# 2023 Annual Monitoring Report

Jocelyn Waste Disposal Site
Jocelyn Township, Ontario

Prepared for:

The Township of Jocelyn
3670 5th Side Road, PR#1
Hilton Beach, ON, P0R 1G0

February 22, 2024

Pinchin File: 204232.008

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| **Issued To:** | **The Township of Jocelyn** |
| **Issued On:** | **February 22, 2024** |
| **Pinchin File:** | **204232.008** |
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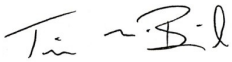

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# 1.0 INTRODUCTION

Pinchin Ltd. (Pinchin) was retained by The Township of Jocelyn (Client) to prepare the 2023 Annual Monitoring Program at the Jocelyn Township Waste Disposal Site (the Site). The following report provides a detailed evaluation and summary of the 2023 monitoring data and was completed to constitute the 2023 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 **A561001** and the applicable regulatory requirements during the spring and fall of 2023. 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 in Lot 4, Concession 5 of Jocelyn Township, is located approximately 65 kilometres (km) east of Sault Ste. Marie in the District of Algoma, Ontario. The Site is situated in an undeveloped area and the visibility of landfilling activities is limited to the adjacent roadway to the north due to 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 17T, 449,280 metres (m) Easting and 5,110,082 m Northing (North American Datum 1983). Landfill coordinates were obtained using Google Earth and confirmed via hand-held GPS during the spring and fall 2023 monitoring events.

### *1.1.1 Site Survey and Aerial Photography*

At the time of preparation of this report, a geodetic survey and aerial photography of the Site was available for Pinchin to review, however this was limited the Site topography and did not include the incorporation of monitoring well network measuring points. Elevations referenced within this report are with respect to elevations of local benchmarks established during previous investigations at the Site.

## 1.2 Ownership and Key Personnel

The Site is owned and operated by the Township of Jocelyn. Pinchin completed the project as requested by the following Client representative:

Mrs. Janet Boucher, Clerk/Treasurer

Township of Jocelyn

3670 5th Side Road, RR #1

Hilton Beach, ON  P0R 1G0

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

Mr. Tim McBride, B.Sc., P. Geo., $QP_{ESA}$.

Pinchin Ltd.

662 Falconbridge Road, Unit 3

Sudbury, Ontario, P3A 4S4

## 1.3 Description and Development of the Site

The Site is operated as a domestic landfill for solid non-hazardous municipal and commercial wastes to be utilized by residences of the area. The Site was approved with a total fill area of 2.0 hectares (ha) within a total site area of 40 ha. A road with a locked gate is located north of the Site which provides access to the Site from the south side of Concession Road 4, approximately 540 m southwest of the intersection of 5th Side Road and Concession Road 4.

The Site was initially developed in the early 1970s and was primarily utilized as an area fill style landfill with initial waste deposits existing within the northwest portion of the Site. The active tipping face for domestic refuse is currently located along the south-central portion of the Site, progressing in an easterly direction. There is a demolition waste tipping face situated on the south-east portion of the Site. The northeast portion of the Site has been utilized for temporary storage of recyclable metals. Recyclable materials including electronic waste and cans are stored in a storage container/shed along the access road, as a waste diversion measure.

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

### *1.3.1 Site Document Review*

Pinchin reviewed the following report for the Site and is referenced within this document:

- Report entitled "*Township of Jocelyn Municipal Landfill Site, Annual Operations Report – 2011-2012*" prepared by Kresin Engineering Corporation (KEC), dated June 2012 (the 2011-2012 KEC Report);
- Report entitled "*Township of Jocelyn Municipal Landfill Site, Annual Operations Report – 2012*" prepared by KEC, dated April 2013 (the 2012 KEC Report);
- Report entitled "*Township of Jocelyn Municipal Landfill Site, Annual Operations Report – 2013*" prepared by KEC, dated April 2014 (the 2013 KEC Report);
- Report entitled "*Township of Jocelyn Municipal Landfill Site, Annual Operations Report – 2014*" prepared by KEC, dated April 2015 (the 2014 KEC Report);
- Report entitled "*Township of Jocelyn Municipal Landfill Site, Annual Site Monitoring Report – 2015*" prepared by KEC, dated April 2016 (the 2015 KEC Report); Solid Non-Hazardous Waste Disposal Site Inspection Report, issued by Lilian Keen of the Ontario Ministry Environment and Climate Change (MECP), dated January 7, 2015 (the 2015 MECP Inspection Report);
- Solid Non-Hazardous Waste Disposal Site Inspection Report, issued by Lori Greco of the MECP, dated March 11, 2016;
- Report entitled, *"2016 Annual Monitoring Report"* prepared by Pinchin, dated April 21, 2017 (the 2016 Pinchin Report);
- Report entitled, *"2017 Annual Monitoring Report"* prepared by Pinchin, dated February 13, 2018 (the 2017 Pinchin Report);
- Letter Report entitled, *"Waste Capacity Review"* prepared by Pinchin, dated February 15, 2018 (the 2018 Waste Capacity Review);
- Letter Report entitled, *"Contaminant Attenuation Zone (CAZ) Assessment, Jocelyn Waste Disposal Site, Jocelyn, Ontario"*, prepared by Pinchin, dated August 27, 2018 (the 2018 CAZ Report);
- Report entitled, "*2018 Annual Monitoring Report"* prepared by Pinchin, dated March 22, 2019 (the 2018 Pinchin Report);
- Report entitled, "*FINAL 2019 Annual Monitoring Report, Jocelyn Waste Disposal Site, Jocelyn Township, Ontario"* prepared by Pinchin, dated February 10, 2020 (the 2019 Pinchin Report);

- Memorandum entitled *"2019 Monitoring Report for Jocelyn Waste Disposal Site"* issued by the MECP, dated October 29, 2020 (the 2020 MECP Memo);
- Report entitled, "*2020 Annual Monitoring Report Jocelyn WDS Jocelyn Twp February 4, 2021*" prepared by Pinchin, dated February 4, 2021 (the 2020 Pinchin Report);
- Report entitled, "*2021 Annual Monitoring Report, Jocelyn Waste Disposal Site, Jocelyn Township, Ontario"* prepared by Pinchin and dated March 3, 2022 (the 2021 Pinchin Report);
- Report entitled, "*Waste Capacity Review, Jocelyn Waste Disposal Site, Jocelyn Township, Ontario"* prepared by Pinchin, dated August 25, 2022 (the 2022 Waste Capacity Review); and
- Report entitled, "*2022 Annual Monitoring Report, Jocelyn Waste Disposal Site, Jocelyn Township, Ontario"* prepared by Pinchin and dated February 27, 2022 (the 2022 Pinchin 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 these reports is referenced in pertinent sections throughout this document.

### 1.4 Monitoring and Reporting Program Objectives and Requirements

The current CofA for the Site provides detailed monitoring and reporting program objectives and requirements. These requirements are specified in Section VIII of the CofA. The specific monitoring and reporting requirements for the Site in The Annual Report shall include the following:

- The results and an interpretive analysis of the results of all leachate, groundwater, surface water and landfill gas monitoring, including an assessment of the need to amend the monitoring programs;
- An assessment of the operation and performance of all engineered facilities, the need to amend the design or operation of the Site, and the adequacy of and need to implement the contingency plans;
- Site plans showing the existing contours of the Site, areas of landfilling operation during the reporting period; areas of intended operation during the next reporting period; areas of excavation during the reporting period; the progress of final cover, vegetative cover, and any intermediate cover application; previously existing facilities; facilities installed during the reporting period; and site preparations and facilities planned for installation during the next reporting period;

- Calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the Site during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;
- A calculation of the remaining capacity of the Site and an estimate of the remaining Site life;
- A summary of the quantity of any leachate or pre-treated leachate removed from the Site or leachate treated and discharged from the Site during each operating week;
- A summary of the total annual quantity (cubic meters) of waste at the Site;
- A summary of any complaints received and the responses made;
- A discussion of any operational problems encountered at the Site, and corrective action taken;
- A report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903;
- Any other information with respect to the Site which the Regional Director may require from time to time;
- A section under a heading of “Compliance with Conditions of the Certificate of Approval”, a statement as to compliance with all of the terms and conditions of this Certificate and a detailed description of the measures taken to ensure compliance with this certificate, including any supporting data or other information; and
- In the event of any non-compliance during the reporting period, and under a heading of “Non-Compliance with Conditions of the Certificate of Approval” details of the non-compliance as well as details of how and when any non-compliance was corrected.

A copy of the CofA and MECP correspondence for the Site is provided in Appendix II and III, respectively.

## 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.

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 our 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 modifications to the conclusions can be made, if 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 surficial geology of the Jocelyn Township area is dominated by a mantle of sand, glaciolacustrine and lacustrine deep water deposits overlying Ordovician age limestone bedrock. No bedrock outcrops are located within the Site. Based on Pinchin's review of borehole logs for locations at and near the Site, the soil beneath the Site consists mainly of silty sand till underlain by sandy and clayey deposits. All borehole logs are provided in Appendix IV.

Based on Pinchin's review of the water level elevations collected at the Site, the water table beneath the Site is considered to be relatively shallow.

The groundwater flow system most representative of the performance of the Site occurs within the underlying unconfined overburden aquifer. Static water levels were recorded by Pinchin in all of the accessible wells for each of the 2023 groundwater monitoring events. 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 2023 groundwater elevations, as measured by Pinchin personnel, are presented in Appendix V.

In general, the static groundwater levels exist within 5 m of surface for most wells, with the depth to groundwater ranging from 0.180 meters below ground surface (mbgs) at BH4A to 5.250 mbgs at BH2 during the spring 2023 sampling events. During the fall monitoring event on October 17, 2023, the depth to groundwater was observed to range from 1.470 mbgs at BH4A to 6.630 mbgs at BH7-21.

Groundwater movement at the Site has been established (by water level contouring), as being directed in a west-southwesterly direction. Consequently, well nest BH1 and BH1A are situated (hydraulically) in a position considered to be representative of background conditions. Accurate triangulation of the water table elevations was undertaken for the 2023 sampling events using the available monitoring well system and the survey elevation data provided by the Client. The inferred groundwater contours for the shallow and deep monitoring wells in the spring are presented in Figure 3 and 4, respectively. Similarly, the inferred groundwater contours for the shallow and deep monitoring wells in the fall are presented in Figure 5 and 6, respectively. The presentation of the groundwater contours and the associated inferred

groundwater flow direction for the 2023 sampling events confirms the previous findings of earlier Annual Monitoring Reports. It should be noted that the variations in groundwater elevations between BH6 and BH2 are attributed to the difference in topography surrounding these particular monitoring wells. Monitoring well BH6 is situated within the waste mound, on an elevated plateau, approximately 2 meters of relief higher than BH2, which is situated at the toe of the waste mound.

## 2.2 Surface Water Features

No significant surface water features are located within the Site. Seasonal ponding occurs along the southwest toe of the waste mound and has been reported to be an expression of the local water table. A ditch is located along the west perimeter of the Site that directs surface water around the Site and away from interacting with the active waste areas. Seasonal ponding has also been observed within the central portion of the Site but has recently been filled using clean granular material.

Rains Lake is approximately 645 m southeast of the Site and flows east, discharging into Sterling Bay approximately 1.4 km southeast of the Site.

## 2.3 Historical Document Review

Pinchin reviewed the monitoring reports from 2011 to 2021, to help 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. In addition, Pinchin reviewed the 2020 MECP Memo provided to Pinchin by the Client.

### *2.3.1 Historical Groundwater*

The following groundwater information was identified by Pinchin based on the results of the 2022 monitoring program and previous investigations completed at the Site:

- During the 2022 reporting period, all reported concentrations in the groundwater samples submitted for analysis satisfied the respective Guideline B-7 criteria with the exception the following:
    - Groundwater samples collected at monitoring location BH3-10 had concentrations of alkalinity (low-spring and DOC (spring) that exceeded the Guideline B-7 criteria;
    - Groundwater samples collected at monitoring location BH4 had concentrations of DOC during the spring monitoring event that exceeded the Guideline B-7 criteria;
    - Groundwater samples collected at monitoring location BH4A had concentrations of DOC during the fall monitoring event that exceeded the Guideline B-7 criteria;

- Groundwater samples collected at monitoring location BH5A had concentrations of alkalinity (low – spring), iron (fall), manganese (fall) and DOC (spring and fall) that exceeded the Guideline B-7 criteria; and
- Groundwater samples collected at monitoring location BH7-21 during the spring 2022 monitoring event had concentrations of iron and manganese that exceeded the Guideline B-7 criteria.

The 2022 Pinchin Report did not identify significant landfill related impacts at the downgradient Site boundary. These findings indicate that the Site is continuing to operate as designed, as a natural attenuation type facility. Concentrations of DOC, iron and manganese parameters within the groundwater samples analyzed at the downgradient monitoring locations are likely attributed to either naturally occurring conditions within the shallow unconfined aquifer on-site or from temperate impacts from leachate sources from the waste deposits at the Site that are inferred to attenuate within close proximity to the Site. Most exceedances of the Guideline B-7 RUC 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. However, given the consistent presence of benzene at the source well (BH6), inclusion of the focused VOC scan should continue.

### *2.3.2 Historical Surface Water Data*

The following surface water information was identified by Pinchin based on the results of the 2023 monitoring program and previous investigations completed at the Site:

- A review of the sample dataset for the spring monitoring event indicated that all parameters from Column 3 (spring) of Schedule 5 satisfied the respective PWQO values at the surface water monitoring location with the exception of iron, zinc and total phosphorus.

### *2.3.3 MECP Correspondence Review*

During the 2020 reporting period, the MECP completed a review of the 2019 Pinchin Report. The purpose of the review was to assess the suitability of the groundwater monitoring program and to assess the monitoring data with provincial regulations.

The following recommendations were provided within the 2020 MECP Memo:

- The proponent must ensure that the designated Contaminant Attenuation Zone (CAZ) is shown on all future monitoring reports to the MECP. The CAZ should be designated downgradient of the site taking into consideration the groundwater flow direction;

- It is recommended that a monitoring be installed to the west of the waste fill area for the purpose of assessing downgradient groundwater quality impacts and to assess compliance with Guideline B-7;
- Borehole logs for all monitoring wells forming part of the monitoring network should be included in all future monitoring reports;
- Monitoring well BH3-10 must be indicated on the site plans; and
- It is recommended that all the available groundwater quality data are included in all future annual monitoring reports. In addition, the historical data should be used to produce temporal graphs to assist in understanding the trends leachate indicator parameters.

As per the CofA, a section under a heading of *"Compliance with Conditions of the Certificate of Approval"*, has been included herein with a detailed description of the measures taken to address the recommendations provided in the 2020 MECP Memo.

# 3.0 METHODOLOGY

## 3.1 Scope of Work

The objectives of the monitoring program included the following scope of work:

- Mobilization to the Site during the spring and fall of 2023 and the collection of groundwater and surface water samples from the existing well network and surface water monitoring locations;
- Submission of the groundwater samples to an accredited analytical laboratory for analysis of the chemical parameters outlined in Column 1 (spring samples) and Column 2 (fall samples) of Schedule 5 of the MECP Landfill Standards;
- Submission of the surface water samples to an accredited analytical laboratory for analysis of the chemical parameters outlined in Column 3 (spring samples) and Column 4 (fall samples) of Schedule 5 of the MECP Landfill Standards; 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;
- MOECC document entitled "*Determination of Contaminant Limits and Attenuation Zones, Procedure B-7-1*", (formerly referenced by 15-08), dated 2015 and updated in 2021;
- Ontario Regulation 903 R.R.O. 1990 "*Wells*", under the Ontario Water Resources Act, as amended in 2019; and
- MECP document entitled "*Water Management Policies Guidelines Provincial Water Quality Objectives*" (PWQO), dated July 1994, revised February 1999.

## 3.2 Groundwater Monitoring Well Locations

A groundwater monitoring network consisting of nine monitoring wells has been installed at the Site. The wells were installed as follows:

- In 1990, monitoring wells BH1/BH1A, BH2, BH3 and BH4/BH4A were installed;
- Prior to 2005, nested wells BH5/BH5A were installed;
- In late 2005, a "source" monitoring well (well BH6) was installed;
- In October 2010, well BH3 was decommissioned and replaced with well BH3-10; and
- In February 2021, well BH7-21 was installed downgradient of BH6.

All monitoring locations for groundwater and surface water are illustrated on Figure 2.

Detailed locations are provided in the following table, with coordinates in NAD 83. Monitoring well elevations for top of casing are provided in Appendix V.

| Monitoring Location | Easting Zone 17 | Northing Zone 17 | Collection Method | Accuracy | Collection Personnel | Date Collected |
|---|---|---|---|---|---|---|
| BH1 | 274,700 | 5,110,084 | Handheld GPS | +/- 5 m | Trained Pinchin field Crew | May 19, 2023 and October 17, 2023 |
| BH1A | 274,696 | 5,110,103 | | | | |
| BH2 | 274,753 | 5,109,990 | | | | |
| BH3-10 | 274,801 | 5,109,894 | | | | |
| BH4 | 274,684 | 5,109,887 | | | | |
| BH4A | 274,681 | 5,109,882 | | | | |
| BH5 | 274,968 | 5,109,863 | | | | |
| BH5A | 274,967 | 5,109,863 | | | | |
| BH6 | 274,715 | 5,109,993 | | | | |
| BH7-21 | 274,625 | 5,109,990 | | | | |
| SW | 274,708 | 5,109,952 | | | | |

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 | Northwest of landfill (nested with BH1A). | Background Well (Deep) |
| BH1A | Northwest of landfill (nested with BH1). | Background Well (Shallow) |
| BH2 | Central portion of landfill. | Source Well |
| BH3-10 | South of landfill. | Downgradient Well |

| Monitoring Well ID | Location | Rationale |
|---|---|---|
| BH4 | Southwest of the landfill (nested with BH4A). | Downgradient Well (Deep) |
| BH4A | Southwest of the landfill (nested with BH4). | Downgradient Well (Shallow) |
| BH5 | Southeast of the landfill (nested with BH5A). | Downgradient Well (Deep) |
| BH5A | Southeast of the landfill (nested with BH5). | Downgradient Well (Shallow) |
| BH6 | West central portion of the landfill. | Source Well |
| BH7-21 | West of the landfill | Downgradient Well |

The locations of the monitoring wells are identified on Figure 2. Additional details regarding the monitoring wells are provided in Table 1 (all Tables are provided in Appendix V).

### 3.3 Surface Water Monitoring Locations

The Site has one designated location for surface water monitoring. The surface water monitoring location was monitored during the spring and fall of 2023 monitoring events. The surface water monitoring location is indicated on Figure 2.

The following table illustrates the location of the surface water monitoring location with respect to its rationale in the annual monitoring program:

| Monitoring Well ID | Location | Rationale |
|---|---|---|
| SW | Southwest toe of the waste Site. | Expression of the local water table. |

## 3.4 Monitoring Frequency

As per previous annual monitoring events, groundwater and surface water was sampled twice annually by Pinchin during 2023, in the spring and fall. Groundwater and surface water sampling events occurred on the following dates:

- Spring – May 19, 2023; and
- Fall – October 17, 2023.

## 3.5 Monitoring Parameters

### *3.5.1 Groundwater Monitoring Parameters*

Groundwater samples were submitted for laboratory analysis of the parameters listed in Column 1 (spring) and Column 2 (fall) of Schedule 5 of the MECP Landfill Standards. Field readings for temperature, pH, conductivity, oxidation reduction potential (ORP) and dissolved oxygen were measured at the time of sample collection.

### *3.5.2 Surface Water Monitoring Parameters*

Surface water samples were collected from the surface water monitoring location during the 2023 spring and fall monitoring events and were submitted for laboratory analysis of the parameters listed in Column 3 (spring) and Column 4 (fall) of Schedule 5 of the MECP Landfill Standards. Field readings for temperature, pH, conductivity, oxidation reduction potential (ORP) and dissolved oxygen were measured at the time of sample collection.

## 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 to the Site to complete the sampling program;
- Static groundwater levels were collected using a Solinst™ water level tape. Depth measurements were collected from the top of riser pipe (which were all surveyed into a common datum);
- 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 inertial pump 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 inertial pump 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 Laboratories (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 Column 1 (spring) and Column 2 (fall) of the MECP Landfill Standards. 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 Sault Ste. Marie office to the Site;
- All field activities at the surface water monitoring location were approved from 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). In the future, and as per previous monitoring events, the component of the samples identified for the analysis of aluminum should be field filtered;
- 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 events at the pre-determined monitoring location for parameters listed in the Column 3 (spring) and Column 4 (fall) of Schedule 5 in the MECP Landfill Standards. 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 meter 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 25ºC;
- *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.

### *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;
- Field parameter measurements;
- Field personnel conducting the investigations;
- Field methods used;
- Sampling location identifications;
- 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);
- 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 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 (BH3-10, BH4, BH4A, BH5, BH5A and BH7-21). It should be noted that these wells represent the furthest downgradient monitoring points, however additional contaminant attenuation capacity is available within the additional CAZ area (as depicted in Figure 2).

### *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 contaminates 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 2023 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 BH3-10, BH4, BH4A, BH5, BH5A and BH7-21 have been compared to the calculated RUC values ($C_m$).

Monitoring well BH1A is located hydraulically upgradient of the Site and has been used to estimate the background water quality coming onto the Site. Monitoring well BH1A 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 2 through 11. An evaluation of the RUC criteria in comparison to the downgradient compliance wells is provided in Table 12. Copies of the laboratory analytical reports are presented in Appendix VI.

The following is a breakdown of the water quality observed at 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 (Deep)***

Background water quality observed immediately northwest of the waste fill area, at BH1, did not identify elevated levels of common landfill-related contaminant parameters such as conductivity, TDS, alkalinity, chloride, sulphate, barium, sodium, boron or nitrate. The spring and fall sampling events appear to be representative of groundwater not affected by fill area leachate.

***Monitoring Well BH1A (Shallow)***

Background water quality observed immediately northwest of the waste fill area, at BH1A, did not identify elevated levels of common landfill-related contaminant parameters such as conductivity, TDS, alkalinity, chloride, sulphate, barium, sodium, boron or nitrate. The results of the spring and fall sampling events at this monitoring location appear to be representative of groundwater not affected by fill area leachate.

#### *4.2.2 Leachate Source Quality Evaluation*

***Monitoring Well BH2***

In comparison to background water quality, groundwater observed at the source of the waste fill area at BH2 was observed to have concentrations of alkalinity, manganese, TDS and DOC which exceeded the ODWQS during the 2023 sampling events indicating point source impacts from the landfill. This suggests the presence of landfill leachate impacts in groundwater at location BH2, consistent with historical monitoring results, which is expected considering its close proximity to the waste deposits.

***Monitoring Well BH6***

In comparison to background water quality, groundwater observed at the source of the waste fill area at BH6 was observed to have higher concentrations of alkalinity, ammonia, barium, boron, chloride, conductivity, iron, manganese, sodium, TDS, TKN, biochemical oxygen demand (BOD), DOC, COD and benzene indicating point source impacts from the landfill operations, which is consistent with historical

observations at this location, and is expected considering its close proximity to the waste deposits. Concentrations of iron, manganese and DOC concentrations at BH6 were observed to exceed the ODWQS during the spring sampling event, consistent with previous investigations. No fall samples were retrieved during the fall sampling event as the well was noted to be dry. Alkalinity, iron, manganese and DOC are either aesthetical objectives or operational guidelines for drinking water systems set by the ODWQS. Elevated concentrations of benzene are known to have health-related effects. As a result, special attention should be given to these the presence of this parameter in the downgradient monitoring well network during future sampling events. Currently, these impacts appear to be limited to this particular source well only.

### *4.2.3 Downgradient Water Quality Evaluation*

***Monitoring Well BH3-10***

In comparison to background water quality, groundwater observed immediately south of the waste fill area at BH3-10 was observed to have lower concentrations of alkalinity and pH. During the fall monitoring event, BH3-10 was observed to be dry, therefore no sample was submitted for analysis. All parameters met the ODWQS requirements. In addition, concentrations of alkalinity (low - spring) were observed to exceed the Guideline B-7 criteria.

***Monitoring Well BH4 (Deep)***

In comparison to background water quality, groundwater observed southwest of the waste fill area at BH4 was observed to have similar characteristics of background monitoring well BH1, with the exception of elevated concentrations of chloride and DOC. All parameters were observed to meet the ODWQS in 2023. DOC exceeded the Guideline B-7 Criteria in spring 2023. During the fall monitoring event, BH4 was observed to be dry, therefore no sample was submitted for analysis.

***Monitoring Well BH4A (Shallow)***

In comparison to background water quality, groundwater observed southwest of the waste fill area at BH4A was observed to have similar concentrations of background monitor BH1A. All parameters were observed to meet the ODWQS in 2023. DOC (fall) exceeded the applicable Guideline B-7 Criteria in 2023. During the fall monitoring event, BH4A was observed to be dry, therefore no sample was submitted for analysis.

***Monitoring Well BH5 (Deep)***

In comparison to background water quality, groundwater observed southwest of the waste fill area at BH4 was observed to have similar characteristics of background monitoring well BH1. During the 2023 sampling events all parameters at monitoring location BH5 were observed to meet the ODWQS. Nitrite (spring) and DOC (spring) exceeded the Guideline B-7 criteria.

