

# 2023 Annual Report

## Final

Griffith Waste Transfer Site  
ECA No. A412203

March 26, 2024

Jp2g Project # 22-6213C



## DISTRIBUTION LIST

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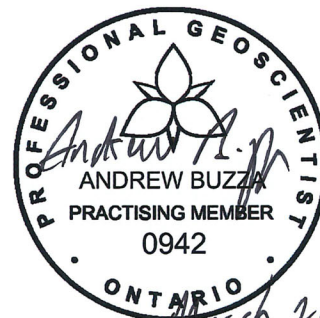
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## EXECUTIVE SUMMARY

Jp2g Consultants Inc. (Jp2g) was retained by the Township of Greater Madawaska to conduct the 2023 ground and surface water monitoring at the Griffith Waste Disposal Site (WDS or landfill), located at 6 Finns Road, on part of Lots 4 and 5, Concession IV, in the geographic Township of Griffith, in the amalgamated Township of Greater Madawaska, in the County of Renfrew. The site is located approximately two kilometers south of the Hamlet of Griffith. This annual report summarizes the results of the 2023 monitoring program, and the results are compared to historical results dating from 2016 to 2022.

In 2023, the Griffith site operated as a waste and recycling transfer station approved to accept municipal waste and recycling for transfer from the Township of Greater Madawaska, in accordance with Environmental Compliance Approval A412203. The site currently consists of an approved fill area of 0.8 hectares within a total property area of 27.5 hectares. Closure activities at the Griffith site were completed in 2012.

The direction of groundwater flow within the shallow overburden is interpreted to be northeast, similar to previous years.

Groundwater quality downgradient of the Griffith Waste Disposal Site was interpreted to be impacted by various sources including landfill-related activities, winter road maintenance of the transfer station, and by naturally occurring conditions. Based on interpreted groundwater flow directions and documented groundwater quality results, attenuation was interpreted to be occurring with increased distance from the landfill. Monitoring well 96-9, located furthest downgradient of the site, was not interpreted to be impacted by landfill-related activities. The existing monitoring well network was interpreted to be sufficient for monitoring groundwater quality at the Griffith Waste Disposal Site.

Monitoring wells 96-7S, 96-7D and 96-9, the most downgradient monitoring wells at the site, were used to determine Reasonable Use Concept and conformance with Guideline B-7 at the site. Since dissolved organic carbon and manganese concentrations decrease significantly between upgradient monitoring wells situated within the approved waste disposal area (91-2 and 91-4) and the downgradient monitors 96-7D and 96-9, the dissolved organic carbon and manganese concentrations would meet Reasonable Use Concept criteria at the downgradient northern and eastern property boundaries. Downgradient monitoring wells 96-7D and 96-9 were not interpreted to be significantly impacted by landfill-related activities at the closest monitoring locations to the downgradient property boundary in 2023. The site was interpreted to meet the intent of Guideline B-7 at the downgradient northern and eastern property boundaries in 2023.

In general, and given that site closure was completed in 2012, ground and surface water quality results are generally stable and/or improving at the Griffith Waste Disposal Site.

The Griffith Waste Disposal Site is approved to receive waste, recyclables and IC&I from residents and generators with the entire Township. The Griffith WTS is currently closed to all landfilling operations but is however currently operating as a municipal solid waste and recycling transfer station.

Based on Township Greater Madawaska records, approximately 4985 vehicles visited the site in 2023. The site accepted approximately 12,694 bags of waste. A recorded 106 tonnes of municipal waste were collected in 2023 and transported for final disposal to the approved waste disposal facility of GFL in Moose Creek, Ontario. Additionally, approximately 344 cubic metres of leaf and yard waste and 819 cubic metres of construction, demolition, and bulky waste were accepted at the Griffith WTS in 2023.



Recycling tonnage records indicated that 45 tonnes of Blue Box recyclables were collected including 23 tonnes of commingled containers, 10 tonnes of mixed fibres, and 12 tonnes of old corrugated cardboard.

A recorded 21 tonnes of scrap metal, 421 tires, 28 refrigerant units and 4 tonnes of waste electronic and electrical equipment were collected from the Griffith Waste Disposal Site.

### **2024 Monitoring Recommendations**

In view of 2023 and historical sampling results, Jp2g does not recommend any changes to the monitoring program in 2024. Ground and surface water should continue to be sampled annually (July/August) for the same list of parameters as analyzed in 2023.



## 1 INTRODUCTION

This report was prepared by Jp2g Consultants Inc. (Jp2g) for the purposes of presenting and interpreting the results of the 2023 ground and surface water monitoring completed at Griffith Waste Disposal Site (WDS). In order to address waste management operations and the direction of long-term waste planning in the Township in 2007, the Griffith Waste Disposal Site was identified for the establishment and operation of a waste transfer station. In 2010, the Township completed the construction of a solid waste and recycling transfer station at the Griffith site, consistent with the Township's long-term waste management plan. Currently, the Township transfers all municipal waste (i.e. bagged garbage) and Blue Box recycling that is received at the site to GFL Environmental Inc. (GFL) which is located in Moose Creek Ontario for disposal and processing.

Jp2g Consultants Inc. completed the environmental monitoring program in 2023. This service was previously offered by Greenview Environmental. For consistency, many details in this report have been copied in part or in whole from previous reports including Greenview (2023).

### 1.1 Site Location

A detailed description of the site location is as follows:

- The site is located on part of Lots 4 and 5, Concession IV, in the geographic Township of Griffith, in the amalgamated Township of Greater Madawaska (Township), in the County of Renfrew as shown on **Figure 1**.
- The civic address of the site is 6 Finns Road.
- The site coordinates are NAD 1983 UTM Zone 18 – 327277E 5012416N.
- The site is located approximately two (2) kilometers (km) west of the Hamlet of Griffith and is accessed via Provincial Highway 41.
- The site currently consists of an approved fill area of 0.8 hectares (ha) within a total property area of 27.5 ha, which was acquired by the Township in 2002 from the Crown (Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry [MNDMNR]) for use as a contaminant attenuation zone (CAZ) at the site (**Appendix A**).

### 1.2 Site Ownership and Key Personnel

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

#### **Municipal Contact**

Township of Greater Madawaska  
Leonard Emon  
Facilities Manager  
Phone: 613.752.2249  
Email: [lemon@greatermadawaska.com](mailto:lemon@greatermadawaska.com)

#### **CEP Contact**

Jp2g Consultants Inc.  
Andrew Buzza, P.Ge  
Sr. Hydrogeologist  
Phone: 613.828-7800  
Email: [andrewb@jp2g.com](mailto:andrewb@jp2g.com)



### 1.3 Site Development of the Waste Disposal Site

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

*Environmental Compliance Approval:*

The site operates under ECA No. A412203 dated December 22, 1999, as amended September 25, 2000, June 13, 2001, June 3, 2008, October 11, 2013 and June 1, 2016 (**Appendix A**).

*Site Status:*

The site is currently operational as a recycling and waste transfer facility.

*Site Capacity:*

Under Condition 17 of the current ECA the approved total waste disposal volume is 17,250m<sup>3</sup>.

*Projected Site Life:*

Landfilling area closed except for stockpiling and processing leaf and yard waste.

*Area of current waste cell footprint and approved footprint:*

The current ECA recognizes a 0.8 ha landfill site and recycling/transfer site within a total site area of 27.5 ha.

*Dates when the site opened, operated and closed as applicable:*

The site was opened in the 1960's and ceased receiving municipal solid waste for disposal in 2012. Under the current ECA the site accepts waste and recyclables.

*Information on final cover, slopes and engineering controls:*

Details found in the Addendum to the Closure Plan (Greenview 2007).

*Any Permits To Take Water associated with the site:*

There are no permits to take water associated with the site.

*Other authorizing and/or control instruments associated with the site:*

There are no storm water management facilities associated with the site.

*Description of any leachate collection systems; and any sewage works, including the C of A number of the works:*

The Griffith Waste Disposal Site is designed for the natural attenuation of leachate. There are no collection systems or sewage works at the site.

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

None

*Any new developments in the vicinity of the site of relevance from a monitoring perspective:*

None.

#### Historical Site Overview

*Environmental Baseline Investigations which were undertaken:*

Investigations of the Griffith Waste Disposal Site have been carried out since 1999. Reports have been submitted annually to the Ministry.





*Design and Construction of the Site:*

The site design, development and operational requirements for the waste transfer site are outlined in the Design and Operations Plan dated January 29, 2024 prepared by Jp2g Consultants Inc.

*Development of environmental monitoring systems:*

Environmental monitoring is conducted annually in accordance with Condition 19 and Schedule “B” of the ECA and recent TSS review comments.

*Conceptual site model:*

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

*Initial placement of waste materials:*

Within the 0.8 ha landfilling area.

*Filling, closure and placement of final cover over waste cells:*

The leaf and yard waste are approved to be burned on site with the cold ashes applied to the waste mound as required. Alternatively, the leaf and yard waste is transferred to another site.

*Problems associated with of final cover over waste:*

There have been no documented issues with the final cover of the waste disposal site.

*Date of site closure, actual or projected, including any closure plans:*

Site closure in 2012 as per the Addendum to the Closure Plan date 2007.

## 1.4 Ministry (MECP) Consultation

On June 3, 2008, an Amendment to the ECA (A412203) was issued by the Ministry, recognizing the entire Township as the service area for the Griffith WTS, and approving the 2007 Closure Plan, recycling and transfer operations, and detailed material storage protocols (**Appendix A**).

On May 21, 2013, the Township submitted an application to amend the ECA to reflect an increase in the maximum storage volume of source separated organics and establish a leaf and yard waste management and burn area at the site. On October 11, 2013, the Township received approval from the Ministry regarding the application to amend the ECA (**Appendix A**).

On July 19, 2013, the Township received Ministry groundwater review comments on the 2012 Annual Report (Greenview, 2013). The groundwater review confirmed that the site in 2012 was in compliance with Ministry Guideline B-7 and requested that the Township propose a trigger mechanism and contingency plan for the site based on Guideline B-7 to be included in the 2013 Annual Report. In accordance with the TSS request, the proposed groundwater trigger mechanism and contingency plan was included in the 2013 Annual Report (Greenview, 2014).



On May 26, 2015, the Griffith Waste Disposal Site was inspected by the Ministry's Ottawa District Office, the results of which were provided to the Township in a *Non-Hazardous Waste Transfer Processing Inspection Report* (Inspection Report) dated July 6, 2015 (Greenview, 2016). On October 1, 2015, the Township submitted a *Proposed Compliance Action Plan* and schedule to the Ministry to address the action items included in the Inspection Report (Greenview, 2016). Subsequent to the submission of the *Proposed Compliance Action Plan*, the Township prepared an application for an administrative amendment to the ECA along with supporting information (Greenview, 2016), in order to address action item #2 from the Inspection Report. Action item #2 required that all waste diversion activities occurring at the site be approved under the ECA; and in the case of the Griffith Waste Disposal Site, it was required that approval for the diversion of construction and demolition (C&D) and bulky waste be included in the site's ECA. As part of the application, the Township requested that an expanded list of waste and recyclable materials be approved at the site for diversion purposes (Greenview, 2016).

On April 5, 2016, the Ministry's environmental approvals branch (EAB) issued a review letter to the Township's ECA application (Greenview, 2017). A response letter was provided to the Ministry on behalf of the Township by Greenview on April 28, 2016 (Greenview, 2017). In the letter, the Township provided responses to questions regarding the application and modified (reduced) the list of additional recyclable materials that had been requested for approval of acceptance at the Griffith site. Subsequent to additional discussions with the Ministry, the Township provided additional information regarding the ECA.

On June 1, 2016, the Ministry issued an Amendment to the ECA for the site which approved changes to the waste and recycling transfer operations (**Appendix A**).

On February 14, 2018, the Township received Ministry surface water review comments to the 2016 Annual Report. The Ministry review approved the reduction of the surface water monitoring program at the site to once per year, in the summer, coinciding with the summer groundwater monitoring program.

On August 28, 2019, the Township received additional surface water review comments to the 2017 Annual Report dated August 19, 2019 (Greenview, 2020). No issues were noted, and no action items were required to be addressed by the Township based on the review.

On October 16, 2019, the Township received an Inspection Report for the Griffith Waste Disposal Site dated October 9, 2019 and related to a site inspection on September 19, 2019 (Greenview, 2020). The Inspection Report required that the Township prepare an Action Plan to address the items noted by the Ministry. On November 26, 2019, the Township submitted an Action Plan to the Ministry's Ottawa District Office relative to the action items of the Inspection Report (Greenview, 2020). On December 3, 2019, the Township received confirmation and approval from the Ottawa District Office regarding the Action Plan (Greenview, 2020). All action items were completed in accordance with the compliance dates identified in the Action Plan. In accordance with the Action Plan, copies of the 2023 Quarterly Inspection Logs are included in **Appendix B**.

A further request for confirmation of completion of the action items was received from the Ministry dated February 6, 2020. As part of the response, the Township was required to submit photographs to the Ministry per their request. The Township submitted their response to the Ottawa District Office on February 14, 2020, including photographs, and the submission was approved by the Ministry in electronic communication dated February 18, 2020 (Greenview, 2020).



The Ministry requested that a Design and Operations (D&O) Report be prepared for the site. Jp2g prepared a D&O Report dated January 29, 2024 found under separate cover.

## 1.5 Purpose and Scope

Jp2g Consultants Inc. (Jp2g) was retained to conduct ground and surface water sampling in 2023, and provide an overview of the annual monitoring, environmental compliance, and operations at the Griffith Waste Disposal Site in accordance with Condition 19 of the ECA (A412203), including the following:

1. Assessment of the condition of the monitoring wells.
2. Annual (July/August) monitoring of groundwater elevations.
3. Annual (July/August) monitoring of groundwater and surface water quality.
4. Site operational overview; and
5. Preparation of an annual report that summarises the results of the monitoring program and submission to the Ministry.

## 1.6 Assumptions and Limitations

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

## 2 SITE DESCRIPTION

The following sections present a summary of the physical characteristics for the Griffith WDS and is based in part on the descriptions in the Annual Monitoring Reports 2008-2022 prepared by Greenview (2009-2023).

### 2.1 Topography and Drainage

The Griffith Waste Disposal Site is located on a topographic high, with topography in the vicinity of the waste mound sloping generally towards the north and northeast, and from the vicinity of the site access gate the topography slopes gently to the southwest (**Figure 2**). Local relief in the area adjacent to the site is observed to slope to the north and northeast towards the Madawaska River. The Madawaska River is located approximately one (1) km north of the site and flows to the southeast.

A small creek, located approximately 200 metres (m) to the east of the site and which flows in a generally northeast direction towards the Madawaska River, is sampled as part of the surface water monitoring program at the site. The small creek intersects and flows under Highway 41 in the general vicinity of surface water location STN1 (**Figure 2**). The creek is sampled at surface water sampling location STN-1 (background), located near the outlet of the northern culvert underlying Highway 41, and at surface water station STN-4 which is located approximately 250 m downstream of STN-1. A low-lying area exists, surrounded by cedar trees, between sampling locations STN-1 and STN-4 where bulrushes and tall grasses are the predominant vegetation. Sampling location STN-5 is located northeast of location STN-1, within a low-lying area of higher elevation than STN-1 and STN-4. Sampling location STN-5 is not located on the same watercourse as STN-1 and STN-4; however, during times of extensive precipitation and/or snow melt, surface water collects within the low area in the vicinity of STN-5 and can flow downhill towards the creek where STN-1 and STN-4 are located.



## 2.2 Hydrogeological Conditions

Overburden geology at the Griffith site is characterized typically by sand ranging in depth from 1 m to 4 m below ground surface, with an underlying bedrock unit comprised of gneiss and marble. In 2006, monitoring well MW06-11 was installed to the east of the site, where overburden comprised of medium-grained sand with some gravel to a depth of 3.06 m, underlain by coarse-grained sand with some silt to a depth of 3.86 m, were observed (Golder Associates Limited [Golder], 2007). Auger refusal was encountered at 3.86 m. Additionally, monitoring well MW12-12 was installed in 2012. Overburden from MW12-12 comprised of fine-grained sand with minor gravel to a depth of 2.59 m, underlain by very fine-grained sand with silt to a depth of 5.33 m, underlain by silt with very fine-grained sand to a depth of 6.86 m. The borehole terminated at 7.06 m. The borehole logs for monitoring wells MW06-11 and MW12-12 are provided in **Appendix C**.

## 2.3 Land Use

The land use designation for the Griffith WTS is Active and Inactive Waste Disposal Site on Schedule “A” to the County’s Official Plan. Adjacent land use is designated Rural and Crown Lands. The Griffith WTS is zoned Waste Disposal (WD) including the 27.5 ha landholding.

## 2.4 Operational Setting

The Griffith Waste Disposal Site currently consists of an approved waste disposal area (AWDA) of 0.8 ha. The Township acquired Crown lands from the MNDMNRF in 2002 for the establishment of a CAZ for the site, and the corresponding total property area of the Griffith Waste Disposal Site is recognized in the ECA as 27.5 ha (**Appendix A; Figure 2**). A Certificate of Prohibition (Requirement) was registered on title for the Griffith Waste Disposal Site on February 27, 2006, in accordance with Condition 15 of the ECA (**Appendix A**).

Currently, the Griffith site operates as a waste transfer site, and is approved to accept municipal waste and recycling from the Township (**Appendix A**). Construction of the transfer station was initiated in 2009 and completed in 2010, with operations commencing on May 19, 2010. Final closure activities at the Griffith site were completed in 2011 and 2012.

# 3 ENVIRONMENTAL MONITORING PROGRAM 2023

## 3.1 Monitoring Locations

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

### 3.1.1 Groundwater Monitoring Locations

Thirteen ground water wells were installed at and around the Griffith WDS between 1991 and 2012. Details are as follows:

- **Monitoring Well 91-1**  
Located approximately 50 m south and upgradient of the southern boundary of the AWDA.



- **Monitoring Well 91-2**  
Located along the north-eastern AWDA.
- **Monitoring Well 91-4**  
Located along the north-eastern AWDA.
- **Monitoring Well 91-5**  
Located approximately 45 m downgradient of monitoring well 91-2, and approximately 30 m downgradient of the north-eastern limit of the AWDA.
- **Monitoring Well 91-6**  
Located approximately 20 m downgradient of the north-eastern limit of the AWDA.
- **Monitoring well 96-7S**  
Located downgradient of the waste mound and approximately 100 m north of monitoring well 91-2 and were used to assess downgradient groundwater quality to the north of the site.
- **Monitoring Well 96-7D**  
Located downgradient of the waste mound and approximately 100 m north of monitoring well 91-2 and were used to assess downgradient groundwater quality to the north of the site.
- **Monitoring Well 96-8**  
Located approximately 80 m downgradient of the north-eastern limit of the AWDA.
- **Monitoring Well 96-9**  
is located approximately 135 m northeast and downgradient of monitoring well 91-4 and was added to the environmental monitoring program in 2008.
- **Monitoring Well 96-10S**  
Located downgradient / partially cross-gradient and adjacent to the northeastern corner of the 30 m operational buffer limit which surrounds the AWDA.
- **Monitoring Well 96-10D**  
Located downgradient / partially cross-gradient and adjacent to the northeastern corner of the 30 m operational buffer limit which surrounds the AWDA.
- **Monitoring Well MW06-11**  
located southeast of the Griffith site, adjacent to the north side of Highway 41.
- **Monitoring Well MW12-12**  
Located approximately 90 m south and upgradient of the southern boundary of the AWDA.

MW12-12 was installed in 2012 in an attempt to avoid impacts as a result of winter road maintenance, which became apparent at background monitoring well 91-1 concurrent with the establishment of the transfer station operations between 2009 and 2010 (Greenview, 2015). Following installation of MW12-12, and based on documented groundwater quality results (Greenview, 2015), it was interpreted that groundwater in the vicinity of MW12-12 was impacted from winter road maintenance activities at the waste transfer station and site access road. Consistent with the recommendations of the 2015 Annual Report (Greenview, 2016), MW12-12 was removed from the annual groundwater monitoring program. Ministry approval to remove MW12-12 from the monitoring program was not required as the well was not required to be sampled by the site's ECA and related control documents.

### 3.1.2 Surface Water Monitoring Locations

In summer 2023, surface water samples were collected at three locations:



### **Monitoring Location STN-1**

Background surface water station STN-1 is located near the outlet of the northern culvert underlying Highway 41.

### **Monitoring Location STN-4**

Surface water station STN-4 is located approximately 250 m downstream of background location STN-1 on a small creek.

### **Monitoring Location STN-5**

Surface water station **STN-5** is located northeast of location STN-1, within a low-lying area of higher elevation than STN-1 and STN-4.

## 3.2 Monitoring Procedures and Methods

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

It was recommended in the 2015 Annual Report (Greenview, 2016) that for future Annual Reports, data from monitoring well 91-1 prior to August 2010 (seven [7] previous sampling events from 2003 to 2009) should be used to calculate median background groundwater quality and the RUC, resulting in consistent (static) median background groundwater parameter concentrations and RUC values for each parameter for all future Annual Reports, until such a time as groundwater monitoring of the Griffith site is discontinued.

This recommendation was proposed given the interpreted impacts related to winter road maintenance activities in both monitoring wells 91-1 (background well) and MW12-12 (background well). Comments on this proposal from the Ministry have not been received by the Township as of the time of writing of this 2023 Annual Report. For the purposes of the 2023 Annual Report, and in the interests of using data that is understood to not be influenced by winter road maintenance activities at the new transfer station as part of the calculations of median background groundwater quality and RUC limits, Jp2g used the Historical Groundwater Quality (**Appendix F**) prepared by Greenview using data from 2003 to 2009 from background monitoring well 91-1, consistent with the recommendations of the 2015 Annual Report (Greenview, 2016).

## 3.3 Groundwater Monitoring Program 2023

One (1) environmental monitoring event was completed by Jp2g in the summer of 2023 (July 17). The monitoring program included the collection of groundwater levels and the collection of water quality samples from selected ground and surface water monitoring stations. **Table 2** (in the tables section) summarizes the sampling activities that were completed during the summer of 2023 monitoring program.

On July 17, 2023, all groundwater wells were inspected by Jp2g and found to be in satisfactory condition. Static water levels were measured, and all wells were purged of standing water prior to sampling. Consistent with historical monitoring programs, monitoring well 96-7S was dry and samples could not be collected (**Table 2**). Purging and sampling of each well was accomplished using a dedicated Waterra<sup>®</sup> D25 foot valve connected to low density polyethylene (LDPE) tubing. Field measurements were collected and included pH, conductivity, and temperature.



Given the observed impacts to groundwater quality at background monitoring well MW12-12 since its installation in 2012, this well was removed from the annual groundwater monitoring program consistent with the recommendations of the 2015 Annual Report (Greenview, 2016). Groundwater elevation measurements were continued at MW12-12 as part of the 2023 groundwater monitoring program.

Data collected for this annual report is included as appendices, namely, borehole logs (**Appendix C**), photo album (**Appendix D**), groundwater elevations (**Appendix G**), laboratory analytical results (**Appendix H**), and ground and surface water results (**Appendix I**).

### 3.4 Surface Water Monitoring Program 2023

On July 17, 2023, surface water samples were collected at STN-1, STN-4, and STN-5 by dipping a clean 500 ml PET bottle below the surface of the water taking care not to disturb the underlying sediments and then placing the sample in laboratory prepared bottles. Field measurements were collected for pH, conductivity, dissolved oxygen and temperature. **Table 2** summarizes the sampling activities that were completed during the summer 2023 monitoring program.

### 3.5 Analytical Laboratory Accreditation

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

### 3.6 Landfill Gas Monitoring

Landfill gas monitoring is not part of the current environmental monitoring program for the site. The waste mound at the Griffith WDS 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.

### 3.7 Operational Monitoring

Operational monitoring at the Griffith Waste Disposal Site is conducted regularly to document waste transfer and storage activities at the site. Closure activities were completed at the site as of 2012.

Daily waste records are completed by Township staff as part of regular operations at the site to monitor vehicular traffic and depot operations. Quarterly Inspection Logs prepared by Township staff are included in **Appendix B**.



The Township has historically submitted annual waste diversion reports in accordance with the Municipal Datacall, inclusive of the Griffith site, to the Resource Productivity and Recovery Authority (RPR). The results of operational monitoring are presented in Section 4.5.

## 4 ENVIRONMENTAL MONITORING RESULTS 2023

### 4.1 Historical Data

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

### 4.2 Groundwater Flow Monitoring

Static water levels were measured in July 2023, and are summarized in **Appendix G**. Ground water flow patterns are provided in **Figure 3**. The water levels were referenced to a local datum. Historically, the groundwater flow at the site was interpreted to flow towards the north and northeast, away from the waste mound (Greenview, 2023) and in the general direction of the low-lying areas northeast of the site.

In 2023, the groundwater flow at the Griffith site was interpreted to be consistent with historical results, as groundwater was interpreted to flow generally to the northeast, towards the low-lying areas north of the site.

### 4.3 Groundwater Quality Assessment

#### 4.3.1 Groundwater Assessment Criteria

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

Background groundwater quality at the Griffith Waste Disposal Site was historically assessed at monitoring well 91-1, located approximately 50 m south and upgradient of the southern boundary of the AWDA, however, based on groundwater results starting from 2010, 91-1 is no longer considered representative of background groundwater quality at the Griffith site. Consistent with recent reports (Greenview, 2023), groundwater at monitoring well 91-1 in summer 2023 was interpreted to be impacted by winter road maintenance activities at the site related to transfer station operations.

#### 4.3.2 Groundwater Quality 2023

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





The results from the blind duplicate sample collected at monitoring well MW06-11 during the summer 2023 sampling event were similar to the identified sample, indicating that the results of the 2023 groundwater monitoring program can be interpreted with confidence.

#### **Background Monitoring Well 91-1**

In the summer of 2023, all parameters met the ODWQS except TDS, manganese, and iron. Monitoring well 91-1 was not interpreted to be impacted from landfill-related activities; however, impacts related to winter road maintenance of the transfer station remain apparent in water quality results (**Appendix I**). Given the winter road maintenance-related impacts interpreted in groundwater results at 91-1, results from monitoring well 91-1 were not considered representative of background groundwater quality at the Griffith Waste Disposal Site in 2023.

#### **Monitoring Well 91-2 and 91-4**

Groundwater quality in the vicinity of the waste mound was assessed at monitoring wells 91-2 and 91-4, located along the north-eastern AWDA, and are interpreted to be most representative of leachate quality at the site. In summer 2023, all parameters (at 91-2 and 91-4) met the ODWQS criteria except Alkalinity, TDS, manganese, and hardness. Iron also exceeded the ODWQS criteria at monitoring 91-2.

Groundwater quality results from monitoring wells 91-2 and 91-4 were interpreted to be consistent with impacts related to winter road maintenance activities at the site and the former landfilling-related activities; however, the decreasing trends noted at both wells were interpreted to be representative of decreasing impacts of landfill-related activities downgradient of the closed waste mound over time.

#### **Monitoring Well 91-5**

In summer 2023, all parameters met the ODWQS criteria except Alkalinity, TDS, DOC, iron, manganese, and hardness. The exceedances of ODWS at well 91-5 were generally consistent with historical results. Most parameters at monitoring well 91-5 were noted to have concentrations less than those at monitoring well 91-2, located directly upgradient and in closer proximity to the waste mound. Based on groundwater quality results in 2023, groundwater in the vicinity of monitoring well 91-5 was interpreted to be impacted by landfill-related activities at the Griffith site and winter road maintenance of the transfer station.

