THE TOWNSHIP OF GREATER MADAWASKA

2022 Annual Report

Norway Lake Waste Disposal Site (A411702)

Township of Greater Madawaska

County of Renfrew, Ontario

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Executive Summary

This report has been prepared to document the results of the 2022 environmental monitoring program for the Township of Greater Madawaska's Norway Lake Waste Disposal Site, located on part of Lot 20, Concession 7 within the geographic Township of Bagot, in the Township of Greater Madawaska. The site is located approximately five (5) kilometres east of the Village of Calabogie, on Norway Lake Road.

The Norway Lake Waste Disposal Site operates in accordance with Environmental Compliance Approval A411702, for the transfer of municipal solid waste and Blue Box recycling from the Norway Lake site to GFL Environmental Inc. in Moose Creek, Ontario for disposal and processing. The site consists of an approved waste disposal area of 1.37 hectares within a total site area of 18.47 hectares. The Norway Lake site was closed to landfilling operations in 2002, and final closure of the waste mound at the Norway Lake site was completed in 2007. Since 2002, the Norway Lake site has operated as a municipal solid waste and recycling transfer station only.

A Revised Design & Operations Plan for the Norway Lake Waste Disposal Site (Greenview, 2022) was submitted to MECP on May 11, 2022. MECP confirmation (5066-CEBKYF) was received on May 11, 2022. No responses have been received at the time of this report.

The interpreted groundwater configuration at the site in 2022 was relatively consistent with historical interpretations in the overburden and bedrock aquifers. The predominant groundwater flow directions in the overburden and bedrock aquifers were interpreted to be to the northeast.

Groundwater quality northeast, east, and immediately downgradient of the site was interpreted to be impacted from the Norway Lake Waste Disposal Site in both the overburden and bedrock aquifers. Based on the results of the 2022 Reasonable Use Concept criteria assessment at the site, the Norway Lake Waste Disposal Site was interpreted to meet the intent of Ontario Ministry of the Environment, Conservation, and Parks' Guideline B-7 at all downgradient property boundaries for a closed landfill.

Historically, surface water quality in the vicinity of the site was assessed at the seasonally inundated creek/low-lying depressional area located to the north and east of the closed waste mound. Historically, the downstream sampling location SW-1 has not been interpreted to be significantly impacted by landfill-related factors and surface water quality was interpreted to meet Provincial Water Quality Objectives. Surface water sampling locations SW-1 and background location SW-4 were not sampled in 2022 as both locations were observed to be dry.

Based on Township Greater Madawaska records, approximately 15,213 vehicles visited the Norway Lake site in 2022, and accepted approximately 26,583 bags of waste. Based on information supplied by the Township of Greater Madawaska, 438 tonnes of municipal waste were collected at the Norway Lake site in 2022 and transported for final disposal to the approved waste disposal facility of GFL in Moose Creek, Ontario. Additionally, approximately 858 cubic metres of leaf and yard waste and 4,368 cubic metres of construction, demolition, and bulky waste were accepted at the Norway Lake site in 2022.

Recycling tonnage records provided by the Township of Greater Madawaska indicated that 128 tonnes of Blue Box recyclables were collected from the Norway Lake Waste Disposal Site in 2022. Blue Box recyclable quantities contributing to this total included 62 tonnes of commingled containers, 39 tonnes of mixed fibres, and 27 tonnes of old corrugated cardboard. Approximately 5 tonnes of household organics were diverted at the Norway Lake site in 2022.

According to Township of Greater Madawaska records, 111 tonnes of scrap metal, 75 refrigerant units, 1,723 tires, and 17 tonnes of waste electronic and electrical equipment were diverted from the depots at the Norway Lake Waste Disposal Site, Mount St. Patrick Waste Disposal Site, and Griffith Waste Disposal Site.

As a result of the May 21st, 2022, storm, the Township of Greater Madawaska declared a State of Emergency as

of 1:30pm May 22, 2022. The township submitted a request to the MECP on May 24, 2022, for a temporary extension to site hours, as well as another privately owned site at 5911 Matawatchan Rd, due to the overwhelming amount of brush debris. MECP approval was provided in a letter dated May 26, 2022. On June 8, 2022, the Township submitted a further request to extent the privately owned site hours. MECP approval was provided via email on June 9, 2022. Based on the results of the 2022 environmental monitoring program, and in accordance with Condition 7.2 (b) (iii) of the Amended Environmental Compliance Approval (A411702), the Norway Lake Waste Disposal Site was interpreted to be in compliance with all conditions of the Environmental Certificate of Approval, and with the inspection and reporting requirements therein.

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1.0 Introduction

1.1 Site Information

The Norway Lake Waste Disposal Site is located on part of Lot 20, Concession 7 within the geographic Township of Bagot, in the amalgamated Township of Greater Madawaska (Township). The site is located approximately five (5) kilometres (km) east of the Village of Calabogie, on Norway Lake Road (Figures 1 and 2). The Universal Transverse Mercator (UTM) coordinates at the site entrance gate relative to the North American Datum (NAD83) are 367326.0 metres (m) East, 5021906.0 m North, in Zone 18T (Google Earth, 2013). The site operates in accordance with the Amended Environmental Compliance Approval (ECA) A411702 issued on April 9, 2013, including the most recent amendment on September 26, 2013 (Appendix A). The site consists of an approved waste disposal area (AWDA) of 1.37 hectares (ha) within a total site area of approximately 18.47 ha (Appendix A; Figures 2 and 3).

The Norway Lake site was closed to landfilling operations in 2002, and final closure of the waste mound at the Norway Lake site was completed in 2007. Since 2002, the Norway Lake site has operated as a municipal solid waste and recycling transfer station only. Currently, received residential and Industrial, Commercial, and Institutional (IC&I) waste and Blue Box recyclables are transported off-site for disposal at GFL Environmental, Inc. (GFL) in Moose Creek, Ontario for disposal and processing. As part of the Township's long-term waste management plan, the Norway Lake site was identified for an upgrade to the site's existing municipal solid waste and recycling transfer station, similar to the waste and recycling transfer stations at the Township's Griffith and Mount St. Patrick sites. Construction of the upgraded municipal solid waste and recycling transfer station was initiated in fall 2008. The upgraded transfer station was opened to the public on November 21, 2009. Construction and demolition (C&D) and bulky wastes are collected at the Norway Lake site and transferred to the Township's Black Donald and Mount St. Patrick Waste Disposal Sites for processing and disposal.

1.2 Background

In accordance with Condition 24 of the ECA (December 24, 2003, Appendix A), the Township identified the Norway Lake site for final closure. Final closure of the waste mound at the Norway Lake site was completed in 2007, in accordance with Condition 24 of the ECA (Appendix A) and correspondence to the Ontario Ministry of the Environment, Conservation, and Parks (MECP) dated September 28, 2006, and October 27, 2006, as detailed in the 2007 Annual Report (Greenview Environmental Management Limited [Greenview], 2008).

Based on the formal closure of the landfill area of the site, and given the direction of long-term waste management planning in the Township which included a waste and recycling transfer station at the Norway Lake site, an application to amend the ECA dated June 8, 2007 was submitted to the MECP, with supporting technical documentation entitled, *Design and Operations Plan, Municipal Solid Waste Transfer Station, Norway Lake Waste Disposal Site* (DOP; Greenview, 2007). The intent of the 2007 application was to recognize proposed future site operations in the form of the upgraded solid waste and recycling transfer station operations to maintain service to residents and IC&I generators of the entire Township. On September 25, 2007, the ECA (A411702) for the Norway Lake site was amended to approve the proposed future site operations as presented in the DOP (Greenview, 2007).

On August 28, 2008, the MECP issued an additional Amendment to the ECA for the Norway Lake site, defining changes in types and volumes of acceptable waste and recyclables allowed on-site, and procedures for the storage and transfer of source separated organic waste (Appendix A).

Upgrades to the transfer station at the Norway Lake site were initiated by the Township in 2008 and were completed in 2009 with operations commencing on November 21, 2009. Funding for the upgrades at the site was made possible with assistance from the Canada-Ontario Municipal Rural Infrastructure Fund (COMRIF).

The Township received MECP Technical Support Section (TSS) surface water review comments, dated March 5, 2012, for the 2010 Annual Report (Greenview, 2011). The MECP TSS agreed to the discontinuation of

surface water sample collection at surface water sampling locations SW2 and SW3, as the locations were historically observed to be shallow, stagnant pools of water with no flow or limited flow conditions.

The Township also received MECP TSS groundwater review comments, dated October 4, 2012, related to the 2011 Annual Report (Greenview, 2012), and further to the subsequent site meeting involving Township representatives, MECP personnel, and Greenview personnel, on December 3, 2012, the MECP TSS provided an Addendum to the October 4, 2012, review comments (Greenview, 2013). The MECP TSS agreed that groundwater quality at monitoring well OB-11 was impacted by road salt utilized by the Township for winter road maintenance and amended the interpretation of non-compliance of the site with MECP Guideline B-7 (MECP, 1994a). The MECP TSS agreed that historical overburden groundwater quality prior to fall 2009 from monitoring well OB-12 could be used for assessing compliance with the Reasonable Use Concept (RUC) and conformance with MECP Guideline B-7 (MECP, 1994a). A consistent calculation for background bedrock groundwater quality was also initiated at that time, using groundwater quality results from prior to fall 2009 from background bedrock well BR-2 to calculate median background groundwater quality for the site. These practices have been continued for this 2022 Annual Report.

The Township provided response comments to the MECP for both the draft Amended ECA (February 28, 2012), and the surface water review comments (March 5, 2012) in correspondence, dated October 31, 2012. Following the submission, the MECP issued an Amended ECA on April 9, 2013.

Condition 5.1 of the Amended ECA (April 9, 2013; Appendix A) required the Township to submit a Contingency Plan by June 3, 2013. The Contingency Plan was submitted to the MECP Environmental Approvals Branch (EAB) by Greenview on behalf of the Township on May 31, 2013 (Greenview, 2014). Subsequent to the submission of the Contingency Plan, an Amendment to the ECA was issued by the MECP on September 26, 2013 (Appendix A).

In 2013, the Township passed a new waste management by-law (By-law No. 09 – 2013) to maintain and regulate a system for the disposal of municipal waste, recyclables, and other refuse (Greenview, 2014).

On September 29, 2014, the Township received MECP TSS groundwater review comments for the 2012 Annual Report (Greenview, 2013) for the Norway Lake site, dated February 5, 2014 (Greenview, 2015). The review comments noted that the Norway Lake site was interpreted to be in conformance with MECP Guideline B-7 and the monitoring schedule and analytical program were deemed to be satisfactory. On January 20, 2015, the Township received MECP TSS surface water review comments for the 2013 Annual Report (Greenview, 2014) for the Norway Lake site dated January 14, 2015 (Greenview, 2015). The MECP TSS surface water review noted that the surface water system in the vicinity of the Norway Lake site was not adversely impacted from former and current site operations, and that the current surface water monitoring program and schedule at the site was sufficient.

On March 16, 2016, the Township requested approval from the MECP Ottawa District Office to amend the operating hours for the transfer station at the Norway Lake Waste Disposal Site (Greenview, 2017). In electronic communication dated March 21, 2016, the MECP Ottawa District Office requested that the Township provide documentation regarding public notification of the Township's intent to modify the transfer station's operational hours prior to MECP approval, in accordance with Condition 9.7 (b) and (c) of the site's ECA. On May 10, 2016, the Township provided the MECP Ottawa District Office with electronic documentation related to public notification efforts in advance of amendment to the transfer stations hours (Greenview, 2017) and confirmed that no public/ratepayer comments were received as part of the process (Greenview, 2017). On May 12, 2016, the MECP Ottawa District Office provided the Township with an electronic letter confirming the MECP's approval to amend the hours of operation of the transfer station effective May 21, 2016 (Greenview, 2017).

On October 29, 2018, monitoring well OB-11 was decommissioned and replaced with a new overburden monitoring well adjacent to the former location of OB-11 (Figure 4). OB-11 had been previously observed to be damaged, likely due to an impact from an all-terrain vehicle. It was interpreted that the PVC well pipe of OB-11 had been broken below grade, which was confirmed during decommissioning operations. The replacement well

was designated as OB-11R, and was advanced through sand and gravel overburden and terminated at the interpreted interface with bedrock, at approximately 4.22 m below ground surface (bgs). A borehole log for the replacement monitoring well OB-11R is included in Appendix C of this report. Decommissioning and well installation operations were conducted by licenced drillers in accordance with Ontario Regulation (O.Reg.) 903 (Wells), as amended.

On June 14, 2019, the Township received MECP TSS surface water review comments related to the 2017 Annual Report, dated June 12, 2019 (Greenview, 2020). The MECP TSS reviewer noted that the seasonal creek at the site was not being impacted by landfill-related factors. Additionally, the reviewer noted that it was premature to cease the surface water monitoring program at the site; however, they noted that they would be agreeable to reducing the frequency of the surface water monitoring program. Subsequent communications between Greenview and the MECP clarified the intended wording of the MECP review, and reducing the frequency of the surface water monitoring program to a biennial program (once every two [2] years, in spring and fall) was confirmed (Greenview, 2020). Based on MECP TSS approval, the next surface water monitoring event at the Norway Lake Waste Disposal Site is scheduled for spring and fall 2022.

Throughout 2021, the Township and Greenview worked together on a Revised Design and Operations Plan (DOP) for the Norway Lake Waste Disposal Site, in an effort to modify transfer station operations and general layout of the site. On January 04, 2022, a copy of the Revised DOP was provided to the MECP Ottawa District Office for preliminary review and as part of the Township's obligation to initiate a Pre-Submission Meeting with the MECP relative to the Revised DOP and planned ECA Application for 2022 (Appendix B). The Pre-Submission Meeting was held between representatives of the MECP, Greenview, and the Township on January 20, 2022 (Appendix B). Formal submission of the ECA Application package, including the Revised DOP, was submitted to the MECP on May 11, 2022, and remains under review by the MECP (5066-CEBKYF).

Greenview was retained by the Township to complete the 2022 environmental monitoring and reporting program at the Norway Lake site.

1.3 Purpose and Scope

The purpose of this report is to provide an overview of the annual monitoring, environmental compliance, and operations at the Norway Lake site, in accordance with Condition 7.0 of the Amended ECA (A411702), including the following:

- Groundwater quality assessment and Reasonable Use Concept (RUC, MECP Guideline B-7) compliance (Section 4.1).
- Surface water quality assessment (Section 4.2).
- Site operational overview (Section 0).
- Conclusions and recommendations (Section 5.0).

2.0 Site Description

The following sections present a summary of the physical characteristics for the Norway Lake site. Locations of features described in this report are referenced to grid north.

2.1 Topography and Drainage

Local topography in the vicinity of the Norway Lake site is characterized by granite and gneissic marble bedrock outcrops, while the topography of the actual site area is of relatively flat to hummocky terrain (Golder Associates Ltd. [Golder], 2007). The AWDA at the site is relatively flat; however, the adjacent ground surface topography slopes towards low-lying areas located to the southeast, east, and northeast of the waste mound.

A topographic depression exists in the northern corner of the contaminant attenuation zone (CAZ), in which a seasonally inundated creek is located, and which is sampled by the two (2) existing surface water sampling locations at the site, SW-1 and SW-4 (Figures 2, 3, 4, 5, and 6). The seasonally inundated creek was historically interpreted to be a localized zone of potential groundwater discharge present during periods when the shallow groundwater table is elevated, primarily in the spring and fall.

A dormant aggregate resource area, locally identified as Burke's Pit, is located to the southwest of the site in the vicinity of monitoring wells OB-11R and OB-12, and adjacent to Norway Lake Road (Figure 3).

2.2 Hydrogeological and Geological Conditions

In the southern and western portions of the site, overburden geology is characterized by a thin layer of fine sand to silty sand, ranging from 0.3 metres (m) to 4.2 m, overlying fractured granite and gneissic marble. A layer of peat was determined to be present over the sandy overburden layer in the vicinity of monitoring well OB-2 (Golder, 2007).

To the north of the site, in the vicinity of the seasonally inundated creek, overburden geology is characterized by silty to coarse sand from surface to a depth of 3.7 m, underlain by a bedrock unit characterized by gneiss, marble, and fractured granite (Golder, 2007).

On the southwest side of Norway Lake Road in Burke's Pit (Figure 3), overburden geology is characterized by fine to coarse sand with trace gravel and/or cobbles, with auger refusal encountered at depths of 2.15 m to 3.65 m bgs (Golder, 2007). Based on observations during the installation of replacement monitoring well OB-11R in October 2018 (Figure 4), bedrock was interpreted at a depth of 4.22 m bgs, and overburden was observed to be generally fine to coarse-grained sand with gravel (Appendix C).

Historically, overburden and bedrock groundwater was interpreted to flow predominantly towards the east, with a localized component of radial flow away from the waste mound. Prior to the 2007 groundwater monitoring program, groundwater in the overburden aquifer in the vicinity of Burke's Pit (southwest of the waste mound) was reported to flow to the east and west (Golder, 2007). For further discussion on current groundwater flow directions, see Section 4.1.1 of this report.

Further to the MECP TSS groundwater review comments dated October 4, 2007 (Greenview, 2008), all available borehole logs for monitoring wells at the Norway Lake site are included in Appendix C. The available borehole logs include details regarding well construction for the corresponding monitoring wells.

In accordance with the MECP TSS Addendum (Greenview, 2012), hydraulic conductivity in the overburden was estimated in 2012 in the range of 0.050 to 0.086 cm/second, which is noted to be within the typical hydraulic conductivity range for well sorted sands and glacial outwash (0.1 to 0.001 cm/second, Fetter, 2001).

2.3 Land Use and Zoning

The zoning designation for the Norway Lake site is "DM", Disposal Industrial, and "DM-E1" Disposal Industrial

Exception 1, for the land area east of the waste mound used for CAZ purposes. Adjacent land use is designated "RU" Rural around the licensed site area, including a dormant mineral aggregate resource area (Burke's Pit) directly southwest of the landfill on the southwest side of Norway Lake Road (Figure 3).

2.4 Operational Setting

The Norway Lake site currently consists of an AWDA and transfer station of 1.37 ha within a total licensed site area of approximately 18.47 ha (Figures 2 and 3), as registered on the ECA (Appendix A).

The site currently operates as a municipal waste and recycling transfer station and has been closed to landfilling operations since 2002. As part of waste transfer operations at the site, the Township maintains a waste and recycling depot (Figure 3). Municipal waste and Blue Box recycling received at the site is transferred to GFL in Moose Creek, Ontario for disposal, processing, and market.

In accordance with amendments to the site's ECA (Appendix A), the Norway Lake transfer station was upgraded as part of the Township's long-term waste management plan. The upgraded transfer station was opened to the public on November 21, 2009.

The Norway Lake site is currently approved in accordance with Amended ECA A411702 (Appendix A) to accept up to 200 cubic metres (m^3) of solid non-hazardous waste and recyclables per day, and the maximum amount of non-hazardous solid waste and recyclable materials to be stored or be present at the site at any given time cannot exceed 910 m^3.

3.0 2022 Environmental Monitoring Program

The following sections present a methodology of the environmental monitoring program conducted at the Norway Lake site in 2022.

3.1 Groundwater Monitoring

Groundwater monitoring and sampling activities were conducted by Greenview on May 05, 2022, and August 17, 2022, from the network of groundwater monitoring wells as part of the 2022 environmental monitoring program at the site (Table 1). The UTM coordinates of the groundwater monitoring wells were confirmed or measured by Greenview personnel during site visits in 2022 using a handheld geographic positioning system (GPS) instrument with an anticipated accuracy of within +/- 5 m (Table 2). During the 2022 spring and summer sampling events, groundwater elevations were measured at each monitoring well using an electronic water level tape prior to sampling. Based on the groundwater elevation a well purge volume equivalent to approximately three (3) borehole volumes was calculated in-situ using a standard conversion factor relevant to the respective well diameter.

Groundwater samples were collected from each monitoring well using dedicated polyethylene tubing and inertial lift foot-valves. Samples were collected into appropriate sample bottles as provided by an accredited laboratory and the designated sample for metal parameters was field-filtered using a dedicated high capacity 45-micron filter to reduce the potential for turbidity induced bias in the analytical results for the metal parameters.

As part of the 2022 monitoring program, a sample for the analysis of volatile organic compounds (VOC) was collected from monitoring well BR-1 during the summer sampling event.

During the spring 2022 sampling event, monitoring well OB-5 and BR-5 were observed to be dry and no groundwater elevation measurements were collected (Appendix D).

Piezometers G-1 and G-5 were observed to be damaged during the spring and summer 2022 sampling events and groundwater elevations were not obtained. During the summer 2022 sampling event, piezometer G-3 was observed to be dry (Appendix D).

Duplicate groundwater samples were collected for Quality Assurance and Quality Control (QA/QC) purposes from the routine and surveillance parameter suites (Table 1) as part of the 2022 environmental monitoring program. During the spring and summer sampling events, QA/QC samples were collected from monitoring well OB-3 for the routine parameter suite. During the spring sampling event, QA/QC samples were collected from OB-12 for the surveillance parameter suite. During the summer sampling event, QA/QC samples were collected from BR2 for the surveillance parameter suite. (Appendix D).

All samples were submitted to an accredited analytical laboratory to be analyzed for the parameter suites listed in Table 1.

Field measurements of pH, conductivity, temperature, and dissolved oxygen (DO) were recorded at each respective groundwater well immediately following the collection of the groundwater samples. Field sampling records completed during the 2022 monitoring program are included in Appendix D. The groundwater samples were recorded on a laboratory Chain of Custody Form and placed in coolers packed with contained ice for preservation during transport to the analytical laboratory.

The results of the 2022 groundwater monitoring program are presented in Section 4.1 of this report.

3.2 Surface Water Monitoring

Surface water monitoring at the Norway Lake Waste Disposal Site have a biennial frequency, with the modified frequency starting in 2019.

Surface water monitoring and sampling activities in 2022 were not conducted by Greenview. The next sampling

event for surface water monitoring (spring and fall) is scheduled for 2023. Details on the surface water monitoring program are included on Table 1 and historical results are included in Table 7.

In 2012, the environmental monitoring program was amended in response to MECP TSS surface water review comments dated March 5, 2012 (Greenview, 2013) to remove surface water monitoring locations SW-2 and SW-3 as they had historically been observed to be shallow, stagnant pools of water that did not exist on a defined surface water channel and were difficult to sample due to low water conditions. The changes made to the environmental monitoring program were applied as of the 2013 environmental monitoring program at the Norway Lake site (Greenview, 2014).

3.3 Analytical Laboratory Accreditation

Collected groundwater and surface water samples were submitted for analysis to the Caduceon Environmental Laboratories (Caduceon), located in Kingston, 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 MECP to perform analysis on drinking water in Ontario in accordance with the Safe Drinking Water Act.

3.4 Landfill Gas Monitoring

Landfill gas monitoring is not part of the current environmental monitoring program for the Norway Lake site. The waste mound at the Norway Lake site is covered with porous soil materials, allowing natural gas flux to the atmosphere. Overburden geology at and adjacent to the site is characterized by shallow, sandy materials, overlying a dense bedrock unit. 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.

3.5 Operational Monitoring

Operational monitoring at the Norway Lake site is minimal since the site operates as a municipal solid waste and recycling transfer station only, with received municipal waste and Blue Box recycling transported off-site to GFL in Moose Creek, Ontario for disposal and processing. A topographic survey of the waste mound and transfer station at the Norway Lake site was conducted on August 12, 2021, as part of the work required for the Revised DOP (Greenview, 2022a). Topographic surfaces for the site have been updated on all figures related to this 2022 Annual Report, accordingly.

Daily waste records at the Norway Lake site are completed as part of regular operations at the site to monitor transfer station operations and vehicular traffic. The Township submits annual reports in accordance with the Municipal Datacall, inclusive of the Norway Lake site, to the Resource Productivity and Recovery Authority (RPRA). The results of the operational monitoring are presented in Section 4.3 of this report.

4.0 Environmental Monitoring Results

The following sections present a summary of the environmental monitoring results obtained during the Norway Lake site 2022 environmental monitoring program.

4.1 Groundwater Quality Assessment

The results of the 2022 groundwater monitoring program conducted at the site are presented as follows.

4.1.1 Groundwater Configuration

The interpreted groundwater configuration at the site in 2022 was relatively consistent with historical interpretations in the overburden and bedrock aquifers (Greenview, 2022). Groundwater elevation data obtained during the 2022 groundwater monitoring program at the site are provided in Table 3. Environmental monitoring location plans for the overburden and bedrock aquifers at the Norway Lake site are included in Figures 3, 4, 5, and 6 of this report.

Average horizontal gradients and the associated predominant directions of groundwater flow in the overburden aquifer at the Norway Lake site in spring and summer 2022 were interpreted as follows:

Aquifer	Sampling Event	Location	Horizontal Gradient	Predominant Direction
Overburden	Spring 2022	Southwest of Waste Mound	0.014	South
		Northeast of Waste Mound	0.047	Northeast
		Southeast of Waste Mound	0.011	East
	Summer 2022	Southwest of Waste Mound	0.009	South
		Northeast of Waste Mound	0.052	Northeast
		Southeast of Waste Mound	0.019	East

Average horizontal gradients and the associated predominant directions of groundwater flow in the bedrock aquifer at the Norway Lake site in spring and summer 2022 were interpreted as follows:

Aquifer	Sampling Event	Location	Horizontal Gradient	Predominant Direction
Bedrock	Spring 2022	Vicinity of Waste Mound	0.020	East
		East of Waste Mound	0.092	Northeast
	Summer 2022	Vicinity of Waste Mound	0.012	East
		East of Waste Mound	0.084	Northeast

Using groundwater elevations measured in 2022 (Table 3), vertical hydraulic gradients were calculated at the following pair of shallow and deep monitoring wells for the spring and summer groundwater elevation monitoring events. The vertical gradients calculated in 2022 were as follows:

Monitoring Wells	Vertical Gradient (Spring 2022)	Vertical Gradient (Summer 2022)
BR-1 and OB-3	0.274	0.173

Monitoring well OB-7 was observed to be significantly damaged during the spring 2015 sampling event, due to an impact from a fallen tree. Since the well could not be accessed via equipment, OB-7 was removed by hand. OB-7 was not historically sampled as part of the groundwater monitoring events at the Norway Lake site

(Greenview, 2016).

Further to the MECP TSS hydrogeological review comments, dated October 4, 2012 (Greenview, 2013), a December 3, 2012, site meeting was arranged which included Township representatives, MECP personnel, and Greenview personnel. The MECP TSS issued an Addendum, dated December 11, 2012, in which the MECP TSS agreed that groundwater quality at monitoring well OB-11 was impacted by road salt utilized by the Township for winter road maintenance, and retracted the statement regarding non-compliance of the site with MECP Guideline B-7 (MECP, 1994a). The MECP TSS agreed that historical overburden groundwater quality from monitoring well OB-12 (prior to August 2009) could be used for assessing compliance with the RUC and conformance with MECP Guideline B-7 (MECP, 1994a). In addition, the MECP reviewer was willing to consider utilization of scientifically defensible methods to determine hydraulic conductivity at the site, rather than requiring the completion of slug tests, as initially directed in the October 4, 2012, review comments (Greenview 2013).

As noted previously in this report, monitoring well OB-11 was decommissioned and replaced with OB-11R on October 29, 2018 (Appendix C).

Per the MECP TSS Addendum (Greenview, 2013), a discussion on hydraulic conductivity within the overburden at the site is included in Section 2.2 of this Report.

4.1.2 Groundwater Quality

The results of the 2022 groundwater monitoring program are presented in Tables 4, 5, 6, and 7 of this report and the accredited laboratory Certificates of Analysis are attached in Appendix E. Analytical data obtained from respective groundwater wells were compared to the Ontario Drinking Water Standards (ODWS; MECP, 2006), median background water quality at the site, and MECP Guideline B-7 (MECP, 1994b) and the RUC (MECP, 1994a). Trend analysis was completed using results from the previous five (5) years and only significant trends are discussed in this report.

The blind duplicate samples collected for routine monitoring at monitoring well OB-3 during the spring and summer 2022 sampling events were similar to the identified samples, indicating that the results of the 2022 routine groundwater monitoring program can be interpreted with confidence. Similarly, the blind duplicate samples collected for surveillance monitoring at monitoring well OB-12 during the spring and BR2 during the summer 2022 sampling events were similar to the identified samples, indicating that the results of the 2022 surveillance groundwater monitoring program can be interpreted with confidence.

Prior to August 2009, background groundwater quality in the overburden aquifer was assessed at monitoring well OB-12, which is located in Burke's Pit, approximately 80 m upgradient and west of the entrance gate to the Norway Lake site (Figures 3 and 5). Due to impacts related to road salt, the MECP TSS agreed that historical overburden groundwater quality prior to fall 2009 from OB-12 could be used for assessing compliance with the Reasonable Use Concept (RUC) and conformance with MECP Guideline B-7 (Greenview, 2013). In 2022, many parameter concentrations in the samples collected from background overburden well OB-12 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at background overburden monitoring location OB-12 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Summer 2022	Increasing	Decreasing
OB-12 (background)	• Hardness • Total Dissolved Solids (TDS)	• Hardness • Manganese • TDS	• Sodium • TDS	• Aluminum • Chemical Oxygen Demand (COD) • Dissolved Organic Carbon (DOC) • Phosphorus

Groundwater quality at OB-12 in 2022 was interpreted to be impacted by road salt from winter road maintenance activities at the nearby Norway Lake Road and the transfer station of the Norway Lake site (Table 4). Further to MECP TSS groundwater review comments, dated December 11, 2012, for the 2011 Annual Report (Greenview, 2012), the MECP confirmed that OB-12 was being impacted by road salt and with the absence of any suitable locations for a replacement background well, the MECP TSS agreed that historical (stable; pre-fall 2009) groundwater quality data from OB-12 should be used for the purpose of establishing median background groundwater quality and the RUC.

Monitoring well OB-3 is installed in the overburden unit at the Norway Lake site, and is located approximately 80 m downgradient and south of the southeastern corner of the former disposal area (Figures 3 and 5). Groundwater at OB-3 is considered most representative of leachate quality in the overburden unit, given the proximity of the well to the existing limit of waste and the interpreted groundwater flow direction. In 2022, most parameter concentrations in samples collected from overburden leachate well OB-3 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at overburden leachate groundwater monitoring location OB-3 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Summer 2022	Increasing	Decreasing
OB-3	• Alkalinity • Chloride • Hardness • Manganese • TDS	• Alkalinity • Chloride • Hardness • Manganese • TDS	• Chloride	• Alkalinity • Boron • DOC

Overburden groundwater at OB-3 was interpreted to be impacted by landfill-related factors and winter road maintenance operations at the transfer station of the Norway Lake site, which was expected given its proximity to the current existing limit of waste at the site and the interpreted groundwater flow direction (Figures 3 and 5).

Overburden monitoring well OB-11R is located on the southwest side of the Norway Lake Road in Burke's Pit (Figure 3). Generally consistent with historical reports (Greenview, 2022), in spring and summer 2022 OB-11R was interpreted to be downgradient and/or cross-gradient of background monitor OB-12 (Figures 3 and 5). During the spring 2022 sampling event, the area in the vicinity of OB-11R was observed to be significantly flooded. The source of the standing water was interpreted to be related to snowmelt from the vicinity of Norway Lake Road flowing towards the topographic low area around OB-11R. The following photographs are indicative of the location of monitoring well OB-11R and the annual spring flooding adjacent to the monitoring well:

Photograph 1: Typical Annual Spring Flooding Adjacent to OB-11R (Spring 2021)

In 2022, many parameter concentrations in samples collected from OB-11R in spring and summer were above

the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at overburden groundwater monitoring location OB-11R were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Summer 2022	Increasing	Decreasing
OB-11R	• Aluminum • Chloride • Hardness • Sodium • TDS	• Alkalinity • Chloride • Hardness • Sodium • TDS	• Barium • Calcium • Chloride • Hardness • Potassium • Sodium • TDS	• DOC • Phosphorus

Based on the directions of groundwater flow in the vicinity of overburden monitoring well OB-11R (Figures 3 and 5), it is unlikely that groundwater was impacted from landfill-related factors of the Norway Lake site. However, results in 2022 suggest continued impacts related to winter road maintenance activities of Norway Lake Road and the transfer station (Table 4, Figures 3 and 5), as supported by the flooding adjacent to OB-11R in the spring.

Overburden groundwater quality northeast of the site is assessed at monitoring well OB-8, located approximately 220 m northeast of the eastern corner of the former disposal area (Figures 3 and 5). In 2022, many parameter concentrations in samples collected from OB-8 were above the median background concentrations during the spring and summer sampling events (Table 4, Appendix D). Non-conformances of ODWS and significant groundwater trends at overburden groundwater monitoring location OB-8 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Summer 2022	Increasing	Decreasing
OB-8	• Hardness	• Hardness • TDS	• Boron • Chloride • Iron • Sodium	• DOC

Impacts resultant of both naturally-occurring conditions and landfill-related factors at OB-8 were interpreted to be occurring downgradient of the site in 2022. OB-8 has historically been observed to be slow to recharge during well purging activities, related to low groundwater conditions, which may be impacting groundwater quality results at the sampling location. The noted concentrations in groundwater results from OB-8 were not interpreted to represent significant landfill-related impacts.

Background groundwater quality in the bedrock aquifer at the Norway Lake site has historically been assessed at bedrock monitoring well BR-2, located approximately 175 m southeast of the AWDA (Figures 4 and 6). In 2022, many parameter concentrations in samples collected from background bedrock well BR-2 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at background bedrock groundwater monitoring location BR-2 were as follows (Table 5):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Summer 2022	Increasing	Decreasing
BR-2 (background)	• Hardness • Iron • Manganese	• Hardness • Iron • Manganese	• Barium • Calcium • Chloride	• DOC

		• TDS	• Hardness • Magnesium • Strontium • TDS	

In 2022, groundwater quality at BR-2 was interpreted to continue to be impacted by winter road maintenance activities along Norway Lake Road (Table 5; Figures 4 and 6). Further to MECP TSS review comments of the 2011 Annual Report (Greenview, 2012), dated December 11, 2012, the MECP confirmed that BR-2 was being impacted by road salt and with the absence of any suitable locations for a replacement background well, the MECP TSS agreed that historical groundwater quality data from prior to fall 2009 at background bedrock well BR-2 should be used for the purpose of calculating median background groundwater quality and the RUC (Greenview 2013).

Bedrock monitoring well BR-10 is located on the southern boundary of the existing limit of waste at the site (Figures 4 and 6), and is installed in an area of refuse as shown on the borehole log in Appendix C (SGS, 2005). Similarly, bedrock monitoring well BR-1 is located approximately 100 m southeast of the former disposal area at the site (Figures 4 and 6). Based on the proximity of these wells to the waste mound, and the documented historical groundwater quality at these locations, these wells are considered to be most representative of leachate characterization in the bedrock aquifer at the site (Table 5). However, further to MECP TSS review comments dated December 11, 2012, BR-10 was noted to be particularly susceptible to road salt impacts from nearby Norway Lake Road and the transfer station, and as such, was not representative of source leachate impacts to the bedrock aquifer at the site. It was the recommendation of the MECP TSS that BR-1 be used in future monitoring programs as most representative of leachate quality at the Norway Lake site (Greenview, 2013). In 2022, most parameter concentrations in samples collected from bedrock wells BR-10 and BR-1 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at bedrock groundwater monitoring locations BR-10 and BR-1 were as follows (Table 5):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Summer 2022	Increasing	Decreasing
BR-10	• Chloride • Hardness • Iron • Manganese • Sodium • TDS	• Alkalinity • Barium • Chloride • Hardness • Iron • Manganese • Sodium • TDS	• Chloride • Sodium • TDS	• COD • DOC • Phosphorus
BR-1	• Alkalinity • Chloride • Hardness • Iron • Manganese • TDS	• Alkalinity • DOC • Hardness • Iron • Manganese • pH • TDS	• Chloride	• Alkalinity • Boron • COD • DOC

Groundwater quality results at BR-10 and BR-1 were interpreted to continue to be representative of leachate characterization at the site; however, BR-10 was interpreted to be significantly more impacted by road salt from winter road maintenance of the nearby Norway Lake Road and the waste transfer station at the Norway Lake site than leachate well BR-1. Therefore, BR-1 was considered most representative of leachate characterization at the site. BR-1 was also interpreted to be partially impacted by winter road maintenance, though to a lesser extent than BR-10. BR-1 and BR-10 were interpreted to exhibit impacts resultant of landfill-related factors in

2022.

As part of the summer 2022 sampling event, samples collected at bedrock monitoring well BR-1 were analyzed for VOC, and no non-conformances of ODWS were noted in results (Table 7).

Bedrock monitoring wells BR-8 and BR-9 are located approximately 300 m and 400 m downgradient of the site, respectively. BR-8 and BH-9 are located upgradient of the low-lying area east of the Norway Lake waste mound and were interpreted to reflect groundwater quality in the northeastern most extent of the CAZ (Figures 4 and 6). BR-9 is located immediately adjacent to a low-lying, depressional area, and therefore groundwater results were compared to both the ODWS and PWQO (Tables 5 and 6). In 2022, many parameter concentrations in samples collected from BR-8 and BR-9 were above the median background concentrations (Table 5). Non-conformances of ODWS and significant groundwater trends at monitoring locations BR-8 and BR-9 were as follows (Table 5):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Summer 2022	Increasing	Decreasing
BR-8	• Hardness	• Hardness	• Chloride • Hardness • TDS	• DOC
BR-9	• Hardness	• Hardness	• Sulphate • TDS	• Phosphorus

Minor non-conformances of the ODWS limits for manganese concentrations at the Norway Lake Waste Disposal Site were not interpreted to represent significant landfill-related impacts, as similar high concentrations of manganese (and iron) have been historically documented in background groundwater at the site (Table 5). Similarly, the ODWS non-conformances of hardness in spring and summer 2022 at BR-8 and BR-9 were generally consistent with historical concentrations at background monitor BR-2 and were interpreted to be resultant of local bedrock geology (Table 5). High concentrations of DOC have also historically been documented in the background at the site, and are interpreted generally to natural conditions in the low-lying areas in the vicinity of the Norway Lake site (Table 6; Figures 4 and 6). The high concentration of aluminum historically documented at monitoring well BR-9 was interpreted to be related to naturally-occurring conditions in the vicinity of the site, and not to landfill-related factors. Monitoring wells BR-8 and BR-9 were not interpreted to be significantly impacted from landfill-related factors in 2022.