***Monitoring Well BH5A (Shallow)***

In comparison to background water quality, groundwater observed at BH5A was observed to have higher concentrations of manganese and DOC which is consistent with historical observations at this location. Concentrations of DOC (spring), and manganese (spring) were identified at BH5A that exceeded the ODWQS. Concentrations of DOC (spring) and manganese (spring) that exceeded the Guideline B-7 Criteria during the 2023 monitoring period. During the fall monitoring event, BH5A was observed to be dry, therefore no sample was submitted for analysis.

***Monitoring Well BH7-21 (Downgradient)***

Downgradient well BH7-21 was observed to have similar characteristics of background monitoring well BH1. All parameter concentrations satisfied the ODWQS during the spring monitoring event. During the fall monitoring event, BH7-21 was observed to be dry, therefore no sample was submitted for analysis. All parameters satisfied Guideline B-7 Criteria at this location during the spring 2023 sampling event.

## 4.3 Concentration Trending

Groundwater concentration trends have been plotted for TDS, iron, manganese and DOC for background monitoring wells BH1 and BH1A along with the furthest downgradient monitoring wells BH4, BH4A, BH5 and BH5A. The concentration trends have been developed using analytical data collected at these locations in the spring of fall since 2005.

Based on Pinchin's review of the concentration trends developed for TDS, it is noted that TDS concentrations are typically the lowest for monitoring wells BH5, BH5A and BH1A, with a slight increase in concentrations during the fall monitoring event at BH5A. The TDS concentrations have stabilized since 2014. Prior to 2014, sporadic analytical data could be attributed to sampling techniques (field filtration).

Based on Pinchin's review of the concentration trends developed for DOC, it is noted that DOC concentrations are typically the highest for monitoring well BH5A and BH4A suggesting that these concentrations are consistent within the shallower aquifer unit south of the Site.

Based on Pinchin's review of the concentration trends developed for manganese, it is noted that manganese concentrations are typically elevated at monitoring well BH5A with previous spikes occurring at BH4 as well.

Groundwater concentration trends have been plotted for benzene for source monitoring well BH6. Based on Pinchin's review of the concentration trend, benzene concentrations have remained relatively consistent throughout the available monitoring record.

The groundwater concentration trends have been provided in Appendix VII.

## 4.4 Groundwater Field Measurement Results

On May 19 and October 17, 2023 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 2 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, with the exception of BH2, BH4 and BH6 which were observed to have higher conductivity measurements, which is an indicator of stagnant anaerobic conditions and possibly impact from leachate generated from the landfill at the source areas.

## 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 live 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".

## 4.6 Surface Water Results

Pinchin collected surface water samples from one surface water monitoring location during the spring 2023 monitoring event. Surface water was not collected during the fall 2023 monitoring event as it was observed to be dry at the time. Surface water samples were collected to monitor the surface water for contaminants of concern as a compliance requirement. A summary of surface water quality monitoring data relative to the regulatory standards is presented in the attached Table 13.

Copies of the laboratory analytical reports are presented in Appendix VI.

Based on the single surface water monitoring location collected from the stagnant pond located at the toe of the waste deposit pile, temporal trend analysis charts were not prepared as they would not provide any additional information due to the limited number of surface water locations.

A review of the sample dataset for the spring monitoring event indicated that all parameters from Column 3 (spring) of Schedule 5 satisfied the respective PWQO values at the surface water monitoring location with the exception of iron, zinc and total phosphorus. Pinchin's review of the surface water monitoring results indicate surface water at this location is being influenced by landfilling activities. This is expected considering the proximity of the surface water to the active fill area and the stagnant condition of this feature. It is recommended that this seasonal surface water ponding located at the southwest toe of the Site be backfilled with clean material to eliminate the expression of the shallow water table and reduce infiltration to the shallow unconfined aquifer.

## 4.7 Surface Water Field Measurement Results

On May 19 and October 17, 2023, Pinchin collected surface water monitoring parameters from the 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 Table 13.

A review of the field parameters for the project identified no significant concerns in the water quality during the monitoring event.

Surface water flow was not observed during the monitoring events at the sampling location. Therefore, surface water flow measurements were not obtained.

## 4.8 Groundwater Flow Interpretation

Groundwater movement at the Site has been established (by water level contouring), as being directed in a west-southwesterly direction. The horizontal groundwater gradients have been observed to be 0.015 and 0.017 within the shallow aquifer in the spring and fall respectively, and 0.043 and 0.026 within the deep aquifer in the spring and fall respectively. The groundwater flow direction may be influenced by

seasonal variations in the amount of precipitation, by aquifer heterogeneity and the buried fill material at the Site.

During the spring monitoring event on May 19, 2023, the depth to groundwater was observed to range 0.230 mbgs at BH5A to 5.52 mbgs at BH2. During the fall monitoring event on October 17, 2023, the depth to groundwater was observed to range from 1.47 mbgs at BH4A to 6.34 mbgs at BH2.

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.

It should be noted that some degree of radial groundwater flow pattern appears to be associated with the waste disposal operations.

### 4.9 Leachate Characterization

The Site is an operating landfill with minor operational or maintenance being overseen by a contractor retained by the Township of Jocelyn. The Site does not have a leachate collection system whereby leachate quality monitoring and characterization is being completed. Upon review of the historical groundwater analytical data collected at the Site, it has been identified that RUC exceedances have historically occurred at downgradient monitoring locations BH3-10, BH4, BH4A, BH5A and BH7-21 for the following parameters:

- Iron (aesthetic objective)
- Manganese (aesthetic objective)
- Alkalinity (operational guideline)
- DOC (aesthetic objective)

Based on Pinchin's review of the groundwater and surface water analytical data collected during the 2016, 2017, 2018, 2019, 2020, 2021 and 2022 monitoring programs, as well as the analytical data provided in the 2011, 2012, 2013, 2014 and 2015 KEC Monitoring Reports, it is Pinchin's opinion that leachate impacts are partially attenuating within close proximity to the waste mound. Pinchin concurs that groundwater quality observed at downgradient monitoring wells BH3-10, BH4A (shallow) and BH5A (shallow) may be slightly impacted by leachate derived effects. Elevated concentrations of DOC observed at BH3-10, BH4A and BH5A are not likely attributed to naturally occurring decomposition processes from biological breakdown within the shallow overburden, but rather influenced by landfill activities. As the 2023 Guideline B-7 exceedances are limited to DOC, iron, manganese and low alkalinity, at concentrations less than those observed in the source wells, it appears that the Site is operating as designed as a natural attenuation type facility. In addition, significant additional downgradient attenuation

area is available within the CAZ which will serve to further improve water quality prior to the downgradient property boundary.

### 4.10 Contaminant Attenuation Zone

The current landfill layout, as approved, continues to be operated as a natural attenuation type facility. The Site is not instrumented with any active leachate collection and/or treatment system and has a current property and buffer area of 40 ha. The 2018 CAZ Report included an assessment of the attenuation capacity of the CAZ which was completed using chloride concentrations as a leachate indicator. The revised surface areas and climatic information from the Sault Ste. Marie weather station were used in the Thornthwaite Method (Thornthwaite and Mather, 1955) to calculate revised infiltration rates. The input parameters for the assessment are based on the following factors:

- Current Approved Footprint Area - The total surface area of the current approved landfill footprint is 2 ha;
- Maintaining the Downgradient Recharge Area – Based on the available distance from the southern edge of the approved landfill footprint to the southern edge of the CAZ, the downgradient recharge area is considered the surface area of the available attenuation zone in the downgradient direction between the landfill and the limits of the property;
- Landfill Area Infiltration Rate – Using the Thornthwaite Method, an infiltration rate (IL) of 20 millimetres per year (mm/a) was calculated for the Site;
- Downgradient Infiltration Rate – The infiltration rate ($I_{CAZ}$) of 100 mm/a for the downgradient attenuation zone in the CAZ would not change; and
- These infiltration rates are considered conservative when compared to the published typical Northern Ontario IL's documented in the report entitled *"An Assessment of the Groundwater Resources of Northern Ontario"* by Singer and Cheng, dated July, 2002.

Based on the above factors, the current approved landfill footprint (i.e. source area) recharge rate is calculated as follows:

$Q_{L\ APP} = A_{L\ APP} \times IL$

$= 20{,}000\ m^2 \times 0.02\ m/a$

$= 400$ cubic metres $(m^3)/a$

Where: $Q_{L\ APP}$ = Recharge rate within the approved landfill footprint;

$A_{L\ APP}$ = Total approved landfill footprint surface area; and

IL = Landfill footprint infiltration rate.

Similarly, the recharge rate for the downgradient CAZ area is calculated as follows:

$Q_{CAZ\ APP}$ = $A_{CAZ\ APP}$ x $I_{CAZ}$

= 96,000 $m^2$ x 0.1 m/a

= 9,600 $m^3$/a

Where: $Q_{CAZ\ APP}$ = Downgradient CAZ recharge rate;

$A_{CAZ\ APP}$ = Downgradient CAZ surface area; and

$I_{CAZ}$ = Downgradient CAZ infiltration rate.

Assuming that groundwater recharges downgradient of the landfill in the CAZ and dilutes the migrating leachate plume, the dilution factor is:

Dilution Factor, $DF_{APP}$ = $Q_{CAZ\ APP}$ / $QL_{\ APP}$

= 9,600 $m^3$/a / 400 $m^3$/a

= 24

Where: DF = downgradient dilution factor;

$Q_{CAZ\ APP}$ = Downgradient CAZ recharge rate; and

$QL_{\ APP}$ = Landfill recharge rate.

An attenuation factor was calculated based on historical chloride concentrations at source (assumed), background and mid-Site locations. For the purposes of the CAZ assessment, the background concentration of chloride was found to average 1.1 mg/L (i.e. the geometric mean of chloride concentrations at BH1A from October 1990 to October 2017). The highest concentration of chloride recorded at the Site to date was quantified at monitoring well BH6, located within the waste fill area. Chloride was detected at a concentration of 249 mg/L at BH-6 (i.e. an assumed source well). The highest chloride concentration recorded at a far field well, approximately 100 m from the source (BH-4) was quantified at 17.5 mg/L. Given the reported source concentrations a conservative assumed chloride concentration of 1,500 mg/L was assumed at the source based on the lower end of the range presented in Table 10 of O.Reg 232/98 and used to calculate the attenuation factor, as follows:

AF = ($Cl_{SOURCE}$ – $Cl_{DOWN}$) / $D_{ATT}$

= (1,500 mg/L – 17.5 mg/L) / 100 m

= 14.83 mg/L/m

Where: $Cl_{SOURCE}$ = The assumed chloride concentration from the source;

$Cl_{DOWN}$ = Maximum chloride concentration from a downgradient well; and

$D_{ATT}$ = Attenuation distance between source area and downgradient well.

Based on the above attenuation factor, the required attenuation distance, $D_{ATT}$, for chloride, and by extension, the leachate plume, to be attenuated from the source area chloride concentration of 1,500 mg/L to an assumed background chloride concentration of 1.1 mg/L is calculated as follows:

$D_{ATT}$ = ($Cl_{SOURCE}$ – $Cl_{BACKGROUND}$) / AF

= (1,500 mg/L – 1.1 mg/L) / 14.83 mg/L/m

= 101 m

Similarly, if we were to complete the same calculation to determine the required attenuation distance, $D_{B-7}$, for chloride to the most recent Guideline B-7 criterion for the Site (chloride of 125.5 mg/L), the calculation would be as follows:

$D_{B-7}$ = ($Cl_{SOURCE}$ – $Cl_{B-7}$) / AF

= (1,500 mg/L – 125.5 mg/L) / 14.83 mg/L/m

= 92.7 m

Based on the calculations and assumptions provided above, the CAZ should be able to accommodate the current approved landfill footprint. It is estimated that the effects of the landfill derived leachate will be attenuated to within acceptable concentrations (as established via the Guideline B-7 Criteria) within 95 m of the landfill deposits. As there is a linear distance in excess of 110 m in all directions from the planned waste deposits to the downgradient property boundaries, it is therefore concluded that the current CAZ is appropriate to accommodate the current approved landfill footprint of 2.0 ha (even in the case of localized radial flow patterns).

Given the calculations and assumptions stated above, the CAZ associated with the Site is appropriately sized to attenuate the potential effects derived from the landfill deposits and can theoretically continue to provide the Site with proper natural attenuation preventing undesirable off-Site impacts. Please note that these calculations are based on the assumption that the Township will continue to operate and maintain the waste disposal site following industry standards and best practices (i.e. regular application of interim and final cover, etc.).

It is important to note that the current downgradient/compliance wells (BH3-10) are located approximately 150 m upgradient of the downgradient of the property line and that significant additional attenuation zone area is available beyond this location.

## 4.11 Adequacy of the Monitoring Program

The groundwater and surface water monitoring programs appear to adequately characterize current conditions at the Site. However, the Township is committed to monitoring the west side of the Site to assess the potential flow associated with possible groundwater mounding within the waste deposits in this direction (BH7-21).

### *4.11.1 Monitoring Well Network Efficiency*

Pinchin concludes that the current groundwater monitoring well network is considered adequate for evaluating the Site's geological and hydrogeological characteristics within the central portion of the former and current fill area (for evaluating leachate strength); and immediately to the south of the landfill (for evaluating downgradient groundwater quality migrating from the Site). The groundwater quality observed in monitoring well BH1A appears to have no 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). Based on a visual inspection of the monitoring well installations, Pinchin concludes that all monitoring wells were satisfactorily installed.

### *4.11.2 Background Monitoring Well Efficiency*

Based on a review of the groundwater contaminant data from BH2 and BH6, as well as the assumed groundwater flow direction, monitoring wells BH1 and BH1A have been identified as best-case background locations. A review of the dataset (as provided on Tables 2 and 3) from BH1 and BH1A did not identify elevated levels of common landfill-related contaminant parameters such as conductivity, TDS, alkalinity, chloride, sulphate, barium, sodium, boron or nitrate. At this time, monitoring wells BH1 and BH1A are considered adequate for monitoring background groundwater quality.

## 4.12 Supplemental Monitoring: Sediment, Benthic and/or Toxicity Monitoring

No supplemental monitoring was completed as part of the 2023 monitoring program completed by Pinchin.

## 4.13 Non-Compliance with Conditions of the Certificate of Approval

The 2020 MECP provided the following recommendations to the Client:

- *The proponent must ensure that the designated CAZ is shown on all future monitoring reports to the Ministry of Environment, Conservation and Parks (MECP). The CAZ should be designated downgradient of the site taking into consideration the groundwater flow direction.*

- *It is recommended that a monitoring be installed to the west of the waste fill area for the purpose of assessing downgradient groundwater quality impacts and to assess compliance with Guideline B-7.*
- *Borehole logs for all monitoring wells forming part of the monitoring network should be included in all future monitoring reports.*
- *Monitoring well BH3-10 must be shown on the site plans.*
- *It is recommended that all the available groundwater quality data are included in all future annual monitoring reports. In addition, the historical data should be used to produce temporal graphs to assist in understanding the trends leachate indicator parameters.*

Pinchin has been retained to address these items which will include the following actions:

- The Annual Monitoring Reports (starting with the current submission) will include an illustration of the CAZ, monitoring well BH3-10 will be shown on the Site plans, borehole logs will be included (as made available by the Client from previous investigation), and historical data has been used to develop and review concentrations trends for leachate indicator parameters.

### 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

Based on the 2015 KEC Report, it was suggested that small quantities of methane gas are expected to be produced in amounts that will not likely impact adjacent properties. 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 monitoring event, 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 2023 monitoring program.

## 4.18 Waste Capacity Assessment Review

Previous investigations conducted at the Site have included annual topographic surveys completed by Kresin Engineering Corporation (KEC) between 2005 through 2015. The results of the most recent topographic survey conducted in 2022 by Pinchin indicated that approximately 29,037 $m^3$ of waste existed at the Site. Based on the topographic surveys, an average annual disposal rate at the Site has been calculated to be approximately 630 $m^3$ per year.

Based on an annual disposal rate of approximately 630 $m^3$ of waste per year, it is Pinchin's opinion that the Site is capable of accepting waste for approximately 16 years. Based on the topographic survey information collected annually for the Site, it is Pinchin's opinion that an accurate annual disposal rate has been established. However; it should be noted that annual disposal rates may fluctuate over time, depending on a number of variables including compaction frequency, receiving and applying interim cover material, number of users and waste diversion initiatives. As part of a due diligence initiative to assist with management of this asset, the Client should consider completing an updated topographic survey of the Site, in order to confirm the existing waste volumes, remaining capacity and associated lifespan. Given the relatively low waste disposal rate, the frequency of completing such surveys should be reduced to once every 3 years.

## 4.19 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.

As a quality control measure, groundwater duplicate samples were collected during each sampling event and were submitted for laboratory analysis of the full suite of analytical parameters. All duplicate data are provided in Appendix VI. Groundwater 2023 field duplicates are summarized as follows:

| Sampling Date | Monitor I.D. | Duplicate Sample I.D. |
|---|---|---|
| May 2023 | BH5 | DUP |
| October 2023 | BH5 | DUP |

The calculated RPDs for the original and field duplicate groundwater samples have been compared to the performance standards considered acceptable by Pinchin (i.e. the industry standard of less than 50%). Each of the calculated RPDs met the corresponding performance standard.

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.

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.

## 5.0 CONCLUSIONS

Based on the work completed, the following is a summary of the activities and findings of the 2023 water quality monitoring program:

- Groundwater samples were collected from all the monitoring well locations on May 19 and October 17, 2023, with the exception of BH3-10, BH5A, BH6 and BH7-21 due to the lack of groundwater (fall sampling event). All groundwater samples were submitted for laboratory analysis of parameters identified in Column 1 (spring sampling event) and

Column 2 (fall sampling event) of Schedule 5 of the MECP Landfill Standards. The groundwater quality was assessed based on the ODWQS and Guideline B-7;

- Surface water samples were collected from one monitoring location “SW” on May 19, 2023 were submitted for laboratory analysis of parameters identified in Column 3 (spring sampling event) and Column 4 (fall sampling event) of Schedule 5 of the MECP Landfill Standards. Surface water samples were not collected during the fall sampling due to lack of water. Surface water quality was assessed based on the PWQO;
- During the spring monitoring event on May 19, 2023, the depth to groundwater was observed to range 0.230 mbgs at BH5A to 5.52 mbgs at BH2. During the fall monitoring event on October 17, 2023, the depth to groundwater was observed to range from 1.47 mbgs at BH4A to 6.34 mbgs at BH2;
- All reported concentrations in the groundwater samples submitted for analysis satisfied the respective ODWQS parameters with the exception the following:
    - Groundwater samples collected at monitoring location BH2 had concentrations of alkalinity, manganese, TDS and DOC that were above the ODWQS;
    - Groundwater samples collected at monitoring location BH5A had concentrations of manganese (spring) and DOC (spring) that were above the ODWQS; and
    - Groundwater samples collected at monitoring location BH6 had concentrations of iron (spring), manganese (spring) and DOC (spring)that were above the ODWQS.
- All reported concentrations in the groundwater samples submitted for analysis satisfied the respective Guideline B-7 criteria with the exception the following:
    - Groundwater samples collected at monitoring location BH3-10 had concentrations of alkalinity (low-spring) that exceeded the Guideline B-7 criteria;
    - Groundwater samples collected at monitoring location BH4 had concentrations of DOC during the spring monitoring event that exceeded the Guideline B-7 criteria;
    - Groundwater samples collected at monitoring location BH4A had concentrations of DOC during the fall monitoring event that exceeded the Guideline B-7 criteria;
    - Groundwater samples collected at monitoring location BH5 had concentrations of DOC and nitrite during the spring monitoring event that exceeded the Guideline B-7 criteria; and

- Groundwater samples collected at monitoring location BH5A had concentrations of manganese (spring) and DOC (spring) that exceeded the Guideline B-7 criteria;

- With the exception of iron, zinc and total phosphorus, all reported concentrations in the surface water samples submitted for analysis satisfied the respective PWQO parameters.

Based on the results obtained from the existing groundwater monitoring wells and surface water monitoring locations, Pinchin has not identified significant landfill related impacts at the downgradient Site boundary. These findings indicate that the Site is continuing to operate as designed, as a natural attenuation type facility. Concentrations of DOC, iron and manganese parameters within the groundwater samples analyzed at the downgradient monitoring locations are likely attributed to either naturally occurring conditions within the shallow unconfined aquifer on-site or from temperate impacts from leachate sources from the waste deposits at the Site that are inferred to attenuate within close proximity to the Site. Most exceedances of the Guideline B-7 RUC 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. However, given the consistent presence of benzene at the source well (BH6), inclusion of the focused VOC scan should continue.

## 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 monitoring shall be completed with analyses for the comprehensive list of parameters listed in Column 1 of Schedule 5 for the spring sampling event and Column 2 of Schedule 5 of the fall monitoring event, of the MECP Landfill Standard. Surface water monitoring shall be completed with analyses for the comprehensive list of parameters listed in Column 3 for the spring monitoring events and Column 4 for the fall monitoring event, of Schedule 5 of the MECP Landfill Standard. 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;
- In order evaluate the efficiency of waste diversion efforts and to track available/remaining waste capacity, the Client should consider completing regularly scheduled topographic surveys of the Site. It is recommended that a topographic survey is completed in the

spring of 2025 to assess the current waste volume at the Site (and the remaining Site capacity/lifespan); and

- The Client should continue to ensure that the requirements as specified in the CofA are complied with and the recommendations within the 2020 MECP Memo are taken into consideration during future monitoring and reporting efforts.

## 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 VI.

## 8.0 DISCLAIMER

This Water Quality Monitoring Program was performed for the Township of Jocelyn (Client) in order to investigate the environmental condition of the groundwater and surface water at the Jocelyn 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 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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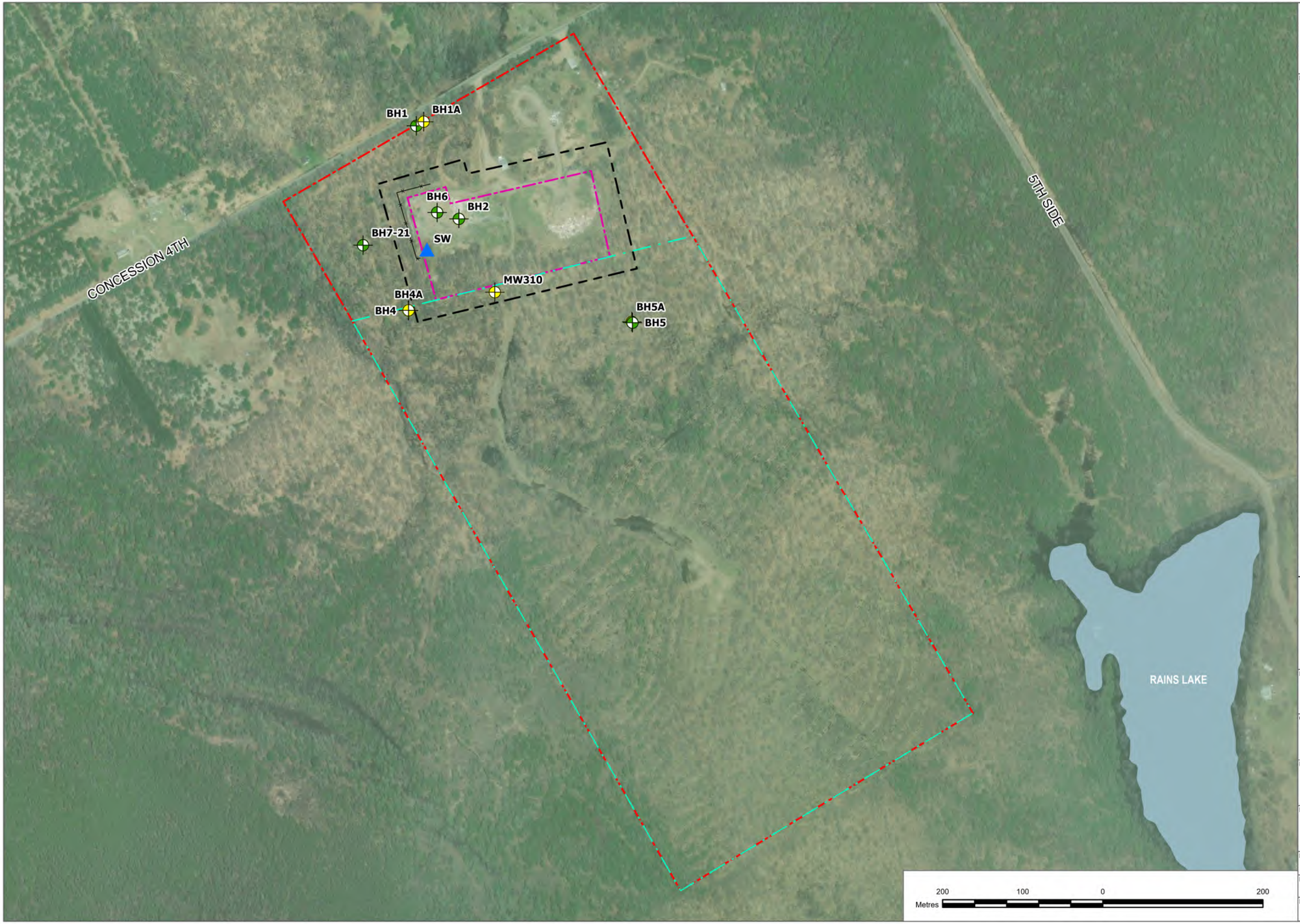
Template: Master Report for Phase II ESA - Stage 2 PSI, EDR, January 13, 2021

# APPENDIX I
## Figures


PINCHIN

| | | | | | |
|---|---|---|---|---|---|
| PROJECT NAME: | 2023 ANNUAL MONITORING REPORT | | | | |
| CLIENT NAME: | THE TOWNSHIP OF JOCELYN | | | | |
| PROJECT LOCATION: | JOCELYN WASTE DISPOSAL SITE, JOCELYN TOWNSHIP, ONTARIO | | | | |
| FIGURE NAME: | KEY MAP | | | | FIGURE NUMBER: 1 |
| PROJECT NUMBER: 204232.008 | SCALE: AS SHOWN | DRAWN BY: CF | REVIEWED BY: TIM | DATE: JANUARY 2024 | |




N

LEGEND

- GROUNDWATER MONITORING WELL DEEP
- GROUNDWATER MONITORING WELL SHALLOW
- SURFACE WATER SAMPLING LOCATION
- FENCE LINE
- WATERBODY
- CONTAMINANT ATTENUATION ZONE
- SITE BOUNDARY
- 30M SITE BUFFER
- CERTIFICATE OF APPROVAL

NOTES:
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4) Coordinate system: NAD 1983 CSRS UTM Zone 17N.
5) Source: Pinchin Ltd., Maxar.
6) Contains information licensed under the Open Government Licence – Ontario.