#### **Monitoring Well 96-7S**

Consistent with historical results, monitoring well 96-7S was observed to have insufficient groundwater for sampling purposes during the summer 2023 sampling event, and groundwater samples could not be collected.

#### **Monitoring Well 96-7D**

Monitoring well 96-7D is used to assess downgradient groundwater quality to the north of the site. In summer 2023, all parameters met the ODWQS criteria except iron and manganese. Parameter concentrations noted at monitoring well 96-7D were generally lower than at upgradient monitoring wells 91-2 and 91-4, suggesting that attenuation is occurring downgradient of the waste mound. Impacts related to winter road maintenance of the transfer station appear to be occurring downgradient of the site at the northern extent of the monitoring well network. Groundwater at 96-7D may also be partially impacted from landfill-related activities.



### **Monitoring Well 96-9**

Monitoring well 96-9 is located approximately 135 m northeast and downgradient of monitoring well 91-4 and was added to the environmental monitoring program in 2008, concurrent with monitoring wells 96-7S and 96-7D, to further assess downgradient groundwater quality to the northeast of the site. In summer 2023, all parameters met the ODWQS criteria except manganese. Based on 2023 results, significant impacts related to landfill-related activities were not interpreted to be occurring in the vicinity of downgradient monitoring well 96-9, as manganese are interpreted to be naturally occurring in the vicinity of the site.

### **Monitoring Well 96-10S**

In summer 2023, all parameters met the ODWQS criteria except TDS, iron, and manganese.

### **Monitoring Well 96-10D**

In summer 2023, all parameters met the ODWQS criteria except Alkalinity, TDS, DOC, iron, manganese, and hardness.

All ODWS non-conformances noted at 96-10S and 96-10D were consistent with historical results at the Griffith site. In 2023, parameter concentrations at monitoring wells 96-10S and 96-10D were generally lower than concentrations at upgradient leachate monitoring wells 91-2 and 91-4. Impacts from upgradient sources, including landfill-related activities and from winter road maintenance, remain apparent in the documented groundwater quality results from both monitoring wells.

### **Monitoring Well MW06-11**

In summer 2023, all parameters met the ODWQS criteria except TDS and sodium. The ODWS non-conformances of TDS and sodium were interpreted to be directly related to winter road maintenance along Highway 41 (rather than landfill-related activities). Monitoring well MW06-11 was not interpreted to be impacted from landfill-related activities in 2023.

#### **4.3.3 Reasonable Use Concept Assessment**

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

#### ***Aesthetic Parameters***

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

#### ***Health Related Parameters***

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

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

**Health Related:**

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

**Non-Health Related:**

$$C_{\text{allow}} = P_b + (C_m - P_b) \times 50\%$$

where:

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

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

$P_b$  = Chosen background value of parameter

The RUC assessment was conducted using the concepts and procedures outlined in Ministry Procedure B-7-1, and further to TSS comments dated September 28, 2007 (Greenview, 2008), specifically using the median value of individual background parameter concentrations from monitoring well 91-1 from 2003 to 2009, to characterize natural groundwater quality at the site for assessing site compliance with the RUC. Groundwater quality data following August 2009 to current for monitoring well 91-1 was removed from the median and RUC calculation in an effort to obtain valid median background concentrations and RUC values for the assessment of Guideline B-7.

Since 2008, results from monitoring wells 96-7S, 96-7D, and 96-9 were used to establish RUC at the Griffith site, due to their location north and northeast and furthest downgradient of the waste mound. Monitoring well MW06-11 was not considered to be an adequate monitor of compliance with the RUC given its location cross-gradient and southeast of the site, and its susceptibility to winter road maintenance activities on the adjacent Highway 41.

**Table 3** outlines the Reasonable Use Criteria using the median of the results from monitoring well 91-1 (2003 to 2009).

#### 4.3.4 Reasonable Use Conclusions - 2023

The reasonable use conclusions and the indicator parameters that exceed the RUC for the summer 2023 sampling event are presented in **Table 4** and include:

##### **Monitoring Well 96-7S**

This well was dry in July 2023.

##### **Monitoring Well 96-7D**

Results indicate that all parameters met the RUC criteria in 2023 except for DOC and manganese during the summer sampling event.

##### **Monitoring Well 96-9**

Results indicate that all parameters met the RUC criteria in 2023 except for manganese during the summer sampling event.

The DOC and manganese concentrations decrease significantly between upgradient monitoring wells situated within the AWDA (91-2 and 91-4) and the downgradient monitors 96-7D and 96-9. Additionally, 2023 manganese concentration at downgradient monitoring well 96-7D was generally less than previous results from background surface water sampling location STN-1, which indicates that high concentrations of manganese are naturally occurring in the vicinity of the site.



Downgradient monitoring wells 96-7D and 96-9 were not interpreted to be significantly impacted by landfill-related activities at the closest monitoring locations to the downgradient property boundary in 2023. The site was interpreted to meet the intent of the Guideline B-7 at the downgradient northern and eastern property boundaries in 2023.

#### 4.3.5 Proposed Trigger Mechanism and Contingency Plan Assessment

Based on Ministry TSS groundwater review comments dated June 19, 2013 (Greenview, 2014) related to the 2012 Annual Report (Greenview, 2013), the Ministry TSS requested that the Township propose a trigger mechanism for the Griffith site based on the Guideline B-7, and general contingency plans in the event the trigger mechanism is ever interpreted to be activated.

As requested, the Township included a proposed trigger mechanism and contingency plan (trigger mechanism) in the 2013 Annual Report for the Griffith site (Greenview, 2014). At the time of writing this report, no response from the Ministry had been received by the Township relative to the proposed trigger mechanism (Greenview, 2023).

Based on a review of the proposed trigger mechanism in 2023 it was interpreted that the trigger mechanism was not activated. The RUC non-conformances for the non-health related parameters manganese at 96-7D and 96-9, and DOC at 96-7D, were not interpreted to be solely related to former landfilling activities at the site.

As high concentrations of manganese were historically noted in background groundwater and surface water in the vicinity of the site, and since the concentration downgradient of the waste mound at monitoring well 96-7D was generally similar to historical background concentrations, the noted manganese concentration at 96-7D in 2022 were not deemed to have activated the trigger mechanism. As monitoring wells 96-7D and 96-9 are located within a poorly drained area northeast of the waste mound, high concentrations of DOC would be anticipated in this type of environmental setting, and the trigger mechanism with respect to DOC was not deemed to be activated.

Further review of the proposed trigger mechanism and contingency plan should continue in future annual reports.

Final closure operations were completed at the Griffith Waste Disposal Site in 2011 and 2012, and the closed status of the landfill should be considered as part of any future review of the trigger mechanism.

## 4.4 Surface Water Quality Assessment

### 4.4.1 Surface Water Assessment Criteria

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



#### 4.4.2 Surface Water Monitoring 2023

Photos of the monitoring stations are included in **Appendix D**, laboratory results are included in **Appendix H**, and the results of the surface water analysis for 2023 are included in **Appendix I. Figure 2** illustrates the locations of all surface water monitoring stations.

##### **Surface Water Station STN-1 - Background**

Historically, background surface water quality was assessed at surface water location STN-1, located upstream of the site on a small creek that flows to the northeast, with eventual discharge into the Madawaska River. In 2023, and consistent with the historical results, all parameters met the PWQO criteria except for total phosphorus and iron. All non-conformances with the PWQO at background location STN-1 were attributed to being either naturally occurring or from upstream sources, and not to landfill-related activities. The proximity of STN-1 to Highway 41, the direction of surface water flow, and the winter road maintenance activities along Highway 41 are interpreted to be related to increasing trends at STN-1.

##### **Surface Water Station STN-4**

In 2023, all parameters from STN-4 met the PWQO criteria except for total phosphorus. The noted increasing trends at STN-4 were consistent with trends interpreted from results at background location STN-1 and were interpreted to be consistent with impacts related to winter road maintenance activities and to naturally occurring conditions in the vicinity of the site. Surface water quality downstream of the Griffith site at sampling location STN-4 was not interpreted to be impacted from landfill-related activities the Griffith site.

##### **Surface Water Station STN-5**

Surface water location STN-5 is located on a drainage channel that flows intermittently into the small surface water stream where surface water sampling locations STN-1 and STN-4 are sampled. In 2023, all parameters met the PWQO criteria except for total phosphorus.

Based on current and historical surface water quality results for the Griffith Waste Disposal Site, it is interpreted that landfill-related impacts to the surface water system downgradient and downstream have not and are not occurring.

## 4.5 Operations Summary

A summary of 2023 waste management operations at the Griffith Waste Disposal Site is presented below.

### 4.5.1 Site Operations

The site currently operates as a municipal solid waste and recycling transfer station. The Griffith site is approved to accept residential and Industrial, Commercial, and Institutional (IC&I) waste from within the Township and operates in accordance with ECA A412203 (**Appendix A**). Construction of the waste and recycling transfer station at the Griffith Waste Disposal Site commenced in 2009 and was completed in 2010.

All regular municipal waste (residential and IC&I waste bagged garbage), and Blue Box recycling, collected at the site in 2023 was transferred to GLF in Moose Creek, Ontario. Landfilling operations ceased at the Griffith site in 2011, following the utilization of the remaining site disposal capacity.

The waste and recycling transfer station at the Griffith site is approved to collect the following materials, per the approved Amendment to the ECA dated June 1, 2016 (**Appendix A**):



Waste / Recyclables	Quantity (units)
Regular Municipal Waste (Residential & IC&I)	80 m <sup>3</sup>
Organics	20 m <sup>3</sup>
Blue Box Recyclables (Mixed Fibres & Commingled Containers)	160 m <sup>3</sup>
Old Corrugated Cardboard (OCC)	80 m <sup>3</sup>
Scrap Metal & White Goods	150 m <sup>3</sup>
Refrigerant Appliances	25 units
Waste Electrical and Electronic Equipment (WEEE)	40 m <sup>3</sup>
Tires	100 m <sup>3</sup>
Leaf and Yard Waste	400 m <sup>3</sup>
Construction and Demolition Waste (C&D) and Bulky Waste	80 m <sup>3</sup>
Automotive Plastics (waste oil and antifreeze containers)	5.4 m <sup>3</sup>
Refillable Propane Tanks	50 units
Single-use Propane Cylinders	1 m <sup>3</sup>

A sign is posted at the entrance to the Griffith Waste Disposal Site that provides hours of operation, accepted waste and recyclables, permitted users, emergency contact information, and the ECA number for the site.

The hours of operation at the Griffith site in 2023 were as follows:

Day of the Week	Hours of Operation
Wednesday	1:00 p.m. – 5:00 p.m.
Saturday	1:00 p.m. – 5:00 p.m.
Sunday	1:00 p.m. – 6:00 p.m.
Extended Summer Hours: Victoria Day Monday, August Civic Holiday Monday, Labour Day Monday, Thanksgiving Monday	12:00 p.m. – 6:00 p.m.

The physical address of the Griffith Waste Disposal Site is 6 Finns Road and is accessed from the site road extending to the north from Finns Road and Highway 41. Is well screened with surrounding trees and thick vegetation, and a fence exists between the site and the Finns Rd. Lockable gates control access to the site.



The access roads at the site entrance and within the Griffith WTS 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 Jp2g during various site visits in 2023.

#### 4.5.2 Waste Disposal/ Transfer Summary

The Griffith Waste Disposal Site is approved to receive waste and recyclables from residents and IC&I generators of the entire Township. The Township commenced with final closure activities at the Griffith site in May 2011, and seeding of the final (vegetative) cover at the Griffith site was completed in the spring of 2012. Griffith WTS is currently closed to all landfilling operations; however, the site is presently operating as a municipal solid waste and recycling transfer station.

Based on Township Greater Madawaska records approximately 4985 vehicles visited the Griffith WTS in 2023 and accepted approximately 12,694 bags of waste. A recorded 106 tonnes of municipal waste were collected in 2023 and transported for final disposal to the approved waste disposal facility of GFL in Moose Creek, Ontario. Additionally, approximately 344 cubic metres of leaf and yard waste and 819 cubic metres of construction, demolition, and bulky waste were accepted at the Griffith WTS in 2023.

Recycling tonnage records indicated that 45 tonnes of Blue Box recyclables were collected including 23 tonnes of commingled containers, 10 tonnes of mixed fibres, and 12 tonnes of old corrugated cardboard.

A recorded 21 tonnes of scrap metal, 421 tires, 28 refrigerant units and 4 tonnes of waste electronic and electrical equipment were collected from the Griffith Waste Disposal Site.

#### 4.5.3 Site Inspections and Maintenance

A site inspection of the operations area and property at the Griffith WTS was conducted by Jp2g on July 17, 2023 during the summer sampling event.

Closed Landfill Site Quarterly Inspection Logs for the Griffith site are required to be conducted by the Township in spring, summer, fall, and winter, as noted by the Ministry Ottawa District Office in the 2019 Inspection Report (Greenview, 2020). Copies of the Quarterly Inspection Logs completed by the Township in 2023 are included in **Appendix B**. Copies of future Quarterly Inspection Logs are to continue to be included in Annual Reports, on an on-going basis.

The Township exercises routine litter management activities at the Griffith WTS. Additional site cleanup activities were completed by the Township on an as required basis.

#### 4.5.4 Monitoring and Screening Checklist

The monitoring and screening checklist is provided in **Appendix J** and based on the 2023 results no contingency measures are required to be implemented.



## 5 CONCLUSIONS AND RECOMMENDATIONS

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

- The groundwater flow direction at the site in 2023 was interpreted to be similar to historical interpretations with the direction of groundwater flow in the overburden unit being to the northeast towards the low-lying area northeast of the site.
- Groundwater from background monitoring well 91-1 in summer 2023 was interpreted to be impacted by winter road maintenance activities at the site and was not interpreted to be impacted by landfill-related activities.
- Groundwater within the AWDA and adjacent to the north-eastern AWDA boundary, at monitoring wells 91-2 and 91-4, was interpreted to be impacted by landfill-related activities at the site. Monitoring wells 91-2 and 91-4 were also interpreted to be impacted by winter road maintenance activities from the transfer station.
- Monitoring well 91-5 was interpreted to be impacted by a combination of landfill-related activities and winter road maintenance of the transfer station; however, the majority of concentrations were lower than those observed at monitoring well 91-2, indicating that attenuation is likely occurring downgradient of the site.
- Groundwater monitoring wells 96-10S and 96-10D are located approximately 65 m downgradient / partially cross-gradient and northeast from monitoring well 91-4, while monitoring well MW06-11 is located east of the site at the southern property boundary and adjacent to Highway 41. Both 96-10S and 96-10D were interpreted to be impacted by a combination of landfill-related activities and winter road maintenance of the transfer station. Monitoring well MW06-11 was not interpreted to be impacted by the Griffith Waste Disposal Site; however, it was interpreted to be impacted by winter road maintenance along Highway 41.
- Monitoring wells 96-7S, 96-7D, and 96-9 were added to the environmental monitoring program in 2008 to establish groundwater quality at the downgradient extent of the established well network at the Griffith site. Concentrations in groundwater samples collected from 96-7D and 96-9 were generally significantly lower than concentrations at monitoring wells closer to the waste mound (91-2 and 91-4), which was interpreted that significant attenuation was occurring downgradient of the site. Naturally occurring conditions in the vicinity of 96-7D and 96-9 and winter road maintenance activities of the transfer station were interpreted to be the most significant contributors to groundwater quality in 2023.

In general, and given that site closure was completed in 2012, ground and surface water quality results were interpreted to be generally stable and/or improving at the Griffith Waste Disposal site, and not interpreted to be impacted from landfill-related activities in 2023.

### 5.1 Groundwater Monitoring

No changes to groundwater monitoring are recommended for 2024. Groundwater monitoring should continue to occur once per year (July/August) and consist of the following (see **Table 5**):

- Water levels at all locations should be collected.
- Any wells that are found to be damaged should be repaired or replaced.
- Groundwater samples should be collected from all locations (**Table 5**) and include appropriate duplicate samples; and





- Samples should be analyzed for the parameters listed in **Table 5**.

## 5.2 Surface Water Monitoring

No changes to surface water monitoring are recommended for 2024. Surface water monitoring should continue to occur once per year (July/August) and consist of the following (see **Table 5**):

- Collect surface water samples from STN-1, STN-4, and STN-5.
- Samples should be analyzed for the parameters listed in **Table 5**.
- Un-ionized ammonia should be calculated using field results.

## 5.3 Operation Monitoring

In 2024, the Township should continue to conduct routine litter management (as required) and waste record keeping protocols, and refrigerant management activities at the Griffith Waste Transfer Site to maintain continued compliance with Ministry guidelines.



## 6 REFERENCES

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## LIMITATIONS AND USE OF THE REPORT

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

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

# Tables

**Table 1**  
**Groundwater Monitoring Well and Surface Water Sampling Locations**  
**Griffith Waste Disposal Site**

Groundwater			
Monitor	Zone	Northing	Easting
91-1	18T	5012572	327304
91-2	18T	5012742	327299
91-4	18T	5012691	327323
91-5	18T	5012787	327312
96-7D	18T	5012840	327267
96-7S	18T	5012840	327267
96-9	18T	5012857	327354
96-10D	18T	5012796	327368
96-10S	18T	5012796	327368
MW06-11	18T	5012656	327575
MW12-12	18T	5012541	327310

Surface Water			
Monitor	Zone	Northing	Easting
STN-1	18T	5012656	327575
STN-4	18T	5012786	327637
STN-5	18T	5012838	327607

Notes:

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

**Table 2: Monitoring Program 2023**

Station ID	Monitorign Location	Task	Summer 2023
<b><u>Groundwater</u></b>			
MW91-1	South and upgradient of the of the landfill	Measure water levels / Sample groundwater	√
MW91-2	North-eastern of the landfill	Measure water levels / Sample groundwater	√
MW91-4	North-eastern of the landfill	Measure water levels / Sample groundwater	√
MW91-5	North and downgradient of the landfill	Measure water levels / Sample groundwater	√
MW91-6	North and downgradient of the landfill	Measure water levels	NS
MW96-7S	North and downgradient of the landfill	Measure water levels / Sample groundwater	Dry
MW96-7D	North and downgradient of the landfill	Measure water levels / Sample groundwater	√
MW96-8	North and downgradient of the landfill	Measure water levels	NS
MW96-9	North and downgradient of the landfill	Measure water levels / Sample groundwater	√
MW96-10S	North and downgradient of the landfill	Measure water levels / Sample groundwater	√
MW96-10D	North and downgradient of the landfill	Measure water levels / Sample groundwater	√
MW06-11	East of the landfill	Measure water levels / Sample groundwater	√ + DUP
MW12-12	South and upgradient of the of the landfill	Measure water levels	NS
<b><u>Surface Water</u></b>			
SW1	Background - East of the landfill	Sample Surface water	√
SW4	East of landfill area	Sample Surface water	√
SW5	East of landfill area	Sample Surface water	√

Notes:

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

**Table 3: Reasonable Use Determination 2023 (Using Monitoring well 91-1 results from 2003 to 2009)**

<b>Parameter (mg/L)</b>	<b>Pb (Median of the 91-1 results from 2003 to 2009)</b>	<b>Cm</b>	<b>F</b>	<b>Callow</b>
<b>Alkalinity</b>	175	500	0.5	<b>338</b>
<b>Chloride</b>	64	250	0.5	<b>157</b>
<b>Nitrate</b>	0.07	10	0.25	<b>2.6</b>
<b>Hardness</b>	244	500	0.5	<b>372</b>
<b>Sulphate</b>	18	500	0.5	<b>259</b>
<b>TDS</b>	354	500	0.5	<b>427</b>
<b>DOC</b>	2.1	5	0.5	<b>3.6</b>
<b>Boron</b>	0.02	5	0.25	<b>1.3</b>
<b>Iron</b>	5.2	0.3	0.5	<b>2.8</b>
<b>Manganese</b>	0.11	0.05	0.5	<b>0.08</b>
<b>Sodium</b>	18.2	200	0.5	<b>109</b>

**Table 4: Reasonable Use Conclusions 2023**

Parameters	ODWS	C <sub>allow</sub>	96-7S	96-7D	96-9
			Jul-23	Jul-23	Jul-23
<b>Health Related</b>					
Nitrate	10	2.60	NS	<0.05	<0.5
Boron	5	1.30		0.049	0.043
<b>Aesthetic Parameters</b>					
Alkalinity	500	338		235	213
Hardness	500	372		307	279
Chloride	250	157		78.3	74.4
Sulphate	500	259		11	24
TDS	500	427		365	350
DOC	5	3.6		4.9	2.2
Iron	0.3	2.80		0.302	0.201
Manganese	0.05	0.08		0.101	0.212
Sodium	200	109		14.4	16.7

NS : Not Sampled

Exceeds

 Reasonable Use Criteria



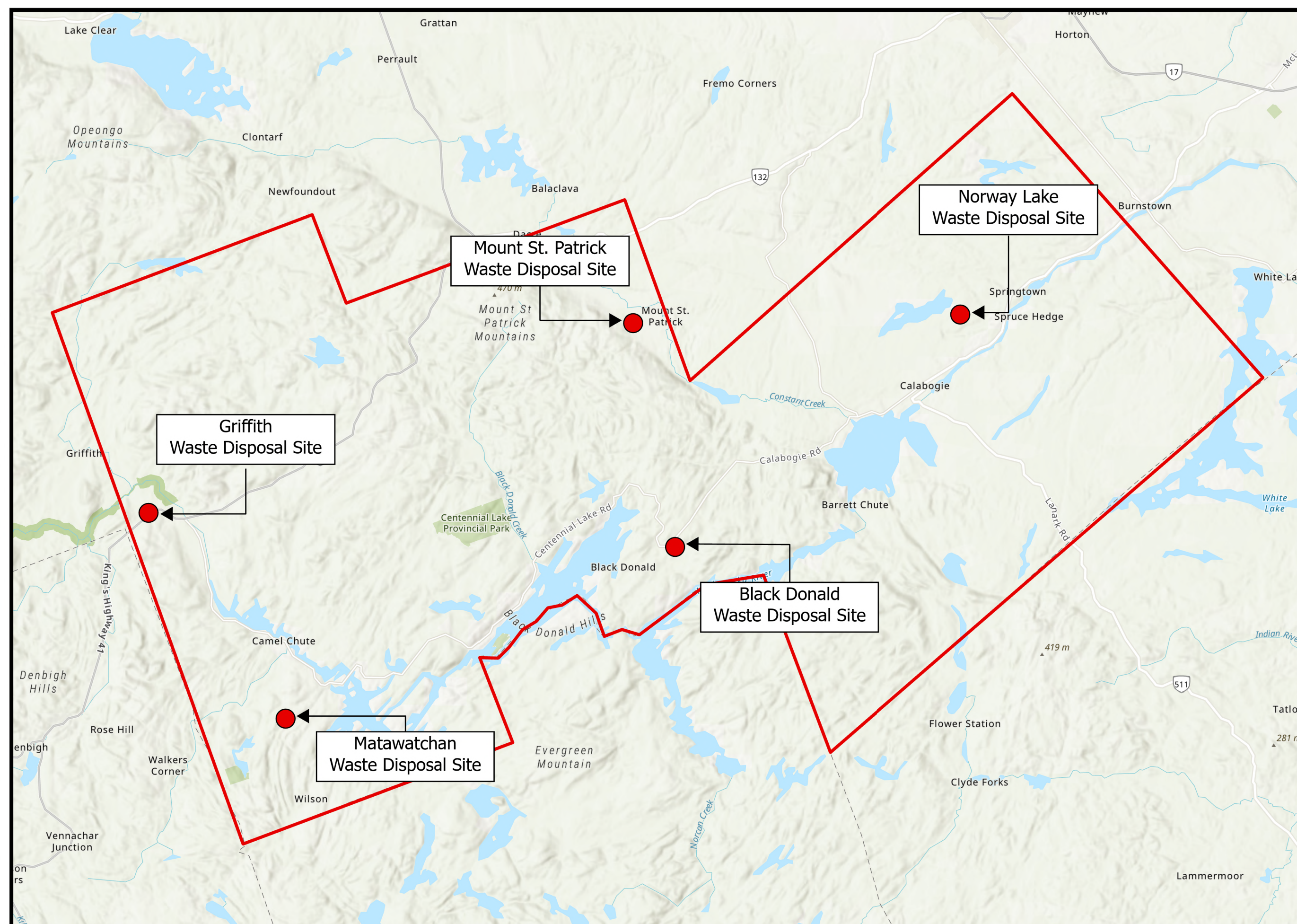
**Table 5 : Proposed Monitoring Program 2024**

Station ID	Task	Summer 2024	Analytical Parameters
<b>Groundwater</b>			
MW91-1	Measure water levels / Sample groundwater	√	<ul style="list-style-type: none"> <li>- Major and minor ions (Ca, Na, Cl, SO4, B, K, Mg, Ba)</li> <li>- Trace metals (Fe, Mn, Cu, Sr, Al, Cd, Cr, Co, Si, Zn)</li> <li>- Nitrogen species (NO3, NO2, NH3, TKN)</li> <li>- General parameters (alkalinity, COD, phenols, total dissolved solids, phosphorous, hardness, dissolved organic carbon)</li> <li>- Field measurements of pH, conductivity, Dissolved Oxygen, and water temperture</li> </ul>
MW91-2	Measure water levels / Sample groundwater	√	
MW91-4	Measure water levels / Sample groundwater	√	
MW91-5	Measure water levels / Sample groundwater	√	
MW91-6	Measure water levels	√	
MW96-7S	Measure water levels / Sample groundwater	√	
MW96-7D	Measure water levels / Sample groundwater	√	
MW96-8	Measure water levels	√	
MW96-9	Measure water levels / Sample groundwater	√	
MW96-10S	Measure water levels / Sample groundwater	√	
MW96-10D	Measure water levels / Sample groundwater	√	
MW06-11	Measure water levels / Sample groundwater	√	
MW12-12	Measure water levels	√	
<b>Surface Water</b>			
STN-1	Sample Surface water	√	<ul style="list-style-type: none"> <li>- Major and minor ions (Ca, Na, K, Cl, total phosphorous, Ba, B, Mg, SO4)</li> <li>- Trace metals (Fe, Mn, Cu, Cd, Cr, Co, Sr, Zn) with detection limits to PWQO</li> <li>- Nitrogen species (NH3, TKN)</li> <li>- General parameters (alkalinity, COD, Total suspended solids, phenols, total dissolved solids, hardness, biochemical oxygen demand)</li> <li>- Field measurements of dissolved oxygen, pH, conductivity, water temperature, and Un-ionized ammonia (calculation)</li> </ul>
STN-4	Sample Surface water	√	
STN-5	Sample Surface water	√	

Notes:

One Duplicate Sample to be collected during each sampling event.

