



2022 Annual Monitoring Report

Croft Waste Disposal Site
Magnetawan, Ontario

Prepared for:

Municipality of Magnetawan

4304 Highway 520
Magnetawan, Ontario P0A 1P0

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1.0 INTRODUCTION

Pinchin Ltd. (Pinchin) was retained by the Corporation of the Municipality of Magnetawan (Client) to prepare the 2022 annual groundwater and surface water monitoring report for the Croft Waste Disposal Site (the Site). The following report provides a detailed evaluation and summary of the 2022 monitoring data and was completed to constitute the 2022 Annual Monitoring Report. This document includes, but is not limited to a summary of historical geochemical data, a review/evaluation of the historical and current geochemical data (as well as groundwater flow), and a summary of geochemical trends.

The purpose of completing the monitoring program was to assess the hydraulic media for contaminants of concern as a compliance requirement under the Site Certificate of Approval (CofA) Number **A7034002** and the applicable regulatory requirements during the spring and fall of 2022. To achieve the reporting objectives of this Site monitoring program, Pinchin carried out groundwater and surface water sampling at the Site in general accordance with the documents referenced within this report.

1.1 Location

The Site property is located in Lot 26, Concession 11, within the Municipality of Magnetawan, District of Parry Sound, Ontario and is located approximately 12 kilometres (km) east-northeast of the Township of Magnetawan, Ontario. The Site is situated in an undeveloped area and the visibility of landfilling activities is limited from the adjacent roadway due to mature tree growth. The Site location is indicated on Figure 1 (all Figures are provided in Appendix I).

The Site is located at Universal Transverse Mercator (UTM) coordinates Zone 17U, 593,659 meters (m) Easting and 5,058,398 m Northing (North American Datum 1983). Landfill coordinates were obtained using a Global Positioning System and are accurate within 10 m.

1.1.1 Site Survey and Aerial Photography

At the time of preparation of this report, previous survey information of the Site and existing monitoring well elevations were provided to Pinchin for review. The available top of casing monitoring well elevation data obtained from the previous survey has been used in the following sections of this report to calculate groundwater elevation contours.

A topographic survey of the Site was completed in 2019 using an Unmanned Aerial Vehicle (UAV) in conjunction with the spring 2019 monitoring event completed by Pinchin for the purpose of creating an accurate aerial image of the Site, while also capturing the current Site topographic conditions.



1.2 Ownership and Key Personnel

The Site is owned and operated by the Corporation of the Municipality of Magnetawan, located in Magnetawan, Ontario. The project was completed for the following representative on behalf of the Municipality:

Kerstin Vroom, Clerk/CAO
Municipality of Magnetawan Government Office
4304 Highway #520
Magnetawan, ON P0A 1P0

The Competent Environmental Practitioner (CEP) for the Site groundwater and surface water monitoring program was Mr. Tim McBride of Pinchin Ltd. Mr. McBride's contact information is provided below:

Mr. Tim McBride, B.Sc., P.Geo., Q.P.^{ESA}
Pinchin Ltd.
662 Falconbridge Road, Unit #3
Sudbury, ON P3A 4S4

1.3 Description and Development of the Site

The Site is operated as a domestic landfill for municipal and non-hazardous, solid, industrial, and commercial wastes to be utilized by residences of the area. The Site was approved with a total fill area of 2.5 hectares (ha) within a 33.7 ha property. A road with a locked gate is located east of the Site which provides access to the Site from the west side of 25th and 26th Side Road, approximately 1 km north of the intersection of 25th and 26th Side Road and Highway 520.

The active landfilling area is currently located within the northern portion of the Site. A site capacity survey was completed by D.M. Wills on November 1, 2018, which resulted in an estimated remaining capacity of approximately 23,565 cubic metres (m³) and an approximate remaining life expectancy of 39 years.

A map illustrating the site features is provided as Figure 2.

1.3.1 Site Document Review

Pinchin reviewed the following reports for the Site and are referenced within this document:

- Report entitled "2018 Annual Monitoring Report, Croft Waste Disposal Site, Magnetawan, Ontario" completed by D.M. Wills Associates Limited for the Corporation of the Municipality of Magnetawan dated March 2019 (the 2018 D.M. Wills Monitoring Report);



- Report entitled “*2019 Annual Monitoring Report, Croft Waste Disposal Site, Magnetawan, Ontario*” completed by Pinchin Ltd. for the Municipality of Magnetawan dated December 12, 2019 (the 2019 Pinchin Monitoring Report);
- Report entitled “*Aquifer Instrumentation Memo, Croft Waste Disposal Site, Magnetawan, Ontario*” completed by Pinchin Ltd. for the Municipality of Magnetawan dated June 16, 2020;
- Report entitled “*2020 Annual Monitoring Report, Croft Waste Disposal Site, Magnetawan, Ontario*” completed by Pinchin Ltd. for the Municipality of Magnetawan dated February 2, 2020 (the 2020 Pinchin Monitoring Report); and
- Report entitled “*2021 Annual Monitoring Report, Croft Waste Disposal Site, Magnetawan, Ontario*” completed by Pinchin Ltd. for the Municipality of Magnetawan dated March 25, 2022 (the 2020 Pinchin Monitoring Report).

A copy of these documents can be obtained from the Client. Pinchin has relied on the information available in the previous environmental reports reviewed for the Site as part of this assessment. Information reviewed within this report is referenced in pertinent sections throughout this document.

1.4 Monitoring and Reporting Program Objectives and Requirements

The site specific CofA for the Site was not provided to Pinchin for review at the time of this monitoring period. The monitoring and reporting completed by Pinchin has been generally developed based on the Ministry of Environment, Conservation and Parks (MECP) document entitled “*Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document*” dated November 2010, as well as the Client’s request for 2022 monitoring and annual reporting.

1.5 Assumptions and Limitations

Pinchin has assumed that the information generated from historical investigations is accurate and has been completed in accordance with standard engineering practices and regulations. It should be noted that the historical background information made available to Pinchin by the Client was limited, and as such, previous reports have been relied on for information where required.

The scope of the monitoring activities was limited to the parameters listed in the 2018 D.M. Wills Monitoring Report and the 2019, 2020, and 2021 Pinchin Monitoring Reports for groundwater and surface water and was limited to the immediate area surrounding the Site. The investigations were limited solely to the groundwater within the monitoring well installations on-Site and the surface water surrounding the Site. The investigation does not constitute an exhaustive investigation of the Site property or adjacent properties for potentially unknown contaminants and/or other unknown sources of environmental impact.



Pinchin's limitation of liability and scope of work is as follows:

- The work performed in this report was carried out in accordance with the Terms and Conditions made part of the contract. The conclusions presented herein are based solely upon the scope of services and time and budgetary limitations described in the contract;
- The report has been prepared in accordance with generally accepted environmental study and/or engineering practices. No other warranties, either expressed or implied, are made as to the professional services provided under the terms of the contract and included in this report;
- The services performed and outlined in this report were based, in part, upon a previously installed monitoring network established by others and approved by the applicable regulatory agencies. Pinchin's opinion cannot be extended to portions of the Site which were unavailable for direct observations, reasonably beyond the control of Pinchin;
- The objective of this report was to assess the water quality conditions at the Site, given the context of the contract, with respect to existing environmental regulations within the applicable jurisdiction;
- The Site history interpreted herein relies on information supplied by others, such as local, provincial, and federal agencies, as well as Site personnel. No attempt has been made to independently verify the accuracy of such information, unless specifically noted in this report;
- Pinchin's interpretations relating to the landfill-derived leachate plume at the Site are described in this report. Where testing was performed, it was executed in accordance with the contract for these services. It should be noted that other compounds or materials not tested for may be present in the Site environment;
- The conclusions of this report are based, in part, on the information provided by others. The possibility remains that unexpected environmental conditions may be encountered at the Site in locations not specifically investigated. Should such an event occur, Pinchin must be notified in order that we may determine if modifications to the conclusions in this report are necessary;
- The utilization of Pinchin's services during future monitoring at the Site will allow Pinchin to observe compliance with the conclusions and recommendations contained herein. It will also provide for changes as necessary to suit field conditions as they are encountered; and



- Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Pinchin accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

2.0 PHYSICAL SETTING

2.1 Geology and Hydrogeology

The Site is located in an area of low relief with numerous small shallow lakes and wetlands interspersed within forested lands dominated by black spruce and poplar. According to previous annual monitoring reports for the Site, the Ontario Geological Survey mapping indicates that the regional geology near the Site is dominated by Precambrian bedrock with local areas of very thin overburden and sand pockets. The underlying Precambrian bedrock is of gneissic composition with very little weathering and lies within the Ahmic Domain of the Central Gneiss Belt. According to the report, mapping indicates the presence of a glaciocustrine sand deposit in the vicinity of the Site, as well as a historical sand pit that operated in the area which is likely where the landfill was developed.

To the north of the Site, bedrock outcrops at surface and rises gradually in elevation toward the north, defining a minor east-west trending ridge approximately 50 m north of the Site. To the east of the Site, the bedrock gradually dips southward from the east-west trending ridge. To the south and west of the Site, the shallow bedrock is inferred to define a minor northwest trending bedrock ridge. Previous intrusive investigations also indicate that the overburden in this area appeared to be thin and was composed of sandy silt till and sand.

Based on the borehole logs for the monitoring wells and drive points at the Site, the subsoil conditions beneath the Site consist of sand and sandy silt till overlying gneissic bedrock. Borehole logs for the monitoring wells on-Site are provided in Appendix II, with the exception of the borehole log for BH1. No other borehole logs were provided to Pinchin for review.

Static water levels were recorded by Pinchin in all of the accessible wells for each of the 2022 groundwater monitoring events, with the exception of BH1 during the spring monitoring event. Water levels were measured prior to purging and developing in preparation for sampling to ensure the water levels are representative of static conditions. Tables that summarize the spring and fall 2022 groundwater elevations, as measured by Pinchin personnel, are presented in Table 1 (all tables are provided in Appendix III).

In general, the static groundwater levels exist within 4 m of surface for most wells, with the deepest depth to water (6.52 metres below ground surface (mbgs)) recorded at BH-13, located northeast of the Site, during the fall monitoring event. Groundwater movement at the Site has been established (by water level

contouring), as being directed in a northerly direction, with the highest groundwater elevations recorded at BH1 and the lowest at DP-7. In addition, there appears to be a radial influence on the groundwater table associated with the apparent groundwater mounding within the above grade waste deposits.

2.2 Surface Water Features

An unnamed tributary to Ahmic Lake is located to the south of the Site, where surface water monitoring location SW1 is located. Love Lake is located approximately 500 m northeast of the Site, where surface water monitoring location SW2 is located to monitor overland flow into the lake from the north side of the Site. A third surface water monitoring location, SW3, is situated in a pool of water along the northwest edge of the landfill footprint to characterize surface water run-off originating within the landfill footprint.

2.3 Historical Data

Pinchin reviewed the 2018 D.M. Wills Annual Monitoring Report and the 2019, 2020, and 2021 Pinchin Annual Monitoring Reports to evaluate historical data and groundwater and surface water quality conditions. No other water quality data from the existing monitoring well network was available to review as part of this monitoring program.

2.3.1 Historical Groundwater Data

Monitoring well BH1 was determined to be located upgradient of the waste deposits and has historically been used to monitor background water quality at the Site. Based on the results of the 2019, 2020, and 2021 Reports, moderate leachate effects are present immediately downgradient of the landfill along the limit of waste as measured at wells BH10 and BH11 (which both quantified Guideline B-7 exceedances in 2021 for chloride, sodium, boron, total dissolved solids, and alkalinity). The results also indicated that well BH9 may also be experiencing minor leachate effects for multiple parameters which were interpreted to be attenuating with further distance from the Site. The furthest downgradient well, BH8, was interpreted to be only slightly affected by landfill leachate. It was noted that significant distance to the downgradient (northern) property boundary exists to allow for additional natural attenuation.

Additional well installations were recommended to further characterize the groundwater at the Site in the downgradient directions and closer to the property boundary. It was recommended that one well be located directly north of the proposed limit of the waste and one further downgradient from BH10 and BH11 in the east-northeast.

2.3.2 Historical Surface Water Data

A review of the 2019, 2020, and 2021 surface water quality results identified slight leachate effects at the downgradient surface water location SW2. These effects were interpreted to be minor and to potentially be mostly attributed to naturally elevated parameters of iron, aluminum, phenols, total phosphorous, and cobalt.

3.0 METHODOLOGY

3.1 Scope of Work

The objectives of the monitoring program as requested by the Client included the following scope of work:

- Mobilization to the Site during the spring and fall of 2022 and collection of groundwater and surface water samples from the existing well network and surface water monitoring locations;
- Submission of the groundwater and surface water samples to an accredited analytical laboratory for analysis of the chemical parameters specified by the client; and
- Preparation of a report outlining the 2022 field work completed and the analytical results, an evaluation of the results, and any subsequent recommendations.

The investigation methodology was also conducted in general accordance with, and reference is made to, the following regulatory and guidance documents:

- MECP document entitled “*Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*”, dated December 1996 (MECP Sampling Guideline);
- MECP document entitled “*Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*”, dated March 9, 2004 amended July 1, 2011 (Analytical Methods);
- Ontario Regulation 169/03 “*Ontario Drinking Water Quality Standards*” under the Safe Drinking Water Act”, dated 2002;
- MECP document entitled “*Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines*”, dated June 2003 (ODWQS Guideline);
- MECP document entitled “*Incorporation of the Reasonable Use Concept into MECPE Groundwater Management Activities, Guideline B-7 (formerly 15-08)*” (Guideline B-7), dated April 1994;
- MECP document entitled “*Determination of Contaminant Limits and Attenuation Zones, Procedure B-7-1*”, (formerly referenced by 15-08), dated 2015 and updated in 2022;
- Ontario Regulation 903 R.R.O. 1990 “*Wells*”, under the Ontario Water Resources Act (as amended);
- MECP document entitled “*Water Management Policies Guidelines Provincial Water Quality Objectives*” (PWQO), dated July 1994, revised February 1999; and



- Canadian Council of Ministers of the Environment (CCME) document entitled “*Canadian Water Quality Guidelines*” (Table 3-1 – Summary Guidelines for Freshwater Aquatic Life) dated November 2008.

3.2 Groundwater Monitoring Well Locations

Historically, the original groundwater monitoring well network for the Site was established in 2003 and consisted of seven shallow overburden wells (BH1, BH2, BH3, BH4, BH5, BH6, and BH7). Monitoring wells BH2, BH3, BH5, BH6, and BH7 were found to be destroyed, prior to 2016. Additional monitoring wells (BH8, BH9, BH10, and BH11) and drive point monitors (DP6, DP7, DP8, and DP9) were installed in June 2015 to replace the destroyed wells. In the spring of 2017, monitoring well BH4 and drive point monitor DP6 were also found to be destroyed due to landfilling operations at the Site.

The configuration of the existing monitoring well network was interpreted to be sufficient to monitor the performance of the landfill; however, was deemed to be overly conservative as a measure of compliance, as these wells were being utilized for the evaluation of the Site versus the MECP Guideline B-7 procedure, which is applicable at the downgradient property line. As a result, the installation of three additional bedrock monitoring wells (BH12, BH13, and BH14) was recommended in the 2019 Pinchin Annual Monitoring Report, in order to allow for further characterization of groundwater quality downgradient of the Site in the north and east directions. The installation of these additional monitoring wells was completed on April 22, 2020. The details of the well installations are included in the Pinchin Aquifer Instrumentation Memo, dated June 16, 2020. Borehole logs for each of the three newly installed wells are included within Appendix II.

The current groundwater monitoring well network at the Site consists of eight bedrock groundwater monitoring wells (BH1, BH8, BH9, BH10, BH11, BH12, BH13, and BH14) and three drive point monitors (DP7, DP8, and DP9). The locations of all the monitoring wells included in the current monitoring program are illustrated on Figure 3. Detailed locations with coordinates in NAD 83, and the available monitoring well elevations for top of casing are provided in Table 1.

All groundwater monitoring wells were sampled during the spring and fall 2022 sampling events, with the exception of DP7, DP8, and DP9 due to these driven point wells having insufficient volume to sample at the time of the monitoring events.

The following table presents a summary of the well construction details and respective on-Site positions of the groundwater monitoring network, based on the borehole logs provided in Appendix II. Construction details for monitoring well BH1 are unknown, as Pinchin was not provided the borehole log for this well to review at the time of preparation of this report. All wells were inspected and found to be in good condition.

No wells displayed evidence of a condition non-compliant with Ontario Regulation 903. A photographic log of all groundwater monitoring wells is provided in Appendix IV.

Well ID	Condition	Total Depth (mbgs)	Screened Interval (mbgs)	Screened Interval (masl)	Unit Screened
BH1	Good	Unknown			
BH8	Good	5.72	1.2 – 5.7	290.4 – 285.9	Gneissic bedrock
BH9	Good	3.89	0.8 – 3.9	288.4 – 285.6	Sand and Gneissic bedrock
BH10	Good	4.06	0.9 – 4.1	290.0 – 286.8	Sand and Gneissic bedrock
BH11	Good	4.39	0.9 – 4.4	289.9 – 286.4	Gneissic bedrock
DP7	Okay	1.72	1.0 – 1.7	288.3 – 287.6	Sandy silt till
DP8	Okay	1.41	0.7 – 1.4	289.8 – 289.1	Sand
DP9	Okay	1.27	0.5 – 1.3	289.5 – 288.7	Sand
BH12	Good	6.10	3.0 - 6.0	285.9 – 282.9	Gneissic bedrock
BH13	Good	6.10	3.0 - 6.0	287.8 – 281.8	Gneissic bedrock
BH14	Good	6.10	3.0 - 6.0	286.4 – 283.4	Gneissic bedrock

The following table illustrates the location of each of the monitoring wells with respect to its rationale in the annual monitoring program.

Monitoring Well ID	Location	Rationale
BH1	Southwest of the Site	Background
BH8	Northwest of the Site	Downgradient
BH9	Immediately northwest of the Site	Downgradient
BH10	Immediately east of the Site	Immediately Downgradient
BH11	Immediately northeast of the Site	Immediately Downgradient
DP7	Northwest of the Site	Downgradient



Monitoring Well ID	Location	Rationale
DP8	East of the Site	Downgradient
DP9	East of the Site	Downgradient
BH12	North of the Site	Downgradient
BH13	Northeast of the Site	Downgradient
BH14	Northeast of the Site	Downgradient

3.3 Surface Water Monitoring Locations

The Site has three historical points for surface water monitoring, SW1 through SW3. All surface water monitoring locations were monitored during the spring and fall 2022 sampling events. The following table illustrates the location of each of the surface water monitoring locations with respect to its rationale in the annual monitoring program.

Monitoring Well ID	Location	Rationale
SW1	Stream to the south of the Site, at culvert on west side of 25 th and 26 th Side Road North.	Upstream Monitoring Location
SW2	Love Lake, north of the Site.	Downstream Monitoring Location
SW3	Pool of water at northwest corner of the Site.	Source Monitoring Location

The locations of the surface water monitoring locations are illustrated on Figure 3. Details regarding the surface water monitoring locations are provided in Table 2. Photos of all surface water monitoring locations are provided in Appendix IV.

3.4 Monitoring Frequency

As per previous annual monitoring events, groundwater and surface water was sampled twice annually by Pinchin during 2022, in the spring and fall. Groundwater and surface water sampling events occurred on the following dates:

- Spring – May 4, 2022; and
- Fall – October 18, 2022.



3.5 Monitoring Parameters

3.5.1 Groundwater Monitoring Parameters

Groundwater samples were submitted for laboratory analysis of the parameters listed in the previous monitoring reports. At the time of sample collection, field readings for the following parameters were measured: temperature, pH, conductivity, oxidation reduction potential (ORP), and dissolved oxygen (DO).

3.5.2 Surface Water Monitoring Parameters

Surface water samples were submitted for laboratory analysis of the parameters listed in in the previous monitoring reports. At the time of the surface water sample collection, field readings for the following parameters were measured: temperature, pH, conductivity, ORP, and DO.

3.6 Monitoring Procedures and Methods

3.6.1 Standard Operating Procedures

The following Pinchin Standard Operating Procedures (SOPs) were followed by Pinchin field personnel for each portion of this project:

- Groundwater Sampling SOP; and
- Surface Water Sampling SOP.

All Pinchin monitoring SOPs have been developed in accordance with the MECP Sampling Document and are consistent with standard engineering practices.

3.6.2 Groundwater Monitoring Activities

To perform the groundwater monitoring activities, the following tasks were conducted:

- Pinchin notified the Client prior to field activities and subsequently mobilized staff from the local Sudbury office to the Site to complete the sampling program;
- Static groundwater levels were collected using a Solinst™ water level tape. Measurements were collected from the top of riser pipe;
- During the monitoring events, groundwater from each monitoring well was purged prior to the collection of the sample, using a moderate-flow sample methodology via high-density polyethylene (HDPE) 3/8" tubing and a Waterra™ inertial footvalve system. The HDPE system was chosen as an approved method to minimize sediment/particulate within each sample and to minimize sample agitation and well trauma in accordance with the MECP Sampling Document. Pinchin purged a minimum of three well volumes to a maximum of six well volumes using the inertial pump system until the well volume column was representative of the surrounding formation. During purging activities, additional

groundwater monitoring parameters were collected from each monitoring well using a YSI-556 water quality meter for measurement of field parameters. Sample residual was disposed of onto the ground surface, on-site, and up-gradient within the landfill confines;

- Groundwater samples were collected using the HDPE system in accordance with the MECP Sampling Document. Dissolved metals were field-filtered using a dedicated in-line 0.45 micron disposable filter. Upon completion of field sampling and monitoring activities, all samples collected were submitted to the project laboratory, SGS Canada Inc. (SGS) in Lakefield, Ontario. All parameters were analyzed by the project laboratory using MECP approved procedures and are consistent with the analytical methods prescribed in the Analytical Methods document; and
- The groundwater samples collected were analyzed at the project laboratory for the parameters listed in the previous monitoring reports. Groundwater sample results were compared to the applicable ODWQS as applied in accordance with the ODWQS Guideline document. Groundwater sample results were also compared to the reasonable usage parameters and were assessed using Guideline B-7 to establish and determine levels of contaminant discharges to the groundwater formation, which would be considered acceptable by the MECP from naturally attenuating landfill sites, with respect to human consumption and potable considerations.

3.6.3 *Surface Water Monitoring Activities*

To perform the surface water monitoring activities, the following tasks were conducted:

- Pinchin notified the Client prior to field activities and subsequently mobilized staff from the local Sudbury office to the Site;
- All field activities at each monitoring location were initiated at down-stream locations working up-stream to avoid sediment disturbance and influencing sample integrity;
- Care was taken during collection of surface water samples to ensure that a representative sample was collected and that underlying sediments were not disturbed. For the surface water samples only, no filtration was done (in accordance with MECP surface water sampling protocols);
- Surface water samples were collected during each sampling event using a direct grab sampling methodology in accordance with the MECP Sampling Document. Upon completion of field sampling and monitoring activities, all samples collected were submitted to SGS. All parameters were analyzed by the project laboratory using MECP

approved procedures and are consistent with the analytical methods prescribed in the Analytical Methods document;

- During sampling activities, surface water monitoring field parameters were collected at each surface water monitoring location using a YSI-556 water quality meter; and
- Surface water samples were analyzed during the monitoring event at the pre-determined monitoring locations for parameters listed in the previous monitoring reports. Sample results were compared to the applicable PWQO criteria.

3.6.4 Groundwater and Surface Water Field Measurements

Prior to sampling groundwater in the wells, Pinchin monitored groundwater depth using a Solinst™ 30-metre electronic water level meter. The water level tape is calibrated in 1.0 mm increments.

Reproducibility of the depth measurements is generally within 2.0 mm or less.

Subsequent to groundwater depth measurement and during purging activities, additional groundwater monitoring parameters were collected from each monitoring well using a YSI-556 water quality meter for measurement of field parameters. Field parameters at each surface water monitoring location were also collected using the YSI-556. The following field parameters were measured during the 2022 monitoring program:

- *Dissolved Oxygen (DO)* refers to the relative quantity of oxygen molecules which are dissolved or carried within a quantity of water. Oxygen enters water as rooted aquatic plants and algae undergo photosynthesis and as oxygen is transferred across an air and water interface. Oxygen's solubility in water is indirectly correlated with water's temperature, salinity, and pressure. DO concentrations have a significant effect on groundwater quality by regulating the valence state of trace of metals and constraining the bacterial metabolism of dissolved organic species;
- *Conductivity* is the measurement of water's capacity to pass an electrical current. It is considered to be a reasonable indicator of ionic activity and dissolved solids concentration levels. It is affected by the presence of inorganic dissolved solids which carry a negative charge such as chloride, nitrate, sulfate, and phosphate anions or a positive charge such as sodium, magnesium, calcium, iron, and aluminum cations. Organic compounds such as oil and phenol do not conduct an electrical current very well and would therefore have low conductivity in water. Conductivity is also directly correlated to the water temperature. Specific conductivity is a measurement of conductivity values which have been compensated to 25°C;

- *pH* is a measure of water's acidic/basic properties on a logarithmic scale from 1 (strongly acidic) to 14 (strongly alkaline or basic). It determines the solubility and biological availability of chemical constituents such as nutrients and heavy metals. For example, in addition to affecting how much and what form of phosphorus is most abundant in the water, pH also determines whether aquatic life can use it. The degree to which heavy metals are soluble determines their toxicity. Metals tend to be more toxic at lower pH values because they are more soluble. Excessively high and low pHs can have serious environmental and health effects. A high pH may cause the release of iron, copper or lead into potable water, corrosion on water pipes and water using appliances, and reduces the effectiveness of water disinfection with chlorine. Low pH values corrode substances such as metals and plastics. Fluctuations in groundwater pH values may be indicative of groundwater contamination;
- *Temperature*; has a dramatic influence on water quality. The rate of chemical reactions is generally correlated to temperature, which in turn affects the biological availability of nutrients within the water. As previously mentioned, oxygen's solubility in water is indirectly correlated with its temperature. Declining concentrations of oxygen within warming water is magnified by aquatic plants increasing metabolism as water temperature increases. Low concentrations of DO weaken aquatic plants resistance to disease, parasites, and other pollutants; and
- *Oxidation-reduction potential (ORP)* characterizes the oxidation-reduction state of the water on a scale from approximately -300mV (strongly reducing) up to +500mV (strongly oxidizing). The primary application of ORP is recording significant changes in the redox potential which is observed when purging a stagnant water column in piezometer and replacing it with "fresh" groundwater.

Field parameter data collected at the groundwater and surface water monitoring locations are provided in Appendix III.

3.6.5 Record Keeping and Field Notes

Field notes were collected during the water quality monitoring events and recorded relevant observations including, but not limited to:

- Dates and time of work being completed;
- Instrumentation and instrument condition;
- Calibration methods and results;
- Field parameter measurements;



- Field personnel conducting the investigations;
- Field methods used;
- Sampling location identifications;
- Sampling equipment and condition;
- Sample identification (i.e. type, media, number of containers, etc.);
- Sample preparation methods (i.e. preservatives, filtration, etc.);
- Field QA/QC measurements;
- Field and sample identifiers;
- Anomalous conditions (i.e. damage to monitoring wells);
- Photographs of monitoring wells and monitoring stations;
- Weather conditions at the time of the monitoring events; and
- Field conditions.

All raw data and field notes are preserved and retained in Pinchin's custody.

3.7 Quality Assurance for Sampling and Analysis

Pinchin uses recognized industry standards, including the Canadian Council of Ministers of the Environment (CCME) *Subsurface Assessment Handbook for Contaminated Sites* and MECP's manual *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario* for conducting environmental assessments. For quality assurance, all work is supervised and internally reviewed by senior staff members. As such, various QA/QC protocols were followed during the water quality sampling events to ensure that representative samples were obtained, and that representative analytical data were reported by the laboratory.

Field QA/QC protocols that were employed by Pinchin included the following:

- Clean, labelled, and pre-preserved (when applicable) sample containers were provided by the laboratory;
- Water quality samples were placed in laboratory-supplied sample jars;
- The monitoring wells were purged to remove stagnant water prior to sample collection, so that representative groundwater samples could be obtained. Dedicated purging and sampling equipment was used for monitoring well development, purging, and sampling to minimize the potential for cross-contamination;

- All water quality samples were placed in coolers on ice immediately upon collection, with appropriate sample temperatures maintained prior submission to the laboratory;
- Dedicated and disposable Nitrile™ gloves were used for all sample handling;
- All non-dedicated monitoring and sampling equipment (i.e. water level meter and YSI-556) was cleaned before initial use and between uses to minimize the potential for cross-contamination by washing with an Alconox™/potable water mixture followed by a deionized water rinse;
- Field duplicate groundwater and surface water samples were collected during the spring and fall sampling event (1 in 10); and
- Sample collection and handling procedures were performed in general accordance with the MECP Sampling Guideline.

The SGS laboratory has an established QA/QC program and is a member of the Canadian Association for Laboratory Accreditation (CALA) and is accredited by the Standards Council of Canada (SCC) for specified environmental analyses.

SGS's internal laboratory QA/QC consisted of the analysis of laboratory duplicate, method blank, matrix spike and spiked blank samples, an evaluation of relative percent difference calculations for laboratory duplicate samples, and an evaluation of surrogate recoveries for the method blank, matrix spike and spiked blank samples.

3.8 Data Quality Evaluation

In order to provide confidence in the data obtained, a comprehensive QA/QC component was included in the monitoring program. The QA/QC procedures developed for this monitoring program are prepared in accordance with MECP Sampling Document and in most cases, exceed the minimum requirements.

Water quality samples collected by Pinchin were generated in accordance with acceptable procedures. No analytical hold times were exceeded for samples submitted for analyses and sample temperatures upon receipt at the project laboratory were below 10° Celsius.

Relative per cent difference (RPD) values (the absolute difference between two values divided by the average value and expressed as a per cent) were calculated between the parent sample and the field duplicate as part of the QA/QC program. RPD results of sample and duplicate analyses that are less than 50 percent indicate an acceptable level of analytical uncertainty. RPD values calculated for measured analyte concentrations for sample and duplicate pairs that exceed 50 per cent generally warrant discussion because they may indicate the presence of elevated analytical uncertainty and a potential for making interpretive errors based on the analysis results. Use of calculated RPD values to assess

analytical uncertainty when using measured analyte concentrations for sample and sample duplicate pairs is not appropriate when either measured analyte concentration is within a multiple of 5 of the method detection limit (a value designated as the practical quantification limit (PQL)), where analytical uncertainty is typically elevated.

All field instrumentation calibration checks were completed by Pinchin field staff members prior to use on-Site. All field operations conducted by Pinchin field staff members were completed using standard equipment decontamination and sampling procedures, and no deviations from the sampling plan were noted.

4.0 ASSESSMENT, INTERPRETATION AND DISCUSSION

4.1 Groundwater Quality Monitoring

4.1.1 The Reasonable Use Criteria Assessment (RUC)

Guideline B-7, the “reasonable use concept” (RUC) approach, is the MECP’s groundwater management strategy for mitigating the effect of contamination on properties adjacent to its source.

It establishes procedures for determining the reasonable use of groundwater on a property adjacent to sources of contaminants and establishes limits on the discharge of contaminants from facilities which dispose of waste into the shallow subsurface.

The application of “reasonable use” is outlined in Procedure B-7-1 “*Determination of Contaminant Limits and Attenuation Zones*”. The procedure determines the maximum concentration (C_m) of a particular contaminant that would be acceptable in the groundwater beneath an adjacent property and is calculated in accordance with the relationship:

$$C_m = C_b + x (C_r - C_b)$$

C_b – This is the background concentration of the particular groundwater contaminant in consideration before it has been affected by human activities. From this it is possible to calculate the extent of human activities impact on contaminant levels.

C_r – In accordance with the Ontario Water Management Guideline, this is the maximum concentration of a particular contaminant that should be present in the groundwater. This value is dependent on property’s use of the groundwater as outlined in B-7. It also allows for the total amount of contamination. Pinchin conservatively assumes that the reasonable use of the groundwater on-site is potentially for potable drinking purposes.

x – As determined by the MECP, this constant determines the extent which the contamination has on the groundwater’s use. For drinking water x is 0.5 for non-health related parameters or 0.25 for health related parameters. For other reasonable uses it is 0.5.

Contamination concentrations which exceed C_m may have an appreciable effect on the use of an adjacent property, and as such the Site should be managed in a manner to minimize environmental damage, or the operation should be modified. It is acceptable to modify the operation of the disposal site to meet the specified limits. However, if these limits are exceeded, all waste disposals, except for that done in conjunction with a reasonable plan for closure or with remedial activities, should be terminated until the specified limits have been met, or until monitoring data indicate that these limits will be met.

Determination of the replacement of contaminated water supplies and the abatement of the contaminant plume must be made on a case-by-case basis in accordance with “*Resolution of Groundwater Quality Interference Problems*”, Guideline B-9. For the purpose of evaluating compliance with respect to the RUC, Pinchin has compared the calculated C_m values versus the applicable downgradient compliance monitoring wells.

4.1.2 *The Ontario Drinking Water Quality Standards (ODWQS)*

Through the establishment of the ODWQS, the province of Ontario has determined legally enforceable standards on contaminants in drinking water. The standards are designed to protect public health by restricting the quality of specific contaminants in drinking water. Three categories of contaminants are regulated under the Ontario Regulation 169/03 Drinking Water Standards:

- Microbiological – Originating from human and animals waste, coliforms and bacteria are common in the environment. Most are harmless however their presence may be indicative of other harmful bacteria in the water. Under the ODWQS, Escherichia coli (“E. Coli”), fecal coliforms and total coliforms must be non-detectable in drinking water;
- Chemical – ODWQS regulates maximum quantities of organic and inorganic chemicals allowed in drinking water. Industrial discharges or agricultural runoff are not necessarily removed by drinking water treatment. Consuming water exhibiting a greater concentration of these chemicals than the ODWQS may cause serious health problems; and
- Radiation – Natural and artificial radio nuclides are also regulated in the ODWQS. Standards are expressed as maximum allowable concentrations in becquerels per litre (“L”). Radiological contaminants include radio nuclides, such as radium 228, which are caused from the erosion of naturally occurring deposits, or artificial radio nuclides, such as tritium, released into the water by nuclear power plants. Radiological contaminants do not naturally occur within the study area and the disposal of radiological waste was not suspected in the Site and as a result radiation was not monitored for this study.



The ODWQS Guideline Document is the MECP technical guidance document which provides guidance on applicability of the ODWQS and also provides applicable interim guidelines where legal standards are absent. Both the ODWQS and Guideline B-7 were used in assessing the groundwater results obtained during the 2022 monitoring program.

4.2 Groundwater Results

The following discussion of parameters documents the groundwater quality in comparison to the calculated reasonable use criteria as per Guideline B-7. The reasonable criteria are MECP's groundwater management strategy for mitigating the effect of contamination on properties adjacent to its source. It establishes procedures for determining what constitutes the reasonable use of groundwater on a property adjacent to sources of contaminants and establishes limits on the discharge of contaminants from landfills which have a potential to migrate hydraulically downgradient and off-site and impair the current and future groundwater use at downgradient properties. To implement Guideline B-7, groundwater samples collected from downgradient monitoring wells have been compared to the calculated RUC values (C_m).

Monitoring well BH1 is located potentially hydraulically upgradient of the Site and has been used to estimate the background water quality coming onto the Site. An average of the historical results from BH1 has been applied as the source of background water quality for the Guideline B-7 calculations.

