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April 30, 2024
Our File: 213087

Via Email: publicworks@westgrey.com

Municipality of West Grey
402813 Grey Road #4
R. R. # 2
Durham, ON N0G 1R0

Attention: Mr. Geoff Aitken
Director of Public Works

Re: 2023 Annual Monitoring Report
Normanby Landfill Site

Dear Geoff,

Please find enclosed, the Annual Monitoring Report (2023) for the Normanby Landfill Site. On behalf of the Municipality and by way of this letter, we have submitted the report to Mr. Scott Gass, District Engineer at the Ministry of the Environment, Conservation and Parks (MECP) Owen Sound District Office.

The environmental monitoring results are generally consistent with the annual monitoring results from previous years, which indicate that the Reasonable Use Guideline continues to be met. The evaluation of the site's compliance is based on the groundwater quality from the newly installed monitoring wells, including new background wells that are nested in the shallow and deeper overburden, as well as new compliance wells located in proximity to the west and northwest property boundaries, respectively.

As requested by the MECP, a copy of the Monitoring and Screening Checklist included in the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010) has also been enclosed with the annual report. It should be noted that the attached checklist is not intended to replace the Annual Monitoring Report, but rather to provide a general summary of the annual findings. Consequently, for details regarding the annual monitoring program and site operations, please refer directly to the report.

I trust that this is sufficient for your records at this time. Please do not hesitate to contact me if you have any questions, or should you wish to discuss this further.

Yours truly,
GM BLUEPLAN ENGINEERING LIMITED
Per:

J. K. Weller, C.E.T.
JW/ah
Encl.

cc: MECP Owen Sound District Office: Scott Gass, via Email – scott.gass@ontario.ca
Alen Bringleson (GM BluePlan Engineering) - al.bringleson@gmblueplan.ca
File No. 213087

Prepared By:

Municipality of West Grey
Normanby Waste Disposal Site

Annual Monitoring Report (2023)
MOE Certificate Approval No. A262104

GMBP File: 213087

April 2024

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NORMANBY WASTE DISPOSAL SITE
MUNICIPALITY OF WEST GREY

APRIL 2024

GMBP FILE: 213087

1. INTRODUCTION & BACKGROUND INFORMATION

The Normanby Landfill Site is located at 221291 Grey Road 9 and is approximately 1.5 kilometres (km) east of the village of Neustadt, as shown on Figure No. 1. The landfill property is located on the north side of Grey Road 9 and is east and adjacent to the South Saugeen River, which flows in a northwesterly direction. The area approved for waste placement comprises an area of 2.8 hectares (6.9 acres) within a total site area of 33 hectares (81.5 acres). The landfill property is legally described as Part of Lot 7, Concession 14, former Township of Normanby, Municipality of West Grey.

The site was reportedly opened in 1974 and has been used as a waste disposal site since that time. Provisional Certificate of Approval (C of A) # A262104 was issued by the Ministry of the Environment (MOE) on February 2, 1987. Amendments to the C of A were completed on August 28, 1989, to extend the service area to include the Village of Neustadt and on September 17, 1992, which provided formal requirements for completion of an annual monitoring and reporting program. The original C of A was revoked and replaced by a new C of A (now referred to as an Environmental Compliance Approval, or ECA) on June 24, 2005, which licensed a landfilling area of 2.8 hectares within a total site area of 33 hectares and modified the service area to include the entire Municipality of West Grey.

A Plan of Development and Operation (PDO) was initially prepared by Gamsby and Mannerow Limited (now operating as GM BluePlan Engineering Limited) in July 1991 and revised in January 1992. The PDO (1992) outlined a five-phase development plan whereby the Area/Ramp Method is used to place refuse in progressive phases. The PDO was revised and updated in December of 2006, and was subsequently amended in 2011 to facilitate the operation of a Waste Diversion and Transfer Facility. The amended PDO is referenced in Schedule “A” of the current Environmental Compliance Approval (ECA). A copy of the ECA and the associated amendments is provided in Appendix “A.”

It is noted that the Site was closed to waste placement in 2022. Based on information provided directly by the Municipality, final cover (i.e., landfill capping) was applied to the remaining portions of the landfill footprint in the fall of 2022. Further to the landfill capping efforts, the placement of topsoil and vegetative cover was reportedly completed in 2023.

2. SITE USAGE

The approved service area for the waste disposal site includes residents from the entire Municipality of West Grey. Refuse delivered to the Site primarily originates from full time and seasonal residents situated within the former Township of Normanby including the villages of Neustadt and Ayton. The contributing population within the Township before amalgamation occurred in 2000 was approximately 2,678 based on the Statistics Canada Census Report. Based on the statistical information available, the population of the former Township of Normanby has historically fluctuated with a reported decline in population between 1991 and 2001. Therefore,

the growth rate for the area is considered to be generally stagnant and the contributing population within the current service area is expected to be generally consistent with the pre-amalgamation totals.

The onsite placement of waste at the landfill property was terminated in 2019 and the landfill was closed to the public with the exception of waste transfer operations.

3. SITE LIFE EXPECTANCY

3.1 Existing Conditions

The amended ECA provides for the use and operation of a waste disposal site consisting of a 2.8 ha landfilling area and a total approved waste disposal capacity of 69,000 m^3 including waste, daily, and final cover. Historically, landfilling has occurred in the northern portion of the landfill, moving south as the area progressively filled with waste. Based on previous reports, areas A1 and A2 were filled and capped in 1999. Landfill development then progressed into the northerly end of Area A4 and A5. Landfilling in the south portion of the approved footprint has ceased, and the site has reached its maximum capacity. Based on information provided directly by the Municipality, final cover was applied to the remaining portions of the landfill footprint in the fall of 2022. The placement of topsoil and vegetative cover/seeding was reportedly completed in 2023.

4. BURNING OPERATIONS

Burning of waste is prohibited at the Site. Based on the current ECA requirements, only segregated clean, dry wood wastes such as brush, trees and untreated lumber may be burned at the site. Supervised burning of wood waste is to occur on clear, dry, windless days when the site is closed to the public. Approved burning of wood wastes is to be conducted in accordance with the Ministry Guideline C-7 "*Burning at Landfill Sites.*" A copy of Guideline C-7 is presented in Appendix "C". The Site Attendant is responsible for removing any non-wood wastes from the pile prior to burning, and to regularly remove cold ashes from the burn area for disposal in the active landfill area.

The operating authority is responsible to maintain appropriate burning operations at the site. Appropriate operations include the burning of approved wood wastes, which are separated from refuse and stockpiled in a designated burn area that is located a minimum distance of 30 metres from the active fill area and is within view of the Site Attendants building.

Burning is to be completed under direct supervision of the operator and is to be conducted as frequently as necessary to maintain a burn pile that measures no greater than 6m by 6m in area and 3m in height. Cold ashes are to be removed from the burn area and placed directly in the active area following each burn.

5. RECYCLING/WASTE REDUCTION

During the current reporting period, the Normanby Landfill site was closed to the public and received no waste or recyclable goods. Based on information provided by West Grey (for the remaining landfills within the municipality), Waste Management was contracted to collect curbside recyclable goods from households and to collect the accumulation of recyclables from the landfill site. All Ontario Recycling (AOR) was contracted to collect and remove accumulations of scrap metal and tires. Recyclable goods not accepted as part of the blue box program, such as scrap metal, tires, used propane tanks, plastic bale wrap, waste electrical and electronic equipment, and vehicle batteries are stockpiled and hauled from the respective landfill sites as required.

6. GENERAL OPERATIONS

6.1 Site Controls

As previously reported, the site is currently closed to the public and waste placement operations ceased in 2022. The ECA specifies the hours of operation for the Site from 7:00 am to 7:00 pm on Monday through Saturday each week. The ECA also notes that the hours of operation may be changed by the Owner to accommodate seasonal or unusual quantities of waste with prior written approval from the District Manager. With the landfill site being closed, a locked gate across the entrance road controls access to the site. The landfill is situated approximately 475 metres from the road and is adequately screened from the public view by low hills and tree cover along the property boundary.

6.2 Site Cleanliness

The most important aspect of site cleanliness is to ensure that all landfilled wastes are adequately covered and compacted immediately following waste placement so that refuse is not exposed at the surface. The application and compaction of an appropriate soil cover immediately following waste disposal decreases blowing litter and reduces surface water infiltration vertically through the refuse to reduce leachate production at the site.

As previously noted, the site is currently closed to the public for onsite waste placement. Final closure and capping of the site was completed in the fall of 2022 with topsoil cover and seeding completed in 2023.

An important aspect of site cleanliness is to ensure that accumulations of recyclable materials, including waste tires and scrap metals, continue to be efficiently managed, and that appropriate wood wastes are burned regularly to maintain a manageable pile. Designated areas for recyclable goods at the site appear to be organized and well managed. The recyclable pile sizes were observed to be adequate during the spring and fall inspections in during the current reporting period.

7. ENVIRONMENTAL MONITORING

The current ECA requires the submission of an annual monitoring report summarizing the environmental conditions at the landfill site, the findings of the monitoring programs, and a discussion of the site operations. Based on the MOE requirements specified in the ECA, the report must address the results of the monitoring programs and assess the environmental conditions at the site to ensure compliance with the RUC and with the requirements of the Provincial Water Quality Objectives (PWQO).

The shallow groundwater has been determined to flow primarily in a northwesterly direction toward the South Saugeen River. Previously completed annual monitoring reports concluded that leachate impacted groundwater is being contained to the subject property and that the landfill site was in compliance with the criteria specified in MOE Guideline B-7. **It is proposed to continue the established annual monitoring program at the site, with the addition of added leachate parameters and the newly installed monitoring well locations, on a semi-annual basis according to the analytical parameters outlined in Table 2.** Monitoring locations are shown on the Monitoring Well Location Plan presented on Figure 4.

TABLE 1 - Monitoring Locations & Analytical Requirements

GROUNDWATER SAMPLE/ MONITORING WELL LOCATIONS		SURFACE WATER SAMPLE LOCATIONS
TW-1 TW-3 TW-5A OW-2 TW-8 TW-9 S&D	TW-2 TW-5 TW-6 OW-3 TW-10	SW-1 SW-2 SW-5
ANALYTICAL PARAMETERS (GROUNDWATER & SURFACE WATER)		
Conductivity, Chloride, Alkalinity, Iron, pH, Total Ammonia, Hardness, Sodium, Nitrate, Sulphate, TKN	**Additional Leachate Well Parameters: Arsenic, Barium, Boron, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Total Phosphorus, Potassium, TSS, TDS**	Conductivity, Chloride, Alkalinity, Iron, pH, Total Ammonia, Total Phosphorus, Phenols, Dissolved Oxygen, Temperature

Notes:
Borehole/Well logs are presented in Appendix "H." A tabulated summary of the monitoring well locations and construction details is provided in Table 2.

7.1 Sampling Procedures and Requirements

Groundwater quality is monitored at the site by semi-annual sampling at the above noted network of monitoring wells in the spring and fall. It is standard procedure to measure the static groundwater level prior to purging three (3) casing volumes of stagnant water from each test well. Wells are allowed to recharge with fresh groundwater before sampling. Groundwater samples are collected using dedicated sampling materials and inertial pumps, are kept chilled, and are sent within 24 hours of the sampling event to an accredited laboratory for appropriate analyses.

MOE Guideline B-7 establishes the basis for determining what constitutes the reasonable use of groundwater on properties adjacent to landfill sites. The potential use of groundwater in this region will typically be for domestic consumption. Therefore, the allowable concentrations presented within the Ontario Drinking Water Standards (ODWS) are utilized to determine the site-specific Reasonable Use Criteria (RUC) through the application of MOE Guideline B-7.

MOE Procedure B-7-1 provides technical details for the application of MOE Guideline B-7. A change in the quality of groundwater on an adjacent property, where the reasonable use is determined to be for drinking water, will be acceptable only where:

i) Quality is not degraded by more than 50% of the difference between background concentrations and the Ontario Drinking Water Standards for *non-health related* parameters, and;

ii) Quality is not degraded by more than 25% of the difference between background concentrations and the Ontario Drinking Water Standards for *health-related* parameters.

Background concentrations are considered to be, the quality of the groundwater prior to influence or impact from landfill related activities.

Using the reasonable use approach, the acceptable concentrations at the site boundary (i.e., RUC), are calculated from MOE Procedure B-7-1 using the following formula:

$$Cm = Cb + x(Cr - Cb)$$

Where:
Cm = Maximum concentration acceptable in groundwater beneath an adjacent property (RUC).
Cb = Background concentration.
Cr = Maximum concentration that should be present in groundwater for domestic consumption according to the ODWS.
X = 0.5 for non-health related parameters (AO and OG) and 0.25 for health related parameters (MAC and IMAC).

AO = Aesthetic Objective
OG = Operational Guideline
MAC = Maximum Acceptable Concentration, Parameters Related to Health
IMAC = Interim Maximum Acceptable Concentration, Parameters Related to Health

It should be noted that if background concentrations exceed the ODWS, the objective level is to be set at the background concentration, as outlined by Procedure B-7-1. The calculated RUC values are provided in Table 3.

To determine if leachate is impacting groundwater, individual indicator parameters were evaluated in conjunction with other indicator parameters and concentration trends. Wells with elevated and stable concentrations of the identified naturally elevated constituents, that show no increases in other leachate indicator parameters, are deemed un-impacted by landfill leachate.

Additionally, comparison of known leachate impacted groundwater is compared to the groundwater chemistry at locations with naturally elevated concentrations to determine if leachate contributes to the elevated concentrations measured.

Surface water samples are collected by submerging the appropriate sample container into the water body and removing the container when a sufficient volume of sample has been collected. During collection, contact with the bottom sediment is avoided to prevent stirring-up sediment. When collecting surface water samples, direct dipping of the sample bottle is completed unless the bottle contains preservative. For those samples requiring preservative, a clean unpreserved bottle is used to obtain the sample then transferred into the appropriate preserved bottle. The surface water temperature is measured and recorded at the time of sampling.

7.2 Summary & Comparison of Background Groundwater Quality

The background groundwater quality at the site has historically been determined by calculating the average concentrations from the groundwater samples collected at TW-1. As previously reported, background groundwater quality is typically evaluated by considering the quality of groundwater at a location that is not subject to potential influence or impact from landfill related activities. Although TW-1 continues to display stable long-term trends and relatively low concentrations of the typical leachate indicator parameters, it is noted that the monitoring well is screened in the shallow overburden and is located directly at the northwest toe of the landfill footprint, which is considered to be directly downgradient of the landfill pile. Therefore, the monitoring well is situated where there is an increased potential for influence or impact from landfill leachate and is not considered to be in an ideal location to represent background conditions. Based on the lack of a true background monitoring well, new nested background monitoring wells (i.e., TW-9S and TW-9D) were installed in 2019 hydraulically upgradient of the landfill footprint to provide a more representative background location.

Based on the current and historical groundwater data from TW-1, the concentrations of hardness (as $CaCO_3$), sulphate, and organic nitrogen in the natural groundwater are moderately elevated and the reported historical concentrations of hardness and organic nitrogen consistently exceed the criteria identified in the ODWS. Similarly, groundwater data from TW-9S and TW-9D display elevated levels of hardness and sulphate. The previous Hydrogeological Assessment completed at the Site in 1986 included the sampling and analytical testing of the adjacent and nearby domestic water supply wells. At that time, it was noted that the nitrate and organic nitrogen concentrations in the domestic wells were elevated at concentrations that exceeded the ODWS. Additionally, the domestic wells located south and hydraulically upgradient of the landfill property had some of the highest measured concentrations of nitrate (i.e., 16 to 19 mg/L). Therefore, these parameters are considered to be unrelated to landfill leachate and are likely due to agricultural practices, or the typical background quality of the natural groundwater in the area of the site. In general, the background groundwater quality at the site is considered to have low levels of typical anions. In particular, chloride concentrations are typically less than 7 mg/L and do not appear to be influenced by road salting or other activities. Therefore, the use of chloride as a leachate indicator parameter is considered to be valid.

7.3 Physiographic and Geological Setting

The site is located in the highland area of central Grey County, within the physiographic region known as the "Horseshoe Moraines". The region is generally characterized by till ridges, kame moraines, outwash plains and spillways. This area of Grey County is located on the Singhampton Recessional Moraine, in the northern "toe" of the horseshoe. The Singhampton Recessional Moraine is a till moraine feature which is aligned in a southwest/northeast direction across the drumlinized till plain that dominates the area. Relief among the moraines and drumlins is often more than 30 metres. Many small lakes, streams and wetland areas exist within the low areas between drumlins.

In the immediate area of the site, the overburden soils consist mainly of glaciofluvial deposits that correspond to the location of the Saugeen River, and loamy tills, which primarily consist of clayey silt, silty sands, and sand and gravel. These loamy tills are classified in the Burford Series, which are described as loams comprised of well sorted gravelly outwash with good drainage characteristics.

A more detailed description of the onsite subsurface soils is provided in the borehole/monitoring well logs provided in Appendix “H.” According to MECP well records and the Grey and Bruce Counties Groundwater Study (Waterloo Hydrogeologic, 2003) the bedrock in the area is approximately 23 to 40 metres deep. Based on a review of the Grey and Bruce Counties Groundwater Study, the groundwater flow in the bedrock unit is reported to be in a northerly direction. MECP water well records indicate that the lower overburden consists of a layer of red to grey clay and stones, which is underlain by the shale and limestone bedrock of the Salina Formation.

Regionally, the drainage from the high plateau is generally from east to west toward Lake Huron. In the area of the subject site, the landscape is generally described as being flat with a gentle slope to the northwest. Surface drainage is generally from south to north toward the onsite tributaries of the South Saugeen River, which flows in a northwesterly direction across the northwest portion of the Site.

Based on a review of the MECP water well records for supply wells in close proximity to the landfill, the shale and limestone bedrock surface is encountered at depths of 23 to 26 metres (76 to 85 ft.) below grade. The water supply wells in the area of the Site obtain their water from the underlying dolostone/limestone bedrock unit.

7.4 Summary of Hydrogeologic Setting

The hydrogeological conditions in the study area were determined based on the information presented within the previous Hydrogeological Assessments, the Annual Monitoring Reports, and on a review of the available borehole/monitoring well logs. According to the above noted document review, the direction of shallow groundwater flow has been established and documented as part of the annual monitoring program that has been conducted for a period of over 30 years. Based on the previous and ongoing studies, the direction of shallow groundwater flow is reportedly in a northwesterly direction toward the South Saugeen River. The shallow groundwater flow was determined through the measurement of groundwater elevations in the monitoring wells located on the landfill property.

Based on previous investigations, the groundwater flow pattern has been divided into two different overburden units comprised of the shallow sand/silty sand and gravel, and the underlying grey silt till. This division was based on an assessment of the borehole depths, screened intervals, soil descriptions, and historical groundwater quality data. A summary of the monitoring well details, including a division of the wells into each separate flow system, is provided in Table 2. Cross sections of the shallow sand/silty sand and gravel unit have been provided on Figure 5. An on-going assessment of the flow pattern and groundwater quality will continue in future annual monitoring reports based on their established designations within these units.

As previously reported, the Grey and Bruce Counties Groundwater Study (July 2003) indicates that the regional groundwater flow in the bedrock aquifer is in a north to northwesterly direction. Upward gradients are commonly measured at the nested monitoring wells located on the landfill property. Based on the measured vertical gradients and on the occurrence of the clayey layer overlying the bedrock, the bedrock groundwater system is inferred to be under confined to semi-confined conditions. Additionally, a groundwater system that contains deeper groundwater systems with an upward gradient typically acts to prevent the downward migration of the shallow groundwater. Therefore, the shallow groundwater in proximity to the landfill site is expected to primarily have a horizontal flow direction within the shallow sand and gravel overburden materials.

Based on the area topography and on the occurrence of the South Saugeen River and associated tributaries adjacent to the Site, a shallow groundwater and surface water flow divide is inferred to exist at the adjacent tributaries to the north of the Site, and at the South Saugeen River to the northwest of the property. Additionally, the hydrogeological conditions indicate that the South Saugeen River would likely be the ultimate receptor for both potential groundwater and surface water impacts from the waste disposal site. As such, it is reasonable to expect that surface water or groundwater impacts would not occur beyond the river.

Groundwater level measurements are collected twice annually in conjunction with the established monitoring program. A review of groundwater contour plans and previously measured groundwater elevation data indicates that the flow pattern depicted using the most recent data are representative of the typical groundwater flow directions at the site. A summary of the historical groundwater elevation measurements is provided in Appendix “G.” In general, the groundwater flow patterns, and vertical and horizontal gradients calculated are consistent with those historically presented.

7.5 Leachate Production

The quality of leachate is measured and characterized by the collection of groundwater samples at the location of TW-6, which is located within the refuse pile. Analytical data for the monitoring well is available dating back to 1984 and a review of the data indicates that there is evidence of leachate influence to the shallow groundwater at this location where elevated concentrations of hardness, alkalinity, chloride, conductivity, sulphate, and organic nitrogen have consistently been reported for several years. Evidence of leachate influence/impact is also identified at the locations of TW-2 and TW-3 (i.e., near-source monitors), which are screened in the upper sand and gravel overburden directly downgradient of the landfill footprint. The current and historical groundwater quality results and the long-term trend graphs are presented in Appendix “D.”

It must be noted that TW-2 and TW-3 are situated at the downgradient toe of the landfill pile and are screened in the shallow sand and gravel overburden at approximate depths of 3.5 and 3.8 metres, respectively. Based on these conditions, the monitoring wells are expected to represent shallow groundwater that is most likely to be impacted from landfill leachate.

An ongoing evaluation and trend analysis of analytical results from the monitoring wells will be completed to more accurately characterize the leachate, evaluate the potential for radial flow/mounding, and to discern long-term attenuation and leachate quality trends.

Based on previous recommendations made by the MECP, the following parameters have been added to the leachate sample analysis list: Arsenic, Barium, Boron, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Total Phosphorus, Potassium, TSS (Total Suspended Solids), TDS (Total Dissolved Solids). During the current monitoring period it is noted that the reported concentrations of these additional leachate characterization parameters at TW-6 are typically below the laboratory detection limits (i.e., arsenic, cadmium, chromium, copper, lead, are all below the laboratory detection limits), and where concentrations are measured (i.e., barium, boron, potassium, TSS, and TDS), they are low and considered typical of natural groundwater. Based on the numerous years of data that has been provided and reviewed, the general characterization of leachate is thought to be well understood. Therefore, the installation of additional leachate wells is not considered to provide additional information pertaining to site compliance.

A detailed review of the analytical results from the shallow and deep overburden monitors continues to indicate that leachate impacts are primarily limited to the upper and higher permeability soils within the overburden. The relatively thick layer (i.e., 23 to 26 metres) of lower permeability silt till and clay overlying the bedrock surface, combined with upwards gradients observed in the area of the landfill are expected to provide a level of hydraulic separation between the shallow overburden unit and the underlying bedrock aquifer.

7.6 Annual Monitoring Program

A groundwater monitoring program was reportedly initiated at the site in 1984 as part of the initial hydrogeological study and to satisfy MOE conditions at that time. Historically, the monitoring program included up to eleven onsite monitoring wells and five surface water sampling locations. Currently, the sampling program consists of a total of ten monitoring wells that intercept the groundwater within two different geologic units including the shallow sand and gravel overburden and the underlying silt till.

Additionally, surface water sampling is also conducted as part of the annual monitoring program. Surface water samples are collected at the locations of SW-1, SW-2 & SW-5, which are located in the adjacent tributaries to the South Saugeen River and include upstream and downstream locations relevant to the landfill property.

The sampling program was completed at the Site in April and November of the current monitoring period. Samples were submitted to Bureau Veritas Laboratories (BVL) in Mississauga for analysis of the established analytical parameter list. Copies of the laboratory Certificates of Analyses are presented in Appendix “F.”

The following is a detailed summary of the Environmental Monitoring Program for the Normanby Landfill site.

7.7 Groundwater Quality Review

North of Landfill Footprint (Downgradient)

The downgradient area to the north and northwest of the landfill footprint was previously monitored at TW-2, TW-3, and OW-3. It is noted that the north property boundary is located approximately 220 metres north of these monitoring wells and the groundwater measured at these locations does not represent the actual environmental condition of groundwater flowing offsite. Based on the additional distance to the north property boundary beyond the monitoring wells, it is reasonable to expect that further attenuation of the groundwater occurs beyond the monitoring network. As such, a new monitoring well (TW-10) was installed in close proximity to the northerly property boundary in spring of 2019.

With the exception of hardness levels, the downgradient observation wells continue to have concentrations of leachate indicator parameters below the criteria of MOE Guideline B-7. The chloride concentrations at TW-10 are slightly elevated but are well below the RUC.

The groundwater results from the current sampling period for TW-10 indicate an exceedance of the RUC for hardness and sulphate in the spring and fall. Conductivity was also observed to be elevated compared to background concentrations. Based on the relatively low concentrations of alkalinity and the additional leachate indicator parameters, the elevated concentrations of hardness and sulphate are inferred to be in relation to groundwater from a deeper geological unit. It is noted that TW-10 was installed and screened within a deeper clay unit. The historical absence of leachate indicator parameters at TW-3 (located directly between TW-10 and the landfill mound), further indicates that the elevated parameters measured at TW-10 are not related to landfill leachate. Since the initial sampling program at TW-10, the reported analytical concentrations have remained stable. Continued monitoring will be conducted to discern if an elevated trend becomes evident. Additionally, it was noted that the steel protective casing at the location of TW-3 had been damaged and appeared to have been removed. The well casing was not covering the monitoring well at the time of the spring sampling event and was therefore not sampled. During the fall sampling event, a new protective casing was installed, and a sample was collected.

As noted above, the elevated concentrations identified at the downgradient monitoring wells are consistent with the historical range of background values and a trend analysis indicates stable long-term trends. It is noted that the ODWS criterion for hardness in drinking water is 80 to 100 mg/L with levels as high as 200 mg/L being considered poor, but tolerable. The ODWS criterion for alkalinity in drinking water is 500 mg/L. It should be noted that the ODWS criteria for hardness and alkalinity are Operational Guidelines (OG) that have been set for *treated* drinking water and not for groundwater. It should also be noted however that Operational Guidelines are established for parameters that, if not controlled, may negatively affect the efficient and effective treatment, disinfection, and distribution of the water.

Based on the inferred discharge of shallow groundwater to the adjacent surface water bodies, it is noted that the relatively extensive surface water sampling completed within the tributaries to the Saugeen River located north of the landfill footprint provides additional information pertaining to the Site's compliance.

Further discussion of the surface water sampling program and the surface water quality to the north of the landfill is provided in Section 7.8.

East Boundary Condition

The groundwater quality to the east of the landfill footprint is monitored at TW-5 and TW-5A, which are considered to be hydraulically cross-gradient of the landfill footprint. These nested monitoring wells are screened in the shallow (TW-5A) and deep (TW-5) overburden and provide information regarding groundwater quality in the upper sand and gravel versus the groundwater quality at the same location in the lower silt till layer. TW-5 and TW-5A are located approximately 50 metres from the east property boundary and do not represent the actual quality of groundwater at the property boundary.
The analytical data at these wells continues to indicate that the groundwater quality at these monitoring locations is generally consistent with the groundwater in the upgradient/background monitoring well with elevated concentrations of hardness, alkalinity, organic nitrogen, and nitrate. Completion of a trend analysis for these wells indicates that the concentrations of leachate indicator parameters continue to display stable to slightly decreasing trends at the location of TW-5 and slightly variable but stablelong-term trends at TW-5A. A review of the laboratory results for TW-5/5A indicates that the measured groundwater quality in the upper, higher permeability soils consistently has elevated concentrations as compared to the groundwater measured in the lower silt till, which suggests a level of hydraulic separation between the upper and lower overburden units.

The elevated concentrations of hardness and nitrate are consistent with background conditions and with historical monitoring trends. The historical data indicates that the concentrations of these parameters have consistently been reported above the MOE Reasonable Use Criteria. It has been noted that the chloride concentrations at TW-5A are slightly elevated and have begun to display an upward trend but continue to be well below the RUC. The groundwater quality at TW-5/5A will continue to be monitored as part of the established groundwater monitoring program to discern if there is a component of radial flow away from the landfill footprint and to evaluate the long-term trends at this location.

South Boundary Condition (Upgradient)

Based on the “L” shape of the property, the south boundary in the west portion of the Site is located approximately 230 metres from the landfill footprint and the south boundary in the east portion extends to Grey Road 9 approximately 500 metres south of the landfill footprint. Due to the documented northwesterly groundwater flow direction, the southern property boundary is considered to be located hydraulically upgradient of the landfill footprint and is considered to have a low risk for potential leachate impact. No evidence of groundwater mounding or radial flow from the landfill is apparent at this time.

As previously reported, the former background monitoring well (TW-1) is located immediately downgradient of the landfill pile and is screened in the overburden at an approximate depth of 5 to 7 metres below ground surface. Due to this location and the screened interval, the monitor is considered to be in a location that is susceptible to influence or impact from landfill leachate. As such, a nested background monitoring well (i.e., TW-9S and TW-9D) was installed in the southeast portion of the landfill in 2019 to allow for comparison to the MOE Reasonable Use Criteria and to facilitate an ongoing compliance review. The locations of the new background monitoring wells have been provided on Figures 3 and 4.

TW-9S and TW-9D were installed approximately 70 metres south of the landfill footprint and are considered to be hydraulically upgradient of the placed waste. TW-9S was installed within a medium sand and silt unit, and TW-9D was installed at an approximate depth of 7.95 metres and was screened within the lower sand and silt unit. Based on groundwater quality results from the current sampling events, no evidence of leachate impacts to TW-9S or TW-9D from landfill activities are evident. The analytical results indicate that there are no exceedances of the MOE Reasonable Use Concept related to leachate impacts.

West Boundary Condition

The onsite groundwater quality to the west of the landfill was formerly monitored by well OW-2. In April of 2019, TW-8 was installed along the westerly property boundary, approximately 200 meters west of the landfill footprint. Based on the direction of shallow groundwater flow at the site, the groundwater at TW-8 is primarily considered to be hydraulically cross-gradient of the landfill footprint and is inferred to provide analysis of the groundwater in close proximity to the westerly property boundary.

A review of the groundwater quality for TW-8 during the current monitoring period indicates that groundwater quality at this location has slightly elevated concentrations of hardness, alkalinity, chloride, conductivity, and nitrate. It is noted that the elevated concentrations are similar to the concentrations reported within the background wells and are not inferred to be related to landfill leachate. The short-term trend for TW-8 (i.e., since monitoring was established in 2019) indicates a stable trend over this period. The westerly monitoring locations will continue to be monitored to discern if an elevated trend becomes apparent to the west of the landfill footprint.

7.8 Surface Water Quality Review

7.8.1 Regulatory Framework

The purpose of surface water quality management at the Site is to achieve the requirements established in the Provincial Water Quality Objectives (PWQO) set out by the MECP. The criteria established by the PWQO ensure that surface waters are of a quality that is satisfactory for aquatic life and recreation. Areas that have water quality that meet the PWQO requirements are to be maintained at or below the applicable objectives. Areas that have water quality that does not presently meet the PWQO are not to be degraded any further and are to be upgraded if practicable.

7.8.2 Surface Water Quality Summary

The surface water monitoring program consists of three sampling locations (SW-1, SW-2, and SW-5), which are located at various points on the Saugeen River tributaries located to the north of the landfill site. The locations of the surface water bodies, and the associated surface water sampling locations are presented in the attached Figures. SW-1 measures surface water quality within a small creek located onsite approximately 75 metres northeast of the landfill pile. SW-2 represents background surface water conditions upstream of the landfill in an adjacent tributary located approximately 150 metres north of the landfill footprint. SW-5 measures water quality in the tributary downstream of the landfill and prior to flowing into the South Saugeen River. The water within the tributaries is reportedly derived partially from shallow groundwater discharge and each represents continuous year-round surface water bodies (i.e., not stagnant, or intermittent flow conditions).

A comparison of the current analytical data indicates that the surface water quality at each sampling location continues to meet objective levels with no reported exceedances of the PWQO.

The analytical results for each sample location are consistent with historic findings and display stable long-term trends. Additionally, the concentrations reported at each respective sample location are consistent relative to each other, which indicate that the quality of the surface water downstream of the landfill is consistent with the quality in each of the upstream tributaries.

Phenols have been analyzed in the surface water samples since monitoring of the tributary began in 2001. Since then, no detections have been reported above 0.001 mg/L with the exception of SW-4 and SW-5 in the April 2015 monitoring event (0.0012 and 0.0013 mg/L, respectively). **It is expected that the concentrations of phenols will generally remain stable and low at the surface water sampling locations. Therefore, it is recommended that phenols be removed from the surface water monitoring program.**

The analytical results from the most recent surface water monitoring program and a comparison to the PWQO are provided in Table 5. A summary of the historical surface water sampling data, compared to the PWQO, is tabulated, and presented in Appendix “E.”

8. LANDFILL GAS MEASUREMENT

Methane is a colorless and odourless gas formed by the decomposition of organic matter under oxygen poor (anaerobic) conditions and is commonly associated with landfills. It is produced by anaerobic bacteria, which become active only when the oxygen in the landfill has been completely consumed. The primary concern related to this parameter is that, under certain conditions, the mixture of methane in air can be explosive within a confined area. Methane gas is measured relative to the lower explosive limit (LEL) which corresponds to 5% the concentration of methane in air.

Based on previous MECP correspondence, it was proposed that a gas monitoring program be implemented at the Normanby Landfill site. Based on the Closure Plan submitted by GMBP in May of 2015, the installation of a methane monitor within the attendant's shelter was previously recommended. However, at this time the Normanby Landfill site remains closed. As such, no further methane monitoring is recommended.

9. CLOSED AREAS

Previous areas A1, A2 and the northern part of A4, as identified in the 1992 PDO were closed and capped at that time. The remainder of the landfill footprint was closed in 2018 and no landfilling or onsite waste placement was completed during the current reporting period. Closure and capping of the remaining portion of the landfill site was completed in the fall of 2022 and placement of topsoil and vegetative cover was completed in 2023. Closure and capping were completed as per the approved Closure Plan.

10. ENVIRONMENTAL COMPLIANCE APPROVAL

The waste disposal site operates under amended Certificate of Approval (C of A) Number A262104, which was issued by the MOE on February 2, 1987. Amendments to the C of A were completed on August 28, 1989, to extend the service area to include the Village of Neustadt and on September 17, 1992, which provided formal requirements for completion of an annual monitoring and reporting program.

The original C of A was revoked and replaced by a new C of A on June 24, 2005, which licensed a landfilling area of 2.8 hectares within a total site area of 33 hectares and modified the service area to include the entire Municipality of West Grey. A copy of the C of A and the associated amendments are provided in Appendix "A."

11. CONCLUSIONS

1) The approved area of the Site specified within the C of A covers a total area of 2.8 ha (6.9 acres) within a total site area of 33 hectares (82 acres).

2) Currently, the total approved capacity for waste, daily cover, and final cover is 69,000 m^3. Based on a review of the remaining capacity, existing stockpiled materials at the site, and site conditions, landfilling operations at the site were previously terminated.

3) The landfill is closed to the public and waste placement has been discontinued. Closure and capping of the site was conducted in 2022 and 2023 as per the approved Closure Plan.

4) The findings of the groundwater monitoring program indicate that minor leachate impacts are being measured in the shallow overburden unit at the landfill site and that there is a level of hydraulic separation between the shallow sandy overburden soils and the underlying silt till.

5) The analytical results at the Site indicate that there is currently no apparent impact to the groundwater migrating away from the subject property above the Reasonable Use Criteria as referenced in MOE Guideline B-7.

6) The surface water monitoring program indicates that the surface water quality in the adjacent surface water bodies directly north of the landfill footprint is not being influenced by landfill leachate and has concentrations that meet the PWQO.

7) The reported surface water results indicate that the concentrations measured downstream of the landfill Site are consistent with those measured in the sample locations in the tributaries upstream of the Site.

12. RECOMMENDATIONS

The following actions are recommended for the upcoming monitoring year(s):

1) It is important that the Municipality continue to remove stockpiles of recyclable goods on a regular basis to further reduce the volume of waste entering the landfill, to prevent clutter, and to maintain an aesthetically acceptable site.

2) We recommend continuing the established monitoring program on a twice annual basis in the spring and fall with the exception of the removal of SW-3 and SW-4 from the surface water monitoring program, and the adjustments to the groundwater monitoring program as outlined below:

<table>
<tr><th colspan="2">GROUNDWATER SAMPLE/
MONITORING WELL LOCATIONS</th><th>SURFACE WATER
SAMPLE LOCATIONS</th></tr>
<tr><td>TW-1
TW-3
TW-5A
TW-8
TW-10</td><td>TW-2
TW-5
TW-6
TW-9S & TW-9D</td><td>SW-1
SW-2
SW-5</td></tr>
<tr><th colspan="3">ANALYTICAL PARAMETERS (GROUNDWATER & SURFACE WATER)</th></tr>
<tr><td>Conductivity, Chloride, Alkalinity, Iron, pH, Total Ammonia, Hardness, Sodium, Nitrate, Sulphate, TKN</td><td>Additional Leachate Well Parameters: Arsenic, Barium, Boron, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Total Phosphorus, Potassium, TSS, TDS</td><td>Conductivity, Chloride, Alkalinity, Iron, pH, Total Ammonia, Total Phosphorus, Phenols, Dissolved Oxygen, Temperature</td></tr>
</table>

All of which is respectfully submitted,

GM BLUEPLAN ENGINEERING LIMITED

Per:

J. K. Weller, C.E.T.

Per:

A.W. Bringleson, B.E.S., C.E.T

Per:

M.D. Nelson, P.Eng., P.Geo.

TABLES:

TABLE 2:
SUMMARY OF MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS

BOREHOLE ID [WELL ID]	LOCATION (relative to refuse pile)	Date of Installation	ELEVATION		Monitoring Well Depth	Screened Interval (metres)	Unit Measured
			Ground	Top of Casing*			
TW-1	Onsite - Northwest Portion of Footprint	1984	90.38	91.42	7.00	5.2 to 7.0	Sandy Silt
TW-2	Onsite - Northwest Portion of Footprint	1984	90.33	91.36	3.55	0.9 to 3.55	Coarse Sand & Gravel / Sandy Silt
TW-3	Onsite - Downgradient	1984	88.77	89.85	3.80	1.2 to 3.8	Medium Sand & Gravel / Sandy Silt
TW-5	Onsite - East Portion of Footprint	1984	96.27	97.60	10.25	7.0 to 10.25	Medium to Fine Sand / Sandy Silt
TW-5A	Onsite - East Portion of Footprint	1984	96.34	97.17	4.70	1.5 to 4.7	Medium Sand & Gravel / Sandy Silt
TW-6	Onsite - In Footprint	1984	95.98	96.92	5.20	3.5 to 5.2	Sandy Silt
TW-8	Onsite - Northwest of Footprint	2019	na	90.84	6.09	3.0 to 6.0	Medium Sand & Silt
TW-9S	Onsite- Upgradient	2019	na	95.10	4.57	1.5 to 4.5	Clay/ Medium Sand & Silt
TW-9D	Onsite- Upgradient	2019	na	95.14	7.62	4.5 to 7.6	Medium Sand & Silt/ Clay
TW-10	Onsite - Northwest of Footprint	2019	na	89.27	6.09	3.0 to 6.0	Clay
OW-2*	Onsite - West of Footprint	1984	na	na	2.25	CSP - Open Bottom	Medium Sand & Gravel / Sandy Silt
OW-3*	Onsite - Downgradient	1984	na	na	2.25	CSP - Open Bottom	Medium Sand & Gravel / Sandy Silt

NOTES:

1. All depths measured in mbgs = approximate depth in metres below ground surface
2. na = Not Available.
3. Borehole logs are provided in the Appendices
4. Elevations measured in mASL = meters above sea level
5. Monitoring Well Depths in meters below ground surface based on physical depth measurements
6. CSP: Corrugated Steel Pipe

* OW-2 & OW-3 were decomissioned in 2019

Table 4:
Summary of Groundwater Quality and Comparison to RUC

SPRING - 2023

Sampling Date / MW Location / Sample ID	Ontario Drinking Water Standards (ODWS) (mg/L)	MOE Guideline B-7 Reasonable Use Criteria (mg/L)	Sample Identification And Monitoring Well Location									
			20-Apr-23									
			Background/Onsite			North - Downgradient		North Boundary	East Boundary		West Boundary	Onsite
			TW-9S	TW-9D	TW-1	TW-2	TW-3	TW-10	TW-5	TW-5A	TW-8	TW-6
Parameter												
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	320	300	180	230		53	230	320	250	**660**
Ammonia(as N)	nv	nv	0.08	0.12	<0.050	0.11		<0.050	<0.050	0.37	0.05	0.07
Chloride	250 [AO]	133	17	9.1	4.6	10		44	13	33	37	<1.0
Conductivity - @25°C (µS/cm)	nv	nv	670	640	520	610		2400	480	800	680	1300
Hardness(as $CaCO_3$)	80 - 100 [OG]	360	350	350	260	310		**1400**	240	**380**	310	**730**
Iron	0.3 [AO]	0.2	<0.02	<0.02	<0.02	<0.02	**NM**	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate(as N)	10	2.6	<0.10	<0.10	0.22	<0.10		0.47	0.21	**7.4**	2.2	1.6
pH	6.5 - 8.5 [OG]	6.5 to 8.5	8.0	8.1	8.0	8.2		7.7	8.1	8.0	8.1	7.8
Sodium	200 [AO]	106	10	5.1	9.0	8.7		43	7.9	20	19	6.4
Sulphate	500 [AO]	267	8.0	28	84	77		**1400**	2.5	25	26	71
Total Kjeldahl Nitrogen(as N)	nv	nv	0.70	0.87	<0.10	0.20		0.46	0.12	0.80	1.1	0.55

Notes:
1. Analytical results are reported in mg/L unless otherwise noted. Analysis completed by Bureau Veritas Laboratories.
2. Reasonable Use Criteria are calculated using MOE Procedure B-7-1
3. AO: Aesthetic Objective; OG = Operational Guideline; MAC = Maximum Acceptable Concentration; IMAC = Interim Maximum Acceptable Concentration; ND: Not Detected
4. Values in **bold** are greater than the Reasonable Use Criteria
5. Shaded values are greater than the ODWS

FALL - 2023

Sampling Date / MW Location / Sample ID	Ontario Drinking Water Standards (ODWS) (mg/L)	MOE Guideline B-7 Reasonable Use Criteria (mg/L)	Sample Identification And Monitoring Well Location									
			22-Nov-23									
			Background/Onsite			North - Downgradient		North Boundary	East Boundary		West Boundary	Onsite
			TW-9S	TW-9D	TW-1	TW-2	TW-3	TW-10	TW-5	TW-5A	TW-8	TW-6
Parameter												
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	320	310	230	190	370	58	270	360	350	**890**
Ammonia(as N)	nv	nv	<0.050	0.21	<0.050	<0.050	0.11	0.49	0.68	1.5	0.09	7.00
Chloride	250 [AO]	133	19	10	13.0	4.1	19	41	19	29	44	4.0
Conductivity - @25°C (µS/cm)	nv	nv	650	630	630	530	800	2300	570	870	870	1600
Hardness(as $CaCO_3$)	80 - 100 [OG]	360	**380**	**380**	350	300	**420**	**1500**	310	**470**	**440**	**910**
Iron	0.3 [AO]	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03
Nitrate(as N)	10	2.6	<0.10	<0.10	0.14	0.2	<0.10	0.30	1.5	**6.2**	1.3	<0.10
pH	6.5 - 8.5 [OG]	6.5 to 8.5	8.0	8.1	8.0	8.1	7.7	7.7	8.0	8.0	7.8	7.7
Sodium	200 [AO]	106	10	5.8	9.2	10	21	46	7.4	24	29	24
Sulphate	500 [AO]	267	7.7	30	74	78	36	**1200**	4.0	36	41	37
Total Kjeldahl Nitrogen(as N)	nv	nv	0.40	0.58	0.13	<0.10	0.95	1.0	0.91	1.8	<0.50	11

Notes:
1. Analytical results are reported in mg/L unless otherwise noted. Analysis completed by Bureau Veritas Laboratories.
2. Reasonable Use Criteria are calculated using MOE Procedure B-7-1
3. AO: Aesthetic Objective; OG = Operational Guideline; MAC = Maximum Acceptable Concentration; IMAC = Interim Maximum Acceptable Concentration; ND: Not Detected
4. Values in **bold** are greater than the Reasonable Use Criteria
5. Shaded values are greater than the ODWS

Table 5:
Summary of Surface Water Quality and Comparison to PWQO

Spring Monitoring - 2023				
Parameter	**PWQO (mg/L)**	**SW-1 (Upstream)**	**SW-2 (Upstream)**	**SW-5 (Downstream)**
Alkalinity (as $CaCO_3$)	**345	270	290	260
Total Ammonia (as N)	nv	<0.050	<0.050	<0.050
Chloride	nv	22	18	19
Conductivity - @25°C (µS/cm)	nv	640	670	630
Iron	0.3	0.1	0.04	0.08
pH	6.5-8.5	8.21	8.36	8.24
Phenols	0.001	<0.0010	<0.0010	<0.0010
Phosphorus, Total	nv	0.007	<0.004	<0.004

	Fall Monitoring - 2023			
Parameter	**PWQO (mg/L)**	**SW-1 (Upstream)**	**SW-2 (Upstream)**	**SW-5 (Downstream)**
Alkalinity (as $CaCO_3$)	**345	320	310	310
Total Ammonia (as N)	nv	<0.050	<0.050	<0.050
Chloride	nv	20	21	20
Conductivity - @25°C (µS/cm)	nv	710	700	710
Iron	0.3	0.07	0.20	0.07
pH	6.5-8.5	8.33	8.17	8.24
Phenols	0.001	<0.0010	<0.0010	<0.0010
Phosphorus, Total	nv	<0.020	<0.020	<0.020

Notes:
1. Analytical results are reported in mg/L unless otherwise noted
2. PWQO: Provincial Water Quality Objective
3. NV: No Value
3. na: Not Available
5. **** Alkalinity should not be decreased by more than 25% of background.
6. Values in **BOLD** and shaded indicate exceedance of PWQO.