# Figures



# Township of Greater Madawaska

Waste Disposal Sites

**LEGEND**

- Waste Disposal Site
- Township Boundary

1:250 000



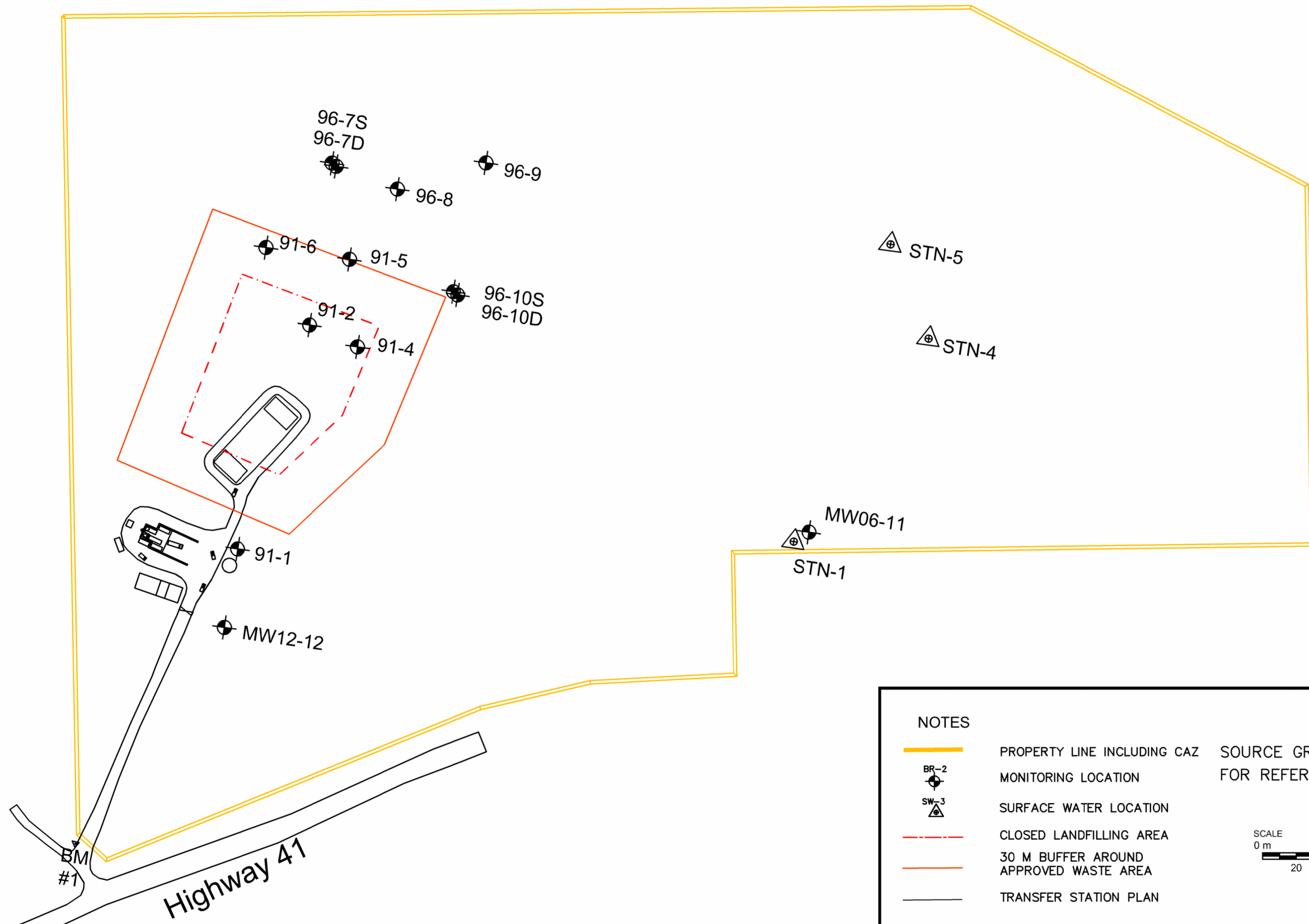
## Regional Location Plan

Project No. 22-6213C Greater Madawaska

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

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





**NOTES**

- PROPERTY LINE INCLUDING CAZ SOURCE GREENVIEW 2022 AMR FOR REFERENCE ONLY
- BR-2 MONITORING LOCATION
- SW-3 SURFACE WATER LOCATION
- - - CLOSED LANDFILLING AREA
- 30 M BUFFER AROUND APPROVED WASTE AREA
- TRANSFER STATION PLAN

SCALE 1:2,500  
0 m 20 40 60 80 100 m

No.	DATE	BY	REVISIONS

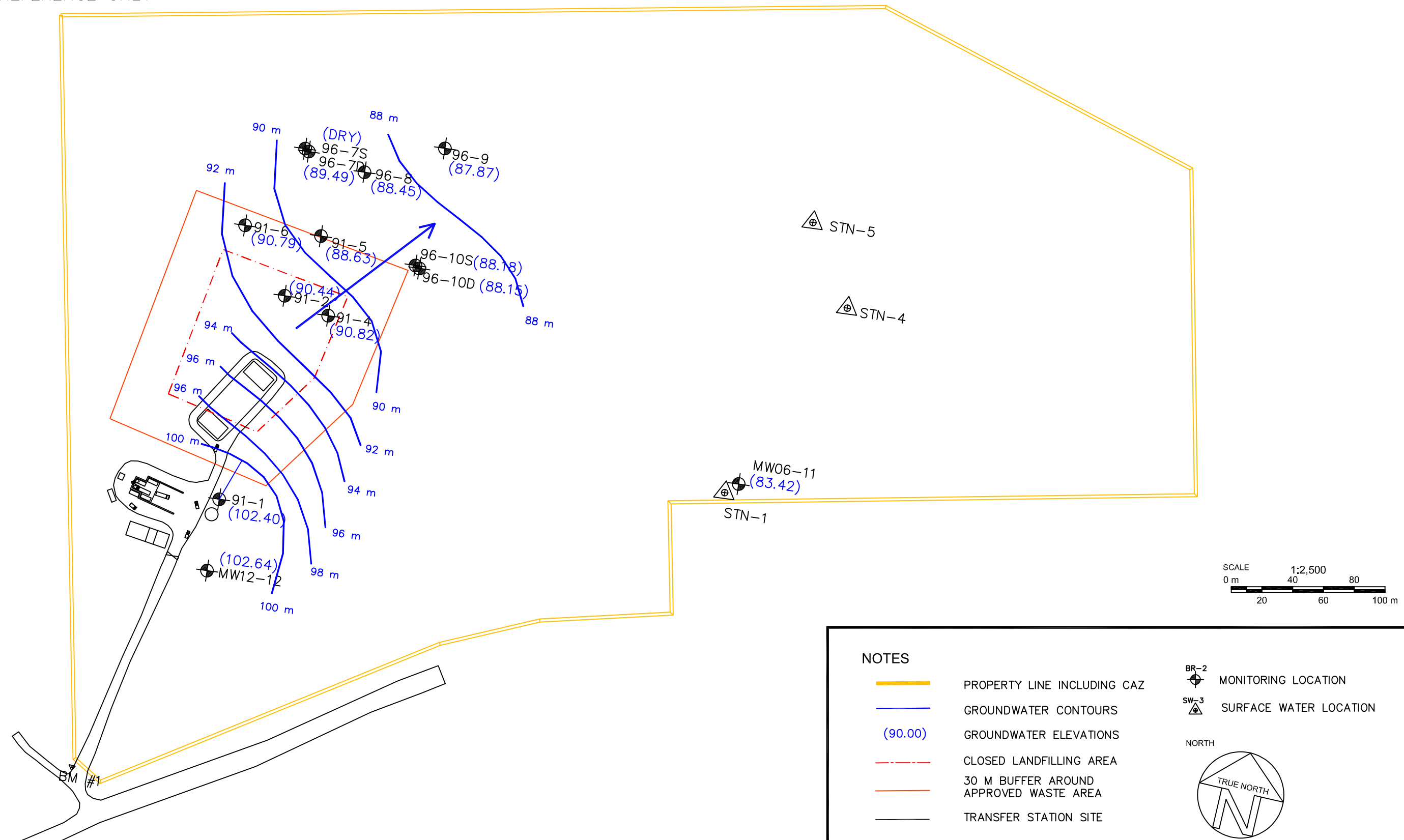
**J2j Jp2g Consultants Inc.**  
 ENGINEERS • PLANNERS • PROJECT MANAGERS  
 1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON K2H 8S9  
 PHONE: 613-828-7800 FAX: 613-828-2600

DESIGNED	QS
DRAWN	QS
CHECKED	KM
APPROVED	KM
SCALE	1:2500

TOWNSHIP OF GREATER MADAWASKA  
 GRIFFITH WASTE TRANSFER SITE  
 Groundwater Wells and Surface Water Locations

DATE	16-JAN-2024
PROJECT	22-6213C
PLOTTED	16-JAN-2024
REF	FIG 2

NOTES:  
SOURCE GREENVIEW 2022 AMR  
FOR REFERENCE ONLY



NOTES

- PROPERTY LINE INCLUDING CAZ
- GROUNDWATER CONTOURS
- (90.00) GROUNDWATER ELEVATIONS
- CLOSED LANDFILLING AREA
- 30 M BUFFER AROUND APPROVED WASTE AREA
- TRANSFER STATION SITE
- BR-2 MONITORING LOCATION
- SW-3 SURFACE WATER LOCATION
- NORTH

No.	DATE	BY	REVISIONS

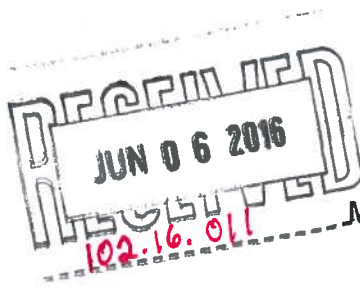
**Jp2g Consultants Inc.**  
ENGINEERS • PLANNERS • PROJECT MANAGERS  
1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON K2H 8S9  
PHONE: 613-828-7800 FAX: 613-828-2600

DESIGNED	QS
DRAWN	QS
CHECKED	KM
APPROVED	KM
SCALE	1:2500

TOWNSHIP OF GREATER MADAWASKA  
GRIFFITH WASTE TRANSFER SITE  
Groundwater Flow - JULY 2023

DATE	16-JAN-2024
PROJECT	22-6213C
PLOTTED	16-JAN-2024
REF	FIG 3

Appendix A  
Environmental Compliance Approval and  
Certificate of Requirement

**AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL**

NUMBER A412203

Notice No. 5

Issue Date: June 1, 2016

The Corporation of the Township of Greater Madawaska  
19 Parnell St  
Post Office Box, No. 180  
Calabogie, Ontario  
K0J 1H0

Site Location: Griffith Waste Disposal Site  
6 Finns Road  
Lot Part of the S 1/2 of Lots 4 and 5, Concession 4  
Township of Greater Madawaska, County of Renfrew

*You are hereby notified that I have amended Approval No. A412203 issued on December 22, 1999 amended on September 25, 2000, June 13, 2001, June 3, 2008 and October 11, 2013 for the use and operation of a 0.8 hectare landfill site and recycling and transfer site within a 27.5 hectare , as follows:*

Following conditions are hereby revoked and replaced as follows :

24(3) The *Owner* shall ensure that the final maximum storage capacity of the Leaf and Yard Burn Storage Area pile does not exceeded 400 m<sup>3</sup>.

25. The *Owner* shall ensure that the final maximum capacities are not exceeded:

(a) waste destined for final disposal	80 m <sup>3</sup>
(b) organic waste	20 m <sup>3</sup>
(c) OCC	80 m <sup>3</sup>
(d) scrap metal	150 m <sup>3</sup>
(e) refrigerant appliances	25 (units)
(c) waste electrical and electronic equipment	40 m <sup>3</sup>
(d) blue box waste	160 m <sup>3</sup>
(e) tires	100 m <sup>3</sup>
(f) leaf and yard waste	400 m <sup>3</sup>
(g) Construction and Demolition waste	80 m <sup>3</sup>

(h)	Automotive Plastic	5.4 m3
(i)	Refillable Propane Tanks	50 units
(j)	Single use propane cylinders	1 m3

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

11. Environmental Compliance Approval Application dated October 27, 2015 signed by Ms. Alison Haltzhauer, CAO/Clerk - Treasurer, Township of Greater Madawaska Valley.
12. Letter dated April 28, 2016 from Greenview Environmental Management to MoECC regarding the clarification of storage quantities, storage method.
13. Email dated May 5, 2016 from Dan Hagan, Grennview Environmental Management to Hirva Vyas, MoECC re : revised site layout plan as well as clarification regarding propane cylinders and tanks

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

*The reason for the amendment to Condition No. 24 and 25 is to amend the storage volumes of Diversion material at the transfer station.*

**This Notice shall constitute part of the approval issued under Approval No. A412203 dated December 22, 1999**

*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

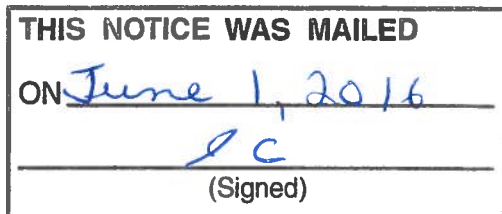
AND

The Director appointed for the purposes of Part II.1 of  
the Environmental Protection Act  
Ministry of the Environment and Climate Change  
135 St. Clair Avenue West, 1st Floor  
Toronto, Ontario  
M4V 1P5

\* 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) 326-5370 or [www.ert.gov.on.ca](http://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 1st day of June, 2016



Dale Gable, P.Eng.

Director

appointed for the purposes of Part II.1 of the  
*Environmental Protection Act*

HV/

c: District Manager, MOECC Ottawa  
Dan Hagan, Greenview Environmental Management Limited ✓



AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A412203

Notice No. 4

Issue Date: October 11, 2013

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

Site Location: Griffith Waste Disposal Site  
HWY 41, Finn Road  
Lot Part of the S 1/2 of Lots 4 and 5, Concession 4  
Greater Madawaska Township, County of Renfrew

*You are hereby notified that I have amended Approval No. A412203 issued on December 22, 1999 and amended on September 25, 2000, June 13, 2001 and June 3, 2008 for the use and operation of a 0.8 hectare landfill site and recycling and transfer site within a 27.5 hectare , as follows:*

**The following Definition is hereby amended/added to the ECA:**

"Approval" or "Certificate" or "ECA" means this entire provisional Environmental Compliance Approval document, issued in accordance with Section 20.3 of the EPA, and includes any schedules to it, the application and the supporting documentation listed in Schedule "A".

**The following Condition is hereby added to the ECA:**

**Burning of Waste**

24. (1) Burning of waste is not permitted at the *Site* with the exception of the material under Condition 24 (2).
- (2) Only clean wood and brush shall be permitted for burning. Burning of the materials shall be completed as per the Ministry of the Environment Guideline C-7 (Burning at landfill Sites).
- (3) The *Owner* shall ensure that the final maximum storage capacity of the Leaf and Yard Burn Storage Area pile does not exceeded 200 m<sup>3</sup>.
25. The *Owner* shall ensure that the final maximum capacities are not exceeded:

- (a) waste destined for final disposal 80 m<sup>3</sup>
- (b) organic waste 20 m<sup>3</sup>
- (c) OCC 80 m<sup>3</sup>
- (d) scrap metal 60 m<sup>3</sup>
- (e) refrigerant appliances 25 (units)
- (c) waste electrical and electronic equipment 40 m<sup>3</sup>
- (d) blue box waste 160 m<sup>3</sup>
- (e) tires 100 m<sup>3</sup>
- (f) leaf and yard waste 200 m<sup>3</sup>

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

CONTENT COPY OF ORIGINAL

9. Letter dated May 21, 2013 and supporting documentation addressed to Mr. Ian Parrott, Director, Environmental Approvals Branch from Mr. Dan Hagan, Greenview Environmental Management Ltd. submitting an application to amend the volume of SSO and leaf and yard waste and permit the burning of leaf and yard waste. The supporting documentation includes:

- i. Environmental Compliance Approval Application dated May 2, 2013 and signed by Ms. Alison Haltzhauer, CAO/Clerk - Treasurer, Township of Greater Madawaska Valley.
- ii. Figure No. 1 entitled "Griffith Waste Disposal Site - Proposed Site Design" prepared by Greenview Environmental Management Ltd. (Project No. 102.13.011) dated May 2013 (saved May 22, 2013)

10. Email dated September 24, 2013 at 5:10 p.m. to Mr. Dale Gable, Ministry of the Environment from Mr. Dan Hagan, Greenview Environmental Management Ltd. providing details and photos of the storage container for organic waste.

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

1. *The reason for Condition 15.14 is to ensure that no waste is burned at the Site other than leaf and yard waste. This is to ensure the leaf and yard waste is managed in a acceptable manner.*
2. *The reason for the amendment to Condition No. 16.4 is to amend the storage volumes at the transfer station.*

**This Notice shall constitute part of the approval issued under Approval No. A412203 dated**

*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](http://www.ert.gov.on.ca)**

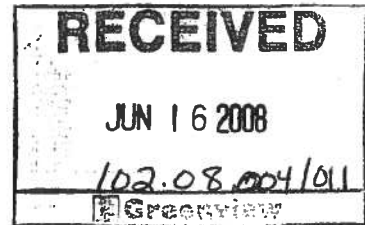
*The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.*

CONTENT COPY OF ORIGINAL

DATED AT TORONTO this 11th day of October, 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 Limited



Ministry of the Environment  
Ministère de l'Environnement

**AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL  
WASTE DISPOSAL SITE  
NUMBER A412203  
Notice No. 3  
Issue Date: June 3, 2008**

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

Site Location: Griffith Waste Disposal Site  
Part of the S 1/2 of Lots 4 and 5, Concession 4  
Greater Madawaska Township, County of Renfrew

*You are hereby notified that I have amended Provisional Certificate of Approval No. A412203 issued on December 22, 1999 and amended on September 25, 2000 and June 13, 2001 for the use and operation of a 0.8 hectare landfill site and recycling and transfer site within a 27.5 hectare , as follows:*

*"Refrigerant Appliances" means household appliances which use, or may use refrigerants, and which include, but is not restricted to, refrigerators, freezers and air-conditioning systems;*

Condition Number 16 is revoked and replaced with the following:

16. This Site shall only receive Municipal Waste that is generated from within the Township of Greater Madawaska.

**The following conditions are added to the Certificate:**

20.1 The landfill shall be closed in accordance with items 10, 11 and 12 of Schedule "A".

**23. WASTE DIVERSION**

(1) The Owner shall ensure that:

- (a) all bins and waste storage areas are clearly labelled;
- (b) all lids or doors on bins shall be kept closed during non-operating hours and during the high wind events; and
- (c) if necessary to prevent litter, waste storage areas shall be covered during the high winds events.

- (2) The Owner shall provide a segregated area for the storage of *Refrigerant Appliances* so that the following are ensured:
  - (a) all *Refrigerant Appliances* have been tagged to indicate that the refrigerant has been removed by a licensed technician. The tag number shall be recorded in the log book and shall remain affixed to the appliance until transferred from the *Site*; **or**
  - (b) all *Refrigerant Appliances* accepted at the *Site*, which have not been tagged by a licensed technician to verify that the equipment no longer contains refrigerants, are stored segregated, in a clearly marked area, in an upright position and in a manner which allows for the safe handling and transfer from the *Site* for removal of refrigerants as required by O.Reg. 189; and
  - (c) all *Refrigerant Appliances* received on-site shall either have the refrigerant removed prior to being transferred from the *Site* or shall be shipped off-site only to facilities where the refrigerants can be removed by a licensed technician in accordance with O.Reg. 189.
- (3) Propane cylinders shall be stored in a segregated area in a manner which prevents cylinders from being knocked over or cylinder valves from breaking.
- (4) The Owner shall transfer waste and recyclable materials from the *Site* as follows:
  - (a) recyclable materials shall be transferred off-site once their storage bins are full;
  - (b) scrap metal shall be transferred off-site once the staging bunker is full;
  - (c) tires shall be transferred off-site as soon as a load for the contractor hired by the Owner has accumulated or as soon as storage bunker is full; and
  - (d) immediately, in the event that waste is creating an odour or vector problem.
- (5) The Owner shall notify the appropriate contractors that waste and recyclable wastes that are to be transferred off the *Site* are ready for removal. Appropriate notice time, as determined by the contract shall be accommodated in the notification procedure.

The following items are added to the Schedule "A".

10. Report titled "Closure Plan, Griffith Waste Disposal Site, Certificate of Approval No.:A412203" and dated May 30, 2006, prepared by SGS Lakefield Research Limited.
11. Letter report dated June 29, 2007 addressed to Ranjani Munasinghe, Ontario Ministry of the Environment, from Tyler Peters, Greenview Environmental Management.
12. Letter report dated March 20, 2008 addressed to Ranjani Munasinghe, Ontario Ministry of the Environment, from Tyler Peters, Greenview Environmental Management.

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

1. This amendment is to approve the closure plan and the recycling and transfer operation.
2. The reason for condition 16.1 is to increase the service area to Township of Greater Madawaska.
3. Condition 23 is included to ensure that the recyclable materials are stored in their temporary storage.

location in a manner as to minimize a likelihood of an adverse effect or a hazard the natural environment or any person.

**This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A412203 dated December 22, 1999 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  
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](http://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 3rd day of June, 2008

THIS NOTICE WAS MAILED
ON <u>June 10 2008</u>
<u>N.P</u>
(Signed)



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

RM/

c: District Manager, MOE Ottawa

CONTENT COPY OF ORIGINAL



Ministry  
of the  
Environment

Ministère  
de  
l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL  
WASTE DISPOSAL SITE  
NUMBER A412203  
Notice No. 2

Corporation of the Township of Greater Madawaska  
1101 Francis Street  
Bagot, Ontario  
K0J 1H0

Site Location: Part of the South Half of Lots 4 and 5, Concession 4  
Township of Greater Madawaska, County Of Renfrew

*You are hereby notified that I have amended Provisional Certificate of Approval No. A412203 issued on December 22, 1999, and as amended on September 26, 2000, for the use and operation of a 0.80 hectare landfill within a 27.5 hectare total site area, as follows:*

1. The following item is hereby added to the supporting information described in Schedule "A":

9. Letter dated March 28, 2001, from Mr. Brian Whitehead, Jp2g Consultants Inc., 12 International Drive, Pembroke, Ontario, K8A 6W5.

2. The Company's name and address have changed:

**FROM: Corporation of the Township of Griffith & Matawatchan**  
Highway No. 41  
Griffith & Matawatchan, Ontario  
K0J 2A0

**TO: Corporation of the Township of Greater Madawaska**  
1101 Francis St.  
Bagot, Ontario  
K0J 1H0

3. The date in Condition 15. (b) of Provisional Certificate of Approval No. A412203 is amended to March 31, 2002, to read as follows:

15. (b) By March 31, 2002, the Applicant must acquire ownership of the buffer land as specified in Item (7) of Schedule "A" or shall close the Site;

All in accordance with the letter dated March 28, 2001, from Mr. Brian Whitehead, Jp2g Consultants Inc., 12 International Drive, Pembroke, Ontario, K8A 6W5.

**This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A412203 dated December 22, 1999.**

*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;



CONTENT COPY OF ORIGINAL

2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

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

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

*This Notice must be served upon:*

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

AND

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

**\* Further information on the Environmental Appeal Board's requirements for an appeal can be obtained directly from the Board at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://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 13th day of June, 2001

Yvonne Hall, P.Eng.  
Director  
Section 39, *Environmental Protection Act*

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

CONTENT COPY OF ORIGINAL



Ontario

Ministry  
of the  
Environment

Ministère  
de  
l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL  
WASTE DISPOSAL SITE  
NUMBER A412203  
Notice No. 1

Corporation of the Township of Griffith & Matawatchan  
Highway No. 41  
Griffith & Matawatchan, Ontario  
K0J 2A0

Site Location: Part of the S 1/2 of Lots 4 and 5, Concession 4  
Griffith & Matawatchan Township, County Of Renfrew, Ontario

*You are hereby notified that I have amended Provisional Certificate of Approval No. A412203 issued on December 22, 1999 for use and operation of a 0.80 hectare landfill within a 27.5 hectare total site area, as follows:*

**Condition 15 (b) of your Provisional Certificate of Approval is hereby revoked and replaced with the following updated Condition No. 15 (b).**

15 (b) By March 31, 2001, the Applicant must acquire ownership of the buffer land as specified in Item (7) of Schedule "A" or shall close the site;

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

Receipt of an application dated August 24, 2000, signed by Audrey Youmans, Clerk-Treasurer, the Township of Griffith & Matawatchan requesting an extension of time.

**This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No.A412203 dated December 22, 1999.**

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

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

*The Notice should also include:*

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

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

*This Notice must be served upon:*

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

AND

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

**CONTENT COPY OF ORIGINAL**

**\* 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](http://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, 2000

Yvonne Hall, P.Eng.  
Director  
Section 39, *Environmental Protection Act*

LD/  
c: District Manager, MOE Ottawa District Office  
Brian Whitehead, Janota Patrick Consulting Engineers



Ontario

Ministry of the Environment  
Ministère de l'Environnement

**PROVISIONAL CERTIFICATE OF APPROVAL  
FOR A WASTE DISPOSAL SITE  
NO. A 412203  
Page 1 of 9**

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

Township of Griffith & Matawatchan  
Highway 41  
Griffith, Ontario  
K0J 2R0

*for the use and operation of a 0.80 hectare landfill within a 27.5 hectare total Site area;*

*all in accordance with the following plans and specifications:*

The application and supporting information as listed in Schedule "A", which is attached to this Provisional Certificate of Approval and forms part of this Certificate;

*Located:* S1/2 Lots 4 and 5, Concession 4  
Township of Griffith  
County of Renfrew

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

*and subject to the following conditions:*

#### **A. DEFINITIONS**

For the purpose of this Provisional Certificate of Approval:

- (a) "Act" and "EPA" mean the Environmental Protection Act, R.S.O. 1990, C. E-19 as amended;
- (b) "Applicant", "Owner" and "Operator" mean the Township of Griffith & Matawatchan, including its officers, employees, agents or contractors;
- (c) "Certificate" means this entire Provisional Certificate of Approval including its schedules, if any, issued in accordance with Section 27, Part V of the Environmental Protection Act;
- (d) "Director" means a Director, Environmental Assessment and Approvals Branch of the Ministry of the Environment;



- (e) "District Manager" means the District Manager of the Ottawa District Office, Eastern Region of the Ministry;
- (f) "Ministry" means the Ontario Ministry of the Environment (MOE);
- (g) "Municipal Waste" is as defined in Ontario Regulation 347, R.R.O. 1990;
- (h) "Site" means the landfill site as described in this Certificate; and
- (i) "Waste fill area" means the area on the surface of the site beneath which or above which waste is disposed by landfilling.

#### **B. GENERAL**

1. (a) The Provisional Certificate of Approval No. A 412203, dated July 1, 1975 is hereby revoked and replaced by this Certificate; and  
(b) Notwithstanding Condition 8, nothing in Condition 1(a) revokes any ongoing obligations and requirements imposed and initiated as the result of the issuance or existence of the previous Certificate for this Site unless specifically stated in this Certificate.
2. Except as otherwise provided by these Conditions, the Site shall be operated and maintained, in accordance with the Applications for a Certificate of Approval for a Waste Disposal Site, dated February 15, 1971, and its supporting documents as listed in Schedule "A".
3. The requirements specified in this Certificate are the requirements under the Environmental Protection Act, R.S.O. 1990. The issuance of this Certificate in no way abrogates the Applicant's legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.
4. The requirements of the Certificate are severable. If any requirement of this Provisional Certificate of Approval, or the application of any requirement of the Provisional Certificate of Approval to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of the Provisional Certificate of Approval shall not be affected in any way.
5. The Applicant shall ensure compliance with all the terms and conditions of this Certificate. Any non-compliance constitutes a violation of the Environmental Protection Act, R.S.O. 1990 and its grounds for enforcement.
6. (a) The Applicant shall, forthwith upon request of the Director, District Manager, or Provincial Officer (as defined in the Act), furnish any information requested by such persons with respect to compliance with this Certificate, including but not limited to, any records required to be kept



under this Certificate; and

- (b) In the event, the Applicant provides the Ministry with information, records, documentation or notification in accordance with this Certificate (for the purposes of this condition referred to as "Information"),
- i. the receipt of Information by the Ministry;
  - ii. the acceptance by the Ministry of the Information's completeness or accuracy; or
  - iii. the failure of the Ministry to prosecute the Applicant, or to require the Applicant to take any action, under this Certificate or any statute or regulation in relation to the Information

shall not be construed as an approval, excuse or justification by the Ministry of any act or omission of the Applicant relating to the Information, amounting to non-compliance with this Certificate or any statute or regulation.

