***	***1.57***	***2.96***	***2.22***	0.384	0.245	1.25	0.373	
Cadmium	0.000015	0.0013	0.005	**< 0.00002**	**< 0.00002**	0.000020	**< 0.000014**	**< 0.000015**	**< 0.000015**	**< 0.000029**	0.000092	**< 0.000015**	0.000065	**< 0.000015**	**< 0.000015**	**< 0.000015**	0.000025	
Calcium	79	N/L	N/L	191	149	252	184	170	163	229	234	291	266	185	181	264	358	
Chloride	0.8	125	250	18.6	11.8	25.7	3.8	16.4	6.9	44.9	25.4	82.5	36.5	4.3	1.7	41.4	10.5	
Chromium	0.001	0.013	0.05	**< 0.002**	**< 0.002**	0.0005	**< 0.001**	**< 0.002**	**< 0.001**	**< 0.001**	0.001	**< 0.001**	**< 0.002**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	
Cobalt	0.0004	N/L	N/L	0.0007	0.0008	0.0006	< 0.0001	< 0.0001	0.0002	0.0011	0.0013	0.0016	0.0012	0.0002	0.0001	0.0009	0.0059	
Chemical Oxygen Demand	5	N/L	N/L	23	< 5	30	18	21	< 5	65	29	87	38	7	< 5	27	45	
Conductivity (µS/cm) [4]	284	N/L	N/L	851	744	966	737	623	780	887	950	971	1534	681	786	820	1218	
Copper	0.002	0.5	1	0.0050	**< 0.002**	0.0030	0.0040	0.0020	**< 0.002**	0.0040	0.0050	0.0070	0.0050	0.0024	0.002	0.0051	0.0037	
Dissolved Organic Carbon	2.1	3.6	5	**9.2**	3.4	**11.8**	**7.9**	**6.5**	**7.2**	**24.9**	**15.9**	**22.0**	**15.9**	**6.2**	**7.8**	**13.8**	**12.5**	
Hardness (as $CaCO_3$)	209	357	500	**552**	***432***	**729**	**541**	***493***	***461***	**673**	**674**	**860**	**775**	**529**	**509**	**766**	**1010**	
Iron	0.007	0.2	0.3	**< 0.005**	**< 0.005**	**< 0.005**	0.010	**< 0.005**	0.007	0.005	0.005	0.005	**< 0.005**	**< 0.005**	0.011	**< 0.005**	0.009	
Magnesium	2.8	N/L	N/L	18.1	14.8	24.2	19.6	16.5	13.0	24.4	21.6	32.2	27.0	16.1	13.8	25.7	27.2	
Manganese	0.001	0.03	0.05	0.006	0.019	**0.108**	**0.195**	0.002	**0.066**	0.015	**1.60**	0.004	**0.852**	0.012	***0.036***	0.010	**7.98**	
Nitrate (as N)	0.10	2.6	10	1.9	1.8	0.73	0.23	2.37	0.39	0.42	0.14	1.15	0.18	0.51	**< 0.05**	0.19	0.08	
pH (units) [4]	7.65	6.5 - 8.5	6.5 - 8.5	6.94	6.91	7.09	6.87	7.67	6.88	7.35	7.31	7.26	6.83	7.01	7.17	7.02	6.98	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.005	< 0.001	< 0.001	0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	
Phosphorus, Total	0.03	N/L	N/L	0.02	0.02	0.03	0.02	0.03	0.03	0.03	0.02	0.03	0.02	0.04	0.01	0.02	0.02	
Potassium	2.4	N/L	N/L	8.3	9.6	13.7	13.2	8.9	7.0	13.3	12.4	17.8	15.4	7.8	7.9	11.5	11.4	
Silicon	4.38	N/L	N/L	5.31	6.26	6.72	7.59	4.68	5.11	6.30	6.03	7.86	7.24	5.60	6.14	6.86	5.05	
Sodium	3	101.3	200	25.7	18.1	39.8	23.5	17.5	10.6	40.6	33.9	65.9	55.7	10.9	7.3	30.7	21.9	
Strontium	0.26	N/L	N/L	0.420	0.362	0.525	0.488	0.414	0.385	0.578	0.659	0.794	0.748	0.469	0.449	0.648	0.821	
Sulphate	12	256	500	147	206	122	113	192	101	151	145	233	156	174	95	**< 1**	***455***	
Total Dissolved Solids	231	366	500	**746**	**530**	**736**	**551**	**568**	**518**	**806**	**665**	**927**	**727**	***488***	***470***	**764**	**956**	
Total Kjeldahl Nitrogen	0.2	N/L	N/L	0.6	0.4	1.1	0.4	0.4	0.3	2.0	1.2	2.0	1.1	0.2	0.2	0.7	1.0	
Zinc	0.005	2.5	5	0.024	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	0.006	

Notes:
1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L unless otherwise stated.
Bold and shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates No Limit.
"*" indicates results obtained from lab analysis
"-" indicates parameter not analyzed.

Greenview ENVIRONMENTAL MANAGEMENT

THE TOWNSHIP OF GREATER MADAWASKA

Table 4
Groundwater Quality
Black Donald Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	MW08-6 (Background)														5-year Trends (sparkline)
				24-May-16	26-Oct-16	08-May-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	16-Oct-19	23-Apr-20	27-Oct-20	18-May-21	04-Nov-21	04-May-22	27-Oct-22	
Alkalinity (as $CaCO_3$)	202	353	30 - 500	194	173	183	172	180	168	171	162	153	145	160	183	169	161	
Aluminum	0.03	0.065	0.1	0.03	0.02	0.05	0.05	0.05	0.03	0.04	0.05	0.04	**< 0.01**	0.02	0.04	0.02	0.03	
Ammonia, Total (as N)	0.02	N/L	N/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.03	0.02	0.02	< 0.01	< 0.01	0.04	< 0.01	< 0.01	
Ammonia, Un-ionized [3]	0.00022	N/L	N/L	0.00003	0.00007	0.00013	0.00016	0.00025	0.00012	0.00086	0.00023	0.00021	0.00006	0.00010	0.00049	0.00011	0.00013	
Barium	0.019	0.3	1	0.016	0.017	0.020	0.018	0.019	0.017	0.019	0.019	0.019	0.020	0.020	0.021	0.023	0.026	
Boron	0.01	1.3	5	0.008	0.005	0.005	0.014	0.008	**< 0.005**	0.012	0.011	0.008	**< 0.005**	0.008	0.008	0.007	0.008	
Cadmium	0.000015	0.0013	0.005	0.00003	**< 0.00002**	**< 0.000014**	**< 0.000014**	**< 0.000015**	**< 0.000015**	**< 0.000029**	0.000017	**< 0.000015**	**< 0.000015**	**< 0.000015**	**< 0.000015**	**< 0.000015**	0.000013	
Calcium	79	N/L	N/L	63.8	69.2	82.5	71.1	72.1	61.5	70.9	66.8	65.1	64.5	69.4	71.5	68.5	63.7	
Chloride	0.8	125	250	**< 0.5**	2.3	**< 0.5**	0.8	**< 0.5**	0.7	1.0	1.0	0.9	0.8	0.6	**< 0.5**	**< 0.5**	0.5	
Chromium	0.001	0.013	0.05	**< 0.002**	**< 0.002**	0.0006	**< 0.001**	**< 0.002**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.002**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	
Cobalt	0.0004	N/L	N/L	0.0020	0.0007	0.0003	0.0003	0.0004	0.0005	0.0004	0.0005	0.0005	0.0005	0.0004	0.0005	0.0005	0.0007	
Chemical Oxygen Demand	5	N/L	N/L	< 5	< 5	< 5	20	7	< 5	5	< 5	6	< 5	< 5	< 5	5	< 5	
Conductivity (µS/cm) [4]	284	N/L	N/L	261	240	129	238	245	286	237	391	192	294	232	257	199	240	
Copper	0.002	0.5	1	0.003	**< 0.002**	**< 0.002**	0.002	**< 0.002**	**< 0.002**	**< 0.002**	**< 0.002**	**< 0.002**	**< 0.002**	0.0019	0.003	0.0022	0.0018	
Dissolved Organic Carbon	2.1	3.6	5	2.0	2.1	2.1	3.3	2.0	2.8	***3.9***	2.7	3.4	**5.5**	2.5	**9.4**	3.1	2.5	
Hardness (as $CaCO_3$)	209	357	500	170	184	219	189	192	164	189	178	174	172	186	191	183	170	
Iron	0.007	0.2	0.3	0.063	**< 0.005**	**< 0.005**	0.016	**< 0.005**	0.005	**< 0.005**	**< 0.005**	0.006	0.018	**< 0.005**	0.009	**< 0.005**	0.014	
Magnesium	2.8	N/L	N/L	2.58	2.76	3.03	2.76	2.88	2.47	2.90	2.73	2.80	2.62	3.09	2.96	2.91	2.63	
Manganese	0.001	0.03	0.05	***0.031***	0.002	0.001	0.001	**< 0.001**	0.001	**< 0.001**	0.001	0.002	0.002	**< 0.001**	0.001	**< 0.001**	0.002	
Nitrate (as N)	0.10	2.6	10	0.4	0.2	0.19	0.07	**< 0.05**	0.19	0.38	0.30	0.16	0.09	0.14	0.19	0.11	0.13	
pH (units) [4]	7.65	6.5 - 8.5	6.5 - 8.5	7.27	7.64	7.94	7.98	8.19	7.87	8.28	7.80	7.82	7.59	7.75	7.89	7.79	7.90	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.003	< 0.001	< 0.001	0.003	< 0.002	< 0.002	0.003	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	
Phosphorus, Total	0.03	N/L	N/L	0.03	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.01	0.02	0.03	0.01	0.01	< 0.01	
Potassium	2.4	N/L	N/L	1.9	1.8	2.2	2.0	1.9	1.5	1.7	2.0	1.8	2.0	1.8	1.7	1.7	2.0	
Silicon	4.38	N/L	N/L	3.35	3.60	4.15	3.86	3.29	3.12	3.38	3.13	3.46	3.32	3.44	3.40	3.52	2.41	
Sodium	3	101.3	200	3.0	2.8	2.8	2.5	2.4	2.0	1.9	2.1	2.0	2.0	2.1	1.9	2.1	2.1	
Strontium	0.26	N/L	N/L	0.326	0.355	0.411	0.357	0.362	0.302	0.330	0.332	0.319	0.313	0.372	0.306	0.345	0.299	
Sulphate	12	256	500	11	36	10	7	10	9	9	8	7	8	7	8	8	9	
Total Dissolved Solids	231	366	500	201	196	205	191	191	186	184	170	164	170	168	183	177	171	
Total Kjeldahl Nitrogen	0.2	N/L	N/L	0.1	0.2	0.2	0.2	0.2	0.2	< 0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	
Zinc	0.005	2.5	5	0.009	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	0.005	

Notes:
1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L unless otherwise stated.
Bold and shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates No Limit.
"*" indicates results obtained from lab analysis
"-" indicates parameter not analyzed.

THE TOWNSHIP OF GREATER MADAWASKA

Table 4
Groundwater Quality
Black Donald Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	MW08-7													5-year Trends
				24-May-16	26-Oct-16	08-May-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	16-Oct-19	23-Apr-20	27-Oct-20	18-May-21	04-Nov-21	04-May-22	27-Oct-22	(sparkline)
Alkalinity (as $CaCO_3$)	202	353	30 - 500	188	182	180	210	189	176	182	176	178	170	185	237	207	220	
Aluminum	0.03	0.065	0.1	0.02	0.03	0.05	0.05	0.04	0.04	**0.14**	0.05	0.05	0.01	0.02	0.05	0.02	0.03	
Ammonia, Total (as N)	0.02	N/L	N/L	< 0.01	< 0.01	< 0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	< 0.01	0.02	< 0.01	< 0.01	
Ammonia, Un-ionized [3]	0.00022	N/L	N/L	0.00001	0.00012	0.00005	0.00023	0.00001	0.00024	0.00019	0.00041	0.00003	0.00051	0.00007	0.00024	0.00008	0.00010	
Barium	0.019	0.3	1	0.033	0.036	0.049	0.048	0.040	0.036	0.045	0.041	0.047	0.040	0.042	0.048	0.047	0.056	
Boron	0.01	1.3	5	**< 0.005**	**< 0.005**	**< 0.005**	0.011	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	0.006	**< 0.005**	**< 0.005**	
Cadmium	0.000015	0.0013	0.005	**< 0.00002**	**< 0.00002**	**< 0.000014**	**< 0.000014**	**< 0.000015**	**< 0.000015**	**< 0.000015**	**< 0.000015**	**< 0.000015**	**< 0.000015**	**< 0.000015**	**< 0.000015**	**< 0.000015**	**< 0.000010**	
Calcium	79	N/L	N/L	57.7	61.4	82.7	71.9	72.2	56.9	79.9	67.6	74.5	64.6	73.3	78.5	81.1	76.5	
Chloride	0.8	125	250	39.1	**< 0.5**	47.0	31.7	39.7	33.4	57.6	49.9	46.7	32.6	31.4	36.2	51.9	47.3	
Chromium	0.001	0.013	0.05	**< 0.002**	**< 0.002**	0.0004	**< 0.001**	**< 0.002**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.002**	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	
Cobalt	0.0004	N/L	N/L	< 0.0001	0.0003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0006	0.0002	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	
Chemical Oxygen Demand	5	N/L	N/L	50	25	< 5	12	21	< 5	10	15	26	11	< 5	< 5	< 5	9	
Conductivity (μS/cm) [4]	284	N/L	N/L	306	301	321	378	282	291	308	323	269	303	284	402	296	396	
Copper	0.002	0.5	1	**< 0.002**	**< 0.002**	0.003	0.002	0.002	**< 0.002**	**< 0.002**	**< 0.002**	0.003	**< 0.002**	0.0014	0.002	0.0027	0.0021	
Dissolved Organic Carbon	2.1	3.6	5	2.3	2.2	2.5	3.5	2.3	2.6	***3.8***	2.7	3.2	3.2	2.9	**5.2**	2.6	1.5	
Hardness (as $CaCO_3$)	209	357	500	175	186	246	214	215	169	243	202	223	192	220	233	241	225	
Iron	0.007	0.2	0.3	**< 0.005**	0.026	**< 0.005**	**< 0.005**	**< 0.005**	0.009	**0.350**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	0.006	**< 0.005**	**< 0.005**	
Magnesium	2.8	N/L	N/L	7.43	7.79	9.67	8.25	8.40	6.58	10.6	7.94	9.02	7.37	8.92	8.90	9.26	8.14	
Manganese	0.001	0.03	0.05	**< 0.001**	0.002	**< 0.001**	**< 0.001**	**< 0.001**	0.001	0.023	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**	0.001	**< 0.001**	**< 0.001**	
Nitrate (as N)	0.10	2.6	10	0.1	0.2	0.09	**< 0.05**	0.06	**< 0.05**	0.21	0.09	0.13	**< 0.05**	0.17	0.07	0.16	0.11	
pH (units) [4]	7.65	6.5 - 8.5	6.5 - 8.5	6.90	7.97	7.67	8.07	6.85	7.94	7.97	8.13	7.16	8.30	7.80	7.87	7.82	7.81	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003	< 0.002	< 0.002	0.003	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	
Phosphorus, Total	0.03	N/L	N/L	2.73	0.80	0.15	0.12	1.23	0.21	0.37	0.62	1.20	1.12	0.12	0.10	0.12	0.07	
Potassium	2.4	N/L	N/L	1.1	1.2	1.5	1.9	1.3	1.3	1.3	1.5	1.5	1.6	1.5	1.7	1.6	1.7	
Silicon	4.38	N/L	N/L	3.08	3.74	4.13	5.08	3.58	3.41	3.38	3.47	3.80	3.73	3.78	4.45	3.93	2.94	
Sodium	3	101.3	200	23.2	29.7	28.2	36.1	22.0	23.9	20.1	28.5	26.5	26.0	22.5	32.7	25.1	30.4	
Strontium	0.26	N/L	N/L	0.103	0.117	0.142	0.135	0.123	0.103	0.142	0.128	0.137	0.112	0.132	0.143	0.141	0.128	
Sulphate	12	256	500	10	10	12	2	7	5	10	5	12	6	9	4	9	3	
Total Dissolved Solids	231	366	500	252	268	305	289	252	245	291	256	267	242	242	285	291	297	
Total Kjeldahl Nitrogen	0.2	N/L	N/L	0.3	0.2	0.8	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.1	
Zinc	0.005	2.5	5	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	**< 0.005**	

Notes:
1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L unless otherwise stated.
Bold and shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates No Limit.
"*" indicates results obtained from lab analysis
"-" indicates parameter not analyzed.