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PROJECT NAME
**2023 ANNUAL MONITORING REPORT**

CLIENT NAME
**THE TOWNSHIP OF JOCELYN**

PROJECT LOCATION
**JOCELYN WASTE DISPOSAL SITE, TOWNSHIP OF JOCELYN, ONTARIO**

FIGURE NAME
**SITE PLAN**

| PROJECT NUMBER: | SCALE |
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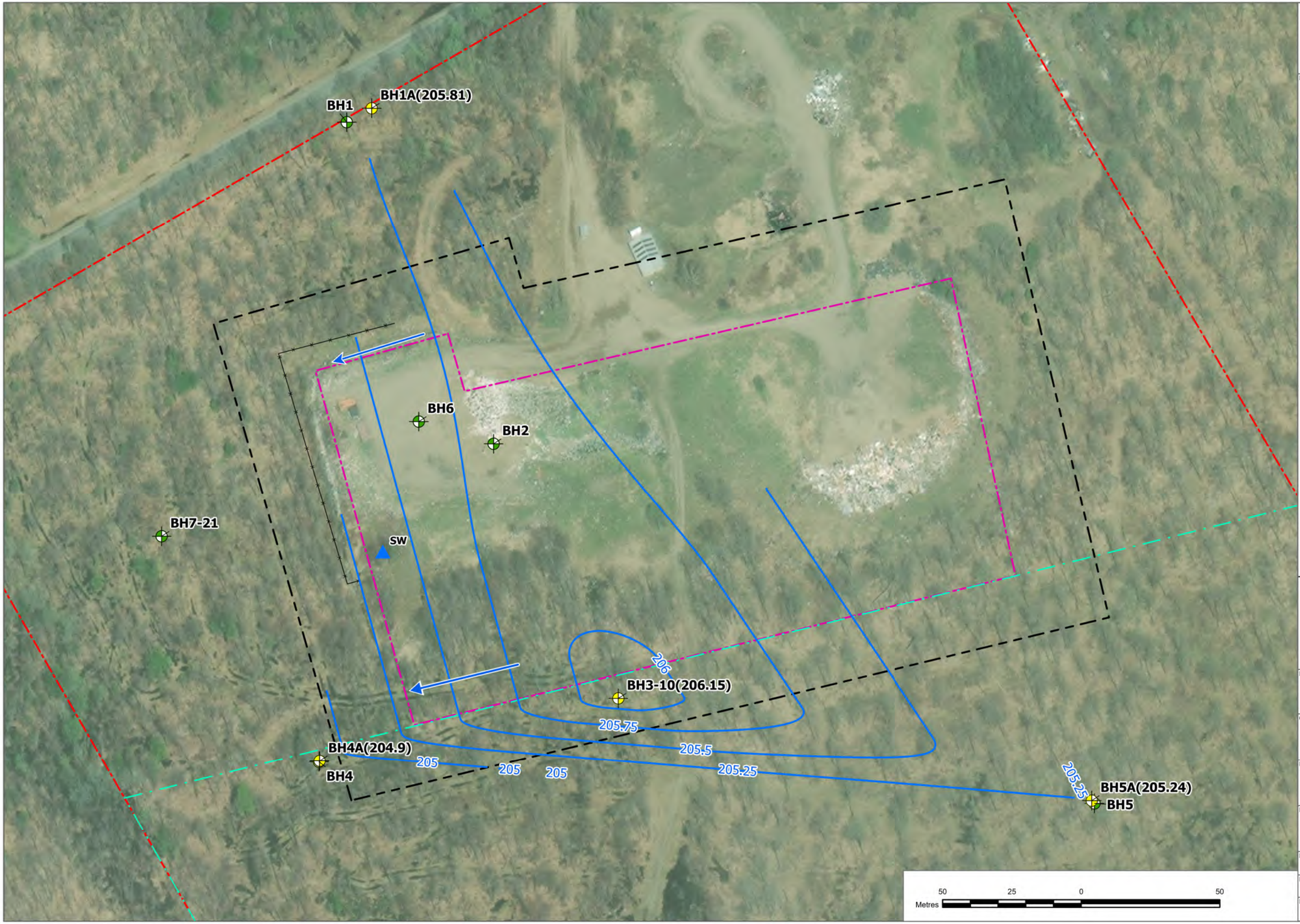
| DATE: JANUARY 2024 | FIGURE NUMBER: 2 |




N

LEGEND

- GROUNDWATER MONITORING WELL SHALLOW
- GROUNDWATER MONITORING WELL DEEP
- SURFACE WATER SAMPLING LOCATION
- GROUNDWATER CONTOUR LINE
- FENCE LINE
- CONTAMINANT ATTENUATION ZONE
- SITE BOUNDARY
- 30M SITE BUFFER
- CERTIFICATE OF APPROVAL
- GROUNDWATER FLOW DIRECTION
- 100.0 CALCULATED WATER LEVEL ELEVATION (mREL)
- 100.0 GROUNDWATER CONTOUR ELEVATION

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PROJECT NAME
**2023 ANNUAL MONITORING REPORT**

CLIENT NAME
**THE TOWNSHIP OF JOCELYN**

PROJECT LOCATION
**JOCELYN WASTE DISPOSAL SITE, TOWNSHIP OF JOCELYN, ONTARIO**

FIGURE NAME
**SPRING SHALLOW GROUNDWATER CONTOUR PLAN**

| PROJECT NUMBER: | SCALE |
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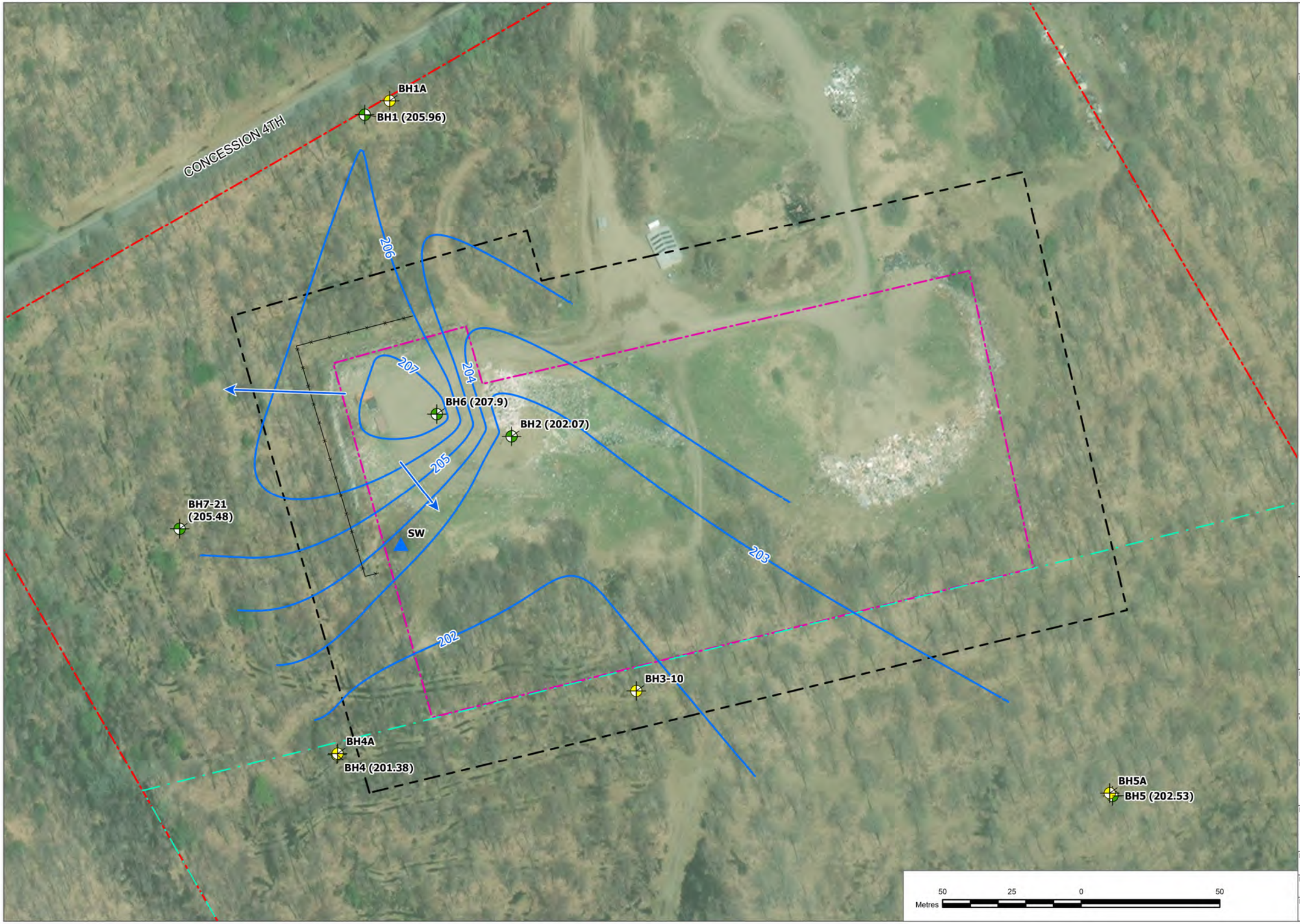
| DRAWN BY: CF | REVIEWED BY: TM |
| DATE: JANUARY 2024 | FIGURE NUMBER: 3 |




N

LEGEND

- GROUNDWATER MONITORING WELL SHALLOW
- GROUNDWATER MONITORING WELL DEEP
- SURFACE WATER SAMPLING LOCATION
- FENCE LINE
- GROUNDWATER CONTOUR LINE
- CONTAMINANT ATTENUATION ZONE
- SITE BOUNDARY
- 30M SITE BUFFER
- CERTIFICATE OF APPROVAL
- GROUNDWATER FLOW DIRECTION
- 100.0 CALCULATED WATER LEVEL ELEVATION (mREL)
- 100.0 GROUNDWATER CONTOUR ELEVATION

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PROJECT NAME
**2023 ANNUAL MONITORING REPORT**

CLIENT NAME
**THE TOWNSHIP OF JOCELYN**

PROJECT LOCATION
**JOCELYN WASTE DISPOSAL SITE, TOWNSHIP OF JOCELYN, ONTARIO**

FIGURE NAME
**SPRING DEEP GROUNDWATER CONTOUR PLAN**

| PROJECT NUMBER: | SCALE |
|---|---|
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| DRAWN BY: CF | REVIEWED BY: TM |
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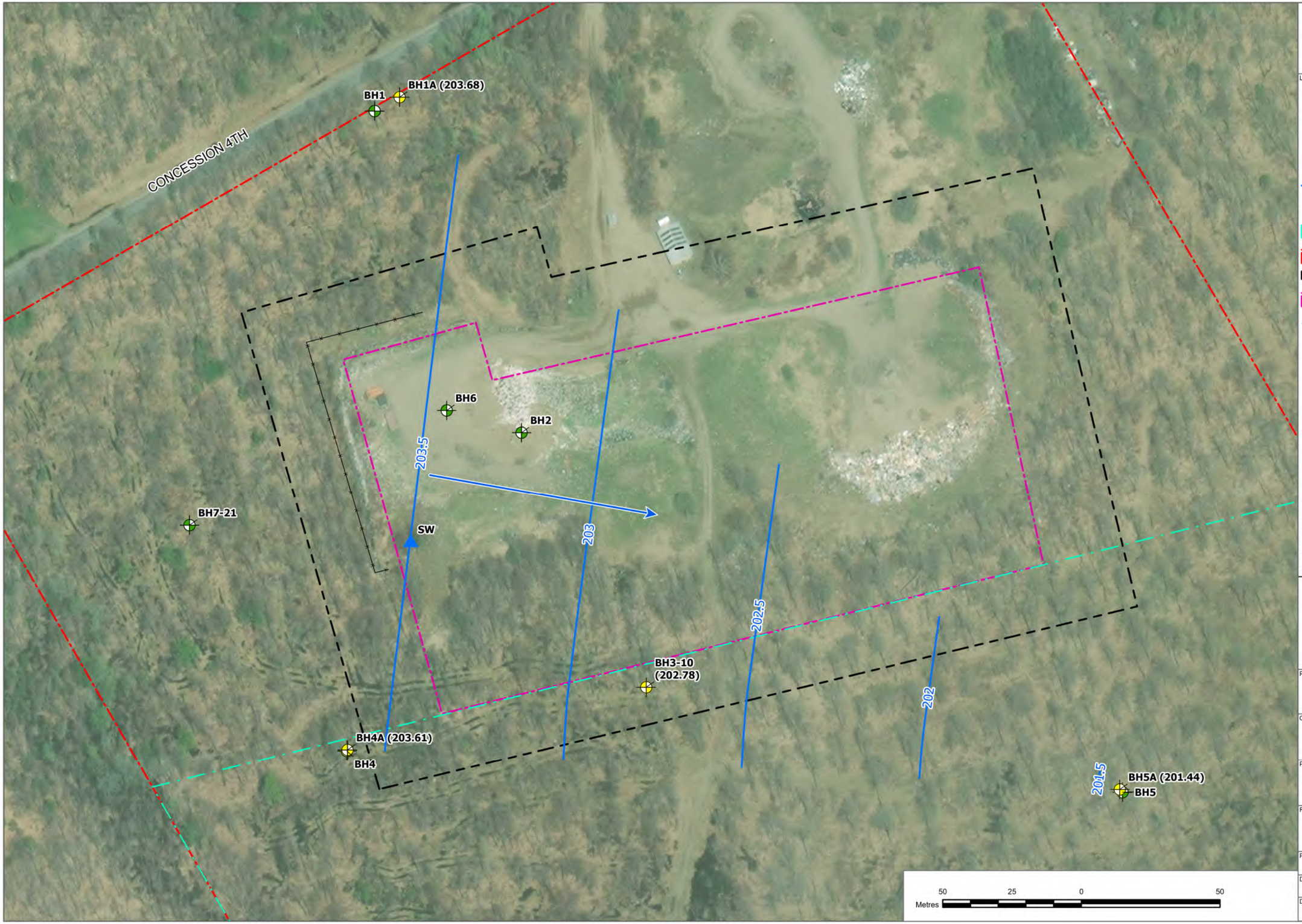


N

LEGEND

- GROUNDWATER MONITORING WELL SHALLOW
- GROUNDWATER MONITORING WELL DEEP
- SURFACE WATER SAMPLING LOCATION
- GROUNDWATER CONTOUR LINE
- FENCE LINE
- CONTAMINANT ATTENUATION ZONE
- SITE BOUNDARY
- 30M SITE BUFFER
- CERTIFICATE OF APPROVAL
- GROUNDWATER FLOW DIRECTION
- 100.0 CALCULATED WATER LEVEL ELEVATION (mREL)
- 100.0 GROUNDWATER CONTOUR ELEVATION

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**2023 ANNUAL MONITORING REPORT**

CLIENT NAME
**THE TOWNSHIP OF JOCELYN**

PROJECT LOCATION
**JOCELYN WASTE DISPOSAL SITE, TOWNSHIP OF JOCELYN, ONTARIO**

FIGURE NAME
**FALL SHALLOW GROUNDWATER CONTOUR PLAN**

| PROJECT NUMBER: | SCALE |
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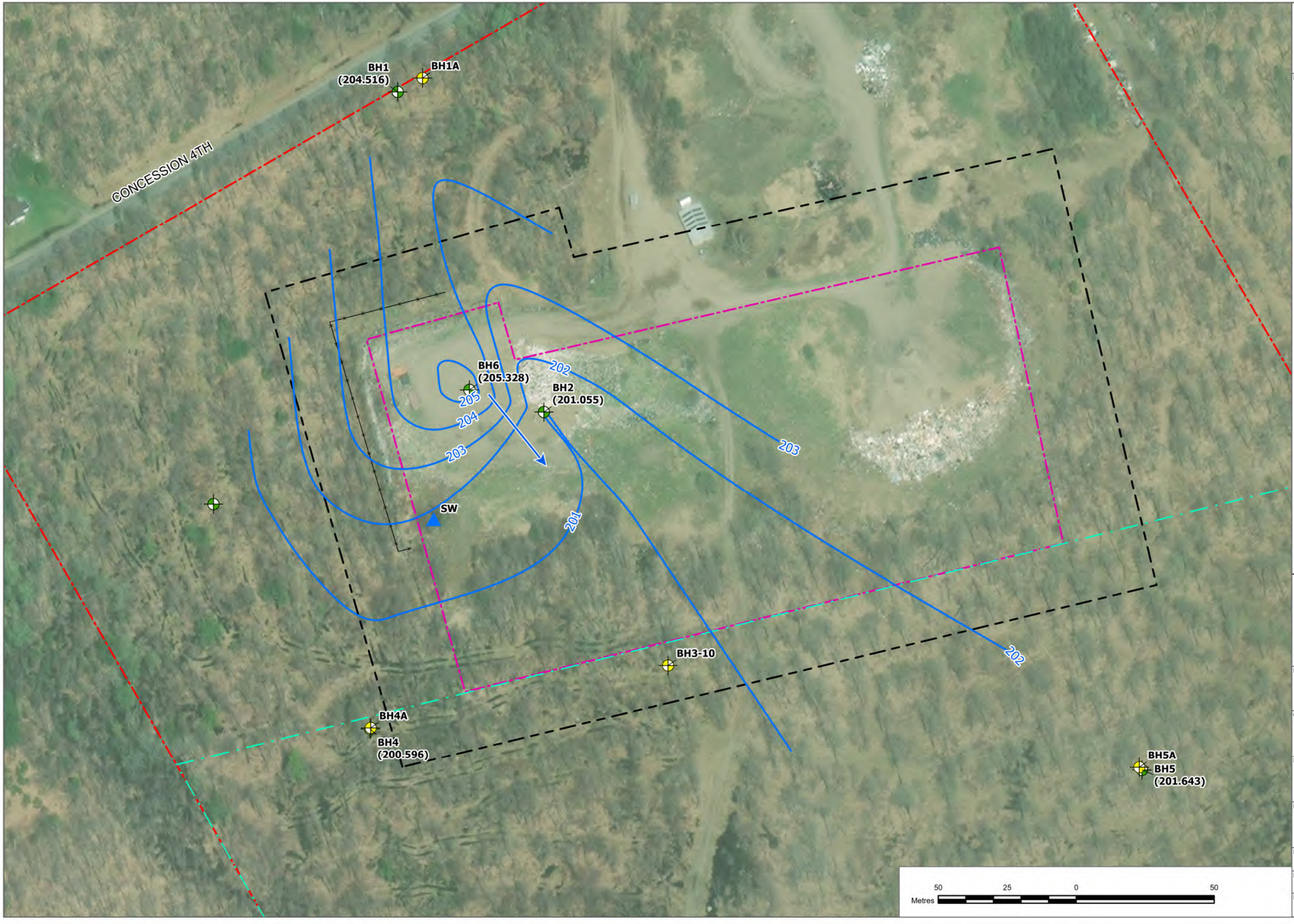
| DATE: JANUARY 2024 | FIGURE NUMBER: 5 |




N

LEGEND

- GROUNDWATER MONITORING WELL SHALLOW
- GROUNDWATER MONITORING WELL DEEP
- SURFACE WATER SAMPLING LOCATION
- GROUNDWATER CONTOUR LINE
- FENCE LINE
- CONTAMINANT ATTENUATION ZONE
- SITE BOUNDARY
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- CERTIFICATE OF APPROVAL
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- 100.0 CALCULATED WATER LEVEL ELEVATION (mREL)
- 100.0 GROUNDWATER CONTOUR ELEVATION

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**2023 ANNUAL MONITORING REPORT**

CLIENT NAME
**THE TOWNSHIP OF JOCELYN**

PROJECT LOCATION
**JOCELYN WASTE DISPOSAL SITE, TOWNSHIP OF JOCELYN, ONTARIO**

FIGURE NAME
**FALL DEEP GROUNDWATER CONTOUR PLAN**

| PROJECT NUMBER: | SCALE |
|---|---|
| 204232.008 | AS SHOWN |
| DRAWN BY: CF | REVIEWED BY: TM |
| DATE: JANUARY 2024 | FIGURE NUMBER: 6 |

**APPENDIX II**

**Certificate of Approval**

Ontario

Ministry of the Environment | Ministère de l'Environnement

*AMENDED PROVISIONAL CERTIFICATE OF APPROVAL*
*WASTE DISPOSAL SITE*
*NUMBER A561001*
*Issue Date: October 13, 2006*

The Corporation of the Township of Jocelyn
Rural Route, No. RR# 1
Richards Landing, Ontario
P0R 1J0

Site Location: Township of Jocelyn Waste Disposal Site
Lot 4, Concession V
Jocelyn Township, District of Algoma

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

a 2.0 hectare landfilling site with a total area of 40 hectares, having a maximum capacity of 40,000 cubic meters.

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

## I. Definitions

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

b. "*Crown*" means Her Majesty the Queen in the Right of Ontario;

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

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

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

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

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

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

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

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

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

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

m. "*Site*" means the entire waste disposal site (40 hectares total site area), including the buffer lands located at Site Lot 4, Concession V, Jocelyn Township, District of Algoma

n. "*Trained personnel*" means knowledgeable in the following through instruction and/or practice:

   a. relevant waste management legislation, regulations and guidelines;
   b. major environmental concerns pertaining to the waste to be handled;
   c. occupational health and safety concerns pertaining to the processes and wastes to be handled;
   d. management procedures including the use and operation of equipment for the processes and wastes to be handled;
   e. emergency response procedures;
   f. specific written procedures for the control of nuisance conditions;
   g. specific written procedures for refusal of unacceptable waste loads;
   h. the requirements of this *Certificate*.

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

TERMS AND CONDITIONS

## II. GENERAL

**Compliance**

1. i. The *Owner* and *Operator* shall ensure compliance with all the conditions of this *Certificate* and shall ensure that any person authorized to carry out work on or

operate any aspect of the *Site* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

ii. The *Owner* shall ensure that MOE Guideline B-7 Reasonable Use Concept are applied and met at all points on the property line at the *Site*.

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

**In Accordance**

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

**Interpretation**

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

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

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

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

**Other Legal Obligations**

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

a. relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or

b. limit in any way the authority of the *Ministry* to require certain steps be taken or to require the *Owner* and *Operator* to furnish any further information related to compliance with this *Certificate*.

**Adverse Effect**

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

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

**Change of Owner**

11. The *Owner* shall notify the *Director*, in writing, and forward a copy of the notification to the *District Manager*, within 30 days of the occurrence of any changes in the following information:

    a. the ownership of the *Site*;
    b. the *Operator* of the *Site*;
    c. the address of the *Owner* or *Operator*;
    d. the partners, where the *Owner* or *Operator* is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act*, R. S. O. 1990, c. B.17, shall be included in the notification;

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

**Certificate of Registration**

13. Pursuant to Section 197 of the *EPA*, no person having an interest in the *Site* shall deal in any way with the *Site* without first giving a copy of this *Certificate* to each person acquiring an interest in the *Site* as a result of the dealing.

14. Two copies of a completed Certificate of Registration, containing a registerable description of the *Site*, shall be submitted to the Director for the *Director*'s signature within 60 calendar days of the date of this *Certificate*.

15. The Certificate of Registration shall be registered in the appropriate land registry office on title to the *Site* by the *Owner* within 10 calendar days of receiving the Certificate of Registration signed by the *Director,* and a duplicate registered copy shall be submitted to the *Director.*

**Inspections**

16. No person shall hinder or obstruct a *Provincial Officer* from carrying out any and all inspections authorized by the *OWRA*, the *EPA*, or the *PA*, of any place to which this *Certificate* relates, and without limiting the foregoing:

    a. to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *Certificate* are kept;
    b. to have access to, inspect, and copy any records required to be kept by the conditions of this *Certificate*;
    c. to inspect the *Site,* related equipment and appurtenances;
    d. to inspect the practices, procedures, or operations required by the conditions of this *Certificate*; and
    e. to sample and monitor for the purposes of assessing compliance with the terms and conditions of this *Certificate* or the *EPA*, the *OWRA* or the *PA*.

**Information and Record Retention**

17. Any information requested, by the *Ministry*, concerning the *Site* and its operation under this *Certificate*, including but not limited to any records required to be kept by this *Certificate* shall be provided to the Ministry, upon request, in a timely manner. Records shall be retained for two (2) years except for as otherwise authorized in writing by the *Director.*

18. The receipt of any information by the *Ministry* or the failure of the *Ministry* to prosecute any person or to require any person to take any action, under this *Certificate* or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:

    a. an approval, waiver, or justification by the *Ministry* of any act or omission of any person that contravenes any term or condition of this *Certificate* or any statute, regulation or other legal requirement; or

    b. acceptance by the *Ministry* of the information's completeness or accuracy.