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

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

without restricting the generality of the foregoing, to:

- (b)
- i. enter upon the premises where the records required by the conditions of this Certificate are kept;
  - ii. have access to and copy, at reasonable times, any records required by the conditions of this Certificate;
  - iii. inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this Certificate; and
  - iv. sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this Certificate.

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



- (b) Where there is a conflict between documents listed in Schedule "A", the document bearing the most recent date shall prevail.
9. The Applicant shall ensure that all communications/correspondence made pursuant to this Certificate includes reference to the Certificate approval number A 412203.
10. The Applicant shall notify the Director in writing of any of the following changes within thirty (30) days of the change occurring:
- (a) change of Applicant or Operator of the Site or both;
  - (b) change of address or address of the new Applicant;
  - (c) change of partners where the Applicant or Operator is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, 1991 shall be included in the notification to the Director;
  - (d) any change of name of the corporation where the Applicant or Operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (form 1 or 2 of O. Reg. 182, Chapter C-39, R.R.O. 1990 as amended from time to time), filed under the Corporations Information Act shall be included in the notification to the Director; and
  - (e) change in directors or officers of the corporation where the Applicant or Operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" as referred to in 10(d), supra.
11. In the event of any change in ownership of the Site, the Applicant shall notify, in writing, the succeeding owner of the existence of this Certificate, and a copy of such notice shall be forwarded to the Director.
12. Any information relating to this Certificate and contained in Ministry files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, R.S.O. 1990, C. F-31.
13. All records and monitoring data required by the conditions of this Certificate shall be kept on the Owners's premises for a minimum period of two (2) years from the date of their creation.
14. The obligations imposed by the terms and conditions of this Certificate are obligations of due diligence.

### C. PROHIBITION AND REGISTRATION ON TITLE

15. (a) Pursuant to Section 197 of the EPA, neither the Applicant nor any person having an interest in the



Site shall deal with the Site in any way without first giving a copy of the Provisional Certificate of Approval to each person acquiring an interest in the Site as a result of the dealing;

- (b) By August 31, 2000, the Applicant must acquire ownership of the buffer land as specified in Item (7) of Schedule "A" or shall close the Site;
- (c) Within sixty (60) calendar days of the date of obtaining ownership of the buffer land, the Applicant shall submit to the Director for the Director's signature two (2) copies of a completed Certificate of Prohibition containing a register able description of the Site, in accordance with Form 1 of O. Reg. 14/92; and
- (d) Within ten (10) calendar days of receiving the Certificate of Prohibition, the Applicant shall register the Certificate of Prohibition in the appropriate Land Registry Office on title and immediately following registration, submit to the Director the duplicate registered copy.

#### **D. SITE OPERATIONS**

- 16. This Site shall only receive Municipal Waste that is generated from within the Township of Griffith & Matawachan.
- 17. The final volumetric capacity of this Site, excluding final cover, is 17, 250 cubic metres.
- 18. Waste shall be managed and landfilled at the Site in accordance with the items listed in Schedule "A".

#### **E. MONITORING AND REPORTING**

- 19. The Owner shall conduct surface and ground water sampling at the frequencies and for the parameters specified in Schedule "B", as modified by the District Manager. By March 31, 2000 and on an annual basis thereafter, the Owner shall submit to the District Manager, an Annual Report that contains the following, for the previous calendar year:
  - (a) the analytical results of the sampling program;
  - (b) an analysis of the results of the monitoring programs conducted at the Site to date;
  - (c) recommendations for any alterations to the monitoring or operation of the Site;
  - (d) for the first two Annual Reports, and at a frequency specified by the District Manager thereafter, a site plan, including cross sectional drawings, showing the current extent of waste disposal;
  - (e) an estimate of the total amount of waste landfilled and an estimate of the Site's remaining capacity;
  - (f) a statement as to compliance with the terms and conditions of the Certificate;





- (g) a summary of complaints regarding the operation the Site and the Owner's response to those complaints; and
- (h) an assessment of the need to develop and implement contingency plans for leachate control.

#### F. Site Closure

- 20. One (1) year prior to the Site reaching the capacity specified in Condition (17), the Owner shall submit to the Director, for approval, a plan for the closure, monitoring and long term maintenance of the Site.

#### G. EMERGENCIES

- 21. In case of an emergency or a spill at this Site, the Applicant shall forthwith call the Ministry of the Environment Spills Action Centre (1-800-268-6060) or the District Office.

#### H. RECORD KEEPING

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

#### SCHEDULE "A"

*This Schedule "A" forms part of Provisional Certificate of Approval No. A 413102:*

1. Application for a Certificate of Approval for a Waste Disposal Site, dated December 11, 1972 and signed by the Clerk, Township of Griffith & Matawatchan.
2. Application to amend a Certificate of Approval for a Waste Disposal Site, dated September 26, 1996 and signed by Audrey Youmath, Clerk, Township of Griffith & Matawatchan.
3. Document entitled "Griffith Waste Disposal Site, Township of Griffith & Matawatchan, Site Development and Operation", dated March 1999 and prepared by Janota Patrick & Associates Ltd.
4. Letter from B. Whitehead, Janota Patrick & Associates Ltd. to A. Polley, MOE, dated March 5, 1999 re: Additional Supporting Information to the application.
5. Letter from I. Parrott, MOE to B. Whitehead, Janota Patrick & Associates Ltd., dated March 15, 1999: re: MOE Review Comments.



6. Letter from I. Parrott, MOE to B. Whitehead, Janota Patrick & Associates Ltd., dated July 8, 1999: re MOE Review Comments.
7. Letter from B. Whitehead, Janota Patrick & Associates Ltd. to I. Parrott, MOE, dated August 6, 1996 (including attached letter from S. Usher, Gartner Lee Limited to B. Whitehead), re: Response to MOE letters dated March 15, 1999 and July 8, 1999.
8. Letter from B. Whitehead, Janota Patrick & Associates Ltd. to I. Parrott, MOE, dated December 10, 1999 re: Cover material requirements during winter.

SCHEDULE "B"

Groundwater Monitoring

On an annual basis in August, Monitors 91-2 91-4, 91-5, 96-10S and 96-10D shall be sampled and analysed for the following parameters:

Major and Minor Ions (Ca, Na, Cl, SO<sub>4</sub>, B, K, Mg)  
Trace Metals (Fe, Mn, Cu, Sr)  
Nitrogen Species (NO<sub>3</sub>, NO<sub>2</sub>, NH<sub>3</sub>, TKN)  
General Parameters (hardness, DOC, alkalinity, COD, phenols, ion balance, total dissolved solids)  
Field Measurements (pH, conductivity, temperature)

On an annual basis, ground water levels in Monitors 91-1, 91-2, 91-4, 91-5, 91-6, 96-7S 96-7D, 96-8, 96-9, 96-10S, 96-10D shall be measured and recorded.

Surface Water Monitoring

On an annual basis in May and August, at sampling stations STN1, STN4 and STN5, samples shall be collected and analysed for the following parameters:

Major and Minor Ions (Ca, Na, Cl, SO<sub>4</sub>, total phosphorus, B, K, Mg)  
Trace Metals (Fe, Mn, Cu, Cd, Sr and Zn)  
Nitrogen Species (NO<sub>3</sub>, NO<sub>2</sub>, NH<sub>3</sub>, TKN)  
General Parameters (alkalinity, COD, phenols, ion balance, total dissolved solids)  
Field Measurements (flow, DO, pH, conductivity, temperature)



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

1. Conditions 1, 3, 4, 5, 6, 8, 9, 10, 11, 12 and 13 are to clarify the legal rights and obligations of this Certificate.
2. Condition 7 is to ensure that the appropriate Ministry staff have ready access to the waste Site to inspect the operations that are approved under this Certificate. The condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the Environmental Protection Act, as amended.
3. Conditions 2 and 22 are to ensure that the waste disposal Site is operated in accordance with the application for this Certificate and supporting information and not in any way or under any name which the Director has not been asked to consider.
4. Condition 14 is required to clarify that the terms and conditions of this Certificate impose a standard of due diligence and not absolute liability.
5. The reason for Condition 15, which requires registration of the Certificate, is that Section 46 of the Environmental Protection Act prohibits any use being made of the lands after they cease to be used for waste disposal purposes within a period of twenty-five years from the year in which such land ceased to be used, unless the approval of the Minister for the proposed use has been given. The purpose of this prohibition is to protect future occupants of the site and the environment from any hazards which might occur as a result of waste being disposed of on the site. This prohibition and potential hazard should be drawn to the attention of future owners and occupants by the Certificate being registered on title.
6. The reason for Conditions 16, 17, 18, 19, 20 and 21 is to ensure that the Site is operated and maintained in a manner that protects the health and safety of people and the environment.

*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;*



Ontario

Ministry of the Environment  
Ministère de l'Environnement

PROVISIONAL CERTIFICATE OF APPROVAL  
FOR A WASTE DISPOSAL SITE  
NO. A 412203  
Page 9 of 9

*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 Ave. W., 12A Floor,  
Toronto, Ontario.  
M4V 1L5

*DATED AT TORONTO this 22nd day of December, 1999.*

THIS IS A TRUE COPY OF THE  
ORIGINAL CERTIFICATE MAILED

ON *Dec 24/99*

(Signed)

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

IP/nb  
c.- District Manager, Ottawa District Office

LRO # 49 Application (General)

Registered as RE49430 on 2008 02 27 at 11:42

The applicant(s) hereby applies to the Land Registrar.

yyyy mm dd Page 1 of 2

**Properties**

**Pin** 57477 - 0134 LT  
**Description** ALL OF LOCATION CL11653 BEING PART OF LTS 4 & 5, CON 4, PTS 1 & 2, 49R  
 14625; GRIFFITH; GREATER MADAWASKA  
**Address** GRIFFITH

**Applicant(s)**

**Name** MINISTRY OF THE ENVIRONMENT  
**Address for Service** 2 St. Clair Avenue West, Floor 12A,  
 Toronto, ON  
 M4V 1L5

I, Greg Washuta, have the authority to bind the corporation.

This document is not authorized under Power of Attorney by this party.

**Statements**

Schedule: See Schedules

**Signed By**

Howard Lithwick	300-39 Robertson Rd. Ottawa (Nepean) K2H 8R2	acting for Applicant(s)	Signed	2008 02 07
<b>Tel</b>	613-828-2120			
<b>Fax</b>	6135980881			

**Submitted By**

HOWARD A. LITHWICK	300-39 Robertson Rd. Ottawa (Nepean) K2H 8R2	2008 02 27
<b>Tel</b>	613-828-2120	
<b>Fax</b>	6135980881	

**Fees/Taxes/Payment**

Statutory Registration Fee	\$60.00
Total Paid	\$60.00

Instrument Statement, 61

Page 2 of 2

## CERTIFICATE OF PROHIBITION

## s. 197(2) Environmental Protection Act

This is to certify that pursuant to Provisional Certificate of Waste Disposal Site Number A412203, dated December 22, 1999, relating to the landfill site more particularly described in this document herein, the following person, namely The Corporation of the Township of Greater Madawaska is prohibited from dealing with the property described in this document herein, without first giving a copy of the Amended Provisional Certificate of Approval to each person acquiring an interest in the property as a result of the dealing.

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

# Appendix B

## MOE Correspondence



THE TOWNSHIP OF  
**GREATER MADAWASKA**

Quarterly Inspection Log  
Griffith Waste Disposal Site  
Township of Greater Madawaska

Potential Issues	Deficiencies Noted		Actions Taken
	Y/N	Location of Issue & Description	
Erosion of Final Cover	N		
Vegetation	N		
Settlement Areas	N		
Leachate Seeps	N		
Litter Management	N		

Inspection Completed By:	Name	Date (mm/dd/yyyy)	Time
	L. Enan	11/07/23	7 Am





THE TOWNSHIP OF  
**GREATER MADAWASKA**

Quarterly Inspection Log  
Griffith Waste Disposal Site  
Township of Greater Madawaska

Potential Issues	Waste Mound Final Cover Inspections		Actions Taken
	Y/N	Deficiencies Noted Location of Issue & Description	
Erosion of Final Cover	2		
Vegetation	2		
Sediment Areas	2		
Leachate Seeps	2		
Litter Management	N		

Inspection Completed By:	Name	Date (mm/dd/yyyy)	Time
	L. Enon	08/14/23	8 AM



THE TOWNSHIP OF  
**GREATER MADAWASKA**

Quarterly Inspection Log  
 Griffith Waste Disposal Site  
 Township of Greater Madawaska

Potential Issues	Waste Mound Final Cover Inspections		Actions Taken
	Y/N	Deficiencies Noted Location of Issue & Description	
Erosion of Final Cover	N		
Vegetation	N		
Settlement Areas	N		
Leachate Seeps	N		
Litter Management	N		

Inspection Completed By:	Name	Date (mm/dd/yyyy)	Time
	L. Emond	05/03/23	7 AM



THE TOWNSHIP OF  
**GREATER MADAWASKA**

Quarterly Inspection Log  
Griffith Waste Disposal Site  
Township of Greater Madawaska

Waste Mound Final Cover Inspections				
Potential Issues	Y / N	Deficiencies Noted		Actions Taken
		Location of Issue & Description		
Erosion of Final Cover	N			
Vegetation	N			
Settlement Areas	N			
Leachate Seeps	N			
Litter Management	N			

Inspection Completed By:	Name	Date (mm/dd/yyyy)	Time
	L. Enza	02/10/23	8 AM

# Appendix C

## Borehole Logs



**Cambium Environmental Inc.**  
 PO Box 325 • Unit 2 • 2085 Whittington Drive  
 Peterborough • Ontario • K9J 6X4

*Project No.:* 06-1122-001

*Project Name:* Griffith Waste Disposal Site

*Client:* Twp of Greater Madawaska

*Location:* See Figure

*Log of Borehole:* MW06-11

*UTM:* 18 T 327534 5012692

*Logged By:* C. Wolf

*Project Manager:* C. Wolf

SUBSURFACE PROFILE			SAMPLE				Well Installation	Remarks
Depth	Symbol	Description	Number	Type	% Recovery	SPT (n)		
0		Ground Surface						Well equipped with lockable steel casing. Bentonite Hole Plug Native Fill  Bentonite Hole Plug  Filter Sand  Well Screen: 1.52m x 0.05m
2		<i>Sand</i> Grey, medium grained Sand, Saturated	1	SS	30	55		
4		<i>Sand</i> Brown, medium grained Sand, Saturated	2	SS	20	44		
6		<i>Sand, some gravel</i> Brown, medium grained Sand, some Gravel, very wet	3	SS	15	10		
8		No sample, same as above	4	SS	15	43		
10		<i>Sand, some Silt</i> Coarse grained Sand, some Silt <i>Auger Refusal at 3.86m</i>	5	SS		60		
12		End of Borehole						

*Drilled By:* George Downing Estate Drilling

*Drill Method:* CME Hollow Stem Auger

*Drill Date:* October 12/06

*Input By:* CMW, snr

*Checked By:* CMW

*Sheet:* 1 of 1

CLIENT Township of Greater Madawaska

 PROJECT NAME Griffith Waste Disposal Site

 PROJECT NUMBER 102.12.011

 PROJECT LOCATION Griffith, Ontario

 DATE STARTED 7/27/12 COMPLETED 7/27/12

 GROUND ELEVATION 104.54 m HOLE SIZE 0.1524

 DRILLING CONTRACTOR Lantech Drilling Services Inc.

GROUND WATER LEVELS:

 DRILLING METHOD Solid Stem Auger

 AT TIME OF DRILLING ---

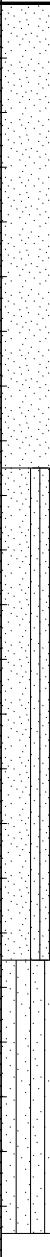
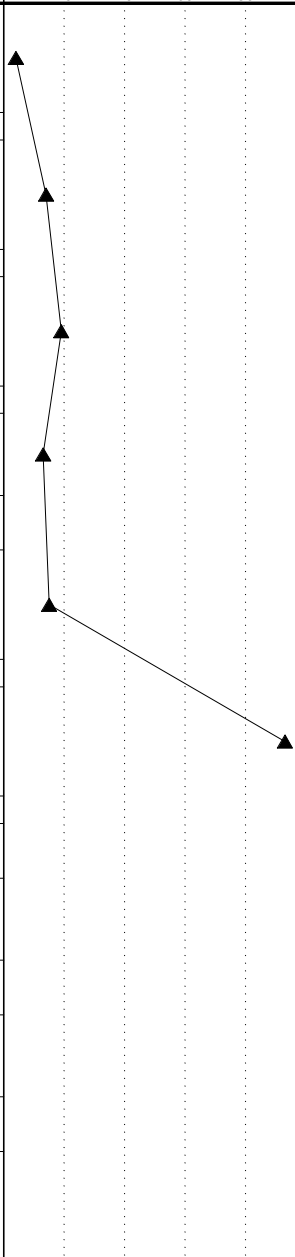
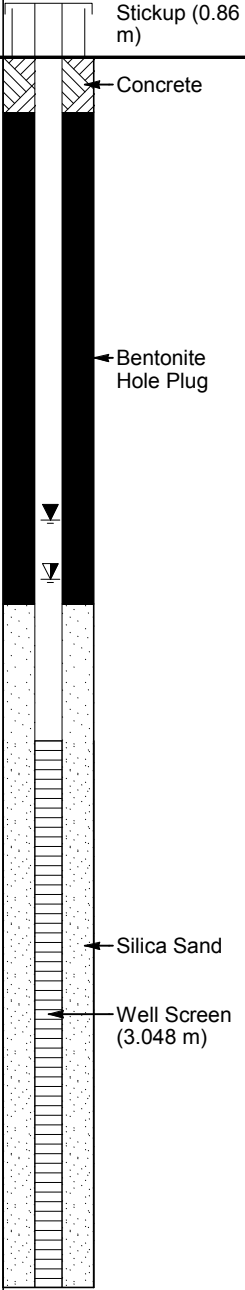
 LOGGED BY D. Hagan, B.Sc. CHECKED BY T. Peters, P.Eng

 ▼ AT END OF DRILLING 2.58 m / Elev 101.96 m

NOTES \_\_\_\_\_

 ▼ AFTER DRILLING 2.91 m / Elev 101.63 m

GREENVIEW - MW LOG - MAY 18-2011 102.12.011 - TGM - GRIFFITH WDS - MW12-12 - FEB 15-13.GPJ GINT STD CANADA.GDT 2/22/13

DEPTH (m)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	▲ SPT N VALUE ▲	WELL DIAGRAM
1	3		(SP) Brown to grey, fine grained sand with minor gravel, dry, very loose to loose.	SS 1	80	2-2-2-3 (4)		
2	4			SS 2	62	3-7-7-8 (14)		
3	5			SS 3	0	4-10-9-10 (19)		
4	6			SS 4	101	6-7-6 (13)		
5	7			SS 5	79	5-6-9-13 (15)		
6	8			SS 6	56	21-43-50-50 (93)		
7	9			SS 7	49	22-50		
8	10			SS 8	92	30-70		
9	11			SS 9	36	13-50		
10	12							
11	13							
12	14							
13	15							
14	16							
15	17							
16	18							
17	19							
18	20							
19	21							
20	22							
21	23							

Bottom of hole at 7.06 m.

# Appendix D

## Photographs



91-1



91-2



91-4



91-5



91-6



96-7 S+D

DATE	March 2024
PROJECT	22-6213C
FIGURE	1





96-8



96-9



96-10 S+D



06-11



12-12

DATE	March 2024
PROJECT	22-6213C
FIGURE	1



STN-1



STN-4



STN-5

DATE	March 2024
PROJECT	22-6213C
FIGURE	1

# Appendix E

## Sampling Protocol

## STANDARD SAMPLING PROTOCOL

The following is a description of the monitoring procedures and protocols used for groundwater and surface water monitoring for landfill sites.

### ***Equipment Cleaning and Calibration***

Regardless of matrix, prior to traveling to the site to be sampled, all equipment such as water level indicators and multi-parameter meters must be cleaned and calibrated as specified by the equipment manufacturer. Details of the cleaning and calibration should be recorded in the field notes.

## **GROUNDWATER**

### ***Monitoring Well Assessment***

Provide an assessment of the status of all monitoring wells at the site.

Note any changes to the well and/or protective casing and record the physical condition of the well; and

Label all observation wells clearly and accurately on both the protective casing and well pipe.

### ***Groundwater Monitoring***

Maintain and use an accurate, up-to-date list of all observation wells to be monitored.

Check all field equipment for cleanliness; and

Wear personnel protective equipment as required (i.e., gloves, protective glasses, splash guards) during all phases of work, and follow any appropriate health and safety plan procedures.

### ***Gas Detection in Wells (Prior to Measuring Water Levels)***

Turn on gas meter and prepare for sampling atmospheric condition inside monitoring well.

Remove protective casing cover and well cap avoiding introduction of foreign materials into the well.

Immediately insert the probe attached to the gas meter into the well and wait for readings to stabilize.

Record the measurement in the appropriate column on the field data sheet or field book.

### ***Water Level Measurements (Prior to Purging)***

Record water level measurements prior to purging or sampling when required.

Do not move dedicated sampling devices such as the "Waterra" inertial pump prior to measuring the water level unless the well diameter dictates removal; reference the measurement from the same location each time (marked location or lowest point on pipe).

Lower the tape/probe into the wells - record the depth to water when the indicator (audible/visual) shows the water level has been reached.

Measure the water level twice by raising and lowering the tape/probe; and

Record the measurement to the nearest cm (0.5 cm) in the appropriate column on the field data sheet or field book.

### ***Well Purging (Prior to Sampling)***

The purpose of purging is to remove the stagnant water from within a monitor (removal of all stagnant water) so that a representative water sample may be collected. The procedures for purging are as follows.

Purge the well only after water levels have been confirmed.

Lift the tubing off the bottom of the well and "pump" at a minimum all stagnant water from the well into a graduated container such as a bucket, pail or cylinder so that the purged volume can be measured and recorded.

For low-yield wells, it is expected that either "no purge sampling techniques or low flow purging will be utilized (avoid purging well dry).

Under normal circumstances purged water may be discarded on the ground, away from the well to avoid the potential of water seeping back into the well; and

Allow a sufficient recovery period before sampling (not more than 48 hours).

### ***Field Measurements***

Field measurements are to be collected and recorded as outlined in the Environmental Compliance Approval or the approved monitoring program. Typically, these include at a minimum: temperature, pH and conductivity.

### ***Well Sampling***

Collect the water sample as soon as practical (not more than 48 hours) after purging starting at the least contaminated location and proceeding to the most contaminated.

Lift tubing and check valve off bottom of well to avoid introducing unnecessary sediment into the sample and transfer some representative sample water into a clean, well rinsed container to conduct measurements of field parameters.

Lift the tubing and gently transfer a sample into a clean container and thoroughly mix to form a single representative sample.

Transfer the sample into a pre-labelled sample bottle; labelling to consist of at a minimum, the project number, well ID and the date.

For samples that require filtering, attach the disposable filter onto the end of the tubing (typically a 0.45-micron membrane filter or as otherwise specified should be used).

Attempt to keep sample agitation to a minimum during sample transfer.

Store samples in a cooler, with ice packs to keep cool.

Transport samples to laboratory within the maximum hold time established by the laboratory (typically within a 48-hour period).

### ***Volatile Organic Compound (VOC) Sampling***

Volatile Organic Compounds (VOC) can be easily lost during sample collection, storage, and transportation. The following sampling and handling protocols are adhered to.

VOC samples are to be collected in special containers provided by the laboratory. These typically include glass vials, preferably amber, with a minimum capacity of 20 ml and sealed with Septum tops.

Vials must be filled just to overflowing in such a manner that no air bubbles pass through the vial as it is being filled (this is easier to accomplish by inserting a 4' length of ¼ " poly tubing into the existing Wattera tubing and filling the vial from the ¼" tubing).

Vials must then be sealed with the cap so that no air bubbles are entrapped within it; the septum is placed with the Teflon side face down toward the inside of the bottle.

Check for the presence of air bubbles by inverting the vial and tapping on hard surface; if air bubbles are present, discard the sample and re-sample.

All VOC samples must be preserved as specified by the laboratory (typically with 1 to 2 drops of Hydrochloric Acid (HCl)) and refrigerated or stored on ice until analysed; and

VOC samples should be submitted in duplicate at a ratio specified in the approved monitoring program (typically 1:10)

### ***Surface Water Sampling (General)***

Surface water samples should be collected at the same designated location during each sample event (do not collect samples from any station which is frozen, stagnant or otherwise not representative of normal conditions).

If you must stand in the stream, position yourself downstream of the sample location to avoid contaminating the sample with sediment, debris, and other floating materials.

All equipment must be thoroughly rinsed with distilled water at the beginning of each station to avoid cross-contamination.

Wear gloves as required to handle the sample bottles.

Fill all bottles using an unpreserved transfer bottle (to avoid overflowing pre-preserved bottles).

When sampling for dissolved metals, the sample must be filtered and placed in a separate metals bottle, while sampling for total metals, the sample is placed in a common bottle for metals that is provided by the laboratory.

Label and store all samples in the same manner as for groundwater samples; and

Conduct field measurements (these typically include temperature, pH, conductivity, Dissolved Oxygen and Flow).

### ***Flow Measurements (General)***

Discharge flow measurements must be taken at designated stations.

### ***QA/QC Water Samples***

A field quality assurance and quality control program for all monitoring events will be established as follows and or as dictated in the approved monitoring program.

Where groundwater or surface water samples are collected, and if stipulated in the approved monitoring program, a field blank in which a set of sample bottles is filled with distilled water at a known site or monitoring station is submitted to the laboratory for analysis along with the samples

Where VOC samples are taken, a trip blank, in which 1 set of VOC vials are filled with distilled water (at the laboratory or office) prior to going to the field and accompanies the sample bottles until they are returned to the lab; and

Duplicate of as outlined in the approved monitoring program or 1 duplicate for every 10 samples (do not identify the sample ID number to the laboratory, but have it recorded in the field notes) use the sampling technique as for observation wells.

## ***SAMPLING***

### ***Station Sampling Order***

The stations will be sampled beginning with those wells exhibiting the lowest chemical concentrations and then moving on to wells with greater chemical concentrations.

### ***Monitoring Periods***

The monitoring periods are as recommended in either the approved monitoring program or the Environmental Compliance Approval.

### ***Analytical Parameters***

Analysis will be as recommended in either the approved monitoring program and or the Environmental Compliance Approval.

### ***Gas Detection of On-site Buildings***

Gas detection in on-site buildings is to be included as part of regular monitoring.