THE TOWNSHIP OF GREATER MADAWASKA

Table 4
Groundwater Quality
Black Donald Waste Disposal Site

Parameter	ODWS [1]	BH4	BH1				
		29-Apr-09	3-May-10	16-May-11	16-Apr-12	08-May-17	04-May-22
Acetone	N/L	-	-	-	-	0.008	0.03
Benzene	0.001	< 0.001	0.00066	< 0.0005	0.0008	< 0.0005	< 0.0005
Bromobenzene	N/L	-	-	-	-	< 0.0001	< 0.0004
Bromodichloromethane	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.002
Bromoform	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.005
Bromomethane	N/L	< 0.0009	< 0.0005	< 0.0015	< 0.0005	< 0.0003	< 0.0005
Carbon Tetrachloride	0.002	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Monochlorobenzene (Chlorobenzene)	0.08	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0005
Chloroethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.003
Chloroform	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.001
Chloromethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0003	< 0.002
Chlorotoluene,2-	N/L	-	-	-	-	< 0.0002	< 0.0002
Chlorotoluene,4-	N/L	-	-	-	-	< 0.0002	< 0.0002
Dibromo-3-Chloropropane, 1,2-	N/L	-	-	-	-	< 0.001	< 0.0006
Dibromochloromethane	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.002
Dibromoethane,1,2- (Ethylene Dibromide)	N/L	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002
Dibromomethane	N/L	-	-	-	-	< 0.001	< 0.0001
Dichlorobenzene,1,2-	0.2	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichlorobenzene,1,3-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichlorobenzene,1,4-	0.005	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0005
Dichlorodifluoromethane	N/L	-	-	-	-	< 0.001	< 0.002
Dichloroethane,1,1-	N/L	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloroethane,1,2-	0.005	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloroethene, cis-1,2-	N/L	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloroethene, trans-1,2-	N/L	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloroethene,1,1-	0.014	< 0.00066	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloromethane (Methylene Chloride)	0.05	< 0.005	< 0.002	< 0.0005	< 0.0005	< 0.0003	< 0.005
Dichloropropane,1,2-	N/L	< 0.0007	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloropropane,1,3-	N/L	-	-	-	-	< 0.0002	< 0.0002
Dichloropropane,2,2-	N/L	-	-	-	-	< 0.0002	< 0.0002
Dichloropropene, cis-1,3-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloropropene, trans-1,3-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloropropene,1,1-	N/L	-	-	-	-	< 0.0002	< 0.0002
Ethylbenzene	0.0024	< 0.001	0.0014	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Hexachlorobutadiene	N/L	-	-	-	-	< 0.001	< 0.0006
Hexane	N/L	-	-	-	-	< 0.001	< 0.005
Isopropylbenzene	N/L	-	-	-	-	< 0.0002	< 0.0002
Isopropyltoluene,4-	N/L	-	-	-	-	< 0.0004	< 0.0002
Methyl Butyl Ketone	N/L	-	-	-	-	< 0.01	< 0.005
Methyl Ethyl Ketone	N/L	-	-	-	-	0.002	< 0.02
Methyl Isobutyl Ketone	N/L	-	-	-	-	< 0.001	< 0.02
Methyl-t-butyl Ether	N/L	-	-	-	-	0.001	< 0.002
Naphthalene	N/L	-	-	-	-	< 0.0007	< 0.0004
n-Butylbenzene	N/L	-	-	-	-	< 0.0007	< 0.0004
n-Propylbenzene	N/L	-	-	-	-	< 0.0004	< 0.0001
sec-Butylbenzene	N/L	-	-	-	-	< 0.0005	< 0.0001
Styrene	N/L	< 0.004	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
tert-Butylbenzene	N/L	-	-	-	-	< 0.0001	< 0.0001
Tetrachloroethane 1,1,1,2-	N/L	< 0.002	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Tetrachloroethane 1,1,2,2-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0005
Tetrachloroethene	0.03	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0005
Toluene	0.024	< 0.0008	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Trichlorobenzene,1,2,3-	N/L	-	-	-	-	< 0.0002	< 0.0005
Trichlorobenzene,1,2,4-	N/L	-	-	-	-	< 0.0002	< 0.0005
Trichloroethane,1,1,1-	N/L	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Trichloroethane,1,1,2-	N/L	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Trichloroethylene	0.005	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Trichlorofluoromethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.005
Trichloropropane,1,2,3-	N/L	-	-	-	-	< 0.0002	< 0.0005
Trimethylbenzene,1,2,4-	N/L	-	-	-	-	< 0.002	< 0.001
Trimethylbenzene,1,3,5-	N/L	-	-	-	-	< 0.0006	< 0.0001
Vinyl Chloride	0.001	< 0.0005	< 0.0005	< 0.0002	0.00022	< 0.0002	< 0.0002
Xylene (Total)	0.3	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Xylene, m,p-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.001
Xylene, o-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005

Notes:
1. Ontario Drinking Water Standards (ODWS).

All results are expressed in mg/L unless otherwise stated.

Greenview ENVIRONMENTAL MANAGEMENT

Shaded areas indicate values that exceed ODWS maximum acceptable concentrations.
N/L indicates No Limit specified.
"-" means parameter not analyzed.
*2-chloroethyl vinyl ether analyzed from sample preserved with HCl.

Table 5
Surface Water Quality
Black Donald Waste Disposal Site

Parameter	Background (75th Percentile)	PWQO [1]	SW-3															5-year Trends
			24-May-16	08-May-17	18-Sep-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	23-Apr-20	19-Aug-20	27-Oct-20	18-May-21	19-Aug-21	04-Nov-21	04-May-22	27-Oct-22	(sparkline)
Alkalinity (as $CaCO_3$)	228	25% Decrease	126	62	185	143	78	155	78	81	154	134	121	228	120	94	158	
Ammonia, Total (as N)	0.1	N/L	< 0.01	< 0.01	0.02	0.02	< 0.01	0.04	0.04	0.02	< 0.01	0.01	< 0.01	0.12	0.02	< 0.01	0.03	
Ammonia, Un-ionized (as N) [2]	0.00145	0.02	0.00001	0.00011	0.00004	0.00036	0.00038	0.00010	0.00023	0.00010	0.00003	0.00003	0.00006	0.00703	0.00010	0.00004	0.00005	
Barium	0.065	N/L	0.024	0.008	0.036	0.019	0.008	0.034	0.013	0.012	0.025	0.018	0.020	0.035	0.022	0.016	0.086	
Boron	0.006	0.2	0.007	< 0.005	0.006	0.006	0.006	< 0.005	< 0.005	< 0.005	0.009	0.008	0.006	0.006	0.005	0.006	< 0.005	
Biological Oxygen Demand	4	N/L	< 3	< 2	< 2	< 2	< 2	< 3	< 3	< 3	20	< 3	< 3	< 3	< 3	< 3	< 3	
Cadmium	0.0000155	0.0002	< 0.00002	< 0.000014	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	0.000015	< 0.000015	0.000032	0.000018	0.000058	
Calcium	89	N/L	45.8	22.4	66.4	44.3	22.7	66.0	30.5	32.8	63.4	51.2	43.1	79.7	41.6	31.6	56.4	
Chromium	0.001	0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Chloride	73	N/L	< 0.5	< 0.5	0.5	1.0	< 0.5	0.8	0.7	0.9	1.4	1.2	0.7	1.1	0.7	< 0.5	0.8	
Chemical Oxygen Demand	21	N/L	8	10	20	12	12	9	40	13	19	13	10	21	15	8	26	
Conductivity (µS/cm) [3]	591	N/L	261	136	370	278	169	-	169	-	-	283	-	-	-	-	-	
Conductivity (µS/cm) [4]	501	N/L	193	78	273	203	115	181	104	92	244	228	174	283	161	164	226	
Copper	0.001	0.005	0.0006	0.0006	0.0001	0.0002	0.0005	0.0005	0.0006	0.0005	0.0007	0.0004	0.0010	0.0003	0.0008	0.0013	0.0015	
Dissolved Oxygen [4]	9.44	5	9.00	12.34	7.50	**4.62**	9.06	**4.16**	8.42	10.48	5.09	8.75	6.30	9.90	7.27	9.81	5.73	
Dissolved Organic Carbon	8.5	N/L	4.3	5.4	6.2	7.1	3.9	6.2	5.1	4.2	5.9	6.2	5.8	8.8	5.7	5.2	8.0	
Hardness (as $CaCO_3$)	263	N/L	136	67	202	134	68	201	90	97	184	152	127	235	125	94	168	
Iron	0.087	0.3	0.291	0.051	0.118	0.044	0.008	0.100	0.055	0.015	0.016	0.073	0.098	**0.309**	**0.456**	0.178	**3.76**	
Magnesium	11	N/L	5.26	2.66	8.75	5.54	2.73	8.65	3.45	3.54	6.16	5.79	4.62	8.68	5.13	3.57	6.47	
Manganese	0.034	N/L	0.250	0.003	0.235	0.074	0.001	0.079	0.016	0.001	0.034	0.046	0.026	0.912	0.550	0.134	4.45	
Nitrate (as N)	0.06	N/L	< 0.1	< 0.05	< 0.05	< 0.05	0.19	< 0.05	0.18	0.06	< 0.05	< 0.05	0.11	0.09	< 0.05	0.08	0.10	
Nitrite (as N)	0.06	N/L	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.07	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [4]	7.81	6.5 - 8.5	6.78	7.98	6.89	7.97	8.44	7.32	7.61	7.70	7.11	7.39	7.52	8.29	7.64	7.41	7.05	
Phenols	0.002	0.001	< 0.001	**0.001**	< 0.001	< 0.001	< 0.001	**0.002**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Phosphorus, Total	0.024	0.03	< 0.01	0.01	**0.03**	0.02	0.01	< 0.01	**0.05**	< 0.01	0.01	0.01	**0.03**	**0.05**	**0.04**	0.02	**0.13**	
Potassium	1.91	N/L	0.8	0.3	0.8	1.0	0.7	0.4	0.5	0.5	0.4	0.9	0.8	1.4	0.9	0.6	1.5	
Sodium	37	N/L	1.3	0.5	5.8	1.2	0.9	2.7	1.1	1.3	1.2	1.5	1.5	1.6	1.5	1.4	1.6	
Strontium	0.18	N/L	0.076	0.035	0.149	0.076	0.035	0.133	0.047	0.047	0.087	0.075	0.067	0.127	0.065	0.050	0.091	
Sulphate	7.15	N/L	7	5	< 1	2	4	4	5	6	9	4	7	< 1	3	6	1	
Total Dissolved Solids	355	N/L	136	75	204	153	86	163	86	92	176	145	121	225	124	97	162	
Total Kjeldahl Nitrogen	0.5	N/L	0.19	0.2	0.3	0.3	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.5	0.5	0.2	0.7	
Total Suspended Solids	4	N/L	< 3	< 3	< 3	< 3	< 3	< 3	< 3	3	< 3	< 3	29	4	< 3	< 3	66.0	
Zinc	0.007	0.02	< 0.005	0.012	**0.038**	**0.042**	< 0.005	0.012	0.006	< 0.005	< 0.005	0.005	**0.026**	0.014	0.010	< 0.005	0.013	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L unless otherwise stated.
Shaded area with bold text indicates PWQO exceedance.
N/L indicates No Limit.
"-" indicates results obtained from lab analysis