## IV. GENERAL OPERATING

**Service Area**

19. Wastes generated only from within the geographic boundaries of the **Township of Jocelyn** may be received for disposal at this Site. No waste shall be received for disposal at this Site from outside the approved service area.

**Waste Types**

20. Only **solid non-hazardous municipal waste** which includes wastes generated by residential, commercial, institutional and industrial sectors, and contaminated fill.

**Unacceptable Waste**

21. i. The *Owner* shall conduct appropriate inspections and ensure that appropriate controls are in place to prevent the acceptance of liquid industrial waste and hazardous waste and to prevent the acceptance of waste from outside the approved service area.

ii. The *Owner* shall record in the daily records for the Site operations any occurrence of unacceptable waste delivered to the *Site*, the name of the waste hauler delivering the waste to the *Site* and waste generator (if known).

iii. The *Owner* shall forthwith notify the *District Manager* of any and all waste load refusals at the *Site* related to requirements in this *Certificate*, including service area and waste types.

**Site Capacity**

22. The total capacity of the *Site* is **40,000** cubic metres; and

**Hours of Operation**

23. (1) The operating hours for the *Site* are limited to:

i. Wednesday and Sunday from 12:00 p.m. to 5:00 p.m. between November 1 to April 30; and
ii. Wednesday and Sunday from 12:00 p.m. to 8:00 p.m. between May 1 and October 31;

(2) The operating hours may be amended from time to time, with written concurrence from the *District Manager*, to accommodate seasonal or unusual circumstances.

**Proper Operation**

24. The *Site* shall be properly operated and maintained at all times. All waste shall be managed and disposed of in accordance with the *EPA*, *Regulation 347*, and the requirements of this *Certificate*. At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

25. By no later than **March 1, 2007**, the *Owner* shall clearly stake the limit of the landfill.

**Vector/Vermin**

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

**Burning Waste Prohibited**

27. Only clean wood and brush shall be permitted for burning. Burning of the materials shall be completed as per the Ministry of the Environment Guideline C-7 (Burning at Landfill Sites);

**Design and Operations**

28. A copy of the Design and Operations Plan shall be:

    a. retained at the Site;
    b. kept up to date through periodic revisions; and
    c. be available for inspection by *Ministry* staff.

**Cover**

29. Cover material shall be applied as follows:

    a. Daily Cover - At least once a month, a minimum of 150 mm of soil cover or an approved thickness of alternative cover material shall be placed;

    b. Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 mm of soil cover or an approved thickness of alternative cover material shall be placed; and

    c. Final Cover - In areas where landfilling has been completed to final contours, a minimum 0.6 metre thick layer of low permeable cover soil underlying 0.15 m of top soil shall be placed.

**Site Security**

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

31. A sign shall be posted in a prominent location at the *Site* entrance clearly stating the

following:

i. *Owner*'s name;
ii. Operator's name;
iii. Provisional Certificate of Approval No.;
iv. Type of Waste Accepted;
v. the hours of operation;
vi. Public access to the *Site* is prohibited during non-operational hours; and
vii. Contact telephone number to call with complaints or in the event of an emergency.

**Litter Control**

32. i. The *Owner* shall undertake litter pick-up around the property in the early spring and late fall, including the fenceline and any surface water bodies on the property.

ii. The *Owner* shall also undertake regularly scheduled litter pick-ups around the site between the months of May and September.

**Employees and Training**

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

**Recycling Operations**

34. Recyclable materials shall be properly separated and each area properly identified. The areas shall be kept in a neat and tidy manner.

35. All storage containers/bins used to store waste and/or recyclable materials shall be maintained in good condition to prevent leakage. The *Owner* shall immediately remove from service any leaking container. Containers/bins used to store clean scrap metal may be equipped with drainage holes to permit the drainage of rainwater.

**Visual Inspections**

36. i. The *Owner* shall on a monthly basis conduct and document visual inspections of the landfill site for leachate outbreaks.

ii. Within one (1) week of an leachate outbreak being identified during the weekly inspections identified in Condition 29 (i), the *Owner* shall notify the District Office in writing of the occurrence and actions to be taken.

## V. Spills

37. All spills and upsets shall be immediately reported to the Ministry's Spills Action Centre (SAC) and shall be recorded in a log as to the nature of the spill or upset, and the action taken for clean-up, correction and prevention of future occurrences.

## VI. Record Keeping

38. The *Owner* shall establish and maintain a written record of daily operations at the *Site*. This record shall be in the form of a log or a dedicated electronic file and it shall include as a minimum the following information:

a) date of record;
b) hours of operation;
c) an approximation of the type, amount and source of waste received (ie. loads or vehicles/day); and
d) an estimate on the amount (depending on item i.e. in tonnes or number of tires, appliances, batteries) of recyclable materials received at the *Site*.

39. The *Owner* shall establish and maintain a written record of all complaints received about the site and any environmental emergency situations that occur at the *Site*. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

a) Date and time of occurrence;
b) type of the environmental emergency situation and the resulting environmental impact;
c) name, address and telephone number of the complainant;
d) actions taken to address the impact;
e) actions taken to prevent the re-occurrence of a similar emergency situation in the future; and
f) method of reporting the incident to the MOE District Office.

40. The *Owner* shall establish and maintain a written record of the *Site* inspections. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

a) date and time of inspection;
b) name, title and signature of trained personnel conducting the inspection;
c) a listing of all equipment, fencing, signs, etc. inspected and any deficiencies observed; and
d) recommendations for remedial action and the completion date of such action.

41. The *Owner* shall establish and maintain a written record of all occurrences of receipt of unacceptable waste at the *Site*. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

a) waste generator;
b) type of unacceptable waste;
c) an estimate on the amount of unacceptable waste;
d) nature of unacceptable waste;
e) steps taken to remove waste; and
f) actions taken by the Owner to prevent recurrence.

42. The *Owner* shall retain at the Municipal Office for a minimum of two (2) years from the date of their creation, or longer if requested in writing by the *District Manager*, all records and information relating to or resulting from the activities approved under this Certificate, and shall make all records and information available at all times for inspection by a Provincial Officer.

## VII. Environmental Monitoring Plan

43. Environmental monitoring for the Site shall be carried out in accordance with Section 7.3 of Item 2 in Schedule "A" and Item 3 to 4 in Schedule "A".

44. The *Owner* can make changes to the monitoring program in accordance with the recommendations of the annual report provided that the *District Manager* agrees, in writing, to such changes to the program.

## VIII. Annual Report

45. A written report on the development, operation and monitoring of the *Site*, shall be completed annually (the "Annual Report"). The Annual Report shall be submitted to the *District Manager*, by no later than April 30, 2007 and every April 30 thereafter, and shall cover the previous calendar year developement, operations and monitoring at the site.

46. The Annual Report shall include the following:

a. the results and an interpretive analysis of the results of all leachate, groundwater, surface water and landfill gas monitoring, including an assessment of the need to amend the monitoring programs;

b. an assessment of the operation and performance of all engineered facilities, the need to amend the design or operation of the *Site*, and the adequacy of and need to implement the contingency plans;

c. site plans showing the existing contours of the *Site;* areas of landfilling operation during the reporting period; areas of intended operation during the next reporting period; areas of excavation during the reporting period; the progress of final cover, vegetative cover, and any intermediate cover application; previously existing site facilities; facilities installed during the reporting period; and site preparations and facilities planned for installation during the next reporting

period;

d. calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the *Site* during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;

e. a calculation of the remaining capacity of the *Site* and an estimate of the remaining *Site* life;

f. a summary of the quantity of any leachate or pre-treated leachate removed from the *Site* or leachate treated and discharged from the Site during each operating week;

g. a summary of the total annual quantity (cubic meters) of waste received at the Site.

h. a summary of any complaints received and the responses made;

i. a discussion of any operational problems encountered at the *Site* and corrective action taken;

j. a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903;

k. any other information with respect to the *Site* which the *Regional Director* may require from time to time;

l. a section under a heading of "Compliance with Conditions of the Certificate of Approval", a statement as to compliance with all of the terms and conditions of this *Certificate* and a detailed description of the measures taken to ensure compliance with this certificate, including any supporting data or other information; and

m. In the event of any non-compliance during the reporting period, and under a heading of "Non-Compliance with Conditions of the Certificate of Approval" details of the non-compliance as well as details of how and when any non-compliance was corrected.

## IX. Closure Plan

48. At least six (6) months prior to the anticipated date of closure of this *Site*, the *Owner* shall submit to the *Director* for approval, with copies to the *District Manager*, a detailed site closure plan pertaining to the termination of landfilling operations at this *Site*, post-closure inspection, maintenance and monitoring, and end use, based on the Landfill Closure Section of the Design and Operations Report. The plan shall include the following:

a. a plan showing the *Site* appearance after closure;

b. a description of the proposed end use of the *Site*;

c. a descriptions of the procedures for closure of the *Site*, including:

i. advance notification of the public of the landfill closure;

ii. posting of a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;

iii. completion, inspection and maintenance of the final cover

and landscaping;

iv. site security;

v. removal of unnecessary landfill-related structures, buildings and facilities;

vi. final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas; and

vii. a schedule indicating the time-period for implementing sub-conditions i) to vi) above.

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

i. operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;

ii. record keeping and reporting; and

iii. complaint contact and response procedures.

e. an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas; and

f. an updated estimate of the contaminating life span of the *Site*, based on the results of the monitoring programs to date.

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

## Schedule "A"

1. Application for a Provisional Certificate of Approval for a Waste Disposal Site submitted by the Township of Jocelyn requesting an expansion to the existing landfill site. The application was undersigned by Ms. Janet Boucher, Clerk-Treasurer, Township of Jocelyn dated March 30, 2006.

2. Report entitled "Township of Jocelyn Municipal Landfill Site - Expansion Report" prepared for the Township of Jocelyn by Kresin Engineering Corporation dated March 30, 2006.

3. Letter dated July 25, 2006 addressed to Ms. Janet Boucher, Township of Jocelyn from Mr. Dale Gable, Ministry of the Environment requesting additional information regarding the design, operations and environmental monitoring for the proposed expansion.

4. Letter dated August 11, 2006 addressed to Mr. Dale Gable, Ministry of the Environment from Mr. Chris Kresin, Kresin Engineering Corp. providing a response to the ministry's July 25, 2006 letter.

5. Letter dated August 14, 2006 addressed to Ms. Janet Boucher, Township of Jocelyn from Mr. Dale Gable, Ministry of the Environment requesting additional information on the final cover and property boundaries.

6. Letter dated September 25, 2006 addressed to Mr. Dale Gable, Ministry of the Environment from Mr. Chris Kresin, Kresin Engineering Corp. providing an updated proposed closure contour and site drawing and a response to the comments provided in the August 14, 2006 letter to the Township.

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

1. *The reason for Conditions (1), (2), (3), (4), (7), (8), (9), (10), (11), (12), (17) and (18) is to clarify the legal rights and responsibilities of the Owner.*

2. *The reasons for Condition (13), (14) and (15) are included, are pursuant to subsection 197(1) of the EPA, to provide that any persons having an interest in the Site are aware that the land has been approved and used for the purposes of waste disposal.*

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

4. *The reasons for Conditions (19), (20), (21) and (22) is to specify the approved areas from which waste may be accepted at the Site and the types and amounts of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.*

5. *The reason for Condition (23) is to clearly identify to the Owner the hours of operations as identified in the application and supporting documentation. This is conjunction with Condition (32) ensures the public and the owner of when the site is opened and an attendant is required.*

6. *The reasons for Condition (24) is to the Owner is aware that the Site has to be designed and operated accordingly to regulations and that discharge of any contaminants is not permitted. This is to ensure the long-term health and safety of the public and the environment.*

7. *The reasons for Condition (25) is to ensure the limits of the landfill are clearly identified for the owner, operator and the ministry such that it can be determine weather fill has been landfilled beyond approved the approved landfilling limits.*

8. *The reasons for Condition (26), (27), (28), (29), (32), (33) and (37) is to ensure the landfill is operated in accordance with Ministry standards, and to ensure the long-term protection of the health and safety of the public and the environment.*

9. *The reasons for Conditions (30) are to specify site access to/from the Site and to ensure the controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.*

10. *The reason for Condition (31) is to ensure that users of the Site are fully aware of important information and restrictions related to Site operations under this Certificate of Approval.*

11. *The reasons for Conditions (34), and (35) are to ensure the recycling operations are completed in accordance with Ministry Standards, and to ensure the long-term protection of the health and safety of the public and the environment.*

12. *The reasons for Condition (36) is to ensure the Owner calls the Spills Action Centre in the event of a spill as required by current regulations. This is to ensure the long-term health and safety of the public and the environment.*

13. *The reasons for Condition (38), (39), (40), (41) and (42) are to ensure monitoring and reporting are completed in accordance with Ministry standards, and to ensure the long-term health and safety protection of the public and the environment.*

14. *The reasons for Condition (43) and (44) are to ensure the Owner has conducts the environmental monitoring as per the approved plan or changes. This is to ensure the long term health and safety of the public and the environment.*

15. *The reasons for Condition (45) and (46) are to ensure the Owner submits an annual summary report to the Ministry so that the landfilling operation can be evaluated to ensure compliance with the Ministry's requirements on annual operations and monitoring. This is to ensure the long-term protection of the health and safety of the public and the environment.*

16. *The reason for Conditions (47) and (48) is to ensure the Owner has an established approved plan for the closure and post-closure maintenance of the landfill site. This is to ensure the long-term health and safety of the public and the environment.*

**This Provisional Certificate of Approval revokes and replaces Certificate(s) of Approval No. A561001 issued on September 7, 1983**

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

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

*The Notice should also include:*

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

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

*This Notice must be served upon:*

The Secretary*
Environmental Review Tribunal

The Director
Section 39, *Environmental Protection Act*

2300 Yonge St., Suite 1700
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

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

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

DATED AT TORONTO this 13th day of October, 2006

THIS CERTIFICATE WAS MAILED
ON Oct. 16, 2006
9C
(Signed)

Tes. Gebrezghi

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

DG/
c: District Manager, MOE Sault Ste. Marie
Chris Kresin, P.Eng., Kresin Engineering Corporation ✓

**APPENDIX III**

**MECP Correspondence**

**From:** Jake Rebellato
**Sent:** Friday, October 30, 2020 9:46 AM
**To:** Township of Jocelyn; Brian Dukes (briandukes15@gmail.com)
**Subject:** RE: Groundwater reviewers comments on 2019 report

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Good morning Janet!
Thank you for sharing this memo, we will address all of these issues and include this document in the 2020 report.

I took a quick review of the letter and a lot of the recommendations can be easily addressed moving forward. Based on my review we will can provide the following actions to the listed items:

- CAZ area will be depicted on the next annual report and all reports moving forward;
- We can send you a proposal to complete the recommended well installation program. Estimated cost would be 10-20K depending on what is needed (depth of well, trail clearing). This work can be done right away as needed.
- We can include all borehole logs in future reports, but we will need to dig up old reports that include these logs (likely Kresin reports)
- Monitoring well BH3-10 is shown on site plan as MW3-10 (minor typo)
- We will have to spend more time completing some trend analysis for the historical data set which we can certainly provide.

We will have to issue a small change order to cover these annual reporting costs including the CAZ calculations and trending analysis but I don't expect this to be a large cost.

Thank you,

Jake Rebellato, B.Sc.(Env.), C.E.T., EP
*Operations Manager, Environmental Due Diligence & Remediation*

**Pinchin Ltd.**
126 Queen Street East, Suite 3, Sault Ste. Marie ON P6A 1Y5
T: 705.575.9207 ext. 3509 | C: 705.542.2126 | pinchin.com

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**From:** Township of Jocelyn <admin@jocelyn.ca>
**Sent:** Friday, October 30, 2020 9:28 AM
**To:** Brian Dukes (briandukes15@gmail.com) <briandukes15@gmail.com>; Jake Rebellato <jrebellato@Pinchin.com>
**Subject:** FW: Groundwater reviewers comments on 2019 report



Hi Jake and Brian – this was received this morning. If I interpret this correctly, they want more data/more historical information included in the annual reports, they disagree with your recommendation to decommission some of the testing holes and they are recommending that we install another one to address leachate. Does that about cover it all?

Can you price out for Council the installation of such a testing hole. We have a meeting next Tuesday and I would include it in the package. In addition, is that something that would be done this year or could we wait until the spring of next year?

Let me know what you think!
Janet

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**From:** Crosson, Kirk (MECP) [mailto:Kirk.Crosson@ontario.ca]
**Sent:** Friday, October 30, 2020 8:50 AM
**To:** Township of Jocelyn <admin@jocelyn.ca>
**Cc:** Mitchell, Kristy (MECP) <Kristy.Mitchell@ontario.ca>
**Subject:** Groundwater reviewers comments on 2019 report

Please find attached the Groundwater reviewer comments for your information, action and consideration.

Regards

Kirk Crosson
MECP-Sault Ste. Marie Office

**APPENDIX IV**

**Borehole Logs**

Project: Jocelyn Township Landfill No.: 53869

Date Drilled: 90/10/2 - 90/10/5 Driller: DBM Drilling

Borehole Location: Approx. 50m north of municipal fill area

Drilling Supervised by: S. Bricks

Drilling Method: 8.26cm I.D hollow stem augers

Piezometer Details

Type of Pipe: 5.1cm dia. sch. 40 Triloc PVC

Type of Screen: 5.1cm dia. sch. 40 Triloc PVC, #10 slot

Borehole No.: BH-1

Piezometers:

Sheet 1 of 1

SS Split Spoon Sample
WA Wash Sample
AU Auger Sample
CN Continuous Sample
SH Shelby Tube Sample
RX Rock Core
GR Grab Sample
Piezometer Screen (water level elev. m, Y/M/D)

| Scale (ft.) (m) | Elev. (m GSD) / Depth (m) | Geological Log — Description | Strat. Plot | Piezometer Details | Sample No. | Plot | Sample Type | Blows /0.3m |
|---|---|---|---|---|---|---|---|---|
| | | Ground Surface Elevation: 209.1m | | | | | | |
| | 208.6 / 0.5 | Topsoil | | Cement | | | | |
| 5 1 | | SANDY SILT TILL<br>- red-brown to brown<br>- moist to very moist<br>- with some pebbles, gravel<br>- fairly cohesive<br>- a number of boulders encountered during drilling/sampling<br>- becomes siltier with depth | | Backfill | 1 | | SS | >100 |
| 2 | | | | Holeplug | 2 | | SS | 20 |
| | | | | | 3 | | SS | >100 |
| 10 3 | | - becomes slightly sandier @ 3.05m | | | 4 | | SS | |
| | 205.5 / 3.6 | | | | | | | |
| 4 | | SILT TILL<br>- clayey, becoming sandier with depth<br>- red-brown to brown<br>- fairly hard, dense<br>- damp to moist<br>- small sand layers (0.3cm thick) @ 4.1m and 4.2m<br>- massive | | | 5 | | SS | >200 |
| 15 5 | | | | | | | | |
| | | | | Natural Pack and Silica Sand | 6 | | SS | 75 |
| 20 6 | 203.1 / 6.1 | | | | | | | |
| | | SILTY FINE SAND to FINE SANDY SILT<br>- brown<br>- partly cohesive<br>- trace to some pebbles, gravel; both disappear below 6.9m<br>- fairly soft<br>- massive<br>- becomes siltier with depth | | | 7 | | SS | |
| 7 | | | | | 8 | | SS | 45 |
| 25 | | | | | 9 | | SS | 55 |
| 8 | | - becomes darker brown, wetter below 8.4m | | | 10 | | SS | 69 |
| 30 9 | 200.0 / 9.1 | | | | | | | |
| | | SILT<br>- greyish brown<br>- trace clay; wet; fairly stiff | | | 11 | | SS | 85 |
| 10 | 199.5 / 9.6 | End of Borehole | | | | | | |

Borehole Record

S. Bricks — Prepared by

H. Jackson — Checked by

MacLaren

91/9/11

Project: Jocelyn Township Landfill  No.: 53869

Date Drilled: 90/10/5 - 90/10/5  Driller: DBM Drilling

Borehole Location: Approx. 50m north of municipal fill area

Drilling Supervised by: S. Bricks

Drilling Method: 8.26cm I.D hollow stem augers

Piezometer Details

Type of Pipe: 5.1cm dia. sch. 40 Triloc PVC

Type of Screen: 5.1cm dia. sch. 40 Triloc PVC, hand slotted

Borehole No.: BH-1A

Piezometers:

Sheet 1 of 1

SS Split Spoon Sample
WA Wash Sample
AU Auger Sample
CN Continuous Sample
SH Shelby Tube Sample
RX Rock Core
GR Grab Sample
Piezometer Screen (water level elev. m, Y/M/D)

| Scale (ft.) (m) | Elev. (m GSD) / Depth (m) | Geological Log — Description | Strat. plot | Piezometer Details | Sample No. | Plot | Sample Type | Blows /0.3m |
|---|---|---|---|---|---|---|---|---|
| | | Ground Surface Elevation: 208.8m | | | | | | |
| | 208.3 / 0.5 | Topsoil | | Cement | | | | |
| 5 — 1 | | SANDY SILT TILL<br>- red-brown to brown<br>- moist to very moist<br>- with some pebbles, gravel<br>- fairly cohesive<br>- a number of boulders encountered during drilling/sampling<br>- becomes siltier with depth | | Backfill<br>Holeplug | | | | |
| 10 — 3 | | - becomes slightly sandier @ 3.05m | | Silica Sand | | | | |
| | 205.2 / 3.6 | | | | | | | |
| 15 — 5 | 204.3 / 4.4 | SILT TILL<br>- clayey, becoming sandier with depth<br>- red-brown to brown<br>- fairly hard, dense<br>- damp to moist; massive<br>- small sand layers (0.3cm thick) @ 4.1m and 4.2m | | | | | | |
| 20 — 6 | | End of Borehole | | | | | | |
| 25 — 8 | | | | | | | | |
| 30 — 9 | | | | | | | | |
| — 10 | | | | | | | | |

Borehole Record

S. Bricks — Prepared by

H. Jackson — Checked by

MacLaren

91/9/11

Project: Jocelyn Township Landfill  No.: 53869

Date Drilled: 90/10/4 - 90/10/4  Driller: DBM Drilling

Borehole Location: Approx 30m southeast of municipal fill area

Drilling Supervised by: S. Bricks

Drilling Method: 8.26cm I.D hollow stem augers

Piezometer Details

Type of Pipe: 5.1cm dia. sch. 40 Triloc PVC

Type of Screen: 5.1cm dia. sch. 40 Triloc PVC, #10 slot

Borehole No.: BH-2

Piezometers:

Sheet 1 of 1

SS Split Spoon Sample
WA Wash Sample
AU Auger Sample
CN Continuous Sample
SH Shelby Tube Sample
RX Rock Core
GR Grab Sample
Piezometer Screen (Water level elev. m, Y/M/D)

| Scale (ft.) | (m) | Elev. (m GSD) / Depth (m) | Geological Log — Description | Strat. Plot | Piezometer Details | Sample No. | Plot | Sample Type | Blows /0.3m |
|---|---|---|---|---|---|---|---|---|---|
| | | | Ground Surface Elevation: 207.3m | | | | | | |
| | | 206.8 / 0.5 | Topsoil | | Cement Holeplug | | | | |
| | 1 | | SILT-CLAY<br>- reddish brown to grey mottled<br>- finely (0.3cm thick) layered<br>- trace to some sand<br>- fairly stiff; damp to moist | | | 1 | | SS | 19 |
| 5 | | 205.8 / 1.5 | | | | | | | |
| | 2 | 205.2 / 2.1 | FINE SANDY SILT to SILT<br>- brown-grey<br>- moist to very moist<br>- trace pebbles | | | 2 | | SS | 45 |
| | | | | | | 3 | | SS | 85 |
| 10 | 3 | | interbedded SILT, CLAY, and SILT TILL<br>- red-grey-brown mottled<br>- damp to dry<br>- stiff to very stiff<br>- each layer is approx. 0.5cm thick<br>- becomes siltier, dryer with depth | | Backfill | | | | |
| | 4 | 203.7 / 3.7 | | | | 4 | | SS | 85 |
| | | | | | | 5 | | SS | >100 |
| 15 | | 202.6 / 4.7 | SILT and FINE SAND<br>- grey and brown<br>- interbedded<br>- with a few 'blebs' of clay<br>- dry to damp<br>- fairly dense | | | 6 | | SS | >200 |
| | 5 | | | | | | | | |
| | | | | | Holeplug | 7 | | SS | >200 |
| 20 | 6 | | SAND<br>- brown<br>- medium grained<br>- well sorted, with a little silt<br>- damp, becoming wet below approx. 7.0m<br>- becomes slightly coarser with depth<br>- massive | | | 8 | | SS | >200 |
| | 7 | | | | | | | | |
| | | | | | | 9 | | SS | >150 |
| 25 | | | | | Natural Pack | | | | |
| | 8 | | | | | | | | |
| | | | | | | 10 | | SS | |
| 30 | 9 | 198.3 / 9.0 | | | | | | | |
| | 10 | | End of Borehole | | | | | | |