Given the close proximity of BR-9 to the low-lying depressional area northeast of the site, groundwater results from BR-9 were also compared with PWQO (MECP, 1994b) and Table B of the TGD (MECP, 2010). Non-conformances of PWQO and Table B of the TGD for monitoring well BR-9 were as follows, and non-conformances documented in background bedrock monitoring well BR-2 in 2022 were included for comparison purposes (Table 6):

Monitoring Well	PWQO Non-Conformance		Table B of TGD Non-Conformance	
	Spring 2022	Summer 2022	Spring 2022	Summer 2022
BR-2 (background)	• Iron	• Iron • Phosphorus	• None	• Chloride
BR-9	• Chromium • Phosphorus	• Phosphorus	• None	• None

Phosphorus concentrations at BR-9 in 2022 were interpreted to be generally consistent with historical concentrations at background monitor BR-2 and were not interpreted to represent significant landfill-related impacts at the Norway Lake Waste Disposal Site (Table 6). Non-conformances of the TGD in Table B for concentrations of chloride were documented to exceed limits at background monitoring well BR-2 in summer 2022. (Table 6).

4.1.3 Reasonable Use Concept Assessment

In an effort to assess potential landfill-related impacts migrating beyond the site boundary, the RUC was used as an assessment tool to monitor downgradient impacts from the site. Downgradient impacts are typically assessed using the MECP RUC at monitoring wells located at, or in close proximity to, the downgradient property boundary. The downgradient monitoring wells, located near the property boundary, were compared to trigger concentrations for specific parameters as determined by groundwater quality at the site using the RUC for groundwater (MECP Procedure B-7-1, 1994a).

The MECP Procedure B-7-1: Determination of Contaminant Limits and Attenuation Zones iterates that in accordance with the appropriate criteria for particular uses, a change in groundwater quality on an adjacent property as a result of landfilling activities will only be accepted by the MECP as follows:

> *The 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. Background is considered to be the quality of the groundwater prior to any man-made contamination.*
>
> *MECP Procedure B-7-1*

The RUC assessment was conducted using the concepts and procedures outlined in MECP Procedure B-7-1 (MECP, 1994a), specifically using the median value of individual background parameter concentrations from monitoring wells BR-2 (bedrock aquifer) and OB-12 (overburden aquifer) to characterize natural groundwater quality at the site. Further to MECP TSS Addendum, dated December 11, 2012, the MECP TSS confirmed that monitoring wells BR-2 and OB-12 were being impacted by road salt and with the absence of any suitable locations for replacement background wells, the MECP TSS agreed that historical groundwater quality data prior to fall 2009 from background wells BR-2 and OB-12 should be used for the purpose of calculating median background concentrations and the RUC.

For assessing site compliance with the RUC and MECP Guideline B-7, groundwater monitoring wells OB-8, BR-8 and BR-9 were used for monitoring downgradient impacts at the property boundary northeast of the waste mound. OB-11R, located in the vicinity of Burke's Pit and southwest of the site, was used for monitoring potential downgradient impacts near the property boundary southwest of the waste mound along Norway Lake Road. BR-2 was used to assess potential impacts at the southeast property boundary. OB-12 and BR-10 were not interpreted to be downgradient of the Norway Lake site in 2022, based on the interpreted ground water flow directions in 2022 (Figures 3, 4, 5, and 6).

All parameters tested as part of the established annual monitoring program were used as groundwater triggers, and a respective RUC criteria value was calculated for each parameter at the Norway Lake site. The trigger concentrations used to assess RUC compliance for the groundwater regime at the site were based on the MECP RUC for each of the respective parameters.

RUC values for overburden and bedrock aquifers were generated based on historical background data for individual parameters at the Norway Lake site up to and including August 2009. If RUC non-conformances are noted, then action will be undertaken as appropriate and necessary in accordance with a defined groundwater contingency plan for the site. In cases where a groundwater contingency plan is not defined, a meeting with representatives of the local MECP District office should be held to develop an appropriate contingency plan, as necessary and appropriate for the particular site.

Bedrock monitoring wells BR-8 and BR-9 are located approximately 300 m and 400 m downgradient of the site, respectively, and were used to assess compliance with the RUC near the northeastern property boundary in 2022 (Figures 4 and 6). Monitoring well OB-8 is located approximately 220 m northeast of the limit of waste, and was also used to assess compliance with the RUC near the northeastern property boundary (Figures 3 and 5). Non-conformances of RUC in spring and summer 2022 from groundwater results at downgradient wells BR-8, BR-9, and OB-8 are included in the table below (Table 5):

Monitoring Well	RUC Non-Conformance	
	Spring 2022	Summer 2022
BR-8	• DOC • Hardness	• Hardness • TDS
BR-9	• Hardness	• Hardness
OB-8	• DOC • Hardness • TDS	• Chloride • DOC • Hardness • TDS

Given that OB-8, BR-8, and BR-9 are approximately 245 m, 190 m, and 10 m upgradient from the downgradient CAZ boundary, respectively (Figures 3, 4, 5, and 6), BR-9 was interpreted to be the most representative of downgradient groundwater quality near the northeastern CAZ boundary. The significant distances from monitoring wells OB-8 and BR-8 to the downgradient northeastern CAZ boundary were interpreted to be sufficient for the attenuation of any landfill-related factors in groundwater. DOC, hardness, and TDS concentrations have consistently been noted to be high in background groundwater monitoring locations (BR-2 and OB-12) prior to 2009, and were generally attributed to naturally-occurring conditions in the vicinity of the site and in the low-lying depressional area northeast of the AWDA (Tables 4 and 5). Typically, low groundwater conditions at OB-8 and general difficulty in obtaining a full purge of groundwater at BR-8 have historically been documented for summer sampling events for both wells; and the identified RUC non-conformances were interpreted to be related to these generally dry, summer conditions. Ultimately, high DOC concentrations in the vicinity of the downgradient northeastern property boundary (OB-8 and BR-8) and periodically at BR-9 were interpreted to the low-lying conditions near the well. High hardness concentrations in 2022 results at BR-9 was interpreted to bedrock geology at the site (marble). The high concentration of aluminum in historical results at BR-9 (Table 5) was interpreted to naturally-occurring conditions and not to landfill-related factors, and was mostly likely related to low groundwater conditions. Based on the above, the Norway Lake site was interpreted to meet the intent of the RUC and conformance with Guideline B-7 in 2022 at the northeastern CAZ/property boundary.

Background monitoring well BR-2 is located southeast and generally upgradient and/or cross-gradient of the waste mound and was used to assess compliance with the RUC at the southeastern property boundary in 2022 (Figures 4 and 6). Non-conformances of RUC in spring and summer 2022 from groundwater results at background monitoring well BR-2 are included in the table below (Table 5):

Monitoring Well	RUC Non-Conformance	
	Spring 2022	Summer 2022
BR-2 (background)	• Hardness • Iron • Manganese • TDS	• Chloride • Hardness • Iron • Manganese • TDS

As was noted in MECP TSS hydrogeological review comments, dated December 11, 2012 (Greenview, 2013), BR-2 was interpreted to be impacted by road salt from winter maintenance activities on the adjacent Norway Lake Road and from the transfer station at the Norway Lake site (Figures 4 and 6). Furthermore, naturally-occurring conditions in the vicinity of BR-2 (i.e. local geology, low-lying area characteristics, etc.) and road salt impacting the solubility of other constituents, were interpreted to be influencing groundwater quality results at BR-2 (Table 5). High concentrations of aluminum, DOC, hardness, iron, manganese, and TDS have historically been documented at BR-2 in results prior to 2009 (Greenview, 2014). Based on the interpreted impacts from road salt in the vicinity of BR-2, naturally-occurring conditions (Table 5), and documented low groundwater conditions in summer (Appendix D), background monitoring well BR-2 is not interpreted to be significantly

impacted by landfill-related factors and groundwater at the southern property boundary is interpreted to be in compliance with RUC and conformance with MECP Guideline B-7 in 2022. Additionally, based on interpreted groundwater flow directions in 2022, monitoring well BR-2 was not interpreted to be located downgradient of the former disposal area of the Norway Lake site in 2022 (Figures 4 and 6).

Monitoring wells OB-11R and OB-12 are located in the vicinity of Burke's Pit, southwest of the waste mound and were used to assess compliance with the RUC adjacent to the southwestern property boundary along Norway Lake Road (Figures 3 and 5). OB-12 is located adjacent to the southwestern property boundary, and was historically used to determine background overburden water quality at the site. Non-conformances of RUC in spring and summer 2022 from groundwater results at OB-12 and OB-11R are included in the table below (Table 4):

Monitoring Well	RUC Non-Conformance	
	Spring 2022	Summer 2022
OB-12 (background)	• Chloride • Hardness • TDS	• Chloride • Hardness • Manganese • TDS
OB-11R	• Aluminum • Barium • Chloride • Hardness • Iron • Sodium • TDS	• Alkalinity • Barium • Chloride • Hardness • Sodium • TDS

As OB-11R and OB-12 have historically been interpreted to be located upgradient and/or cross-gradient of the waste mound (Figures 3 and 5), the noted RUC non-conformances were not interpreted to be resultant of landfill-related factors; however, as noted in MECP TSS hydrogeological review comments, dated December 11, 2012 (Greenview, 2013), it was interpreted that OB-11R and OB-12 were impacted by road salt from winter maintenance activities on the adjacent Norway Lake Road and the transfer station at the Norway Lake site. RUC non-conformances for alkalinity, aluminum, barium, chloride, hardness, manganese, sodium, and TDS were interpreted to be directly attributable to winter road maintenance activities and the resultant solubility of related parameters. Concentrations of iron, hardness and manganese were historically elevated in groundwater quality at background wells BR-2 and OB-12 (Greenview, 2013) and are likely partially resultant of naturally-occurring conditions at the site (Tables 4 and 5). The flooding/standing water observed in spring 2022 in the vicinity of OB-11R (as shown in Section 4.1.2) was interpreted to be a significant factor in documented groundwater quality at OB-11R in 2022 (Table 4). Based on the above, the Norway Lake site was interpreted to meet the intent of the RUC and conformance with Guideline B-7 in 2022 in the vicinity of the southwestern CAZ/property boundary.

In 2022, monitoring well BR-10 was interpreted to be located upgradient of the direction of bedrock groundwater flow at the Norway Lake site (Figures 4 and 6), and therefore was not used to assess the site compliance with the RUC and MECP Guideline B-7. The location of BR-10 relative to the direction of bedrock groundwater flow should be re-assessed for each future Annual Report to determine its applicability related to the RUC and Guideline B-7.

In summary, the Norway Lake site was interpreted to meet the intent of the RUC and conformance with MECP Guideline B-7 in 2022 for a closed landfill at the downgradient property boundaries.

4.2 Surface Water Quality Assessment

2022 surface water sampling events were not conducted as no samples were obtained due to insufficient water for sampling purposes (Table 7):

Spring 2022				
Sample Location	**Depth (m)**	**Width (m)**	**Velocity (m/s)**	**Discharge (m^3/s)**
SW-1	No sample			
SW-4 (background)	No sample			

Fall 2022				
Sample Location	**Depth (m)**	**Width (m)**	**Velocity (m/s)**	**Discharge (m^3/s)**
SW-1	No sample			
SW-4 (background)	No sample			

Further to MECP TSS surface water review comments (March 5, 2012), surface water sampling was discontinued at locations SW-2 and SW-3 in 2012 (Greenview, 2013).

Historically, background surface water quality at the Norway Lake site was assessed using surface water location SW-4, which is located approximately 420 m northeast of the former disposal area on a seasonally-inundated creek flowing in a southeastern direction (Figure 3). The following photographs are representative of background sampling location SW-4.

Photograph 2: Surface Water Location SW-4 (Spring 2021 [left] and Fall 2021 [right])

In 2022, background location SW-4 was not sampled as per Table 7. (Appendix D). Non-conformances of PWQO, and significant trends, at background surface water sampling location SW-4 were as follows (Table 8):

Monitoring Well	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
SW-4 (background)	• No sample (insufficient water for sampling purposes)	• No sample (insufficient water for sampling purposes)	• Insufficient recent data for trend analysis	• Insufficient recent data for trend analysis

In 2022, as no samples were obtained in spring or fall, no non-conformances of the parameter concentration limits per Table B of the TGD were documented for background location SW-4.

Surface water location SW-1 was added to the surface water monitoring program in 2008 in order to better characterize surface water quality downstream of background location SW-4. SW-1 is located approximately 80 m downstream of surface water location SW-4 (Figure 4), and has consistently been observed to be dry for all fall sampling events since 2008 (Appendix D; Table 8). The following photographs are representative of downstream sampling location SW-1.

Photograph 3: Surface Water Location SW-1 (Spring 2021 [left] and Fall 2021 [right])

In 2022, SW-1 was not sampled as per Table 7 due to insufficient water for sampling purposes. (Appendix D). Historically, few parameter concentrations at SW-1 were above the 75th percentile background surface water quality at the site (Table 8). Non-conformances of PWQO, and significant trends, at surface water sampling location SW-1 were as follows (Table 8):

Monitoring Well	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
SW-1	• No sample (insufficient water for sampling purposes)	• No sample (insufficient water for sampling purposes)	• Alkalinity • Boron • Calcium • Conductivity • Copper • Hardness • Magnesium • Silicon • Sodium • Strontium • TDS • Zinc	• Dissolved oxygen

In spring 2021, the concentration of nitrite was documented to be in non-conformances with the concentration

limits per Table B of the TGD at downstream location SW-1. The PWQO non-conformance for the concentration of aluminum was not interpreted to be indicative of significant landfill-related impacts at the Norway Lake site and was attributed to naturally-occurring conditions in the vicinity of the site (Table 8).

4.3 Operations Summary

A summary of 2022 waste management operations at the Norway Lake site is presented below.

4.3.1 Site Operations

The site operates as a municipal solid waste and recycling transfer station, servicing residents and IC&I generators of the Township of Greater Madawaska. The site has been closed to landfilling operations since 2002. Final closure construction activities were completed for the waste mound area in 2007.

In accordance with Condition 25 of the ECA, a sign is posted at the entrance to the site providing the ECA number (A411702, Appendix A), Township information, transfer station hours of operation, accepted waste types, emergency contact information, and a sign warning against dumping outside the site.

The hours of operation for the Norway Lake site effective May 21, 2016, were as follows:

Day of the Week	Hours of Operation
Wednesday	8:00 a.m. – 4:00 p.m.
Saturday	8:00 a.m. – 6:00 p.m.
Sunday (Thanksgiving to Victoria Day)	10:00 a.m. – 5:00 p.m.
Sunday (Victoria Day to Thanksgiving)	10:00 a.m. – 6:00 p.m.
Holiday Mondays (Victoria Day to Thanksgiving)	12:00 p.m. – 6:00 p.m.

As a result of the May 21st, 2022, storm, the Township of Greater Madawaska declared a State of Emergency as of 1:30pm May 22, 2022. The Township submitted a request to the MECP on May 24, 2022, for a temporary extension to site hours, as well as another privately owned site at 5911 Matawatchan Rd, due to the overwhelming amount of brush debris. MECP approval was provided in a letter dated May 26, 2022. On June 8, 2022, the Township submitted a further request to extent the privately owned site hours. MECP approval was provided via email on June 9, 2022. Refer to appendix B.

As per the Amended ECA dated April 9, 2013 (Appendix A), the Norway Lake site is approved for the acceptance and diversion of the following waste and recyclable materials:

Waste / Recyclable Material	Quantity (units)
Regular Municipal Waste (Residential & IC&I)	120 m^3
Organic Waste	20 m^3
Waste Electronic and Electrical Equipment (WEEE)	40 m^3
Blue Box Recyclables (mixed fibres / commingled containers / old corrugated cardboard)	240 m^3
Tires	100 m^3
Leaf and Yard Waste	200 m^3
C&D and Bulky Waste	105 m^3
Scrap Metal and White Goods	60 m^3
Refrigerants	25 m^3

The Norway Lake site is well screened with surrounding trees and thick vegetation, and a screening berm and fence exist between the site and the Norway Lake Road. Lockable gates control access to the site (Figure 3).

The access roads at the site entrance and within the Norway Lake site have sufficient width to allow for unimpeded winter travel and access for emergency and snow removal equipment. The site access road was observed to be in serviceable condition during the routine site inspections conducted by Greenview during various site visits in 2022.

The Norway Lake site was closed to landfilling operations in 2002, and final closure of the waste mound at the Norway Lake site was completed in 2007. Since 2002, the Norway Lake site has operated as a municipal solid waste and recycling transfer station only. Construction began in late 2008 on the upgrades to the waste and recycling transfer station at the Norway Lake site, and the upgraded transfer station was opened to the public on November 21, 2009.

Throughout 2021, the Township and Greenview worked together on a Revised Design and Operations Plan (DOP) for the Norway Lake Waste Disposal Site, in an effort to modify transfer station operations and general layout of the site. On January 04, 2022, a copy of the Revised DOP was provided to the MECP Ottawa District Office for preliminary review and as part of the Township's obligation to initiate a Pre-Submission Meeting with the MECP relative to the Revised DOP and planned ECA Application for 2022 (Appendix B). The Pre-Submission Meeting was held between representatives of the MECP, Greenview, and the Township on January 20, 2022 (Appendix B). Formal submission of the ECA Application package, including the Revised DOP, was submitted to the MECP on May 11, 2022, and remains under review by the MECP (5066-CEBKYF).

4.3.2 Waste Disposal / Transfer Summary

The Norway Lake site is currently closed to all landfilling operations; however, the site is presently operating as a municipal solid waste and recycling transfer station, with all residential and IC&I waste, and Blue Box recycling, transferred to GFL for disposal and processing.

Based on Township Greater Madawaska records, approximately 15,213 vehicles visited the Norway Lake site in 2022, and accepted approximately 26,583 bags of waste. Based on information supplied by the Township of Greater Madawaska, 438 tonnes of municipal waste were collected at the Norway Lake site in 2022 and transported for final disposal to the approved waste disposal facility of GFL in Moose Creek, Ontario. Additionally, approximately 858 cubic metres of leaf and yard waste and 4,368 cubic metres of construction, demolition, and bulky waste were accepted at the Norway Lake site in 2022.

Recycling tonnage records provided by the Township of Greater Madawaska indicated that 128 tonnes of Blue Box recyclables were collected from the Norway Lake Waste Disposal Site in 2022. Blue Box recyclable quantities contributing to this total included 62 tonnes of commingled containers, 39 tonnes of mixed fibres, and 27 tonnes of old corrugated cardboard. Approximately 5 tonnes of household organics were diverted at the Norway Lake site in 2022.

According to Township of Greater Madawaska records, 52 tonnes of scrap metal, 35 refrigerant units, 1,217 tires, and 9 tonnes of waste electronic and electrical equipment were diverted from the depots at the Norway Lake Waste Disposal Site, Mount St. Patrick Waste Disposal Site, and Griffith Waste Disposal Site.

Waste operations training for Township waste operation staff was conducted by JP2G Consultants on October 13, 2022. In 2013, the Township passed a new waste management by-law (By-law No. 09 – 2013), to establish, maintain and regulate a system for the disposal of municipal waste, recyclables, and other refuse (Greenview, 2014).

4.3.3 Site Inspections and Maintenance

Site inspections of the transfer station area, waste disposal area, and property at the Norway Lake site were conducted by Greenview May 05, 2022, and Aug 17, 2022, during the sampling events. The Township also conducted periodic investigations to verify the compliance status of the site.

The site inspections included a cursory investigation of housekeeping and litter control aspects, monitoring well maintenance requirements in accordance with Ontario Regulation 903 (Wells), and a general site overview for MECP regulatory compliance issues.

4.3.4 Complaints

There were no complaints received by the Township with respect to the waste management operations at the Norway Lake site in 2022.

4.3.5 Monitoring and Screening Checklist

In accordance with the MECP TGD (MECP, 2010), the Monitoring and Screening Checklist for the Norway Lake site is included as Appendix F of this report.

5.0 Conclusions and Recommendations

Based on the results of the 2022 environmental monitoring program completed for the Norway Lake Waste Disposal Site, the following conclusions are provided:

- Following the conclusion of the 2022 environmental monitoring program, and in accordance with Condition 7.2 (b) (iii) of the Amended ECA (A411702), the Norway Lake Waste Disposal Site is interpreted to be in compliance with all conditions of the ECA, and with the inspection and reporting requirements of the conditions therein.
- The interpreted groundwater configuration at the site in 2022 was relatively consistent with historical interpretations in the overburden and bedrock aquifers. The predominant groundwater flow directions in the overburden and bedrock aquifers were interpreted to be to the northeast.
- Average horizontal gradients in the overburden aquifer at the Norway Lake site were calculated for both the spring and summer sampling events. In spring 2022, average horizontal gradients northeast of the waste mound, southeast of the waste mound, and southwest of the waste mound were calculated to be 0.047 to the northeast, 0.014 to the east, and 0.011 to the south, respectively. In summer 2022, average horizontal gradients northeast of the waste mound, southeast of the waste mound, and southwest of the waste mound were calculated to be 0.052 to the northeast, 0.009 to the east, and 0.019 to the south, respectively.
- Average horizontal gradients in the bedrock aquifer at the Norway Lake site were calculated for both the spring and summer sampling events. In spring 2022, average horizontal gradients in the vicinity of the waste mound and east of the waste mound were calculated to be 0.020 to the east and 0.092 to the northeast, respectively. In summer 2022, average horizontal gradients in the vicinity of the waste mound and east of the waste mound were calculated to be 0.012 to the east and 0.084 to the northeast, respectively.
- Groundwater quality northeast, east, and immediately downgradient of the site was interpreted to be impacted from the Norway Lake Waste Disposal Site in both the overburden and bedrock aquifers.
- Based on the results of the 2022 RUC assessment at the site, the Norway Lake Waste Disposal Site was interpreted to meet the intent of MECP Guideline B-7 at the downgradient property boundaries to the north, northeast, south, southeast, and southwest of the site. Further sampling in future environmental monitoring programs is required in order to confirm continued site conformance with Guideline B-7.
- Groundwater in the overburden aquifer southwest of the site was interpreted to be impacted by road salt from winter road maintenance activities at the transfer station of the Norway Lake site and along Norway Lake Road.
- Surface water quality in the vicinity of the site is historically assessed at the seasonally inundated creek/low-lying depressional area located to the north and east of the closed waste mound, at surface water locations SW-1 and background surface water location SW-4. 2022 surface water sampling events were not conducted as per Table 7. Historically, the downstream sampling location SW-1 was not interpreted to be significantly impacted by landfill-related factors and surface water quality was interpreted to meet PWQO.
- Based on Township records, approximately 15,213 vehicles visited the Norway Lake site in 2022, and accepted approximately 26,583 bags of waste. Based on information supplied by the Township, 438 tonnes of municipal waste were collected at the Norway Lake site in 2022 and transported for final disposal to the approved waste disposal facility of GFL in Moose Creek, Ontario. Additionally, approximately 858 m^3 of leaf and yard waste and 4,368 m^3 of C&D and bulky waste were accepted at

the Norway Lake site in 2022.

- Recycling tonnage records provided by the Township of Greater Madawaska indicated that 128 tonnes of Blue Box recyclables were collected from the Norway Lake Waste Disposal Site in 2022. Blue Box recyclable quantities contributing to this total included 62 tonnes of commingled containers, 39 tonnes of mixed fibres, and 27 tonnes of old corrugated cardboard. Approximately 5 tonnes of household organics were diverted at the Norway Lake site in 2022.
- According to Township of Greater Madawaska records, 111 tonnes of scrap metal, 75 refrigerant units, 1,723 tires, and 17 tonnes of waste electronic and electrical equipment were diverted from the depots at the Norway Lake Waste Disposal Site, Mount St. Patrick Waste Disposal Site, and Griffith Waste Disposal Site.
- As a result of the May 21st, 2022, storm, the Township of Greater Madawaska declared a State of Emergency as of 1:30pm May 22, 2022. The township submitted a request to the MECP on May 24, 2022, for a temporary extension to site hours, as well as another privately owned site at 5911 Matawatchan Rd, due to the overwhelming amount of brush debris. MECP approval was provided in a letter dated May 26, 2022. On June 8, 2022, the Township submitted a further request to extent the privately owned site hours. MECP approval was provided via email on June 9, 2022.

The following recommendations are provided to the Township for consideration as part of the 2022 environmental work program for the Norway Lake Waste Disposal Site:

- The 2022 groundwater monitoring program for the site should continue to include sampling events in the spring and summer, for the parameter suite shown in Table 1, for the groundwater regime at the site.
- It is requested that consideration should be undertaken by the MECP to amend the schedule for groundwater sampling from spring and summer to spring and fall, consistent with the surface water monitoring program, in order to avoid low groundwater conditions in summer months.
- Consistent with the approval from the MECP TSS in 2019, the surface water monitoring program has been modified to a biennial frequency, with samples to be collected in spring and fall at monitors SW-1 and SW-4 (background). The next surface water sampling events are to be conducted in spring and fall 2023, with subsequent monitoring programs over the next ten (10) year period to be conducted in 2025, 2027, 2029, and 2031 (unless approval to cease the surface water monitoring program is received from the MECP). Collection of surface water samples during scheduled sample events should only be conducted if sufficient quantities of water are available at the sampling location to avoid potentially biased results.

6.0 Closing

Greenview has prepared the 2022 Annual Report in accordance with MECP guidelines and Condition 21 of the ECA (A411702) to document the results of the 2022 environmental monitoring program and to provide waste information for the Norway Lake Waste Disposal Site.

This report is governed by the attached statement of service conditions and limitations (Appendix G).

All respectfully submitted by,

Greenview Environmental Management Limited

Tyler H. Peters, P.Eng.
Project Director

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Tables

THE TOWNSHIP OF GREATER MADAWASKA

Table 1
2022 Groundwater and Surface Water Monitoring Program
Norway Lake Waste Disposal Site

Location		Frequency	Parameters		
Groundwater (Routine Monitors)					
OB-3	OB-8	Twice (2x)	Alkalinity	Boron	Chloride
BR-8			DOC	Hardness	Iron
			Manganese	Sodium	TDS
1x QA/QC		(Spring & Late Summer)	***Field Measurements***		
			Conductivity	Dissolved Oxygen	pH
COUNT =	***4***		Temperature		
Groundwater (Surveillance Monitors)					
BR-1	BR-2	Twice (2x)	Alkalinity	Aluminum	Ammonia (total)
BR-9	BR-10		Barium	Boron	Calcium
OB-11R	OB-12		Chloride	Chromium	Cobalt
			COD	Copper	DOC
			Hardness	Iron	Magnesium
1x QA/QC			Manganese	Nitrate	Phosphorus (total)
			Potassium	Silicon	Sodium
		(Spring & Late Summer)	Strontium	Sulphate	TDS
			TKN	Zinc	
			Field Measurements		
			Conductivity	Dissolved Oxygen	pH
COUNT =	***7***		Temperature		
Groundwater (Volatile Organic Compounds)					
BR-1		Once (1x) (Late Summer)	EPA 624 Volatile Organic Compounds		
COUNT =	***1***				
Surface Water					
SW-1	SW-4	Twice (2x) *Every Two (2) Years* *Next in 2023*	Alkalinity	Aluminum	Ammonia (total)
			Barium	Boron	BOD
			Calcium	Chloride	Chromium
1x QA/QC			Cobalt	COD	Conductivity
			Copper	DOC	Hardness
			Iron	Magnesium	Manganese
			Nitrate	Nitrite	pH
		(Spring & Late Fall)	Phenols	Phosphorus (total)	Potassium
			Silicon	Sodium	Strontium
			TDS	TKN	TSS
			Zinc		
			Field Measurements		
			Conductivity	Dissolved Oxygen	pH
COUNT =	***3***		Temperature	Un-ionized Ammonia (calculation)	

THE TOWNSHIP OF GREATER MADAWASKA

Table 2
Groundwater Monitoring Well and Surface Water Sampling Locations
Norway Lake Waste Disposal Site

Groundwater			
Monitor	**Zone**	**Northing**	**Easting**
BR-1	18T	5021910	367520
BR-2	18T	5021811	367580
BR-8	18T	5022137	367795
BR-9	18T	5022200	367859
BR-10	18T	5021888	367372
OB-3	18T	5021906	367525
OB-8	18T	5022091	367711
OB-11R	18T	5021820	367360
OB-12	18T	5021900	367222

Surface Water			
Monitor	**Zone**	**Northing**	**Easting**
SW-1	18T	5022187	367743
SW-2	18T	5022232	367884
SW-3	18T	5022213	367919
SW-4	18T	5022244	367687

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

THE TOWNSHIP OF GREATER MADAWASKA

Table 3
Groundwater Elevations
Norway Lake Waste Disposal Site

Monitor	Ground Elevation (m) [1]	Top of Pipe Elevation (m) [1]	Original Stick-up (m)	Measured Stick-Up (m) [2]	Depth of Well (m)	Well Diameter (mm)	Groundwater Elevation (m)													
							25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	29-Oct-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	05-May-22	17-Aug-22
OB-1	171.63	172.39	0.76	0.65	1.55	38.1	171.31	171.04	171.44	171.23	171.42	171.09	-	171.40	170.79	171.38	171.21	171.31	171.09	171.36	171.20
OB-2	171.21	171.96	0.75	0.81	0.45	38.1	170.96	170.77	171.01	170.94	171.01	170.79	-	170.97	170.45	170.97	170.90	170.91	170.75	170.86	170.82
OB-3	171.20	172.01	0.81	0.80	4.35	38.1	170.98	170.73	171.05	170.93	171.06	170.75	-	171.03	170.42	171.02	170.92	170.99	170.68	170.97	170.82
OB-4	171.74	172.75	1.01	0.94	1.29	38.1	171.09	170.72	171.56	170.94	171.41	170.78	-	171.32	-	171.25	170.86	171.05	170.72	171.15	170.79
OB-5	174.48	174.88	0.40	0.39	3.03	38.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OB-7	170.29	171.29	1.00	1.00	2.37	38.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OB-8	166.76	167.51	0.75	0.72	4.23	38.1	164.00	162.69	166.45	163.34	166.38	163.00	-	166.25	162.68	165.60	162.55	164.36	162.99	165.18	163.51
OB-11 [4]	171.87	172.78	0.91	0.85	3.58	50.8	171.50	-	172.04	-	171.86	171.28	-	-	-	-	-	-	-	-	-
OB-11R [4]	171.04	172.08	1.04	1.04	4.22	50.8	-	-	-	-	-	-	171.24	171.71	170.97	171.63	171.32	170.72	170.48	170.83	170.58
OB-12	172.66	173.67	1.01	1.01	2.07	50.8	171.94	171.71	172.55	171.82	172.39	171.74	-	172.33	171.47	172.27	171.90	172.89	171.55	172.07	171.73
BR-1	171.18	171.91	0.73	0.64	5.39	101.6	171.31	171.04	171.41	171.04	171.43	171.07	-	171.39	170.75	171.38	171.26	171.34	171.09	171.43	171.11
BR-2	172.09	172.64	0.55	0.55	3.00	101.6	171.09	170.82	171.31	170.82	171.25	170.97	-	171.21	170.62	171.15	171.10	171.13	170.93	171.17	170.96
BR-3	176.25	176.69	0.44	0.37	4.70	101.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BR-4 [3]	179.06	179.86	0.80	0.46	7.89	101.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BR-5	175.60	176.14	0.54	0.56	4.56	101.6	171.62	-	169.16	-	173.00	170.97	-	172.60	-	172.47	-	171.85	-	172.40	-
BR-7	170.29	171.29	1.00	0.90	5.60	38.1	169.09	168.48	169.55	168.48	169.48	168.58	-	-	-	169.32	168.33	169.28	168.59	169.16	168.78
BR-8	162.09	162.69	0.60	0.54	5.44	38.1	161.09	160.07	161.75	160.07	161.46	160.44	-	161.52	160.18	161.41	160.41	161.20	160.39	161.38	160.71
BR-9	160.86	161.30	0.44	0.41	5.14	38.1	159.58	159.15	159.74	159.15	159.70	159.34	-	159.65	159.09	159.64	159.43	160.60	160.34	159.62	159.48
BR-10 [3]	176.09	177.20	1.11	1.10	7.79	31.8	171.39	171.82	173.41	171.82	172.86	171.83	-	172.91	171.54	172.72	171.98	172.23	171.76	172.57	171.98
G-1	173.73	174.18	0.45	0.36	2.04	25.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
G-2	171.21	171.73	0.52	0.44	2.01	25.0	171.18	170.97	171.38	168.97	171.11	170.92	-	171.12	170.56	171.03	170.74	171.03	170.82	170.92	170.79
G-3	171.66	172.18	0.52	0.38	2.08	25.0	-	-	-	171.44	171.90	171.32	-	171.88	171.11	171.78	171.43	171.65	-	171.79	-
G-4	171.69	172.08	0.39	0.35	2.06	25.0	171.27	171.10	171.54	169.10	171.57	171.27	-	171.47	170.87	171.35	171.11	171.23	171.04	171.31	171.11
G-5	171.60	172.08	0.48	0.39	2.01	25.0	171.53	-	-	-	-	-	-	171.90	-	171.79	-	-	-	-	-
G-6	171.80	172.74	0.94	0.49	1.59	25.0	172.07	171.73	172.52	171.73	172.44	171.76	-	172.38	171.56	172.37	171.79	172.13	171.74	172.26	171.90
G-7	171.99	173.51	1.52	1.40	1.07	25.0	171.93	171.79	172.16	171.79	172.18	171.87	-	172.09	171.44	172.10	171.88	171.94	171.71	172.03	171.83
G-8	171.85	172.81	0.96	0.85	1.34	25.0	-	-	172.82	172.70	172.24	171.92	-	171.94	171.72	172.15	171.81	172.14	171.92	172.09	171.93
G-9	171.89	172.84	0.95	0.85	1.42	25.0	-	-	-	-	172.16	171.89	-	172.08	171.66	172.08	171.92	172.01	171.82	172.02	171.94

Notes:
1. Elevations surveyed by SGS Lakefield Research on October 7, 2003 and October 5, 2004
2. Stick-Up measured by Greenview April 25, 2007.
3. BR-4 was decommissioned and BR-10 repaired by Greenview July 29, 2013.
4. OB-11 was decommissioned and OB-11R was installed on October 29, 2018.
All elevations are relative to a site specific benchmark (BM# 1) elevation of 176.93 m.
"-" indicates water level is not available.

THE TOWNSHIP OF GREATER MADAWASKA

Table 4
Groundwater Quality - Overburden
Norway Lake Waste Disposal Site

Parameter	Background Overburden (median)	Overburden RUC [1]	ODWS [2]	OB-3													5-year Trends
				25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	05-May-22	17-Aug-22	(sparkline)
Alkalinity (as $CaCO_3$)	246	373	30 - 500	**962**	**752**	**782**	**1160**	**754**	**765**	**602**	**779**	**570**	**674**	**651**	**646**	**511**	**730**	
Aluminum	0.01	0.06	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ammonia, Total (as N)	0.1	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Barium	0.09	0.32	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron	0.02	1.26	5	0.566	0.719	0.663	***1.610***	0.943	1.020	0.637	0.885	0.632	0.671	0.573	0.621	0.503	0.563	
Calcium	74	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chloride	33	142	250	91.2	***197***	124	69.1	82.7	117	***187***	127	**251**	**252**	***201.0***	**338.0**	**312**	**261**	
Chromium	0.0014	0.014	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cobalt	0.0005	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chemical Oxygen Demand	8	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Conductivity (µS/cm) [4]	430	N/L	N/L	1308	1860	1164	1564	1060	1239	948	1147	987	1204	1181	1280	1088	1506	
Copper	0.002	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Organic Carbon	1.3	3.15	5	**8.7**	***3.9***	**6.8**	**20.2**	**9.9**	**8.3**	**8.2**	**10.1**	***4.0***	**5.9**	***4.1***	2.9	***3.2***	***3.7***	
Hardness (as $CaCO_3$)	254	254	80 - 100	**852**	**943**	**923**	**1350**	**820**	**874**	**758**	**995**	**871**	**961**	**817**	**956**	**949**	**958**	
Iron	0.05	0.18	0.3	< 0.005	0.019	***0.236***	0.104	0.078	0.150	0.044	0.091	***0.260***	***0.227***	0.088	***0.215***	0.033	0.099	
Magnesium	17	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Manganese	0.12	0.12	0.05	**0.334**	**0.391**	**0.384**	**0.663**	**0.387**	**0.445**	**0.348**	**0.492**	**0.449**	**0.468**	**0.394**	**0.461**	**0.457**	**0.468**	
Nitrate (as N)	0.1	2.58	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
pH (units) [4]	7.50	8.00	6.5 - 8.5	7.24	6.86	7.77	**5.69**	6.90	6.88	7.39	6.99	7.06	7.23	6.99	8.00	7.17	7.13	
Phosphorus, Total	0.02	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Potassium	3	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silicon	4	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sodium	12	106	200	77.0	89.4	89.7	***114***	84.8	88.3	73.8	86.3	81.6	79.7	77	87.6	87.5	84.6	
Strontium	0.18	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulphate	8	254	500	94	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Dissolved Solids	318	409	500	**1130**	**1100**	**1020**	**1280**	**909**	**1000**	**886**	**1940**	**1002**	**1102**	**999**	**1091**	**1148**	**1137**	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc	0.006	2.5	5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Note:
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.
Bedrock RUC is compared to background monitoring well BR-2.
Overburden RUC is compared to background monitoring well OB-12.
N/L indicates No Limit.
"-" indicates the parameter was not analyzed.

Greenview ENVIRONMENTAL MANAGEMENT

THE TOWNSHIP OF GREATER MADAWASKA

Table 4
Groundwater Quality - Overburden
Norway Lake Waste Disposal Site

Parameter	Background Overburden (median)	Overburden RUC [1]	ODWS [2]	OB-8											5-year Trends
				25-May-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	27-Apr-20	17-May-21	19-Aug-21	05-May-22	17-Aug-22	(sparkline)
Alkalinity (as $CaCO_3$)	246	373	30 - 500	272	233	***394***	261	338	229	223	257	351	224	324	
Aluminum	0.01	0.06	0.1	-	-	-	-	-	-	-	-	-	-	-	
Ammonia, Total (as N)	0.1	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	
Barium	0.09	0.32	1	-	-	-	-	-	-	-	-	-	-	-	
Boron	0.02	1.26	5	0.054	0.062	***1.620***	0.052	0.085	0.070	0.078	0.079	0.107	0.089	0.119	
Calcium	74	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	
Chloride	33	142	250	71.6	66.0	69.0	55.1	89.6	86.7	92.8	95.0	***162.0***	104	***149.0***	
Chromium	0.0014	0.014	0.05	-	-	-	-	-	-	-	-	-	-	-	
Cobalt	0.0005	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	
Chemical Oxygen Demand	8	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	
Conductivity (µS/cm) [4]	430	N/L	N/L	497	436	792	387	672	433	423	525	737	421	748	
Copper	0.002	0.5	1	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Organic Carbon	1.3	3.15	5	***4.3***	**6.8**	**20.8**	***4.4***	**6.1**	**7.1**	**5.5**	***4.9***	***4.3***	***4.8***	***3.2***	
Hardness (as $CaCO_3$)	254	254	80 - 100	**303**	**342**	**1350**	**315**	**439**	**341**	**367**	**347**	**548**	**361**	**466**	
Iron	0.05	0.18	0.3	0.009	0.011	0.105	0.009	< 0.005	0.027	0.011	0.063	0.154	0.066	0.170	
Magnesium	17	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	
Manganese	0.12	0.12	0.05	0.001	< 0.001	**0.663**	< 0.001	0.001	0.001	0.001	0.002	0.006	0.002	0.004	
Nitrate (as N)	0.1	2.58	10	-	-	-	-	-	-	-	-	-	-	-	
pH (units) [4]	7.50	8.00	6.5 - 8.5	7.78	7.89	8.16	7.87	7.09	7.45	7.45	7.91	8.14	7.46	6.78	
Phosphorus, Total	0.02	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	
Potassium	3	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	
Silicon	4	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	
Sodium	12	106	200	21.2	25.0	***115***	18.8	32.3	23.9	27.5	27.8	38	31.0	40.6	
Strontium	0.18	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	
Sulphate	8	254	500	19	-	-	-	-	-	-	-	-	-	-	
Total Dissolved Solids	318	409	500	382	397	**577**	334	**509**	391	406	***419***	**607**	***420***	**569**	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	
Zinc	0.006	2.5	5.0	-	-	-	-	-	-	-	-	-	-	-	

Note:
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.
Bedrock RUC is compared to background monitoring well BR-2.
Overburden RUC is compared to background monitoring well OB-12.
N/L indicates No Limit.
"-" indicates the parameter was not analyzed.