## Appendix F

# Historic Static Levels, Ground and Surface Water Analysis

**Table 3  
Groundwater Elevations  
Griffith Waste Disposal Site**

Monitor	Ground Elevation (m)	Top of Pipe Elevation (m) 1,2	Original Stick-Up (m)	Depth of Well (m) <sup>3</sup>	Well Diameter (mm)	Groundwater Elevation (m)								
						24-May-16	31-Aug-16	04-May-17	19-Sep-17	13-Aug-18	20-Aug-19	19-Aug-20	18-Aug-21	18-Aug-22
91-1	103.70	104.73	1.03	4.45	38.1	102.96	101.94	103.62	102.15	102.18	101.82	102.02	102.51	102.43
91-2	95.75	96.36	0.61	9.66	38.1	90.45	88.99	91.23	89.92	89.93	89.22	89.34	89.88	90.11
91-4	92.18	94.63	0.94	6.08	38.1	91.39	90.23	92.16	90.64	90.62	90.44	90.38	91.37	90.63
91-5	91.08	91.83	1.09	6.95	38.1	88.75	88.25	89.18	88.51	88.51	88.21	88.34	88.70	88.46
91-6	91.70	92.46	1.14	4.15	38.1	91.06	90.44	91.20	90.70	90.62	90.37	90.56	91.03	90.61
96-7S	90.75	91.78	1.03	2.38	38.1	Dry	Dry	90.45	Dry	Dry	Dry	Dry	Dry	Dry
96-7D	90.75	91.35	0.60	6.89	38.1	89.10	88.46	89.45	89.04	88.95	88.17	88.97	89.83	89.09
96-8	90.51	91.54	1.03	5.16	38.1	88.64	88.05	89.08	88.42	88.39	87.70	88.23	88.56	88.32
96-9	89.67	90.41	0.74	5.86	38.1	87.89	87.53	87.96	87.68	87.62	87.06	87.45	87.90	87.81
96-10S	88.50	89.43	0.93	2.24	38.1	88.24	87.92	88.36	88.17	88.11	87.80	88.03	88.19	88.05
96-10D	88.50	89.43	0.93	6.66	38.1	88.30	87.96	88.47	88.21	88.18	87.87	88.07	88.23	88.07
MW06-11	83.40	84.39	0.83	3.82	50.8	83.50	83.24	83.72	83.36	83.35	83.26	83.37	83.53	83.34
MW12-12	104.54	105.40	0.86	6.86	50.8	103.52	101.96	104.13	102.39	102.32	101.92	102.17	102.11	101.92

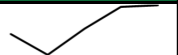

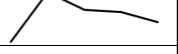
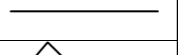
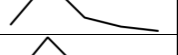
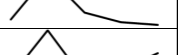



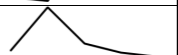
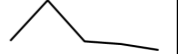
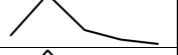
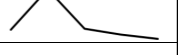
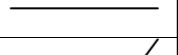
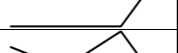

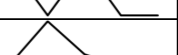
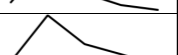

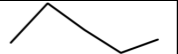
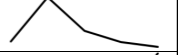
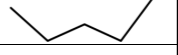
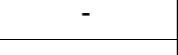
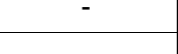
Notes:

1. Elevations based on SGS Lakefield Research 2004 Annual Report, with updated elevations following 2006 repairs.
2. Monitoring Well 91-2 extended and MW12-12 installed July 27, 2012, surveyed November 20, 2012.
3. Depth of well below ground surface (m).

All elevations are relative to a site specific benchmark (BM# 2) elevation of 106.277 m.

"-" indicates water level is not available.

**Table 4**  
**Groundwater Quality**  
**Griffith Waste Disposal Site**

Parameter	Background (median) (2003 - 2009)	RUC <sup>1</sup>	ODWS <sup>2</sup>	91-1 (Background)							5-year Trends (sparkline)
				31-Aug-16	19-Sep-17	13-Aug-18	20-Aug-19	19-Aug-20	18-Aug-21	18-Aug-22	
Alkalinity (as CaCO <sub>3</sub> )	175	338	30 - 500	274	277	238	192	249	298	301	
Ammonia, Total (as N)	0.1	N/L	N/L	0.14	0.04	0.03	0.06	0.02	0.04	0.02	
Boron	0.02	1.3	5	0.044	0.041	0.041	0.061	0.054	0.053	0.049	
Cadmium	0.00004	0.0013	0.005	< 0.00002	< 0.000014	< 0.000015	< 0.000015	< 0.000028	< 0.000028	< 0.000028	
Calcium	84	N/L	N/L	110	90.3	112	394	159	97.8	71.2	
Chloride	64	157	250	<b>220</b>	146	<b>301</b>	<b>1380</b>	<b>468</b>	<b>230</b>	<b>170</b>	
Chemical Oxygen Demand	10	N/L	N/L	19	13	11	25	10	13	18	
Conductivity (µS/cm) <sup>3</sup>	452	N/L	N/L	1276	876	1119	2424	1409	941	851	
Copper	0.003	0.5	1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0012	0.0013	
Dissolved Organic Carbon	2.1	3.6	5	1.4	3.3	1.7	1.6	2.9	2.2	1.7	
Hardness (as CaCO <sub>3</sub> )	244	372	500	321	262	329	<b>1140</b>	<b>459</b>	282	205	
Iron	5.2	5.2	0.3	<b>6.95</b>	<b>5.22</b>	<b>7.56</b>	<b>23.4</b>	<b>7.20</b>	<b>6.14</b>	<b>3.79</b>	
Magnesium	8.6	N/L	N/L	11.0	8.83	11.9	36.6	14.9	9.21	6.59	
Manganese	0.11	0.11	0.05	<b>0.079</b>	<b>0.066</b>	<b>0.078</b>	<b>0.207</b>	<b>0.082</b>	<b>0.063</b>	0.049	
Nitrate (as N)	0.07	2.6	10	0.1	< 0.05	< 0.05	< 0.5	< 0.05	< 0.5	< 0.05	
Nitrite (as N)	0.06	0.3	1	< 0.1	< 0.05	< 0.05	< 0.5	< 0.05	< 0.5	0.16	
pH (units) <sup>3</sup>	7.00	6.5 - 8.5	6.5 - 8.5	7.41	7.56	7.17	6.88	7.02	7.48	<b>6.48</b>	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.008	< 0.002	0.008	< 0.002	< 0.001	
Potassium	2.9	N/L	N/L	3.8	3.9	4.1	7.4	4.8	3.9	3.5	
Sodium	18.2	109	200	<b>160</b>	<b>158</b>	<b>182</b>	<b>386</b>	<b>259</b>	<b>215</b>	<b>169</b>	
Strontium	0.28	N/L	N/L	0.429	0.319	0.444	1.41	0.542	0.355	0.255	
Sulphate	18	259	500	47	30	33	45	37	30	34	
Total Dissolved Solids	354	427	500	<b>733</b>	<b>615</b>	<b>801</b>	<b>2290</b>	<b>1148</b>	<b>783</b>	<b>612</b>	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	1.1	0.2	0.4	0.2	0.3	0.2	0.5	
Anion Sum (meq/L)	-	N/L	N/L	12.7	10.3	13.9	43.7	19.0	13.1	11.5	-
Cation Sum (meq/L)	-	N/L	N/L	13.8	12.5	15.0	40.9	20.9	15.4	11.8	-
Anion-Cation Balance (% difference)	-	N/L	N/L	4.36	9.78	3.69	3.30	4.92	8.29	0.899	-

Notes:

1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.


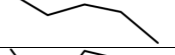
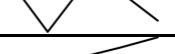



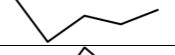


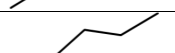

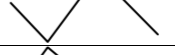
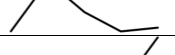
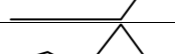
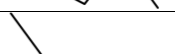
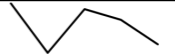
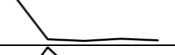
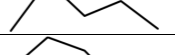



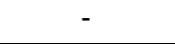
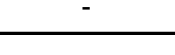

Bold and shaded values exceed the ODWS.

Bold and Italic values exceed RUC limits.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

**Table 4**  
**Groundwater Quality**  
**Griffith Waste Disposal Site**

Parameter	Background (median) (2003 - 2009)	RUC <sup>1</sup>	ODWS <sup>2</sup>	91-2							5-year Trends
				31-Aug-16	19-Sep-17	13-Aug-18	20-Aug-19	19-Aug-20	18-Aug-21	18-Aug-22	(sparkline)
Alkalinity (as CaCO <sub>3</sub> )	175	338	30 - 500	<b>840</b>	<b>792</b>	<b>722</b>	<b>674</b>	<b>674</b>	<b>692</b>	<b>671</b>	
Ammonia, Total (as N)	0.1	N/L	N/L	7.30	6.37	6.95	6.05	6.49	6.19	4.92	
Boron	0.02	1.3	5	0.803	0.935	0.773	0.615	0.768	0.740	0.651	
Cadmium	0.00004	0.0013	0.005	0.00063	0.000386	0.000384	0.000362	0.000423	0.000442	0.000462	
Calcium	84	N/L	N/L	210	214	176	203	217	222	200	
Chloride	64	157	250	139	65.8	65.5	68.7	83.9	115	84.4	
Chemical Oxygen Demand	10	N/L	N/L	214	73	56	52	53	69	69	
Conductivity (µS/cm) <sup>3</sup>	452	N/L	N/L	1884	1193	1123	936	1034	1003	1056	
Copper	0.003	0.5	1	0.037	0.027	0.023	0.017	0.032	0.0228	0.0221	
Dissolved Organic Carbon	2.1	3.6	5	<b>13.4</b>	<b>20.1</b>	<b>18.0</b>	<b>18.4</b>	<b>18.9</b>	<b>12.3</b>	<b>11.0</b>	
Hardness (as CaCO <sub>3</sub> )	244	372	500	<b>681</b>	<b>687</b>	<b>578</b>	<b>635</b>	<b>687</b>	<b>705</b>	<b>632</b>	
Iron	5.2	5.2	0.3	0.193	0.245	0.250	0.191	<b>0.678</b>	<b>0.598</b>	<b>0.925</b>	
Magnesium	8.6	N/L	N/L	38.0	37.0	33.6	31.1	35.2	36.4	32.3	
Manganese	0.11	0.11	0.05	<b>33.0</b>	<b>26.4</b>	<b>22.1</b>	<b>19.6</b>	<b>22.8</b>	<b>22.5</b>	<b>20.1</b>	
Nitrate (as N)	0.07	2.6	10	< 0.1	0.20	< 0.05	0.71	0.27	< 0.5	0.05	
Nitrite (as N)	0.06	0.3	1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	0.08	
pH (units) <sup>3</sup>	7.00	6.5 - 8.5	6.5 - 8.5	6.79	6.73	6.62	6.80	<b>6.49</b>	7.24	<b>6.43</b>	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.015	< 0.002	< 0.002	< 0.002	< 0.001	
Potassium	2.9	N/L	N/L	63.7	63.1	61.1	51.4	60.0	57.9	53.1	
Sodium	18.2	109	200	<b>149</b>	<b>121</b>	95.6	68.9	68.0	69.3	68.3	
Strontium	0.28	N/L	N/L	0.772	0.737	0.638	0.755	0.673	0.709	0.643	
Sulphate	18	259	500	79	77	63	85	76	51	57	
Total Dissolved Solids	354	427	500	<b>1120</b>	<b>988</b>	<b>875</b>	<b>846</b>	<b>897</b>	<b>914</b>	<b>826</b>	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	9.1	8.4	8.1	7.2	7.4	6.7	9.3	
Anion Sum (meq/L)	-	N/L	N/L	22.4	19.3	17.6	17.2	17.4	18.1	17.0	-
Cation Sum (meq/L)	-	N/L	N/L	23.1	22.2	18.7	17.9	19.7	20.0	17.9	-
Anion-Cation Balance (% difference)	-	N/L	N/L	1.72	7.04	3.18	1.81	6.11	4.91	2.60	-

Notes:

1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.


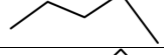
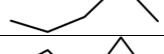

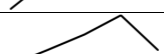

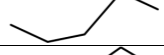


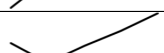
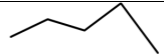

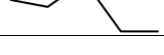
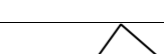
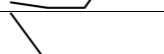




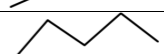

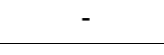
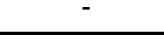

Bold and shaded values exceed the ODWS.

Bold and Italic values exceed RUC limits.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

**Table 4**  
**Groundwater Quality**  
**Griffith Waste Disposal Site**

Parameter	Background (median) (2003 - 2009)	RUC <sup>1</sup>	ODWS <sup>2</sup>	91-4							5-year Trends
				31-Aug-16	19-Sep-17	13-Aug-18	20-Aug-19	19-Aug-20	18-Aug-21	18-Aug-22	(sparkline)
Alkalinity (as CaCO <sub>3</sub> )	175	338	30 - 500	<b>665</b>	<b>659</b>	<b>581</b>	<b>580</b>	<b>570</b>	<b>618</b>	<b>609</b>	
Ammonia, Total (as N)	0.1	N/L	N/L	5.05	4.90	4.09	4.99	4.47	5.28	3.59	
Boron	0.02	1.3	5	0.442	0.463	0.454	0.435	0.460	0.518	0.453	
Cadmium	0.00004	0.0013	0.005	0.000760	0.000509	0.000550	0.000613	0.000495	0.000654	0.000494	
Calcium	84	N/L	N/L	212	209	177	200	212	216	192	
Chloride	64	157	250	72.9	42.5	34.1	51.6	69.6	91.9	51.5	
Chemical Oxygen Demand	10	N/L	N/L	56	34	44	44	44	61	70	
Conductivity (µS/cm) <sup>3</sup>	452	N/L	N/L	1041	954	897	839	864	1006	949	
Copper	0.003	0.5	1	0.0350	0.027	0.027	0.023	0.026	0.0291	0.0265	
Dissolved Organic Carbon	2.1	3.6	5	<b>13.6</b>	<b>18.8</b>	<b>15.8</b>	<b>17.7</b>	<b>16.3</b>	<b>11.6</b>	<b>11.9</b>	
Hardness (as CaCO <sub>3</sub> )	244	372	500	<b>668</b>	<b>654</b>	<b>556</b>	<b>621</b>	<b>646</b>	<b>667</b>	<b>588</b>	
Iron	5.2	5.2	0.3	0.015	0.013	0.016	0.008	0.015	0.021	0.028	
Magnesium	8.6	N/L	N/L	33.7	32.1	27.7	29.4	28.3	30.9	26.2	
Manganese	0.11	0.11	0.05	<b>32.2</b>	<b>26.7</b>	<b>23.0</b>	<b>24.3</b>	<b>21.9</b>	<b>23.8</b>	<b>23.2</b>	
Nitrate (as N)	0.07	2.6	10	0.5	0.84	0.65	0.51	1.04	< 0.5	< 0.05	
Nitrite (as N)	0.06	0.3	1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	
pH (units) <sup>3</sup>	7.00	6.5 - 8.5	6.5 - 8.5	6.61	<b>6.48</b>	6.56	6.50	6.50	7.04	6.70	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.012	< 0.002	< 0.002	< 0.002	< 0.001	
Potassium	2.9	N/L	N/L	47.8	47.8	41.4	46	39.0	42.4	39.3	
Sodium	18.2	109	200	57.3	53.6	49.0	49.8	35.4	50.0	55.4	
Strontium	0.28	N/L	N/L	0.703	0.649	0.601	0.624	0.597	0.667	0.614	
Sulphate	18	259	500	112	66	65	106	77	74	86	
Total Dissolved Solids	354	427	500	<b>865</b>	<b>805</b>	<b>710</b>	<b>749</b>	<b>783</b>	<b>829</b>	<b>734</b>	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	5.9	5.6	4.6	5.8	5.1	6.0	5.2	
Anion Sum (meq/L)	-	N/L	N/L	17.7	15.8	14.0	15.3	15.0	16.5	15.4	-
Cation Sum (meq/L)	-	N/L	N/L	18.4	18.1	15.6	16.8	16.7	18.0	16.2	-
Anion-Cation Balance (% difference)	-	N/L	N/L	2.02	6.86	5.43	4.73	5.29	4.36	2.43	-

Notes:

1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.

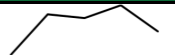
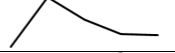

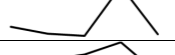
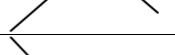





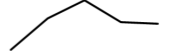

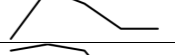
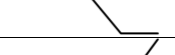

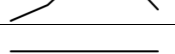


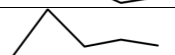

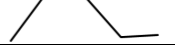
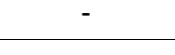
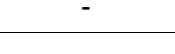
Bold and shaded values exceed the ODWS.

Bold and Italic values exceed RUC limits.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

**Table 4**  
**Groundwater Quality**  
**Griffith Waste Disposal Site**

Parameter	Background (median) (2003 - 2009)	RUC <sup>1</sup>	ODWS <sup>2</sup>	91-5							5-year Trends (sparkline)
				31-Aug-16	19-Sep-17	13-Aug-18	20-Aug-19	19-Aug-20	18-Aug-21	18-Aug-22	
Alkalinity (as CaCO <sub>3</sub> )	175	338	30 - 500	<b>594</b>	<b>356</b>	288	<b>581</b>	<b>552</b>	<b>646</b>	<b>456</b>	
Ammonia, Total (as N)	0.1	N/L	N/L	2.79	1.23	1.23	4.66	3.11	2.11	2.05	
Boron	0.02	1.3	5	0.539	0.348	0.274	0.648	0.635	0.733	0.463	
Cadmium	0.00004	0.0013	0.005	0.00015	0.000054	0.000092	0.000063	0.000053	0.000271	0.000061	
Calcium	84	N/L	N/L	187	144	129	201	213	241	170	
Chloride	64	157	250	87.0	152	<b>211</b>	75.2	66.6	36.7	64.3	
Chemical Oxygen Demand	10	N/L	N/L	94	106	63	118	61	49	43	
Conductivity (µS/cm) <sup>3</sup>	452	N/L	N/L	1273	855	774	811	780	1004	800	
Copper	0.003	0.5	1	0.004	< 0.002	< 0.002	< 0.002	0.002	0.0087	0.0027	
Dissolved Organic Carbon	2.1	3.6	5	<b>12.9</b>	<b>8.7</b>	<b>6.0</b>	<b>17.1</b>	<b>15.5</b>	<b>15.7</b>	<b>9.2</b>	
Hardness (as CaCO <sub>3</sub> )	244	372	500	<b>581</b>	<b>441</b>	<b>391</b>	<b>624</b>	<b>643</b>	<b>719</b>	<b>513</b>	
Iron	5.2	5.2	0.3	<b>2.50</b>	<b>2.13</b>	<b>0.586</b>	<b>2.73</b>	<b>3.95</b>	<b>2.48</b>	<b>2.35</b>	
Magnesium	8.6	N/L	N/L	27.8	19.6	16.6	29.5	26.8	28.3	21.5	
Manganese	0.11	0.11	0.05	<b>9.09</b>	<b>8.77</b>	<b>3.63</b>	<b>9.64</b>	<b>7.89</b>	<b>4.88</b>	<b>4.84</b>	
Nitrate (as N)	0.07	2.6	10	0.2	< 0.05	0.07	0.08	0.07	< 0.5	< 0.05	
Nitrite (as N)	0.06	0.3	1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	0.08	
pH (units) <sup>3</sup>	7.00	6.5 - 8.5	6.5 - 8.5	6.86	6.67	6.79	6.95	7.30	7.31	6.91	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	< 0.01	< 0.002	< 0.002	< 0.002	< 0.001	
Potassium	2.9	N/L	N/L	24.4	15.1	16.0	30.2	30.0	26.2	23.5	
Sodium	18.2	109	200	84.0	104	81.5	53.5	47.4	31.0	36.8	
Strontium	0.28	N/L	N/L	1.96	1.39	1.07	2.32	1.38	1.55	1.41	
Sulphate	18	259	500	88	53	43	106	83	113	65	
Total Dissolved Solids	354	427	500	<b>817</b>	<b>758</b>	<b>710</b>	<b>778</b>	<b>755</b>	<b>772</b>	<b>594</b>	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	3.8	3.0	2.5	6.6	6.2	2.8	3.0	
Anion Sum (meq/L)	-	N/L	N/L	16.2	12.5	12.6	15.9	14.6	16.3	12.3	-
Cation Sum (meq/L)	-	N/L	N/L	16.4	14.3	12.0	16.1	16.4	16.9	12.8	-
Anion-Cation Balance (% difference)	-	N/L	N/L	0.748	6.65	2.36	0.576	5.76	1.77	2.00	-

Notes:

1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.



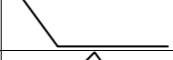
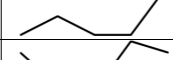



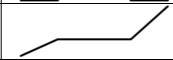

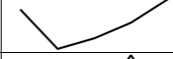

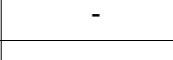
Bold and shaded values exceed the ODWS.

Bold and Italic values exceed RUC limits.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

**Table 4**  
**Groundwater Quality**  
**Griffith Waste Disposal Site**

Parameter	Background (median) (2003 - 2009)	RUC <sup>1</sup>	ODWS <sup>2</sup>	96-7D							5-year Trends (sparkline)
				31-Aug-16	19-Sep-17	13-Aug-18	20-Aug-19	19-Aug-20	18-Aug-21	18-Aug-22	
Alkalinity (as CaCO <sub>3</sub> )	175	338	30 - 500	215	208	197	196	196	221	223	
Ammonia, Total (as N)	0.1	N/L	N/L	0.05	0.06	0.06	0.06	0.04	0.07	< 0.01	
Boron	0.02	1.3	5	0.043	0.035	0.039	0.036	0.042	0.044	0.039	
Cadmium	0.00004	0.0013	0.005	0.00002	< 0.000014	0.000017	< 0.000015	< 0.000015	< 0.000015	< 0.000015	
Calcium	84	N/L	N/L	122	123	110	111	114	110	111	
Chloride	64	157	250	92.1	68.2	78.9	65.2	60.8	57.6	66.3	
Chemical Oxygen Demand	10	N/L	N/L	25	31	29	32	29	29	37	
Conductivity (µS/cm) <sup>3</sup>	452	N/L	N/L	626	484	465	393	382	490	466	
Copper	0.003	0.5	1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0017	0.0030	
Dissolved Organic Carbon	2.1	3.6	5	<b>7.8</b>	<b>10.6</b>	<b>10.4</b>	<b>11.8</b>	<b>11.8</b>	<b>9.0</b>	<b>8.1</b>	
Hardness (as CaCO <sub>3</sub> )	244	372	500	337	338	306	304	315	305	308	
Iron	5.2	5.2	0.3	<b>1.25</b>	<b>0.671</b>	<b>0.702</b>	<b>0.476</b>	<b>0.877</b>	<b>0.948</b>	<b>0.716</b>	
Magnesium	8.6	N/L	N/L	7.42	7.44	7.51	6.44	7.20	7.25	7.81	
Manganese	0.11	0.11	0.05	<b>0.285</b>	<b>0.140</b>	<b>0.215</b>	<b>0.111</b>	<b>0.183</b>	<b>0.219</b>	<b>0.148</b>	
Nitrate (as N)	0.07	2.6	10	0.1	< 0.05	0.06	0.08	0.07	0.14	< 0.05	
Nitrite (as N)	0.06	0.3	1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.08	
pH (units) <sup>3</sup>	7.00	6.5 - 8.5	6.5 - 8.5	6.95	6.67	7.31	7.76	8.01	8.12	7.41	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	< 0.002	< 0.002	0.007	< 0.002	< 0.001	
Potassium	2.9	N/L	N/L	3.40	3.5	3.3	3.4	3.4	3.4	3.6	
Sodium	18.2	109	200	10.9	13.4	12.1	11.7	10.6	11.3	11.6	
Strontium	0.28	N/L	N/L	1.25	1.21	1.25	1.10	1.14	1.20	1.29	
Sulphate	18	259	500	15	16	17	17	17	18	17	
Total Dissolved Solids	354	427	500	395	378	355	311	319	331	332	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	0.4	0.5	0.5	0.4	0.5	0.4	0.5	
Anion Sum (meq/L)	-	N/L	N/L	7.21	6.40	6.51	6.12	5.98	6.43	6.69	-
Cation Sum (meq/L)	-	N/L	N/L	7.36	7.47	6.77	6.7	6.89	6.73	6.80	-
Anion-Cation Balance (% difference)	-	N/L	N/L	1.05	7.67	1.95	4.51	7.02	2.27	0.773	-

Notes:

1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.

Bold and shaded values exceed the ODWS.

Bold and Italic values exceed RUC limits.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

**Table 4**  
**Groundwater Quality**  
**Griffith Waste Disposal Site**

Parameter	Background (median) (2003 - 2009)	RUC <sup>1</sup>	ODWS <sup>2</sup>	96-9							5-year Trends
				31-Aug-16	19-Sep-17	13-Aug-18	20-Aug-19	19-Aug-20	18-Aug-21	18-Aug-22	(sparkline)
Alkalinity (as CaCO <sub>3</sub> )	175	338	30 - 500	188	139	117	192	119	141	166	
Ammonia, Total (as N)	0.1	N/L	N/L	0.10	0.01	0.02	0.04	< 0.01	0.03	0.01	
Boron	0.02	1.3	5	0.024	0.021	0.022	0.036	0.023	0.030	0.024	
Cadmium	0.00004	0.0013	0.005	< 0.00002	< 0.000014	< 0.000015	< 0.000015	< 0.000015	0.000016	< 0.000015	
Calcium	84	N/L	N/L	104	73.7	60.7	98.1	51.3	67.8	73.8	
Chloride	64	157	250	77.4	30.3	23.7	54.8	19.3	33.7	50.4	
Chemical Oxygen Demand	10	N/L	N/L	41	14	6	13	6	12	19	
Conductivity (µS/cm) <sup>3</sup>	452	N/L	N/L	406	369	368	337	331	440	396	
Copper	0.003	0.5	1	0.002	< 0.002	0.003	< 0.002	0.003	0.0044	0.0055	
Dissolved Organic Carbon	2.1	3.6	5	2.9	<b>4.9</b>	<b>4.1</b>	<b>5.3</b>	<b>5.4</b>	<b>4.8</b>	<b>3.9</b>	
Hardness (as CaCO <sub>3</sub> )	244	372	500	311	218	178	290	148	194	212	
Iron	5.2	5.2	0.3	<b>0.308</b>	0.240	0.170	0.217	0.005	0.100	0.080	
Magnesium	8.6	N/L	N/L	12.5	8.19	6.49	11.0	4.87	6.01	6.75	
Manganese	0.11	0.11	0.05	<b>0.240</b>	<b>0.147</b>	<b>0.112</b>	<b>0.230</b>	<b>0.058</b>	<b>0.076</b>	<b>0.083</b>	
Nitrate (as N)	0.07	2.6	10	0.1	< 0.05	< 0.05	0.06	< 0.05	0.12	< 0.05	
Nitrite (as N)	0.06	0.3	1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.07	
pH (units) <sup>3</sup>	7.00	6.5 - 8.5	6.5 - 8.5	<b>6.49</b>	7.97	7.21	7.79	8.13	7.74	6.78	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	< 0.002	< 0.002	0.006	< 0.002	< 0.001	
Potassium	2.9	N/L	N/L	1.8	1.7	1.4	1.8	1.4	1.6	1.8	
Sodium	18.2	109	200	7.3	8.1	9.4	13.2	8.4	12.9	15.9	
Strontium	0.28	N/L	N/L	0.819	0.496	0.421	0.715	0.309	0.382	0.423	
Sulphate	18	259	500	23	14	15	27	17	16	18	
Total Dissolved Solids	354	427	500	353	224	338	297	174	215	256	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	0.4	0.2	0.2	0.2	0.1	0.2	0.3	
Anion Sum (meq/L)	-	N/L	N/L	6.43	3.91	3.31	5.94	3.28	4.11	5.11	-
Cation Sum (meq/L)	-	N/L	N/L	6.59	4.77	4.02	6.44	3.36	4.49	4.98	-
Anion-Cation Balance (% difference)	-	N/L	N/L	1.27	9.84	9.69	4.06	1.32	4.41	1.33	-

Notes:

1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.