Table 5
Surface Water Quality
Black Donald Waste Disposal Site

Parameter	Background (75th Percentile)	PWQO [1]	SW-4 (Background)															5-year Trends
			24-May-16	08-May-17	18-Sep-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	23-Apr-20	19-Aug-20	27-Oct-20	18-May-21	19-Aug-21	04-Nov-21	04-May-22	18-Aug-22	(sparkline)
Alkalinity (as $CaCO_3$)	228	25% Decrease	196	133	246	216	138	226	145	144	214	220	202	243	227	170	233	
Ammonia, Total (as N)	0.1	N/L	< 0.01	< 0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.02	0.01	0.16	0.05	0.02	0.01	0.04	
Ammonia, Un-ionized (as N) [2]	0.00145	0.02	0.00016	0.00011	0.00012	0.00023	0.00029	0.00009	0.00019	0.00006	0.00020	0.00002	0.00252	0.00338	0.00010	0.00008	0.00038	
Barium	0.065	N/L	0.052	0.028	0.065	0.051	0.036	0.067	0.045	0.034	0.078	0.067	0.049	0.069	0.052	0.042	0.060	
Boron	0.006	0.2	0.006	< 0.005	< 0.005	0.006	0.005	< 0.005	< 0.005	< 0.005	0.092	0.007	0.006	0.007	0.005	0.005	0.007	
Biological Oxygen Demand	4	N/L	< 3	< 2	< 2	< 2	< 2	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	
Cadmium	0.0000155	0.0002	0.00003	< 0.000014	0.000017	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	0.000018	< 0.000015	< 0.000015	< 0.000015	< 0.000015	
Calcium	89	N/L	71.1	45.2	86.6	74.2	52.1	101	62.0	56.2	93.9	104	71.3	88.1	86.7	59.2	80.8	
Chromium	0.001	0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Chloride	73	N/L	47.1	23.8	55.8	60.2	37.2	72.7	56.5	35.5	46.6	80.8	37.4	56.0	78.6	45.1	60.7	
Chemical Oxygen Demand	21	N/L	15	11	24	13	12	19	16	12	26	18	12	27	10	6	28	
Conductivity (µS/cm) [3]	591	N/L	542	361	345	640	388	-	473	-	-	683	-	-	-	-	-	
Conductivity (µS/cm) [4]	501	N/L	436	213	515	464	263	396	298	209	429	546	345	421	457	267	528	
Copper	0.001	0.005	0.0007	0.0006	0.0006	0.0003	0.0008	0.0003	0.0011	0.0008	0.0015	0.0006	0.0010	0.0010	0.0005	0.0007	0.0004	
Dissolved Oxygen [4]	9.44	5	9.56	14.37	**4.05**	6.32	9.30	**3.40**	10.28	11.37	5.12	9.40	7.99	**2.90**	8.36	8.06	**4.11**	
Dissolved Organic Carbon	8.5	N/L	5.9	5.5	9.4	8.9	4.6	8.4	5.9	4.4	11.7	5.2	5.9	9.3	7.1	5.3	8.4	
Hardness (as $CaCO_3$)	263	N/L	212	135	260	221	153	304	183	166	277	302	210	259	257	175	239	
Iron	0.087	0.3	0.022	0.017	0.124	0.085	0.009	0.088	0.025	0.021	0.085	0.069	0.032	0.131	0.065	0.024	0.173	
Magnesium	11	N/L	8.31	5.32	10.7	8.68	5.62	12.60	6.83	6.15	10.2	10.3	7.71	9.52	9.82	6.64	8.86	
Manganese	0.034	N/L	0.018	0.001	0.054	0.052	0.002	0.042	0.002	0.002	0.031	0.020	0.006	0.056	0.023	0.001	0.037	
Nitrate (as N)	0.06	N/L	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.17	0.06	< 0.05	< 0.05	0.09	0.10	< 0.05	< 0.05	0.17	
Nitrite (as N)	0.06	N/L	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.10	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [4]	7.81	6.5 - 8.5	7.82	7.95	7.36	7.78	8.28	7.55	7.80	7.74	7.58	7.14	7.93	8.29	7.62	7.67	7.48	
Phenols	0.002	0.001	< 0.001	**0.002**	< 0.001	< 0.001	< 0.001	**0.003**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Phosphorus, Total	0.024	0.03	**0.03**	0.01	**0.03**	0.02	0.01	< 0.01	0.02	< 0.01	0.01	< 0.01	**0.08**	0.02	**0.03**	**0.08**	**0.03**	
Potassium	1.91	N/L	1.6	0.8	1.5	1.4	1.3	1.5	1.5	1.2	1.6	1.9	1.8	2.1	2.0	1.5	1.9	
Sodium	37	N/L	32.3	16.6	36.6	36.6	19.6	32.7	30.4	22.5	29.6	38.4	28.8	36.9	41.7	26.0	34.3	
Strontium	0.18	N/L	0.138	0.085	0.187	0.144	0.095	0.210	0.111	0.099	0.181	0.168	0.131	0.169	0.156	0.113	0.161	
Sulphate	7.15	N/L	7	5	< 1	1	6	6	7	7	10	2	8	< 1	< 1	8	1	
Total Dissolved Solids	355	N/L	285	199	190	352	200	355	245	211	309	355	261	338	351	238	319	
Total Kjeldahl Nitrogen	0.5	N/L	0.29	0.2	0.3	0.3	0.2	0.3	0.2	0.1	0.4	0.3	0.7	0.4	0.3	0.8	0.4	
Total Suspended Solids	4	N/L	5	< 3	< 3	4	< 3	3	< 3	4	< 3	< 3	5	6	< 3	< 3	270	
Zinc	0.007	0.02	< 0.005	< 0.005	< 0.005	**0.043**	< 0.005	0.011	0.008	< 0.005	**0.030**	< 0.005	**0.021**	0.012	0.007	< 0.005	< 0.005	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L unless otherwise stated.
Shaded area with bold text indicates PWQO exceedance.
N/L indicates No Limit.
"" indicates results obtained from lab analysis

Table 5
Surface Water Quality
Black Donald Waste Disposal Site

Parameter	Background (75th Percentile)	PWQO [1]	SW-5																			5-year Trends
			19-Oct-15	08-May-17	18-Sep-17	25-Oct-17	02-May-18	14-Aug-18	30-Oct-18	14-May-19	20-Aug-19	16-Oct-19	23-Apr-20	19-Aug-20	27-Oct-20	18-May-21	19-Aug-21	04-Nov-21	04-May-22	18-Aug-22	27-Oct-22	(sparkline)
Alkalinity (as $CaCO_3$)	228	25% Decrease	160	132	180	138	105	189	165	111	154	147	145	143	148	144	184	136	129	173	180	
Ammonia, Total (as N)	0.1	N/L	< 0.1	< 0.01	0.03	0.02	< 0.01	0.04	0.03	0.02	0.08	0.04	0.01	0.01	0.02	0.02	0.03	0.02	0.01	0.03	0.02	
Ammonia, Un-ionized (as N) [2]	0.00145	0.02	0.00018	0.00008	0.00010	0.00032	0.00014	0.00032	0.00020	0.00017	0.00132	0.00038	0.00008	0.00025	0.00005	0.00012	0.00216	0.00010	0.00005	0.00077	0.00012	
Barium	0.065	N/L	0.0396	0.028	0.052	0.040	0.029	0.056	0.059	0.037	0.048	0.042	0.032	0.061	0.048	0.042	0.058	0.039	0.034	0.052	0.049	
Boron	0.006	0.2	0.0106	< 0.005	0.023	0.011	0.014	0.018	0.008	0.012	0.016	0.025	0.014	0.110	0.017	0.021	0.021	0.015	0.018	0.014	0.015	
Biological Oxygen Demand	4	N/L	< 4	< 2	< 2	< 2	< 2	< 2	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	
Cadmium	0.0000155	0.0002	< 0.000003	< 0.000014	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	
Calcium	89	N/L	56.0	46.8	60.0	43.1	35.3	60.4	67.0	44.4	55.6	52.0	44.7	64.4	58.8	49.2	64.0	50.3	41.9	63.2	64.0	
Chromium	0.001	0.001	0.00004	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Chloride	73	N/L	13	14.9	5.0	2.6	6.0	8.0	9.0	7.6	5.9	6.8	5.6	9.9	8.5	4.5	9.9	5.6	6.6	4.7	5.4	
Chemical Oxygen Demand	21	N/L	19	10	27	24	26	29	26	20	32	34	16	36	33	23	32	25	18	36	20	
Conductivity (µS/cm) [3]	591	N/L	-	330	660	278	227	388	-	256	-	-	-	-	338	-	-	-	-	-	-	
Conductivity (µS/cm) [4]	501	N/L	240	202	300	217	156	352	227	171	230	361	150	259	272	232	268	202	169	321	256	
Copper	0.001	0.005	0.00042	0.0004	< 0.0001	0.0001	0.0004	0.0003	0.0004	0.0005	0.0005	0.0006	0.0007	0.0003	0.0004	0.0005	0.0003	0.0003	0.0006	0.0004	0.0003	
Dissolved Oxygen [4]	9.44	5	5.88	7.70	**4.69**	8.89	8.72	**2.80**	5.20	8.71	**2.97**	**4.57**	11.30	8.17	5.63	5.43	**3.89**	**4.67**	6.34	6.03	6.97	
Dissolved Organic Carbon	8.5	N/L	8.4	6.4	12.1	13.7	5.7	12.4	11.9	8.0	12.0	11.1	6.6	16.2	12.2	11.1	13.1	12.5	8.8	16.8	11.4	
Hardness (as $CaCO_3$)	263	N/L	171	148	186	134	107	183	208	134	168	160	136	194	177	150	193	154	128	191	193	
Iron	0.087	0.3	0.165	0.029	0.228	0.079	0.034	**0.797**	**0.380**	0.051	**0.329**	0.244	0.030	0.267	0.158	0.049	**0.424**	0.122	0.087	0.216	0.125	
Magnesium	11	N/L	7.60	7.50	8.86	6.41	4.62	7.90	9.93	5.64	7.15	7.23	5.80	8.00	7.31	6.47	8.07	6.92	5.62	7.99	8.09	
Manganese	0.034	N/L	0.0122	0.017	0.037	0.012	0.002	0.146	0.077	0.003	0.052	0.022	0.002	0.032	0.025	0.034	0.086	0.013	0.004	0.019	0.022	
Nitrate (as N)	0.06	N/L	< 0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.18	0.06	< 0.05	0.06	< 0.05	< 0.05	0.08	0.09	< 0.05	0.08	< 0.05	0.11	
Nitrite (as N)	0.06	N/L	< 0.03	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.07	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [4]	7.81	6.5 - 8.5	7.15	7.78	7.03	7.89	7.91	7.31	7.70	7.68	7.60	7.74	7.74	7.84	7.33	7.28	8.26	7.59	7.36	7.77	7.54	
Phenols	0.002	0.001	**0.001**	**0.004**	< 0.001	< 0.001	< 0.001	< 0.002	**0.004**	< 0.002	**0.003**	**0.005**	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Phosphorus, Total	0.024	0.03	0.027	0.02	0.01	0.01	0.01	**0.06**	< 0.01	0.02	**0.05**	**0.03**	< 0.01	0.02	0.01	0.02	0.02	0.01	0.01	0.01	< 0.01	
Potassium	1.91	N/L	0.860	1.3	0.5	1.3	0.8	0.9	2.0	0.8	0.5	1.0	0.8	0.6	2.3	1.0	0.7	1.1	0.8	0.9	1.3	
Sodium	37	N/L	5.41	5.9	4.4	2.1	4.0	5.4	6.4	5.1	4.1	4.3	4.5	7.0	4.9	4.4	6.6	3.7	5.2	5.2	5.0	
Strontium	0.18	N/L	0.0974	0.087	0.134	0.084	0.065	0.128	0.156	0.079	0.110	0.102	0.078	0.132	0.103	0.094	0.124	0.094	0.079	0.119	0.118	
Sulphate	7.15	N/L	5	6	< 1	2	3	1	3	5	5	24	5	6	3	4	1	3	5	2	2	
Total Dissolved Solids	355	N/L	226	182	363	153	116	200	192	131	170	165	131	173	174	148	206	152	139	170	190	
Total Kjeldahl Nitrogen	0.5	N/L	< 0.5	0.3	0.4	0.3	0.2	0.5	0.5	0.3	0.6	0.6	0.2	0.5	0.5	0.3	0.4	0.5	0.3	0.6	0.4	
Total Suspended Solids	4	N/L	2	< 3	< 3	< 3	< 3	6	< 3	3	11	5	< 3	< 3	5	< 3	4	< 3	< 3	3	< 3	
Zinc	0.007	0.02	< 0.002	< 0.005	0.005	**1.60**	< 0.005	0.017	0.018	0.005	< 0.005	< 0.005	< 0.005	**0.027**	< 0.005	0.019	0.011	0.009	0.010	0.016	**0.023**	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L unless otherwise stated.
Shaded area with bold text indicates PWQO exceedance.
N/L indicates No Limit.
"-" indicates results obtained from lab analysis