Greenview ENVIRONMENTAL MANAGEMENT

THE TOWNSHIP OF GREATER MADAWASKA

Table 4
Groundwater Quality - Overburden
Norway Lake Waste Disposal Site

Parameter	Background Overburden (median)	Overburden RUC [1]	ODWS [2]	OB-11					OB-11R								5-year Trends
				25-May-16	01-Sep-16	08-May-17	18-Sep-17	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	05-May-22	17-Aug-22	(sparkline)
Alkalinity (as $CaCO_3$)	246	373	30 - 500	324	338	254	***421***	***381***	182	345	249	342	***403***	***409***	356	**368**	
Aluminum	0.01	0.06	0.1	0.05	***0.06***	***0.06***	**0.14**	***0.08***	**0.71**	***0.09***	***0.07***	**0.10**	**0.10**	**0.10**	**0.14**	0.05	
Ammonia, Total (as N)	0.1	N/L	N/L	0.02	0.08	0.01	0.03	0.02	0.16	0.08	0.03	0.03	0.05	0.04	0.06	< 0.01	
Barium	0.09	0.32	1	***0.356***	***0.594***	0.112	***0.742***	***0.402***	0.084	***0.360***	0.231	***0.531***	***0.462***	***0.489***	***0.481***	***0.590***	
Boron	0.02	1.26	5	0.016	0.030	< 0.005	0.041	0.041	0.020	0.033	0.027	0.038	0.040	0.044	0.034	0.027	
Calcium	74	N/L	N/L	160	271	101	298	167	72.8	194	129	242	210	206	225	236	
Chloride	33	142	250	**623**	**898**	97.0	75.9	**572**	121	**646**	**405**	**881**	**865**	**912**	**870**	**1160**	
Chromium	0.0014	0.014	0.05	< 0.002	< 0.002	< 0.001	0.002	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.002	< 0.001	< 0.001	
Cobalt	0.0005	N/L	N/L	0.0003	0.0003	0.0014	0.0017	0.0008	0.0017	0.0001	0.0003	< 0.0005	< 0.001	< 0.001	< 0.0005	< 0.0005	
Chemical Oxygen Demand	8	N/L	N/L	101	6	25	10	36	20	30	12	8	19	11	17	27	
Conductivity (µS/cm) [4]	430	N/L	N/L	1683	3251	569	2508	1862	461	1863	995	2335	2354	3150	1993	2034	
Copper	0.002	0.5	1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.003	< 0.002	< 0.002	0.0018	0.0021	< 0.002	0.0023	0.0012	
Dissolved Organic Carbon	1.3	3.15	5	0.4	0.6	***4.1***	2.3	1.2	***3.7***	2.1	1.5	2.3	2.1	1.8	1.5	0.6	
Hardness (as $CaCO_3$)	254	254	80 - 100	**571**	**934**	**324**	**1030**	**577**	**253**	**637**	**436**	**784**	**703**	**678**	**747**	**767**	
Iron	0.05	0.18	0.3	0.062	0.022	**1.10**	**0.609**	0.163	**1.34**	0.035	0.016	0.015	0.011	0.021	***0.241***	< 0.005	
Magnesium	17	N/L	N/L	41.3	62.3	17.5	68.8	38.8	17.2	36.9	27.6	43.6	43.2	39.6	44.9	43.0	
Manganese	0.12	0.12	0.05	0.022	0.016	**0.991**	**0.284**	**0.051**	**0.112**	0.003	0.001	0.002	0.002	0.003	0.014	0.002	
Nitrate (as N)	0.1	2.58	10	0.7	2.3	< 0.05	0.15	< 0.5	< 0.05	1.22	0.42	2.31	2.18	2.07	1.38	0.28	
pH (units) [4]	7.50	8.00	6.5 - 8.5	7.32	7.27	7.82	**8.67**	7.09	7.82	7.20	7.19	**6.40**	7.28	7.74	7.13	6.87	
Phosphorus, Total	0.02	N/L	N/L	1.67	0.53	0.29	0.22	0.55	0.37	0.39	0.39	0.14	0.45	0.04	0.09	0.04	
Potassium	3	N/L	N/L	3.2	4.8	2.2	5.7	4.5	2.1	4.8	2.8	5.4	4.7	5.3	4.6	6.3	
Silicon	4	N/L	N/L	4.12	5.51	5.98	6.82	5.04	4.17	4.73	3.80	5.30	4.59	5.64	5.03	5.36	
Sodium	12	106	200	**216**	**322**	75.3	**397**	**322**	65.1	**373**	**232**	**437**	**469**	**499**	**498**	**571**	
Strontium	0.18	N/L	N/L	0.383	0.693	0.158	0.714	0.430	0.161	0.435	0.303	0.527	0.522	0.504	0.511	0.592	
Sulphate	8	254	500	45	80	9	8	68	8	53	37	78	64	74	58	65	
Total Dissolved Solids	318	409	500	**1290**	**1840**	***470***	**1950**	**1451**	380	**1583**	**941**	**1944**	**2042**	**2036**	**2145**	**2474**	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	1.1	1.1	0.5	0.3	0.4	0.1	0.3	0.3	0.3	0.3	0.2	0.2	0.3	
Zinc	0.006	2.5	5.0	0.007	0.005	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Note:
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.
Bedrock RUC is compared to background monitoring well BR-2.
Overburden RUC is compared to background monitoring well OB-12.
N/L indicates No Limit.
"-" indicates the parameter was not analyzed.

THE TOWNSHIP OF GREATER MADAWASKA

Table 4
Groundwater Quality - Overburden
Norway Lake Waste Disposal Site

Parameter	Background Overburden (median)	Overburden RUC [1]	ODWS [2]	OB-12 (Background)													5-year Trends
				25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	05-May-22	17-Aug-22	(sparkline)
Alkalinity (as $CaCO_3$)	246	373	30 - 500	247	246	211	284	220	243	203	232	207	254	243	253	214	269	
Aluminum	0.01	0.06	0.1	0.02	0.03	***0.06***	***0.06***	0.05	***0.07***	0.05	0.05	0.05	**0.15**	***0.06***	***0.06***	0.02	0.03	
Ammonia, Total (as N)	0.1	N/L	N/L	0.02	0.08	0.03	0.03	0.06	0.03	0.13	0.14	0.02	0.02	0.02	0.05	0.18	< 0.01	
Barium	0.09	0.32	1	0.102	0.158	0.100	0.130	0.101	0.174	0.120	0.143	0.124	0.164	0.126	0.145	0.130	0.170	
Boron	0.02	1.26	5	0.007	0.016	< 0.005	0.009	0.006	0.013	0.007	0.015	0.008	0.013	0.009	0.013	0.008	0.008	
Calcium	74	N/L	N/L	71.8	97.1	80.5	78.5	82.5	105	93.4	98.0	97.8	98.1	92.0	89.4	107	108	
Chloride	33	142	250	138	128	39.5	39.6	123	***194***	***158***	140	***204***	***160***	***147***	132	***175***	***197***	
Chromium	0.0014	0.014	0.05	< 0.002	< 0.002	< 0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Cobalt	0.0005	N/L	N/L	< 0.0001	0.0002	< 0.0001	0.0003	< 0.0001	0.0003	0.0002	< 0.0001	< 0.0002	0.0005	< 0.0001	0.0002	< 0.0001	< 0.0002	
Chemical Oxygen Demand	8	N/L	N/L	37	46	34	17	12	39	23	43	9	7	10	< 5	7	8	
Conductivity (µS/cm) [4]	430	N/L	N/L	642	866	385	540	477	881	531	643	578	713	635	570	601	908	
Copper	0.002	0.5	1	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002	< 0.002	0.0033	0.0013	< 0.002	0.0018	0.0007	
Dissolved Organic Carbon	1.3	3.15	5	0.9	1.2	1.9	3.1	1.4	1.3	2.8	2.8	1.4	2.0	1.5	1.7	1.3	0.6	
Hardness (as $CaCO_3$)	254	254	80 - 100	**253**	**330**	**271**	**271**	**291**	**364**	**321**	**338**	**339**	**326**	**319**	**305**	**366**	**361**	
Iron	0.05	0.18	0.3	< 0.005	0.013	0.006	0.007	0.029	< 0.005	0.009	0.005	0.006	**0.315**	0.005	0.009	< 0.005	< 0.005	
Magnesium	17	N/L	N/L	17.8	21.2	16.9	18.3	20.5	24.7	21.3	22.7	22.9	19.7	21.6	19.9	24.2	22.5	
Manganese	0.12	0.12	0.05	0.008	**0.251**	0.047	**0.752**	0.033	**0.290**	0.027	**0.363**	0.012	**0.200**	0.020	**0.421**	0.010	**0.059**	
Nitrate (as N)	0.1	2.58	10	0.2	0.2	< 0.05	< 0.05	< 0.05	< 0.05	0.07	0.08	0.07	< 0.05	0.10	< 0.05	< 0.05	< 0.05	
pH (units) [4]	7.50	8.00	6.5 - 8.5	7.71	7.71	7.98	**8.75**	7.51	7.27	7.30	7.09	7.19	**6.20**	7.50	7.93	7.30	6.91	
Phosphorus, Total	0.02	N/L	N/L	0.70	0.37	4.48	0.48	0.25	1.21	0.42	0.31	0.16	0.11	0.07	0.10	0.04	0.08	
Potassium	3	N/L	N/L	2.3	3.4	2.5	3.0	2.3	3.8	2.9	3.6	2.5	3.2	2.8	3.4	2.8	3.8	
Silicon	4	N/L	N/L	3.38	4.71	3.32	5.16	3.05	4.48	3.21	4.35	3.19	4.43	3.33	4.59	3.35	4.49	
Sodium	12	106	200	58.9	54.8	26.4	59.5	35.2	79.5	50.2	67.7	74.4	93.9	61.2	70	62.3	89.6	
Strontium	0.18	N/L	N/L	0.170	0.262	0.166	0.197	0.185	0.287	0.210	0.258	0.220	0.218	0.212	0.224	0.218	0.255	
Sulphate	8	254	500	16	15	6	12	6	13	15	15	9	13	10	12	9	17	
Total Dissolved Solids	318	409	500	***455***	***481***	301	382	392	**590**	***467***	***494***	**556**	**551**	***497***	***449***	**536**	**610**	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	0.7	0.4	1.7	0.4	0.3	0.6	0.2	0.4	0.2	0.2	0.2	0.2	0.2	0.2	
Zinc	0.006	2.5	5.0	0.008	0.006	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Note:
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.
Bedrock RUC is compared to background monitoring well BR-2.
Overburden RUC is compared to background monitoring well OB-12.
N/L indicates No Limit.
"-" indicates the parameter was not analyzed.

THE TOWNSHIP OF GREATER MADAWASKA

Table 5
Groundwater Quality - Bedrock
Norway Lake Waste Disposal Site

Parameter	Background Bedrock (median)	Bedrock RUC [1]	ODWS [2]	BR-1													5-year Trends
				25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	05-May-22	17-Aug-22	(sparkline)
Alkalinity (as $CaCO_3$)	199	350	30 - 500	**1020**	**825**	**962**	**1090**	**864**	**880**	**684**	**820**	**651**	**743**	**788**	**705**	**572**	**772**	
Aluminum	0.0045	0.052	0.1	***0.05***	***0.06***	**0.11**	**0.11**	***0.09***	**0.10**	***0.09***	**0.10**	***0.09***	***0.09***	**0.10**	**0.10**	***0.06***	0.05	
Ammonia, Total (as N)	0.1	N/L	N/L	0.04	0.09	0.09	0.14	0.22	0.16	0.21	0.25	0.27	0.21	0.28	0.22	0.29	0.21	
Barium	0.081	0.31	1	0.130	0.153	0.175	0.219	0.172	0.160	0.136	0.175	0.161	0.184	0.154	0.172	0.156	0.181	
Boron	0.018	1.26	5	0.757	0.830	1.02	***1.38***	1.20	1.15	0.949	1.01	0.939	0.822	0.823	0.752	0.777	0.678	
Calcium	73	N/L	N/L	183	208	233	264	221	199	177	231	204	227	189	208	201	211	
Chloride	39	144	250	63.0	***154***	53.0	59.2	80.3	79.3	106	96.7	***156***	***164***	11.8	***241***	**257**	***193***	
Chromium	0.002	0.014	0.05	< 0.002	< 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	
Cobalt	0.0005	N/L	N/L	0.0104	0.0079	0.0094	0.0106	0.0122	0.0097	0.0085	0.0104	0.0100	0.0101	0.0096	0.0084	0.0195	0.0085	
Chemical Oxygen Demand	8	N/L	N/L	67	23	42	58	56	42	48	43	55	34	37	28	26	33	
Conductivity (µS/cm) [4]	424	N/L	N/L	1351	1253	1191	1468	1222	1274	950	1100	990	1147	1137	1630	1039	1316	
Copper	0.0039	0.5	1	0.006	0.005	< 0.002	0.002	0.004	< 0.002	0.003	< 0.002	0.004	0.0043	0.0051	0.002	0.0101	0.0030	
Dissolved Organic Carbon	1.5	3.3	5	**13.5**	**5.8**	**13.9**	**20.8**	**15.6**	**11.9**	**13.4**	**13.9**	**9.1**	**8.8**	**10.0**	**5.9**	***4.5***	**5.2**	
Hardness (as $CaCO_3$)	254	254	80 - 100	**871**	**961**	**1080**	**1220**	**1030**	**945**	**838**	**1050**	**942**	**987**	**875**	**943**	**917**	**944**	
Iron	2.18	2.18	0.3	**0.967**	**0.877**	**1.69**	**1.05**	**0.820**	**0.995**	**1.57**	**0.993**	**3.74**	**3.99**	**1.01**	**1.77**	**2.27**	**2.27**	
Magnesium	17	N/L	N/L	101	107	122	136	115	109	96.3	116	105	102	98.0	103.0	101	102	
Manganese	0.11	0.11	0.05	**0.510**	**0.488**	**0.585**	**0.773**	**0.661**	**0.572**	**0.496**	**0.693**	**0.651**	**0.645**	**0.610**	**0.564**	**0.609**	**0.604**	
Nitrate (as N)	0.05	2.54	10	< 0.1	0.1	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	0.06	< 0.05	0.08	< 0.05	< 0.05	< 0.05	
pH (units) [4]	7.53	8.02	6.5 - 8.5	7.10	6.85	7.17	6.52	6.65	6.78	7.24	7.08	6.97	7.09	6.94	7.91	7.04	**6.46**	
Phosphorus, Total	0.025	N/L	N/L	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.10	0.03	0.02	0.01	0.02	0.04	
Potassium	6	N/L	N/L	11.9	13.0	16.7	19.1	17.2	16.8	15.7	18.2	18.0	17.4	17.4	17.3	17.9	17.6	
Silicon	4	N/L	N/L	5.84	6.76	7.43	8.21	6.75	6.93	6.25	6.81	6.56	6.63	6.13	6.82	6.16	6.63	
Sodium	3	101	200	73.2	88.6	86.2	99.4	78.3	85.4	65.9	80.3	72.6	76.0	67.7	81.1	72.7	77.5	
Strontium	0.13	N/L	N/L	0.661	0.865	0.903	1.01	0.880	0.916	0.844	0.927	0.898	0.847	0.808	0.885	0.811	0.912	
Sulphate	11	255	500	82	92	55	92	104	91	61	110	75	13	7	80	48	66	
Total Dissolved Solids	332	416	500	**1130**	**1080**	**1040**	**1190**	**994**	**1034**	**897**	**1034**	**960**	**1051**	**975**	**1045**	**1043**	**1067**	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	0.7	0.5	0.7	0.9	0.8	0.8	0.6	0.8	0.8	0.7	0.8	0.6	0.6	0.8	
Zinc	0.01	2.5	5.0	0.008	< 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	

Note:
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.
Bedrock RUC is compared to background monitoring well BR-2.
Overburden RUC is compared to background monitoring well OB-12.
N/L indicates No Limit.
"-" indicates the parameter was not analyzed.

THE TOWNSHIP OF GREATER MADAWASKA

Table 5
Groundwater Quality - Bedrock
Norway Lake Waste Disposal Site

Parameter	Background Bedrock (median)	Bedrock RUC [1]	ODWS [2]	BR-2 (Background)													5-year Trends
				25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	05-May-22	17-Aug-22	(sparkline)
Alkalinity (as $CaCO_3$)	199	350	30 - 500	322	327	250	296	290	320	258	268	267	292	328	338	301	318	
Aluminum	0.0045	0.052	0.1	0.03	0.04	***0.06***	***0.08***	0.05	***0.08***	0.05	0.05	***0.06***	***0.06***	***0.07***	***0.08***	0.04	0.03	
Ammonia, Total (as N)	0.1	N/L	N/L	< 0.01	0.05	< 0.01	0.03	0.03	0.01	0.04	0.28	0.02	0.02	0.02	0.03	< 0.01	< 0.01	
Barium	0.081	0.31	1	0.132	0.163	0.147	0.188	0.136	0.166	0.129	0.125	0.141	0.164	0.156	0.197	0.180	0.234	
Boron	0.018	1.26	5	0.007	0.020	< 0.005	0.014	0.011	0.013	0.011	0.017	0.010	0.015	0.012	0.016	0.013	0.009	
Calcium	73	N/L	N/L	98.7	115	107	128	96.9	112	91.0	92.4	101	111	110	132.0	132	151	
Chloride	39	144	250	51.0	80.1	42.9	65.4	44.6	71.8	31.4	49.5	32.7	51.0	56.4	91.7	84.2	***146***	
Chromium	0.002	0.014	0.05	< 0.002	< 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	
Cobalt	0.0005	N/L	N/L	0.0002	0.0002	< 0.0001	0.0003	< 0.0001	0.0004	0.0004	< 0.0001	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	
Chemical Oxygen Demand	8	N/L	N/L	14	7	8	6	14	13	19	16	7	5	15	19	11	20	
Conductivity (µS/cm) [4]	424	N/L	N/L	438	731	406	593	441	553	361	399	342	468	526	565	458	770	
Copper	0.0039	0.5	1	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0014	0.0011	< 0.002	0.0012	0.0004	
Dissolved Organic Carbon	1.5	3.3	5	2.3	2.2	2.2	***3.3***	2.5	3.0	3.1	***4.0***	***3.6***	***4.1***	***3.9***	3.0	2.6	1.2	
Hardness (as $CaCO_3$)	254	254	80 - 100	**330**	**387**	**352**	**416**	**319**	**369**	**301**	**309**	**331**	**358**	**363**	**428**	**432**	**487**	
Iron	2.18	2.18	0.3	**1.06**	**4.89**	**1.27**	**0.794**	**0.311**	**1.55**	**0.788**	**5.93**	**0.923**	**2.98**	**0.643**	**0.604**	**0.857**	**1.02**	
Magnesium	17	N/L	N/L	20.1	24.2	20.5	23.3	18.7	21.6	18.0	18.9	19.2	19.6	21.5	23.9	24.7	26.5	
Manganese	0.11	0.11	0.05	0.032	**0.118**	**0.058**	0.025	0.019	0.037	0.023	**0.117**	0.027	**0.082**	0.034	0.049	**0.051**	**0.058**	
Nitrate (as N)	0.05	2.54	10	< 0.1	0.1	< 0.05	< 0.05	< 0.05	0.38	< 0.05	< 0.05	0.08	< 0.05	0.15	< 0.05	< 0.05	< 0.05	
pH (units) [4]	7.53	8.02	6.5 - 8.5	**6.06**	7.53	7.93	**8.80**	7.90	7.63	7.57	7.42	7.33	6.95	7.79	8.37	7.48	6.70	
Phosphorus, Total	0.025	N/L	N/L	0.01	0.12	0.04	0.02	0.05	0.08	0.07	0.13	0.10	0.13	0.10	0.22	0.02	0.11	
Potassium	6	N/L	N/L	5.4	7.3	6.6	8.1	5.9	7.4	5.6	6.6	6.0	7.1	6.5	7.8	6.9	8.1	
Silicon	4	N/L	N/L	4.63	5.24	5.19	7.04	5.04	5.72	4.94	4.66	5.23	5.19	5.13	6.39	5.58	6.22	
Sodium	3	101	200	17.4	22.3	18.7	25.2	19.9	26.0	19.7	22.3	20.6	21.7	21.5	26.4	24.9	28.3	
Strontium	0.13	N/L	N/L	0.172	0.218	0.174	0.218	0.172	0.209	0.163	0.154	0.172	0.181	0.200	0.229	0.209	0.259	
Sulphate	11	255	500	24	24	15	16	19	19	19	16	22	20	20	25	20	21	
Total Dissolved Solids	332	416	500	411	***493***	366	***451***	348	***433***	328	368	347	394	413	***469***	***466***	**563**	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	0.1	0.2	0.2	0.1	0.1	0.2	< 0.1	0.2	0.1	0.2	0.2	0.3	0.1	0.1	
Zinc	0.01	2.5	5.0	< 0.005	0.007	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Note:
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.
Bedrock RUC is compared to background monitoring well BR-2.
Overburden RUC is compared to background monitoring well OB-12.
N/L indicates No Limit.
"-" indicates the parameter was not analyzed.

THE TOWNSHIP OF GREATER MADAWASKA

Table 5
Groundwater Quality - Bedrock
Norway Lake Waste Disposal Site

Parameter	Background Bedrock (median)	Bedrock RUC [1]	ODWS [2]	BR-8													5-year Trends
				25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	05-May-22	17-Aug-22	(sparkline)
Alkalinity (as $CaCO_3$)	199	350	30 - 500	259	258	230	264	255	265	226	239	218	247	250	260	227	279	
Aluminum	0.0045	0.052	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ammonia, Total (as N)	0.1	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Barium	0.081	0.31	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron	0.018	1.26	5	0.104	0.275	0.102	0.261	0.121	0.194	0.144	0.152	0.100	0.208	0.191	0.259	0.148	0.125	
Calcium	73	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chloride	39	144	250	32.5	43.1	47.8	38.7	50.4	42.5	45.3	41.0	56.5	56.6	55.1	61.1	73.0	98.2	
Chromium	0.002	0.014	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cobalt	0.0005	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chemical Oxygen Demand	8	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Conductivity (µS/cm) [4]	424	N/L	N/L	425	408	398	448	384	462	337	376	345	405	402	408	359	528	
Copper	0.0039	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Organic Carbon	1.5	3.3	5	***3.3***	3.2	***3.9***	**5.4**	***3.9***	***3.7***	**5.1**	***4.8***	***4.2***	***4.6***	***4.1***	***3.6***	***3.7***	2.5	
Hardness (as $CaCO_3$)	254	254	80 - 100	**277**	**293**	**326**	**344**	**298**	**312**	**294**	**324**	**330**	**344**	**307**	**327**	**349**	**388**	
Iron	2.18	2.18	0.3	0.083	0.294	0.052	**0.354**	0.040	0.111	0.074	0.155	0.044	**0.658**	0.161	0.232	0.056	0.032	
Magnesium	17	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Manganese	0.11	0.11	0.05	0.013	**0.074**	0.016	**0.091**	**0.173**	0.041	0.016	**0.058**	0.012	**0.090**	**0.054**	**0.064**	0.018	0.024	
Nitrate (as N)	0.05	2.54	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
pH (units) [4]	7.53	8.02	6.5 - 8.5	7.02	7.95	8.06	**8.78**	7.89	7.33	7.23	7.82	7.48	6.89	8.15	8.19	7.69	6.90	
Phosphorus, Total	0.025	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Potassium	6	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silicon	4	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sodium	3	101	200	16.4	16.9	19.0	21.5	21.0	23.2	16.9	19.7	20.8	18.6	17.4	18.7	21.0	30.2	
Strontium	0.13	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulphate	11	255	500	23	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Dissolved Solids	332	416	500	326	364	358	372	325	343	320	328	340	367	347	361	369	***440***	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc	0.01	2.5	5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Note:
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.
Bedrock RUC is compared to background monitoring well BR-2.
Overburden RUC is compared to background monitoring well OB-12.
N/L indicates No Limit.
"-" indicates the parameter was not analyzed.

THE TOWNSHIP OF GREATER MADAWASKA

Table 5
Groundwater Quality - Bedrock
Norway Lake Waste Disposal Site

Parameter	Background Bedrock (median)	Bedrock RUC [1]	ODWS [2]	BR-9													5-year Trends
				25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	05-May-22	17-Aug-22	(sparkline)
Alkalinity (as $CaCO_3$)	199	350	30 - 500	254	249	209	246	251	260	217	228	234	260	253	256	241	262	
Aluminum	0.0045	0.052	0.1	0.02	0.03	0.04	***0.06***	0.04	0.05	0.05	0.05	0.05	**0.15**	0.05	***0.06***	0.04	0.01	
Ammonia, Total (as N)	0.1	N/L	N/L	< 0.01	0.04	< 0.01	< 0.01	0.05	< 0.01	0.04	0.05	0.03	< 0.01	< 0.01	0.01	0.26	< 0.01	
Barium	0.081	0.31	1	0.059	0.083	0.066	0.094	0.067	0.078	0.063	0.074	0.075	0.095	0.068	0.086	0.074	0.095	
Boron	0.018	1.26	5	0.009	0.026	< 0.005	0.028	0.007	0.026	0.008	0.023	0.008	0.024	0.013	0.026	0.013	0.025	
Calcium	73	N/L	N/L	61.2	79.3	71.1	81.0	71.0	75.5	68.5	77.5	79.1	86.8	70.9	83.2	79.8	84.2	
Chloride	39	144	250	5.5	13.1	1.3	10.6	1.5	15.1	3.6	16.4	4.6	17.6	6.0	21.8	8.2	27.2	
Chromium	0.002	0.014	0.05	< 0.002	< 0.002	0.002	< 0.001	< 0.001	< 0.001	0.001	< 0.001	0.001	0.002	< 0.001	< 0.001	0.002	< 0.001	
Cobalt	0.0005	N/L	N/L	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	0.0002	< 0.0001	0.0002	0.0024	0.0001	0.0001	0.0005	< 0.0001	
Chemical Oxygen Demand	8	N/L	N/L	5	< 5	18	6	6	5	11	5	< 5	< 5	8	9	5	18	
Conductivity (µS/cm) [4]	424	N/L	N/L	346	500	251	334	303	355	263	298	265	316	325	349	275	349	
Copper	0.0039	0.5	1	< 0.002	0.002	0.005	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002	0.0031	0.0014	< 0.002	0.0029	0.0015	
Dissolved Organic Carbon	1.5	3.3	5	1.5	2.0	2.1	***3.4***	1.7	2.3	***3.3***	3.1	2.8	***3.6***	2.8	3.0	3.0	2.3	
Hardness (as $CaCO_3$)	254	254	80 - 100	**228**	**285**	**253**	**295**	**261**	**281**	**253**	**278**	**288**	**304**	**259**	**300**	**290**	**301**	
Iron	2.18	2.18	0.3	< 0.005	0.009	< 0.005	0.005	0.010	< 0.005	0.008	< 0.005	0.006	0.232	0.006	0.011	0.036	< 0.005	
Magnesium	17	N/L	N/L	18.2	21.2	18.4	22.5	20.3	22.5	20.0	20.4	21.9	21.2	20.0	22.4	22.1	22.1	
Manganese	0.11	0.11	0.05	< 0.001	< 0.001	0.002	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.062**	0.001	0.002	0.013	< 0.001	
Nitrate (as N)	0.05	2.54	10	0.1	0.2	< 0.05	< 0.05	0.06	< 0.05	0.07	0.11	0.10	0.05	0.17	0.06	< 0.05	0.06	
pH (units) [4]	7.53	8.02	6.5 - 8.5	7.55	7.95	8.33	**8.89**	7.69	7.53	7.72	7.48	7.25	7.14	7.68	8.38	7.68	8.38	
Phosphorus, Total	0.025	N/L	N/L	0.05	0.14	0.17	0.04	0.11	0.03	0.09	0.08	0.10	0.08	0.03	0.04	0.04	0.03	
Potassium	6	N/L	N/L	2.3	3.2	2.5	3.5	2.6	3.6	2.5	3.0	2.8	3.3	2.8	3.4	3.0	3.5	
Silicon	4	N/L	N/L	3.47	4.34	4.37	4.95	4.01	4.07	3.78	4.00	4.12	4.19	3.67	4.35	4.18	4.26	
Sodium	3	101	200	3.6	6.0	2.4	5.9	2.8	6.9	2.9	5.4	3.4	6.1	3.7	6.5	3.9	6.8	
Strontium	0.13	N/L	N/L	0.114	0.183	0.101	0.188	0.117	0.203	0.114	0.163	0.121	0.170	0.136	0.184	0.126	0.194	
Sulphate	11	255	500	11	14	8	9	8	10	9	11	10	14	11	18	12	15	
Total Dissolved Solids	332	416	500	255	293	224	285	240	281	239	266	254	277	254	287	264	300	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	0.2	0.2	0.7	0.1	0.1	0.1	< 0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	
Zinc	0.01	2.5	5.0	0.011	0.007	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Note:
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.
Bedrock RUC is compared to background monitoring well BR-2.
Overburden RUC is compared to background monitoring well OB-12.
N/L indicates No Limit.
"-" indicates the parameter was not analyzed.

THE TOWNSHIP OF GREATER MADAWASKA

Table 5
Groundwater Quality - Bedrock
Norway Lake Waste Disposal Site

Parameter	Background Bedrock (median)	Bedrock RUC [1]	ODWS [2]	BR-10													5-year Trends
				25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	05-May-22	17-Aug-22	(sparkline)
Alkalinity (as $CaCO_3$)	199	350	30 - 500	**556**	**613**	***480***	**708**	***482***	**585**	**516**	**626**	***490***	**589**	**512**	**571**	***467***	**636**	
Aluminum	0.0045	0.052	0.1	0.04	***0.08***	***0.09***	**0.12**	***0.07***	**0.10**	***0.09***	**0.12**	***0.08***	**0.11**	**0.10**	**0.13**	***0.07***	***0.07***	
Ammonia, Total (as N)	0.1	N/L	N/L	12.4	11.7	6.38	16.5	8.60	18.3	12.5	20.2	13.4	19.8	12.6	12.8	10.0	13.7	
Barium	0.081	0.31	1	***0.500***	**1.19**	***0.640***	***0.878***	***0.626***	**1.16**	***0.617***	**1.17**	***0.612***	**1.14**	***0.762***	**1.4**	***0.711***	**1.06**	
Boron	0.018	1.26	5	0.362	0.483	0.398	0.704	0.349	0.650	0.550	0.713	0.482	0.613	0.415	0.476	0.425	0.508	
Calcium	73	N/L	N/L	131	302	167	201	157	270	159	291	149	277	193	374	192	269	
Chloride	39	144	250	***211***	**752**	***186***	***176***	**289**	**519**	**271**	**571**	***229***	**657**	**469**	**987**	**435**	**720**	
Chromium	0.002	0.014	0.05	< 0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	< 0.002	0.002	0.002	
Cobalt	0.0005	N/L	N/L	0.0087	0.0183	0.0121	0.0115	0.0115	0.0177	0.0127	0.0131	0.0103	0.0136	0.0116	0.0174	0.0120	0.0126	
Chemical Oxygen Demand	8	N/L	N/L	51	59	67	87	150	116	82	72	74	92	44	60	44	63	
Conductivity (µS/cm) [4]	424	N/L	N/L	1864	2168	1109	1441	1239	2195	1102	1825	1040	1902	1909	3800	1383	2382	
Copper	0.0039	0.5	1	0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0013	0.0020	< 0.002	0.0019	< 0.0005	
Dissolved Organic Carbon	1.5	3.3	5	**6.3**	2.8	**9.0**	**9.0**	**6.2**	**5.3**	**14.4**	**8.0**	**8.1**	**6.6**	**5.2**	***4.8***	***4.9***	***4.3***	
Hardness (as $CaCO_3$)	254	254	80 - 100	**463**	**1080**	**579**	**725**	**550**	**963**	**559**	**1010**	**519**	**925**	**664**	**1260**	**650**	**907**	
Iron	2.18	2.18	0.3	**12.1**	**26.2**	**19.0**	**25.9**	**17.9**	**28.9**	**20.3**	**29.7**	**19.7**	**20.7**	**21.2**	**30.3**	**22.0**	**26.1**	
Magnesium	17	N/L	N/L	32.6	77.9	39.2	54.2	38.4	70.0	39.4	69.4	35.7	56.6	44.2	79.9	41.3	57.0	
Manganese	0.11	0.11	0.05	**4.09**	**9.07**	**7.81**	**7.27**	**5.95**	**7.33**	**6.65**	**7.18**	**5.45**	**6.02**	**5.26**	**8.03**	**5.98**	**6.16**	
Nitrate (as N)	0.05	2.54	10	0.6	0.6	0.23	< 0.05	< 0.05	< 0.5	0.22	< 0.05	0.08	0.28	0.66	< 0.5	< 0.3	< 0.05	
pH (units) [4]	7.53	8.02	6.5 - 8.5	**6.02**	6.92	7.11	**8.95**	7.04	6.78	6.95	6.81	6.82	6.88	6.97	7.7	6.60	6.69	
Phosphorus, Total	0.025	N/L	N/L	0.11	0.31	0.23	0.49	0.41	0.80	0.48	0.23	0.69	0.52	0.20	0.13	0.05	0.14	
Potassium	6	N/L	N/L	15.2	21.6	18.3	29.0	17.8	32.1	24.1	34.4	23.9	35.7	25.2	33.6	22.7	32.8	
Silicon	4	N/L	N/L	7.81	11.1	11.2	12.6	10.2	10.6	10.5	10.7	11.1	9.99	9.72	10.7	10.9	10.6	
Sodium	3	101	200	***112***	**252**	***138***	***149***	***150***	**244**	***134***	**246**	***141***	**264**	**212**	**444**	**228**	**315**	
Strontium	0.13	N/L	N/L	0.394	0.870	0.466	0.600	0.472	0.847	0.523	0.840	0.482	0.767	0.603	1.090	0.541	0.828	
Sulphate	11	255	500	26	69	36	31	33	42	34	43	24	47	33	64	32	52	
Total Dissolved Solids	332	416	500	**896**	**1830**	**915**	**1080**	**960**	**1520**	**977**	**1669**	**893**	**1686**	**1336**	**2266**	**1268**	**1835**	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	14.8	14.7	13.6	20.6	10.1	21.9	15.4	23.5	15.5	23.3	13.4	13.6	10.5	23.1	
Zinc	0.01	2.5	5.0	0.010	0.009	< 0.005	0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	

Note:
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.
Bedrock RUC is compared to background monitoring well BR-2.
Overburden RUC is compared to background monitoring well OB-12.
N/L indicates No Limit.
"-" indicates the parameter was not analyzed.

THE TOWNSHIP OF GREATER MADAWASKA

Table 6
Groundwater Quality Compared to PWQO
Norway Lake Waste Disposal Site

Parameter	PWQO [1]	BR-9														5-year Trends
		25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	05-May-22	17-Aug-22	(sparkline)
Alkalinity (as $CaCO_3$)	< 25% decrease	254	249	209	246	251	260	217	228	234	260	253	256	241	262	
Aluminum	0.075	0.02	0.03	0.04	0.06	0.04	0.05	0.05	0.05	0.05	**0.15**	0.05	0.06	0.04	0.01	
Ammonia, Total (as N)	N/L	< 0.01	0.04	< 0.01	< 0.01	0.05	< 0.01	0.04	0.05	0.03	< 0.01	< 0.01	0.01	0.26	< 0.01	
Barium	N/L	0.059	0.083	0.066	0.094	0.067	0.078	0.063	0.074	0.075	0.095	0.068	0.086	0.074	0.095	
Boron	0.2	0.009	0.026	< 0.005	0.028	0.007	0.026	0.008	0.023	0.008	0.024	0.013	0.026	0.013	0.025	
Calcium	N/L	61.2	79.3	71.1	81.0	71.0	75.5	68.5	77.5	79.1	86.8	70.9	83.2	79.8	84.2	
Chloride	N/L	5.5	13.1	1.3	10.6	1.5	15.1	3.6	16.4	4.6	17.6	6.0	21.8	8.2	27.2	
Chromium	0.001	< 0.002	< 0.002	**0.002**	< 0.001	< 0.001	< 0.001	**0.001**	< 0.001	**0.001**	**0.002**	< 0.001	< 0.001	**0.002**	< 0.001	
Cobalt	0.0009	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	0.0002	< 0.0001	0.0002	**0.0024**	0.0001	0.0001	0.0005	< 0.0001	
Chemical Oxygen Demand	N/L	5	< 5	18	6	6	5	11	5	< 5	< 5	8	9	5	18	
Conductivity (µS/cm) [3]	N/L	346	500	251	334	303	355	263	298	265	316	325	349	275	349	
Copper	0.005	< 0.002	0.002	**0.005**	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002	0.0031	0.0014	< 0.002	0.0029	0.0015	
Dissolved Organic Carbon	N/L	1.5	2.0	2.1	3.4	1.7	2.3	3.3	3.1	2.8	3.6	2.8	3.0	3.0	2.3	
Hardness (as $CaCO_3$)	N/L	228	285	253	295	261	281	253	278	288	304	259	300	290	301	
Iron	0.3	< 0.005	0.009	< 0.005	0.005	0.01	< 0.005	0.008	< 0.005	0.006	0.232	0.006	0.011	0.036	< 0.005	
Magnesium	N/L	18.2	21.2	18.4	22.5	20.3	22.5	20.0	20.4	21.9	21.2	20.0	22.4	22.1	22.1	
Manganese	N/L	< 0.001	< 0.001	0.002	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.062	0.001	0.002	0.013	< 0.001	
Nitrate (as N)	N/L	0.1	0.2	< 0.05	< 0.05	0.06	< 0.05	0.07	0.11	0.10	0.05	0.17	0.06	< 0.05	0.06	
pH (units) [3]	6.5 - 8.5	7.55	7.95	8.33	**8.89**	7.69	7.53	7.72	7.48	7.25	7.14	7.68	8.38	7.68	8.38	
Phosphorus, Total	0.03	**0.05**	**0.14**	**0.17**	**0.04**	**0.11**	**0.03**	**0.09**	**0.08**	**0.10**	**0.08**	**0.03**	**0.04**	**0.04**	**0.03**	
Potassium	N/L	2.3	3.2	2.5	3.5	2.6	3.6	2.5	3.0	2.8	3.3	2.8	3.4	3.0	3.5	
Silicon	N/L	3.47	4.34	4.37	4.95	4.01	4.07	3.78	4.00	4.12	4.19	3.67	4.35	4.18	4.26	
Sodium	N/L	3.6	6.0	2.4	5.9	2.8	6.9	2.9	5.4	3.4	6.1	3.7	6.5	3.9	6.8	
Strontium	N/L	0.114	0.183	0.101	0.188	0.117	0.203	0.114	0.163	0.121	0.170	0.136	0.184	0.126	0.194	
Sulphate	N/L	11	14	8	9	8	10	9	11	10	14	11	18	12	15	
Total Dissolved Solids	N/L	255	293	224	285	240	281	239	266	254	277	254	287	264	300	
Total Kjeldahl Nitrogen	N/L	0.2	0.2	0.7	0.1	0.1	0.1	< 0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	
Zinc	0.02	0.011	0.007	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Note:
1. Provincial Water Quality Objectives (PWQO).
2. Results obtained from laboratory analysis.
3. Results obtained from field analysis.
All results are expressed in mg/L unless otherwise stated.
Bold and shaded values exceed the PWQO.
N/L indicates No Limit.
"-" indicates the parameter was not analyzed.