Bold and shaded values exceed the ODWS.


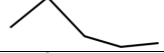
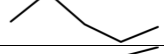






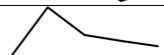



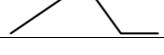

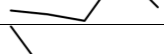

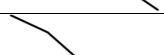

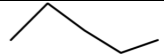
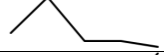

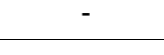
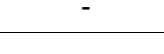
Bold and Italic values exceed RUC limits.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.



**Table 4**  
**Groundwater Quality**  
**Griffith Waste Disposal Site**

Parameter	Background (median) (2003 - 2009)	RUC <sup>1</sup>	ODWS <sup>2</sup>	96-10S							5-year Trends
				31-Aug-16	19-Sep-17	13-Aug-18	20-Aug-19	19-Aug-20	18-Aug-21	18-Aug-22	(sparkline)
Alkalinity (as CaCO <sub>3</sub> )	175	338	30 - 500	<b>594</b>	<b>516</b>	<b>549</b>	<b>606</b>	<b>512</b>	<b>534</b>	<b>579</b>	
Ammonia, Total (as N)	0.1	N/L	N/L	1.42	1.61	1.57	2.97	1.15	0.64	0.81	
Boron	0.02	1.3	5	0.523	0.514	0.564	0.752	0.548	0.435	0.531	
Cadmium	0.00004	0.0013	0.005	0.00045	0.000217	0.000098	0.000065	0.000099	0.000283	0.000337	
Calcium	84	N/L	N/L	203	196	185	244	213	200	201	
Chloride	64	157	250	85.7	92.9	48.7	59.7	56.4	85.1	45.3	
Chemical Oxygen Demand	10	N/L	N/L	371	282	265	323	464	182	483	
Conductivity (µS/cm) <sup>3</sup>	452	N/L	N/L	986	922	888	915	848	834	889	
Copper	0.003	0.5	1	0.011	0.004	0.006	0.002	0.006	0.0120	0.0075	
Dissolved Organic Carbon	2.1	3.6	5	<b>11.2</b>	<b>11.9</b>	<b>13.3</b>	<b>17.2</b>	<b>13.0</b>	<b>9.4</b>	<b>11.2</b>	
Hardness (as CaCO <sub>3</sub> )	244	372	500	<b>626</b>	<b>601</b>	<b>570</b>	<b>739</b>	<b>645</b>	<b>625</b>	<b>607</b>	
Iron	5.2	5.2	0.3	<b>0.318</b>	0.079	<b>0.896</b>	<b>0.319</b>	0.191	0.163	<b>0.793</b>	
Magnesium	8.6	N/L	N/L	28.7	27.1	26.1	31.5	27.3	30.3	25.7	
Manganese	0.11	0.11	0.05	<b>4.40</b>	<b>2.78</b>	<b>2.24</b>	<b>3.15</b>	<b>2.22</b>	<b>4.30</b>	<b>5.63</b>	
Nitrate (as N)	0.07	2.6	10	0.4	< 0.05	< 0.05	0.06	0.12	< 0.5	< 0.05	
Nitrite (as N)	0.06	0.3	1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	
pH (units) <sup>3</sup>	7.00	6.5 - 8.5	6.5 - 8.5	6.93	7.71	6.95	6.88	6.76	7.69	7.01	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.014	< 0.002	< 0.002	< 0.002	< 0.001	
Potassium	2.9	N/L	N/L	18.9	19.2	19.6	25.0	16.7	19.4	13.7	
Sodium	18.2	109	200	80.5	86.8	64.5	58.1	46.1	47.6	47.5	
Strontium	0.28	N/L	N/L	0.855	0.779	0.797	0.940	0.753	0.666	0.756	
Sulphate	18	259	500	92	69	72	115	83	57	72	
Total Dissolved Solids	354	427	500	<b>813</b>	<b>771</b>	<b>704</b>	<b>783</b>	<b>687</b>	<b>687</b>	<b>674</b>	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	2.6	7.9	5.0	3.5	8.7	4.0	9.3	
Anion Sum (meq/L)	-	N/L	N/L	16.2	14.4	13.8	16.2	13.6	14.3	14.3	-
Cation Sum (meq/L)	-	N/L	N/L	16.7	16.5	14.9	18.1	15.5	15.3	14.8	-
Anion-Cation Balance (% difference)	-	N/L	N/L	1.37	6.97	3.86	5.56	6.61	3.44	1.64	-

Notes:

1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.





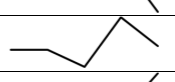
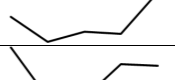




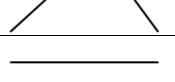
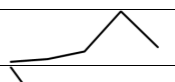

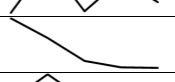

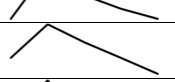


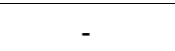





Bold and shaded values exceed the ODWS.

Bold and Italic values exceed RUC limits.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

**Table 4**  
**Groundwater Quality**  
**Griffith Waste Disposal Site**

Parameter	Background (median) (2003 - 2009)	RUC <sup>1</sup>	ODWS <sup>2</sup>	96-10D							5-year Trends (sparkline)
				31-Aug-16	19-Sep-17	13-Aug-18	20-Aug-19	19-Aug-20	18-Aug-21	18-Aug-22	
Alkalinity (as CaCO <sub>3</sub> )	175	338	30 - 500	<b>637</b>	<b>584</b>	<b>587</b>	<b>607</b>	<b>553</b>	<b>568</b>	<b>597</b>	
Ammonia, Total (as N)	0.1	N/L	N/L	0.87	1.23	1.08	1.94	0.98	1.24	1.07	
Boron	0.02	1.3	5	0.514	0.665	0.567	0.742	0.669	0.645	0.598	
Cadmium	0.00004	0.0013	0.005	0.00024	0.000181	0.000157	0.000194	0.000132	0.000153	0.000127	
Calcium	84	N/L	N/L	204	215	188	234	235	202	194	
Chloride	64	157	250	92.4	84.1	44.0	57.5	56.0	60.4	34.6	
Chemical Oxygen Demand	10	N/L	N/L	78	40	45	45	36	62	47	
Conductivity (µS/cm) <sup>3</sup>	452	N/L	N/L	925	986	879	845	859	856	912	
Copper	0.003	0.5	1	0.011	0.003	0.008	0.005	0.005	0.0070	0.0069	
Dissolved Organic Carbon	2.1	3.6	5	<b>11.8</b>	<b>12.6</b>	<b>13.9</b>	<b>17.4</b>	<b>15.9</b>	<b>11.9</b>	<b>13.2</b>	
Hardness (as CaCO <sub>3</sub> )	244	372	500	<b>607</b>	<b>654</b>	<b>572</b>	<b>708</b>	<b>698</b>	<b>623</b>	<b>589</b>	
Iron	5.2	5.2	0.3	0.216	<b>0.903</b>	<b>0.637</b>	<b>0.574</b>	<b>0.910</b>	<b>1.39</b>	<b>0.876</b>	
Magnesium	8.6	N/L	N/L	24.0	28.4	24.9	29.9	26.9	28.6	25.3	
Manganese	0.11	0.11	0.05	<b>2.76</b>	<b>5.02</b>	<b>3.94</b>	<b>5.01</b>	<b>5.48</b>	<b>6.87</b>	<b>7.72</b>	
Nitrate (as N)	0.07	2.6	10	0.1	< 0.05	< 0.05	0.06	0.06	0.09	< 0.05	
Nitrite (as N)	0.06	0.3	1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) <sup>3</sup>	7.00	6.5 - 8.5	6.5 - 8.5	6.81	7.84	6.71	6.78	6.96	7.91	7.06	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.014	< 0.002	< 0.002	< 0.002	< 0.001	
Potassium	2.9	N/L	N/L	13.3	16.7	15.1	18.4	15.2	17.3	15.8	
Sodium	18.2	109	200	95.4	96.5	70.1	63.5	56.0	53.9	53.7	
Strontium	0.28	N/L	N/L	0.951	0.901	0.846	0.949	0.850	0.776	0.755	
Sulphate	18	259	500	102	83	74	118	95	83	74	
Total Dissolved Solids	354	427	500	<b>865</b>	<b>828</b>	<b>710</b>	<b>783</b>	<b>744</b>	<b>710</b>	<b>675</b>	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	1.7	1.8	1.7	2.5	1.5	1.8	1.7	
Anion Sum (meq/L)	-	N/L	N/L	17.5	15.8	14.5	16.2	14.6	14.8	14.4	-
Cation Sum (meq/L)	-	N/L	N/L	16.7	18.0	15.1	17.6	17.1	15.7	14.9	-
Anion-Cation Balance (% difference)	-	N/L	N/L	2.10	6.72	2.14	4.18	7.88	2.95	1.49	-

Notes:

1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.

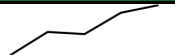
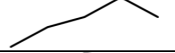
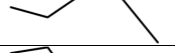
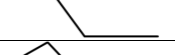

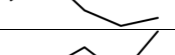


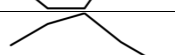
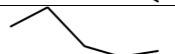

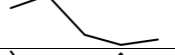

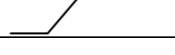
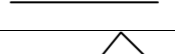
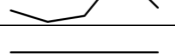
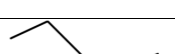


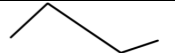
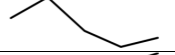

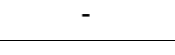
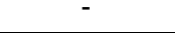
Bold and shaded values exceed the ODWS.

Bold and Italic values exceed RUC limits.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

**Table 4**  
**Groundwater Quality**  
**Griffith Waste Disposal Site**

Parameter	Background (median) (2003 - 2009)	RUC <sup>1</sup>	ODWS <sup>2</sup>	MW06-11							5-year Trends (sparkline)
				31-Aug-16	19-Sep-17	13-Aug-18	20-Aug-19	19-Aug-20	18-Aug-21	18-Aug-22	
Alkalinity (as CaCO <sub>3</sub> )	175	338	30 - 500	84	111	91	103	102	113	117	
Ammonia, Total (as N)	0.1	N/L	N/L	0.08	0.01	0.01	0.03	0.04	0.06	0.04	
Boron	0.02	1.3	5	0.010	0.008	0.007	0.005	0.010	0.009	< 0.005	
Cadmium	0.00004	0.0013	0.005	0.00009	0.000099	0.000130	0.000148	< 0.000070	< 0.000070	< 0.000070	
Calcium	84	N/L	N/L	95.3	178	144	209	86.1	52.5	70.8	
Chloride	64	157	250	<b>582</b>	<b>806</b>	<b>1040</b>	<b>1450</b>	<b>863</b>	<b>598</b>	<b>736</b>	
Chemical Oxygen Demand	10	N/L	N/L	183	84	< 5	34	86	16	127	
Conductivity (µS/cm) <sup>3</sup>	452	N/L	N/L	1410	2174	2451	2617	1835	1700	1981	
Copper	0.003	0.5	1	0.003	< 0.002	0.002	< 0.002	< 0.002	0.0035	0.0016	
Dissolved Organic Carbon	2.1	3.6	5	0.4	0.7	0.5	1.1	1.4	0.6	< 0.2	
Hardness (as CaCO <sub>3</sub> )	244	372	500	295	<b>554</b>	<b>448</b>	<b>632</b>	258	157	213	
Iron	5.2	5.2	0.3	0.007	0.010	<b>0.302</b>	0.006	0.022	<b>0.352</b>	0.023	
Magnesium	8.6	N/L	N/L	13.7	26.5	21.3	26.6	10.4	6.35	8.64	
Manganese	0.11	0.11	0.05	<b>0.057</b>	0.031	<b>0.052</b>	0.006	0.015	<b>0.050</b>	0.010	
Nitrate (as N)	0.07	2.6	10	0.5	< 0.5	< 0.5	< 0.5	0.18	0.21	0.19	
Nitrite (as N)	0.06	0.3	1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	
pH (units) <sup>3</sup>	7.00	6.5 - 8.5	6.5 - 8.5	7.57	7.25	7.11	6.81	6.97	8.12	7.18	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	< 0.01	< 0.002	< 0.002	< 0.002	< 0.001	
Potassium	2.9	N/L	N/L	2.8	4.2	4.1	4.9	3.2	2.6	3.4	
Sodium	18.2	109	200	<b>288</b>	<b>439</b>	<b>501</b>	<b>593</b>	<b>469</b>	<b>401</b>	<b>442</b>	
Strontium	0.28	N/L	N/L	0.276	0.497	0.436	0.578	0.229	0.147	0.211	
Sulphate	18	259	500	21	25	22	33	25	17	21	
Total Dissolved Solids	354	427	500	<b>1130</b>	<b>1730</b>	<b>1887</b>	<b>2370</b>	<b>1600</b>	<b>1228</b>	<b>1434</b>	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	0.3	0.2	0.2	0.1	0.4	1.1	1.4	
Anion Sum (meq/L)	-	N/L	N/L	18.6	25.5	31.6	43.7	26.9	19.5	23.6	-
Cation Sum (meq/L)	-	N/L	N/L	18.5	30.3	30.9	38.5	25.6	20.7	23.6	-
Anion-Cation Balance (% difference)	-	N/L	N/L	0.257	8.60	1.24	6.25	2.47	2.96	0.00677	-

Notes:

1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.

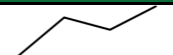


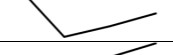
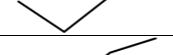


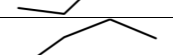
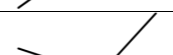

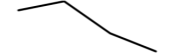
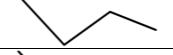
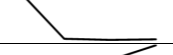

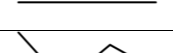
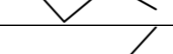
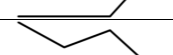
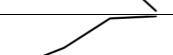
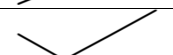
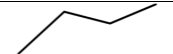

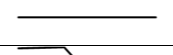


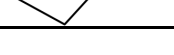


Bold and shaded values exceed the ODWS.

Bold and Italic values exceed RUC limits.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

**Table 4**  
**Groundwater Quality**  
**Griffith Waste Disposal Site**

Parameter	Background (median) (2003 - 2009)	RUC <sup>1</sup>	ODWS <sup>2</sup>	MW12-12				5-year Trends (sparkline)
				11-Sep-12	21-Aug-13	03-Sep-14	10-Aug-15	
Alkalinity (as CaCO <sub>3</sub> )	175	338	30 - 500	205	261	243	277	
Ammonia, Total (as N)	0.1	N/L	N/L	< 0.1	0.1	< 0.1	< 0.1	
Boron	0.02	1.3	5	0.0183	0.0121	0.0083	0.0157	
Cadmium	0.00004	0.0013	0.005	0.000071	0.000033	0.000041	0.000051	
Calcium	84	N/L	N/L	225	179	233	254	
Chloride	64	157	250	<b>540</b>	<b>510</b>	<b>710</b>	<b>790</b>	
Chemical Oxygen Demand	10	N/L	N/L	8	< 8	11	12	
Conductivity (µS/cm) <sup>3</sup>	452	N/L	N/L	1425	1347	1922	2005	
Copper	0.003	0.5	1	0.0019	0.0026	0.00298	0.00257	
Dissolved Organic Carbon	2.1	3.6	5	1.2	< 1	< 1	<b>4.1</b>	
Hardness (as CaCO <sub>3</sub> )	244	372	500	<b>729</b>	<b>573</b>	<b>735</b>	<b>773</b>	
Iron	5.2	5.2	0.3	0.209	0.254	0.092	< 0.007	
Magnesium	8.6	N/L	N/L	40.4	30.6	37.1	33.6	
Manganese	0.11	0.11	0.05	<b>0.286</b>	0.0254	0.0189	0.0206	
Nitrate (as N)	0.07	2.6	10	0.26	1.02	1.08	1.43	
Nitrite (as N)	0.06	0.3	1	< 0.06	< 0.03	< 0.03	< 0.03	
pH (units) <sup>3</sup>	7.00	6.5 - 8.5	6.5 - 8.5	7.68	<b>6.32</b>	7.34	6.66	
Phenols	0.002	N/L	N/L	< 0.002	< 0.002	< 0.002	0.007	
Potassium	2.9	N/L	N/L	6.76	5.16	6.23	3.57	
Sodium	18.2	109	200	96.3	<b>161</b>	<b>267</b>	<b>274</b>	
Strontium	0.28	N/L	N/L	0.665	0.533	0.659	0.789	
Sulphate	18	259	500	19	30	27	32	
Total Dissolved Solids	354	427	500	<b>1890</b>	<b>1490</b>	<b>1730</b>	<b>1940</b>	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	< 0.5	< 0.5	
Anion Sum (meq/L)	-	N/L	N/L	19.72	20.22	-	-	
Cation Sum (meq/L)	-	N/L	N/L	18.91	18.58	-	-	
Anion-Cation Balance (% difference)	-	N/L	N/L	-2.09	-4.22	-	-	

Notes:

1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.


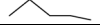
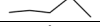
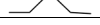

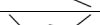

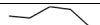

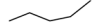
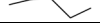
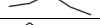
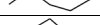

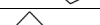
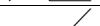


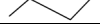


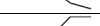
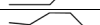

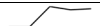

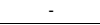

Bold and shaded values exceed the ODWS.

Bold and Italic values exceed RUC limits.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

**Table 5**  
**Surface Water Quality**  
**Griffith Waste Disposal Site**

Parameter	75th Percentile Background	PWQO <sup>1</sup>	STN-1 (Background)									5-year Trends (sparkline)
			24-May-16	31-Aug-16	04-May-17	19-Sep-17	13-Aug-18	20-Aug-19	19-Aug-20	18-Aug-21	18-Aug-22	
Alkalinity (as CaCO <sub>3</sub> )	176	25 % Decrease	108	182	60	156	175	160	163	176	176	
Ammonia, Total (as N)	0.1	N/L	< 0.01	< 0.01	< 0.01	0.02	0.03	0.07	0.03	0.03	0.02	
Ammonia, Un-ionized (as N) <sup>2</sup>	0.00047	0.02	0.00004	0.00007	0.00008	0.00013	0.00012	0.00016	0.00011	0.00047	0.00002	
Boron	0.0090	0.2	0.007	0.009	0.057	0.011	0.006	0.006	0.091	0.007	< 0.005	
Cadmium	0.000015	0.0002	0.00004	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	
Calcium	57.8	N/L	37.1	64.3	23.7	56.0	57.8	60.9	69.8	57.7	49.6	
Chemical Oxygen Demand	22	N/L	11	14	22	26	23	19	21	20	23	
Chloride	127	N/L	68.5	126	49.5	84	127	145	154	149	113	
Conductivity (µS/cm) <sup>3</sup>	752	N/L	450	752	315	613	745	732	813	792	664	
Conductivity (µS/cm) <sup>4</sup>	560	N/L	375	687	227	492	622	501	560	661	540	
Copper	0.00070	0.005	0.0026	0.0007	< 0.002	0.0006	0.0002	0.0004	0.0002	0.0003	0.0007	
Dissolved Oxygen <sup>4</sup>	9.21	5	14.63	<b>4.98</b>	12.88	<b>4.06</b>	<b>3.07</b>	<b>3.64</b>	<b>3.90</b>	<b>1.55</b>	<b>2.64</b>	
Hardness (as CaCO <sub>3</sub> )	186	N/L	121	207	76	185	186	194	221	184	163	
Iron	3.20	0.3	0.140	<b>3.20</b>	0.098	<b>2.55</b>	<b>3.37</b>	<b>7.55</b>	<b>3.10</b>	<b>1.42</b>	<b>4.84</b>	
Magnesium	10.2	N/L	6.83	11.2	4.17	10.9	10.2	10.2	11.3	9.66	9.39	
Manganese	0.69	N/L	0.028	0.923	0.018	0.673	0.720	0.755	0.691	0.385	0.556	
Nitrate (as N)	0.06	N/L	< 0.1	0.1	< 0.05	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	N/L	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.11	
pH (units) <sup>4</sup>	7.71	6.5 - 8.5	7.72	7.36	7.71	7.38	7.15	6.95	7.15	7.73	6.59	
Phenols	0.002	0.001	< 0.001	< 0.001	< 0.001	<b>0.002</b>	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	
Phosphorus, Total	0.04	0.03	< 0.01	<b>0.04</b>	0.02	<b>0.03</b>	<b>0.03</b>	<b>0.08</b>	<b>0.05</b>	0.02	<b>0.08</b>	
Potassium	1.11	N/L	1.0	1.5	0.6	0.8	0.8	0.7	1.1	1.1	1.3	
Sodium	76.1	200	44.1	76.1	35.8	63.7	78.4	73.3	82.4	87.0	67.4	
Strontium	0.17	N/L	0.110	0.193	0.072	0.202	0.171	0.171	0.193	0.162	0.151	
Sulphate	5.0	N/L	7	2	7	1	< 1	< 1	< 1	2	2	
Total Dissolved Solids	389	N/L	229	399	186	337	389	382	424	422	352	
Total Kjeldahl Nitrogen	0.5	N/L	0.08	1.0	0.3	0.3	0.3	0.4	0.3	0.3	0.6	
Zinc	0.015	0.02	< 0.005	< 0.005	< 0.005	<b>0.039</b>	< 0.005	< 0.005	0.018	0.015	0.016	
Cation Sum (meq/L)	-	N/L	4.37	7.68	3.10	5.51	7.37	7.52	8.22	7.58	6.50	-
Anion Sum (meq/L)	-	N/L	4.22	7.23	2.74	6.65	7.11	7.32	7.59	7.77	6.75	-
Anion-Cation Balance (% difference)	-	N/L	1.69	3.03	6.29	9.34	1.74	1.36	3.99	1.21	1.88	-

Notes:

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





























All results are expressed in mg/L unless otherwise stated.

Bold and shaded values exceed the PWQO.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

**Table 5**  
**Surface Water Quality**  
**Griffith Waste Disposal Site**

Parameter	75th Percentile Background	PWQO <sup>1</sup>	STN-4									5-year Trends (sparkline)
			24-May-16	31-Aug-16	04-May-17	19-Sep-17	13-Aug-18	20-Aug-19	19-Aug-20	18-Aug-21	18-Aug-22	
Alkalinity (as CaCO <sub>3</sub> )	176	25 % Decrease	116	185	71	161	178	166	165	179	182	
Ammonia, Total (as N)	0.1	N/L	< 0.01	0.07	< 0.01	0.01	0.01	0.05	< 0.01	0.02	< 0.01	
Ammonia, Un-ionized (as N) <sup>2</sup>	0.00047	0.02	0.00003	0.00101	0.00004	0.00011	0.00014	0.00011	0.00004	0.00073	0.00018	
Boron	0.0090	0.2	0.008	0.008	0.057	0.009	0.005	< 0.005	0.098	0.009	< 0.005	
Cadmium	0.000015	0.0002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	
Calcium	57.8	N/L	42.9	60.3	26.9	52.4	60.5	62.8	73.2	58.1	51.7	
Chemical Oxygen Demand	22	N/L	13	11	22	15	20	14	15	28	12	
Chloride	127	N/L	72.0	113	49.4	81.5	117	127	140	138	107	
Conductivity (µS/cm) <sup>3</sup>	752	N/L	488	699	333	612	729	700	788	758	652	
Conductivity (µS/cm) <sup>4</sup>	560	N/L	207	655	243	475	572	463	533	653	549	
Copper	0.00070	0.005	0.0005	0.0007	0.003	0.0007	0.0003	0.0004	0.0003	0.0007	0.0005	
Dissolved Oxygen <sup>4</sup>	9.21	5	15.38	9.89	13.39	7.89	8.91	12.45	8.43	5.44	8.68	
Hardness (as CaCO <sub>3</sub> )	186	N/L	140	193	86	171	194	199	231	185	168	
Iron	3.20	0.3	0.083	0.147	0.067	0.167	0.243	0.141	<b>0.351</b>	0.163	0.121	
Magnesium	10.2	N/L	7.98	10.30	4.54	9.75	10.3	10.3	11.8	9.57	9.35	
Manganese	0.69	N/L	0.021	0.068	0.014	0.126	0.254	0.101	0.248	0.099	0.048	
Nitrate (as N)	0.06	N/L	< 0.1	0.1	< 0.05	< 0.05	< 0.05	0.07	< 0.05	0.06	< 0.05	
Nitrite (as N)	0.05	N/L	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.12	
pH (units) <sup>4</sup>	7.71	6.5 - 8.5	7.24	7.72	7.38	7.64	7.69	6.99	7.23	8.12	7.82	
Phenols	0.002	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.002	<b>0.002</b>	< 0.001	< 0.001	
Phosphorus, Total	0.04	0.03	< 0.01	<b>0.03</b>	0.02	0.01	< 0.01	< 0.01	< 0.01	0.02	0.02	
Potassium	1.11	N/L	1.2	1.4	0.7	0.9	0.9	1.0	1.3	1.3	1.3	
Sodium	76.1	200	47.2	64.0	35.7	60.3	72.0	63.3	74.8	78.2	61.1	
Strontium	0.17	N/L	0.137	0.167	0.083	0.162	0.170	0.166	0.197	0.160	0.149	
Sulphate	5.0	N/L	7	4	7	2	2	4	3	3	3	
Total Dissolved Solids	389	N/L	248	383	197	337	380	364	403	409	351	
Total Kjeldahl Nitrogen	0.5	N/L	0.22	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3	
Zinc	0.015	0.02	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.018	0.014	< 0.005	
Cation Sum (meq/L)	-	N/L	4.89	6.69	3.29	5.55	7.05	6.77	7.94	7.13	6.05	-
Anion Sum (meq/L)	-	N/L	4.49	6.99	2.96	6.08	6.89	7.01	7.31	7.53	6.72	-
Anion-Cation Balance (% difference)	-	N/L	4.28	2.26	5.40	4.51	1.13	1.75	4.15	2.67	5.27	-

Notes:

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





























All results are expressed in mg/L unless otherwise stated.