Table 5
Surface Water Quality
Black Donald Waste Disposal Site

Parameter	Background (75th Percentile)	PWQO [1]	SW-6																				5-year Trends
			24-May-16	31-Aug-16	26-Oct-16	08-May-17	18-Sep-17	25-Oct-17	02-May-18	14-Aug-18	30-Oct-18	14-May-19	20-Aug-19	16-Oct-19	23-Apr-20	19-Aug-20	27-Oct-20	18-May-21	19-Aug-21	04-Nov-21	04-May-22	18-Aug-22	27-Oct-22	(sparkline)
Alkalinity (as $CaCO_3$)	228	25% Decrease	174	213	198	99	184	176	109	225	177	121	215	188	124	159	170	150	196	178	136	197	189	
Ammonia, Total (as N)	0.1	N/L	< 0.01	0.08	< 0.01	< 0.01	0.02	0.02	< 0.01	0.02	0.02	0.02	0.05	0.03	0.01	< 0.01	0.01	0.01	0.03	0.01	< 0.01	0.02	< 0.01	
Ammonia, Un-ionized (as N) [2]	0.00145	0.02	0.00013	0.00216	0.00005	0.00007	0.00005	0.00024	0.00018	0.00038	0.00018	0.00023	0.00097	0.00028	0.00009	0.00017	0.00002	0.00005	0.00429	0.00007	0.00007	0.00041	0.00007	
Barium	0.065	N/L	0.0450	0.053	0.045	0.021	0.058	0.035	0.026	0.058	0.052	0.031	0.057	0.045	0.030	0.054	0.040	0.038	0.052	0.036	0.030	0.046	0.038	
Boron	0.006	0.2	0.0070	0.015	< 0.005	0.008	0.016	0.010	0.011	0.015	< 0.005	0.006	0.009	0.010	0.010	0.095	0.012	0.018	0.014	0.010	0.012	0.007	0.010	
Biological Oxygen Demand	4	N/L	< 3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	
Cadmium	0.0000155	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	
Calcium	89	N/L	62.9	78.2	84.6	37.2	68.2	55.8	39.1	77.5	72.9	46.4	83.4	71.5	52.4	70.5	71.2	53.0	74.6	67.4	46.7	69.9	63.2	
Chromium	0.001	0.001	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Chloride	73	N/L	11	29.1	32.1	10.0	15.4	13.4	10.5	20.8	29.1	16.3	23.9	23.7	13.2	20.0	30.2	8.7	25.6	27.8	16.8	16.9	17.8	
Chemical Oxygen Demand	21	N/L	16	17	7	16	28	19	20	29	18	19	22	15	19	29	16	20	24	13	14	35	40	
Conductivity (µS/cm) [3]	591	N/L	385	511	-	243	361	390	256	499	-	304	-	-	-	-	446	-	-	-	-	-	-	
Conductivity (µS/cm) [4]	501	N/L	320	427	305	151	321	283	173	417	260	195	344	527	157	299	360	236	300	285	186	362	296	
Copper	0.001	0.005	0.00020	0.0004	0.0002	0.0005	0.0003	0.0002	0.0004	0.0003	0.0003	0.0005	0.0002	0.0004	0.0004	0.0007	0.0005	0.0006	0.0004	0.0003	0.0014	0.0003	0.0003	
Dissolved Oxygen [4]	9.44	5	12.80	9.2	7.78	13.93	8.83	10.57	10.65	7.66	10.65	11.50	6.75	6.25	14.85	8.82	13.69	8.23	6.98	12.9	8.21	8.03	10.06	
Dissolved Organic Carbon	8.5	N/L	7.2	6.6	6.4	7.9	10.8	11.0	5.9	12.0	7.3	7.5	9.3	6.2	6.1	13.7	7.5	11.0	9.0	8.1	8.1	13.4	9.4	
Hardness (as $CaCO_3$)	263	N/L	189	236	256	112	209	169	117	237	226	139	249	218	156	210	212	158	222	203	140	208	190	
Iron	0.087	0.3	0.065	**0.510**	0.112	0.022	0.221	0.122	0.024	**0.323**	0.161	0.048	**0.991**	**1.34**	0.036	0.266	0.139	0.235	0.211	0.110	0.036	0.154	0.086	
Magnesium	11	N/L	7.80	9.93	10.9	4.64	9.46	7.22	4.63	10.5	10.7	5.49	9.96	9.55	6.02	8.14	8.31	6.32	8.75	8.47	5.57	8.19	7.73	
Manganese	0.034	N/L	0.0280	0.085	0.017	0.002	0.052	0.021	0.002	0.500	0.028	0.005	0.370	0.181	0.006	0.041	0.025	0.049	0.038	0.018	0.003	0.018	0.015	
Nitrate (as N)	0.06	N/L	< 0.1	0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.17	0.06	< 0.05	0.07	< 0.05	< 0.05	0.10	0.11	< 0.05	0.08	< 0.05	0.08	
Nitrite (as N)	0.06	N/L	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.08	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [4]	7.81	6.5 - 8.5	7.60	7.86	7.69	7.72	6.98	7.79	8.06	7.77	7.89	7.85	7.87	7.80	7.87	7.75	7.25	7.33	**8.65**	7.82	7.54	7.78	7.61	
Phenols	0.002	0.001	< 0.001	< 0.001	< 0.001	**0.006**	< 0.001	< 0.001	< 0.001	< 0.002	**0.004**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Phosphorus, Total	0.024	0.03	< 0.01	< 0.01	0.01	0.02	0.02	**0.03**	< 0.01	**0.03**	< 0.01	0.02	**0.04**	**0.03**	< 0.01	0.02	< 0.01	**0.03**	0.01	< 0.01	< 0.01	< 0.01	0.01	
Potassium	1.91	N/L	1.00	1.5	1.6	0.6	0.9	1.3	0.9	1.6	1.6	0.9	0.9	2.9	0.8	0.9	1.5	0.9	1.2	1.3	1.0	1.1	1.5	
Sodium	37	N/L	8.3	13.8	15.9	7.8	13.3	9.6	6.6	13.2	16.0	9.6	12.5	11.1	8.7	11.9	16.8	7.1	15.7	16.4	9.7	11.4	11.4	
Strontium	0.18	N/L	0.123	0.172	0.186	0.070	0.184	0.114	0.072	0.182	0.181	0.087	0.164	0.149	0.090	0.149	0.136	0.104	0.157	0.133	0.090	0.140	0.123	
Sulphate	7.15	N/L	6	10	14	4	1	3	4	1	6	6	2	7	6	6	7	6	2	6	7	2	3	
Total Dissolved Solids	355	N/L	201	271	278	134	199	215	131	258	236	156	253	241	154	206	230	161	245	228	161	213	218	
Total Kjeldahl Nitrogen	0.5	N/L	0.2	0.4	0.2	0.3	0.4	0.3	0.2	0.5	0.3	0.2	0.3	0.4	0.2	0.4	0.3	0.4	0.3	0.3	0.3	0.4	0.3	
Total Suspended Solids	4	N/L	< 3	< 3	4	< 3	3	< 3	< 3	< 3	4	< 3	5	11	3	3	< 3	7	< 3	< 3	< 3	3	< 3	
Zinc	0.007	0.02	< 0.005	< 0.005	< 0.005	< 0.005	**0.065**	0.016	< 0.005	**0.021**	0.012	0.007	< 0.005	< 0.005	< 0.005	**0.025**	< 0.005	0.013	0.009	0.006	< 0.005	< 0.005	< 0.005	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L unless otherwise stated.
Shaded area with bold text indicates PWQO exceedance.
N/L indicates No Limit.
"-" indicates results obtained from lab analysis

Appendix G
Groundwater Elevations 2023

Groundwater Elevations 2023

Black Donald WDS

Monitor	Top of Pipe Elevation (Assumed Datum)	Ground Elevation (Assumed Datum)	Well of Bottom Depth (M)	Date	Water Depth From Top of Pipe (m)	Water elevation (Assumed Datum)
BH 1						
Greenview depth was 8.25	94.18	93.60	8.83	Jun-23	5.21	88.97
Measured by Jp2g @ 8.83	94.18	93.60	8.83	Nov-23	7.10	87.08
BH 2						
Greenview depth was 7.06	99.79	98.98	7.91	Jun-23	4.43	95.36
Measured by Jp2g @ 7.91	99.79	98.98	7.91	Nov-23	5.08	94.71
BH 3						
	100.67	99.80	8.61	Jun-23	Destoryed	100.67
BH 4						
Greenview depth was 6.97	96.80	95.96	7.80	Jun-23	3.70	93.10
Measured by Jp2g @ 7.80	96.80	95.96	7.80	Nov-23	4.67	92.13
MW-08-5						
Greenview depth was 12.52	106.06	105.03	13.56	Jun-23	13.51	92.55
Measured by Jp2g @13.52	106.06	105.03	13.56	Nov-23	DRY	106.06
MW 08-6						
Greenview depth was 22.74	103.22	102.23	23.80	Jun-23	5.50	97.72
Measured by Jp2g @ 23.80	103.22	102.23	23.80	Nov-23	5.68	97.54
MW 08-7S (Previously MW 08-7)						
Greenview depth was 7.70	78.72	77.79	8.46	Jun-23	1.20	77.52
Measured by Jp2g @ 8.46	78.72	77.79	8.46	Nov-23	3.30	75.42
MW 23-7D						
Measured by Jp2g	78.00	hold	16.56	Nov-23	3.38	74.62
BH 23-8S						
Measured by Jp2g	93.60	93.60	14.35	Nov-23	DRY	93.60
BH 23-8D						
Measured by Jp2g	93.60	93.60	20.50	Nov-23	DRY	93.60

Note: 1. Well depths based on Jp2g measurements in 2023
2. Elevations based on SGS Lakefield Research Ltd.
3. Elevations are assumed
4. MW 08-7D Installed Nov 2023
5. BH 23-8 D/S Installed Nov 2023

Appendix H
Laboratory Certificates of Analysis 2023

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G 107345 **REPORT No: 23-014972 - Rev. 0**

Report To:
Jp2g Consultants Inc
1150 Morrison Dr.
Ottawa, ON K2H 8S9

CADUCEON Environmental Laboratories
2378 Holly Lane
Ottawa, ON K1V 7P1

Attention: Nick Weston

DATE RECEIVED: 2023-Jun-22
DATE REPORTED: 2023-Jul-12
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: Black & Donald WDS
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	5	OTTAWA	VKASYAN	2023-Jun-23	A-IC-01	SM 4110B
COD (Liquid)	5	KINGSTON	KWELCH	2023-Jun-28	COD-001	SM 5220D
Cond/pH/Alk Auto (Liquid)	5	OTTAWA	SBOUDREAU	2023-Jun-23	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
DOC/DIC (Liquid)	5	OTTAWA	VKASYAN	2023-Jun-23	C-OC-01	EPA 415.2
Ion Balance (Calc.)	5	OTTAWA	STAILLON		CP-028	MECP E3196
ICP/MS (Liquid)	5	OTTAWA	TPRICE	2023-Jun-26	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	5	OTTAWA	NHOGAN	2023-Jun-23	D-ICP-01	SM 3120B
Mercury (Liquid)	5	OTTAWA	APRUDYVUS	2023-Jun-29	D-HG-02	SM 3112B
Ammonia & o-Phosphate (Liquid)	5	KINGSTON	KDIBBITS	2023-Jun-30	NH3-001	SM 4500NH3
Phenols (Liquid)	5	KINGSTON	KWELCH	2023-Jun-23	PHEN-01	MECP E3179
TP & TKN (Liquid)	5	KINGSTON	KDIBBITS	2023-Jun-30	TPTKN-001	MECP E3516.2
VOC-Volatiles Full (Water)	5	RICHMOND_HILL	FLENA	2023-Jun-27	C-VOC-02	EPA 8260

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Steve Garrett
Director of Laboratory Services

	Client I.D.	MW 08-6	BH 4	BH 1	BH 2	MW 08-7
	Sample I.D.	23-014972-1	23-014972-2	23-014972-3	23-014972-4	23-014972-5
	Date Collected	2023-06-21	2023-06-21	2023-06-21	2023-06-21	2023-06-21
Parameter	**Units** / **R.L.**	-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L / 5	192	623	503	244	176
pH @25°C	pH units / -	8.07	7.62	7.71	7.81	7.97
Conductivity @25°C	uS/cm / 1	364	1640	969	456	427
TDS (Calc. from Cond.)	mg/L / 3	187	896	516	236	220
Chloride	mg/L / 0.5	0.8	45.5	18.1	0.7	31.0
Nitrate (N)	mg/L / 0.05	0.09	0.47	0.38	<0.05	<0.05
Nitrite (N)	mg/L / 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L / 1	12	295	26	12	7
Phosphorus (Total)	mg/L / 0.01	<0.01	0.03	0.03	0.04	2.22
Total Kjeldahl Nitrogen	mg/L / 0.1	0.2	1.4	2.1	0.2	0.1
Ammonia (N)-Total (NH3+NH4)	mg/L / 0.05	<0.05	0.63	2.10	<0.05	<0.05
Dissolved Organic Carbon	mg/L / 0.2	2.1	5.6	8.0	0.8	2.0
Phenolics	mg/L / 0.001	<0.001	<0.001	<0.001	<0.001	<0.001
COD	mg/L / 5	6	70	20	6	18
Hardness (as CaCO3)	mg/L / 0.02	179	794	394	227	170
Aluminum	mg/L / 0.01	0.05	0.11	0.06	0.05	0.04
Barium	mg/L / 0.001	0.035	0.101	0.055	0.031	0.034
Boron	mg/L / 0.005	0.010	2.11	0.655	0.009	<0.005
Calcium	mg/L / 0.02	67.0	277	121	86.5	57.0
Iron	mg/L / 0.005	0.011	0.007	<0.005	0.015	0.007
Magnesium	mg/L / 0.02	2.78	24.7	22.3	2.66	6.61

Steve Garrett

Director of Laboratory Services

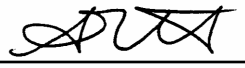
Parameter	Units	R.L.	Client I.D.	MW 08-6	BH 4	BH 1	BH 2	MW 08-7
			Sample I.D.	23-014972-1	23-014972-2	23-014972-3	23-014972-4	23-014972-5
			Date Collected	2023-06-21	2023-06-21	2023-06-21	2023-06-21	2023-06-21
				-	-	-	-	-
Manganese	mg/L	0.001		<0.001	0.532	0.520	<0.001	<0.001
Potassium	mg/L	0.1		2.1	11.1	5.1	2.7	1.2
Silicon	mg/L	0.01		3.37	6.00	9.55	5.70	3.16
Sodium	mg/L	0.2		2.1	48.3	50.5	2.3	20.9
Strontium	mg/L	0.001		0.299	0.686	0.352	0.175	0.102
Zinc	mg/L	0.005		<0.005	<0.005	<0.005	0.005	<0.005
Arsenic	mg/L	0.0001		0.0002	0.0008	0.0002	0.0001	<0.0001
Cadmium	mg/L	0.000015		<0.000015	0.000042	<0.000015	<0.000015	<0.000015
Chromium	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001		0.0008	0.0018	0.0025	0.0003	0.0001
Copper	mg/L	0.0001		0.0030	0.0045	0.0031	0.0038	0.0012
Lead	mg/L	0.00002		0.00003	0.00004	0.00004	0.00011	0.00002
Mercury	mg/L	0.00002		<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Anion Sum	meq/L	-		4.11	20.1	11.1	5.13	4.54
Cation Sum	meq/L	-		3.73	18.3	10.4	4.71	4.33
% Difference	%	-		4.91	4.83	3.48	4.26	2.34
Ion Ratio	-	-		1.10	1.10	1.07	1.09	1.05
Sodium Adsorption Ratio	-	-		0.0683	0.746	1.11	0.0676	0.698
TDS (Ion Sum Calc)	mg/L	1		202	1090	549	253	229
TDS(calc.)/EC(actual)	-	-		0.555	0.665	0.567	0.554	0.537
Conductivity Calc	µmho/cm	-		368	1610	935	455	432

Steve Garrett

Director of Laboratory Services

		Client I.D.	MW 08-6	BH 4	BH 1	BH 2	MW 08-7
		Sample I.D.	23-014972-1	23-014972-2	23-014972-3	23-014972-4	23-014972-5
		Date Collected	2023-06-21	2023-06-21	2023-06-21	2023-06-21	2023-06-21
Parameter	**Units**	**R.L.**	-	-	-	-	-
Conductivity Calc / Conductivity	-	-	1.01	0.982	0.965	0.999	1.01
Langelier Index(25°C)	-	-	0.747	1.34	1.02	0.701	0.540
Saturation pH (25°C)	-	-	7.32	6.28	6.69	7.11	7.43
pH (Client Data)	pH units	-	7.8	6.2	6.2	7.5	7.8
Temperature (Client Data)	°C	-	11.0	10.2	11.2	9.9	6.3

		Client I.D.	MW 08-6	BH 4	BH 1	BH 2	MW 08-7
		Sample I.D.	23-014972-1	23-014972-2	23-014972-3	23-014972-4	23-014972-5
		Date Collected	2023-06-21	2023-06-21	2023-06-21	2023-06-21	2023-06-21
Parameter	**Units**	**R.L.**	-	-	-	-	-
Benzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorobenzene,1,4-	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane (Methylene Chloride)	µg/L	5	<5	<5	<5	<5	<5
Toluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl Chloride	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2



Steve Garrett

Director of Laboratory Services

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G 100359

REPORT No: 23-030972 - Rev. 0

Report To:
Jp2g Consultants Inc
1150 Morrison Dr.
Ottawa, ON K2H 8S9

CADUCEON Environmental Laboratories
2378 Holly Lane
Ottawa, ON K1V 7P1

Attention: Nick Weston

DATE RECEIVED: 2023-Nov-03
DATE REPORTED: 2023-Dec-07
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: Black & Donald WDS
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	6	OTTAWA	LMACGREGOR	2023-Nov-17	A-IC-01	SM 4110B
COD (Liquid)	6	KINGSTON	EHINCH	2023-Nov-09	COD-001	SM 5220D
Cond/pH/Alk Auto (Liquid)	6	OTTAWA	SBOUDREAU	2023-Nov-10	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
DOC/DIC (Liquid)	6	OTTAWA	VKASYAN	2023-Nov-16	C-OC-01	EPA 415.2
Ion Balance (Calc.)	6	OTTAWA	ASCHNEIDER		CP-028	MECP E3196
ICP/MS (Liquid)	6	OTTAWA	AOZKAYMAK	2023-Nov-07	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	6	OTTAWA	NHOGAN	2023-Nov-06	D-ICP-01	SM 3120B
Ammonia & o-Phosphate (Liquid)	6	KINGSTON	KDIBBITS	2023-Nov-28	NH3-001	SM 4500NH3
Phenols (Liquid)	6	KINGSTON	JMACINNES	2023-Dec-06	PHEN-01	MECP E3179
TP & TKN (Liquid)	6	KINGSTON	KDIBBITS	2023-Nov-30	TPTKN-001	MECP E3516.2