THE TOWNSHIP OF GREATER MADAWASKA

Table 6
Groundwater Quality Compared to PWQO
Norway Lake Waste Disposal Site

Parameter	PWQO [1]	BR-2 (Background)														5-year Trends
		25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	05-May-22	17-Aug-22	(sparkline)
Alkalinity (as $CaCO_3$)	< 25% decrease	322	327	250	296	290	320	258	268	267	292	328	338	301	318	
Aluminum	0.075	0.03	0.04	0.06	**0.08**	0.05	**0.08**	0.05	0.05	0.06	0.06	0.07	**0.08**	0.04	0.03	
Ammonia, Total (as N)	N/L	< 0.01	0.05	< 0.01	0.03	0.03	0.01	0.04	0.28	0.02	0.02	0.02	0.03	< 0.01	< 0.01	
Barium	N/L	0.132	0.163	0.147	0.188	0.136	0.166	0.129	0.125	0.141	0.164	0.156	0.197	0.180	0.234	
Boron	0.2	0.007	0.020	< 0.005	0.014	0.011	0.013	0.011	0.017	0.010	0.015	0.012	0.016	0.013	0.009	
Calcium	N/L	98.7	115	107	128	96.9	112	91.0	92.4	101	111	110	132	132	151	
Chloride	N/L	51.0	80.1	42.9	65.4	44.6	71.8	31.4	49.5	32.7	51.0	56.4	91.7	84.2	146	
Chromium	0.001	< 0.002	< 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	
Cobalt	0.0009	0.0002	0.0002	< 0.0001	0.0003	< 0.0001	0.0004	0.0004	< 0.0001	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	
Chemical Oxygen Demand	N/L	14	7	8	6	14	13	19	16	7	5	15	19	11	20	
Conductivity (µS/cm) [3]	N/L	438	731	406	593	441	553	361	399	342	468	526	565	458	770	
Copper	0.005	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0014	0.0011	< 0.002	0.0012	0.0004	
Dissolved Organic Carbon	N/L	2.3	2.2	2.2	3.3	2.5	3.0	3.1	4.0	3.6	4.1	3.9	3.0	2.6	1.2	
Hardness (as $CaCO_3$)	N/L	330	387	352	416	319	369	301	309	331	358	363	428	432	487	
Iron	0.3	**1.06**	**4.89**	**1.27**	**0.794**	**0.311**	**1.55**	**0.788**	**5.93**	**0.923**	**2.98**	**0.643**	**0.604**	**0.857**	**1.02**	
Magnesium	N/L	20.1	24.2	20.5	23.3	18.7	21.6	18.0	18.9	19.2	19.6	21.5	23.9	24.7	26.5	
Manganese	N/L	0.032	0.118	0.058	0.025	0.019	0.037	0.023	0.117	0.027	0.082	0.034	0.049	0.051	0.058	
Nitrate (as N)	N/L	< 0.1	0.1	< 0.05	< 0.05	< 0.05	0.38	< 0.05	< 0.05	0.08	< 0.05	0.15	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.5 - 8.5	**6.06**	7.53	7.93	**8.80**	7.90	7.63	7.57	7.42	7.33	6.95	7.79	8.37	7.48	6.70	
Phosphorus, Total	0.03	0.01	**0.12**	**0.04**	0.02	**0.05**	**0.08**	**0.07**	**0.13**	**0.10**	**0.13**	**0.10**	**0.22**	0.02	**0.11**	
Potassium	N/L	5.4	7.3	6.6	8.1	5.9	7.4	5.6	6.6	6.0	7.1	6.5	7.8	6.9	8.1	
Silicon	N/L	4.63	5.24	5.19	7.04	5.04	5.72	4.94	4.66	5.23	5.19	5.13	6.39	5.58	6.22	
Sodium	N/L	17.4	22.3	18.7	25.2	19.9	26.0	19.7	22.3	20.6	21.7	21.5	26.4	24.9	28.3	
Strontium	N/L	0.172	0.218	0.174	0.218	0.172	0.209	0.163	0.154	0.172	0.181	0.200	0.229	0.209	0.259	
Sulphate	N/L	24	24	15	16	19	19	19	16	22	20	20	25	20	21	
Total Dissolved Solids	N/L	411	493	366	451	348	433	328	368	347	394	413	469	466	563	
Total Kjeldahl Nitrogen	N/L	0.1	0.2	0.2	0.1	0.1	0.2	< 0.1	0.2	0.1	0.2	0.2	0.3	0.1	0.1	
Zinc	0.02	< 0.005	0.007	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Note:
1. Provincial Water Quality Objectives (PWQO).
2. Results obtained from laboratory analysis.
3. Results obtained from field analysis.
All results are expressed in mg/L unless otherwise stated.
Bold and shaded values exceed the PWQO.
N/L indicates No Limit.
"-" indicates the parameter was not analyzed.

THE TOWNSHIP OF GREATER MADAWASKA

Table 7
Groundwater Quality - Volatile Organic Compounds
Norway Lake Waste Disposal Site

Parameter	ODWS [1]	BR-1						
		01-Sep-16	18-Sep-17	13-Aug-18	21-Aug-19	18-Aug-20	19-Aug-21	17-Aug-22
Acetone	N/L	< 0.002	< 0.002	< 0.002	< 0.03	< 0.03	< 0.03	< 0.03
Benzene	0.001	< 0.0005	0.0009	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bromobenzene	N/L	< 0.0001	< 0.0001	< 0.0001	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Bromodichloromethane	N/L	< 0.0001	< 0.0001	< 0.0001	< 0.002	< 0.002	< 0.002	< 0.002
Bromoform	N/L	< 0.0001	< 0.0001	< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005
Bromomethane	N/L	< 0.0003	< 0.0003	< 0.0003	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Carbon Tetrachloride	0.002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorobenzene	0.08	0.0007	0.0033	0.0014	< 0.0005	< 0.0005	< 0.0005	0.0006
Chloroethane	N/L	< 0.0001	< 0.0001	0.0016	< 0.003	< 0.003	< 0.003	< 0.003
Chloroform	N/L	< 0.0003	< 0.0003	< 0.0003	< 0.001	< 0.001	< 0.001	< 0.001
Chloromethane	N/L	< 0.0003	0.0025	0.0003	< 0.002	< 0.002	< 0.002	< 0.002
Chlorotoluene,2-	N/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorotoluene,4-	N/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dibromo-3-Chloropropane, 1,2-	N/L	< 0.001	< 0.001	< 0.001	< 0.0006	< 0.0006	< 0.0006	< 0.0006
Dibromochloromethane	N/L	< 0.0001	< 0.0001	< 0.0001	< 0.002	< 0.002	< 0.002	< 0.002
Dibromoethane,1,2- (Ethylene Dibromide)	N/L	< 0.001	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dibromomethane	N/L	< 0.001	< 0.001	< 0.001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Dichlorobenzene,1,2-	0.2	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dichlorobenzene, 1,3-	N/L	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dichlorobenzene, 1,4-	0.005	0.0007	0.0012	0.001	< 0.0005	< 0.0005	0.0011	0.0009
Dichlorodifluoromethane	N/L	< 0.001	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002
Dichloroethane, 1,1-	N/L	0.0002	0.0002	0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dichloroethane, 1,2-	0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dichloroethylene (vinylidene chloride), 1,1-	0.014	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dichloroethylene, cis-1,2-	N/L	0.0001	0.0001	0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dichloroethylene, trans-1,2-	N/L	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dichloromethane (Methylene Chloride)	0.05	< 0.0003	< 0.0003	< 0.0003	< 0.005	< 0.005	< 0.005	< 0.005
Dichloropropane, 1,2-	0.7	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dichloropropane,1,3-	N/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dichloropropane,2,2-	N/L	< 0.0002	< 0.0002	< 0.0002	-	-	-	-
Dichloropropylene, cis-1,3-	N/L	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dichloropropylene, trans-1,3-	N/L	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dichloropropene,1,1-	N/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Ethylbenzene	0.14	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Hexachlorobutadiene	N/L	< 0.001	< 0.001	< 0.001	< 0.0006	< 0.0006	< 0.0006	< 0.0006
Hexane	N/L	< 0.001	< 0.001	< 0.001	< 0.005	< 0.005	< 0.005	< 0.005
Isopropylbenzene	N/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Isopropyltoluene,4-	N/L	< 0.0004	< 0.0004	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Methyl Butyl Ketone	N/L	< 0.010	< 0.010	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005
Methyl Ethyl Ketone	N/L	< 0.001	< 0.001	< 0.001	< 0.02	< 0.02	< 0.02	< 0.02
Methyl Isobutyl Ketone	N/L	< 0.001	< 0.001	< 0.001	< 0.02	< 0.02	< 0.02	< 0.02
Methyl-t-Butyl Ether	N/L	< 0.001	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002
Naphthalene	N/L	< 0.0007	< 0.0007	< 0.0007	< 0.0004	< 0.0004	< 0.0004	< 0.0004
n-Butylbenzene	N/L	< 0.0007	< 0.0007	< 0.0007	< 0.0004	< 0.0004	< 0.0004	< 0.0004
n-Propylbenzene	N/L	< 0.0004	< 0.0004	< 0.0004	< 0.0001	< 0.0001	< 0.0001	< 0.0001
sec-Butylbenzene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Styrene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
tert-Butylbenzene	N/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Tetrachloroethane, 1,1,1,2-	N/L	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Tetrachloroethane, 1,1,2,2-	N/L	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Tetrachloroethylene (Perchloroethylene)	0.03	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Toluene	0.06	< 0.0005	< 0.0005	< 0.0005	0.0006	< 0.0005	< 0.0005	< 0.0005
Trichlorobenzene,1,2,3-	N/L	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Trichlorobenzene,1,2,4-	N/L	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Trichloroethane, 1,1,1-	N/L	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Trichloroethane, 1,1,2-	N/L	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Trichloroethene (Trichloroethylene)	0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Trichlorofluoromethane	N/L	< 0.0001	< 0.0001	< 0.0001	< 0.005	< 0.005	< 0.005	< 0.005
Trichloropropane,1,2,3-	N/L	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Trimethylbenzene,1,2,4-	N/L	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001
Trimethylbenzene,1,3,5-	N/L	< 0.0006	< 0.0006	< 0.0006	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Vinyl Chloride	0.001	< 0.0002	0.0003	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Xylene	0.09	< 0.0005	< 0.0005	< 0.0004	< 0.0015	< 0.0015	< 0.0015	< 0.0015
m-Xylene & p-Xylene	N/L	< 0.0004	< 0.0004	< 0.0004	< 0.001	< 0.001	< 0.001	< 0.001
o-Xylene	N/L	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005

1. Ontario Drinking Water Standards (ODWS).
2. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.
Bold and shaded values exceed the ODWS.
N/L indicates No Limit.
"-" indicates the parameter was not analyzed.

Greenview ENVIRONMENTAL MANAGEMENT

THE TOWNSHIP OF GREATER MADAWASKA

Table 8
Surface Water Quality
Norway Lake Waste Disposal Site

Parameter	Background	PWQO [1]	SW-1						5-year Trends
	(75th Percentile)		26-May-15	25-May-16	08-May-17	02-May-18	15-May-19	17-May-21	(sparkline)
Alkalinity (as $CaCO_3$)	125	25 % Decrease	143	138	84	85	96	128	
Aluminum	0.039	0.075	**0.0790**	**0.22**	0.06	0.02	0.03	**0.17**	
Ammonia, Total (as N)	0.1	N/L	< 0.1	0.01	< 0.01	0.01	0.03	0.01	
Ammonia, Un-ionized (as N) [2]	0.001	0.02	0.00068	0.000004	0.000265	0.000003	0.000253	0.000154	
Barium	0.12	N/L	0.0700	0.075	0.059	0.046	0.060	0.064	
Biological Oxygen Demand	3	N/L	< 4	< 3	< 2	< 2	< 3	< 3	
Boron	0.03	0.2	0.0245	0.020	0.010	0.016	0.019	0.026	
Calcium	45	N/L	42.8	38.7	29.4	23.7	32.4	38.7	
Chemical Oxygen Demand	49	N/L	31	32	30	23	34	23	
Chloride	2	N/L	1	0.7	0.9	< 0.5	0.7	1.0	
Chromium	0.001	0.001	0.00020	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	
Conductivity (µS/cm) [3]	193	N/L	119	223	109	101	123	260	
Cobalt	0.00034	0.0009	0.000099	0.0003	< 0.0001	< 0.0001	0.0001	0.0002	
Copper	0.001	0.005	0.00127	0.0012	0.0007	0.0005	0.0008	0.0015	
Dissolved Organic Carbon	18.7	N/L	12.1	7.2	11.2	7.6	11.4	9.5	
Dissolved Oxygen	7.22	5	10.12	14.38	12.78	11.10	10.61	8.72	
Hardness	148	N/L	151	138	102	84	113	139	
Iron	0.23	0.3	0.107	**0.748**	0.051	0.024	0.033	0.268	
Magnesium	10	N/L	10.7	10.1	6.82	5.91	7.75	10.2	
Manganese	0.163	N/L	0.00781	0.051	0.004	0.001	0.002	0.025	
pH (units) [3]	7.54	6.5 - 8.5	7.59	**6.18**	8.33	**6.40**	7.80	7.95	
Nitrate (as N)	0.15	N/L	< 0.06	0.1	0.07	< 0.05	< 0.05	0.13	
Nitrite (as N)	0.06	N/L	< 0.03	< 0.1	< 0.05	< 0.05	< 0.05	0.07	
Phenols	0.001	0.001	< 0.001	< 0.001	**0.005**	< 0.001	< 0.002	< 0.001	
Phosphorus, Total	0.043	0.03	0.012	**0.08**	0.02	0.02	**0.03**	0.02	
Potassium	1.4	N/L	1.43	1.0	1.2	1.0	1.0	1.0	
Silicon	5	N/L	4.40	3.96	3.51	2.72	3.17	3.71	
Sodium	2	N/L	1.84	1.7	1.4	1.1	1.4	1.9	
Strontium	0.14	N/L	0.124	0.114	0.081	0.072	0.090	0.112	
Total Dissolved Solids	208	N/L	137	141	98	87	106	133	
Total Kjeldahl Nitrogen	0.7	N/L	< 0.5	0.65	1.8	0.3	0.3	0.4	
Total Suspended Solids	11	N/L	3	22	< 3	< 3	< 3	< 3	
Zinc	0.0065	0.02	0.003	< 0.005	< 0.005	< 0.005	0.010	0.013	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.
Bold and shaded values exceed the PWQO.
N/L indicates No Limit.
"-" indicates the parameter was not analyzed.

Greenview ENVIRONMENTAL MANAGEMENT

THE TOWNSHIP OF GREATER MADAWASKA

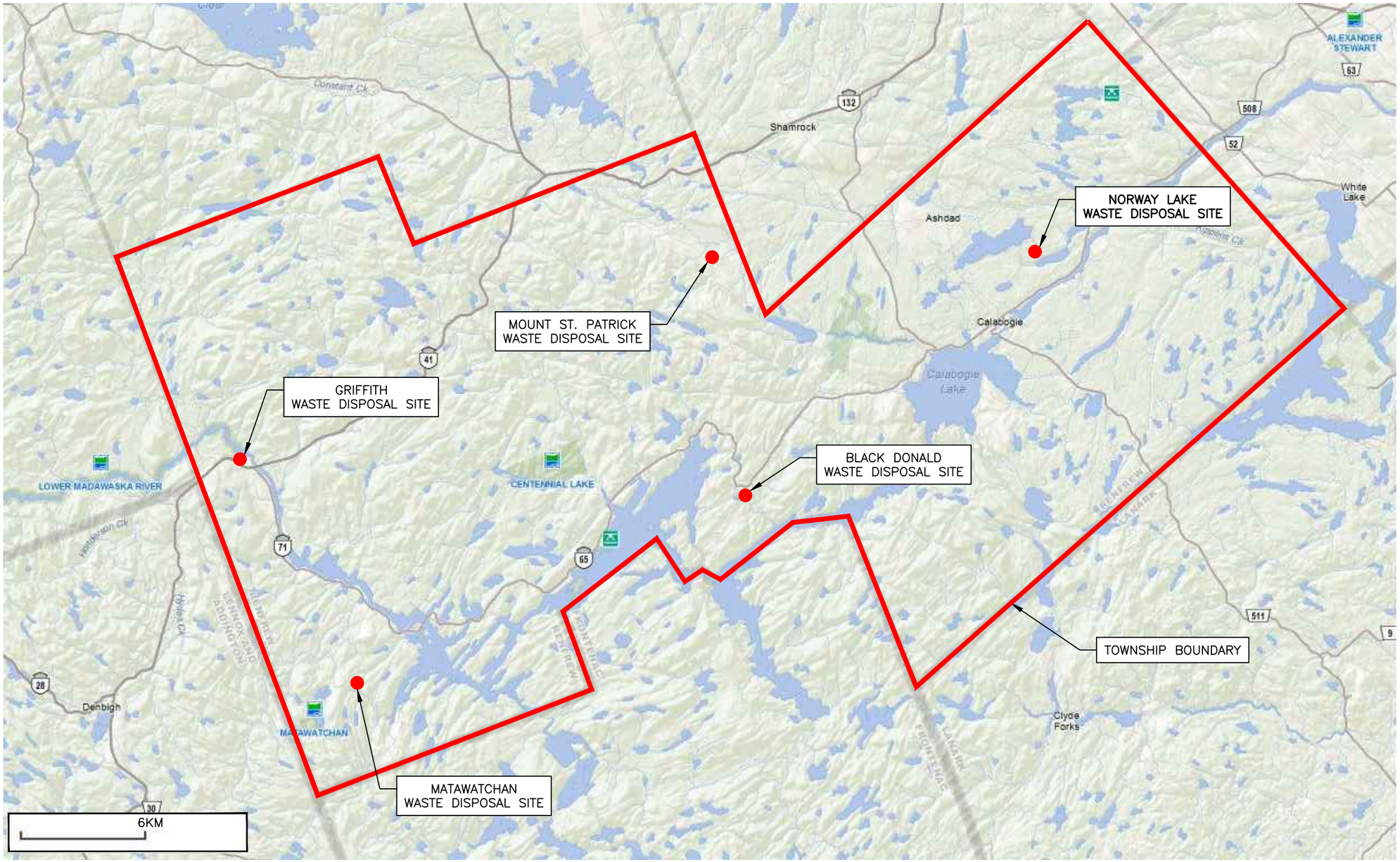
Table 8
Surface Water Quality
Norway Lake Waste Disposal Site

Parameter	Background	PWQO [1]	SW-4 (Background)			5-year Trends
	(75th Percentile)		25-May-16	08-May-17	02-May-18	(sparkline)
Alkalinity (as $CaCO_3$)	125	25 % Decrease	174	88	60	
Aluminum	0.039	0.075	0.02	0.04	0.04	
Ammonia, Total (as N)	0.1	N/L	< 0.01	< 0.01	0.04	
Ammonia, Un-ionized (as N) [2]	0.001	0.02	0.00009	0.00024	0.00001	
Barium	0.12	N/L	0.127	0.063	0.048	
Biological Oxygen Demand	3	N/L	< 3	< 2	< 2	
Boron	0.03	0.2	0.031	0.014	0.013	
Calcium	45	N/L	48.6	30.0	21.5	
Chemical Oxygen Demand	49	N/L	31	30	35	
Chloride	2	N/L	0.9	0.7	< 0.5	
Chromium	0.001	0.001	< 0.002	< 0.001	< 0.001	
Conductivity (µS/cm) [3]	193	N/L	262	103	109	
Cobalt	0.00034	0.0009	0.0001	< 0.0001	0.0001	
Copper	0.001	0.005	0.0009	0.0008	0.0006	
Dissolved Organic Carbon	18.7	N/L	13.0	11.0	9.5	
Dissolved Oxygen	7.22	5	9.87	11.02	6.24	
Hardness	148	N/L	172	106	72	
Iron	0.23	0.3	0.096	0.016	0.121	
Magnesium	10	N/L	12.4	7.57	4.36	
Manganese	0.163	N/L	0.150	0.003	0.033	
pH (units) [3]	7.54	6.5 - 8.5	7.48	8.29	**6.45**	
Nitrate (as N)	0.15	N/L	0.2	0.19	< 0.05	
Nitrite (as N)	0.06	N/L	< 0.1	< 0.05	< 0.05	
Phenols	0.001	0.001	< 0.001	**0.004**	< 0.001	
Phosphorus, Total	0.043	0.03	0.02	0.01	**0.10**	
Potassium	1.4	N/L	1.3	1.3	1.3	
Silicon	5	N/L	3.63	3.62	2.80	
Sodium	2	N/L	2.5	1.6	2.2	
Strontium	0.14	N/L	0.117	0.066	0.089	
Total Dissolved Solids	208	N/L	176	103	60	
Total Kjeldahl Nitrogen	0.7	N/L	0.42	0.4	0.7	
Total Suspended Solids	11	N/L	< 3	3	8	
Zinc	0.0065	0.02	< 0.005	< 0.005	**0.025**	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.
Bold and shaded values exceed the PWQO.
N/L indicates No Limit.
"-" indicates the parameter was not analyzed.

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
0	NOV08-22	THP	ISSUED FOR REPORT

DRAWN BY: MAG	CHECKED BY: MAG
DESIGNED BY: MAG	APPROVED BY: THP
SCALE: AS NOTED	DATE: NOV-22

CLIENT: THE TOWNSHIP OF GREATER MADAWASKA

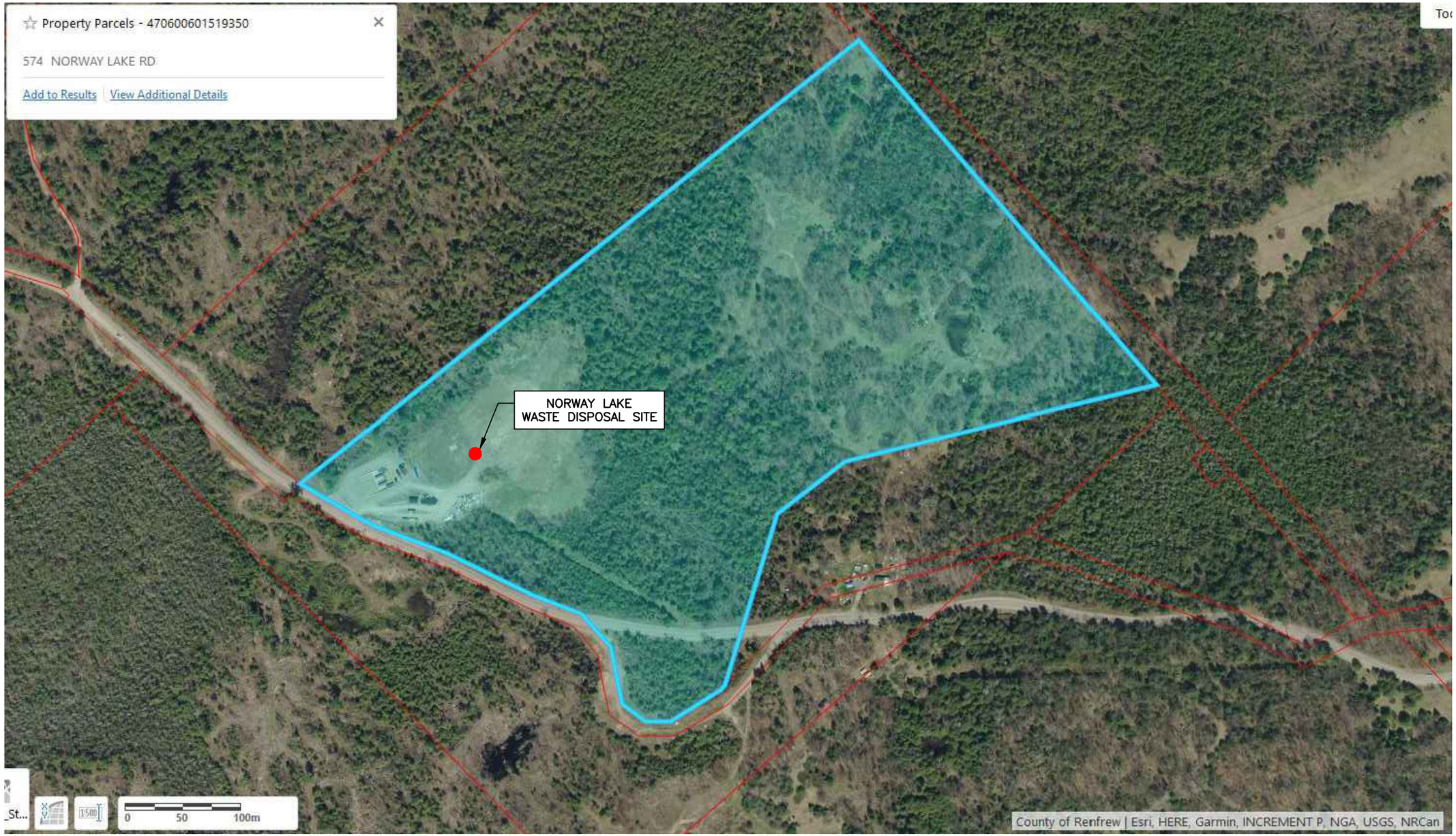
PROJECT:

REGIONAL LOCATION PLAN
2022 ANNUAL REPORT
NORWAY LAKE WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

PROJECT No: 102.22.013

FIGURE: 1

G:\AutoCAD\102 Greater Madawaska\013 Norway Lake WDS\dwg\102.22.013 - TGM - NL - 2022 AR FIGURES - DRAFT.dwg



SOURCE: COUNTY OF RENFREW GIS, 2021.

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MAG	MAG
DESIGNED BY:	APPROVED BY:
MAG	THP
SCALE:	DATE:
AS NOTED	NOV–22

CLIENT: THE TOWNSHIP OF GREATER MADAWASKA

PROJECT:

PROPERTY PLAN
2022 ANNUAL REPORT
NORWAY LAKE WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

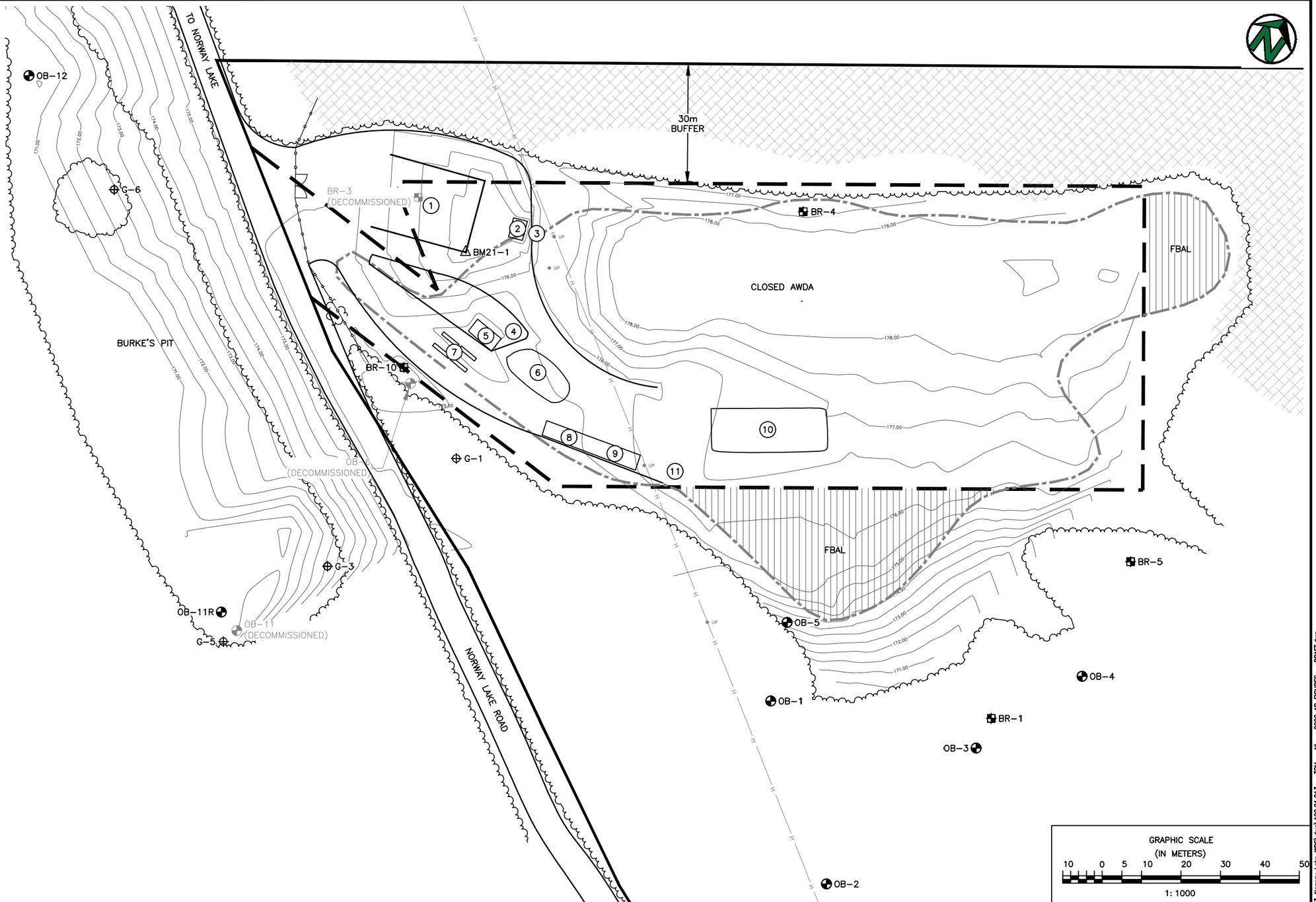
PROJECT No: 102.22.013

FIGURE: 2

G:\AutoCAD\102 Greater Madawaska\013 Norway Lake WDS\dwg\102.21.013 - TQM - NL - 2022 AR FIGURES - DRAFT.dwg

LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA (AWDA)
- LIMIT OF EXISTING WASTE
- 178.00 TOPOGRAPHIC CONTOUR LINE
- ON-SITE ROAD
- FENCELINE
- APPROXIMATE TREE LINE
- ROCK OUTCROP
- H OVERHEAD UTILITIES
- UP OVERHEAD UTILITY POLE
- FILL BEYOND APPROVED LIMITS (FBAL)
- G-1 PIEZOMETER
- OB-11 OVERBURDEN GROUNDWATER MONITORING WELL
- BR-1 BEDROCK GROUNDWATER MONITORING WELL
- BM BENCHMARK
- (1) MSW & BLUE BOX RECYCLING TRANSFER STATION
- (2) ATTENDANT'S OFFICE & PRIVY
- (3) ORGANIC WASTE
- (4) WASTE ELECTRICAL & ELECTRONIC EQUIPMENT (WEEE)
- (5) ANCILLARY STORAGE BUILDING
- (6) TIRES
- (7) CONSTRUCTION + DEMOLITION (C+D) & BULKY WASTE
- (8) REFRIGERANT APPLIANCES
- (9) SCRAP METAL & WHITE GOODS
- (10) CLEAN WOOD, BRUSH & LEAF + YARD (L+Y) WASTE
- (11) EMPTY ROLL OFF BIN STORAGE AREA



NOTES

1. BENCHMARKS
   BM21-1
   PAINTED TARGET ON SE CORNER OF TRANSFER STATION
   ELEVATION = 177.35m
2. DRAWING BASED ON DIGITAL INFORMATION PROVIDED BY GOLDER ASSOCIATES, 2006.
3. TOPOGRAPHICAL SURVEY CONDUCTED BY GREENVIEW ENVIRONMENTAL ON AUGUST 12, 2021.

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SCALE: 1:1000	DATE: NOV-22

CLIENT: THE TOWNSHIP OF GREATER MADAWASKA

PROJECT:

EXISTING SITE CONDITIONS PLAN
2022 ANNUAL REPORT
NORWAY LAKE WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

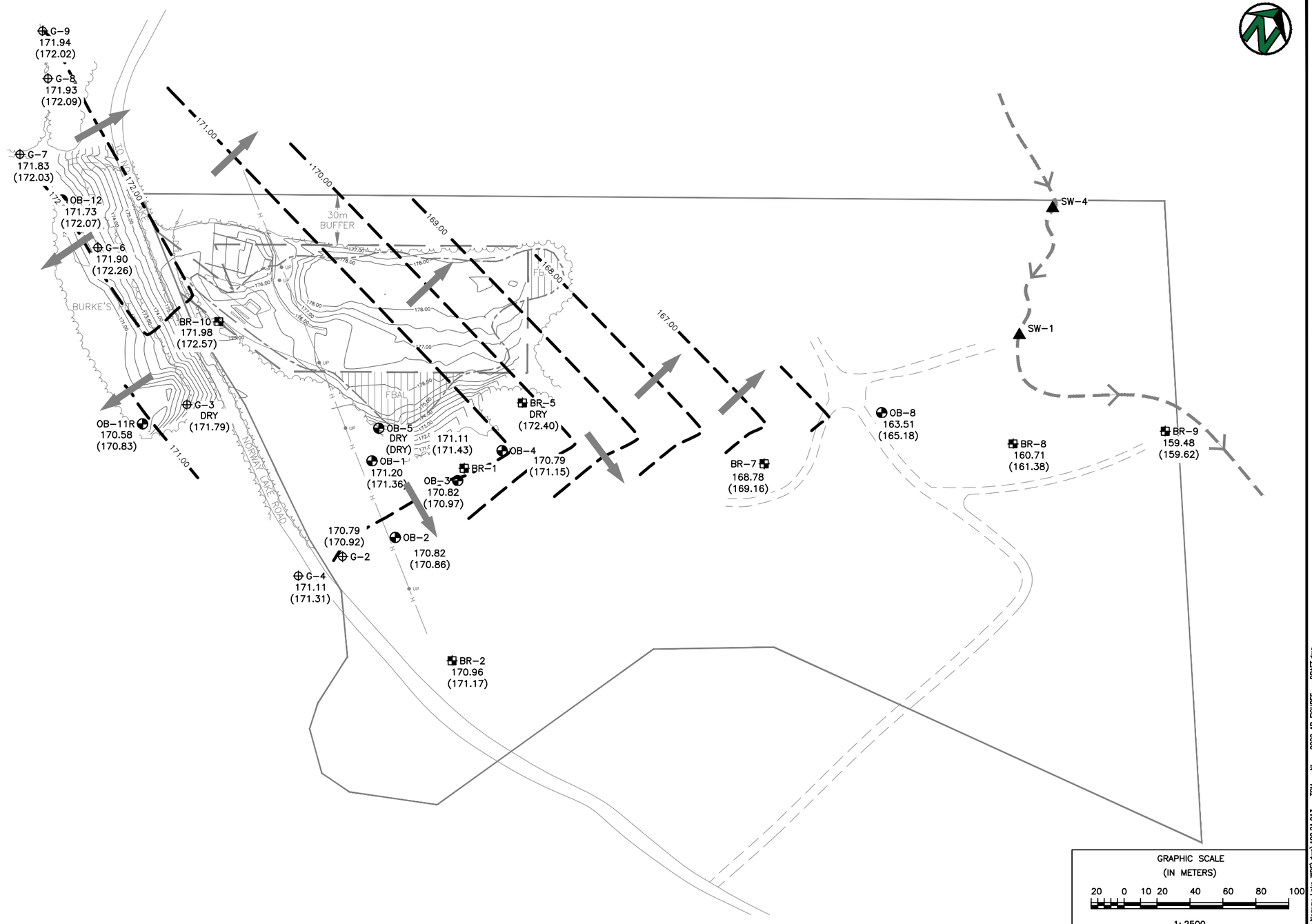
PROJECT No: 102.22.013

FIGURE: 3

G:\AutoCAD\102 Greater Madawaska\013 Norway Lake WDS\dwg\102.21.013 - TGM - NL - 2022 AR FIGURES - DRAFT.dwg

LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- LIMIT OF EXISTING WASTE
- 178.00 — TOPOGRAPHIC CONTOUR LINE
- ON-SITE ROAD
- FENCELINE
- APPROXIMATE TREE LINE
- H — OVERHEAD UTILITIES
- UP — OVERHEAD UTILITY POLE
- G-1 — PIEZOMETER
- OB-11 — OVERBURDEN GROUNDWATER MONITORING WELL
- BR-1 — BEDROCK GROUNDWATER MONITORING WELL
- SW-1 — SURFACE WATER SAMPLING LOCATION
- 169.00 — EQUIPOTENTIAL CONTOUR (MAY 05, 2022)
- 171.23 (171.44) — GROUNDWATER ELEVATIONS AUGUST 17, 2022 (MAY 05, 2022)
- GROUNDWATER FLOW DIRECTION
- BM — BENCHMARK
- FILL BEYOND APPROVED LIMITS (FBAL)



NOTES

1. BENCHMARKS
   BM21-1
   PAINTED TARGET ON SE CORNER OF TRANSFER STATION
   ELEVATION = 177.35m
2. DRAWING BASED ON DIGITAL INFORMATION PROVIDED BY GOLDER ASSOCIATES, 2006.
3. TOPOGRAPHICAL SURVEY CONDUCTED BY GREENVIEW ENVIRONMENTAL ON AUGUST 12, 2021.