Bold and shaded values exceed the PWQO.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

**Table 5**  
**Surface Water Quality**  
**Griffith Waste Disposal Site**

Parameter	75th Percentile Background	PWQO <sup>1</sup>	STN-5					5-year Trends (sparkline)
			25-May-15	10-Aug-15	24-May-16	04-May-17	18-Aug-21	
Alkalinity (as CaCO <sub>3</sub> )	176	25 % Decrease	113	197	163	112	238	
Ammonia, Total (as N)	0.1	N/L	< 0.1	< 0.1	< 0.01	< 0.01	0.09	
Ammonia, Un-ionized (as N) <sup>2</sup>	0.00047	0.02	0.00016	0.00021	0.00003	0.00002	0.00002	
Boron	0.0090	0.2	0.0055	0.0063	0.044	0.089	0.030	
Cadmium	0.000015	0.0002	< 0.000003	0.000005	< 0.00002	< 0.000014	< 0.000015	
Calcium	57.8	N/L	39.1	66.0	73.3	44.0	88.7	
Chemical Oxygen Demand	22	N/L	12	19	< 5	44	89	
Chloride	127	N/L	74	89	55.7	27.7	62.1	
Conductivity (µS/cm) <sup>3</sup>	752	N/L	-	-	551	352	648	
Conductivity (µS/cm) <sup>4</sup>	560	N/L	421	530	819	239	446	
Copper	0.00070	0.005	0.00075	0.00033	0.0004	< 0.002	0.0004	
Dissolved Oxygen <sup>4</sup>	9.21	5	10.93	8.20	8.62	9.80	<b>1.82</b>	
Hardness (as CaCO <sub>3</sub> )	186	N/L	126	208	222	134	265	
Iron	3.20	0.3	0.26	0.121	0.058	0.023	<b>0.310</b>	
Magnesium	10.2	N/L	6.8	10.5	9.35	5.90	10.5	
Manganese	0.69	N/L	0.045	0.186	0.034	0.003	0.211	
Nitrate (as N)	0.06	N/L	< 0.06	< 0.06	< 0.1	< 0.05	0.07	
Nitrite (as N)	0.05	N/L	< 0.03	< 0.03	< 0.1	< 0.05	< 0.05	
pH (units) <sup>4</sup>	7.71	6.5 - 8.5	6.92	6.99	7.18	7.04	8.20	
Phenols	0.002	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Phosphorus, Total	0.04	0.03	0.011	< 0.003	0.02	0.02	<b>0.07</b>	
Potassium	1.11	N/L	1.09	0.901	2.7	1.5	2.5	
Sodium	76.1	200	41.2	57.5	31.0	21.8	33.7	
Strontium	0.17	N/L	0.104	0.166	0.296	0.174	0.348	
Sulphate	5.0	N/L	6	< 1	14	13	< 1	
Total Dissolved Solids	389	N/L	254	383	284	199	328	
Total Kjeldahl Nitrogen	0.5	N/L	< 0.5	< 0.5	0.61	0.5	1.3	
Zinc	0.015	0.02	0.002	< 0.002	< 0.005	< 0.005	0.016	
Cation Sum (meq/L)	-	N/L	4.33	-	5.85	3.67	6.85	-
Anion Sum (meq/L)	-	N/L	4.47	-	5.12	3.28	6.52	-
Anion-Cation Balance (% difference)	-	N/L	-1.56	-	6.61	5.55	2.48	-

Notes:

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

All results are expressed in mg/L unless otherwise stated.

Bold and shaded values exceed the PWQO.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

Appendix G  
Groundwater Elevations 2023



## Groundwater Elevations 2023

### Griffith WDS

Monitor	Top of Pipe Elevation (Assumed Datum)	Ground Elevation (Assumed Datum)	Well of Bottom Depth (M)	Date	Water Depth From Top of Pipe (m)	Water elevation (Assumed Datum)
<b>91-1</b> Greenview measured Depth 4.45	104.73	103.70	4.49	Jul-23	2.33	102.40
<b>91-2</b> Greenview measured Depth 9.66	96.36	95.75	10.32	Jul-23	5.92	90.44
<b>91-4</b> Greenview measured Depth 6.08	94.63	92.18	5.98	Jul-23	3.81	90.82
<b>91-5</b> Greenview measured Depth 6.95	91.83	91.08	7.07	Jul-23	3.20	88.63
<b>91-6</b> Greenview measured Depth 4.15	92.46	91.70	4.16	Jul-23	1.67	90.79
<b>96-7S</b> Greenview measured Depth 2.38	91.78	90.75	2.31	Jul-23	DRY	DRY
<b>96-7D</b> Greenview measured Depth 6.89	91.35	90.75	6.87	Jul-23	1.86	89.49
<b>96-8</b> Greenview measured Depth 5.16	91.54	90.51	5.01	Jul-23	3.09	88.45
<b>96-9</b> Greenview measured Depth 5.86	90.41	89.67	6.65	Jul-23	2.54	87.87
<b>96-10S</b> Greenview measured Depth 2.24	89.43	88.50	2.27	Jul-23	1.25	88.18
<b>96-10D</b> Greenview measured Depth 6.66	89.43	88.50	6.72	Jul-23	1.28	88.15
<b>MW06-11</b> Greenview measured Depth 3.82	84.39	84.40	3.91	Jul-23	0.97	83.42
<b>MW12-12</b> Greenview measured Depth 6.86	105.40	104.54	7.57	Jul-23	2.76	102.64

- Note: 1. Well depths based on Jp2g measurements in 2023  
2. MW 95-3B was repaired by Greenview 2021 surveyed Nov 16, 2021  
3. Elevations based on SGS Lakefield updated by Greenview 2007 Survey  
4. Elevations are assumed from BM#2 (106.277m)  
5. MW 91-2 Extended and MW 12-12 place by Greenveiw in july 27, 2012 Surveyed Nov 2012

Appendix H  
Laboratory Certificates of Analysis 2023

**C.O.C.: G 110451**

**REPORT No: 23-018041 - Rev. 0**

**Report To:**

Jp2g Consultants Inc  
 1150 Morrison Dr.  
 Ottawa, ON K2H 8S9

**CADUCEON Environmental Laboratories**

2378 Holly Lane  
 Ottawa, ON K1V 7P1

**Attention: Nick Weston**

DATE RECEIVED: 2023-Jul-18  
 DATE REPORTED: 2023-Jul-26  
 SAMPLE MATRIX: Surface Water

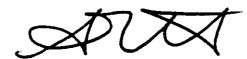
CUSTOMER PROJECT: Griffith 22-6213B  
 P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	3	OTTAWA	VKASYAN	2023-Jul-21	A-IC-01	SM 4110B
COD (Liquid)	3	KINGSTON	KWELCH	2023-Jul-21	COD-001	SM 5220D
Cond/pH/Alk Auto (Liquid)	3	OTTAWA	SBOUDREAU	2023-Jul-19	COND-02/PH-02/A LK-02	SM 2510B/4500H/ 2320B
Ion Balance (Calc.)	3	OTTAWA	STAILLON		CP-028	MECP E3196
ICP/MS Total (Liquid)	3	OTTAWA	TPRICE	2023-Jul-20	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	3	OTTAWA	NHOGAN	2023-Jul-25	D-ICP-01	SM 3120B
Ammonia (Liquid)	3	KINGSTON	KDIBBITS	2023-Jul-24	NH3-001	SM 4500NH3
Phenols (Liquid)	3	KINGSTON	JMACINNES	2023-Jul-21	PHEN-01	MECP E3179
TP & TKN (Liquid)	3	KINGSTON	KDIBBITS	2023-Jul-24	TPTKN-001	MECP E3516.2

R.L. = Reporting Limit

NC = Not Calculated

Test methods may be modified from specified reference method unless indicated by an \*

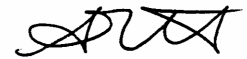


**Steve Garrett**  
**Director of Laboratory Services**

**CADUCEON Environmental Laboratories Certificate of Analysis**

Final Report  
REPORT No: 23-018041 - Rev. 0

Parameter	Client I.D.		SW5	SW4	SW1
	Sample I.D.		23-018041-1	23-018041-2	23-018041-3
	Date Collected		2023-07-17	2023-07-17	2023-07-17
	Units	R.L.	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	211	163	156
TDS (Calc. from Cond.)	mg/L	3	254	287	284
Chloride	mg/L	0.5	37.1	91.7	96.6
Nitrate (N)	mg/L	0.05	0.12	0.11	0.06
Nitrite (N)	mg/L	0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1	<1	3	2
Phosphorus (Total)	mg/L	0.01	0.05	0.03	0.04
Total Kjeldahl Nitrogen	mg/L	0.1	1.3	0.3	0.3
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05	<0.05	<0.05	<0.05
Phenolics	mg/L	0.001	<0.001	<0.001	<0.001
COD	mg/L	5	181	81	13
Hardness (as CaCO3)	mg/L	-	193	150	148
Boron (Total)	mg/L	0.005	0.031	0.007	0.005
Calcium (Total)	mg/L	0.02	64.7	47.1	46.2
Iron (Total)	mg/L	0.005	0.167	0.217	2.14
Magnesium (Total)	mg/L	0.02	7.55	7.90	7.81
Manganese (Total)	mg/L	0.001	0.207	0.083	0.248
Potassium (Total)	mg/L	0.1	1.5	0.7	0.5
Sodium (Total)	mg/L	0.2	25.2	54.4	55.1
Strontium (Total)	mg/L	0.001	0.263	0.138	0.136
Cadmium (Total)	mg/L	0.000015	<0.000015	<0.000015	<0.000015



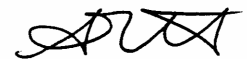
**Steve Garrett**  
**Director of Laboratory Services**

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

**CADUCEON Environmental Laboratories Certificate of Analysis**

Final Report  
REPORT No: 23-018041 - Rev. 0

Parameter	Units	R.L.	Client I.D.	SW5	SW4	SW1
			Sample I.D.	23-018041-1	23-018041-2	23-018041-3
			Date Collected	2023-07-17	2023-07-17	2023-07-17
				-	-	-
Copper (Total)	mg/L	0.0001		0.0009	0.0006	0.0006
Anion Sum	meq/L	-		5.29	5.91	5.89
Cation Sum	meq/L	-		5.01	5.40	5.49
% Difference	%	-		2.69	4.52	3.52
Ion Ratio	-	-		1.06	1.09	1.07
Sodium Adsorption Ratio	-	-		0.790	1.93	1.97
TDS (Ion Sum Calc)	mg/L	1		264	303	305
TDS(calc.)/EC(actual)	-	-		0.538	0.548	0.556
Conductivity Calc	µmho/cm	-		495	580	581
Conductivity Calc / Conductivity	-	-		1.01	1.05	1.06
Langelier Index(25°C)	-	-		-0.197	-0.0669	-0.355
Saturation pH (25°C)	-	-		7.30	7.56	7.59
pH (Client Data)	pH units	-		6.6	7.4	7.2
Temperature (Client Data)	°C	-		18.9	17.3	17.3



**Steve Garrett**  
**Director of Laboratory Services**

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**C.O.C.: G 110239**

**REPORT No: 23-018027 - Rev. 0**

**Report To:**

Jp2g Consultants Inc  
 1150 Morrison Dr.  
 Ottawa, ON K2H 8S9

**CADUCEON Environmental Laboratories**

2378 Holly Lane  
 Ottawa, ON K1V 7P1

**Attention: Nick Weston**

DATE RECEIVED: 2023-Jul-18  
 DATE REPORTED: 2023-Jul-31  
 SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: Griffith 22-6213B  
 P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	10	OTTAWA	PCURIEL	2023-Jul-28	A-IC-01	SM 4110B
COD (Liquid)	10	KINGSTON	KWELCH	2023-Jul-21	COD-001	SM 5220D
Cond/pH/Alk Auto (Liquid)	10	OTTAWA	SBOUDREAU	2023-Jul-19	COND-02/PH-02/A LK-02	SM 2510B/4500H/ 2320B
DOC/DIC (Liquid)	10	OTTAWA	VKASYAN	2023-Jul-19	C-OC-01	EPA 415.2
Ion Balance (Calc.)	10	OTTAWA	STAILLON		CP-028	MECP E3196
ICP/MS (Liquid)	10	OTTAWA	TPRICE	2023-Jul-24	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	10	OTTAWA	NHOGAN	2023-Jul-27	D-ICP-01	SM 3120B
Ammonia (Liquid)	10	KINGSTON	KDIBBITS	2023-Jul-24	NH3-001	SM 4500NH3
Phenols (Liquid)	10	KINGSTON	JMACINNES	2023-Jul-21	PHEN-01	MECP E3179
TP & TKN (Liquid)	10	KINGSTON	KDIBBITS	2023-Jul-24	TPTKN-001	MECP E3516.2

R.L. = Reporting Limit

NC = Not Calculated

Test methods may be modified from specified reference method unless indicated by an \*



**Michelle Dubien**  
**Laboratory Manager**

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Final Report

REPORT No: 23-018027 - Rev. 0

Parameter	Units	R.L.	Client I.D.	96-9	96-7D	96-10S	96-10D	91-5
			Sample I.D.	23-018027-1	23-018027-2	23-018027-3	23-018027-4	23-018027-5
			Date Collected	2023-07-17	2023-07-17	2023-07-17	2023-07-17	2023-07-17
				-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	213	235	447	634	508	
TDS (Calc. from Cond.)	mg/L	3	350	365	552	748	597	
Chloride	mg/L	0.5	74.4	78.3	43.5	29.3	21.8	
Nitrate (N)	mg/L	0.05	<0.05	<0.05	0.12	0.27	<0.05	
Nitrite (N)	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Sulphate	mg/L	1	24	11	58	103	71	
Total Kjeldahl Nitrogen	mg/L	0.1	0.3	0.3	3.9	1.6	4.4	
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05	0.05	<0.05	0.70	1.30	3.69	
Dissolved Organic Carbon	mg/L	0.2	2.2	4.9	3.8	5.7	6.7	
Phenolics	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
COD	mg/L	5	12	21	579	48	112	
Hardness (as CaCO3)	mg/L	0.02	279	307	467	686	513	
Boron	mg/L	0.005	0.043	0.049	0.313	0.855	0.679	
Calcium	mg/L	0.02	94.2	111	149	223	170	
Iron	mg/L	0.005	0.201	0.302	1.45	2.19	3.82	
Magnesium	mg/L	0.02	10.7	7.22	22.9	31.2	21.5	
Manganese	mg/L	0.001	0.212	0.101	4.16	8.74	6.55	
Potassium	mg/L	0.1	1.7	3.5	14.8	19.5	25.5	
Sodium	mg/L	0.2	16.7	14.4	29.0	41.2	23.9	
Strontium	mg/L	0.001	0.669	1.26	0.509	0.842	1.37	
Cadmium	mg/L	0.000015	<0.000015	<0.000015	0.000153	0.000098	0.000052	



**Michelle Dubien**  
Laboratory Manager

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REPORT No: 23-018027 - Rev. 0

Parameter	Units	R.L.	Client I.D.	96-9	96-7D	96-10S	96-10D	91-5
			Sample I.D.	23-018027-1	23-018027-2	23-018027-3	23-018027-4	23-018027-5
			Date Collected	2023-07-17	2023-07-17	2023-07-17	2023-07-17	2023-07-17
				-	-	-	-	-
Copper	mg/L	0.0001		0.0023	0.0028	0.0050	0.0051	0.0038
Anion Sum	meq/L	-		6.86	7.14	11.4	15.7	12.3
Cation Sum	meq/L	-		6.39	6.90	11.2	16.5	12.6
% Difference	%	-		3.56	1.72	0.554	2.71	1.27
Ion Ratio	-	-		1.07	1.04	1.01	0.947	0.975
Sodium Adsorption Ratio	-	-		0.435	0.358	0.584	0.685	0.459
TDS (Ion Sum Calc)	mg/L	1		350	367	592	842	652
TDS(calc.)/EC(actual)	-	-		0.521	0.523	0.574	0.611	0.587
Conductivity Calc	µmho/cm	-		659	695	1000	1340	1070
Conductivity Calc / Conductivity	-	-		0.979	0.989	0.973	0.975	0.962
Langelier Index(25°C)	-	-		0.459	0.554	0.691	1.09	0.874
Saturation pH (25°C)	-	-		7.15	7.04	6.65	6.34	6.54
pH (Client Data)	pH units	-		7.2	7.2	6.9	6.7	7.1
Temperature (Client Data)	°C	-		10.0	10.6	13.1	8.3	10.3



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Laboratory Manager

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REPORT No: 23-018027 - Rev. 0

Parameter	Units	R.L.	Client I.D.	91-4	91-2	91-1	MW06-11	Dup#1
			Sample I.D.	23-018027-6	23-018027-7	23-018027-8	23-018027-9	23-018027-10
			Date Collected	2023-07-17	2023-07-17	2023-07-17	2023-07-17	2023-07-17
				-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	577	647	213	103	103	
TDS (Calc. from Cond.)	mg/L	3	695	790	517	1630	1620	
Chloride	mg/L	0.5	33.2	59.3	167	829	821	
Nitrate (N)	mg/L	0.05	1.30	0.13	0.16	<0.40	<0.40	
Nitrite (N)	mg/L	0.05	<0.05	<0.05	<0.05	<0.40	<0.40	
Sulphate	mg/L	1	75	68	28	14	14	
Total Kjeldahl Nitrogen	mg/L	0.1	3.7	5.2	3.3	0.3	0.2	
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05	3.82	5.48	<0.05	<0.05	<0.05	
Dissolved Organic Carbon	mg/L	0.2	4.9	3.2	1.4	<0.2	<0.2	
Phenolics	mg/L	0.001	<0.001	<0.001	0.022	<0.001	<0.001	
COD	mg/L	5	54	59	91	98	91	
Hardness (as CaCO3)	mg/L	0.02	569	563	204	249	252	
Boron	mg/L	0.005	0.459	0.603	0.047	0.012	0.009	
Calcium	mg/L	0.02	187	179	71.3	82.8	84.3	
Iron	mg/L	0.005	0.026	1.37	4.88	<0.005	<0.005	
Magnesium	mg/L	0.02	24.6	28.1	6.37	10.1	10.1	
Manganese	mg/L	0.001	21.0	17.6	0.058	0.004	0.006	
Potassium	mg/L	0.1	36.4	47.5	3.2	3.0	3.1	
Sodium	mg/L	0.2	43.2	61.5	149	461	460	
Strontium	mg/L	0.001	0.596	0.617	0.263	0.263	0.263	
Cadmium	mg/L	0.000015	0.000490	0.000358	<0.000015	0.000045	0.000060	



**Michelle Dubien**  
Laboratory Manager

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Final Report  
REPORT No: 23-018027 - Rev. 0

Parameter	Units	R.L.	Client I.D.	91-4	91-2	91-1	MW06-11	Dup#1
			Sample I.D.	23-018027-6	23-018027-7	23-018027-8	23-018027-9	23-018027-10
			Date Collected	2023-07-17	2023-07-17	2023-07-17	2023-07-17	2023-07-17
				-	-	-	-	-
Copper	mg/L	0.0001		0.0236	0.0196	0.0004	0.0010	0.0010
Anion Sum	meq/L	-		14.1	16.0	9.57	25.8	25.5
Cation Sum	meq/L	-		15.1	16.1	10.9	25.1	25.1
% Difference	%	-		3.37	0.157	6.56	1.30 (10)	0.787 (10)
Ion Ratio	-	-		0.935	0.997	0.877	1.03	1.02
Sodium Adsorption Ratio	-	-		0.788	1.13	4.54	12.7	12.6
TDS (Ion Sum Calc)	mg/L	1		775	855	559	1460	1450
TDS(calc.)/EC(actual)	-	-		0.603	0.589	0.576	0.499	0.500
Conductivity Calc	µmho/cm	-		1230	1360	1020	2730	2710
Conductivity Calc / Conductivity	-	-		0.961	0.938	1.05	0.930	0.932
Langelier Index(25°C)	-	-		0.830	0.871	0.0780	-0.722	-0.704
Saturation pH (25°C)	-	-		6.45	6.43	7.29	7.58	7.57
pH (Client Data)	pH units	-		6.7	6.4	7.2	7.1	
Temperature (Client Data)	°C	-		10.5	12.4	12.7	10.9	

**Comments:**

10. % Difference outside 15% acceptance criteria



**Michelle Dubien**  
**Laboratory Manager**

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# Appendix I

## Chemistry Analysais 2023

**Groundwater Quality**  
**Project Name: Griffith**

Monitor Number->	ODWS	91-1						
		Jul-23						
<b>Parameters mg/L</b>								
Alkalinity(CaCO3) to pH4.5	30-500	213						
pH @25°C	6.5 - 8.5							
Conductivity @25°C								
TDS (Calc. from Cond.)	500	517						
Chloride	250	167						
Nitrate (N)	10	0.16						
Nitrite (N)	1	<0.05						
Sulphate	500	28						
Phosphorus (Total)								
Total Kjeldahl Nitrogen		3.3						
Ammonia (N)-Total (NH3+NH4)		<0.05						
Dissolved Organic Carbon	5	1.4						
Phenolics		0.022						
COD		91						
Hardness (as CaCO3)	500	204						
Aluminum	0.1							
Barium	1							
Boron	5	0.047						
Calcium		71.3						
Iron	0.3	4.88						
Magnesium		6.37						
Manganese	0.05	0.058						
Potassium		3.2						
Silicon								
Sodium	200	149						
Strontium		0.263						
Zinc	5							
Arsenic	0.01							
Cadmium	0.005	<0.000015						
Chromium	0.050							
Cobalt								
Copper	1	0.0004						
Lead	0.010							
Mercury	0.001							
Anion Sum		9.57						
Cation Sum		10.9						
% Difference		6.56						
Ion Ratio		0.877						
Sodium Adsorption Ratio		4.54						
TDS (Ion Sum Calc)		559						
TDS(calc.)/EC(actual)		0.576						
Conductivity Calc		1020						
Conductivity Calc / Conductivity		1.05						
Langelier Index(25°C)		0.078						
Saturation pH (25°C)		7.29						
<b>Field Measured</b>								
Water Temp. (°C)		12.7						
Conductivity (microS/cm)		1000						
pH (pH units)		7.2						

## Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

NS = No Sample

**Groundwater Quality**  
**Project Name: Griffith**

Monitor Number->	ODWS	91-2							
		Jul-23							
<b>Parameters mg/L</b>									
Alkalinity(CaCO3) to pH4.5	30-500	647							
pH @25°C	6.5 - 8.5								
Conductivity @25°C									
TDS (Calc. from Cond.)	500	790							
Chloride	250	59.3							
Nitrate (N)	10	0.13							
Nitrite (N)	1	<0.05							
Sulphate	500	68							
Phosphorus (Total)									
Total Kjeldahl Nitrogen		5.2							
Ammonia (N)-Total (NH3+NH4)		5.48							
Dissolved Organic Carbon	5	3.2							
Phenolics		<0.001							
COD		59							
Hardness (as CaCO3)	500	563							
Aluminum	0.1								
Barium	1								
Boron	5	0.603							
Calcium		179							
Iron	0.3	1.37							
Magnesium		28.1							
Manganese	0.05	17.6							
Potassium		47.5							
Silicon									
Sodium	200	61.5							
Strontium		0.617							
Zinc	5								
Arsenic	0.01								
Cadmium	0.005	0.000358							
Chromium	0.050								
Cobalt									
Copper	1	0.0196							
Lead	0.010								
Mercury	0.001								
Anion Sum		16							
Cation Sum		16.1							
% Difference		0.157							
Ion Ratio		1.00							
Sodium Adsorption Ratio		1.13							
TDS (Ion Sum Calc)		855							
TDS(calc.)/EC(actual)		0.589							
Conductivity Calc		1360							
Conductivity Calc / Conductivity		0.938							
Langelier Index(25°C)		0.871							
Saturation pH (25°C)		6.43							
<b>Field Measured</b>									
Water Temp. (°C)		12.4							
Conductivity (microS/cm)		1480							
pH (pH units)		6.4							

## Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

NS = No Sample

**Groundwater Quality**  
**Project Name: Griffith**

Monitor Number->	ODWS	91-4							
		Jul-23							
<u>Parameters mg/L</u>									
Alkalinity(CaCO3) to pH4.5	30-500	577							
pH @25°C	6.5 - 8.5								
Conductivity @25°C									
TDS (Calc. from Cond.)	500	695							
Chloride	250	33.2							
Nitrate (N)	10	1.3							
Nitrite (N)	1	<0.05							
Sulphate	500	75							
Phosphorus (Total)									
Total Kjeldahl Nitrogen		3.7							
Ammonia (N)-Total (NH3+NH4)		3.82							
Dissolved Organic Carbon	5	4.9							
Phenolics		<0.001							
COD		54							
Hardness (as CaCO3)	500	569							
Aluminum	0.1								
Barium	1								
Boron	5	0.459							
Calcium		187							
Iron	0.3	0.026							
Magnesium		24.6							
Manganese	0.05	21							
Potassium		36.4							
Silicon									
Sodium	200	43.2							
Strontium		0.60							
Zinc	5								
Arsenic	0.01								
Cadmium	0.005	0.00049							
Chromium	0.050								
Cobalt									
Copper	1	0.0236							
Lead	0.010								
Mercury	0.001								
Anion Sum		14.1							
Cation Sum		15.1							
% Difference		3.37							
Ion Ratio		0.935							
Sodium Adsorption Ratio		0.788							
TDS (Ion Sum Calc)		775							
TDS(calc.)/EC(actual)		0.603							
Conductivity Calc		1230							
Conductivity Calc / Conductivity		0.961							
Langelier Index(25°C)		0.83							
Saturation pH (25°C)		6.45							
<u>Field Measured</u>									
Water Temp. (°C)		10.5							
Conductivity (microS/cm)		1340							
pH (pH units)		6.7							

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

NS = No Sample

**Groundwater Quality**  
**Project Name: Griffith**

Monitor Number->	ODWS	91-5							
		Jul-23							
<b>Parameters mg/L</b>									
Alkalinity(CaCO3) to pH4.5	30-500	508							
pH @25°C	6.5 - 8.5								
Conductivity @25°C									
TDS (Calc. from Cond.)	500	597							
Chloride	250	21.8							
Nitrate (N)	10	<0.05							
Nitrite (N)	1	<0.05							
Sulphate	500	71							
Phosphorus (Total)									
Total Kjeldahl Nitrogen		4.4							
Ammonia (N)-Total (NH3+NH4)		3.69							
Dissolved Organic Carbon	5	6.7							
Phenolics		<0.001							
COD		112							
Hardness (as CaCO3)	500	513							
Aluminum	0.1								
Barium	1								
Boron	5	0.679							
Calcium		170							
Iron	0.3	3.82							
Magnesium		21.5							
Manganese	0.05	6.55							
Potassium		25.5							
Silicon									
Sodium	200	23.9							
Strontium		1.37							
Zinc	5								
Arsenic	0.01								
Cadmium	0.005	0.000052							
Chromium	0.050								
Cobalt									
Copper	1	0.0038							
Lead	0.010								
Mercury	0.001								
Anion Sum		12.3							
Cation Sum		12.6							
% Difference		1.27							
Ion Ratio		0.975							
Sodium Adsorption Ratio		0.459							
TDS (Ion Sum Calc)		652							
TDS(calc.)/EC(actual)		0.587							
Conductivity Calc		1070							
Conductivity Calc / Conductivity		0.962							
Langelier Index(25°C)		0.874							
Saturation pH (25°C)		6.54							
<b>Field Measured</b>									
Water Temp. (°C)		10.3							
Conductivity (microS/cm)		1210							
pH (pH units)		7.1							

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

NS = No Sample

**Groundwater Quality**  
**Project Name: Griffith**

Monitor Number->	ODWS	96-75							
		Jul-23							
<b>Parameters mg/L</b>									
Alkalinity(CaCO3) to pH4.5	30-500	NS							
pH @25°C	6.5 - 8.5								
Conductivity @25°C									
TDS (Calc. from Cond.)	500								
Chloride	250								
Nitrate (N)	10								
Nitrite (N)	1								
Sulphate	500								
Phosphorus (Total)									
Total Kjeldahl Nitrogen									
Ammonia (N)-Total (NH3+NH4)									
Dissolved Organic Carbon	5								
Phenolics									
COD									
Hardness (as CaCO3)	500								
Aluminum	0.1								
Barium	1								
Boron	5								
Calcium									
Iron	0.3								
Magnesium									
Manganese	0.05								
Potassium									
Silicon									
Sodium	200								
Strontium									
Zinc	5								
Arsenic	0.01								
Cadmium	0.005								
Chromium	0.050								
Cobalt									
Copper	1								
Lead	0.010								
Mercury	0.001								
Anion Sum									
Cation Sum									
% Difference									
Ion Ratio									
Sodium Adsorption Ratio									
TDS (Ion Sum Calc)									
TDS(calc.)/EC(actual)									
Conductivity Calc									
Conductivity Calc / Conductivity									
Langelier Index(25°C)									
Saturation pH (25°C)									
<b>Field Measured</b>									
Water Temp. (°C)									
Conductivity (microS/cm)									
pH (pH units)									