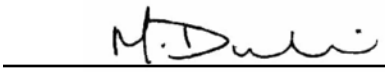
R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

	Client I.D.	MW08-7S	MW08-7D	MW08-6	BH2	BH1
	Sample I.D.	23-030972-1	23-030972-2	23-030972-3	23-030972-4	23-030972-5
	Date Collected	2023-11-02	2023-11-02	2023-11-02	2023-11-02	2023-11-02
Parameter	**Units** / **R.L.**	-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L / 5	203	320	169	228	509
Chloride	mg/L / 0.5	38.3	37.1	<0.5	0.7	13.8
Nitrate (N)	mg/L / 0.05	0.07	0.12	0.08	0.11	0.29
Sulphate	mg/L / 1	4	23	8	16	24
Phosphorus (Total)	mg/L / 0.01	0.77	5.19	<0.01	0.02	0.02
Total Kjeldahl Nitrogen	mg/L / 0.1	0.2	1.7	0.1	0.2	1.9
Ammonia (N)-Total (NH3+NH4)	mg/L / 0.05	<0.05	0.06	<0.05	<0.05	1.46
Dissolved Organic Carbon	mg/L / 0.2	3.3	6.4	4.4	2.6	11.7
Phenolics	mg/L / 0.001	<0.001	<0.001	<0.001	<0.001	<0.001
COD	mg/L / 5	10	130	<5	<5	24
Hardness (as CaCO3)	mg/L / 0.02	199	336	174	235	510
Aluminum	mg/L / 0.01	0.02	0.05	0.02	0.03	0.06
Barium	mg/L / 0.001	0.048	0.094	0.024	0.020	0.099
Boron	mg/L / 0.005	<0.005	0.371	<0.005	0.006	0.715
Calcium	mg/L / 0.02	67.9	116	65.3	89.6	163
Iron	mg/L / 0.005	<0.005	0.005	<0.005	<0.005	3.60
Magnesium	mg/L / 0.02	7.12	11.2	2.59	2.68	24.9
Manganese	mg/L / 0.001	<0.001	0.009	0.001	<0.001	0.866
Potassium	mg/L / 0.1	1.4	1.8	1.6	2.7	7.6
Silicon	mg/L / 0.01	3.72	3.74	3.14	6.01	9.83
Sodium	mg/L / 0.2	26.1	24.7	1.7	2.8	51.5

Michelle Dubien
Data Specialist

	Client I.D.		MW08-7S	MW08-7D	MW08-6	BH2	BH1
	Sample I.D.		23-030972-1	23-030972-2	23-030972-3	23-030972-4	23-030972-5
	Date Collected		2023-11-02	2023-11-02	2023-11-02	2023-11-02	2023-11-02
Parameter	**Units**	**R.L.**	-	-	-	-	-
Strontium	mg/L	0.001	0.113	0.248	0.258	0.165	0.410
Zinc	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium	mg/L	0.000015	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015
Chromium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001	0.0001	0.0007	0.0005	0.0002	0.0088
Copper	mg/L	0.0001	0.0015	0.0021	0.0010	0.0012	0.0016
Anion Sum	meq/L	-	5.22	7.94	3.56	4.92	11.1
Cation Sum	meq/L	-	5.15	7.84	3.59	4.88	12.9
% Difference	%	-	0.722	0.640	0.430	0.386	7.40
Ion Ratio	-	-	1.01	1.01	0.991	1.01	0.862
Sodium Adsorption Ratio	-	-	0.805	0.586	0.0561	0.0781	0.993
TDS (Ion Sum Calc)	mg/L	1	267	407	182	252	596
TDS(calc.)/EC(actual)	-	-	0.532	0.545	0.540	0.554	0.603
Conductivity Calc	µmho/cm	-	503	732	339	459	1030
Conductivity Calc / Conductivity	-	-	1.00	0.981	1.01	1.01	1.04
Langelier Index(25°C)	-	-	0.916	1.06	0.730	0.998	1.30
Saturation pH (25°C)	-	-	7.29	6.89	7.37	7.12	6.55
pH (Client Data)	pH units	-	8.0	7.4	6.8	7.8	7.4
Temperature (Client Data)	°C	-	6.8	6.2	7.6	8.8	9.7

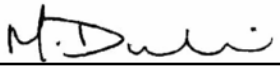


Michelle Dubien
Data Specialist

		Client I.D.	BH4
		Sample I.D.	23-030972-6
		Date Collected	2023-11-02
Parameter	Units	R.L.	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	533
Chloride	mg/L	0.5	20.2
Nitrate (N)	mg/L	0.05	0.06
Sulphate	mg/L	1	228
Phosphorus (Total)	mg/L	0.01	0.02
Total Kjeldahl Nitrogen	mg/L	0.1	0.9
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05	0.33
Dissolved Organic Carbon	mg/L	0.2	13.4
Phenolics	mg/L	0.001	<0.001
COD	mg/L	5	42
Hardness (as CaCO3)	mg/L	0.02	756
Aluminum	mg/L	0.01	0.08
Barium	mg/L	0.001	0.099
Boron	mg/L	0.005	0.862
Calcium	mg/L	0.02	273
Iron	mg/L	0.005	0.012
Magnesium	mg/L	0.02	17.8
Manganese	mg/L	0.001	1.06
Potassium	mg/L	0.1	8.2
Silicon	mg/L	0.01	5.71
Sodium	mg/L	0.2	25.6

Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Client I.D.: BH4 Sample I.D.: 23-030972-6 Date Collected: 2023-11-02 -
Strontium	mg/L	0.001	0.616
Zinc	mg/L	0.005	<0.005
Cadmium	mg/L	0.000015	0.000060
Chromium	mg/L	0.001	<0.001
Cobalt	mg/L	0.0001	0.0013
Copper	mg/L	0.0001	0.0047
Anion Sum	meq/L	-	16.0
Cation Sum	meq/L	-	16.5
% Difference	%	-	1.53
Ion Ratio	-	-	0.970
Sodium Adsorption Ratio	-	-	0.405
TDS (Ion Sum Calc)	mg/L	1	894
TDS(calc.)/EC(actual)	-	-	0.651
Conductivity Calc	µmho/cm	-	1380
Conductivity Calc / Conductivity	-	-	1.01
Langelier Index(25°C)	-	-	1.32
Saturation pH (25°C)	-	-	6.33
pH (Client Data)	pH units	-	7.2
Temperature (Client Data)	°C	-	9.6



Michelle Dubien
Data Specialist

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G 107347

REPORT No: 23-014965 - Rev. 0

Report To:
Jp2g Consultants Inc
1150 Morrison Dr.
Ottawa, ON K2H 8S9

CADUCEON Environmental Laboratories
2378 Holly Lane
Ottawa, ON K1V 7P1

Attention: Nick Weston

DATE RECEIVED: 2023-Jun-22
DATE REPORTED: 2023-Jul-13
SAMPLE MATRIX: Surface Water

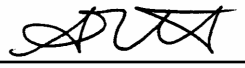
CUSTOMER PROJECT: Black & Donald WDS
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	3	OTTAWA	VKASYAN	2023-Jun-23	A-IC-01	SM 4110B
BOD5 (Liquid)	3	KINGSTON	MDUBIEN	2023-Jun-26	BOD-001	SM 5210B
COD (Liquid)	3	KINGSTON	KWELCH	2023-Jun-28	COD-001	SM 5220D
Cond/pH/Alk Auto (Liquid)	3	OTTAWA	SBOUDREAU	2023-Jun-23	COND-02/PH-02/A LK-02	SM 2510B/4500H/ 2320B
Ion Balance (Calc.)	3	OTTAWA	STAILLON		CP-028	MECP E3196
ICP/MS Total (Liquid)	3	OTTAWA	TPRICE	2023-Jun-27	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	3	OTTAWA	NHOGAN	2023-Jul-05	D-ICP-01	SM 3120B
Mercury (Liquid)	3	OTTAWA	APRUDYVUS	2023-Jun-29	D-HG-02	SM 3112B
Ammonia & o-Phosphate (Liquid)	3	KINGSTON	KDIBBITS	2023-Jun-30	NH3-001	SM 4500NH3
Phenols (Liquid)	3	KINGSTON	KWELCH	2023-Jun-23	PHEN-01	MECP E3179
TP & TKN (Liquid)	3	KINGSTON	KDIBBITS	2023-Jun-28	TPTKN-001	MECP E3516.2
TSS (Liquid)	3	KINGSTON	JMACINNES	2023-Jun-28	TSS-001	SM 2540D

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Steve Garrett
Director of Laboratory Services

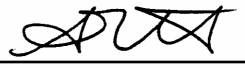
Parameter	Units	R.L.	Client I.D.	SW5	SW4	Dup#1
			Sample I.D.	23-014965-1	23-014965-2	23-014965-3
			Date Collected	2023-06-21	2023-06-21	2023-06-21
				-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5		188	222	192
pH @25°C	pH units	-		8.04	8.01	7.93
Conductivity @25°C	uS/cm	1		355	554	360
TDS (Calc. from Cond.)	mg/L	3		183	287	185
Chloride	mg/L	0.5		5.7	49.6	5.7
Nitrate (N)	mg/L	0.05		<0.05	0.11	0.08
Nitrite (N)	mg/L	0.05		<0.05	<0.05	<0.05
Sulphate	mg/L	1		1	<1	1
BOD5	mg/L	3		<3	<3	<3
Total Suspended Solids	mg/L	3		<3	4	3
Phosphorus (Total)	mg/L	0.01		0.01	0.02	0.01
Total Kjeldahl Nitrogen	mg/L	0.1		0.5	0.4	0.5
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05		<0.05	<0.05	<0.05
Phenolics	mg/L	0.001		<0.001	<0.001	<0.001
COD	mg/L	5		34	17	24
Hardness (as CaCO3)	mg/L	-		173	232	187
Barium (Total)	mg/L	0.001		0.053	0.062	0.057
Boron (Total)	mg/L	0.005		0.021	0.008	0.022
Calcium (Total)	mg/L	0.02		58.3	79.0	63.0
Iron (Total)	mg/L	0.005		0.192	0.239	0.205
Magnesium (Total)	mg/L	0.02		6.61	8.38	7.18



Steve Garrett

Director of Laboratory Services

Parameter	Units	R.L.	Client I.D.: SW5	SW4	Dup#1
			Sample I.D.: 23-014965-1	23-014965-2	23-014965-3
			Date Collected: 2023-06-21	2023-06-21	2023-06-21
			-	-	-
Strontium (Total)	mg/L	0.001	0.113	0.158	0.123
Zinc (Total)	mg/L	0.005	0.005	0.005	0.006
Arsenic (Total)	mg/L	0.0001	0.0002	0.0002	0.0002
Cadmium (Total)	mg/L	0.000015	<0.000015	<0.000015	<0.000015
Chromium (Total)	mg/L	0.001	<0.001	<0.001	<0.001
Copper (Total)	mg/L	0.0001	0.0003	0.0003	0.0003
Lead (Total)	mg/L	0.00002	0.00004	0.00004	0.00004
Mercury	mg/L	0.00002	<0.00002	<0.00002	<0.00002
Anion Sum	meq/L	-	3.94	5.84	4.04
Cation Sum	meq/L	-	3.67	6.09	3.97
% Difference	%	-	3.50	2.14	0.865
Ion Ratio	-	-	1.07	0.958	1.02
Sodium Adsorption Ratio	-	-	0.139	0.915	0.147
TDS (Ion Sum Calc)	mg/L	1	190	305	199
TDS(calc.)/EC(actual)	-	-	0.535	0.551	0.553
Conductivity Calc	µmho/cm	-	355	578	374
Conductivity Calc / Conductivity	-	-	1.00	1.04	1.04
Langelier Index(25°C)	-	-	0.656	0.811	0.591
Saturation pH (25°C)	-	-	7.38	7.20	7.34
pH (Client Data)	pH units	-	7.4	7.4	
Temperature (Client Data)	°C	-	19.5	6.1	



Steve Garrett

Director of Laboratory Services

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G 107421

REPORT No: 23-023263 - Rev. 0

Report To:
Jp2g Consultants Inc
1150 Morrison Dr.
Ottawa, ON K2H 8S9

CADUCEON Environmental Laboratories
2378 Holly Lane
Ottawa, ON K1V 7P1

Attention: Nick Weston

DATE RECEIVED: 2023-Sep-01
DATE REPORTED: 2023-Sep-26
SAMPLE MATRIX: Surface Water

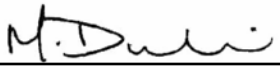
CUSTOMER PROJECT: Black & Donald WDS
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	2	OTTAWA	VKASYAN	2023-Sep-06	A-IC-01	SM 4110B
BOD5 (Liquid)	2	KINGSTON	JWOLFE	2023-Sep-07	BOD-001	SM 5210B
COD (Liquid)	2	KINGSTON	EHINCH	2023-Sep-11	COD-001	SM 5220D
Cond/pH/Alk Auto (Liquid)	2	OTTAWA	SBOUDREAU	2023-Sep-06	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
DOC/DIC (Liquid)	2	OTTAWA	VKASYAN	2023-Sep-05	C-OC-01	EPA 415.2
Ion Balance (Calc.)	2	OTTAWA	STAILLON		CP-028	MECP E3196
ICP/MS Total (Liquid)	2	OTTAWA	TPRICE	2023-Sep-08	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	2	OTTAWA	NHOGAN	2023-Sep-11	D-ICP-01	SM 3120B
Ammonia & o-Phosphate (Liquid)	2	KINGSTON	KDIBBITS	2023-Sep-13	NH3-001	SM 4500NH3
Phenols (Liquid)	2	KINGSTON	JMACINNES	2023-Sep-14	PHEN-01	MECP E3179
TP & TKN (Liquid)	2	KINGSTON	KDIBBITS	2023-Sep-25	TPTKN-001	MECP E3516.2
TSS (Liquid)	2	KINGSTON	AMANIYA	2023-Sep-11	TSS-001	SM 2540D