GRAPHIC SCALE
(IN METERS)
20 0 10 20 40 60 80 100
1: 2500

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CLIENT: THE TOWNSHIP OF GREATER MADAWASKA

PROJECT:
ENVIRONMENTAL MONITORING LOCATION PLAN – SPRING OVERBURDEN
2022 ANNUAL REPORT
NORWAY LAKE WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

PROJECT No: 102.22.013
FIGURE: 4

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LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- LIMIT OF EXISTING WASTE
- 178.00 — TOPOGRAPHIC CONTOUR LINE
- ON-SITE ROAD
- FENCELINE
- APPROXIMATE TREE LINE
- H — OVERHEAD UTILITIES
- UP — OVERHEAD UTILITY POLE
- G-1 — PIEZOMETER
- OB-11 — OVERBURDEN GROUNDWATER MONITORING WELL
- BR-1 — BEDROCK GROUNDWATER MONITORING WELL
- SW-1 — SURFACE WATER SAMPLING LOCATION
- 169.00 — EQUIPOTENTIAL CONTOUR (MAY 05, 2022)
- 171.23 (171.44) — GROUNDWATER ELEVATIONS AUGUST 17, 2022 (MAY 05, 2022)
- GROUNDWATER FLOW DIRECTION
- BM — BENCHMARK
- FILL BEYOND APPROVED LIMITS (FBAL)

GRAPHIC SCALE
(IN METERS)
20 0 10 20 40 60 80 100
1: 2500

NOTES

1. BENCHMARKS
   BM21-1
   PAINTED TARGET ON SE CORNER OF TRANSFER STATION
   ELEVATION = 177.35m
2. DRAWING BASED ON DIGITAL INFORMATION PROVIDED BY GOLDER ASSOCIATES, 2006.
3. TOPOGRAPHICAL SURVEY CONDUCTED BY GREENVIEW ENVIRONMENTAL ON AUGUST 12, 2021.

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CLIENT: THE TOWNSHIP OF GREATER MADAWASKA

PROJECT:
ENVIRONMENTAL MONITORING LOCATION PLAN – SPRING BEDROCK
2022 ANNUAL REPORT
NORWAY LAKE WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

PROJECT No: 102.22.013

FIGURE: 5

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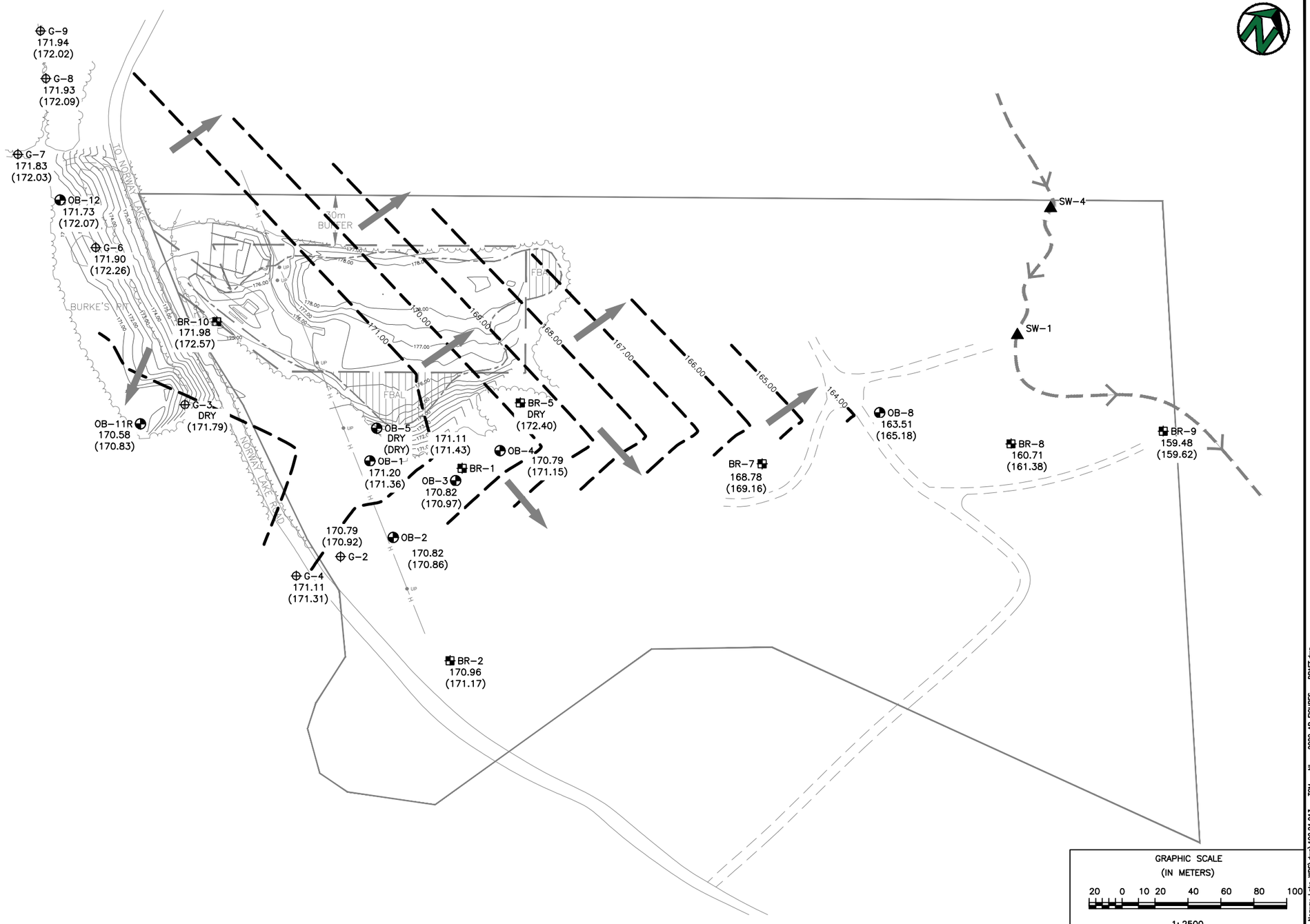
LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- LIMIT OF EXISTING WASTE
- 178.00 — TOPOGRAPHIC CONTOUR LINE
- ON-SITE ROAD
- FENCELINE
- APPROXIMATE TREE LINE
- H — OVERHEAD UTILITIES
- UP — OVERHEAD UTILITY POLE
- G-1 — PIEZOMETER
- OB-11 — OVERBURDEN GROUNDWATER MONITORING WELL
- BR-1 — BEDROCK GROUNDWATER MONITORING WELL
- SW-1 — SURFACE WATER SAMPLING LOCATION
- 169.00 — EQUIPOTENTIAL CONTOUR (AUGUST 17, 2022)
- 171.23 (171.44) — GROUNDWATER ELEVATIONS AUGUST 17, 2022 (MAY 05, 2022)
- GROUNDWATER FLOW DIRECTION
- BM — BENCHMARK
- FILL BEYOND APPROVED LIMITS (FBAL)



NOTES

1. BENCHMARKS
   BM21-1
   PAINTED TARGET ON SE CORNER OF TRANSFER STATION
   ELEVATION = 177.35m
2. DRAWING BASED ON DIGITAL INFORMATION PROVIDED BY GOLDER ASSOCIATES, 2006.
3. TOPOGRAPHICAL SURVEY CONDUCTED BY GREENVIEW ENVIRONMENTAL ON AUGUST 12, 2021.

GRAPHIC SCALE
(IN METERS)
20 0 10 20 40 60 80 100
1: 2500

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No.	DATE	BY	REMARKS
0	NOV08-22	THP	ISSUED FOR REPORT

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SCALE: 1:2500 | DATE: NOV-22

CLIENT: THE TOWNSHIP OF GREATER MADAWASKA

PROJECT:
ENVIRONMENTAL MONITORING LOCATION PLAN – SUMMER OVERBURDEN
2022 ANNUAL REPORT
NORWAY LAKE WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

PROJECT No: 102.22.013
FIGURE: 6

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LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- LIMIT OF EXISTING WASTE
- 178.00 — TOPOGRAPHIC CONTOUR LINE
- ON-SITE ROAD
- FENCELINE
- APPROXIMATE TREE LINE
- H — OVERHEAD UTILITIES
- UP — OVERHEAD UTILITY POLE
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- OB-11 — OVERBURDEN GROUNDWATER MONITORING WELL
- BR-1 — BEDROCK GROUNDWATER MONITORING WELL
- SW-1 — SURFACE WATER SAMPLING LOCATION
- 169.00 — EQUIPOTENTIAL CONTOUR (AUGUST 17, 2022)
- 171.23 (171.44) — GROUNDWATER ELEVATIONS AUGUST 17, 2022 (MAY 05, 2022)
- GROUNDWATER FLOW DIRECTION
- BM — BENCHMARK
- FILL BEYOND APPROVED LIMITS (FBAL)

NOTES

1. BENCHMARKS
   BM21-1
   PAINTED TARGET ON SE CORNER OF TRANSFER STATION
   ELEVATION = 177.35m
2. DRAWING BASED ON DIGITAL INFORMATION PROVIDED BY GOLDER ASSOCIATES, 2006.
3. TOPOGRAPHICAL SURVEY CONDUCTED BY GREENVIEW ENVIRONMENTAL ON AUGUST 12, 2021.

GRAPHIC SCALE
(IN METERS)
20 0 10 20 40 60 80 100
1: 2500

Greenview ENVIRONMENTAL MANAGEMENT
13 Commerce Court
Bancroft, Ontario
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No.	DATE	BY	REMARKS
0	NOV08-22	THP	ISSUED FOR REPORT

DRAWN BY: MAG | CHECKED BY: MAG
DESIGNED BY: MAG | APPROVED BY: THP
SCALE: 1:2500 | DATE: NOV-22

CLIENT: THE TOWNSHIP OF GREATER MADAWASKA

PROJECT:
ENVIRONMENTAL MONITORING LOCATION PLAN – SUMMER BEDROCK
2022 ANNUAL REPORT
NORWAY LAKE WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

PROJECT No: 102.22.013
FIGURE: 7
7 OF 7

G:\AutoCAD\102 Greater Madawaska\013 Norway Lake WDS\dwg\102.21.013 - TGM - NL - 2022 AR FIGURES - DRAFT.dwg

Appendix A

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A411702
Notice No. 1
Issue Date: September 26, 2013

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

Site Location: Norway Lake Waste Disposal Site
574 Norway Lake Road
Lot Part of 20, Concession 7
Greater Madawaska Township, County of Renfrew

You are hereby notified that I have amended Approval No. A411702 issued on April 9, 2013 fora 18.47 hectare Waste Disposal Site consisting of a 1.37 hectare landfill and a transfer station, as follows:

The following Condition is hereby added to the ECA:

4.5 The Trigger Mechanism Plans and Contingency Plans to address potential off-site exceedances related to groundwater and surface water shall be carried out by the *Owner* in accordance with Item 30 in Schedule "A".

The following Condition is hereby amended as follows:

5.1 The contingency plan to reduce or otherwise control, to prevent adverse impacts resultant from leachate, noise, dust, odour, litter, traffic, or vermin associated with the operation of the *Site* carried out by the *Owner* in accordance with Item 30 in Schedule "A".

The following Item is hereby added to Schedule "A":

30. Letter report dated May 31, 2013 addressed to Director, Environmental Approvals Branch from Mr. Dan Hagan, Greenview Environmental Management Limited providing various contingency plans related to groundwater, surface water, litter, noise, odour, traffic, dust and vermin.

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

1. The reasons for Condition Nos. 4.5 and 5.1 is to incorporate and approve the trigger mechanism plan into the ECA. This is to ensure the long-term health and safety of the public and the environment.

This Notice shall constitute part of the approval issued under Approval No. A411702 dated April 9, 2013

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) 314-3717 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 26th day of September, 2013

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

DG/
c: District Manager, MOE Ottawa
Dan Hagan, Greenview Environmental Management

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A411702
Issue Date: April 9, 2013

The Corporation of the Township of Greater Madawaska
1101 Francis St.
PO Box 180
Greater Madawaska, Ontario
K0J 1H0

Site Location: Norway Lake Waste Disposal Site
574 Norway Lake Road
Part Lot 20, Concession 7, Geographic Township of Bagot
Township of Greater Madawaska, County of Renfrew

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

a Waste Disposal Site consisting of a closed landfill and a transfer station.

For the purpose of this environmental compliance approval, the following definitions apply:

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

- "Buffer" means those lands between the limit of fill and the boundaries of the property owned by the Township, that shall in no instance be less than 30 meters, as identified in Schedule "A"

- "Director" means any Ministry employee appointed in writing by the Minister pursuant to section 5 of the EPA as a Director for the purposes of Part V of the EPA

- "District Manager" means the District Manager of the local district office of the Ministry in which the Site is geographically located

- "Engineer" means a professional engineer licenced under the Ontario Professional Engineers Act

- "EPA" means Environmental Protection Act, R.S.O. 1990, c. E. 19, as amended

- "Landfill" means the part of the Site comprising the Limit of Fill and the Buffer

- "Limit of Fill" means the area in which waste is approved for final disposal according to this Approval

- "Ministry" and "MOE" means the Ontario Ministry of the Environment

- "ODWS" and/or "ODWQS" means the Ontario Drinking Water Quality Standards as amended from time to time.

- "Operator" means any person, other than the Owner's employees, authorized by the Owner as having the charge, management or control of any aspect of the Site and includes its successors or assigns

- "organic waste" means waste from kitchens, restaurants, food processing operations, waste of vegetable and animal origin, packaging materials that have been in direct contact with and are contaminated by these wastes and waste of a similar nature and characteristics, including waste that is liable to become putrid, rotten or decayed

- "OWRA" means the Ontario Water Resources Act, R.S.O. 1990, c. O.40, as amended

- "Provincial Officer" means any person designated in writing by the Minister as a provincial officer pursuant to section 5 of the OWRA or section 5 of the EPA or section 17 of PA

- "PWQO" means the Provincial Water Quality Objectives included in the July 1994 publication entitled Water Management Policies, Guidelines, Provincial Water Quality Objectives, as amended from time to time

- "Regional Director" means the Regional Director of the local Regional Office of the Ministry in which the Site is located

- "Regulation 347" or "Reg. 347" means Regulation 347, R.R.O. 1990, General - Waste Management made under the EPA, as amended from time to time

- "Site" means the property, located at 574 Norway Lake Road, Part Lot 20, Concession 7, Geographic Township of Bagot, Township of Greater Madawaska, County of Renfrew

- "Township" means the Corporation of the Township of Greater Madawaska

- "Trained personnel" means knowledgeable in the following through instruction and/or practice:
    (a) relevant waste management legislation, regulations and guidelines
    (b) major environmental concerns pertaining to the waste to be handled
    (c) occupational health and safety concerns pertaining to the processes and wastes to be handled
    (d) management procedures including the use and operation of equipment for the processes and wastes to be handled
    (e) emergency response procedures
    (f) specific written procedures for the control of nuisance conditions
    (g) specific written procedures for refusal of unacceptable waste loads

(h) the requirements of this Approval

- "waste electrical and electronic equipment" means devices listed in Schedules 1 through 7 of Ontario Regulation 393/04, Waste Electrical and Electronic Equipment made under the Waste Diversion Act 2002

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1.0 General

1.1 This Approval revokes all previously issued Approvals issued under Part V, EPA, for this Site. The Approval given herein, including the Terms and Conditions set out, replaces all previously issued Approvals and related Terms and Conditions under Part V, EPA for this Site.

1.2 The Site shall be constructed and operated in accordance with Item 1 in Schedule "A" (the Site Development, Operation and Closure Report) and in accordance with all other applicable construction and operation documents listed in Schedule "A" to this Approval.

1.3 Schedules A and B are integral parts of these Conditions of Approval.

1.4 Pursuant to Section 197 of the EPA, neither the Township nor any person having an interest in the Property shall deal with the Property in any way without first giving a copy of this Approval to each person acquiring an interest in the Property as a result of the dealing.

1.5 Should there be any discrepancies between items in Schedule "A", and the conditions in this Approval, the conditions shall take precedence. In all matters requiring the interpretation and implementation of this Approval, the conditions of the Approval shall take precedence, followed in descending order by: the Township's application; and the documentation referred to in this Approval which is submitted in support of the application, with the most recent documents taking precedence.

1.6 The Township shall comply with the Conditions and schedules in this Approval. The requirements specified in this Approval are minimum requirements and do not abrogate the need to take all reasonable steps to avoid violating the provisions of other applicable legislation.

1.7 The requirements of this Approval are severable. If any requirement of this Approval, or the application of any requirement of this Approval, due to any circumstances, is held invalid, the application of such requirement to other circumstances and the remainder of this Approval shall not be affected thereby.

1.8 The Township shall allow MOE personnel, or a MOE authorized representative(s), upon presentation of credentials, to:
(a) carry out any and all inspections authorized by the EPA, OWRA, or the Pesticides Act, R.S.O.

1990, as amended from time to time, of any place to which this Approval relates, and without restricting the generality of the foregoing, to:

(b) (i) enter upon the premises or the location where the records required by the conditions of this Approval are kept

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

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

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

1.9 The Township shall, forthwith upon request of the Director, District Manager, or Provincial Officer (as defined in the EPA), furnish any information requested by such persons with respect to compliance with this Approval, including but not limited to, any records required to be kept under this Approval.

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

(a) the receipt of Information by the Ministry

(b) the acceptance by the Ministry of the Information's completeness or accuracy

(c) the failure of the Ministry to prosecute, or to require the Township to take any action, under this 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 Township relating to the Information, amounting to non-compliance with this Approval or any statute or regulation.

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

(a) change of owner or operator of the Site or both

(b) change of address or address of the new owner or operator

(c) change of partners where the owner 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

Closed Landfill

2.0 Site Design and Development

2.1 Any significant design optimization or modification not otherwise requiring an amendment to this Approval shall be submitted to the Regional Director for approval at least 60 days prior to its implementation along with an explanation of the reasons.

2.2 Waste may only have been disposed at the Norway Lake waste disposal site in accordance with

Items 8, 9, 10, and 12 of Schedule A and the Amendment to the Approval (A411702) dated January 15, 2001.

2.3 The Buffer shall not be used for waste disposal but may be used for receiving and recording waste arrivals, monitoring, surface water management, and the operation of other approved ancillary waste management facilities to include, but not necessarily be limited to, scrap metal recycling piles, tire recycling piles, recycling bins, a re-use area, brush and wood chipping and storage areas, and a concrete storage area, all in accordance with Items 1, 8, 9, 10, 12, 15, 18, 20, and 21 in Schedule "A". All parts of the Buffer, other than roadways, parking areas and structures shall be maintained with a healthy vegetative cover or other appropriate surface treatment which will minimize erosion.

2.4 The Township shall ensure compliance with MOE Guideline B-7 Reasonable Use Concept, at the property line.

3.0 Site Operations

3.1 Equipment maintenance and administrative functions may occur at any time. Upon reasonable notification of the District Manager, contingency actions may proceed outside of the normal hours of operation. Emergency response may occur at any time, as required.

3.2 During non-operating hours, the Landfill entrance and exit gates will be locked or otherwise secured against access by unauthorized persons.

3.3 Access to the Landfill shall be via the existing main entrance from Norway Lake Road, as shown in Figure 3 in Item 1 of Schedule "A" (Site Development, Operation and Closure Report). Any changes to the main Landfill entrance or exit shall be submitted to the Director for prior approval. Other service entrances may be established for access by Township staff or contractors, or for contingency or emergency use, provided that they are secured from entry when not in use.

3.4 Scavenging at the Norway Lake WDS is prohibited, except at a designated re-use area under the supervision of the Site attendant.

3.5 The Township shall take all practical steps to prevent the escape of litter from the Site. Periodic pick-up of litter at the Site and along the Access Road in the vicinity of the Site shall be carried out as required. Private property adjacent to the Landfill shall be inspected weekly and litter shall be collected if necessary, with permission of access from the property owner.

3.6 The Township shall ensure that all employees that operate any aspect of the Site, receive initial and ongoing training with respect to the following: the Approval and Conditions attached to the Approval, the Design & Operations Report; relevant waste management regulations and legislation; environmental concerns related to the waste being handled at the site; occupational health and safety concerns pertaining to the waste being handled at the Site; fire fighting protocol; and emergency and contingency measures for the preventing of off-site impacts.

3.7 No water obtained from surface water or from a well constructed on the Site shall be used for

drinking purposes without prior approval from the District Manager. Any water supply system that obtains water from a well or surface water source on the Site shall be clearly marked to indicate that the water is not potable.

3.8 Where existing cover material has eroded such that waste is exposed, the cover material shall be promptly replaced.

4.0 Monitoring

4.1 The Township shall monitor groundwater and surface water as per Schedule "B". The Township may amend Schedule "B" from time-to-time with the prior written consent of the Director.

4.2 All monitoring wells which form part of any monitoring program shall be properly capped, locked and protected from damage. Any groundwater monitoring wells that are damaged shall be repaired, replaced forthwith or properly abandoned.

4.3 In the event that the results of the monitoring programs listed in Schedule "B" are such that an off-site exceedance of the Reasonable Use Policy and/or PWQO has occurred as a result of the operation of the Landfill Site, the Township shall notify the Regional Director as soon as reasonably possible and specify the following:

(a) details of the off-site exceedance, confirmatory monitoring requirements and the potential off-site impacts to surface water and groundwater users
(b) the extent and timing of contingency measures to be implemented
(c) modifications, if any, which should be made to the monitoring program
(d) other mitigation measures, if any, which may be necessary to reduce or prevent off-site impacts

4.4 In the event that the results of the monitoring programs listed in Schedule "B" are such that an off-site exceedance of the Reasonable Use Policy and/or PWQO can reasonably be predicted to occur, the Township shall include in the annual report:

(a) the details of any such predicted off-site exceedance, including the assumptions upon which the prediction is based
(b) a discussion of the modifications, if any, to intended operations which would be necessary to prevent the predicted off-site exceedance
(c) a discussion of the modifications, if any, which should be made to the monitoring program
(d) a discussion of other mitigation measures or contingency actions, if any, which may be necessary to prevent off-site impacts

5.0 Contingency Plans

5.1 The Township shall have in place a written contingency plan to reduce or otherwise control, to prevent
adverse impacts resultant from leachate, noise, dust, odour, litter, traffic, or vermin associated with the operation of the Site. The contingency plan shall be submitted for approval to the Director by June 3, 2013.

6.0 Closure

6.1 The Township shall continue to be responsible for the operation, maintenance and monitoring of the Site until such time as the Township can demonstrate to the Director that the leachate being produced at the site would not cause an exceedance ofthe PWQO, ODWS, Reasonable Use Guideline and/or all other relevant statutes and policies respecting groundwater and surface water as may be applicable at that time.

7.0 Reporting

7.1 An Annual Report on the development, operation and monitoring of the Site shall be submitted by the Township to the District Manager no later than March 31 of the year following the period being reported upon.

7.2 The Report shall be prepared by, or under the direction of, a qualified Engineer and shall include, as a minimum, the following elements:

(a) Executive Summary
  (i) A summary of findings, conclusions and recommendations.

(b) Site Operations
  (i) A Site plan of the landfilling area showing: the final extent of the Limit of Fill with contours and any changes to the Site layout.
  (ii) A summary of complaints regarding the Site operations and the Township's response.
  (iii) An assessment as to whether or not the Township is operating the Site in a manner consistent with the Conditions of this Approval.

(c) Environmental Quality Monitoring
  (i) Site plan only if there has been any changes to the monitoring network.
  (ii) An analysis and interpretation of the surface water and groundwater monitoring data.
  (iii) An assessment of the surface water quality at the Site boundaries with respect to PWQO.
  (iv) An assessment of the adequacy of the natural attenuation of leachate generated by the Landfill.
  (v) An assessment of the physical condition of the groundwater monitoring well installations.

(d) Information about the inspections conducted, the results and the remedial actions taken, as required by Condition 8.1:
  (i) quarterly inspection of cover
  (ii) biannual inspection of vegetative cover
  (iii) quarterly inspection of leachate seeps
  (iv) quarterly inspection of slope erosion
  (v) quarterly inspection of other nuisance factors

(e) Recommendations
  (i) Recommendations respecting any proposed changes to the surface water or

groundwater monitoring programs or any repairs required to the monitoring well network.

(ii) Recommendations respecting any proposed changes to the operation of the landfill.

(iii) Recommendations respecting the requirement for any remedial works or contingency actions based on the monitoring results or operation of the Site.

8.0 Inspection

8.1 Following the application of the cover and seeding, the Township shall:

(a) inspect the cover integrity on a quarterly basis. If cover integrity is damaged, then the necessary remedial measure shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting).

(b)inspect the vegetative cover in the fall and spring seasons. Any deficiencies in the vegetative cover shall be repaired as soon as weather and equipment availability permits.

(c) inspect for leachate seeps on a quarterly basis. If a leachate seep is observed, then the necessary remedial measures shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting).

(d) inspect for slope erosion on a quarterly basis. If erosion is observed, then the necessary remediation measures shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting).

(e) inspect for other nuisance factors (litter, rodents, bears) on a quarterly basis. If any problems are observed, then the necessary remedial measures shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting).

Transfer Station

9.0 Waste Types and Processes

9.1 The Transfer Station (TS) shall only accept wastes generated by ratepayers in the Township or from a municipality that abuts the Township.

9.2 The Transfer Station shall be designed, developed, built, operated, maintained, and the management and disposal of all waste shall be carried out, in accordance with the EPA, Regulation 347, and except as otherwise provided by this Approval, with the application for this Approval, dated June 8, 2007, and the supporting documentation listed in Schedule "A". At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

9.3 All waste shall be inspected by Trained personnel prior to being accepted at the Transfer Station to ensure that the waste is of a type approved for acceptance under this Approval.

9.4 The Transfer Station shall only accept the following types of residential and industrial, commercial, and institutional (IC&I) waste and recyclables:

(a) residential and IC&I waste

(b) blue-box recyclables
(c) source separated organics (SSO)
(d) waste tires
(e) leaf and yard waste
(f) waste electrical and electronic equipment (WEEE)
(g) refrigerant appliances
(h) scrap metal
(i) construction and demolition (C&D) and bulky waste

9.5 The maximum amount of solid non-hazardous waste and recyclables that can be accepted at the Site is 200 cubic metres per day.

9.6 (a) The maximum amount of non-hazardous solid waste and recyclable materials to be stored or be present at the Site at any given time shall not exceed 910 cubic metres, as per Condition 9.6 (b).

(b) The maximum amount of each type non-hazardous solid waste and recyclable materials to be stored or be present at the Site at any give time shall be:
(i) residential and IC&I waste - 120 cubic metres
(ii) blue-box recycables - 240 cubic metres
(iii) source separated organics (SSO) contained in locking, bear-proof roll-off container - 20 cubic metres
(iv) waste tires - 100 cubic metres
(v) leaf and yard waste - 200 cubic metres
(vi) waste electrical and electronic equipment (WEEE) - 40 cubic metres
(vii) refrigerant appliances - 25 cubic metres
(viii) scrap metal - 60 cubic metres
(ix) construction and demolition (C & D) and bulky waste contained in two (2) forty (40) cubic metre containers and one (1) twenty-five (25) cubic metre container - 105 cubic metres

9.7 (a) Normal operating hours of the Transfer Station shall be:
Wednesday - 8:00 a.m. to 4:00 p.m.
Saturday - 8:00 a.m. to 4:00 p.m.
Sunday (Victoria Day to Thanksgiving) - 10:00 a.m. to 8:00 p.m.
Sunday (Thanksgiving to Victoria Day) - 10:00 a.m. to 6:00 p.m.
Holiday Monday (Victoria Day to Thanksgiving) - 12:00 p.m. to 8:00 p.m.

(b) The Township may provide alternative hours of operation providing that they are correctly posted at the Site gate, that suitable public notice is given of any change and that there are no objections or complaints from the public regarding the hours of operation.

(c) The Township shall notify the District Manager of the new proposed operating hours fourteen (14) business days prior to their implementation. The notification shall include the details on the public notification undertaken by the Township and the public's response to the proposal.

9.8 All waste bins shall be clearly marked showing the type of waste they are to contain.

10.0 Nuisance Control

10.1 All waste stored on site shall be appropriately protected from rodents, animals and weather to prevent nuisance impacts such as dust, litter, odour, run-off and leachate generation.

10.2 Scavenging is prohibited, except at a designated re-use area under the supervision of the Site attendant.

11.0 Burn Operations

11.1 (a) The leaf and yard waste collection management area, shall include segregated collection and burn areas.
(b) Burn operations shall be undertaken while the Site is not open to residents, during optimal weather conditions (non windy days).
(c) The burn area shall be designed and operated in accordance with MOE Guideline C-7 Burning at Landfill Sites.
(d) Once burned, ash material shall be transferred to the Township's other waste disposal sites or to an approved facility for disposal or use as an alternative daily cover.

12.0 Annual report

12.1 By March 31 the Township shall prepare and retain on-site an annual report covering the previous calendar year. Each report shall include, as a minimum, the following information:
(a) a detailed monthly summary of the type and quantity of all wastes received and transferred from the TS
(b) any environmental and operational problems, that could negatively impact the environment, encountered during the operation of the Site and during the facility inspections and any mitigative actions taken
(c) a statement as to compliance with all Conditions of this Approval and with the inspection and reporting requirements of the Conditions herein
(d) any recommendations to minimize environmental impacts from the operation of the Site and to improve Site operations and monitoring programs in this regard

13.0 Signage and Security

13.1 A sign shall be posted and maintained at the Transfer Station in a manner that is clear and legible, and shall include the following information:
(a) the name of the Transfer Station and Township
(b) this Approval number
(c) the name of the Operator
(d) the normal hours of operation
(e) the allowable and prohibited waste types
(f) a telephone number to which complaints may be directed
(g) a twenty-four (24) hour emergency telephone number (if different from above)

(h) a warning against dumping outside the Transfer Station

13.2 The Transfer Station shall be operated and maintained in a secure manner, such that unauthorized persons cannot enter the Transfer Station.

14.0 Site Inspection

14.1 All incoming and outgoing wastes shall be inspected by trained personnel prior to being received, transferred and/or shipped to ensure wastes are being managed and disposed of in accordance with the EPA and Reg. 347.

14.2 An inspection of the entire Transfer Station and all equipment on the Transfer Station shall be conducted each week the Transfer Station is in operation to ensure that: the Transfer Station is secure; that the operation of the Transfer Station is not causing any nuisances; that the operation of the Transfer Station is not causing any adverse effects on the environment; and that the Transfer Station is being operated in compliance with this Approval. Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the Transfer Station if needed.

15.0 Record Keeping

15.1 A record of the inspections, including the following information, shall be kept in the weekly log book:
(a) the name and signature of person that conducted the inspection
(b) the date and time of the inspection
(c) a list of any deficiencies discovered
(d) any recommendations for remedial action
(e) the date, time and description of actions taken

15.2 A log shall be maintained, either electronically or in written format, and shall include the following information as a minimum:
(a) the date
(b) quantity and source of waste received
(c) quantity of waste at the Transfer Station at the end of the operating week
(d) quantities and destination of each type of waste shipped from the Transfer Station
(e) a record of inspections required by this Approval
(f) a record of any spills or process upsets at the site, the nature of the spill or process upset and the action taken for the clean up or correction of the spill, the time and date of the spill or process upset, and for spills, the time that the Ministry and other persons were notified of the spill in fulfilment of the reporting requirements in the EPA
(g) a record of any waste refusals which shall include: amounts, reasons for refusal and actions taken
(h) the signature of the Trained Personnel conducting the inspection and completing the report

16.0 Organic Waste

16.1 (a) The Township shall ensure that containers used to store source separated organic (SSO) waste are leakproof, lockable and bear resistant.

(b) The Township shall monitor the containers in which SSO waste are stored for:

(i) decomposition to ensure that the organic waste has not decomposed to the point where it is unacceptable for the intended receiving facility

(ii) odours

(c) The Owner shall empty the containers used to store organic waste and transfer the organic waste from the Site forthwith when:

(i) the maximum capacity approved in Condition 9.6(b) has been reached

(ii) the organic waste has decomposed to the point where it is unacceptable to the receiving facility

(iii) the organic waste is creating odours that are creating a negative impact on Site users or off-site

17.0 Transfer Site Closure Plan

17.1 (a) Six (6) months prior to the permanent closure of the Site, the Township shall submit to the Director, written notification of the decision to cease activities at this Site. The written notification shall also include, for approval by the Director, a closure plan detailing a list of activities and schedule for the implementation of those activities necessary for the decommissioning of the Site.

(b) Within ten (10) business days after closure of the Site, the Township must notify the Director, in writing, that the Site is closed and that the Site closure plan has been implemented.

SCHEDULE "A"

1. A report entitled Site Development, Operation and Closure Report, Norway Lake Landfill Site, PC of A No. A411702, dated September, 1998 and prepared by The Greer Galloway Group Inc.

2. A report entitled Hydrogeology, Norway Lake Waste Disposal Site, Township of Bagot, Blythfield and Brougham, dated September, 1998 and prepared by Golder Associates Ltd.

3. A completed Ministry of the Environment form entitled Application for Approval of a Waste Disposal Site dated February 8, 2000 (revised) with a cover letter dated February 7, 2000, from Brian Whitehead, Janota Patrick & Associates Ltd., to Tesfaye Gebrezghi, MOE.

4. Letter dated February 1,2000, from Brian Whitehead, Janota Patrick & Associates Ltd., to Andrew Polley, MOE.

5. Fax dated December 2, 1999, from Brian Whitehead, Janota Patrick & Associates Ltd., to MOE.

6. Letter dated August 6, 1998, from Brian Whitehead, Janota Patrick & Associates Ltd., to Tesfaye Gebrezghi, MOE.

7. Letter dated September 14, 1998, from Kevin Mooder, The Greer Galloway Group Inc., to A. Dominski, MOE.

8. Letter dated June 23, 2000, to Tesfaye Gebrezghi, MOE, from Brian whitehead, Jonata Patrick & Associates Ltd.

9. Final Contour Plan (Drawing No.1), dated June 2000.

10. Application for a Provisional Certificate of Approval and supporting information, dated July 24, 2002, including report entitled, "Design and Operations Report: Proposed Municipal Solid Waste Transfer Station: Township of Greater Madawaska, Norway Lake Waste Disposal Site." prepared by SGS Lakefield Research.

11. Facsimile dated September 30, 2002, from Philippa McPhee, Project Manager, SGS Lakefiled Research to David Lee, MOE supplying requested information.

12. Interim Closure Plan, Norway Lake Waste Disposal Site, prepared for the Corporation of the Township of Greater Madawaska, prepared by SGS Lakefield Research Limited, dated May 2003.

13. 2002 Annual Report, Norway Lake Waste Disposal Site, prepared for the Corporation of the Township of Greater Madawaska, prepared by SGS Lakefield Research Limited, dated March 20, 2003.

14. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated June 8, 2007 and signed by John A. Baird, CAO, the Township of Greater Madawaska, including all supporting documentation.

15. Document entitled "Design and Operations Plan Municipal Solid Waste Transfer Station - Norway Lake Waste Disposal Site" dated June 29, 2007, prepared by Tyler H. Peters, P.Eng., Project Manager of Greenview Environmental Management Limited, describing the design and operation of the transfer site.

16. Response letter to MOE dated August 24, 2007, prepared by Tyler H. Peters, P.Eng., Project Manager of Greenview Environmental Management Limited.

17. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated May 1, 2008 and signed by John A. Baird, CAO/Clerk, the Corporation of the Township of Greater Madawaska, including all supporting documentation.

18. Document entitled "Revised Design and Operations Plan Municipal Solid Waste Transfer Station - Norway Lake Waste Disposal Site" dated May 12, 2008 (Revision to June 29, 207 Version), prepared by Tyler H. Peters, P.Eng., Project Manager of Greenview Environmental Management Limited, describing the design and operation of the transfer Site.

19. E-mails from Tyler Peters addressed to Jim Chisholm of the Ministry of Environment dated July 21, 2008 and July 30, 2008.

20. Letter dated September 8, 2011 from Tyler Peters, Greenview Environmental Management Ltd., with attached application for an Approval for a Waste Disposal Site signed by Angela Yolkowskie, the Corporation of the Township of Greater Madawaska, dated September 6, 2011.

21. Letter dated September 26, 2011 from Tyler Peters, Greenview Environmental Management Ltd.

22. Final Contour & Site Plan dated June 6, 2000 submitted by Janota Patrick & Associates Ltd.

23. Letter dated June 21, 2010 from Tyler Peters, Greenview Environmental Management Ltd. to MOE Ottawa D.O. re Amendment to Operational Hours.

24. MOE TSS surface water review dated March 5, 2012 of the 2010 Annual Report.

25. MOE TSS groundwater review dated October 4, 2012 of the 2011 Annual Monitoring Report.

26. E-mail dated October 31, 2012 from Dan Hagan, Greenview Environmental Management Ltd. to Roman Lysiak, MOE.

27. E-mail dated December 12, 2012 from. Emily Tieu, MOE Ottawa District Office to Ms. Holtzhauer, Township of Greater Madawaska with attached Addendum, 2011 Annual Monitoring Report, Norway Lake Waste Disposal Site A411702.

28. Addendum, 2011 Annual Monitoring Report, Norway Lake Waste Disposal Site A411702, prepared by Shawn Kinney, MOE TSS dated December 11, 2012.

29. E-mail dated January 28, 2013 from Dan Hagan, Greenview Environmental Management Ltd. to Roman Lysiak, MOE.

SCHEDULE "B"

Groundwater and Surface Water Monitoring Program

1. Groundwater Monitoring

Monitoring Requirement	Sampling Location	Parameters	Sampling Frequency
Surveillance	BR-1, BR-2, BR-9, BR-10 OB-11, OB-12 1 QA/QC	Alkalinity, aluminum, ammonia, barium, boron, calcium, chloride, COD, chromium, cobalt, copper, DOC, hardness, iron, magnesium, manganese, nitrate, potassium, sodium, silicon, strontium, sulphate, total phosphorus, TKN, TDS, zinc Field Measurements: conductivity, pH, temperature	Twice (2) annually: - in the spring (April/May/June) - in late summer (August/September)
Routine	OB3, OB8, BR-8 1 QA/QC	Alkalinity, boron, chloride, DOC, hardness, iron, manganese, sodium, TDS Field Measurements: conductivity, pH, temperature	Twice (2) annually: - in the spring (April/May/June) - in late summer (August/September)
Volatile Organic Compounds	BR-1	VOC – EPA 624	Once (1) annually: - in late summer (August/September)
Groundwater Elevations	Monitoring Wells: BR-1, BR-2, BR-4, BR-5, BR-7, BR-8, BR-9, BR-10 OB-1, OB-2, OB-3, OB-4, OB-5, OB-7, OB-8, OB-11, OB-12 Piezometers: G-1, G-2, G-3, G-4, G-5, G-6, G-7, G-8, G-9	Groundwater elevation measurements (in metres)	Twice (2) annually: - in the spring (April/May/June) - in late summer (August/September)

2. Surface Water Monitoring

Sampling Location	Parameters	Sampling Frequency
SW-1, SW-4 1 QA/QC	Alkalinity, aluminum, ammonia, barium, boron, BOD, calcium, chloride, COD, chromium, cobalt, copper, DOC, hardness, iron, magnesium, manganese, nitrate, nitrite, phenols, potassium, sodium, silicon, strontium, total phosphorus, TKN, TDS, TSS, zinc Field Measurements: pH, conductivity, dissolved oxygen, temperature, unionized Ammonia (calculation)	Twice (2) annually: - in the spring (April/May/June) - in late fall (October/November)

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

The reason for Condition 1.1, 1.2, 1.3 and 1.5 is to ensure that the environment is protected and the Site is operated in accordance with the application and supporting documentation submitted by the Township, and not in a manner which the Director has not been asked to consider.