Borehole Record

S. Bricks — Prepared by

H. Jackson — Checked by

MacLaren

91/9/11

Project: Jocelyn Township Landfill  No.: 53869

Date Drilled: 90/10/4 - 90/10/4  Driller: DBM Drilling

Borehole Location: Approx. 150m southeast of municipal fill area

Drilling Supervised by: S. Bricks

Drilling Method: 8.26cm I.D hollow stem augers

Piezometer Details

Type of Pipe: 5.1cm dia. sch. 40 Triloc PVC

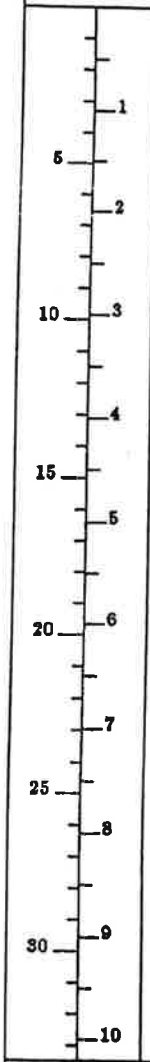
Type of Screen: 5.1cm dia. sch. 40 Triloc PVC, #10 slot

Borehole No.: BH-3

Piezometers:

Sheet 1 of 1

SS Split Spoon Sample
WA Wash Sample
AU Auger Sample
CN Continuous Sample
SH Shelby Tube Sample
RX Rock Core
GR Grab Sample
Piezometer Screen (water level elev. m, Y/M/D)




| Elev. (m GSD) / Depth (m) | Geological Log — Description | Strat. Plot | Piezometer Details | Sample No. | Plot | Sample Type | Blows /0.3m |
|---|---|---|---|---|---|---|---|
| | Ground Surface Elevation: 205.9m | | | | | | |
| 205.4 / 0.5 | Topsoil | | Cement | | | | |
| | SILTY SAND TILL<br>- red-brown to brown<br>- with pebbles and gravel, odd boulders<br>- trace organics above 2.3m<br>- massive<br>- moist<br>- becomes slightly sandier, moister with depth | | Holeplug | 1 | | SS | 45 |
| | | | | 2 | | SS | 40 |
| | | | | 3 | | SS | 65 |
| | - interbedded till, silt-clay blebs and sand pockets from 3.2 to 3.5m | | | 4 | | SS | >100 |
| 202.4 / 3.5 | SILT TILL to SILT-SAND TILL<br>- red-brown to grey-brown<br>- with varying amounts of clay and sand<br>- damp<br>- crumbly texture<br>- fairly dense and hard<br>- massive<br>- becomes silt-sand till below 4.6m | | Natural Pack and Cave | 5 | | SS | 60 |
| | | | | 6 | | SS | 40 |
| 200.7 / 5.2 | SAND<br>- brown<br>- fine to medium grained<br>- trace to some silt<br>- very moist, becoming wet below 5.9m | | | 7 | | SS | 120 |
| | | | | 8 | | SS | 40 |
| 199.2 / 6.7 | End of Borehole | | | | | | |

Borehole Record

S. Bricks — Prepared by

H. Jackson — Checked by

MacLaren

91/9/11

Project: Jocelyn Township Landfill No.: 53869

Date Drilled: 90/10/5 - 90/10/5 Driller: DBM Drilling

Borehole Location: Approx. 140m south of municipal fill area

Drilling Supervised by: S. Bricks

Drilling Method: 8.26cm I.D hollow stem augers

Piezometer Details

Type of Pipe: 5.1cm dia. sch. 40 Triloc PVC

Type of Screen: 5.1cm dia. sch. 40 Triloc PVC, #10 slot

Borehole No.: BH-4

Piezometers:

Sheet 1 of 1

SS Split Spoon Sample
WA Wash Sample
AU Auger Sample
CN Continuous Sample
SH Shelby Tube Sample
RX Rock Core
GR Grab Sample
Piezometer Screen (water level elev. m, Y/M/D)

| Scale (ft.) (m) | Elev. (m GSD) / Depth (m) | Geological Log — Description | Strat. Plot | Piezometer Details | Sample No. | Plot | Sample Type | Blows /0.3m |
|---|---|---|---|---|---|---|---|---|
| | | Ground Surface Elevation: 205.1m | | | | | | |
| | 204.6 / 0.5 | Topsoil | | Cement | | | | |
| 5 1 | | SILTY SAND TILL to SANDY SILT TILL<br>- red-brown to brown to dark brown<br>- moist to wet<br>- some pebbles<br>- fairly dense<br>- sand till from 1.5 to 1.6m | | | 1 | | SS | >100 |
| | | | | | 2 | | SS | >100 |
| | | | | | 3 | | SS | |
| 10 3 | | - silt till from 3.1 to 3.3m | | | 4 | | SS | >100 |
| | | - boulder encountered @ 3.4m | | Backfill | | | | |
| 4 | | | | | | | | |
| 15 5 | | - sandy silt till from 4.3 to 5.2m | | | 5<br>6 | | SS | 80 |
| | 199.9 / 5.2 | | | | | | | |
| | | SANDY SILT TILL<br>- appears 'washed' from 5.2 to 5.8m<br>- light brown to brown to dark brown<br>- soft to fairly dense<br>- with pebbles and gravel<br>- massive | | | 7 | | SS | 85 |
| 20 6 | | | | Holeplug | | | | |
| 7 | | - 2.5cm thick sand layer @ 7.0m | | | 8 | | SS | 95 |
| 25 8 | | - darker, dryer less dense below 7.6m | | Silica Sand | 9 | | SS | >100 |
| | | - becomes siltier below 8.2m | | | | | | |
| | 196.6 / 8.5 | End of Borehole | | | 10 | | SS | |
| 30 9 | | | | | | | | |
| 10 | | | | | | | | |

Borehole Record

S. Bricks — Prepared by

H. Jackson — Checked by

MacLaren

91/9/11

Project: Jocelyn Township Landfill No.: 53869

Date Drilled: 90/10/3 - 90/10/3 Driller: DBM Drilling

Borehole Location: Approx. 140m south of municipal fill area

Drilling Supervised by: S. Bricks

Drilling Method: 8.26cm I.D hollow stem augers

Piezometer Details

Type of Pipe: 5.1cm dia. sch. 40 Triloc PVC

Type of Screen: 5.1cm dia. sch. 40 Triloc PVC, #10 slot

Borehole No.: BH-4A

Piezometers:

Sheet 1 of 1

SS Split Spoon Sample
WA Wash Sample
AU Auger Sample
CN Continuous Sample
SH Shelby Tube Sample
RX Rock Core
GR Grab Sample
Piezometer Screen (water level elev. m, Y/M/D)

| Scale (ft.) (m) | Elev. (m GSD) / Depth (m) | Geological Log — Description | Strat. Plot | Piezometer Details | Sample No. | Plot | Sample Type | Blows /0.3m |
|---|---|---|---|---|---|---|---|---|
| | | Ground Surface Elevation: 205.1m | | | | | | |
| | 204.6 / 0.5 | Topsoil | | Cement | | | | |
| 5 1 | | SILTY SAND TILL to SANDY SILT TILL to SILT TILL<br>- red-brown to brown to dark brown<br>- moist to wet<br>- some pebbles<br>- fairly dense<br>- sand till from 1.5 to 1.6m | | Holeplug | | | | |
| 10 3 | | - silt till from 3.1 to 3.3m<br>- boulder encountered @ 3.4m | | Silica Sand | | | | |
| 15 5 | 200.3 / 4.8 | - sandy silt till from 4.3 to 5.2m | | Holeplug Backfill | | | | |
| | | End of Borehole | | | | | | |
| 20 6 | | | | | | | | |
| 25 7 8 | | | | | | | | |
| 30 9 10 | | | | | | | | |

Borehole Record

S. Bricks
Prepared by

H. Jackson
Checked by

MacLaren

91/9/11

# Log of Borehole: BH7-21

**Project #:** 204232.007 **Logged By:** MA

**Project:** Monitoring Well Installation Program

**Client:** The Corporation of the Township of Jocelyn

**Location:** Jocelyn Waste Disposal Site, Township of Jocelyn, ON

**Drill Date:** February 1, 2021 **Project Manager:** JR

| Depth (m) | Description | Elevation (m) |
|---|---|---|
| 0 | Ground Surface | 0.00 |
| | ***Glacial Till*** Reddish brown silty sand, trace clay, trace gravel, occaisional cobbles, dry | |
| | | -2.13 |
| | Boulder | |
| | | -3.05 |
| | Auger Refusal on Boulders - Start Tri-cone | |
| | | -4.88 |
| | Moist, Tri-cone Refusal on Boulders - Start Coring | -5.18 |
| | Brown sand trace silt, wet | |
| | | -5.64 |
| | End of Borehole | |

Monitoring Well Details: Riser, Bentonite, Silica Sand, Screen

SAMPLE: Sample Type, Sampler #, Recovery (%), SPT N-values

SPT N-values: 20, 40, 60

Shear Strength kPa: 50, 100, 150, 200

Lab Analysis, Moisture (%), Soil Vapour Concentration

**Contractor:** Marathon Underground

**Drilling Method:** Hollow Stem Auger/Tri-core/Diamond Bit Core

**Well Casing Size:** 5.08 cm

**Grade Elevation:** 0

**Top of Casing Elevation:** 0

**Sheet:** 1 of 1

# APPENDIX V
## Summary Tables

**TABLE 1**
**Groundwater Monitoring Location Data**
**Jocelyn Waste Disposal Site**
**Township of Jocelyn, Ontario**

| *Well Number* | *Date (dd/mmm/yy)* | *Ground Surface Elevation (mREL)** | *TOC Elevation (mREL)* | *Height of TOC from Ground Surface (m)* | *NAPL Level Measurement from TOC (m)* | *Water Level Measurement from TOC (m)* | *Total Well Depth from TOC (m)* | *Depth to Groundwater (mbgs)* | *NAPL Thickness (m)* | *Calculated Water Level Elevation (mREL)* | *Methane Detection Reading (ppm)* | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BH1 | 15/06/2016 | 208.896 | 209.915 | 1.019 | 0.000 | 4.455 | 9.885 | 3.436 | 0 | 205.460 | 0 | Pink, cloudy. |
| | 12/10/2016 | 208.896 | 209.915 | 1.019 | 0.000 | 5.170 | 9.930 | 4.151 | 0 | 204.745 | 0 | Waste in water. |
| | 05/12/2017 | 208.896 | 209.915 | 1.019 | 0.000 | 3.930 | 9.870 | 2.911 | 0 | 205.985 | 0 | Brown, cloudy, odour. |
| | 05/10/2017 | 208.896 | 209.915 | 1.019 | 0.000 | 4.640 | 9.910 | 3.621 | 0 | 205.275 | 0 | Cloudy. |
| | 10/10/2018 | 208.896 | 209.915 | 1.019 | 0.000 | 5.200 | - | 4.181 | 0 | 204.715 | 0 | Clear, slight odour. |
| | 10/10/2018 | 208.896 | 209.915 | 1.019 | 0.000 | 5.200 | - | 4.181 | 0 | 204.715 | 0 | Clear, slight odour. |
| | 07/05/2019 | 208.896 | 209.915 | 1.019 | 0.000 | 3.730 | 9.950 | 2.711 | 0 | 206.185 | 0 | Translucent, no odour. |
| | 01/10/2019 | 208.896 | 209.915 | 1.019 | 0.000 | 4.445 | 9.855 | 3.426 | 0 | 205.470 | 0 | Cloudy, strong odour, good recovery. |
| | 05/05/2020 | 208.896 | 209.915 | 1.019 | 0.000 | 3.700 | 9.950 | 2.681 | 0 | 206.215 | 0 | Cloudy, sulpher odour, good recovery. |
| | 26/10/2020 | 208.896 | 209.915 | 1.019 | 0.000 | 4.000 | 9.910 | 2.981 | 0 | 205.915 | 0 | Yellow, strong odour, good flow. |
| | 05/05/2021 | 208.896 | 209.915 | 1.019 | 0.000 | 3.820 | 9.820 | 2.801 | 0 | 206.095 | 0 | Cloudy, no odour, good recharge. |
| | 15/10/2021 | 208.896 | 209.915 | 1.019 | 0.000 | 5.300 | 9.770 | 4.281 | 0 | 204.615 | 0 | Brown, no odour. |
| | 04/05/2022 | 208.896 | 209.915 | 0.955 | 0.000 | 3.810 | 9.780 | 2.855 | 0 | 206.041 | 0 | grey, no odour |
| | 17/10/2022 | 208.896 | 209.915 | 0.980 | 0.000 | 5.360 | 9.760 | 4.380 | 0 | 204.516 | 0 | Brown, no odour, silty. |
| | 19/05/2023 | 208.896 | 209.915 | 0.980 | 0.000 | 3.920 | 9.760 | 2.940 | 0 | 205.956 | 0 | Slight sulphur like odour, no color/turbidity |
| | 17/10/2023 | 208.896 | 209.915 | 0.980 | 0.000 | 5.180 | 9.890 | 4.200 | 0 | 204.696 | 0 | No odour, brown, silty |
| BH1A | 15/06/2016 | 206.753 | 209.778 | 3.025 | 0.000 | 5.380 | 5.380 | 2.355 | 0 | 204.398 | 0 | Clear, odourless. |
| | 12/10/2016 | 206.753 | 209.778 | 3.025 | 0.000 | 2.545 | 5.390 | 0.480 | 0 | 206.273 | 0 | No Odour, slightly cloudy. |
| | 05/12/2017 | 206.753 | 209.778 | 3.025 | 0.000 | 1.650 | 5.380 | 1.375 | 0 | 205.378 | 0 | Cloudy, odour. |
| | 05/10/2017 | 206.753 | 209.778 | 3.025 | 0.000 | 2.380 | 5.380 | 0.645 | 0 | 206.108 | 0 | Clear. |
| | 03/05/2018 | 206.753 | 209.778 | 3.025 | 0.000 | 1.420 | 5.350 | 1.605 | 0 | 205.148 | 0 | Clear with silt, no odour. |
| | 10/10/2018 | 206.753 | 209.778 | 3.025 | 0.000 | 2.300 | 5.350 | 0.725 | 0 | 206.028 | 0 | Clear, slight odour. |
| | 07/05/2019 | 206.753 | 209.778 | 3.025 | 0.000 | 1.580 | 5.370 | 1.445 | 0 | 205.308 | 0 | Clear, no odour. |
| | 01/10/2019 | 206.753 | 209.778 | 3.025 | 0.000 | 1.850 | 5.340 | 1.175 | 0 | 205.578 | 0 | Clear, no odour. |
| | 05/05/2020 | 206.753 | 209.778 | 3.025 | 0.000 | 1.515 | 5.335 | 1.510 | 0 | 205.243 | 0 | Clear, no odour, good recovery. |
| | 26/10/2020 | 206.753 | 209.778 | 3.025 | 0.000 | 1.590 | 5.430 | 1.435 | 0 | 205.318 | 0 | Clear, no odour, good recovery. |
| | 05/05/2021 | 206.753 | 209.778 | 3.025 | 0.000 | 1.570 | 5.340 | 1.455 | 0 | 205.298 | 0 | Clear, no odours, moderate recharge. |
| | 15/10/2021 | 206.753 | 209.778 | 3.025 | 0.000 | 2.600 | 5.350 | 0.425 | 0 | 206.328 | 0 | Clear, no odour. |
| | 04/05/2022 | 206.753 | 207.628 | 0.875 | 0.000 | 1.550 | 5.360 | 0.675 | 0 | 206.078 | 0 | Clear, no odour. |
| | 17/10/2022 | 206.753 | 207.633 | 0.880 | 0.000 | 3.710 | 5.350 | 2.830 | 0 | 203.923 | 0 | Clear, no odour. |
| | 19/05/2023 | 206.753 | 207.633 | 0.880 | 0.000 | 1.820 | 5.410 | 0.940 | 0 | 205.813 | 0 | Clear, no odour. |
| | 17/10/2023 | 206.753 | 207.633 | 0.880 | 0.000 | 3.950 | 5.400 | 3.070 | 0 | 203.683 | 0 | Clear, no odour. |
| BH2 | 15/06/2016 | 207.315 | 208.420 | 1.105 | 0.000 | 6.515 | 10.020 | 5.410 | 0 | 201.905 | 0 | Brown, cloudy. |
| | 12/10/2016 | 207.315 | 208.420 | 1.105 | 0.000 | 7.210 | 10.020 | 6.105 | 0 | 201.210 | 0 | Odour, cloudy. |
| | 05/12/2017 | 207.315 | 208.420 | 1.105 | 0.000 | 6.305 | 9.930 | 5.200 | 0 | 202.115 | 0 | Grey, cloudy, strong odour. |
| | 05/10/2017 | 207.315 | 208.420 | 1.105 | 0.000 | 6.690 | 10.000 | 5.585 | 0 | 201.730 | 0 | Cloudy, odour. (DUP) |
| | 03/05/2018 | 207.315 | 208.420 | 1.105 | 0.000 | 6.460 | 9.980 | 5.355 | 0 | 201.960 | 0 | Clear, brown, slight odour. |
| | 10/10/2018 | 207.315 | 208.420 | 1.105 | 0.000 | 6.070 | 9.980 | 4.965 | 0 | 202.350 | 0 | No odour, clear. |
| | 07/05/2019 | 207.315 | 208.420 | 1.105 | 0.000 | 5.860 | 9.960 | 4.755 | 0 | 202.560 | 0 | Light brown, no odour. |
| | 01/10/2019 | 207.315 | 208.420 | 1.105 | 0.000 | 6.691 | 10.202 | 5.586 | 0 | 201.729 | 0 | Brown, strong odour. |
| | 05/05/2020 | 207.315 | 208.420 | 1.105 | 0.000 | 5.930 | 10.050 | 4.825 | 0 | 202.490 | 0 | Yellow, cloudy, faint odour, good recovery. |
| | 26/10/2020 | 207.315 | 208.420 | 1.105 | 0.000 | 6.750 | 8.260 | 5.645 | 0 | 201.670 | 0 | Clear, no odour, good recovery. |
| | 05/05/2021 | 207.315 | 208.420 | 1.105 | 0.000 | 6.610 | 9.670 | 5.505 | 0 | 201.810 | 0 | Clear, no odour, good recovery. |
| | 15/10/2021 | 207.315 | 208.420 | 1.105 | 0.000 | 6.930 | 8.880 | 5.825 | 0 | 201.490 | 0 | Clear, no odour. |
| | 04/05/2022 | 207.315 | 208.420 | 0.970 | 0.000 | 6.500 | 6.730 | 5.530 | 0 | 201.785 | 0 | clear, no odour |
| | 17/10/2022 | 207.315 | 208.420 | 1.040 | 0.000 | 7.300 | 7.820 | 6.260 | 0 | 201.055 | 0 | Brown, sulphur odour. (DUP collected) |
| | 19/05/2023 | 207.315 | 208.420 | 1.050 | 0.000 | 6.300 | 7.520 | 5.250 | 0 | 202.065 | 0 | Sulphur like odour, clear, no turbidity |
| | 17/10/2023 | 207.315 | 208.420 | 1.040 | 0.000 | 7.380 | 9.900 | 6.340 | 0 | 200.975 | 0 | No comments |
| BH3-10 | 15/06/2016 | 206.560 | 207.369 | 0.809 | 0.000 | 2.300 | 4.540 | 1.491 | 0 | 205.069 | 0 | Light brown, cloudy. |
| | 12/10/2016 | 206.560 | 207.369 | 0.809 | 0.000 | 3.060 | 4.580 | 2.251 | 0 | 204.309 | 0 | Brown, cloudy, no odour. |
| | 05/12/2017 | 206.560 | 207.369 | 0.809 | 0.000 | 1.720 | 4.515 | 0.911 | 0 | 205.649 | 0 | Brown, cloudy, odourless. |
| | 05/10/2017 | 206.560 | 207.369 | 0.809 | 0.000 | 2.590 | 3.200 | 1.781 | 0 | 204.779 | 0 | Cloudy |
| | 03/05/2018 | 206.560 | 207.369 | 0.809 | 0.000 | 1.750 | 4.520 | 0.941 | 0 | 205.619 | 0 | Brownish color, no odour. |
| | 10/10/2018 | 206.560 | 207.369 | 0.809 | 0.000 | 1.330 | 4.520 | 0.521 | 0 | 206.039 | 0 | Rusty colour, no odour. |
| | 07/05/2019 | 206.560 | 207.369 | 0.809 | 0.000 | 1.590 | 4.520 | 0.781 | 0 | 205.779 | 0 | Light brown, no odour. |
| | 01/10/2019 | 206.560 | 207.369 | 0.809 | 0.000 | 1.290 | 6.600 | 0.481 | 0 | 206.079 | 0 | Light brown, strong odour. |
| | 05/05/2020 | 206.560 | 207.369 | 0.809 | 0.000 | 1.540 | 4.520 | 0.731 | 0 | 205.829 | 0 | Brown, sandy, no odour, good recovery. |
| | 26/10/2020 | 206.560 | 207.369 | 0.809 | 0.000 | 1.440 | 4.830 | 0.631 | 0 | 205.929 | 0 | Clear, no odour, good recovery. |
| | 05/05/2021 | 206.560 | 207.369 | 0.809 | 0.000 | 1.370 | 4.520 | 0.561 | 0 | 205.999 | 0 | Brown, no odour, good recovery. |
| | 15/10/2021 | 206.560 | 207.369 | 0.809 | 0.000 | 2.960 | 4.340 | 2.151 | 0 | 204.409 | 0 | Brown, silty, no odour. |
| | 04/05/2022 | 206.560 | 207.369 | 0.730 | 0.000 | 1.430 | 4.460 | 0.700 | 0 | 205.860 | 0 | Brown, silty, no odour. |
| | 17/10/2022 | 206.560 | 207.369 | 0.790 | 0.000 | 4.460 | 4.600 | 3.670 | 0 | 202.890 | 0 | Purged dry x3. No Sample. |
| | 19/05/2023 | 206.560 | 207.369 | 0.880 | 0.000 | 1.290 | 4.320 | 0.410 | 0 | 206.150 | 0 | Brown, silty, no odour. |
| | 17/10/2023 | 206.560 | 207.369 | 0.770 | 0.000 | 4.550 | 4.590 | 3.780 | 0 | 202.780 | 0 | Dry. No Sample. |
| BH4 | 15/06/2016 | 205.066 | 206.119 | 1.053 | 0.000 | 4.695 | 9.460 | 3.642 | 0 | 201.424 | 0 | Slightly cloudy. |
| | 12/10/2016 | 205.066 | 206.119 | 1.053 | 0.000 | 5.075 | 9.445 | 4.022 | 0 | 201.044 | 0 | Clear, Odourless. |
| | 05/12/2017 | 205.066 | 206.119 | 1.053 | 0.000 | 4.525 | 9.440 | 3.472 | 0 | 201.594 | 0 | Grey, cloudy, odourless. |
| | 05/10/2017 | 205.066 | 206.119 | 1.053 | 0.000 | 4.780 | 9.550 | 3.727 | 0 | 201.339 | 0 | Brownish, slight odour. |
| | 03/05/2018 | 205.066 | 206.119 | 1.053 | 0.000 | 4.500 | 9.530 | 3.447 | 0 | 201.619 | 0 | Cloudy, no odour. |
| | 10/10/2018 | 205.066 | 206.119 | 1.053 | 0.000 | 5.040 | 9.530 | 3.987 | 0 | 201.079 | 0 | Clear, no odour. |
| | 07/05/2019 | 205.066 | 206.119 | 1.053 | 0.000 | 4.290 | 9.600 | 3.237 | 0 | 201.829 | 0 | Translucent, no odour. |
| | 01/10/2019 | 205.066 | 206.119 | 1.053 | 0.000 | 4.505 | 9.510 | 3.452 | 0 | 201.614 | 0 | Cloudy, faint odour, good recovery. |
| | 05/05/2020 | 205.066 | 206.119 | 1.053 | 0.000 | 4.320 | 9.560 | 3.267 | 0 | 201.799 | 0 | Slightly cloudy, no odour, good recovery. |
| | 26/10/2020 | 205.066 | 206.119 | 1.053 | 0.000 | 4.600 | 9.640 | 3.547 | 0 | 201.519 | 0 | Clear, no odour, good recovery. |
| | 05/05/2021 | 205.066 | 206.119 | 1.053 | 0.000 | 4.590 | 9.470 | 3.537 | 0 | 201.529 | 0 | Cloudy, no odour, purged dry three times. |
| | 15/10/2021 | 205.066 | 206.119 | 1.053 | 0.000 | 4.960 | 9.440 | 3.907 | 0 | 201.159 | 0 | Brown, silty, no odour. |
| | 04/05/2022 | 205.066 | 206.119 | 0.910 | 0.000 | 4.620 | 9.580 | 3.710 | 0 | 201.356 | 0 | Brown, silty, no odour. |
| | 17/10/2022 | 205.066 | 206.119 | 0.910 | 0.000 | 5.380 | 9.560 | 4.470 | 0 | 200.596 | 0 | Brown, no odour, silty. |
| | 19/05/2023 | 205.066 | 206.119 | 0.920 | 0.000 | 4.610 | 9.540 | 3.690 | 0 | 201.376 | 0 | No colour, no odour. silty |
| | 17/10/2023 | 205.066 | 206.119 | 0.900 | 0.000 | 5.510 | 9.580 | 4.610 | 0 | 200.456 | 0 | No colour, no odour |
| BH4A | 15/06/2016 | 205.075 | 206.212 | 1.137 | 0.000 | 1.520 | 4.610 | 0.383 | 0 | 204.692 | 0 | Slightly cloudy. |
| | 12/10/2016 | 205.075 | 206.212 | 1.137 | 0.000 | 1.410 | 4.580 | 0.273 | 0 | 204.802 | 0 | Clear, odourless. |
| | 05/12/2017 | 205.075 | 206.212 | 1.137 | 0.000 | 1.280 | 4.580 | 0.143 | 0 | 204.932 | 0 | Grey. cloudy, odourless. |
| | 05/10/2017 | 205.075 | 206.212 | 1.137 | 0.000 | 1.540 | 4.640 | 0.403 | 0 | 204.672 | 0 | Clear, slight odour. |
| | 03/05/2018 | 205.075 | 206.212 | 1.137 | 0.000 | 1.300 | 4.680 | 0.163 | 0 | 204.912 | 0 | Clear, no odour. |
| | 10/10/2018 | 205.075 | 206.212 | 1.137 | 0.000 | 1.250 | 4.680 | 0.113 | 0 | 204.962 | 0 | Clear, no odour. |
| | 07/05/2019 | 205.075 | 206.212 | 1.137 | 0.000 | 1.210 | 4.990 | 0.073 | 0 | 205.002 | 0 | Translucent, no odour. |
| | 01/10/2019 | 205.075 | 206.212 | 1.137 | 0.000 | 1.220 | 4.680 | 0.083 | 0 | 204.992 | 0 | Translucent, strong odour. |
| | 05/05/2020 | 205.075 | 206.212 | 1.137 | 0.000 | 1.250 | 4.690 | 0.113 | 0 | 204.962 | 0 | Slightly cloudy, no odour, good recovery. |
| | 26/10/2020 | 205.075 | 206.212 | 1.137 | 0.000 | 1.210 | 4.700 | 0.073 | 0 | 205.002 | 0 | Clear, no odour, good recovery. |
| | 05/05/2021 | 205.075 | 206.212 | 1.137 | 0.000 | 1.190 | 4.610 | 0.053 | 0 | 205.022 | 0 | Clear, no odour, purged dry three times. |
| | 15/10/2021 | 205.075 | 206.212 | 1.137 | 0.000 | 1.370 | 4.650 | 0.233 | 0 | 204.842 | 0 | Clear, no odour. |
| | 04/05/2022 | 205.075 | 206.212 | 0.990 | 0.000 | 1.205 | 4.619 | 0.215 | 0 | 204.860 | 0 | Clear, no odour. |
| | 17/10/2022 | 205.075 | 206.212 | 1.000 | 0.000 | 2.190 | 4.640 | 1.190 | 0 | 203.885 | 0 | Grey, no odour, silty. |
| | 19/05/2023 | 205.075 | 206.212 | 0.990 | 0.000 | 1.170 | 4.650 | 0.180 | 0 | 204.895 | 0 | Clear, no odour. |
| | 17/10/2023 | 205.075 | 206.212 | 0.985 | 0.000 | 2.455 | 4.650 | 1.470 | 0 | 203.605 | 0 | Clear, no odour. |
| BH5 | 15/06/2016 | 205.483 | 206.301 | 0.818 | 0.000 | 3.985 | 6.650 | 3.167 | 0 | 202.316 | 0 | Orange, cloudy. |
| | 12/10/2016 | 205.483 | 206.301 | 0.818 | 0.000 | 4.640 | 6.610 | 3.822 | 0 | 201.661 | 0 | Yellow, cloudy, no odour. |
| | 05/12/2017 | 205.483 | 206.301 | 0.818 | 0.000 | 3.740 | 6.630 | 2.922 | 0 | 202.561 | 0 | Brown, cloudy, odourless. |
| | 05/10/2017 | 205.483 | 206.301 | 0.818 | 0.000 | 4.140 | 6.600 | 3.322 | 0 | 202.161 | 0 | Cloudy, no odour. |
| | 03/05/2018 | 205.483 | 206.301 | 0.818 | 0.000 | 3.740 | 6.660 | 2.922 | 0 | 202.561 | 0 | Cloudy, no odour. |
| | 10/10/2018 | 205.483 | 206.301 | 0.818 | 0.000 | 4.450 | 6.660 | 3.632 | 0 | 201.851 | 0 | Brownish, no odour. |
| | 07/05/2019 | 205.483 | 206.301 | 0.818 | 0.000 | 3.320 | 6.630 | 2.502 | 0 | 202.981 | 0 | Clear, no odour. |
| | 01/10/2019 | 205.483 | 206.301 | 0.818 | 0.000 | 4.090 | 6.550 | 3.272 | 0 | 202.211 | 0 | Clear, no odour. |
| | 05/05/2020 | 205.483 | 206.301 | 0.818 | 0.000 | 3.310 | 6.390 | 2.492 | 0 | 202.991 | 0 | Slightly cloudy, no odour, good recovery. |
| | 26/10/2020 | 205.483 | 206.301 | 0.818 | 0.000 | 4.100 | 6.850 | 3.282 | 0 | 202.201 | 0 | Clear, no odour, good recovery. |
| | 05/05/2021 | 205.483 | 206.301 | 0.818 | 0.000 | 3.960 | 6.650 | 3.142 | 0 | 202.341 | 0 | Clear, no odour, good recovery. |
| | 15/10/2021 | 205.483 | 206.301 | 0.818 | 0.000 | 4.550 | 6.520 | 3.732 | 0 | 201.751 | 0 | Clear, no odour. |
| | 04/05/2022 | 205.483 | 206.301 | 0.770 | 0.000 | 3.800 | 6.550 | 3.030 | 0 | 202.453 | 0 | Clear, no odour. |
| | 17/10/2022 | 205.483 | 206.301 | 0.770 | 0.000 | 4.610 | 6.620 | 3.840 | 0 | 201.643 | 0 | Brown, no odour, clear. |
| | 19/05/2023 | 205.483 | 206.301 | 0.760 | 0.000 | 3.710 | 6.590 | 2.950 | 0 | 202.533 | 0 | Clear, no odour. |
| | 17/10/2023 | 205.483 | 206.301 | 0.770 | 0.000 | 4.800 | 6.670 | 4.030 | 0 | 201.453 | 0 | Clear, no odour. |
| BH5A | 15/06/2016 | 205.468 | 206.252 | 0.784 | 0.000 | 1.410 | 2.935 | 0.626 | 0 | 204.842 | 0 | Orange, cloudy, limited sample. |
| | 12/10/2016 | 205.468 | 206.252 | 0.784 | 0.000 | 1.660 | 2.930 | 0.876 | 0 | 204.592 | 0 | Yellow, cloudy, no odour. |
| | 05/12/2017 | 205.468 | 206.252 | 0.784 | 0.000 | 1.120 | 2.950 | 0.336 | 0 | 205.132 | 0 | Brown, cloudy, odourless. |
| | 05/10/2017 | 205.468 | 206.252 | 0.784 | 0.000 | 1.340 | 2.880 | 0.556 | 0 | 204.912 | 0 | Cloudy, no odour. |
| | 03/05/2018 | 205.468 | 206.252 | 0.784 | 0.000 | 0.830 | 1.890 | 0.046 | 0 | 205.422 | 0 | Cloudy, no odour. |
| | 10/10/2018 | 205.468 | 206.252 | 0.784 | 0.000 | 0.870 | 1.890 | 0.086 | 0 | 205.382 | 0 | Brown, no odour. |
| | 07/05/2019 | 205.468 | 206.252 | 0.784 | 0.000 | 0.930 | 2.910 | 0.146 | 0 | 205.322 | 0 | Clear, no odour. |
| | 01/10/2019 | 205.468 | 206.252 | 0.784 | 0.000 | 0.850 | 2.900 | 0.066 | 0 | 205.402 | 0 | Brown, strong odour. |
| | 05/05/2020 | 205.468 | 206.252 | 0.784 | 0.000 | 0.870 | 2.970 | 0.086 | 0 | 205.382 | 0 | Brown, cloudy, no odour, good recovery. |
| | 26/10/2020 | 205.468 | 206.252 | 0.784 | 0.000 | 0.890 | 2.960 | 0.106 | 0 | 205.362 | 0 | Clear, no odour, good recovery. |
| | 05/05/2021 | 205.468 | 206.252 | 0.784 | 0.000 | 0.850 | 2.890 | 0.066 | 0 | 205.402 | 0 | - |
| | 15/10/2021 | 205.468 | 206.252 | 0.784 | 0.000 | 1.420 | 2.850 | 0.636 | 0 | 204.832 | 0 | Brown, no odour. |
| | 04/05/2022 | 205.468 | 206.252 | 0.715 | 0.000 | 0.900 | 2.880 | 0.185 | 0 | 205.283 | 0 | silty, no odour. |
| | 17/10/2022 | 205.468 | 206.252 | 0.840 | 0.000 | 2.420 | 2.960 | 1.580 | 0 | 203.888 | 0 | Brown, no odour, silty. Limited Sample. |
| | 19/05/2023 | 205.468 | 206.252 | 0.780 | 0.000 | 1.010 | 2.980 | 0.230 | 0 | 205.238 | 0 | Clear, no odour. |
| | 17/10/2023 | 205.468 | 206.252 | 0.770 | 0.000 | 4.800 | 6.670 | 4.030 | 0 | 201.438 | 0 | Clear, no odour. |
| BH6 | 15/06/2016 | 209.498 | 210.278 | 0.780 | 0.000 | 2.700 | 6.140 | 1.920 | 0 | 207.578 | 0 | Light brown, cloudy. (DUP) |
| | 12/10/2016 | 209.498 | 210.278 | 0.780 | 0.000 | 2.680 | 6.140 | 1.900 | 0 | 207.598 | 0 | Odour, brown and cloudy. |
| | 05/12/2017 | 209.498 | 210.278 | 0.780 | 0.000 | 2.460 | 4.640 | 1.680 | 0 | 207.818 | 0 | Brown, cloudy, strong odour., |
| | 05/10/2017 | 209.498 | 210.278 | 0.780 | 0.000 | 2.780 | 6.170 | 2.000 | 0 | 207.498 | 0 | Cloudy, strong odour. |
| | 03/05/2018 | 209.498 | 210.278 | 0.780 | 0.000 | 2.350 | 6.130 | 1.570 | 0 | 207.928 | 0 | Cloudy, odour. |
| | 10/10/2018 | 209.498 | 210.278 | 0.780 | 0.000 | 2.500 | 6.130 | 1.720 | 0 | 207.778 | 0 | Clear, strong odour. |
| | 07/05/2019 | 209.498 | 210.278 | 0.780 | 0.000 | 2.370 | 6.150 | 1.590 | 0 | 207.908 | 0 | Light brown, slight odour. |
| | 01/10/2019 | 209.498 | 210.278 | 0.780 | 0.000 | 2.310 | 6.101 | 1.530 | 0 | 207.968 | 0 | Brown, strong odour. |
| | 05/05/2020 | 209.498 | 210.278 | 0.780 | 0.000 | 2.350 | 6.160 | 1.570 | 0 | 207.928 | 0 | Cloudy, yellow, sulpher odour, good flow. |
| | 26/10/2020 | 209.498 | 210.278 | 0.780 | 0.000 | 2.650 | 6.030 | 1.870 | 0 | 207.628 | 0 | Brown, strong odour, good recovery. |
| | 05/05/2021 | 209.498 | 210.278 | 0.780 | 0.000 | 2.420 | 6.120 | 1.640 | 0 | 207.858 | 0 | Cloudy, strong odour, good recharge |
| | 15/10/2021 | 209.498 | 210.278 | 0.780 | 0.000 | 2.940 | 6.200 | 2.160 | 0 | 207.338 | 0 | Hydrocarbon odour, grey, silty. |
| | 05/04/2022 | 209.498 | 210.278 | 0.950 | 0.000 | 2.410 | 6.090 | 1.460 | 0 | 208.038 | 0 | Hydrocarbon odour, grey, silty. |
| | 17/10/2022 | 209.498 | 210.278 | 0.970 | 0.000 | 5.140 | 6.290 | 4.170 | 0 | 205.328 | 0 | Brown, sulphur odour, silty. Limited Sample. |
| | 19/05/2023 | 209.498 | 210.278 | 0.910 | 0.000 | 2.510 | 6.200 | 1.600 | 0 | 207.898 | 0 | Brown, sulphur odour, silty. |
| | 17/10/2023 | 209.498 | 210.278 | 0.965 | 0.000 | 4.850 | 6.190 | 3.885 | 0 | 205.613 | 0 | Brown, sulphur odour, silty. |
| BH7-21 | 05/05/2021 | 206.767 | 207.640 | 0.790 | 0.000 | 5.900 | 6.600 | 5.110 | 0 | 201.657 | 0 | Brown, no odour, low recovery |
| | 15/10/2021 | 206.767 | 207.640 | 0.790 | 0.000 | 6.560 | 6.620 | 5.770 | 0 | 200.997 | 0 | Brown, organic turbidity, purged dry three times. |
| | 04/05/2022 | 206.767 | 207.640 | 0.770 | 0.000 | 4.510 | 6.470 | 3.740 | 0 | 203.027 | 0 | Brown, no odour, silty. |
| | 17/10/2022 | 206.767 | 207.640 | 0.820 | 0.000 | - | 6.570 | - | 0 | - | 0 | Dry. No Sample. |
| | 19/05/2023 | 206.767 | 207.640 | | 0.000 | 1.290 | 4.320 | 1.290 | 0 | 205.477 | 0 | Brown, no odour, silty. |
| | 17/10/2023 | 206.767 | 207.640 | | 0.000 | 6.630 | 6.630 | 6.630 | 0 | 200.137 | 0 | Dry. No Sample. |