The analytical data for each well in comparison to the applicable regulatory criteria is provided in Tables 3 through 11. An evaluation of the RUC criteria in comparison to the downgradient compliance wells is provided in Tables 12 and 13 for the spring and fall events, respectively. Copies of the laboratory analytical reports are presented in Appendix V. The following is a breakdown of the water quality observed the monitoring well locations with comparison to the background quality and leachate being produced on-Site.

4.2.1 Background Water Quality Evaluation

Monitoring Well BH1

Background water quality observed southwest of the waste fill area at BH1 did not identify elevated levels of common landfill-related contaminant parameters such as conductivity, total dissolved solids (TDS), chloride, sulphate, calcium, sodium, potassium, or nitrate. During the spring and fall sampling events, concentrations of hardness (low), dissolved organic carbon (DOC), iron, manganese, and aluminum were quantified above the recommended levels specified in the ODWQS. These parameters are either operational guidelines or aesthetic objectives for drinking water systems set by the ODWQS and are not considered to be a significant environmental concern originating from the Site.



4.2.2 Leachate Source Quality Evaluation

No groundwater monitoring wells in the existing monitoring well network are situated within the active landfill area to evaluate the source leachate quality.

4.2.3 Immediately Downgradient Water Quality Evaluation

Monitoring Well BH10

In comparison to background water quality, groundwater observed immediately east of the waste fill area at BH10 was observed to have higher concentrations of conductivity, alkalinity, TDS, chloride, sulphate, sodium, potassium, and nitrate indicating temperate impacts from the landfill, which is consistent with historical observations at this location. It is expected that the groundwater at this location is impacted with minor amounts of landfill leachate considering its close proximity to the active fill zone (as it is essentially considered to be a source well as opposed to a compliance station). Elevated hardness (high), alkalinity (high), TDS, DOC, chloride, sodium, turbidity, boron, and manganese concentrations were identified at BH10 that exceeded the ODWQS and/or the Guideline B-7 criteria. Hardness, alkalinity, TDS, DOC, chloride, sodium, turbidity, and manganese are either operational guidelines or aesthetic objectives for drinking water systems set by the ODWQS and are not considered to be a significant environmental concern originating from the Site. Elevated concentrations of DOC, manganese, and turbidity are also quantified at the background monitoring location; however the concentrations of these parameters are further elevated beyond that observed in the background and are therefore considered to be landfill derived.

Nitrate (a health-related parameter) was quantified in the fall of 2019 at BH10 to be in exceedance of both the ODWQS and the Guideline B-7. Concentrations of nitrate observed at this location fluctuate considerably throughout the historical monitoring record and have returned to levels within the ODWQS during the 2022 monitoring events.

Monitoring Well BH11

In comparison to background water quality, groundwater observed immediately northeast of the Site at BH11 was observed to have higher concentrations of conductivity, alkalinity, TDS, chloride, sulphate, sodium, potassium, and nitrate indicating temperate impacts from the landfill, which is consistent with historical observations at this location. It is expected that the groundwater at this location is impacted with minor amounts of landfill leachate considering its close proximity to the active fill zone. Elevated hardness (high), alkalinity (high), TDS, DOC, nitrate, chloride, sodium, boron, turbidity, manganese, and aluminum concentrations were identified at BH11 that exceeded the ODWQS and/or the Guideline B-7 criteria. Hardness, alkalinity, TDS, DOC, chloride, sodium, turbidity, manganese, and aluminum are either



operational guidelines or aesthetic objectives for drinking water systems set by the ODWQS and is not considered to be a significant environmental concern originating from the Site.

Elevated concentrations of DOC, manganese, aluminum, and turbidity are also quantified at the background monitoring location; however the concentrations of these parameters are further elevated at BH11 and are therefore considered to be landfill derived.

4.2.4 Downgradient Water Quality Evaluation

Monitoring Well BH8

In comparison to background water quality, groundwater observed northwest of the Site was observed to have generally similar concentrations of conductivity, alkalinity, TDS, nitrate, chloride, sulphate, calcium, sodium, and potassium indicating little to no impacts from the landfill, which is consistent with historical observations at this location. It is interpreted that natural attenuation of the landfill leachate is occurring with distance from the active fill zone. Depressed hardness (low) and alkalinity (low), with elevated aluminum and turbidity concentrations were identified at BH8 that exceeded the ODWQS. Concentrations of alkalinity (low) quantified during the spring and fall of 2022 exceeding the Guideline B-7 criteria. Alkalinity is an operational guideline for drinking water systems set by the ODWQS and are not considered to be a significant environmental concern originating from the Site.

Monitoring Well BH9

In comparison to background water quality, groundwater observed northwest of the Site at BH9 was observed to have slightly higher concentrations of conductivity, alkalinity, TDS, chloride, sulphate, calcium, sodium, and potassium indicating minor impacts from the landfill, which is consistent with historical observations at this location. These elevated concentrations are also observed to attenuate to concentrations similar to background conditions at the further downgradient monitoring location, BH8. Elevated hardness (high), DOC, manganese, iron, aluminum, turbidity, and manganese concentrations were identified at BH9 that exceeded the ODWQS and/or the Guideline B-7 criteria. These parameters are either operational guidelines or aesthetic objectives for drinking water systems set by the ODWQS and are not considered to be a significant environmental concern originating from the Site. Furthermore, elevated concentrations of these parameters (with the exception of high hardness) are also quantified at the background monitoring location; however the concentrations of DOC, iron, and manganese are further elevated at BH9 and are therefore considered to be landfill derived..

Drive Point Monitor DP7

Similar to both sampling efforts in 2020 and 2021, drive point monitoring location DP7 located northwest of the Site, was observed to have insufficient groundwater volume to sample at the time of sampling for both the spring and fall 2022 monitoring events.



During 2019, water quality at this location was observed to have generally similar concentrations of conductivity, alkalinity, TDS, nitrate, chloride, sulphate, calcium, sodium, and potassium in comparison to background, indicating little to no impacts from the landfill. It is interpreted that natural attenuation of the landfill leachate is occurring with distance from the active fill zone.

Drive Point Monitor DP8

Drive point monitoring location DP8, located east of the Site, was observed to have insufficient groundwater volume to sample at the time of sampling for both the spring and fall 2022 monitoring events.

Drive Point Monitor DP9

Drive point monitoring location DP9, located east of the Site, was observed to have insufficient groundwater volume to sample at the time of sampling for both the spring and fall 2022 monitoring events.

Monitoring Well BH12

Groundwater monitoring well BH12 was installed in April 2020, in order to characterize downgradient water quality to the north of the Site. In comparison to background water quality, groundwater observed at monitoring well BH12 was observed to have generally similar concentrations of conductivity, alkalinity, TDS, nitrate, chloride, sulphate, calcium, sodium, and potassium, indicating very minor impacts from the landfill. It is interpreted that natural attenuation of the landfill leachate is occurring with distance from the active fill zone. Depressed hardness (low), with elevated iron, manganese, and turbidity concentrations were identified at BH12 that exceeded the ODWQS. These parameters are all either operational guidelines or aesthetic objectives for drinking water systems set by the ODWQS and are not considered to be a significant environmental concern originating from the Site. Furthermore, similar concentrations of all of these parameters are also quantified at the background monitoring location and therefore are not considered to be landfill derived. No exceedances of the Guideline B-7 criteria were quantified at BH12.

Further monitoring events are required to establish a scientifically defensible database at this monitoring location before this interpretation can be confirmed.

Monitoring Well BH13

Groundwater monitoring well BH13 was installed in April 2020, in order to characterize downgradient water quality to the northeast of the Site, further downgradient from wells BH10 and BH11 which have quantified temperate leachate impacts. In comparison to background water quality, groundwater observed at monitoring well BH13 was observed to have generally similar concentrations of conductivity, alkalinity, TDS, nitrate, chloride, sulphate, calcium, sodium, and potassium, indicating very minor impacts from the



landfill. It is interpreted that natural attenuation of the landfill leachate is occurring with distance from the active fill zone. Depressed hardness (low), with elevated manganese, turbidity, DOC iron and aluminum concentrations were identified at BH13 that exceeded the ODWQS. These parameters are all either operational guidelines or aesthetic objectives for drinking water systems set by the ODWQS and are not considered to be a significant environmental concern originating from the Site. Furthermore, similar concentrations of all of these parameters are also quantified at the background monitoring location and therefore are not considered to be landfill derived. No exceedances of the Guideline B-7 criteria were quantified at BH13.

Further monitoring events are required to establish a scientifically defensible database at this monitoring location before this interpretation can be confirmed.

Monitoring Well BH14

Groundwater monitoring well BH14 was installed in April 2020, in order to further characterize downgradient water quality to the northeast of the Site, closer to the property boundary. In comparison to background water quality, groundwater observed at monitoring well BH14 was observed to have slightly higher concentrations of conductivity, alkalinity, TDS, chloride, sulphate, calcium, and sodium, indicating minor impacts from the landfill. It is interpreted that natural attenuation of the landfill leachate is occurring with distance from the active fill zone, as these concentrations are significantly reduced in comparison to those quantified at BH11. Elevated hardness (high), iron, manganese, and turbidity concentrations were identified at BH14 that exceeded the ODWQS and/or the Guideline B-7 criteria. These parameters are all either operational guidelines or aesthetic objectives for drinking water systems set by the ODWQS and are not considered to be a significant environmental concern originating from the Site. Furthermore, elevated concentrations of all of these parameters, except for hardness, are also quantified at similar concentrations at the background monitoring location and therefore are not considered to be landfill derived.

Further monitoring events are required to establish a scientifically defensible database at this monitoring location before this interpretation can be confirmed.

In summary, the current 2022 groundwater monitoring data indicates that the Site is continuing to effectively operate as designed, as a natural attenuation type facility, with any landfill derived groundwater impacts attenuated to acceptable levels prior to the downgradient property boundaries.

4.3 Groundwater Trend Analysis

A hydrograph was developed to identify any changes in the historical and current groundwater elevation data over time for each of the wells. A series of time versus concentration graphs were also developed to evaluate the concentrations of several select landfill indicator parameters (including alkalinity, chloride,



dissolved organic carbon, pH, total dissolved solids, nitrate, aluminum, and copper) at each monitoring well for the Site. Current and historical groundwater quality data was utilized to identify any apparent trends or inconsistencies in the water quality within the monitoring well network. The groundwater trend analysis graphs are provided in Appendix VI.

The groundwater elevations displayed on the hydrograph indicate generally stable elevations with respect to time at all monitoring well locations, with the exception of BH8 which produced a water elevation lower than the historical record during the fall of 2019. This groundwater elevation has returned to stabilized conditions during the 2021 and 2022 monitoring events. The fall 2022 groundwater elevation at BH-13 was recorded below the range of the available historic record and is currently considered anomalous. This elevation will need to be confirmed during future monitoring efforts.

In general, the landfill indicator parameters are demonstrating fairly stable trends with respect to time at all monitoring well locations, with some exceptions. Concentrations of alkalinity are generally stable, with all concentrations quantified inside of the ODWQS limits except for BH8 which was lower and BH11 which was higher than the limits. Alkalinity concentrations at BH11 are demonstrating an increasing trend until the spring 2022 sampling event. Concentrations of chloride, DOC, pH, TDS, and copper are all generally stable, except for well BH11 which is demonstrating an increasing trend for these parameters. Chloride and TDS concentrations at BH10 have also been demonstrating an increasing trend. Concentrations of nitrate are generally stable, with the exception of BH10 and BH11 which are not demonstrating any apparent trends. Aluminum concentrations are stable with the exception of BH1 and BH11 which are not demonstrating any apparent trends.

Concentrations of chloride and TDS quantified at BH10 and nitrate at BH10 and BH11 in the fall of 2021 and 2022 were significantly higher than the historical record at these locations and are interpreted to be anomalous. During the 2022 monitoring period, TDS concentrations have decreased slightly, but are still relatively high in comparison to the historical data sets. The nitrate concentrations have returned to levels consistent with the historical data sets. Further confirmation of these concentrations is required during future monitoring events.

Further monitoring investigations are required to confirm the trends observed during this monitoring period. Concentrations of all parameters quantified at newly installed wells BH12, BH13, and BH14 generally appear to be stable, with the exception of aluminum at BH12; however, additional sampling events are required at these locations before a detailed trend analysis can be completed.

4.4 Groundwater Field Measurement Results

On May 4 and October 18, 2022, Pinchin collected groundwater monitoring parameters from each of the well locations using a YSI-556 water quality meter for measurement of field parameters. The field parameter measurements are provided in Tables 3 through 11.

A review of the field parameters for the project identified no significant concerns in the water quality during the monitoring events. The water quality at the Site monitoring locations did not change significantly between each of the monitoring locations and the measured field parameters were within the normal variability associated with shallow groundwater monitoring systems.

4.5 Surface Water Quality Monitoring

4.5.1 The Provincial Water Quality Objectives (PWQO)

The PWQO are numerical and narrative criteria which serve as chemical and physical indicators representing satisfactory levels for surface water and groundwater where it discharges to the surface. The PWQO are levels which are protective of the water quality for all forms of aquatic life during their indefinite exposures to the water. The PWQO levels include protection for anthropogenic recreational water uses where there is a high potential of exposure and are based on public health and aesthetic considerations.

In general, the PWQO stated that the surface water quality of a water body shall be “free from contaminating levels of substances and materials attributable to human activities which in themselves, or in combination with other factors can: settle to form objectionable deposits; float as debris or scum or oil or other matter to form nuisances; product objectionable colour, odour, taste, or turbidity; injure, are toxic to or produce adverse physiological or behavioural responses in humans, animals, or plants; or enhance the production of undesirable aquatic life or result in the dominance of nuisance species”.

4.5.2 Canadian Water Quality Guidelines (CWQG)

The CWQG were developed by the Canadian Council of Resources and Environment, to provide basic scientific information about the effects of water quality parameters on uses in order to assess water quality issues and concerns and to establish water quality objectives for specific sites. The guidelines contain recommendations for chemical, physical, radiological, and biological parameters necessary to protect and enhance designated uses of water. They apply only to inland surface waters and groundwater, and not to estuarine and marine waterbodies. The rationale for each parameter is included to assist in the development of water quality objectives to suit local water conditions.

4.6 Surface Water Results

Pinchin collected surface water samples from all surface water monitoring locations during the spring and fall monitoring events in 2022. Surface water samples were collected to monitor the surface water for contaminants of concern as a compliance requirement. A summary of water quality monitoring data



relative to the regulatory standards is presented in the attached Tables 14 through 16. Copies of the laboratory analytical reports are presented in Appendix V.

Surface water monitoring location SW1, located within the creek to the south of the Site at the culvert on 25th and 26th Side Road, is considered representative of background water quality conditions and is characterized by naturally elevated concentrations of pH (low), phenols, iron, phosphorus, aluminum, and cobalt. These parameter concentrations exceeded the PWQO and/or the CWQG during the 2022 sampling events, which is consistent with the observations at this location throughout the historical monitoring record. Additional PWQO exceedances were quantified for zinc during the fall and spring 2022 monitoring events, and an additional CWQG exceedance was quantified for chloride during the fall and spring events.

Surface water monitoring location SW3, located in the pool of water at the northwest edge of the waste deposits, is considered to be representative of source surface water quality at the Site. Minor leachate impacts are observed at this location, with PWQO and/or CWQG exceedances quantified in 2021 for nitrite, phenols, iron, total phosphorus, boron, chromium, cobalt, and copper. Minor boron exceedances were quantified during the spring 2022 sampling event. It should be noted, SW3 was observed to be dry during the fall 2022 sampling event and was not able to be sampled.

These impacts are interpreted to improve with distance from the landfill, as lower concentrations are quantified at the downgradient monitoring location, SW2. PWQO and/or CWQG exceedances at downgradient surface water monitoring location SW2 include pH (low), iron, and aluminum. These elevated concentrations are not interpreted to be landfill derived as exceedances of these parameters were also quantified at the background monitoring location (SW1) indicating that they are naturally elevated.

Concentrations of nitrite at SW3 and of chromium and selenium at all locations were quantified below the laboratory RDL; however, the laboratory RDL for these parameters are higher than the respective CWQG standards. Therefore, these concentrations are inconclusive of CWQG exceedances.

Based on a review of the current and historic aluminum concentrations in comparison to total suspended solids (TSS), it is possible that the quantified aluminum concentrations are biased high due to a potential interference with TSS. To reduce the TSS concentrations in the samples and thereby minimize the potential interference of TSS, the PWQO requires that samples analyzed for aluminum be free of any clay. In the future, the component of the samples identified for the analysis of aluminum should be filtered prior to analysis, in order to provide a clay free sample (as per the requirements of the PWQO).



4.7 Surface Water Trend Analysis

A series of time versus concentration graphs were developed to evaluate the concentrations of several select landfill indicator parameters (including alkalinity, chloride, dissolved organic carbon, pH, total dissolved solids, nitrate, aluminum, and copper) at each surface water monitoring location for the Site. Current and historical surface water quality data was utilized to identify any apparent trends or inconsistencies in the water quality at the Site. The surface water time versus concentration graphs are provided in Appendix VII.

In general, the landfill indicator parameters are demonstrating stable trends with respect to time at all surface water monitoring locations, with some exceptions. Concentrations of alkalinity, DOC, TDS, and nitrate are generally stable except for SW3 which has not demonstrated an apparent trend. Concentrations of chloride are increasing at SW1 and SW3. Concentrations of pH and aluminum do not appear to be indicative of an apparent trend; SW1 and SW2 consistently below the PWQO range. Concentrations of aluminum are generally stable at SW3 and SW2, but appear to be demonstrating an increasing trend at SW1.

Further monitoring investigations are required to confirm the trends observed during this monitoring period.

4.8 Surface Water Field Measurement Results

On May 4 and October 18, 2022, Pinchin collected surface water monitoring parameters from each surface water monitoring location using a YSI-556 water quality meter for real-time in-situ measurement of field parameters. The field parameter measurements are provided in Tables 14 through 16.

A review of the field parameters for the project identified no significant concerns in the water quality during the monitoring event. The quality at the surface water monitoring locations did not change significantly between each of the monitoring locations. Surface water flow measurements were not obtained; however, each of the monitoring locations were observed to be stagnant at the time of the 2022 sampling events, while SW3 was observed to be dry in the fall of 2022.

4.9 Groundwater Flow Interpretation

The hydraulic flow vector was historically estimated to range to the north. The groundwater flow direction may be influenced by seasonal variations in the amount of precipitation by aquifer heterogeneity and the deposited fill material at the Site. Groundwater level trends indicate seasonal fluctuations in the depth to groundwater which is consistent with seasonal fluctuations in precipitation events. The depth to groundwater measurement results are presented in Table 1.



During the spring monitoring event on May 4, 2022, the depth to groundwater was observed to range from 288.31 metres above the ground surface (mbgs) at DP7 to 291.34 mbgs at BH11. During the fall monitoring event on October 18, 2022, the depth to groundwater was observed to range from 285.05 mbgs at BH13 to 292.64 mbgs at BH13.

Accurate triangulation of the water table elevations was undertaken for the 2022 sampling events using the available monitoring well system and the survey elevation data. The inferred groundwater contours for both the spring and fall events are presented on Figures 4 and 5, respectively. The presentation of the groundwater contours and the associated inferred groundwater flow direction for the 2022 sampling events, as illustrated on Figures 4 and 5, indicates that groundwater flows radially at the Site, directed towards the west, north, and east.

4.10 Leachate Characterization

The Site is an operating landfill with minor operational or maintenance being overseen by the Client. The Site does not have a leachate collection system whereby leachate quality monitoring and characterization is being completed. Currently, there is no groundwater monitoring well included in the existing monitoring well network at the Site that is situated within the active landfill area or which is considered representative of source leachate water quality. Therefore, leachate at the Site cannot be characterized at the time of preparation of this report.

4.11 Contaminant Attenuation Zone

A formal Contaminant Attenuation Zone (CAZ) has not been established for the Site. However, it should be noted that based on the current observed water quality data, landfill derived leachate impacts appear to attenuate prior to the property boundary.

4.12 Adequacy of the Monitoring Program

At this time there is currently no formal monitoring program for the Site. Pinchin recommends continuation of sampling the groundwater and surface water two times per year (spring and fall) to establish any notable trends or impacts emanating from the landfill. The results of inspection and monitoring will be reported annually to the MECP. After that time, and with the establishment of baseline data/source data leachate concentrations, a review of all data will then be used to establish the expected level of impact and the need and scope for long term monitoring.

During these sampling and reporting events, it is recommended that the monitoring well network be evaluated for adequacy and determine if there is a need for additional monitoring locations.



4.12.1 Monitoring Well Network Efficiency

Additional well installations were completed in April 2020 to supplement the existing groundwater monitoring well network at the Croft Waste Disposal Site. These additional wells (BH12, BH13, and BH14) were installed downgradient of the Site to the north and northwest to allow for further water quality characterization in all downgradient directions and closer to the property boundary. Pinchin concludes that the current groundwater monitoring well network is considered adequate for evaluating the Croft Waste Disposal Site geological and hydrogeological characteristics downgradient of the Site.

It is recommended that the drive point well locations DP7, DP8, and DP9 be removed from the sampling program for the Croft Waste Disposal Site as these locations have consistently been found to have insufficient volume to sample. It is recommended that these wells should be retained as water level only monitoring locations to supplement the groundwater elevation monitoring for the Site; however, the drive point monitors should be equipped with appropriate lockable caps to ensure representative water level data is obtained.

The groundwater quality observed in monitoring well BH1 appears to have minor derived impacts and as such, has been used within this report for assessing the Site's water quality data to Guideline B-7 RUC (i.e. background well).

4.12.2 Background Monitoring Well Efficiency

Based on a review of the groundwater contaminant data from BH1, as well as the assumed groundwater flow direction, monitoring well BH1 has been identified as a best-case background location. A review of the dataset (as provided on Table 3) from BH1 did not identify elevated levels of common landfill-related contaminant parameters, with the exception of hardness and alkalinity which are naturally lower than the ODWQS and DOC which is naturally elevated. At this time, monitoring well BH1 is considered adequate for monitoring background groundwater quality.

4.13 Supplemental Monitoring: Sediment, Benthic and/or Toxicity Monitoring

No supplemental monitoring was completed as part of the 2022 monitoring program completed by Pinchin.

4.14 Assessment of the Need for Implementation of Contingency Measures

There are currently no set trigger levels designed for the Site. At this time Pinchin does not recommend any need or implementation for contingency measures.

4.15 Waste Disposal Site Gas Impacts

At this time no evidence has been documented to suggest that methane gas generation from the Site is a significant concern.



4.16 Effectiveness of Engineered Controls

With the exception of the intermittent landfill cover, there are no operational engineered controls in effect at the Site. The Client should continue to maintain the integrity of the landfill cover as per the CofA. Annual monitoring and inspections should continue to be completed to ensure regular maintenance is occurring on an as needed basis. At the time of the 2022 monitoring events no significant damage or concerns were noted.

4.17 Control Systems Monitoring

Environmental control systems are designed, constructed, and utilized at some waste disposal sites to reduce or increase an environmental variable to an acceptable level, or to maintain an environmental variable within an acceptable range, in order to prevent a negative environmental outcome. Certain environmental control systems such as a leachate collection system or a methane gas collection system can provide the basis for operator intervention to bring about or maintain a desired condition to operate the landfill. The Site does not currently operate any control systems; therefore no control system monitoring was completed as part of the 2022 monitoring program.

4.18 QA/QC Results

In order to provide confidence in the data obtained, a comprehensive QA/QC component was included in the monitoring program. The QA/QC procedures developed for this monitoring program are prepared in accordance with MECP Sampling Document, and in most cases, exceed the minimum requirements.

Water quality samples collected by Pinchin were generated in accordance with acceptable procedures. No analytical hold times were exceeded for samples submitted for analyses and sample temperatures upon receipt at the project laboratory were below 10° Celsius.

Two groundwater duplicate sample pairs and one surface water duplicate sample pair were collected from the Site during the spring and fall sampling events and submitted for laboratory analysis of the full suite of analytical parameters. All duplicate data for 2022 are provided in Tables 17 and 18 for groundwater and surface water, respectively.

The following table summarizes the duplicate pairs for 2022:

Sampling Event	Duplicate Sample ID	Original Sample ID
Spring	GW DUP	BH11
	SW DUP	SW2
Fall	GW DUP	BH12



Sampling Event	Duplicate Sample ID	Original Sample ID
	SW DUP	SW2

The calculated RPDs for the original and field duplicate groundwater sample has been compared to the performance standards considered acceptable by Pinchin (i.e. 50%). Each of the calculated groundwater RPDs met the corresponding performance standard. Each of the calculated surface water RPDs met the corresponding performance standard, with the exception of aluminum (spring), silicon (spring) and manganese in the fall surface water duplicate.

Upon review of the QA/QC results for spring and fall sampling programs, Pinchin has not identified any significant concerns that would warrant the invalidation of any of the field or laboratory data, therefore considers the data generated as part of this program to be reliable.

The analytical laboratory employed to perform the laboratory analyses (SGS) is accredited by the Standards Council of Canada/Canadian Association for Laboratory Accreditation in accordance with ISO/IEC 17025:1999 – “*General Requirements for the Competence of Testing and Calibration Laboratories*” for the tested parameters and has met the standards for proficiency testing developed by the Standards Council of Canada for parameters set out in the Soil, Ground Water, and Sediment Standards.

Sample analysis dates provided on the laboratory analytical reports issued by SGS indicate that all sample analyses were performed within the required sample/extract hold times, as indicated by the dates presented in columns for each sample parameter on the analytical report. The laboratory minimum detection limits were reported to be at or lower than the required MECP reporting detection limits for the parameters analyzed. A comparison of the internal laboratory duplicate samples indicates that all samples and the respective duplicates are within acceptable limits.

5.0 CONCLUSIONS

Based on the work completed, the following is a summary of the activities and findings of the 2022 water quality monitoring program:

- Groundwater samples were collected from all monitoring wells at the Site on May 4 and October 18, 2022, with the exception of DP7, DP8, and DP9 in the spring and fall due to the insufficient sample volume at the time of sampling. All groundwater samples were submitted for laboratory analysis of parameters identified in the previous monitoring reports. The groundwater quality was assessed based on the ODWQS and Guideline B-7;



- Surface water samples were collected from all monitoring locations on May 4 and October 18, 2022; with the exception of SW3 in the fall of 2022 as it was observed to be dry at the time. All surface water samples were submitted for laboratory analysis of parameters identified in the previous monitoring reports. Surface water quality was assessed based on the PWQO and CWQG;
- During the spring monitoring event on May 4, 2022, the depth to groundwater was observed to range from 288.31 metres above the ground surface (mbgs) at DP7 to 291.34 mbgs at BH11. During the fall monitoring event on October 18, 2022, the depth to groundwater was observed to range from 285.05 mbgs at BH13 to 292.64 mbgs at BH13. Groundwater flow at the Site is interpreted to flow radially, directed towards the west, north and east;
- All reported concentrations in the groundwater samples submitted for analysis satisfied the respective ODWQS parameters with the exception the following:
 - Hardness (high) at BH9, BH10, BH11 (spring), and BH14;
 - Hardness (low) at BH1, BH8, BH11 (fall), BH12, and BH13;
 - DOC at BH1, BH9, BH10, BH11, and BH13;
 - Manganese at BH1, BH9, BH10, BH11, BH12, BH13, and BH14;
 - Turbidity at BH8, BH9, BH10, BH11, BH12, BH13, and BH14;
 - Iron at BH1, BH9, BH12, BH13, and BH14;
 - Aluminum at BH1, BH8 (spring), BH9, BH11, and BH13 (spring);
 - Alkalinity (low) at BH8 (spring);
 - TDS at BH10 and BH11 (spring); and
 - Chloride at BH10.
- All reported concentrations in the groundwater samples collected from the downgradient monitoring wells met the applicable Guideline B-7 criteria for all parameters analyzed, with the exception of the following:
 - TDS at BH10 during the spring and fall and BH11 during the spring;
 - Chloride at BH10 during the spring and fall;
 - DOC at BH9, BH10, and BH11 during the spring;
 - Iron at BH9 during the spring and fall and BH14 during the fall;
 - Alkalinity (low) at BH8 during the spring and fall; and



- Manganese at BH9, BH10, and BH14 during the spring and fall, as well as BH11 during the spring.
- The current 2022 groundwater monitoring data indicates that the Site is continuing to effectively operate as designed, as a natural attenuation type facility, with any landfill derived groundwater impacts attenuated to acceptable levels prior to the downgradient property boundaries;
- All reported concentrations in the surface water samples submitted for analysis satisfied the respective PWQO and/or CWQG parameters, with the exception of the following:
 - pH (low) at SW1 and SW2;
 - Chloride at SW1;
 - Phenols at SW1 and SW2;
 - Iron at SW1 and SW2;
 - Aluminum at SW1 and SW2;
 - Cobalt at SW1;
 - Total phosphorous at SW1;
 - Cadmium at SW1;
 - Zinc at SW1; and
 - Boron at SW3.

Based on the results obtained from the existing groundwater monitoring wells and surface water monitoring locations, Pinchin has not identified any significant landfill related impacts at the Site. Elevated concentration parameters within the groundwater samples analyzed at the furthest downgradient monitoring locations (i.e. BH8, BH9, BH12, BH13, and BH14) are likely attributed to either naturally occurring conditions within the shallow unconfined aquifer on-site or from temperate impacts from leachate sourced from the waste deposits at the Site. All exceedances of the Guideline B-7 RUC at the downgradient wells considered representative of the property boundary are related to operational guidelines and/or aesthetic objectives associated with drinking water systems set by the ODWQS and are not considered to be an immediate significant human health or environmental concern originating from the Site. The elevated concentrations of boron are only quantified in the immediate vicinity of the waste deposits within well BH10. These concentrations are interpreted to attenuate with further distance from the Site. In summary, the current 2022 groundwater monitoring data indicates that the Site is continuing to effectively operate as designed, as a natural attenuation type facility, with any landfill derived groundwater impacts attenuated to acceptable levels prior to the downgradient property boundaries.



6.0 RECOMMENDATIONS

Based on a review of the existing dataset and regulatory requirements to date, Pinchin recommends the following:

- Continue with routine monitoring of all the available groundwater monitoring wells and surface water monitoring locations. Groundwater and surface water monitoring shall be completed with analyses for the parameters identified in the historical monitoring record. It is recommended that groundwater and surface water monitoring be completed during the spring and late fall to generate a baseline data set, to evaluate trends, and to determine the need and scope of a long-term monitoring program for the Site. Considering the dataset completed thus far, it is Pinchin's opinion that sampling should continue in 2023 before the adequacy of the monitoring program can be fully evaluated;
- The Client should continue to ensure that the requirements as specified in the CofA are complied with;
- In the future, the component of the surface water samples identified for the analysis of aluminum should be filtered prior to analysis, in order to provide a clay free sample (as per the requirements of the PWQO); and
- It is recommended that the drive point well locations DP7, DP8, and DP9 be removed from the sampling program as these locations have consistently been found to have insufficient volume to sample. It is recommended that these wells should be retained as water level only monitoring locations to supplement the groundwater elevation monitoring for the Site; however, the drive point monitors should be equipped with appropriate lockable caps to ensure representative water level data is obtained.

7.0 MONITORING AND SCREENING CHECKLIST

In accordance with the MECP Landfill Standards, the Monitoring and Screening Checklist for the Site completed by the Pinchin CEP is completed and provided in Appendix VIII.

8.0 DISCLAIMER

This Water Quality Monitoring Program was performed for the Corporation of the Municipality of Magnetawan (Client) in order to investigate the environmental condition of the groundwater and surface water at the Croft Waste Disposal Site (Site). The term recognized environmental condition means the presence or likely presence of any hazardous substance on a property under conditions that indicate an existing release, past release, or a material threat of a release of a hazardous substance into structures on the property or into the ground, groundwater, or surface water of the property. This Water Quality



Monitoring Program does not quantify the extent of the current and/or recognized environmental condition or the cost of any remediation.

Conclusions derived are specific to the immediate area of study and cannot be extrapolated extensively away from sample locations. Samples have been analyzed for a limited number of contaminants that are expected to be present at the Site, and the absence of information relating to a specific contaminant does not indicate that it is not present.

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions on a property. Performance of this Water Quality Monitoring Program to the standards established by Pinchin is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions on the Site and recognizes reasonable limits on time and cost.

This Water Quality Monitoring Program was performed in general compliance with currently acceptable practices for environmental site investigations, and specific Client requests, as applicable to this Site.

This report was prepared for the exclusive use of the Client, subject to the conditions and limitations contained within the duly authorized work plan. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third parties. If additional parties require reliance on this report, written authorization from Pinchin will be required. Pinchin disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. No other warranties are implied or expressed. Furthermore, this report should not be construed as legal advice.

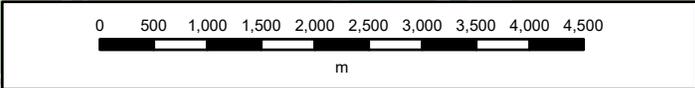
Pinchin will not be responsible for any consequential or indirect damages. Pinchin will only be held liable for damages resulting from the negligence of Pinchin. Pinchin will not be liable for any losses or damage if the Client has failed, within a period of two years following the date upon which the claim is discovered within the meaning of the Limitations Act, 2002 (Ontario), to commence legal proceedings against Pinchin to recover such losses or damage.

Pinchin makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time.

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Template: Groundwater Monitoring Template – Oil and Gas, EDR, May 28, 2019

APPENDIX I
Figures



PROJECT NAME:		2021 ANNUAL MONITORING REPORT		
CLIENT NAME:		THE MUNICIPALITY OF MAGNETAWAN		
PROJECT LOCATION:		CROFT WASTE DISPOSAL SITE, MAGNETAWAN, ONTARIO		
FIGURE NAME:		KEY MAP		FIGURE NUMBER
PROJECT NUMBER:	SCALE:	DRAWN BY:	REVIEWED BY:	DATE:
225335.006	1:100,000	DM	MB	MARCH 2022
				1



LEGEND

- - - PROPOSED LIMIT OF WASTE
- - - 30m BUFFER
- - - UAV IMAGE

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.



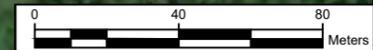
PROJECT NAME:
2021 ANNUAL MONITORING REPORT

CLIENT NAME:
THE MUNICIPALITY OF MAGNETAWAN

PROJECT LOCATION:
CROFT WASTE DISPOSAL SITE,
MAGNETAWAN, ONTARIO

FIGURE NAME:
SITE PLAN

PROJECT NUMBER: 225335.006	SCALE: AS SHOWN
DRAWN BY: DM	REVIEWED BY: MB
DATE: MARCH 2022	FIGURE NUMBER: 2





- LEGEND**
- - - PROPOSED LIMIT OF WASTE
 - - - 30m BUFFER
 - - - UAV IMAGE
 - MONITORING WELL
 - SURFACE WATER WELL

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INTERPRETATION.