The reason for Condition 1.4 is pursuant to subsection 197(1) of the EPA, to ensure that any persons having an interest in the site are aware that the land has been approved and used for the purposes of waste disposal.

The reason for Conditions 1.6 and 1.7 is to clarify the legal rights and responsibilities of the Township (severable, violation of EPA).

The reason for Conditions 1.8 and 1.9 is to ensure that the appropriate Ministry staff have ready access to information and the operations of the Site.

The reason for Condition 1.10 to clarify the legal rights and responsibilities of the Township.

The reason for Condition 2.1 is to ensure that the proposed detailed design for the engineering works are submitted for the Director's approval in a timely manner and approved prior to the commencement of the construction.

The reason for Condition 2.2 is to ensure that enough physical space around the fill area is available and in the event a need arises for mitigative measures in the future.

The reason for Condition.2.3 is specify the Buffer area.

The reason for Condition 2.4 is to ensure that the issue of FBAL is addressed as soon as possible in an environmentally acceptable way.

The reason for Conditions 3.1 and 3.2 is to specify the operating hours of the site and ensure security against access by unauthorized persons.

The reason for Condition 3.3 is to specify access to landfill.

The reason for Conditions 3.4, 3.5 and 3.7 is to ensure that certain activities are not carried out at the site that are not environmentally acceptable and not safe for human health, and to minimize litter impacts resulting from the operating activities of the Site.

The reason for Condition 3.6 is to ensure that the Township properly trained the staff operating the site to ensure that the operations are undertaken in accordance with the requirements of this Approval.

The reason for Condition 3.8 is to ensure that the waste is adequately covered with a suitable material, to minimize the environmental impacts from the landfilling operations.

The reason for Condition 4 is to require the Township to undertake the monitoring activities in accordance with the methods acceptable to the Ministry, in order to demonstrate that the site is performing as designed and the impacts on the natural environment are acceptable.

The reason for Condition 5 is to ensure that there is a plan with an organized set of procedures for identifying and responding to unforeseen but possible problems at the site. A contingency plan is necessary to ensure protection of the natural environment.

The reason for Condition 6 is to ensure that final closure of the site is completed in an aesthetically pleasing manner and to ensure the long term protection of the natural environment.

The reason for Condition 7 is to ensure that regular review of site development, operations and monitoring is documented and any possible improvements to site design, operations or monitoring programs are identified.

The reason for Condition 8 is to minimize the potential for negative environmental impacts from the landfill.

The reason for Condition 9.1 is to ensure that the Site is operated in accordance with the application and supporting information submitted by the Applicant, and not in a manner which the Director has not been asked to consider.

The reason for Condition 9.2 is to ensure that the Transfer Station is operated in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

The reason for Condition 9.3 is to ensure that all incoming wastes are inspected to ensure compliance

with this Certificate.

The reasons for Conditions 9.4, 9.5, and 9.6 are to specify the approved the types of waste that may be accepted at the Transfer Station, the amounts of waste that may be stored and processed at the Transfer Station, and the maximum rate at which the Transfer Station may receive waste.

The reason for Condition 9.7 is to specify the hours of operation for the Transfer Station and a mechanism for amendment of the hours of operation, as required.

The reason for Conditions 9.8, 10.1, 10.2 and 11.1 is to ensure that the site is operated in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

The reason for Condition 12.1 is to ensure that the Site is designed, operated and maintained in accordance with the application and supporting documentation submitted by the Township, and not in a manner which the Director has not been asked to consider.

The reasons for Conditions 13.1 and 13.2 is to ensure that users of the Transfer Station are fully aware of important information and restrictions related to Transfer Station operations and access under this Approval.

The reason for Condition 14.1 is to ensure that the Transfer Station is operated by properly Trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.

The reasons for Conditions 14.2 and 15.1 are to ensure that routine Transfer Station inspections are completed, and that detailed records of Transfer Station inspections are recorded and maintained for inspection and information purposes.

The reason for Condition 15.2 is to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this Approval, the EPA and its regulations.

The reason for Condition 16.1 is to make sure that SSO waste are handled in a manner that won't create an adverse affect.

The reason for Condition 17.1 is to ensure that the Site is closed in accordance with MOE standards and to protect the health and safety of the environment.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A411702 issued on May 24, 2000

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 9th day of April, 2013

THIS APPROVAL WAS MAILED
ON April 15, 2013
(Signed)

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

RL/

c: District Manager, MOE Ottawa
Tyler Peters, P.Eng., Greenview Environmental Management Ltd. ✓

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A411702
Notice No. 5
Issue Date: August 28, 2008

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

Site Location: Norway Lake Waste Disposal Site
Lot Part of 20, Concession 7
Greater Madawaska Township, County of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A411702 issued on May 24, 2000 and amended on January 15, 2001, December 2, 2002, December 24, 2003 and September 25, 2007 for a 18.47 hectare Waste Disposal Site consisting of a 1.37 hectare landfill and a transfer station, as follows:

I. The following definitions are hereby added to the Certificate:

1.1.17 "**waste electrical and electronic equipment**" means devices listed in Schedules 1 through 7 of Ontario Regulation 393/04, Waste Electrical and Electronic Equipment made under the *Waste Diversion Act* 2002; and

1.1.18 "**organic waste**" means waste from kitchens, restaurants, food processing operations, waste of vegetable and animal origin, packaging materials that have been in direct contact with and are contaminated by these wastes and waste of a similar nature and characteristics, including waste that is liable to become putrid, rotten or decayed;

II. Conditions 14 and 15 of the Certificate are hereby revoked and replaced with the following:

14. The maximum amount of solid non-hazardous waste and recyclables that can be accepted at the site is 200 cubic metres per day.

15. (a) The maximum amount of non-hazardous solid waste and recyclable materials to be stored or be present

at the Site at any given time shall not exceed 637 cubic metres.

(b) The maximum amount of each type non-hazardous solid waste and recyclable materials to be stored or be present at the Site at any give time shall be as follows:

a. domestic household waste - 120 cubic metres;
b. blue-box recycables - 240 cubic metres;
c. source separated organics (SSO) contained in two MOLOK Deep Collection System containers (or equivalent) - 2 cubic metres;
d. waste tires - 100 cubic metres;
e. leaf and yard waste - 50 cubic metres;
f. waste electrical and electronic equipment (WEEE) - 40 cubic metres;
g. refrigerant appliances - 25 cubic metres; and
h. scrap metal - 60 cubic metres.

III. The following new Condition is hereby added to the Certificate

31. (a) The Owner shall ensure that containers used to store source separated organic (SSO) waste are leakproof, lockable and bear resistant; and

(b) The Owner shall monitor the containers in which SSO waste are stored for:

(i) decomposition to ensure that the organic waste has not decomposed to the point where it is unacceptable for the intended receiving facility; and

(ii) odours; and

(c) The Owner shall empty the containers used to store organic waste and transfer the organic waste from the Site forthwith when:

(i) the maximum capacity approved in Condition 15 (b) has been reached; or

(ii) the organic waste has decomposed to the point where it is unacceptable to the receiving facility; or

(iii) the organic waste is creating odours that are creating a negative impact on Site users or off-Site.

IV. The following items are hereby added to Schedule "A"

16. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated May 1, 2008 and signed by John A. Baird, CAO/Clerk, the Corporation of the Township of Greater Madawaska, including all supporting documentation.

17. Document entitled "Revised Design and Operations Plan Municipal Solid Waste Transfer Station - Norway Lake Waste Disposal Site" dated May 12, 2008 (Revision to June 29, 207 Version), prepared by Tyler H. Peters, P.Eng., Project Manager of Greenview Environmental Management Limited, describing the design and operation of the transfer Site.

18. E-mails from Tyler Peters addressed to Jim Chisholm of the Ministry of Environment dated July 21, 2008 and July 30, 2008.

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

1. The new definitions are given to give clarity to the meaning of their usage in the Certificate.

2. The reason for Condition No. 14 is to accept the application from the proponent to reduce from 262 cubic metres per day of non-hazardous solid waste that can be accepted per day to 200 cubic metres per day.

3. The reason for Condition No. 15 is to accept the application from the proponent to increase the allowable storage of non-hazardous solid waste and recyclables to 637 cubic metres from 597 cubic metres.

4. The reason for Condition No. 31 is to make sure that SSO waste are handled in a manner that won't create an adverse affect.

5. The reason for accepting the revised Revised Design and Operations Plan as noted in item 18 of Schedule "A" is to accept the Plan and in particular to allow the waste Site to be moved from its original planned location at the landfill Site to a different location at the landfill Site.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A411702 dated May 24, 2000

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
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

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 28th day of August, 2008

THIS NOTICE WAS MAILED
ON sep. 02, 2008
N.P
(Signed)

Tesfaye Gebrezghi, P.Eng.
Director
Section 39, *Environmental Protection Act*

JC/
c: District Manager, MOE Ottawa
Tyler Peters, P. Eng., Greenview Environmental Management Limited

Ontario

Ministry of the Environment | Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A411702
Notice No. 4
Issue Date: September 25, 2007

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

Site Location: Norway Lake Waste Disposal Site
Lot Part of 20, Concession 7, Geographic Township of Bagot
Greater Madawaska Township, County of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A411702 issued on May 24, 2000, and amended on January 15, 2001, December 2, 2002, and December 24, 2003 for a 18.47 hectare Waste Disposal Site consisting of a 1.37 hectare landfill and a transfer station , as follows:

The following changes apply to the operation of the *Transfer Station* only.

Condition 11 is hereby revoked and replaced with:

11. The *Transfer Station* shall be designed, developed, built, operated, maintained, and the management and disposal of all waste shall be carried out, in accordance with the *EPA* , *Regulation 347* , and except as otherwise provided by this *Certificate* , with the application for this *Certificate* , dated **June 8, 2007**, and the supporting documentation listed in Schedule "A". At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

Condition 12 is hereby revoked and replaced with:

12. All waste shall be inspected by *Trained personnel* prior to being accepted at the *Transfer Station* to ensure that the waste is of a type approved for acceptance under this *Certificate* .

Condition 13 is hereby revoked and replaced with:

13. The Transfer Station shall only accept the following types of waste:

a. domestic household waste;
b. blue-box recycables;
c. source separated organics (SSO);

d. waste tires;
e. leaf and yard waste;
f. waste electrical and electronic equipment (WEEE);
g. refrigerant applicances; and
h. scrap metal.

Condition 14 is hereby revoked and replaced with:

14. The total amount of waste and recyclables to be stored at the Site at any given time shall not exceed 597 m3.

Condition 15 is hereby revoked and replaced with:

15. The maxium storage capacity of waste and recyclable materials shall be as follows:

a. domestic household waste - 80 m3;
b. blue-box recycables - 240 m3;
c. source separated organics (SSO) - 2 m3;
d. waste tires - 100 m3;
e. leaf and yard waste - 50 m3;
f. waste electrical and electronic equipment (WEEE) - 40 m3;
g. refrigerant applicances - 25 m3; and
h. scrap metal - 60 m3.

Condition 16 is hereby revoked and replaced with:

16. (a) Normal operating hours of the *Transfer Station* shall be as follows:

- Sunday and Holiday Monday(s) - 12:00 p.m. to 2:00 p.m.
- Wednesday - 8:00 a.m. to 12:00 p.m.
- Saturday - 8:00 a.m. to 12:00 p.m.

(b) The Municipality may provide alternative hours of operation providing that they are correctly posted at the Site gate, that suitable public notice is given of any change and that there are no objections or complaints from the public regarding the hours of operation.

(c) The Municipality shall notify the District Manager of the new proposed operating hours fourteen (14) business days prior to their implementation. The notification shall include the details on the public notification undertaken by the Municipality and the public's response to the proposal.

The following new Conditions are hereby added:

25. A sign shall be posted and maintained at the *Transfer Station* in a manner that is clear and legible, and shall include the following information:

a. the name of the *Transfer Station* and *Owner* ;
b. this *Certificate* number;
c. the name of the *Operator* ;
d. the normal hours of operation;
e. the allowable and prohibited waste types;
f. a telephone number to which complaints may be directed;
g. a twenty-four (24) hour emergency telephone number (if different from above); and
h. a warning against dumping outside the *Transfer Station* .

26. *The Transfer* Station shall be operated and maintained in a secure manner, such that unauthorized persons cannot enter the *Transfer Station* .

27. All incoming and outgoing wastes shall be inspected by trained personnel prior to being received, transferred and/or shipped to ensure wastes are being managed and disposed of in accordance with the *EPA* and *Reg. 347.*

28. An inspection of the entire *Transfer Station* and all equipment on the *Transfer Station* shall be conducted each week the *Transfer Station* is in operation to ensure that: the *Transfer* Station is secure; that the operation of the *Transfer Station* is not causing any nuisances; that the operation of the *Transfer Station* is not causing any adverse effects on the environment; and that *the Transfer Station* is being operated in compliance with this *Certificate* . Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the *Transfer Station* if needed.

29. A record of the inspections, including the following information, shall be kept in the weekly log book:

a. the name and signature of person that conducted the inspection;
b. the date and time of the inspection;
c. a list of any deficiencies discovered;
d. any recommendations for remedial action; and
e. the date, time and description of actions taken.

30. A log shall be maintained, either electronically or in written format, and shall include the following information as a minimum:

a. the date;
b. quantity and source of waste received;
c. quantity of waste at the *Transfer Station* at the end of the operating week;
d. quantities and destination of each type of waste shipped from the *Transfer Station;*
e. a record of inspections required by this *Certificate;*
f. a record of any spills or process upsets at the site, the nature of the spill or process upset and the action taken for the clean up or correction of the spill, the time and date of the spill or process upset, and for spills, the time that the *Ministry* and other persons were

notified of the spill in fulfilment of the reporting requirements in the *EPA* .

g. a record of any waste refusals which shall include; amounts, reasons for refusal and actions taken; and

h. the signature of the *Trained Personnel* conducting the inspection and completing the report.

The following Items are hereby added to Schedule "A":

13. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated June 8, 2007 and signed by John A. Baird, CAO, the Township of Greater Madawaska, including all supporting documentation.

14. Document entitled "Design and Operations Plan Municipal Solid Waste Transfer Station - Norway Lake Waste Disposal Site" dated June 29, 2007, prepared by Tyler H. Peters, P.Eng., Project Manager of Greenview Environmental Management Limited, describing the design and operation of the transfer site.

15. Response letter to MOE dated August 24, 2007, prepared by Tyler H. Peters, P.Eng., Project Manager of Greenview Environmental Management Limited.

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

1. The reason for Condition 11 is to ensure that the Transfer Station is operated in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

2. The reason for Condition 12 is to ensure that all incoming wastes are inspected to ensure compliance with this *Certificate.*

3. The reasons for Conditions 13, 14, and 15 are to specify the approved the types of waste that may be accepted at the Transfer Station, the amounts of waste that may be stored and processed at the Transfer Station, and the maximum rate at which the Transfer Station may receive waste.

4. The reason for Condition 16 is to specify the hours of operation for the Transfer Station and a mechanism for amendment of the hours of operation, as required.

5. The reasons for Conditions 25 and 26 is to ensure that users of the Transfer Station are fully aware of important information and restrictions related to Transfer Station operations and access under this Certificate of Approval.

6. The reason for Condition 27 is to ensure that the Transfer Station is operated by properly Trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.

7. The reasons for Conditions 28 and 29 are to ensure that routine Transfer Station inspections are completed, and that detailed records of Transfer Station inspections are recorded and maintained for inspection and information purposes.

8. The reason for Condition 30 is to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this Certificate of Approval, the EPA and its regulations.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A411702 dated May 24, 2000, 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 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., Suite 1700
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 25th day of September, 2007

THIS NOTICE WAS MAILED
ON Oct. 1, 2007
9c
(Signed)

Tesfaye Gebrezghi, P.Eng.
Director

AT/

c: District Manager, MOE Ottawa
Tyler H. Peters, P.Eng., Greenview Environmental Management Limited

Ontario

Ministry of the Environment | Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A411702
Notice No. 3

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

Site Location: Norway Lake Waste Disposal Site
Part of Lot 20, Concession 7
Greater Madawaska Township, County of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A411702 issued on May 24, 2000, as amended on January 15, 2001 and December 2, 2002 for a 18.47 hectare Waste Disposal Site consisting of a 1.37 hectare landfill and a transfer station, as follows:

The following Condition is hereby revoked:

Condition 20 (a)

The following Condition is hereby added:

22. Prior to June 30, 2004, the Township shall complete closure activities which shall include:
    (a) regrading of the slope of the waste pile to not less than 5% and not more than 25% on all sides in accordance with Figure No. 4 of Item 12 of Schedule "A";
    (b) application of a minimum of 300 mm of cover material; and
    (c) seeding with both annual and perennial plant species.

23. Following the application of the cover and seeding, the Township shall:
    (a) inspect the cover integrity on a quarterly basis. If cover integrity is damaged, then the necessary remedial measure shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting);
    (b) inspect the vegetative cover in the fall and spring seasons. Any deficiencies in the vegetative cover shall be repaired as soon as weather and equipment availability permits;
    (c) inspect for leachate seeps on a quarterly basis. If a leachate seep is observed, then the necessary remedial measures shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting);

(d) inspect for slope erosion on a quarterly basis. If erosion is observed, then the necessary remediation measures shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting);

(e) inspect for other nuisance factors (litter, rodents, bears) on a quarterly basis. If any problems are observed, then the necessary remedial measures shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting);

24. Prior to June 30, 2005, the Township shall:

(a) submit an application to the Director to expand the landfill for the purpose of resuming landfilling operations; or

(b) carry out final closure activities consisting of increasing the granular cover material to a depth of 0.6 m and applying 0.15 m of topsoil, seeded with both annual and perennial plant species, except for those areas previously approved for the establishment of a transfer station.

The following is hereby added to Schedule "A":

11. Interim Closure Plan, Norway Lake Waste Disposal Site, prepared for the Corporation of the Township of Greater Madawaska, prepared by SGS Lakefield Research Limited, dated May 2003.

12. 2002 Annual Report, Norway Lake Waste Disposal Site, prepared for the Corporation of the Township of Greater Madawaska, prepared by SGS Lakefield Research Limited, dated March 20, 2003.

The reason(s) for this amendment to the Certificate of Approval is (are) as follows:

Condition 20(a) was revoked because the Condition has been satisfied.

The reason for Condition 22 and 23 is to ensure minimize the potential for negative environmental impacts from the landfill during the period that the Township is conducting is Waste Management Strategy Plan.

The reason for Condition 24 is to ensure that the landfill is closed in accordance with Ontario Regulation 347 and the Guidance Manual for Landfill Sites Receiving Municipal Waste in a timely fashion.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A411702 dated May 24, 2000

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 Environment and Energy
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 24th day of December, 2003

THIS CERTIFICATE WAS MAILED
ON Jan 2/04
CM
(Signed)

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

VP/

c: District Manager, MOE Ottawa
Philippa McPhee, Project Manager, SGS Lakefield Research Limited

file: SIREBA C07 25

Ontario

Ministry of Environment and Energy | Ministère de l'Environnement et de l'Énergie

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL WASTE DISPOSAL SITE NUMBER A411702

MINISTRY OF THE ENVIRONMENT
DEC 16 2002
OTTAWA

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

Site Location: Norway Lake Waste Disposal Site
Part of Lot 20, Concession 7, BAGOT TWP.
Greater Madawaska Township, County of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A411702 issued on May 24, 2000 and amended January 15, 2001 for a waste disposal site (landfill), as follows:

DEFINITIONS

Condition 1.1.6 is hereby revoked and replaced with:

1.1.6 "Township" means the Corporation of the Township of Greater Madawaska;

SITE OPERATIONS

The following conditions are hereby added:

(10) The Transfer Station (TS) shall only accept wastes generated by ratepayers in the Township.

(11) The TS shall be maintained and operated in accordance with the items listed in Schedule "A".

(12) The Township shall ensure that no wastes be received or removed at the TS unless a Site Supervisor and/or designated alternate(s) are present to supervise the operation.

(13) The TS shall only accept municipal waste, with the exception of:

(a) household appliances;
(b) construction and demolition waste;
(c) scrap metals;
(d) tires;
(e) propane tanks; and

(f) brush.

(14) The TS shall not accept more than sixty (60) cubic metres of domestic waste per week;

(15) (a) All domestic waste must be stored in two (2) roll-off bins of approximately thirty (30) cubic metre capacity with solid or screened lids that shall be closed while the site is not in operation;

(b) All recyclable waste must be segregated and stored into:

(i) one (1) compartmentalized roll-off bin of approximately fifteen (15) cubic metre capacity;
(ii) two (2) cardboard recycling containers; and
(iii) one (1) polystyrene recycling container,

with all containers being sealed by solid or screened lids while the site is not in operation.

(16) (a) During the winter months (November 1st to March 31st), all solid waste containers and bins shall be emptied when they become full or every thirty days (30) days, whichever comes first; and

(b) At all other times, the solid waste containers shall be emptied when they become full or every seven (7) days, whichever comes first; and

(c) All containers or bins with recyclables shall be emptied when they become full.

(17) All waste bins shall be clearly marked showing the type of waste they are to contain.

(18) All waste stored on site shall be appropriately protected from rodents, animals and weather to prevent nuisance impacts such as dust, litter, odour, run-off and leachate generation.

(19) No scavenging of waste is permitted at the site.

CLOSURE PLAN

(20) (a) By **May 31, 2003**, the Township shall submit to the Director for approval, an written interim closure plan for the Site. This plan must include, as a minimum, a description of the work that will be done to facilitate temporary closure of the Site and a schedule for completion of that work. The plan must also outline the Township's future plans on site expansion and permanent closure of the Site;

(b) Upon commencement of the Transfer Station, the Township shall begin to implement interim closure tasks including grading and compaction of side slopes and application of interim cover material; and

(c) If, at any time, the Township decides to permanently close the site, a permanent closure plan

shall be submitted, for approval by the Director, four (4) months prior to closure of the Site. This plan shall include, as a minimum, the following information:

(i) changes to the final contour plan that have been previously identified in the annual reports or recommended in the development of the detailed closure plan;

(ii) fencing and access control;

(iii) details of any vegetative planting planned;

(iv) the sequence and scheduling for final cover installation;

(v) post-closure and end-use plans;

(vi) plans and schedules for the management and continued monitoring of the surface water and groundwater;

(vii) plans and schedules for routine monitoring and maintenance of stormwater facilities; and

(viii) plans and schedules for the routine monitoring of leachate seeps, the final cover and Site settlement.

ANNUAL REPORT

(21) By **March 31, 2003**, and on an annual basis thereafter, the Company shall prepare and retain on-site an annual report covering the previous calendar year. Each report shall include, as a minimum, the following information:

(a) a detailed monthly summary of the type and quantity of all wastes received and transferred from the TS;

(b) any environmental and operational problems, that could negatively impact the environment, encountered during the operation of the Site and during the facility inspections and any mitigative actions taken;

(c) a statement as to compliance with all Conditions of this Provisional Certificate of Approval and with the inspection and reporting requirements of the Conditions herein; and

(d) any recommendations to minimize environmental impacts from the operation of the Site and to improve Site operations and monitoring programs in this regard.

SCHEDULE "A"

The following items are hereby amended to Schedule "A":

(8) Letter dated June 23, 2000, to Tesfaye Gebrezghi, MOE, from Brian whitehead, Jonata Patrick & Associates Ltd.

(9) Final Contour Plan (Drawing No.1), dated June 2000.

(10) Application for a Provisional Certificate of Approval and supporting information, dated July 24, 2002, including report entitled, "Design and Operations Report: Proposed Municipal Solid Waste Transfer Station: Township of Greater Madawaska, Norway Lake Waste Disposal Site." prepared by SGS Lakefield Research.

(11) Facsimile dated September 30, 2002, from Philippa McPhee, Project Manager, SGS Lakefiled Research to David Lee, MOE supplying requested information.

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

The reason for Condition (10), (11), (12), (14) and (22) is to ensure that the Site is operated in accordance with the application and supporting information submitted by the Applicant, and not in a manner which the Director has not been asked to consider.

The reason for Condition (13) is to ensure the types and amounts of wastes received at the waste transfer station are in accordance with that approved under the Certificate of Approval.

The reason for Conditions (15), (16), (17), (18) and (19) is to ensure that the site is operated in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

The reason for Condition (20) is to ensure that the Site is closed in accordance with Ministry standards and to protect the health and safety of the public and the environment.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A411702 dated May 24, 2000.

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 Environment and Energy
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 2nd day of December, 2002

THIS CERTIFICATE WAS MAILED
ON Dec. 12, 2002
DC
(Signed)

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

DL/
c: District Manager, MOEE Ottawa ✓
Michael J. Lord, SGS Lakefield Research Design

Ontario

Ministry of the Environment | Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A411702
Notice No. 1

Corporation of the Township of Bagot, Blythfield & Broughham
P.O. Box 180
Calabogie, Ontario
K0J 1H0

Site Location: Part Lot 20, Concession 7
Bagot, Blythfield And Brougham Township, County Of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A411702 issued on May 24, 2000 for the disposal of solid municipal waste, as follows:

Approval is hereby granted to the Final Contour and Site Plan dated June 06, 2000, submitted by Janota Patrick & Associates Ltd.

The reason for this amendment to the Certificate of Approval is as follows:

Condition 3.5 has been satisfied.

All in accordance with the following supporting information and documentation prepared by Janota Patrick & Associates Ltd.:

1. Letter dated June 23, 2000, to Tesfaye Gebrezghi, MOE, from Brian Whitehead, Jonata Patrick & Associates Ltd.

2. Final Contour Plan (Drawing No. 1), dated June 2000.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No.A411702 dated May 24, 2000.

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:

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 15th day of January, 2001

Andrzej Dominski, P.Eng.
Director
Section 39, *Environmental Protection Act*

TG/

c: District Manager, MOE Ottawa
Brian Whitehead, Janota Patrick & Associates Ltd.

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

Corporation of the Township of Bagot, Blythfield & Broughham
P.O.Box 180
Calabogie, Ontario
K0J 1H0

for the use and operation of a 1.37 hectare landfilling area within an 18.47 hectare landfill site property,

all in accordance with the following plans and specifications:

As per the attached Schedule A

Located: Part Lot 20, Concession 7
Township of Bagot
The Corporation of the Township of Bagot, Blythfield and Brougham

which includes the use of the site only for the disposal of solid municipal waste (Note: Use of the site for additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval)

1. Definition of Terms

1.1 In this Certificate of Approval ("Certificate"), the following definitions shall apply:

1.1.1 "Certificate" means this Certificate of Approval No. A411702 as amended from time to time and all Schedules attached to and forming part of this Certificate;

1.1.2 "District Manager" means the Manager of the Ministry of the Environment, Ottawa District Office.

1.1.3 "Director" means the one or more persons who from time to time so designated for the purpose of Part V of the Environmental Protection Act, R.S.O. 1990, as amended from time to time;

1.1.4 "Engineer" means a professional engineer licenced under the Ontario Professional Engineers Act;

1.1.5 "EPA" means the Environmental Protection Act, R.S.O. 1990, as amended;

1.1.6 "Township" means the Corporation of the Township of Bagot, Blythfield and Brougham;

1.1.7 "Buffer" means those lands between the limit of fill and the boundaries of the property owned by the Township, that shall in no instance be less than 30 meters, as identified in Schedule "A".

1.1.8 "Landfill" means the part of the Site comprising the Limit of Fill and the Buffer

1.1.9 "Limit of Fill" means the area in which waste is approved for final disposal according to this Certificate;

1.1.10 "Ministry" or "MOE" means the Ontario Ministry of Environment;

1.1.11 "MNR" means Ontario Ministry of Natural Resources;

1.1.12 "ODWO" means the Ontario Drinking Water Objectives as amended from time to time;

1.1.13 "OWRA" means the Ontario Water Resources Act, R.S.O. 1990, c.0.40, as amended;

1.1.14 "PWQO" means the Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives*, as amended from time to time;

1.1.15 "Regional Director" means the Director, Eastern Ontario Region, Ministry of Environment;

1.1.16 "Site" means the property owned by the Township for the purposes of waste disposal, described as Part Lot 20, Concession 7, Township of Bagot.

2. General

2.1 This Certificate revokes all previously issued Provisional Certificates of Approval issued under Part V, EPA, for this site. The approval given herein, including the Terms and Conditions set out, replaces all previously issued approvals and related Terms and Conditions under Part V, EPA for this Site.

2.2 The site shall be constructed and operated in accordance with Item 1 in Schedule "A" (the Site Development, Operation and Closure Report) and in accordance with all other documents listed in Schedule "A" to this Certificate.

2.3 Schedules A and B are integral parts of these Conditions of Approval.

2.4 Pursuant to Section 197 of the EPA, neither the Company nor any person having an interest in the Property shall deal with the Property in any way without first giving a copy of this Certificate to each person acquiring an interest in the Property as a result of the dealing. In addition, the Company shall,

(a) within 60 days of the date of issuance of this Certificate, submit to the Director for the Director's signature two copies of a completed Certificate of Prohibition containing a registrable description of the Property, in accordance with Form 1 of O. Reg. 14/92; and

recycling bins, a re-use area, brush and wood chipping and storage areas, and a concrete storage area, all in accordance with Item 1 in Schedule "A" (Site Development, Operation and Closure Report). All parts of the Buffer, other than roadways, parking areas and structures shall be maintained with a healthy vegetative cover or other appropriate surface treatment which will minimize erosion.

3.4 Final cover shall be applied progressively, as weather conditions permit, as each part of the Limit of Fill reaches its final grades. The design of the final cover shall comply with the specifications contained in Item 1 in Schedule "A" (Site Development, Operation and Closure Report). Vegetation of completed final cover using drought-resistant, low-nutrient requirement grass and legume blends which regenerate annually shall occur within one month of its placement and final grading, or as soon as weather permits.

3.5 Within 30 days of the date of issuance of this Certificate of Approval, the Township shall submit to the Director, for approval, final site and contour plans for the site which show how the remaining waste capacity of the Site will be utilized and how the Fill Beyond Approved Limits (FBAL) will be incorporated without a change to the approved waste volume capacity of 36,000 m3, excluding final cover. Plans shall include the current and final extent of the Limit of Fill with contours and any changes to the Site layout.

4. Site Operations

4.1 The maximum waste disposal operating hours of the Landfill shall be 7:00 a.m. to 9:00 p.m. everyday. Equipment maintenance and administrative functions may occur at any time. Upon reasonable notification of the District Manager, contingency actions may proceed outside of the normal hours of operation. Emergency response may occur at any time, as required.

4.2 During non-operating hours, the Landfill entrance and exit gates will be locked or otherwise secured against access by unauthorized persons.

4.3 No waste shall be received for disposal at the Landfill except during the operating hours and under the supervision of the landfill attendants.

4.4 Only solid, non-hazardous wastes shall be disposed of in the Landfill.

4.5 The Township shall record the name and vehicle license for any load rejected for disposal in the Landfill along with the reason for rejection.

4.6 Access to the Landfill shall be *via* the existing main entrance from Norway Lake Road, as shown in Figure 3 in Item 1 of Schedule "A" (Site Development, Operation and Closure Report). Any changes to the main Landfill entrance or exit shall be submitted to the Regional Director for prior approval. Other service entrances may be established for access by Township staff or contractors, or for contingency or emergency use, provided that they are secured from entry when not in use.

4.7 The burning of wastes at the Landfill is prohibited.

4.8 Scavenging at the Landfill is prohibited, except at the designated re-use area and under the supervision of the landfill attendant.

4.9 The Township shall take all practical steps to prevent the escape of litter from the site. Periodic pick-up of litter at the Site and along the Access Road in the vicinity of the Site shall be carried out as required. Private property adjacent to the Landfill shall be inspected weekly and litter shall be collected if necessary, with permission of access from the property owner.

4.10 The Township shall ensure that all Landfill supervisors receive initial and ongoing training with respect to the following: the Certificate and Conditions attached to the Certificate, the Design & Operations Report; relevant waste management regulations and legislation; environmental concerns related to the waste being handled at the site; occupational health and safety concerns pertaining to the waste being handled at the site; fire fighting protocol; and emergency and contingency measures for the preventing of off-site impacts.

4.11 No water obtained from surface water or from a well constructed on the Site shall be used for drinking purposes without prior approval from the District Manager. Any water supply system that obtains water from a well or surface water source on the Site shall be clearly marked to indicate that the water is not potable.

4.12 Waste shall be deposited in a manner that minimizes the area of exposed waste at the Landfill working face and shall be compacted before cover material is applied according to the requirements of this Certificate.

4.13 At the end of each working day, and within two hours of the entrance gate closure, weather permitting, cover material consisting of a minimum of 0.15 m thickness of soil, as described in Item 1 (Site Development, Operations and Closure Report), Schedule "A", shall be applied to all exposed waste. Any alternative cover material must be approved by the Ministry unless it allowed as noted in the MOE's 1998 Landfill Standards Guideline.

4.14 In landfilling areas where waste placement is below the final approved contours and landfilling is to be suspended for one month or more, an interim cover consisting of a minimum of 0.30 m thickness of soil shall be applied.

4.15 Where existing cover material has eroded such that waste is exposed, the cover material shall be promptly replaced.

5. Monitoring

5.1 The Township shall monitor groundwater and surface water as per Schedule "B". The Township may amend Schedule "B" from time-to-time with the prior written consent of the District Manager.

5.2 All monitoring wells which form part of any monitoring program shall be properly capped, locked and protected from damage. Any groundwater monitoring wells that are damaged shall be repaired, replaced forthwith or properly abandoned.

5.3 In the event that the results of the monitoring programs listed in Schedule "B" are such that an off-site exceedance of the Reasonable Use Policy and/or PWQO has occurred as a result of the operation of the

Landfill Site, the Township shall notify the Regional Director as soon as reasonably possible and specify the following:

a) details of the off-site exceedance, confirmatory monitoring requirements and the potential off-site impacts to surface water and groundwater users;
b) the extent and timing of contingency measures to be implemented;
c) modifications, if any, which should be made to the monitoring program; and
d) other mitigation measures, if any, which may be necessary to reduce or prevent off-site impacts.

5.4 In the event that the results of the monitoring programs listed in Schedule "B" are such that an off-site exceedance of the Reasonable Use Policy and /or PWQO can reasonably be predicted to occur, the Township shall include in the annual report:

a) the details of any such predicted off-site exceedance, including the assumptions upon which the prediction is based;
b) a discussion of the modifications, if any, to intended operations which would be necessary to prevent the predicted off-site exceedance;
c) a discussion of the modifications, if any, which should be made to the monitoring program; and
d) a discussion of other mitigation measures or contingency actions, if any, which may be necessary to prevent off-site impacts.

6. Contingency Plans

6.1 If it is determined by the District Manager that leachate, noise, dust, odour, litter, traffic, or vermin associated with the operation of the Site must, in the opinion of the District Manager, be reduced or otherwise controlled to prevent adverse impacts, the Township shall implement reasonable contingency measures as directed by the District Manager.

7. Closure

7.1 Unless a new application for expansion is submitted for this Site, the Township shall submit a complete plan for the closure, long term maintenance, long term monitoring and after use of the Site to the Director. The plan shall be developed in consultation with the public. The plan shall include, but not be limited to, the following:

a) plans for fencing and access control;
b) details of any additional cover required;
c) details of any vegetative cover required;

d) post-closure land use plans, including any further grading, filling or landscaping and the need for any structures;

e) the need for any municipal or provincial approvals that would be required to implement the proposed closure plan and the schedule for obtaining such approvals;

f) plans for the continued maintenance, operation and monitoring of stormwater management system, and landfill gas collection/destruction system (if implemented);

g) plans for the continued monitoring of landfill gas, surface water and groundwater;

h) updated contingency plans to mitigate potential impacts from landfill gas, leachate and stormwater; and

i) details of post-closure ownership of the Site.

7.2 The Township shall continue to be responsible for the operation, maintenance and monitoring of the Site until such time as the Township can demonstrate to the Director that the leachate and gas being produced at the site would not cause an exceedance of the PWQO, ODWO, Reasonable Use Guideline and/or all other relevant statutes and policies respecting groundwater, surface water and air as may be applicable at that time.

8. Reporting

8.1 A periodic Status Report on the development, operation and monitoring of the Site shall be submitted by the Township to the District Manager. The Status Report shall be submitted annually for at least the first five (5) years from the date of issuance of this approval. Thereafter, the frequency of the report may be reduced with prior written permission of the District Manager, and provided that the Township demonstrates to the District Manager that the site operations and monitoring results have become routine and consistent. Notwithstanding any approved change in reporting frequency, the District Manager may at any time require the Township to return to annual submission of the Status Report if there is reasonable evidence to conclude that the site operations or monitoring results are no longer routine or consistent.

8.2 Each Status Report shall be submitted no later than March 31 of the year following the period being reported upon.

8.3 The Status Report shall be prepared by, or under the direction of, a qualified Engineer and shall include, as a minimum, the following elements:

a) Executive Summary

i) A summary of findings, conclusions and recommendations;

b) Site Operations

i) A site plan of the landfilling area showing: the current and final extent of the Limit of Fill with contours and cross-sections; and any changes to the Site layout;

8. Condition No. 3.1 is included to ensure that the proposed detailed design for the engineering works are submitted for the Director's approval in a timely manner and approved prior to the commencement of the construction.

9. Conditions No. 3.2 and 3.4 are included to ensure that enough physical space around the fill area is available for the purposes described under Condition 3.4 and in the event a need arises for mitigative measures in the future.

10. Condition No. 3.6 is included to ensure that the issue of FBAL is addressed as soon as possible in an environmentally acceptable way.

11. Conditions No. 4.1 and 4.2 are included to specify the operating hours of the site and ensure security against access by unauthorized persons.

12. Condition No.4.3 is included to ensure that landfilling of waste is done under supervision of a properly trained person, to ensure that it is done in accordance with the requirements of this Certificate.

13. Condition No. 4.5 is included to ensure that the Townshipaccurately estimates the amount of waste brought to the site so that compliance with this Certificate can be verified.