Table 3:
REASONABLE USE CRITERIA - OBJECTIVE LEVELS

Parameter	Background Concentration (Cb)	Maximum Concentration (Cr)	Objective Level (Cm)
Alkalinity(as $CaCO_3$)	309	30 - 500 [OG]	404
Ammonia(as N)	0.1	nv	nv
Calcium	56	nv	nv
Chloride	16	250 [AO]	133
Conductivity - @25°C (µS/cm)	648	nv	nv
Hardness(as $CaCO_3$)	346	80-100 [OG]	360*
Iron	<0.02	0.3 [AO]	0.16
Magnesium	--	nv	nv
Nitrate(as N)	0.12	10 (MAC)	2.6
pH	8.09	6.5-8.5 [OG]	6.5 to 8.5
Sodium	10	200 [AO]	105
Sulphate	31	500 [AO]	265
Total Kjeldahl Nitrogen(as N)	nv	nv	nv

Notes:

***** The background concentrations for these parameters exceed the ODWS. Therefore, the RUC is set at the maximum measured naturally occurring concentration in the background well

AO = Aesthetic Objective

OG = Operational Guideline

MAC = Maximum Acceptable Concentration

Background Concentrations are based on concentrations reported from TW-9S&D from 2019 to present

MOE Procedure B-7-1

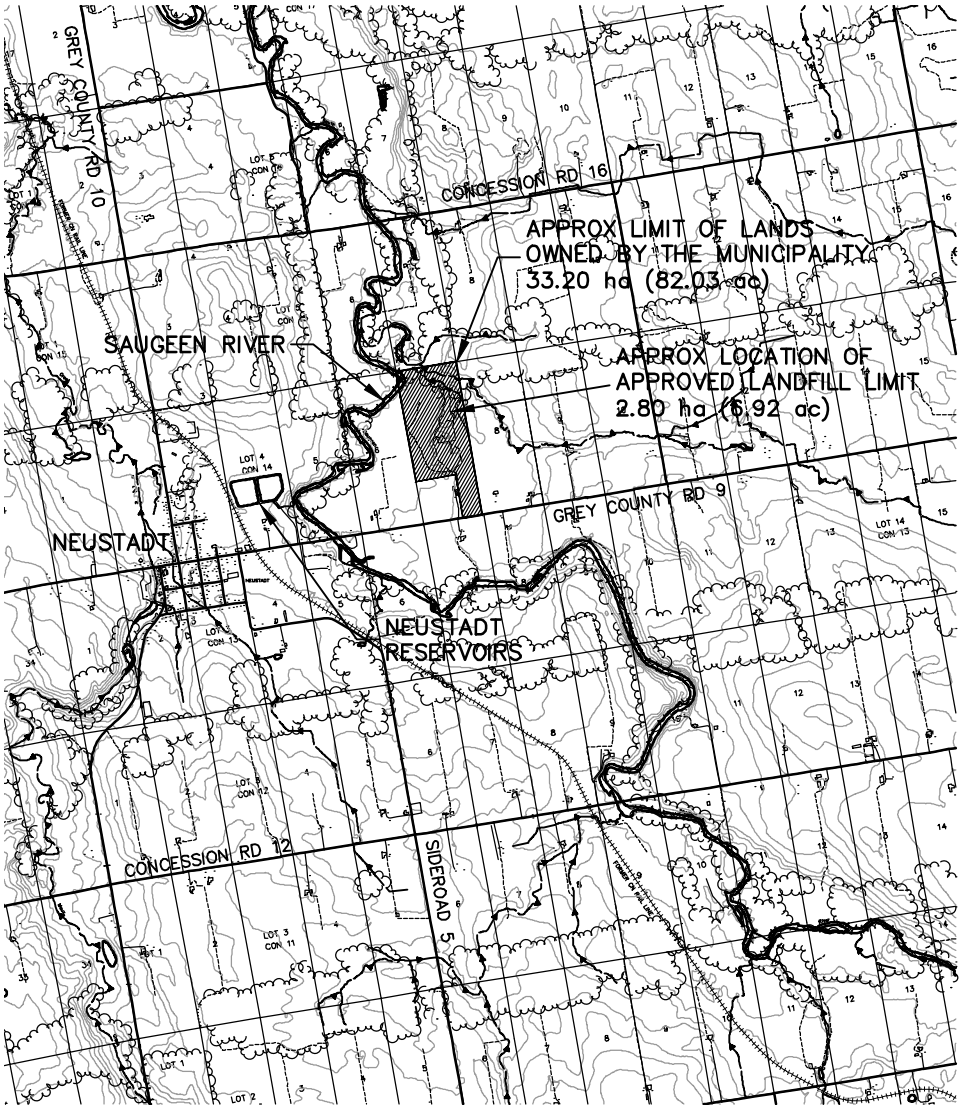
$Cm = Cb + x(Cr-Cb)$

Where:

Cm = Maximum Concentration Acceptable in Groundwater at Property Line
Cb = Background Concentration from OW-8 from 2004 to Present
Cr = Maximum Concentration Acceptable in Groundwater as per Ontario Drinking Water Standards (ODWS)
x = A Constant; Being 0.5 for Non-Health related Parameters, and 0.25 for Helath Related Parameters

FIGURES:

213087
Normanby Landfill
Municipality of West Grey



SCALE 1:50,000
MARCH 2024

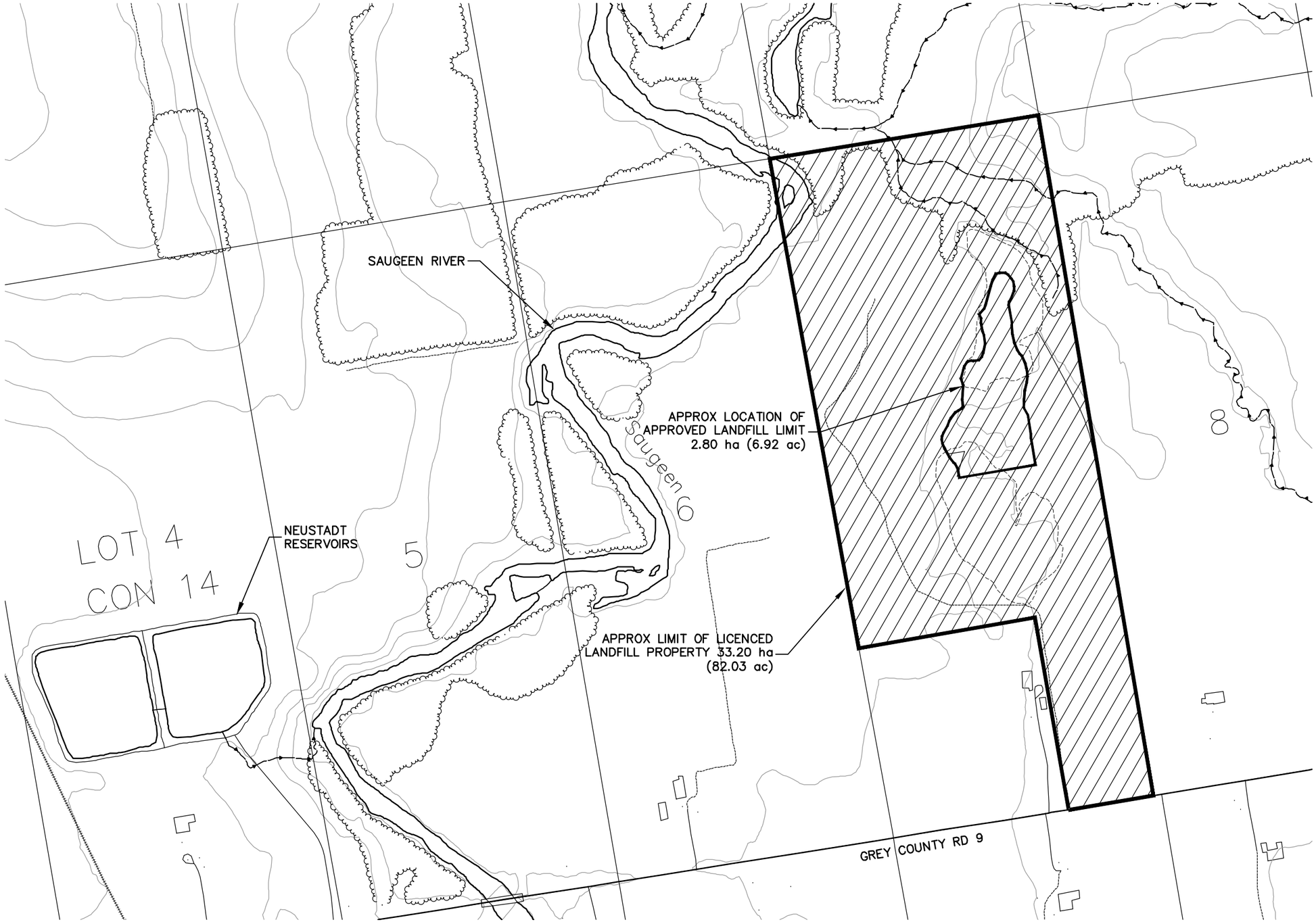
SITE LOCATION MAP

Part Lot 7, Concession 14
Former Township of
Normanby

Figure No. 1

BluePlan ENGINEERING

213087
Normanby Landfill
Municipality of West Grey



LEGEND

LICENCED LANDFILL PROPERTY

SCALE 1:6,000
MARCH 2024

SITE LAYOUT PLAN

Part Lot 7, Concession 14
Former Township of Normanby

Figure No. 2

BluePlan ENGINEERING

FILE:C:\Carri Documents\2023 Landfills\213087 AMR Normanby Fig 1-2-C.dwg LAYOUT:FIG 2
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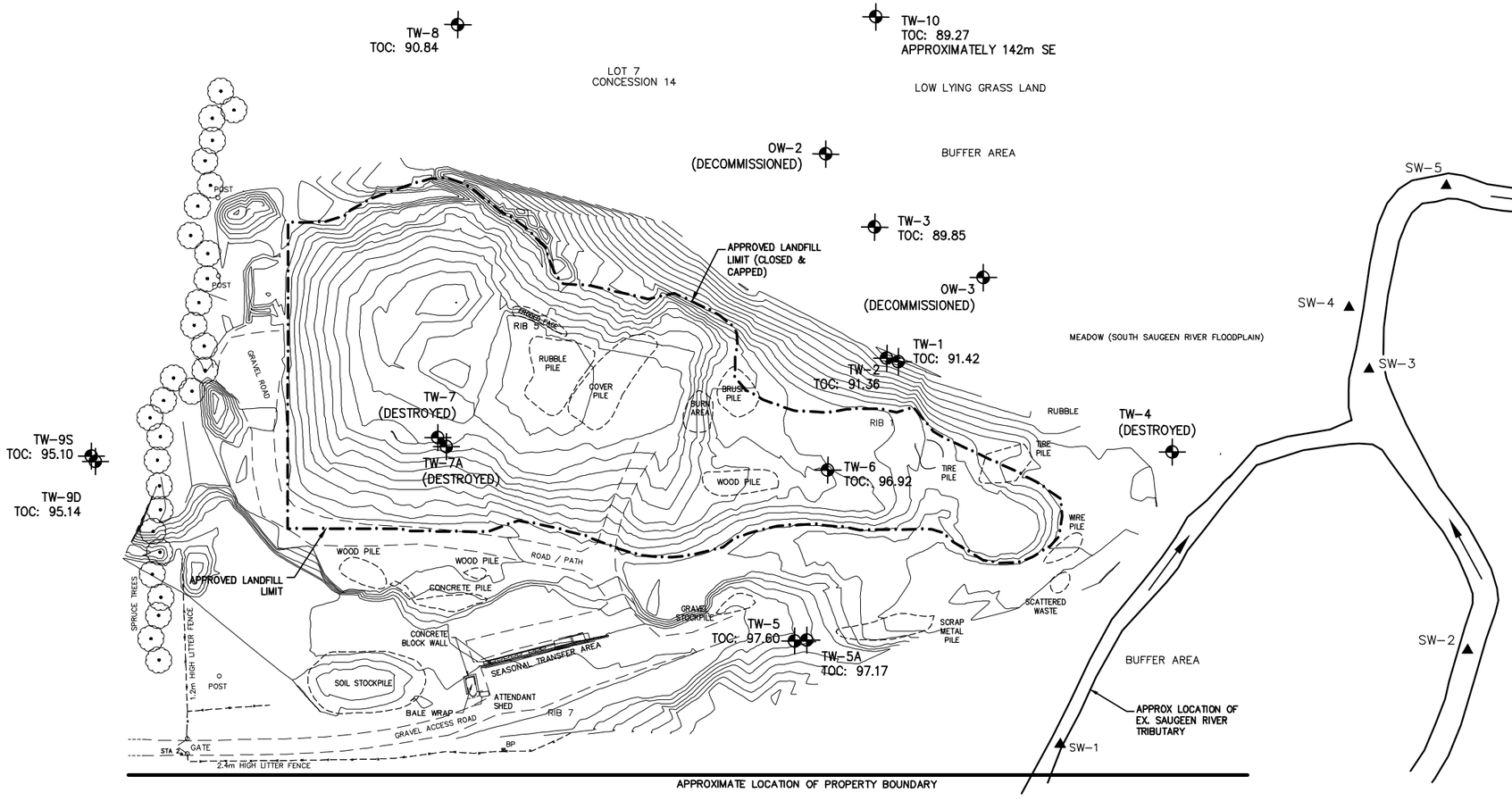
213087
Normanby Landfill
Municipality of West Grey



LEGEND

- TW/OW — MONITORING WELL LOCATION
- SW-2 — SURFACE WATER SAMPLE LOCATION
- TOC — TOP OF CASING ELEVATION
- APPROVED LANDFILL AREA
- PROPERTY BOUNDARY

NOTES

1. TOPOGRAPHIC FEATURES SHOWN ON THIS PLAN ARE BASED ON FIELD SURVEY DATA BY GENIVAR INC. ON DECEMBER 4, 2012, AND ACTIVE AREA SURVEY BY GM BLUEPLAN LTD. ON DECEMBER 21, 2016.

SCALE - 1:2,000
MARCH 2024

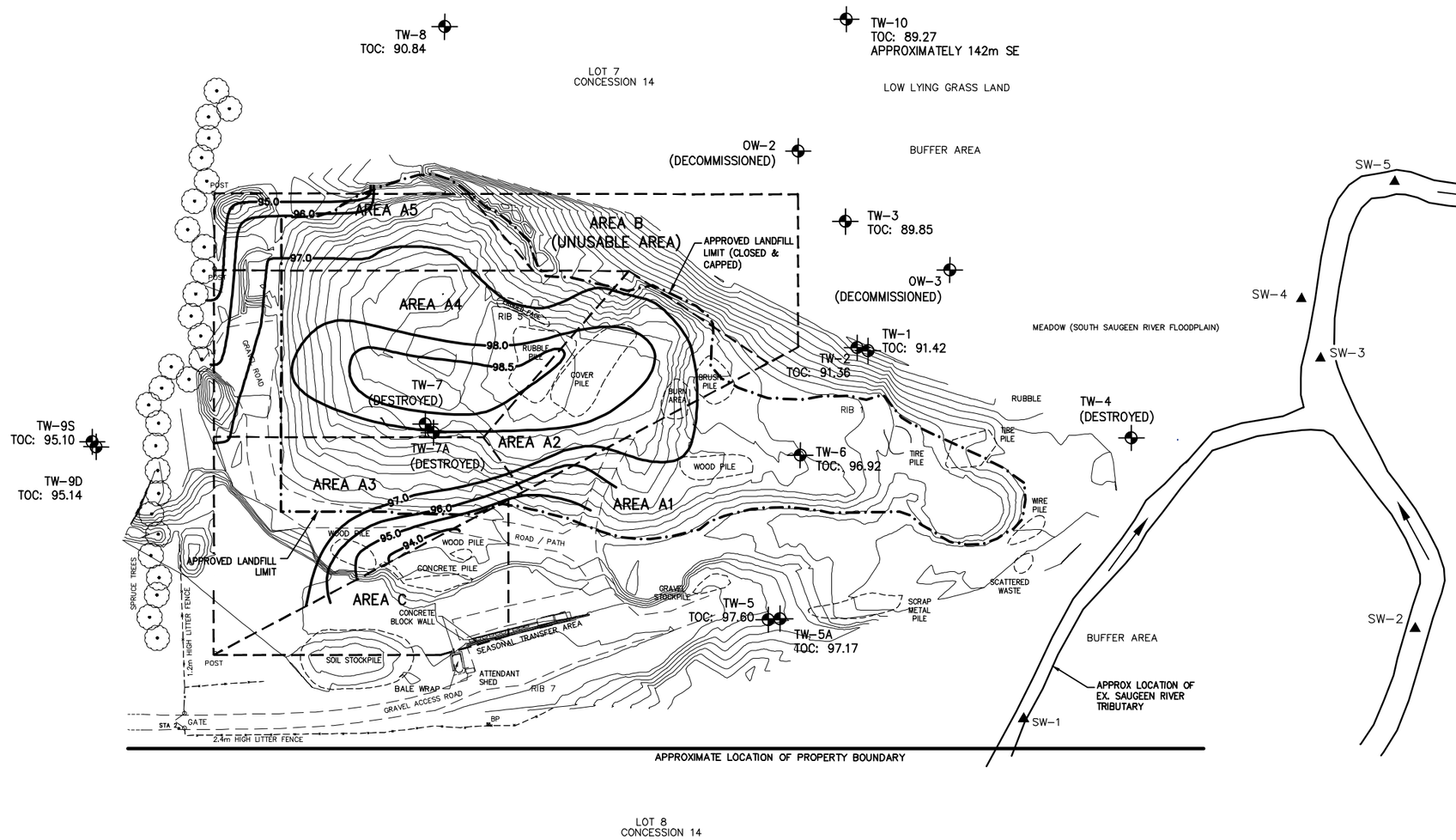
EXISTING CONDITIONS PLAN

Part Lot 7, Concession 14
Former Township of Normanby

Figure No. 3

BluePlan ENGINEERING

213087
Normanby Landfill
Municipality of West Grey



LEGEND

- TW/OW — MONITORING WELL LOCATION
- SW-2 — SURFACE WATER SAMPLE LOCATION
- TOC — TOP OF CASING ELEVATION
- 98.0 — PROPOSED FINAL CONTOUR
- APPROVED LANDFILL AREA
- PROPERTY BOUNDARY

NOTES

1. TOPOGRAPHIC FEATURES SHOWN ON THIS PLAN ARE BASED ON FIELD SURVEY DATA BY GENIVAR INC. ON DECEMBER 4, 2012, AND ACTIVE AREA SURVEY BY GM BLUEPLAN LTD. ON DECEMBER 21, 2016.

SCALE - 1:2,000
MARCH 2024

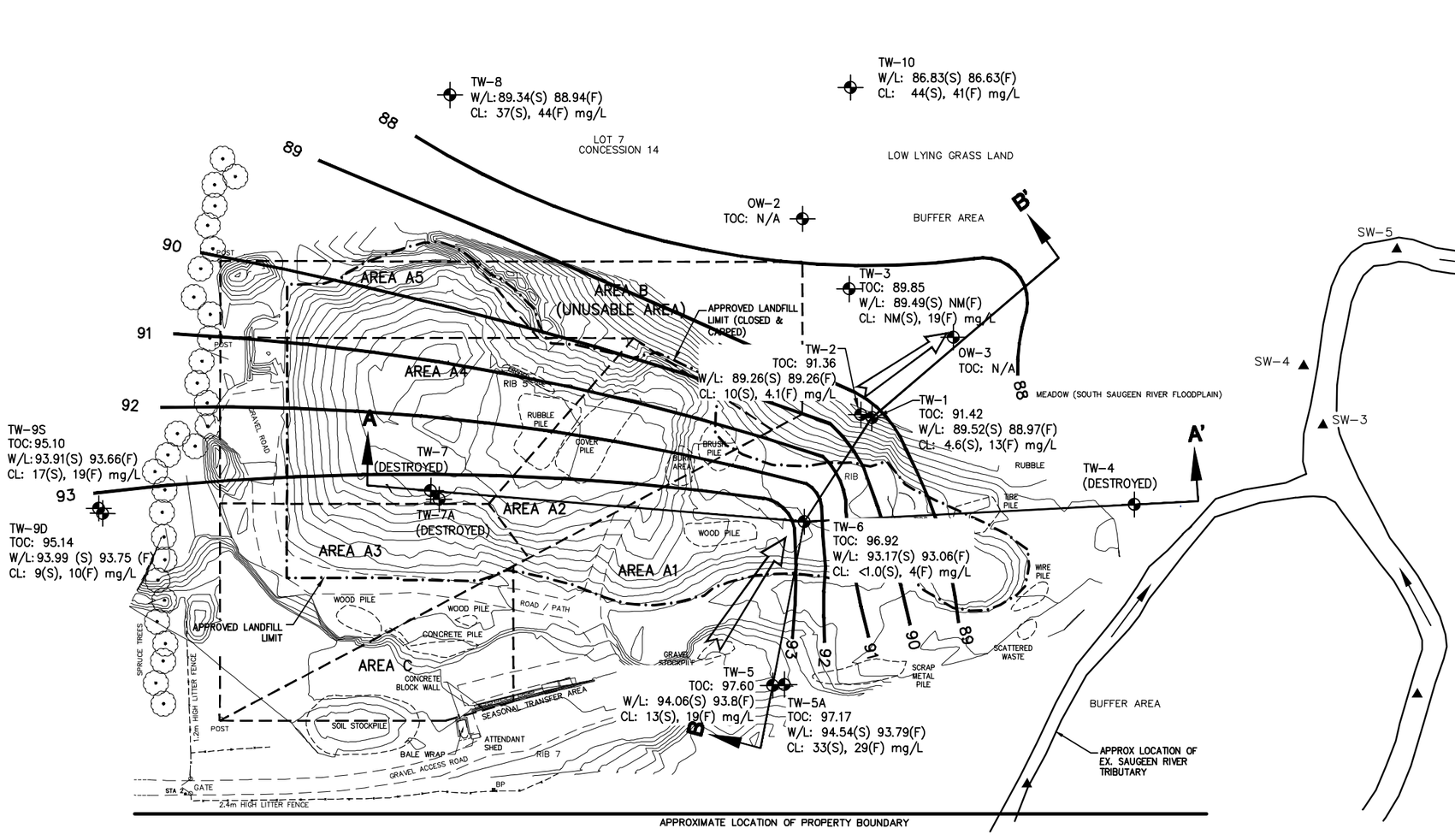
FINAL CONTOUR PLAN

Part Lot 7, Concession 14
Former Township of Normanby

Figure No. 3a

BluePlan ENGINEERING

213087
Normanby Landfill
Municipality of West Grey



LOT 8
CONCESSION 14

LEGEND

TW/OW	MONITORING WELL LOCATION
SW-2	SURFACE WATER SAMPLE LOCATION
TOC	TOP OF CASING ELEVATION
W/L	GROUNDWATER ELEVATION
CL	CHLORIDE CONCENTRATION
(S)/(F)	SPRING/FALL MONITORING ROUND
	APPROVED LANDFILL AREA
	PROPERTY BOUNDARY
91.0	GROUNDWATER CONTOUR
	INFERRED DIRECTION OF GROUNDWATER FLOW

NOTES

1. TOPOGRAPHIC FEATURES SHOWN ON THIS PLAN ARE BASED ON FIELD SURVEY DATA BY GENIVAR INC. ON DECEMBER 4, 2012, AND ACTIVE AREA SURVEY BY GM BLUEPLAN LTD. ON MAY 15, 2018.
2. GROUNDWATER CONTOURS DERIVED FROM GROUNDWATER ELEVATIONS OBTAINED DURING THE 2022 MONITORING ROUND.

SCALE - 1:2,000
MARCH 2024

MONITORING LOCATIONS & GROUNDWATER CONTOUR PLAN

Part Lot 7, Concession 14
Former Township of Normanby

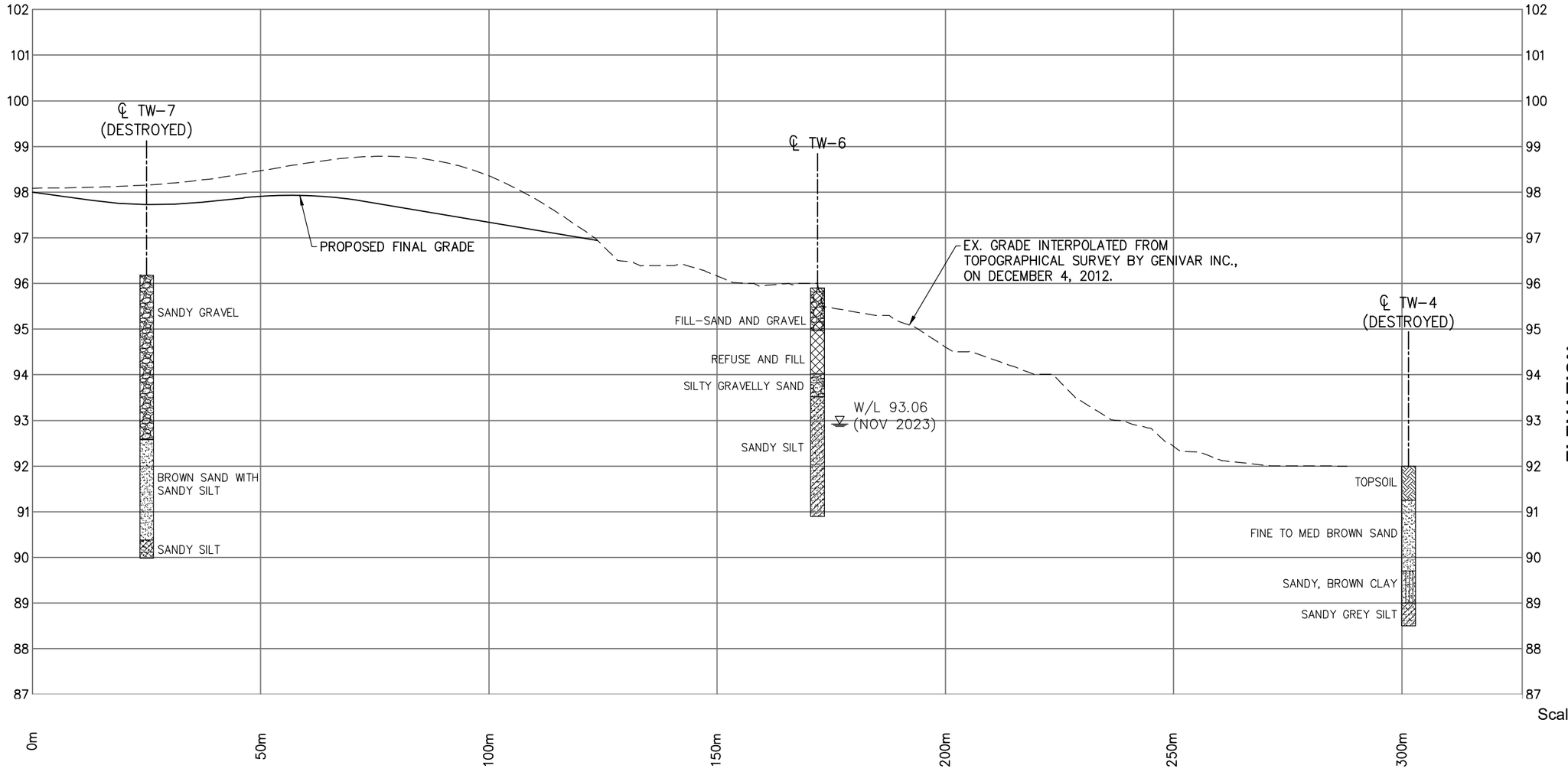
Figure No. 4

BluePlan ENGINEERING

213087
Normanby Landfill
Municipality of West Grey

A

A'



Scale - 1:1000 Horiz.
1:100 Vert.

MARCH 2024

CROSS SECTION A-A'

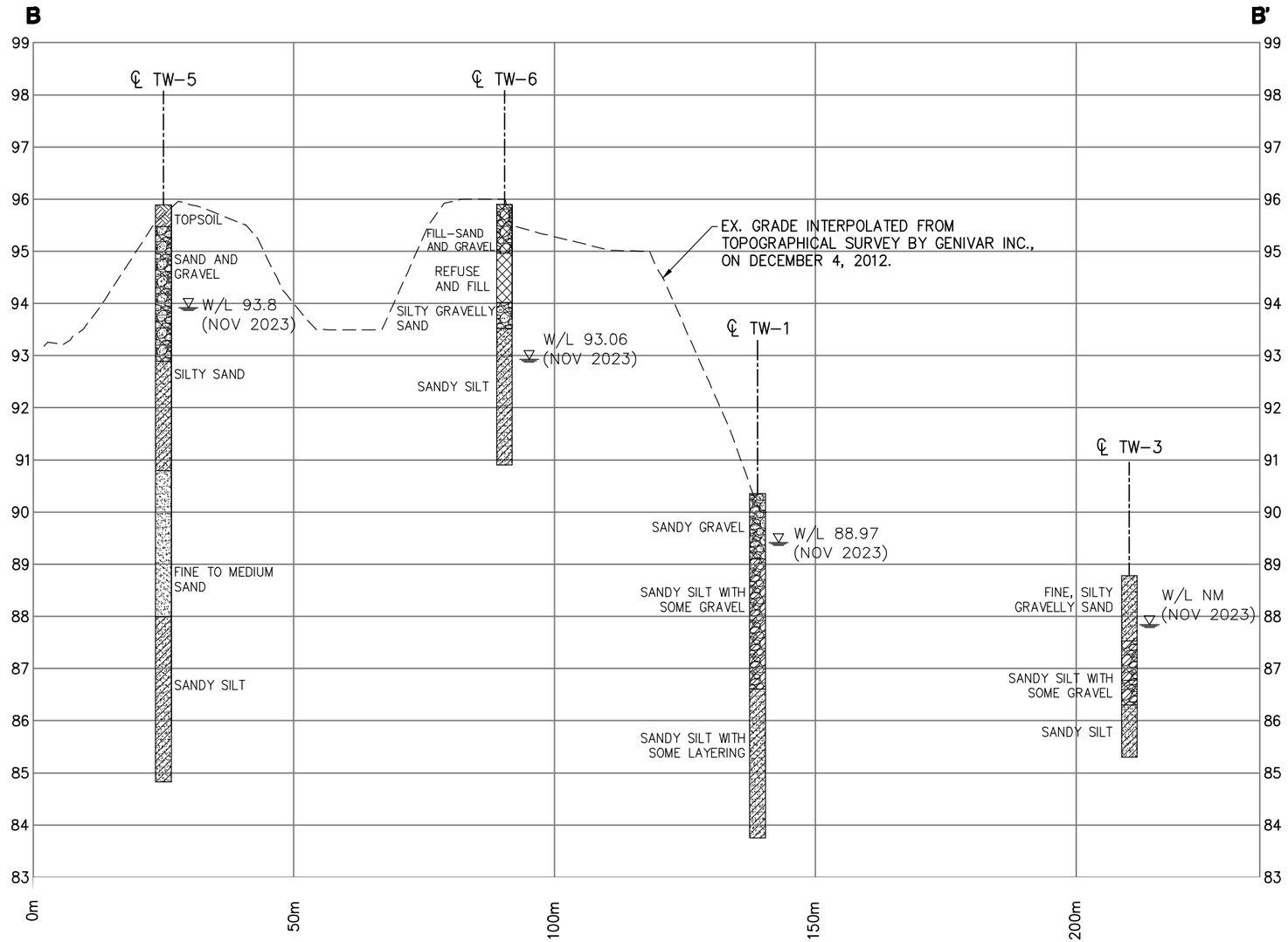
Figure No. 5a

NOTES:

1. 10x VERTICAL EXAGGERATION.

BluePlan ENGINEERING

213087
Normanby Landfill
Municipality of West Grey



NOTES:

1. 10x VERTICAL EXAGGERATION.

Scale - 1:1000 Horiz.
1:100 Vert.

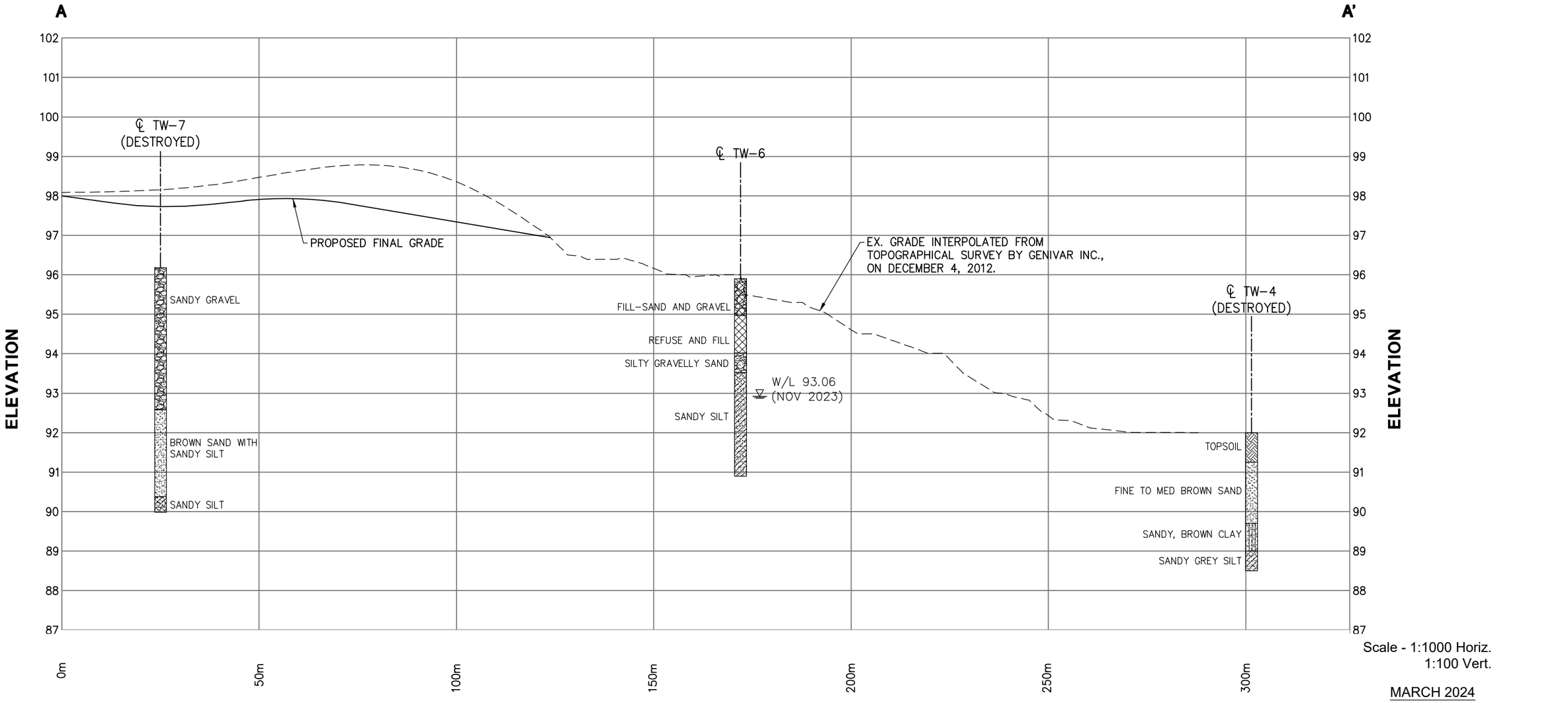
MARCH 2024

CROSS SECTION B-B'

Figure No. 5b

BluePlan ENGINEERING

213087
Normanby Landfill
Municipality of West Grey



Scale - 1:1000 Horiz.
1:100 Vert.

MARCH 2024

CROSS SECTION A-A'

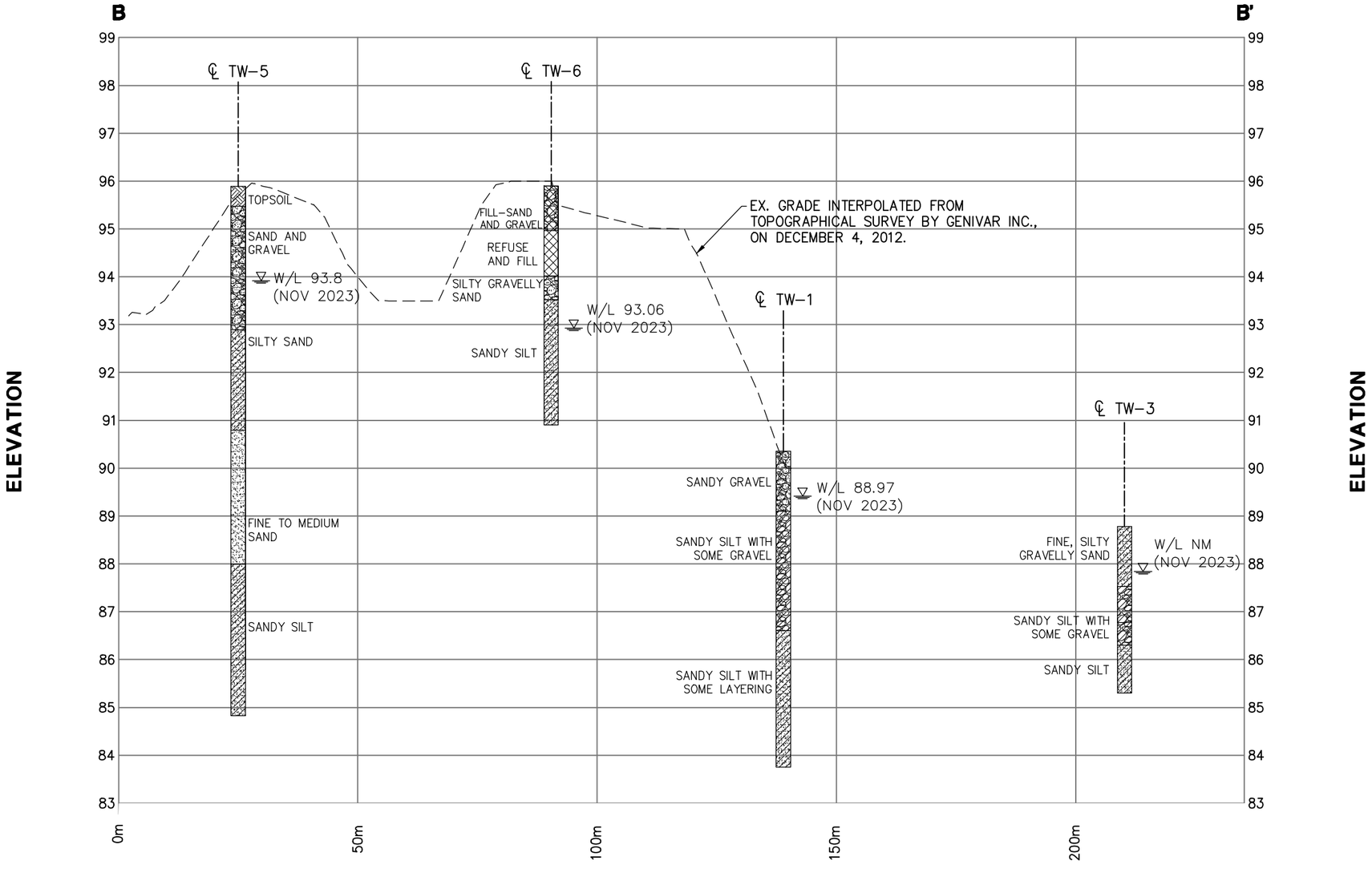
Figure No. 5a

NOTES:

1. 10x VERTICAL EXAGGERATION.

BluePlan ENGINEERING

213087
Normanby Landfill
Municipality of West Grey



NOTES:

1. 10x VERTICAL EXAGGERATION.

Scale - 1:1000 Horiz.
1:100 Vert.

MARCH 2024

CROSS SECTION B-B'

Figure No. 5b

BluePlan ENGINEERING

APPENDIX A:
CERTIFICATE OF APPROVAL NO. A262104

Fik 101818

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A262104
Notice No. 3
Issue Date: August 31, 2012

RECEIVED
SEP 10 2012

The Corporation of the Municipality of West Grey
Rural Route, No. 2
Durham, Ontario
N0G 1R0

Site Location: Normanby Landfill Site
221291 Grey Road 16 Part of Lot 7, Concession 14
West Grey Municipality, County of Grey
N0G 2M0

You are hereby notified that I have amended Approval No. A262104 issued on June 24, 2005, as amended for a Waste Disposal Site, covering a 2.8 hectare waste fill area, within a total Site area of 33 hectares , as follows:

SUBMISSION OF REPORT - DEVELOPMENT AND OPERATIONS REPORT, ADDENDUM No. 1

Pursuant to Condition 55 in Environmental Compliance Approval No. A262104, dated September 28, 2011, approval is hereby granted for the design and operation of the Waste Diversion/Transfer Facility at the Normanby Landfill Site, as presented in a report entitled "Development and Operations Report, Addendum No. 1", dated November, 2011, prepared by GENIVAR Inc, which is listed as Item 11 under Documentation below.

Documentation

The following item is hereby added to Schedule "A" and forms part of the Environmental Compliance Approval, No. A262104 :

11. Letter dated January 13, 2012 from Peter Brodzikowski to Tesfaye Gebrezghi, Director, Ministry of the Environment, with attached report entitled "Development and Operations Report, Addendum No. 1", Normanby Landfill, Municipality of West Grey", Waste Diversion and Transfer Facilities, dated November, 2011, prepared by GENIVAR Inc.

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

TERMS AND CONDITIONS

56. The operation of the Waste Diversion/Transfer Facility at the Normanby Landfill Site, for the acceptance, temporary storage, and transfer of solid non-hazardous waste, and recyclable waste, shall be operated in accordance with the report entitled "Development and Operations Report, Addendum No. 1", dated November, 2011, Item 11 in Schedule "A", attached to this Approval.

57. All waste storage containers at the Waste Diversion/Transfer Facility shall have labels or signs which clearly identifies the volume and type of waste.

58. The Owner/Operator shall ensure that at the end of each day's operation, the waste storage containers at the Transfer Station are covered with tarps, or other appropriate means, to prevent blowing litter, and to prevent interference of the waste by rodents, birds, vector/vermin, etc.

59. The Owner/Operator shall ensure that all waste is removed from the Transfer Station for disposal at the waste fill area of the Normanby Landfill site or an approved facility, at least once a week, as described in Item 11 in Schedule "A", attached to this Certificate, or more frequently as needed, to prevent odour effects. This Condition is not applicable to Recycleable materials, in which case, shall be removed as needed, based on the storage containers becoming full.

REASONS

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

The reasons for Conditions 56 to 59 are to ensure that the Site including the Waste Diversion and Transfer Facilities, is operated in accordance with the application and supporting documentation submitted by the Owner/Operator, and not in a manner which the Director has not been asked to consider, and that the site is maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to any person or the natural environment.

This Notice shall constitute part of the approval issued under Approval No. A262104 dated June 24, 2005, as amended.

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

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

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

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in

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

This Notice must be served upon:

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

AND

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

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

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

DATED AT TORONTO this 31st day of August, 2012

THIS NOTICE WAS MAILED
ON Sept. 6, 2012
P.C.
(Signed)

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

DO/

c: District Manager, MOE Owen Sound
Peter Brdzikowski, P. Eng., GENIVAR ✓

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A262104
Notice No. 2
Issue Date: September 28, 2011

The Corporation of the Municipality of West Grey
402813 Grey Road 4
West Grey, Ontario
N0G 1R0

Site Location: Normanby Landfill Site
221291 Grey Road 16 Part of Lot 7, Concession 14
West Grey Municipality, County of Grey
N0G 2M0

You are hereby notified that I have amended Provisional Certificate of Approval No. A262104 issued on June 24, 2005, as amended for a Waste Disposal Site, covering a 2.8 hectare waste fill area, within a total Site area of 33 hectares, as follows:

ALTERATION OF FINAL WASTE CONTOURS

Pursuant to Condition 4 in the Provisional Certificate of Approval dated June 24, 2005, approval is hereby granted for the alteration of the final waste contours to the southern third of the Normanby Landfill Site, as described in a letter dated November 10, 2010, from GENIVAR to the Ministry of the Environment, and shown on attached Drawing No. 0181813 - 2010FCW, dated November 1, 2010, which is listed as Item 10 under Documentation below.

Documentation

The following item is hereby added to Schedule "A" and forms part of the Provisional Certificate of Approval, No. A262104:

10. Letter dated November 10, 2010, from Peter S. Brodzikowski and Brian R. Scott, GENIVAR to the Director, Environmental Assessment and Approvals Branch, Ministry of the Environment, and attached Drawing No. 0181813 - 2010FCW, dated November 1, 2010 entitled "Proposed Final Contours (Top of Waste), Normanby Landfill Site, Municipality of West Grey".

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

TERMS AND CONDITIONS

Capacity

Condition 28 in the Provisional Certificate of Approval, No. A262104, dated June 24, 2005, is hereby revoked and replaced with new Condition 28 as follows:

28. No waste shall be landfilled at any time above the final contours, shown on Drawing No. 0181813 - 2010FCW, dated November 1, 2010 entitled "Proposed Final Contours (Top of Waste), attached to Item 10, in Schedule "A" attached to this Certificate. The maximum elevation of the top of waste in the fill area, shall not exceed 100.00 metres above sea level. Final slopes above grade within the waste fill area at the time of site closure, shall be within the range of 4H:1V on the sideslopes and 20H:1V on the top flat areas.

Condition 43 is hereby revoked and replaced with new Condition 43 as follows:

43. The current monitoring programs for groundwater/leachate and surface water, as provided in Schedule "B", as amended (attached to this Certificate), and described in letter dated November 10, 2010 and the Development and Operations Report, Item 9 in Schedule "A", attached to the Certificate, and in accordance with any applicable legislation, shall be confirmed through the review of the Development and Operations Report (Item 9 in Schedule "A"), and subsequent Annual Monitoring Reports, by the District Manager.

The following new Condition is hereby added to the Certificate:

55. Within six (6) months of the date of this Notice, the Owner shall submit for the Director's approval, copied to the District Manager, an Updated Design and Operations Plan for the waste recycling/transfer facility at the Normanby Landfill Site. As a minimum, the Updated Design and Operations Plan shall identify the materials/items included in the program, storage locations shown on a full scale site operations drawing, storage capacities and quantities for each material, frequency of removal, record keeping and reporting, emergency response, etc. and shall address the operational impacts on the natural environment, including nuisance controls.

SCHEDULE "B"

Schedule "B" in the Provisional Certificate of Approval No. A262104, dated June 24, 2005, is hereby revoked and replaced with new Schedule "B" below, which forms part of the Provisional Certificate of Approval No. A262104, as amended:

Date	Sampling Location	Analytical Parameters
Water Levels: Spring, Fall	TW-1, TW-2, TW-3, TW-5, TW-5A, TW-6, OW-2 and OW-3	
Groundwater: Spring & Fall	TW-1, TW-2, TW-3, TW-5, TW-5A, TW-6, OW-2 and OW-3	CWC - Conductivity, Chlorides, Alkalinity, Iron, pH, Total Ammonia, Hardness, Sodium, Nitrate, Sulphate, TKN;
Surface Water: Spring & Fall	SW-1, SW-2, SW-3, SW-4, SW-5	Conductivity, Chloride, Iron, Alkalinity, pH, Total Ammonia, Total Phosphorous Phenols, Dissolved Oxygen, Temp. (in field);

Duplicates: 1 in 10 per water type (groundwater, surface water)

REASONS

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

1. The reason for Condition 28 is to ensure that the Site is operated to the approved capacity and that the closed site is graded appropriately to allow free surface water drainage.

2. The reasons for Condition 43 are to demonstrate that the landfill site is performing as designed, and that the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensuress that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.

3. The reason for Condition 55 is to ensure that the Site is operated, inspected and maintained in an environmentally acceptable manner as approved by the Ministry, and does not result in a hazard or nuisance to any person or the natural environment.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A262104 dated June 24, 2005

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

shall state:

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

The Notice should also include:

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

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

AND

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

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

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

DATED AT TORONTO this 28th day of September, 2011

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

DO/
c: District Manager, MOE Owen Sound
Peter Brodzikowski/Brian Scott, GENIVAR Consultants LP

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A262104
Notice No. 1
Issue Date: October 16, 2008

The Corporation of the Municipality of West Grey
Rural Route, No. 2
Durham, Ontario
N0G 1R0

Site Location: Normanby Landfill
Lot 7, Concession 14
West Grey Municipality, County of Grey

You are hereby notified that I have amended Provisional Certificate of Approval No. A262104 issued on June 24, 2005 for a Waste Disposal Site, covering a 2.8 hectare waste fill area, within a total Site area of 33 hectares , as follows:

SUBMISSION OF DESIGN AND OPERATIONS REPORT

Pursuant to Condition 32 in Provisional Certificate of Approval No. A262104 dated June 24, 2005, approval is hereby granted for the development and operation of the Normanby Landfill Site as presented in a report entitled "Development and Operations Report" dated December 2006, prepared by Henderson Paddon & Associates Limited, which is listed as Item 9 under Documentation below.

Documentation

The following item is hereby added to Schedule "A" and forms part of the Provisional Certificate of Approval, No. A262104 :

9. Report entitled "Development and Operations Report" Normanby Landfill, Municipality of West Grey", dated December 2006, prepared by Henderson Paddon & Associates Limited.

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

TERMS AND CONDITIONS

Monitoring Program

Condition 43 is hereby revoked and replaced with new Condition 43 as follows:

43. The current monitoring programs for groundwater/leachate and surface water, as provided in Schedule "B" and described in the Development and Operations Report, Item 9 in Schedule "A", attached to this Certificate, and in accordance with any applicable legislation, shall be confirmed through the review of the Development and Operations Report (Item 9 in Schedule "A"), and subsequent Annual Monitoring Reports, by the District Manager.

The following new Conditions are hereby added to the Certificate:

50. A recommendation for proposed changes to the monitoring programs under this Certificate may be made in the Annual Monitoring Reports, based on the results to date, and may be implemented subject to the prior written concurrence of the District Manager.

51. Any groundwater/leachate monitoring wells included in the monitoring program that get damaged or in any way made inoperable for sampling, shall be assessed, repaired, replaced or decommissioned, as the case may be, by the landfill Owner.

Trigger Mechanisms and Contingency Plans

52. The Site specific Trigger Mechanism and Contingency Plans for groundwater/leachate, surface water and landfill gas, as described in Sections 8.2 to 8.3 in the Development and Operations Report, Item 9 in Schedule "A" attached to the Certificate, shall be confirmed through the review of the Development and Operations Report, by the District Manager.

53. In the event of contaminant concentration exceeding acceptable levels, relating to leachate mounding or groundwater and/or surface water impacts due to leachate or landfill gas, the Owner shall immediately notify the District Manager, and an investigation into the cause and the need to implement a remedial or contingency action shall be submitted for the written acceptance of the District Manager.

54. The Owner/Operator shall implement the accepted remedial or contingency action as soon as practicable to address the problem.

REASONS

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

1. The reason for amending Condition 43 is to reflect the monitoring programs for the Site, as provided in this Certificate and as described in the Development and Operations Report submitted by the Owner. Regular monitoring demonstrates that the landfill site is performing as designed and the impacts on the

natural environment are acceptable, and allows for the analysis of trends over time to ensure that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.

2. The reason for Conditions 50 and 51 is to provide for regular review of the performance of the site design to demonstrate that impacts to the natural environment are within acceptable limits.

3. The reasons for Conditions 52 to 54 are to ensure that the Owner follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site. A remedial action / contingency plan is necessary to ensure protection of the natural environment and public health and safety.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A262104 dated June 24, 2009

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

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

The Notice should also include:

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

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

AND

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

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

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

DATED AT TORONTO this 16th day of October, 2008

THIS NOTICE WAS MAILED
ON Oct. 23, 2005
DC
(Signed)

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

DC/
c: District Manager, MOE Owen Sound
Frank C. Ford, M.A.Sc., P.Eng., Henderson Paddon & Associates Limited ✓

Ontario

Ministry of the Environment | Ministère de l'Environnement

AMENDED PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A282104

The Corporation of the Municipality of West Grey
Rural Route, No. 2
Durham, Ontario
N0G 1R0

Site Location: Normanby Landfill
Lot 7, Concession 14
West Grey Municipality, County of Grey

You have applied in accordance with Section 27 of the Environmental Protection Act for approval of:

the use and operation of a Waste Disposal Site consisting of a 2.8 hectare landfilling area

which included the use of the Site for 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, commercial and solid non-hazardous industrial waste.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

a. "*Anniversary Date*" means the date on which waste is first received at the *Site*;

b. "*Certificate*" means this entire provisional Certificate of Approval document, issued in accordance with section 39 of the *EPA*, and includes any schedules to it, the application and the supporting documentation listed in schedule "A";

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

d. "*District Manager*" means the District Manager of the local district office of the *Ministry* in which the *Site* is geographically located;

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

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

g. "*Owner*" means any person that is responsible for the establishment or operation of the site being approved by this *Certificate*, and includes the Municipality of West Grey, its successors and assigns;

h. "*OWRA*" means the *Ontario Water Resources Act*, R.S.O. 1990, c. O-40, as amended from time to time;

i. "*PA*" means the *Pesticides Act*, R.S.O. 1990, c. P-11, as amended from time to time;

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

k. "*Regional Director*" means the Regional Director of the local Regional Office of the *Ministry* in which the Site is located.

l. "*Regulation 347*" or "*Reg. 347*" means Regulation 347, R.R.O. 1990, made under the *EPA*, as amended from time to time;

m. "*Site*" means the entire waste disposal site, including buffer lands located at Part of Lot 7, Concession 14, Township of Normanby, County of Grey, approved by this *Certificate*.

n. "*Trained personnel*" means knowledgeable in the following through instruction and/or practice:
i. relevant waste management legislation, regulations and guidelines;
ii. major environmental concerns pertaining to the waste to be handled;
iii. occupational health and safety concerns pertaining to the processes and wastes to be handled;
iv. management procedures including the use and operation of equipment for the processes and wastes to be handled;
v. emergency response procedures;
vi. specific written procedures for the control of nuisance conditions;
vii. specific written procedures for refusal of unacceptable waste loads;
viii. the requirements of this *Certificate*.

o. "*white goods containing refrigerants*" means appliances and equipment which contain, or may contain refrigerants, and which include, but are not restricted to, refrigerators, freezers, humidifiers and air-conditioning systems;

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

TERMS AND CONDITIONS

Compliance

1. This Provisional Certificate of Approval supersedes and replaces Provisional Certificate Number A262104 issued on February 2, 1987.

2. The *Owner* and *Operator* shall ensure compliance with all the conditions of this Certificate and shall ensure that any person authorized to carry out work on or operate any aspect of the *Site* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

3. Any person authorized to carry out work on or operate any aspect of the *Site* shall comply with the conditions of this *Certificate*.