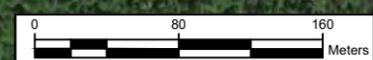
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**2021 ANNUAL MONITORING
REPORT**

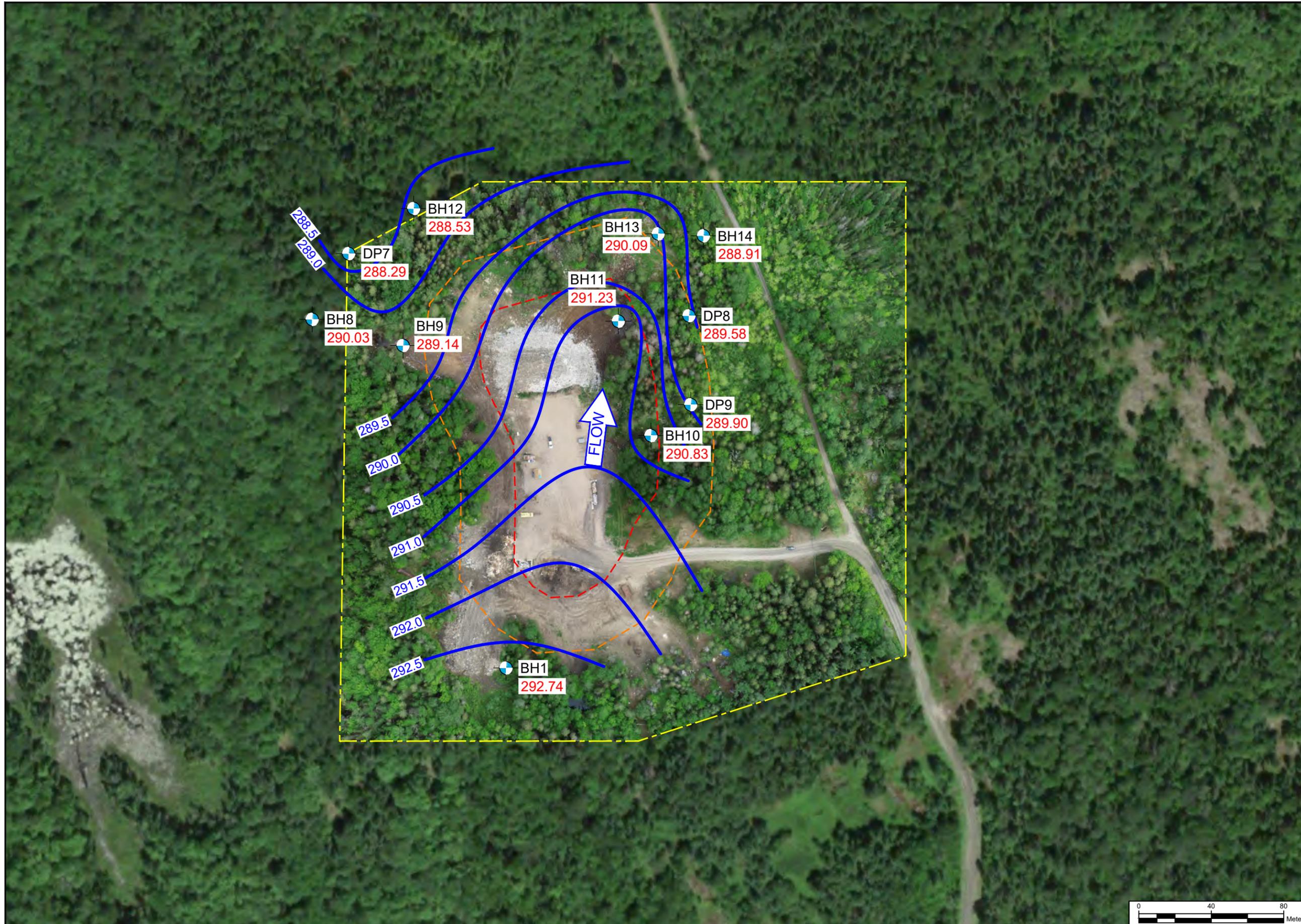
CLIENT NAME:
**THE MUNICIPALITY OF
MAGNETAWAN**

PROJECT LOCATION:
**CROFT WASTE DISPOSAL SITE,
MAGNETAWAN, ONTARIO**

FIGURE NAME:
MONITORING LOCATIONS

PROJECT NUMBER: 225335.006	SCALE: AS SHOWN
DRAWN BY: DM	REVIEWED BY: MB
DATE: MARCH 2022	FIGURE NUMBER: 3



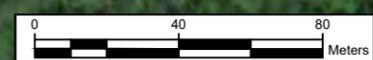


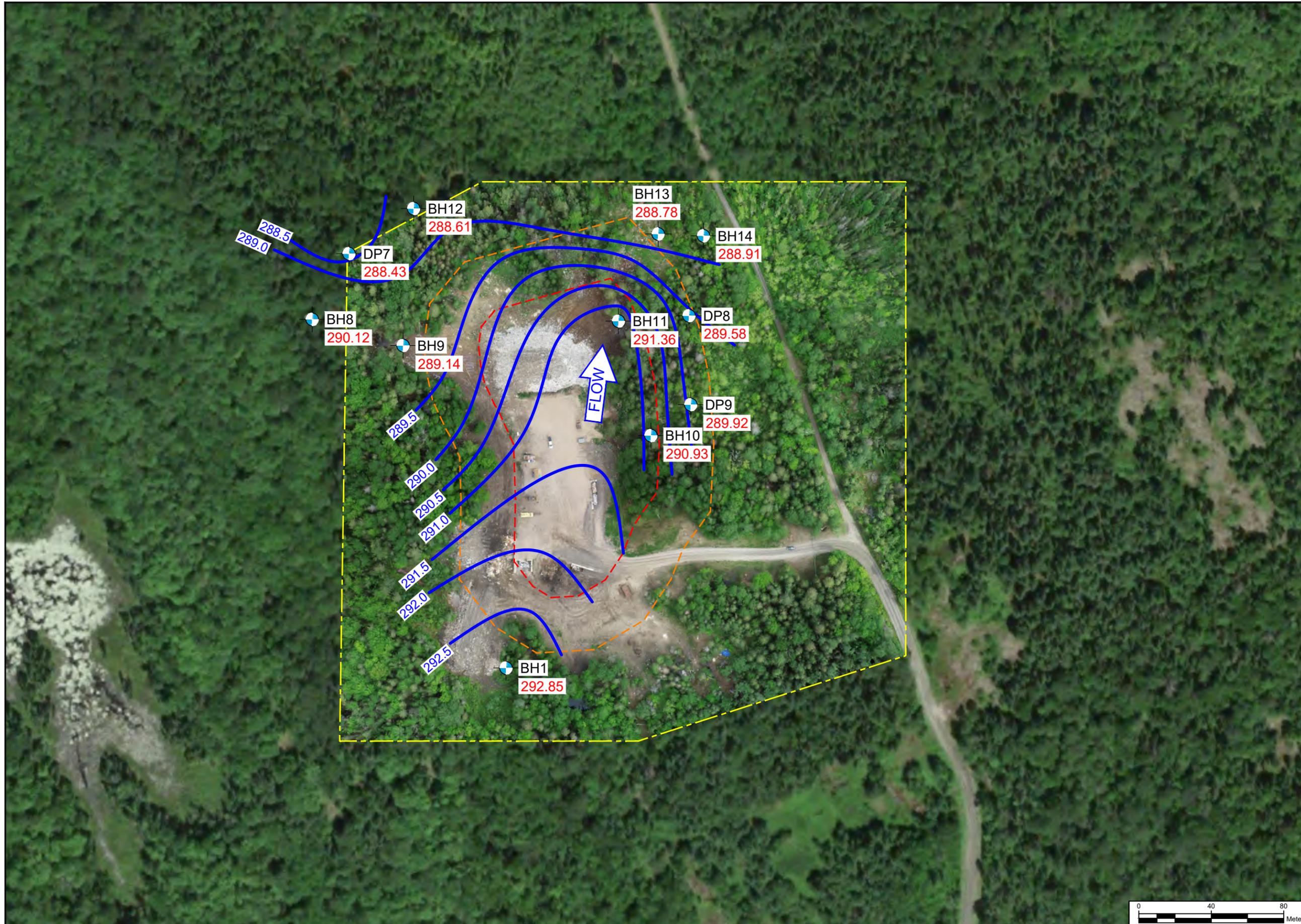
- LEGEND**
- PROPOSED LIMIT OF WASTE
 - 30m BUFFER
 - UAV IMAGE
 - MONITORING WELL
 - 100.0 BOREHOLE ELEVATION (masl.)
 - 100.0 GROUNDWATER CONTOUR ELEVATION (masl.)
 - GROUNDWATER CONTOUR LINES
 - GROUNDWATER FLOW DIRECTION

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PROJECT NAME: 2021 ANNUAL MONITORING REPORT	
CLIENT NAME: THE MUNICIPALITY OF MAGNETAWAN	
PROJECT LOCATION: CROFT WASTE DISPOSAL SITE, MAGNETAWAN, ONTARIO	
FIGURE NAME: GROUNDWATER CONTOUR PLAN - SPRING 2021	
PROJECT NUMBER: 225335.006	SCALE: AS SHOWN
DRAWN BY: DM	REVIEWED BY: MB
DATE: MARCH 2022	FIGURE NUMBER: 4





LEGEND

- PROPOSED LIMIT OF WASTE
- 30m BUFFER
- UAV IMAGE
- MONITORING WELL
- 100.0 BOREHOLE ELEVATION (masl.)
- 100.0 GROUNDWATER CONTOUR ELEVATION (masl.)
- GROUNDWATER CONTOUR LINES
- GROUNDWATER FLOW DIRECTION

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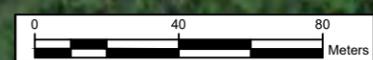
PROJECT NAME:
2021 ANNUAL MONITORING
REPORT

CLIENT NAME:
THE MUNICIPALITY OF
MAGNETAWAN

PROJECT LOCATION:
CROFT WASTE DISPOSAL SITE,
MAGNETAWAN, ONTARIO

FIGURE NAME:
GROUNDWATER CONTOUR
PLAN - FALL 2021

PROJECT NUMBER: 225335.006	SCALE: AS SHOWN
DRAWN BY: DM	REVIEWED BY: MB
DATE: MARCH 2022	FIGURE NUMBER: 5



APPENDIX II
Borehole Logs



Log of Borehole: BH12

Project #: 225335.005

Logged By: TG

Project: Groundwater Monitoring Well Installation

Client: The Corporation of the Municipality of Magnetawan

Location: Croft Waste Disposal Site, Magnetawan, Ontario

Drill Date: April 21, 2020

Sheet: 1 of 1

SUBSURFACE PROFILE					SAMPLE			
Depth	Symbol	Description	Elevation (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) CGI/PID	Laboratory Analysis
0		Ground Surface	0.00					
0 to 6		Gneissic Bedrock Grey to black metamorphic bedrock, some quartzite and biotite with garnet mineralization, massive			100	RC1		
7					100	RC2		
10					100	RC3		
17					100	RC4		
20			-6.10					
20 to 25		End of Borehole						

Contractor: Marathon Underground Constructors Corporation

Grade Elevation: 288.896 mREL

Drilling Method: HQ Diamond Core Bit

Top of Casing Elevation: 289.866 mREL

Well Casing Size: 5.08 cm

UTM Coordinates: 17T 593608mE 5058582 mN



Log of Borehole: BH13

Project #: 225335.005

Logged By: TG

Project: Groundwater Monitoring Well Installation

Client: The Corporation of the Municipality of Magnetawan

Location: Croft Waste Disposal Site, Magnetawan, Ontario

Drill Date: April 22, 2020

Sheet: 1 of 1

SUBSURFACE PROFILE					SAMPLE			
Depth	Symbol	Description	Elevation (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) CGI/PID	Laboratory Analysis
ft m								
0		Ground Surface	0.00					
1		Gneissic Bedrock Grey to black metamorphic bedrock, some quartzite and biotite with garnet mineralization, massive			100	RC1		
2					100	RC2		
3					100	RC3		
4					100	RC4		
5								
6		End of Borehole	-6.10					
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

Contractor: Marathon Underground Constructors Corporation

Grade Elevation: 290.821 mREL

Drilling Method: HQ Diamond Core Bit

Top of Casing Elevation: 291.566 mREL

Well Casing Size: 5.08 cm

UTM Coordinates: 17T 593714 mE 5058508 mN



Log of Borehole: BH14

Project #: 225335.005

Logged By: TG

Project: Groundwater Monitoring Well Installation

Client: The Corporation of the Municipality of Magnetawan

Location: Croft Waste Disposal Site, Magnetawan, Ontario

Drill Date: April 22, 2020

Sheet: 1 of 1

SUBSURFACE PROFILE					SAMPLE			
Depth	Symbol	Description	Elevation (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) CGI/PID	Laboratory Analysis
ft m		Ground Surface	0.00					
0		Gneissic Bedrock Grey to black metamorphic bedrock, some quartzite and biotite with garnet mineralization, massive			100	RC1		
1								
2								
3								
4					100	RC2		
5								
6								
7					100	RC3		
8								
9								
10								
11								
12								
13					100	RC4		
14								
15								
16								
17								
18								
19								
20			-6.10					
21		End of Borehole						
22								
23								
24								
25								

Contractor: Marathon Underground Constructors Corporation

Grade Elevation: 289.416 mREL

Drilling Method: HQ Diamond Core Bit

Top of Casing Elevation: 290.259 mREL

Well Casing Size: 5.08 cm

UTM Coordinates: 17T 593733 mE 5058558 mN

APPENDIX III
Summary Tables

TABLE 1
Groundwater Monitoring Location Data
Croft Waste Disposal Site
Magnetawan, Ontario

Well ID Number	Date (dd/mm/yyyy)	Ground Surface Elevation (masl)	TOC Elevation (masl)	Height of TOC from Ground Surface (m)	Water Level Measurement from TOC (m)	Total Well Depth from TOC (m)	Depth to Groundwater (mbgs)	Calculated Water Level Elevation (masl)	UTM Coordinates			Comments			
									Zone	Northing (m)	Easting (m)				
BH1	8-May-14	NA	293.82		0.93			292.89	17T	5058316	593651				
	30-Oct-14				0.91		292.91								
	9-Jun-15														
	22-Jun-15														
	23-Jun-15														
	6-Aug-15						1.78					292.04			
	22-Oct-15														
	13-Jun-16						1.66					292.16			
	18-May-17						0.97					292.85			
	25-Oct-17						0.92					292.90			
	2-May-18						0.84					292.98			
	17-Oct-18						1.06					292.76			
	11-Jun-19						0.72	0.95				4.34	0.23	292.87	
	25-Sep-19						0.65	1.42				4.29	0.77	292.40	
	2-Jun-20						0.65	1.12				4.29	0.47	292.70	
	1-Oct-20						0.66	1.02				3.47	0.36	292.80	
	12-May-21						0.72	1.08				4.40	0.36	292.74	Orange, odour.
	7-Oct-21						0.72	0.97				4.38	0.25	292.85	
4-May-22									No Data						
18-Oct-22				0.72	1.18	4.39	0.46	292.64							
BH8	8-May-14	291.63	292.47						17T	5058508	593544				
	30-Oct-14														
	9-Jun-15														
	22-Jun-15						2.24						290.23		
	23-Jun-15														
	6-Aug-15						4.04						288.43		
	22-Oct-15						4.55						287.92		
	13-Oct-16						4.20						288.27		
	18-May-17						2.36						290.11		
	25-Oct-17						2.43						290.04		
	2-May-18						1.69						290.78		
	17-Oct-18						2.90						289.57		
	11-Jun-19						0.83	2.59				6.52	1.76	289.88	
	25-Sep-19						0.76	3.95				6.45	3.20	288.52	Partial sample
	2-Jun-20						0.76	2.75				6.54	1.99	289.72	Purged dry.
	1-Oct-20						0.84	2.79				6.41	1.95	289.68	
	12-May-21						0.82	2.44				6.51	1.62	290.03	Purged dry.
	7-Oct-21						0.82	2.35				6.51	1.53	290.12	Purged dry.
4-May-22				0.82	2.3	6.52	1.48	290.17							
18-Oct-22				0.82	4	6.50	3.18	288.47							
BH9	8-May-14	289.52	290.44						17T	5058495	593597				
	30-Oct-14														
	9-Jun-15														
	22-Jun-15						1.84						288.60		
	23-Jun-15														
	6-Aug-15						1.98						288.46		
	22-Oct-15						1.83						288.61		
	13-Oct-16						1.79						288.65		
	18-May-17						1.18						289.26		
	25-Oct-17						1.18						289.26		
	2-May-18						0.95						289.49		
	17-Oct-18						1.41						289.03		
	11-Jun-19						0.99	1.10				4.61	0.11	289.34	
	25-Sep-19						0.93	1.42				4.62	0.49	289.02	
	2-Jun-20						1.00	1.33				4.70	0.33	289.11	Purged dry.
	1-Oct-20						0.81	1.27				4.60	0.46	289.17	
	12-May-21						0.80	1.3				4.64	0.5	289.14	
	7-Oct-21						0.80	1.12				4.67	0.32	289.32	Purged dry.
4-May-22				1.00	1.1	4.63	0.1	289.34							
18-Oct-22				0.90	1.31	4.61	0.41	289.13							
BH10	8-May-14	290.87	291.83						17T	5058444	593731				
	30-Oct-14														
	9-Jun-15														
	22-Jun-15														
	23-Jun-15						1.13						290.70		
	6-Aug-15						1.74						290.09		
	22-Oct-15						2.22						289.61		
	13-Oct-16						1.23						290.60		
	18-May-17						0.86						290.97		
	25-Oct-17						0.80						291.03		
	2-May-18						0.79						291.04		
	17-Oct-18						0.95						290.88		
	11-Jun-19						0.86	0.93				4.92	0.07	290.90	
	25-Sep-19						0.83	1.19				4.83	0.36	290.64	
	2-Jun-20						0.92	1.00				4.91	0.17	290.83	
	1-Oct-20						0.92	0.88				4.87	-0.04	290.95	
	12-May-21						0.92	1				4.88	0.08	290.83	
	7-Oct-21						0.92	0.9				4.87	-0.02	290.93	
4-May-22				0.92	0.88	4.90	-0.04	290.95							
18-Oct-22				0.94	0.96	4.88	0.02	290.87							
BH11	8-May-14	290.74	292.61						17T	5059507	593713				
	30-Oct-14														
	9-Jun-15														
	22-Jun-15														
	23-Jun-15						2.41						290.20		
	6-Aug-15						2.46						290.15		
	22-Oct-15						1.95						290.66		
	13-Oct-16						1.23						291.38		
	18-May-17						1.01						291.60		
	25-Oct-17						0.91						291.70		
	2-May-18						1.10						291.51		
	17-Oct-18						0.74	1.07				4.81	0.33	291.54	
	11-Jun-19						0.66	1.19				4.72	0.53	291.42	
	25-Sep-19						0.66	1.50				4.72	0.84	291.11	
	2-Jun-20						0.75	1.08				4.82	0.33	291.53	
	1-Oct-20						0.75	1.38				4.82	0.63	291.23	
	12-May-21						0.75	1.25				4.82	0.50	291.36	
	7-Oct-21						0.75	1.27				4.81	0.52	291.34	
4-May-22				0.75	1.04	4.66	0.29	291.57							
18-Oct-22															
DP-7	8-May-14	289.30	289.77						17T	5058495	593597				
	30-Oct-14														
	9-Jun-15						1.22						288.55		
	22-Jun-15														
	23-Jun-15														
	6-Aug-15						1.88						287.89		
	22-Oct-15														
	13-Oct-16														
	18-May-17						1.73						288.04		
	25-Oct-17						1.64						288.13		
	2-May-18														
	17-Oct-18														
	11-Jun-19						1.51						288.26		
	25-Sep-19						1.21	1.28				1.93	0.07	288.49	
	2-Jun-20						1.13	1.36				1.81	0.23	288.41	
	1-Oct-20														Insufficient volume to sample. No cap.
	12-May-21						1.19	1.30				1.60	0.11	288.47	Insufficient volume to sample.
	7-Oct-21						1.21	1.48				1.59	0.27	288.29	Insufficient volume to sample.
4-May-22				1.19	1.34	1.55	0.15	288.43	Insufficient volume to sample.						
18-Oct-22				1.19	1.46	1.58	0.27	288.31	Insufficient volume to sample.						
DP-8	8-May-14	290.54	291.06						17T	5058510	593752				
	30-Oct-14														
	9-Jun-15						1.59						289.47		
	22-Jun-15														
	23-Jun-15														
	6-Aug-15						1.89						289.17		
	22-Oct-15						1.96						289.10		
	13-Oct-16						1.70						289.36		
	18-May-17														
	25-Oct-17						2.06						289.00		
	2-May-18						1.35						289.71		
	17-Oct-18						2.04						289.02		
	11-Jun-19														
	25-Sep-19						1.23	1.44				2.13	0.21	289.62	
	2-Jun-20														
	1-Oct-20						1.28	1.48				1.60	0.20	289.58	Insufficient volume to sample. No cap.
	12-May-21						1.29	1.48				1.58	0.19	289.58	Insufficient volume to sample.
	7-Oct-21						1.28	1.48				1.60	0.20	289.58	Insufficient volume to sample.
4-May-22				1.28	1.46	1.59	0.18	289.60	Insufficient volume to sample.						
18-Oct-22				1.29	1.48	1.59	0.19	289.58	Insufficient volume to sample.						
DP-9	8-May-14	289.97	290.92						17T	5058461	593753				
	30-Oct-14														
	9-Jun-15						1.28						289.64		
	22-Jun-15														
	23-Jun-15														
	6-Aug-15						1.58						289.34		
	22-Oct-15														
	13-Oct-16						1.33						289.59		
	18-May-17						1.11						289.81		
	25-Oct-17						1.18						289.74		
	2-May-18						1.08						289.84		
	17-Oct-18						1.22						289.70		
	11-Jun-19														
	25-Sep-19														
	2-Jun-20														
	1-Oct-20						0.95	1.06				1.57	0.11	289.86	Insufficient volume to sample. No cap.
	12-May-21						0.95	1.02				1.58	0.07	289.90	Insufficient volume to sample.
	7-Oct-21						0.95	1.00				1.56	0.05	289.92	Insufficient volume to sample.
4-May-22				0.95	1.00	1.54	0.05	289.92	Insufficient volume to sample.						
18-Oct-22				0.94	1.01	1.58	0.07	289.91	Insufficient volume to sample.						
BH-12	12-May-21	288.90	289.87		0.89	1.34	7.24	0.45	288.53	17T	5058569	593600			
	7-Oct-21				0.89	1.26	7.40	0.37	288.61						
	4-May-22				0.89	1.30	7.30	0.41	288.57						
	18-Oct-22				0.88	1.34	7.32	0.46	288.53						
BH-13	12-May-21	290.82	291.57		1.29	1.48	1.58	0.19	290.09	17T	5058461	593735			
	7-Oct-21				0.85	2.79	7.79	1.94	288.78						
	4-May-22				0.85	2.79	7.20	1.94	288.78						
	18-Oct-22				0.85	6.52	7.20	5.67	285.05						
BH-14	12-May-21	289.42	290.26		0.70	1.35	7.13	0.65	288.91	17T	5058554	593760			
	7-Oct-21				0.70	1.35	7.11	0.65	288.91						
	4-May-22				0.70	1.30	7.13	0.60	288.96						
	18-Oct-22				0.70	1.33	7.15</								

TABLE 2
Surface Water Monitoring Location Data
Croft Waste Disposal Site
Magnetawan, Ontario

<i>Surface Water Monitoring Location</i>	<i>UTM Coordinates</i>			<i>Comments</i>
	<i>Zone</i>	<i>Easting (m)</i>	<i>Northing (m)</i>	
SW1	17T	593867	5058308	No Flow
SW2	17T	593556	5059083	Flowing
SW3	17T	593597	5058495	Dry

TABLE 3
Groundwater Quality Results - BH-1
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation														ODWQS	
		Sample Collection Date (mm/dd/yyyy)															
		08/06/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	05/02/2018	10/17/2018	06/11/2019	09/25/2019	06/22/2020	10/1/2020	5/12/2021	10/7/2021	04/05/2022		10/18/2022
pH Lab	pH Units	6.55	NA	6	6.3	6.2	6.2	6.1	6.67	6.54	6.64	6.33	6.41	7.10	6.88	7.00	6.5-8.5
Conductivity	uS/cm	92		596	96	97	68	134	57	146	101	189	89	192	123	433	-
Hardness	mg/L	34		185	16	25	19	33	17.2	32	20.7	59	30.5	50.1	43.7	84.1	80-100
Total Dissolved Solids	mg/L	126		416	114	78	46	128	76	90	76	120	94	240	66	271	500
Alkalinity	mg/L	32		55	26	38	25	38	24	39	36	74	38	59	49	99	30-500
Chloride	mg/L	7.9		54	5	5	5	7	1.9	5.34	2.8	12.7	3.0	11.0	7	16.0	250
Sodium	mg/L	1.2		30	5.61	6.32	3.33	5.23	3.9	7.55	4.7	7.3	5.8	9.1	6.78	10.3	200
Calcium	mg/L	9.9		63.1	5.42	8.24	6.11	10.5	5.5	9.62	6.4	18.1	9.8	15.3	13.3	25.2	-
Magnesium	mg/L	2.3		6.75	0.699	1.12	0.859	1.62	0.86	1.84	1.13	3.36	1.48	2.88	2.56	5.12	-
Potassium	mg/L	1.4		2.95	1.16	1.79	1.09	1.5	1.2	1.82	1.3	2.2	1.5	2.1	2.02	2.9	-
Sulphate	mg/L	<1		154	5	154	1	19	2.1	10.2	2.4	18.0	4.0	<20	5	24.0	500
Ammonia	mg/L	<0.05		0.09	0.12	0.23	0.08	0.08	0.4	0.21	0.2	0.1	0.1	0.1	0.08	0.1	-
Nitrate as N	mg/L	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.03	0.53	<0.06	<0.06	10
Nitrite as N	mg/L	<0.01		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.06	<0.03	<0.03	<0.03	1
Total Kjeldahl Nitrogen	mg/L	0.47		0.7	1.8	1.1	0.4	1.4	0.77	0.68	0.53	0.72	0.40	0.42	0.49	0.43	-
Phenolics	mg/L	<0.001		<0.001	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.002	<0.002	<0.002	0.008	-
Dissolved Organic Carbon	mg/L	7.2		13.3	16.1	15.8	8.2	17.5	10.6	8.5	10.0	15.6	12.0	13.0	18	17.0	5
Chemical Oxygen Demand	mg/L	76		62	108	63	27	74	28	31	32	<5	27	33	40	51	-
Iron	mg/L	8.5		16.7	1.49	4.94	2.29	8.76	4.35	7.32	5.48	13.9	5.18	10.4	6.76	17.1	0.3
Manganese	mg/L	1.5		4.1	0.579	0.611	0.45	0.819	0.46	0.86	0.53	1.40	0.95	1.17	1.24	2.20	0.05
Phosphorus	mg/L	0.7		0.1	0.8	0.29	0.06	0.27	0.22	0.06	0.02	0.06	0.06	<0.03	<0.03	<0.03	-
Orthophosphate	mg/L										<0.10						-
Turbidity	NTU	60		94.1	507	158	22.9	118	58.4	44.2	22.4	8.1	5.5	3.3	4.35	3.2	5
Total Suspended Solids	mg/L	140		142	822	422	56	181	150	61	37	27	133	40	35	23	-
BOD	mg/L	<2		2	<20	6	<2	3	<5	<5	<5	3	<4	<4	<4	<4	-
Anion Sum		0.869		5.84	0.74	0.96	0.66	1.35									-
Cation Sum		1.13		5.09	0.6	0.82	0.55	0.92									-
Ion Balance	%			-6.9			-9.6	N/A									-
Silver	mg/L	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005	-
Aluminum	mg/L	0.53		0.199	0.253	0.321	0.311	0.883	0.537	0.44	0.50	0.83	0.40	0.46	0.473	0.25	0.1
Antimony	mg/L	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.003	<0.003	<0.001	<0.001	<0.0009	<0.0009	<0.0009	<0.0009	0.006
Arsenic	mg/L	<0.001		<0.001	0.001	0.001	0.001	0.004	<0.003	<0.003	<0.001	0.007	0.0014	0.0021	0.0014	0.0025	0.010
Barium	mg/L	0.033		0.192	0.025	0.032	0.013	0.045	0.024	0.04	0.023	0.059	0.033	0.051	0.0466	0.085	1
Beryllium	mg/L	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.0005	<0.0005	0.000069	0.000124	0.000139	0.000105	-
Bismuth	mg/L	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	0.00002	0.00003	<0.00001	0.00001	-
Boron	mg/L	<0.01		0.202	0.014	0.015	0.025	0.026	0.017	0.03	0.014	0.045	0.024	0.059	0.046	0.101	5
Cadmium	mg/L	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	<0.000003	0.000009	0.000061	0.000007	0.005
Chromium	mg/L	<0.005		0.003	<0.001	0.001	<0.001	0.002	<0.003	<0.003	<0.002	0.003	0.00161	0.00166	0.00132	0.00178	0.05
Cobalt	mg/L	0.031		0.0686	0.0071	0.0087	0.0044	0.0105	0.005	0.01	0.005	0.016	0.008	0.012	0.0107	0.019	-
Copper	mg/L	0.0087		0.0016	0.0027	0.0031	0.0023	0.0059	0.007	0.01	0.003	0.005	0.003	0.003	0.0053	0.001	1
Molybdenum	mg/L	0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	0.00019	0.00034	0.00026	0.0004	-
Nickel	mg/L	0.0019		0.004	<0.001	0.001	<0.001	0.003	<0.003	<0.003	<0.003	<0.003	0.0012	0.0011	0.0017	0.0016	-
Phosphate	mg/L			<0.0002	<0.2	<0.2	<0.2	<0.0002	<0.10	<0.10	<0.10	<0.10	<0.03	-	-	-	-
Lead	mg/L	0.00094		0.0002	0.0005	0.0005	0.0002	0.0016	0.001	0.002	0.0008	0.002	0.00062	0.00089	0.00035	0.0002	0.01
Selenium	mg/L	<0.002		<0.001	<0.0001	0.002	0.002	0.006	<0.004	<0.004	<0.001	0.001	0.00019	0.00026	0.00020	0.00028	0.05
Silicon	mg/L	7.4		5.05	3.13	4.05	2.52	3.6	3.22	5.90	3.43	4.96	3.76	5	3.98	6.86	-
Tin	mg/L	<0.001		<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	0.05	<0.002	<0.002	<0.00006	<0.00006	0.00013	<0.00006	-
Strontium	mg/L	0.06		0.068	0.019	0.048	0.035	0.06	0.031	<0.002	0.033	0.092	0.056	0.077	0.0649	0.133	-
Titanium	mg/L	0.14		0.009	0.027	0.034	0.025	0.072	0.056	0.08	0.035	0.125	0.0434	0.0572	0.0347	0.0235	-
Uranium	mg/L	0.002		0.0012	0.0008	0.0007	0.0005	0.0014	<0.002	<0.002	0.001	0.002	0.001	0.001	0.000712	0.001	0.02
Vanadium	mg/L	0.0057		0.0071	0.0023	0.0027	0.0023	0.0077	0.004	0.01	0.004	0.007	0.00384	0.00452	0.00433	0.00563	-
Zinc	mg/L	<0.005		<0.005	<0.005	<0.005	<0.005	0.02	<0.005	0.03	<0.005	<0.005	<0.002	0.006	0.006	0.002	5
Field Measurements																	
Temperature	oC	4.91	-	5.22	6.37	6.24	8.08	6.45	10.3	13.1	9.2	11.62	6.42	12.1		10.1	-
pH	pH Units	-	-	-	-	-	-	-	6.4	5.4	5.4	5.9	15.9	6.7		6.1	6.5-8.5
Conductivity	uS/cm	6.55	-	786	-	-	0.08	0.19	78.40	118.50	116.70	143.00	69.00	1290.00		225.10	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	145.3	176.5	170.6	98	53.5	27		28	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	1.21	1.18	1.15	7.44	1.42	1.35		2.15	-

Note: No field data recorded for BH1

Ontario Drinking Water Quality Standards Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 4
Groundwater Quality Results - BH-8
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation															ODWQS
		Sample Collection Date (mm/dd/yyyy)															
		08/06/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	05/02/2018	10/17/2018	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021	04/05/2022	10/18/2022	
pH Lab	pH Units	7.87	7.62	7.2	6.7	7	6.4	6.7	6.62	6.72	6.57	6.21	6.59	6.93	6.55	7.02	6.5-8.5
Conductivity	uS/cm	450	200	124	88	103	68	94	35	70	51	51	39	60	28	77	-
Hardness	mg/L	190	62	39	18	20	10	27	9.8	22.8	13.5	18.9	11.1	9.2	5.9	27.5	80-100
Total Dissolved Solids	mg/L	298	158	118	110	80	42	58	50	68	44	32	< 30	46	40	< 30	500
Alkalinity	mg/L	180	86	48	31	34	18	28	11	23	12	27	9	16	8	30	30-500
Chloride	mg/L	16	3.5	1	<0.001	<0.1	<1	<1	0.5	0.4	0.5	0.4	2	<1	<1	<1	250
Sodium	mg/L	9.9	1.9	2.7	8.35	7.9	7.37	3.36	2.8	2.5	1.8	1.9	3.25	4.26	3.63	2.13	200
Calcium	mg/L	53	17	11.3	5.8	6.28	2.97	7.39	2.9	6.2	4.0	5.4	3.26	2.76	1.81	6.58	-
Magnesium	mg/L	15	5.1	2.59	0.926	1.06	0.533	2.1	0.7	1.8	0.9	1.3	0.709	0.563	0.340	2.690	-
Potassium	mg/L	12	5.6	3.14	1.42	1.65	0.888	2.02	0.8	1.70	0.8	1.32	0.735	0.556	0.371	1.790	-
Sulphate	mg/L	31	8.6	10	0.014	17	12	17	5.1	8.8	6.8	7.1	5	10	5	7	500.0
Ammonia	mg/L	0.11	<0.05	0.05	0.01	0.05	0.01	0.01	0.11	<0.02	<0.02	<0.02	< 0.04	<0.04	< 0.04	0.04	-
Nitrate as N	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.1	<0.05	0.06	0.07	<0.05	< 0.03	0.23	0.11	0.08	10
Nitrite as N	mg/L	0.032	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.14	<0.03	< 0.03	< 0.03	1
Total Kjeldahl Nitrogen	mg/L	0.25	<0.2	0.3	0.4	0.3	0.4	0.2	0.36	0.86	0.28	0.19	0.13	0.15	0.09	0.05	-
Phenolics	mg/L	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	0.001	<0.001	< 0.002	<0.002	< 0.002	0.003	-
Dissolved Organic Carbon	mg/L	3	1.5	3.4	5	9.7	3.9	58	2.6	3.1	3.3	3.5	4	4	4	3	5
Chemical Oxygen Demand	mg/L	120	14	127	59	109	54	37	<5	12	8	<5	11	8	< 8	< 8	-
Iron	mg/L	<0.1	0.39	<0.1	<0.1	<0.1	<0.1	<0.1	0.05	<0.010	0.06	0.030	0.082	0.095	0.073	0.139	0.3
Manganese	mg/L	0.1	0.12	0.055	0.926	0.027	0.01	0.03	0.01	0.02	0.01	0.01	0.0080	0.0066	0.00278	0.0146	0.05
Phosphorus	mg/L	9.2	0.61	0.68	0.22	0.53	0.26	0.2	0.13	0.21	0.32	0.13	0.10	0.19	0.04	< 0.03	-
Orthophosphate	mg/L										<0.10				0.03		-
Turbidity	NTU	4100	220	900	225	451	195	304	162	192	150	119	21.6	17.0	16.3	15.0	5
Total Suspended Solids	mg/L	4200	1100	932	272	584	297	234	154	227	198	274	26	152	43	45	-
BOD	mg/L	2	<2	ND (20)	<2	<20	<2	<2	<5	<5	<5	<2	< 4	< 4	< 4	< 4	-
Anion Sum		4.64	1.99	1.2	0.94	1.05	0.65	0.95									-
Cation Sum		4.6	1.48	0.99	0.76	0.79	0.54	0.75									-
Ion Balance	%	0.44	NC	-9.6			-9										-
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.0001	<0.0001	< 0.00005	<0.00005	< 0.00005	< 0.00005	-
Aluminum	mg/L	0.031	0.0064	0.046	0.142	0.094	0.167	0.042	0.101	0.065	0.076	0.056	0.119	0.163	0.195	0.089	0.1
Antimony	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.003	<0.003	<0.001	<0.001	< 0.0009	<0.0009	< 0.0009	< 0.0009	0.006
Arsenic	mg/L	<0.001	0.0013	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.001	<0.001	< 0.0002	0.0004	0.0005	0.0017	0.010
Barium	mg/L	0.1	0.082	0.053	0.022	0.032	0.009	0.035	0.019	0.033	0.020	0.024	0.0161	0.0151	0.0196	0.0304	1.00
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.0005	<0.0005	0.000013	0.000028	0.000025	0.000013	-
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	< 0.00001	<0.00001	< 0.00001	< 0.00001	-
Boron	mg/L	0.027	<0.01	0.012	<0.01	<0.01	0.044	<0.01	<0.010	<0.010	<0.010	<0.010	0.025	0.009	0.007	0.027	5
Cadmium	mg/L	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	0.0008	<0.001	<0.001	<0.0001	<0.0001	0.000026	0.000028	0.000014	0.000055	0.005
Chromium	mg/L	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.002	<0.002	0.00037	0.00026	0.00038	0.00020	0.05
Cobalt	mg/L	<0.0005	0.00065	0.0007	0.0007	0.0012	0.0008	0.0013	<0.001	0.001	0.001	0.002	0.00092	0.00124	0.000528	0.00069	-
Copper	mg/L	<0.001	<0.001	0.0019	0.0277	0.0179	0.0222	0.00068	0.011	0.008	0.01	0.013	0.0139	0.0238	0.0156	0.0073	1
Molybdenum	mg/L	0.013	0.0015	0.0011	0.0039	0.0011	0.0017	0.0005	<0.002	<0.002	<0.002	<0.002	0.00055	0.00066	0.00057	0.00037	-
Nickel	mg/L	0.019	0.0032	0.004	0.011	0.01	0.006	0.007	0.005	0.006	0.006	0.008	0.0044	0.0050	0.0027	0.0035	-
Phosphate	mg/L			<0.0002	<0.2	<0.2	<0.2	<0.2	<0.10	<0.10	<0.10	<0.10	0.04				-
Lead	mg/L	<0.0005	<0.0005	<0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0005	<0.0005	0.00014	0.00015	< 0.00009	0.00014	0.01
Selenium	mg/L	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.004	<0.001	<0.001	0.00006	0.00008	0.00005	0.00006	0.05
Silicon	mg/L	5.3	5.6	4.71	2.96	4.15	2.95	3.49	3.17	4.42	2.85	4.3	3.02	3.57	2.50	4.65	-
Tin	mg/L	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	0.026	<0.002	<0.002	0.00007	<0.00006	0.00008	< 0.00006	-
Strontium	mg/L	0.16	0.056	0.039	0.029	0.025	0.014	0.03	0.015	<0.002	0.015	0.022	0.0147	0.0151	0.0100	0.0277	-
Titanium	mg/L	<0.005	<0.005	<0.005	0.007	<0.005	0.005	<0.005	0.005	0.003	0.005	<0.002	0.00466	0.00437	0.00378	0.00518	-
Uranium	mg/L	0.0022	0.00017	0.0001	0.0002	0.0002	0.0001	0.0002	<0.002	<0.002	<0.0005	<0.0005	0.000252	0.000210	0.000092	0.000132	0.02
Vanadium	mg/L	0.00074	<0.0005	0.002	0.0009	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	0.00036	0.00029	0.00046	0.00034	-
Zinc	mg/L	<0.005	0.0088	0.01	0.088		0.018	0.031	0.017	0.032	0.021	0.031	0.017	0.015	0.009	0.014	5
Field Measurements																	
Temperature	oC	-	-	-	-	-	-	-	11.3	Partial sample	7	10.7	8.4	11.5	5.7	8.9	-
pH	pH Units	6.91	5.37	6.43	7.45	7.38	7.8	7.78	6.8	no field chem	5.42	5.8	4.91	6.62	16.25	6.81	-
Coductivity	uS/cm	368	179	114	-	-	0.1	0.11	43.3	-	42.1	38	28	34	17.8	52.5	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	111	-	105.5	353.4	194.1	64.2	101.9	-1.1	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	12.4	-	8.74	10.29	8.69	6.38	11.08	10.29	-