14. Condition No.4.6 is included to specify access to landfill.

15. Conditions Nos. 4.7, 4.8, 4.9 and 4.11 are included to ensure that certain activities are not carried out at the site that are not environmentally acceptable and not safe for human health, and to minimize litter impacts resulting from the operating activities of the Site.

16. Condition No. 4.10 is included to ensure that the Township properly trained the staff operating the site to ensure that the operations are undertaken in accordance with the requirements of this Certificate.

17. Condition No. 4.12 is included to ensure that efficient and environmentally sound procedures are employed during the operation of the landfill site.

18. Conditions Nos. 4.13 and 4.15 are included to ensure that the waste is adequately covered with a suitable material, to minimize the environmental impacts from the landfilling operations.

19. Condition 4.14 is included to ensure that the waste is covered with a suitable final cover material in a timely manner, to minimize the environmental impacts from the disposal of waste.

20. Condition No. 5 is included to require the Township to undertake the monitoring activities in accordance with the methods acceptable to the Ministry, in order to demonstrate that the site is performing as designed and the impacts on the natural environment are acceptable.

21. Condition No. 6 is included to ensure that there is a plan with an organized set of procedures for identifying and responding to unforeseen but possible problems at the site. A contingency plan is necessary to ensure protection of the natural environment.

22. Condition No. 7 is included to ensure that final closure of the site is completed in an aesthetically pleasing manner and to ensure the long term protection of the natural environment.

23. Condition No. 8 is included to ensure that regular review of site development, operations and monitoring is documented and any possible improvements to site design, operations or monitoring programs are identified.

25. Condition No. 9 is included is to ensure that the Township has a plan to adequately address public complaints in order to minimize the impacts from the operations at the site.

26. Condition No. 9. is included so that if any complaints are caused by the Facility the complaints are addressed in a timely manner and action is taken to prevent further complaints.

Schedule A: Supporting Documents

1. A report entitled *Site Development, Operation and Closure Report, Norway Lake Landfill Site, PC of A No. A411702,* dated September, 1998 and prepared by The Greer Galloway Group Inc.

2. A report entitled *Hydrogeology, Norway Lake Waste Disposal Site, Township of Bagot, Blythfield and Brougham,* dated September, 1998 and prepared by Golder Associates Ltd.

3. A completed Ministry of the Environment form entitled *Application for Approval of a Waste Disposal Site* dated February 8, 2000 (revised) with a cover letter dated February 7, 2000, from Brian Whitehead, Janota Patrick & Associates Ltd., to Tesfaye Gebrezghi, MOE

4. Letter dated February 1, 2000, from Brian Whitehead, Janota Patrick & Associates Ltd., to Andrew Polley, MOE

5. Fax dated December 2, 1999, from Brian Whitehead, Janota Patrick & Associates Ltd., to MOE

6. Letter dated August 6, 1998, from Brian Whitehead, Janota Patrick & Associates Ltd., to Tesfaye Gebrezghi, MOE

7. Letter dated September 14, 1998, from Kevin Mooder, The Greer Galloway Group Inc., to A. Dominski, MOE

Schedule B: Surface Water and Groundwater Monitoring Program

Groundwater and Surface water sampling will be carried out twice a year, one in the Spring (April/May) and the second in late Summer (August/September).

1. Groundwater:

Sampling Locations for routine groundwater monitors:

OB-3, OB-8, OB-10, BR-8

The following parameters shall be tested on water samples collected from all routine groundwater monitores:

chloride, hardness, sodium, boron, iron, manganese, alkalinity, DOC and TDS

Surveillance groundwater monitors:

BR-1, BR-2, BR-9

The following parameters shall be tested on water samples collected from all groundwater surveillance monitores:

Calcium, magnesium, sodium, potassium, aluminum, barium, boron, chromium, cobalt, copper, iron, manganese, total phosphorus, silicon, strontium, zinc, ammonia, nitrate, sulphate, alkalinity, TDS, chloride, TKN, COD, DOC, hardness (calculated from laboratory calcium and magnesium analyses), Volatile organics (EPA 624 list) on BR-1 during the late summer session only.

Field measured parameters shall include:

Groundwater levels in all sample monitors, Temperature, Conductivity and pH.

2. Surface Water

Sampling Locations for routine surface water monitors:

SW-1 and SW-2

The following parameters shall be tested on water samples collected from all surveillance surface water stations:

Calcium, magnesium, sodium, potassium, aluminum, barium, boron, chromium, cobalt, copper, iron, manganese, total phosphorus, silicon, strontium, zinc, total ammonia with un-ionized ammonia determination, BOD, phenol, alkalinity, TDS, chloride, TKN, COD, DOC, hardness (calculated from laboratory calcium and magnesium analyses).

Field measured parameters shall include:

Temperature, Conductivity, pH and Dissolved Oxygen.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990 c. E-19, 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, as amended provides that the Notice requiring a 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.

In addition to these legal requirements, 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 Environment,
2 St. Clair Ave., West, 12A Floor,
Toronto, Ontario.
M4V 1L5

DATED AT TORONTO this 24th day of May, 2000.

THIS IS A TRUE COPY OF THE
ORIGINAL CERTIFICATE MAILED

ON ..... 5/6/2000 .....

RA

(Signed)

A. Dominski, P. Eng.,
Director, Section 39,
Environmental Protection Act

TG/aq

c:
District Manager, MOE Ottawa District Office.
C. Reddy, Clerk Corporation of the Township of Bagot, Blythfield & Broughham

Appendix B

Celine Boutin (Greenview)

From: ECA Submission, MOE (MECP) <ECA.Submission@ontario.ca>
Sent: May 11, 2022 11:31 AM
To: Dan Hagan (Greenview)
Cc: Allison Holtzhauer (TGM); Leonard Emon (TGM); Solutions - Greenview
Subject: RE: ECA Application - Revised Design & Operations Plan - Norway Lake WDS (A411702) - TGM (102.21.013)

Hello,

The ministry's reference number for your application is **5066-CEBKYF.**

Please quote this number in any correspondence or enquiries regarding this application. **Please note, we no longer require a hard copy of the application package.**

If your application requires payment:

1. You must print and complete the payment page of the application form, with the following information clearly identified:
    i. The reference number, as noted above
    ii. Client name
    iii. Site address

2. Staple the Cheque/Money Order (made out to: Minister of Finance) to the payment page or provide your credit card information (VISA/MC only)

3. Send the payment page to the address below:

    Client Services and Permissions Branch
    Ministry of the Environment, Conservation and Parks
    135 St. Clair Avenue West, 1st Floor
    Toronto, ON
    M4V 1P5

- If any information is missing from the payment page, it will be destroyed, and cheques/money orders will be returned.

If your application does not require payment:
No further action is required. The ministry will notify you if there are questions regarding your submission.

Do not reply to this e-mail, please call 416-314-8001/1-800-461-6290 or send an email to enviropermissions@ontario.ca for any questions about your application/fee submission.

Regards,

Application Assessment Unit
Client Services and Permissions Branch
Ministry of the Environment, Conservation, and Parks
135 St. Clair Avenue West, Second Floor | Toronto ON M4V 1P5

From: Dan Hagan (Greenview) <dan.hagan@greenview-environmental.ca>
Sent: May 11, 2022 10:39 AM
To: ECA Submission, MOE (MECP) <ECA.Submission@ontario.ca>
Cc: Hart, Tracy (MECP) <Tracy.Hart@ontario.ca>; Quyum, Abdul (MECP) <Abdul.Quyum@ontario.ca>; Ponalo, Thandeka (MECP) <Thandeka.Ponalo@ontario.ca>; Tieu, Emily (MECP) <Emily.Tieu@ontario.ca>; Allison Holtzhauer (TGM) <aholtzhauer@greatermadawaska.com>; Leonard Emon (TGM) <lemon@greatermadawaska.com>; Solutions - Greenview <solutions@greenview-environmental.ca>
Subject: ECA Application - Revised Design & Operations Plan - Norway Lake WDS (A411702) - Township of Greater Madawaska - TGM (102.21.013)
Importance: High

Good morning, ECA.submission@ontario.ca:

On behalf of the Township of Greater Madawaska (Township), Greenview Environmental Management Limited (Greenview) is pleased to submit to the Ontario Ministry of the Environment, Conservation, and Parks (MECP) the following Environmental Compliance Approval (ECA) Application Package for the Township's Norway Lake Waste Disposal Site (A411702), and related to proposed Transfer Station operation changes for the site. This email submission includes the following attachments:

1. *Revised Design and Operations Plan* for the transfer station at the closed Norway Lake Waste Disposal Site **(102.21.013 - TGM - NL WDS - Revised DOP - FINAL (ALL - SR) - May10-22.pdf)**

2. Copy of the summary email sent to representatives of the MECP who participated in the Pre-Submission Meeting held between Greenview, the Township, and the MECP on January 20, 2022 **(102.21.013 - TGM - NL WDS - Pre-submission Email Summary - Rev DOP - Jan20-22.pdf)**

3. ECA Application Form **(102.21.013 - TGM - NL WDS - Revised DOP - ECA Application Form (FINAL) - May10-22.pdf)**

4. Scanned Section 7.1 & 7.2 of ECA Application Form, signed by the CAO/Clerk-Deputy Treasurer of the Township of Greater Madawaska **(102.21.013 - TGM - NL WDS - Revised DOP - ECA App Form (Sec 7.1 & 7.2) - May10-22.pdf)**

5. Scanned Section 7.3 of ECA Application Form, signed by Technical Contact #1 **(102.21.013 - TGM - NL WDS - Revised DOP - ECA App Form (Sec 7.3 - TC #1) - May10-22.pdf)**

6. Scanned Section 7.3 of ECA Application Form, signed by Technical Contact #2 **(102.21.013 - TGM - NL WDS - Revised DOP - ECA App Form (Sec 7.3 - TC #2) - May10-22.pdf)**

With respect to payment of application fees for this ECA Application, we intend to pay by Credit Card. Per "Payment Method" information provided by the MECP on the MECP's website (https://www.ontario.ca/page/environmental-compliance-approval#section-4), we will submit a *Signed Hardcopy of Section 8 – Payment Information* of the *ECA Application Form* to the MECP at the following address, once we have received the Confirmation Email from the MECP with the Reference Number for the application:

- Ministry of the Environment, Conservation and Parks
  Attention: Environmental Compliance Approval, Director
  Client Services and Permissions Branch
  135 St. Clair Avenue West, 1st Floor
  Toronto Ontario
  M4V 1P5

As part of this submission, we have copied relevant contacts for the project at the MECP Ottawa District Office, per the requirements of the MECP to distribute copies of the ECA Application to the local MECP District Office.

Copies of the *Adjacent Property Owner Notification Letters* are to be sent out today, by regular mail, and are also included in Appendix G of the Revised Design and Operations Plan (attached).

Many thanks in advance for your time, and if you have any questions regarding this submission, please contact me at your convenience.

Sincerely,

Dan Hagan, P.Geo.
Senior Project Manager / Geologist

Greenview

613.332.0057 x 105
www.greenview-environmental.ca

Celine Boutin (Greenview)

From: Ponalo, Thandeka (MECP) <Thandeka.Ponalo@ontario.ca>
Sent: June 9, 2022 4:38 PM
To: Township Clerk
Cc: Leonard Emon; Tyler Peters (Greenview); Dan Hagan (Greenview); Allison Holtzhauer; Tieu, Emily (MECP); Hart, Tracy (MECP)
Subject: RE: Extended Operating Hours of Waste Sites - State of Emergency - Township of Greater Madawaska

Follow Up Flag: Follow up
Flag Status: Flagged

Good afternoon Leonard,

On behalf of the Ottawa District Manager, the request to extended operating hours of the site located at 5911 Matawatchan Rd, Griffith, to facilitate the acceptance of wood and brush debris resulting from the storm for the days listed below, is permitted. All other requirements outlined in the letter dated May 26, 2022 remain in place and have not change.

If you have any questions please do not hesitate to contact me.

Thank you,

Thandeka Ponalo
Senior Environmental Officer
Ontario Ministry of the Environment, Conservation and Parks
Ottawa District Office
2430 Don Reid Drive
Ottawa ON K1H 1E1
Tel: 613-858-0695 | Fax: 613-521-5437
Spills Action Centre (SAC): 1-800-268-6060
Thandeka.Ponalo@ontario.ca | www.ene.gov.on.ca

We want to hear from you. How was my service? You can provide feedback at 1-888-745-8888 or ontario.ca/inspectionfeedback

---

From: Township Clerk <clerk@greatermadawaska.com>
Sent: June 8, 2022 3:27 PM
To: Ponalo, Thandeka (MECP) <Thandeka.Ponalo@ontario.ca>
Cc: Leonard Emon <lemon@greatermadawaska.com>; tyler.peters@greenview-environmental.ca; dan.hagan@greenview-environmental.ca; Allison Holtzhauer <aholtzhauer@greatermadawaska.com>; Tieu, Emily (MECP) <Emily.Tieu@ontario.ca>; Hart, Tracy (MECP) <Tracy.Hart@ontario.ca>
Subject: RE: Extended Operating Hours of Waste Sites - State of Emergency - Township of Greater Madawaska

Hello Thandeka,
We have another extension request for the Extended Operating Hours of Waste Sites - State of Emergency - Township of Greater Madawaska.
We would like to open the additional site, as described previously, at 5911 Matawatchan Rd Griffith, on June 11, 12, 18, & 19 from 12pm to 4pm, for accepting brush debris resulting from the storm.
If you need any further information, please contact:

Leonard Emon | Facilities Manager
P: 613.752.2249 | E: lemon@greatermadawaska.com
Township of Greater Madawaska | 19 Parnell St., PO Box 180 | Calabogie ON K0J 1H0

Thank you,

Robin Emon | Deputy Clerk

P: 613.752.2229 | E: clerk@greatermadawaska.com
Township of Greater Madawaska | 19 Parnell St., PO Box 180 | Calabogie ON K0J 1H0
P: 613.752.2222 | F: 613.752.2617 | TF: 1.800.347.7224

From: Ponalo, Thandeka (MECP) <Thandeka.Ponalo@ontario.ca>
Sent: May 27, 2022 4:57 PM
To: Township Clerk <clerk@greatermadawaska.com>
Cc: Leonard Emon <lemon@greatermadawaska.com>; tyler.peters@greenview-environmental.ca; dan.hagan@greenview-environmental.ca; Allison Holtzhauer <aholtzhauer@greatermadawaska.com>; Tieu, Emily (MECP) <Emily.Tieu@ontario.ca>; Hart, Tracy (MECP) <Tracy.Hart@ontario.ca>
Subject: RE: Extended Operating Hours of Waste Sites - State of Emergency - Township of Greater Madawaska

Good afternoon Leonard,

On behalf of the Ottawa District Manager, the request to operate the privately owned site located at 5911 Matawatchan Rd, Griffith, to facilitate the acceptance of wood and brush debris resulting from the storm until June 5, 2022, is permitted. All other requirements outlined in the letter dated May 26, 2022 remain in place and have not change.

If you have any questions please do not hesitate to contact me.

Thank you,

Thandeka Ponalo
Senior Environmental Officer
Ontario Ministry of the Environment, Conservation and Parks
Ottawa District Office
2430 Don Reid Drive
Ottawa ON K1H 1E1
Tel: 613-858-0695 | Fax: 613-521-5437
Spills Action Centre (SAC): 1-800-268-6060
Thandeka.Ponalo@ontario.ca | www.ene.gov.on.ca

We want to hear from you. How was my service? You can provide feedback at 1-888-745-8888 or ontario.ca/inspectionfeedback

---

From: Township Clerk <clerk@greatermadawaska.com>
Sent: May 27, 2022 10:33 AM
To: Ponalo, Thandeka (MECP) <Thandeka.Ponalo@ontario.ca>
Cc: Leonard Emon <lemon@greatermadawaska.com>; tyler.peters@greenview-environmental.ca; dan.hagan@greenview-environmental.ca; Allison Holtzhauer <aholtzhauer@greatermadawaska.com>; Tieu, Emily

(MECP) <Emily.Tieu@ontario.ca>; Hart, Tracy (MECP) <Tracy.Hart@ontario.ca>
Subject: RE: Extended Operating Hours of Waste Sites - State of Emergency - Township of Greater Madawaska

Thankdeka,
Thank you for the response letter.
We have had to make the decision to offer the additional site until June 5, 2022.
I have included our revised request below, the only change is shown in red. I will watch for a revised response. If you need any further information, please contact:

Leonard Emon | Facilities Manager
P: 613.752.2249 | E: lemon@greatermadawaska.com
Township of Greater Madawaska | 19 Parnell St., PO Box 180 | Calabogie ON K0J 1H0

Norway Lake site (A411702)

- *Regular hours are:*
  - *Wednesdays 8am-4pm*
  - *Saturdays 8am-6pm*
  - *Sundays 10am-5pm*
- *Extended hours will be:*
  - *Thursday May 26, 2022 8am-4pm*
  - *Friday May 27, 2022 8am-4pm*
  - *Monday May 30, 2022 8am-4pm*
  - *Tuesday May 31, 2022 8am-4pm*
- *Only Brush debris will be accepted during the extended hours*
- *We are anticipating going back to regular hours after May 31, 2022, however, we will be reassessing the need of extended hours at that time and will contact you with updated information*

Opening an additional site for accepting brush debris resulting from the storm. The site is privately owned. The site will be supervised by Township staff.

- *Owner: Ronald Stanley Reiche*
- *Location: 5911 Matawatchan Rd Griffith (legal text: Grif con 25 Pt lot 8)*
- *Only wood and brush debris will be accepted at this site*
- *An appropriate fire break radius from the stockpile to tree lines will be maintained*
- *The location will be open and supervised daily, 8am-4pm, anticipating open until **June 5**, however, we will be reassessing the need of the additional site at that time and will contact you with updated information*

Your assistance is appreciated,
Robin

Robin Emon| Deputy Clerk
P: 613.752.2229 | E: clerk@greatermadawaska.com
Township of Greater Madawaska | 19 Parnell St., PO Box 180 | Calabogie ON K0J 1H0
P: 613.752.2222 | F: 613.752.2617 | TF: 1.800.347.7224

From: Ponalo, Thandeka (MECP) <Thandeka.Ponalo@ontario.ca>
Sent: May 26, 2022 11:24 AM

To: Township Clerk <clerk@greatermadawaska.com>
Cc: Leonard Emon <lemon@greatermadawaska.com>; tyler.peters@greenview-environmental.ca; dan.hagan@greenview-environmental.ca; Allison Holtzhauer <aholtzhauer@greatermadawaska.com>; Tieu, Emily (MECP) <Emily.Tieu@ontario.ca>; Hart, Tracy (MECP) <Tracy.Hart@ontario.ca>
Subject: RE: Extended Operating Hours of Waste Sites - State of Emergency - Township of Greater Madawaska

Good morning,

On behalf of the Ottawa District Manager, Tracy Hart, please find attached a response letter to the request to extend the operating hours at the Norway Lake Waste Disposal Site and opening an additional site at 5911 Matawatchan Rd, Griffith. If you have any questions or concerns about the letter, please do not hesitate to contact me.

Thank you,

Thandeka Ponalo
Senior Environmental Officer
Ontario Ministry of the Environment, Conservation and Parks
Ottawa District Office
2430 Don Reid Drive
Ottawa ON K1H 1E1
Tel: 613-858-0695 | Fax: 613-521-5437
Spills Action Centre (SAC): 1-800-268-6060
Thandeka.Ponalo@ontario.ca | www.ene.gov.on.ca

We want to hear from you. How was my service? You can provide feedback at 1-888-745-8888 or ontario.ca/inspectionfeedback

---

From: Township Clerk <clerk@greatermadawaska.com>
Sent: May 24, 2022 2:41 PM
To: Ponalo, Thandeka (MECP) <Thandeka.Ponalo@ontario.ca>; Tieu, Emily (MECP) <Emily.Tieu@ontario.ca>; Hart, Tracy (MECP) <Tracy.Hart@ontario.ca>
Cc: Leonard Emon <lemon@greatermadawaska.com>; tyler.peters@greenview-environmental.ca; dan.hagan@greenview-environmental.ca; Allison Holtzhauer <aholtzhauer@greatermadawaska.com>
Subject: Extended Operating Hours of Waste Sites - State of Emergency - Township of Greater Madawaska

This email is sent to you, on behalf of Leonard Emon, Facilities and Environment Manager, Township of Greater Madawaska.
As a result of the May 21st, 2022 storm, the Township of Greater Madawaska declared a State of Emergency as of 1:30pm May 22, 2022.
As a result of the storm the Township will be extending the hours of one of our transfer stations and opening an additional site for brush disposal. The overwhelming amount of brush debris has made this step necessary.

Norway Lake site (A411702)

- Regular hours are:
  - Wednesdays 8am-4pm
  - Saturdays 8am-6pm
  - Sundays 10am-5pm
- Extended hours will be:
  - Thursday May 26, 2022 8am-4pm
  - Friday May 27, 2022 8am-4pm
  - Monday May 30, 2022 8am-4pm

    - Tuesday May 31, 2022 8am-4pm
- Only Brush debris will be accepted during the extended hours
- We are anticipating going back to regular hours after May 31, 2022, however, we will be reassessing the need of extended hours at that time and will contact you with updated information

Opening an additional site for accepting brush debris resulting from the storm. The site is privately owned. The site will be supervised by Township staff.

- Owner: Ronald Stanley Reiche
- Location: 5911 Matawatchan Rd Griffith (legal text: Grif con 25 Pt lot 8)
- Only wood and brush debris will be accepted at this site
- An appropriate fire break radius from the stockpile to tree lines will be maintained
- The location will be open and supervised daily, 8am-4pm, anticipating open until May 31, however, we will be reassessing the need of the additional site at that time and will contact you with updated information

Please contact Leonard Emon, Facilities Manager, for further information:

Leonard Emon | Facilities Manager
P: 613.752.2249 | E: lemon@greatermadawaska.com
Township of Greater Madawaska | 19 Parnell St., PO Box 180 | Calabogie ON K0J 1H0

Thank you,
Robin

Robin Emon | Deputy Clerk
P: 613.752.2229 | E: clerk@greatermadawaska.com
Township of Greater Madawaska | 19 Parnell St., PO Box 180 | Calabogie ON K0J 1H0
P: 613.752.2222 | F: 613.752.2617 | TF: 1.800.347.7224

Appendix C

Project No: 10392-015

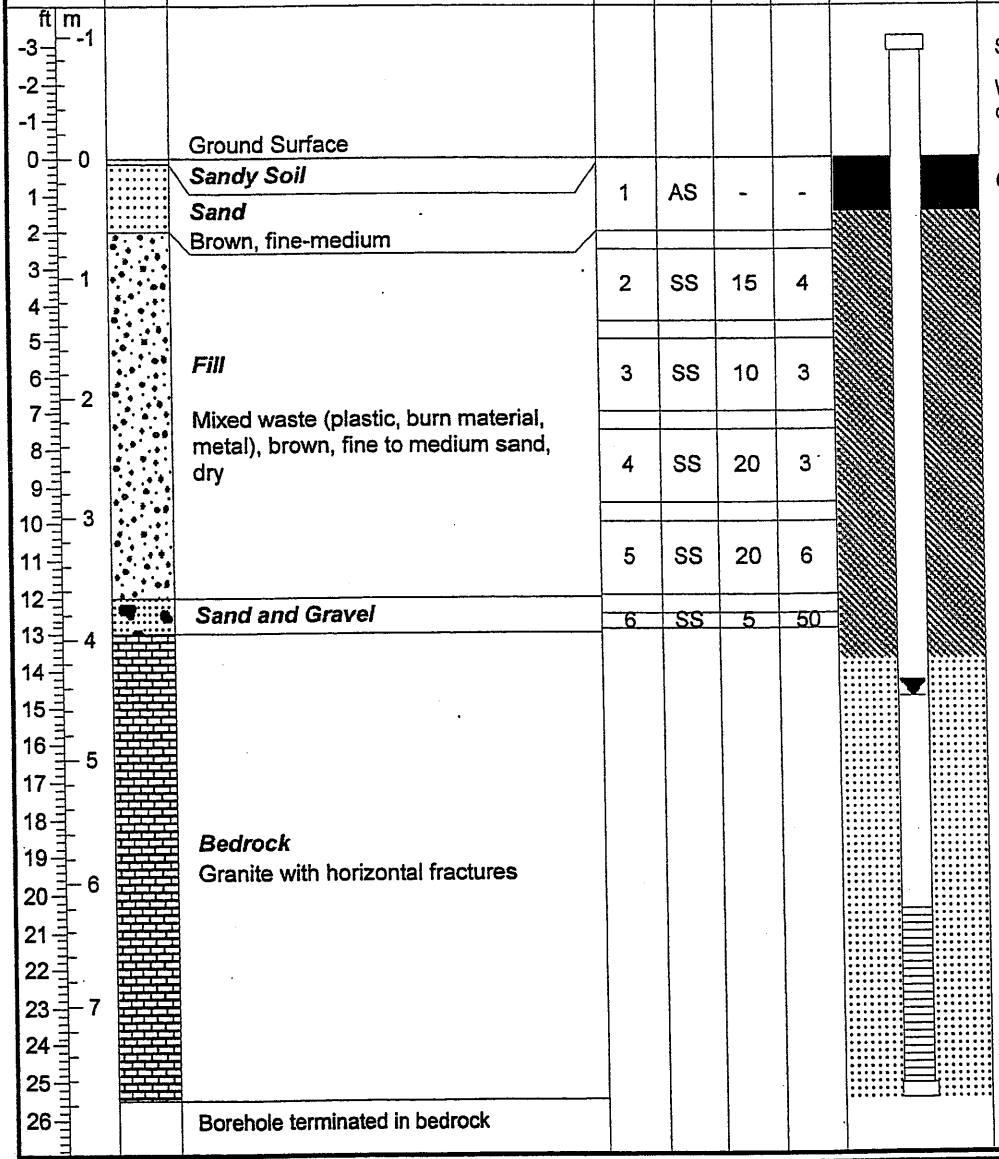
Log of Borehole: BR-10

Project: Norway Lake WDS

Client: Township of Greater Madawaska

Location: See Site Plan

Logged By: STM



Drill Method: Hollow Stem Auger/Diamond Bit Core

Drill Date: August 30, 2004

Input by: STM

Checked by: DFB

Sheet: 1 of 1

SGS

Project No: 10392-015

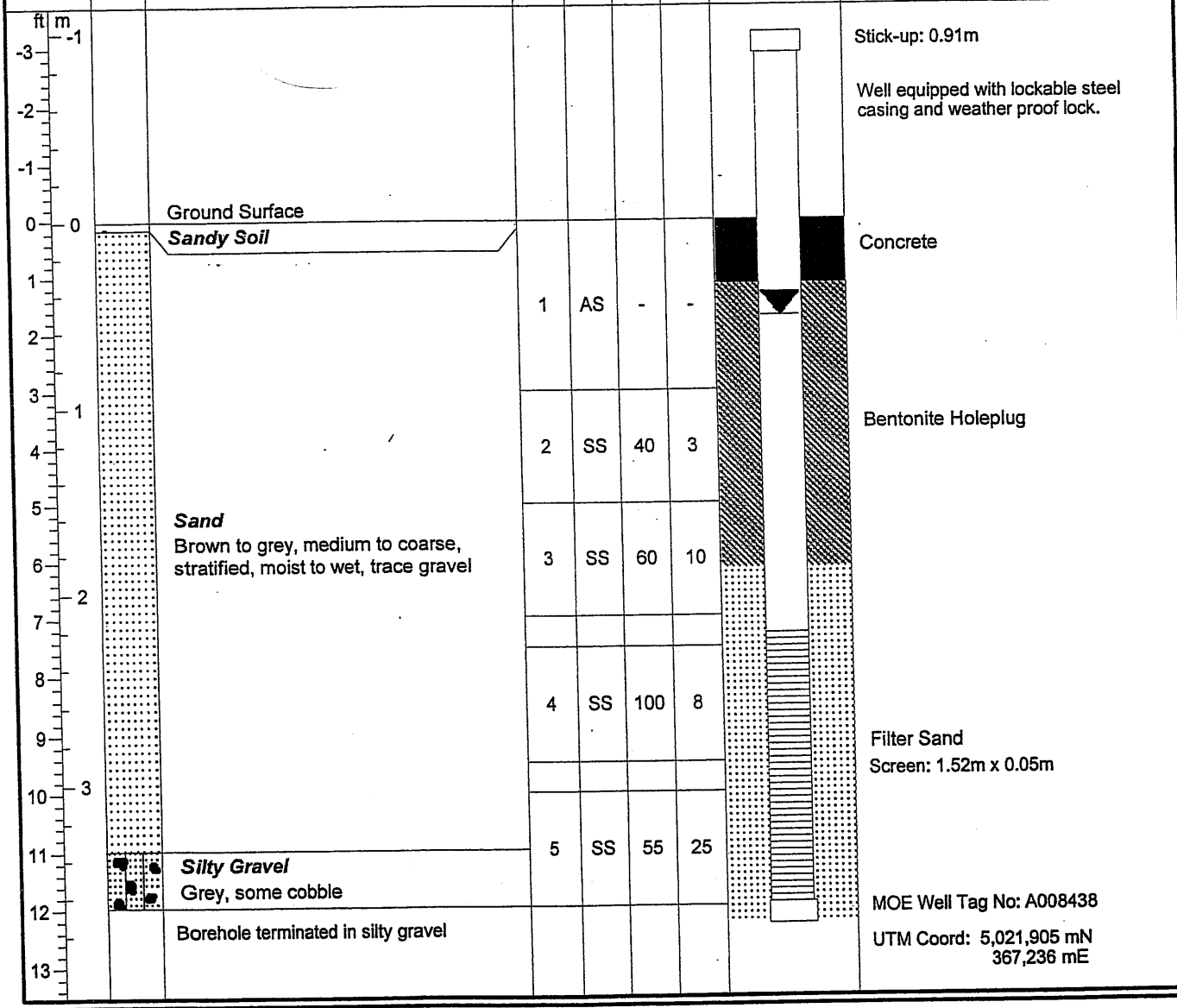
Log of Borehole: OB-11

Project: Norway Lake WDS

Client: Township of Greater Madawaska

Location: See Site Plan

Logged By: STM



Drill Method: Hollow Stem Auger - CME 75

Drill Date: August 30, 2004

Input by: STM

Checked by: DFB

Sheet: 1 of 1

SGS

Project No: 10392-015

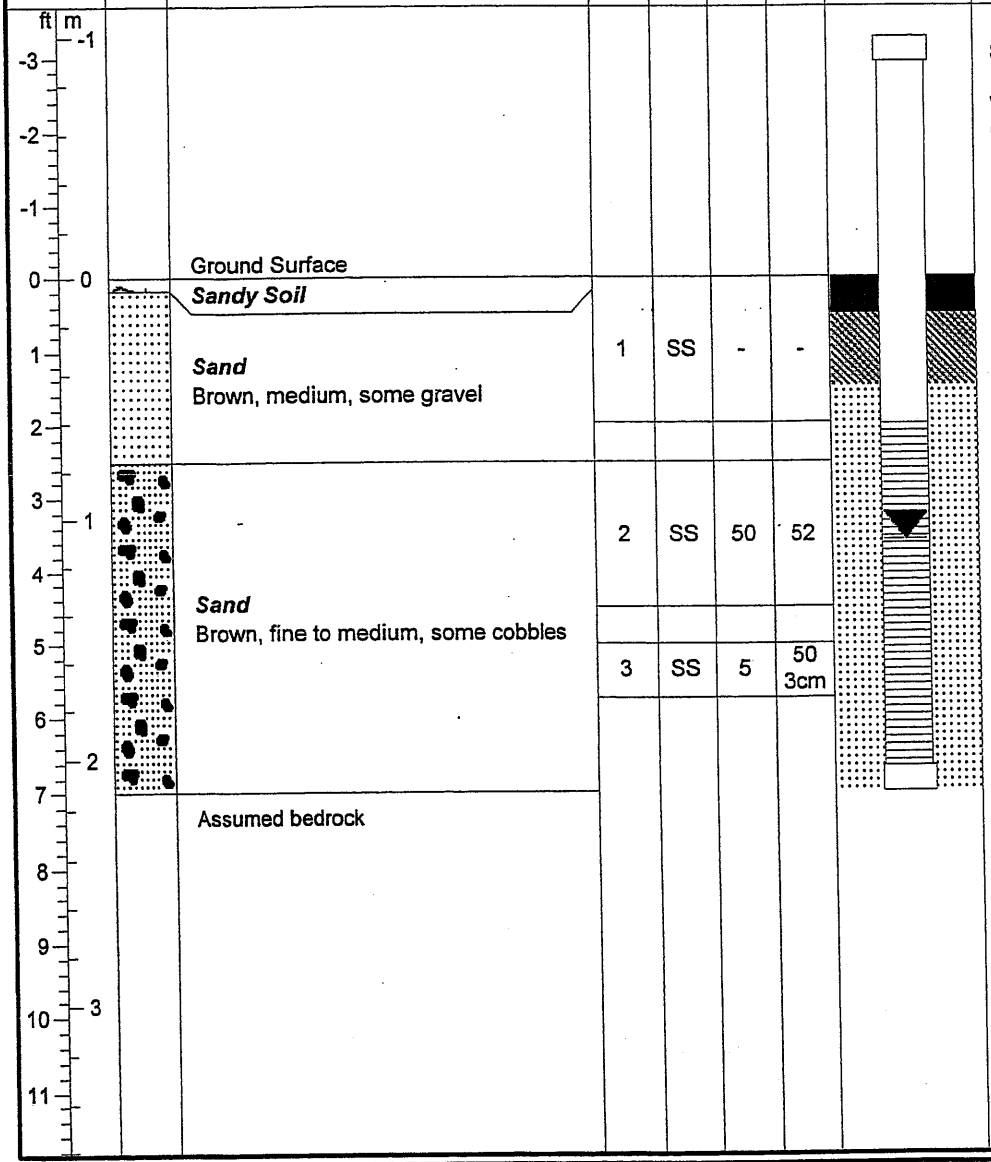
Log of Borehole: OB-12

Project: Norway Lake WDS

Client: Township of Greater Madawaska

Location: See Site Plan

Logged By: SR



Drill Method: Hollow Stem Auger - CME 75

Drill Date: August 30, 2004

Input by: STM

Checked by: DFB

Sheet: 1 of 1

SGS

BOREHOLE LOG OB-11R

Greenview
ENVIRONMENTAL MANAGEMENT

CLIENT Township of Greater Madawaska
PROJECT NAME Norway Lake Waste Disposal Site
PROJECT NUMBER 102.18.013
PROJECT LOCATION Burnstown, Ontario
DATE STARTED 10/29/18 **COMPLETED** 10/29/18
GROUND ELEVATION 171.74 m **HOLE SIZE** 0.1524 m (6")
DRILLING CONTRACTOR OGS Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger (0.1524 m)
AT TIME OF DRILLING ---
LOGGED BY DMH **CHECKED BY** THP
AT END OF DRILLING ---
NOTES Replacement well for OB-11
1hrs AFTER DRILLING 0.50 m / Elev 171.24 m

DEPTH (m)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	▲ SPT N VALUE ▲ (20 40 60 80)	WELL DIAGRAM (Stickup = 1.04 m)
			0.00 Brown topsoil, dry					
	1		Grey, fine-grained sand, damp	SS 1	49	1-4-5-5 (9)		
	2		0.76 Grey, medium to fine-grained sand, wet					
1	3			SS 2	49	2-8-26-36 (34)		Bentonite hole plug
	4							
	5			SS 3	16	2-22-50 (72)		
2	6							
	7		2.29 Grey, medium to fine-grained sand with gravel, wet					
	8			SS 4	34	2-2-4-6 (6)		0.05 m (2") PVC well pipe
	9							
3	10		3.05 No sample due to gravel plug in splitspoon (interpreted to be grey, medium to fine-grained sand with gravel, wet)	SS 5	0	3-50		Silica sand
	11							Well Screen = 1.524 m
	12							
4	13		4.22 Refusal encountered - interpreted bedrock					

Bottom of hole at 4.22 m.