Notes:
mREL - Indicates Groundwater Elevation (metres) Relative to Site Benchmark
NAPL - Non Aqueous Phase Liquid
ND - Not Detected
mbgs - metres below ground suface
TOC - Top of Casing
NT- Not Tested
*All elevations are measured relative to metres above sea level, established by Kresin Engineering Corporation

**TABLE 2**
**Groundwater Quality Results - BH1 (background deep)**
**Jocelyn Waste Disposal Site**
**Township of Jocelyn, Ontario**

| Parameter | Units | Sample Designation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ODWQS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sample Collection Date (dd/mmm/yy) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | BH1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | *24-Oct-90* | *18-Apr-91* | *31-Oct-05* | *8-May-07* | *9-Jun-10* | *12-Nov-10* | *19-May-11* | *5-Oct-11* | *25-Apr-12* | *25-Apr-12* | *12-Oct-12* | *20-Jun-13* | *3-Oct-13* | *7-May-14* | *8-Oct-14* | *6-May-15* | *13-Oct-15* | *15-Jun-16* | *12-Oct-16* | *Duplicate* | *12-May-17* | *5-Oct-17* | *3-May-18* | *10-Oct-18* | *7-May-19* | *1-Oct-19* | *5-May-20* | *26-Oct-20* | *5-May-21* | *15-Oct-21* | *4-May-22* | *17-Oct-22* | *19-May-23* | *17-Oct-23* | |
| Alkalinity | mg/L $CaCO_3$ | 194.4 | 175.5 | 237 | 288 | 254 | 254 | 239 | 234 | 261 | 227 | 244 | 259 | 229 | 258 | 256.5 | 254 | 250 | 259 | 254 | 255 | 250 | 248 | 258 | 225 | 258 | 278 | 269 | 292 | 268 | 257 | 261 | 193 | 254 | 244 | 30 - 500 |
| Ammonia | mg/L | NT | NT | 0.05 | 0.0782 | 0.09 | 0.023 | <0.01 | 0.029 | 0.044 | 0.026 | 0.069 | 0.073 | 0.062 | 0.061 | 0.076 | 0.058 | <0.01 | <0.02 | 0.05 | 0.05 | <0.02 | 0.03 | <0.02 | <0.02 | <0.02 | <0.020 | 0.013 | 0.014 | < 0.04 | <0.04 | < 0.04 | < 0.04 | <0.04 | < 0.04 | - |
| Arsenic | mg/L | NT | NT | 0.001 | 0.0037 | 0.002 | <0.001 | <0.001 | 0.0013 | 0.0015 | 0.004 | 0.0012 | 0.0012 | 0.0028 | <0.001 | NT | <0.002 | <0.001 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.00095 | 0.0008 | 0.00067 | 0.0008 | 0.001 | - | 0.001 | - | < 0.00001 | - | 0.01 |
| Barium | mg/L | NT | 0.0045 | <0.01 | 0.0196 | 0.018 | 0.0096 | 0.0099 | 0.0221 | 0.0164 | 0.0742 | 0.0086 | 0.0078 | 0.0515 | 0.0083 | 0.0094 | 0.0143 | 0.0067 | 0.01 | 0.012 | 0.012 | 0.01 | 0.008 | 0.01 | 0.008 | 0.00776 | 0.00816 | 0.00871 | 0.00899 | 0.00869 | 0.00744 | 0.00835 | 0.00884 | 0.00776 | 0.00752 | 1 |
| Boron | mg/L | NT | NT | 0.07 | 0.013 | 0.0099 | 0.011 | <0.002 | 0.01 | <0.002 | <0.002 | 0.0241 | 0.029 | <0.002 | <0.002 | 0.0052 | <0.002 | 0.0126 | <0.010 | <0.010 | 0.011 | <0.010 | <0.010 | 0.012 | <0.010 | <0.010 | <0.010 | <0.010 | 0.011 | 0.01 | 0.017 | 0.015 | 0.022 | 0.008 | 0.006 | 5 |
| Cadmium | mg/L | NT | ND | <0.0001 | **0.00508** | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.0004 | <0.0001 | <0.0001 | 0.00028 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.000005 | 0.0000434 | 0.0000082 | 0.000012 | - | - | 0.000003 | - | 0.0 | - | 0.005 |
| Calcium | mg/L | 73.1 | 55.2 | 56.3 | 66 | 133 | 55.2 | 60.5 | 84.1 | 65.4 | 249 | 41.2 | 48.3 | 265 | 67.1 | 53 | 58.6 | 54.4 | 60.1 | 60.8 | 58.1 | 53.9 | 56.4 | 55.7 | 55.1 | 56.5 | 56.7 | 62.3 | 55.9 | 61.5 | 58.8 | 69.4 | 51.7 | 62.0 | 54.9 | - |
| Chloride | mg/L | 73.40 | 39.30 | 4.70 | 2.17 | 2.45 | 2.83 | 3.51 | 2.31 | 3.62 | 3.01 | 3.95 | 5.24 | 3.66 | 4.67 | 4.34 | 6.57 | 38.60 | 3.71 | 3.74 | 3.59 | 3.17 | 2.97 | 2.46 | 3.05 | 2.34 | 3.26 | - | 3.38 | 2.00 | 1.00 | < 1 | < 1 | <1 | 2.00 | 250 |
| Chromium | mg/L | NT | ND | <0.001 | 0.0071 | 0.0056 | <0.001 | 0.0025 | 0.0043 | 0.003 | 0.0288 | <0.001 | 0.0013 | 0.0103 | <0.001 | 0.0015 | 0.0088 | <0.001 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.00010 | 0.00051 | <0.00010 | 0.0004 | 0.00034 | - | 0.00011 | - | 0.0001 | - | 0.05 |
| Conductivity | µS/cm | 618 | 456 | 417 | 226 | 437 | 441 | 434 | 407 | 501 | 432 | 383 | 449 | 442 | 452 | 467 | 456 | 434 | 486 | 499 | 499 | 518 | 473 | 430 | 489 | 471 | 508 | 459 | 481 | 437 | 452 | 452 | 359 | 460 | 457 | - |
| Copper | mg/L | NT | ND | 0.001 | 0.0025 | 0.0041 | <0.001 | <0.001 | 0.0033 | 0.0025 | 0.0169 | <0.001 | <0.001 | 0.0157 | <0.001 | 0.0014 | <0.001 | <0.001 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.00020 | 0.0033 | 0.00104 | 0.00279 | 0.001 | - | 0.0007 | - | 0.0003 | - | 1 |
| Iron | mg/L | NT | ND | 0.17 | 0.16 | **2.35** | 0.065 | 0.033 | **0.806** | **0.651** | **4.1** | 0.273 | **0.334** | **6.71** | 0.11 | 0.135 | 0.065 | 0.166 | <0.010 | 0.068 | 0.07 | <0.010 | <0.010 | <0.010 | <0.010 | 0.105 | 0.125 | 0.021 | 0.095 | 0.134 | 0.108 | 0.103 | 0.104 | 0.108 | 0.123 | 0.3 |
| Lead | mg/L | NT | ND | <0.001 | 0.0034 | 0.0012 | <0.001 | <0.001 | 0.0017 | 0.0011 | 0.0044 | <0.0001 | <0.0001 | 0.00641 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.001 | <0.001 | <0.00005 | <0.000050 | <0.000050 | 0.000068 | < 0.00009 | - | < 0.00009 | - | <0.00009 | - | 0.01 |
| Magnesium | mg/L | 33.55 | 25.5 | 24.7 | 25.9 | 68.2 | 20.4 | 28.8 | 28.6 | 28.5 | 97.9 | 23.7 | 25.9 | 120 | 26.8 | 26.8 | 28.8 | 28 | 26.8 | 25.6 | 25.3 | 24.5 | 24.6 | 24.8 | 23.7 | 26.9 | 26.3 | 28.1 | 25.5 | 27 | 25.9 | 31.1 | 22.6 | 25.2 | 25.5 | - |
| Manganese | mg/L | NT | **0.08** | 0.05 | **0.08** | **0.19** | 0.03 | 0.03 | **0.11** | **0.08** | **0.53** | 0.03 | 0.04 | **0.54** | 0.02 | 0.02 | 0.02 | 0.03 | 0.02 | 0.03 | 0.02 | 0.03 | 0.01 | 0.01 | 0.01 | 0.03 | 0.02 | 0.01 | 0.02 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.05 |
| Mercury | mg/L | NT | N | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.000005 | <0.0000050 | <0.0000050 | <0.0000050 | < 0.00001 | - | < 0.00001 | - | <0.00001 | - | 0.001 |
| Nitrate | mg/L | ND | ND | 0.13 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.00068 | <0.1 | <0.1 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.044 | 0.161 | <0.020 | <0.020 | < 0.06 | < 0.06 | < 0.06 | < 0.06 | <0.06 | < 0.06 | 10 |
| Nitrite | mg/L | ND | ND | <0.02 | <0.03 | NT | NT | NT | NT | NT | NT | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.010 | <0.010 | <0.010 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | <0.03 | < 0.03 | 1 |
| pH | mg/L | 7.90 | 7.72 | 7.80 | 7.84 | 8.01 | 7.75 | 8.10 | 7.67 | 8.23 | 8.14 | 7.76 | 7.53 | 7.67 | 7.65 | 8.04 | 7.94 | 7.89 | 8.20 | 8.27 | 7.98 | 8.33 | 8.03 | 8.17 | 7.84 | 8.11 | 7.73 | 8.02 | 8.06 | 7.94 | 8.03 | 8.20 | 8.15 | 8.22 | 8.13 | 6.5 - 8.5 |
| Potassium | mg/L | 2.15 | 0.75 | 0.41 | 0.83 | 0.79 | 0.47 | 0.87 | 0.65 | 0.56 | 0.93 | 0.69 | 0.51 | 1.11 | 0.42 | 0.53 | 0.52 | 0.5 | 0.71 | 0.65 | 0.54 | 0.47 | 0.43 | 0.46 | 0.5 | 0.465 | 0.512 | 0.459 | 0.525 | 0.55 | - | 0.62 | - | 0.478 | - | - |
| Sodium | mg/L | 6.00 | 3.20 | 4.30 | 3.20 | 3.02 | 2.91 | 4.30 | 2.97 | 2.66 | 3.09 | 2.75 | 2.84 | 3.53 | 3.30 | 3.42 | 3.81 | 3.01 | 3.71 | 3.74 | 3.66 | 3.34 | 3.31 | 3.05 | 3.15 | 3.07 | 3.45 | 4.10 | 3.89 | 3.49 | 3.00 | 3.75 | 2.68 | 2.74 | 2.71 | 200 |
| Sulphate | mg/L | 10.65 | NT | 8 | 5.4 | 4.9 | 6.5 | 7.2 | 6 | 6.2 | 6.3 | 8 | 7.5 | 7.4 | 5 | 5.1 | 13.9 | 59.7 | 8.04 | 7 | 7.35 | 7.01 | 6.58 | 6.35 | 6.07 | 5.02 | 11.7 | 5.71 | 3.82 | 5 | 6 | 6 | 8 | 5 | 6 | 500 |
| Total Dissolved Solids | mg/L | 317.4 | NT | 210.0 | 316.0 | **640.0** | 330.0 | 280.0 | 420.0 | 250.0 | 260.0 | 260.0 | 300.0 | **620.0** | 330.0 | 360.0 | 270.0 | 290.0 | 244.0 | 284.0 | 272.0 | 224.0 | 252.0 | 224.0 | 282.0 | 259.0 | 291.0 | 324.0 | 304.0 | 249.0 | 254.0 | 231.0 | 217.0 | 263.0 | 257.0 | 500 |
| TKN | mg/L | NT | NT | 1.16 | 3.06 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.10 | 0.14 | 0.14 | <0.10 | 0.23 | 0.21 | <0.10 | 0.16 | 0.27 | <0.15 | 0.8 | < 0.05 | - | < 0.05 | - | 0.07 | - | - |
| Total Phosphorous | mg/L | NT | NT | 1.1 | 1.1 | 0.9 | 0.3 | 0.8 | 0.4 | 1.9 | 0.2 | NT | NT | NT | NT | NT | NT | NT | 1.0 | 1.2 | 1.2 | 1.3 | 0.8 | 1.8 | 2.0 | 0.4 | 0.8 | 0.4 | 1.6 | 0.5 | - | 0.1 | - | 0.16 | - | - |
| Total Suspended Solids | mg/L | NT | NT | 4780.00 | 61100.00 | 1500.00 | 10900.00 | 1980.00 | 1920.00 | 2250.00 | 6570.00 | 1500.00 | 644.00 | 3250.00 | 1500.00 | 2540.0 | 823.0 | 2090.0 | 10000.0 | 3420.0 | 4290.0 | 5180.0 | 13400.0 | 4810.0 | 1460.0 | 1730.0 | 8950.0 | 981.0 | 965.0 | 3830.0 | 1260.0 | 393.0 | 3900.0 | 6320.0 | 12300.0 | - |
| Zinc | mg/L | NT | ND | 0.01 | 0.01 | 0.01 | 0.00 | <0.001 | 0.00 | 0.00 | 0.01 | 0.02 | NT | 0.02 | 0.00 | NT | 0.00 | 0.03 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.0010 | 0.0021 | 0.0019 | 0.0017 | 0.0040 | - | < 0.002 | - | <0.002 | - | 5 |
| **Other Organics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BOD5* | mg/L | NT | NT | NT | 2.5 | 0.6 | 1.6 | 0.6 | <0.5 | 0.7 | 0.6 | 0.6 | 0.5 | 0.8 | 0.9 | 0.7 | 3.4 | <0.5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | - | <2.0 | <2.0 | <2.0 | < 4 | <4 | < 4 | < 4 | <4 | < 4 | - |
| COD | mg/L | NT | NT | NT | <20 | 22.0 | <5 | <5 | 8.8 | 22.0 | 8.8 | 17.7 | 48.6 | <5 | 13.3 | 8.8 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 28 | <20 | 26 | 40 | < 8 | <8 | < 8 | < 8 | <8 | < 8 | - |
| DOC | mg/L | NT | NT | 5.0 | 2.7 | 1.6 | 1.9 | 1.8 | 2.50 | 1.30 | 1.20 | 2.53 | 2.60 | **6.22** | 2.10 | 2.10 | 1.70 | 1.70 | 2.40 | 1.80 | 1.90 | 1.50 | 2.00 | 2.20 | 1.70 | - | 2.01 | 2.24 | 1.35 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 5 |
| Phenol | ug/L | ND | 1 | 17 | 0.0029 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0015 | 0.0071 | 0.0017 | 0.0016 | < 0.002 | - | 0.002 | - | <0.002 | - | - |
| **Volatile Organics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,4-Dichlorobenzene | ug/L | NT | NT | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.0002 | NT | NT | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.5 | <0.50 | <0.50 | <0.5 | <0.5 | - | < 0.5 | - | < 0.5 | - | 5 |
| Benzene | ug/L | NT | NT | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | 0.0025 | NT | NT | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.5 | <0.50 | <0.50 | <0.5 | <0.5 | - | < 0.5 | - | < 0.5 | - | 1 |
| Dichloromethane | ug/L | NT | NT | NT | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | 0.0022 | NT | NT | - | - | - | - | - | - | - | - | <5.0 | <5.0 | <0.5 | <0.5 | - | < 0.5 | - | < 0.5 | - | 50 |
| Toluene | ug/L | NT | NT | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | 0.0013 | NT | NT | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.5 | <0.50 | <0.50 | <0.5 | <0.5 | - | < 0.5 | - | < 0.5 | - | 60 |
| Methylene Chloride | ug/L | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.30 | <0.30 | <0.30 | <0.30 | - | - | - | - | - | - | - | - | < 0.2 | - | - |
| Vinyl Chloride | ug/L | NT | NT | <0.002 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.0002 | NT | NT | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | - | <0.50 | <0.50 | <0.2 | <0.2 | - | < 0.2 | - | <0.2 | - | 1 |
| **Field Measurements** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| pH | pH Units | NT | NT | NT | 7.75 | 7.74 | 8.78 | 7.93 | 8.03 | 7.45 | NA | 7.71 | 7.50 | 7.57 | 7.67 | 7.23 | 6.89 | 7.35 | 7.49 | 7.41 | 7.41 | 7.49 | 7.43 | 7.91 | 6.80 | 7.43 | 7.30 | 7.56 | 8.22 | 7.51 | 7.36 | 7.65 | 7.48 | 8.28 | - | - |
| Conductivity | uS/cm | NT | NT | NT | 0.41 | 0.44 | 0.39 | 0.54 | 0.47 | 0.48 | NA | 0.47 | 0.47 | 0.49 | 0.56 | 0.52 | 0.46 | 0.45 | 0.532 | 0.497 | 0.497 | 0.451 | 0.014 | 392 | 0.025 | 334.7 | 110.1 | 246 | 275 | 250 | 318 | 314 | 315 | 278 | - | - |
| Temperature | °C | NT | NT | NT | 13 | 7.5 | 8.8 | 7.6 | 8.7 | 7.7 | NA | 8.3 | 8 | 9.5 | 6.4 | 8.2 | 7.8 | 8.3 | 8.41 | 7.98 | 7.98 | 7.67 | 13.68 | 5.23 | 8.96 | 7 | 13.2 | 6.15 | 8.48 | 7.58 | 8.7 | 8.2 | 8.4 | 8.18 | - | - |
| Dissolved Oxygen | % | NT | NT | NT | 43.3 | 37.8 | 26.2 | 25.1 | 43.1 | 34.3 | NA | 38.5 | 13 | 16.9 | 17 | 15.7 | 16.6 | 20.7 | 45.1 | 44.3 | 44.3 | 18 | 152.4 | 62.7 | 5.45 | 25.4 | 32.8 | 56 | 60.2 | 63.7 | 6.29 | 6.56 | 6.17 | - | - | - |