Notes: Ontario Drinking Water Quality Standards* Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 5
Groundwater Quality Results - BH-9
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation														ODWQS	
		Sample Collection Date (mm/dd/yyyy)															
		08/06/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	05/02/218	10/17/2018	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021	04/05/2022		10/18/2022
pH Lab	pH Units	7.56	6.78	6.9	7.2	7.1	6.5	6.7	7.27	7.04	7.10	6.73	7.00	7.64	7.50	7.51	6.5-8.5
Conductivity	uS/cm	730	750	1050	678	587	523	735	289	694	371	397	268	439	283	698	-
Hardness	mg/L	220	220	240	156	157	147	276	104	235	115	159	107	150	111	228	80-100
Total Dissolved Solids	mg/L	496	462	668	454	378	262	494	174	398	228	230	194	287	220	423	500
Alkalinity	mg/L	210	170	203	187	182	171	200	97	181	101	152	99	156	122	230	30-500
Chloride	mg/L	48	64	126	65	50	23	20	6.04	22.6	18.0	48.7	18.0	36.0	20	75.0	250
Sodium	mg/L	50	50	132	61.3	47.7	29.8	23.9	10.8	23.9	10.1	45.8	10.9	24.5	15.4	41.4	200
Calcium	mg/L	64	72	81.8	49.9	49.3	44.4	89.4	34.50	76.50	37.40	51.40	36.10	50.60	37.1	75.20	-
Magnesium	mg/L	13	11	8.67	7.55	8.34	8.88	12.8	4.41	10.70	5.25	7.42	4.12	5.87	4.53	9.91	-
Potassium	mg/L	17	19	24.8	11	10.7	9.75	15	6.08	9.87	4.74	7.17	4.41	6.89	5.49	15.30	-
Sulphate	mg/L	75	88	128	75.0	56.0	62.0	180	37.7	95.8	33.4	16.2	9.0	<20	16	25.0	500.0
Ammonia	mg/L	2.2	0.37	0.82	0.6	0.71	1.78	2.13	1.04	1.47	0.99	0.96	1.18	1.48	1.40	3.84	-
Nitrate as N	mg/L	<0.1	2.61	0.5	0.4	0.1	<0.1	0.7	<0.05	<0.10	<0.05	<0.05	<0.03	0.51	< 0.06	< 0.06	10
Nitrite as N	mg/L	<0.01	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	< 0.06	<0.03	< 0.03	< 0.03	1
Total Kjeldahl Nitrogen	mg/L	3.5	1.1	2.7	2.3	1.4	2.8	4.2	1.70	2.73	1.79	2.12	1.99	67.00	1.97	5.20	-
Phenolics	mg/L	<0.001	<0.001	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	0.002	<0.001	< 0.002	<0.002	< 0.002	0.007	-
Dissolved Organic Carbon	mg/L	20	14	40	23	16.4	33.2	20	16.7	24.1	14.5	28.0	19.0	22.0	19	29.0	5
Chemical Oxygen Demand	mg/L	380	81	159	155	16.4	160	169	36	69	68	53	63	67	< 8	81	-
Iron	mg/L	1.9	0.71	<0.1	0.263	11.4	18.7	17.7	11.1	25.1	15.6	15.9	13.6	16.5	15.9	21	0.3
Manganese	mg/L	1.6	1.1	1.03	1.11	1.38	2.79	5.65	1.64	4.16	1.62	1.86	1.27	1.62	1.43	3.94	0.05
Phosphorus	mg/L	12	1.3	0.41	0.58	0.18	0.8	0.72	0.1	0.32	0.1	0.1	0.1	0.2	< 0.03	< 0.03	-
Orthophosphate	mg/L									<0.10					0.03		-
Turbidity	NTU	38000	510	758	1130	281	1900	2010	151	196	282	72.8	54.7	69	117	70	5
Total Suspended Solids	mg/L	55000	1600	1750	1600	394	1660	2770	212	100	283	108	244	157	185	66	-
BOD	mg/L	<2	<2	ND (30)	12	3	20	<20	<5	<5	<5	9	4	<4	< 4	< 4	-
Anion Sum		7.18	7.18	10.3	7.18	6.23	5.37	8.37									-
Cation Sum		7.17	7.16	11.2	6.06	5.5	4.49	6.94									-
Ion Balance	%	0.1	0.1	3.9	-8.4	-6.3	-8.9	-9.3									-
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.0001	<0.0001	< 0.00005	<0.00005	< 0.00005	< 0.00005	-
Aluminum	mg/L	0.1	0.027	0.08	0.057	0.065	0.1	0.095	0.109	0.161	0.110	0.147	0.136	0.159	0.150	0.141	0.1
Antimony	mg/L	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.003	<0.003	<0.001	<0.001	< 0.0009	<0.0009	< 0.0009	< 0.0009	0.006
Arsenic	mg/L	0.0011	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	0.002	0.002	0.0009	0.0014	0.0012	0.0013	0.010
Barium	mg/L	0.13	0.12	0.178	0.095	0.111	0.062	0.18	0.054	0.114	0.047	0.059	0.047	0.072	0.0497	0.113	1.00
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.0005	<0.0005	0.00002	0.00004	0.000030	0.000046	-
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	< 0.00001	<0.00001	< 0.00001	< 0.00001	-
Boron	mg/L	0.62	0.68	1.07	0.394	0.31	0.264	0.527	0.259	0.489	0.217	0.384	0.226	0.460	0.300	1.170	5
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	0.000016	0.000042	0.000064	0.000028	0.005
Chromium	mg/L	<0.005	<0.005	0.019	0.001	0.001	0.002	0.002	<0.003	<0.003	<0.002	<0.002	0.00166	0.00197	0.00147	0.00213	0.05
Cobalt	mg/L	0.0015	0.0071	0.0033	0.002	0.0038	0.0044	0.0203	0.011	0.027	0.0118	0.009	0.0098	0.0105	0.00782	0.0158	-
Copper	mg/L	0.0024	0.014	0.0547	0.0271	0.0068	0.0034	0.0051	<0.003	0.004	0.007	0.003	0.0009	0.0028	0.0031	0.0025	1
Molybdenum	mg/L	0.0094	0.0076	0.0048	0.0036	0.0027	0.001	0.0014	<0.002	<0.002	<0.002	<0.002	0.001	0.001	0.00080	0.002	-
Nickel	mg/L	0.025	0.052	0.037	0.015	0.011	0.01	0.01	<0.003	0.008	0.01	0.004	0.0017	0.0028	0.0019	0.0031	-
Phosphate	mg/L			<0.0002	<0.2	<0.2	<0.2	<0.10	<0.20			<0.10	0.07				-
Lead	mg/L	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0005	<0.0005	0.00009	<0.00009	< 0.00009	0.00012	0.01
Selenium	mg/L	<0.002	<0.002	0.002	<0.001	<0.001	<0.001	<0.001	<0.004	<0.004	<0.001	<0.001	0.00019	0.00027	0.00017	0.00035	0.05
Silicon	mg/L	6.1	2.6	3.28	3.53	4.95	3.44	3.77	3.57	5.21	3.06	3.84	2.9	4.85	3.19	4.21	-
Tin	mg/L	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	0.267	<0.002	<0.002	< 0.00006	<0.00006	0.00018	0.00011	-
Strontium	mg/L	0.3	0.24	0.253	0.183	0.235	0.166	0.347	0.121	<0.002	0.110	0.099	0.128	0.173	0.119	0.283	-
Titanium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.002	0.004	<0.002	0.005	0.00312	0.00288	0.00316	0.00297	-
Uranium	mg/L	0.0025	0.00053	0.0017	0.0029	0.0024	0.0012	0.0024	<0.002	<0.002	<0.0005	<0.0005	0.000392	0.000535	0.000330	0.000904	0.02
Vanadium	mg/L	0.00088	<0.0005	0.0049	0.0009	0.0009	0.0011	0.0018	<0.002	0.002	<0.002	<0.002	0.00219	0.00304	0.00264	0.003	-
Zinc	mg/L	0.0063	0.033	0.027	0.023	0.027	0.034	0.04	0.016	0.047	0.008	0.006	0.005	0.007	0.010	0.005	5
Field Measurements																	
Temperature	°C	-	-	-	-	-	-	-	10.9	15	9.1	12.69	8.52	12.3	6.3	10.3	-
pH	pH Units	6.33	6.52	5.68	6.62	6.65	7.23	7.04	6.82	6.15	5.96	6.39	7.04	6.38	15.62	6.63	6.5-8.5
Conductivity	uS/cm	652	562	1014	-	-	0.55	0.87	339.2	591	34.9	388	209	392	207	540	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	143.4	46.6	71.6	89.2	18.1	5.3	19.3	-16.8	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	6.32	6.05	5.02	10.84	7.9	4.73	5.37	6.66	-

Notes: Ontario Drinking Water Quality Standards* Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 6
Groundwater Quality Results - BH-10
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation														ODWQS	
		Sample Collection Date (mm/dd/yyyy)															
		BH-10															
		08/06/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	05/02/2018	10/10/2018	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021	04/05/2022	10/18/2022	
pH Lab	pH Units	7.47	7.46	7.4	7.2	7.5	7.1	7.3	7.81	7.6	7.67	7.62	7.2	7.92	7.88	7.82	6.5-8.5
Conductivity	uS/cm	1900	2100	1980	1.48	2010	1440	1210	1790	2680	2430	1880	2190	2300	1640	2100	-
Hardness	mg/L	550	610	607	513	627	426	328	507	630	563	531	659	553	419	512	80-100
Total Dissolved Solids	mg/L	1090	1130	1170	970	1190	730	656	954	1540	1280	1240	1440	1420	946	1220	500
Alkalinity	mg/L	670	640	573	487	695	522	496	508	372	527	559	448	383	413	461	30-500
Chloride	mg/L	170	180	219	185	289	143	104	246	462	381	395	400	480	340	420	250
Sodium	mg/L	120	120	164	84.8	107	66.5	71.8	129	182.0	144	159	156	191	147	175	200
Calcium	mg/L	170	190	192	177	200	136	107	169	214.0	178	170	216	181	134	166	-
Magnesium	mg/L	30	33	30.8	17.2	31.1	21.3	14.5	20.6	23.30	28.7	25.9	29.1	24.3	20.5	23.4	-
Potassium	mg/L	85	93	78.2	54.7	76.7	49.7	39.8	46.2	50.9	57.2	57.1	57	52.3	42.4	47.6	-
Sulphate	mg/L	49	45	82	67	46	37	42	68.6	53	27.6	24.5	20	25	24	27	500.0
Ammonia	mg/L	24	24	8.69	8	23.5	17.3	7.43	11.7	7.82	16.3	13.4	16.7	11.2	12.2	13.4	-
Nitrate as N	mg/L	0.97	14.9	15.2	0.7	1.1	<0.1	0.2	<0.5	22.6	1.8	<0.5	<0.03	1.31	0.29	1.57	10
Nitrite as N	mg/L	0.08	0.406	1.44	<0.05	<0.05	<0.05	0.33	<0.5	<1.0	<1.0	<0.5	0.91	<0.3	<0.03	<0.03	1
Total Kjeldahl Nitrogen	mg/L	28	25	11.8	10	25.5	16.2	8.8	12.6	8.2	18.1	15.4	19.6	12.3	12.2	14.3	-
Phenolics	mg/L	<0.001	<0.001	0.009	<0.001	0.009	<0.001	<0.001	0.001	0.002	0.003	0.003	<0.002	0.005	0.002	0.012	-
Dissolved Organic Carbon	mg/L	32	34	33.3	18.1	32	21.3	19.5	20.4	16	22.4	25.4	18	18	17	17	5
Chemical Oxygen Demand	mg/L	670	91	145	67	95	81	87	51	49	61	45	48	52	48	50	-
Iron	mg/L	7.1	0.27	<0.1	<0.1	<0.1	<0.1	<0.1	0.064	<0.010	0.031	0.049	0.023	0.019	0.020	0.044	0.3
Manganese	mg/L	3.1	2.5	0.973	0.922	5.72	6.12	4.02	2.88	4.34	2.14	2.02	3.10	2.34	1.63	2.26	0.05
Phosphorus	mg/L	4.4	0.12	0.2	0.05	0.05	0.09	0.14	0.08	0.36	<0.02	0.06	0.08	<0.03	0.04	<0.03	-
Orthophosphate	mg/L										<2.0						-
Turbidity	NTU	1600	28	147	22.9	34.6	101	175	6.6	31.0	60.8	9.1	1.5	1.84	10.5	5.1	5
Total Suspended Solids	mg/L	5800	380	516	123	90	228	312	328	132	115	43	47	53	175	71	-
BOD	mg/L	<2	<2	23	<2	3	4	4	<5	<5	<5	<2	4	<4	<4	<4	-
Anion Sum		19.4	20	20.4	16.4	23.1	15.2	13.8									-
Cation Sum		20.1	21.7	21.2	15.3	19.1	12.7	10.7									-
Ion Balance	%	1.7	4.09	1.9	-3.3	-9.4	-9.2	-12.5									-
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005	-
Aluminum	mg/L	0.071	0.046	0.038	0.024	0.033	0.031	0.045	0.04	0.032	0.048	0.036	0.028	0.026	0.032	0.035	0.1
Antimony	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.003	<0.003	<0.001	<0.001	<0.0009	<0.0009	<0.0009	<0.0009	0.006
Arsenic	mg/L	<0.001	<0.001	0.002	0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.001	<0.001	0.0008	0.0025	0.0003	0.0015	0.010
Barium	mg/L	0.3	0.33	0.276	0.183	0.262	0.122	0.146	0.225	0.279	0.276	0.236	0.29	0.243	0.210	0.254	1.00
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.0005	<0.0005	0.00001	0.000015	0.000017	0.000014	-
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.00001	<0.00001	<0.00001	<0.00001	-
Boron	mg/L	1.8	2.1	2.05	1.09	1.4	0.577	1.2	1.16	1.28	1.29	1.47	1.05	1.11	0.966	1.29	5
Cadmium	mg/L	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	0.000075	0.000061	0.000039	0.000066	0.005
Chromium	mg/L	<0.005	<0.005	0.049	0.003	0.002	0.001	0.002	<0.003	<0.003	<0.002	<0.002	0.00146	0.00125	0.00136	0.00134	0.05
Cobalt	mg/L	0.0096	0.0064	0.0032	0.0021	0.0044	0.0031	0.0028	0.004	0.0040	0.0025	0.0023	0.0033	0.00283	0.00256	0.00303	-
Copper	mg/L	0.0056	0.08	0.0366	0.0148	0.0179	0.0141	0.0168	0.007	0.0100	0.01	0.0077	0.0076	0.0076	0.0092	0.0098	1
Molybdenum	mg/L	0.0061	0.0065	0.0019	0.0012	0.0017	0.0014	0.0019	<0.002	<0.002	<0.002	<0.002	0.0012	0.00116	0.00097	0.00169	-
Nickel	mg/L	0.012	0.043	0.012	0.007	0.005	0.004	0.004	<0.003	0.006	0.003	<0.003	0.0024	0.0021	0.0019	0.0022	-
Phosphate	mg/L			<0.0002	<0.2	<0.2	<0.2	<0.0002	<1.0	<2.0		<1.0	<0.03				-
Lead	mg/L	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.001	<0.001	<0.0005	<0.0005	<0.00009	<0.00009	<0.00009	<0.00009	0.01
Selenium	mg/L	<0.002	<0.002	0.004	0.003	<0.001	<0.001	<0.001	<0.004	0.006	<0.001	0.001	0.00026	0.00024	0.00022	0.00033	0.05
Silicon	mg/L	5.3	4.7	4.37	3.92	4.7	3.89	3.24	4.44	4.66	3.67	3.89	5.11	4.95	4.12	5.06	-
Tin	mg/L	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	1.06	<0.002	<0.002	0.00011	0.00009	0.00031	0.00009	-
Strontium	mg/L	0.8	0.85	0.943	0.628	0.95	0.614	0.503	0.793	<0.002	0.783	0.601	1.01	0.8	0.592	0.794	-
Titanium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	0.002	<0.002	0.005	0.00127	0.00077	0.00100	0.0009	-
Uranium	mg/L	0.0081	0.011	0.0083	0.0057	0.0072	0.0043	0.0046	0.007	0.0050	0.005	0.004	0.00487	0.00347	0.00291	0.0052	0.02
Vanadium	mg/L	<0.0005	0.0005	0.0131	0.0012	0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	0.00041	0.00041	0.00056	0.00043	-
Zinc	mg/L	0.012	0.036	0.021	0.023	0.012	0.008	0.013	<0.005	0.006	<0.005	<0.005	0.003	0.005	0.009	0.003	5
Field Measurements																	
Temperature	oC	-	-	-	-	-	-	-	11.7	13.5	8.3	11.83	8.83	13.2	6.4	10.3	-
pH	pH Units	6.25	6.43	5.71	6.88	6.86	7.18	7.28	6.49	6.58	6.88	6.61	6.46	6.47	16.22	6.73	6.5-8.5
Conductivity	uS/cm	1715	1481	1913	-	-	1.52	1.24	1935	2120	2184	1521	1456	1850	1073	1512	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	129.1	134.9	50.7	126	64.3	109.7	74	107.3	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	1.61	4.25	5.44	7.29	17.77	0.87	1.5	3.12	-

Notes: Ontario Drinking Water Quality Standards* Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 7
Groundwater Quality Results - BH-11
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation														ODWQS	
		Sample Collection Date (mm/dd/yyyy)															
		BH-11															
		08/06/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	05/02/18	10/17/2018	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021	04/05/2022	10/18/2022	
pH Lab	pH Units	6.81	6.97	5	5.2	6.2	6.3	6.4	7.32	7.32	7.36	7.41	7.75	7.81	7.68	7.40	6.5-8.5
Conductivity	uS/cm	550	600	1590	1130	1500	1880	825	1730	1620	2530	1420	2540	1390	944	305	-
Hardness	mg/L	140	190	171	77	211	250	140	245	225	411	237	367	210	152	49.1	80-100
Total Dissolved Solids	mg/L	340	330	928	700	926	1010	466	1000	828	1300	836	1400	627	580	163	500
Alkalinity	mg/L	50	82	7	18	79	498	58	439	294	542	484	872	380	321	54	30-500
Chloride	mg/L	63	67	286	242	275	168	67	200	123	237	178	230	150	79	43	250
Sodium	mg/L	41	30	215	160	192	187	63.4	184	136	209	150	233	147	96.5	23	200
Calcium	mg/L	40	58	52.4	22.9	33.1	59.7	32.6	65.3	64.6	119.0	68.5	104.0	61.5	44.1	14.7	-
Magnesium	mg/L	8.8	11	9.75	4.93	31.3	24.6	14.3	19.90	15.5	27.70	15.90	26.40	13.80	10.3	3.03	-
Potassium	mg/L	5.6	4.9	39	22.2	79.4	59.7	29.1	67.90	56.5	82.30	55.20	91.90	61.00	40.5	11.80	-
Sulphate	mg/L	86	91	258	165	243	213	194	115	83.7	118	85	68	59	65	28	500.0
Ammonia	mg/L	<0.05	0.06	6.37	4.55	17.5	48	3.58	32.30	28.40	29.90	26.20	53.10	34.10	18.8	3.74	-
Nitrate as N	mg/L	4.58	2.06	18.5	1.6	3.2	0.1	8.7	<0.5	42.0	36.6	<0.25	< 0.3	12.1	0.56	0.9	10
Nitrite as N	mg/L	0.031	0.019	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.25	<1.0	<0.25	< 0.06	0.24	0.04	< 0.03	1
Total Kjeldahl Nitrogen	mg/L	0.85	0.6	8.4	6.7	22.8	44.9	5	41.5	32.80	38.4	30.3	70	37.1	21.0	4.62	-
Phenolics	mg/L	<0.001	<0.001	0.013	<0.001	0.011	0.011	<0.001	0.005	0.006	0.009	0.004	0.006	0.002	0.004	0.006	-
Dissolved Organic Carbon	mg/L	4.8	3.8	23.1	20.8	40.6	90.2	8.5	78.3	58.8	75.2	109.0	108.0	54.0	51	15.0	5
Chemical Oxygen Demand	mg/L	32	23	98	114	129	266	54	224	152	192	200	244	139	128	39	-
Iron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	0.78	<0.1	1.42	0.079	0.126	0.719	5.68	0.231	0.229	0.141	0.3
Manganese	mg/L	0.39	0.38	6.1	2.1	5.68	5.03	2.09	3.23	1.88	3.74	2.11	4.69	1.81	1.24	0.40	0.05
Phosphorus	mg/L	0.98	1	0.2	0.19	0.08	0.21	0.02	0.10	0.07	0.03	0.14	0.06	0.04	< 0.03	0.06	-
Orthophosphate	mg/L										<2.0				0.03		-
Turbidity	NTU	1100	270	713	64.4	139	119	29.1	88.4	41.7	18.4	44.6	30.3	8.7	8.54	7.2	5
Total Suspended Solids	mg/L	600	1600	846	170	216	345	50	164	103	62	65	40	53	29	77	-
BOD	mg/L	<2	<2	ND (12)	<20	<20	<20	<2	<5	<5	<5	3	20	<4	<4	6	-
Anion Sum		4.9	5.58	14.9	10.7	14.6	19.1	7									-
Cation Sum		4.69	5.24	13.8	9.07	14.6	14.7	6.3									-
Ion Balance	%	2.15	3.1	-3.8	-8.3	<0.1	-13.1	-9.9									-
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.002	<0.002	<0.0001	<0.0001	0.00009	<0.00005	< 0.00005	< 0.00005	-
Aluminum	mg/L	0.13	0.1	1.9	2.07	0.036	0.563	0.18	0.459	0.236	0.226	0.754	0.451	0.236	0.358	0.159	0.1
Antimony	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.003	<0.003	<0.001	<0.001	< 0.0009	<0.0009	< 0.0009	< 0.0009	0.006
Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.003	<0.003	<0.001	<0.001	0.0019	0.0009	0.0009	0.0003	0.010
Barium	mg/L	0.12	0.11	0.093	207	0.269	0.053	0.034	0.106	0.067	0.129	0.154	0.158	0.074	0.0597	0.023	1.00
Beryllium	mg/L	<0.0005	<0.0005	0.0008	0.0006	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005	0.000074	0.000043	0.000043	0.000023	-
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	< 0.00001	<0.00001	< 0.00001	< 0.00001	< 0.00001	-
Boron	mg/L	0.48	0.37	2.32	1.1	1.44	1.63	1.71	3.15	2.41	2.72	2.63	2.65	1.88	1.25	0.49	5
Cadmium	mg/L	0.00031	0.00018	0.0005	0.0009	<0.001	0.0004	0.0002	<0.001	<0.001	0.0002	0.0003	0.000279	0.000111	0.000097	0.000031	0.005
Chromium	mg/L	<0.005	<0.005	0.016	0.003	0.002	0.004	0.001	0.005	0.004	0.003	0.004	0.00528	0.00283	0.00260	0.00089	0.05
Cobalt	mg/L	0.00062	<0.0005	0.0444	0.0167	0.0044	0.0374	0.0039	0.021	0.006	0.0096	0.0069	0.0318	0.00727	0.00594	0.000988	-
Copper	mg/L	0.0041	0.0044	0.0137	0.0064	0.0174	0.0114	0.004	0.012	0.024	0.011	0.018	0.006	0.013	0.0093	0.004	1
Molybdenum	mg/L	0.001	0.0032	<0.0005	<0.0005	0.0017	0.0016	0.0005	<0.002	0.004	0.003	0.004	0.00419	0.00527	0.00225	0.00101	-
Nickel	mg/L	0.0056	0.0021	0.012	0.011	0.005	0.011	0.003	0.007	0.007	0.008	0.007	0.0124	0.0066	0.0051	0.0013	-
Phosphate	mg/L			<0.0002	<0.2	<0.2	<0.2	<0.2	<1.0	<0.50	<0.50	<0.50	< 0.03				-
Lead	mg/L	<0.0005	<0.0005	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0005	<0.0005	0.00013	<0.00009	< 0.00009	< 0.00009	0.01
Selenium	mg/L	<0.002	<0.002	0.001	<0.001	<0.001	0.004	0.002	<0.004	<0.004	<0.001	0.003	0.00172	0.00107	0.00078	0.00024	0.05
Silicon	mg/L	5.3	5.7	4.42	3.42	4.76	1.32	1.24	2	1	2	2	2	1	1.54	2	-
Tin	mg/L	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	0.127	<0.002	<0.002	0.00024	0.00014	0.00013	< 0.00006	-
Strontium	mg/L	0.16	0.21	0.057	0.089	0.956	0.136	0.084	0.177	<0.002	0.272	0.175	0.268	0.140	0.109	0.037	-
Titanium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	<0.005	0.006	0.005	<0.002	0.021	0.01066	0.00447	0.00423	0.00148	-
Uranium	mg/L	0.0015	0.0034	0.0024	0.0012	0.0072	0.0034	0.0006	0.006	0.003	0.0075	0.0052	0.00783	0.00448	0.00222	0.000358	0.02
Vanadium	mg/L	<0.0005	<0.0005	0.0038	0.0015	0.0005	0.0009	<0.0005	<0.002	<0.002	<0.002	<0.002	0.00283	0.00058	0.00085	0.00017	-
Zinc	mg/L	0.0059	0.0076	0.022	0.062	0.007	0.024	0.009	0.010	0.012	0.005	0.008	0.010	0.004	0.004	< 0.002	5
Field Measurements																	
Temperature	oC	-	-	-	-	-	-	-	11.1	15	10.9	13.07	8.27	14.4	7.9	10.9	-
pH	pH Units	6.01	5.22	5.43	5.09	5.85	6.8	8.06	6.6	6.3	6.6	6.5	6.3	6.4	16.2	6.5	6.5-8.5
Conductivity	uS/cm	473	233	1475	-	-	1.35	0.85	1972	1305	2289	1139	1650	1170	684	225	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	129.2	83.7	120.7	172	38.7	97.4	85.6	93	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	1.96	1.26	1.8	6.47	2.96	0.9	1.79	1.16	-

Notes: Ontario Drinking Water Quality Standards* Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 8
Groundwater Quality Results - DP-7
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation Sample Collection Date (mm/dd/yyyy)													ODWQS
		DP-7													
		08/06/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021	04/05/2022	10/18/2022	
pH Lab	pH Units	DRY	DRY	DRY	DRY	DRY	6.49	6.71	Insufficient	Insufficient	Insufficient	Water	Water	Insufficient	6.5-8.5
Conductivity	uS/cm						41	122	volume	volume	volume	level	Level	Volume	-
Hardness	mg/L						15.2	48	for sample	for sample	for sample	only	Only	for sample	80-100
Total Dissolved Solids	mg/L						114	78							500
Alkalinity	mg/L						9	36							30-500
Chloride	mg/L						2.06	0.6							250
Sodium	mg/L						1.68	2.8							200
Calcium	mg/L						4.6	13.5							-
Magnesium	mg/L						0.90	3.47							-
Potassium	mg/L						0.16	0.27							-
Sulphate	mg/L						7.5	15.9							500
Ammonia	mg/L						0.48	<0.02							-
Nitrate as N	mg/L						0.06	0.07							10
Nitrite as N	mg/L						<0.05	<0.05							1
Total Kjeldahl Nitrogen	mg/L						1.14	1.69							-
Phenolics	mg/L						0.004	0.001							-
Dissolved Organic Carbon	mg/L						8.5	5.3							5
Chemical Oxygen Demand	mg/L						33	156							-
Iron	mg/L						7.26	0.342							0.3
Manganese	mg/L						0.549	0.082							0.05
Phosphorus	mg/L						0.54	3.78							-
Orthophosphate	mg/L														-
Turbidity	NTU						1100	6240							5
Total Suspended Solids	mg/L						7060	3780							-
BOD	mg/L						7	<5							-
Anion Sum															-
Cation Sum															-
Ion Balance	%														-
Silver	mg/L						<0.002	<0.002							-
Aluminum	mg/L						0.325	0.392							0.1
Antimony	mg/L						<0.003	<0.003							0.006
Arsenic	mg/L						<0.003	<0.003							0.010
Barium	mg/L						0.011	0.010							1
Beryllium	mg/L						<0.001	<0.001							-
Bismuth	mg/L						<0.002	<0.002							-
Boron	mg/L						0.129	0.086							5
Cadmium	mg/L						<0.001	<0.001							0.005
Chromium	mg/L						<0.003	<0.003							0.05
Cobalt	mg/L						0.004	<0.001							-
Copper	mg/L						<0.003	<0.003							1
Molybdenum	mg/L						<0.002	<0.002							-
Nickel	mg/L						0.004	<0.003							-
Phosphate	mg/L						<0.10	<0.10							-
Lead	mg/L						<0.001	<0.001							0.01
Selenium	mg/L						<0.004	<0.004							0.05
Silicon	mg/L						4.36	5.43							-
Tin	mg/L						<0.002	0.056							-
Strontium	mg/L						0.031	<0.002							-
Titanium	mg/L						0.004	0.014							-
Uranium	mg/L						<0.002	<0.002							0.02
Vanadium	mg/L						0.004	0.004							-
Zinc	mg/L						0.013	0.008							5
Field Measurements															
Temperature	oC						13.1	14.8							-
pH	pH Units						6.48	6.33							6.5-8.5
Coductivity	uS/cm						82.9	76.7							-
Oxidation Reduction Potenti	mV						149.3	113.5							-
Dissolved Oxygen	mg/L						7.75	7.31							-

Notes: Ontario Drinking Water Quality Standards* Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 9
Groundwater Quality Results - BH-12
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation						ODWQS
		Sample Collection Date (mm/dd/yyyy)						
		BH-12						
		06/2/2020	10/1/2020	5/12/2021	10/7/2021	04/05/2022	10/18/2022	
pH Lab	pH Units	7.09	6.70	7.35	7.65	7.60	7.50	6.5-8.5
Conductivity	uS/cm	266	205	152	182	158	153	-
Hardness	mg/L	91.9	80.9	61.9	78.5	67.6	68.9	80-100
Total Dissolved Solids	mg/L	134	116	97	147	131	100	500
Alkalinity	mg/L	92	97	56	70	67	64	30-500
Chloride	mg/L	6	9	4	9	5	5	250
Sodium	mg/L	15	12	5	6	6.12	5	200
Calcium	mg/L	30.9	27.6	20.9	27.3	23.4	24.1	-
Magnesium	mg/L	3.59	2.92	2.36	2.50	2.21	2.13	-
Potassium	mg/L	7.87	3.00	1.30	1.60	1.15	1.27	-
Sulphate	mg/L	12	17	8	9	12	9	500.0
Ammonia	mg/L	0.25	0.11	0.08	0.08	0.06	0.08	-
Nitrate as N	mg/L	<0.05	0.1	< 0.03	0.1	< 0.06	< 0.06	10
Nitrite as N	mg/L	<0.05	<0.05	< 0.06	<0.03	< 0.03	< 0.03	1
Total Kjeldahl Nitrogen	mg/L	0.45	0.3	0.17	0.1	0.12	0.08	-
Phenolics	mg/L	0.001	<0.001	< 0.002	<0.002	< 0.002	< 0.002	-
Dissolved Organic Carbon	mg/L	4.7	4.9	4.0	4.0	4	4.0	5
Chemical Oxygen Demand	mg/L	10	<5	10	9	9	10	-
Iron	mg/L	1.91	3.8	1.56	1.19	1.49	1.25	0.3
Manganese	mg/L	1.18	0.42	0.38	0.38	0.369	0.37	0.05
Phosphorus	mg/L	0.43	0.80	0.24	0.06	0.10	0.08	-
Orthophosphate	mg/L	<0.10			-	0.03		-
Turbidity	NTU	406	550	107	11	5.55	60	5
Total Suspended Solids	mg/L	316	1500	931	153	239	271	-
BOD	mg/L	<5	<2	< 10	<4	< 4	< 4	-
Anion Sum					-			-
Cation Sum					-			-
Ion Balance	%				-			-
Silver	mg/L	<0.0001	<0.0001	< 0.00005	<0.00005	< 0.00005	< 0.00005	-
Aluminum	mg/L	0.117	1.340	0.054	0.038	0.050	0.041	0.1
Antimony	mg/L	<0.001	<0.001	< 0.0009	<0.0009	< 0.0009	< 0.0009	0.006
Arsenic	mg/L	<0.001	0.002	0.0007	0.0009	0.0006	0.0011	0.010
Barium	mg/L	0.067	0.057	0.044	0.048	0.0525	0.045	1.00
Beryllium	mg/L	<0.0005	<0.0005	0.000043	0.000045	0.000034	0.000042	-
Bismuth	mg/L	<0.002	<0.002	< 0.00001	<0.00001	< 0.00001	< 0.00001	-
Boron	mg/L	0.16	0.07	0.05	0.08	0.117	0.09	5
Cadmium	mg/L	<0.0001	<0.0001	0.000006	0.000014	0.000007	0.000004	0.005
Chromium	mg/L	<0.002	<0.002	0.00029	0.00023	0.00030	0.00027	0.05
Cobalt	mg/L	0.0008	<0.0005	0.00009	0.000106	0.000190	0.000161	-
Copper	mg/L	<0.001	0.002	< 0.0002	0.001	0.0019	0.000	1
Molybdenum	mg/L	0.005	<0.002	0.00088	0.00104	0.00075	0.00096	-
Nickel	mg/L	<0.003	<0.003	0.0003	0.0003	0.0005	0.0002	-
Phosphate	mg/L		<0.10	0.11	-			-
Lead	mg/L	<0.0005	0.0008	< 0.00009	<0.00009	< 0.00009	< 0.00009	0.01
Selenium	mg/L	<0.001	<0.001	< 0.00004	<0.00004	< 0.00004	0.00004	0.05
Silicon	mg/L	5	8	6	6	4.69	6	-
Tin	mg/L	<0.002	<0.002	< 0.00006	<0.00006	0.00014	< 0.00006	-
Strontium	mg/L	0.089	0.096	0.105	0.124	0.113	0.117	-
Titanium	mg/L	0.004	0.144	0.00083	0.000109	0.00069	0.00074	-
Uranium	mg/L	0.0012	0.0007	0.000193	0.000191	0.000195	0.000199	0.02
Vanadium	mg/L	<0.002	<0.002	0.00037	0.00034	0.00042	0.00039	-
Zinc	mg/L	<0.005	0.012	< 0.002	0.003	0.004	< 0.002	5
Field Measurements								
Temperature	oC	7.8	11.3	6.65	13.4	6.4	9.4	-
pH	pH Units	6.7	6.6	6.1	6.3	16.2	6.6	6.5-8.5
Conductivity	uS/cm	272	158	76	154	107	114	-
Oxidation Reduction Potential	mV	108.7	61.1	86	29.4	-0.7	59.4	-
Dissolved Oxygen	mg/L	1.15	7.55	5.05	1.06	1.19	5.2	-

Notes: Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

- BOLD** Exceeds ODWQS
- INSV Insufficient volume to allow for sampling
- NC Not Calculated
- CNL Could Not Locate
- LS Limited Sample
- Units All Units in mg/L Unless Otherwise Noted.