Appendix D

Greenview
ENVIRONMENTAL MANAGEMENT

FIELD SAMPLING RECORD - GROUND WATER

LOCATION: Norway Lake Waste Disposal Site **DATE:** May 5, 2022 **SAMPLED BY:** MAG / NBF

PROJECT NO.: 102.22.013 **WEATHER (SAMPLE DAY):** Sunny, 10°C **WEATHER (PREVIOUS DAY):** Cloudy, 10°C

Monitoring Location	Static Water Level	Borehole Depth (m)	Stick - Up (m)	Borehole Diameter (mm)	Purge Volumes (L)		Temperature (°C)	pH (units)	Conductivity (µS)	Dissolved Oxygen (mg/L)	Observations				Comments
					Needed	Obtained					Colour	Clarity	Odour	Sheen	
G-1	-	-	0.36	25.0	-	-	-	-	-	-	-	-	-	-	Previously Reported Damaged
G-2	0.81	2.43	0.44	25.0	-	-	-	-	-	-	-	-	-	-	Missing Cap
G-3	0.39	2.47	0.38	25.0	-	-	-	-	-	-	-	-	-	-	Wet Conditions Around Pipe
G-4	0.77	2.44	0.35	25.0	-	-	-	-	-	-	-	-	-	-	Missing Cap
G-5	-	-	0.39	25.0	-	-	-	-	-	-	-	-	-	-	Previously Reported Damaged
G-6	0.48	2.06	0.49	25.0	-	-	-	-	-	-	-	-	-	-	Wet Conditions Around Pipe
G-7	1.48	2.47	1.40	25.0	-	-	-	-	-	-	-	-	-	-	
G-8	0.72	2.40	0.85	25.0	-	-	-	-	-	-	-	-	-	-	Bring Cap Replacement Next Time
G-9	0.82	2.40	0.85	25.0	-	-	-	-	-	-	-	-	-	-	
OB-1	1.03	-	0.65	38.1	-	-	-	-	-	-	-	-	-	-	Water Level Only
OB-2	1.10	-	0.81	38.1	-	-	-	-	-	-	-	-	-	-	Water Level Only
OB-3	1.04	4.36	0.80	38.1	10	10	6.62	7.17	1088	5.99	light yellow	cloudy	-	-	GW Routine QA/QC
OB-4	1.60	-	0.94	38.1	-	-	-	-	-	-	-	-	-	-	Insufficient Amount of Water (Dry Well)
OB-5	-	-	0.39	38.1	-	-	-	-	-	-	-	-	-	-	Dry Well
OB-8	2.33	4.96	0.72	38.1	8	8	6.51	7.46	421	10.42	light yellow	clear	-	-	
OB-11R	1.25	4.19	0.85	50.8	16	17	6.33	7.13	1993	8.20	light yellow	cloudy	-	-	Slightly Silty
OB-12	1.60	3.04	0.97	50.8	9	10	6.61	7.30	601	7.28	light brown	cloudy	-	-	GW Surveillance QA/QC

Greenview
ENVIRONMENTAL MANAGEMENT

FIELD SAMPLING RECORD - GROUND WATER

LOCATION: Norway Lake Waste Disposal Site **DATE:** May 5, 2022 **SAMPLED BY:** MAG / NBF

PROJECT NO.: 102.22.013 **WEATHER (SAMPLE DAY):** Sunny, 10°C **WEATHER (PREVIOUS DAY):** Cloudy, 10°C

Monitoring Location	Static Water Level	Borehole Depth (m)	Stick - Up (m)	Borehole Diameter (mm)	Purge Volumes (L)		Temperature (°C)	pH (units)	Conductivity (µS)	Dissolved Oxygen (mg/L)	Observations				Comments
					Needed	Obtained					Colour	Clarity	Odour	Sheen	
BR-1	0.48	5.70	0.64	101.6	120	120	7.25	7.04	1039	4.67	clear	clear	-	-	-
BR-2	1.47	3.53	0.55	101.6	47	50	5.62	7.48	458	7.56	clear	clear	-	-	-
BR-5	3.74	-	0.56	101.6	-	-	-	-	-	-	-	-	-	-	Water Level Only / To Top of Casing
BR-7	2.13	-	0.90	38.1	-	-	-	-	-	-	-	-	-	-	Water Level Only
BR-8	1.31	5.93	0.54	38.1	14	14	5.68	7.69	359	8.68	light yellow	cloudy	-	-	-
BR-9	1.68	5.53	0.41	38.1	12	12	6.50	7.68	275	7.75	clear	clear	-	-	-
BR-10	4.63	7.80	0.78	31.8	10	10	9.31	6.60	1383	5.84	clear	cloudy	Sulfur	-	-

Greenview
ENVIRONMENTAL MANAGEMENT

FIELD SAMPLING RECORD - SURFACE WATER

LOCATION: Norway Lake Waste Disposal Site

DATE: May 5, 2022

SAMPLED BY: MAG / NBF

PROJECT NO.: 102.22.013

WEATHER (SAMPLE DAY): Sunny, 10°C

WEATHER (PREVIOUS DAY): Cloudy, 10°C

Sample Station	Depth (m)	Width (m)	Distance (m)	Time (s)	Correction (.9=S, .8=R)	Velocity (m/s)	Discharge (m^3/s)	Temperature (°C)	pH (units)	Conductivity (µS)	Dissolved Oxygen (mg/L)	Observations				Comments
												Colour	Clarity	Odour	Sheen	
SW1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Insufficient Water to Sample
SW4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Insufficient Water to Sample

Greenview
ENVIRONMENTAL MANAGEMENT

FIELD SAMPLING RECORD - GROUND WATER

LOCATION: Norway Lake Waste Disposal Site **DATE:** August 17, 2022 **SAMPLED BY:** MAG / NBF

PROJECT NO.: 102.22.013 **WEATHER (SAMPLE DAY):** Sunny, 20°C **WEATHER (PREVIOUS DAY):** Sunny, 20°C

Monitoring Location	Static Water Level	Borehole Depth (m)	Stick - Up (m)	Borehole Diameter (mm)	Purge Volumes (L)		Temperature (°C)	pH (units)	Conductivity (µS)	Dissolved Oxygen (mg/L)	Observations				Comments
					Needed	Obtained					Colour	Clarity	Odour	Sheen	
OB-8	1.19	4.38	0.80	38.1	10	10	10.17	7.13	1506	6.83	Clear	Clear	-	-	Routine QA/QC
OB-8	4.00	4.97	0.72	38.1	3	3	10.34	6.78	748	8.47	Yellow	Cloudy	-	-	-
OB-11R	1.50	4.17	0.85	50.8	16	16	13.35	6.87	2034	8.20	Clear	Clear	-	-	-
OB-12	1.94	2.94	0.97	50.8	6	6	14.66	6.91	908	5.29	Light Yellow	Clear	-	-	-
G7	1.68	2.60	-	-	-	-	-	-	-	-	-	-	-	-	-
G9	0.90	2.40	-	-	-	-	-	-	-	-	-	-	-	-	-
G4	0.97	2.25	-	-	-	-	-	-	-	-	-	-	-	-	-
G8	0.88	-	-	-	-	-	-	-	-	-	-	-	-	-	-
G2	0.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-
G6	0.84	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OB4	1.96	2.06	-	-	-	-	-	-	-	-	-	-	-	-	-
BR5	-	5.08	-	-	-	-	-	-	-	-	-	-	-	-	-
OB-2	1.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BR9	1.82	5.53	-	-	10	10	10.17	7.13	1506	6.83	Clear	Clear	-	-	-
OB1	1.19	2.23	-	-	-	-	-	-	-	-	-	-	-	-	-
OB3	1.19	4.38	-	-	10	10	10.17	7.13	1506	6.83	Clear	Clear	-	-	Routine QA/QC

Greenview
ENVIRONMENTAL MANAGEMENT

FIELD SAMPLING RECORD - GROUND WATER

LOCATION: Norway Lake Waste Disposal Site **DATE:** August 17, 2022 **SAMPLED BY:** MAG / NBF

PROJECT NO.: 102.22.013 **WEATHER (SAMPLE DAY):** Sunny, 20°C **WEATHER (PREVIOUS DAY):** Sunny, 20°C

Monitoring Location	Static Water Level	Borehole Depth (m)	Stick - Up (m)	Borehole Diameter (mm)	Purge Volumes (L)		Temperature (°C)	pH (units)	Conductivity (µS)	Dissolved Oxygen (mg/L)	Observations				Comments
					Needed	Obtained					Colour	Clarity	Odour	Sheen	
BR1	0.80	5.90	0.65	38.1	122	123	8.6	6.46	1316	6	Light Grey	Clear	-	-	-
BR2	1.68	3.60	-	-	48	48	11.49	6.70	770	5.24	Clear	Clear	-	-	-
BR5	-	5.08	-	-	-	-	-	-	-	-	-	-	-	-	-
BR7	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BR8	1.98	5.94	-	-	12	12	10.45	6.90	528	6.90	Clear	Clear	-	-	-
BR-9	0.96	5.45	0.41	38.1	11	11	10.95	8.38	349	7.80	clear	cloudy	none	none	
BR10	5.22	7.80	-	-	8	8	10.46	6.69	2382	6.90	Grey	Opaque	Sulfur	-	Gravel in Foot Valve

Appendix E

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G100099

REPORT No. B22-13283

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Mike Grasby

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 06-May-22
DATE REPORTED: 26-May-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Norway Lake WDS
P.O. NUMBER: 102.22.013
WATERWORKS NO.

			Client I.D.		QA/QC(Routine)	OB-3	OB-8	BR-8
			Sample I.D.		B22-13283-1	B22-13283-2	B22-13283-3	B22-13283-4
			Date Collected		05-May-22	05-May-22	05-May-22	05-May-22
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	12-May-22/O	510	511	224	227
Chloride	mg/L	0.5	SM4110C	11-May-22/O	335	312	104	73.0
Nitrate (N)	mg/L	0.05	SM4110C	11-May-22/O				
Sulphate	mg/L	1	SM4110C	11-May-22/O				
Phosphorus-Total	mg/L	0.01	E3516.2	12-May-22/K				
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	12-May-22/K				
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	12-May-22/K				
TDS (Calc. from Cond.)	mg/L	1	Calc.	13-May-22	1148	1148	420	369
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	11-May-22/O	3.3	3.2	4.8	3.7
COD	mg/L	5	SM5220C	16-May-22/K				
Hardness (as CaCO3)	mg/L	1	SM 3120	11-May-22/O	949	949	361	349
Aluminum	mg/L	0.01	SM 3120	11-May-22/O				
Barium	mg/L	0.001	SM 3120	11-May-22/O				
Boron	mg/L	0.005	SM 3120	11-May-22/O	0.505	0.503	0.089	0.148
Calcium	mg/L	0.02	SM 3120	11-May-22/O				
Chromium	mg/L	0.001	EPA 200.8	16-May-22/O				
Cobalt	mg/L	0.0001	EPA 200.8	16-May-22/O				
Copper	mg/L	0.0001	EPA 200.8	16-May-22/O				
Iron	mg/L	0.005	SM 3120	11-May-22/O	0.025	0.033	0.066	0.056
Magnesium	mg/L	0.02	SM 3120	11-May-22/O				
Manganese	mg/L	0.001	SM 3120	11-May-22/O	0.458	0.457	0.002	0.018
Potassium	mg/L	0.1	SM 3120	11-May-22/O				
Silicon	mg/L	0.01	SM 3120	11-May-22/O				
Sodium	mg/L	0.2	SM 3120	11-May-22/O	87.8	87.5	31.0	21.0
Strontium	mg/L	0.001	SM 3120	11-May-22/O				
Zinc	mg/L	0.005	SM 3120	11-May-22/O				

Michelle Dubien
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G100099

REPORT No. B22-13283

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Mike Grasby

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 06-May-22
DATE REPORTED: 26-May-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Norway Lake WDS
P.O. NUMBER: 102.22.013
WATERWORKS NO.

			Client I.D.		QA/QC(Routine)	OB-3	OB-8	BR-8
			Sample I.D.		B22-13283-1	B22-13283-2	B22-13283-3	B22-13283-4
			Date Collected		05-May-22	05-May-22	05-May-22	05-May-22
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				

Michelle Dubien
Lab Manager

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DATE RECEIVED: 06-May-22
DATE REPORTED: 26-May-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Norway Lake WDS
P.O. NUMBER: 102.22.013
WATERWORKS NO.

			Client I.D.		QA/QC (Surveillance)	BR-1	BR-2	BR-9
			Sample I.D.		B22-13283-5	B22-13283-6	B22-13283-7	B22-13283-8
			Date Collected		05-May-22	05-May-22	05-May-22	05-May-22
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	12-May-22/O	217	572	301	241
Chloride	mg/L	0.5	SM4110C	11-May-22/O	193	257	84.2	8.2
Nitrate (N)	mg/L	0.05	SM4110C	11-May-22/O	< 0.05	< 0.05	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	11-May-22/O	10	48	20	12
Phosphorus-Total	mg/L	0.01	E3516.2	12-May-22/K	0.05	0.02	0.02	0.04
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	12-May-22/K	0.1	0.6	0.1	0.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	12-May-22/K	< 0.01	0.29	< 0.01	0.26
TDS (Calc. from Cond.)	mg/L	1	Calc.	13-May-22	567	1043	466	264
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	11-May-22/O	1.0	4.5	2.6	3.0
COD	mg/L	5	SM5220C	16-May-22/K	10	26	11	5
Hardness (as CaCO3)	mg/L	1	SM 3120	11-May-22/O	363	917	432	290
Aluminum	mg/L	0.01	SM 3120	11-May-22/O	0.02	0.06	0.04	0.04
Barium	mg/L	0.001	SM 3120	11-May-22/O	0.129	0.156	0.180	0.074
Boron	mg/L	0.005	SM 3120	11-May-22/O	0.008	0.777	0.013	0.013
Calcium	mg/L	0.02	SM 3120	11-May-22/O	106	201	132	79.8
Chromium	mg/L	0.001	EPA 200.8	16-May-22/O	< 0.001	0.001	< 0.001	0.002
Cobalt	mg/L	0.0001	EPA 200.8	16-May-22/O	< 0.0001	0.0195	0.0003	0.0005
Copper	mg/L	0.0001	EPA 200.8	16-May-22/O	0.0018	0.0101	0.0012	0.0029
Iron	mg/L	0.005	SM 3120	11-May-22/O	< 0.005	2.27	0.857	0.036
Magnesium	mg/L	0.02	SM 3120	11-May-22/O	24.1	101	24.7	22.1
Manganese	mg/L	0.001	SM 3120	11-May-22/O	0.010	0.609	0.051	0.013
Potassium	mg/L	0.1	SM 3120	11-May-22/O	2.8	17.9	6.9	3.0
Silicon	mg/L	0.01	SM 3120	11-May-22/O	3.34	6.16	5.58	4.18
Sodium	mg/L	0.2	SM 3120	11-May-22/O	62.3	72.7	24.9	3.9
Strontium	mg/L	0.001	SM 3120	11-May-22/O	0.218	0.811	0.209	0.126
Zinc	mg/L	0.005	SM 3120	11-May-22/O	< 0.005	< 0.005	< 0.005	< 0.005

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

CADUCEON™ ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G100099

REPORT No. B22-13283

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Mike Grasby

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 06-May-22
DATE REPORTED: 26-May-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Norway Lake WDS
P.O. NUMBER: 102.22.013
WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	QA/QC (Surveillance)	BR-1	BR-2	BR-9
					Sample I.D.	B22-13283-5	B22-13283-6	B22-13283-7	B22-13283-8
					Date Collected	05-May-22	05-May-22	05-May-22	05-May-22

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Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 06-May-22
DATE REPORTED: 26-May-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Norway Lake WDS
P.O. NUMBER: 102.22.013
WATERWORKS NO.

			Client I.D.		BR-10	OB-11R	OB-12	
			Sample I.D.		B22-13283-9	B22-13283-10	B22-13283-11	
			Date Collected		05-May-22	05-May-22	05-May-22	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	12-May-22/O	467	356	214	
Chloride	mg/L	0.5	SM4110C	11-May-22/O	435	870	175	
Nitrate (N)	mg/L	0.05	SM4110C	11-May-22/O	< 0.3	1.38	< 0.05	
Sulphate	mg/L	1	SM4110C	11-May-22/O	32	58	9	
Phosphorus-Total	mg/L	0.01	E3516.2	12-May-22/K	0.05	0.09	0.04	
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	12-May-22/K	10.5	0.2	0.2	
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	12-May-22/K	10.0	0.06	0.18	
TDS (Calc. from Cond.)	mg/L	1	Calc.	13-May-22	1268	2145	536	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	11-May-22/O	4.9	1.5	1.3	
COD	mg/L	5	SM5220C	16-May-22/K	44	17	7	
Hardness (as CaCO3)	mg/L	1	SM 3120	11-May-22/O	650	747	366	
Aluminum	mg/L	0.01	SM 3120	11-May-22/O	0.07	0.14	0.02	
Barium	mg/L	0.001	SM 3120	11-May-22/O	0.711	0.481	0.130	
Boron	mg/L	0.005	SM 3120	11-May-22/O	0.425	0.034	0.008	
Calcium	mg/L	0.02	SM 3120	11-May-22/O	192	225	107	
Chromium	mg/L	0.001	EPA 200.8	16-May-22/O	0.002	< 0.001	< 0.001	
Cobalt	mg/L	0.0001	EPA 200.8	16-May-22/O	0.0120	< 0.0005	< 0.0001	
Copper	mg/L	0.0001	EPA 200.8	16-May-22/O	0.0019	0.0023	0.0018	
Iron	mg/L	0.005	SM 3120	11-May-22/O	22.0	0.241	< 0.005	
Magnesium	mg/L	0.02	SM 3120	11-May-22/O	41.3	44.9	24.2	
Manganese	mg/L	0.001	SM 3120	11-May-22/O	5.98	0.014	0.010	
Potassium	mg/L	0.1	SM 3120	11-May-22/O	22.7	4.6	2.8	
Silicon	mg/L	0.01	SM 3120	11-May-22/O	10.9	5.03	3.35	
Sodium	mg/L	0.2	SM 3120	11-May-22/O	228	498	62.3	
Strontium	mg/L	0.001	SM 3120	11-May-22/O	0.541	0.511	0.218	
Zinc	mg/L	0.005	SM 3120	11-May-22/O	< 0.005	< 0.005	< 0.005	

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G100099 **REPORT No. B22-13283**

Report To:
Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Mike Grasby

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 06-May-22
DATE REPORTED: 26-May-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Norway Lake WDS
P.O. NUMBER: 102.22.013
WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	BR-10	OB-11R	OB-12	
					Sample I.D.	B22-13283-9	B22-13283-10	B22-13283-11	
					Date Collected	05-May-22	05-May-22	05-May-22	

M. Dubien

Michelle Dubien
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G097156 **REPORT No. B22-26584 (i)**

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Mike Grasby

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 19-Aug-22
DATE REPORTED: 02-Sep-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Norway Lake WDS
P.O. NUMBER: 102.22.013
WATERWORKS NO.

			Client I.D.		QA/QC(Routine)	OB-3	OB-8	BR-8
			Sample I.D.		B22-26584-1	B22-26584-2	B22-26584-3	B22-26584-4
			Date Collected		17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	23-Aug-22/O	728	730	324	279
Chloride	mg/L	0.5	SM4110C	22-Aug-22/O	261	261	149	98.2
Nitrate (N)	mg/L	0.05	SM4110C	22-Aug-22/O				
Sulphate	mg/L	1	SM4110C	22-Aug-22/O				
Phosphorus-Total	mg/L	0.01	E3516.2	30-Aug-22/K				
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	30-Aug-22/K				
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	25-Aug-22/K				
TDS (Calc. from Cond.)	mg/L	1	Calc.	24-Aug-22	1137	1137	569	440
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	22-Aug-22/O	3.5	3.7	3.2	2.5
COD	mg/L	5	SM5220C	24-Aug-22/K				
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Aug-22/O	951	958	466	388
Aluminum	mg/L	0.01	SM 3120	26-Aug-22/O				
Barium	mg/L	0.001	SM 3120	26-Aug-22/O				
Boron	mg/L	0.005	SM 3120	26-Aug-22/O	0.559	0.563	0.119	0.125
Calcium	mg/L	0.02	SM 3120	26-Aug-22/O				
Chromium	mg/L	0.001	EPA 200.8	24-Aug-22/O				
Cobalt	mg/L	0.0001	EPA 200.8	24-Aug-22/O				
Copper	mg/L	0.0001	EPA 200.8	24-Aug-22/O				
Iron	mg/L	0.005	SM 3120	26-Aug-22/O	0.101	0.099	0.170	0.032
Magnesium	mg/L	0.02	SM 3120	26-Aug-22/O				
Manganese	mg/L	0.001	SM 3120	26-Aug-22/O	0.465	0.468	0.004	0.024
Potassium	mg/L	0.1	SM 3120	26-Aug-22/O				
Silicon	mg/L	0.01	SM 3120	26-Aug-22/O				
Sodium	mg/L	0.2	SM 3120	26-Aug-22/O	84.0	84.6	40.6	30.2
Strontium	mg/L	0.001	SM 3120	26-Aug-22/O				
Zinc	mg/L	0.005	SM 3120	26-Aug-22/O				

R.L. = Reporting Limit
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Michelle Dubien
Lab Manager

CADUCEON ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G097156 **REPORT No. B22-26584 (i)**

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Mike Grasby

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 19-Aug-22
DATE REPORTED: 02-Sep-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Norway Lake WDS
P.O. NUMBER: 102.22.013
WATERWORKS NO.

Client I.D.					QA/QC(Routine)	OB-3	OB-8	BR-8
Sample I.D.					B22-26584-1	B22-26584-2	B22-26584-3	B22-26584-4
Date Collected					17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Norway Lake WDS
P.O. NUMBER: 102.22.013
WATERWORKS NO.

			Client I.D.		QA/QC (Surveillance)	BR-1	BR-2	BR-9
			Sample I.D.		B22-26584-5	B22-26584-6	B22-26584-7	B22-26584-8
			Date Collected		17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	23-Aug-22/O	321	772	318	262
Chloride	mg/L	0.5	SM4110C	22-Aug-22/O	145	193	146	27.2
Nitrate (N)	mg/L	0.05	SM4110C	22-Aug-22/O	< 0.05	< 0.05	< 0.05	0.06
Sulphate	mg/L	1	SM4110C	22-Aug-22/O	21	66	21	15
Phosphorus-Total	mg/L	0.01	E3516.2	30-Aug-22/K	0.05	0.04	0.11	0.03
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	30-Aug-22/K	0.1	0.8	0.1	0.2
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	25-Aug-22/K	< 0.01	0.21	< 0.01	< 0.01
TDS (Calc. from Cond.)	mg/L	1	Calc.	24-Aug-22	566	1067	563	300
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	22-Aug-22/O	0.9	5.2	1.2	2.3
COD	mg/L	5	SM5220C	24-Aug-22/K	8	33	20	18
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Aug-22/O	489	944	487	301
Aluminum	mg/L	0.01	SM 3120	26-Aug-22/O	0.03	0.05	0.03	0.01
Barium	mg/L	0.001	SM 3120	26-Aug-22/O	0.235	0.181	0.234	0.095
Boron	mg/L	0.005	SM 3120	26-Aug-22/O	0.007	0.678	0.009	0.025
Calcium	mg/L	0.02	SM 3120	26-Aug-22/O	152	211	151	84.2
Chromium	mg/L	0.001	EPA 200.8	24-Aug-22/O	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt	mg/L	0.0001	EPA 200.8	24-Aug-22/O	0.0003	0.0085	0.0003	< 0.0001
Copper	mg/L	0.0001	EPA 200.8	24-Aug-22/O	0.0005	0.0030	0.0004	0.0015
Iron	mg/L	0.005	SM 3120	26-Aug-22/O	1.02	2.27	1.02	< 0.005
Magnesium	mg/L	0.02	SM 3120	26-Aug-22/O	26.6	102	26.5	22.1
Manganese	mg/L	0.001	SM 3120	26-Aug-22/O	0.058	0.604	0.058	< 0.001
Potassium	mg/L	0.1	SM 3120	26-Aug-22/O	8.2	17.6	8.1	3.5
Silicon	mg/L	0.01	SM 3120	26-Aug-22/O	6.28	6.63	6.22	4.26
Sodium	mg/L	0.2	SM 3120	26-Aug-22/O	28.5	77.5	28.3	6.8
Strontium	mg/L	0.001	SM 3120	26-Aug-22/O	0.262	0.912	0.259	0.194
Zinc	mg/L	0.005	SM 3120	26-Aug-22/O	< 0.005	< 0.005	< 0.005	< 0.005

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Michelle Dubien
Lab Manager

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JOB/PROJECT NO.: Norway Lake WDS
P.O. NUMBER: 102.22.013
WATERWORKS NO.

Client I.D.					QA/QC (Surveillance)	BR-1	BR-2	BR-9
Sample I.D.					B22-26584-5	B22-26584-6	B22-26584-7	B22-26584-8
Date Collected					17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				

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WATERWORKS NO.

			Client I.D.		BR-10	OB-11R	OB-12R	
			Sample I.D.		B22-26584-9	B22-26584-10	B22-26584-11	
			Date Collected		17-Aug-22	17-Aug-22	17-Aug-22	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	23-Aug-22/O	636	368	269	
Chloride	mg/L	0.5	SM4110C	22-Aug-22/O	720	1160	197	
Nitrate (N)	mg/L	0.05	SM4110C	22-Aug-22/O	< 0.05	0.28	< 0.05	
Sulphate	mg/L	1	SM4110C	22-Aug-22/O	52	65	17	
Phosphorus-Total	mg/L	0.01	E3516.2	30-Aug-22/K	0.14	0.04	0.08	
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	30-Aug-22/K	23.1	0.3	0.2	
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	25-Aug-22/K	13.7	< 0.01	< 0.01	
TDS (Calc. from Cond.)	mg/L	1	Calc.	24-Aug-22	1835	2474	610	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	22-Aug-22/O	4.3	0.6	0.6	
COD	mg/L	5	SM5220C	24-Aug-22/K	63	27	8	
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Aug-22/O	907	767	361	
Aluminum	mg/L	0.01	SM 3120	26-Aug-22/O	0.07	0.05	0.03	
Barium	mg/L	0.001	SM 3120	26-Aug-22/O	1.06	0.590	0.170	
Boron	mg/L	0.005	SM 3120	26-Aug-22/O	0.508	0.027	0.008	
Calcium	mg/L	0.02	SM 3120	26-Aug-22/O	269	236	108	
Chromium	mg/L	0.001	EPA 200.8	24-Aug-22/O	0.002	< 0.001	< 0.001	
Cobalt	mg/L	0.0001	EPA 200.8	24-Aug-22/O	0.0126	< 0.0005	< 0.0002	
Copper	mg/L	0.0001	EPA 200.8	24-Aug-22/O	< 0.0005	0.0012	0.0007	
Iron	mg/L	0.005	SM 3120	26-Aug-22/O	26.1	< 0.005	< 0.005	
Magnesium	mg/L	0.02	SM 3120	26-Aug-22/O	57.0	43.0	22.5	
Manganese	mg/L	0.001	SM 3120	26-Aug-22/O	6.16	0.002	0.059	
Potassium	mg/L	0.1	SM 3120	26-Aug-22/O	32.8	6.3	3.8	
Silicon	mg/L	0.01	SM 3120	26-Aug-22/O	10.6	5.36	4.49	
Sodium	mg/L	0.2	SM 3120	26-Aug-22/O	315	571	89.6	
Strontium	mg/L	0.001	SM 3120	26-Aug-22/O	0.828	0.592	0.255	
Zinc	mg/L	0.005	SM 3120	26-Aug-22/O	< 0.005	< 0.005	< 0.005	

Michelle Dubien
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

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Bancroft Ontario K0L1C0
Attention: Mike Grasby

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Norway Lake WDS
P.O. NUMBER: 102.22.013
WATERWORKS NO.

			Client I.D.		BR-10	OB-11R	OB-12R	
			Sample I.D.		B22-26584-9	B22-26584-10	B22-26584-11	
			Date Collected		17-Aug-22	17-Aug-22	17-Aug-22	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				

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Michelle Dubien
Lab Manager

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Final Report

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13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
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Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

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DATE REPORTED: 02-Sep-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Norway Lake WDS
P.O. NUMBER: 102.22.013
WATERWORKS NO.

			Client I.D.		BR-1			
			Sample I.D.		B22-26584-6			
			Date Collected		17-Aug-22			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Acetone	µg/L	30	EPA 8260	22-Aug-22/R	< 30			
Benzene	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Bromobenzene	µg/L	0.4	EPA 8260	22-Aug-22/R	< 0.4			
Bromodichloromethane	µg/L	2	EPA 8260	22-Aug-22/R	< 2			
Bromoform	µg/L	5	EPA 8260	22-Aug-22/R	< 5			
Bromomethane	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Carbon Tetrachloride	µg/L	0.2	EPA 8260	22-Aug-22/R	< 0.2			
Chloroethane	µg/L	3	EPA 8260	22-Aug-22/R	< 3			
Chloroform	µg/L	1	EPA 8260	22-Aug-22/R	< 1			
Chloromethane	µg/L	2	EPA 8260	22-Aug-22/R	< 2			
Chlorotoluene,2-	µg/L	0.2	EPA 8260	22-Aug-22/R	< 0.2			
Chlorotoluene,4-	µg/L	0.2	EPA 8260	22-Aug-22/R	< 0.2			
Dibromo-3-Chloropropane, 1,2-	µg/L	0.6	EPA 8260	22-Aug-22/R	< 0.6			
Dibromochloromethane	µg/L	2	EPA 8260	22-Aug-22/R	< 2			
Dibromoethane,1,2- (Ethylene Dibromide)	µg/L	0.2	EPA 8260	22-Aug-22/R	< 0.2			
Dibromomethane	µg/L	0.1	EPA 8260	22-Aug-22/R	< 0.1			
Dichlorobenzene,1,2-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Dichlorobenzene,1,3-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Dichlorobenzene,1,4-	µg/L	0.5	EPA 8260	22-Aug-22/R	0.9			
Dichlorodifluoromethane	µg/L	2	EPA 8260	22-Aug-22/R	< 2			
Dichloroethane,1,1-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Dichloroethane,1,2-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Dichloroethylene,1,1-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			

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			Client I.D.		BR-1			
			Sample I.D.		B22-26584-6			
			Date Collected		17-Aug-22			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	22-Aug-22/R	< 5			
Dichloropropane,1,2-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Dichloropropane,1,3-	µg/L	0.2	EPA 8260	22-Aug-22/R	< 0.2			
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Dichloropropene,1,1-	µg/L	0.2	EPA 8260	22-Aug-22/R	< 0.2			
Ethylbenzene	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Hexachlorobutadiene	µg/L	0.6	EPA 8260	22-Aug-22/R	< 0.6			
Hexane	µg/L	5	EPA 8260	22-Aug-22/R	< 5			
Isopropylbenzene	µg/L	0.2	EPA 8260	22-Aug-22/R	< 0.2			
Isopropyltoluene,4-	µg/L	0.2	EPA 8260	22-Aug-22/R	< 0.2			
Methyl Butyl Ketone	µg/L	5	EPA 8260	22-Aug-22/R	< 5			
Methyl Ethyl Ketone	µg/L	20	EPA 8260	22-Aug-22/R	< 20			
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	22-Aug-22/R	< 20			
Methyl-t-butyl Ether	µg/L	2	EPA 8260	22-Aug-22/R	< 2			
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	22-Aug-22/R	0.6			
Naphthalene	µg/L	0.4	EPA 8260	22-Aug-22/R	< 0.4			
n-Butylbenzene	µg/L	0.4	EPA 8260	22-Aug-22/R	< 0.4			
n-Propylbenzene	µg/L	0.1	EPA 8260	22-Aug-22/R	< 0.1			
sec-Butylbenzene	µg/L	0.1	EPA 8260	22-Aug-22/R	< 0.1			
Styrene	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
tert-Butylbenzene	µg/L	0.1	EPA 8260	22-Aug-22/R	< 0.1			
Tetrachloroethane,1,1,1,2-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Tetrachloroethane,1,1,2,2-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Tetrachloroethylene	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Toluene	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			

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JOB/PROJECT NO.: Norway Lake WDS
P.O. NUMBER: 102.22.013
WATERWORKS NO.

			Client I.D.		BR-1			
			Sample I.D.		B22-26584-6			
			Date Collected		17-Aug-22			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Trichlorobenzene,1,2,3-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Trichlorobenzene,1,2,4-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Trichloroethane,1,1,1-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Trichloroethane,1,1,2-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Trichloroethylene	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Trichlorofluoromethane	µg/L	5	EPA 8260	22-Aug-22/R	< 5			
Trichloropropane,1,2,3-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			
Trimethylbenzene,1,2,4-	µg/L	1	EPA 8260	22-Aug-22/R	< 1			
Trimethylbenzene,1,3,5-	µg/L	0.1	EPA 8260	22-Aug-22/R	< 0.1			
Vinyl Chloride	µg/L	0.2	EPA 8260	22-Aug-22/R	< 0.2			
Xylene, m,p-	µg/L	1.0	EPA 8260	22-Aug-22/R	< 1.0			
Xylene, o-	µg/L	0.5	EPA 8260	22-Aug-22/R	< 0.5			

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Appendix F

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: Norway Lake WDS
Location (e.g. street address, lot, concession): Part of Lot 20, Concession 7, geographic Township of Bagot, Township of Greater Madawaska
GPS Location (taken within the property boundary at front gate/front entry):
North American Datum (NAD83) are 367326.0 metres (m) East, 5021906.0 m North, in Zone 18T
Municipality: Township of Greater Madawaska

Client and/or Site Owner: Township of Greater Madawaska

Monitoring Period (Year): 2022
This Monitoring Report is being submitted under the following:

- Certificate of Approval No.: A411702
- Director's Order No.: _____
- Provincial Officer's Order No.: _____
- Other: _____

Report Submission Frequency: Annual [X] Other [ ] specify : _____

The site is: active [ ] inactive [ ] closed [X]

If closed, specify C of A, control or authorizing document closure date: Amendment to PC of A (A411702) dated December 24, 2003

Has the nature of the operations at the site changed during this monitoring period? Yes [ ] No [X]
If yes, provide details: _____

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

If no, list exceptions:

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

3) a) Some or all groundwater, leachate and WDS gas sampling and monitoring requirements have been established or defined outside of a ministry C of A, authorizing, or control document.

☐ Yes ☒ No ☐ Not applicable

b) If yes, 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 or attach additional information.

Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
See Report		

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

If no, specify:

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.

[X] Yes [ ] No

If no, the potential design and operational concerns/exceptions are as follows:

See Report

6) The site meets compliance and assessment criteria.

[X] Yes [ ] No

If no, list and explain exceptions

See Report

7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.

[X] Yes [ ] No

If no, list exceptions and explain reason for increase/change.

See Report

8) 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.

[X] Yes Note which practice(s): (a) [ ] b) [ ] c) [X]
[ ] No

9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):

[ ] Yes [X] No [ ] Not applicable

If yes, list value(s) that are/have been exceeded and follow-up action taken

See Report

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: _____.

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:

Recommendation to revise groundwater sampling program from Spring & Summer to Spring & Fall.
See Section 5.0 of 2020 Annual Report.

☒ No changes to the site design and operation are recommended
☐ The following change(s) to the site design and operation is/are recommended:

Name: Tyler H. Peters, P.Eng. Seal:

Signature: _____ Date: Feb17-23

CEP Contact Information:
Company: Greenview Environmental Address:
Telephone No.: Fax No. : E-mail Address:
613-332-0057 solutions@greenview-environmental.ca

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) Un-named seasonally-inundated creek
Distance(s) See report

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

If no, identify issues.

See Report. Next sampling event in 2021.

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
See Report		

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
See Report		

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

If no, specify:

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:

See Report. Next sampling event in 2021.

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
See report		

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

If yes, specify

See Report. Next sampling event in 2023.

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

If no, list parameters and stations that is outside the expected range. Identify whether parameter concentrations show an increasing trend or are within a high historical range.

See Report. Next sampling event in 2023.

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

If yes, provide details and whether remedial measures are necessary.

See report

9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):

☐ Yes ☒ No ☐ Not applicable

If yes, list value(s) that are/have been exceeded and follow-up action taken.

X

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: _____.

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 P.Eng.
Date: (yyyy/mm/dd): Feb17-23

CEP Contact Information:
Company: Greenview Environmental Management Limited
Address: 13 Commerce Court, Bancroft, Ontario, K0L 1C0
Telephone No.: 613-332-0057
Fax No. :
E-mail Address: solutions@greenview-environmental.ca

Appendix G

Statement of Service Conditions & Limitations

The following conditions and limitations shall form an integral part of any agreement between Greenview and the Client. In the event of duplication or conflict, the most stringent shall supercede the other.

Provision of Services and Payment

Upon documented acceptance of Greenview's proposed services and conditions in written form by the Client, Greenview may commence work on the proposed services directly.

Greenview's offers for services in the form of proposals, quotations, bids, tenders, or other like an offering to a Client are formulated upon available information at the time of the offer submission. In the event of discovery of unknown conditions, or any other unknown circumstance that may arise following the presentation of Greenview's offer to the Client, Greenview reserves the right to negotiate terms with the Client with respect to changes in scope, fees, disbursements, or the like as may be fair and reasonable considering the discovery.

Upon retention of Greenview's services related to any commission, the Client agrees to remit payment for the services rendered for the specified period within (30) days of the invoice date as invoiced by Greenview on a typical monthly basis, unless otherwise arranged between the Client and Greenview. In the event of non-payment by the Client, Greenview reserves the right, without external influence or expense, to discontinue services and retain any documentation, data, reports, or other project information until such time as payment is received by Greenview. Interest on any overdue accounts may be applied accordingly.

Warranty, Limitations, and Reliance

Greenview relies on background and historical information from the Client to determine the appropriate scope of services to meet the Client's objectives, in accordance with applicable legislation, guidelines, industry practices, and accepted methodologies.

Greenview provides its services under the specific terms and conditions of a specific proposal (and where necessary formal contract), in accordance with the above requirements and the *Limitations Act 2002,* as amended, only.

The hypotheses, results, conclusions, and recommendations presented in documentation authored by Greenview are founded on the information provided by the Client to Greenview in preparation for the work. Facts, conditions, and circumstances discovered by Greenview during the performance of the work requested by the Client are assumed by Greenview to be part of preparatory information provided by the Client as part of the proposal stage of the project. Greenview assumes that, until notified or discovered otherwise, that the information provided by, or obtained by Greenview from, the Client is factual, accurate, and represents a true depiction of the circumstances that exist related to the time of the work.

Greenview relies on its Clients to inform Greenview if there are changes to any related information to the work. Greenview does not review, analyze, or attempt to verify the accuracy or completeness of the information or materials provided, or circumstances encountered, other than in accordance with applicable accepted industry practice. Greenview will not be responsible for matters arising from incomplete, incorrect, or misleading information or from facts or circumstances that are not fully disclosed to, or that are concealed from Greenview during the period that proposals, services, work, or documentation preparation was performed by Greenview.

Facts, conditions, information, and circumstances may vary with time and locations and Greenview's services are based on a review of such matters as they existed at the time and location indicated in its documentation. No assurance is made by Greenview that the facts, conditions, information, circumstances or any underlying assumptions made by Greenview in connection with the work performed will not change after the work is completed and documentation is submitted. If any such changes occur or additional information is obtained, Greenview should be advised and requested to consider if the changes or additional information affect its findings or results.

When preparing documentation, Greenview considers applicable legislation, regulations, governmental guidelines, and policies to the extent they are within its knowledge, but Greenview is not qualified to advise with respect to legal matters. The presentation of information regarding applicable legislation, regulations, not intended to and should not be interpreted as constituting a legal opinion concerning the work completed or conditions outlined in a report. All legal matters should be reviewed and considered by an appropriately qualified legal practitioner.

Greenview's services, work and reports are provided solely for the exclusive use of the Client which has retained the services of Greenview and to which its reports are addressed. Greenview is not responsible for the use of its services, work or reports by any other party, or for the reliance on, or for any decision which is made by any party using the services or work performed by or a report prepared by Greenview without Greenview's express written consent. Any party that uses, relies on, or makes a decision based on services or work performed by Greenview or a report prepared by Greenview without Greenview's express written consent, does so at its own risk. Except as set out herein, Greenview specifically disclaims any liability or responsibility to any third party for any loss, damage, expense, fine, penalty or other such thing which may arise or result from the use of, reliance on or decision based on any information, recommendation or other matter arising from the services, work or reports provided by Greenview.

Site Reviews and Assessments

A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Greenview's work or report considers any locations or times other than those from which information, sample results and data were specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those based on extrapolations.

Only conditions, and substances, at the site and locations chosen for study by the Client are evaluated; no adjacent or other properties are evaluated unless specifically requested by the Client. Any physical or other aspects of the site that were not chosen for study by the Client, or any other matter not specifically addressed in a report prepared by Greenview, are beyond the scope of the work performed by Greenview and such matters have not been investigated or addressed.

Confidentiality

Greenview provides its proposals, reports, assessments, designs, and any other work for the sole party identified as the Client or potential Client in the case of proposals.

For proposals specifically, the information contained therein is strictly confidential, proprietary information, and shall not be reproduced or disclosed to any other party than to that of the addressee of the original proposal submission, without prior written permission of Greenview. Any such unauthorised reproduction, in whole or in part, is considered a breach of trust or contract, as applicable by law.

Greenview retains all rights to its working/editable files, documents, calculations, drawings, and all other such information utilized in the preparation of its end deliverables to its Clients. Working documentation is considered to be proprietary, and the sole ownership of Greenview and its subconsultants/subtractors.