In Accordance

4. Except as otherwise provided for in this *Certificate*, the *Site* shall be designed, developed, built, operated and maintained in accordance with the application for this *Certificate* and the supporting documentation listed in Schedule "A".

Interpretation

5. Where there is a conflict between a provision of any document, including the application, referred to in this *Certificate*, and the conditions of this *Certificate*, the conditions in this *Certificate* shall take precedence.

6. Where there is a conflict between the application and a provision in any documents listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and that the *Ministry* approved the amendment.

7. Where there is a conflict between any two documents listed in Schedule "A", other than the application, the document bearing the most recent date shall take precedence.

8. The conditions of this *Certificate* are severable. If any condition of this *Certificate*, or the application of any condition of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this *Certificate* shall not be affected thereby.

Other Legal Obligations

9. The issuance of, and compliance with, this *Certificate* does not:

a. relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or
b. limit in any way the authority of the *Ministry* to require certain steps be taken or to require the *Owner* and *Operator* to furnish any further information related to compliance with this *Certificate*.

Adverse Effect

10. The *Owner* and *Operator* shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of water quality resulting from the *Site*, including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

11. Despite an *Owner*, *Operator* or any other person fulfilling any obligations imposed by this certificate, the person remains responsible for any contravention of any other condition of this *Certificate* or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect to the natural environment or impairment of water quality.

Change of Owner

12. The *Owner* shall notify the *Director*, in writing, and forward a copy of the notification to the *District Manager*, within 30 days of the occurrence of any changes in the following information:
a. the ownership of the *Site*;
b. the Operator of the *Site*;
c. the address of the *Owner* or *Operator*;
d. the partners, where the *Owner* or *Operator* is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act*, R. S. O. 1990, c. B.17, shall be included in the notification.

13. No portion of this *Site* shall be transferred or encumbered prior to or after closing of the *Site* unless the *Director* is notified in advance and sufficient financial assurance is deposited with the *Ministry* to ensure that these conditions will be carried out. In the event of any change in *Ownership* of the works, other than change to a successor municipality, the *Owner* shall notify the successor of and provide the successor with a copy of this *Certificate*, and the Owner shall provide a copy of the notification to the *District Manager* and the *Director*.

Certificate of Requirement/ Registration on Title

14. The Owner shall:
a. within 60 days of the date of this *Certificate*, submit to the *Director*, for *Director's* signature, two copies of a completed Certificate of Requirement containing a registerable description of the Property, in accordance with the attached form;
b. within 10 calendar days of receiving the Certificate of Requirement signed by the *Director*, register the Certificate of Requirement in the appropriate Land Registry Office on title to the Property and submit to the *Director* the duplicate registered copy immediately following registration; and

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

Inspections

16. No person shall hinder or obstruct a *Provincial Officer* from carrying out any and all inspections authorized by the *OWRA*, the *EPA*, or the *PA*, of any place to which this *Certificate* relates, and without limiting the foregoing:
a. to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *Certificate* are kept;
b. to have access to, inspect, and copy any records required to be kept by the conditions of this *Certificate*;
c. to inspect the *Site*, related equipment and appurtenances;
d. to inspect the practices, procedures, or operations required by the conditions of this *Certificate*; and
e. to sample and monitor for the purposes of assessing compliance with the terms and conditions of this *Certificate* or the *EPA*, the *OWRA* or the *PA*.

Information and Record Retention

17. a. Any information requested, by the *Ministry*, concerning the *Site* and its operation under this *Certificate*, including but not limited to any records required to be kept by this *Certificate* shall be provided to the *Ministry*, upon request, in a timely manner.
b. Records shall be retained for contaminating life span of the *Site* except for as otherwise authorized in writing by the *Director*.

18. The receipt of any information by the *Ministry* or the failure of the *Ministry* to prosecute any person or to require any person to take any action, under this *Certificate* or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:
a. an approval, waiver, or justification by the *Ministry* of any act or omission of any person that contravenes any term or condition of this *Certificate* or any statute, regulation or other legal requirement; or
b. acceptance by the *Ministry* of the information's completeness or accuracy.

Signs

19. A sign shall be installed and maintained at the main entrance/exit to the *Site* on which is legibly displayed the following information:
a. the name of the *Site* and *Owner*;
b. the number of the *Certificate*;
c. the name of the *Operator;*
d. the normal hours of operation;
e. the allowable and prohibited waste types;
f. the telephone number to which complaints may be directed;
g. a twenty-four (24) hour emergency telephone number (if different from above); and
h. a warning against dumping outside the *Site*.

Closure Plan

20. At least 2 years prior to the anticipated date of closure of this *Site*, the *Owner* shall submit to the *Director* for approval, with copies to the *District Manager*, a detailed site closure plan pertaining to the termination of landfilling operations at this *Site*, post-closure inspection, maintenance and monitoring, and end use. The plan shall include the following:
a. a plan showing *Site* appearance after closure;
b. a description of the proposed end use of the *Site*;
c. a descriptions of the procedures for closure of the *Site*, including:

    i. advance notification of the public of the landfill closure;
    ii. posting of a sign at the *Site* entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
    iii. completion, inspection and maintenance of the final cover and landscaping;
    iv. site security;
    v. removal of unnecessary landfill-related structures, buildings and facilities; and
    vi final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
    vii. a schedule indicating the time-period for implementing sub-conditions i. to vi. above.

d. descriptions of the procedures for post-closure care of the Site, including:

    i. operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
    ii. record keeping and reporting; and
    iii. complaint contact and response procedures;

e. an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas;
f. an updated estimate of the contaminating life span of the *Site*, based on the results of the monitoring programs to date.

21. The *Site* shall be closed in accordance with the closure plan as approved by the *Director*.

Operation

22. a. The *Site* shall be operated and maintained at all time including management and disposal of all waste in accordance with the *EPA, Regulation 347,* the conditions of this *Certificate.*
b. At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

Vermin, etc.

23. The *Site* shall be operated and maintained such that the vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.

Burning Waste Prohibited

24. a. burning of waste at the *Site* is prohibited, except for the burning of segregated brush, and unpainted, unstained and unpreserved lumber and in accordance with the Ministry Guideline C-7 "Burning at Landfill Sites" dated April 1994;
b. access to the burning area by the public and unauthorized personnel is prohibited when burning is being carried out;
c. no burning is to occur without the supervision of the operating authority; and
d. a sign shall be installed and maintained at the burn pile describing what is acceptable for depositing at the burn pile.

Waste Type

25. Only the following types of waste shall be accepted at the *Site*:
a. Municipal Waste;
b. Non-hazardous Solid Industrial waste; and
c. Commercial waste.

26. The Owner shall ensure that:
a. all *white goods containing refrigerants* accepted at the *Site*, are stored in a segregated area, in an upright position and in a manner which allows for the safe handling and removal of refrigerants as required by Ontario Regulation 189;
b. refrigerants shall be removed only by a licensed technician in accordance with Ontario Regulation 189;
c. if refrigerants are not removed on *Site*, then the white goods containing refrigerants may only be shipped to a facility which is licensed to remove refrigerants in accordance with Ontario Regulation 189;
d. *white goods containing* refrigerants stored on *Site* shall be clearly marked as to whether or not refrigerants have been removed; and
e. a detailed log of all *white goods containing refrigerants* received is maintained and includes the following information:

i. date of the record;
ii. types, quantities and source of *white goods containing refrigerants* received;
iii. quantity and destination of the white goods transferred from the Site without prior removal of refrigerants;
iv. the details of on-Site removal of refrigerants, and the quantities and destination of the refrigerants transferred from the *Site*.

27. The *Operator* shall develop and implement a program to inspect waste to ensure that the waste is of a type approved for acceptance under this *Certificate*.

Capacity

28. The *Owner* shall only accept and deposit waste at the site as long as there is available capacity as defined by the final contours for the *Site* approved by this *Certificate* as shown in Drawing M-1170-4 prepared by Gamsby & Mannerow, dated January 1992 of Item 4 of Schedule "A".

29. The total approved waste disposal capacity of the Landfill shall be limited to 69,000 m^3.

Service Area

30. Only waste that is generated from within the geographical boundaries of the Municipality of West Grey shall be accepted at the *Site*.

Plan of Development and Operation Report

31. A Plan of Development and Operation (PDO) report shall be retained at the *Site* and kept up to date through periodic revisions; and be available for inspection by *Ministry* staff. Changes to the PDO report shall be submitted to the *Director* for approval.

32. The following information in the PDO report shall be updated as a minimum requirement within eighteen (18) months from the date of this *Certificate* and submitted to the *Director* for approval.
a. location and description of the access road, the on-site roads at the Site and the impact of the increased traffic to the *Site*;
b. description and location of the fencing and the gates;
c. description of the fill method, the equipment used at the *Site*, the areas used for various fill methods of landfilling, and timelines for various phases of the Site development;
d. the operating hours of the *Site* and the hours for the various activities to be undertaken at the *Site*, including waste compaction, waste coverage and burning;
e. details on winter operations;
f. review and update the thickness of the daily cover, frequency of the application, characteristics of the material used and the source of the material;
g. review and update the thickness of the intermediate cover, frequency of the application, characteristics of the material used and the source of the material;
h. frequency and the procedures for waste compaction;
i. details on handling of other waste, including types and amounts of waste handled, storage locations, frequency of removal from the *Site*;
j. details on housekeeping practices undertaken to control nuisances such as noise, dust, litter, odour, rodents, insects and other disease vectors, scavenging birds or animals;
k. details on the closure of the *Site*, including the description of the final cover and its estimated permeability, its thickness, the source of the final cover material, the thickness of the top soil and the vegetation proposed for the closed waste mound, as well as the timeframe for the progressive waste coverage;
l. updated monitoring program for the surface and groundwater;
m. site-specific trigger mechanism program for the implementation of the groundwater and surface water contingency measures and a description of such measures;
n. maintenance activities proposed for the *Site*, including the frequency of the activities and the personnel responsible for them;
o. inspection activities proposed for the *Site*, including the frequency of the activities and the personnel responsible for them;
p. details of training provided for the personnel responsible for the activities at the *Site*;
q. contingency plan for the emergency situations that may occur at the *Site*; and
r. any other information relevant to the design and operation of the *Site* or the information required by the *District Manager*.

Hours of Operation

33. Waste shall only be accepted at the Site during the following time periods:
Monday to Saturday from 7:00 am to 7:00 pm.

34. On-site equipment used for daily site preparation and closing activities shall only be used during the following time periods:
7:00 am to 7:00 pm - Monday to Saturday

35. With the prior written approval from the *District Manager*, the time periods may be extended to accommodate seasonal or unusual quantities of waste.

Site Security

36. No waste shall be received, landfilled or removed from the *Site* unless a site supervisor or attendant is present and supervises the operations during operating hours. The *Site* shall be closed when a site attendant is not present to supervise landfilling operations.

37. The *Site* shall be operated and maintained in a secure manner. During non-operating hours, all *Site* entrances and exit gates shall be locked and the *Site* shall be secured against access by unauthorized persons.

Site Access

38. Access to and exit from the *Site* for the transportation of waste shall only be permitted from County Road 9, former Township of Normanby.

Employees and Training

39. A training plan for all employees that operate any aspect of the site shall be developed and implemented by the *Operator*. Only *trained personnel* shall operate any aspect of the *Site* or carry out any activity required under this *Certificate*.

Daily Inspections

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

41. A record of the inspections shall kept in a daily log book that includes:
a. the name and signature of person that conducted the inspection;
b. the date and time of the inspection;
c. the list of any deficiencies discovered;
d. the recommendations for remedial action; and
e. the date, time and description of actions taken.

42. A record shall be kept in the daily log book of all refusal of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

Monitoring Program

43. Monitoring programs shall be carried out for groundwater and surface water in accordance with Schedule "D" attached to this *Certificate*.

Compliance Limits

44. The *Site* shall be operated in such a way as to ensure compliance with the following:
a. Reasonable Use Guideline B-7 for the protection of the groundwater at the Site;
b. Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives*, as amended from time to time or limits set by the Regional Director, for the protection of the surface water at the Site.

Complaints Procedure

45. If at any time, the *Owner* receives complaints regarding the operation of the *Site*, the *Owner* shall respond to these complaints according to the following procedure:

a. the *Owner* shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information and the time and date of the complaint;
b. the *Owner*, upon notification of the complaint, shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and
c. the *Owner* shall complete and retain on-site a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents.

Daily Log Book

46. A daily log shall be maintained in written format and shall include the following information:
a. the type, date and estimation of the time all waste and cover material received at the *Site*;
b. the area of the *Site* in which waste disposal operations are taking place;
c. if waste shipment are refused, the reasons for refusal and the origin of the waste if known;
d. a record of litter collection activities and the application of any dust suppressants;
e. a record of the site inspections;

47. Any information requested, by the *Director* or a *Provincial Officer*, concerning the *Site* and its operation under this *Certificate*, including but not limited to any records required to be kept by this *Certificate* shall be provided to the *Ministry*, upon request.

Annual Report

48. A written report on the development, operation and monitoring of the *Site*, shall be completed annually (the "Annual Report"). The Annual Report shall be submitted to the *District Manager* each year by April 30th, and shall cover the preceding calendar year.

49. The Annual Report shall include the following:
a. the results and an interpretive analysis of the results of all monitoring programs, including an assessment of the need to amend the monitoring programs;
b. an assessment of the operation and performance of all engineered facilities, the need to amend the design or operation of the *Site*, and the adequacy of and need to implement the contingency plans;
c. site plans showing the existing contours of the *Site;* areas of landfilling operation during the reporting period; areas of intended operation during the next reporting period; areas of excavation during the reporting period; the progress of final cover, vegetative cover, and any intermediate cover application; previously existing site facilities installed during the reporting period; and site preparations and facilities planned for installation during the next reporting period;
d. calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the *Site* during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;
e. a calculation of the remaining capacity of the *Site* and an estimate of the remaining *Site* life;
f. On a bi-annual basis, a field survey of the limit of fill area be completed to determine the quantity of waste received at the *Site*.
g. the extent and effect of the recycling programs established by the *Owner* on the operation ion of the *Site*;
h. a summary of any complaints received and the responses made;
i. a discussion of any operational problems encountered at the *Site* and corrective action taken;
j. any changes to the Plan of Development and Operations Report and the Closure Plan that have been approved by the *Director* since the last *Annual Report;*
k. a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903; and
l. any other information with respect to the *Site* which the *Regional Director* may require from time to time.

SCHEDULE "A"

This Schedule "A" forms part of this Certificate:

1. Application for a Certificate of Approval for a Waste Disposal Site dated October 17, 1973 signed by the Clerk Treasurer.

2. Application for a Certificate of Approval for a Waste Disposal Site (Landfill) dated July 18, 1989 signed by the Clerk Treasurer.

3. Normanby Township Landfill, Hydrogeologic Investigation and Plan of Development and Operation, prepared by Gamsby & Mannerow Limited, dated July 1991, revised January 1992.

4. Drawings prepared by Gamsby & Mannerow Limited, dated January 1992 consisting of:
Dwg. No. M-1170-1: Site Plan;
Dwg. No. M-1170-2: Groundwater Contours;
Dwg. No. M-1170-3: Development Plan;
Dwg. No. M-1170-4: Final Contour;
Dwg. No. M-1170-5: Capacity Isopach Plan;

5. Letter to Mr. Ian Parrott, Supervisor, Ministry of the Environment, dated August 4, 2004 from Ken Gould, Public Works Manager, The Corporation of the Municipality of West Grey requesting to modify the service area of the Normanby Landfill to include the entire Municipality of West Grey.

6. Application for a Provisional Certificate of Approval for a Waste Disposal Site signed by Mr. Ken Gould, Public Works Manager, dated August 3, 2004.

7. Normanby Landfill Site, Service Area Modifications, prepared for Municipality of West Grey, prepared by Henderson Paddon & Associates Limited, dated October 2004.

8. Letter from Brian Scott, P.Eng. (Henderson Paddon & Associates Limited) to Richard Saunders (MOE) dated November 26, 2004 regarding the new operating hours of the Normanby Landfill and the adjacent property owner notification.

SCHEDULE "B"

This Schedule "B" forms part of this Certificate:

Date	Sampling Location	Analytical Parameters
Water Levels: Spring, Fall	TW-1, TW-2, TW-3, TW-5, TW-5A, TW-6, OW-2, and OW-3	
Groundwater: Spring & Fall	TW-1, TW-2, TW-3, TW-5,TW-5A, TW-6, OW-2, and OW-3	GWC - Conductivity, chlorides, alkalinity, iron, pH, total ammonia, hardness, sodium, nitrate, sulphate, TKN;
Surface Water: Spring & Fall	SW-1, SW-2, SW-3, SW-4, SW-5	Conductivity, chloride, iron, alkalinity, pH, total ammonia, total phosphorous phenol, dissolved Oxygen, Temp. (in field);

Duplicates: 1 in 10 per water type (groundwater, surface water)

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

REASONS

1. The reason for Condition 1 is to clarify that the previously issued *Certificate* of Approval No. A262104 issued on February 2, 1987 as amended on August 28, 1989 and September 17, 1992 are no longer in effect and have been replaced and superseded by the Terms and Conditions stated in this *Certificate*.

2. The reason for Conditions 2, 3, 5, 6, 7, 8, 9, 10, 11, 17 and 18 are to clarify the legal rights and responsibilities of the *Owner* and *Operator* under this *Certificate* of Approval.

3. The reasons for Conditions 4, 31 and 32 are to ensure that the *Site* is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the *Owner*, and not in a manner which the *Director* has not been asked to consider.

4. The reasons for Condition 12 are to ensure that the *Site* is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the *Director* is informed of any changes.

5. The reasons for Condition 13 are to restrict potential transfer or encumbrance of the *Site* without the approval of the *Director* and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this *Certificate* of Approval.

6. Conditions 14, and 15 are included, pursuant to subsection 197(1) of the EPA, to provide that any persons having an interest in the *Site* are aware that the land has been approved and used for the purposes of waste disposal.

7. The reason for Condition 16 is to ensure that appropriate Ministry staff have ready access to the *Site* for inspection of facilities, equipment, practices and operations required by the conditions in this *Certificate* of Approval. This condition is supplementary to the powers of entry afforded a *Provincial Officer* pursuant to the *EPA* and *OWRA*.

8. The reason for Condition 19 is to ensure that users of the *Site* are fully aware of important information and restrictions related to *Site* operations and access under this *Certificate* of Approval.

9. The reasons for Conditions 20 and 21 are to ensure that final closure of the *Site* is completed in an aesthetically pleasing manner, in accordance with Ministry standards, and to ensure the long-term protection of the health and safety of the public and the environment.

10. The reasons for Conditions 22, 23, 26, 27, and 40 are to ensure that the *Site* is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.

11. The reason for Condition 24 is that open burning of municipal waste is unacceptable because of concerns with air emissions, smoke and other nuisance affects, and the potential fire hazard.

12. The reason for Conditions 25, 28, 29 and 30 is to specify the approved areas from which waste may be accepted at the *Site* and the types and amounts of waste that may be accepted for disposal at the *Site*, based on the *Owner*'s application and supporting documentation.

13. The reasons for Conditions 33, 34 and 35 are to specify the hours of operation for the landfill Site and a mechanism for amendment of the hours of operation, as required.

14. The reasons for Conditions 36, 37 and 38 are to ensure that the *Site* is supervised by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person and to ensure the controlled access and integrity of the *Site* by preventing unauthorized access when the *Site* is closed and no site attendant is on duty.

15. The reason for Condition 39 is to ensure that the *Site* is supervised and operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.

16. The reason for Conditions 41 and 42 is to ensure that detailed records of *Site* inspections are recorded and maintained for inspection and information purposes.

17. The reasons for Condition 43 are to demonstrate that the landfill site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.

18. Condition 44 is included to provide the groundwater and surface water limits to prevent water pollution at the *Site*.

19. The reason for Condition 45 is to ensure that any complaints regarding landfill operations at this *Site* are responded to in a timely and efficient manner.

20. The reason for Conditions 46 and 47 is to ensure that accurate waste records are maintained to ensure compliance with the conditions in this *Certificate* of Approval (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the *EPA* and its regulations.

21. Condition 48 requires the submission of an Annual Report by April 30th of each year.

22. The reasons for Condition 49 is to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.

This Provisional Certificate of Approval revokes and replaces Certificate(s) of Approval No. A262104 issued on February 2, 1987

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

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

The Notice should also include:

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

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

This Notice must be served upon:

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

AND

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

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

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

DATED AT TORONTO this 24th day of June, 2005

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

RS/
c; District Manager, MOE Owen Sound
Brian Scott, P.Eng., Henderson Paddon & Associates Limited

APPENDIX B:
CORRESPONDENCE

Site Name: 213087
File No: Normanby
Date: 4/20/23
Inspector: JW/RQ/KC

GAMSBY AND MANNEROW LIMITED
LANDFILL INSPECTION REPORT

		YES	NO	COMMENTS
1.	Site Open:	☐	☒	
2.	Access Control:	☒	☐	
3.	Supervisor On-Site:	☐	☒	
4.	Signs Posted:			
	Entrance	☒	☐	
	Waste Disposal Area	☒	☐	
	Tires	☒	☐	
	Brush	☒	☐	
	Appliances	☒	☐	
	Metals	☒	☐	
	Other	☐	☐	
5.	Litter:			
	On-Site	☐	☐	Closed site
	Off-Site	☐	☐	
6.	Rodent/Vector Evidence:	☐	☐	
7.	Scavenging:	☐	☐	
8.	Monitoring Wells			

NOTES:

		ACCEPTABLE	NOT ACCEPTABLE	COMMENTS
9.	Access Road Condition:	☑	☐	
10.	Screening from Public View:	☑	☐	
11.	Working Face:			
	Compaction	☐	☐	Closed
	Daily Cover	☐	☐	Final cover
12.	Segregation of Wastes:	☐	☐	applied.
13.	Finished Areas:			
	Final Cover	☐	☐	
	Seeding	☐	☐	
14.	Burning:			
	Burn Pile Size	☐	☐	
	Wood Wastes Only	☐	☐	
	Ashes Removed	☐	☐	
15.	Leachate Management:	☐	☐	
16.	Recycleables:			
	Tires	☑	☐	
	Appliances	☑	☐	
	Metals	☑	☐	
	Blue Box	☑	☐	
	Other	☐	☐	

NOTES: _____

Site Name: Normanby
File No: 213087
Date: 2023/11/22
Inspector: JW/PQ/KC

GAMSBY AND MANNEROW LIMITED
LANDFILL INSPECTION REPORT

		YES	NO	COMMENTS
1.	Site Open:	☐	☒	
2.	Access Control:	☒	☐	
3.	Supervisor On-Site:	☐	☒	
4.	Signs Posted:			
	Entrance	☐	☐	
	Waste Disposal Area	☐	☐	N/A
	Tires	☐	☐	Closed Site.
	Brush	☐	☐	
	Appliances	☐	☐	
	Metals	☐	☐	
	Other	☐	☐	
5.	Litter:			
	On-Site	☐	☒	
	Off-Site	☐	☒	
6.	Rodent/Vector Evidence:	☐	☒	
7.	Scavenging:	☐	☒	
8.	Monitoring Wells			

NOTES: Completed casing repair for TW-3.

		ACCEPTABLE	NOT ACCEPTABLE	COMMENTS
9.	Access Road Condition:	☒	☐	
10.	Screening from Public View:	☒	☐	
11.	Working Face:			
	Compaction	☒	☐	
	Daily Cover	☒	☐	
12.	Segregation of Wastes:	☒	☐	
13.	Finished Areas:			
	Final Cover	☐	☐	
	Seeding	☐	☐	
14.	Burning:			
	Burn Pile Size	☐	☐	
	Wood Wastes Only	☐	☐	
	Ashes Removed	☐	☐	
15.	Leachate Management:	☐	☐	
16.	Recycleables:			
	Tires	☐	☐	
	Appliances	☐	☐	
	Metals	☐	☐	
	Blue Box	☐	☐	
	Other	☐	☐	

NOTES: _____

APPENDIX C:
DUTIES OF SITE SUPERVISOR & SITE ATTENDANT

Attachment 1

Duties of Site Supervisor

(1) Knowledge of the Plan of Operation for the site.

(2) Responsible for site access control.

(3) Ensures deposition of waste in designated areas.

(4) Ensures all burning on-site consists of clean dry wood waste of manageable size which does not adversely impact on neighbouring property owners at any time.

(5) Ensures litter pickup on and off site on a weekly basis.

Where required by Council, the site supervisor shall also:

(6) Ensure proper compaction and cover of material at the specified frequency;

(7) Record volumes and types of waste material;

(8) Maintain monitoring well security;

(9) Identify on-site road maintenance problems to Council;

(10) Discuss with Council waste site problems with respect to site users, types of waste etc.

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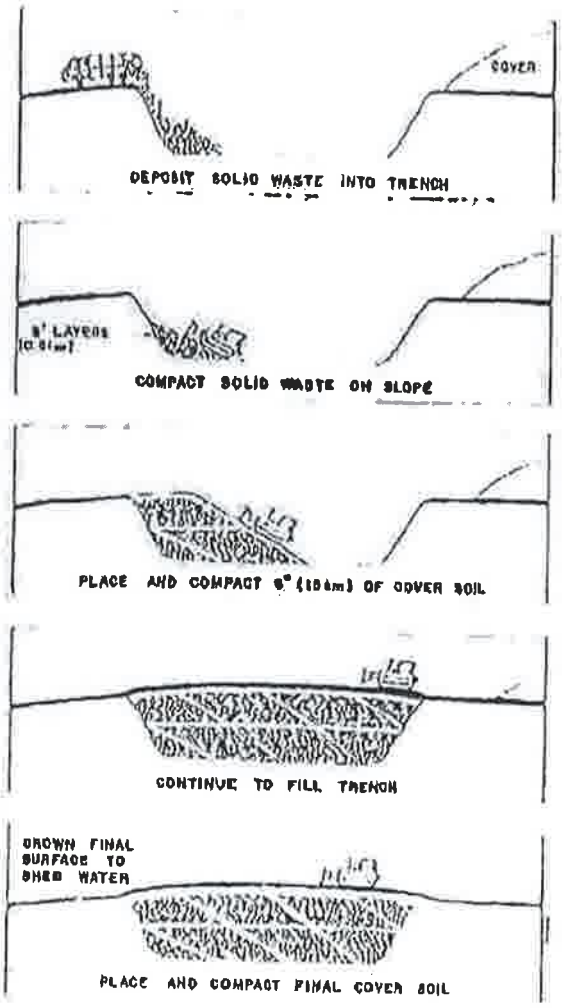

TRENCH METHOD

COMPACTION EFFORT

COMPACTION	EQUIPMENT	METHOD	DENSITY
Poor	None	Wastes dumped into trench	100 - 200 lb/yd³ 60 - 120 kgm/m³
Minimal	Tracked Machine	Waste dumped into trench. Equipment compacts surface of wastes	200 - 500 lb/yd³ 120 - 300 kgm/m³
Moderate	Tracked Machine	Wastes spread in layers. Each layer is compacted with one pass of the machine	500 - 800 lb/yd³ 300 - 475 kgm/m³
Good	Tracked Machine	Waste spread in thin layers. Each layer compacted with three to five passes of the machine	800 - 1000 lb/yd³ 475 - 600 kgm/m³
Excellent	Steel Wheeled Compactor	Wastes spread in thin layers. Each layer compacted with the machine with up to five passes	over 1000 lb/yd³

GUIDELINE C-7
(formerly 14-08)

Burning at Landfill Sites

Legislative Authority:

Environmental Protection Act, RSO 1990, Sections 6, 14 and 27
Ontario Regulation 347, Sections 1 and 12.1

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

Table of Contents

SYNOPSIS

The primary purpose of this guideline is to provide a set of operational requirements for the orderly burning of segregated clean wood and brush in a safe and environmentally- acceptable manner at appropriate landfill sites. This guideline is intended for use by landfill operators in their operation of a landfill site, and by Ministry staff during their review and inspection of landfill operations. The operational requirements are provided in Section 4-21, "Open Burning of Waste", of Procedure C-8-5: "Guidance Manual for Landfill Sites Receiving Municipal Waste" (C-8-1).

The guideline shall be enforced by including appropriate conditions on a Certificate of Approval for a landfill site, and by the Regions during the normal course of their activities.

1.0 Introduction

The burning of municipal waste, except for a limited number of specific materials, is prohibited by O. Regulation 347, Section 12.1. Segregated clean wood and brush, however, may be burned at certain sites, subject to certain requirements. These requirements are detailed in Section 4.21 of Procedure C-8-1: "Guidance Manual for Landfill Sites Receiving Municipal Waste".

2.0 General Requirements

As part of an overall program to maximize waste capacity at existing landfill sites, thereby extending their life, burning of clean wood and brush may be allowed under strictly controlled conditions.

2.1 Other Agencies

The Ministry of Natural Resources and local municipal authorities shall be consulted to obtain any necessary permits. Specific regulations enforced by the Ministry of Natural Resources shall be complied with for burning wood and brush at landfills located north of Ontario's fire line.

2.2 Certificate of Approval

Burning of any kind is not permitted at new landfill sites unless specifically allowed in the Certificate of Approval.

3.0 Operational Requirements

The operational requirements are detailed under Section 4.21.3 of the guidance manual under the headings of:

(a) Weather and Atmospheric Conditions,
(b) Supervision,
(c) Environmental Controls,
(d) Extinguishing Requirements,
(e) Access Control, and
(f) Resolution of Complaints.

4.2.3 Operational Requirements

a) Weather and Atmospheric Conditions

Burning should be carried out only when prevailing weather and atmospheric conditions are suitable. Burning should not be carried out when:

i) the area has a high Air Quality Index (AQI);
ii) rain or fog are present, since smoke cannot disperse properly and may be concentrated in one particular area; and
iii) wind speeds are high or wind directions are changing frequently, because these conditions allow fires to spread rapidly.

b) Supervision

i) Dry brush and clean wood wastes should be segregated and subsequently burned on a designated, cleared area of the site, under supervision of the site operator.

ii) The fire should be supervised continuously until completely extinguished.

iii) The site operator should clear residual ashes from a fire and dispose of the ash with normal incoming waste as soon as practically possible. The ashes must be cold prior to mixing with waste. Residual ashes should not be allowed to accumulate at the designated burning area.

c) Environmental Controls

i) Petroleum products, plastics, rubber or any other material that will cause excessive smoke or noxious fumes must not be mixed with or contaminate the wood or brush that may be burned.

ii) Burning should not be carried out if there is sensitive land-use adjacent to the landfill site or if the nearest dwelling is less than 150 metres from the site.

iii) A 30 metre fire break should be provided around the burning area.

iv) Ontario Regulation 308, made under the EPA, contains provisions dealing with air pollution. Owners and site operators are advised to apprise themselves of the provisions contained therein.

d) Extinguishing Requirements

The area of burning on the landfill site must be restricted in order to enable the operator to extinguish the fire immediately if necessary due to a change in weather or other conditions or if so ordered by MOEE or Ministry of Natural Resources staff. The operator must also provide proof of this ability (i.e., on-site equipment or written agreement with local fire control agency) to extinguish the fire.

e) Access Control

i) Access to the landfill site by the public and other unauthorized personnel must be restricted when burning is carried out.

ii) Appropriate signs should be posted at all entrances to the site used by the public and waste haulers advising them of restricted access due to burning of waste.

f) Resolution of Complaints

i) Complaints from local residents regarding smoke or odour emissions will have to be resolved by the operator. If this is not corrected satisfactorily, the operator would be required to stop burning.

ii) When persistent problems are encountered with burning at existing sites, the operator may be requested either to stop burning or make a satisfactory proposal to control burning for incorporation in the Certificate of Approval for the site. This may involve a request for amendment of a current Certificate of Approval. If the operator does not comply voluntarily with such a request, formal action to halt burning may be taken under provisions of the EPA.

4.21 OPEN BURNING OF WASTE

4.21.1 Rationale

The burning of municipal waste, except a limited number of specific material, is prohibited by regulation in Ontario. Open burning of waste at a landfill site creates

a) air emission concerns;
b) public and environmental hazards;
c) lack of site operational control;
d) fire hazard; and
e) nuisance.

Segregated, clean wood and brush, however, may be burned at certain isolated sites, subject to weather and atmospheric conditions and supervision requirements.

4.21.2 General Requirements

a) As part of an overall program to maximize waste capacity at existing landfill sites, thereby extending their life, open burning of clean wood and brush may be allowed under strictly controlled conditions as discussed in this subsection.

The Ministry of Natural Resources and local municipal authorities should be consulted in order to obtain any necessary permits for burning. These agencies may require specific details on safety precautions and fire prevention measures that will be taken. Landfill site owner/operators are also advised to check for any municipal by-laws enforced by the local police and fire departments. Specific regulations enforced by the Ministry of Natural Resources must be complied with for burning north of Ontario's fire line. The fire line runs east from Lake Huron across the bottom of Georgian Bay and the top of Lake Simcoe down to Gananoque, then north and west to meet the Ottawa River north of Renfrew.

b) Burning is not permitted at new landfill sites unless specifically allowed in the Certificate of Approval, usually conditional on the compliance with various environmental and safety considerations. Any permit to burn waste at new landfill sites would also be conditional on compliance with local municipal by-laws, and specific requirements of The Ministry of Natural Resources.

APPENDIX D:
HISTORICAL GROUNDWATER QUALITY

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	**ODWS**	**MECP Guideline B-7** Reasonable Use Criteria	**TW1** **1-Jun-89**	**TW1** **1-Oct-89**	**TW1** **1-May-90**	**TW1** **1-Jan-91**	**TW1** **1-Apr-91**	**TW1** **1-Oct-91**	**TW1** **1-Apr-92**	**TW1** **1-Oct-92**	**TW1** **1-May-93**
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25		201	202	211	208	215	198	225	215
Ammonia(as N)	-	nv	0.01	0.238	0.001	0.259	0.197	0.251	0.148	0.086	0.102
Barium	1										
Boron	5 [IMAC]										
Calcium	-	nv									
Chloride	250 [AO]	133.25	5	4.9	4.4	5.7	4.9	5.3	5.3	5.9	5.5
Conductivity - @25°C (µS/cm)	-	nv	536	551	548	573	565	560	556	577	545
Hardness(as $CaCO_3$)	80-100 [OG]	360*	277	259	275	255	265	251	254	252	272
Iron	0.3 [AO]	0.155									
Magnesium	-	nv									
Nitrate(as N)	10 d	2.59	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.5
Nitrite(as N)	1 d		0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01
Organic Nitrogen	0.15		0.31	0.238	0.33	0.221	0.273	0.289	0.222	0.394	0.598
pH	6.5-8.5 [OG]	6.5 to 8.5	7.59	7.71	7.86	8.05	7.97	8.04	7.78	7.92	7.86
Sodium	200 [AO]	105.8									
Sulphate	500 [AO]	267									
Total Kjeldahl Nitrogen(as N)	-	nv	0.32	0.46	0.33	0.48	0.47	0.54	0.37	0.48	0.7

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	**ODWS**	**MECP Guideline B-7** Reasonable Use Criteria	**TW1** **1-Nov-93**	**TW1** **1-May-94**	**TW1** **1-Oct-94**	**TW1** **1-May-95**	**TW1** **1-Oct-95**	**TW1** **1-May-96**	**TW1** **1-Apr-97**	**TW1** **1-Sep-97**	**TW1** **1-May-98**
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25	195	195	225	203	208	243	202	199	320
Ammonia(as N)	-	nv	0.049	0.063	0.23	0.12	0.22		0.042	0.017	0.11
Barium	1										
Boron	5 [IMAC]										
Calcium	-	nv									
Chloride	250 [AO]	133.25	4.5	4.2	5.3	4.4	4.8	2	4.49	5.33	2.73
Conductivity - @25°C (µS/cm)	-	nv	538	540	553	544	534	675	460	530	442
Hardness(as $CaCO_3$)	80-100 [OG]	360*	282	276	279	283	279	297	344	264	218
Iron	0.3 [AO]	0.155									
Magnesium	-	nv									
Nitrate(as N)	10 d	2.59	0.7	0.4	0.1	0.2	0.5	0.05	0.11	0.42	1.24
Nitrite(as N)	1 d		0.01	0.02	0.07	0.08	0.01		0.1	0.1	0.05
Organic Nitrogen	0.15		0.341	0.167	0.33	0.03	0.15		0.16	0.36	0.6
pH	6.5-8.5 [OG]	6.5 to 8.5	7.91	8.15	8.1	7.86	7.95	7.33	7.7	8	7.34
Sodium	200 [AO]	105.8		11.8		12.3	13.5	14.6	13.1	22.1	14.9
Sulphate	500 [AO]	267				86	81.9	78.8	90.8	89.8	19.1
Total Kjeldahl Nitrogen(as N)	-	nv	0.39	0.23	0.56	0.15	0.37		0.2	0.38	0.71

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Quality Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW1 1-Oct-98	TW1 1-May-99	TW1 1-Nov-99	TW1 9-Jun-00	TW1 Rep 9-Jun-00	TW1 005 18-Jul-01	TW1 006 19-Oct-01	TW1 003 26-Jun-02	TW1 010 23-Oct-02	TW1 008 27-May-03
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25	197	158	184	215	216	198	214	210	204	198
Ammonia(as N)	-	nv	0.37	0.16	0.05	2.67	2.67	0.2	1.97	1.21	0.3	0.12
Barium	1					0.683	0.675	0.04	0.04	0.04	0.05	0.045
Boron	5 [IMAC]					0.19	0.19	0.08	0.08	0.07	0.08	0.07
Calcium	-	nv				60.4	59.8	53.6	55.1	51.6	59.3	57.1
Chloride	250 [AO]	133.25	3.85	1.87	8.6	3.7	3.9	4.3	5.4	4.7	4.5	4.4
Conductivity - @25°C (µS/cm)	-	nv	540	462	468	543	547	538	559	558	542	495
Hardness(as $CaCO_3$)	80-100 [OG]	360*	223	281	270	276	273	263	261	243	271	263.584
Iron	0.3 [AO]	0.155		0.01	0.01	0.38	0.38	0.07	0.26	0.13	0.47	0.27
Magnesium	-	nv				30.3	30	31.5	30	27.8	29.8	29.4
Nitrate(as N)	10 d	2.59	0.09	0.35	0.92	nd	nd	<0.1	<0.1	<0.1	0.1	0.1
Nitrite(as N)	1 d		0.05	0.05	0.05	nd	nd	<0.1	<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		3.03	1.7	3.4	1.93	1.83	0.63	0.07	0.24	0.48	0.05
pH	6.5-8.5 [OG]	6.5 to 8.5	8.1	7.98	7.87	7.34	7.34	7.92	7.67	7.28	8.52	7.9
Sodium	200 [AO]	105.8	23.7	16.8	29.3	29.6	29.2	14.9	13.3	12.3	22.6	16.3
Sulphate	500 [AO]	267	86.2	104	87.2	85.4	86.4	81.7	74.8	76.6	93	95
Total Kjeldahl Nitrogen(as N)	-	nv	3.4	1.9	3.5	4.6	4.5	0.83	2.04	1.45	0.78	0.17

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Quality Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW1 008 30-Sep-03	TW1 008 3-Jun-04	TW1 006 22-Sep-04	TW1 008 27-Apr-05	TW1 005 17-Oct-05	TW1 006 27-Apr-06	TW1 001 26-Oct-06	TW1 003 9-Apr-07	TW1 004 10-Oct-07
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25	199	177	204	200	214	198	203	202	232
Ammonia(as N)	-	nv	0.33	0.2	0.62	0.21	0.28	0.17	0.31	<0.01	7.46
Barium	1		0.049	0.045	0.044	0.049	0.05	0.049	0.044	0.043	0.037
Boron	5 [IMAC]		0.06	0.07	0.061	0.063	0.069	0.074	0.066	0.07	0.068
Calcium	-	nv	57.2	57.7	50.5	61.2	57	61.8	55.7	55.8	53.6
Chloride	250 [AO]	133.25	4.1	4.4	4.7	4.2	4.4	4.4	5	4.8	4.7
Conductivity - @25°C (µS/cm)	-	nv	487	537	516	525	514	531	519	489	574
Hardness(as $CaCO_3$)	80-100 [OG]	360*	266	268	244	286	269	287	260	261	253
Iron	0.3 [AO]	0.155	0.375	0.065	0.448	0.178	0.421	0.02	0.025	<0.005	0.888
Magnesium	-	nv	30	30.1	28.6	32.4	30.7	32.3	29.5	29.6	28.9
Nitrate(as N)	10 d	2.59	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		0.2	0.16	0.38	0.07	0.12	2.47	0.01	0.21	3.14
pH	6.5-8.5 [OG]	6.5 to 8.5	7.79	8.33	7.56	7.79	7.76	7.94	7.81	7.66	7.36
Sodium	200 [AO]	105.8	12.4	11.4	11.3	10.5	10	13.7	10.8	11.8	12.9
Sulphate	500 [AO]	267	91	93	92	91	83	89	88	94	74
Total Kjeldahl Nitrogen(as N)	-	nv	0.53	0.36	1	0.28	0.4	2.64	0.32	0.22	10.6

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Quality Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW1 007 17-Apr-08	TW1 007 6-Oct-08	TW1 29-Apr-09	TW1 13-Oct-09	TW1 4-May-10	TW1 10-Nov-10	TW1 14-Apr-11	TW1 25-Oct-11	TW1 3-Apr-12
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25	190	240	265	219	206	226	206	213	204
Ammonia(as N)	-	nv	0.44	4.4	0.76	1.23	0.31	3.23	0.4	1.31	0.33
Barium	1		0.035	0.04	0.038	0.033	0.041	0.047	0.045	0.044	0.042
Boron	5 [IMAC]		0.061	0.066	0.068	0.058	0.065	0.075	0.024	0.062	0.072
Calcium	-	nv	53.2	54.7	59.2	52	54.6	56.2	57.4	56.1	51.2
Chloride	250 [AO]	133.25	4.9	5.1	4.4	4.7	4.6	4.8	4.7	4.5	4.8
Conductivity - @25°C (µS/cm)	-	nv	588	519	540	550	540	539	528	551	521
Hardness(as $CaCO_3$)	80-100 [OG]	360*	247	253	279	248	257	268	267	273	252
Iron	0.3 [AO]	0.155	0.39	0.173	0.732	0.609	0.976	0.633	1.14	0.638	0.076
Magnesium	-	nv	27.9	28.4	31.8	28.7	29.2	30.9	30.1	32.2	30.1
Nitrate(as N)	10 d	2.59	<0.1	0.2	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	0.1
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		0.75	2.28	0.78	0.01	0.38		0.32	0.09	0.52
pH	6.5-8.5 [OG]	6.5 to 8.5	7.72	7.67	7.58	7.6	6.1	7.81	7.13	7.84	6.74
Sodium	200 [AO]	105.8	12.7	9.4	12.3	9.9	10.5	10.2	9.2	8.8	10.2
Sulphate	500 [AO]	267	76	67	59	77	84	68	77	73	84
Total Kjeldahl Nitrogen(as N)	-	nv	1.19	6.68	1.54	1.24**	0.69	1.74	0.72	1.4	0.85

NOTES:
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW1 26-Sep-12	TW1 7-May-13	TW1 26-Nov-13	TW1 1-May-14	TW1 4-Nov-14	TW1 20-Apr-15	TW1 3-Nov-15	TW1 19-Apr-16	TW1 26-Oct-16
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25	211	200	250	220	250	200	210	210	200
Ammonia(as N)	-	nv	1.08	0.38	4.9	1.2	12	1.2	0.27	0.19	0.34
Barium	1		0.048								
Boron	5 [IMAC]		0.068								
Calcium	-	nv	57.8	58	59						61
Chloride	250 [AO]	133.25	4.8	5	6	5	6	5	5.8	5.4	5.3
Conductivity - @25°C (µS/cm)	-	nv	533	540	560	530	590	540	530	530	540
Hardness(as $CaCO_3$)	80-100 [OG]	360*	272	270	280	270	290	280	300	280	280
Iron	0.3 [AO]	0.155	1.57	<0.1	<0.1	ND	0.06	<0.02	<0.02	<0.02	<0.02
Magnesium	-	nv	31	31	32						32
Nitrate(as N)	10 d	2.59	<0.1	<0.1	<0.1	<0.1	<0.1	0.35	<0.10	0.19	0.1
Nitrite(as N)	1 d		<0.1	0.082	<0.01						
Organic Nitrogen	0.15		0.09	0.23	0.3	1	2	0.1	0.17	0.01	0.2
pH	6.5-8.5 [OG]	6.5 to 8.5	7.99	7.98	7.82	8.07	7.8	7.97	7.92	8.01	8.09
Sodium	200 [AO]	105.8	10.6	10	10	9.1	11	10	11	9.5	10
Sulphate	500 [AO]	267	84	73	49	53	54	70	60	65	73
Total Kjeldahl Nitrogen(as N)	-	nv	1.17	0.61	5.2	2.2	14	1.3	0.44	0.2	0.54

NOTES:
1. All results expressed in mg/L unless otherwise noted.
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW1 16-May-17	TW1 27-Nov-17	TW1 10-Apr-18	TW1 14-Nov-18	TW1 24-Apr-19	TW1 20-Nov-19	TW1 13-May-20	TW1 12-Nov-20	TW1 20-Apr-21	TW1 5-Oct-21
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25	190	210	210	200	190	200	190	200	200	200
Ammonia(as N)	-	nv	0.18	0.11	0.94	0.11	0.28	<0.050	0.085	<0.050	<0.050	<0.050
Barium	1											
Boron	5 [IMAC]											
Calcium	-	nv			60							
Chloride	250 [AO]	133.25	5.9	5.9	5.7	5.9	5.5	5.6	5.7	5.7	6.2	6.2
Conductivity - @25°C (µS/cm)	-	nv	550	560	540	540	540	520	550	530	530	520
Hardness(as $CaCO_3$)	80-100 [OG]	360*	280	290	280	260	280	280	260	280	260	260
Iron	0.3 [AO]	0.155	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Magnesium	-	nv			32							
Nitrate(as N)	10 d	2.59	0.13	0.33	<0.10	0.29	<0.10	<0.50	0.1	0.2	0.3	0.28
Nitrite(as N)	1 d											
Organic Nitrogen	0.15		0.15	0.13	0.06	0.71	0.07					
pH	6.5-8.5 [OG]	6.5 to 8.5	8.03	7.9	7.98	7.74	8.15	8.19	8.01	8.17	8.14	7.97
Sodium	200 [AO]	105.8	10	11	9.8		9.7	9.9	9.4	9.8	8.7	8.5
Sulphate	500 [AO]	267	84	82	73	70	81	74	89	79	75	79
Total Kjeldahl Nitrogen(as N)	-	nv	0.33	0.24	1	0.82	0.35	0.19	<0.10	0.14	<0.10	0.13

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW1 3-May-22	TW1 29-Sep-22	TW1 20-Apr-23	TW1 22-Nov-23
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25	190	190	180	230
Ammonia(as N)	-	nv	0.11	0.4	<0.050	<0.050
Barium	1		-	-		
Boron	5 [IMAC]		-	-		
Calcium	-	nv	-	-		
Chloride	250 [AO]	133.25	5.6	5.8	4.6	13
Conductivity - @25°C (µS/cm)	-	nv	530	530	520	630
Hardness(as $CaCO_3$)	80-100 [OG]	360*	270	270	260	350
Iron	0.3 [AO]	0.155	<0.02	<0.02	<0.02	<0.02
Magnesium	-	nv	-	-		
Nitrate(as N)	10 d	2.59	0.42	<0.10	0.22	0.14
Nitrite(as N)	1 d		-	-		<0.010
Organic Nitrogen	0.15		-	-		
pH	6.5-8.5 [OG]	6.5 to 8.5	8.21	8.09	8.02	7.98
Sodium	200 [AO]	105.8	9.3	9.2	9	9.2
Sulphate	500 [AO]	267	82	75	84	74
Total Kjeldahl Nitrogen(as N)	-	nv	0.27	0.47	<0.10	0.13

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	OW2 1-May-93	OW2 1-Nov-93	OW2 1-May-94	OW2 1-Oct-94	OW2 1-Oct-95	OW2 1-Apr-97	OW2 1-May-98	OW2 1-Nov-99	OW2 004 18-Jul-01
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	369		270	261	308	259	112	266	272
Ammonia(as N)	-	nv	0.091	0.036	0.051	0.279	0.18	0.622	0.13	0.05	0.57
Barium	1										0.04
Boron	5 [IMAC]										0.22
Calcium	-	nv									64
Chloride	250 [AO]	133	30.6	12.6	11.3	9.2	22.2	31.8	31.1	30.9	19.6
Conductivity - @25°C (µS/cm)	-	nv	722	696	586	657	698	530	570	604	578
Hardness(as $CaCO_3$)	80-100 [OG]	360*	346	**405**	308	350	**367**	335	299	**372**	274
Iron	0.3 [AO]	0.16								0.01	0.29
Magnesium	-	nv									27.7
Nitrate(as N)	10 d	2.59	0.2	0.1	1.6	0.3	0.6	1.57	1.8	0.61	0.7
Nitrite(as N)	1 d		0.01	0.01	0.01	0.03	0.01	0.1	0.05	0.05	<0.1
Organic Nitrogen	0.15		0.899	0.414	0.329	0.661	0.39	0.91	1.08	4.2	0.49
pH	6.5-8.5 [OG]	6.5 to 8.5	7.77	8.12	7.86	7.98	7.74	7.6	7.18	7.71	7.47
Sodium	200 [AO]	106			8		14.9	22.1	21.4	21.3	14.9
Sulphate	500 [AO]	267					51.4	19	16.1	72.3	17.5
Total Kjeldahl Nitrogen(as N)	-	nv	0.99	0.45	0.38	0.94	0.57	1.53	1.21	4.3	1.06