TABLE 10
Groundwater Quality Results - BH-13
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation						ODWQS
		Sample Collection Date (mm/dd/yyyy)						
		BH-13						
		06/2/2020	10/1/2020	5/12/2021	10/7/2021	04/05/2022	10/18/2022	
pH Lab	pH Units	7.32	6.74	7.42	7.41	7.22	7.09	6.5-8.5
Conductivity	uS/cm	291	206	90	130	88	152	-
Hardness	mg/L	103	108	43	50.5	36.6	41.6	80-100
Total Dissolved Solids	mg/L	178	114	60	120	83	60	500
Alkalinity	mg/L	106	116	35	55	32	53	30-500
Chloride	mg/L	14	7	3	6	5	12	250
Sodium	mg/L	9	3	1	2	1.65	3	200
Calcium	mg/L	32.9	36.3	14.5	16.9	12.2	14.0	-
Magnesium	mg/L	5.17	4.21	1.65	2.00	1.48	1.62	-
Potassium	mg/L	5.82	2.45	0.95	1.47	0.721	0.77	-
Sulphate	mg/L	2	3	4	4	5	4	500.0
Ammonia	mg/L	0.08	0.48	0.04	0.37	< 0.04	0.30	-
Nitrate as N	mg/L	<0.05	<0.05	< 0.03	<0.06	< 0.06	0.1	10
Nitrite as N	mg/L	<0.05	<0.05	< 0.06	<0.03	< 0.03	< 0.03	1
Total Kjeldahl Nitrogen	mg/L	2.52	0.92	0.17	0.56	0.08	0.65	-
Phenolics	mg/L	0.006	0.002	<0.002	<0.002	< 0.002	< 0.002	-
Dissolved Organic Carbon	mg/L	27.8	5.6	4.0	5.0	3	6.0	5
Chemical Oxygen Demand	mg/L	221	18	11	19	< 8	24	-
Iron	mg/L	7.29	2.26	0.245	1.48	0.144	0.341	0.3
Manganese	mg/L	0.695	0.515	0.184	0.212	0.129	0.192	0.05
Phosphorus	mg/L	31.90	8.74	0.90	3.46	0.17	3.73	-
Orthophosphate	mg/L	<0.10			-	0.03		-
Turbidity	NTU	28700	23200	42	43	28.6	2100	5
Total Suspended Solids	mg/L	39600	18600	1360	10300	590	7370	-
BOD	mg/L	35	2	< 10	<4	< 4	< 4	-
Anion Sum					-			-
Cation Sum					-			-
Ion Balance	%				-			-
Silver	mg/L	<0.0001	<0.0001	< 0.00005	0.00024	0.00006	< 0.00005	-
Aluminum	mg/L	0.134	0.070	0.084	0.502	0.117	0.092	0.1
Antimony	mg/L	<0.001	<0.001	< 0.0009	<0.0009	< 0.0009	< 0.0009	0.006
Arsenic	mg/L	<0.001	<0.001	0.0008	0.0011	0.0003	0.0004	0.010
Barium	mg/L	0.041	0.054	0.037	0.048	0.0389	0.035	1.00
Beryllium	mg/L	<0.0005	<0.0005	0.000043	0.000145	0.000056	0.000088	-
Bismuth	mg/L	<0.002	<0.002	< 0.00001	<0.00001	< 0.00001	< 0.00001	-
Boron	mg/L	0.05	0.03	0.01	0.04	0.015	0.08	5
Cadmium	mg/L	<0.0001	<0.0001	0.00005	0.000042	0.000056	0.000049	0.005
Chromium	mg/L	<0.002	<0.002	0.00033	0.00047	0.00040	0.00037	0.05
Cobalt	mg/L	0.0009	<0.0005	0.00026	0.000362	0.000232	0.000167	-
Copper	mg/L	<0.001	<0.001	0.003	0.005	0.0090	0.005	1
Molybdenum	mg/L	0.006	<0.002	0.00041	0.0003	0.00023	0.00019	-
Nickel	mg/L	<0.003	<0.003	0.0009	0.0008	0.0010	0.0006	-
Phosphate	mg/L		<0.10	0.19	-			-
Lead	mg/L	<0.0005	<0.0005	< 0.00009	0.00045	< 0.00009	< 0.00009	0.01
Selenium	mg/L	<0.001	<0.001	0.00008	0.00011	0.00008	0.00014	0.05
Silicon	mg/L	5.6	5.6	3.6	4.4	2.75	3.2	-
Tin	mg/L	<0.002	<0.002	< 0.00006	0.00006	0.00023	< 0.00006	-
Strontium	mg/L	0.087	0.062	0.034	0.035	0.0248	0.028	-
Titanium	mg/L	<0.002	0.002	0.00153	0.0448	0.00190	0.00078	-
Uranium	mg/L	0.002	0.0013	0.00365	0.00296	0.00253	0.00324	0.02
Vanadium	mg/L	<0.002	<0.002	0.0006	0.00171	0.00055	0.00045	-
Zinc	mg/L	<0.005	<0.005	0.006	0.008	0.012	0.004	5
Field Measurements								
Temperature	oC	7.9	11.93	8.5	15	6.9	10.5	-
pH	pH Units	6.3	6.8	5.8	6.0	16.2	6.5	6.5-8.5
Conductivity	uS/cm	287	171	63	102	55	81	-
Oxidation Reduction Potential	mV	259	83.1	111.4	83	61	61.8	-
Dissolved Oxygen	mg/L	3.43	7.45	2.89	14.7	3.01	1.68	-

Notes: Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

- BOLD** Exceeds ODWQS
- INSV Insufficient volume to allow for sampling
- NC Not Calculated
- CNL Could Not Locate
- LS Limited Sample
- Units All Units in mg/L Unless Otherwise Noted.

TABLE 11
Groundwater Quality Results - BH-14
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation						ODWQS
		Sample Collection Date (mm/dd/yyyy)						
		BH-14						
		06/2/2020	10/1/2020	5/12/2021	10/7/2021	04/05/2022	10/18/2022	
pH Lab	pH Units	7.01	6.69	7.67	7.63	7.67	7.61	6.5-8.5
Conductivity	uS/cm	472	408	406	305	409	234	-
Hardness	mg/L	106	130	135	106	160	93.1	80-100
Total Dissolved Solids	mg/L	288	256	306	207	143	143	500
Alkalinity	mg/L	67	118	86	84	90	81	30-500
Chloride	mg/L	87	73	56	41	66	21	250
Sodium	mg/L	31	27	14	11	11.3	6	200
Calcium	mg/L	31.3	39.8	41.0	33.4	51.1	29.7	-
Magnesium	mg/L	6.84	7.49	7.88	5.42	7.99	4.59	-
Potassium	mg/L	8.35	6.14	3.66	3.50	3.45	2.52	-
Sulphate	mg/L	4	7	19	17	29	12	500.0
Ammonia	mg/L	0.02	0.29	0.36	0.29	0.09	0.15	-
Nitrate as N	mg/L	<0.05	<0.05	< 0.03	<0.06	< 0.06	< 0.06	10
Nitrite as N	mg/L	<0.05	<0.05	< 0.06	<0.03	< 0.03	< 0.03	1
Total Kjeldahl Nitrogen	mg/L	0.98	0.96	0.5	0.46	0.16	0.29	-
Phenolics	mg/L	0.003	<0.001	< 0.002	<0.002	< 0.002	< 0.002	-
Dissolved Organic Carbon	mg/L	24.8	23.4	16.0	4.0	4	2.0	5
Chemical Oxygen Demand	mg/L	75	35	42	22	11	< 8	-
Iron	mg/L	3.77	4.35	4.52	2.87	4.60	1.67	0.3
Manganese	mg/L	1.19	1.12	1.31	0.75	1.16	0.54	0.05
Phosphorus	mg/L	4.98	7.38	5.69	1.73	0.43	1.81	-
Orthophosphate	mg/L	<0.10			-	0.04		-
Turbidity	NTU	5920	6190	226	180	1010	750	5
Total Suspended Solids	mg/L	8970	4150	11400	710	1400	2850	-
BOD	mg/L	32	8	5	<4	< 4	< 4	-
Anion Sum					-			-
Cation Sum					-			-
Ion Balance	%				-			-
Silver	mg/L	<0.0001	<0.0001	< 0.00005	<0.00005	< 0.00005	< 0.00005	-
Aluminum	mg/L	0.144	0.083	0.207	0.051	0.087	0.051	0.1
Antimony	mg/L	<0.001	<0.001	< 0.0009	<0.0009	< 0.0009	< 0.0009	0.006
Arsenic	mg/L	0.002	0.002	0.0006	0.0005	0.0004	0.0003	0.010
Barium	mg/L	0.103	0.109	0.093	0.061	0.0874	0.043	1.00
Beryllium	mg/L	<0.0005	<0.0005	0.000091	0.000056	0.000058	0.000031	-
Bismuth	mg/L	<0.002	<0.002	< 0.00001	<0.00001	< 0.00001	< 0.00001	-
Boron	mg/L	0.22	0.17	0.08	0.11	0.080	0.05	5
Cadmium	mg/L	<0.0001	<0.0001	< 0.000003	<0.000003	< 0.000003	0.000004	0.005
Chromium	mg/L	<0.002	<0.002	0.00043	0.00019	0.00024	0.00018	0.05
Cobalt	mg/L	0.0019	0.0016	0.00104	0.000525	0.000687	0.000283	-
Copper	mg/L	<0.001	0.001	0.001	0.000	0.0018	< 0.0002	1
Molybdenum	mg/L	<0.002	<0.002	0.00015	0.00044	0.00026	0.00056	-
Nickel	mg/L	0.007	<0.003	0.0008	0.0004	0.0005	0.0001	-
Phosphate	mg/L		<0.10	0.42	-			-
Lead	mg/L	<0.0005	<0.0005	< 0.00009	<0.00009	< 0.00009	< 0.00009	0.01
Selenium	mg/L	<0.001	0.012	0.00012	0.00006	0.00005	< 0.00004	0.05
Silicon	mg/L	4	8	11	9	10.6	11	-
Tin	mg/L	<0.002	<0.002	0.00007	<0.00006	0.00013	< 0.00006	-
Strontium	mg/L	0.161	0.154	0.209	0.144	0.208	0.124	-
Titanium	mg/L	<0.002	<0.002	0.00745	0.00156	0.00196	0.00112	-
Uranium	mg/L	0.0006	<0.0005	0.000581	0.000499	0.000153	0.000321	0.02
Vanadium	mg/L	<0.002	<0.002	0.00141	0.0007	0.00085	0.0003	-
Zinc	mg/L	<0.005	<0.005	0.002	0.003	0.003	< 0.002	5
Field Measurements								
Temperature	oC	7.7	12.7	7.03	15.2	6.1	10.2	-
pH	pH Units	6.4	6.3	16.1	6.6	16.2	6.9	6.5-8.5
Conductivity	uS/cm	442	332	243	270	263	168	-
Oxidation Reduction Potential	mV	46.2	55.3	27.9	-25.2	-14.7	-18.8	-
Dissolved Oxygen	mg/L	1.12	6.95	3.84	0.69	1.04	1.02	-

Notes: Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 12
B-7 Guideline Calculations - Spring 2022
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation							ODWQS	Guideline B-7 Calculation			
		Sample Collection Date (dd/mm/yyyy)								Cm = Cb + x (Cr - Cb)			
		BH8	BH9	BH10	BH11	BH12	BH13	BH14		Cb	x	Cr	Cm
Chloride	mg/L	< 1	20	340	79	5	5	66	250	6.0	0.5	250	128.0
Sulphate	mg/L	5	16	24	65	12	5	29	500	7.50	0.5	500	253.8
Sodium	mg/L	3.63	15.4	147	96.5	6.12	1.65	11.3	200	5	0.5	200	102.7
Boron	mg/L	0.007	0.300	0.966	1.25	0.117	0.015	0.080	5	0.02	0.25	5	1.27
Nitrate	mg/L	0.11	< 0.06	0.29	0.56	< 0.06	< 0.06	< 0.06	10	0.04	0.25	10	2.53
Alkalinity	mg/L	8	122	413	321	67	32	90	30-500	37	0.5	30-500	33.2-268.2
Dissolved Organic Carbon	mg/L	4	19	17	51	4	3	4	5	12	0.5	5	8.4
Total Dissolved Solids	mg/L	40	220	946	580	131	83	143	500	104	0.5	500	302.2
Iron	mg/L	0.073	15.9	0.020	0.229	1.49	0.144	4.60	0.3	5.83	0.5	0.3	3.1
Manganese	mg/L	0.00278	1.43	1.63	1.24	0.369	0.129	1.16	0.05	0.872	0.5	0.05	0.46

Notes:

Ontario Drinking Water Quality Standards*

Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds Cm value.
INSV	Insufficient volume to allow for sampling
NC	Not Calculated due to the background concentration being in exceedance of the ODWQS.
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration - average of valid sampling rounds at BH1
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 13
B-7 Guideline Calculations - Fall 2022
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units								ODWQS	Guideline B-7 Calculation Cm = Cb + x (Cr - Cb)			
		BH8	BH9	BH10	BH11	BH12	BH13	BH14		Cb	x	Cr	Cm
		18-Oct-22	18-Oct-22	18-Oct-22	18-Oct-22	18-Oct-22	18-Oct-22	44852					
Chloride	mg/L	< 1	75.0	420	43	5	12	21	250	6.6	0.5	250	128.3
Sulphate	mg/L	7	25	27	28	9	4	12	500	8.26	0.5	500	254.1
Sodium	mg/L	2	41	175	23	5	3	6	200	5.75	0.5	200	102.9
Boron	mg/L	0.027	1.17	1.29	0.49	0.09	0.08	0.05	5	0.03	0.25	5	1.27
Nitrate	mg/L	0.080	< 0.06	1.57	0.9	< 0.06	0.08	< 0.06	10	0.04	0.25	10	2.53
Alkalinity	mg/L	30	230	461	54	64	53	81	30-500	40	0.5	30-500	33.2 - 268.2
Dissolved Organic Car	mg/L	3	29	17	15	4	6	2	5	12	0.5	5	8.6
Total Dissolved Solids	mg/L	< 30	423	1220	163	100	60	143	500	113	0.5	500	306.5
Iron	mg/L	0.1	21.0	0.044	0.141	1.25	0.34	1.67	0.3	6.37	0.5	0.3	3.3
Manganese	mg/L	0.0146	3.94	2.26	0.399	0.365	0.192	0.536	0.05	0.942	0.5	0.05	0.50

Notes:

Ontario Drinking Water
Quality Standards*

Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds Cm value.
INSV	Insufficient volume to allow for sampling
NC	Not Calculated due to the background concentration being in exceedance of the ODWQS.
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration - average of valid sampling rounds at BH1
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 14
Surface Water Quality Results - SW-1
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation																PWQO	CWQG		
		Sample Collection Date (mm/dd/yyyy)																			
		04/08/2014	10/30/2014	05/13/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	05/02/2018	10/17/2018	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021	04/05/2022			18-Oct-22	
SW-1																					
pH Lab	pH units	6.21	6.02	6.01	6.44	6.3	6.2	6.1	5.8	5.4	4	5	DRY	5	4	4	6.29	5	6.5-8.5	6.5-9.0	
Conductivity	uS/cm	23	23	27	400	186	27	45	20	72	478	89		676	780	635	699	490			
Hardness	mg/L	10	11	11	150	56	12	22	7	27	80	22		158	221	213	248	148			
Total Dissolved Solids	mg/L	42	76	48	270	184	154	84	24	84	432	80		418	449	480	383	250			
Alkalinity	mg/L	5.5	5.9	3.8	7.8	12	7	10	6	7	<5	<5		<5	<2	<2	7	<2			
Chloride	mg/L	<1	<1	3	100	41	2	5	1	10	149	17		231	260	240	240	160		120	
Sodium	mg/L	0.63	0.65	0.9	6.6	3.7	1.44	0.885	0.781	1.18	14	3		23	27	33	25.6	18			
Calcium	mg/L	3.3	3.6	3	32	14.9	3.96	6.41	2.1	7.99	32	5		38	58	52	70.1	41			
Magnesium	mg/L	0.52	0.59	0.47	13	4.53	0.58	1.33	0.394	1.76	14	2		15	19	20	17.8	11			
Potassium	mg/L	0.27	0.31	0.38	6.5	1.23	0.34	1.47	0.468	1.37	2	1		2	3	2	4.04	3			
Sulphate	mg/L	<1	<1	<1	15	2	1	<1	2	6	4	3		3	<2	2	2	3			
Ammonia	mg/L	<0.05	<0.05	<0.05	0.058	0.06	0.01	<0.01	0.02	0.05	0.18	0.15		<0.02	<0.04	<0.04	<0.04	<0.04			
Nitrate as N	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05		<0.10	<0.06	0	<0.06	<0.06		13	
Nitrite as N	mg/L	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.10	<0.03	<0.03	<0.03	<0.03		0.06	
Total Kjeldahl Nitrogen	mg/L	1	0.55	0.49	0.67	0.8	0.6	0.9	0.3	1	0.41	2		0.45	0.14	0.35	0.19	0.21			
Phenolics	mg/L	<0.001	0.0049	<0.001	<0.001	0.009	<0.001	0.006	<0.001	<0.001	0.001	0.01		0.003	0.002	0.004	0.003	0.004		0.001	0.004
Dissolved Organic Carbon	mg/L	13	21	16	14	24.1	16.3	27.5	7.6	44.8	4	12		10	2	4	3	10			
Chemical Oxygen Demand	mg/L	27	56	47	38	81	55	77	28	85	8	10		20	13	30	19	14			
Iron	mg/L	0.12	0.29	0.15	0.65	0.981	0.167	0.888	0.2	0.794	2	0.42		6	5	10	0.208	1		0.3	0.3
Manganese	mg/L	0.0094	0.028	0.019	0.23	0.038	0.072	0.152	0.022	0.079	1	0.10		1	1	2	0.894	1			
Phosphorus	mg/L	0.01	0.009	0.008	0.026	<0.01	<0.01	0.03	<0.01	0.04	0.04	0.05		0.02	<0.03	0.04	<0.003	0.03		0.03	
Orthophosphate	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.10	<0.10		-	-	-	<0.03	-			
Turbidity	NTU	0.2	0.3	0.4	2.5	1.5	0.7	1.4	2.1	0.9	6	3		5	-	-	-	-			
Total Suspended Solids	mg/L	<10	<10	<1	<10	4	<2	4	2	<2	38	<10		10	8	63	12	4			
BOD	mg/L	<2	2	<2	<2	<12	<2	<2	<2	<5	<5	<5		<5	<4	<4	<4	<4			
Anion Sum		0.109	0.117	0.175	3.28	1.41	0.23	0.35	0.19	0.54											
Cation Sum		0.272	0.281	0.339	3.58	1.31	0.32	0.51	0.18	0.63											
Ion Balance	%	NC	NC	NC	4.34	-3.9		-1.5	8.1												
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	1.18	<0.0001	<0.0001		<0.0001	<0.0005	<0.0005	<0.0005	<0.0005		0.001	0.0025
Aluminum	mg/L	0.26	0.34	0.26	0.22	0.167	0.228	0.265	0.133	0.375	0.72	0.28		1.42	1.20	0.53	0.239	0.37		0.075	0.1
Antimony	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001		<0.001	<0.0009	<0.0009	<0.0009	<0.0009		0.02	
Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003		<0.003	<0.0002	0	<0.0002	0		0.1	0.005
Barium	mg/L	0.012	0.013	0.012	0.17	0.055	0.017	0.02	0.005	0.028	0.088	0.023		0.106	0.152	0.133	0.126	0.098			
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	0	0	0.000033	0		1.1	
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002		<0.002	<0.00001	0	<0.00001	<0.00001			
Boron	mg/L	<0.01	<0.01	<0.01	0.015	<0.05	0.049	<0.01	0.011	<0.01	<0.010	0.093		0	0	0	0.015	0		0.2	1.5
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	0.0001		0.0002	0.0002	0.0004	0.000209	0.0005		0.0002	0.00026
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003		<0.003	0	0	<0.00008	0		0.0089	0.001
Cobalt	mg/L	<0.0005	<0.0005	<0.0005	0.0023	<0.0025	0.0013	0.0022	<0.0005	0.0013	0.007	0.001		0.013	0.011	0.012	0.00642	0.006		0.0009	
Copper	mg/L	0.0018	<0.001	0.0012	0.0017	<0.0025	0.0016	<0.0005	0.0009	0.0025	0.001	0.003		0.002	0.001	0.001	0.0004	0.003		0.005	0.004
Molybdenum	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002		<0.002	<0.00004	0	<0.00004	0		0.04	0.073
Nickel	mg/L	0.0017	0.0025	0.002	0.0025	<0.005	0.002	0.002	<0.001	0.004	0.003	<0.003		0.006	0.006	0.005	0.0034	0.003		0.025	0.15
Phosphate	mg/L					<0.0002	<0.2	<0.0002	<0.0002	<0.2	<0.10	<0.10		<0.20	0	-	-	-			
Lead	mg/L	0.00055	0.00066	0.00071	<0.0005	<0.0005	0.0007	0.0005	0.0001	0.0008	<0.001	<0.001		<0.001	0	0	<0.00009	0		0.005	0.01
Selenium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.005	<0.001	<0.001	<0.001	<0.001	<0.004	<0.004		<0.004	<0.00004	<0.00004	0.00006	0		0.1	0.001
Silicon	mg/L	0.77	3.3	0.94	1.7	1.54	0.856	3.27	1.99	1.8	2	2		4	3	4	3.16	3			
Tin	mg/L	<0.001	<0.001	<0.001	<0.001	<0.025	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002		<0.002	<0.00006	0	<0.00006	<0.00006			
Strontium	mg/L	0.017	0.017	0.016	0.24	0.124	0.014	0.045	0.013	0.059	0.31	0.07		0.38	0.69	0.60	0.860	0.47			
Titanium	mg/L	<0.005	<0.005	<0.005	0.017	<0.025	<0.005	0.006	<0.005	0.006	0.00	0.01		0.00	0.01	0.01	<0.00005	0.00236			
Uranium	mg/L	0.00017	<0.0001	<0.0001	0.00012	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002		<0.002	0	0	0.000009	0.000048		0.005	0.02
Vanadium	mg/L	<0.0005	<0.0005	<0.0005	0.00058	<0.0025	0.0005	<0.0005	<0.0005	0.0007	<0.002	<0.002		<0.002	0	0	0.00008	0.00042		0.006	
Zinc	mg/L	0.0061	0.016	0.0066	0.02	<0.025	0.012	0.013	0.009	0.021	0.12	0.05		0.09	0.16	0.06	0.254	0.114		0.03	0.093
Field Measurements																					
Temperature	oC									14.7	15.6			12.66	10.92	15.9	8.9	8			
pH	pH Units	7.36	6.92	6.53	6.25	6.45	5.81		7.37	6.64	6.9	4.5		4.5	16.2	5.2	16.1	5.1			
Conductivity	uS/cm	41	21	19.2	303	1975			0.03	0.08	772	83		550	683	800	603	167			
Oxidation Reduction Potential	mV										174.9	226.3		276.5	172.7	191	88.3	153.6			
Dissolved Oxygen	mg/L										1.26	3.6		9.62	8.3						

TABLE 15
Surface Water Quality Results - SW-2
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation																PWQO	CWQG		
		Sample Collection Date (mm/dd/yyyy)																			
		SW-2																			
		05/08/2014	10/30/14	05/13/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	05/02/2018	10/17/2018	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021	04/05/2022	18-Oct-22			
pH Lab	pH units	5.79	5.83	5.88	6.6	6.6	4.1	5.6	5.9	6	5.82	5.16	6.98	6.66	6.80	5.82	6.34	6	6.5-8.5	6.5-9.0	
Conductivity	uS/cm	15	18	15	32	27	45	16	13	19	21	33	32	23	25	17	14	22			
Hardness	mg/L	4.3	5.2	5	13	7	5	5	3	7	4	11.3	8.1	9.5	8.4	7	4.4	8			
Total Dissolved Solids	mg/L	24	52	<10	26	34	132	16	14	20	42	94	36	<20	<30	<30	43	<30			
Alkalinity	mg/L	1.2	2.1	1.8	9.3	9	<5	<5	<5	6	<5	<5	5	13	7	3	4	2			
Chloride	mg/L	<1	1	1	<1	1	<1	<1	1	<1	2.05	0.6	0.86	0.9	2.0	<1	<1	<1		120	
Sodium	mg/L	0.8	1.1	0.89	0.85	1	0.711	0.706	0.811	0.701	1.7	1.1	1.1	1.0	1.1	4.4	0.63	1			
Calcium	mg/L	1.2	1.6	1.3	3.2	2.74	1.51	1.36	0.798	2.03	1.6	3.0	2.4	2.8	2.6	2.1	1.33	2			
Magnesium	mg/L	0.3	0.43	0.34	1.1	<1	0.085	0.368	0.211	0.442	0.40	0.93	0.50	0.59	0.49	0.44	0.273	1			
Potassium	mg/L	0.24	0.38	0.39	0.88	<0.5	0.357	0.521	0.398	0.309	0.33	0.71	0.62	0.58	0.49	0.86	0.284	1			
Sulphate	mg/L	2	<1	<1	<1	3	3	<1	1	2	0.7	3.9	2.9	1.9	<2	<2	<2	<2			
Ammonia	mg/L	0.059	<0.05	<0.05	<0.05	0.04	0.02	0.02	0.03	0.03	0.14	0.18	<0.02	0.03	<0.04	<0.04	<0.04	<0.04			
Nitrate as N	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	1.8	<0.1	<0.1	<0.1	<0.05	0.10	<0.05	<0.05	<0.06	0.40	<0.06	0		13	
Nitrite as N	mg/L	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.03	<0.03	<0.03	<0.03		0.06	
Total Kjeldahl Nitrogen	mg/L	0.42	0.44	0.44	<0.5	0.3	0.9	0.5	0.4	0.5	1.07	1.67	0.45	0.62	0.27	0.37	0.26	0.45			
Phenolics	mg/L	<0.001	0.0043		<0.001	0.002	<0.001	0.004	<0.001	<0.001	0.002	0.012	0.002	<0.001	<0.001	<0.001	<0.001	0.003	0.001	0.004	
Dissolved Organic Carbon	mg/L	6.4	13	11	10	6.4	14.7	12.7	4.5	16.6	11.8	38.3	6.7	11.0	7.0	13.0	8	13			
Chemical Oxygen Demand	mg/L	15	35	26	28	36	63	30	19	21	44	125	21	7	25	33	22	37			
Iron	mg/L	0.38	1	1	2.5	0.738	0.632	1.09	0.364	0.596	1.31	2.73	0.451	1.25	0.711	1.11	0.250	1	0.3	0.3	
Manganese	mg/L	0.034	0.046	0.049	0.31	0.032	0.085	0.055	0.035	0.041	0.122	0.305	0.077	0.076	0.052	0.056	0.0286	0			
Phosphorus	mg/L	0.006	0.013	0.017	0.027	<0.01	0.05	0.04	0.01	0.02	0.07	0.15	<0.02	<0.02	<0.03	0.02	0.004	0.03	0.03		
Orthophosphate	mg/L	<0.01	<0.01	<0.01	<0.01						<0.10			<0.10				<0.03			
Turbidity	NTU	0.4	1.2	1.2	5	1.1	8.6	2.4	2.2	1.9	8.1	9.2	1.0	1.5							
Total Suspended Solids	mg/L	17	<10	1	<10	3	15	2	7	<2	26	<10	<10	3	5	4	2				
BOD	mg/L	<2	<2	<2	<2	<2			<2	<2	<5	<5	<5	13	<4	<4	<4	<4			
Anion Sum		0.056	0.081	0.077	0.186	0.28	0.21	0.13	0.14	0.2											
Cation Sum		0.167	0.201	0.191	0.379	0.21	0.14	0.14	0.1	0.18											
Ion Balance	%	NC	NC	NC	NC	-13.6				-6.2											
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0004	<0.00005	<0.00005	<0.00005	<0.00005	0.0001	0.00025
Aluminum	mg/L	0.18	0.3	0.25	0.13	0.037	0.192	0.216	0.005	0.135	0.176	0.577	0.063	0.087	0.067	0.303	0.139	0.15	0.075	0.1	
Antimony	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.0009	<0.0009	0.02		
Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	<0.0002	<0.0002	0.003	0	0.1	0.01	
Barium	mg/L	0.008	0.0091	0.0087	0.01	0.008	0.012	0.009	0.003	0.009	0.012	0.030	0.008	0.012	0.008	0.011	0.00643	0.014			
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000015	0.000028	0.000024	0	1.1		
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.00001	0.00001	<0.00001	<0.00001			
Boron	mg/L	<0.01	<0.01	<0.01	<0.01	<0.05	0.023	<0.01	0.011	<0.01	0.012	<0.010	<0.010	0.019	0.010	0.008	0.009	0	0.2	1.5	
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.000025	0.00003	0.000015	0.000041	0.0002	0.00026	
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	0.00034	0.0004	0.00047	0	0.0089	0.001	
Cobalt	mg/L	<0.0005	<0.0005	<0.0005	0.0011	<0.0025	0.0007	0.0005	<0.0005	<0.0005	0.0009	0.0028	<0.0005	<0.0005	0.000241	0.000357	0.000144	0.001	0.0009		
Copper	mg/L	<0.001	<0.001	<0.001	<0.001	0.0143	0.0008	<0.0005	<0.0005	0.0008	<0.001	0.003	<0.001	0.002	0.001	0.001	0.0005	0.001	0.005	0.004	
Molybdenum	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	0.00026	<0.00004	0.00007	0	0.04	0.073	
Nickel	mg/L	0.0012	0.001	<0.001	<0.001	<0.005	0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	0.001	0.001	0.0006	0.001	0.025	0.15	
Phosphate	mg/L					<0.0002	<0.0002	<0.0002	<0.2	<0.2		<0.10		<0.10	0.012						
Lead	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	0.0003	0.0002	0.0001	0.0002	<0.001	0.001	<0.001	<0.001	0.00024	0.00036	0.00012	0	0.005	0.01	
Selenium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.005	<0.001	<0.0001	<0.001	<0.001	<0.004	<0.004	<0.004	<0.004	0.00007	0.00007	0.00009	0	0.01	0.001	
Silicon	mg/L	0.6	2.1	0.59	3.1	<0.05	0.306	2.15	1.14	1.27	0.45	4.6	0.91	2.02	1.04	1.75	0.66	2			
Tin	mg/L	<0.001	<0.001	<0.001	<0.001	<0.025	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	0.00013	0.0003	<0.00006	0			
Strontium	mg/L	0.0086	0.011	0.0092	0.022	<0.05	0.014	0.014	<0.01	0.016	0.011	0.025	0.015	0.019	0.016	0.016	0.0108	0.02			
Titanium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005	0.003	0.008	<0.002	0.002	0.00183	0.00423	0.00117	0.00374			
Uranium	mg/L	0.00012	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	0.000036	0.000063	0.000048	0.000057	0.005	0.02	
Vanadium	mg/L	<0.0005	<0.0005	0.00058	0.00082	<0.0025	0.0005	<0.0005	<0.0005	<0.0005	<0.002	0.002	<0.002	<0.002	0.00029	0.0006	0.00033	0.00064	0.006		
Zinc	mg/L	0.0075	0.0085	0.0069	<0.005	<0.025	0.022	0.008	0.007	0.01	0.012	0.021	<0.005	0.008	0.010	0.008	0.006	0.006	0.03	0.09	
Field Measurements																					
Temperature	oC	9.2	6.1	13.1	7.69	17.6	21.4			7.3	17.8	14.4	17.6	14.76	13.63	16.9	15.1	8.5			
pH	pH Units	5.95	7	9.26	6.88	7.03	6.03		6.52	7.1	6.8	4.5	7.1	6.2	6.9	15.9	5.9				
Conductivity	uS/cm	34	1044	13	46	6.6	4.1</														