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

		Client I.D.	SW5	Dup#1
		Sample I.D.	23-023263-1	23-023263-2
		Date Collected	2023-08-31	2023-08-31
Parameter	**Units**	**R.L.**	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	251	248
TDS (Calc. from Cond.)	mg/L	3	255	259
Chloride	mg/L	0.5	9.7	9.6
Nitrate (N)	mg/L	0.05	0.06	0.08
Nitrite (N)	mg/L	0.05	<0.05	<0.05
Sulphate	mg/L	1	<1	<1
BOD5	mg/L	3	<3	<3
Total Suspended Solids	mg/L	3	11	10
Phosphorus (Total)	mg/L	0.01	0.04	0.09
Total Kjeldahl Nitrogen	mg/L	0.1	0.7	0.8
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05	0.14	0.14
Dissolved Organic Carbon	mg/L	0.2	16.7	16.7
Phenolics	mg/L	0.001	<0.001	<0.001
COD	mg/L	5	39	36
Hardness (as CaCO3)	mg/L	-	258	244
Aluminum (Total)	mg/L	0.01	0.05	0.06
Barium (Total)	mg/L	0.001	0.082	0.078
Boron (Total)	mg/L	0.005	0.018	0.017
Calcium (Total)	mg/L	0.02	85.4	80.9
Iron (Total)	mg/L	0.005	1.93	1.83
Magnesium (Total)	mg/L	0.02	10.9	10.2



Michelle Dubien
Data Specialist

			Client I.D.	SW5	Dup#1
			Sample I.D.	23-023263-1	23-023263-2
			Date Collected	2023-08-31	2023-08-31
Parameter	Units	R.L.		-	-
Manganese (Total)	mg/L	0.001		0.297	0.282
Potassium (Total)	mg/L	0.1		1.1	1.0
Sodium (Total)	mg/L	0.2		6.4	6.0
Strontium (Total)	mg/L	0.001		0.170	0.160
Zinc (Total)	mg/L	0.005		<0.005	<0.005
Cadmium (Total)	mg/L	0.000015		<0.000015	<0.000015
Chromium (Total)	mg/L	0.001		<0.001	<0.001
Copper (Total)	mg/L	0.0001		0.0002	0.0002
Anion Sum	meq/L	-		5.31	5.25
Cation Sum	meq/L	-		5.58	5.28
% Difference	%	-		2.52	0.225
Ion Ratio	-	-		0.951	0.996
Sodium Adsorption Ratio	-	-		0.173	0.168
TDS (Ion Sum Calc)	mg/L	1		267	260
TDS(calc.)/EC(actual)	-	-		0.542	0.520
Conductivity Calc	µmho/cm	-		497	481
Conductivity Calc / Conductivity	-	-		1.01	0.962
Langelier Index(25°C)	-	-		0.368	0.390
Saturation pH (25°C)	-	-		7.10	7.13
pH (Client Data)	pH units	-		7.3	
Temperature (Client Data)	°C	-		17.5	

Michelle Dubien
Data Specialist

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G 110186 **REPORT No: 23-030976 - Rev. 0**

Report To:
Jp2g Consultants Inc
1150 Morrison Dr.
Ottawa, ON K2H 8S9

CADUCEON Environmental Laboratories
2378 Holly Lane
Ottawa, ON K1V 7P1

Attention: Nick Weston

DATE RECEIVED: 2023-Nov-03
DATE REPORTED: 2023-Dec-07
SAMPLE MATRIX: Surface Water

CUSTOMER PROJECT: Black & Donald WDS
P.O. NUMBER: 22-6213B

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	2	OTTAWA	PCURIEL	2023-Nov-21	A-IC-01	SM 4110B
BOD5 (Liquid)	2	KINGSTON	JWOLFE2	2023-Nov-23	BOD-001	SM 5210B
COD (Liquid)	2	KINGSTON	EHINCH	2023-Nov-09	COD-001	SM 5220D
Cond/pH/Alk Auto (Liquid)	2	OTTAWA	SBOUDREAU	2023-Nov-10	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
DOC/DIC (Liquid)	2	OTTAWA	VKASYAN	2023-Nov-16	C-OC-01	EPA 415.2
Ion Balance (Calc.)	2	OTTAWA	ASCHNEIDER		CP-028	MECP E3196
ICP/MS Total (Liquid)	2	OTTAWA	AOZKAYMAK	2023-Nov-07	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	2	OTTAWA	NHOGAN	2023-Nov-08	D-ICP-01	SM 3120B
Ammonia & o-Phosphate (Liquid)	2	KINGSTON	KDIBBITS	2023-Nov-28	NH3-001	SM 4500NH3
Phenols (Liquid)	2	KINGSTON	JMACINNES	2023-Dec-06	PHEN-01	MECP E3179
TP & TKN (Liquid)	2	KINGSTON	KDIBBITS	2023-Nov-30	TPTKN-001	MECP E3516.2
TSS (Liquid)	2	KINGSTON	TSUNNY	2023-Nov-08	TSS-001	SM 2540D

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

		Client I.D.	SW5	Dup#1
		Sample I.D.	23-030976-1	23-030976-2
		Date Collected	2023-11-02	2023-11-02
Parameter	**Units**	**R.L.**	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	187	180
Chloride	mg/L	0.5	11.2	10.9
Nitrate (N)	mg/L	0.05	0.05	0.06
Nitrite (N)	mg/L	0.05	<0.05	<0.05
Sulphate	mg/L	1	9	9
BOD5	mg/L	3	<3	<3
Total Suspended Solids	mg/L	3	6	<3
Phosphorus (Total)	mg/L	0.01	0.02	0.02
Total Kjeldahl Nitrogen	mg/L	0.1	0.5	0.5
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05	<0.05	<0.05
Dissolved Organic Carbon	mg/L	0.2	11.0	10.6
Phenolics	mg/L	0.001	0.001	0.002
COD	mg/L	5	22	24
Hardness (as CaCO3)	mg/L	-	195	184
Aluminum (Total)	mg/L	0.01	0.04	0.05
Barium (Total)	mg/L	0.001	0.051	0.049
Boron (Total)	mg/L	0.005	0.014	0.014
Calcium (Total)	mg/L	0.02	63.4	60.0
Iron (Total)	mg/L	0.005	0.238	0.232
Magnesium (Total)	mg/L	0.02	8.92	8.36
Manganese (Total)	mg/L	0.001	0.024	0.023

Michelle Dubien
Data Specialist

			Client I.D.	SW5	Dup#1
			Sample I.D.	23-030976-1	23-030976-2
			Date Collected	2023-11-02	2023-11-02
Parameter	Units	R.L.		-	-
Potassium (Total)	mg/L	0.1		1.8	1.7
Sodium (Total)	mg/L	0.2		6.4	6.0
Strontium (Total)	mg/L	0.001		0.125	0.117
Zinc (Total)	mg/L	0.005		0.009	0.006
Cadmium (Total)	mg/L	0.000015		<0.000015	<0.000015
Chromium (Total)	mg/L	0.001		<0.001	<0.001
Copper (Total)	mg/L	0.0001		0.0006	0.0005
Anion Sum	meq/L	-		4.24	4.10
Cation Sum	meq/L	-		4.24	4.00
% Difference	%	-		0.0941	1.24
Ion Ratio	-	-		1.00	1.03
Sodium Adsorption Ratio	-	-		0.198	0.191
TDS (Ion Sum Calc)	mg/L	1		213	205
TDS(calc.)/EC(actual)	-	-		0.540	0.518
Conductivity Calc	µmho/cm	-		402	385
Conductivity Calc / Conductivity	-	-		1.02	0.975
Langelier Index(25°C)	-	-		0.461	0.461
Saturation pH (25°C)	-	-		7.36	7.40
pH (Client Data)	pH units	-		8.6	
Temperature (Client Data)	°C	-		3.2	

Michelle Dubien
Data Specialist

Appendix I
Chemistry Analysais 2023

Groundwater Quality
Project Name: Black Donald

Monitor Number->	ODWS	BH 1					
		Jun-23	Nov-23				
Parameters mg/L							
Alkalinity(CaCO3) to pH4.5	30-500	503	509				
pH @25°C	6.5 - 8.5	7.71					
Conductivity @25°C		969					
TDS (Calc. from Cond.)		516					
Chloride	250	18.1	13.8				
Nitrate (N)	10	0.38	0.29				
Nitrite (N)	1	<0.05					
Sulphate	500	26	24				
Phosphorus (Total)		0.03	0.02				
Total Kjeldahl Nitrogen		2.1	1.9				
Ammonia (N)-Total (NH3+NH4)		2.1	1.46				
Dissolved Organic Carbon	5	8	11.7				
Phenolics		<0.001	<0.001				
COD		20	24				
Hardness (as CaCO3)	500	394	510				
Aluminum	0.1	0.06	0.06				
Barium	1	0.055	0.099				
Boron	5	0.655	0.715				
Calcium		121	163				
Iron	0.3	<0.005	3.6				
Magnesium		22.3	24.9				
Manganese	0.05	0.52	0.866				
Potassium		5.1	7.6				
Silicon		9.55	9.83				
Sodium	200	50.5	51.5				
Strontium		0.352	0.41				
Zinc	5	<0.005	<0.005				
Arsenic	0.01	0.0002					
Cadmium	0.005	<0.000015	<0.000015				
Chromium	0.050	<0.001	<0.001				
Cobalt		0.0025	0.0088				
Copper	1	0.0031	0.0016				
Lead	0.010	0.00004					
Mercury	0.001	<0.00002					
Anion Sum		11.1	11.1				
Cation Sum		10.4	12.9				
% Difference		3.48	7.4				
Ion Ratio		1.07	0.862				
Sodium Adsorption Ratio		1.11	0.993				
TDS (Ion Sum Calc)	500	549	596				
TDS(calc.)/EC(actual)		0.567	0.603				
Conductivity Calc		935	1030				
Conductivity Calc / Conductivity		0.965	1.04				
Langelier Index(25°C)		1.02	1.3				
Saturation pH (25°C)		6.69	6.55				
Benzene		<0.5					
Dichlorobenzene,1,4-		<0.5					
Dichloromethane		<5					
Toluene		<0.5					
Vinyl Chloride		<0.2					
Field Measured							
Water Temp. (^{o}C)		11.2	9.7				
Conductivity (microS/cm)		800	1090				
pH (pH units)	6.5-8.5	6.2	7.4				

Notes:
All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standards
Shaded values exceed ODWS
NS = No Sample

Groundwater Quality
Project Name: Black Donald

Monitor Number->	ODWS	BH 2					
		Jun-23	Nov-23				
Parameters mg/L							
Alkalinity(CaCO3) to pH4.5	30-500	244	228				
pH @25°C	6.5 - 8.5	7.81					
Conductivity @25°C		456					
TDS (Calc. from Cond.)		236					
Chloride	250	0.7	0.7				
Nitrate (N)	10	<0.05	0.11				
Nitrite (N)	1	<0.05					
Sulphate	500	12	16				
Phosphorus (Total)		0.04	0.02				
Total Kjeldahl Nitrogen		0.2	0.2				
Ammonia (N)-Total (NH3+NH4)		<0.05	<0.05				
Dissolved Organic Carbon	5	0.8	2.6				
Phenolics		<0.001	<0.001				
COD		6	<5				
Hardness (as CaCO3)	500	227	235				
Aluminum	0.1	0.05	0.03				
Barium	1	0.031	0.02				
Boron	5	0.009	0.006				
Calcium		86.5	89.6				
Iron	0.3	0.015	<0.005				
Magnesium		2.66	2.68				
Manganese	0.05	<0.001	<0.001				
Potassium		2.7	2.7				
Silicon		5.7	6.01				
Sodium	200	2.3	2.8				
Strontium		0.175	0.165				
Zinc	5	0.005	<0.005				
Arsenic	0.01	0.0001					
Cadmium	0.005	<0.000015	<0.000015				
Chromium	0.050	<0.001	<0.001				
Cobalt		0.0003	0.0002				
Copper	1	0.0038	0.0012				
Lead	0.010	0.00011					
Mercury	0.001	<0.00002					
Anion Sum		5.13	4.92				
Cation Sum		4.71	4.88				
% Difference		4.26	0.386				
Ion Ratio		1.09	1.01				
Sodium Adsorption Ratio		0.0676	0.0781				
TDS (Ion Sum Calc)	500	253	252				
TDS(calc.)/EC(actual)		0.554	0.554				
Conductivity Calc		455	459				
Conductivity Calc / Conductivity		0.999	1.01				
Langelier Index(25°C)		0.701	0.998				
Saturation pH (25°C)		7.11	7.12				
Benzene		<0.5					
Dichlorobenzene,1,4-		<0.5					
Dichloromethane		<5					
Toluene		<0.5					
Vinyl Chloride		<0.2					
Field Measured							
Water Temp. (^{o}C)		9.9	8.8				
Conductivity (microS/cm)		510	550				
pH (pH units)	6.5-8.5	7.5	7.8				

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

NS = No Sample

Groundwater Quality
Project Name: Black Donald

Monitor Number->	ODWS	BH 3					
		Jun-23	Nov-23				
Parameters mg/L		NS	NS				
Alkalinity(CaCO3) to pH4.5	30-500						
pH @25°C	6.5 - 8.5						
Conductivity @25°C							
TDS (Calc. from Cond.)							
Chloride	250						
Nitrate (N)	10						
Nitrite (N)	1						
Sulphate	500						
Phosphorus (Total)							
Total Kjeldahl Nitrogen							
Ammonia (N)-Total (NH3+NH4)							
Dissolved Organic Carbon	5						
Phenolics							
COD							
Hardness (as CaCO3)	500						
Aluminum	0.1						
Barium	1						
Boron	5						
Calcium							
Iron	0.3						
Magnesium							
Manganese	0.05						
Potassium							
Silicon							
Sodium	200						
Strontium							
Zinc	5						
Arsenic	0.01						
Cadmium	0.005						
Chromium	0.050						
Cobalt							
Copper	1						
Lead	0.010						
Mercury	0.001						
Anion Sum							
Cation Sum							
% Difference							
Ion Ratio							
Sodium Adsorption Ratio							
TDS (Ion Sum Calc)	500						
TDS(calc.)/EC(actual)							
Conductivity Calc							
Conductivity Calc / Conductivity							
Langelier Index(25°C)							
Saturation pH (25°C)							
Benzene							
Dichlorobenzene,1,4-							
Dichloromethane							
Toluene							
Vinyl Chloride							
Field Measured							
Water Temp. (^{o}C)							
Conductivity (microS/cm)							
pH (pH units)	6.5-8.5						

Notes:
All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standards
Shaded values exceed ODWS
NS = No Sample