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	OW2 013 (dup) 18-Jul-01	OW2 007 19-Oct-01	OW2 002 27-Jun-02	OW2 23-Oct-02	OW2 009 27-May-03	OW2 009 30-Sep-03	OW2 009 3-Jun-04	OW2 004 22-Sep-04
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	329	371	348		333	375	356	375
Ammonia(as N)	-	nv	<0.01	0.79	2.46		0.1	0.14	1.52	0.37
Barium	1		0.03	0.06	0.07		0.073	0.085	0.124	0.11
Boron	5 [IMAC]		0.28	0.36	0.3		0.22	0.218	0.313	0.3
Calcium	-	nv	73.1	101	67		85.6	94	89.1	86.6
Chloride	250 [AO]	133	22.5	31.3	22.4		42.9	29.9	37.8	36.1
Conductivity - @25°C (µS/cm)	-	nv	724	896	743		720	725	850	822
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**365**	**427**	300	DRY	350.041	**377**	**369**	**363**
Iron	0.3 [AO]	0.16	<0.01	<0.01	1.46		0.22	0.054	0.065	0.078
Magnesium	-	nv	44.4	42.4	32.3		33.1	34.6	35.7	35.7
Nitrate(as N)	10 d	2.59	**4.7**	0.6	0.6		0.8	0.2	0.2	0.2
Nitrite(as N)	1 d		<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		0.58	0.08	1.02		2.57	0.65	1.07	0.67
pH	6.5-8.5 [OG]	6.5 to 8.5	7.96	7.52	7.19		7.72	7.51	8.33	7.26
Sodium	200 [AO]	106	13.6	21.3	18.5		32.5	23.5	29.3	24
Sulphate	500 [AO]	267	31.8	66.7	16.2		34	26	16	39
Total Kjeldahl Nitrogen(as N)	-	nv	0.58	0.87	3.48		2.67	0.79	2.59	1.04

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	OW2 004 27-Apr-05	OW2 001 17-Oct-05	OW2 007 27-Apr-06	OW2 003 26-Oct-06	OW2 004 9-Apr-07	OW2 10-Oct-07	OW2 005 17-Apr-08	OW2 005 6-Oct-08	OW2 29-Apr-09
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	324	342	312	362	398		324	**412**	352
Ammonia(as N)	-	nv	0.7	0.02	0.29	<0.01	0.47		0.39	<0.01	0.49
Barium	1		0.093	0.095	0.081	0.072	0.077		0.059	0.111	0.054
Boron	5 [IMAC]		0.269	0.254	0.263	0.218	0.338		0.268	0.265	0.23
Calcium	-	nv	82.1	96.4	84.1	96.8	94.5		78	125	89
Chloride	250 [AO]	133	24.7	29.4	24.6	28.4	30.8		24.9	25.1	23.7
Conductivity - @25°C (µS/cm)	-	nv	756	774	718	763	831		740	799	779
Hardness(as $CaCO_3$)	80-100 [OG]	360*	340	**389**	346	**385**	**395**	DRY	322	**505**	**367**
Iron	0.3 [AO]	0.16	0.024	0.019	0.015	<0.005	0.014		<0.005	4.32	<0.005
Magnesium	-	nv	32.7	36	33	34.8	38.6		30.9	47	35.3
Nitrate(as N)	10 d	2.59	**3.4**	0.7	**4.2**	0.3	**6.4**		**5.9**	0.9	**3.9**
Nitrite(as N)	1 d		<0.1	0.2	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1
Organic Nitrogen	0.15		2.33	1.54	1.35	0.56	1.03		0.88	0.78	1.28
pH	6.5-8.5 [OG]	6.5 to 8.5	7.64	7.29	7.65	7.81	7.51		7.55	7.16	7.25
Sodium	200 [AO]	106	22.8	19.5	21.7	18.4	29.4		24.7	27	23.7
Sulphate	500 [AO]	267	31	71	30	54	33		32	31	27
Total Kjeldahl Nitrogen(as N)	-	nv	3.03	1.56	1.64	0.57	1.5		1.27	0.79	1.77

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	OW2 13-Oct-09	OW2 4-May-10	OW2 10-Nov-10	OW2 14-Apr-11	OW2 25-Oct-11	OW2 3-Apr-12	OW2 26-Sep-12	OW2 7-May-13
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	357	332	383	343	363	342	314	330
Ammonia(as N)	-	nv	0.02	<0.01	<0.01	0.1	<0.01	<0.01	0.15	0.13
Barium	1		0.054	0.071	0.059	0.053	0.061	0.041	0.05	
Boron	5 [IMAC]		0.263	0.247	0.19	0.238	0.304	0.18	0.177	
Calcium	-	nv	87.5	96.8	101	88	98.4	75.8	84.9	88
Chloride	250 [AO]	133	22.3	23.8	20.8	21.3	24	22.3	17.7	22
Conductivity - @25°C (µS/cm)	-	nv	769	742	779	753	817	732	679	760
Hardness(as $CaCO_3$)	80-100 [OG]	360*	357	**402**	**407**	**362**	**404**	327	355	350
Iron	0.3 [AO]	0.16	0.024	9.21	0.172	0.082	0.065	0.03	0.054	<0.1
Magnesium	-	nv	33.6	38.8	37.7	34.5	38.4	33.5	34.7	33
Nitrate(as N)	10 d	2.59	0.3	**3**	0.6	**4.4**	0.5	**2.7**	0.7	**3.9**
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01
Organic Nitrogen	0.15		0.73	0.56	0.46	0.72	<0.69	0.75	1.61	1.67
pH	6.5-8.5 [OG]	6.5 to 8.5	7.15	7	7.59	6.99	7.53	7.67	7.97	7.96
Sodium	200 [AO]	106	13.8	16	14.9	21.2	15.5	19	12.7	21
Sulphate	500 [AO]	267	44	30	21	24	40	25	38	30
Total Kjeldahl Nitrogen(as N)	-	nv	0.75	0.57	0.47	0.82	0.7	0.75	1.76	1.8

NOTES:
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	OW2 26-Nov-13	OW2 1-May-14	OW2 4-Nov-14	OW2 20-Apr-15	OW2 3-Nov-15	OW2 19-Apr-16	OW2 26-Oct-16	OW2 16-May-17	OW2 27-Nov-17	OW2 10-Apr-18
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	340	260	380	210	370	270	300	340	340	260
Ammonia(as N)	-	nv	0.067	0.24	<0.05	0.054	0.15	0.095	0.38	<0.050	<0.050	<0.050
Barium	1											
Boron	5 [IMAC]											
Calcium	-	nv	94						97			78
Chloride	250 [AO]	133	21	12	23	16	28	19	33	26	28	27
Conductivity - @25°C (µS/cm)	-	nv	740	560	820	500	820	600	760	760	760	630
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**380**	260	**430**	250	**440**	280	**380**	**370**	**380**	310
Iron	0.3 [AO]	0.16	<0.1	0.03	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Magnesium	-	nv	35						33			27
Nitrate(as N)	10 d	2.59	2.3	**3.25**	0.58	2.44	0.43	2.39	0.25	2.07	1.87	**4.95**
Nitrite(as N)	1 d		<0.01									
Organic Nitrogen	0.15		0.863	1.06	0.62	0.476	0.33	0.125	0.61	0.74	0.125	0.325
pH	6.5-8.5 [OG]	6.5 to 8.5	7.9	8.02	7.88	8.05	8.04	8.06	8.06	7.95	7.65	7.9
Sodium	200 [AO]	106	20	13	21	12	23	14	20	24	22	17
Sulphate	500 [AO]	267	26	20	34	22	38	20	56	26	27	23
Total Kjeldahl Nitrogen(as N)	-	nv	0.93	1.3	0.67	0.53	0.48	0.22	0.99	0.79	0.15	0.35

NOTES:
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	OW2 14-Nov-18	OW2 24-Apr-19
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	270	330
Ammonia(as N)	-	nv	0.18	0.12
Barium	1			
Boron	5 [IMAC]			
Calcium	-	nv		
Chloride	250 [AO]	133	22	23
Conductivity - @25°C (µS/cm)	-	nv	600	700
Hardness(as $CaCO_3$)	80-100 [OG]	360*	350	340
Iron	0.3 [AO]	0.16		<0.02
Magnesium	-	nv		
Nitrate(as N)	10 d	2.59	<0.10	<0.10
Nitrite(as N)	1 d			
Organic Nitrogen	0.15		0.04	0.27
pH	6.5-8.5 [OG]	6.5 to 8.5	7.87	8.06
Sodium	200 [AO]	106		20
Sulphate	500 [AO]	267	72	
Total Kjeldahl Nitrogen(as N)	-	nv	0.22	0.39

NOTES:
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	OW3 1-May-93	OW3 1-Nov-93	OW3 1-May-94	OW3 1-Oct-94	OW3 1-May-95	OW3 1-Oct-95	OW3 1-May-96	OW3 1-Apr-97
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	365		303	**493**	336	356	359	296
Ammonia(as N)	-	nv	0.068	0.02	0.039	0.107	0.23	0.13		0.656
Barium	1									
Boron	5 [IMAC]									
Calcium	-	nv								
Chloride	250 [AO]	133	32.6	57	21.5	44.2	30.4	37.8	37.4	33.2
Conductivity - @25°C (µS/cm)	-	nv	890	1066	717	1013	775	895	985	650
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**427**	**571**	353	**504**	**370**	**454**	**411**	**447**
Iron	0.3 [AO]	0.16								
Magnesium	-	nv								
Nitrate(as N)	10 d	2.59	**4.2**	0.1	**3.1**	0.1	**4.8**	**3.4**	0.05	**4.06**
Nitrite(as N)	1 d		0.01	0.01	0.01	0.03	0.05	0.01		0.1
Organic Nitrogen	0.15		0.632	0.34	0.401	0.353	0.37	0.57		0.32
pH	6.5-8.5 [OG]	6.5 to 8.5	7.64	7.75	8.07	7.58	7.78	7.67	7.23	7.6
Sodium	200 [AO]	106			15.1		24.7	19	26	28.8
Sulphate	500 [AO]	267					42.1	74.5	60.3	52.9
Total Kjeldahl Nitrogen(as N)	-	nv	0.7	0.36	0.44	0.46	0.6	0.7		0.98

NOTES:
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	OW3 1-Sep-97	OW3 1-May-98	OW3 1-Nov-99	OW3 9-Jun-00	OW3 006 18-Jul-01	OW3 008 19-Oct-01	OW3 001 27-Jun-02
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	**406**	342	365	**414**	314	**475**	**444**
Ammonia(as N)	-	nv	0.031	0.14	0.05	0.12	<0.01	0.01	0.35
Barium	1					0.56	0.03	0.05	0.34
Boron	5 [IMAC]					0.61	0.27	0.45	0.62
Calcium	-	nv				104	71.6	116	90.5
Chloride	250 [AO]	133	60.9	48	47.4	39.3	22	39.3	31.2
Conductivity - @25°C (µS/cm)	-	nv	1250	884	930	901	720	1078	995
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**406**	**431**	**567**	**498**	345	**562**	**424**
Iron	0.3 [AO]	0.16			0.01	0.09	<0.01	<0.01	0.03
Magnesium	-	nv				57.8	40.4	66.2	48.2
Nitrate(as N)	10 d	2.59	**4.45**	2.19	0.93	**3.9**	**4.7**	1.5	**8**
Nitrite(as N)	1 d		0.1	0.05	0.05	nd	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		0.37	1.68	3	1.18	0.33	0.41	0.52
pH	6.5-8.5 [OG]	6.5 to 8.5	7.3	7.1	7.68	7.37	7.89	7.54	7.01
Sodium	200 [AO]	106	60.6	38.2	30.8	40	14.4	27.7	26.5
Sulphate	500 [AO]	267	62.2	15.5	91.7	50	31.3	64.3	38.9
Total Kjeldahl Nitrogen(as N)	-	nv	0.4	1.82	3.1	1.3	0.33	0.42	0.87

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	OW3 003 23-Oct-02	OW3 006 27-May-03	OW3 005 30-Sep-03	OW3 005 3-Jun-04	OW3 001 22-Sep-04	OW3 006 27-Apr-05	OW3 002 17-Oct-05	OW3 003 27-Apr-06	OW3 004 26-Oct-06
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	351	**402**	**504**	378	**453**	358	**436**	384	**555**
Ammonia(as N)	-	nv	0.01	0.07	0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01
Barium	1		0.045	0.051	0.076	0.048	0.055	0.041	0.062	0.045	0.051
Boron	5 [IMAC]		0.31	0.42	0.627	0.449	0.375	0.422	0.559	0.491	0.479
Calcium	-	nv	105	108	119	98.9	98.4	88	100	103	118
Chloride	250 [AO]	133	38.6	41.9	53.5	24.6	33.6	18.8	33.9	23.9	27.2
Conductivity - @25°C (µS/cm)	-	nv	925	965	1140	873	982	792	963	853	956
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**487**	**498.516**	**558**	**441**	**464**	**395**	**457**	**455**	**538**
Iron	0.3 [AO]	0.16	<0.02	0.33	0.013	0.011	0.007	0.017	0.018	<0.005	<0.005
Magnesium	-	nv	54.7	55.6	63.5	47.1	53.1	42.5	50.4	47.9	58.8
Nitrate(as N)	10 d	2.59	**4**	**15.9**	**14.1**	**8.4**	**5.9**	**5.9**	**7.4**	**7.7**	1.8
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		0.72	2.34	0.65	0.64	0.67	1.64	1.02	0.91	1.58
pH	6.5-8.5 [OG]	6.5 to 8.5	8.38	7.58	7.29	8.25	7.24	7.48	7.35	7.85	7.53
Sodium	200 [AO]	106	23.9	34.1	46.4	19.7	19.1	16.1	30.8	20.1	28.4
Sulphate	500 [AO]	267	89	84	70	43	70	34	56	37	55
Total Kjeldahl Nitrogen(as N)	-	nv	0.73	2.41	0.66	0.65	0.67	1.65	1.03	0.92	1.59

NOTES:
1. All results expressed in mg/L unless otherwise noted.
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	OW3 005 9-Apr-07	OW3 10-Oct-07	OW3 004 17-Apr-08	OW3 003 6-Oct-08	OW3 29-Apr-09	OW3 13-Oct-09	OW3 4-May-10	OW3 10-Nov-10	OW3 14-Apr-11
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	356		360	**486**	362	**461**	**448**	**443**	351
Ammonia(as N)	-	nv	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Barium	1		0.035		0.037	0.053	0.032	0.047	0.055	0.059	0.037
Boron	5 [IMAC]		0.354		0.376	0.552	0.331	0.491	0.574	0.494	0.218
Calcium	-	nv	86		88.3	103	90.9	97.5	104	111	89.9
Chloride	250 [AO]	133	18.5		21.5	36.4	19.5	34.2	33.6	30.7	17.2
Conductivity - @25°C (µS/cm)	-	nv	709		872	1000	776	984	1020	973	768
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**380**	Dry	**382**	**449**	**394**	**432**	**457**	**484**	**390**
Iron	0.3 [AO]	0.16	0.01		0.01	<0.005	<0.005	0.011	0.01	<0.005	<0.005
Magnesium	-	nv	40.1		39.1	46.2	40.6	45.8	48.1	50.4	40.2
Nitrate(as N)	10 d	2.59	**6.5**		**7.9**	**6**	**6.3**	**4.5**	**9.8**	**6.3**	**4.7**
Nitrite(as N)	1 d		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Organic Nitrogen	0.15		0.66		2.32	0.82	0.68	0.88	0.6	0.48	0.33
pH	6.5-8.5 [OG]	6.5 to 8.5	7.49		7.41	7.18	7.34	7.08	6.92	7.55	7.04
Sodium	200 [AO]	106	12.9		14.9	28.8	14.9	27.5	28	26	13.2
Sulphate	500 [AO]	267	39		44	37	30	43	39	35	30
Total Kjeldahl Nitrogen(as N)	-	nv	0.67		2.33	0.83	0.69	0.89	0.61	0.49	0.34

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	OW3 25-Oct-11	OW3 3-Apr-12	OW3 25-Sep-12	OW3 7-May-13	OW3 26-Nov-13	OW3 1-May-14	OW3 4-Nov-14	OW3 20-Apr-15	OW3 3-Nov-15
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	**419**	**442**	363	390	**480**	240	400	170	400
Ammonia(as N)	-	nv	<0.01	0.11	<0.01	<0.05	<0.05	0.083	<0.05	<0.050	<0.050
Barium	1		0.048	0.047	0.043						
Boron	5 [IMAC]		0.412	0.497	0.336						
Calcium	-	nv	98.8	89.3	94.8	100	130				
Chloride	250 [AO]	133	20.4	29.5	26.5	20	29	10	24	11	28
Conductivity - @25°C (µS/cm)	-	nv	907	987	811	900	1100	540	910	400	910
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**447**	**425**	**424**	**470**	**570**	240	**440**	200	**460**
Iron	0.3 [AO]	0.16	0.005	<0.005	<0.005	<0.1	<0.1	ND	<0.02	<0.02	<0.02
Magnesium	-	nv	48.7	49	45.4	52	61				
Nitrate(as N)	10 d	2.59	**3.7**	**10.9**	1.9	**5.1**	**8.9**	**3.43**	**7.84**	**4.69**	**3.71**
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	<0.01	<0.01				
Organic Nitrogen	0.15		<0.33	0.66	0.58	0.56	0.65	0.267	0.26	0.6	0.36
pH	6.5-8.5 [OG]	6.5 to 8.5	7.61	7.66	8.03	8.11	7.88	8.14	7.75	7.95	7.98
Sodium	200 [AO]	106	17.8	25.5	18.2	19	30	7.9	28	11	30
Sulphate	500 [AO]	267	34	31	58	38	45	24	33	12	37
Total Kjeldahl Nitrogen(as N)	-	nv	0.34	0.77	0.58	0.56	0.65	0.35	0.26	0.6	0.36

NOTES:
1. All results expressed in mg/L unless otherwise noted.
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	OW3 19-Apr-16	OW3 26-Oct-16	OW3 16-May-17	OW3 27-Nov-17	OW3 10-Apr-18	OW3 14-Nov-18	OW3 24-Apr-19
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	320	**410**	**490**	**540**	**510**	390	380
Ammonia(as N)	-	nv	<0.050	<0.050	0.1	<0.050	2.3	<0.050	<0.050
Barium	1								
Boron	5 [IMAC]								
Calcium	-	nv		100			110		
Chloride	250 [AO]	133	15	30	27	30	30	28	20
Conductivity - @25°C (µS/cm)	-	nv	710	950	1100	1200	1100	780	850
Hardness(as $CaCO_3$)	80-100 [OG]	360*	350	**470**	**520**	**570**	**510**	**400**	**400**
Iron	0.3 [AO]	0.16	<0.02	<0.02	0.02	<0.02	<0.02		<0.02
Magnesium	-	nv		52			56		
Nitrate(as N)	10 d	2.59	**3.3**	1.24	**8.05**	**9.24**	**11.9**	**5.04**	**7.01**
Nitrite(as N)	1 d								
Organic Nitrogen	0.15		0.21	0.26	0.61	0.225	0.6	0.025	0.025
pH	6.5-8.5 [OG]	6.5 to 8.5	7.97	8.08	7.9	7.67	7.86	7.79	8.12
Sodium	200 [AO]	106	13	21	30	36	30		20
Sulphate	500 [AO]	267	32	58	47	36	36	34	
Total Kjeldahl Nitrogen(as N)	-	nv	0.21	0.26	0.71	<0.50	2.9	<0.10	0.22

NOTES:
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2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODW
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW2 1-Jan-91	TW2 1-Apr-91	TW2 1-Oct-91	TW2 1-Apr-92	TW2 1-Oct-92	TW2 1-May-93	TW2 1-Nov-93	TW2 1-May-94	TW2 1-Oct-94	TW2 1-May-95	TW2 1-Oct-95
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	383	332	290	331	323	271	215	263	357	306	346
Ammonia(as N)	-	nv	0.007	0.035	0.115	0.054	0.348	0.056	0.13	0.077		0.16	0.3
Barium	1												
Boron	5 [IMAC]												
Calcium	-	nv											
Chloride	250 [AO]	133	20.7	11	36.1	21.1	12	9.7	10.3	12.8	15	11.3	28.5
Conductivity - @25°C (µS/cm)	-	nv	856	772	888	806	791	668	608	750	680	719	850
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**391**	**373**	**447**	**405**	283	347	340	**386**	**376**	**369**	**431**
Iron	0.3 [AO]	0.16											
Magnesium	-	nv											
Nitrate(as N)	10 d	2.59	**4.2**	1.9	0.1	**5.1**	0.2	1.3	0.1	1.1	0.1	0.6	0.6
Nitrite(as N)	1 d		0.01	0.02	0.01	0.03	0.01	0.01	0.01	0.01	0.03	0.04	0.01
Organic Nitrogen	0.15		0.563	0.495	0.385	0.606	0.532	0.474	0.64	0.333		0.39	0.23
pH	6.5-8.5 [OG]	6.5 to 8.5	8.03	7.88	7.75	7.65	7.75	7.8	7.92	8.07	8.19	8.07	7.69
Sodium	200 [AO]	106								12.5		15.7	15.5
Sulphate	500 [AO]	267										65.9	101
Total Kjeldahl Nitrogen(as N)	-	nv	0.57	0.53	0.5	0.66	0.88	0.53	0.77	0.41	0.6	0.55	0.53

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

NOTES:
1. All results expressed in mg/
2. ODWS - Ontario Drinking W
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Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW2 1-Apr-97	TW2 1-Sep-97	TW2 1-May-98	TW2 1-May-99	TW2 1-Nov-99
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	303	263	**510**	215	282
Ammonia(as N)	-	nv	0.004	0.007	0.12	0.44	0.05
Barium	1						
Boron	5 [IMAC]						
Calcium	-	nv					
Chloride	250 [AO]	133	12	15.7	10.5	9.4	40.9
Conductivity - @25°C (µS/cm)	-	nv	620	680	523	534	770
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**418**	**363**	312	**362**	**496**
Iron	0.3 [AO]	0.16				0.01	0.01
Magnesium	-	nv					
Nitrate(as N)	10 d	2.59	1.65	0.45	0.65	0.23	0.43
Nitrite(as N)	1 d		0.1	0.1	0.05	0.05	0.05
Organic Nitrogen	0.15		0.29	0.24	1.2	1.7	2.7
pH	6.5-8.5 [OG]	6.5 to 8.5	7.6	7.8	7.27	7.86	7.72
Sodium	200 [AO]	106	9.52	19	12.1	6.74	21
Sulphate	500 [AO]	267	60.1	102	156	144	118
Total Kjeldahl Nitrogen(as N)	-	nv	0.29	0.24	1.32	2.2	2.8

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/ater Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
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guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW2 9-Jan-01	TW2 Rep 9-Jan-01	TW2 18-Jul-01	TW2 005 19-Oct-01	TW2 26-Jun-02	TW2 011 23-Oct-02	TW2 007 27-May-03	TW2 007 30-Sep-03	TW2 007 3-Jun-04
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	192	**1974.5**	**DRY**	**409**	**DRY**	309	375	357	**405**
Ammonia(as N)	-	nv	0.04	0.06		0.06		0.22	0.06	0.22	0.1
Barium	1		0.257	0.252				0.1	0.086	0.085	0.083
Boron	5 [IMAC]		0.17	0.17					0.15	0.154	0.227
Calcium	-	nv	55.3	54.9		127		154	121	111	116
Chloride	250 [AO]	133	4.5	4.5		37.7		29.6	62.4	28	16.1
Conductivity - @25°C (µS/cm)	-	nv	499	501		1014		997	953	822	820
Hardness(as $CaCO_3$)	80-100 [OG]	360*	259	258		**558**		**618**	**533.482**	**471**	**475**
Iron	0.3 [AO]	0.16	0.06	0.06				0.19	0.37	0.182	0.062
Magnesium	-	nv	29.2	29.2		58.4		56.8	56.2	47.2	44.9
Nitrate(as N)	10 d	2.59	nd	nd		<0.1		0.1	0.1	0.1	2
Nitrite(as N)	1 d		nd	nd		<0.1		<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		nd	nd		0.38		1.29	0.68	0.4	0.49
pH	6.5-8.5 [OG]	6.5 to 8.5	7.92	7.86		7.52		8.09	7.7	7.47	8.2
Sodium	200 [AO]	106	21.2	22.3		20.4		13.9	21	16.3	15.1
Sulphate	500 [AO]	267	84.5	85.3		97.6		208	135	120	59
Total Kjeldahl Nitrogen(as N)	-	nv	0.04	0.05		0.44		1.51	0.74	0.62	0.59

NOTES:
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW2 005 22-Sep-04	TW2 007 27-Apr-05	TW2 004 17-Oct-05	TW2 005 27-Apr-06	TW2 002 26-Oct-06	TW2 002 9-Apr-07	TW2 10-Oct-07	TW2 006 17-Apr-08	TW2 006 6-Oct-08
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	267	368	352	380	**402**	350	**DRY**	346	360
Ammonia(as N)	-	nv	0.27	0.12	0.15	0.03	0.03	<0.01		0.02	0.11
Barium	1		0.055	0.076	0.093	0.08	0.074	0.071		0.068	0.075
Boron	5 [IMAC]		0.11	0.162	0.189	0.221	0.177	0.147		0.167	0.165
Calcium	-	nv	73.1	105	104	111	111	93.6		98.3	94.3
Chloride	250 [AO]	133	14.6	9.2	19.6	13	36.1	10.9		11	16.4
Conductivity - @25°C (µS/cm)	-	nv	645	748	783	783	830	689		813	752
Hardness(as $CaCO_3$)	80-100 [OG]	360*	324	**429**	**449**	**432**	**477**	**367**		**394**	**395**
Iron	0.3 [AO]	0.16	0.106	0.046	0.077	0.033	<0.005	<0.005		<0.005	0.102
Magnesium	-	nv	34.3	40.4	45.9	37.9	48.8	32.3		36.2	38.7
Nitrate(as N)	10 d	2.59	0.2	1.4	0.1	2.4	0.2	2.4		2.1	1.3
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1
Organic Nitrogen	0.15		0.28	0.84	0.53	0.59	1.61	1.56		1.82	1.85
pH	6.5-8.5 [OG]	6.5 to 8.5	7.47	7.78	7.37	7.96	7.66	7.53		7.52	7.46
Sodium	200 [AO]	106	9.7	10.2	13.8	12.8	18.4	10.7		11.4	12.2
Sulphate	500 [AO]	267	106	40	92	41	97	57		59	80
Total Kjeldahl Nitrogen(as N)	-	nv	0.55	0.96	0.68	0.62	1.64	1.57		1.84	1.96

NOTES:
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW2 29-Apr-09	TW2 13-Oct-09	TW2 4-May-10	TW2 10-Nov-10	TW2 14-Apr-11	TW2 25-Oct-11	TW2 3-Apr-12	TW2 26-Sep-12	TW2 7-May-13
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	393	340	395	322	385	**479**	**409**	349	360
Ammonia(as N)	-	nv	<0.01	0.07	<0.01	0.02	<0.01	<0.01	0.02	<0.01	0.16
Barium	1		0.062	0.068	0.08	0.073	0.064	0.08	0.059	0.096	
Boron	5 [IMAC]		0.193	0.138	0.176	0.136	0.127	0.198	0.21	0.182	
Calcium	-	nv	104	88.4	98.6	87.6	100	124	89.4	113	97
Chloride	250 [AO]	133	12	18.4	13.2	14.2	12.2	10	15.1	21.5	8
Conductivity - @25°C (µS/cm)	-	nv	828	801	844	741	814	989	840	877	780
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**419**	**377**	**411**	**364**	**410**	**526**	**388**	**479**	**420**
Iron	0.3 [AO]	0.16	<0.005	0.012	<0.005	<0.005	<0.005	0.033	<0.005	<0.005	<0.1
Magnesium	-	nv	38.4	37.8	40	35.2	38.9	52.4	40	48	44
Nitrate(as N)	10 d	2.59	**3.5**	0.2	2.2	**2.9**	**4.1**	**3.6**	**4.6**	0.2	1.7
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01
Organic Nitrogen	0.15		1.11	2.93	0.89	0.78	1.13	<1.28	0.75	1.49	2.34
pH	6.5-8.5 [OG]	6.5 to 8.5	7.62	7.36	6.99	7.72	7.11	7.72	7.99	7.77	8.12
Sodium	200 [AO]	106	11.5	12.1	11	9.4	10.5	9.8	12	14.8	8.2
Sulphate	500 [AO]	267	37	88	56	53	37	39	31	131	53
Total Kjeldahl Nitrogen(as N)	-	nv	1.12	3	0.9	0.8	1.14	1.29	0.77	1.49	2.5

NOTES:
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4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW2 26-Nov-13	TW2 1-May-14	TW2 4-Nov-14	TW2 20-Apr-15	TW2 3-Nov-15	TW2 19-Apr-16	TW2 26-Oct-16	TW2 16-May-17	TW2 27-Nov-17	TW2 10-Apr-18
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	330	370	270	230	220	290	300	290	400	290
Ammonia(as N)	-	nv	0.095	0.46	0.2	0.11	0.11	0.071	0.49	0.12	0.093	0.31
Barium	1											
Boron	5 [IMAC]											
Calcium	-	nv	87						100			80
Chloride	250 [AO]	133	9	9	12	9	10	11	17	5.9	15	9
Conductivity - @25°C (µS/cm)	-	nv	720	780	680	600	600	700	790	690	830	660
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**390**	**400**	**380**	340	340	**380**	**420**	**370**	**440**	340
Iron	0.3 [AO]	0.16	<0.1	ND	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Magnesium	-	nv	41						43			35
Nitrate(as N)	10 d	2.59	1.4	**2.72**	0.48	0.38	0.28	1.09	<0.1	0.66	0.44	1.34
Nitrite(as N)	1 d		<0.01									
Organic Nitrogen	0.15		1.205	3.44	1.8	0.73	0.63	0.129	0.47	0.59	0.157	0.89
pH	6.5-8.5 [OG]	6.5 to 8.5	7.98	8.01	7.94	8.14	8.05	8.16	8.06	8.01	8.06	8.04
Sodium	200 [AO]	106	8.6	7.9	11	8.3	9.2	8.7	14	7.4	10	8
Sulphate	500 [AO]	267	52	37	80	72	90	81	110	34	42	46
Total Kjeldahl Nitrogen(as N)	-	nv	1.3	3.9	<2	0.84	0.74	0.2	0.96	0.71	<0.50	1.2

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW2	TW2	TW2	TW2	TW2	TW2	TW2	TW2	TW2	TW2	TW2
			14-Nov-18	24-Apr-19	20-Nov-19	13-May-20	12-Nov-20	20-Apr-21	5-Oct-21	3-May-22	29-Sep-22	########	22-Nov-23
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401		270	250	250	310	310	**420**	210	200	230	190
Ammonia(as N)	-	nv		<0.050	0.11	0.08	0.12	0.2	2.1	0.33	0.19	0.11	<0.050
Barium	1									-	-		
Boron	5 [IMAC]									-	-		
Calcium	-	nv								-	-		
Chloride	250 [AO]	133		3.9	18	11	23	14	16	12	29	10	4.1
Conductivity - @25°C (µS/cm)	-	nv		550	670	630	760	710	840	600	950	610	530
Hardness(as $CaCO_3$)	80-100 [OG]	360*		290	**370**	310	**390**	360	**450**	330	**520**	310	300
Iron	0.3 [AO]	0.16	**ISW**	<0.02	<0.02	<0.02	<0.02	<0.02	0.31	<0.02	<0.02	<0.02	<0.02
Magnesium	-	nv								-	-		
Nitrate(as N)	10 d	2.59		1.43	<0.10	0.18	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.16
Nitrite(as N)	1 d									-	-		<0.010
Organic Nitrogen	0.15			0.365						-	-		
pH	6.5-8.5 [OG]	6.5 to 8.5		8.23	8.01	8.01	8.15	8.06	7.83	8.08	8.04	8.15	8.09
Sodium	200 [AO]	106		5.6	10	8.2	13	9.6	10	8.5	18	8.7	10
Sulphate	500 [AO]	267		19	84	78	76	66	64	100	89	77	78
Total Kjeldahl Nitrogen(as N)	-	nv		0.39	0.34	0.49	0.28	0.53	4.2	0.57	0.69	0.2	<0.10

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW3 1-Jun-89	TW3 1-Oct-89	TW3 1-May-90	TW3 1-Jan-91	TW3 1-Apr-91	TW3 1-Oct-91	TW3 1-Apr-92	TW3 1-Oct-92	TW3 1-May-93
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	355		**368**	**277**	**367**	**335**	**375**	**309**	**410**	**396**
Ammonia(as N)	-	nv	0.062	0.044	0.226	0.02	0.031	0.094	0.053	0.025	0.06
Barium	1	0.32									
Boron	5 [IMAC]	1.31									
Calcium	-	nv									
Chloride	250 [AO]	127	27.1	17.3	26.3	**28.9**	19	**45.4**	21.1	26.7	**30.6**
Conductivity - @25°C (µS/cm)	-	nv	767	925	663	782	677	877	651	804	774
Hardness(as $CaCO_3$)	80-100 [OG]	183	**387**	**476**	302	344	328	**414**	328	283	**375**
Iron	0.3 [AO]	0.36									
Magnesium	-	nv									
Nitrate(as N)	10 d	2.68	0.1	0.1	**4.8**	0.1	0.1	0.1	0.1	0.1	0.1
Nitrite(as N)	1 d	0.28	0.02	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01
Organic Nitrogen	0.15	0.41	0.618	0.356	0.944	0.6	0.559	0.746	0.417	0.715	0.89
pH	6.5-8.5 [OG]	6.5 to 8.5	7	7.14	7.71	7.53	7.57	7.37	7.17	7.23	7.29
Sodium	200 [AO]	107									
Sulphate	500 [AO]	290									
Total Kjeldahl Nitrogen(as N)	-	nv	0.68	0.4	1.17	0.62	0.59	0.84	0.46	0.74	0.95

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW3 1-Nov-93	TW3 1-May-94	TW3 1-Oct-94	TW3 1-May-95	TW3 1-Oct-95	TW3 1-May-96	TW3 1-Apr-97	TW3 1-Sep-97
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	355	**372**	**308**	**437**	**350**	**421**	**387**	**273**	**412**
Ammonia(as N)	-	nv	0.083	0.067	0.282	0.14	0.32		0.077	0.198
Barium	1	0.32								
Boron	5 [IMAC]	1.31								
Calcium	-	nv								
Chloride	250 [AO]	127	3.9	18.9	**53.3**	**39.2**	**63.8**	**37.5**	**46.4**	**89.1**
Conductivity - @25°C (µS/cm)	-	nv	1023	690	978	749	1055	905	740	1250
Hardness(as $CaCO_3$)	80-100 [OG]	183	**505**	333	**458**	358	**469**	**391**	**518**	**436**
Iron	0.3 [AO]	0.36								
Magnesium	-	nv								
Nitrate(as N)	10 d	2.68	0.1	**0.2**	0.1	0.1	0.1	0.05	0.1	0.1
Nitrite(as N)	1 d	0.28	0.01	0.01	0.03	0.04	0.01		0.1	0.1
Organic Nitrogen	0.15	0.41	0.637	0.423	0.978	0.51	0.73		0.56	0.97
pH	6.5-8.5 [OG]	6.5 to 8.5	7.72	7.81	7.41	7.64	7.43	7.19	7.3	7.3
Sodium	200 [AO]	107		**19.7**		**26.2**	**52.2**	**29.6**	**39.6**	**0.072**
Sulphate	500 [AO]	290				**17**	**67.5**	**12.2**	**29.1**	**90.1**
Total Kjeldahl Nitrogen(as N)	-	nv	0.72	0.49	1.26	0.65	1.05		0.64	1.17

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW3 1-May-99	TW3 1-Nov-99	TW3 9-Jan-01	TW3 011 12-Jul-02	TW3 002 23-Oct-02	TW3 005 27-May-03	TW3 006 30-Sep-03	TW3 006 3-Jun-04
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	355	**270**	**343**	**438**	**570**	**537**	**390**	**531**	**549**
Ammonia(as N)	-	nv	0.21	0.11	0.07	0.25	0.13	0.04	0.06	0.27
Barium	1	0.32			0.5	0.23	0.075	0.072	0.089	0.088
Boron	5 [IMAC]	1.31			0.28	0.7	0.7	0.46	0.639	0.465
Calcium	-	nv			91.7	124	126	92.6	113	111
Chloride	250 [AO]	127	**54.3**	**66.5**	**44.5**	**56.1**	**53.8**	**50.2**	**61.7**	**45.5**
Conductivity - @25°C (µS/cm)	-	nv	819	1000	837	1265	1190	889	1120	1100
Hardness(as $CaCO_3$)	80-100 [OG]	183	**450**	**590**	**426**	**564**	**588**	**420.971**	**518**	**513**
Iron	0.3 [AO]	0.36	0.01	0.01	1.11	1.58	0.88	0.28	0.06	0.139
Magnesium	-	nv			47.8	61.9	66.4	46.1	57.3	57.1
Nitrate(as N)	10 d	2.68	**0.2**	**0.32**	nd	<0.1	<0.1	**0.6**	**0.4**	<0.1
Nitrite(as N)	1 d	0.28	0.05	0.05	nd	<0.1	<0.1	0.2	0.1	<0.1
Organic Nitrogen	0.15	0.41	2.2	5.1	0.76	0.92	0.98	1.83	0.8	0.74
pH	6.5-8.5 [OG]	6.5 to 8.5	7.93	7.4	7.45	6.92	8.41	7.47	7.2	8.14
Sodium	200 [AO]	107	**32.5**	**50.1**	**38.4**	**57.3**	**51.6**	**46.5**	**57**	**46.8**
Sulphate	500 [AO]	290	**98.1**	**127.5**	**28**	**52.2**	**75**	**92**	**58**	**19**
Total Kjeldahl Nitrogen(as N)	-	nv	2.4	5.2	0.83	1.17	1.11	1.87	0.86	1.01

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW3 002 22-Sep-04	TW3 (dup) 003 22-Sep-04	TW3 005 27-Apr-05	TW3 003 17-Oct-05	TW3 004 27-Apr-06	TW3 005 26-Oct-06	TW3 006 9-Apr-07	TW3 (dup) 007 9-Apr-07	TW3 003 10-Oct-07
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	355	**543**	**543**	**396**	**396**	**402**	**468**	**448**	**450**	**501**
Ammonia(as N)	-	nv	0.01	<0.01	0.18	0.07	0.11	0.02	0.09	0.08	0.01
Barium	1	0.32	0.093	0.093	0.06	0.076	0.059	0.079	0.059	0.059	0.072
Boron	5 [IMAC]	1.31	0.775	0.783	0.349	0.633	0.369	0.546	0.296	0.293	0.632
Calcium	-	nv	108	108	87.1	89.5	85.4	106	90.6	89.4	109
Chloride	250 [AO]	127	**61.7**	**68**	**34**	**43.2**	26.2	**43.5**	**33.1**	**33**	**37.1**
Conductivity - @25°C (µS/cm)	-	nv	1240	1230	865	933	805	1120	846	833	1100
Hardness(as $CaCO_3$)	80-100 [OG]	183	**512**	**512**	**405**	**406**	**390**	**483**	**417**	**411**	**499**
Iron	0.3 [AO]	0.36	0.125	0.206	0.033	0.027	0.018	0.013	0.031	0.032	0.067
Magnesium	-	nv	58.9	59	45.6	44.4	43	52.9	46.2	45.6	54.9
Nitrate(as N)	10 d	2.68	**8.1**	**8.8**	<0.1	**0.3**	<0.1	**0.3**	<0.1	<0.1	**1**
Nitrite(as N)	1 d	0.28	0.6	0.7	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	0.4
Organic Nitrogen	0.15	0.41	0.99	0.97	1.71	1.24	1.04	0.89	3.41	2.82	1.04
pH	6.5-8.5 [OG]	6.5 to 8.5	7.06	7.1	7.41	7.32	7.7	7.39	7.38	7.35	7.09
Sodium	200 [AO]	107	**51**	**51.2**	**32.6**	**44.7**	**30.2**	**41.1**	**29.4**	**29**	**35.8**
Sulphate	500 [AO]	290	**74**	**81**	**31**	**89**	**20**	**116**	**26**	**26**	**87**
Total Kjeldahl Nitrogen(as N)	-	nv	1	0.97	1.89	1.31	1.15	0.91	3.5	2.9	1.05

NOTES:
1. All results expressed in mg/L unless otherwise noted.
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW3 003 17-Apr-08	TW3 004 6-Oct-08	TW3 29-Apr-09	TW3 13-Oct-09	TW3 Duplicate #1 13-Oct-09	TW3 4-May-10	TW3 10-Nov-10	TW3 14-Apr-11	TW3 25-Oct-11
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	355	**362**	**448**	**410**	**502**	**496**	**453**	**431**	**408**	**336**
Ammonia(as N)	-	nv	<0.01	0.12	0.08	0.03	0.03	0.05	0.1	0.06	0.04
Barium	1	0.32	0.05	0.062	0.043	0.069	0.07	0.06	0.06	0.047	0.056
Boron	5 [IMAC]	1.31	0.327	0.628	0.325	0.574	0.583	0.404	0.495	0.257	0.505
Calcium	-	nv	79.8	95.5	84.3	106	107	99.5	104	91.4	92.7
Chloride	250 [AO]	127	**30.7**	**38**	23.3	**36.9**	**36.2**	**36**	**30**	24.6	26.9
Conductivity - @25°C (µS/cm)	-	nv	864	987	807	1090	1100	967	930	838	895
Hardness(as $CaCO_3$)	80-100 [OG]	183	359	**419**	**381**	**469**	**474**	**439**	**450**	**399**	**401**
Iron	0.3 [AO]	0.36	<0.005	0.034	0.084	0.026	0.028	0.08	0.364	0.265	0.284
Magnesium	-	nv	38.9	43.9	41.4	49.6	50	46.3	46.4	41.6	41.2
Nitrate(as N)	10 d	2.68	<0.1	<0.1	<0.1	**0.4**	**0.4**	<0.1	<0.1	<0.1	<0.1
Nitrite(as N)	1 d	0.28	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15	0.41	2.24	1.13	3.43	2.18	2.03	2.44	1.57	1.7	1.56
pH	6.5-8.5 [OG]	6.5 to 8.5	7.43	7.21	7.39	7.05	7.02	6.97	7.56	6.81	7.56
Sodium	200 [AO]	107	**29.7**	**35.3**	**22**	**33.3**	**33.7**	**27.4**	**27.3**	**22.9**	**24.6**
Sulphate	500 [AO]	290	**81**	**84**	**11**	**86**	**85**	**32**	**48**	**27**	**105**
Total Kjeldahl Nitrogen(as N)	-	nv	2.25	1.25	3.51	2.21	2.06	2.49	1.67	1.76	1.6

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW3 3-Apr-12	TW3 26-Sep-12	TW3 Duplicate #2 26-Sep-12	TW3 7-May-13	TW3 26-Nov-13	TW3 1-May-14	TW3 4-Nov-14	TW3 20-Apr-15	TW3 3-Nov-15
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	355	**388**	**438**	**436**	**330**	**350**	**360**	**410**	**300**	**390**
Ammonia(as N)	-	nv	0.07	0.03	0.03	0.13	0.11	0.25	0.075	0.088	0.17
Barium	1	0.32	0.044	0.073	0.072						
Boron	5 [IMAC]	1.31	0.286	0.664	0.667						
Calcium	-	nv	76.5	113	114	76	87				
Chloride	250 [AO]	127	23.5	**30.6**	**30.4**	20	21	23	18	17	24
Conductivity - @25°C (µS/cm)	-	nv	773	1020	997	730	780	760	88	640	870
Hardness(as $CaCO_3$)	80-100 [OG]	183	345	**492**	**495**	330	**370**	320	**450**	330	**440**
Iron	0.3 [AO]	0.36	0.329	0.084	0.072	<0.1	<0.1	ND	<0.02	<0.02	<0.02
Magnesium	-	nv	37.3	51	51.3	33	38				
Nitrate(as N)	10 d	2.68	<0.1	**2.3**	**2.3**	<0.1	<0.1	<0.1	**0.13**	<0.10	<0.10
Nitrite(as N)	1 d	0.28	<0.1	0.4	0.5	<0.01	<0.01				
Organic Nitrogen	0.15	0.41	1.1	1.06	0.88	1.27	2.79	4.25	1.93	0.522	0.83
pH	6.5-8.5 [OG]	6.5 to 8.5	7.91	7.82	7.94	7.87	7.81	8.03	7.69	8.04	7.93
Sodium	200 [AO]	107	**20.7**	**29.9**	**30**	**22**	**23**	**18**	**26**	**15**	**26**
Sulphate	500 [AO]	290	**18**	**87**	**88**	**32**	**43**	**28**	**57**	**25**	**58**
Total Kjeldahl Nitrogen(as N)	-	nv	1.17	1.09	0.91	1.4	2.9	4.5	<2	0.61	1

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW3 19-Apr-16	TW3 26-Oct-16	TW3 16-May-17	TW3 27-Nov-17	TW3 10-Apr-18	TW3 14-Nov-18	TW3 24-Apr-19	TW3 20-Nov-19	TW3 13-May-20
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	355	**310**	**380**	**340**	**410**	**360**	**340**	**180**	**330**	**350**
Ammonia(as N)	-	nv	0.12	0.11	0.077	0.1	0.29	0.28	0.33	0.086	<0.050
Barium	1	0.32									
Boron	5 [IMAC]	1.31									
Calcium	-	nv		110			86				
Chloride	250 [AO]	127	19	**31**	20	27	24	**33**	8.6	**28**	22
Conductivity - @25°C (µS/cm)	-	nv	670	930	730	850	720	830	360	810	710
Hardness(as $CaCO_3$)	80-100 [OG]	183	340	**460**	360	**420**	350	**400**	180	**420**	340
Iron	0.3 [AO]	0.36	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	0.68	<0.02	<0.02
Magnesium	-	nv		44			33				
Nitrate(as N)	10 d	2.68	<0.10	**1.76**	<0.10	<0.10	<0.10	**0.15**	0.1	<0.10	**0.25**
Nitrite(as N)	1 d	0.28									
Organic Nitrogen	0.15	0.41	0.1	0.57	0.493	0.34	0.18	0.3	0.49		
pH	6.5-8.5 [OG]	6.5 to 8.5	7.79	7.97	7.9	7.55	7.76	7.58	8.06	7.89	7.83
Sodium	200 [AO]	107	**14**	**28**	**18**	**25**	**20**		**6**	**27**	**19**
Sulphate	500 [AO]	290	**32**	**76**	**19**	**19**	**17**	**87**	<1.0	**72**	**14**
Total Kjeldahl Nitrogen(as N)	-	nv	<0.10	0.68	0.57	0.44	0.47	0.58	0.82	0.47	0.39

NOTES:
1. All results expressed in mg/L unless otherwise noted.
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW3 12-Nov-20	TW3 20-Apr-21	TW3 5-Oct-21	TW3 22-Nov-23
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	355		**140**	**380**	**370**
Ammonia(as N)	-	nv		0.58	0.07	0.11
Barium	1	0.32				
Boron	5 [IMAC]	1.31				
Calcium	-	nv				
Chloride	250 [AO]	127		8.2	21	19
Conductivity - @25°C (µS/cm)	-	nv		300	760	800
Hardness(as $CaCO_3$)	80-100 [OG]	183		140	**370**	**420**
Iron	0.3 [AO]	0.36	ISW	0.02	<0.02	<0.02
Magnesium	-	nv				
Nitrate(as N)	10 d	2.68		**0.58**	**<0.10**	<0.10
Nitrite(as N)	1 d	0.28				<0.010
Organic Nitrogen	0.15	0.41				
pH	6.5-8.5 [OG]	6.5 to 8.5		8	7.76	7.72
Sodium	200 [AO]	107		**5.9**	**20**	**21**
Sulphate	500 [AO]	290		**8.7**	**39**	**36**
Total Kjeldahl Nitrogen(as N)	-	nv		0.68	0.64	0.95

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5 1-Jun-89	TW5 1-Oct-89	TW5 1-May-90	TW5 1-Jan-91	TW5 1-Apr-91	TW5 1-Oct-91	TW5 1-Apr-92	TW5 1-Oct-92	TW5 1-May-93
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25									
Ammonia(as N)	-	nv	0.028	0.012	0.029	0.015	0.049	0.043	0.028	0.016	0.072
Barium	1										
Boron	5 [IMAC]										
Calcium	-	nv	87.4	84.4	85.4	80.7	83	80.6	80.4	35.9	86.4
Chloride	250 [AO]	133.25	15.5	15.1	16.1	18	19.2	20.1	17.1	18.2	19.7
Conductivity - @25°C (µS/cm)	-	nv	669	678	688	715	705	681	657	677	697
Hardness(as $CaCO_3$)	80-100 [OG]	360*	354	348	349	345	339	338	344	234	354
Iron	0.3 [AO]	0.155									
Magnesium	-	nv	32.8	33.2	33	34.7	31.9	33.1	34.7	35	33.4
Nitrate(as N)	10 d	2.59	**9.6**	**9.1**	**9.1**	**8.6**	**9.2**	**8.9**	**8.3**	**7.9**	**7.6**
Nitrite(as N)	1 d		0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.01	0.01
Organic Nitrogen	0.15		0.482	0.388	0.421	0.365	0.681	0.557	0.432	0.854	0.868
pH	6.5-8.5 [OG]	6.5 to 8.5	7.45	7.51	7.67	7.73	7.67	7.83	7.47	7.75	7.65
Sodium	200 [AO]	105.7875									
Sulphate	500 [AO]	267									
Total Kjeldahl Nitrogen(as N)	-	nv	0.51	0.4	0.45	0.38	0.73	0.6	0.46	0.87	0.94

NOTES:
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5 1-Nov-93	TW5 1-May-94	TW5 1-Oct-94	TW5 1-May-95	TW5 1-Oct-95	TW5 1-May-96	TW5 1-Apr-97	TW5 1-Sep-97
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25								
Ammonia(as N)	-	nv	0.072	0.031	0.225	0.35	0.54		1.49	3.18
Barium	1									
Boron	5 [IMAC]									
Calcium	-	nv	80.7	92.2	99.5	97.7	88.7	114		
Chloride	250 [AO]	133.25	17.5	31.5	31.8	37.6	34.7	40.8	32.3	89.1
Conductivity - @25°C (µS/cm)	-	nv	667	809	816	893	852	1107	770	920
Hardness(as $CaCO_3$)	80-100 [OG]	360*	345	**399**	**424**	**430**	**402**	**493**	**478**	**420**
Iron	0.3 [AO]	0.155								
Magnesium	-	nv	34.8	41	42.6	45.2	43.7	50		
Nitrate(as N)	10 d	2.59	**6.4**	1.5	0.3	**6.6**	**7.6**	0.05	**6.66**	**5.95**
Nitrite(as N)	1 d		0.026	0.01	0.04	0.05	0.02		0.1	0.21
Organic Nitrogen	0.15		0.748	0.649	0.955	1.11	0.91		0.15	0.01
pH	6.5-8.5 [OG]	6.5 to 8.5	7.98	7.82	7.47	7.7	7.61	7.1	7.5	7.4
Sodium	200 [AO]	105.7875		17	28.8		23.2	25	18.5	37.5
Sulphate	500 [AO]	267				25.7	23.2	50.1	40.1	52.5
Total Kjeldahl Nitrogen(as N)	-	nv	0.82	0.68	1.18	1.46	1.45		1.64	3.19