TABLE 16
Surface Water Quality Results - SW-3
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation															PWQO	CWQG
		Sample Collection Date (mm/dd/yyyy)																
		SW-3																
		05/08/2014	10/30/2014	05/13/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021	04/05/2022	18-Oct-22		
pH Lab	pH units	7.73	7.09	6.38	7.59	7.9	DRY	DRY	7.54	7.41	No Sample	8.15	8.12	7.47	8.18	DRY	6.5-8.5	6.5-9.0
Conductivity	uS/cm	820	510	210	1400	2060			193	241		901	617.00	687.00	317			
Hardness	mg/L	250	170	77	410	460			64.7	56.7		309.0	208.00	273.00	147			
Total Dissolved Solids	mg/L	552	276	158	820	1380			112	124		536	403.00	420.00	209			
Alkalinity	mg/L	190	120	17	190	657			78	69		444	204.00	267.00	115			
Chloride	mg/L	49	34	9	160	242			6.38	14.20		61.50	50.00	53.00	34			120
Sodium	mg/L	60	31	8	99	227			7.49	14.90		62.32	47.30	58.20	16.6			
Calcium	mg/L	83	55	22	120	146			25.90	18.90		101.58	67.70	88.80	51.6			
Magnesium	mg/L	11	8.6	3.3	17	23.1			2.69	2.31		13.45	9.56	12.50	4.51			
Potassium	mg/L	33	13	3.3	33	66.7			4.77	9.13		29.6	23.70	28.30	10.3			
Sulphate	mg/L	110	73	58	160	159			6.96	6.96		17.00	18.00	27.00	24			
Ammonia	mg/L	4.6	1.1	0.48	0.1	4.54			0.05	0.66		14.30	0.60	1.95	0.08			
Nitrate as N	mg/L	4.57	1.22	0.31	11.3	3.7			0.10	0.40		1.40	9.12	9.73	4.86			13
Nitrite as N	mg/L	0.171	0.045	<0.01	0.12	<0.05			<0.05	0.08		<0.25	0.46	0.62	< 0.03			0.06
Total Kjeldahl Nitrogen	mg/L	6.9	2	0.93	1.6	9			1.22	1.52		17.40	1.74	2.52	0.62			
Phenolics	mg/L	0.0027	0.0053	<0.001	0.0017	0.029			0.003	0.008		0.003	0.003	0.002	< 0.001		0.001	0.004
Dissolved Organic Carbon	mg/L	30	17	7.1	30	90.2			13.7	11.2		40.4	25.00	27.00	14			
Chemical Oxygen Demand	mg/L	81	47	16	80	270			44	53		75	85.00	62.00	32			
Iron	mg/L	0.76	2.4	0.21	0.16	0.854			1.35	1.65		1.04	0.56	0.72	0.015		0.3	0.3
Manganese	mg/L	0.067	0.18	0.042	0.25	1.07			0.351	0.138		0.479	0.00	0.09	0.00033			
Phosphorus	mg/L	0.052	0.062	0.014	0.045	0.17			0.06	0.21		0.04	< 0.03	0.05	0.005		0.03	
Orthophosphate	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01			<0.10						< 0.03			
Turbidity	NTU	49	1.5	0.6	2.4	8.1			15.7	71		7.2						
Total Suspended Solids	mg/L	160	<10	1	<10	19			16	52		<10	16.00	8.00	6			
BOD	mg/L	3	<2	<2	<2	32			<5	<5		444	< 4	4.00	< 4			
Anion Sum		7.92	4.99	1.83	12.6	23.5												
Cation Sum		8.83	5.1	2.1	13.9	20.8												
Ion Balance	%	5.4	1.1	NC	4.85	-6.2												
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005			<0.0001	<0.0001		<0.0001	< 0.00005	<0.00005	< 0.00005		0.0001	0.00025
Aluminum	mg/L	0.81	0.08	0.087	0.073	0.038			0.032	0.062		0.035	0.05	0.02	0.035		0.075	0.1
Antimony	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025			<0.001	<0.001		<0.001	< 0.0009	<0.0009	< 0.0009		0.02	
Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005			<0.003	<0.003		<0.003	0.0008	0.0012	0.0004		0.1	0.01
Barium	mg/L	0.077	0.063	0.052	0.11	0.119			0.026	0.029		0.040	0.03	0.05	0.02101			
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025			<0.0005	<0.0005		<0.0005	0.000013	0.000032	< 0.000007		1.1	
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005			<0.002	<0.002		<0.002	0.000050	0.000010	< 0.00001			
Boron	mg/L	1	0.51	0.15	1	2.29			0.219	0.471		1.42	1.27	1.16	0.458		0.2	1.5
Cadmium	mg/L	0.00014	<0.0001	<0.0001	0.0002	<0.0005			<0.0001	<0.0001		<0.0001	0.00002	0.00006	0.000006		0.0002	0.00026
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005			<0.003	<0.003		<0.003	0.001	0.003	0.00057		0.0089	0.001
Cobalt	mg/L	0.0012	0.0012	<0.0005	0.0016	0.005			0.0012	0.001		0.001	0.001	0.001	0.000236		0.0009	
Copper	mg/L	0.0071	0.0018	<0.001	0.0062	0.008			0.004	0.008		0.005	0.004	0.01	0.0026		0.005	0.004
Molybdenum	mg/L	0.001	<0.0005	<0.0005	0.0014	0.0035			<0.002	<0.002		<0.002	0.001	0.0004	0.00033		0.04	0.073
Nickel	mg/L	0.0018	0.0017	<0.001	0.0025	0.01			<0.003	<0.003		<0.003	0.002	0.0022	0.0006		0.025	0.15
Phosphate	mg/L					<0.0002				<0.10		<0.50	0.06					
Lead	mg/L	0.0013	<0.0005	<0.0005	<0.0005	0.0005			0.001	0.003		<0.001	0.00038	0.00227	0.00012		0.005	0.01
Selenium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.005			<0.004	<0.004		<0.004	0.00019	0.00017	0.00009		0.1	0.001
Silicon	mg/L	2.3	3	2.2	1.4	1.04			0.99	1.01		2.48	0.36	2.36	0.66			
Tin	mg/L	<0.001	<0.001	<0.001	<0.001	<0.025			<0.002	<0.002		<0.002	0.00	0.00	< 0.00006			
Strontium	mg/L	0.3	0.19	0.084	0.38	0.523			0.095	0.076		0.317	0.28	0.36	0.0108			
Titanium	mg/L	0.047	<0.005	<0.005	<0.005	<0.025			0.013	0.038		0.008	0.01	0.04	0.00117			
Uranium	mg/L	0.0026	0.00072	0.00011	0.0018	0.0059			<0.002	<0.002		<0.002	0.000541	0.000559	0.000048		0.005	0.02
Vanadium	mg/L	0.0017	<0.0005	<0.0005	0.00068	<0.0025			<0.002	0.002		<0.002	0.000510	0.001540	0.000033		0.006	
Zinc	mg/L	0.0082	<0.005	<0.005	0.009	0.055			0.009	0.013		<0.005	0.004000	0.012000	0.006		0.03	0.09
Field Measurements																		
Temperature	oC	16	6.7	14.1	8.2	18.9			19.2	16.5		11.68	18.78	15.80	12.40			
pH	pH Units	7.68	6.67	6.43	5.33	6.73			7.1	7.33		7.86	8.15	7.26	16.04			
Conductivity	uS/cm	249	15	490	860	179			215.1	6.25		772	512.00	154.00	321.80			
Oxidation Reduction Potential	mV								116.3	112.6		297.7	126.10	29.40	-7.10			
Dissolved Oxygen	mg/L	5.05	11.12	6.56	4.98				6.05	6.43		17.01	11.28	1.06	7.70			

Notes:

PWQO Provincial Water Quality Objective
 APV Aquatic Protection Values
 CWQG Canadian Water Quality Guidelines

BOLD Exceeds PWQO
ITALICS Exceeds APV
UNDERLINED Exceeds CWQG
 SHADED ONLY RDL exceeds the standard

INSV Insufficient volume to allow for sampling
 NC Not Calculated
 CNL Could Not Locate
 LS Limited Sample
 Units All Units in mg/L Unless Otherwise Noted.

TABLE 17
Groundwater Duplicate Data
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	RDL	PQL	4-May-22			18-Oct-22		
				BH-11	GW DUP	Relative Percent Difference (%)	BH-12	GW DUP	Relative Percent Difference (%)
pH Lab	pH Units	NA		7.68	7.66	0.26	7.50	7.48	0.27
Conductivity	uS/cm	2	10	944	948	0.42	153	165	7.55
Hardness	mg/L	0.5	2.5	152	148	2.67	68.9	66	5.06
Total Dissolved Solids	mg/L	20	100	580	580	0.00	100	66	NC
Alkalinity	mg/L	5	25	321	321	0.00	64	67	4.58
Chloride	mg/L	0.10	0.5	79	79	0.00	5	5	0.00
Sodium	mg/L	0.05	0.25	96.5	93.5	3.16	5	5	0.60
Calcium	mg/L	0.05	0.25	44.1	43.1	2.29	24.1	22.7	5.98
Magnesium	mg/L	0.05	0.25	10.3	9.87	4.26	2.13	2.12	0.47
Potassium	mg/L	0.05	0.25	40.5	39.1	3.52	1.27	1.21	4.84
Sulphate	mg/L	0.10	0.5	65	63	3.13	9	9	0.00
Ammonia	mg/L	0.02	0.1	18.8	18.9	0.53	0.08	0.1	NC
Nitrate as N	mg/L	0.05	0.25	0.56	0.56	NC	< 0.06	< 0.06	NC
Nitrite as N	mg/L	0.05	0.25	0.04	0.04	NC	< 0.03	< 0.03	NC
Total Kjeldahl Nitrogen	mg/L	0.10	0.5	21.0	20.5	2.41	0.08	0.17	NC
Phenolics	mg/L	0.001	0.005	0.004	0.003	NC	< 0.002	0.004	NC
Dissolved Organic Carbon	mg/L	0.5	2.5	51	48	6.06	4.0	3	28.57
Chemical Oxygen Demand	mg/L	5	25	128	122	4.80	10	8	NC
Iron	mg/L	0.010	0.05	0.229	0.211	8.18	1.25	1.17	6.61
Manganese	mg/L	0.002	0.01	1.24	1.18	4.96	0.37	0.341	6.80
Phosphorus	mg/L	0.02	0.1	< 0.03	0.03	NC	0.08	0.08	NC
Turbidity	NTU	0.5	2.5	8.54	8.50	0.47	60	95	45.16
Total Suspended Solids	mg/L	10	50	29	23	23.08	271	225	18.55
BOD	mg/L	5	25	<4	< 4	NC	< 4	< 4	NC
Silver	mg/L	0.002	0.01	< 0.00005	< 0.00005	NC	< 0.00005	< 0.00005	NC
Aluminum	mg/L	0.004	0.02	0.358	0.351	1.97	0.041	0.045	9.30
Antimony	mg/L	0.003	0.015	< 0.0009	< 0.0009	NC	< 0.0009	< 0.0009	NC
Arsenic	mg/L	0.003	0.015	0.0009	0.0008	11.76	0.0011	0.001	NC
Barium	mg/L	0.002	0.01	0.0597	0.0576	3.58	0.045	0.047	3.46
Beryllium	mg/L	0.001	0.005	0.000043	0.000045	4.55	0.000042	0.000047	NC
Bismuth	mg/L	0.002	0.01	< 0.00001	< 0.00001	NC	< 0.00001	< 0.00001	NC
Boron	mg/L	0.010	0.05	1.25	1.21	3.25	0.09	0.142	46.96
Cadmium	mg/L	0.001	0.005	0.000097	0.000077	NC	0.000004	< 0.000003	NC
Chromium	mg/L	0.003	0.015	0.00260	0.00245	5.94	0.00027	0.00029	NC
Cobalt	mg/L	0.001	0.005	0.00594	0.00580	2.39	0.000161	0.000152	5.75
Copper	mg/L	0.003	0.015	0.0093	0.0101	NC	0.000	0.0015	NC
Molybdenum	mg/L	0.002	0.01	0.00225	0.00212	5.95	0.00096	0.00096	0.00
Nickel	mg/L	0.003	0.015	0.0051	0.0052	1.94	0.0002	0.0002	NC
Phosphate	mg/L	0.10	0.5			NC			-
Lead	mg/L	0.001	0.005	< 0.00009	< 0.00009	NC	< 0.00009	< 0.00009	NC
Selenium	mg/L	0.004	0.02	0.00078	0.00083	NC	0.00004	< 0.00004	NC
Sillicon	mg/L	0.05	0.25	1.54	1.54	0.00	6	6.28	7.09
Tin	mg/L	0.002	0.01	0.00013	0.00024	NC	< 0.00006	< 0.00006	NC
Strontium	mg/L	0.005	0.025	0.109	0.103	5.66	0.117	0.113	3.48
Titanium	mg/L	0.002	0.01	0.00423	0.00435	2.80	0.00074	0.00072	NC
Uranium	mg/L	0.002	0.01	0.00222	0.00216	2.74	0.000199	0.000194	NC
Vanadium	mg/L	0.002	0.01	0.00085	0.00079	7.32	0.00039	0.00037	NC
Zinc	mg/L	0.005	0.025	0.004	0.005	NC	< 0.002	< 0.002	NC

Notes:

NC

Not calculable due to one or more of the concentrations being quantified over the reasonable detection limit (RDL) or the practical quantification limit (PQL).

BOLD

Bolded and shaded entries indicates that the relative percent difference (RPD) exceeds the industry standard of 50%.

TABLE 18
Surface Water Duplicate Data
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	RDL	PQL	4-May-22			18-Oct-22		
				SW2	SW DUP	Relative Percent Difference (%)	SW2	SW DUP	Relative Percent Difference (%)
pH Lab	pH units	NA		6.34	6.25	1.43	5.81	6.08	4.54
Conductivity	uS/cm	2	10	14	13	7.41	22	19	14.63
Hardness	mg/L	0.5	2.5	4.4	4.1	7.06	7.57	6.91	9.12
Total Dissolved Solids	mg/L	20	100	43	< 30	NC	< 30	< 30	NC
Alkalinity	mg/L	5	25	4	3	28.57	2	3	NC
Chloride	mg/L	0.50	2.5	< 1	< 1	NC	< 1	< 1	NC
Sodium	mg/L	0.05	0.25	0.63	0.60	4.88	1.1	1.03	9.26
Calcium	mg/L	0.05	0.25	1.33	1.20	10.28	2.1	1.9	10.95
Magnesium	mg/L	0.05	0.25	0.273	0.263	3.73	0.56	0.527	5.36
Potassium	mg/L	0.05	0.25	0.284	0.283	0.35	0.83	0.674	20.27
Sulphate	mg/L	0.10	0.5	< 2	< 2	NC	< 2	< 2	NC
Ammonia	mg/L	0.02	0.1	< 0.04	0.05	NC	< 0.04	0.06	NC
Nitrate as N	mg/L	0.05	0.25	< 0.06	< 0.06	NC	0.49	0.09	NC
Nitrite as N	mg/L	0.05	0.25	< 0.03	< 0.03	NC	< 0.03	< 0.03	NC
Total Kjeldahl Nitrogen	mg/L	0.10	0.5	0.26	0.27	3.77	0.45	0.36	NC
Phenolics	mg/L	0.001	0.005	< 0.001	< 0.001	NC	0.003	0.003	NC
Dissolved Organic Carbon	mg/L	0.5	2.5	8	8	0.00	13.0	13	0.00
Chemical Oxygen Demand	mg/L	5	25	22	20	9.52	37	37	0.00
Iron	mg/L	0.010	0.05	< 4	< 4	NC	1.4	1.33	5.13
Manganese	mg/L	0.002	0.01	0.250	0.240	4.08	0.245	0.045	137.93
Phosphorus	mg/L	0.02	0.1	0.0286	0.0231	NC	0.03	0.016	NC
Orthophosphate	mg/L	0.10	0.5	0.004	0.005	NC			-
Turbidity	NTU	0.5	2.5	< 0.03	< 0.03	NC			-
Total Suspended Solids	mg/L	10	50	4	< 2	NC	2	2	NC
BOD	mg/L	5	25	44687	44687	NC	< 4	< 4	NC
Silver	mg/L	0.0001	0.0005	< 0.00005	< 0.00005	NC	< 0.00005	< 0.00005	NC
Aluminum	mg/L	0.004	0.02	0.239	0.135	55.61	0.152	0.14	8.22
Antimony	mg/L	0.001	0.005	< 0.0009	< 0.0009	NC	< 0.0009	< 0.0009	NC
Arsenic	mg/L	0.003	0.015	< 0.0002	0.0002	NC	0.0005	0.0006	NC
Barium	mg/L	0.002	0.01	0.126	0.00699	NC	0.014	0.0104	30.89
Beryllium	mg/L	0.0005	0.0025	0.000033	0.000023	35.71	0.000027	0.000028	NC
Bismuth	mg/L	0.002	0.01	< 0.00001	< 0.00001	NC	< 0.00001	< 0.00001	NC
Boron	mg/L	0.010	0.05	0.015	0.034	NC	0.007	0.007	NC
Cadmium	mg/L	0.0001	0.0005	0.000209	0.000025	NC	0.000041	0.000024	NC
Chromium	mg/L	0.003	0.015	< 0.00008	0.00080	NC	0.00038	0.00044	NC
Cobalt	mg/L	0.0005	0.0025	0.00642	0.000105	NC	0.000794	0.00031	NC
Copper	mg/L	0.001	0.005	0.0004	0.0005	22.22	0.001	0.0013	NC
Molybdenum	mg/L	0.002	0.01	< 0.00004	0.00004	NC	0.00018	0.00012	NC
Nickel	mg/L	0.003	0.015	0.0034	0.0005	NC	0.001	0.0006	NC
Lead	mg/L	0.001	0.005	< 0.00009	0.00011	NC	0.00036	0.00035	NC
Selenium	mg/L	0.004	0.02	0.00006	0.00013	NC	0.00007	0.00009	NC
Sillicon	mg/L	0.05	0.25	3.16	0.62	134.39	1.65	1.66	0.60
Tin	mg/L	0.002	0.01	< 0.00006	< 0.00006	NC	0.00007	< 0.00006	NC
Strontium	mg/L	0.005	0.025	0.860	0.0109	NC	0.018	0.0163	NC
Titanium	mg/L	0.002	0.01	< 0.00005	0.00119	NC	0.00374	0.00315	NC
Uranium	mg/L	0.002	0.01	0.000009	0.000049	NC	0.000057	0.000053	NC
Vanadium	mg/L	0.002	0.01	0.00008	0.00031	NC	0.00064	0.00059	NC
Zinc	mg/L	0.005	0.025	0.254	0.006	NC	0.006	0.005	NC

Notes:

NC

Not calculable due to one or more of the concentrations being quantified over the reasonable detection limit (RDL) or the practical quantification limit (PQL).

BOLD

Bolded and shaded entries indicates that the relative percent difference (RPD) exceeds the industry standard of 50%.

APPENDIX IV
Photographic Log



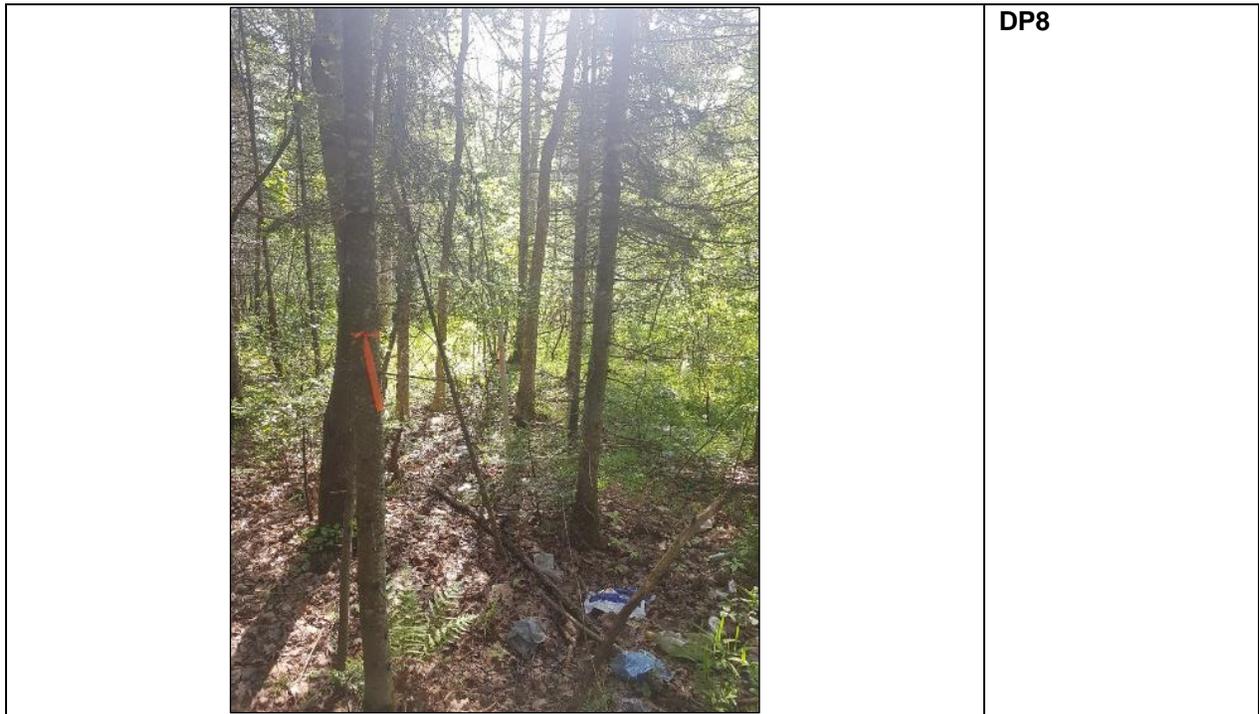




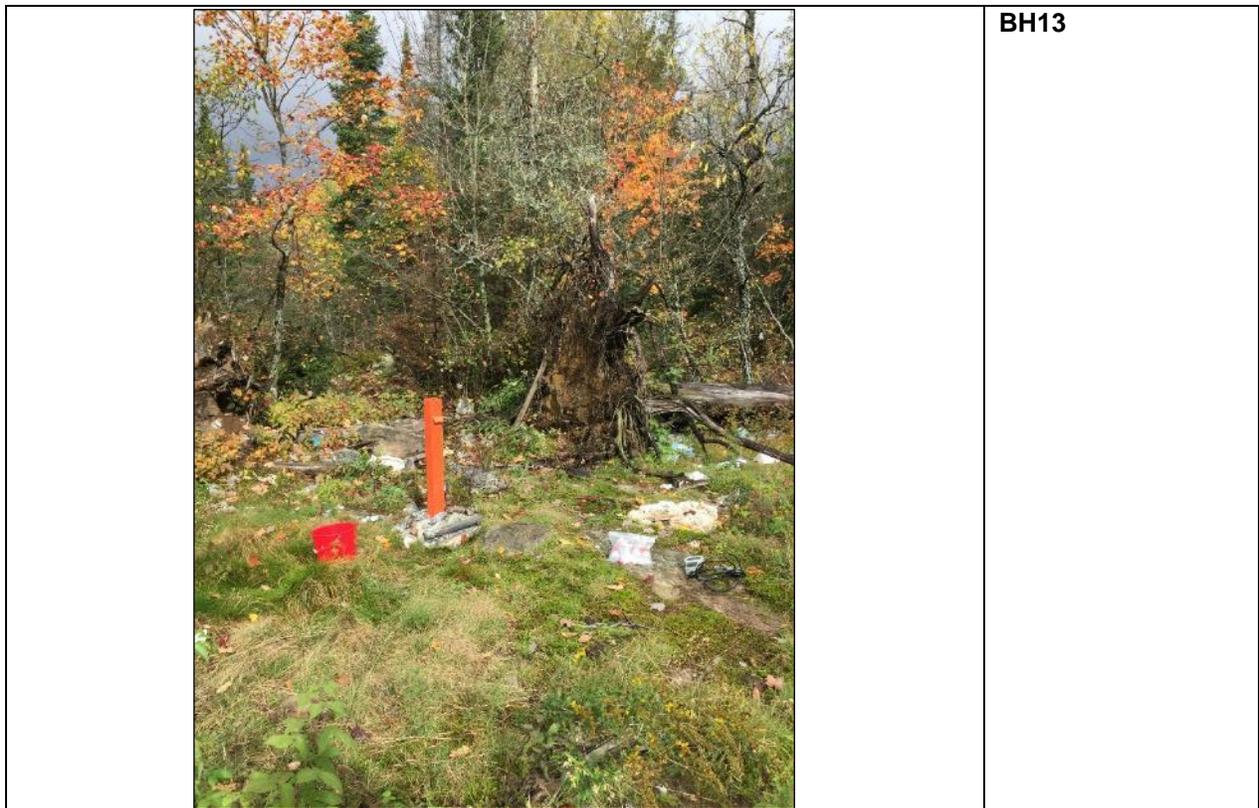


















			SW3
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APPENDIX V
Laboratory Certificates of Analysis



FINAL REPORT

CA15096-MAY22 R1

225335.006, Croft Landfill GW

Prepared for

Pinchin Ltd

First Page

CLIENT DETAILS

Client Pinchin Ltd

Address 957 Cambrian Heights Drive, Suite 203,
Sudbury
Canada. P3C 5S5

Contact Alana Valle

Telephone 705-521-0560

Facsimile

Email avalue@Pinchin.com

Project 225335.006, Croft Landfill GW

Order Number

Samples Ground Water (9)

LABORATORY DETAILS

Project Specialist Brad Moore Hon. B.Sc

Laboratory SGS Canada Inc.

Address 185 Concession St., Lakefield ON, K0L 2H0

Telephone 705-652-2143

Facsimile 705-652-6365

Email brad.moore@sgs.com

SGS Reference CA15096-MAY22

Received 05/06/2022

Approved 05/17/2022

Report Number CA15096-MAY22 R1

Date Reported 05/17/2022

COMMENTS

Temperature of Sample upon Receipt: 2 degrees C

Cooling Agent Present: Yes

Custody Seal Present: Yes

Chain of Custody Number: N/A

SIGNATORIES

Brad Moore Hon. B.Sc

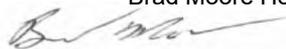


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FINAL REPORT

CA15096-MAY22 R1

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

	Sample Number	7	8	9	10	11	12	13	14
	Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
	Sample Matrix	Ground Water							
	Sample Date	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result							
Acid Rock Drainage												
pH Check <2	pH	0.05			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

General Chemistry

Biochemical Oxygen Demand (BOD5)	mg/L	2			< 4 †	< 4 †	< 4 †	< 4 †	< 4 †	< 4 †	< 4 †	< 4 †
Prep BOD	Prep	no			44687	44687	44687	44687	44687	44687	44687	44687
Total Suspended Solids	mg/L	2			35	43	185	175	29	239	590	1400
Alkalinity	mg/L as CaCO3	2	500		49	8	122	413	321	67	32	90
Conductivity	uS/cm	2			123	28	283	1640	944	158	88	409
Total Dissolved Solids	mg/L	30	500		66	40	220	946	580	131	83	143
Chemical Oxygen Demand	mg/L	8			40	< 8	< 8	48	128	9	< 8	11
Turbidity	NTU	0.10	5	1	4.35	16.3	117	10.5	8.54	5.55	28.6	1010
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.49	0.09	1.97	12.2	21.0	0.12	0.08	0.16
Ammonia+Ammonium (N)	as N mg/L	0.04			0.08	< 0.04	1.40	12.2	18.8	0.06	< 0.04	0.09
Phosphorus (total reactive)	mg/L	0.03			0.03	0.03	0.03	< 0.03	0.03	0.03	0.03	0.04
Dissolved Organic Carbon	mg/L	1	5		18	4	19	17	51	4	3	4



FINAL REPORT

CA15096-MAY22 R1

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

	Sample Number	7	8	9	10	11	12	13	14
	Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
	Sample Matrix	Ground Water							
	Sample Date	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result							
Metals and Inorganics												
Phosphorus (total)	mg/L	0.03			< 0.03	0.04	< 0.03	0.04	< 0.03	0.10	0.17	0.43
Sulphate	mg/L	2	500		5	5	16	24	65	12	5	29
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	< 0.06	0.11	< 0.06	0.29	0.56	< 0.06	< 0.06	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	100		43.7	5.9	111	419	152	67.6	36.6	160
Silver (dissolved)	mg/L	0.00005			< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00006	< 0.00005
Aluminum (dissolved)	mg/L	0.001			0.473	0.195	0.150	0.032	0.358	0.050	0.117	0.087
Arsenic (dissolved)	mg/L	0.0002		0.01	0.0014	0.0005	0.0012	0.0003	0.0009	0.0006	0.0003	0.0004
Barium (dissolved)	mg/L	0.00008		1	0.0466	0.0196	0.0497	0.210	0.0597	0.0525	0.0389	0.0874
Beryllium (dissolved)	mg/L	0.000007			0.000139	0.000025	0.000030	0.000017	0.000043	0.000034	0.000056	0.000058
Bismuth (dissolved)	mg/L	0.00001			< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron (dissolved)	mg/L	0.002		5	0.046	0.007	0.300	0.966	1.25	0.117	0.015	0.080
Calcium (dissolved)	mg/L	0.01			13.3	1.81	37.1	134	44.1	23.4	12.2	51.1
Cadmium (dissolved)	mg/L	0.000003		0.005	0.000061	0.000014	0.000064	0.000039	0.000097	0.000007	0.000056	< 0.000003
Cobalt (dissolved)	mg/L	0.000004			0.0107	0.000528	0.00782	0.00256	0.00594	0.000190	0.000232	0.000687
Chromium (dissolved)	mg/L	0.00008		0.05	0.00132	0.00038	0.00147	0.00136	0.00260	0.00030	0.00040	0.00024
Copper (dissolved)	mg/L	0.0002		1	0.0053	0.0156	0.0031	0.0092	0.0093	0.0019	0.0090	0.0018
Iron (dissolved)	mg/L	0.007		0.3	6.76	0.073	15.9	0.020	0.229	1.49	0.144	4.60
Potassium (dissolved)	mg/L	0.009			2.02	0.371	5.49	42.4	40.5	1.15	0.721	3.45
Magnesium (dissolved)	mg/L	0.001			2.56	0.340	4.53	20.5	10.3	2.21	1.48	7.99
Manganese (dissolved)	mg/L	0.00001		0.05	1.24	0.00278	1.43	1.63	1.24	0.369	0.129	1.16
Molybdenum (dissolved)	mg/L	0.00004			0.00026	0.00057	0.00080	0.00097	0.00225	0.00075	0.00023	0.00026



FINAL REPORT

CA15096-MAY22 R1

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

Sample Number	7	8	9	10	11	12	13	14
Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
Sample Matrix	Ground Water							
Sample Date	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
Metals and Inorganics (continued)												
Sodium (dissolved)	mg/L	0.01	200	20	6.78	3.63	15.4	147	96.5	6.12	1.65	11.3
Nickel (dissolved)	mg/L	0.0001			0.0017	0.0027	0.0019	0.0019	0.0051	0.0005	0.0010	0.0005
Lead (dissolved)	mg/L	0.00009		0.01	0.00035	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Antimony (dissolved)	mg/L	0.0009		0.006	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Selenium (dissolved)	mg/L	0.00004		0.05	0.00020	0.00005	0.00017	0.00022	0.00078	< 0.00004	0.00008	0.00005
Silicon (dissolved)	mg/L	0.02			3.98	2.50	3.19	4.12	1.54	4.69	2.75	10.6
Tin (dissolved)	mg/L	0.00006			0.00013	0.00008	0.00018	0.00031	0.00013	0.00014	0.00023	0.00013
Strontium (dissolved)	mg/L	0.00008			0.0649	0.0100	0.119	0.592	0.109	0.113	0.0248	0.208
Titanium (dissolved)	mg/L	0.00005			0.0347	0.00378	0.00316	0.00100	0.00423	0.00069	0.00190	0.00196
Uranium (dissolved)	mg/L	0.000002		0.02	0.000712	0.000092	0.000330	0.00291	0.00222	0.000195	0.00253	0.000153
Vanadium (dissolved)	mg/L	0.00001			0.00433	0.00046	0.00264	0.00056	0.00085	0.00042	0.00055	0.00085
Zinc (dissolved)	mg/L	0.002	5		0.006	0.009	0.010	0.009	0.004	0.004	0.012	0.003

Other (ORP)

pH	No unit	0.05	8.5		6.88	6.55	7.50	7.88	7.68	7.60	7.22	7.67
Chloride	mg/L	1	250		7	< 1	20	340	79	5	5	66



FINAL REPORT

CA15096-MAY22 R1

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

	Sample Number	7	8	9	10	11	12	13	14
	Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
	Sample Matrix	Ground Water							
	Sample Date	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022	04/05/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
Phenols												
4AAP-Phenolics	mg/L	0.002			< 0.002	< 0.002	< 0.002	0.002	0.004	< 0.002	< 0.002	< 0.002

MATRIX: WATER

	Sample Number	15
	Sample Name	GW DUP
	Sample Matrix	Ground Water
	Sample Date	04/05/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result
Acid Rock Drainage					
pH Check <2	pH	0.05			1.00

General Chemistry

Biochemical Oxygen Demand (BOD5)	mg/L	2			< 4 †
Prep BOD	Prep	no			44687
Total Suspended Solids	mg/L	2			23
Alkalinity	mg/L as CaCO3	2	500		321
Conductivity	uS/cm	2			948
Total Dissolved Solids	mg/L	30	500		580
Chemical Oxygen Demand	mg/L	8			122
Turbidity	NTU	0.10	5	1	8.50
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			20.5
Ammonia+Ammonium (N)	as N mg/L	0.04			18.9
Phosphorus (total reactive)	mg/L	0.03			< 0.03
Dissolved Organic Carbon	mg/L	1	5		48



FINAL REPORT

CA15096-MAY22 R1

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

Sample Number 15

Sample Name GW DUP

Sample Matrix Ground Water

Sample Date 04/05/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics					
Phosphorus (total)	mg/L	0.03			0.03
Sulphate	mg/L	2	500		63
Nitrite (as N)	as N mg/L	0.03		1	0.04
Nitrate (as N)	as N mg/L	0.06		10	0.56
Hardness (dissolved)	mg/L as CaCO3	0.05	100		148
Silver (dissolved)	mg/L	0.00005			< 0.00005
Aluminum (dissolved)	mg/L	0.001			0.351
Arsenic (dissolved)	mg/L	0.0002		0.01	0.0008
Barium (dissolved)	mg/L	0.00008		1	0.0576
Beryllium (dissolved)	mg/L	0.000007			0.000045
Bismuth (dissolved)	mg/L	0.00001			< 0.00001
Boron (dissolved)	mg/L	0.002		5	1.21
Calcium (dissolved)	mg/L	0.01			43.1
Cadmium (dissolved)	mg/L	0.000003		0.005	0.000077
Cobalt (dissolved)	mg/L	0.000004			0.00580
Chromium (dissolved)	mg/L	0.00008		0.05	0.00245
Copper (dissolved)	mg/L	0.0002	1		0.0101
Iron (dissolved)	mg/L	0.007	0.3		0.211
Potassium (dissolved)	mg/L	0.009			39.1
Magnesium (dissolved)	mg/L	0.001			9.87
Manganese (dissolved)	mg/L	0.00001	0.05		1.18
Molybdenum (dissolved)	mg/L	0.00004			0.00212