Groundwater Quality
Project Name: Black Donald

Monitor Number->	ODWS	BH 4					
		Jun-23	Nov-23				
Parameters mg/L							
Alkalinity(CaCO3) to pH4.5	30-500	623	533				
pH @25°C	6.5 - 8.5	7.62					
Conductivity @25°C		1640					
TDS (Calc. from Cond.)		896					
Chloride	250	45.5	20.2				
Nitrate (N)	10	0.47	0.06				
Nitrite (N)	1	<0.05					
Sulphate	500	295	228				
Phosphorus (Total)		0.03	0.02				
Total Kjeldahl Nitrogen		1.4	0.9				
Ammonia (N)-Total (NH3+NH4)		0.63	0.33				
Dissolved Organic Carbon	5	5.6	13.4				
Phenolics		<0.001	<0.001				
COD		70	42				
Hardness (as CaCO3)	500	794	756				
Aluminum	0.1	0.11	0.08				
Barium	1	0.101	0.099				
Boron	5	2.11	0.862				
Calcium		277	273				
Iron	0.3	0.007	0.012				
Magnesium		24.7	17.8				
Manganese	0.05	0.532	1.06				
Potassium		11.1	8.2				
Silicon		6	5.71				
Sodium	200	48.3	25.60				
Strontium		0.686	0.616				
Zinc	5	<0.005	<0.005				
Arsenic	0.01	0.0008					
Cadmium	0.005	0.000042	0.00				
Chromium	0.050	<0.001	<0.001				
Cobalt		0.0018	0.0013				
Copper	1	0.0045	0.0047				
Lead	0.010	0.00004					
Mercury	0.001	<0.00002					
Anion Sum		20.1	16				
Cation Sum		18.3	16.5				
% Difference		4.83	1.53				
Ion Ratio		1.1	0.97				
Sodium Adsorption Ratio		0.746	0.405				
TDS (Ion Sum Calc)	500	1090	894				
TDS(calc.)/EC(actual)		0.665	0.651				
Conductivity Calc		1610	1380				
Conductivity Calc / Conductivity		0.982	1.01				
Langelier Index(25°C)		1.34	1.32				
Saturation pH (25°C)		6.28	6.33				
Benzene		<0.5					
Dichlorobenzene,1,4-		<0.5					
Dichloromethane		<5					
Toluene		<0.5					
Vinyl Chloride		<0.2					
Field Measured							
Water Temp. (^{o}C)		10.2	9.6				
Conductivity (microS/cm)		1770	1480				
pH (pH units)	6.5-8.5	6.2	7.2				

Notes:
All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standards
Shaded values exceed ODWS
NS = No Sample

Groundwater Quality
Project Name: Black Donald

Monitor Number->	ODWS	MW08-5					
		Jun-23	Nov-23				
Parameters mg/L		NS	NS				
Alkalinity(CaCO3) to pH4.5	30-500						
pH @25°C	6.5 - 8.5						
Conductivity @25°C							
TDS (Calc. from Cond.)							
Chloride	250						
Nitrate (N)	10						
Nitrite (N)	1						
Sulphate	500						
Phosphorus (Total)							
Total Kjeldahl Nitrogen							
Ammonia (N)-Total (NH3+NH4)							
Dissolved Organic Carbon	5						
Phenolics							
COD							
Hardness (as CaCO3)	500						
Aluminum	0.1						
Barium	1						
Boron	5						
Calcium							
Iron	0.3						
Magnesium							
Manganese	0.05						
Potassium							
Silicon							
Sodium	200						
Strontium							
Zinc	5						
Arsenic	0.01						
Cadmium	0.005						
Chromium	0.050						
Cobalt							
Copper	1						
Lead	0.010						
Mercury	0.001						
Anion Sum							
Cation Sum							
% Difference							
Ion Ratio							
Sodium Adsorption Ratio							
TDS (Ion Sum Calc)	500						
TDS(calc.)/EC(actual)							
Conductivity Calc							
Conductivity Calc / Conductivity							
Langelier Index(25°C)							
Saturation pH (25°C)							
Benzene							
Dichlorobenzene,1,4-							
Dichloromethane							
Toluene							
Vinyl Chloride							
Field Measured							
Water Temp. (^{o}C)							
Conductivity (microS/cm)							
pH (pH units)	6.5-8.5						

Notes:
All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standards
Shaded values exceed ODWS
NS = No Sample

Groundwater Quality
Project Name: Black Donald

Monitor Number->	ODWS	MW 08-6					
		Jun-23	Nov-23				
Parameters mg/L							
Alkalinity(CaCO3) to pH4.5	30-500	192	169				
pH @25°C	6.5 - 8.5	8.07					
Conductivity @25°C		364					
TDS (Calc. from Cond.)		187					
Chloride	250	0.8	<0.5				
Nitrate (N)	10	0.09	0.08				
Nitrite (N)	1	<0.05					
Sulphate	500	12	8				
Phosphorus (Total)		<0.01	<0.01				
Total Kjeldahl Nitrogen		0.2	0.1				
Ammonia (N)-Total (NH3+NH4)		<0.05	<0.05				
Dissolved Organic Carbon	5	2.1	4.4				
Phenolics		<0.001	<0.001				
COD		6	<5				
Hardness (as CaCO3)	500	179	174				
Aluminum	0.1	0.05	0.02				
Barium	1	0.035	0.024				
Boron	5	0.01	<0.005				
Calcium		67	65.3				
Iron	0.3	0.011	<0.005				
Magnesium		2.78	2.59				
Manganese	0.05	<0.001	0.001				
Potassium		2.1	1.6				
Silicon		3.37	3.14				
Sodium	200	2.1	1.7				
Strontium		0.299	0.258				
Zinc	5	<0.005	<0.005				
Arsenic	0.01	0.0002					
Cadmium	0.005	<0.000015	<0.000015				
Chromium	0.050	<0.001	<0.001				
Cobalt		0.0008	0.0005				
Copper	1	0.003	0.001				
Lead	0.010	0.00003					
Mercury	0.001	<0.00002					
Anion Sum		4.11	3.56				
Cation Sum		3.73	3.59				
% Difference		4.91	0.43				
Ion Ratio		1.1	0.991				
Sodium Adsorption Ratio		0.0683	0.0561				
TDS (Ion Sum Calc)	500	202	182				
TDS(calc.)/EC(actual)		0.555	0.54				
Conductivity Calc		368	339				
Conductivity Calc / Conductivity		1.01	1.01				
Langelier Index(25°C)		0.747	0.73				
Saturation pH (25°C)		7.32	7.37				
Benzene		<0.5					
Dichlorobenzene,1,4-		<0.5					
Dichloromethane		<5					
Toluene		<0.5					
Vinyl Chloride		<0.2					
Field Measured							
Water Temp. (^{o}C)		11.0	7.6				
Conductivity (microS/cm)		420	410				
pH (pH units)	6.5-8.5	7.8	6.8				

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

NS = No Sample

Groundwater Quality
Project Name: Black Donald

Monitor Number->	ODWS	MW 08-7S (Historically MW 08-7)					
		Jun-23	Nov-23				
Parameters mg/L							
Alkalinity(CaCO3) to pH4.5	30-500	176	203				
pH @25°C	6.5 - 8.5	7.97					
Conductivity @25°C		427					
TDS (Calc. from Cond.)		220					
Chloride	250	31	38.3				
Nitrate (N)	10	<0.05	0.07				
Nitrite (N)	1	<0.05					
Sulphate	500	7	4				
Phosphorus (Total)			0.77				
Total Kjeldahl Nitrogen		0.1	0.2				
Ammonia (N)-Total (NH3+NH4)		<0.05	<0.05				
Dissolved Organic Carbon	5	2	3.3				
Phenolics		<0.001	<0.001				
COD		18	10				
Hardness (as CaCO3)	500	170	199				
Aluminum	0.1	0.04	0.02				
Barium	1	0.034	0.048				
Boron	5	<0.005	<0.005				
Calcium		57	67.9				
Iron	0.3	0.007	<0.005				
Magnesium		6.61	7.12				
Manganese	0.05	<0.001	<0.001				
Potassium		1.2	1.4				
Silicon		3.16	3.72				
Sodium	200	20.9	26.1				
Strontium		0.102	0.113				
Zinc	5	<0.005	<0.005				
Arsenic	0.01	<0.0001					
Cadmium	0.005	<0.000015	<0.000015				
Chromium	0.050	<0.001	<0.001				
Cobalt		0.0001	0.0001				
Copper	1	0.0012	0.0015				
Lead	0.010	0.00002					
Mercury	0.001	<0.00002					
Anion Sum		4.54	5.22				
Cation Sum		4.33	5.15				
% Difference		2.34	0.722				
Ion Ratio		1.05	1.01				
Sodium Adsorption Ratio		0.698	0.805				
TDS (Ion Sum Calc)	500	229	267				
TDS(calc.)/EC(actual)		0.537	0.532				
Conductivity Calc		432	503				
Conductivity Calc / Conductivity		1.01	1				
Langelier Index(25°C)		0.54	0.916				
Saturation pH (25°C)		7.43	7.29				
Benzene		<0.5					
Dichlorobenzene,1,4-		<0.5					
Dichloromethane		<5					
Toluene		<0.5					
Vinyl Chloride		<0.2					
Field Measured							
Water Temp. (^{o}C)		7.8	6.8				
Conductivity (microS/cm)		520	590				
pH (pH units)	6.5-8.5	6.3	8				

Notes:
All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standards
Shaded values exceed ODWS
NS = No Sample

Groundwater Quality
Project Name: Black Donald

Monitor Number->	ODWS	MW 23-7D (Well Installed Nov 2023)					
		Nov-23					
Parameters mg/L							
Alkalinity(CaCO3) to pH4.5	30-500	320					
pH @25°C	6.5 - 8.5						
Conductivity @25°C							
TDS (Calc. from Cond.)							
Chloride	250	37.1					
Nitrate (N)	10	0.12					
Nitrite (N)	1						
Sulphate	500	23					
Phosphorus (Total)		5.19					
Total Kjeldahl Nitrogen		1.7					
Ammonia (N)-Total (NH3+NH4)		0.06					
Dissolved Organic Carbon	5	6.4					
Phenolics		<0.001					
COD		130					
Hardness (as CaCO3)	500	336					
Aluminum	0.1	0.05					
Barium	1	0.094					
Boron	5	0.371					
Calcium		116					
Iron	0.3	0.005					
Magnesium		11.2					
Manganese	0.05	0.009					
Potassium		1.8					
Silicon		3.74					
Sodium	200	24.7					
Strontium		0.248					
Zinc	5	<0.005					
Arsenic	0.01						
Cadmium	0.005	<0.000015					
Chromium	0.050	<0.001					
Cobalt		0.0007					
Copper	1	0.0021					
Lead	0.010						
Mercury	0.001						
Anion Sum		7.94					
Cation Sum		7.84					
% Difference		0.64					
Ion Ratio		1.01					
Sodium Adsorption Ratio		0.586					
TDS (Ion Sum Calc)	500	407					
TDS(calc.)/EC(actual)		0.545					
Conductivity Calc		732					
Conductivity Calc / Conductivity		0.981					
Langelier Index(25°C)		1.06					
Saturation pH (25°C)		6.89					
Benzene							
Dichlorobenzene,1,4-							
Dichloromethane							
Toluene							
Vinyl Chloride							
Field Measured							
Water Temp. (^{o}C)		6.2					
Conductivity (microS/cm)		7.4					
pH (pH units)	6.5-8.5	8.4					

Notes:
All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standards
Shaded values exceed ODWS
NS = No Sample

Groundwater Quality
Project Name: Black Donald

Monitor Number->	ODWS	MW23-8S			MW 23-8D		
		Nov-23			Nov-23		
Parameters mg/L		Dry			Dry		
Alkalinity(CaCO3) to pH4.5	30-500						
pH @25°C	6.5 - 8.5						
Conductivity @25°C							
TDS (Calc. from Cond.)							
Chloride	250						
Nitrate (N)	10						
Nitrite (N)	1						
Sulphate	500						
Phosphorus (Total)							
Total Kjeldahl Nitrogen							
Ammonia (N)-Total (NH3+NH4)							
Dissolved Organic Carbon	5						
Phenolics							
COD							
Hardness (as CaCO3)	500						
Aluminum	0.1						
Barium	1						
Boron	5						
Calcium							
Iron	0.3						
Magnesium							
Manganese	0.05						
Potassium							
Silicon							
Sodium	200						
Strontium							
Zinc	5						
Arsenic	0.01						
Cadmium	0.005						
Chromium	0.050						
Cobalt							
Copper	1						
Lead	0.010						
Mercury	0.001						
Anion Sum							
Cation Sum							
% Difference							
Ion Ratio							
Sodium Adsorption Ratio							
TDS (Ion Sum Calc)	500						
TDS(calc.)/EC(actual)							
Conductivity Calc							
Conductivity Calc / Conductivity							
Langelier Index(25°C)							
Saturation pH (25°C)							
Benzene							
Dichlorobenzene,1,4-							
Dichloromethane							
Toluene							
Vinyl Chloride							
Field Measured							
Water Temp. (^{o}C)							
Conductivity (microS/cm)							
pH (pH units)	6.5-8.5						

Notes:
All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standards
Shaded values exceed ODWS
NS = No Sample

Surface Water Quality
Project Name: Black Donald

Monitor Number ->

				SW 4					
Parameters	**Limit**	**PWQO**	**CWQG**	**23-Jun**	**23-Aug**	**Nov-23**			
Alkalinity(CaCO3) to pH4.5	IPWQO	a		222	DRY	DRY			
pH @25°C				8.01					
Conductivity @25°C				554					
TDS (Calc. from Cond.)				287					
Chloride			120	49.6					
Nitrate (N)			13	0.11					
Nitrite (N)			0.6	<0.05					
Sulphate				<1					
BOD5				<3					
Total Suspended Solids				4					
Phosphorus (Total)	IPWQO	0.02	0.020	0.02					
Total Kjeldahl Nitrogen				0.4					
Ammonia (N)-Total (NH3+NH4)				<0.05					
Dissolved Organic Carbon									
Phenolics		0.0010	0.0040	<0.001					
COD				17					
Hardness (as CaCO3)				232					
Aluminum (Total)		0.075							
Barium (Total)				0.062					
Boron (Total)	IPWQO	0.2	1.5	0.008					
Calcium (Total)				79					
Iron (Total)	PWQO	0.3	0.3	0.239					
Magnesium (Total)				8.38					
Manganese (Total)									
Potassium (Total)									
Sodium (Total)									
Strontium (Total)				0.158					
Zinc (Total)	PWQO IPWQO	0.03 0.02	0.007	0.005					
Arsenic (Total)		0.005	0.005	0.0002					
Cadmium (Total)	PWQO	0.0002	0.00009	<0.000015					
Chromium (Total)	PWQO	0.001	0.001	<0.001					
Copper (Total)	PWQO IPWQO	0.005 d	Max 0.004 min 0.002 (based on hardness)	0.0003					
Lead (Total)	PWQO	0.005	0.001	0.00004					
Mercury	PWQO	0.0002	0.000026	<0.00002					
Anion Sum				5.84					
Cation Sum				6.09					
% Difference				2.14					
Ion Ratio				0.958					
Sodium Adsorption Ratio				0.915					
TDS (Ion Sum Calc)				305					
TDS(calc.)/EC(actual)				0.551					
Conductivity Calc				578					
Conductivity Calc / Conductivity				1.04					
Langelier Index(25°C)				0.811					
Saturation pH (25°C)				7.2					
Field Measured									
Water Temp. (^{o}C)				6.1					
Conductivity (microS/cm)				630					
pH (pH units)		6.5 - 8.5	6.5 - 9	7.4					
DO				5					
FLOW L/S				36					