NOTES:
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2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5 1-May-98	TW5 1-May-99	TW5 1-Nov-99	TW5 9-Jun-00	TW5 001 18-Jul-01	TW5 001 19-Oct-01	TW5 010 28-Jun-02	TW5 001 23-Oct-02	TW5 001 27-May-03
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25				238	350	330	351	330	333
Ammonia(as N)	-	nv	0.13	0.18	0.05	0.2	1.88	1.7	1.26	1.37	0.63
Barium	1					0.983	0.05	0.05	0.04	0.05	0.042
Boron	5 [IMAC]					0.27	0.45	0.44	0.6	0.51	0.41
Calcium	-	nv		0.01	0.01	67.5	108	97.6	99.6	105	91
Chloride	250 [AO]	133.25	1.83	1.91	5	1.8	23	21.1	19.1	19.6	18.5
Conductivity - @25°C (µS/cm)	-	nv	349	352	396	454	894	877	894	847	701
Hardness(as $CaCO_3$)	80-100 [OG]	360*	199	256	328	265	**454**	**427**	**438**	**455**	**386.968**
Iron	0.3 [AO]	0.155				0.31	0.02	<0.01	<0.01	<0.02	0.24
Magnesium	-	nv		220	220	23.3	44.8	44.6	46.1	46.9	38.8
Nitrate(as N)	10 d	2.59	1.61	0.74	0.97	0.7	**7.2**	**7.3**	**5.5**	**5.9**	**5.3**
Nitrite(as N)	1 d		0.05	0.05	0.05	nd	<0.1	<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		1.07	2.1	3.6	0.9	0.42	0.7	0.17	0.34	2.09
pH	6.5-8.5 [OG]	6.5 to 8.5	7.5	7.68	7.59	7.6	7.28	7.37	7.14	8.26	7.31
Sodium	200 [AO]	105.7875	5.11	2.8	7.66	16.4	15.3	14.7	14	16	13.5
Sulphate	500 [AO]	267	16.3	11.4	12.7	9	84.3	69.9	89.1		49
Total Kjeldahl Nitrogen(as N)	-	nv	1.2	2.3	3.7	1.1	2.3	2.4	1.43	1.71	2.72

NOTES:
1. All results expressed in mg/L unless otherwise noted.
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5 002 (dup) 27-May-03	TW5 001 30-Sep-03	TW5 002 (dup) 30-Sep-03	TW5 001 3-Jun-04	TW5 002 (dup) 3-Jun-04	TW5 007 22-Sep-04	TW5 001 (dup) 27-Apr-05	TW5 002 27-Apr-05	TW5 008 17-Oct-05
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25	330	336	327	315	321	345	340	336	346
Ammonia(as N)	-	nv	0.56	0.72	0.81	0.56	0.5	0.72	0.76	0.77	0.82
Barium	1		0.042	0.043	0.043	0.045	0.044	0.04	0.045	0.044	0.043
Boron	5 [IMAC]		0.41	0.398	0.4	0.515	0.513	0.448	0.496	0.495	0.424
Calcium	-	nv	91.2	95	95.4	99.6	97.8	86	99.5	98.4	91.7
Chloride	250 [AO]	133.25	18.5	19.1	19.3	19.1	19.1	18.7	17.9	17.9	18.6
Conductivity - @25°C (µS/cm)	-	nv	702	744	723	786	788	765	786	782	759
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**388.29**	**404**	**405**	**422**	**414**	**380**	**425**	**421**	**398**
Iron	0.3 [AO]	0.155	0.24	0.005	<0.005	<0.005	0.005	0.008	0.112	<0.005	<0.005
Magnesium	-	nv	39	40.5	40.6	42.2	41.3	40.2	42.9	42.7	41.1
Nitrate(as N)	10 d	2.59	**5.3**	**4.8**	**4.8**	**4.7**	**4.7**	**4.7**	**3.8**	**3.8**	**3.7**
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		2.02	0.66	0.54	0.81	0.85	0.56	0.5	0.47	0.81
pH	6.5-8.5 [OG]	6.5 to 8.5	7.32	7.27	7.22	8.1	8.19	7.17	7.43	7.29	7.22
Sodium	200 [AO]	105.7875	13.5	13.7	13.7	14.9	14.6	12.6	13.8	13.6	13.1
Sulphate	500 [AO]	267	49	69	69	83	83	74	63	63	54
Total Kjeldahl Nitrogen(as N)	-	nv	2.58	1.38	1.35	1.37	1.35	1.28	1.26	1.24	1.63

NOTES:
1. All results expressed in mg/L unless otherwise noted.
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5 009 (dup) 17-Oct-05	TW5 001 27-Apr-06	TW5 002 (dup) 27-Apr-06	TW5 012 26-Oct-06	TW5 013 (dup) 26-Oct-06	TW5 001 9-Apr-07	TW5 001 10-Oct-07	TW5 (dup) 002 10-Oct-07
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25	348	336	334	346	348	338	334	334
Ammonia(as N)	-	nv	0.85	0.34	0.34	0.65	0.66	0.29	0.51	0.52
Barium	1		0.043	0.041	0.041	0.037	0.037	0.035	0.036	0.035
Boron	5 [IMAC]		0.424	0.473	0.479	0.413	0.412	0.446	0.401	0.405
Calcium	-	nv	92	98.6	100	89.1	89.7	88.3	85.5	86
Chloride	250 [AO]	133.25	18.9	19	18.9	19.7	19.5	18.8	17.9	17.8
Conductivity - @25°C (µS/cm)	-	nv	759	771	766	677	699	691	757	745
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**399**	**418**	**423**	**379**	**381**	**375**	**366**	**369**
Iron	0.3 [AO]	0.155	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	0.006	<0.005
Magnesium	-	nv	41.1	41.8	42	38.1	38.2	37.7	37	37.5
Nitrate(as N)	10 d	2.59	**3.7**	1.1	**4.1**	**4.6**	**4.6**	**4.9**	**4.8**	**4.8**
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		0.8	0.99	0.89	1.02	1.25	0.41	0.84	0.69
pH	6.5-8.5 [OG]	6.5 to 8.5	7.31	7.73	7.71	7.43	7.48	7.48	6.99	7.07
Sodium	200 [AO]	105.7875	13.1	14.1	14.2	13	12.9	12.6	12.4	12.6
Sulphate	500 [AO]	267	54	52	53	47	47	49	43	43
Total Kjeldahl Nitrogen(as N)	-	nv	1.65	1.33	1.23	1.67	1.91	0.7	1.35	1.21

NOTES:
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5 001 17-Apr-08	TW5 (dup) 002 17-Apr-08	TW5 001 6-Oct-08	TW5 (dup) 002 6-Oct-08	TW5 29-Apr-09	TW5 (dup) Duplicate #1 29-Apr-09	TW5 13-Oct-09	TW5 4-May-10
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25	314	322	328	330	338	357	327	329
Ammonia(as N)	-	nv	0.16	0.16	0.45	0.43	0.48	0.46	0.56	0.48
Barium	1		0.032	0.032	0.031	0.031	0.031	0.031	0.029	0.034
Boron	5 [IMAC]		0.356	0.363	0.405	0.406	0.441	0.44	0.33	0.404
Calcium	-	nv	82.1	83.3	83.2	83.5	90.6	90.3	77.7	85.9
Chloride	250 [AO]	133.25	19.2	19.2	19.6	19.5	19.2	19	20.9	20.5
Conductivity - @25°C (µS/cm)	-	nv	743	696	719	728	756	750	742	747
Hardness(as $CaCO_3$)	80-100 [OG]	360*	345	350	350	351	**388**	**386**	339	**366**
Iron	0.3 [AO]	0.155	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium	-	nv	34.1	34.4	34.5	34.7	39.3	39	35.2	36.7
Nitrate(as N)	10 d	2.59	**5.9**	**5.8**	**5.8**	**5.8**	**5.3**	**5.3**	**4.9**	**4.3**
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		1.24	0.96	0.97	1	2.06	2.18	0.65	1.34
pH	6.5-8.5 [OG]	6.5 to 8.5	7.43	7.44	7.12	7.19	7.35	7.36	7.16	7.05
Sodium	200 [AO]	105.7875	12.1	12.5	12.1	12.2	13.5	13.4	11.1	12.4
Sulphate	500 [AO]	267	39	39	44	44	38	38	34	34
Total Kjeldahl Nitrogen(as N)	-	nv	1.4	1.12	1.42	1.43	2.54	2.64	1.21	1.82

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5 (dup) Duplicate #1 4-May-10	TW5 10-Nov-10	TW5 (dup) Duplicate #1 10-Nov-10	TW5 14-Apr-11	TW5 (dup) Duplicate #1 14-Apr-11	TW5 25-Oct-11	TW5 (dup) Duplicate #1 25-Oct-11	TW5 3-Apr-12
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25	329	317	317	325	326	324	324	335
Ammonia(as N)	-	nv	0.46	0.42	0.41	0.46	0.47	0.48	0.46	0.22
Barium	1		0.034	0.037	0.037	0.035	0.035	0.034	0.033	0.032
Boron	5 [IMAC]		0.41	0.448	0.45	0.435	0.439	0.375	0.376	0.41
Calcium	-	nv	84.8	88.9	89	87.5	88.1	86.4	85.2	76.2
Chloride	250 [AO]	133.25	20.3	20.4	20.4	19.3	19.3	18.2	18.3	19.2
Conductivity - @25°C (µS/cm)	-	nv	742	719	721	729	728	750	743	727
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**361**	**378**	**378**	**373**	**376**	**377**	**372**	341
Iron	0.3 [AO]	0.155	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium	-	nv	36.3	37.9	37.8	37.6	37.8	39.2	38.7	36.6
Nitrate(as N)	10 d	2.59	**4.3**	**4.7**	**4.7**	**4.7**	**4.7**	**4.8**	**4.3**	**5**
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		1.37	0.66	0.7	0.4	0.43	0.71	0.76	1.02
pH	6.5-8.5 [OG]	6.5 to 8.5	7.05	7.61	7.61	6.92	6.98	7.64	7.66	7.67
Sodium	200 [AO]	105.7875	12.3	12.1	12.2	12.6	12.8	11	10.8	13.6
Sulphate	500 [AO]	267	34	33	33	31	31	25	25	28
Total Kjeldahl Nitrogen(as N)	-	nv	1.83	1.08	1.11	0.86	0.9	1.19	1.22	1.24

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5 25-Sep-12	TW5 7-May-13	TW5 26-Nov-13	TW5 1-May-14	TW5 4-Nov-14	TW5 20-Apr-15	TW5 3-Nov-15	TW5 19-Apr-16
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25	338	240	250	220	260	220	280	230
Ammonia(as N)	-	nv	0.37	0.12	0.065	0.13	0.086	<0.050	<0.050	0.078
Barium	1		0.036							
Boron	5 [IMAC]		0.423							
Calcium	-	nv	89	68	76					
Chloride	250 [AO]	133.25	20.2	22	21	15	16	21	16	21
Conductivity - @25°C (µS/cm)	-	nv	738	540	560	470	550	500	590	520
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**381**	270	300	220	310	280	340	280
Iron	0.3 [AO]	0.155	<0.005	<0.1	<0.1	ND	<0.02	<0.02	<0.02	<0.02
Magnesium	-	nv	38.6	25	27					
Nitrate(as N)	10 d	2.59	**4.5**	1.6	1.2	1.27	0.98	0.81	0.34	0.88
Nitrite(as N)	1 d		<0.1	0.023	<0.01					
Organic Nitrogen	0.15		1	2.38	2.335	1.37	1.91	0.68	0.6	<0.10
pH	6.5-8.5 [OG]	6.5 to 8.5	7.72	8.06	8.01	8.15	7.87	8.04	8.02	8.09
Sodium	200 [AO]	105.7875	12.7	7.1	6.4	4.2	5.3	5.8	6.4	6.2
Sulphate	500 [AO]	267	28	12	11	9	10	7	10	13
Total Kjeldahl Nitrogen(as N)	-	nv	1.37	2.5	2.4	1.5	<2	0.73	0.65	<0.10

NOTES:
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2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5 26-Oct-16	TW5 16-May-17	TW5 27-Nov-17	TW5 10-Apr-18	TW5 14-Nov-18	TW5 24-Apr-19	TW5 20-Nov-19	TW5 13-May-20
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25	280	250	290	270	290	250	280	260
Ammonia(as N)	-	nv	0.36	2	0.62	1.3	0.41	0.086	0.23	0.43
Barium	1									
Boron	5 [IMAC]									
Calcium	-	nv	80			72				
Chloride	250 [AO]	133.25	17	17	16	17	13	16	12	19
Conductivity - @25°C (µS/cm)	-	nv	590	550	590	570	510	530	560	560
Hardness(as $CaCO_3$)	80-100 [OG]	360*	320	280	300	290	300	280	310	270
Iron	0.3 [AO]	0.155	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Magnesium	-	nv	30			26				
Nitrate(as N)	10 d	2.59	0.35	1.51	1.68	1.71	2.21	1	0.56	1.25
Nitrite(as N)	1 d									
Organic Nitrogen	0.15		0.45	1.9	1.18	2.8	0.23	0.534		
pH	6.5-8.5 [OG]	6.5 to 8.5	8.09	8.02	7.79	7.95	7.81	8.14	7.88	7.95
Sodium	200 [AO]	105.7875	6.7	6.1	5.8	5.2		6.2	6.1	6.3
Sulphate	500 [AO]	267	17	13	12	15	8.8	14	7.4	14
Total Kjeldahl Nitrogen(as N)	-	nv	0.81	3.9	1.8	4.1	0.64	0.62	0.7	1

NOTES:
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4. IMAC indicates an interim maximum acceptable concentration ODWO.
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Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5 12-Nov-20	TW5 20-Apr-21	TW5 5-Oct-21	TW5 3-May-22	TW5 29-Sep-22	TW5 20-Apr-23	TW5 22-Nov-23
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401.25	310	240	280	230	260	230	270
Ammonia(as N)	-	nv	1.8	0.14	0.2	0.25	0.31	<0.050	0.68
Barium	1					-	-		
Boron	5 [IMAC]					-	-		
Calcium	-	nv				-	-		
Chloride	250 [AO]	133.25	15	30	14	14	21	13	19
Conductivity - @25°C (µS/cm)	-	nv	620	550	550	490	550	480	570
Hardness(as $CaCO_3$)	80-100 [OG]	360*	320	260	280	250	290	240	310
Iron	0.3 [AO]	0.155	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Magnesium	-	nv				-	-		
Nitrate(as N)	10 d	2.59	1.27	0.73	0.47	1.15	0.73	0.21	1.52
Nitrite(as N)	1 d					-	-		0.121
Organic Nitrogen	0.15					-	-		
pH	6.5-8.5 [OG]	6.5 to 8.5	8.05	8.11	7.96	8.22	8.06	8.06	8.01
Sodium	200 [AO]	105.7875	7.7	6.7	8.7	7.6	7.6	7.9	7.4
Sulphate	500 [AO]	267	9.6	5.1	7.4	4.5	6.8	2.5	4.0
Total Kjeldahl Nitrogen(as N)	-	nv	5.6	0.23	0.44	0.4	0.46	0.12	0.91

NOTES:
1. All results expressed in mg/L unless otherwise noted.
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6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5A 1-Jun-89	TW5A 1-Jan-91	TW5A 1-Apr-91	TW5A 1-Oct-91	TW5A 1-Apr-92	TW5A 1-Oct-92	TW5A 1-May-93	TW5A 1-Nov-93	TW5A 1-May-94
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401		245	231	231	215	242	247	233	171
Ammonia(as N)	-	nv	0.29	0.014	0.008	0.028	0.04	0.022	0.034	0.119	0.097
Barium	1										
Boron	5 [IMAC]										
Calcium	-	nv									
Chloride	250 [AO]	133	8.1	7.9	7.4	9.4	8.7	8.1	8.6	7.3	5
Conductivity - @25°C (µS/cm)	-	nv	504	526	484	536	514	526	498	485	459
Hardness(as $CaCO_3$)	80-100 [OG]	360*	274	265	243	277	256	194	263	263	248
Iron	0.3 [AO]	0.16									
Magnesium	-	nv									
Nitrate(as N)	10 d	2.59	2.5	1.9	2.1	1.6	**2.7**	1.8	2.2	1.4	1.5
Nitrite(as N)	1 d		0.01	0.01	0.01	0.01	0.03	0.01	0.01	0.01	0.01
Organic Nitrogen	0.15		0.291	0.286	0.462	0.282	0.28	0.518	0.776	1.321	0.253
pH	6.5-8.5 [OG]	6.5 to 8.5	7.61	8.08	8.08	8.04	7.88	7.97	7.89	8.16	8.07
Sodium	200 [AO]	106									3.6
Sulphate	500 [AO]	267									
Total Kjeldahl Nitrogen(as N)	-	nv	0.32	0.3	0.47	0.31	0.32	0.54	0.81	1.44	0.35

NOTES:
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3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5A 10-Oct-94	TW5A 1-May-95	TW5A 1-Apr-97	TW5A 1-Sep-97	TW5A 9-Jun-00	TW5A 9-Jan-01	TW5A 002 18-Jul-01	TW5A 002 12-Oct-01
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	263	255	230	241	353	367	249	240
Ammonia(as N)	-	nv	0.13	0.22	0.071	0.024	4.11	1.41	0.31	<0.01
Barium	1						0.634	0.047	0.02	0.01
Boron	5 [IMAC]						0.61	0.44	0.03	0.02
Calcium	-	nv					112	99.3	65.2	63.2
Chloride	250 [AO]	133	7	6.1	4.48	5.15	30.3	28.5	4.1	4.3
Conductivity - @25°C (µS/cm)	-	nv	520	536	390	480	846	802	502	467
Hardness(as $CaCO_3$)	80-100 [OG]	360*	283	277	276	230	**475**	**426**	**364**	252
Iron	0.3 [AO]	0.16					0.04	0.01	0.02	0.03
Magnesium	-	nv					47.7	43.2	24.5	22.8
Nitrate(as N)	10 d	2.59	1.5	1.2	1.19	1.17	**7.4**	**8**	1.6	1.2
Nitrite(as N)	1 d		0.04	0.04	0.1	0.1	nd	nd	<0.1	<0.1
Organic Nitrogen	0.15		0.55	0.61	0.27	0.17	nd	0.58	1.38	0.22
pH	6.5-8.5 [OG]	6.5 to 8.5	8.16	8.11	7.7	8.2	7.34	7.72	7.7	7.85
Sodium	200 [AO]	106	9.8		3.13	5.63	30.1	20.6	3.6	2.6
Sulphate	500 [AO]	267		12.9	12	12.3	74.6	81.4	13.8	11.4
Total Kjeldahl Nitrogen(as N)	-	nv	0.68	0.83	0.34	0.19	2.21	1.99	1.69	0.22

NOTES:
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4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5A 012 23-Oct-02	TW5A 003 27-May-03	TW5A 003 30-Sep-03	TW5A 003 3-Jun-04	TW5A 22-Sep-04	TW5A 003 27-Apr-05	TW5A 007 17-Oct-05	TW5A 015 27-Apr-06	TW5A 014 25-Oct-06
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	246	227	246	231	DRY	238	266	244	266
Ammonia(as N)	-	nv	0.02	0.01	0.01	0.03		0.07	0.04	0.03	<0.01
Barium	1		0.02	0.014	0.017	0.015		0.015	0.018	0.016	0.016
Boron	5 [IMAC]		0.02	<0.01	0.019	0.013		<0.005	0.022	0.013	0.03
Calcium	-	nv	76.8	63.2	69	68.4		66.3	68.5	71.7	69.3
Chloride	250 [AO]	133	5.7	5.8	7.2	6.2		6.6	6.7	13.3	14.5
Conductivity - @25°C (µS/cm)	-	nv	523	426	458	485		484	489	515	489
Hardness(as $CaCO_3$)	80-100 [OG]	360*	306	249.242	271	272		268	271	288	269
Iron	0.3 [AO]	0.16	<0.02	0.14	<0.005	<0.005		<0.005	0.009	0.006	<0.005
Magnesium	-	nv	27.7	22.2	23.9	24.6		24.9	24.4	26.4	23.2
Nitrate(as N)	10 d	2.59	1.2	1.5	1.4	1.2		1	0.9	1.2	0.8
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		0.46	4.61	0.07	0.28		1.47	0.36	1.59	4.05
pH	6.5-8.5 [OG]	6.5 to 8.5	8.26	7.72	7.47	8.29		7.77	7.63	7.91	7.76
Sodium	200 [AO]	106	5	4.2	3.9	4.6		4.7	5.8	6.5	7.6
Sulphate	500 [AO]	267	17	12	11	14		12	11	13	10
Total Kjeldahl Nitrogen(as N)	-	nv	0.48	4.62	0.08	0.31		1.54	0.4	1.62	4.06

NOTES:
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4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5A 9-Apr-07	TW5A 10-Oct-07	TW5A 015 17-Apr-08	TW5A 6-Oct-08	TW5A 29-Apr-09	TW5A 13-Oct-09	TW5A 4-May-10	TW5A 10-Nov-10	TW5A 14-Apr-11
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401			228		247	262	241	252	234
Ammonia(as N)	-	nv			0.04		<0.01	<0.01	0.5	0.09	0.07
Barium	1				0.014		0.012	0.015	0.017	0.02	0.016
Boron	5 [IMAC]				0.009		0.014	0.019	0.016	0.045	<0.005
Calcium	-	nv	DRY	DRY	58.9	DRY	67.8	68.2	63.2	74.5	68.8
Chloride	250 [AO]	133			15.8		16.7	17.4	17.5	19.9	18.3
Conductivity - @25°C (µS/cm)	-	nv			528		529	544	517	534	513
Hardness(as $CaCO_3$)	80-100 [OG]	360*			240		275	270	253	292	271
Iron	0.3 [AO]	0.16			<0.005		<0.005	<0.005	0.009	<0.005	<0.005
Magnesium	-	nv			22.6		25.6	24.2	23.2	25.8	24
Nitrate(as N)	10 d	2.59			1.1		1.2	0.8	1.3	1.4	0.1
Nitrite(as N)	1 d				<0.1		<0.1	<0.1	<0.1	<0.1	0.1
Organic Nitrogen	0.15				8.79		6.55	2.74	7.6	6.54	3.29
pH	6.5-8.5 [OG]	6.5 to 8.5			7.47		7.6	7.32	7.25	7.75	7.44
Sodium	200 [AO]	106			5.6		6	5.8	6.6	5.9	5.8
Sulphate	500 [AO]	267			12		11	11	11	11	11
Total Kjeldahl Nitrogen(as N)	-	nv			8.83		6.56	2.75	8.1	6.63	3.36

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4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5A 25-Oct-11	TW5A 3-Apr-12	TW5A 26-Sep-12	TW5A 7-May-13	TW5A 26-Nov-13	TW5A 1-May-14	TW5A 4-Nov-14	TW5A 20-Apr-15	TW5A 3-Nov-15
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	262	272	257	320	310	320	360	340	350
Ammonia(as N)	-	nv	0.44	0.28	0.02	0.27	0.31	0.46	1.2	1	1.4
Barium	1		0.03	0.018	0.018						
Boron	5 [IMAC]		0.036	0.025	0.019						
Calcium	-	nv	76	62.3	74.4	90	97				
Chloride	250 [AO]	133	15.5	21.2	19.8	22	22	25	23	24	28
Conductivity - @25°C (µS/cm)	-	nv	564	528	529	750	760	770	820	780	820
Hardness(as $CaCO_3$)	80-100 [OG]	360*	299	258	298	**380**	**410**	**370**	**430**	**420**	**440**
Iron	0.3 [AO]	0.16	0.062	<0.005	0.052	<0.1	<0.1	ND	<0.02	<0.02	<0.02
Magnesium	-	nv	26.4	24.9	27.2	38	40				
Nitrate(as N)	10 d	2.59	0.8	1.8	0.8	**5.8**	**8.3**	**8.1**	**5.93**	**5.68**	**5.61**
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	0.027	0.073				
Organic Nitrogen	0.15		4.42	7.81	3.52	1.13	1.69	1.24		1.5	0.7
pH	6.5-8.5 [OG]	6.5 to 8.5	7.85	7.96	7.7	7.84	7.81	7.97	7.73	8.01	7.96
Sodium	200 [AO]	106	5.2	6.8	5.1	14	15	15	18	17	19
Sulphate	500 [AO]	267	10	12	13	26	27	32	36	36	35
Total Kjeldahl Nitrogen(as N)	-	nv	4.86	8.09	3.54	1.4	2	1.7	1.1	2.5	2.1

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5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5A 19-Apr-16	TW5A 26-Oct-16	TW5A 16-May-17	TW5A 27-Nov-17	TW5A 10-Apr-18	TW5A 14-Nov-18	TW5A 24-Apr-19	TW5A 20-Nov-19	TW5A 13-May-20
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	350	360	340	360	370	370	340	360	370
Ammonia(as N)	-	nv	0.81	1.4	0.89	1.3	1.6	2	1	1.7	5.0 (1)
Barium	1										
Boron	5 [IMAC]										
Calcium	-	nv		100			100				
Chloride	250 [AO]	133	36	34	30	27	30	33	31	29	31
Conductivity - @25°C (µS/cm)	-	nv	860	880	830	850	870	730	830	870	900
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**430**	**440**	**400**	**420**	**430**	**420**	**400**	**440**	**390**
Iron	0.3 [AO]	0.16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Magnesium	-	nv		44			42				
Nitrate(as N)	10 d	2.59	**5.6**	**5.58**	**6.01**	**8.23**	**8.86**	**8.55**	**8.8**	**8.55**	**6.74**
Nitrite(as N)	1 d										
Organic Nitrogen	0.15		0.39	0.7	0.41	0.1	0.3	-0.3	0.2		
pH	6.5-8.5 [OG]	6.5 to 8.5	7.8	7.95	7.88	7.7	7.75	7.69	7.96	7.86	7.8
Sodium	200 [AO]	106	22	25	22	21	21		21	22	20
Sulphate	500 [AO]	267	36	39	33	37	38	37	33	34	34
Total Kjeldahl Nitrogen(as N)	-	nv	1.2	2.1	1.3	1.4	1.9	1.7	1.2	2.1	4.7 (1)

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Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW5A 12-Nov-20	TW5A 20-Apr-21	TW5A 5-Oct-21	TW5A 3-May-22	TW5A ########	TW5A ########	TW5A 22-Nov-23
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	360	360	380	380	360	320	360
Ammonia(as N)	-	nv	2.8	4.2	2.9	4.5	1.4	0.37	1.5
Barium	1					-	-		
Boron	5 [IMAC]					-	-		
Calcium	-	nv				-	-		
Chloride	250 [AO]	133	31	35	35	36	34	33	29
Conductivity - @25°C (µS/cm)	-	nv	860	860	830	860	880	800	870
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**410**	**390**	**410**	**400**	**430**	**380**	**470**
Iron	0.3 [AO]	0.16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Magnesium	-	nv				-	-		
Nitrate(as N)	10 d	2.59	**8.61**	**7**	1.1	0.11	**6.51**	**7.4**	**6.23**
Nitrite(as N)	1 d					-	-		0.101
Organic Nitrogen	0.15					-	-		
pH	6.5-8.5 [OG]	6.5 to 8.5	8.02	7.92	7.9	8.1	7.96	7.97	8.03
Sodium	200 [AO]	106	21	18	20	21	23	20	24
Sulphate	500 [AO]	267	39	34	41	35	36	25	36
Total Kjeldahl Nitrogen(as N)	-	nv	2.1	4.3	3.2	5.2	1.6	0.8	1.8

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Exceeds ODW
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW6 1-Jun-89	TW6 1-Oct-89	TW6 1-May-90	TW6 1-Jan-91	TW6 1-Apr-91	TW6 1-Oct-91	TW6 1-Apr-92	TW6 1-Oct-92	TW6 1-Nov-93
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401		**729**	**898**	**1050**	**1015**	**519**	**967**	**859**	**703**
Ammonia(as N)	-	nv	1.7	0.476	1.5	2	2.1	0.509	1.9	2.2	1.5
Barium	1										
Boron	5 [IMAC]										
Calcium	-	nv	175	244	160	82.7	139	224	134	6.5	109
Chloride	250 [AO]	133	**238**	**621**	**152**	64.8	58.3	**720**	69.8	56.1	57
Conductivity - @25°C (µS/cm)	-	nv	2600	3340	2350	2080	2070	3190	1920	1930	1620
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**1121**	**1372**	**1039**	**807**	**961**	**1355**	**920**	**620**	**816**
Iron	0.3 [AO]	0.16									
Magnesium	-	nv	166	185	155	146	149	193	142	146	132
Nitrate(as N)	10 d	2.59	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Nitrite(as N)	1 d		0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01
Organic Nitrogen	0.15		0.9	0.164	0.92	1.3	1.4	1.691	1.3	2.1	1.7
pH	6.5-8.5 [OG]	6.5 to 8.5	7.1	7.03	7.31	7.51	7.34	7.42	7.15	7.56	8.04
Sodium	200 [AO]	106									
Sulphate	500 [AO]	267									
Total Kjeldahl Nitrogen(as N)	-	nv	2.6	0.64	2.42	3.3	3.5	2.2	3.2	4.3	3.2
Mercury	0.001 [MAC]										
Arsenic (As)	0.025 [IMAC]										
Cadmium (Cd)	0.005 [MAC]										
Chromium (Cr)	0.05 [MAC]										
Copper (Cu)	-										
Lead (Pb)	0.01 [MAC]										
Manganese (Mn)	-										
Potassium (K)	-										
Total Suspended Solids (TSS)											
Total Dissolved Solids (TDS)	500 [AO]										

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW6 1-May-94	TW6 1-Oct-94	TW6 1-May-95	TW6 1-Apr-97	TW6 1-Sep-97	TW6 1-May-98	TW6 9-Jun-00	TW6 9-Jan-01	TW6 003 18-Jul-01	TW6 003 19-Oct-01
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	**772**	**954**	**920**	**659**	**761**	380	**887**	**852**	**838**	**814**
Ammonia(as N)	-	nv	2.69	2.21	3.08	5.31	2.92	0.14	3.51	5.19	3.67	3.28
Barium	1								0.998	0.133	0.14	0.12
Boron	5 [IMAC]								0.57	0.35	0.37	0.4
Calcium	-	nv	112	138	121				143	126	116	137
Chloride	250 [AO]	133	22	66.3	23.4	13.8	71	13	36.2	14.4	29.2	13.8
Conductivity - @25°C (µS/cm)	-	nv	1670	1780	1670	1300	670	1224	1410	1220	1508	1435
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**840**	**881**	**846**	**793**	**690**	**674**	**803**	**711**	**664**	**731**
Iron	0.3 [AO]	0.16							3.88	3.4	6.71	2.48
Magnesium	-	nv	135	129	131				108	96.4	90.9	94.5
Nitrate(as N)	10 d	2.59	0.2	0.2	0.1	0.1	0.1	1.6	nd	nd	0.5	0.5
Nitrite(as N)	1 d		0.01	0.05	0.05	0.1	0.1	0.05	nd	nd	<0.1	<0.1
Organic Nitrogen	0.15		6.01	1.55	1.98	0.03	0.9	1.11	1.39	0.71	2.55	2.9
pH	6.5-8.5 [OG]	6.5 to 8.5	7.74	7.46	7.5	7.1	7.3	7.03	7.22	7.28	7.41	7.19
Sodium	200 [AO]	106	36.3		37.1	20.1	59.3	21.3	51.1	19.7	29.9	24.7
Sulphate	500 [AO]	267			24.2	14.7	72.7	172.5	32	12.5	26	17
Total Kjeldahl Nitrogen(as N)	-	nv	8.7	3.76	5.06	5.34	3.82	1.25	4.9	5.9	6.22	6.18
Mercury	0.001 [MAC]											
Arsenic (As)	0.025 [IMAC]											
Cadmium (Cd)	0.005 [MAC]											
Chromium (Cr)	0.05 [MAC]											
Copper (Cu)	-											
Lead (Pb)	0.01 [MAC]											
Manganese (Mn)	-											
Potassium (K)	-											
Total Suspended Solids (TSS)												
Total Dissolved Solids (TDS)	500 [AO]											

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW6 004 (dup) 19-Oct-01	TW6 004 27-Jun-02	TW6 004 23-Oct-02	TW6 004 27-May-03	TW6 004 30-Sep-03	TW6 004 3-Jun-04	TW6 013 22-Sep-04	TW6 009 27-Apr-05	TW6 006 17-Oct-05	TW6 008 27-Apr-06
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	**827**	**780**	**711**	**762**	**855**	**723**	**910**	**750**	**870**	**810**
Ammonia(as N)	-	nv	4.56	4.24	2.66	4.12	2.64	4.49	1.88	3.42	1.86	2.94
Barium	1		0.14	0.13	0.17	0.183	0.165	0.198	0.131	0.178	0.148	0.174
Boron	5 [IMAC]		0.39	0.34	0.27	0.33	0.338	0.393	0.359	0.395	0.427	0.44
Calcium	-	nv	128	114	171	158	162	170	135	178	153	177
Chloride	250 [AO]	133	14.5	23.3	**190**	17.2	56.1	12.9	67.6	6.3	44.5	29.4
Conductivity - @25°C (µS/cm)	-	nv	1436	1467	1940	1450	1560	1490	1740	1540	1610	1560
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**760**	**615**	**884**	**822.44**	**828**	**874**	**773**	**880**	**839**	**899**
Iron	0.3 [AO]	0.16	8.91	5.84	5.43	10.9	6.65	13.3	4.4	11	6.13	8.31
Magnesium	-	nv	107	80.2	111	104	103	109	106	106	111	111
Nitrate(as N)	10 d	2.59	<0.1	<0.1	0.2	0.1	0.1	0.1	0.5	0.1	0.1	<0.1
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		1.55	0.97	1.17	0.67	0.92	1.22	1.01	1.11	1.1	0.67
pH	6.5-8.5 [OG]	6.5 to 8.5	7.29	6.8	8.06	6.96	6.97	7.94	6.89	6.88	6.99	7.28
Sodium	200 [AO]	106	21.3	23.6	**110**	24.1	64	18.7	79.5	17.4	68.2	38
Sulphate	500 [AO]	267	17.1	36	72	97	82	189	76	164	99	122
Total Kjeldahl Nitrogen(as N)	-	nv	6.11	5.21	3.83	4.79	3.56	5.71	2.89	4.53	2.96	3.61
Mercury	0.001 [MAC]											
Arsenic (As)	0.025 [IMAC]											
Cadmium (Cd)	0.005 [MAC]											
Chromium (Cr)	0.05 [MAC]											
Copper (Cu)	-											
Lead (Pb)	0.01 [MAC]											
Manganese (Mn)	-											
Potassium (K)	-											
Total Suspended Solids (TSS)												
Total Dissolved Solids (TDS)	500 [AO]											

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW6 006 26-Oct-06	TW6 008 9-Apr-07	TW6 005 10-Oct-07	TW6 008 17-Apr-08	TW6 008 6-Oct-08	TW6 29-Apr-09	TW6 13-Oct-09	TW6 4-May-10	TW6 10-Nov-10	TW6 14-Apr-11
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	**888**	**825**	**900**	**740**	**890**	**954**	**939**	**941**	**906**	**790**
Ammonia(as N)	-	nv	1.57	2.17	1.39	1.5	4.48	1.47	3.3	1.01	1.63	1.07
Barium	1		0.153	0.152	0.119	0.147	0.118	0.134	0.105	0.146	0.15	0.141
Boron	5 [IMAC]		0.453	0.383	0.397	0.338	0.37	0.365	0.409	0.38	0.528	0.36
Calcium	-	nv	153	165	132	163	146	177	138	166	159	174
Chloride	250 [AO]	133	26.3	10.8	106	14.9	79.5	9.5	43.7	32.3	52.1	16.6
Conductivity - @25°C (µS/cm)	-	nv	1430	1420	1840	1290	1650	1510	1790	1640	1710	1490
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**843**	**789**	**789**	**754**	**719**	**838**	**785**	**880**	**876**	**815**
Iron	0.3 [AO]	0.16	5.03	7.61	0.736	3	2.74	3.64	5.26	3.75	0.547	1.64
Magnesium	-	nv	112	91.5	112	84.3	85.8	96.2	107	108	116	92.6
Nitrate(as N)	10 d	2.59	0.1	<0.1	0.6	<0.1	0.9	0.5	**3.1**	0.1	0.3	<0.1
Nitrite(as N)	1 d		<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1
Organic Nitrogen	0.15		1.11	1.11	0.8	1.07	4.27	2.82	2.65	1.6	2.44	1.17
pH	6.5-8.5 [OG]	6.5 to 8.5	7.12	7.03	7.09	7.03	7.24	6.99	6.79	6.76	7.37	6.59
Sodium	200 [AO]	106	40.8	17.7	95.7	19.7	65.4	16.9	72.3	45	55.5	17.6
Sulphate	500 [AO]	267	98	112	57	121	65	98	41	94	71	89
Total Kjeldahl Nitrogen(as N)	-	nv	2.68	3.28	2.19	2.57	8.75	4.29	5.95	2.61	4.07	2.24
Mercury	0.001 [MAC]											
Arsenic (As)	0.025 [IMAC]											
Cadmium (Cd)	0.005 [MAC]											
Chromium (Cr)	0.05 [MAC]											
Copper (Cu)	-											
Lead (Pb)	0.01 [MAC]											
Manganese (Mn)	-											
Potassium (K)	-											
Total Suspended Solids (TSS)												
Total Dissolved Solids (TDS)	500 [AO]											

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW6 25-Oct-11	TW6 3-Apr-12	TW6 26-Sep-12	TW6 7-May-13	TW6 26-Nov-13	TW6 1-May-14	TW6 4-Nov-14	TW6 ########	TW6 3-Nov-15	TW6 ########
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	**838**	**808**	**812**	**760**	**870**	**790**	**890**	**800**	**920**	
Ammonia(as N)	-	nv	0.95	0.78	1.98	0.31	1.6	0.57	1.6	0.14	2.2	
Barium	1		0.158	0.128	0.112					0.16		
Boron	5 [IMAC]		0.541	0.346	0.303					0.39		
Calcium	-	nv	156	136	135	200	200					
Chloride	250 [AO]	133	13.5	20.5	92.3	7	10	9	15	7	19	
Conductivity - @25°C (µS/cm)	-	nv	1630	1490	1710	1500	1700	1500	1700	1500	1700	
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**990**	**684**	**769**	**850**	**950**	**770**		**900**	**950**	
Iron	0.3 [AO]	0.16	4.57	3.02	3.16	<0.1	<0.1	0.04		<0.02	<0.02	<0.02
Magnesium	-	nv	146	83.5	105	85	110	-				
Nitrate(as N)	10 d	2.59	<0.1	0.2	2.2	0.18	<0.1	ND		0.3	**3.38**	
Nitrite(as N)	1 d		<0.1	<0.1	1.3	0.025	0.026	ND				
Organic Nitrogen	0.15		0.71	1.54	1.17	1.19	2	1.73		0.48	1.3	
pH	6.5-8.5 [OG]	6.5 to 8.5	7.28	7.29	7.95	7.68	7.56	7.8	7.61	7.92	7.84	
Sodium	200 [AO]	106	33.7	36.6	**115**	14	27	19		19	67	11
Sulphate	500 [AO]	267	83	83	72	110	110	86		86	78	
Total Kjeldahl Nitrogen(as N)	-	nv	1.66	2.32	3.15	1.5	3.6	2.3		0.62	3.5	
Mercury	0.001 [MAC]											
Arsenic (As)	0.025 [IMAC]											
Cadmium (Cd)	0.005 [MAC]											
Chromium (Cr)	0.05 [MAC]											
Copper (Cu)	-											
Lead (Pb)	0.01 [MAC]											
Manganese (Mn)	-											
Potassium (K)	-											
Total Suspended Solids (TSS)												
Total Dissolved Solids (TDS)	500 [AO]											

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW6 26-Oct-16	TW6 16-May-17	TW6 27-Nov-17	TW6 10-Apr-18	TW6 14-Nov-18	TW6 24-Apr-19	TW6 20-Nov-19	TW6 13-May-20	TW6 12-Nov-20	TW6 20-Apr-21
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	**800**	**730**	**870**	**790**	**870**	**590**	**820**	**740**	**900**	**760**
Ammonia(as N)	-	nv	0.69	0.077	0.8	0.25	1.8	0.08	1.7	0.15	4.9	<0.050
Barium	1				0.14	0.13	0.13	0.11	0.11		0.1	0.13
Boron	5 [IMAC]				0.43	0.32	0.5	0.23	0.23		0.49	0.27
Calcium	-	nv			200	180						
Chloride	250 [AO]	133	25	4.3	6.7	4.5	15	2.4	30	2.9	28	4.5
Conductivity - @25°C (µS/cm)	-	nv	1600	1500	1700	1500	1500	1300	1600	1400	1700	1400
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**740**	**840**	**890**	**810**	**870**	**680**	**750**	**780**	**840**	**790**
Iron	0.3 [AO]	0.16	<0.02		<0.02	<0.02	0.11	<0.02	0.12	<0.02	0.03	<0.02
Magnesium	-	nv			94	86						
Nitrate(as N)	10 d	2.59	0.9	1.08	2.09	1.14	0.32	1.25	0.57	0.63	1.41	1.14
Nitrite(as N)	1 d											
Organic Nitrogen	0.15		0.61	0.883	0.3	0.68	0.8	0.27				
pH	6.5-8.5 [OG]	6.5 to 8.5	8.04	7.75	7.35	7.65	7.7	7.97	7.53	7.58	7.97	7.78
Sodium	200 [AO]	106		10	18	12	46	5.9	57	9	61	11
Sulphate	500 [AO]	267	23	130	110	83	110	71	80	89	92	95
Total Kjeldahl Nitrogen(as N)	-	nv	1.3	0.96	1.1	0.93	2.6	0.35	4	0.83	8.6	0.43
Mercury	0.001 [MAC]			<0.1	<0.1	<0.0001	<0.0001	<0.1	<0.1			<0.1
Arsenic (As)	0.025 [IMAC]										<0.2	<0.2
Cadmium (Cd)	0.005 [MAC]										<0.005	<0.005
Chromium (Cr)	0.05 [MAC]										<0.01	<0.01
Copper (Cu)	-										<0.02	<0.02
Lead (Pb)	0.01 [MAC]										<0.05	<0.05
Manganese (Mn)	-										0.25	0.03
Potassium (K)	-										43	27
Total Suspended Solids (TSS)											450	43
Total Dissolved Solids (TDS)	500 [AO]										910	760

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW6 5-Oct-21	TW6 3-May-22	TW6 29-Sep-22	TW6 20-Apr-23	TW6 22-Nov-23
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	**790**	**830**	**680**	**660**	**890**
Ammonia(as N)	-	nv	0.8	5.7	<0.050	0.066	7
Barium	1		0.13	0.12	0.12	0.1	0.066
Boron	5 [IMAC]		0.34	0.34	0.23	0.2	0.32
Calcium	-	nv		-	-		
Chloride	250 [AO]	133	5.1	38	2.5	<1.0	4
Conductivity - @25°C (µS/cm)	-	nv	1400	1600	1300	1300	1600
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**810**	**840**	**770**	**730**	**910**
Iron	0.3 [AO]	0.16	<0.02	<0.02	<0.02	<0.02	0.03
Magnesium	-	nv		-	-		
Nitrate(as N)	10 d	2.59	0.46	**<0.10**	1.42	1.62	<0.10
Nitrite(as N)	1 d			-	-		0.015
Organic Nitrogen	0.15			-	-		
pH	6.5-8.5 [OG]	6.5 to 8.5	7.86	7.8	7.91	7.75	7.65
Sodium	200 [AO]	106	16	66	6.4	6.4	24
Sulphate	500 [AO]	267	110	76	66	71	37
Total Kjeldahl Nitrogen(as N)	-	nv	1.5	8.6	0.24	0.55	11
Mercury	0.001 [MAC]			-	-	<0.10	
Arsenic (As)	0.025 [IMAC]		<0.2	<0.2	<0.2	<0.2	<0.2
Cadmium (Cd)	0.005 [MAC]		<0.005	<0.005	<0.005	<0.005	<0.005
Chromium (Cr)	0.05 [MAC]		<0.01	<0.01	<0.01	<0.01	<0.01
Copper (Cu)	-		<0.02	<0.02	<0.02	<0.02	<0.02
Lead (Pb)	0.01 [MAC]		<0.05	<0.05	<0.05	<0.05	<0.05
Manganese (Mn)	-		0.04	0.13	0.01	<0.01	0.31
Potassium (K)	-		29	23	26	22	29
Total Suspended Solids (TSS)			56	170	30	69	950
Total Dissolved Solids (TDS)	500 [AO]		735	860	615	685	885

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS
BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW8 24-Apr-19	TW8 20-Nov-19	TW8 13-May-20	TW8 12-Nov-20	TW8 20-Apr-21	TW8 5-Oct-21	TW8 3-May-22
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	270	300	260	310	290	360	290
Ammonia(as N)	-	nv	0.12	0.062	<0.050	0.07	<0.050	<0.050	0.061
Barium	1								-
Boron	5 [IMAC]								-
Calcium	-	nv							-
Chloride	250 [AO]	133	34	40	40	45	39	39	36
Conductivity - @25°C (µS/cm)	-	nv	690	780	720	830	720	840	720
Hardness(as $CaCO_3$)	80-100 [OG]	360*	320	**420**	320	**390**	330	**400**	360
Iron	0.3 [AO]	0.16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Magnesium	-	nv							-
Nitrate(as N)	10 d	2.59	**3.14**	2.1	**5.86**	**4.47**	**3.48**	1.34	**6.02**
Nitrite(as N)	1 d								-
Organic Nitrogen	0.15								-
pH	6.5-8.5 [OG]	6.5 to 8.5	8.08	7.9	7.9	7.98	8.03	7.78	8.09
Sodium	200 [AO]	106	19	25	21	27	18	25	21
Sulphate	500 [AO]	267	25	55	29	48	32	49	23
Total Kjeldahl Nitrogen(as N)	-	nv	1.8	1.4	1.9	0.93	1.6	1	1.2

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS

BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW8 29-Sep-22	TW8 20-Apr-23	TW8 22-Nov-23
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	320	250	350
Ammonia(as N)	-	nv	<0.050	0.053	0.09
Barium	1		-		
Boron	5 [IMAC]		-		
Calcium	-	nv	-		
Chloride	250 [AO]	133	46	37	44
Conductivity - @25°C (µS/cm)	-	nv	870	680	870
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**430**	310	**440**
Iron	0.3 [AO]	0.16	<0.02	<0.02	<0.02
Magnesium	-	nv	-		
Nitrate(as N)	10 d	2.59	**4.23**	2.24	1.26
Nitrite(as N)	1 d		-		<0.010
Organic Nitrogen	0.15		-		
pH	6.5-8.5 [OG]	6.5 to 8.5	7.92	8.06	7.79
Sodium	200 [AO]	106	27	19	29
Sulphate	500 [AO]	267	37	26	41
Total Kjeldahl Nitrogen(as N)	-	nv	2.1	1.1	<0.50

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwi
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.