FINAL REPORT

CA15096-MAY22 R1

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

Sample Number 15

Sample Name GW DUP

Sample Matrix Ground Water

Sample Date 04/05/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics (continued)					
Sodium (dissolved)	mg/L	0.01	200	20	93.5
Nickel (dissolved)	mg/L	0.0001			0.0052
Lead (dissolved)	mg/L	0.00009		0.01	< 0.00009
Antimony (dissolved)	mg/L	0.0009		0.006	< 0.0009
Selenium (dissolved)	mg/L	0.00004		0.05	0.00083
Silicon (dissolved)	mg/L	0.02			1.54
Tin (dissolved)	mg/L	0.00006			0.00024
Strontium (dissolved)	mg/L	0.00008			0.103
Titanium (dissolved)	mg/L	0.00005			0.00435
Uranium (dissolved)	mg/L	0.000002		0.02	0.00216
Vanadium (dissolved)	mg/L	0.00001			0.00079
Zinc (dissolved)	mg/L	0.002	5		0.005
Other (ORP)					
pH	No unit	0.05	8.5		7.66
Chloride	mg/L	1	250		79



FINAL REPORT

CA15096-MAY22 R1

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

Sample Number 15

Sample Name GW DUP

Sample Matrix Ground Water

Sample Date 04/05/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result
Phenols					
4AAP-Phenolics	mg/L	0.002			0.003

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG /	ODWS_MAC /
				WATER / - - Table 4 - Drinking Water - Reg O.169_03	WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03
				L1	L2

BH1

Turbidity	SM 2130	NTU	4.35		1
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	6.76	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	1.24	0.05	
Dissolved Organic Carbon	SM 5310	mg/L	18	5	

BH8

Turbidity	SM 2130	NTU	16.3	5	1
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BH9

Turbidity	SM 2130	NTU	117	5	1
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	111	100	
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	15.9	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	1.43	0.05	
Dissolved Organic Carbon	SM 5310	mg/L	19	5	

BH10

Turbidity	SM 2130	NTU	10.5	5	1
Total Dissolved Solids	SM 2540C	mg/L	946	500	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	419	100	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	1.63	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	147		20
Dissolved Organic Carbon	SM 5310	mg/L	17	5	
Chloride	US EPA 325.2	mg/L	340	250	

BH11

Turbidity	SM 2130	NTU	8.54	5	1
Total Dissolved Solids	SM 2540C	mg/L	580	500	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	152	100	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	1.24	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	96.5		20
Dissolved Organic Carbon	SM 5310	mg/L	51	5	

BH12

Turbidity	SM 2130	NTU	5.55	5	1
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	1.49	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.369	0.05	

BH13

Turbidity	SM 2130	NTU	28.6	5	1
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.129	0.05	

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03
				L1	L2

BH14

Turbidity	SM 2130	NTU	1010	5	1
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	160	100	
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	4.60	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	1.16	0.05	

GW DUP

Turbidity	SM 2130	NTU	8.50	5	1
Total Dissolved Solids	SM 2540C	mg/L	580	500	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	148	100	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	1.18	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	93.5		20
Dissolved Organic Carbon	SM 5310	mg/L	48	5	



FINAL REPORT

CA15096-MAY22 R1

QC SUMMARY

Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0198-MAY22	mg/L as CaCO3	2	< 2	1	20	106	80	120	NA		

Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0085-MAY22	mg/L	0.04	<0.04	2	10	97	90	110	95	75	125
Ammonia+Ammonium (N)	SKA0100-MAY22	mg/L	0.04	<0.04	ND	10	98	90	110	99	75	125



FINAL REPORT

CA15096-MAY22 R1

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO5028-MAY22	mg/L	1	<1	0	20	106	80	120	92	75	125
Sulphate	DIO5028-MAY22	mg/L	2	<2	0	20	109	80	120	82	75	125
Chloride	DIO5050-MAY22	mg/L	1	<1	10	20	114	80	120	124	75	125
Sulphate	DIO5050-MAY22	mg/L	2	<2	3	20	114	80	120	108	75	125
Chloride	DIO5051-MAY22	mg/L	1	<1	1	20	105	80	120	115	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0202-MAY22	mg/L	0.03	<0.03	7	20	101	90	110	87	75	125
Nitrate (as N)	DIO0202-MAY22	mg/L	0.06	<0.06	1	20	104	90	110	89	75	125
Nitrite (as N)	DIO0219-MAY22	mg/L	0.03	<0.03	ND	20	99	90	110	99	75	125
Nitrate (as N)	DIO0219-MAY22	mg/L	0.06	<0.06	ND	20	101	90	110	102	75	125



FINAL REPORT

CA15096-MAY22 R1

QC SUMMARY

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0012-MAY22	mg/L	2	< 2	13	30	97	70	130	84	70	130

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-IENVISFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0106-MAY22	mg/L	1	<1	ND	20	100	90	110	101	75	125
Dissolved Organic Carbon	SKA0119-MAY22	mg/L	1	<1	3	20	108	90	110	95	75	125

Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0207-MAY22	mg/L	8	<8	ND	20	96	80	120	112	75	125



FINAL REPORT

CA15096-MAY22 R1

QC SUMMARY

Conductivity

Method: SM 2510 | Internal ref.: ME-CA-ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0198-MAY22	uS/cm	2	< 2	0	20	98	90	110	NA		



FINAL REPORT

CA15096-MAY22 R1

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (dissolved)	EMS0068-MAY22	mg/L	0.00005	<0.00005	ND	20	101	90	110	79	70	130
Aluminum (dissolved)	EMS0068-MAY22	mg/L	0.001	<0.001	ND	20	105	90	110	95	70	130
Arsenic (dissolved)	EMS0068-MAY22	mg/L	0.0002	<0.0002	14	20	101	90	110	103	70	130
Barium (dissolved)	EMS0068-MAY22	mg/L	0.00008	<0.00002	0	20	102	90	110	98	70	130
Beryllium (dissolved)	EMS0068-MAY22	mg/L	0.000007	<0.000007	ND	20	97	90	110	95	70	130
Boron (dissolved)	EMS0068-MAY22	mg/L	0.002	<0.002	ND	20	92	90	110	93	70	130
Bismuth (dissolved)	EMS0068-MAY22	mg/L	0.00001	<0.00001	ND	20	98	90	110	88	70	130
Calcium (dissolved)	EMS0068-MAY22	mg/L	0.01	<0.01	2	20	97	90	110	97	70	130
Cadmium (dissolved)	EMS0068-MAY22	mg/L	0.000003	<0.000003	ND	20	104	90	110	103	70	130
Cobalt (dissolved)	EMS0068-MAY22	mg/L	0.000004	<0.000004	6	20	102	90	110	100	70	130
Chromium (dissolved)	EMS0068-MAY22	mg/L	0.00008	<0.00008	4	20	99	90	110	94	70	130
Copper (dissolved)	EMS0068-MAY22	mg/L	0.0002	<0.0002	5	20	97	90	110	97	70	130
Iron (dissolved)	EMS0068-MAY22	mg/L	0.007	<0.007	ND	20	97	90	110	100	70	130
Potassium (dissolved)	EMS0068-MAY22	mg/L	0.009	<0.009	3	20	97	90	110	91	70	130
Magnesium (dissolved)	EMS0068-MAY22	mg/L	0.001	<0.001	4	20	97	90	110	91	70	130
Manganese (dissolved)	EMS0068-MAY22	mg/L	0.00001	<0.00001	3	20	100	90	110	99	70	130
Molybdenum (dissolved)	EMS0068-MAY22	mg/L	0.00004	<0.00004	ND	20	97	90	110	96	70	130
Sodium (dissolved)	EMS0068-MAY22	mg/L	0.01	<0.01	3	20	96	90	110	97	70	130
Nickel (dissolved)	EMS0068-MAY22	mg/L	0.0001	<0.0001	1	20	99	90	110	99	70	130
Lead (dissolved)	EMS0068-MAY22	mg/L	0.00009	<0.00001	5	20	102	90	110	104	70	130



FINAL REPORT

CA15096-MAY22 R1

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Antimony (dissolved)	EMS0068-MAY22	mg/L	0.0009	<0.0009	ND	20	106	90	110	101	70	130
Selenium (dissolved)	EMS0068-MAY22	mg/L	0.00004	<0.00004	ND	20	105	90	110	97	70	130
Silicon (dissolved)	EMS0068-MAY22	mg/L	0.02	<0.02	0	20	96	90	110	NV	70	130
Tin (dissolved)	EMS0068-MAY22	mg/L	0.00006	<0.00006	2	20	97	90	110	NV	70	130
Strontium (dissolved)	EMS0068-MAY22	mg/L	0.00008	<0.00002	4	20	101	90	110	102	70	130
Titanium (dissolved)	EMS0068-MAY22	mg/L	0.00005	<0.00005	16	20	94	90	110	NV	70	130
Uranium (dissolved)	EMS0068-MAY22	mg/L	0.000002	<0.000002	1	20	92	90	110	92	70	130
Vanadium (dissolved)	EMS0068-MAY22	mg/L	0.00001	<0.00001	ND	20	101	90	110	110	70	130
Zinc (dissolved)	EMS0068-MAY22	mg/L	0.002	<0.002	2	20	101	90	110	NV	70	130
Silver (dissolved)	EMS0071-MAY22	mg/L	0.00005	<0.00005	ND	20	96	90	110	94	70	130
Aluminum (dissolved)	EMS0071-MAY22	mg/L	0.001	<0.001	17	20	94	90	110	96	70	130
Arsenic (dissolved)	EMS0071-MAY22	mg/L	0.0002	<0.0002	4	20	103	90	110	104	70	130
Barium (dissolved)	EMS0071-MAY22	mg/L	0.00008	<0.00002	4	20	99	90	110	98	70	130
Beryllium (dissolved)	EMS0071-MAY22	mg/L	0.000007	<0.000007	ND	20	92	90	110	83	70	130
Boron (dissolved)	EMS0071-MAY22	mg/L	0.002	<0.002	ND	20	100	90	110	86	70	130
Bismuth (dissolved)	EMS0071-MAY22	mg/L	0.00001	<0.00001	ND	20	94	90	110	96	70	130
Calcium (dissolved)	EMS0071-MAY22	mg/L	0.01	<0.01	0	20	94	90	110	95	70	130
Cadmium (dissolved)	EMS0071-MAY22	mg/L	0.000003	<0.000003	5	20	101	90	110	104	70	130
Cobalt (dissolved)	EMS0071-MAY22	mg/L	0.000004	<0.000004	2	20	100	90	110	97	70	130
Chromium (dissolved)	EMS0071-MAY22	mg/L	0.00008	<0.00008	10	20	99	90	110	103	70	130



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CA15096-MAY22 R1

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Copper (dissolved)	EMS0071-MAY22	mg/L	0.0002	<0.0002	2	20	96	90	110	97	70	130
Iron (dissolved)	EMS0071-MAY22	mg/L	0.007	<0.007	ND	20	94	90	110	100	70	130
Potassium (dissolved)	EMS0071-MAY22	mg/L	0.009	<0.009	4	20	96	90	110	94	70	130
Magnesium (dissolved)	EMS0071-MAY22	mg/L	0.001	<0.001	8	20	95	90	110	88	70	130
Manganese (dissolved)	EMS0071-MAY22	mg/L	0.00001	<0.00001	3	20	99	90	110	98	70	130
Molybdenum (dissolved)	EMS0071-MAY22	mg/L	0.00004	<0.00004	4	20	105	90	110	112	70	130
Sodium (dissolved)	EMS0071-MAY22	mg/L	0.01	<0.01	1	20	93	90	110	92	70	130
Nickel (dissolved)	EMS0071-MAY22	mg/L	0.0001	<0.0001	5	20	100	90	110	99	70	130
Lead (dissolved)	EMS0071-MAY22	mg/L	0.00009	<0.00001	5	20	97	90	110	99	70	130
Antimony (dissolved)	EMS0071-MAY22	mg/L	0.0009	<0.0009	ND	20	104	90	110	105	70	130
Selenium (dissolved)	EMS0071-MAY22	mg/L	0.00004	<0.00004	ND	20	104	90	110	107	70	130
Silicon (dissolved)	EMS0071-MAY22	mg/L	0.02	<0.02	6	20	99	90	110	NV	70	130
Tin (dissolved)	EMS0071-MAY22	mg/L	0.00006	<0.00006	ND	20	100	90	110	NV	70	130
Strontium (dissolved)	EMS0071-MAY22	mg/L	0.00008	<0.00002	1	20	102	90	110	104	70	130
Titanium (dissolved)	EMS0071-MAY22	mg/L	0.00005	<0.00005	ND	20	100	90	110	NV	70	130
Uranium (dissolved)	EMS0071-MAY22	mg/L	0.000002	<0.000002	3	20	92	90	110	94	70	130
Vanadium (dissolved)	EMS0071-MAY22	mg/L	0.00001	<0.00001	4	20	98	90	110	121	70	130
Zinc (dissolved)	EMS0071-MAY22	mg/L	0.002	<0.002	ND	20	97	90	110	NV	70	130
Boron (dissolved)	EMS0094-MAY22	mg/L	0.002	<0.002	4	20	101	90	110	93	70	130



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QC SUMMARY

pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0198-MAY22	No unit	0.05	NA	1		100			NA		

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-IENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0108-MAY22	mg/L	0.002	<0.002	ND	10	108	80	120	105	75	125

Phosphorus by SFA

Method: SM 4500-P J | Internal ref.: ME-CA-IENVISFA-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	SKA0089-MAY22	mg/L	0.03	<0.03	6	10	102	90	110	99	75	125



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QC SUMMARY

Reactive Phosphorus by SFA

Method: SM 4500-P F | Internal ref.: ME-CA-IENVISFA-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total reactive)	SKA0095-MAY22	mg/L	0.03	<0.03	ND	10	100	90	110	81	75	125

Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0185-MAY22	mg/L	30	<30	3	20	100	80	120	NA		
Total Dissolved Solids	EWL0195-MAY22	mg/L	30	<30	3	20	97	80	120	NA		

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-IENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0215-MAY22	mg/L	2	< 2	1	10	101	90	110	NA		



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QC SUMMARY

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-IENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0088-MAY22	mg/L	0.05	<0.05	7	10	107	90	110	106	75	125
Total Kjeldahl Nitrogen (N)	SKA0104-MAY22	mg/L	0.05	<0.05	4	10	101	90	110	106	75	125
Total Kjeldahl Nitrogen (N)	SKA0112-MAY22	mg/L	0.05	<0.05	ND	10	102	90	110	101	75	125

Turbidity

Method: SM 2130 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0169-MAY22	NTU	0.10	< 0.10	1	10	100	90	110	NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

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

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS Insufficient sample for analysis.
RL Reporting Limit.
 ↑ Reporting limit raised.
 ↓ Reporting limit lowered.
NA The sample was not analysed for this analyte
ND Non Detect

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

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This report supersedes all previous versions.

-- End of Analytical Report --



Request for Laboratory Services and CHAIN OF CUSTODY (General)

SGS Environmental Services - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365 Web: www.ca.sgs.com (4)

SGS Environmental Services - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com (4)

Laboratory Information Section

Received Date (mm/dd/yyyy): 05/06/2022 LAB LIMS #: CA 15096 - May 22
Received Time (After Hours Only): Temperature Upon Receipt (°C): 1, 2, 3

Billing & Reporting Information

Invoice/Receipt to (3): Company: Pinchin Attention: Alana Valle Address: 662 Falconbridge Rd, Unit 3 Sudbury, Ontario P3A 4S4 Email: avalue@pinchin.com
Quote #: 2021 254
Attached Parameter List: YES NO
Turnaround Time
Is *Rush Turnaround Time Required? YES NO
Specify:
* Rush TA Requests Require Lab Approval

Client Information/Report To: Client Lab #: Company Name: Phone Number: 705.507.9479
Contact Name: Fax Number:
Address: E-mail:
Copy to:

Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)																		
				GW Package																		
✓ BH1	5/4/22	PM	9	X																		
✓ BH8				X																		
✓ BH9				X																		
✓ BH10				X																		
✓ BH11				X																		
✓ BH12				X																		
✓ BH13				X																		
✓ BH14				X																		
✓ GW DUP				X																		

Sampled By {1}: (Name) Alana Valle (Signature) AV Date: 05/05/22 (mm/dd/yy)
Relinquished by {2}: (Name) Alana Valle (Signature) AV Date: 05/05/22 (mm/dd/yy)

Note: (1) Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. (2) Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). (3) Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. (4) Completion of work may require the subcontracting of samples between the London and Lakefield laboratories. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

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in 10:00
RTW



FINAL REPORT

CA15098-MAY22 R

225335.006, Croft Landfill SW

Prepared for

Pinchin Ltd

First Page

CLIENT DETAILS

Client Pinchin Ltd

Address 957 Cambrian Heights Drive, Suite 203,
Sudbury
Canada. P3C 5S5

Contact Alana Valle

Telephone 705-521-0560

Facsimile

Email avalue@Pinchin.com

Project 225335.006, Croft Landfill SW

Order Number

Samples Surface Water (4)

LABORATORY DETAILS

Project Specialist Brad Moore Hon. B.Sc

Laboratory SGS Canada Inc.

Address 185 Concession St., Lakefield ON, K0L 2H0

Telephone 705-652-2143

Facsimile 705-652-6365

Email brad.moore@sgs.com

SGS Reference CA15098-MAY22

Received 05/06/2022

Approved 05/17/2022

Report Number CA15098-MAY22 R

Date Reported 05/17/2022

COMMENTS

Temperature of Sample upon Receipt: 7 degrees C

Cooling Agent Present: Yes

Custody Seal Present: Yes

Chain of Custody Number: N/A

SIGNATORIES

Brad Moore Hon. B.Sc

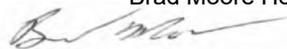


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FINAL REPORT

CA15098-MAY22 R

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill SW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

L1 = PWQQ_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	6	7	8	9
Sample Name	SW1	SW2	SW3	SW DUP
Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water
Sample Date	04/05/2022	04/05/2022	04/05/2022	04/05/2022

Parameter	Units	RL	L1	Result	Result	Result	Result
General Chemistry							
Biochemical Oxygen Demand (BOD5)	mg/L	2		< 4 †	< 4 †	< 4 †	< 4 †
Prep BOD	Prep	no		44687	44687	44687	44687
Total Suspended Solids	mg/L	2		12	4	6	< 2
Alkalinity	mg/L as CaCO3	2		7	4	115	3
Conductivity	uS/cm	2		699	14	317	13
Total Dissolved Solids	mg/L	30		383	43	209	< 30
Chemical Oxygen Demand	mg/L	8		19	22	32	20
Colour	TCU	3		3	62	31	62
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05		0.19	0.26	0.62	0.27
Ammonia+Ammonium (N)	as N mg/L	0.04		< 0.04	< 0.04	0.08	0.05
Phosphorus (total reactive)	mg/L	0.03		< 0.03	< 0.03	< 0.03	< 0.03
Dissolved Organic Carbon	mg/L	1		3	8	14	8

Metals and Inorganics

Sulphate	mg/L	2		2	< 2	24	< 2
Nitrite (as N)	as N mg/L	0.03		< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		< 0.06	< 0.06	4.86	< 0.06
Hardness	mg/L as CaCO3	0.05		248	4.4	147	4.1
Silver (total)	mg/L	0.00005	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Aluminum (0.2µm)	mg/L	0.001	0.015 0.075	0.239	0.139	0.035	0.135
Arsenic (total)	mg/L	0.0002	0.005	< 0.0002	0.0003	0.0004	0.0002
Barium (total)	mg/L	0.00008		0.126	0.00643	0.02101	0.00699



FINAL REPORT

CA15098-MAY22 R

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill SW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	6	7	8	9
Sample Name	SW1	SW2	SW3	SW DUP
Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water
Sample Date	04/05/2022	04/05/2022	04/05/2022	04/05/2022

Parameter	Units	RL	L1	Result	Result	Result	Result
Metals and Inorganics (continued)							
Beryllium (total)	mg/L	0.000007	0.011 1.1	0.000033	0.000024	< 0.000007	0.000023
Bismuth (total)	mg/L	0.00001		< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron (total)	mg/L	0.002	0.2	0.015	0.009	0.458	0.034
Calcium (total)	mg/L	0.01		70.1	1.33	51.6	1.20
Cadmium (total)	mg/L	0.000003	0.0001 0.0005	0.000209	0.000015	0.000006	0.000025
Cobalt (total)	mg/L	0.000004	0.0009	0.00642	0.000144	0.000236	0.000105
Chromium (total)	mg/L	0.00008	0.1	< 0.00008	0.00047	0.00057	0.00080
Copper (total)	mg/L	0.0002	0.001 0.005	0.0004	0.0005	0.0026	0.0005
Iron (total)	mg/L	0.007	0.3	0.208	0.250	0.015	0.240
Potassium (total)	mg/L	0.009		4.04	0.284	10.3	0.283
Magnesium (total)	mg/L	0.001		17.8	0.273	4.51	0.263
Manganese (total)	mg/L	0.00001		0.894	0.0286	0.00033	0.0231
Molybdenum (total)	mg/L	0.00004	0.04	< 0.00004	0.00007	0.00033	0.00004
Sodium (total)	mg/L	0.01		25.6	0.63	16.6	0.60
Nickel (total)	mg/L	0.0001	0.025	0.0034	0.0006	0.0006	0.0005
Lead (total)	mg/L	0.00009	0.005 0.025	< 0.00009	0.00012	< 0.00009	0.00011
Phosphorus (total)	mg/L	0.003	0.01	< 0.003	0.004	0.005	0.005
Antimony (total)	mg/L	0.0009	0.02	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.00004	0.1	0.00006	0.00009	0.00017	0.00013



FINAL REPORT

CA15098-MAY22 R

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill SW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

Sample Number	6	7	8	9
Sample Name	SW1	SW2	SW3	SW DUP
Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water
Sample Date	04/05/2022	04/05/2022	04/05/2022	04/05/2022

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Parameter	Units	RL	L1	Result	Result	Result	Result
Metals and Inorganics (continued)							
Silicon (total)	mg/L	0.02		3.16	0.66	0.16	0.62
Tin (total)	mg/L	0.00006		< 0.00006	< 0.00006	< 0.00006	< 0.00006
Strontium (total)	mg/L	0.00008		0.860	0.0108	0.185	0.0109
Titanium (total)	mg/L	0.00005		< 0.00005	0.00117	0.00023	0.00119
Uranium (total)	mg/L	0.000002	0.005	0.000009	0.000048	0.000268	0.000049
Vanadium (total)	mg/L	0.00001	0.006	0.00008	0.00033	0.00018	0.00031
Zinc (total)	mg/L	0.002	0.02	0.254	0.006	0.002	0.006
Other (ORP)							
pH	No unit	0.05	0.1 8.6	6.29	6.34	8.18	6.25
Chloride	mg/L	1		240	< 1	34	< 1
Phenols							
4AAP-Phenolics	mg/L	0.001	0.001	0.003	< 0.001	< 0.001	< 0.001

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E L1
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SW1

Aluminum (dissolved)	SM 3030/EPA 200.8	mg/L	0.239	0.015
Cobalt	SM 3030/EPA 200.8	mg/L	0.00642	0.0009
Zinc	SM 3030/EPA 200.8	mg/L	0.254	0.02
pH	SM 4500	No unit	6.29	0.1
4AAP-Phenolics	SM 5530B-D	mg/L	0.003	0.001

SW2

Aluminum (dissolved)	SM 3030/EPA 200.8	mg/L	0.139	0.015
pH	SM 4500	No unit	6.34	0.1

SW3

Boron	SM 3030/EPA 200.8	mg/L	0.458	0.2
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SW DUP

Aluminum (dissolved)	SM 3030/EPA 200.8	mg/L	0.135	0.015
pH	SM 4500	No unit	6.25	0.1



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CA15098-MAY22 R

QC SUMMARY

Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0227-MAY22	mg/L as CaCO3	2	< 2	1	20	109	80	120	NA		

Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0085-MAY22	mg/L	0.04	<0.04	2	10	97	90	110	95	75	125
Ammonia+Ammonium (N)	SKA0110-MAY22	mg/L	0.04	<0.04	9	10	102	90	110	96	75	125



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CA15098-MAY22 R

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO5050-MAY22	mg/L	1	<1	10	20	114	80	120	124	75	125
Sulphate	DIO5050-MAY22	mg/L	2	<2	3	20	114	80	120	108	75	125
Chloride	DIO5051-MAY22	mg/L	1	<1	1	20	105	80	120	115	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0219-MAY22	mg/L	0.03	<0.03	ND	20	99	90	110	99	75	125
Nitrate (as N)	DIO0219-MAY22	mg/L	0.06	<0.06	ND	20	101	90	110	102	75	125



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CA15098-MAY22 R

QC SUMMARY

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0012-MAY22	mg/L	2	< 2	13	30	97	70	130	84	70	130

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-IENVISFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0106-MAY22	mg/L	1	<1	ND	20	100	90	110	101	75	125

Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0186-MAY22	mg/L	8	<8	ND	20	108	80	120	100	75	125



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CA15098-MAY22 R

QC SUMMARY

Colour

Method: SM 2120 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Colour	EWL0223-MAY22	TCU	3	< 3	0	10	100	80	120	NA		

Conductivity

Method: SM 2510 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0227-MAY22	uS/cm	2	< 2	0	20	98	90	110	NA		



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CA15098-MAY22 R

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0082-MAY22	mg/L	0.00005	<0.00005	ND	20	97	90	110	89	70	130
Aluminum (0.2µm)	EMS0082-MAY22	mg/L	0.001	<0.001	7	20	99	90	110	109	70	130
Arsenic (total)	EMS0082-MAY22	mg/L	0.0002	<0.0002	7	20	101	90	110	102	70	130
Barium (total)	EMS0082-MAY22	mg/L	0.00008	<0.00002	5	20	99	90	110	85	70	130
Beryllium (total)	EMS0082-MAY22	mg/L	0.000007	<0.000007	ND	20	96	90	110	85	70	130
Boron (total)	EMS0082-MAY22	mg/L	0.002	<0.002	11	20	95	90	110	87	70	130
Bismuth (total)	EMS0082-MAY22	mg/L	0.00001	<0.00001	ND	20	101	90	110	86	70	130
Calcium (total)	EMS0082-MAY22	mg/L	0.01	<0.01	2	20	99	90	110	105	70	130
Cadmium (total)	EMS0082-MAY22	mg/L	0.000003	<0.000003	5	20	101	90	110	103	70	130
Cobalt (total)	EMS0082-MAY22	mg/L	0.000004	<0.000004	6	20	94	90	110	92	70	130
Chromium (total)	EMS0082-MAY22	mg/L	0.00008	<0.00008	9	20	102	90	110	93	70	130
Copper (total)	EMS0082-MAY22	mg/L	0.0002	<0.0002	0	20	99	90	110	101	70	130
Iron (total)	EMS0082-MAY22	mg/L	0.007	<0.007	4	20	97	90	110	100	70	130
Potassium (total)	EMS0082-MAY22	mg/L	0.009	<0.009	3	20	95	90	110	101	70	130
Magnesium (total)	EMS0082-MAY22	mg/L	0.001	<0.001	3	20	93	90	110	96	70	130
Manganese (total)	EMS0082-MAY22	mg/L	0.00001	<0.00001	4	20	108	90	110	103	70	130
Molybdenum (total)	EMS0082-MAY22	mg/L	0.00004	<0.00004	12	20	106	90	110	110	70	130
Sodium (total)	EMS0082-MAY22	mg/L	0.01	<0.01	1	20	96	90	110	123	70	130
Nickel (total)	EMS0082-MAY22	mg/L	0.0001	<0.0001	9	20	100	90	110	114	70	130
Lead (total)	EMS0082-MAY22	mg/L	0.00009	<0.00001	6	20	100	90	110	83	70	130



FINAL REPORT

CA15098-MAY22 R

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	EMS0082-MAY22	mg/L	0.003	<0.003	ND	20	95	90	110	NV	70	130
Antimony (total)	EMS0082-MAY22	mg/L	0.0009	<0.0009	ND	20	108	90	110	102	70	130
Selenium (total)	EMS0082-MAY22	mg/L	0.00004	<0.00004	8	20	103	90	110	83	70	130
Silicon (total)	EMS0082-MAY22	mg/L	0.02	<0.02	9	20	100	90	110	NV	70	130
Tin (total)	EMS0082-MAY22	mg/L	0.00006	<0.00006	ND	20	106	90	110	NV	70	130
Strontium (total)	EMS0082-MAY22	mg/L	0.00008	<0.00002	4	20	103	90	110	94	70	130
Titanium (total)	EMS0082-MAY22	mg/L	0.00005	<0.00005	15	20	94	90	110	NV	70	130
Uranium (total)	EMS0082-MAY22	mg/L	0.000002	<0.000002	0	20	101	90	110	105	70	130
Vanadium (total)	EMS0082-MAY22	mg/L	0.00001	<0.00001	6	20	99	90	110	108	70	130
Zinc (total)	EMS0082-MAY22	mg/L	0.002	<0.002	ND	20	108	90	110	98	70	130

pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0227-MAY22	No unit	0.05	NA	1		100			NA		



FINAL REPORT

CA15098-MAY22 R

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-IENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0148-MAY22	mg/L	0.001	<0.001	ND	10	104	80	120	101	75	125

Reactive Phosphorus by SFA

Method: SM 4500-P F | Internal ref.: ME-CA-IENVISFA-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total reactive)	SKA0109-MAY22	mg/L	0.03	<0.03	ND	10	101	90	110	91	75	125

Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0164-MAY22	mg/L	30	<30	1	20	100	80	120	NA		



FINAL REPORT

CA15098-MAY22 R

QC SUMMARY

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-IENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0178-MAY22	mg/L	2	< 2	1	10	93	90	110	NA		
Total Suspended Solids	EWL0231-MAY22	mg/L	2	< 2	5	10	98	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-IENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0088-MAY22	mg/L	0.05	<0.05	7	10	107	90	110	106	75 125	

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

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

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND**FOOTNOTES**

NSS Insufficient sample for analysis.
RL Reporting Limit.
 ↑ Reporting limit raised.
 ↓ Reporting limit lowered.
NA The sample was not analysed for this analyte
ND Non Detect

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

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This report supersedes all previous versions.

-- End of Analytical Report --



FINAL REPORT

CA15364-OCT22 R

225335.006, Croft Landfill GW

Prepared for

Pinchin Ltd

First Page

CLIENT DETAILS

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Project 225335.006, Croft Landfill GW

Order Number

Samples Ground Water (9)

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SGS Reference CA15364-OCT22

Received 10/20/2022

Approved 11/17/2022

Report Number CA15364-OCT22 R

Date Reported 11/17/2022

COMMENTS

Temperature of Sample upon Receipt: 5 degrees C

Cooling Agent Present: Yes

Custody Seal Present: Yes

Chain of Custody Number: n/a

SIGNATORIES

Brad Moore Hon. B.Sc

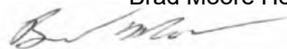


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FINAL REPORT

CA15364-OCT22 R

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

	Sample Number	7	8	9	10	11	12	13	14
	Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
	Sample Matrix	Ground Water							
	Sample Date	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result							
Acid Rock Drainage												
pH Check <2	pH	0.05			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

General Chemistry

Biochemical Oxygen Demand (BOD5)	mg/L	2			< 4 †	< 4 †	< 4 †	< 4 †	6	< 4 †	< 4 †	< 4 †
Prep BOD	Prep	no			44855	44855	44855	44855	44855	44855	44855	44855
Total Suspended Solids	mg/L	2			23	45	66	71	77	271	7370	2850
Alkalinity	mg/L as CaCO3	2	500		99	30	230	461	54	64	53	81
Conductivity	uS/cm	2			433	77	698	2100	305	153	152	234
Total Dissolved Solids	mg/L	30	500		271	< 30	423	1220	163	100	60	143
Chemical Oxygen Demand	mg/L	8			51	< 8	81	50	39	10	24	< 8
Turbidity	NTU	0.10	5	1	3.2	15	70	5.1	7.2	60	2100	750
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.43	0.05	5.20	14.3	4.62	0.08	0.65	0.29
Ammonia+Ammonium (N)	as N mg/L	0.04			0.12	0.04	3.84	13.4	3.74	0.08	0.30	0.15
Phosphorus (total reactive)	mg/L	0.03			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.12	0.12
Dissolved Organic Carbon	mg/L	1	5		17	3	29	17	15	4	6	2



FINAL REPORT

CA15364-OCT22 R

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number	7	8	9	10	11	12	13	14
Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
Sample Matrix	Ground Water							
Sample Date	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022

Parameter	Units	RL	L1	L2	Result							
Metals and Inorganics												
Phosphorus (total)	mg/L	0.03			< 0.03	< 0.03	< 0.03	< 0.03	0.06	0.08	3.73	1.81
Sulphate	mg/L	2	500		24	7	25	27	28	9	4	12
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	< 0.06	0.08	< 0.06	1.57	0.91	< 0.06	0.08	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	100		84.1	27.5	228	512	49.1	68.9	41.6	93.1
Silver (dissolved)	mg/L	0.00005			< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Aluminum (dissolved)	mg/L	0.001			0.248	0.089	0.141	0.035	0.159	0.041	0.092	0.051
Arsenic (dissolved)	mg/L	0.0002		0.01	0.0025	0.0017	0.0013	0.0015	0.0003	0.0011	0.0004	0.0003
Barium (dissolved)	mg/L	0.00008		1	0.0848	0.0304	0.113	0.254	0.0232	0.0454	0.0352	0.0429
Beryllium (dissolved)	mg/L	0.000007			0.000105	0.000013	0.000046	0.000014	0.000023	0.000042	0.000088	0.000031
Bismuth (dissolved)	mg/L	0.00001			0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Boron (dissolved)	mg/L	0.002		5	0.101	0.027	1.17	1.29	0.491	0.088	0.075	0.054
Calcium (dissolved)	mg/L	0.01			25.2	6.58	75.2	166	14.7	24.1	14.0	29.7
Cadmium (dissolved)	mg/L	0.000003		0.005	0.000007	0.000055	0.000028	0.000066	0.000031	0.000004	0.000049	0.000004
Cobalt (dissolved)	mg/L	0.000004			0.0194	0.000685	0.0158	0.00303	0.000988	0.000161	0.000167	0.000283
Chromium (dissolved)	mg/L	0.00008		0.05	0.00178	0.00020	0.00213	0.00134	0.00089	0.00027	0.00037	0.00018
Copper (dissolved)	mg/L	0.0002		1	0.0011	0.0073	0.0025	0.0098	0.0038	0.0003	0.0054	< 0.0002
Iron (dissolved)	mg/L	0.007		0.3	17.1	0.139	21.0	0.044	0.141	1.25	0.341	1.67
Potassium (dissolved)	mg/L	0.009			2.87	1.79	15.3	47.6	11.8	1.27	0.772	2.52
Magnesium (dissolved)	mg/L	0.001			5.12	2.69	9.91	23.4	3.03	2.13	1.62	4.59
Manganese (dissolved)	mg/L	0.00001		0.05	2.20	0.0146	3.94	2.26	0.399	0.365	0.192	0.536
Molybdenum (dissolved)	mg/L	0.00004			0.00040	0.00037	0.00159	0.00169	0.00101	0.00096	0.00019	0.00056



FINAL REPORT

CA15364-OCT22 R

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Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