Notes:
All values reported in mg/L unless otherwise noted
PWQO- Provincial Water Quality Objectives
CWQG - Canadian Water Quality Guidelines
Shaded values exceed PWQO
NS - No Sample Taken

Surface Water Quality
Project Name: Black Donald

Monitor Number ->

			SW 5					
Parameters	**Limit**	**PWQO**	**23-Jun**	**Dup #1 23-Jun**	**23-Aug**	**Dup #1 23-Aug**	**Nov-23**	**Dup #1 Nov-23**
Alkalinity(CaCO3) to pH4.5	IPWQO	a	188	192	251	248	187	180
pH @25°C			8.04	7.93				
Conductivity @25°C			355	360				
TDS (Calc. from Cond.)			183	185	255	259		
Chloride			5.7	5.7	9.7	9.6	11.2	10.9
Nitrate (N)			<0.05	0.08	0.06	0.08	0.05	0.06
Nitrite (N)			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate			1	1	<1	<1	9	9
BOD5			<3	<3	<3	<3	<3	<3
Total Suspended Solids			<3	3	11	10	6	<3
Phosphorus (Total)	IPWQO	0.02	0.01	0.01	0.04	0.09	0.02	0.02
Total Kjeldahl Nitrogen			0.5	0.5	0.7	0.8	0.5	0.5
Ammonia (N)-Total (NH3+NH4)			<0.05	<0.05	0.14	0.14	<0.05	<0.05
Dissolved Organic Carbon					16.7	16.7	11	10.6
Phenolics		0.0010	<0.001	<0.001	<0.001	<0.001	0.001	0.002
COD			34	24	39	36	22	24
Hardness (as CaCO3)			173	187	258	244	195	184
Aluminum (Total)		0.075					0.04	0.05
Barium (Total)			0.053	0.057	0.082	0.078	0.051	0.049
Boron (Total)	IPWQO	0.2	0.021	0.022	0.018	0.017	0.014	0.014
Calcium (Total)			58.3	63	85.4	80.9	63.4	60
Iron (Total)	PWQO	0.3	0.192	0.205	1.93	1.83	0.238	0.232
Magnesium (Total)			6.61	7.18	10.9	10.20	8.92	8.36
Manganese (Total)					0.297	0.28	0.02	0.023
Potassium (Total)					1.1	1.00	1.80	1.7
Sodium (Total)					6.4	6.00	6.40	6
Strontium (Total)			0.113	0.123	0.17	0.16	0.125	0.117
Zinc (Total)	PWQO IPWQO	0.03 0.02	0.005	0.006	<0.005	<0.005	0.009	0.006
Arsenic (Total)		0.005	0.0002	0.0002				
Cadmium (Total)	PWQO	0.0002	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015
Chromium (Total)	PWQO	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Total)	PWQO IPWQO	0.005 d	0.0003	0.0003	0.0002	0.0002	0.0006	0.0005
Lead (Total)	PWQO	0.005	0.00004	0.00004				
Mercury	PWQO	0.0002	<0.00002	<0.00002				
Anion Sum			3.94	4.04	5.31	5.25	4.24	4.1
Cation Sum			3.67	3.97	5.58	5.28	4.24	4
% Difference			3.5	0.865	2.52	0.225	0.0941	1.24
Ion Ratio			1.07	1.02	0.951	0.996	1	1.03
Sodium Adsorption Ratio			0.139	0.147	0.173	0.168	0.198	0.191
TDS (Ion Sum Calc)			190	199	267	260	213	205
TDS(calc.)/EC(actual)			0.535	0.553	0.542	0.52	0.54	0.518
Conductivity Calc			355	374	497	481	402	385
Conductivity Calc / Conductivity			1	1.04	1.01	0.962	1.02	0.975
Langelier Index(25°C)			0.656	0.591	0.368	0.39	0.461	0.461
Saturation pH (25°C)			7.38	7.34	7.1	7.13	7.36	7.4
Field Measured								
Water Temp. (^{o}C)			19.5		17.5		3.2	
Conductivity (microS/cm)			420		580		470	
pH (pH units)		6.5 - 8.5	7.4		7.30		8.6	
DO			3.4		NA		8.1	
FLOW L/S			16.59		4.39		20.5	

Notes:
All values reported in mg/L unless otherwise noted
PWQO- Provincial Water Quality Objectives
CWQG - Canadian Water Quality Guidelines
Shaded values exceed PWQO
NS - No Sample Taken

Appendix J
Monitoring and Screening Checklist

Appendix D-Monitoring and Screening Checklist
General Information and Instructions

General Information: The checklist is to be completed, and submitted with the Monitoring Report.
Instructions: A complete checklist consists of:
(a) a completed and signed checklist, including any additional pages of information which can be attached as needed to provide further details where indicated.
(b) completed contact information for the Competent Environmental Practitioner (CEP)
(c) self-declaration that CEP(s) meet(s) the qualifications as set out below and in Section 1.2 of the Technical Guidance Document.

Definition of Groundwater CEP:
For groundwater, the CEP must have expertise in hydrogeology and meet one of the following:
(a) the person holds a licence, limited licence or temporary licence under the *Professional Engineers Act*; or
(b) the person holds a certificate of registration under the *Professional Geoscientists Act, 2000* and is a practicing member, temporary, member or limited member of the Association of Professional Geoscientists of Ontario. O. Reg. 66/08, s. 2..
Definition of Surface water CEP:
A CEP for surface water assessments is a scientist, professional engineer or professional geoscientist as described in (a) and (b) above with demonstrated experience and post-secondary education, either a diploma or degree, in hydrology, aquatic ecology, limnology, aquatic biology, physical geography with specialization in surface water, and/or water resource management.

The type of scientific work that a CEP performs must be consistent with that person's education and experience. If an individual has appropriate training and credentials in both groundwater and surface water and is responsible for both areas of expertise, the CEP may then complete and validate both sections of the checklist.

Monitoring Report and Site Information	
Waste Disposal Site Name	Black Donald Landfill
Location (e.g. street address, lot, concession)	Part of Lot 9, Concession 2 and 3, within the geographic Township of Brougham, Township of Greater Madawaska
GPS Location (taken within the property boundary at front gate/ front entry)	NAD 83, UTM Zone 18, 353188E 5010581N
Municipality	Township of Greater Madawaska
Client and/or Site Owner	Township of Greater Madawaska
Monitoring Period (Year)	2023
This Monitoring Report is being submitted under the following:	
Environmental Compliance Approval Number:	ECA # A411902
Director's Order No.:	NA
Provincial Officer's Order No.:	NA
Other:	NA

Report Submission Frequency	◉ **Annual** ○ **Other**		
The site is: **(Operation Status)**	◉ **Open** ○ **Inactive** ○ **Closed**		
Does your Site have a Total Approved Capacity?	◉ **Yes** ○ **No**		
If yes, please specify Total Approved Capacity	46,785	*Units*	Cubic Metres
Does your Site have a Maximum Approved Fill Rate?	○ **Yes** ◉ **No**		
If yes, please specify Maximum Approved Fill Rate		*Units*	
Total Waste Received within Monitoring Period (Year)	0	*Units*	Cubic Metres
Total Waste Received within Monitoring Period (Year) *Methodology*			
Estimated Remaining Capacity	2,718	*Units*	Cubic Metres
Estimated Remaining Capacity *Methodology*	Direct Survey (GPS/Total Station)		
Estimated Remaining Capacity *Date Last Determined*	December 20 , 2023		
Non-Hazardous Approved Waste Types	☒ Domestic ☐ Industrial, Commercial & Institutional (IC&I) ☐ Source Separated Organics (Green Bin) ☐ Tires	☐ Contaminated Soil ☐ Wood Waste ☐ Blue Box Material ☐ Processed Organics ☐ Leaf and Yard Waste	☐ Food Processing/Preparation Operations Waste ☐ Hauled Sewage Other: Construction and demolition and Bulky waste
Subject Waste Approved Waste Classes: Hazardous & Liquid Industrial *(separate waste classes by comma)*			
Year Site Opened *(enter the Calendar Year only)*	1960	**Current ECA Issue Date**	1980-03-27 amended 2013-01-24
Is your Site required to submit Financial Assurance?		○ **Yes** ◉ **No**	
Describe how your Landfill is designed.		◉ Natural Attenuation only ○ Fully engineered Facility ○ Partially engineered Facility	
Does your Site have an approved Contaminant Attenuation Zone?		○ **Yes** ◉ **No**	

If closed, specify C of A, control or authorizing document closure date:	

Has the nature of the operations at the site changed during this monitoring period?	◯ **Yes** ◉ **No**
If yes, provide details:	
Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i.e. exceeded the LEL for methane)	◯ Yes ◉ No

Groundwater WDS Verification:

Based on all available information about the site and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:	◉ **Yes** ○ **No**	New monitoring wells were established in 2023 enhance the groundwater monitoring network. These wells (MW08-7D, MW23-8S, & MW23-8D) were sampled in November 2023 monitoring program and have been included in the updated monitoring program.
2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document (s):	○ **Yes** ◉ **No** ○ **Not Applicable**	If no, list exceptions below or attach information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
BH3	Observed to be destroyed since fall 2021	June and November 2023
MW08-5	Not enough water to sample	June and November 2023
MW23-8S	Dry	November 2023
MW23-8D	Dry	November 2023

3) a) Is landfill gas being monitored or controlled at the site?	○ **Yes** ◉ **No**	
If yes to 3(a), please answer the next two questions below.		
b) Have any measurements been taken since the last reporting period that indicate landfill gas is present in the subsurface at levels exceeding criteria established for the site?	○ **Yes** ◉ **No**	
c) Has the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:	○ **Yes** ○ **No** ◉ **Not Applicable**	If no, list exceptions below or attach additional information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
All sampling completed in general accordance with our sampling protocols		

4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	◉ **Yes** ○ **No**	All sampling was completed in general accordance with sampling protocols

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.	(●) Yes ( ) No		
6) The site meets compliance and assessment criteria.	(●) Yes ( ) No	Compliant with Guideline B-7	
7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.	(●) Yes ( ) No		
1) Is one or more of the following risk reduction practices in place at the site: ***(a)*** **There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/ treatment; or** ***(b)*** **There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or** ***(c)*** **The site meets the following two conditions (typically achieved after 15 years or longer of site operation):** ***i.*** **The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and** ***ii.*** **Seasonal and annual water levels and water quality fluctuations are well understood.**	(●) Yes ( ) No	**Note which practice(s):**	☐ (a) ☐ (b) ☒ (c)
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	( ) Yes (●) No ( ) Not Applicable		

Groundwater CEP Declaration:

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended), and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Select Date

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

◉ **No changes to the monitoring program are recommended**	New monitoring wells were established in 2023 enhance the groundwater monitoring network. These wells (MW08-7D, MW23-8S, & MW23-8D) were sampled in November 2023 monitoring program and have been included in the updated monitoring program.
○ **The following change(s) to the monitoring program is/are recommended:**	
◉ **No Changes to site design and operation are recommended**	
○ **The following change(s) to the site design and operation is/ are recommended:**	

Name:	Andrew Buzza, P.Geo		
Seal:	Add Image		
Signature:		**Date:**	March 2024
CEP Contact Information:	Andrew Buzza, P.Geo		
Company:	Jp2g Consultants Inc		
Address:	1150 Morrison Drive Suite 410		
Telephone No.:	613 828 7800	Fax No. :	613 828 2600
E-mail Address:	andrewb@jp2g.com		
Co-signers for additional expertise provided:			
Signature:		**Date:**	
Signature:		**Date:**	

Surface Water WDS Verification:

Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):

Name (s)	Unnamed Creeks
Distance(s)	Approximately 850 m northwest of the site

Based on all available information and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:	◉ Yes ○ No	
2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):	○ Yes ◉ No ○ **Not applicable (No C of A, authorizing / control document applies)**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
SW3 and SW6	Removed from the monitoring program in 2023	June, August, & November 2023

3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.	○ **Yes** ◉ **No** ○ **Not Applicable**	
b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:	◉ **Yes** ○ **No** ○ **Not Applicable**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
All surface water sampling completed in general accordance with our sampling procedures.		

4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	◉ **Yes** ○ **No**	All sampling completed in general conformance with Jp2g sampling procedures

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The receiving water body meets surface water-related compliance criteria and assessment criteria: i.e., there are no exceedances of criteria, based on MOE legislation, regulations, Water Management Policies, Guidelines and Provincial Water Quality Objectives and other assessment criteria (e.g., CWQGs, APVs), as noted in Table A or Table B in the Technical Guidance Document (Section 4.6):	○ **Yes** ◉ **No**

If no, list parameters that exceed criteria outlined above and the amount/percentage of the exceedance as per the table below or provide details in an attachment:

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO
Phosphorus	IPWQO 0.03	SW5 33.3% (August 2023)
Iron	PWQO 0.3	SW5 543.3% Iron (August 2023)
6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	◉ **Yes** ○ **No**	

7) All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.	◉ **Yes** ◯ **No**	
8) For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g. , PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):	◉ Yes ◯ No ◯ Not Known ◯ Not Applicable	Overall the results of the surface and groundwater sampling do not indicate that the past years of landfill at this location is having a negative effect on the surface water around the Landfill site.
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	◯ **Yes** ◉ **No** ◯ **Not Applicable**	At SW5, no parameter concentrations were above 75th percentile background surface water quality except for •In June: Chemical oxygen demand COD. •In August: Phosphorus, iron, barium, chemical oxygen demand COD, and total Kjeldahl nitrogen (TKN). •In November: total Kjeldahl nitrogen (TKN). These exceedances did not trigger the implementation of the contingency plan.

Surface Water CEP Declaration:

I, the undersigned hereby declare that I am a Competent Environmental Practitioner as defined in Appendix D under Instructions, holding the necessary level of experience and education to design surface water monitoring and sampling programs, conduct appropriate surface water investigations and interpret the related data as it pertains to the site for this monitoring period.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended) and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Select Date

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

◉ **No Changes to the monitoring program are recommended** ○ **The following change(s) to the monitoring program is/are recommended:**	
◉ **No changes to the site design and operation are recommended** ○ **The following change(s) to the site design and operation is/are recommended:**	

CEP Signature	
Relevant Discipline	Professional Geoscientist, education and over 30 years experience
Date:	March 2024
CEP Contact Information:	Andrew Buzza
Company:	Jp2g Consultants Inc
Address:	1150 Morrison Drive
Telephone No.:	613 828 7800
Fax No. :	613 828 2600
E-mail Address:	andrewb@jp2g.com

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