Exceeds ODWS

BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW9D 24-Apr-19	TW9D 20-Nov-19	TW9D 13-May-20	TW9D 12-Nov-20	TW9D 20-Apr-21	TW9D 5-Oct-21	TW9D 3-May-22	TW9D 29-Sep-22	TW9D 20-Apr-23
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	280	290	310	300	320	320	310	310	300
Ammonia(as N)	-	nv	<0.050	0.09	0.17	0.1	<0.050	<0.050	<0.050	<0.050	0.12
Barium	1								-	-	
Boron	5 [IMAC]								-	-	
Calcium	-	nv							-	-	
Chloride	250 [AO]	133	23	15	12	12	12	13	12	10	9.1
Conductivity - @25°C (µS/cm)	-	nv	620	640	660	660	650	640	660	620	640
Hardness(as $CaCO_3$)	80-100 [OG]	360*	360	350	330	340	340	340	**380**	**370**	350
Iron	0.3 [AO]	0.16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Magnesium	-	nv							-	-	
Nitrate(as N)	10 d	2.59	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrite(as N)	1 d								-	-	
Organic Nitrogen	0.15								-	-	
pH	6.5-8.5 [OG]	6.5 to 8.5	8.14	8.16	8.02	8.1	8.06	8.07	8.12	8.1	8.08
Sodium	200 [AO]	106	12	21	11	8.7	7.6	9.7	6.2	5.6	5.1
Sulphate	500 [AO]	267	52	38	37	48	31	30	11	23	28
Total Kjeldahl Nitrogen(as N)	-	nv	0.42	0.41	0.25	0.25	0.13	<0.50 (1)	0.54	0.69	0.87

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS

BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW9D 22-Nov-23
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	310
Ammonia(as N)	-	nv	0.21
Barium	1		
Boron	5 [IMAC]		
Calcium	-	nv	
Chloride	250 [AO]	133	9.5
Conductivity - @25°C (µS/cm)	-	nv	630
Hardness(as $CaCO_3$)	80-100 [OG]	360*	**380**
Iron	0.3 [AO]	0.16	<0.02
Magnesium	-	nv	
Nitrate(as N)	10 d	2.59	<0.10
Nitrite(as N)	1 d		<0.010
Organic Nitrogen	0.15		
pH	6.5-8.5 [OG]	6.5 to 8.5	8.07
Sodium	200 [AO]	106	5.8
Sulphate	500 [AO]	267	30
Total Kjeldahl Nitrogen(as N)	-	nv	0.58

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS

BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW9S 24-Apr-19	TW9S 20-Nov-19	TW9S 13-May-20	TW9S 12-Nov-20	TW9S 20-Apr-21	TW9S 5-Oct-21	TW9S 3-May-22	TW9S 29-Sep-22
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	320	320	330	320	320	330	330	320
Ammonia(as N)	-	nv	0.081	0.056	0.15 (1)	0.1	0.076	<0.050	0.2	0.14
Barium	1								-	-
Boron	5 [IMAC]								-	-
Calcium	-	nv							-	-
Chloride	250 [AO]	133	16	12	18	18	19	17	19	19
Conductivity - @25°C (µS/cm)	-	nv	680	630	660	630	640	620	670	640
Hardness(as $CaCO_3$)	80-100 [OG]	360*	360	360	330	340	320	330	**370**	350
Iron	0.3 [AO]	0.16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Magnesium	-	nv							-	-
Nitrate(as N)	10 d	2.59	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrite(as N)	1 d								-	-
Organic Nitrogen	0.15								-	-
pH	6.5-8.5 [OG]	6.5 to 8.5	8.15	7.99	8	8.12	8.12	8.02	8.01	8.08
Sodium	200 [AO]	106	7.5	5.8	7.5	9	8.7	8.8	9.9	10
Sulphate	500 [AO]	267	27	19	14	12	11	12	6.9	10
Total Kjeldahl Nitrogen(as N)	-	nv	0.22	0.37	0.13 (1)	0.32	0.19	<0.50 (1)	0.25	0.47

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS

BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	**ODWS**	**MECP Guideline B-7** Reasonable Use Criteria	**TW9S** **20-Apr-23**	**TW9S** **22-Nov-23**
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	320	320
Ammonia(as N)	-	nv	0.076	<0.050
Barium	1			
Boron	5 [IMAC]			
Calcium	-	nv		
Chloride	250 [AO]	133	17	19
Conductivity - @25°C (µS/cm)	-	nv	670	650
Hardness(as $CaCO_3$)	80-100 [OG]	360*	350	**380**
Iron	0.3 [AO]	0.16	<0.02	<0.02
Magnesium	-	nv		
Nitrate(as N)	10 d	2.59	<0.10	<0.10
Nitrite(as N)	1 d			<0.010
Organic Nitrogen	0.15			
pH	6.5-8.5 [OG]	6.5 to 8.5	8.03	7.99
Sodium	200 [AO]	106	9.6	10
Sulphate	500 [AO]	267	8	7.7
Total Kjeldahl Nitrogen(as N)	-	nv	0.7	0.4

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated o
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

Exceeds ODWS

BOLD Exceeds RUC

Municipality of West Grey
Groundwater Quality - Normanby Landfill

Chemical Parameter	ODWS	MECP Guideline B-7 Reasonable Use Criteria	TW10 24-Apr-19	TW10 20-Nov-19	TW10 13-May-20	TW10 12-Nov-20	TW10 20-Apr-21	TW10 5-Oct-21	TW10 3-May-22	TW10 29-Sep-22	TW10 20-Apr-23	TW10 22-Nov-23
Alkalinity(as $CaCO_3$)	30 - 500 [OG]	401	200	84	73	61	59	64	60	48	53	58
Ammonia(as N)	-	nv	0.52	0.99	0.21	0.98	0.3	0.22	0.12	1.2	<0.050	0.49
Barium	1								-	-		
Boron	5 [IMAC]								-	-		
Calcium	-	nv							-	-		
Chloride	250 [AO]	133	34	44	41	47	44	44	43	48	44	41
Conductivity - @25°C (µS/cm)	-	nv	930	2200	2300	2400	2300	2200	2300	2500	2400	2300
Hardness(as $CaCO_3$)	80-100 [OG]	360*	360	**1300**	**1300**	**1500**	**1400**	**1400**	**1500**	**1600**	**1400**	**1500**
Iron	0.3 [AO]	0.16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.2	<0.02	<0.02
Magnesium	-	nv							-	-		
Nitrate(as N)	10 d	2.59	2.5	0.48	0.80	0.29	0.49	0.62	0.46	0.15	0.47	0.3
Nitrite(as N)	1 d								-	-		0.038
Organic Nitrogen	0.15								-	-		
pH	6.5-8.5 [OG]	6.5 to 8.5	8.18	7.88	7.57	7.71	7.76	7.69	7.8	7.75	7.67	7.71
Sodium	200 [AO]	106	84	59	48	50	44	44	48	47	43	46
Sulphate	500 [AO]	267	**270**	**1100**	**1100**	**1300**	**1300**	**1300**	**1300**	**1400**	**1400**	**1200**
Total Kjeldahl Nitrogen(as N)	-	nv	1.8	1.5	0.62	1.0	0.5	1.0	0.38	1.2	0.46	1.0

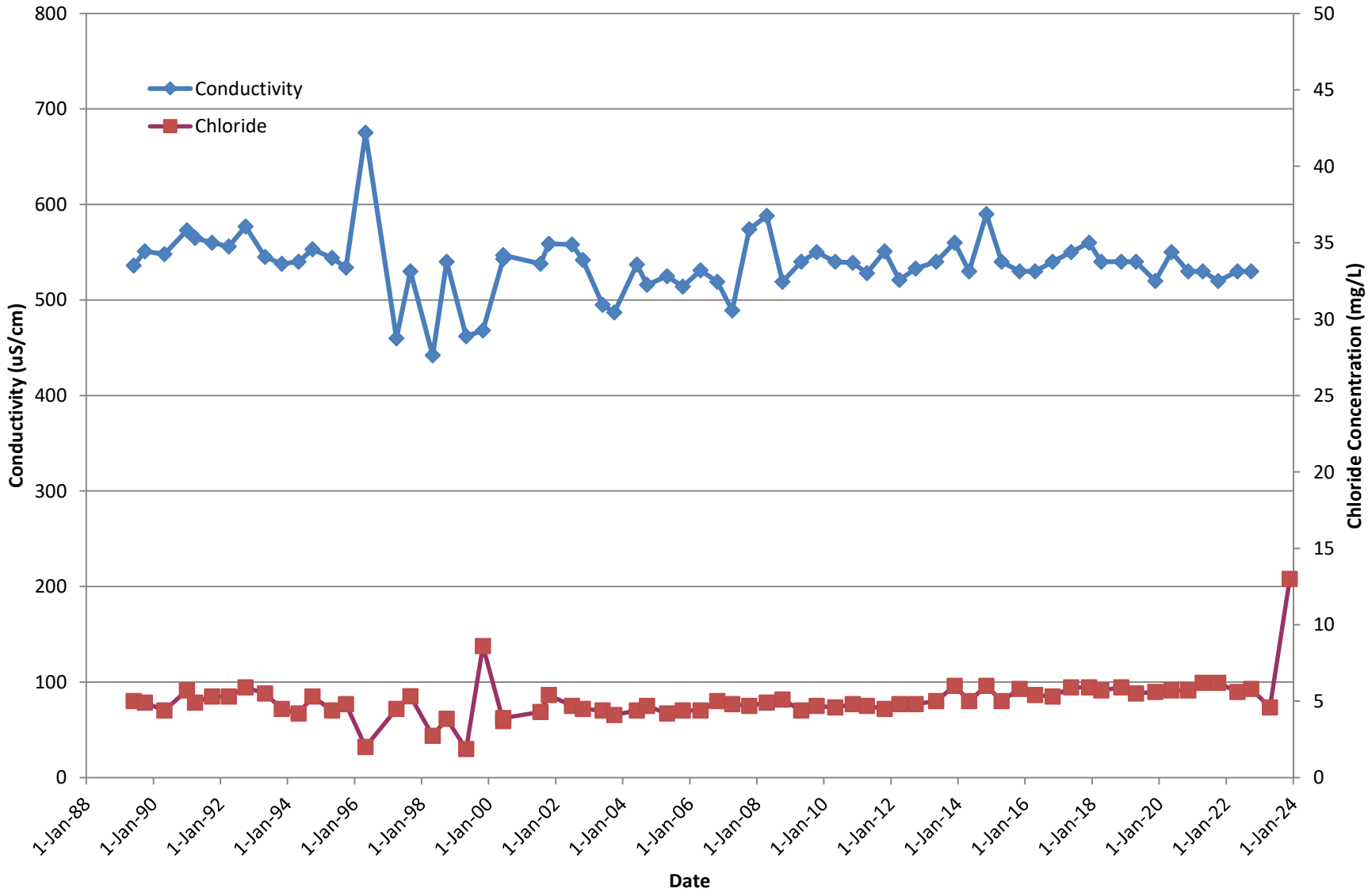
NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards (per O. Reg. 169/03 as amended to O. Reg. 255/05.
3. All ODWS values expressed are Maximum Acceptable Concentrations, unless indicated otherwise.
4. IMAC indicates an interim maximum acceptable concentration ODWO.
5. AO indicates an aesthetic objective ODWO, not health related.
6. OG indicates an operational guideline ODWO, not health related.

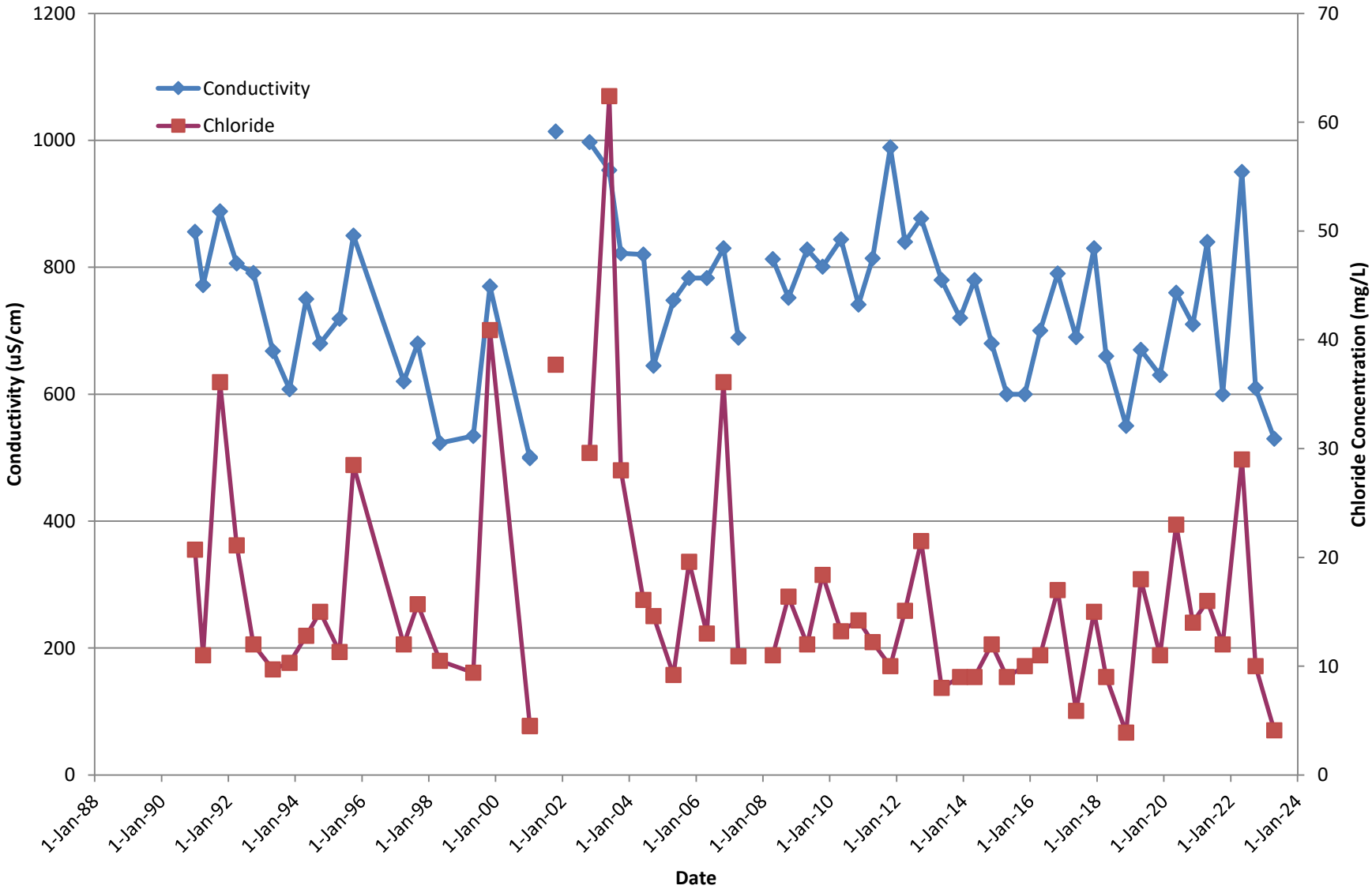
Exceeds ODWS

BOLD Exceeds RUC

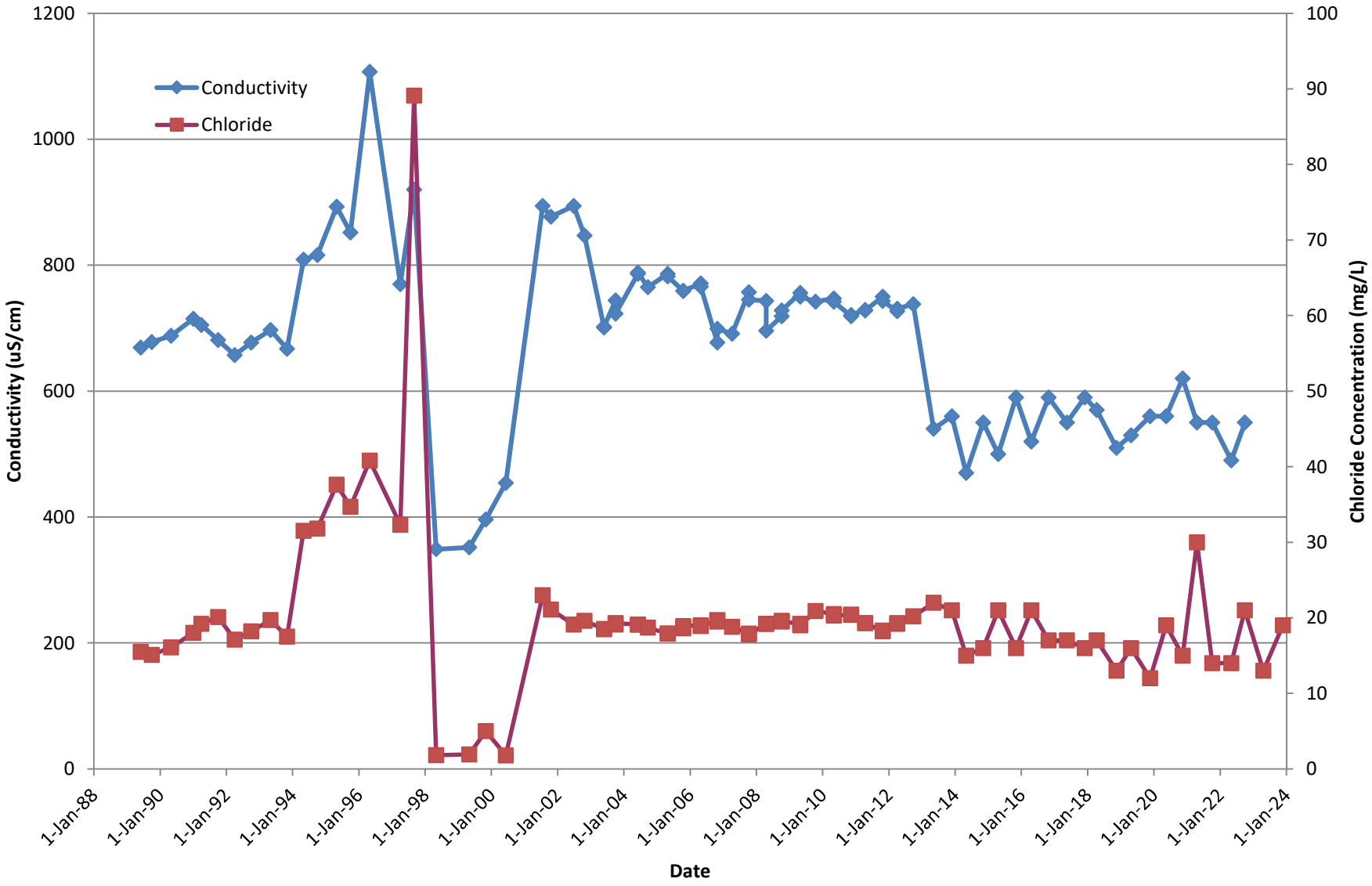
Historical Groundwater Conductivity and Chloride Concentrations
TW-1



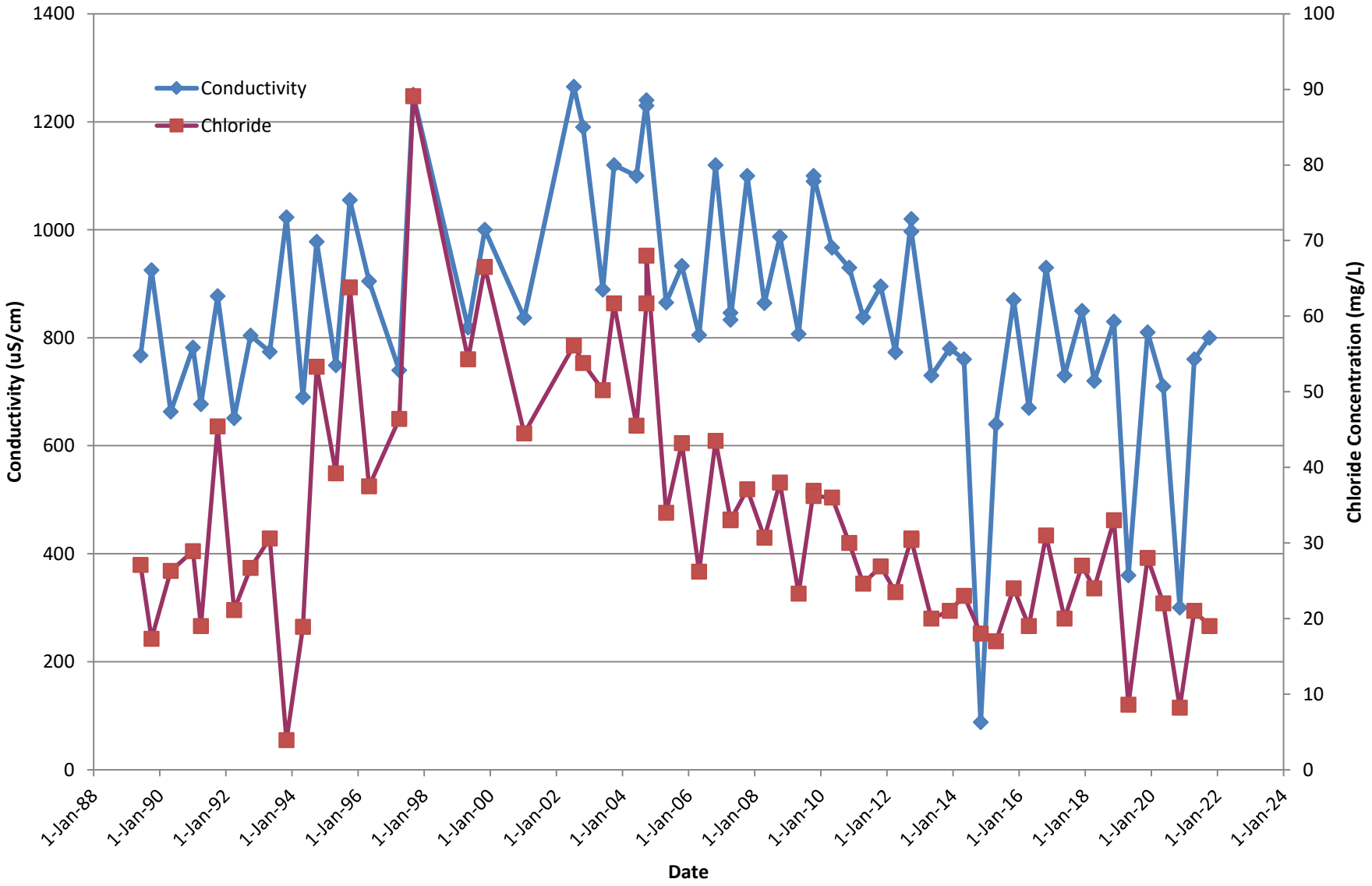
Historical Groundwater Conductivity and Chloride Concentrations
TW-2



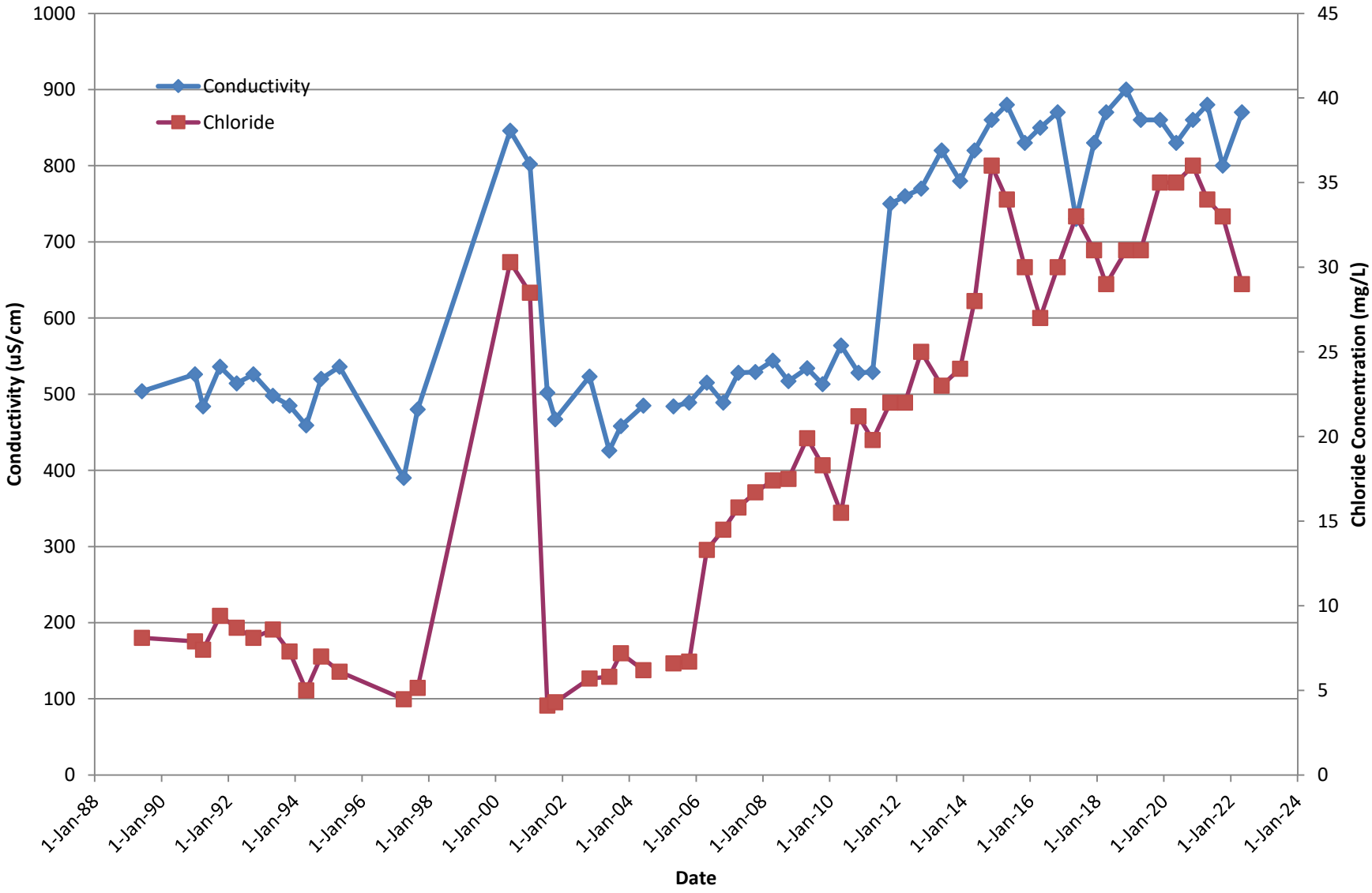
Historical Groundwater Conductivity and Chloride Concentrations
TW-5

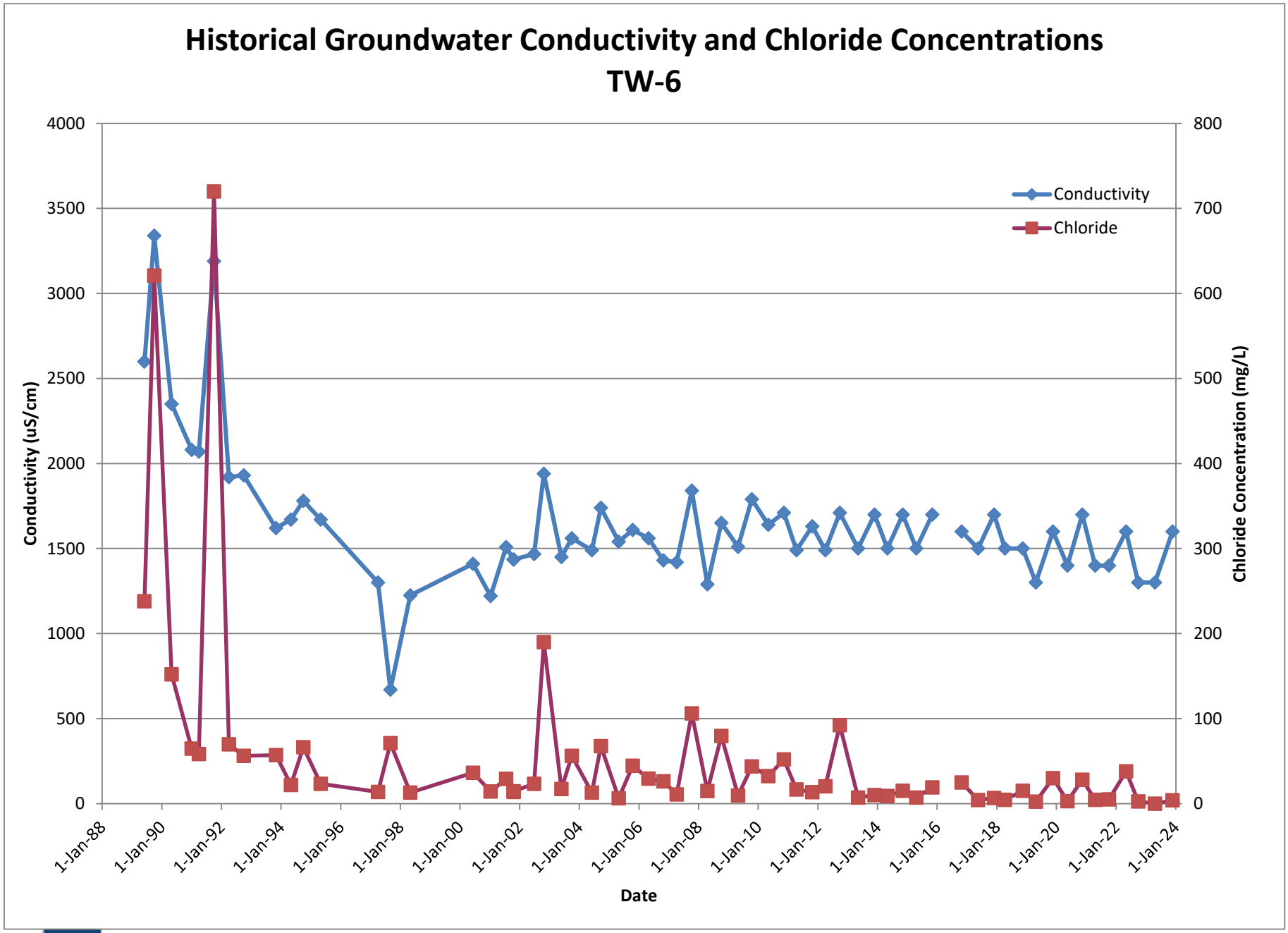


Historical Groundwater Conductivity and Chloride Concentrations
TW-3

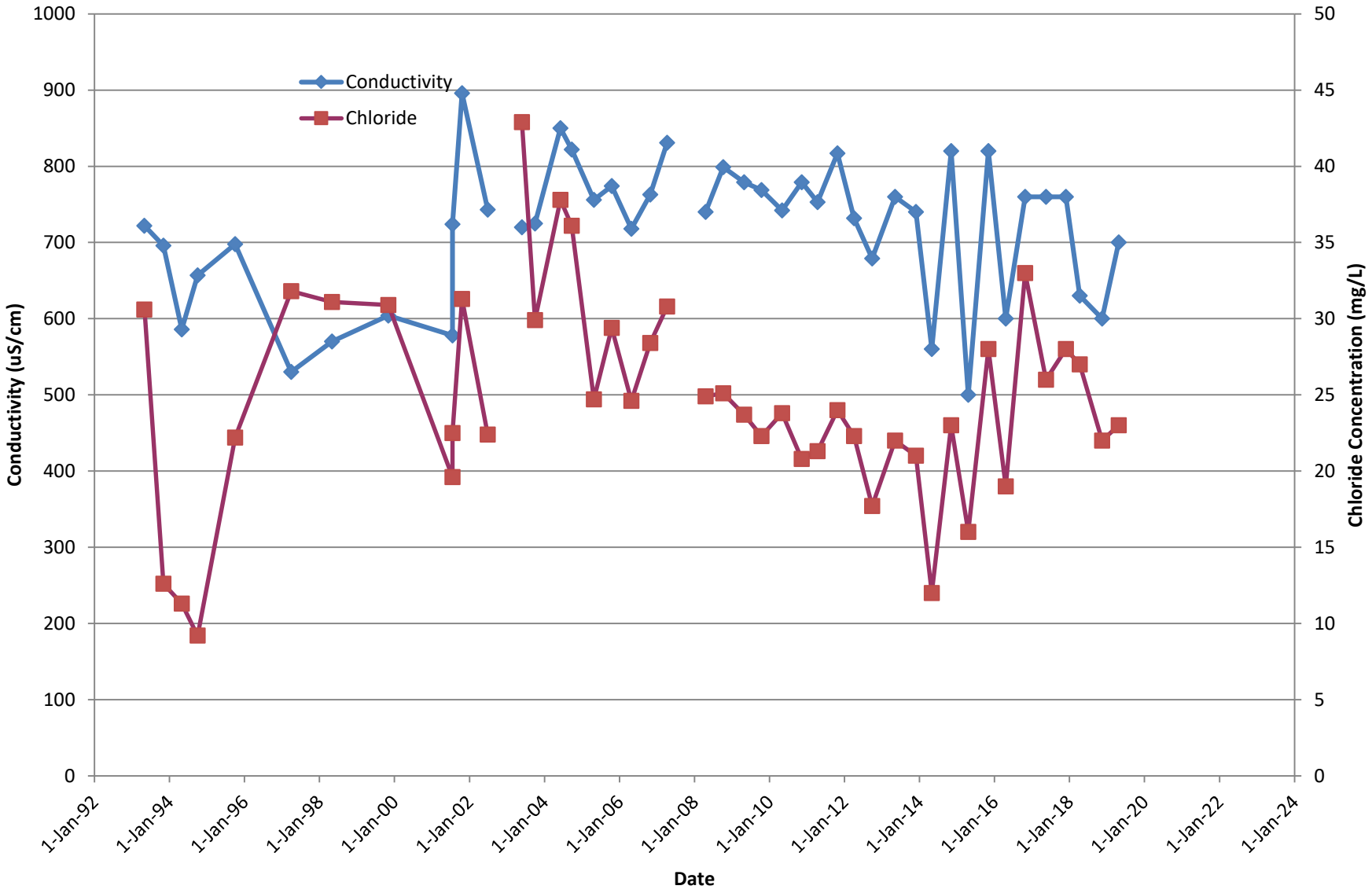


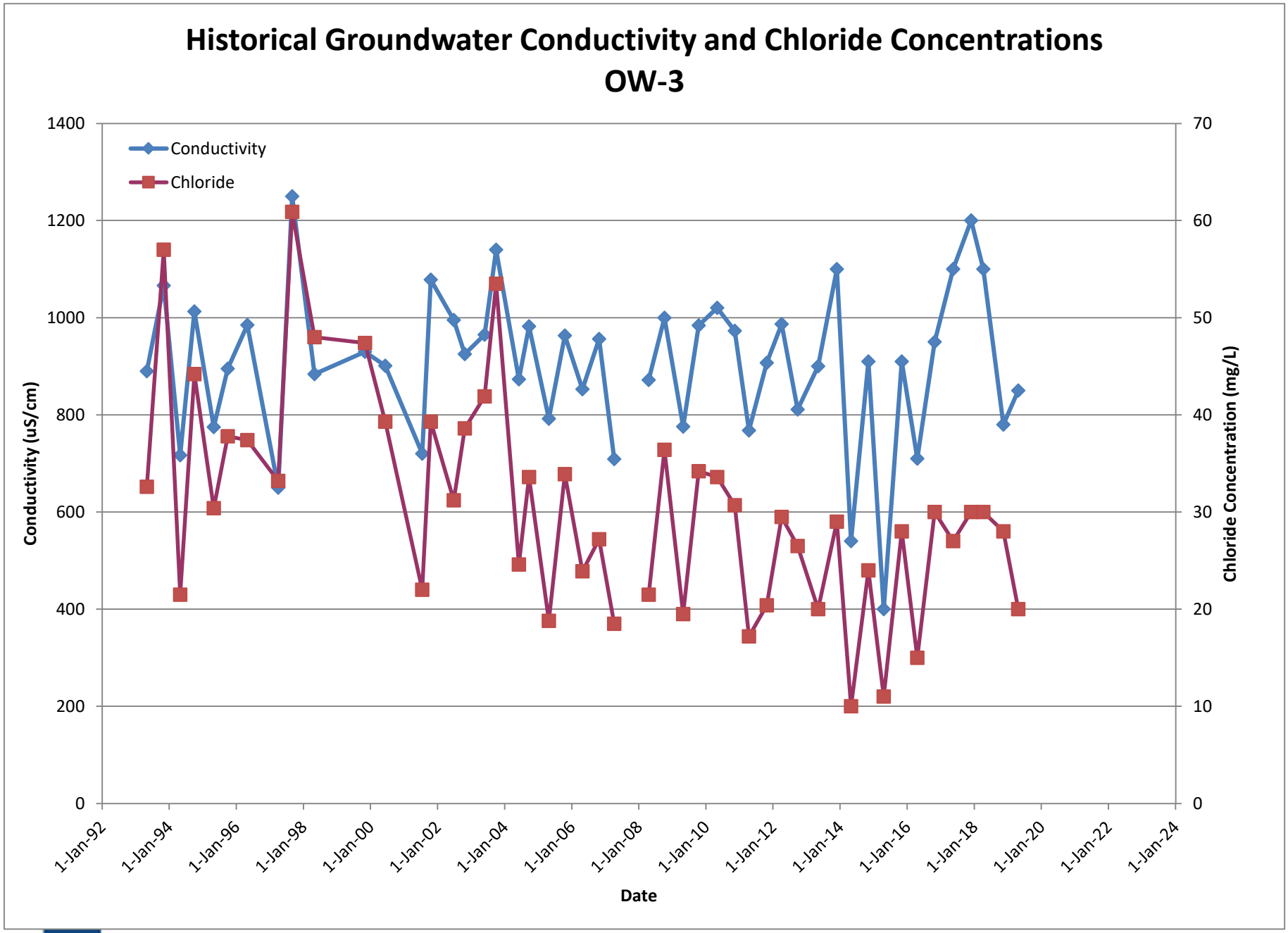
Historical Groundwater Conductivity and Chloride Concentrations
TW-5A

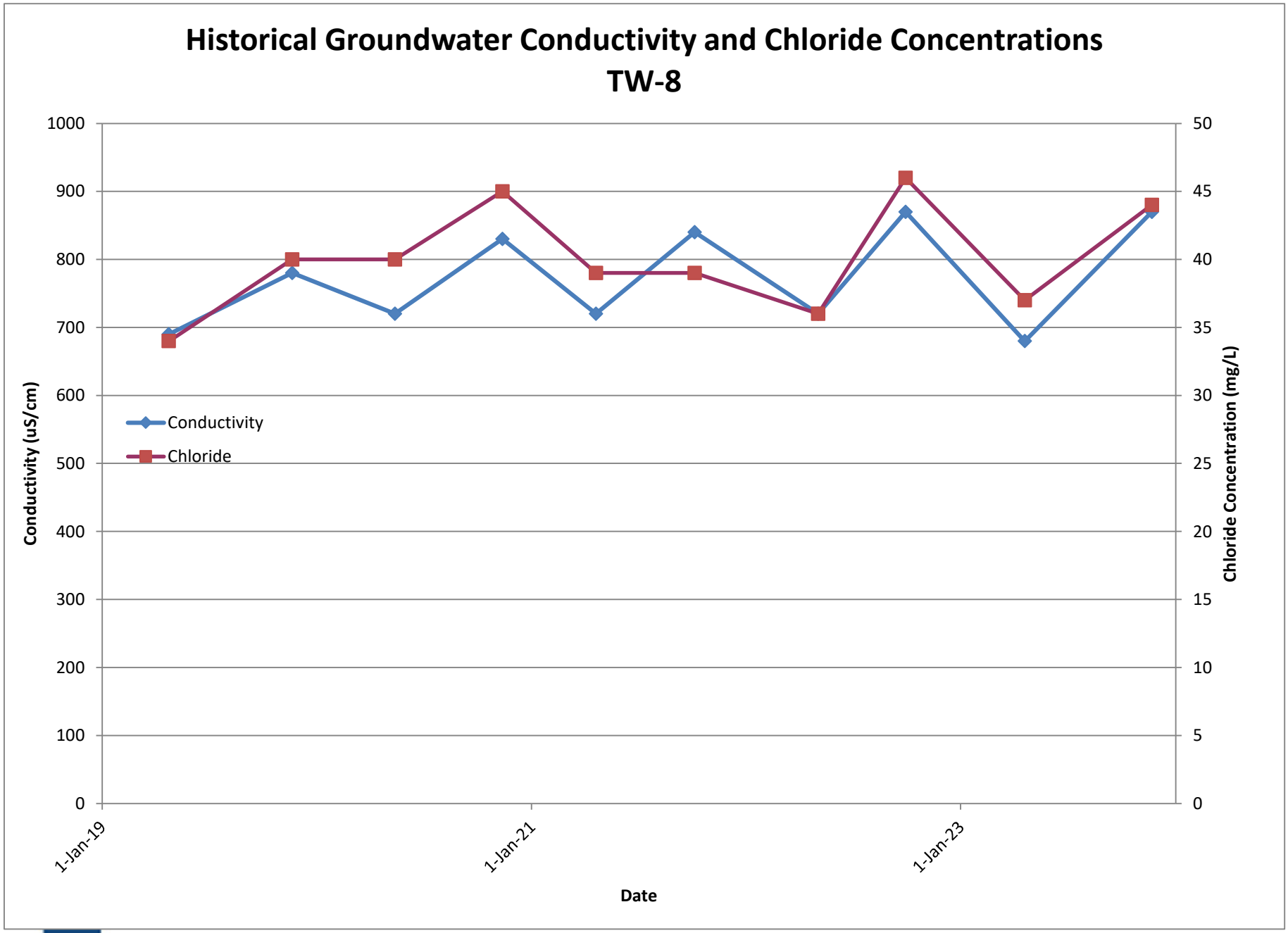


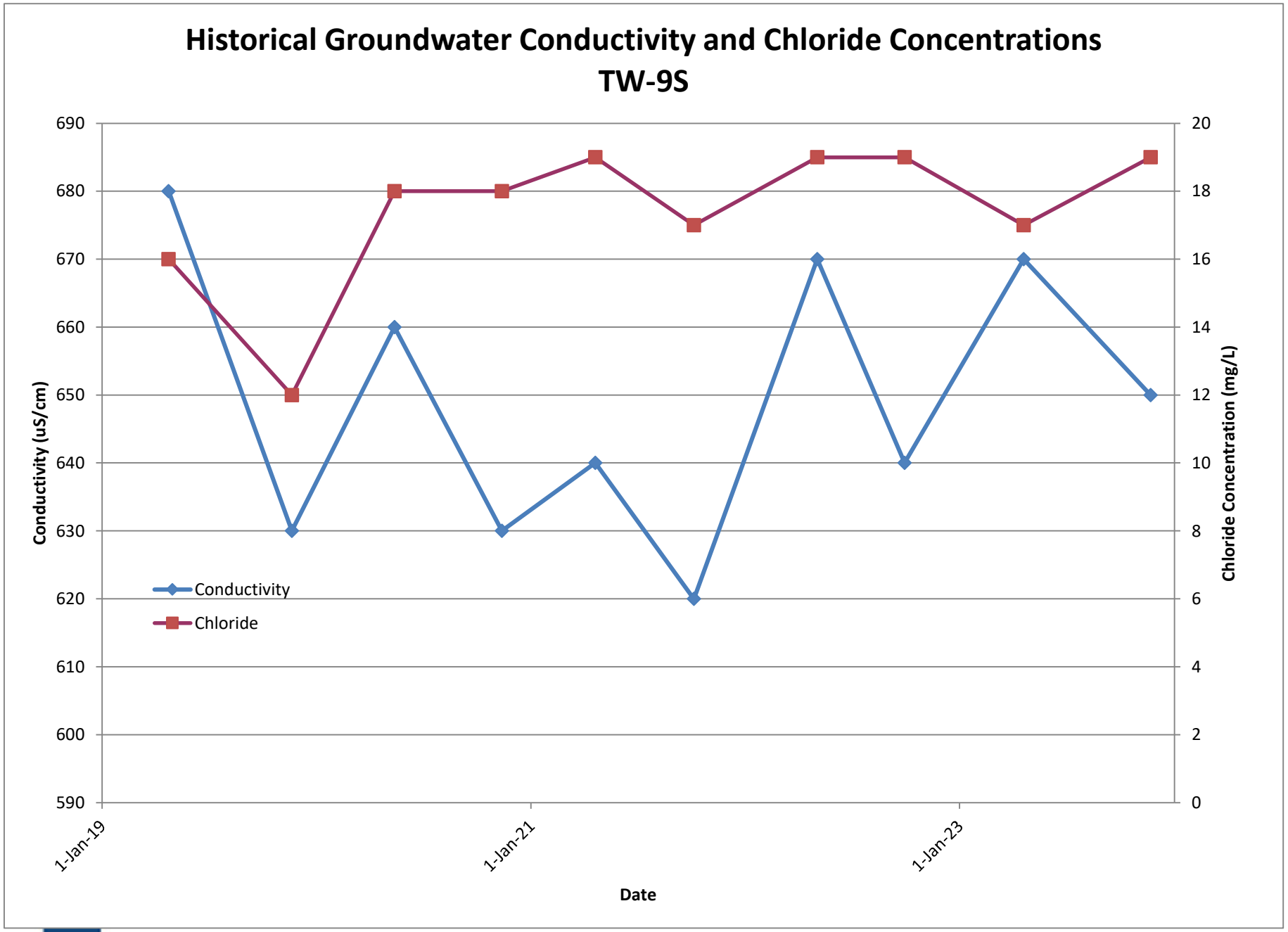

Historical Groundwater Conductivity and Chloride Concentrations
TW-6
Conductivity
Chloride
Conductivity (uS/cm)
Chloride Concentration (mg/L)
Date
4000
3500
3000
2500
2000
1500
1000
500
0
800
700
600
500
400
300
200
100
0
1-Jan-88
1-Jan-90
1-Jan-92
1-Jan-94
1-Jan-96
1-Jan-98
1-Jan-00
1-Jan-02
1-Jan-04
1-Jan-06
1-Jan-08
1-Jan-10
1-Jan-12
1-Jan-14
1-Jan-16
1-Jan-18
1-Jan-20
1-Jan-22
1-Jan-24

Historical Groundwater Conductivity and Chloride Concentrations
OW-2

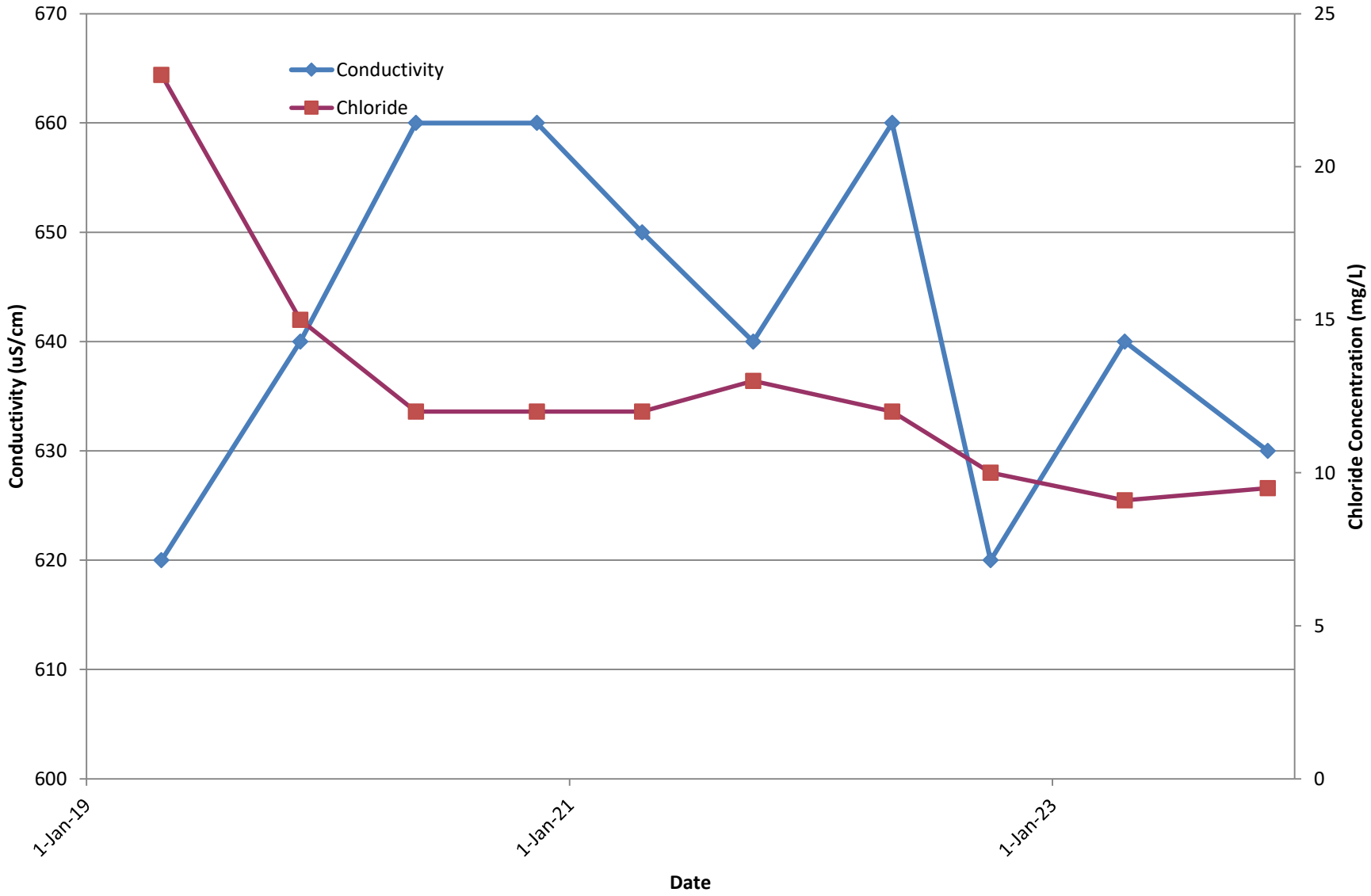



Historical Groundwater Conductivity and Chloride Concentrations
OW-3
Conductivity
Chloride
Conductivity (uS/cm)
Chloride Concentration (mg/L)
Date
0
200
400
600
800
1000
1200
1400
0
10
20
30
40
50
60
70
1-Jan-92
1-Jan-94
1-Jan-96
1-Jan-98
1-Jan-00
1-Jan-02
1-Jan-04
1-Jan-06
1-Jan-08
1-Jan-10
1-Jan-12
1-Jan-14
1-Jan-16
1-Jan-18
1-Jan-20
1-Jan-22
1-Jan-24

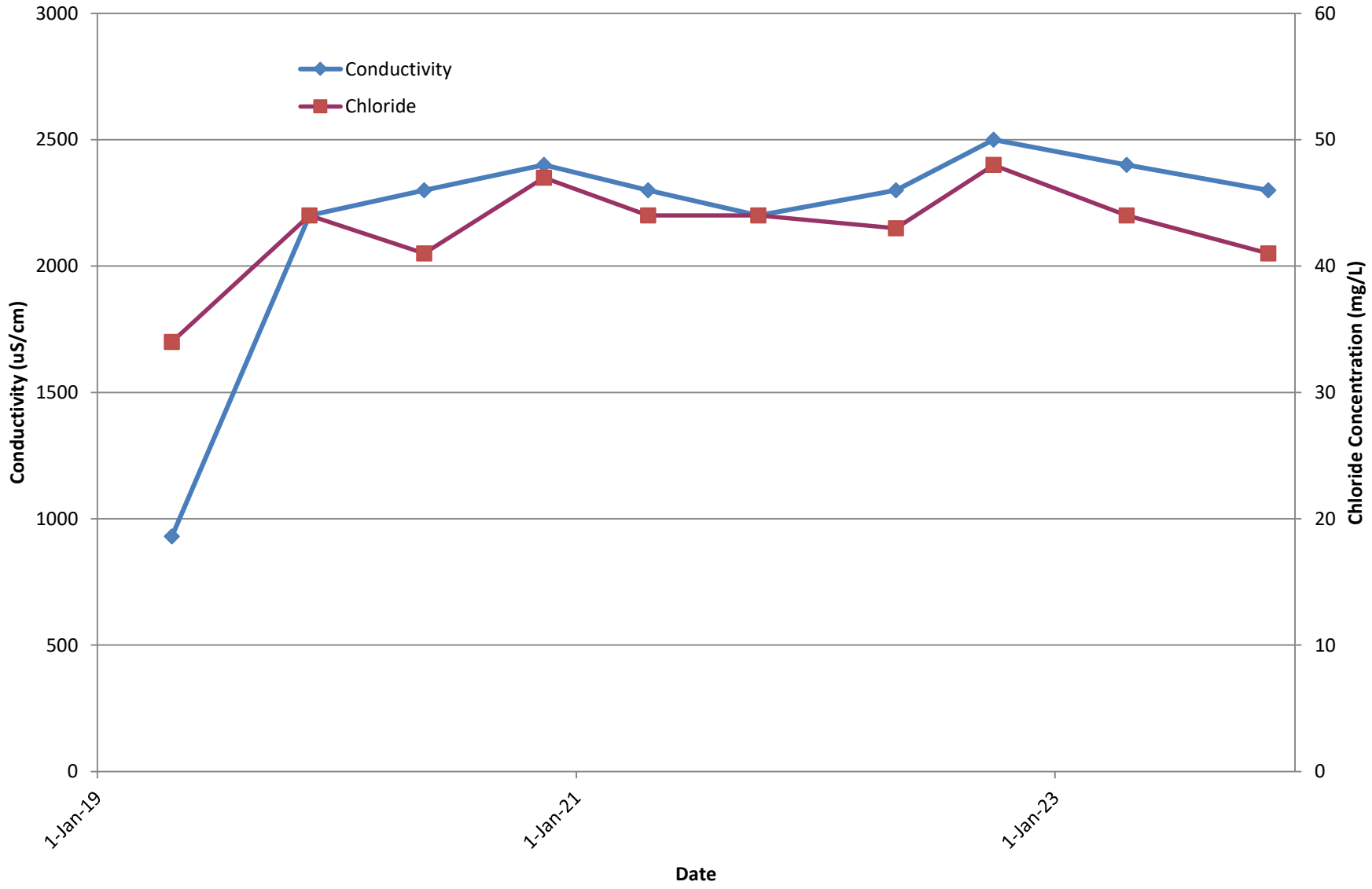

Historical Groundwater Conductivity and Chloride Concentrations
TW-8
Conductivity (uS/cm)
Chloride Concentration (mg/L)
Conductivity
Chloride
1000
900
800
700
600
500
400
300
200
100
0
50
45
40
35
30
25
20
15
10
5
0
1-Jan-19
1-Jan-21
1-Jan-23
Date


Historical Groundwater Conductivity and Chloride Concentrations
TW-9S
690
680
670
660
650
640
630
620
610
600
590
20
18
16
14
12
10
8
6
4
2
0
Conductivity (uS/cm)
Chloride Concentration (mg/L)
Conductivity
Chloride
1-Jan-19
1-Jan-21
1-Jan-23
Date

Historical Groundwater Conductivity and Chloride Concentrations
TW-9D



Historical Groundwater Conductivity and Chloride Concentrations
TW-10



APPENDIX E:
HISTORICAL SURFACE WATER QUALITY

Municipality of West Grey
Surface Water Quality - Normanby Landfill

Chemical Parameter	PWQO	SW3 Jun-89	SW3 Oct-89	SW3 May-90	SW3 Jan-91	SW3 Apr-91	SW3 Oct-91	SW3 Apr-92	SW3 Oct-92	SW3 May-93	SW3 Nov-93
Alkalinity (as $CaCO_3$)	345		291	277	319	291					
Total Ammonia (as N)		0.021	0.004	0.014	0.001	0.04	0.005	0.013	0.015	0.007	0.03
Chloride		13.2	18.5	16.5	20.5	14.6	22.3	15.6	16.1	13.1	16.9
Conductivity - @25°C (µS/cm)		590	672	587	703	610	636	589	667	624	620
Iron	0.3										
pH	6.5-8.5	8.02	7.97	8.34	8.04	8.39	8.34	8.16	8.22	8.36	8.31
Phenols	0.001										
Phosphorus, Total											
Field Temperature (C°)											

NOTES:
1. All results in mg/L unless otherwise noted.
2. > means greater than.
3. < means less than.
4. PWQO indicates Provincial Water Quality Objectives.