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 Standard

NT — Not Tested

Pinchin File: 204232.008

**TABLE 3**
**Groundwater Quality Results - BH1A (background shallow)**
**Jocelyn Waste Disposal Site**
**Township of Jocelyn, Ontario**

| Parameter | Units | Sample Designation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ODWQS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sample Collection Date (dd/mmm/yy) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | BH1A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | *24-Oct-90* | *18-Apr-91* | *31-Oct-05* | *8-May-07* | *9-Jun-10* | *12-Nov-10* | *19-May-11* | *5-Oct-11* | *25-Apr-12* | *12-Oct-12* | *12-Oct-12* | *20-Jun-13* | *3-Oct-13* | *3-Oct-13* | *7-May-14* | *8-Oct-14* | *6-May-15* | *13-Oct-15* | *13-Oct-15* | *15-Jun-16* | *12-Oct-16* | *12-May-17* | *5-Oct-17* | *3-May-18* | *10-Oct-18* | *7-May-19* | *1-Oct-19* | *5-May-20* | *26-Oct-20* | *5-May-21* | *15-Oct-21* | *4-May-22* | *17-Oct-22* | *19-May-23* | *17-Oct-23* | |
| Alkalinity | mg/L $CaCO_3$ | 136.6 | 127.4 | 156 | 188 | 163 | 163 | 156 | 155 | 170 | 159 | 157 | 159 | 154 | 158 | 150 | 162 | 165 | 165 | 165 | 30 - 500 | 170 | 166 | 171 | 179 | 157 | 171 | 187 | 191 | 193 | 178 | 257 | 199 | 194 | 200 | 195 | 30 - 500 |
| Ammonia | mg/L | NT | NT | 0.07 | 0.0446 | <0.01 | 0.021 | 0.017 | 0.013 | 0.015 | 0.02 | <0.01 | 0.017 | 0.016 | 0.015 | 0.027 | <0.01 | <0.01 | <0.01 | <0.01 | <0.02 | 0.05 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.020 | <0.010 | <0.0050 | < 0.04 | < 0.04 | 0.05 | < 0.04 | < 0.04 | < 0.04 | - |
| Arsenic | mg/L | NT | NT | <0.001 | 0.0038 | 0.0011 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | NT | <0.001 | <0.001 | <0.001 | NT | <0.001 | <0.001 | <0.001 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.00075 | 0.00079 | 0.00074 | 0.00082 | 0.0007 | - | 0.0007 | - | 0.0007 | - | 0.01 |
| Barium | mg/L | 0.004 | 0.0009 | <0.01 | 0.0131 | 0.0057 | 0.0044 | 0.0039 | 0.0041 | 0.0049 | 0.004 | 0.0058 | 0.005 | 0.0067 | 0.0088 | 0.004 | 0.0052 | 0.0049 | 0.0048 | 0.0051 | 0.006 | 0.006 | 0.005 | 0.005 | 0.004 | 0.005 | 0.00528 | 0.00545 | 0.00497 | 0.00573 | 0.00581 | 0.00744 | 0.00609 | 0.00848 | 0.00617 | 0.00637 | 1 |
| Boron | mg/L | NT | NT | 0.05 | 0.011 | 0.014 | 0.0064 | <0.002 | 0.0032 | <0.002 | 0.0115 | 0.0082 | 0.0158 | <0.002 | <0.002 | <0.002 | 0.0026 | <0.002 | 0.0091 | 0.0092 | <0.010 | <0.010 | <0.010 | <0.010 | 0.01 | 0.01 | <0.010 | <0.010 | <0.010 | <0.010 | 0.014 | 0.017 | 0.009 | 0.065 | 0.016 | 0.005 | 5 |
| Cadmium | mg/L | 0.0017 | ND | <0.0001 | **0.00561** | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.00014 | 0.00071 | 0.00071 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.0000189 | 0.000121 | 0.0000248 | 0.0000969 | - | - | 0.000066 | - | 0.000027 | - | 0.005 |
| Calcium | mg/L | 30 | 36.8 | 41.6 | 34 | 40.1 | 33.4 | 36.4 | 35.8 | 36.8 | 34.6 | 34.1 | 32.6 | 34.6 | 35.1 | 40.2 | 35.9 | 36.1 | 35.9 | 37.5 | 39.9 | 39.9 | 35.6 | 37.4 | 38.2 | 37.6 | 41.1 | 40.4 | 42 | 40.5 | 46 | 58.8 | 56.6 | 46.5 | 54.3 | 48.3 | - |
| Chloride | mg/L | 6.70 | 5.30 | 1.70 | 1.20 | 0.64 | 1.30 | 0.69 | 0.97 | 0.80 | 1.06 | 0.85 | 0.70 | 0.72 | 0.82 | 0.63 | 0.68 | 2.09 | 0.85 | 2.72 | 1.09 | 0.84 | 0.8 | 0.98 | 0.76 | 0.81 | 0.53 | 0.69 | - | 0.78 | < 1 | 1 | < 1 | < 1 | < 1 | < 1 | 250 |
| Chromium | mg/L | ND | ND | 0.002 | 0.0051 | 0.0015 | <0.001 | 0.0022 | <0.001 | 0.0016 | <0.001 | <0.001 | 0.0014 | 0.0013 | 0.001 | <0.001 | 0.0018 | 0.0028 | 0.0014 | 0.0012 | <0.003 | <0.003 | <0.003 | 0.004 | <0.003 | <0.003 | 0.00116 | 0.00143 | 0.00087 | 0.00098 | 0.00118 | - | 0.00143 | - | 0.00128 | - | 0.05 |
| Conductivity | µS/cm | 306 | 305 | 277 | 189 | 293 | 288 | 294 | 286 | 321 | 274 | 270 | 287 | 311 | 311 | 276 | 299 | 308 | 298 | 296 | 314 | 331 | 346 | 329 | 301 | 347 | 327 | 341 | 334 | 321 | 329 | 452 | 353 | 362 | 364 | 375 | - |
| Copper | mg/L | 0.0052 | ND | 0.001 | 0.0028 | 0.0013 | <0.001 | <0.001 | <0.001 | 0.0014 | <0.001 | <0.001 | <0.001 | 0.0019 | 0.0021 | <0.001 | 0.0016 | <0.001 | <0.001 | <0.001 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.0012 | 0.00162 | 0.00064 | 0.00064 | 0.0011 | - | 0.0028 | - | 0.0006 | - | 1 |
| Iron | mg/L | 0.025 | 0.066 | 0.1 | <0.020 | <0.020 | <0.020 | <0.020 | 0.04 | **0.342** | 0.087 | 0.056 | <0.02 | **0.596** | **0.598** | <0.02 | 0.02 | <0.02 | 0.031 | <0.02 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.148 | 0.049 | <0.010 | <0.010 | 0.01 | 0.108 | < 0.007 | 0.045 | < 0.007 | < 0.007 | 0.3 |
| Lead | mg/L | **0.019** | ND | <0.001 | 0.0045 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.0001 | <0.0001 | <0.0001 | 0.00051 | 0.00074 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.002 | <0.002 | <0.002 | <0.002 | <0.001 | <0.001 | 0.000412 | <0.000050 | <0.000050 | <0.000050 | < 0.00009 | - | < 0.00009 | - | < 0.00009 | - | 0.01 |
| Magnesium | mg/L | 10.4 | 13.9 | 14.4 | 12.2 | 16.6 | 8.16 | 13.7 | 11.7 | 14 | 13.3 | 12.8 | 13.4 | 13.6 | 13.9 | 13.3 | 14.2 | 14.2 | 14.6 | 14.5 | 14.5 | 14.2 | 13.7 | 14.4 | 14.4 | 14.1 | 15.9 | 15.4 | 18.4 | 16.7 | 16.7 | 25.9 | 20.8 | 15.4 | 17.9 | 17.2 | - |
| Manganese | mg/L | 0.02 | 0.01 | 0.00 | 0.05 | 0.02 | 0.00 | 0.00 | 0.01 | 0.03 | 0.01 | 0.02 | 0.00 | 0.04 | 0.05 | <0.001 | 0.00 | <0.001 | 0.00 | 0.00 | <0.002 | 0.003 | <0.002 | <0.002 | <0.002 | <0.002 | 0.00781 | 0.00112 | 0.00037 | 0.00067 | 0.00072 | 0.0297 | 0.00092 | 0.0012 | 0.00028 | 0.00042 | 0.05 |
| Mercury | mg/L | NT | NT | <0.0001 | <0.0001 | 0.00 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.000005 | <0.0000050 | <0.0000050 | <0.0000050 | < 0.00001 | - | < 0.00001 | - | 0.00001 | - | 0.001 |
| Nitrate | mg/L | 0.65 | 0.75 | 0.39 | 0.43 | <0.1 | 0.19 | 0.37 | 0.28 | 0.45 | 0.5 | 0.48 | 0.19 | 0.32 | 0.44 | 0.255 | 0.25 | 0.49 | 0.68 | 0.26 | 0.26 | 0.28 | 0.24 | 0.2 | 0.19 | 0.2 | 0.218 | 0.21 | 0.231 | 0.291 | 0.75 | < 0.06 | 0.86 | 0.96 | 0.94 | 1.04 | 10 |
| Nitrite | mg/L | 0.09 | ND | <0.02 | 0.06 | NT | NT | NT | NT | NT | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.010 | <0.010 | <0.010 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | <0.03 | < 0.03 | 1 |
| pH | mg/L | 8.23 | 8.01 | 8.00 | 8.11 | 7.99 | 7.78 | 7.86 | 8.12 | 8.22 | 7.87 | 7.91 | 7.62 | 8.04 | 7.59 | 7.75 | 8.09 | 8.09 | 8.01 | 8.00 | 8.26 | 8.12 | 8.18 | 8.11 | 7.94 | 7.71 | 8.17 | 8.09 | 8.14 | 8.12 | 8.14 | 8.03 | 8.19 | 8.22 | 8.24 | 8.28 | 6.5 - 8.5 |
| Potassium | mg/L | 4.07 | 1.6 | 0.32 | 3.01 | 1.07 | 0.5 | 0.63 | 0.37 | 0.41 | 0.62 | 0.63 | 0.41 | 0.41 | 0.42 | 0.34 | 0.52 | 0.38 | 0.38 | 0.41 | 0.54 | 0.49 | 0.36 | 0.36 | 0.33 | 0.46 | 0.384 | 0.435 | 0.295 | 0.456 | 0.426 | - | 0.83 | - | 0.399 | - | - |
| Sodium | mg/L | 21.70 | 8.60 | 4.52 | 11.85 | 8.45 | 7.98 | 6.68 | 5.57 | 5.27 | 4.42 | 4.26 | 5.55 | 5.83 | 5.96 | 5.93 | 5.37 | 6.35 | 5.04 | 4.97 | 6.49 | 7.31 | 6.93 | 8.2 | 6.18 | 7.5 | 5.5 | 7.26 | 5.98 | 7.02 | 6.9 | 3 | 6.47 | 4.26 | 4.82 | 4.42 | 200 |
| Sulphate | mg/L | 12.65 | NT | 9.2 | 5.6 | 5.1 | 5.8 | 5.8 | 6.1 | 5 | 6.6 | 6.7 | 6.1 | 5.8 | 5.3 | 4.15 | 4.2 | 11.8 | 5.2 | 9.4 | 6.25 | 5.27 | 4.35 | 4.15 | 4.26 | 4.35 | 3.92 | 4 | 4.24 | 4.28 | 4 | 6 | 5 | 5 | 4 | 6 | 500 |
| Total Dissolved Solids | mg/L | 171.7 | NT | 150.0 | 190.0 | 110.0 | 240.0 | 160.0 | 340.0 | 140.0 | 180.0 | 180.0 | 170.0 | 200.0 | **1560.0** | 160.0 | 210.0 | 200.0 | 190.0 | 210.0 | 166 | 172 | 154 | 182 | 170 | 180 | 165 | 194 | 231 | 201 | 183 | 254 | 203 | 209 | 206 | 229 | 500 |
| TKN | mg/L | NT | NT | 0.27 | 2.13 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.10 | 0.18 | <0.10 | 0.2 | 0.14 | 0.1 | <0.15 | <0.15 | <0.15 | 0.1 | < 0.05 | - | 0.43 | - | < 0.05 | - | - |
| Total Phosphorous | mg/L | NT | NT | 0.1 | 0.2 | 0.011 | 0.012 | 0.012 | 0.0223 | 0.0282 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.05 | 0.05 | <0.05 | <0.05 | 0.03 | <0.02 | 0.0239 | 0.0157 | 0.019 | 0.028 | < 0.03 | - | < 0.03 | - | < 0.03 | - | - |
| Total Suspended Solids | mg/L | NT | NT | 52.00 | 71.00 | 68.50 | 70.70 | 30.80 | 94.50 | 44.50 | 178.00 | 109.00 | 98.00 | 747.00 | 38.00 | 145.00 | 297.00 | 5.30 | 13.70 | 17.30 | 47 | 14 | 38 | 20 | 29 | 30 | 44.5 | 21.6 | 12.3 | 53.2 | 19 | 1260 | 18 | 2340 | 11 | 3 | - |
| Zinc | mg/L | 0.00 | ND | <0.003 | 0.02 | 0.01 | 0.01 | <0.001 | <0.001 | 0.01 | 0.00 | 0.03 | NT | 0.01 | 0.02 | 0.00 | NT | 0.01 | 0.00 | 0.00 | <0.005 | <0.005 | <0.005 | 0.007 | <0.005 | 0.011 | 0.0024 | 0.0035 | 0.0011 | 0.0012 | 0.004 | - | 0.009 | - | < 0.002 | - | 5 |
| **Other Organics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BOD5* | mg/L | NT | NT | <2 | 2.9 | 0.8 | <0.5 | 1.3 | 0.9 | 0.8 | 1.7 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.7 | 1 | <0.5 | <0.5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <2.0 | <2.0 | <2.0 | <2.0 | < 4 | < 4 | < 4 | < 4 | < 4 | < 4 | - |
| COD | mg/L | NT | NT | 7.000 | <20 | 26.000 | <5 | 8.800 | <5 | 8.800 | 8.800 | 26.000 | 13.300 | 8.800 | 17.700 | 8.800 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <20 | <20 | <10 | <20 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | - |
| DOC | mg/L | NT | NT | **10.000** | 2.700 | 1.000 | 1.000 | 1.300 | 1.800 | 0.920 | 1.770 | 2.000 | 2.000 | 4.820 | 4.940 | 1.500 | 1.600 | 1.200 | 1.100 | 1.200 | 1.500 | 1.400 | 1.000 | 1.500 | 1.400 | 1.500 | 3.08 | 1.59 | 1.64 | 0.63 | 1 | 2 | 3 | 2 | 2 | 2 | 5 |
| Phenol | ug/L | ND | 0.6 | <0.002 | 0.0044 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0016 | 0.004 | <0.0010 | <0.0010 | < 0.002 | - | < 0.002 | - | < 0.002 | - | - |
| **Volatile Organics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,4-Dichlorobenzene | ug/L | NT | NT | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.50 | <0.50 | <0.5 | <0.5 | <0.5 | - | < 0.5 | - | < 0.5 | - | 5 |
| Benzene | ug/L | NT | NT | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.50 | <0.50 | <0.5 | <0.5 | <0.5 | - | < 0.5 | - | < 0.5 | - | 1 |
| Dichloromethane | ug/L | NT | NT | NT | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | - | - | - | - | - | - | <5.0 | <5.0 | <0.5 | <0.5 | <0.5 | - | < 0.5 | - | < 0.5 | - | 50 |
| Toluene | ug/L | NT | NT | <0.01 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.50 | <0.50 | <0.5 | <0.5 | <0.5 | - | < 0.5 | - | < 0.5 | - | 60 |
| Methylene Chloride | ug/L | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.30 | <0.30 | <0.30 | <0.30 | - | - | - | - | - | - | - | - | - | - | - |
| Vinyl Chloride | ug/L | NT | NT | <0.01 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.50 | <0.50 | <0.2 | <0.2 | <0.2 | - | < 0.2 | - | < 0.2 | - | 1 |
| **Field Measurements** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| pH | pH Units | NT | NT | NT | 8.08 | 8.24 | 8.87 | 8.21 | 8.32 | 7.94 | 7.93 | NA | 7.75 | 7.51 | NA | 8.13 | 8.05 | 7.44 | 7.55 | 7.55 | 7.44 | 7.69 | 7.87 | 7.69 | 7.45 | 6.64 | 7.99 | 7.46 | 7.28 | 8.38 | 7.57 | 7.61 | 7.75 | 7.98 | 8.24 | - | - |
| Conductivity | uS/cm | NT | NT | NT | 0.26 | 0.23 | 0.24 | 0.23 | 0.3 | 0.29 | 0.29 | NA | 0.28 | 0.29 | NA | 0.25 | 0.32 | 0.27 | 0.28 | 0.28 | 0.311 | 0.331 | 0.292 | 0.06 | 194 | 0.013 | 214.2 | 301 | 178 | 204 | 185 | 267 | 231.6 | 270.4 | 225 | - | - |
| Temperature | °C | NT | NT | NT | 8.4 | 8 | 9.9 | 7.6 | 11.1 | 6.5 | 10.2 | NA | 7.9 | 11.5 | NA | 4.7 | 10.7 | 5.2 | 10.4 | 10.4 | 9.18 | 11.31 | 7.42 | 12.2 | 4.31 | 10.85 | 5.1 | 15 | 4.79 | 9.17 | 5.8 | 11.3 | 5.9 | 9.9 | 7.06 | - | - |
| Dissolved Oxygen | % | NT | NT | NT | 95.8 | 87.6 | 36.5 | 32.3 | 48.3 | 69.2 | 55.1 | NA | 50.6 | 51.3 | NA | 54.6 | 76.7 | 49.7 | 53 | 53 | 83.7 | 64.1 | 69.9 | 149.6 | 69.2 | 8.64 | 74.4 | 47.7 | 90.4 | 93.2 | 108 | 9.44 | 9.47 | 7.97 | - | - | - |