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

NS = No Sample



**Groundwater Quality**  
**Project Name: Griffith**

Monitor Number->	ODWS	96-7D							
		Jul-23							
<u>Parameters mg/L</u>									
Alkalinity(CaCO3) to pH4.5	30-500	235							
pH @25°C	6.5 - 8.5								
Conductivity @25°C									
TDS (Calc. from Cond.)	500	365							
Chloride	250	78.3							
Nitrate (N)	10	<0.05							
Nitrite (N)	1	<0.05							
Sulphate	500	11							
Phosphorus (Total)									
Total Kjeldahl Nitrogen		0.3							
Ammonia (N)-Total (NH3+NH4)		<0.05							
Dissolved Organic Carbon	5	4.9							
Phenolics		<0.001							
COD		21							
Hardness (as CaCO3)	500	307							
Aluminum	0.1								
Barium	1								
Boron	5	0.049							
Calcium		111							
Iron	0.3	0.302							
Magnesium		7.22							
Manganese	0.05	0.101							
Potassium		3.5							
Silicon									
Sodium	200	14.4							
Strontium		1.26							
Zinc	5								
Arsenic	0.01								
Cadmium	0.005	<0.000015							
Chromium	0.050								
Cobalt									
Copper	1	0.0028							
Lead	0.010								
Mercury	0.001								
Anion Sum		7.14							
Cation Sum		6.9							
% Difference		1.72							
Ion Ratio		1.04							
Sodium Adsorption Ratio		0.358							
TDS (Ion Sum Calc)		367							
TDS(calc.)/EC(actual)		0.523							
Conductivity Calc		695							
Conductivity Calc / Conductivity		0.989							
Langelier Index(25°C)		0.554							
Saturation pH (25°C)		7.04							
<u>Field Measured</u>									
Water Temp. (°C)		10.6							
Conductivity (microS/cm)		780							
pH (pH units)		7.2							

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

NS = No Sample

**Groundwater Quality**  
**Project Name: Griffith**

Monitor Number->	ODWS	96-9							
		Jul-23							
<u>Parameters mg/L</u>									
Alkalinity(CaCO3) to pH4.5	30-500	213							
pH @25°C	6.5 - 8.5								
Conductivity @25°C									
TDS (Calc. from Cond.)	500	350							
Chloride	250	74.4							
Nitrate (N)	10	<0.05							
Nitrite (N)	1	<0.05							
Sulphate	500	24							
Phosphorus (Total)									
Total Kjeldahl Nitrogen		0.3							
Ammonia (N)-Total (NH3+NH4)		0.05							
Dissolved Organic Carbon	5	2.2							
Phenolics		<0.001							
COD		12							
Hardness (as CaCO3)	500	279							
Aluminum	0.1								
Barium	1								
Boron	5	0.043							
Calcium		94.2							
Iron	0.3	0.201							
Magnesium		10.7							
Manganese	0.05	0.212							
Potassium		1.7							
Silicon									
Sodium	200	16.7							
Strontium		0.669							
Zinc	5								
Arsenic	0.01								
Cadmium	0.005	<0.000015							
Chromium	0.050								
Cobalt									
Copper	1	0.0023							
Lead	0.010								
Mercury	0.001								
Anion Sum		6.86							
Cation Sum		6.39							
% Difference		3.56							
Ion Ratio		1.07							
Sodium Adsorption Ratio		0.435							
TDS (Ion Sum Calc)		350							
TDS(calc.)/EC(actual)		0.521							
Conductivity Calc		659							
Conductivity Calc / Conductivity		0.979							
Langelier Index(25°C)		0.459							
Saturation pH (25°C)		7.15							
<u>Field Measured</u>									
Water Temp. (°C)		10							
Conductivity (microS/cm)		730							
pH (pH units)		7.2							

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

NS = No Sample

**Groundwater Quality**  
**Project Name: Griffith**

Monitor Number->	ODWS	96-10S							
		Jul-23							
<b>Parameters mg/L</b>									
Alkalinity(CaCO3) to pH4.5	30-500	447							
pH @25°C	6.5 - 8.5								
Conductivity @25°C									
TDS (Calc. from Cond.)	500	552							
Chloride	250	43.5							
Nitrate (N)	10	0.12							
Nitrite (N)	1	<0.05							
Sulphate	500	58							
Phosphorus (Total)									
Total Kjeldahl Nitrogen		3.9							
Ammonia (N)-Total (NH3+NH4)		0.7							
Dissolved Organic Carbon	5	3.8							
Phenolics		<0.001							
COD		579							
Hardness (as CaCO3)	500	467							
Aluminum	0.1								
Barium	1								
Boron	5	0.313							
Calcium		149							
Iron	0.3	1.45							
Magnesium		22.9							
Manganese	0.05	4.16							
Potassium		14.8							
Silicon									
Sodium	200	29							
Strontium		0.509							
Zinc	5								
Arsenic	0.01								
Cadmium	0.005	0.000153							
Chromium	0.050								
Cobalt									
Copper	1	0.005							
Lead	0.010								
Mercury	0.001								
Anion Sum		11.4							
Cation Sum		11.2							
% Difference		0.554							
Ion Ratio		1.01							
Sodium Adsorption Ratio		0.584							
TDS (Ion Sum Calc)		592							
TDS(calc.)/EC(actual)		0.574							
Conductivity Calc		1000							
Conductivity Calc / Conductivity		0.973							
Langelier Index(25°C)		0.691							
Saturation pH (25°C)		6.65							
<b>Field Measured</b>									
Water Temp. (°C)		13.1							
Conductivity (microS/cm)		1090							
pH (pH units)		6.9							

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

NS = No Sample

**Groundwater Quality**  
**Project Name: Griffith**

Monitor Number->	ODWS	96-10D							
		Jul-23							
<b>Parameters mg/L</b>									
Alkalinity(CaCO3) to pH4.5	30-500	634							
pH @25°C	6.5 - 8.5								
Conductivity @25°C									
TDS (Calc. from Cond.)	500	748							
Chloride	250	29.3							
Nitrate (N)	10	0.27							
Nitrite (N)	1	<0.05							
Sulphate	500	103							
Phosphorus (Total)									
Total Kjeldahl Nitrogen		1.6							
Ammonia (N)-Total (NH3+NH4)		1.3							
Dissolved Organic Carbon	5	5.7							
Phenolics		<0.001							
COD		48							
Hardness (as CaCO3)	500	686							
Aluminum	0.1								
Barium	1								
Boron	5	0.855							
Calcium		223							
Iron	0.3	2.19							
Magnesium		31.2							
Manganese	0.05	8.74							
Potassium		19.5							
Silicon									
Sodium	200	41.2							
Strontium		0.842							
Zinc	5								
Arsenic	0.01								
Cadmium	0.005	0.000098							
Chromium	0.050								
Cobalt									
Copper	1	0.0051							
Lead	0.010								
Mercury	0.001								
Anion Sum		15.7							
Cation Sum		16.5							
% Difference		2.71							
Ion Ratio		0.947							
Sodium Adsorption Ratio		0.685							
TDS (Ion Sum Calc)		842							
TDS(calc.)/EC(actual)		0.611							
Conductivity Calc		1340							
Conductivity Calc / Conductivity		0.975							
Langelier Index(25°C)		1.09							
Saturation pH (25°C)		6.34							
<b>Field Measured</b>									
Water Temp. (°C)		8.3							
Conductivity (microS/cm)		1470							
pH (pH units)		6.7							

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

NS = No Sample

**Groundwater Quality**  
**Project Name: Griffith**

Monitor Number->	ODWS	MW06-11							
		Jul-23	Jul-23						
<b>Parameters mg/L</b>			<b>Dup #1</b>						
Alkalinity(CaCO3) to pH4.5	30-500	103	103						
pH @25°C	6.5 - 8.5								
Conductivity @25°C									
TDS (Calc. from Cond.)	500	1630	1620						
Chloride	250	829	821						
Nitrate (N)	10	<0.40	<0.40						
Nitrite (N)	1	<0.40	<0.40						
Sulphate	500	14	14						
Phosphorus (Total)									
Total Kjeldahl Nitrogen		0.3	0.2						
Ammonia (N)-Total (NH3+NH4)		<0.05	<0.05						
Dissolved Organic Carbon	5	<0.2	<0.2						
Phenolics		<0.001	<0.001						
COD		98	91						
Hardness (as CaCO3)	500	249	252						
Aluminum	0.1								
Barium	1								
Boron	5	0.012	0.009						
Calcium		82.8	84.3						
Iron	0.3	<0.005	<0.005						
Magnesium		10.1	10.1						
Manganese	0.05	0.004	0.006						
Potassium		3	3.1						
Silicon									
Sodium	200	461	460						
Strontium		0.263	0.263						
Zinc	5								
Arsenic	0.01								
Cadmium	0.005	0.000045	0.00006						
Chromium	0.050								
Cobalt									
Copper	1	0.001	0.001						
Lead	0.010								
Mercury	0.001								
Anion Sum		25.8	25.5						
Cation Sum		25.1	25.1						
% Difference		1.3	0.787						
Ion Ratio		1.03	1.02						
Sodium Adsorption Ratio		12.7	12.6						
TDS (Ion Sum Calc)		1460	1450						
TDS(calc.)/EC(actual)		0.499	0.5						
Conductivity Calc		2730	2710						
Conductivity Calc / Conductivity		0.93	0.932						
Langelier Index(25°C)		-0.722	-0.704						
Saturation pH (25°C)		7.58	7.57						
<b>Field Measured</b>									
Water Temp. (°C)		10.9							
Conductivity (microS/cm)		2980							
pH (pH units)		7.1							

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

NS = No Sample

**Surface Water Quality**  
**Project Name: Griffith**

Monitor Number ->

SW 1

Parameters	Limit	PWQO	CWQG	Jul-23				
Alkalinity(CaCO3) to pH4.5	IPWQO	a		156				
pH @25°C								
Conductivity @25°C								
TDS (Calc. from Cond.)				284				
Chloride			120	96.6				
Nitrate (N)			13	0.06				
Nitrite (N)			0.6	<0.05				
Sulphate				2				
BOD5								
Total Suspended Solids								
Phosphorus (Total)	IPWQO	0.02	0.02	0.04				
Total Kjeldahl Nitrogen				0.3				
Ammonia (N)-Total (NH3+NH4)				<0.05				
Dissolved Organic Carbon								
Phenolics		0.001	0.004	<0.001				
COD				13				
Hardness (as CaCO3)				148				
Barium (Total)								
Boron (Total)	IPWQO	0.2	1.5	0.005				
Calcium (Total)				46.2				
Iron (Total)	PWQO	0.3	0.3	2.14				
Magnesium (Total)				7.81				
Manganese (Total)				0.248				
Potassium (Total)				0.5				
Sodium (Total)				55.1				
Strontium (Total)				0.136				
Zinc (Total)	PWQO IPWQO	0.03 0.02	0.007					
Arsenic (Total)		0.005	0.005					
Cadmium (Total)	PWQO	0.00020	0.00009	<0.000015				
Chromium (Total)	PWQO	0.001	0.001					
Copper (Total)	PWQO IPWQO	0.005 d	Max 0.004 min 0.002 (based on hardness)	0.0006				
Lead (Total)	PWQO	0.005	0.001					
Mercury	PWQO	0.0002	0.000026					
Anion Sum				5.89				
Cation Sum				5.49				
% Difference				3.52				
Ion Ratio				1.07				
Sodium Adsorption Ratio				1.97				
TDS (Ion Sum Calc)				305				
TDS(calc.)/EC(actual)				0.556				
Conductivity Calc				581				
Conductivity Calc / Conductivity				1.06				
Langelier Index(25°C)				-0.355				
Saturation pH (25°C)				7.59				
<b>Field Measured</b>								
Water Temp. (°C)				17.3				
Conductivity (microS/cm)				620				
pH (pH units)		6.5 - 8.5	6.5 - 9	7.2				
DO				3.6				
FLOW L/S				33.4				

Notes:

All values reported in mg/L unless otherwise noted

PWQO- Provincial Water Quality Objectives

CWQG - Canadian Water Quality Guidelines

NS - No Sample Taken

**Surface Water Quality**  
**Project Name: Griffith**

Monitor Number ->

SW 4

Parameters	Limit	PWQO	Jul-23				
Alkalinity(CaCO3) to pH4.5	IPWQO	a	163				
pH @25°C							
Conductivity @25°C							
TDS (Calc. from Cond.)			287				
Chloride			91.7				
Nitrate (N)			0.11				
Nitrite (N)			<0.05				
Sulphate			3				
BOD5							
Total Suspended Solids							
Phosphorus (Total)	IPWQO	0.02	0.03				
Total Kjeldahl Nitrogen			0.3				
Ammonia (N)-Total (NH3+NH4)			<0.05				
Dissolved Organic Carbon							
Phenolics		0.001	<0.001				
COD			81				
Hardness (as CaCO3)			150				
Barium (Total)							
Boron (Total)	IPWQO	0.2	0.007				
Calcium (Total)			47.1				
Iron (Total)	PWQO	0.3	0.217				
Magnesium (Total)			7.9				
Manganese (Total)			0.083				
Potassium (Total)			0.7				
Sodium (Total)			54.4				
Strontium (Total)			0.138				
Zinc (Total)	PWQO IPWQO	0.03 0.02					
Arsenic (Total)		0.005					
Cadmium (Total)	PWQO	0.00020	<0.000015				
Chromium (Total)	PWQO	0.001					
Copper (Total)	PWQO IPWQO	0.005 d	0.0006				
Lead (Total)	PWQO	0.005					
Mercury	PWQO	0.0002					
Anion Sum			5.91				
Cation Sum			5.4				
% Difference			4.52				
Ion Ratio			1.09				
Sodium Adsorption Ratio			1.93				
TDS (Ion Sum Calc)			303				
TDS(calc.)/EC(actual)			0.548				
Conductivity Calc			580				
Conductivity Calc / Conductivity			1.05				
Langelier Index(25°C)			-0.0669				
Saturation pH (25°C)			7.56				
<b>Field Measured</b>							
Water Temp. (°C)			17.3				
Conductivity (microS/cm)			630				
pH (pH units)		6.5 - 8.5	7.4				
DO			6.6				
FLOW L/S			9.68				

Notes:

All values reported in mg/L unless otherwise noted

PWQO- Provincial Water Quality Objectives

CWQG - Canadian Water Quality Guidelines

NS - No Sample Taken

**Surface Water Quality**  
**Project Name: Griffith**

Monitor Number ->

SW 5

Parameters	Limit	PWQO	Jul-23				
Alkalinity(CaCO3) to pH4.5	IPWQO	a	211				
pH @25°C							
Conductivity @25°C							
TDS (Calc. from Cond.)			254				
Chloride			37.1				
Nitrate (N)			0.12				
Nitrite (N)			<0.05				
Sulphate			<1				
BOD5							
Total Suspended Solids							
Phosphorus (Total)	IPWQO	0.02	0.05				
Total Kjeldahl Nitrogen			1.3				
Ammonia (N)-Total (NH3+NH4)			<0.05				
Dissolved Organic Carbon							
Phenolics		0.001	<0.001				
COD			181				
Hardness (as CaCO3)			193				
Barium (Total)							
Boron (Total)	IPWQO	0.2	0.031				
Calcium (Total)			64.7				
Iron (Total)	PWQO	0.3	0.167				
Magnesium (Total)			7.55				
Manganese (Total)			0.207				
Potassium (Total)			1.5				
Sodium (Total)			25.2				
Strontium (Total)			0.263				
Zinc (Total)	PWQO IPWQO	0.03 0.02					
Arsenic (Total)		0.005					
Cadmium (Total)	PWQO	0.00020	<0.000015				
Chromium (Total)	PWQO	0.001					
Copper (Total)	PWQO IPWQO	0.005 d	0.0009				
Lead (Total)	PWQO	0.005					
Mercury	PWQO	0.0002					
Anion Sum			5.29				
Cation Sum			5.01				
% Difference			2.69				
Ion Ratio			1.06				
Sodium Adsorption Ratio			0.79				
TDS (Ion Sum Calc)			264				
TDS(calc.)/EC(actual)			0.538				
Conductivity Calc			495				
Conductivity Calc / Conductivity			1.01				
Langelier Index(25°C)			-0.197				
Saturation pH (25°C)			7.3				
<b>Field Measured</b>							
Water Temp. (°C)			18.9				
Conductivity (microS/cm)			630				
pH (pH units)		6.5 - 8.5	6.6				
DO			5.3				
FLOW L/S			NA				

Notes:

All values reported in mg/L unless otherwise noted

PWQO- Provincial Water Quality Objectives

CWQG - Canadian Water Quality Guidelines

NS - No Sample Taken



# Appendix J

## Monitoring and Screening Checklist

# Appendix D-Monitoring and Screening Checklist

## General Information and Instructions

**General Information: The checklist is to be completed, and submitted with the Monitoring Report.**

**Instructions:** A complete checklist consists of:

- (a) a completed and signed checklist, including any additional pages of information which can be attached as needed to provide further details where indicated.
- (b) completed contact information for the Competent Environmental Practitioner (CEP)
- (c) self-declaration that CEP(s) meet(s) the qualifications as set out below and in Section 1.2 of the Technical Guidance Document.

**Definition of Groundwater CEP:**

For groundwater, the CEP must have expertise in hydrogeology and meet one of the following:

- (a) the person holds a licence, limited licence or temporary licence under the *Professional Engineers Act*; or
- (b) the person holds a certificate of registration under the *Professional Geoscientists Act, 2000* and is a practicing member, temporary, member or limited member of the Association of Professional Geoscientists of Ontario. O. Reg. 66/08, s. 2..

**Definition of Surface water CEP:**

A CEP for surface water assessments is a scientist, professional engineer or professional geoscientist as described in (a) and (b) above with demonstrated experience and post-secondary education, either a diploma or degree, in hydrology, aquatic ecology, limnology, aquatic biology, physical geography with specialization in surface water, and/or water resource management.

The type of scientific work that a CEP performs must be consistent with that person's education and experience. If an individual has appropriate training and credentials in both groundwater and surface water and is responsible for both areas of expertise, the CEP may then complete and validate both sections of the checklist.

<b>Monitoring Report and Site Information</b>	
<b>Waste Disposal Site Name</b>	Griffith WTS
<b>Location (e.g. street address, lot, concession)</b>	Part of Lots 4 and 5, Concession IV, geographic Township of Griffith, Township of Greater Madawaska
<b>GPS Location (taken within the property boundary at front gate/ front entry)</b>	NAD 83, UTM Zone 18, 327277E 5012416N
<b>Municipality</b>	Township of Greater Madawaska
<b>Client and/or Site Owner</b>	Township of Greater Madawaska
<b>Monitoring Period (Year)</b>	2023
This Monitoring Report is being submitted under the following:	
<b>Environmental Compliance Approval Number:</b>	ECA # A412203
<b>Director's Order No.:</b>	NA
<b>Provincial Officer's Order No.:</b>	NA
<b>Other:</b>	NA

<b>Report Submission Frequency</b>	<input checked="" type="radio"/> <b>Annual</b> <input type="radio"/> <b>Other</b>		
<b>The site is:</b> <b>(Operation Status)</b>	<input type="radio"/> <b>Open</b> <input type="radio"/> <b>Inactive</b> <input checked="" type="radio"/> <b>Closed</b>		
<b>Does your Site have a Total Approved Capacity?</b>	<input checked="" type="radio"/> <b>Yes</b> <input type="radio"/> <b>No</b>		
<b>If yes, please specify Total Approved Capacity</b>	17250	Units	Cubic Metres
<b>Does your Site have a Maximum Approved Fill Rate?</b>	<input type="radio"/> <b>Yes</b> <input checked="" type="radio"/> <b>No</b>		
<b>If yes, please specify Maximum Approved Fill Rate</b>		Units	<input type="text"/>
<b>Total Waste Received within Monitoring Period (Year)</b>	0	Units	Cubic Metres
<b>Total Waste Received within Monitoring Period (Year)</b> <i>Methodology</i>			
<b>Estimated Remaining Capacity</b>		Units	Cubic Metres
<b>Estimated Remaining Capacity</b> <i>Methodology</i>	Direct Survey (GPS/Total Station)		
<b>Estimated Remaining Capacity</b> <i>Date Last Determined</i>			
<b>Non-Hazardous Approved Waste Types</b>	<input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Industrial, Commercial & Institutional (IC&I) <input type="checkbox"/> Source Separated Organics (Green Bin) <input type="checkbox"/> Tires	<input type="checkbox"/> Contaminated Soil <input type="checkbox"/> Wood Waste <input type="checkbox"/> Blue Box Material <input type="checkbox"/> Processed Organics <input type="checkbox"/> Leaf and Yard Waste	<input type="checkbox"/> Food Processing/Preparation Operations Waste <input type="checkbox"/> Hauled Sewage Other: <input type="text"/>
<b>Subject Waste Approved Waste Classes: Hazardous &amp; Liquid Industrial</b> <i>(separate waste classes by comma)</i>			
<b>Year Site Opened</b> <i>(enter the Calendar Year only)</i>	1960	<b>Current ECA Issue Date</b>	December 1999 last amended June 2014
<b>Is your Site required to submit Financial Assurance?</b>	<input type="radio"/> <b>Yes</b> <input checked="" type="radio"/> <b>No</b>		
<b>Describe how your Landfill is designed.</b>	<input checked="" type="radio"/> <b>Natural Attenuation only</b> <input type="radio"/> <b>Fully engineered Facility</b> <input type="radio"/> <b>Partially engineered Facility</b>		
<b>Does your Site have an approved Contaminant Attenuation Zone?</b>	<input type="radio"/> <b>Yes</b> <input checked="" type="radio"/> <b>No</b>		

If closed, specify C of A, control or authorizing document closure date:

Has the nature of the operations at the site changed during this monitoring period?

- Yes
- No

If yes, provide details:

Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i.e. exceeded the LEL for methane)

- Yes
- No

# Groundwater WDS Verification:

Based on all available information about the site and site knowledge, it is my opinion that:

## Sampling and Monitoring Program Status:

<p>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:</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	
<p>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):</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Applicable</p>	<p>If no, list exceptions below or attach information.</p>

Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
MW96-7S	Dry	July 2023

3) a) Is landfill gas being monitored or controlled at the site?	<input type="radio"/> Yes <input checked="" type="radio"/> No
--	--

If yes to 3(a), please answer the next two questions below.

b) Have any measurements been taken since the last reporting period that indicate landfill gas is present in the subsurface at levels exceeding criteria established for the site?	<input type="radio"/> Yes <input checked="" type="radio"/> No
--	--

c) Has the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Applicable	If no, list exceptions below or attach additional information.
--	--	--

Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
All sampling completed in general accordance with our sampling protocols		

4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	<input checked="" type="radio"/> Yes <input type="radio"/> No	All sampling completed in general accordance with our sampling protocols
--	--	--

## Sampling and Monitoring Program Results/WDS Conditions and Assessment:

<p>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.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>		
<p>6) The site meets compliance and assessment criteria.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>All parameters met the Reasonable Use Criteria in 2023 except for DOC and manganese at the northern boundary</p>	
<p>7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Site closed in 2012 , however it is noted that there have been no unusual trends or changes since 2012.</p>	
<p>1) Is one or more of the following risk reduction practices in place at the site:</p> <p>(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</p> <p>(b) There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or</p> <p>(c) The site meets the following two conditions (typically achieved after 15 years or longer of site operation):</p> <p><i>i.</i> The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and</p> <p><i>ii.</i> Seasonal and annual water levels and water quality fluctuations are well understood.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Note which practice(s):</p>	<p><input type="checkbox"/> (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> (c)</p>
<p>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Applicable</p>		

## 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:

<p><input checked="" type="radio"/> No changes to the monitoring program are recommended</p> <p><input type="radio"/> The following change(s) to the monitoring program is/are recommended:</p>	Continue to monitor with no changes from 2023 monitoring program
<p><input checked="" type="radio"/> No Changes to site design and operation are recommended</p> <p><input type="radio"/> The following change(s) to the site design and operation is/are recommended:</p>	



<b>Name:</b>	Andrew Buzza, P.Geo Note: Report signed and stamped.		
<b>Seal:</b>	Add Image		
<b>Signature:</b>	<input type="text"/>	<b>Date:</b>	March 2023
<b>CEP Contact Information:</b>	Andrew Buzza, p.Geo		
<b>Company:</b>	Jp2g Consultants Inc.		
<b>Address:</b>	1150 Morrison Drive Suite 410 Ottawa ON K2H 8S9		
<b>Telephone No.:</b>	613 828-7800	<b>Fax No. :</b>	613 828-2600
<b>E-mail Address:</b>	andrewb@jp2g.com		
<b>Co-signers for additional expertise provided:</b>			
<b>Signature:</b>	<input type="text"/>	<b>Date:</b>	
<b>Signature:</b>	<input type="text"/>	<b>Date:</b>	

## 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 creek
Distance(s)	Approximately 200m east of the site

Based on all available information and site knowledge, it is my opinion that:

### Sampling and Monitoring Program Status:

1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:	<input checked="" type="radio"/> Yes <input type="radio"/> No	
2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> 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

<p>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.</p>	<p><input checked="" type="radio"/> Yes  <input type="radio"/> No  <input type="radio"/> Not Applicable</p>	
<p>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:</p>	<p><input checked="" type="radio"/> Yes  <input type="radio"/> No  <input type="radio"/> Not Applicable</p>	<p>If no, specify below or provide details in an attachment.</p>
<p><b>Surface Water Sampling Location</b></p>	<p><b>Description/Explanation for change (change in name or location, additions, deletions)</b></p>	<p><b>Date</b></p>
<p>All surface water sampling completed in general accordance with our sampling procedures.</p>		
<p>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):</p>	<p><input checked="" type="radio"/> Yes  <input type="radio"/> No</p>	<p>All surface water sampling completed in general accordance with our sampling procedures.</p>

## Sampling and Monitoring Program Results/WDS Conditions and Assessment:

<b>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):</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No
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**If no, list parameters that exceed criteria outlined above and the amount/percentage of the exceedance as per the table below or provide details in an attachment:**

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO
Phosphorus	PWQO 0.02	STN-1 100% (July 2023) STN-4 50% (July 2023) STN-5 150% (July 2023)
Iron	PWQO 0.3	STN-1 613.33% (July 2023)

<b>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)?</b>	<input checked="" type="radio"/> Yes <input type="radio"/> No	
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<p>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.</p>	<p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>	
<p>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)):</p>	<p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Not Known</p> <p><input type="radio"/> Not Applicable</p>	<p>Overall the results of the surface and groundwater sampling do not indicate that the past years of landfill at this location is having a negative effect on the surface water around the Landfill site.</p>
<p>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</p>	<p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p> <p><input type="radio"/> Not Applicable</p>	

## 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:

<p><input checked="" type="radio"/> No Changes to the monitoring program are recommended</p> <p><input type="radio"/> The following change(s) to the monitoring program is/are recommended:</p>	
<p><input type="radio"/> No changes to the site design and operation are recommended</p> <p><input checked="" type="radio"/> The following change(s) to the site design and operation is/are recommended:</p>	

<b>CEP Signature</b>	
<b>Relevant Discipline</b>	Education with 30 years experience
<b>Date:</b>	
<b>CEP Contact Information:</b>	Andrew Buzza, P.Geo
<b>Company:</b>	Jp2g Consultants Inc.
<b>Address:</b>	1150 Morrison Drive Suite 410 Ottawa ON K2H 8S9
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<b>Fax No. :</b>	613 828-2600
<b>E-mail Address:</b>	andrewb@jp2g.com
<b>Save As</b>	<b>Print Form</b>