Exceeds PWQO

Results up to 2012 are summarized and presented from previous Annual Reports completed by Others

Municipality of West Grey
Surface Water Quality - Normanby Landfill

Chemical Parameter	PWQO	SW3 May-94	SW3 Oct-94	SW3 May-95	SW3 Oct-95	SW3 Apr-97	SW3 Sep-97	SW3 Apr-98	SW3 May-99	SW3 Nov-99	SW3 9-Jun-00	SW3 9-Jan-01
Alkalinity (as $CaCO_3$)	345			278	305	290	298	421	214	253	319	324
Total Ammonia (as N)		0.04	0.006	0.15	0.38	0.004	0.004	0.1	0.34	0.05	0.05	0.05
Chloride		14.4	18.1	14.7	19.5	14.9	16.8	20.2	19.2	32	19.9	18.7
Conductivity - @25^{o}C (µS/cm)		592	643	644	652	530	600	558	495	635	642	637
Iron	0.3										0.17	0.05
pH	6.5-8.5	8.44	8.27	8.42	8.24	8.30	8.20	7.80	7.91	7.78	8.13	8.13
Phenols	0.001										nd	nd
Phosphorus, Total											2	3
Field Temperature (C^{o})												

NOTES:
1. All results in mg/L unless otherwise noted.
2. > means greater than.
3. < means less than.
4. PWQO indicates Provincial Water Quality Objectives.

Results up to 2012 are summarized and presented from previous Annual Reports completed by Others

Municipality of West Grey
Surface Water Quality - Normanby Landfill

Chemical Parameter	PWQO	SW3 007 18-Jul-01	SW3 012 19-Oct-01	SW3 006 15-Jun-02	SW3 (dup) 007 15-Jun-02	SW3 007 23-Oct-02	SW3 011 27-May-03	SW3 012 (dup) 27-May-03	SW3 011 30-Sep-03	SW3 (dup) 012 30-Sep-03	SW3 011 3-Jun-04
Alkalinity (as $CaCO_3$)	345	311	304	303	309	300	270	270	315	315	279
Total Ammonia (as N)		<0.01	<0.01	0.01	0.01	<0.01	0.01	<0.01	0.02	0.02	0.11
Chloride		16.3	17	14.5	14.6	18.2	18.4	18.1	22.6	22.1	15.8
Conductivity - @25°C (µS/cm)		646	666	655	654	663	618	634	673	676	635
Iron	0.3	0.06	0.04	0.11	0.09	0.4	0.25	0.24	0.363	0.18	0.131
pH	6.5-8.5	8.23	7.93	7.93	7.9	8.11	8.13	8.19	8.49	8.48	8.49
Phenols	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Phosphorus, Total									0.01	0.02	0.01
Field Temperature (C°)											16.6

NOTES:
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4. PWQO indicates Provincial Water Quality Objectives.

Exceeds PWQO

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Municipality of West Grey
Surface Water Quality - Normanby Landfill

Chemical Parameter	PWQO	SW3 (dup) 012 3-Jun-04	SW3 009 22-Sep-04	SW3 (dup) 010 22-Sep-04	SW3 012 27-Apr-05	SW3 (dup) 013 27-Apr-05	SW3 012 17-Oct-05	SW3 (dup) 013 17-Oct-05	SW3 011 27-Apr-06	SW3 008 26-Oct-06	SW3 012 9-Apr-07
Alkalinity (as $CaCO_3$)	345	285	339	336	250	254	316	312	286	320	286
Total Ammonia (as N)		0.06	< 0.01	< 0.01	0.03	0.01	< 0.01	<0.01	< 0.01	0.01	< 0.01
Chloride		15.7	16.5	16.6	14.2	14.2	19.5	19.6	16.5	20	16.7
Conductivity - @25°C (µS/cm)		625	663	672	544	544	641	642	600	675	561
Iron	0.3	0.232	0.017	0.031	0.141	0.23	0.027	0.015	0.023	0.026	0.047
pH	6.5-8.5	8.44	8.37	8.43	8.21	8.23	8.12	8.02	8.14	8.02	8.14
Phenols	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Phosphorus, Total		0.01	<0.01	<0.01	0.02	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Field Temperature (C°)			15.2		8		11.4		11.1	8.0	3.9

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4. PWQO indicates Provincial Water Quality Objectives.

Exceeds PWQO

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Municipality of West Grey
Surface Water Quality - Normanby Landfill

Chemical Parameter	PWQO	SW3 007 10-Oct-07	SW3(dup) 008 10-Oct-07	SW3 011 17-Apr-08	SW3 (dup) 012 17-Apr-08	SW3 010 6-Oct-08	SW3 29-Apr-09	SW3 13-Oct-09	SW3 4-May-10
Alkalinity (as $CaCO_3$)	345	300	294	244	286	330	294	323	305
Total Ammonia (as N)		< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloride		18	18.2	16.7	16.6	16	15	19.1	15.1
Conductivity - @25°C (µS/cm)		627	631	629	625	615	601	672	613
Iron	0.3	0.064	0.068	0.026	0.02	0.031	0.008	0.019	0.036
pH	6.5-8.5	7.71	7.81	8.01	8.04	7.96	8.15	7.86	7.97
Phenols	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Phosphorus, Total		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
Field Temperature (C°)		12.4		12.3		10.8	12.4	8.7	15.0

NOTES:
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Exceeds PWQO

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Municipality of West Grey
Surface Water Quality - Normanby Landfill

Chemical Parameter	PWQO	SW3 (dup) Duplicate #2 4-May-10	SW3 10-Nov-10	SW3 (dup) Duplicate #2 10-Nov-10	SW3 14-Apr-11	SW3 25-Oct-11	SW3 (dup) Duplicate #2 25-Oct-11	SW3 3-Apr-12	
Alkalinity (as $CaCO_3$)	345	305	333	332	296	308	309	307	
Total Ammonia (as N)		0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<
Chloride		15	16	16	14.8	15.3	15.1	15.0	
Conductivity - @25°C (µS/cm)		611	690	684	620	667	671	640	
Iron	0.3	0.024	0.013	0.014	0.034	0.043	0.041	0.045	
pH	6.5-8.5	7.93	8.1	8.11	7.77	8.10	8.10	8.31	
Phenols	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Phosphorus, Total		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Field Temperature (C°)			7.2		10.7	9.5		7.2	

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Exceeds PWQO

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Municipality of West Grey
Surface Water Quality - Normanby Landfill

Chemical Parameter	PWQO	SW3 (dup) Duplicate #2 3-Apr-12	SW3 25-Sep-12	SW3 9-May-13	SW3 26-Nov-13	SW-3 1-May-14	SW-3 4-Nov-14	SW-3 20-Apr-15	SW-3 3-Nov-15
Alkalinity (as $CaCO_3$)	345	310	301	290	310	270	330	280	310
Total Ammonia (as N)		0.01	< 0.01	0.086	<0.05	0.054	<0.05	<0.050	<0.050
Chloride		15.0	17.8	20.0	19	18.0	20	20	22
Conductivity - @25°C (µS/cm)		641	632	660	680	590	690	620	700
Iron	0.3	0.032	0.023	<0.02	0.04	0.26	0.03	0.19	0.02
pH	6.5-8.5	8.33	8.24	8.38	8.3	8.4	8.28	8.24	8.32
Phenols	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010
Phosphorus, Total		<0.01	<0.01	0.007	<0.01	0.038	0.006	0.018	0.011
Field Temperature (C°)			13.5	15	4	11.3	8.3	10	11.83

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Exceeds PWQO

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Municipality of West Grey
Surface Water Quality - Normanby Landfill

Chemical Parameter	PWQO	SW-3 19-Apr-16	SW-3 26-Oct-16	SW-3 16-May-17	SW-3 27-Nov-17	SW-3 10-Apr-18	SW-3 14-Nov-18
Alkalinity (as $CaCO_3$)	345	300	290	300	340	320	310
Total Ammonia (as N)		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride		17	22	19	19	17	19
Conductivity - @25°C (µS/cm)		670	670	670	710	660	660
Iron	0.3	0.05	<0.02	0.05	0.11		0.04
pH	6.5-8.5	8.3	8.34	8.38	8.3	8.38	8.25
Phenols	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus, Total		0.007	<0.1	0.008	0.015	0.022	0.006
Field Temperature (C°)		7.02	7.28	10.85	6	7.65	3.48

NOTES:
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Exceeds PWQO

Results up to 2012 are summarized and presented from previous Annual Reports completed by Others

APPENDIX F:
LABORATORY CERTIFICATE OF ANALYSIS

Your Project #: NORMANBY(213087)
Your C.O.C. #: 959845-01-01

Attention: Reporting Contacts

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

Report Date: 2023/12/01
Report #: R7937566
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3AI799
Received: 2023/11/23, 09:42

Sample Matrix: Water
Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	13	N/A	2023/11/27	CAM SOP-00448	SM 24 2320 B m
Chloride by Automated Colourimetry	12	N/A	2023/11/27	CAM SOP-00463	SM 24 4500-Cl E m
Chloride by Automated Colourimetry	1	N/A	2023/11/30	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity	13	N/A	2023/11/27	CAM SOP-00414	SM 23 2510 m
Dissolved Oxygen	3	2023/11/23	2023/11/23	CAM SOP-00427	SM 23 4500 O G m
Hardness (calculated as CaCO3)	9	N/A	2023/11/30	CAM SOP 00102/00408/00447	SM 2340 B
Hardness (calculated as CaCO3)	1	N/A	2023/12/01	CAM SOP 00102/00408/00447	SM 2340 B
Mercury in Water by CVAA	1	2023/11/28	2023/11/29	CAM SOP-00453	EPA 7470A m
Lab Filtered Metals Analysis by ICP	9	2023/11/27	2023/11/29	CAM SOP-00408	EPA 6010D m
Lab Filtered Metals Analysis by ICP	1	2023/11/30	2023/12/01	CAM SOP-00408	EPA 6010D m
Total Metals Analysis by ICP	3	2023/11/28	2023/11/28	CAM SOP-00408	EPA 6010D m
Total Ammonia-N	13	N/A	2023/11/28	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1)	2	N/A	2023/11/27	CAM SOP-00440	SM 24 4500-NO3I/NO2B
Nitrate & Nitrite as Nitrogen in Water (1)	8	N/A	2023/11/28	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH	13	2023/11/24	2023/11/27	CAM SOP-00413	SM 24th - 4500H+ B
Phenols (4AAP)	3	N/A	2023/11/29	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Turbidimetry	10	N/A	2023/11/27	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids	1	2023/11/27	2023/11/28	CAM SOP-00428	SM 24 2540C m
Total Kjeldahl Nitrogen in Water	9	2023/11/27	2023/11/28	CAM SOP-00938	OMOE E3516 m
Total Kjeldahl Nitrogen in Water	1	2023/11/27	2023/11/29	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	4	2023/11/27	2023/11/28	CAM SOP-00407	SM 23 4500-P I
Total Suspended Solids	1	2023/11/29	2023/11/30	CAM SOP-00428	SM 24 2540D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in

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Your Project #: NORMANBY(213087)
Your C.O.C. #: 959845-01-01

Attention: Reporting Contacts

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

Report Date: 2023/12/01
Report #: R7937566
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3AI799

Received: 2023/11/23, 09:42

writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Ashton Gibson, Project Manager
Email: Ashton.Gibson@bureauveritas.com
Phone# (905)817-5765

==========

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Bureau Veritas Job #: C3AI799
Report Date: 2023/12/01

GM BluePlan Engineering Limited
Client Project #: NORMANBY(213087)
Sampler Initials: KC

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XRQ876			XRQ876			XRQ877		
Sampling Date		2023/11/22 08:15			2023/11/22 08:15			2023/11/22 08:20		
COC Number		959845-01-01			959845-01-01			959845-01-01		
	UNITS	TW-1	RDL	QC Batch	TW-1 Lab-Dup	RDL	QC Batch	TW-2	RDL	QC Batch
Calculated Parameters										
Hardness (CaCO3)	mg/L	350	1.0	9068262				300	1.0	9068262
Inorganics										
Total Ammonia-N	mg/L	<0.050	0.050	9074446				<0.050	0.050	9074446
Conductivity	umho/cm	630	1.0	9071821				530	1.0	9071821
Total Kjeldahl Nitrogen (TKN)	mg/L	0.13	0.10	9074937				<0.10	0.10	9074953
pH	pH	7.98		9071832				8.09		9071832
Dissolved Sulphate (SO4)	mg/L	74	1.0	9072078	74	1.0	9072078	78	1.0	9071324
Alkalinity (Total as CaCO3)	mg/L	230	1.0	9071808				190	1.0	9071808
Dissolved Chloride (Cl-)	mg/L	13	1.0	9072076	13	1.0	9072076	4.1	1.0	9071317
Nitrite (N)	mg/L	<0.010	0.010	9071844				<0.010	0.010	9071923
Nitrate (N)	mg/L	0.14	0.10	9071844				0.16	0.10	9071923
Nitrate + Nitrite (N)	mg/L	0.14	0.10	9071844				0.16	0.10	9071923

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas ID		XRQ878		XRQ879		XRQ880		XRQ881		
Sampling Date		2023/11/22 08:25		2023/11/22 08:30		2023/11/22 08:40		2023/11/22 08:50		
COC Number		959845-01-01		959845-01-01		959845-01-01		959845-01-01		
	UNITS	TW-3	QC Batch	TW-5A	RDL	TW-8	RDL	TW-9 (S)	RDL	QC Batch
Calculated Parameters										
Hardness (CaCO3)	mg/L	420	9068262	470	1.0	440	1.0	380	1.0	9068262
Inorganics										
Total Ammonia-N	mg/L	0.11	9074446	1.5	0.050	0.090	0.050	<0.050	0.050	9074446
Conductivity	umho/cm	800	9071821	870	1.0	870	1.0	650	1.0	9071821
Total Kjeldahl Nitrogen (TKN)	mg/L	0.95	9074937	1.8	0.20	<0.50	0.50	0.40	0.10	9074937
pH	pH	7.72	9071832	8.03		7.79		7.99		9071832
Dissolved Sulphate (SO4)	mg/L	36	9071324	36	1.0	41	1.0	7.7	1.0	9072078
Alkalinity (Total as CaCO3)	mg/L	370	9071808	360	1.0	350	1.0	320	1.0	9071808
Dissolved Chloride (Cl-)	mg/L	19	9071317	29	1.0	44	1.0	19	1.0	9072076
Nitrite (N)	mg/L	<0.010	9071844	0.101	0.010	<0.010	0.010	<0.010	0.010	9071844
Nitrate (N)	mg/L	<0.10	9071844	6.23	0.10	1.26	0.10	<0.10	0.10	9071844
Nitrate + Nitrite (N)	mg/L	<0.10	9071844	6.33	0.10	1.26	0.10	<0.10	0.10	9071844

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3AI799
Report Date: 2023/12/01

GM BluePlan Engineering Limited
Client Project #: NORMANBY(213087)
Sampler Initials: KC

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XRQ882			XRQ883			XRQ884		
Sampling Date		2023/11/22 08:55			2023/11/22 09:00			2023/11/22 09:10		
COC Number		959845-01-01			959845-01-01			959845-01-01		
	UNITS	TW-9 (D)	RDL	QC Batch	TW-10	RDL	QC Batch	TW-5	RDL	QC Batch
Calculated Parameters										
Hardness (CaCO3)	mg/L	380	1.0	9068262	1500	1.0	9068262	310	1.0	9068262
Inorganics										
Total Ammonia-N	mg/L	0.21	0.050	9074446	0.49	0.050	9074446	0.68	0.050	9074446
Conductivity	umho/cm	630	1.0	9071821	2300	1.0	9071821	570	1.0	9071821
Total Kjeldahl Nitrogen (TKN)	mg/L	0.58	0.50	9074937	0.96	0.20	9074937	0.91	0.10	9074937
pH	pH	8.07		9071832	7.71		9071832	8.01		9071832
Dissolved Sulphate (SO4)	mg/L	30	1.0	9072078	1200	5.0	9071324	4.0	1.0	9072078
Alkalinity (Total as CaCO3)	mg/L	310	1.0	9071808	58	1.0	9071808	270	1.0	9071808
Dissolved Chloride (Cl-)	mg/L	9.5	1.0	9072076	41	1.0	9071317	19	1.0	9072076
Nitrite (N)	mg/L	<0.010	0.010	9071844	0.038	0.010	9071923	0.121	0.010	9071844
Nitrate (N)	mg/L	<0.10	0.10	9071844	0.30	0.10	9071923	1.52	0.10	9071844
Nitrate + Nitrite (N)	mg/L	<0.10	0.10	9071844	0.33	0.10	9071923	1.64	0.10	9071844

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C3AI799
Report Date: 2023/12/01

GM BluePlan Engineering Limited
Client Project #: NORMANBY(213087)
Sampler Initials: KC

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		XRQ885			XRQ886	XRQ887		XRQ888		
Sampling Date		2023/11/22 09:20			2023/11/22 09:35	2023/11/22 09:45		2023/11/22 10:00		
COC Number		959845-01-01			959845-01-01	959845-01-01		959845-01-01		
	UNITS	TW-6	RDL	QC Batch	SW-1	SW-2	QC Batch	SW-5	RDL	QC Batch
Calculated Parameters										
Hardness (CaCO3)	mg/L	910	1.0	9068262						
Inorganics										
Total Ammonia-N	mg/L	7.0	0.050	9074454	<0.050	<0.050	9074446	<0.050	0.050	9074454
Conductivity	umho/cm	1600	1.0	9071821	710	700	9071821	710	1.0	9071821
Total Dissolved Solids	mg/L	885	10	9073983						
Total Kjeldahl Nitrogen (TKN)	mg/L	11	1.0	9074937						
Dissolved Oxygen	mg/L				10.7	10.5	9069593	10.4	0.050	9069593
pH	pH	7.65		9071832	8.33	8.17	9071832	8.24		9071832
Phenols-4AAP	mg/L				<0.0010	<0.0010	9079619	<0.0010	0.0010	9079619
Total Phosphorus	mg/L	2.2	0.10	9074874	<0.020	<0.020	9074874	<0.020	0.020	9074874
Total Suspended Solids	mg/L	950	25	9076891						
Dissolved Sulphate (SO4)	mg/L	37	1.0	9072078						
Alkalinity (Total as CaCO3)	mg/L	890	1.0	9071808	320	310	9071808	310	1.0	9071808
Dissolved Chloride (Cl-)	mg/L	4.0	1.0	9072076	20	21	9072076	20	1.0	9071053
Nitrite (N)	mg/L	0.015	0.010	9071844						
Nitrate (N)	mg/L	<0.10	0.10	9071844						
Nitrate + Nitrite (N)	mg/L	0.10	0.10	9071844						

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas ID		XRQ888		
Sampling Date		2023/11/22 10:00		
COC Number		959845-01-01		
	UNITS	SW-5 Lab-Dup	RDL	QC Batch
Inorganics				
Total Ammonia-N	mg/L	<0.050	0.050	9074454
Conductivity	umho/cm	700	1.0	9071821
pH	pH	8.29		9071832
Alkalinity (Total as CaCO3)	mg/L	320	1.0	9071808

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Bureau Veritas Job #: C3AI799
Report Date: 2023/12/01

GM BluePlan Engineering Limited
Client Project #: NORMANBY(213087)
Sampler Initials: KC

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		XRQ876		XRQ877	XRQ877	XRQ878	XRQ879		
Sampling Date		2023/11/22 08:15		2023/11/22 08:20	2023/11/22 08:20	2023/11/22 08:25	2023/11/22 08:30		
COC Number		959845-01-01		959845-01-01	959845-01-01	959845-01-01	959845-01-01		
	UNITS	TW-1	QC Batch	TW-2	TW-2 Lab-Dup	TW-3	TW-5A	RDL	QC Batch
Metals									
Dissolved Iron (Fe)	mg/L	<0.02	9074291	<0.02	<0.02	<0.02	<0.02	0.02	9074301
Dissolved Sodium (Na)	mg/L	9.2	9074291	10	10	21	24	0.5	9074301

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas ID		XRQ880	XRQ881		XRQ882		XRQ883	XRQ884		
Sampling Date		2023/11/22 08:40	2023/11/22 08:50		2023/11/22 08:55		2023/11/22 09:00	2023/11/22 09:10		
COC Number		959845-01-01	959845-01-01		959845-01-01		959845-01-01	959845-01-01		
	UNITS	TW-8	TW-9 (S)	QC Batch	TW-9 (D)	QC Batch	TW-10	TW-5	RDL	QC Batch
Metals										
Dissolved Iron (Fe)	mg/L	<0.02	<0.02	9074291	<0.02	9082648	<0.02	<0.02	0.02	9074291
Dissolved Sodium (Na)	mg/L	29	10	9074291	5.8	9082648	46	7.4	0.5	9074291

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas ID		XRQ885			XRQ886	XRQ887	XRQ888		
Sampling Date		2023/11/22 09:20			2023/11/22 09:35	2023/11/22 09:45	2023/11/22 10:00		
COC Number		959845-01-01			959845-01-01	959845-01-01	959845-01-01		
	UNITS	TW-6	RDL	QC Batch	SW-1	SW-2	SW-5	RDL	QC Batch
Metals									
Dissolved Arsenic (As)	mg/L	<0.2	0.2	9074291					
Dissolved Barium (Ba)	mg/L	0.066	0.005	9074291					
Dissolved Boron (B)	mg/L	0.32	0.02	9074291					
Dissolved Cadmium (Cd)	mg/L	<0.005	0.005	9074291					
Dissolved Chromium (Cr)	mg/L	<0.01	0.01	9074291					
Dissolved Copper (Cu)	mg/L	<0.02	0.02	9074291					
Dissolved Iron (Fe)	mg/L	0.03	0.02	9074291					
Total Iron (Fe)	mg/L				0.07	0.20	0.07	0.02	9076950
Dissolved Lead (Pb)	mg/L	<0.05	0.05	9074291					
Dissolved Manganese (Mn)	mg/L	0.31	0.01	9074291					
Mercury (Hg)	mg/L	<0.00010	0.00010	9075999					
Dissolved Potassium (K)	mg/L	29	1	9074291					
Dissolved Sodium (Na)	mg/L	24	0.5	9074291					

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TEST SUMMARY

Bureau Veritas ID: XRQ876
Sample ID: TW-1
Matrix: Water

Collected: 2023/11/22
Shipped:
Received: 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9071808	N/A	2023/11/27	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9072076	N/A	2023/11/27	Massarat Jan
Conductivity	AT	9071821	N/A	2023/11/27	Surinder Rai
Hardness (calculated as CaCO3)		9068262	N/A	2023/11/30	Automated Statchk
Lab Filtered Metals Analysis by ICP	ICP	9074291	2023/11/27	2023/11/29	Suban Kanapathippllai
Total Ammonia-N	LACH/NH4	9074446	N/A	2023/11/28	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9071844	N/A	2023/11/28	Nimarta Singh
pH	AT	9071832	2023/11/24	2023/11/27	Surinder Rai
Sulphate by Automated Turbidimetry	SKAL	9072078	N/A	2023/11/27	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9074937	2023/11/27	2023/11/28	Kruti Jitesh Patel

Bureau Veritas ID: XRQ876 Dup
Sample ID: TW-1
Matrix: Water

Collected: 2023/11/22
Shipped:
Received: 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	SKAL	9072076	N/A	2023/11/27	Massarat Jan
Sulphate by Automated Turbidimetry	SKAL	9072078	N/A	2023/11/27	Massarat Jan

Bureau Veritas ID: XRQ877
Sample ID: TW-2
Matrix: Water

Collected: 2023/11/22
Shipped:
Received: 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9071808	N/A	2023/11/27	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9071317	N/A	2023/11/27	Alina Dobreanu
Conductivity	AT	9071821	N/A	2023/11/27	Surinder Rai
Hardness (calculated as CaCO3)		9068262	N/A	2023/11/30	Automated Statchk
Lab Filtered Metals Analysis by ICP	ICP	9074301	2023/11/27	2023/11/29	Suban Kanapathippllai
Total Ammonia-N	LACH/NH4	9074446	N/A	2023/11/28	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9071923	N/A	2023/11/27	Nimarta Singh
pH	AT	9071832	2023/11/24	2023/11/27	Surinder Rai
Sulphate by Automated Turbidimetry	SKAL	9071324	N/A	2023/11/27	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9074953	2023/11/27	2023/11/28	Rajni Tyagi

Bureau Veritas ID: XRQ877 Dup
Sample ID: TW-2
Matrix: Water

Collected: 2023/11/22
Shipped:
Received: 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Lab Filtered Metals Analysis by ICP	ICP	9074301	2023/11/27	2023/11/29	Suban Kanapathippllai

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TEST SUMMARY

Bureau Veritas ID: XRQ878
Sample ID: TW-3
Matrix: Water

Collected: 2023/11/22
Shipped:
Received: 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9071808	N/A	2023/11/27	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9071317	N/A	2023/11/27	Alina Dobreanu
Conductivity	AT	9071821	N/A	2023/11/27	Surinder Rai
Hardness (calculated as CaCO3)		9068262	N/A	2023/11/30	Automated Statchk
Lab Filtered Metals Analysis by ICP	ICP	9074301	2023/11/27	2023/11/29	Suban Kanapathippllai
Total Ammonia-N	LACH/NH4	9074446	N/A	2023/11/28	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9071844	N/A	2023/11/28	Nimarta Singh
pH	AT	9071832	2023/11/24	2023/11/27	Surinder Rai
Sulphate by Automated Turbidimetry	SKAL	9071324	N/A	2023/11/27	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9074937	2023/11/27	2023/11/28	Kruti Jitesh Patel

Bureau Veritas ID: XRQ879
Sample ID: TW-5A
Matrix: Water

Collected: 2023/11/22
Shipped:
Received: 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9071808	N/A	2023/11/27	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9072076	N/A	2023/11/27	Massarat Jan
Conductivity	AT	9071821	N/A	2023/11/27	Surinder Rai
Hardness (calculated as CaCO3)		9068262	N/A	2023/11/30	Automated Statchk
Lab Filtered Metals Analysis by ICP	ICP	9074301	2023/11/27	2023/11/29	Suban Kanapathippllai
Total Ammonia-N	LACH/NH4	9074446	N/A	2023/11/28	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9071844	N/A	2023/11/28	Nimarta Singh
pH	AT	9071832	2023/11/24	2023/11/27	Surinder Rai
Sulphate by Automated Turbidimetry	SKAL	9072078	N/A	2023/11/27	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9074937	2023/11/27	2023/11/28	Kruti Jitesh Patel

Bureau Veritas ID: XRQ880
Sample ID: TW-8
Matrix: Water

Collected: 2023/11/22
Shipped:
Received: 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9071808	N/A	2023/11/27	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9072076	N/A	2023/11/27	Massarat Jan
Conductivity	AT	9071821	N/A	2023/11/27	Surinder Rai
Hardness (calculated as CaCO3)		9068262	N/A	2023/11/30	Automated Statchk
Lab Filtered Metals Analysis by ICP	ICP	9074291	2023/11/27	2023/11/29	Suban Kanapathippllai
Total Ammonia-N	LACH/NH4	9074446	N/A	2023/11/28	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9071844	N/A	2023/11/28	Nimarta Singh
pH	AT	9071832	2023/11/24	2023/11/27	Surinder Rai
Sulphate by Automated Turbidimetry	SKAL	9072078	N/A	2023/11/27	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9074937	2023/11/27	2023/11/28	Kruti Jitesh Patel

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TEST SUMMARY

Bureau Veritas ID: XRQ881
Sample ID: TW-9 (S)
Matrix: Water

Collected: 2023/11/22
Shipped:
Received: 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9071808	N/A	2023/11/27	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9072076	N/A	2023/11/27	Massarat Jan
Conductivity	AT	9071821	N/A	2023/11/27	Surinder Rai
Hardness (calculated as CaCO3)		9068262	N/A	2023/11/30	Automated Statchk
Lab Filtered Metals Analysis by ICP	ICP	9074291	2023/11/27	2023/11/29	Suban Kanapathippllai
Total Ammonia-N	LACH/NH4	9074446	N/A	2023/11/28	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9071844	N/A	2023/11/28	Nimarta Singh
pH	AT	9071832	2023/11/24	2023/11/27	Surinder Rai
Sulphate by Automated Turbidimetry	SKAL	9072078	N/A	2023/11/27	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9074937	2023/11/27	2023/11/28	Kruti Jitesh Patel

Bureau Veritas ID: XRQ882
Sample ID: TW-9 (D)
Matrix: Water

Collected: 2023/11/22
Shipped:
Received: 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9071808	N/A	2023/11/27	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9072076	N/A	2023/11/27	Massarat Jan
Conductivity	AT	9071821	N/A	2023/11/27	Surinder Rai
Hardness (calculated as CaCO3)		9068262	N/A	2023/12/01	Automated Statchk
Lab Filtered Metals Analysis by ICP	ICP	9082648	2023/11/30	2023/12/01	Suban Kanapathippllai
Total Ammonia-N	LACH/NH4	9074446	N/A	2023/11/28	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9071844	N/A	2023/11/28	Nimarta Singh
pH	AT	9071832	2023/11/24	2023/11/27	Surinder Rai
Sulphate by Automated Turbidimetry	SKAL	9072078	N/A	2023/11/27	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9074937	2023/11/27	2023/11/29	Kruti Jitesh Patel

Bureau Veritas ID: XRQ883
Sample ID: TW-10
Matrix: Water

Collected: 2023/11/22
Shipped:
Received: 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9071808	N/A	2023/11/27	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9071317	N/A	2023/11/27	Alina Dobreanu
Conductivity	AT	9071821	N/A	2023/11/27	Surinder Rai
Hardness (calculated as CaCO3)		9068262	N/A	2023/11/30	Automated Statchk
Lab Filtered Metals Analysis by ICP	ICP	9074291	2023/11/27	2023/11/29	Suban Kanapathippllai
Total Ammonia-N	LACH/NH4	9074446	N/A	2023/11/28	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9071923	N/A	2023/11/27	Nimarta Singh
pH	AT	9071832	2023/11/24	2023/11/27	Surinder Rai
Sulphate by Automated Turbidimetry	SKAL	9071324	N/A	2023/11/27	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9074937	2023/11/27	2023/11/28	Kruti Jitesh Patel

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TEST SUMMARY

Bureau Veritas ID: XRQ884 **Collected:** 2023/11/22
Sample ID: TW-5 **Shipped:**
Matrix: Water **Received:** 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9071808	N/A	2023/11/27	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9072076	N/A	2023/11/27	Massarat Jan
Conductivity	AT	9071821	N/A	2023/11/27	Surinder Rai
Hardness (calculated as CaCO3)		9068262	N/A	2023/11/30	Automated Statchk
Lab Filtered Metals Analysis by ICP	ICP	9074291	2023/11/27	2023/11/29	Suban Kanapathippllai
Total Ammonia-N	LACH/NH4	9074446	N/A	2023/11/28	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9071844	N/A	2023/11/28	Nimarta Singh
pH	AT	9071832	2023/11/24	2023/11/27	Surinder Rai
Sulphate by Automated Turbidimetry	SKAL	9072078	N/A	2023/11/27	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9074937	2023/11/27	2023/11/28	Kruti Jitesh Patel

Bureau Veritas ID: XRQ885 **Collected:** 2023/11/22
Sample ID: TW-6 **Shipped:**
Matrix: Water **Received:** 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9071808	N/A	2023/11/27	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9072076	N/A	2023/11/27	Massarat Jan
Conductivity	AT	9071821	N/A	2023/11/27	Surinder Rai
Hardness (calculated as CaCO3)		9068262	N/A	2023/11/30	Automated Statchk
Mercury in Water by CVAA	CV/AA	9075999	2023/11/28	2023/11/29	Maninder Kaur
Lab Filtered Metals Analysis by ICP	ICP	9074291	2023/11/27	2023/11/29	Suban Kanapathippllai
Total Ammonia-N	LACH/NH4	9074454	N/A	2023/11/28	Shivani Shivani
Nitrate & Nitrite as Nitrogen in Water	LACH	9071844	N/A	2023/11/28	Nimarta Singh
pH	AT	9071832	2023/11/24	2023/11/27	Surinder Rai
Sulphate by Automated Turbidimetry	SKAL	9072078	N/A	2023/11/27	Massarat Jan
Total Dissolved Solids	BAL	9073983	2023/11/27	2023/11/28	Tina Teng
Total Kjeldahl Nitrogen in Water	SKAL	9074937	2023/11/27	2023/11/28	Kruti Jitesh Patel
Total Phosphorus (Colourimetric)	SKAL/P	9074874	2023/11/27	2023/11/28	Muskan
Total Suspended Solids	BAL	9076891	2023/11/29	2023/11/30	Darshan Patel

Bureau Veritas ID: XRQ886 **Collected:** 2023/11/22
Sample ID: SW-1 **Shipped:**
Matrix: Water **Received:** 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9071808	N/A	2023/11/27	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9072076	N/A	2023/11/27	Massarat Jan
Conductivity	AT	9071821	N/A	2023/11/27	Surinder Rai
Dissolved Oxygen	DO	9069593	2023/11/23	2023/11/23	Gurjot Kaur
Total Metals Analysis by ICP	ICP	9076950	2023/11/28	2023/11/28	Suban Kanapathippllai
Total Ammonia-N	LACH/NH4	9074446	N/A	2023/11/28	Shivani Shivani
pH	AT	9071832	2023/11/24	2023/11/27	Surinder Rai
Phenols (4AAP)	TECH/PHEN	9079619	N/A	2023/11/29	Chloe Pollock
Total Phosphorus (Colourimetric)	SKAL/P	9074874	2023/11/27	2023/11/28	Muskan

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Bureau Veritas Job #: C3AI799
Report Date: 2023/12/01

GM BluePlan Engineering Limited
Client Project #: NORMANBY(213087)
Sampler Initials: KC

TEST SUMMARY

Bureau Veritas ID: XRQ887
Sample ID: SW-2
Matrix: Water

Collected: 2023/11/22
Shipped:
Received: 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9071808	N/A	2023/11/27	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9072076	N/A	2023/11/27	Massarat Jan
Conductivity	AT	9071821	N/A	2023/11/27	Surinder Rai
Dissolved Oxygen	DO	9069593	2023/11/23	2023/11/23	Gurjot Kaur
Total Metals Analysis by ICP	ICP	9076950	2023/11/28	2023/11/28	Suban Kanapathippllai
Total Ammonia-N	LACH/NH4	9074446	N/A	2023/11/28	Shivani Shivani
pH	AT	9071832	2023/11/24	2023/11/27	Surinder Rai
Phenols (4AAP)	TECH/PHEN	9079619	N/A	2023/11/29	Chloe Pollock
Total Phosphorus (Colourimetric)	SKAL/P	9074874	2023/11/27	2023/11/28	Muskan

Bureau Veritas ID: XRQ888
Sample ID: SW-5
Matrix: Water

Collected: 2023/11/22
Shipped:
Received: 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9071808	N/A	2023/11/27	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9071053	N/A	2023/11/30	Massarat Jan
Conductivity	AT	9071821	N/A	2023/11/27	Surinder Rai
Dissolved Oxygen	DO	9069593	2023/11/23	2023/11/23	Gurjot Kaur
Total Metals Analysis by ICP	ICP	9076950	2023/11/28	2023/11/28	Suban Kanapathippllai
Total Ammonia-N	LACH/NH4	9074454	N/A	2023/11/28	Shivani Shivani
pH	AT	9071832	2023/11/24	2023/11/27	Surinder Rai
Phenols (4AAP)	TECH/PHEN	9079619	N/A	2023/11/29	Chloe Pollock
Total Phosphorus (Colourimetric)	SKAL/P	9074874	2023/11/27	2023/11/28	Muskan

Bureau Veritas ID: XRQ888 Dup
Sample ID: SW-5
Matrix: Water

Collected: 2023/11/22
Shipped:
Received: 2023/11/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9071808	N/A	2023/11/27	Surinder Rai
Conductivity	AT	9071821	N/A	2023/11/27	Surinder Rai
Total Ammonia-N	LACH/NH4	9074454	N/A	2023/11/28	Shivani Shivani
pH	AT	9071832	2023/11/24	2023/11/27	Surinder Rai

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.7°C
Package 2	7.7°C

Sample XRQ885 [TW-6] : TSS Analysis: Due to the nature of the sample, a smaller than usual portion of the sample was used.

Results relate only to the items tested.

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Bureau Veritas Job #: C3AI799
Report Date: 2023/12/01

QUALITY ASSURANCE REPORT

GM BluePlan Engineering Limited
Client Project #: NORMANBY(213087)
Sampler Initials: KC

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9069593	Dissolved Oxygen	2023/11/23							0.10	30		
9071053	Dissolved Chloride (Cl-)	2023/11/30	80	80 - 120	100	80 - 120	<1.0	mg/L	0.69	20		
9071317	Dissolved Chloride (Cl-)	2023/11/27	NC	80 - 120	100	80 - 120	<1.0	mg/L	0.029	20		
9071324	Dissolved Sulphate (SO4)	2023/11/27	NC	75 - 125	99	80 - 120	<1.0	mg/L	0.77	20		
9071808	Alkalinity (Total as CaCO3)	2023/11/27			100	85 - 115	<1.0	mg/L	1.0	20		
9071821	Conductivity	2023/11/27			101	85 - 115	<1.0	umho/cm	0.56	10		
9071832	pH	2023/11/27			102	98 - 103			0.51	N/A		
9071844	Nitrate (N)	2023/11/28	89	80 - 120	90	80 - 120	<0.10	mg/L	1.8	20		
9071844	Nitrite (N)	2023/11/28	104	80 - 120	105	80 - 120	<0.010	mg/L				
9071923	Nitrate (N)	2023/11/27	96	80 - 120	98	80 - 120	<0.10	mg/L	NC	20		
9071923	Nitrite (N)	2023/11/27	106	80 - 120	107	80 - 120	<0.010	mg/L				
9072076	Dissolved Chloride (Cl-)	2023/11/27	86	80 - 120	94	80 - 120	<1.0	mg/L	0.59	20		
9072078	Dissolved Sulphate (SO4)	2023/11/27	NC	75 - 125	96	80 - 120	<1.0	mg/L	0.11	20		
9073983	Total Dissolved Solids	2023/11/28			98	80 - 120	<10	mg/L	1.3	20		
9074291	Dissolved Arsenic (As)	2023/11/29	97	80 - 120	100	80 - 120	<0.2	mg/L				
9074291	Dissolved Barium (Ba)	2023/11/29	99	80 - 120	102	80 - 120	<0.005	mg/L				
9074291	Dissolved Boron (B)	2023/11/29	100	80 - 120	103	80 - 120	<0.02	mg/L				
9074291	Dissolved Cadmium (Cd)	2023/11/29	98	80 - 120	102	80 - 120	<0.005	mg/L				
9074291	Dissolved Chromium (Cr)	2023/11/29	101	80 - 120	103	80 - 120	<0.01	mg/L				
9074291	Dissolved Copper (Cu)	2023/11/29	99	80 - 120	103	80 - 120	<0.02	mg/L				
9074291	Dissolved Iron (Fe)	2023/11/29	100	80 - 120	104	80 - 120	<0.02	mg/L				
9074291	Dissolved Lead (Pb)	2023/11/29	97	80 - 120	102	80 - 120	<0.05	mg/L				
9074291	Dissolved Manganese (Mn)	2023/11/29	100	80 - 120	104	80 - 120	<0.01	mg/L				
9074291	Dissolved Potassium (K)	2023/11/29	98	80 - 120	103	80 - 120	<1	mg/L	0.87	20		
9074291	Dissolved Sodium (Na)	2023/11/29	NC	80 - 120	103	80 - 120	<0.5	mg/L	1.0	20		
9074301	Dissolved Iron (Fe)	2023/11/29	100	80 - 120	104	80 - 120	<0.02	mg/L	NC	20		
9074301	Dissolved Sodium (Na)	2023/11/29	NC	80 - 120	103	80 - 120	<0.5	mg/L	0.67	20		
9074446	Total Ammonia-N	2023/11/28	100	75 - 125	100	80 - 120	<0.050	mg/L	NC	20		
9074454	Total Ammonia-N	2023/11/28	101	75 - 125	101	80 - 120	<0.050	mg/L	NC	20		
9074874	Total Phosphorus	2023/11/28	98	80 - 120	104	80 - 120	<0.020	mg/L	2.3	20	105	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9074937	Total Kjeldahl Nitrogen (TKN)	2023/11/28	103	80 - 120	102	80 - 120	<0.10	mg/L	12	20	100	80 - 120
9074953	Total Kjeldahl Nitrogen (TKN)	2023/11/28	111	80 - 120	101	80 - 120	<0.10	mg/L	5.1	20	98	80 - 120
9075999	Mercury (Hg)	2023/11/29	88	75 - 125	94	80 - 120	<0.00010	mg/L	NC	20		
9076891	Total Suspended Solids	2023/11/30			95	80 - 120	<10	mg/L	NC	20		
9076950	Total Iron (Fe)	2023/11/28	NC	80 - 120	98	80 - 120	<0.02	mg/L				
9079619	Phenols-4AAP	2023/11/29	104	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20		
9082648	Dissolved Iron (Fe)	2023/12/01	100	80 - 120	100	80 - 120	<0.02	mg/L				
9082648	Dissolved Sodium (Na)	2023/12/01	NC	80 - 120	101	80 - 120	<0.5	mg/L	3.3	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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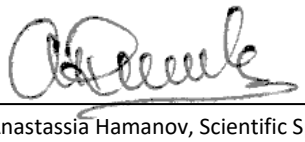
VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist

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Your Project #: Bentinck Surfacewater (213085)
Your C.O.C. #: 926689-01-01

Attention: Reporting Contacts

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

Report Date: 2023/04/28
Report #: R7606760
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3B2440
Received: 2023/04/21, 09:06

Sample Matrix: Surface Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	4	N/A	2023/04/26	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	4	N/A	2023/04/26	CAM SOP-00463	SM 23 4500-Cl E m
Conductivity	4	N/A	2023/04/26	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	4	N/A	2023/04/24	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	4	N/A	2023/04/27	CAM SOP 00102/00408/00447	EPA 6010D m
Total Metals Analysis by ICPMS	4	2023/04/25	2023/04/25	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	4	N/A	2023/04/26	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	4	N/A	2023/04/25	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	4	2023/04/24	2023/04/26	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	4	N/A	2023/04/26	CAM SOP-00444	OMOE E3179 m
Orthophosphate	4	N/A	2023/04/26	CAM SOP-00461	SM 23 4500-P E m
Sulphate by Automated Turbidimetry	4	N/A	2023/04/26	CAM SOP-00464	SM 23 4500-SO42- E m
Total Dissolved Solids	4	2023/04/25	2023/04/26	CAM SOP-00428	SM 23 2540C m
Total Kjeldahl Nitrogen in Water	4	2023/04/25	2023/04/26	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	4	2023/04/25	2023/04/27	CAM SOP-00407	SM 23 4500-P I

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Your Project #: Bentinck Surfacewater (213085)
Your C.O.C. #: 926689-01-01

Attention: Reporting Contacts

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

Report Date: 2023/04/28
Report #: R7606760
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3B2440
Received: 2023/04/21, 09:06

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Ashton Gibson, Project Manager
Email: Ashton.Gibson@bureauveritas.com
Phone# (905)817-5765
==========
This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

RESULTS OF ANALYSES OF SURFACE WATER

Bureau Veritas ID		VPO531		VPO532			VPO532		
Sampling Date		2023/04/20		2023/04/20			2023/04/20		
COC Number		926689-01-01		926689-01-01			926689-01-01		
	UNITS	SW-2	QC Batch	SW-2A	RDL	QC Batch	SW-2A Lab-Dup	RDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L	220	8621993	210	1.0	8621993			
Inorganics									
Total Ammonia-N	mg/L	<0.050	8627167	<0.050	0.050	8627167			
Conductivity	umho/cm	470	8626212	440	1.0	8626212			
Total Dissolved Solids	mg/L	235	8626714	230	10	8626706	215	10	8626706
Total Kjeldahl Nitrogen (TKN)	mg/L	0.33	8627673	0.37	0.10	8627673			
Dissolved Organic Carbon	mg/L	7.1	8623859	7.5	0.40	8623859			
Orthophosphate (P)	mg/L	<0.010	8627116	<0.010	0.010	8627116			
pH	pH	8.19	8626214	8.19		8626214			
Phenols-4AAP	mg/L	<0.0010	8628696	<0.0010	0.0010	8628696			
Total Phosphorus	mg/L	<0.004	8627670	<0.004	0.004	8627670			
Dissolved Sulphate (SO4)	mg/L	5.6	8627133	5.5	1.0	8627133			
Alkalinity (Total as CaCO3)	mg/L	200	8626209	200	1.0	8626209			
Dissolved Chloride (Cl-)	mg/L	17	8627136	15	1.0	8627136			
Nitrite (N)	mg/L	<0.010	8625745	<0.010	0.010	8625745			
Nitrate (N)	mg/L	<0.10	8625745	0.11	0.10	8625745			
Nitrate + Nitrite (N)	mg/L	<0.10	8625745	0.11	0.10	8625745			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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RESULTS OF ANALYSES OF SURFACE WATER

Bureau Veritas ID		VPO533		VPO534			VPO534		
Sampling Date		2023/04/20		2023/04/20			2023/04/20		
COC Number		926689-01-01		926689-01-01			926689-01-01		
	UNITS	SW-4	QC Batch	SW-5	RDL	QC Batch	SW-5 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L	230	8621993	230	1.0	8621993			
Inorganics									
Total Ammonia-N	mg/L	<0.050	8627167	<0.050	0.050	8627167			
Conductivity	umho/cm	440	8626212	440	1.0	8626212			
Total Dissolved Solids	mg/L	200	8626706	170	10	8626706			
Total Kjeldahl Nitrogen (TKN)	mg/L	0.32	8627673	0.24	0.10	8627673			
Dissolved Organic Carbon	mg/L	4.1	8623859	4.2	0.40	8623909	4.2	0.40	8623909
Orthophosphate (P)	mg/L	<0.010	8627116	<0.010	0.010	8627116			
pH	pH	8.31	8626214	8.33		8626214			
Phenols-4AAP	mg/L	<0.0010	8628696	<0.0010	0.0010	8628696			
Total Phosphorus	mg/L	<0.004	8627670	<0.004	0.004	8627670			
Dissolved Sulphate (SO4)	mg/L	9.1	8627133	8.6	1.0	8627133			
Alkalinity (Total as CaCO3)	mg/L	210	8626209	210	1.0	8626209			
Dissolved Chloride (Cl-)	mg/L	5.1	8627136	5.0	1.0	8627136			
Nitrite (N)	mg/L	<0.010	8625743	<0.010	0.010	8625745			
Nitrate (N)	mg/L	0.41	8625743	0.37	0.10	8625745			
Nitrate + Nitrite (N)	mg/L	0.41	8625743	0.37	0.10	8625745			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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ELEMENTS BY ATOMIC SPECTROSCOPY (SURFACE WATER)