	Sample Number	7	8	9	10	11	12	13	14
	Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
	Sample Matrix	Ground Water							
	Sample Date	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
Metals and Inorganics (continued)												
Sodium (dissolved)	mg/L	0.01	200	20	10.3	2.13	41.4	175	23.1	5.03	2.54	6.03
Nickel (dissolved)	mg/L	0.0001			0.0016	0.0035	0.0031	0.0022	0.0013	0.0002	0.0006	0.0001
Lead (dissolved)	mg/L	0.00009		0.01	0.00020	0.00014	0.00012	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Antimony (dissolved)	mg/L	0.0009		0.006	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Selenium (dissolved)	mg/L	0.00004		0.05	0.00028	0.00006	0.00035	0.00033	0.00024	0.00004	0.00014	< 0.00004
Tin (dissolved)	mg/L	0.00006			< 0.00006	< 0.00006	0.00011	0.00009	< 0.00006	< 0.00006	< 0.00006	< 0.00006
Strontium (dissolved)	mg/L	0.00008			0.133	0.0277	0.283	0.794	0.0371	0.117	0.0284	0.124
Silicon (dissolved)	mg/L	0.02			6.86	4.65	4.21	5.06	1.58	5.85	3.18	10.6
Titanium (dissolved)	mg/L	0.00005			0.0235	0.00518	0.00297	0.00090	0.00148	0.00074	0.00078	0.00112
Uranium (dissolved)	mg/L	0.000002		0.02	0.00137	0.000132	0.000904	0.00520	0.000358	0.000199	0.00324	0.000321
Vanadium (dissolved)	mg/L	0.00001			0.00563	0.00034	0.00300	0.00043	0.00017	0.00039	0.00045	0.00030
Zinc (dissolved)	mg/L	0.002	5		0.002	0.014	0.005	0.003	< 0.002	< 0.002	0.004	< 0.002

Other (ORP)

pH	No unit	0.05	8.5		7.00	7.02	7.51	7.82	7.40	7.50	7.09	7.61
Chloride	mg/L	1	250		16	< 1	75	420	43	5	12	21



FINAL REPORT

CA15364-OCT22 R

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

	Sample Number	7	8	9	10	11	12	13	14
	Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
	Sample Matrix	Ground Water							
	Sample Date	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022	18/10/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
Phenols												
4AAP-Phenolics	mg/L	0.002			0.008	0.003	0.007	0.012	0.006	< 0.002	< 0.002	< 0.002

MATRIX: WATER

	Sample Number	15
	Sample Name	GW DUP
	Sample Matrix	Ground Water
	Sample Date	18/10/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result
Acid Rock Drainage					
pH Check <2	pH	0.05			1.00

General Chemistry

Biochemical Oxygen Demand (BOD5)	mg/L	2			< 4 †
Prep BOD	Prep	no			44855
Total Suspended Solids	mg/L	2			225
Alkalinity	mg/L as CaCO3	2	500		67
Conductivity	uS/cm	2			165
Total Dissolved Solids	mg/L	30	500		66
Chemical Oxygen Demand	mg/L	8			8
Turbidity	NTU	0.10	5	1	95
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.17
Ammonia+Ammonium (N)	as N mg/L	0.04			0.10
Phosphorus (total reactive)	mg/L	0.03			< 0.03
Dissolved Organic Carbon	mg/L	1	5		3



FINAL REPORT

CA15364-OCT22 R

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

Sample Number 15
Sample Name GW DUP
Sample Matrix Ground Water
Sample Date 18/10/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics					
Phosphorus (total)	mg/L	0.03			0.08
Sulphate	mg/L	2	500		9
Nitrite (as N)	as N mg/L	0.03		1	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	100		65.5
Silver (dissolved)	mg/L	0.00005			< 0.00005
Aluminum (dissolved)	mg/L	0.001			0.045
Arsenic (dissolved)	mg/L	0.0002		0.01	0.0010
Barium (dissolved)	mg/L	0.00008		1	0.0470
Beryllium (dissolved)	mg/L	0.000007			0.000047
Bismuth (dissolved)	mg/L	0.00001			< 0.00001
Boron (dissolved)	mg/L	0.002		5	0.142
Calcium (dissolved)	mg/L	0.01			22.7
Cadmium (dissolved)	mg/L	0.000003		0.005	< 0.000003
Cobalt (dissolved)	mg/L	0.000004			0.000152
Chromium (dissolved)	mg/L	0.00008		0.05	0.00029
Copper (dissolved)	mg/L	0.0002	1		0.0015
Iron (dissolved)	mg/L	0.007	0.3		1.17
Potassium (dissolved)	mg/L	0.009			1.21
Magnesium (dissolved)	mg/L	0.001			2.12
Manganese (dissolved)	mg/L	0.00001	0.05		0.341
Molybdenum (dissolved)	mg/L	0.00004			0.00096



FINAL REPORT

CA15364-OCT22 R

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

Sample Number 15

Sample Name GW DUP

Sample Matrix Ground Water

Sample Date 18/10/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics (continued)					
Sodium (dissolved)	mg/L	0.01	200	20	5.00
Nickel (dissolved)	mg/L	0.0001			0.0002
Lead (dissolved)	mg/L	0.00009		0.01	< 0.00009
Antimony (dissolved)	mg/L	0.0009		0.006	< 0.0009
Selenium (dissolved)	mg/L	0.00004		0.05	< 0.00004
Tin (dissolved)	mg/L	0.00006			< 0.00006
Strontium (dissolved)	mg/L	0.00008			0.113
Silicon (dissolved)	mg/L	0.02			6.28
Titanium (dissolved)	mg/L	0.00005			0.00072
Uranium (dissolved)	mg/L	0.000002		0.02	0.000194
Vanadium (dissolved)	mg/L	0.00001			0.00037
Zinc (dissolved)	mg/L	0.002	5		< 0.002
Other (ORP)					
pH	No unit	0.05	8.5		7.48
Chloride	mg/L	1	250		5



FINAL REPORT

CA15364-OCT22 R

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

Sample Number 15

Sample Name GW DUP

Sample Matrix Ground Water

Sample Date 18/10/2022

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result
Phenols					
4AAP-Phenolics	mg/L	0.002			0.004

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG /	ODWS_MAC /
				WATER / - - Table 4 - Drinking Water - Reg O.169_03	WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03
				L1	L2

BH1

Turbidity	SM 2130	NTU	3.2		1
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	17.1	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	2.20	0.05	
Dissolved Organic Carbon	SM 5310	mg/L	17	5	

BH8

Turbidity	SM 2130	NTU	15	5	1
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BH9

Turbidity	SM 2130	NTU	70	5	1
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	228	100	
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	21.0	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	3.94	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	41.4		20
Dissolved Organic Carbon	SM 5310	mg/L	29	5	

BH10

Turbidity	SM 2130	NTU	5.1	5	1
Total Dissolved Solids	SM 2540C	mg/L	1220	500	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L as CaCO3	512	100	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	2.26	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	175		20
Dissolved Organic Carbon	SM 5310	mg/L	17	5	
Chloride	US EPA 325.2	mg/L	420	250	

BH11

Turbidity	SM 2130	NTU	7.2	5	1
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.399	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	23.1		20
Dissolved Organic Carbon	SM 5310	mg/L	15	5	

BH12

Turbidity	SM 2130	NTU	60	5	1
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	1.25	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.365	0.05	

BH13

Turbidity	SM 2130	NTU	2100	5	1
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	0.341	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.192	0.05	
Dissolved Organic Carbon	SM 5310	mg/L	6	5	

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03
				L1	L2

BH14

Turbidity	SM 2130	NTU	750	5	1
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	1.67	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.536	0.05	

GW DUP

Turbidity	SM 2130	NTU	95	5	1
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	1.17	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.341	0.05	



FINAL REPORT

CA15364-OCT22 R

QC SUMMARY

Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0500-OCT22	mg/L as CaCO3	2	< 2	0	20	104	80	120	NA		

Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0261-OCT22	mg/L	0.04	<0.04	1	10	100	90	110	92	75	125
Ammonia+Ammonium (N)	SKA0279-OCT22	mg/L	0.04	<0.04	0	10	94	90	110	100	75	125



FINAL REPORT

CA15364-OCT22 R

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO5119-OCT22	mg/L	1	<1	4	20	107	80	120	100	75	125
Sulphate	DIO5119-OCT22	mg/L	2	<2	4	20	103	80	120	94	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0475-OCT22	mg/L	0.03	<0.03	ND	20	98	90	110	101	75	125
Nitrate (as N)	DIO0475-OCT22	mg/L	0.06	<0.06	0	20	101	90	110	101	75	125
Nitrite (as N)	DIO0476-OCT22	mg/L	0.03	<0.03	ND	20	96	90	110	96	75	125
Nitrate (as N)	DIO0476-OCT22	mg/L	0.06	<0.06	ND	20	100	90	110	101	75	125



FINAL REPORT

CA15364-OCT22 R

QC SUMMARY

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0045-OCT22	mg/L	2	< 2	10	30	105	70	130	71	70	130

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-IENVISFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0231-OCT22	mg/L	1	<1	7	20	101	90	110	93	75	125
Dissolved Organic Carbon	SKA0245-OCT22	mg/L	1	<1	3	20	98	90	110	115	75	125

Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0557-OCT22	mg/L	8	<8	ND	20	96	80	120	95	75	125



FINAL REPORT

CA15364-OCT22 R

QC SUMMARY

Conductivity

Method: SM 2510 | Internal ref.: ME-CA-ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0500-OCT22	uS/cm	2	< 2	0	20	98	90	110	NA		



FINAL REPORT

CA15364-OCT22 R

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-ENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (dissolved)	EMS0179-OCT22	mg/L	0.00005	<0.00005	ND	20	97	90	110	95	70	130
Aluminum (dissolved)	EMS0179-OCT22	mg/L	0.001	<0.001	ND	20	96	90	110	100	70	130
Arsenic (dissolved)	EMS0179-OCT22	mg/L	0.0002	<0.0002	ND	20	100	90	110	107	70	130
Barium (dissolved)	EMS0179-OCT22	mg/L	0.00008	<0.00002	0	20	98	90	110	78	70	130
Beryllium (dissolved)	EMS0179-OCT22	mg/L	0.000007	<0.000007	ND	20	91	90	110	99	70	130
Boron (dissolved)	EMS0179-OCT22	mg/L	0.002	<0.002	1	20	93	90	110	96	70	130
Bismuth (dissolved)	EMS0179-OCT22	mg/L	0.00001	<0.00001	ND	20	93	90	110	119	70	130
Calcium (dissolved)	EMS0179-OCT22	mg/L	0.01	<0.01	0	20	98	90	110	100	70	130
Cadmium (dissolved)	EMS0179-OCT22	mg/L	0.000003	<0.000003	ND	20	97	90	110	130	70	130
Cobalt (dissolved)	EMS0179-OCT22	mg/L	0.000004	<0.000004	18	20	97	90	110	113	70	130
Chromium (dissolved)	EMS0179-OCT22	mg/L	0.00008	<0.00008	ND	20	96	90	110	113	70	130
Copper (dissolved)	EMS0179-OCT22	mg/L	0.0002	<0.0002	0	20	96	90	110	92	70	130
Iron (dissolved)	EMS0179-OCT22	mg/L	0.007	<0.007	ND	20	99	90	110	100	70	130
Potassium (dissolved)	EMS0179-OCT22	mg/L	0.009	<0.009	3	20	103	90	110	96	70	130
Magnesium (dissolved)	EMS0179-OCT22	mg/L	0.001	<0.001	1	20	97	90	110	96	70	130
Manganese (dissolved)	EMS0179-OCT22	mg/L	0.00001	<0.00001	2	20	99	90	110	96	70	130
Molybdenum (dissolved)	EMS0179-OCT22	mg/L	0.00004	<0.00004	1	20	100	90	110	107	70	130
Sodium (dissolved)	EMS0179-OCT22	mg/L	0.01	<0.01	1	20	93	90	110	98	70	130
Nickel (dissolved)	EMS0179-OCT22	mg/L	0.0001	<0.0001	1	20	96	90	110	102	70	130
Lead (dissolved)	EMS0179-OCT22	mg/L	0.00009	<0.00001	7	20	96	90	110	102	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Antimony (dissolved)	EMS0179-OCT22	mg/L	0.0009	<0.0009	ND	20	100	90	110	110	70	130
Selenium (dissolved)	EMS0179-OCT22	mg/L	0.00004	<0.00004	1	20	98	90	110	126	70	130
Tin (dissolved)	EMS0179-OCT22	mg/L	0.00006	<0.00006	ND	20	102	90	110	NV	70	130
Strontium (dissolved)	EMS0179-OCT22	mg/L	0.00008	<0.00002	3	20	96	90	110	100	70	130
Titanium (dissolved)	EMS0179-OCT22	mg/L	0.00005	<0.00005	ND	20	101	90	110	NV	70	130
Uranium (dissolved)	EMS0179-OCT22	mg/L	0.000002	<0.000002	1	20	92	90	110	100	70	130
Vanadium (dissolved)	EMS0179-OCT22	mg/L	0.00001	<0.00001	8	20	96	90	110	109	70	130
Zinc (dissolved)	EMS0179-OCT22	mg/L	0.002	<0.002	0	20	96	90	110	102	70	130

pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0500-OCT22	No unit	0.05	NA	0		100			NA		



FINAL REPORT

CA15364-OCT22 R

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-IENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0233-OCT22	mg/L	0.002	<0.002	ND	10	107	80	120	124	75	125

Phosphorus by SFA

Method: SM 4500-P J | Internal ref.: ME-CA-IENVISFA-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	SKA0277-OCT22	mg/L	0.03	<0.03	ND	10	100	90	110	78	75	125
Phosphorus (total)	SKA0295-OCT22	mg/L	0.03	<0.03	4	10	98	90	110	84	75	125

Reactive Phosphorus by SFA

Method: SM 4500-P F | Internal ref.: ME-CA-IENVISFA-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total reactive)	SKA0230-OCT22	mg/L	0.03	<0.03	ND	10	99	90	110	95	75	125



FINAL REPORT

CA15364-OCT22 R

QC SUMMARY

Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0533-OCT22	mg/L	30	<30	0	20	94	80	120	NA		

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-IENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0582-OCT22	mg/L	2	< 2	1	10	96	90	110	NA		
Total Suspended Solids	EWL0589-OCT22	mg/L	2	< 2	3	10	102	90	110	NA		



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CA15364-OCT22 R

QC SUMMARY

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-IENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0281-OCT22	mg/L	0.05	<0.05	ND	10	100	90	110	107	75	125
Total Kjeldahl Nitrogen (N)	SKA0293-OCT22	mg/L	0.05	<0.05	1	10	104	90	110	108	75	125

Turbidity

Method: SM 2130 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0489-OCT22	NTU	0.10	< 0.10	0	10	101	90	110	NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

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

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND**FOOTNOTES**

NSS Insufficient sample for analysis.
RL Reporting Limit.
 ↑ Reporting limit raised.
 ↓ Reporting limit lowered.
NA The sample was not analysed for this analyte
ND Non Detect

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

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This report supersedes all previous versions.

-- End of Analytical Report --



Request for Laboratory Services and CHAIN OF CUSTODY (General)

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SGS Environmental Services - London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com (4)

Laboratory Information Section

Received Date (mm/dd/yyyy): 10/20/2022 LAB LIMS #: OCT-15264
 Received Time (After Hours Only): _____ CA Temperature Upon Receipt (°C): 5 x 3

Billing & Reporting Information

Invoice/Receipt to (3):
 Company: Pinchin Quote #: 2021 254
 Attention: Alana Valle Attached Parameter List: YES NO
 Address: 662 Falconbridge Rd, Unit 3
 Sudbury, Ontario Turnaround Time
 P3A 4S4 Is *Rush Turnaround Time Required? YES NO
 Email: avalue@pinchin.com Specify: _____
 Project Name/Number: 225335.006-Croft Landfill GW P.O. #: _____ * Rush TA Requests Require Lab Approval

Client Information/Report To:

Company Name: _____ Phone Number: 705.507.9479
 Contact Name: _____ Fax Number: _____
 Address: _____ E-mail: _____
 Copy to: _____

Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)								
				GW Package								
BH1	10/18/22	4-6	9	X								
BH8	↓	↓	9	X								
BH9	↓	↓	9	X								
BH10	↓	↓	9	X								
BH11	↓	↓	9	X								
BH12	↓	↓	9	X								
BH13	↓	↓	9	X								
BH14	↓	↓	9	X								
GW DUP	10/18/22	4-6	9	X								

Sampled By (1): (Name) Alana Valle (Signature) AV Date: 10.18/22 (mm/dd/yy)
 Relinquished by (2): (Name) Alana Valle (Signature) AV Date: 10.18/22 (mm/dd/yy)

Note: (1) Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. (2) Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). (3) Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. (4) Completion of work may require the subcontracting of samples between the London and Lakefield laboratories.
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FINAL REPORT

CA15373-OCT22 R

225335.006, Croft Landfill SW

Prepared for

Pinchin Ltd

First Page

CLIENT DETAILS

Client Pinchin Ltd

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Canada. P3C 5S5

Contact Alana Valle

Telephone 705-521-0560

Facsimile

Email avalue@Pinchin.com

Project 225335.006, Croft Landfill SW

Order Number

Samples Surface Water (3)

LABORATORY DETAILS

Project Specialist Maarit Wolfe, Hon.B.Sc

Laboratory SGS Canada Inc.

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Telephone 705-652-2000

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SGS Reference CA15373-OCT22

Received 10/20/2022

Approved 11/11/2022

Report Number CA15373-OCT22 R

Date Reported 11/11/2022

COMMENTS

Temperature of Sample upon Receipt: 9 degrees C

Cooling Agent Present: Yes

Custody Seal Present: Yes

Chain of Custody Number: n/a

SIGNATORIES

Maarit Wolfe, Hon.B.Sc



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FINAL REPORT

CA15373-OCT22 R

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill SW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

Sample Number	6	7	8
Sample Name	SW1	SW2	SW DUP
Sample Matrix	Surface Water	Surface Water	Surface Water
Sample Date	18/10/2022	18/10/2022	18/10/2022

Parameter	Units	RL	Result	Result	Result
General Chemistry					
Biochemical Oxygen Demand (BOD5)	mg/L	2	< 4 †	< 4 †	< 4 †
Prep BOD	Prep	no	44855	44855	44855
Total Suspended Solids	mg/L	2	4	2	2
Alkalinity	mg/L as CaCO3	2	< 2	2	3
Conductivity	uS/cm	2	490	22	19
Total Dissolved Solids	mg/L	30	250	< 30	< 30
Chemical Oxygen Demand	mg/L	8	14	37	37
Colour	TCU	3	36	92	92
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05	0.21	0.45	0.36
Ammonia+Ammonium (N)	as N mg/L	0.04	< 0.04	< 0.04	0.06
Phosphorus (total reactive)	mg/L	0.03	< 0.03	< 0.03	< 0.03
Dissolved Organic Carbon	mg/L	1	10	13	13

Metals and Inorganics

Sulphate	mg/L	2	3	< 2	< 2
Nitrite (as N)	as N mg/L	0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06	< 0.06	0.49	0.09
Hardness	mg/L as CaCO3	0.05	148	7.57	6.91
Silver (total)	mg/L	0.00005	< 0.00005	< 0.00005	< 0.00005
Aluminum (0.2µm)	mg/L	0.001	0.368	0.152	0.140
Arsenic (total)	mg/L	0.0002	0.0004	0.0005	0.0006
Barium (total)	mg/L	0.00008	0.0981	0.0142	0.0104
Beryllium (total)	mg/L	0.000007	0.000087	0.000027	0.000028



FINAL REPORT

CA15373-OCT22 R

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill SW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

Sample Number	6	7	8
Sample Name	SW1	SW2	SW DUP
Sample Matrix	Surface Water	Surface Water	Surface Water
Sample Date	18/10/2022	18/10/2022	18/10/2022

Parameter	Units	RL	Result	Result	Result
Metals and Inorganics (continued)					
Bismuth (total)	mg/L	0.00001	< 0.00001	< 0.00001	< 0.00001
Boron (total)	mg/L	0.002	0.010	0.007	0.007
Calcium (total)	mg/L	0.01	41.2	2.12	1.90
Cadmium (total)	mg/L	0.000003	0.000469	0.000041	0.000024
Cobalt (total)	mg/L	0.000004	0.006134	0.000794	0.000310
Chromium (total)	mg/L	0.00008	0.00033	0.00038	0.00044
Copper (total)	mg/L	0.0002	0.0026	0.0010	0.0013
Iron (total)	mg/L	0.007	1.27	1.40	1.33
Potassium (total)	mg/L	0.009	2.75	0.826	0.674
Magnesium (total)	mg/L	0.001	11.0	0.556	0.527
Manganese (total)	mg/L	0.00001	0.807	0.245	0.0450
Molybdenum (total)	mg/L	0.00004	0.00024	0.00018	0.00012
Sodium (total)	mg/L	0.01	17.6	1.13	1.03
Nickel (total)	mg/L	0.0001	0.0028	0.0007	0.0006
Lead (total)	mg/L	0.00009	0.00058	0.00036	0.00035
Phosphorus (total)	mg/L	0.003	0.030	0.028	0.016
Antimony (total)	mg/L	0.0009	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.00004	0.00008	0.00007	0.00009
Silicon (total)	mg/L	0.02	2.99	1.65	1.66
Tin (total)	mg/L	0.00006	< 0.00006	0.00007	< 0.00006
Strontium (total)	mg/L	0.00008	0.469	0.0175	0.0163
Titanium (total)	mg/L	0.00005	0.00236	0.00374	0.00315



FINAL REPORT

CA15373-OCT22 R

Client: Pinchin Ltd

Project: 225335.006, Croft Landfill SW

Project Manager: Alana Valle

Samplers: Alana Valle

MATRIX: WATER

Sample Number	6	7	8
Sample Name	SW1	SW2	SW DUP
Sample Matrix	Surface Water	Surface Water	Surface Water
Sample Date	18/10/2022	18/10/2022	18/10/2022

Parameter	Units	RL	Result	Result	Result
Metals and Inorganics (continued)					
Uranium (total)	mg/L	0.000002	0.000048	0.000057	0.000053
Vanadium (total)	mg/L	0.00001	0.00042	0.00064	0.00059
Zinc (total)	mg/L	0.002	0.114	0.006	0.005
Other (ORP)					
pH	No unit	0.05	5.02	5.81	6.08
Chloride	mg/L	1	160	< 1	< 1
Phenols					
4AAP-Phenolics	mg/L	0.001	0.004	0.003	0.003



FINAL REPORT

CA15373-OCT22 R

QC SUMMARY

Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0500-OCT22	mg/L as CaCO3	2	< 2	0	20	104	80	120	NA		

Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0279-OCT22	mg/L	0.04	<0.04	0	10	94	90	110	100	75	125



FINAL REPORT

CA15373-OCT22 R

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO5026-NOV22	mg/L	1	<1	ND	20	105	80	120	104	75	125
Sulphate	DIO5026-NOV22	mg/L	2	<2	ND	20	100	80	120	101	75	125
Sulphate	DIO5027-NOV22	mg/L	2	<2	0	20	102	80	120	79	75	125
Chloride	DIO5028-NOV22	mg/L	1	<1	0	20	96	80	120	84	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0490-OCT22	mg/L	0.03	<0.03	ND	20	95	90	110	101	75	125
Nitrate (as N)	DIO0490-OCT22	mg/L	0.06	<0.06	ND	20	99	90	110	101	75	125



FINAL REPORT

CA15373-OCT22 R

QC SUMMARY

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0045-OCT22	mg/L	2	< 2	10	30	105	70	130	71	70	130

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-IENVISFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0260-OCT22	mg/L	1	<1	2	20	103	90	110	104	75	125

Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0536-OCT22	mg/L	8	<8	ND	20	97	80	120	87	75	125
Chemical Oxygen Demand	EWL0537-OCT22	mg/L	8	<8	8	20	102	80	120	94	75	125



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QC SUMMARY

Colour

Method: SM 2120 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Colour	EWL0609-OCT22	TCU	3	< 3	ND	10	110	80	120	NA		

Conductivity

Method: SM 2510 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0500-OCT22	uS/cm	2	< 2	0	20	98	90	110	NA		



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QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-ENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0186-OCT22	mg/L	0.00005	<0.00005	ND	20	100	90	110	95	70	130
Aluminum (0.2µm)	EMS0186-OCT22	mg/L	0.001	<0.001	8	20	96	90	110	122	70	130
Arsenic (total)	EMS0186-OCT22	mg/L	0.0002	<0.0002	19	20	101	90	110	109	70	130
Barium (total)	EMS0186-OCT22	mg/L	0.00008	<0.00002	2	20	98	90	110	93	70	130
Beryllium (total)	EMS0186-OCT22	mg/L	0.000007	<0.000007	0	20	94	90	110	92	70	130
Boron (total)	EMS0186-OCT22	mg/L	0.002	<0.002	10	20	100	90	110	99	70	130
Bismuth (total)	EMS0186-OCT22	mg/L	0.00001	<0.00001	0	20	105	90	110	104	70	130
Calcium (total)	EMS0186-OCT22	mg/L	0.01	<0.01	2	20	103	90	110	97	70	130
Cadmium (total)	EMS0186-OCT22	mg/L	0.000003	<0.000003	8	20	101	90	110	104	70	130
Cobalt (total)	EMS0186-OCT22	mg/L	0.000004	<0.000004	5	20	100	90	110	101	70	130
Chromium (total)	EMS0186-OCT22	mg/L	0.00008	<0.00008	ND	20	97	90	110	95	70	130
Copper (total)	EMS0186-OCT22	mg/L	0.0002	<0.0002	5	20	101	90	110	101	70	130
Iron (total)	EMS0186-OCT22	mg/L	0.007	<0.007	ND	20	103	90	110	125	70	130
Potassium (total)	EMS0186-OCT22	mg/L	0.009	<0.009	4	20	107	90	110	86	70	130
Magnesium (total)	EMS0186-OCT22	mg/L	0.001	<0.001	2	20	105	90	110	91	70	130
Manganese (total)	EMS0186-OCT22	mg/L	0.00001	<0.00001	6	20	99	90	110	100	70	130
Molybdenum (total)	EMS0186-OCT22	mg/L	0.00004	<0.00004	19	20	101	90	110	105	70	130
Sodium (total)	EMS0186-OCT22	mg/L	0.01	<0.01	2	20	104	90	110	95	70	130
Nickel (total)	EMS0186-OCT22	mg/L	0.0001	<0.0001	8	20	99	90	110	98	70	130
Lead (total)	EMS0186-OCT22	mg/L	0.00009	<0.00001	9	20	109	90	110	108	70	130



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QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	EMS0186-OCT22	mg/L	0.003	<0.003	ND	20	101	90	110	NV	70	130
Antimony (total)	EMS0186-OCT22	mg/L	0.0009	<0.0009	ND	20	106	90	110	95	70	130
Selenium (total)	EMS0186-OCT22	mg/L	0.00004	<0.00004	ND	20	110	90	110	127	70	130
Silicon (total)	EMS0186-OCT22	mg/L	0.02	<0.02	11	20	98	90	110	NV	70	130
Tin (total)	EMS0186-OCT22	mg/L	0.00006	<0.00006	ND	20	99	90	110	NV	70	130
Strontium (total)	EMS0186-OCT22	mg/L	0.00008	<0.00002	1	20	97	90	110	91	70	130
Titanium (total)	EMS0186-OCT22	mg/L	0.00005	<0.00005	3	20	103	90	110	NV	70	130
Uranium (total)	EMS0186-OCT22	mg/L	0.000002	<0.000002	0	20	106	90	110	101	70	130
Vanadium (total)	EMS0186-OCT22	mg/L	0.00001	<0.00001	2	20	100	90	110	104	70	130
Zinc (total)	EMS0186-OCT22	mg/L	0.002	<0.002	9	20	100	90	110	90	70	130

pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0500-OCT22	No unit	0.05	NA	0		100			NA		



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QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-IENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0257-OCT22	mg/L	0.001	<0.001	ND	10	100	80	120	NV	75	125

Reactive Phosphorus by SFA

Method: SM 4500-P F | Internal ref.: ME-CA-IENVISFA-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total reactive)	SKA0246-OCT22	mg/L	0.03	<0.03	ND	10	100	90	110	87	75	125

Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0509-OCT22	mg/L	30	<30	2	20	93	80	120	NA		



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QC SUMMARY

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-IENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0542-OCT22	mg/L	2	< 2	1	10	95	90	110	NA		
Total Suspended Solids	EWL0570-OCT22	mg/L	2	< 2	1	10	96	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-IENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0293-OCT22	mg/L	0.05	<0.05	1	10	104	90	110	108	75 125	

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

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

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND**FOOTNOTES**

NSS Insufficient sample for analysis.
RL Reporting Limit.
 ↑ Reporting limit raised.
 ↓ Reporting limit lowered.
NA The sample was not analysed for this analyte
ND Non Detect

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm.

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This report supersedes all previous versions.

-- End of Analytical Report --

APPENDIX VIII
Monitoring and Screening Checklist

Appendix D-Monitoring and Screening Checklist General Information and Instructions

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

Instructions: A complete checklist consists of:

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

Definition of Groundwater CEP:

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

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

Definition of Surface water CEP:

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

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

Monitoring Report and Site Information

Monitoring Report and Site Information	
Waste Disposal Site Name	Croft Waste Disposal Site
Location (e.g. street address, lot, concession)	Lot 26, Concession 11, within the Municipality of Magnetawan, District of Parry Sound, Ontario
GPS Location (taken within the property boundary at front gate/ front entry)	Universal Transverse Mercator (UTM) coordinates Zone 17U, 593659 meters (m) Easting and 5058398 m Northing (North American Datum 1983)
Municipality	Magnetawan
Client and/or Site Owner	The Corporation of the Municipality of Magnetawan
Monitoring Period (Year)	2022
This Monitoring Report is being submitted under the following:	
Certificate of Approval No.:	A7034002
Director's Order No.:	Type Here
Provincial Officer's Order No.:	Type Here
Other:	Type Here

Report Submission Frequency	<input checked="" type="radio"/> Annual <input type="radio"/> Other	Specify (Type Here):
The site is:	<input checked="" type="radio"/> Active <input type="radio"/> Inactive <input type="radio"/> Closed	
If closed, specify C of A, control or authorizing document closure date:		Select Date
Has the nature of the operations at the site changed during this monitoring period?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
If yes, provide details:	Type Here	
Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i. e. exceeded the LEL for methane)	<input type="radio"/> Yes <input checked="" type="radio"/> No	

Groundwater WDS Verification:

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

Sampling and Monitoring Program Status:

1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:	<input checked="" type="radio"/> Yes <input type="radio"/> No	If no, list exceptions (Type Here):
2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document(s):	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Applicable	If no, list exceptions below or attach information.

Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

3) a) Some or all groundwater, leachate and WDS gas sampling and monitoring requirements have been established or defined outside of a ministry C of A, authorizing, or control document.	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Applicable	
b) If yes, the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Applicable	If no, list exceptions below or attach additional information.
Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	<input checked="" type="radio"/> Yes <input type="radio"/> No	If no, specify (Type Here):

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

<p>5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>No formal CAZ registered for the site, but all wells reflective of property boundary conditions currently meet the applicable criteria.</p>	
<p>6) The site meets compliance and assessment criteria.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>If no, list and explain exceptions (Type Here):</p>	
<p>7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>If no, list exceptions and explain reason for increase/change (Type Here):</p>	
<p>1) Is one or more of the following risk reduction practices in place at the site:</p> <p>(a) There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/treatment; or</p> <p>(b) There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or</p> <p>(c) The site meets the following two conditions (typically achieved after 15 years or longer of site operation):</p> <p><i>i.</i> The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and</p> <p><i>ii.</i> Seasonal and annual water levels and water quality fluctuations are well understood.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Note which practice(s):</p>	<p><input type="checkbox"/> (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> (c)</p>
<p>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</p>	<p><input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Applicable</p>	<p>If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here):</p>	

Groundwater CEP Declaration:

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended), and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories*, or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

18-Jan-2023

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

No changes to the monitoring program are recommended

The following change(s) to the monitoring program is/are recommended:

It is recommended that drive point monitoring locations DP7, DP8 and DP9 be removed from the sampling program as these locations have consistently been found to have insufficient volume to sample. It is recommended that these wells should be retained as water level only monitoring locations to supplement the groundwater elevation monitoring for the Site; however, the drive point monitors should be equipped with appropriate caps to ensure representative water level data is obtained.

No Changes to site design and operation are recommended

The following change(s) to the site design and operation is/are recommended:

Type Here

Name:	Tim McBride		
Seal:	Add Image		
Signature:	 <p>Digitally signed by Tim McBride DN: PostalCode=L6N7W5, O=Pinchin Ltd., STREET=2470 Milltower Cr., S=Ontario, C=CA, CN=Tim McBride, E=tmcbride@pinchin.com Reason: I am the author of this document Date: 2023.01.18 14:23:42-05'00' Foxit PDF Editor Version: 12.1.0</p>	Date:	18-Jan-2023
CEP Contact Information:	Tim McBride		
Company:	Pinchin Ltd.		
Address:	662 Falconbridge Road, Unit 3 Sudbury ON P3A 4S4		
Telephone No.:	705.521.0560	Fax No. :	705.521.1309
E-mail Address:	tmcbride@pinchin.com		
Co-signers for additional expertise provided:			
Signature:		Date:	Select Date
Signature:		Date:	Select Date

Surface Water WDS Verification:

Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):

Name (s)	Love Lake Unnamed tributary to Ahmic Lake
Distance(s)	500 m north of the Site South of the Site

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

Sampling and Monitoring Program Status:

1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:	<input checked="" type="radio"/> Yes <input type="radio"/> No	If no, identify issues (Type Here):
2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not applicable (No C of A, authorizing / control document applies)	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
SW3	Dry	18-Oct-2022
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

<p>3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.</p>	<p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p> <p><input type="radio"/> Not Applicable</p>		
<p>b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:</p>	<p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> Not Applicable</p>	<p>If no, specify below or provide details in an attachment.</p>	
Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)		Date
Type Here	Type Here		Select Date
Type Here	Type Here		Select Date
Type Here	Type Here		Select Date
Type Here	Type Here		Select Date
<p>4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/ outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):</p>	<p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>If no, specify (Type Here):</p>	

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The receiving water body meets surface water-related compliance criteria and assessment criteria: i.e., there are no exceedances of criteria, based on MOE legislation, regulations, Water Management Policies, Guidelines and Provincial Water Quality Objectives and other assessment criteria (e.g., CWQGs, APVs), as noted in Table A or Table B in the Technical Guidance Document (Section 4.6):	<input type="radio"/> Yes <input checked="" type="radio"/> No
--	--

If no, list parameters that exceed criteria outlined above and the amount/percentage of the exceedance as per the table below or provide details in an attachment:

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO
See Section 4.6	Type Here	Type Here
Type Here	Type Here	Type Here
Type Here	Type Here	Type Here
Type Here	Type Here	Type Here

6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	<input checked="" type="radio"/> Yes <input type="radio"/> No	If yes, specify (Type Here)
--	--	-----------------------------

<p>7) All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.</p>	<p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>If no, list parameters and stations that is outside the expected range. Identify whether parameter concentrations show an increasing trend or are within a high historical range (Type Here)</p>
<p>8) For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g. , PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):</p>	<p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> Not Known</p> <p><input type="radio"/> Not Applicable</p>	<p>If yes, provide details and whether remedial measures are necessary (Type Here)</p>
<p>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</p>	<p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> Not Applicable</p>	<p>If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here)</p>

Surface Water CEP Declaration:

I, the undersigned hereby declare that I am a Competent Environmental Practitioner as defined in Appendix D under Instructions, holding the necessary level of experience and education to design surface water monitoring and sampling programs, conduct appropriate surface water investigations and interpret the related data as it pertains to the site for this monitoring period.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended) and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories*, or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

18-Jan-2023

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

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

CEP Signature	<p>Digitally signed by Tim McBride DN: PostalCode=L5N7W5, O=Pinchin Ltd., STREET=2470 Milltower Crt, S=Ontario, C=CA, CN=Tim McBride, E=tmcbride@pinchin.com Reason: I am the author of this document Location: Date: 2023.01.18 14:24:14-05'00' Foxit PDF Editor Version: 12.1.0</p> <p>Tim McBride</p>	
Relevant Discipline	Hydrogeologist	
Date:	18-Jan-2023	
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