Bureau Veritas ID		VPO531	VPO531	VPO532	VPO533	VPO534		
Sampling Date		2023/04/20	2023/04/20	2023/04/20	2023/04/20	2023/04/20		
COC Number		926689-01-01	926689-01-01	926689-01-01	926689-01-01	926689-01-01		
	UNITS	SW-2	SW-2 Lab-Dup	SW-2A	SW-4	SW-5	RDL	QC Batch
Metals								
Total Calcium (Ca)	ug/L	56000	54000	55000	57000	58000	200	8626481
Total Iron (Fe)	ug/L	<100	<100	<100	<100	<100	100	8626481
Total Magnesium (Mg)	ug/L	21000	20000	21000	24000	25000	50	8626481
Total Manganese (Mn)	ug/L	9.3	9.0	6.3	5.4	4.6	2.0	8626481
Total Potassium (K)	ug/L	1600	1500	1600	790	780	200	8626481
Total Sodium (Na)	ug/L	10000	10000	9900	3400	3500	100	8626481

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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TEST SUMMARY

Bureau Veritas ID: VPO531
Sample ID: SW-2
Matrix: Surface Water

Collected: 2023/04/20
Shipped:
Received: 2023/04/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8626209	N/A	2023/04/26	Kien Tran
Chloride by Automated Colourimetry	KONE	8627136	N/A	2023/04/26	Alina Dobreanu
Conductivity	AT	8626212	N/A	2023/04/26	Kien Tran
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8623859	N/A	2023/04/24	Gyulshen Idriz
Hardness (calculated as CaCO3)		8621993	N/A	2023/04/27	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	8626481	2023/04/25	2023/04/25	Prempal Bhatti
Total Ammonia-N	LACH/NH4	8627167	N/A	2023/04/26	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8625745	N/A	2023/04/25	Samuel Law
pH	AT	8626214	2023/04/24	2023/04/26	Kien Tran
Phenols (4AAP)	TECH/PHEN	8628696	N/A	2023/04/26	Mandeep Kaur
Orthophosphate	KONE	8627116	N/A	2023/04/26	Alina Dobreanu
Sulphate by Automated Turbidimetry	KONE	8627133	N/A	2023/04/26	Alina Dobreanu
Total Dissolved Solids	BAL	8626714	2023/04/25	2023/04/26	Shaneil Hall
Total Kjeldahl Nitrogen in Water	SKAL	8627673	2023/04/25	2023/04/26	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	8627670	2023/04/25	2023/04/27	Sachi Patel

Bureau Veritas ID: VPO531 Dup
Sample ID: SW-2
Matrix: Surface Water

Collected: 2023/04/20
Shipped:
Received: 2023/04/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals Analysis by ICPMS	ICP/MS	8626481	2023/04/25	2023/04/25	Prempal Bhatti

Bureau Veritas ID: VPO532
Sample ID: SW-2A
Matrix: Surface Water

Collected: 2023/04/20
Shipped:
Received: 2023/04/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8626209	N/A	2023/04/26	Kien Tran
Chloride by Automated Colourimetry	KONE	8627136	N/A	2023/04/26	Alina Dobreanu
Conductivity	AT	8626212	N/A	2023/04/26	Kien Tran
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8623859	N/A	2023/04/24	Gyulshen Idriz
Hardness (calculated as CaCO3)		8621993	N/A	2023/04/27	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	8626481	2023/04/25	2023/04/25	Prempal Bhatti
Total Ammonia-N	LACH/NH4	8627167	N/A	2023/04/26	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8625745	N/A	2023/04/25	Samuel Law
pH	AT	8626214	2023/04/24	2023/04/26	Kien Tran
Phenols (4AAP)	TECH/PHEN	8628696	N/A	2023/04/26	Mandeep Kaur
Orthophosphate	KONE	8627116	N/A	2023/04/26	Alina Dobreanu
Sulphate by Automated Turbidimetry	KONE	8627133	N/A	2023/04/26	Alina Dobreanu
Total Dissolved Solids	BAL	8626706	2023/04/25	2023/04/26	Shaneil Hall
Total Kjeldahl Nitrogen in Water	SKAL	8627673	2023/04/25	2023/04/26	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	8627670	2023/04/25	2023/04/27	Sachi Patel

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TEST SUMMARY

Bureau Veritas ID: VPO532 Dup
Sample ID: SW-2A
Matrix: Surface Water

Collected: 2023/04/20
Shipped:
Received: 2023/04/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Dissolved Solids	BAL	8626706	2023/04/25	2023/04/26	Shaneil Hall

Bureau Veritas ID: VPO533
Sample ID: SW-4
Matrix: Surface Water

Collected: 2023/04/20
Shipped:
Received: 2023/04/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8626209	N/A	2023/04/26	Kien Tran
Chloride by Automated Colourimetry	KONE	8627136	N/A	2023/04/26	Alina Dobreanu
Conductivity	AT	8626212	N/A	2023/04/26	Kien Tran
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8623859	N/A	2023/04/24	Gyulshen Idriz
Hardness (calculated as CaCO3)		8621993	N/A	2023/04/27	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	8626481	2023/04/25	2023/04/25	Prempal Bhatti
Total Ammonia-N	LACH/NH4	8627167	N/A	2023/04/26	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8625743	N/A	2023/04/25	Samuel Law
pH	AT	8626214	2023/04/24	2023/04/26	Kien Tran
Phenols (4AAP)	TECH/PHEN	8628696	N/A	2023/04/26	Mandeep Kaur
Orthophosphate	KONE	8627116	N/A	2023/04/26	Alina Dobreanu
Sulphate by Automated Turbidimetry	KONE	8627133	N/A	2023/04/26	Alina Dobreanu
Total Dissolved Solids	BAL	8626706	2023/04/25	2023/04/26	Shaneil Hall
Total Kjeldahl Nitrogen in Water	SKAL	8627673	2023/04/25	2023/04/26	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	8627670	2023/04/25	2023/04/27	Sachi Patel

Bureau Veritas ID: VPO534
Sample ID: SW-5
Matrix: Surface Water

Collected: 2023/04/20
Shipped:
Received: 2023/04/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	8626209	N/A	2023/04/26	Kien Tran
Chloride by Automated Colourimetry	KONE	8627136	N/A	2023/04/26	Alina Dobreanu
Conductivity	AT	8626212	N/A	2023/04/26	Kien Tran
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8623909	N/A	2023/04/24	Gyulshen Idriz
Hardness (calculated as CaCO3)		8621993	N/A	2023/04/27	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	8626481	2023/04/25	2023/04/25	Prempal Bhatti
Total Ammonia-N	LACH/NH4	8627167	N/A	2023/04/26	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	8625745	N/A	2023/04/25	Samuel Law
pH	AT	8626214	2023/04/24	2023/04/26	Kien Tran
Phenols (4AAP)	TECH/PHEN	8628696	N/A	2023/04/26	Mandeep Kaur
Orthophosphate	KONE	8627116	N/A	2023/04/26	Alina Dobreanu
Sulphate by Automated Turbidimetry	KONE	8627133	N/A	2023/04/26	Alina Dobreanu
Total Dissolved Solids	BAL	8626706	2023/04/25	2023/04/26	Shaneil Hall
Total Kjeldahl Nitrogen in Water	SKAL	8627673	2023/04/25	2023/04/26	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	8627670	2023/04/25	2023/04/27	Sachi Patel

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TEST SUMMARY

Bureau Veritas ID: VPO534 Dup
Sample ID: SW-5
Matrix: Surface Water

Collected: 2023/04/20
Shipped:
Received: 2023/04/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	8623909	N/A	2023/04/24	Gyulshen Idriz

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GENERAL COMMENTS

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8623859	Dissolved Organic Carbon	2023/04/24	93	80 - 120	97	80 - 120	<0.40	mg/L	4.6	20		
8623909	Dissolved Organic Carbon	2023/04/24	95	80 - 120	99	80 - 120	<0.40	mg/L	0.95	20		
8625743	Nitrate (N)	2023/04/25	NC	80 - 120	98	80 - 120	<0.10	mg/L	1.5	20		
8625743	Nitrite (N)	2023/04/25	100	80 - 120	104	80 - 120	<0.010	mg/L	3.0	20		
8625745	Nitrate (N)	2023/04/25	95	80 - 120	92	80 - 120	<0.10	mg/L	2.3	20		
8625745	Nitrite (N)	2023/04/25	100	80 - 120	104	80 - 120	<0.010	mg/L	0.91	20		
8626209	Alkalinity (Total as CaCO3)	2023/04/26			92	85 - 115	<1.0	mg/L	5.8	20		
8626212	Conductivity	2023/04/26			99	85 - 115	1.1, RDL=1.0	umho/cm	5.1	25		
8626214	pH	2023/04/26			101	98 - 103			0.52	N/A		
8626481	Total Calcium (Ca)	2023/04/25	NC	80 - 120	103	80 - 120	<200	ug/L	3.2	20		
8626481	Total Iron (Fe)	2023/04/25	107	80 - 120	103	80 - 120	<100	ug/L	NC	20		
8626481	Total Magnesium (Mg)	2023/04/25	107	80 - 120	103	80 - 120	<50	ug/L	5.7	20		
8626481	Total Manganese (Mn)	2023/04/25	103	80 - 120	100	80 - 120	<2.0	ug/L	3.3	20		
8626481	Total Potassium (K)	2023/04/25	106	80 - 120	102	80 - 120	<200	ug/L	4.1	20		
8626481	Total Sodium (Na)	2023/04/25	107	80 - 120	104	80 - 120	<100	ug/L	4.9	20		
8626706	Total Dissolved Solids	2023/04/26					<10	mg/L	6.7	20	100	90 - 110
8626714	Total Dissolved Solids	2023/04/26					<10	mg/L	8.7	20	100	90 - 110
8627116	Orthophosphate (P)	2023/04/26	93	75 - 125	94	80 - 120	<0.010	mg/L	NC	20		
8627133	Dissolved Sulphate (SO4)	2023/04/26	94	75 - 125	97	80 - 120	<1.0	mg/L	NC	20		
8627136	Dissolved Chloride (Cl-)	2023/04/26	93	80 - 120	95	80 - 120	<1.0	mg/L	2.5	20		
8627167	Total Ammonia-N	2023/04/26	101	75 - 125	99	80 - 120	<0.050	mg/L	4.4	20		
8627670	Total Phosphorus	2023/04/27	105	80 - 120	106	80 - 120	<0.004	mg/L	NC	20	105	80 - 120
8627673	Total Kjeldahl Nitrogen (TKN)	2023/04/27	119	80 - 120	96	80 - 120	<0.10	mg/L	11	20	97	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8628696	Phenols-4AAP	2023/04/25	101	80 - 120	96	80 - 120	<0.0010	mg/L	NC	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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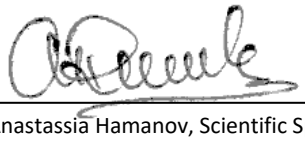
VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

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APPENDIX G:
HISTORICAL GROUNDWATER ELEVATIONS

APPENDIX G
NORMANBY LANDFILL SITE
GROUNDWATER LEVELS AND ELEVATIONS

Test Well	Ground Elevation (m)	Measuring Point Elevation (m)	April 14, 2011		October 25, 2011		April 3, 2012		September 25, 2012		May 9, 2013		November 26, 2013		May 1, 2014		November 4, 2014	
			WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)
TW-1	90.38	91.42	1.69	89.73	1.71	89.71	1.83	89.59	2.38	89.04	2.01	89.41	1.83	89.59	1.71	89.71	1.99	89.43
TW-2	90.33	91.36	1.88	89.48	2.00	89.36	2.05	89.31	2.5	88.89	2.38	88.98	2.07	89.29	1.95	89.41	2.29	89.07
TW-3	88.77	89.49	1.53	87.96	1.53	87.96	1.58	87.91	2.66	86.83	1.68	87.81	1.55	87.94	1.55	87.94	1.93	87.56
TW-5	96.27	97.60	3.25	94.35	3.24	94.36	3.26	94.34	3.89	93.71	3.29	94.31	2.70	94.90	3.49	94.11	3.58	94.02
TW5-A	96.34	97.17	3.7	93.47	3.46	93.71	3.55	93.62	4.04	93.13	3.74	93.43	3.25	93.92	3.24	93.93	3.45	93.72
TW-6	95.98	96.92	3.78	93.14	3.70	93.22	3.78	93.14	4.32	92.60	3.77	93.15	3.70	93.22	3.73	93.19	3.88	93.04
OW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.50	NA	1.61	NA
OW-3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.24	NA	1.40	NA

Test Well	Ground Elevation (m)	Measuring Point Elevation (m)	April 20, 2015		November 3, 2015		April 19, 2016		October 26, 2016		May 16, 2017		November 27, 2017		April 10, 2018		November 14, 2018	
			WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)
TW-1	90.38	91.42	1.78	89.64	2.27	89.15	1.71	89.71	2.23	89.19	1.91	89.51	1.97	89.45	1.91	89.51	2.06	89.36
TW-2	90.33	91.36	1.98	89.38	2.27	89.09	2.04	89.32	2.51	88.85	2.40	88.96	2.32	89.04	2.21	89.15	2.42	88.94
TW-3	88.77	89.49	1.60	87.89	2.21	87.28	1.66	87.83	2.62	86.87	1.65	87.84	1.65	87.84	1.40	88.09	1.44	88.05
TW-5	96.27	97.60	3.53	94.07	3.70	93.90	3.49	94.11	4.15	93.45	3.52	94.08	3.52	94.08	3.55	94.05	3.61	93.99
TW5-A	96.34	97.17	2.64	94.53	3.68	93.49	3.26	93.91	3.94	93.23	3.32	93.85	3.28	93.89	3.37	93.8	3.51	93.66
TW-6	95.98	96.92	3.75	93.17	4.06	92.86	3.77	93.15	4.40	92.52	3.76	93.16	3.73	93.19	3.80	93.12	3.92	93.00
OW-2	NA	NA	1.53	NA	1.66	NA	1.51	NA	2.00	NA	1.56	NA	1.54	NA	1.51	NA	1.56	NA
OW-3	NA	NA	1.25	NA	1.40	NA	1.26	NA	1.76	NA	1.33	NA	1.22	NA	1.32	NA	1.36	NA

Test Well	Ground Elevation (m)	Measuring Point Elevation (m)	April 24, 2019		November 20, 2019		May 13, 2020		November 12, 2020		April 20, 2021		October 5, 2021		April 20, 2023		November 22, 2023	
			WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)	WL (m)	WL Elev. (m)
TW-1	90.38	91.42	1.67	89.75	2.01	89.41	2.11	89.31	2.20	89.22	2.70	88.72	1.96	89.46	1.90	89.52	2.45	88.97
TW-2	90.33	91.36	2.00	89.36	2.64	88.72	2.27	89.09	2.46	88.9	2.44	88.92	1.17	90.19	2.10	89.26	2.10	89.26
TW-3	88.77	89.49	1.05	88.44	1.65	87.84	2.02	87.47	DRY	--	2.94	86.55	0.41	--		89.49		--
TW-5	96.27	97.60	3.66	93.94	3.68	93.92	3.55	94.05	3.86	93.74	3.60	94	3.60	94.00	3.54	94.06	3.80	93.80
TW5-A	96.34	97.17	3.20	93.97	3.57	93.60	2.80	94.37	3.40	93.77	2.69	94.48	2.76	94.41	2.63	94.54	3.38	93.79
TW-6	95.98	96.92	3.63	93.29	4.00	92.92	3.82	93.10	4.26	92.66	3.40	93.52	3.85	93.07	3.75	93.17	3.86	93.06
TW-8	na	90.84	1.30	89.54	1.95	88.89	1.83	89.01	2.33	88.51	1.59	89.25	1.68	89.16	1.50	89.34	1.90	88.94
TW-9S	na	95.10	1.05	94.05	1.58	93.52	1.57	93.53	1.82	93.28	1.33	93.77	1.24	93.86	1.19	93.91	1.44	93.66
TW-9D	na	95.14	1.18	93.96	1.56	93.58	1.43	93.71	1.83	93.31	1.32	93.82	1.24	93.90	1.15	93.99	1.39	93.75
TW-10	na	89.27	2.32	86.95	2.68	86.59	2.55	86.72	3.20	86.07	2.48	86.79	2.55	86.72	2.44	86.83	2.64	86.63

Notes:
1. The data presented up to 2013 has been summarized from information presented in previous Annual Reports completed by Genivar
2. Wells TW4, TW7 and TW7A were previously destroyed.
3. WL = Water Levels below top of pipe
4. TW5A damaged - repaired July 12, 2002. New top of casing (measuring point) elevation required.
5. NA: No Data is Available
6. No historic groundwater elevation data is available beyond the 2011 Annual Report

APPENDIX H:
BOREHOLE LOGS/MONITORING WELL CONSTRUCTION DETAILS

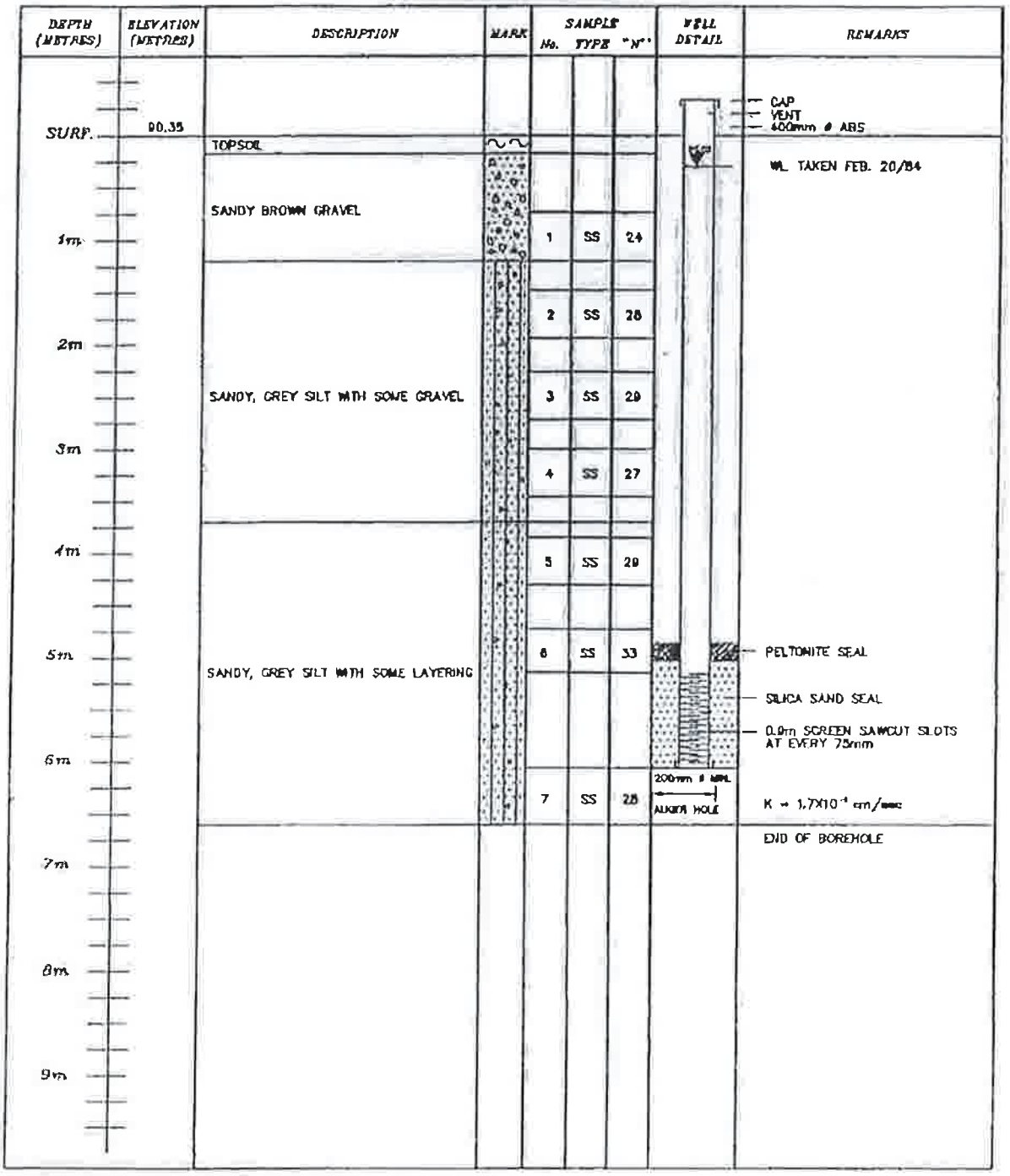
RECORD OF WELL No. 1

PROJECT : NORMANBY TOWNSHIP LANDFILL — PROJECT NO. : M-1170

CLIENT : TOWNSHIP OF NORMANBY — SUPERVISOR : R. SLAUGHTER

WELL TYPE : 400 mm ø ABS PIEZOMETER — DATE : JANUARY 13, 1984

LOCATION : LOT 7, CONCESSION 14, TOWNSHIP OF NORMANBY



GS – GRAB SAMPLE, SS – SPLIT SPOON, ST – SHELBY TUBE, "N" – BLOWS/FOOT

RECORD OF WELL No. 2

PROJECT : NORMANBY TOWNSHIP LANDFILL

PROJECT NO. : M-1170

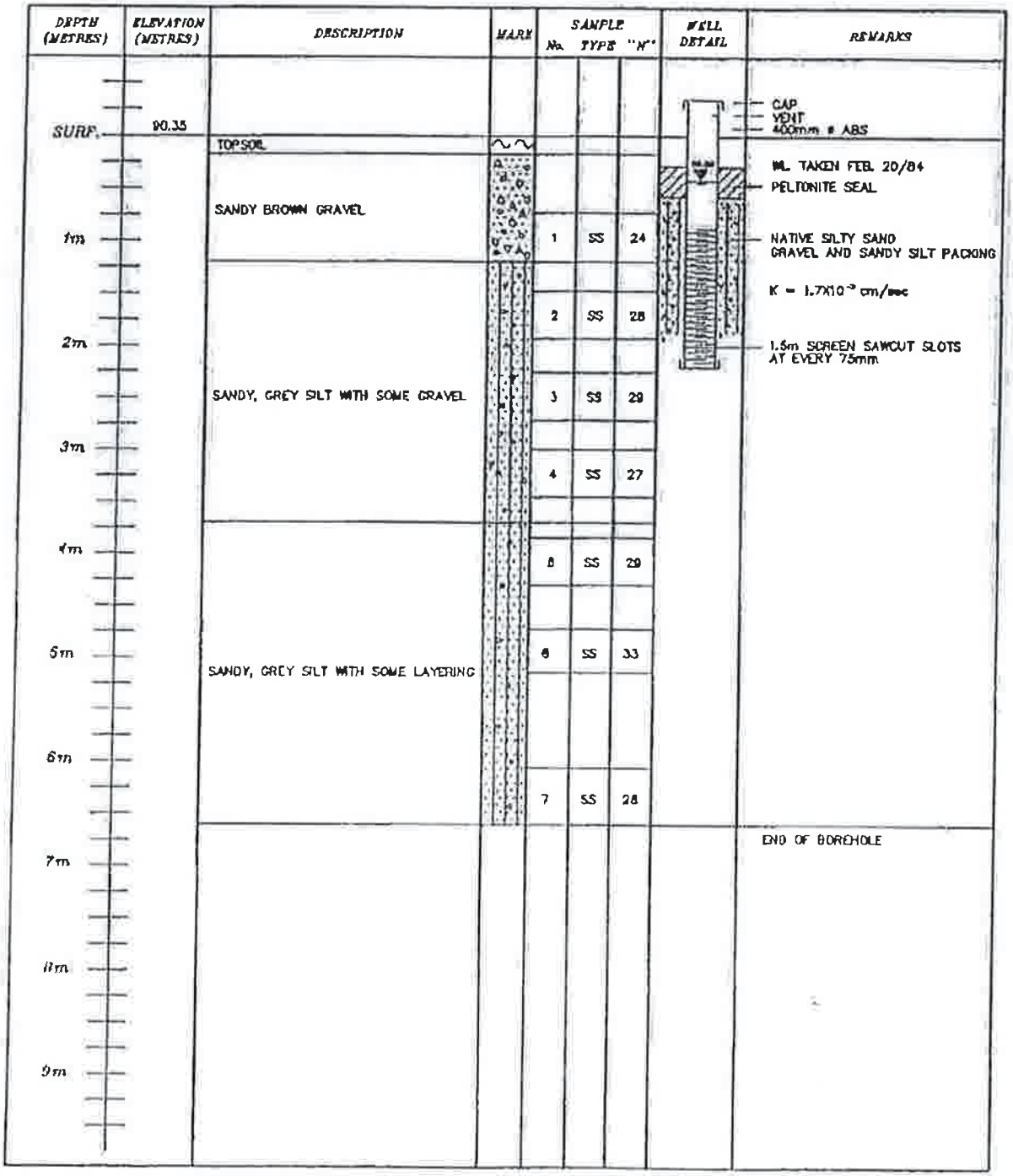
CLIENT : TOWNSHIP OF NORMANBY

SUPERVISOR : R. SLAUGHTER

WELL TYPE : 400 mm ϕ ABS PIEZOMETER

DATE : JANUARY 13, 1984

LOCATION : LOT 7, CONCESSION 14, TOWNSHIP OF NORMANBY



GS - GRAB SAMPLE, SS - SPLIT SPOON, ST - SHELBY TUBE, "N" - BLOWS/FOOT

RECORD OF WELL No. 3

PROJECT : NORMANBY TOWNSHIP LANDFILL

PROJECT NO. : M-1170

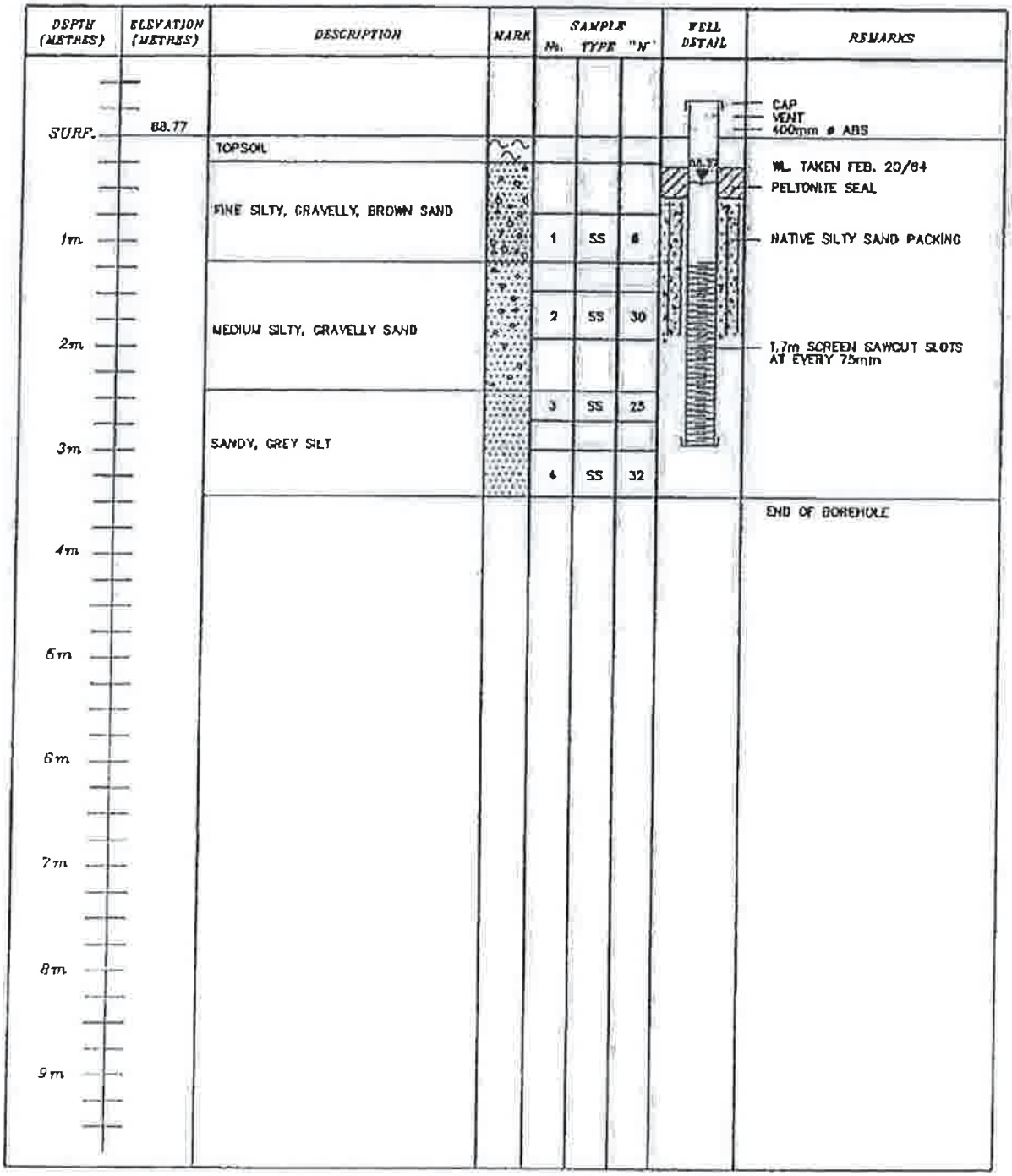
CLIENT : TOWNSHIP OF NORMANBY

SUPERVISOR : R. SLAUGHTER

WELL TYPE : 400 mm ø ABS PIEZOMETER

DATE : JANUARY 13, 1984

LOCATION : LOT 7, CONCESSION 14, TOWNSHIP OF NORMANBY



GS - GRAB SAMPLE, SS - SPLIT SPOON, ST - SHELBY TUBE, "N" - BLOWS/FOOT

RECORD OF WELL No. 4

PROJECT : NORMANBY TOWNSHIP LANDFILL — PROJECT NO. : M-1170

CLIENT : TOWNSHIP OF NORMANBY — SUPERVISOR : R. SLAUGHTER

WELL TYPE : 400 mm ϕ ABS PIEZOMETER — DATE : JANUARY 13, 1984

LOCATION : LOT 7, CONCESSION 14, TOWNSHIP OF NORMANBY

DEPTH (METRES)	ELEVATION (METRES)	DESCRIPTION	MARK	SAMPLE No.	SAMPLE TYPE	SAMPLE "N"	WELL DETAIL	REMARKS
SURF.	92.00						CAP VENT 400mm ϕ ABS	
		TOPSOIL AND FILL					PELTONITE SEAL	
1m		FINE TO MEDIUM BROWN SAND		1	SS	13	NATIVE SAND PACKING	WL TAKEN FEB. 20/84
2m				2	SS	22	1.8m SCREEN SAWCUT SLOTS AT EVERY 75mm	
		SANDY, MOTTLED, BROWN CLAY		3	SS	64		
3m		SANDY GREY SILT		4	SS	68		
								END OF BOREHOLE
4m								
5m								
6m								
7m								
8m								
9m								

GS – GRAB SAMPLE, SS – SPLIT SPOON, ST – SHELBY TUBE, "N" – BLOWS/FOOT

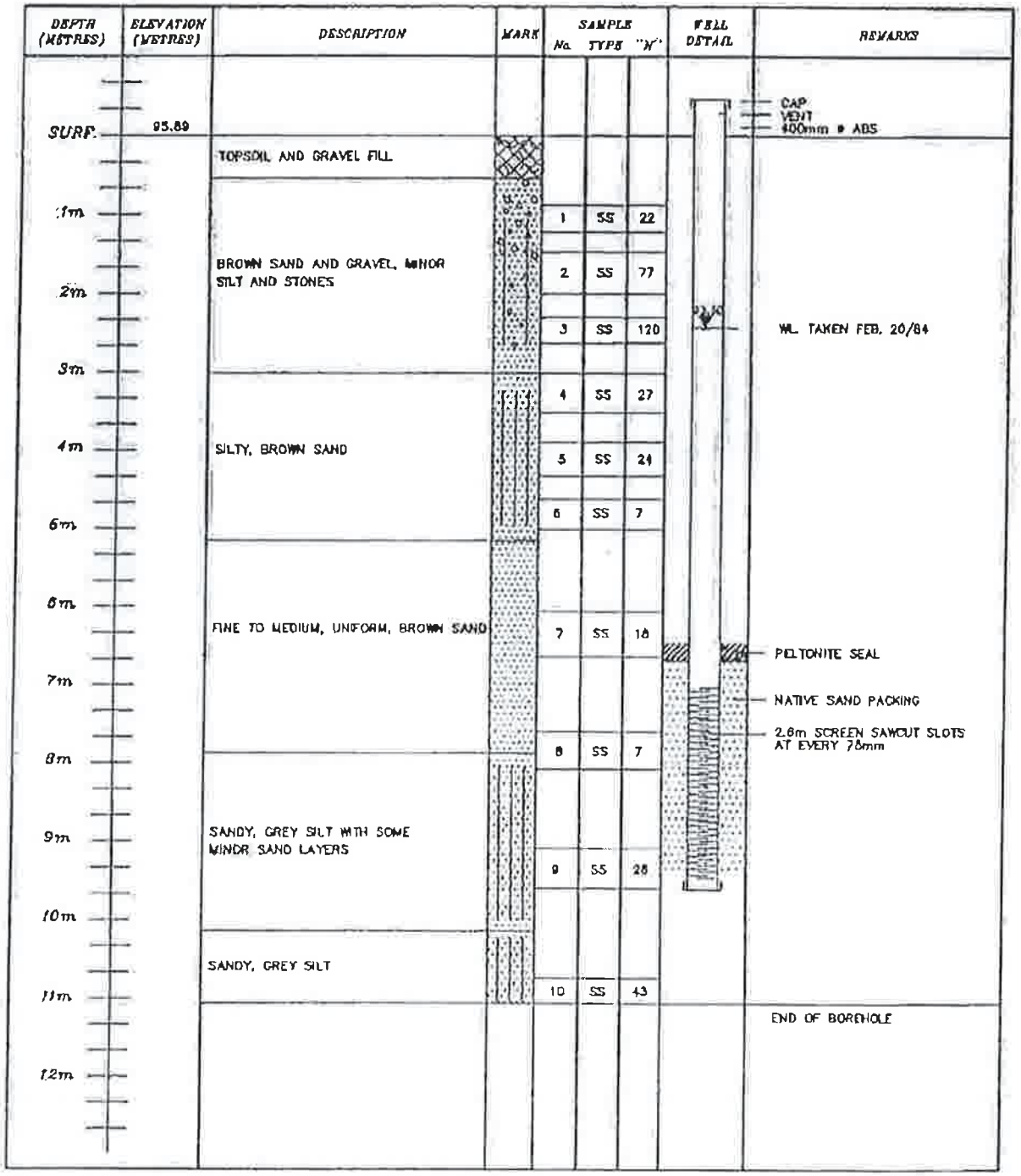
RECORD OF WELL No. 5

PROJECT : NORMANBY TOWNSHIP LANDFILL — PROJECT NO. : M-1170

CLIENT : TOWNSHIP OF NORMANBY — SUPERVISOR : R. SLAUGHTER

WELL TYPE : 400 mm ø ABS PIEZOMETER — DATE : JANUARY 13, 1984

LOCATION : LOT 7, CONCESSION 14, TOWNSHIP OF NORMANBY



GS – GRAB SAMPLE, SS – SPLIT SPOON, ST – SHELBY TUBE, "N" – BLOWS/FOOT

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RECORD OF WELL No. 5A

PROJECT : NORMANBY TOWNSHIP LANDFILL — PROJECT NO. : M-1170

CLIENT : TOWNSHIP OF NORMANBY — SUPERVISOR : R. SLAUGHTER

WELL TYPE : 400 mm ø ABS PIEZOMETER — DATE : JANUARY 13, 1984

LOCATION : LOT 7, CONCESSION 14, TOWNSHIP OF NORMANBY

DEPTH (METRES)	ELEVATION (METRES)	DESCRIPTION	MARK	SAMPLE No.	SAMPLE TYPE	SAMPLE "N"	WELL DETAIL	REMARKS
SURF.	95.89						CAP VENT 400mm ø ABS	
		TOPSOIL AND GRAVEL FILL						
1m		BROWN SAND AND GRAVEL, MINOR SILT AND STONES		1	SS	22	PELTONITE SEAL	
				2	SS	77	NATIVE SAND/GRAVEL PACKING	
2m				3	SS	120	2.4m SCREEN SAWCUT SLOTS AT EVERY 75mm	
3m								WL TAKEN FEB. 21/84
				4	SS	27		
4m		SILTY, BROWN SAND		5	SS	24		
5m				6	SS	7		
6m								
		FINE TO MEDIUM, UNIFORM, BROWN SAND		7	SS	18		
7m								
8m				8	SS	7		
9m		SANDY, GREY SILT WITH SOME MINOR SAND LAYERS		9	SS	25		
10m								
		SANDY, GREY SILT		10	SS	43		
11m								
12m								END OF BOREHOLE

RECORD OF WELL No. 6

PROJECT : NORMANBY TOWNSHIP LANDFILL — PROJECT NO. : M-1170

CLIENT : TOWNSHIP OF NORMANBY — SUPERVISOR : R. SLAUGHTER

WELL TYPE : 400 mm ø ABS PIEZOMETER — DATE : JANUARY 13, 1984

LOCATION : LOT 7, CONCESSION 14, TOWNSHIP OF NORMANBY

DEPTH (METRES)	ELEVATION (METRES)	DESCRIPTION	MARK	SAMPLE No.	SAMPLE TYPE	SAMPLE "N"	WELL DETAIL	REMARKS
								CAP VENT 400mm ø ABS
SURF.	85.90							
		FILL – SAND AND GRAVEL						
1m		REFUSE AND FILL						
2m		SILTY SAND AND GRAVEL						
		SANDY, GREY TO GREY-BROWN SILT					83.31	WL TAKEN FEB. 20/84
3m								PELTONITE SEAL
				1	SS	24		NATIVE SILTY SAND GRAVEL AND SANDY SILT PACKING
4m				2	SS	14		1.2m SCREEN SAWCUT SLOTS AT EVERY 75mm
				3	SS	17		
5m								END OF BOREHOLE
6m								
7m								
8m								
9m								

GS – GRAB SAMPLE, SS – SPLIT SPOON, ST – SHELBY TUBE, "N" – BLOWS/FOOT

GAMSBY AND MANNEROW Limited

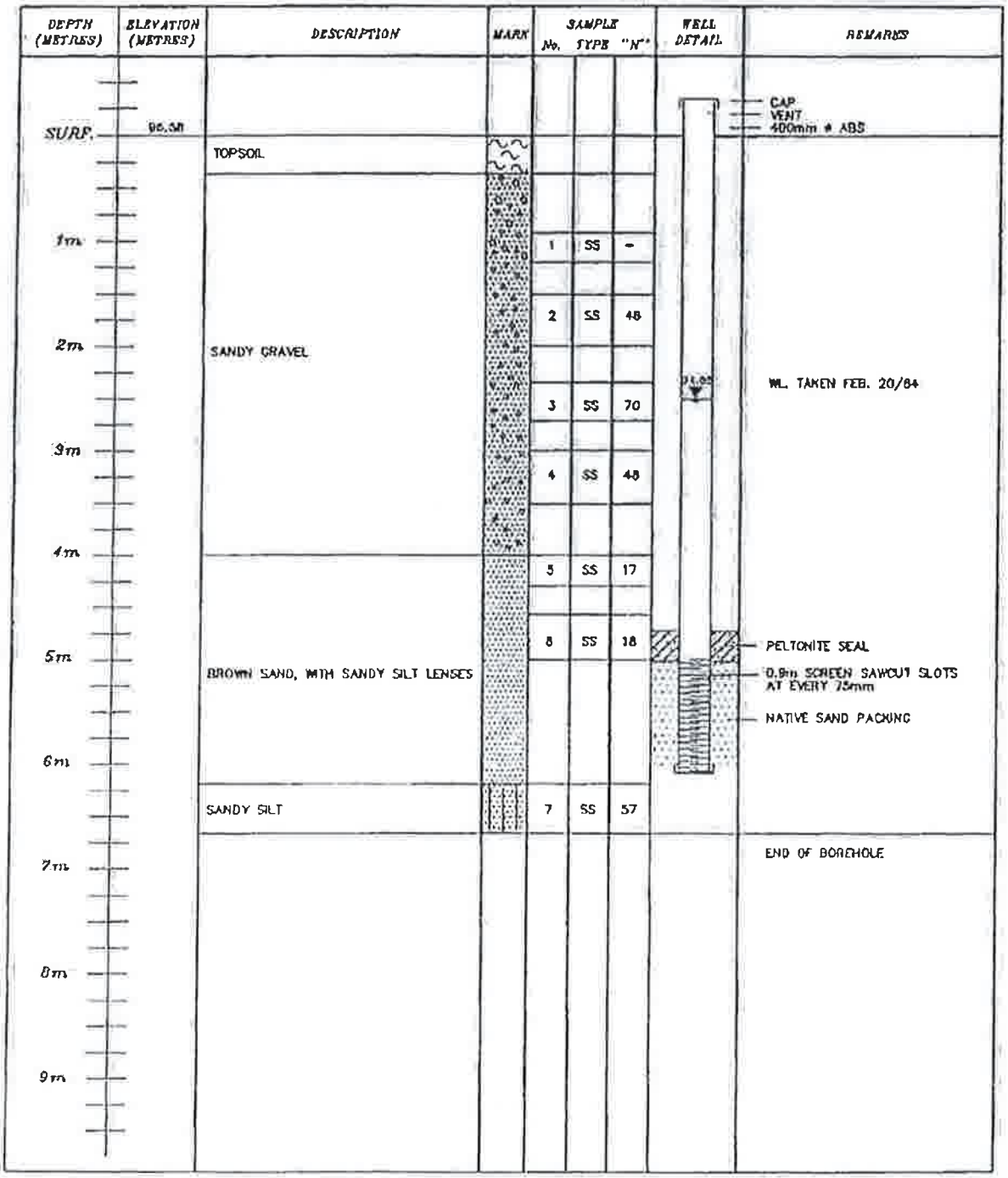
RECORD OF WELL No. 7

PROJECT : NORMANBY TOWNSHIP LANDFILL — PROJECT NO. : M-1170

CLIENT : TOWNSHIP OF NORMANBY — SUPERVISOR : R. SLAUGHTER

WELL TYPE : 400 mm ø ABS PIEZOMETER — DATE : JANUARY 13, 1984

LOCATION : LOT 7, CONCESSION 14, TOWNSHIP OF NORMANBY



CS - CRAB SAMPLE, SS - SPLIT SPOON, ST - SHELBY TUBE, "N" - BLOWS/FOOT

RECORD OF WELL No. 7A

PROJECT : NORMANBY TOWNSHIP LANDFILL — PROJECT NO. : M-1170

CLIENT : TOWNSHIP OF NORMANBY — SUPERVISOR : R. SLAUGHTER

WELL TYPE : 400 mm ø ABS PIEZOMETER — DATE : JANUARY 13, 1984

LOCATION : LOT 7, CONCESSION 14, TOWNSHIP OF NORMANBY

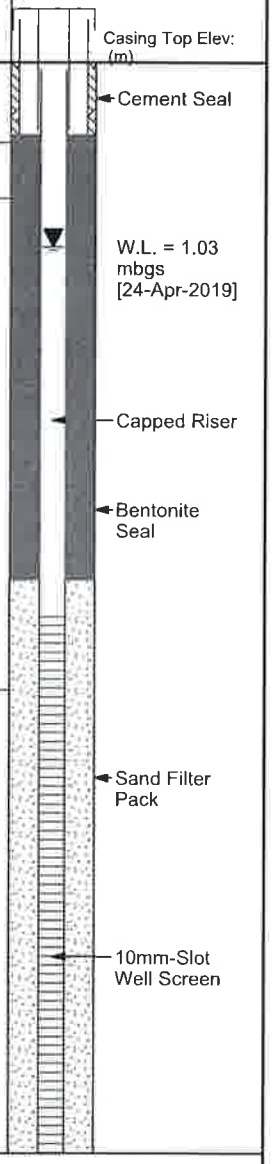
DEPTH (METRES)	ELEVATION (METRES)	DESCRIPTION	MARK	SAMPLE No.	SAMPLE TYPE	SAMPLE "N"	WELL DETAIL	REMARKS
								CAP VENT 400mm ø ABS
SURF.	96.58	TOPSOIL						
1m		SANDY GRAVEL		1	SS	-		
				2	SS	48		
2m								WL TAKEN FEB. 20/84
				3	SS	70		PELTONITE SEAL
3m				4	SS	48		0.9m SCREEN SAWCUT SLOTS AT EVERY 75mm NATIVE SAND/GRAVEL PACKING
4m		BROWN SAND, WITH SANDY SILT LENSES		5	SS	17		
				6	SS	18		
5m								
6m		SANDY SILT		7	SS	57		
7m								END OF BOREHOLE
8m								
9m								

GS - GRAB SAMPLE, SS - SPLIT SPOON, ST - SHELBY TUBE, "N" - BLOWS/FOOT

BOREHOLE ID: TW-8

CLIENT Municipality of West Grey
PROJECT NAME Normanby Waste Disposal Site
PROJECT NUMBER 213087
PROJECT LOCATION 221291 Grey Road 9, Neustadt
DATE COMPLETED 12-Apr-2019
CONTRACTOR London Soil Test
LOGGED BY Corbin Sweet
METHOD Hollow Stem Auger / Split-Spoon Sampler
WELL CONSTRUCTION 0.05m Ø PVC
NOTES MECP Well ID: A263748

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION
			TOPSOIL, Dark Brown, Moist, Loose
			0.45
			SILT and SAND with GRAVEL and COBBLES, Brown Colour, Moist-to-Dry, Loose
			0.76
1			Medium-to-Coarse SAND with SILT, Brown Colour, Moist-to-Saturated, Loose-to-Compact Saturated below ~1.3 mbgs
2			
3			
			3.51
4			CLAY, Grey Colour, Firm, Wet-to-Saturated
5			
6			6.10



Borehole Terminated at 6.10 m.

BOREHOLE ID: TW-9S

BluePlan ENGINEERING

CLIENT Municipality of West Grey
PROJECT NAME Normanby Waste Disposal Site
PROJECT NUMBER 213087
PROJECT LOCATION 221291 Grey Road 9, Neustadt
DATE COMPLETED 12-Apr-2019
CONTRACTOR London Soil Test
LOGGED BY Corbin Sweet
METHOD Hollow Stem Auger / Split-Spoon Sampler
WELL CONSTRUCTION 0.05m Ø PVC
NOTES MECP Well ID: A263746

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0			SAND and GRAVEL, Dry-to-Wet, Light Brown Colour Loose-to-Compact	Casing Top Elev: (m)
				Cement Seal
				W.L. = 0.3 mbgs [24-Apr-2019]
1				
				Capped Riser
2				Bentonite Seal
			2.13	
			CLAY, Grey Colour, Soft, Moist-to-Wet	
3				
			3.35	
			Medium SAND with SILT, Brown Colour, Moist-to-Saturated	Sand Filter Pack
4				
			4.60	10mm-Slot Well Screen

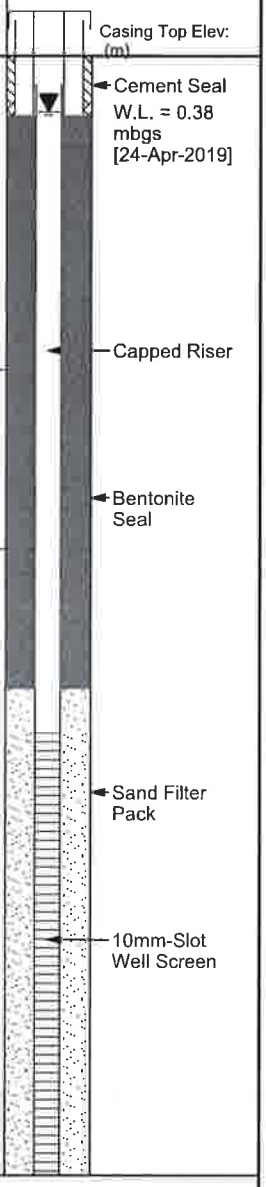
Borehole Terminated at 4.60 m.

BOREHOLE ID: TW-9D

BluePlan ENGINEERING

CLIENT Municipality of West Grey
PROJECT NAME Normanby Waste Disposal Site
PROJECT NUMBER 213087
PROJECT LOCATION 221291 Grey Road 9, Neustadt
DATE COMPLETED 12-Apr-2019
CONTRACTOR London Soil Test
LOGGED BY Corbin Sweet
METHOD Hollow Stem Auger / Split-Spoon Sampler
WELL CONSTRUCTION 0.05m Ø PVC
NOTES MECP Well ID: A263747

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION
0			SAND and GRAVEL, Dry-to-Wet, Light Brown Colour Loose-to-Compact
2.13			CLAY, Grey Colour, Soft, Moist-to-Wet
3.35			Medium SAND with SILT, Brown Colour, Moist-to-Saturated
7.60			Borehole Terminated at 7.60 m.

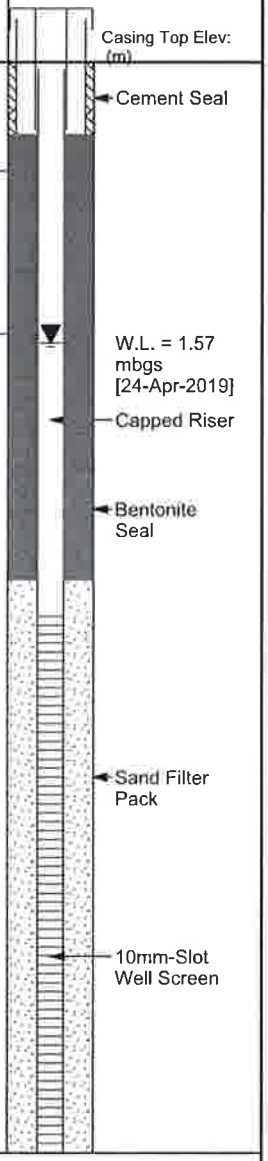


BOREHOLE ID: TW-10

CLIENT Municipality of West Grey
PROJECT NAME Normanby Waste Disposal Site
PROJECT NUMBER 213087
PROJECT LOCATION 221291 Grey Road 9, Neustadt
DATE COMPLETED 12-Apr-2019
CONTRACTOR London Soil Test
LOGGED BY Corbin Sweet
METHOD Hollow Stem Auger / Split-Spoon Sampler
WELL CONSTRUCTION 0.05m Ø PVC
NOTES MECP Well ID: A264299

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION
0			TOPSOIL, Dark Brown, Moist, Loose
0.61			
1			SAND with GRAVEL and trace SILT, Brown Colour, Moist-to-Dry, Loose
1.52			
2			CLAY, Grey Colour, Firm, Moist-to-Wet
3			
4			
5			
6			
6.10			

WELL DIAGRAM



Borehole Terminated at 6.10 m.