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 Standard

NT — Not Tested

Pinchin File: 204232.008

**TABLE 4**
**Groundwater Quality Results - BH2 (source well)**
**Jocelyn Waste Disposal Site**
**Township of Jocelyn, Ontario**

| Parameter | Units | Sample Designation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ODWQS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sample Collection Date (dd/mmm/yy) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | BH2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 24-Oct-90 | 18-Apr-91 | 31-Oct-05 | 8-May-07 | 9-Jun-10 | 12-Nov-10 | 19-May-11 | 5-Oct-11 | 25-Apr-12 | 12-Oct-12 | 20-Jun-13 | 3-Oct-13 | 7-May-14 | Duplicate | 8-Oct-14 | Duplicate | 6-May-15 | 13-Oct-15 | 15-Jun-16 | 12-Oct-16 | 12-May-17 | 12-May-17 | 5-Oct-17 | Duplicate | 3-May-18 | 10-Oct-18 | 7-May-19 | 7-May-19 (Dup) | 1-Oct-19 | 5-May-20 | 26-Oct-20 | 5-May-21 | 15-Oct-21 | 15-Oct-21 (Dup) | 4-May-22 | 17-Oct-22 | 17-Oct-22 (Dup) | 19-May-23 | 17-Oct-23 | |
| Alkalinity | mg/L $CaCO_3$ | 181.4 | 213.1 | 358 | **711** | 476 | **514** | **555** | **573** | **527** | **616** | **663** | **574** | **621** | **626** | 426 | 405 | 387 | **659** | - | **638** | **711** | **676** | **764** | **758** | **632** | 470 | **682** | **682** | **646** | **677** | 493 | **544** | 491 | 491 | **554** | 491 | **541** | **629** | **589** | 30 - 500 |
| Ammonia | mg/L | NT | NT | <0.02 | 0.0246 | 0.025 | 0.54 | 0.01 | 0.026 | 0.026 | 0.02 | 0.028 | 0.031 | 0.04 | 0.039 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.02 | 0.03 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | 0.055 | <0.010 | 0.0099 | < 0.04 | < 0.04 | < 0.04 | < 0.04 | < 0.04 | < 0.04 | < 0.04 | < 0.04 | - |
| Arsenic | mg/L | NT | NT | <0.001 | 0.0041 | 0.0014 | <0.001 | <0.001 | <0.001 | 0.002 | 0.0011 | NT | <0.001 | <0.001 | <0.001 | NT | NT | <0.001 | 0.001 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.00062 | 0.00067 | 0.00093 | 0.0004 | 0.00046 | 0.0004 | | | 0.0004 | | | 0.0003 | | 0.01 |
| Barium | mg/L | 0.016 | 0.017 | 0.01 | 0.0232 | 0.0187 | 0.0158 | 0.025 | 0.0226 | 0.0375 | 0.0231 | 0.0293 | 0.0421 | 0.0303 | 0.0305 | 0.0306 | 0.0282 | 0.0319 | 0.0307 | 0.033 | 0.033 | 0.038 | 0.039 | 0.024 | 0.036 | 0.03 | 0.024 | 0.0333 | 0.0331 | 0.0252 | 0.0335 | 0.019 | 0.0215 | 0.0194 | 0.0194 | 0.023 | 0.0255 | 0.0266 | 0.0256 | 0.0240 | 1 |
| Boron | mg/L | NT | NT | 0.13 | 0.0444 | 0.0365 | 0.0413 | 0.0264 | 0.0386 | 0.027 | 0.0522 | 0.075 | 0.0412 | 0.0211 | 0.0171 | 0.0544 | 0.0496 | 0.0436 | 0.0627 | 0.082 | 0.056 | 0.059 | 0.062 | 0.049 | 0.085 | 0.068 | 0.054 | 0.09 | 0.091 | 0.07 | 0.107 | 0.058 | 0.064 | 0.086 | 0.086 | 0.154 | 0.098 | 0.112 | 0.096 | 0.090 | 5 |
| Cadmium | mg/L | NT | 0.0017 | <0.0001 | 0.00566 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.00037 | <0.0001 | 0.00014 | 0.00114 | <0.0001 | <0.0001 | <0.0001 | 0.00015 | <0.0001 | <0.0001 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.0000106 | 0.0000132 | 0.0000216 | 0.0000168 | 0.00001 | - | - | - | 0.000015 | - | - | 0.000047 | - | 0.005 |
| Calcium | mg/L | 54.8 | NT | <2 | 125 | 149 | 112 | 111 | 140 | 210 | 76.1 | 144 | 240 | 181 | 175 | 128 | 129 | 139 | 158 | 167 | 148 | 151 | 149 | 161 | 165 | 125 | 115 | 157 | 157 | 133 | 159 | 101 | 142 | 124 | 124 | 181 | 118 | 113 | 149 | 133 | - |
| Chloride | mg/L | 14.7 | 16.1 | 14 | 8.75 | 12.9 | 10.7 | 9.53 | 13.1 | 11.4 | 27.5 | 41.4 | 25.8 | 30.6 | 29.9 | 30.2 | 29.1 | 29.1 | 23.8 | 32.4 | 14.4 | 27.9 | 28.2 | 33.5 | 32.3 | 20.4 | 13.4 | 24.8 | 24.4 | 22.4 | - | 13.6 | 19 | 17 | 17 | 23 | 24 | 30 | 38 | 37 | 250 |
| Chromium | mg/L | ND | ND | <0.001 | 0.0172 | 0.0028 | <0.001 | 0.0089 | 0.0052 | 0.0049 | 0.0022 | 0.0058 | 0.0026 | 0.006 | 0.0067 | 0.0042 | 0.0056 | 0.0076 | 0.002 | <0.003 | <0.003 | 0.003 | 0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.0001 | 0.0004 | 0.000074 | <0.00010 | <0.00010 | 0.00019 | - | - | 0.00014 | - | - | 0.00019 | - | 0.05 |
| Conductivity | µS/cm | 531 | 522 | 15.5 | 735 | 854 | 916 | 990 | 963 | 1000 | 962 | 1200 | 1140 | 1150 | 1150 | 903 | 819 | 807 | 1110 | 1330 | 1230 | 1400 | 1410 | 1420 | 1420 | 1130 | 1070 | 1280 | 1290 | 1190 | 1190 | 855 | 989 | 914 | 914 | 1010 | 950 | 1030 | 1180 | 1110 | - |
| Copper | mg/L | 0.0039 | 0.0042 | 0.002 | 0.0032 | 0.005 | 0.0034 | 0.0046 | 0.0059 | 0.0176 | 0.0012 | 0.0018 | 0.0102 | 0.0018 | 0.0022 | 0.0035 | 0.0018 | - | 0.0013 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.007 | 0.0022 | 0.00524 | 0.00224 | 0.00223 | 0.00341 | 0.0021 | - | - | 0.0033 | - | - | 0.0036 | - | 1 |
| Iron | mg/L | 0.14 | **0.7** | 0.22 | <0.02 | 0.15 | 0.295 | **0.332** | **0.892** | **2.96** | **0.964** | **0.741** | **2.39** | 0.217 | 0.152 | 0.23 | 0.184 | **0.388** | **0.701** | **0.469** | **0.595** | 0.204 | 0.158 | <0.010 | <0.010 | 0.04 | 0.027 | 0.125 | 0.163 | 0.191 | 0.011 | 0.036 | 0.039 | 0.049 | 0.049 | 0.025 | 0.022 | 0.02 | 0.055 | 0.009 | 0.3 |
| Lead | mg/L | 0.031 | 0.031 | <0.001 | 0.0031 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0054 | 0.0002 | 0.00016 | 0.00291 | <0.0001 | <0.0001 | 0.00019 | 0.00017 | 0.00012 | 0.00016 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 19.81526587 | <0.001 | 0.002 | 0.000059 | 0.000253 | <0.000050 | 0.0000083 | <0.0000050 | < 0.00009 | - | - | < 0.00009 | - | - | 0.00009 | - | 0.01 |
| Magnesium | mg/L | 29.8 | NT | 39.3 | 53.8 | 60.8 | 43 | 70.4 | 61.6 | 105 | 59.1 | 78 | 107 | 74.4 | 71.9 | 75.1 | 73.8 | 78.3 | 74.7 | 77.4 | 68.7 | 71.4 | 71.3 | 76.9 | 77.4 | 62.1 | 56.1 | 76 | 75.5 | 74.3 | 80 | 53.8 | 61.3 | 58.2 | 58.2 | 87.7 | 55.3 | 52.7 | 62.6 | 62.1 | - |
| Manganese | mg/L | **0.01** | **0.062** | **0.034** | **0.228** | **0.381** | **0.477** | **0.572** | **0.571** | **0.835** | **0.663** | **0.796** | **1.04** | **1.05** | **1.05** | **0.904** | **0.933** | **0.987** | **0.763** | **0.77** | **0.694** | **0.755** | **0.72** | **0.151** | **0.707** | **0.586** | **0.394** | **0.725** | **0.762** | **0.645** | **0.814** | **0.337** | **0.538** | **0.458** | **0.458** | **0.414** | **0.608** | **0.586** | **0.655** | **0.606** | 0.05 |
| Mercury | mg/L | NT | NT | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0000005 | <0.000005 | <0.000050 | <0.0000050 | <0.0000050 | < 0.00001 | - | - | < 0.00001 | - | - | 0.00001 | - | 0.001 |
| Nitrate | mg/L | 2.95 | 1.95 | 1.01 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.66 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.05 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.05 | <0.25 | 0.03 | 0.062 | <0.020 | <0.040 | 0.161 | 0.16 | 0.81 | 0.81 | 0.74 | 0.61 | 0.3 | <0.06 | 0.26 | 10 |
| Nitrite | mg/L | 0.03 | ND | 0.06 | 0.03 | NT | NT | NT | NT | NT | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.05 | <0.25 | <0.25 | <0.25 | <0.05 | <0.25 | <0.010 | <0.010 | <0.010 | <0.020 | 0.153 | 0.07 | 0.11 | 0.11 | < 0.03 | 0.05 | 0.06 | <0.03 | 0.03 | 1 |
| pH | mg/L | 7.91 | 7.76 | 7.6 | 7.37 | 7.93 | 7.74 | 7.86 | 7.8 | 7.99 | 7.85 | 7.55 | 7.75 | 7.81 | 7.8 | 8.12 | 8.08 | 7.89 | 7.34 | 7.96 | 8.02 | 8.14 | 8.06 | 7.68 | 7.66 | 7.86 | 7.99 | 7.24 | 7.18 | 7.44 | 7.2 | 7.74 | 7.61 | 7.51 | 7.51 | 8.02 | 7.88 | 7.79 | 7.73 | 7.64 | 6.5 - 8.5 |
| Potassium | mg/L | 0.81 | NT | 0.54 | 0.97 | 1.01 | 0.74 | 1.53 | 0.81 | 0.87 | 1.05 | 0.96 | 1.02 | 0.8 | 0.79 | 1.02 | 0.96 | 0.95 | 0.84 | 1.03 | 0.86 | 1.03 | 0.89 | 0.89 | 1.01 | 0.91 | 0.74 | 0.973 | 0.245 | 1 | 0.86 | 0.738 | 0.881 | - | - | 1.29 | - | - | 0.894 | - | - |
| Sodium | mg/L | 3.9 | NT | 10.8 | 14.9 | 12.5 | 12.3 | 13.8 | 13.3 | 12 | 12.7 | 16.8 | 15.9 | 19.6 | 18.8 | 19.6 | 18.9 | 33.9 | 20.1 | 30.5 | 16.9 | 20.9 | 21 | 36.6 | 36.5 | 21.4 | 12.4 | 33.2 | 33.9 | 24.1 | 25.7 | 11.2 | 16.7 | 19.2 | 19.2 | 32.3 | 18.9 | 18.1 | 23.3 | 19.8 | 200 |
| Sulphate | mg/L | 37.92 | NT | 54.1 | 32.5 | 29.6 | 31.7 | 29.5 | 28.5 | 36.6 | 33.5 | 45.6 | 58.1 | 38.1 | 39.3 | 32.5 | 33.4 | 31.7 | 36.1 | 37.9 | 49.5 | 40.7 | 40.3 | 26.5 | 27.3 | 45.2 | 48.4 | 29.6 | 29.4 | 34.8 | 36 | 43.3 | 35 | 35 | 35 | 34 | 31 | 30 | 27 | 26 | 500 |
| Total Dissolved Solids | mg/L | **265.6** | NT | 420 | **675** | **550** | **600** | **640** | **790** | **590** | **580** | **890** | **800** | **860** | **830** | **900** | **1010** | **1000** | **820** | **754** | **688** | **702** | **682** | **776** | **770** | **638** | **638** | **745** | **724** | **631** | **705** | **579** | **623** | **566** | **566** | **589** | **600** | **637** | **689** | **686** | 500 |
| TKN | mg/L | NT | NT | 0.35 | 4.81 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | 0.38 | 0.54 | 0.38 | 0.4 | 0.84 | 0.56 | 0.43 | 0.35 | 0.53 | 0.49 | 0.51 | <0.15 | 0.506 | 0.25 | - | - | 0.29 | - | - | 0.26 | - | - |
| Total Phosphorous | mg/L | NT | NT | 0.471 | 0.103 | 0.26 | 0.308 | 0.497 | 0.277 | 0.56 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | 0.32 | 0.3 | 0.5 | 0.5 | 0.17 | 0.35 | 0.25 | 0.15 | 0.262 | 0.245 | 0.0903 | 0.0162 | 0.13 | - | 0.04 | - | - | 0.03 | - | - | 0.05 | - | - |
| Total Suspended Solids | mg/L | NT | NT | 528 | 93 | 1620 | 2000 | 1970 | 329 | 1230 | 782 | 912 | 646 | 520 | 360 | 603 | 420 | 425 | 297 | 2010 | 890 | 1340 | 1130 | 708 | 989 | 594 | 523 | 414 | 614 | 313 | 516 | 548 | 92 | 262 | 262 | 78 | 196 | 324 | 289 | 71 | - |
| Zinc | mg/L | 0.0044 | 0.017 | <0.003 | 0.0075 | 0.0067 | 0.003 | 0.0012 | 0.0039 | 0.0128 | 0.0048 | NT | 0.02 | 0.0029 | 0.007 | NT | NT | 0.0027 | 0.003 | 0.04 | 0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | 0.021 | 0.0011 | 0.0027 | 0.0017 | 0.001 | <0.0010 | 0.004 | - | - | 0.002 | - | - | < 0.002 | - | 5 |
| **Other Organics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BOD5* | mg/L | NT | NT | <2 | 3.3 | 1 | <0.5 | 1.6 | 1.5 | 1.6 | 2.8 | 1.8 | <3 | 1 | 1.4 | 1.6 | 1.3 | 3 | 0.5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | < 4 | < 4 | < 4 | < 4 | < 4 | < 4 | < 4 | < 4 | - |
| COD | mg/L | NT | NT | 14 | 78 | 49 | 38 | 45 | 42 | 42 | 85.4 | 55.4 | 45.1 | 48.6 | 52 | 33.9 | 41.5 | 33.9 | 48 | 25 | 33 | 23 | 25 | 59 | 12 | 18 | 16 | 44 | 41 | 35 | 38 | 39 | 20 | 21 | 21 | 12 | 20 | 26 | 15 | 14 | - |
| DOC | mg/L | NT | NT | 4 | **20.2** | **10.8** | **11.4** | **13.5** | **17.5** | **12.8** | **17.4** | **16.9** | **19.9** | **15.1** | **15.3** | **14.9** | **14.8** | **12.2** | **15** | **11** | **15.2** | **11** | **11** | **9.1** | **9.2** | **12** | **11.7** | **10.5** | **11.2** | **11.1** | **9.42** | **8.29** | **7** | **8** | **8** | **7** | **6** | **7** | **6** | **7** | 5 |
| Phenol | ug/L | 0.6 | 0.8 | <0.002 | 0.00072 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0051 | 0.0013 | 0.0099 | <0.0010 | <0.0010 | < 0.002 | - | - | < 0.002 | - | - | < 0.002 | - | - |
| **Volatile Organics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,4-Dichlorobenzene | ug/L | NT | NT | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.10 | <0.10 | <0.40 | <0.40 | <0.10 | <0.10 | <0.40 | <0.10 | <0.50 | <0.50 | <0.50 | <0.5 | <0.5 | <0.5 | - | - | < 0.5 | - | - | < 0.5 | - | 5 |
| Benzene | ug/L | NT | NT | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.20 | <0.20 | <0.80 | <0.80 | <0.20 | <0.20 | <0.80 | <0.20 | <0.50 | <0.50 | <0.50 | <0.5 | <0.5 | <0.5 | - | - | < 0.5 | - | - | < 0.5 | - | 1 |
| Dichloromethane | ug/L | NT | NT | NT | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | - | - | - | - | - | - | - | - | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | - | - | < 0.5 | - | - | < 0.5 | - | 50 |
| Toluene | ug/L | NT | NT | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.20 | <0.20 | <0.80 | <0.80 | <0.20 | <0.20 | <0.80 | <0.20 | <0.50 | <0.50 | <0.50 | <0.5 | <0.5 | <0.5 | - | - | < 0.5 | - | - | < 0.5 | - | 60 |
| Methylene Chloride | ug/L | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <1.20 | <1.20 | <0.30 | <0.30 | <1.20 | <0.30 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vinyl Chloride | ug/L | NT | NT | <0.002 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.17 | <0.17 | <0.68 | <0.68 | <0.17 | <0.17 | <0.68 | <0.17 | <0.50 | <0.50 | <0.50 | <0.50 | <0.2 | <0.2 | <0.2 | - | - | < 0.2 | - | - | < 0.2 | - | 1 |
| **Field Measurements** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| pH | pH Units | NT | NT | NT | 7.15 | 7.17 | 8.13 | 8.15 | 7.23 | 6.94 | 7.09 | 7.12 | 7.13 | 6.88 | NA | 6.83 | NT | 6.60 | 6.94 | 7.92 | 6.91 | 6.92 | 6.92 | 7.61 | 7.61 | 6.93 | 6.76 | 7.99 | 7.09 | 6.91 | 7.26 | 7.57 | 7.11 | 6.90 | 6.90 | 7.21 | 7.24 | 7.24 | 6.10 | - | - |
| Conductivity | uS/cm | NT | NT | 1.05 | 0.87 | 0.89 | 1.23 | 1.19 | 1.12 | 1.22 | 1.31 | 1.16 | 1.2 | NA | 1.14 | NT | 1.1 | 1.08 | 1.353 | 1.174 | 1.173 | 1.173 | 0.72 | 0.72 | 708 | 0.083 | 214.2 | 945 | 34.8 | 703 | 480 | 570 | 585 | 585 | 589 | 629 | 629 | 671 | - | - |
| Temperature | °C | NT | NT | NT | 10 | 9.1 | 9.8 | 16.8 | 9.6 | 9.5 | 9.2 | 9.6 | 9.7 | 8.8 | NA | 9 | NT | 8.5 | 9.5 | 9.11 | 8.1 | 8.57 | 8.57 | 13.68 | 13.68 | 6.49 | 8.3 | 5.1 | 8.5 | 16.5 | 7.79 | 7.07 | 7.83 | 8.3 | 8.3 | 8.7 | 8.3 | 8.3 | 8.44 | - | - |
| Dissolved Oxygen | % | NT | NT | NT | 26.3 | 13.9 | 32.8 | 15.3 | 26.8 | 56.6 | 45.8 | 27.7 | 23.4 | 8.4 | NA | 19.4 | NT | 23.7 | 12.4 | 23.4 | 43.5 | 4.2 | 19.5 | 19.5 | 46 | 46 | 19.2 | 4.2 | 74.4 | 42.1 | 52.5 | 41.4 | 50.4 | 42.4 | 4.53 | 4.53 | 7.78 | 5.7 | 5.7 | - | - | - |

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 Standard

NT — Not Tested

**TABLE 5**
**Groundwater Quality Results - BH3-10**
**Jocelyn Waste Disposal Site**
**Township of Jocelyn, Ontario**

| Parameter | Units | Sample Designation | | | | ODWQS |
|---|---|---|---|---|---|---|
| | | Sample Collection Date (dd/mmm/yy) | | | | |
| | | BH3-10 | | | | |
| | | *12-Nov-10* | *17-Oct-22* | *19-May-23* | *17-Oct-23* | |
| Alkalinity | mg/L $CaCO_3$ | 95.3 | - | 31 | - | 30 - 500 |
| Ammonia | mg/L | 0.042 | - | < 0.04 | - | - |
| Arsenic | mg/L | <0.001 | - | < 0.0002 | - | 0.01 |
| Barium | mg/L | 0.106 | - | 0.00744 | - | 1 |
| Boron | mg/L | 0.0067 | - | 0.006 | - | 5 |
| Cadmium | mg/L | <0.0001 | - | 0.000012 | - | 0.005 |
| Calcium | mg/L | 22.1 | - | 5.89 | - | - |
| Chloride | mg/L | 2.23 | - | 4 | - | 250 |
| Chromium | mg/L | 0.0012 | - | 0.00066 | - | 0.05 |
| Conductivity | µS/cm | 175 | - | 72 | - | - |
| Copper | mg/L | 0.006 | - | 0.0036 | - | 1 |
| Iron | mg/L | **0.363** | - | 0.065 | - | 0.3 |
| Lead | mg/L | 0.0014 | - | < 0.00009 | - | 0.01 |
| Magnesium | mg/L | 6.09 | - | 4.16 | - | - |
| Manganese | mg/L | **0.0953** | - | 0.00681 | - | 0.05 |
| Mercury | mg/L | <0.0001 | - | 0.00001 | - | 0.001 |
| Nitrate | mg/L | 0.5 | - | <0.06 | - | 10 |
| Nitrite | mg/L | NT | - | <0.03 | - | 1 |
| pH | mg/L | 7.07 | - | 7.32 | - | 6.5 - 8.5 |
| Potassium | mg/L | 0.45 | - | 0.407 | - | - |
| Sodium | mg/L | 1.58 | - | 1.72 | - | 200 |
| Sulphate | mg/L | 4.2 | - | 6 | - | 500 |
| Total Dissolved Solids | mg/L | 490 | - | 111 | - | 500 |
| TKN | mg/L | NT | - | 0.31 | - | - |
| Total Phosphorous | mg/L | 13.8 | - | 0.92 | - | - |
| Total Suspended Solids | mg/L | 16200 | - | 1110 | - | - |
| Zinc | mg/L | 0.0123 | - | 0.004 | - | 5 |
| **Other Organics** | | | | | | |
| BOD5* | mg/L | 0.6 | - | < 4 | - | - |
| COD | mg/L | 22 | - | 24 | - | - |
| DOC | mg/L | **8.65** | - | 2 | - | 5 |
| Phenol | ug/L | NT | - | < 0.002 | - | - |
| **Volatile Organics** | | | | | | |
| 1,4-Dichlorobenzene | ug/L | NT | - | < 0.5 | - | 5 |
| Benzene | ug/L | NT | - | < 0.5 | - | 1 |
| Dichloromethane | ug/L | NT | - | < 0.5 | - | 50 |
| Toluene | ug/L | NT | - | < 0.5 | - | 60 |
| Methylene Chloride | ug/L | NT | - | | - | - |
| Vinyl Chloride | ug/L | NT | - | < 0.2 | - | 1 |
| **Field Measurements** | | | | | | |
| pH | pH Units | 8.50 | - | 8.12 | - | - |
| Conductivity | uS/cm | 0.05 | - | 42 | - | - |
| Temperature | ℃ | 8.8 | - | 6.64 | - | - |
| Dissolved Oxygen | % | 27.3 | - | - | - | - |

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 Standard |
| NT | Not Tested |

**TABLE 6**
**Groundwater Quality Results - BH4 (downgradient deep)**
**Jocelyn Waste Disposal Site**
**Township of Jocelyn, Ontario**

| Parameter | Units | Sample Designation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ODWQS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sample Collection Date (dd/mmm/yy) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | BH4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | *31-Oct-05* | *8-May-07* | *9-Jun-10* | *12-Nov-10* | *19-May-11* | *5-Oct-11* | *25-Apr-12* | *12-Oct-12* | *20-Jun-13* | *3-Oct-13* | *7-May-14* | *8-Oct-14* | *6-May-15* | *13-Oct-15* | *15-Jun-16* | *12-Oct-16* | *12-May-17* | *5-Oct-17* | *3-May-18* | *10-Oct-18* | *7-May-19* | *1-Oct-19* | *5-May-20* | *26-Oct-20* | *5-May-21* | *15-Oct-21* | *4-May-22* | *17-Oct-22* | *19-May-23* | *17-Oct-23* | |
| Alkalinity | mg/L $CaCO_3$ | 188 | 215.5 | 197 | 193 | 190 | 180 | 198 | 188 | 192 | 177 | 179 | 150 | 146 | 196 | 205 | 197 | 206 | 201 | 208 | 170 | 207 | 203 | 215 | 202 | 210 | 187 | 272 | 199 | 237 | 203 | 30 - 500 |
| Ammonia | mg/L | 0.02 | 0.019 | 0.193 | 0.065 | 0.026 | 0.084 | 0.017 | <0.01 | 0.028 | 0.02 | 0..025 | 0.055 | 0.013 | <0.01 | <0.02 | 0.06 | <0.02 | <0.02 | <0.02 | <0.02 | <0.020 | <0.020 | <0.010 | <0.010 | < 0.04 | < 0.04 | < 0.04 | 0.07 | < 0.04 | < 0.04 | - |
| Arsenic | mg/L | 0.001 | 0.0016 | 0.003 | 0.0015 | 0.0011 | 0.0056 | 0.0032 | <0.001 | NT | 0.0028 | <0.001 | NT | <0.001 | 0.0011 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.00245 | 0.0011 | 0.00126 | 0.00132 | 0.0011 | - | 0.0002 | - | 0.0012 | - | 0.01 |
| Barium | mg/L | 0.01 | 0.0166 | 0.118 | 0.0331 | 0.0297 | 0.253 | 0.138 | 0.0279 | 0.0258 | 0.104 | 0.0278 | 0.0323 | 0.0279 | 0.0278 | 0.028 | 0.036 | 0.034 | 0.032 | 0.031 | 0.034 | 0.101 | 0.0313 | 0.0403 | 0.0356 | 0.032 | 0.0351 | 0.00818 | 0.0366 | 0.0343 | 0.0329 | 1 |
| Boron | mg/L | 0.07 | 0.012 | 0.014 | 0.01 | <0.002 | 0.009 | <0.002 | 0.0176 | 0.0171 | <0.002 | <0.002 | 0.0058 | 0.009 | 0.0132 | 0.01 | 0.012 | 0.011 | <0.010 | 0.013 | 0.014 | 0.014 | 0.01 | 0.012 | 0.014 | 0.014 | 0.015 | 0.089 | 0.013 | 0.012 | 0.012 | 5 |
| Cadmium | mg/L | <0.0001 | <0.0001 | 0.00022 | <0.0001 | <0.0001 | 0.00095 | 0.00056 | <0.0001 | 0.00034 | 0.00059 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.002 | <0.002 | <0.002 | <0.020 | <0.002 | <0.002 | 0.000158 | 0.0000156 | 0.0000176 | 0.000017 | - | - | 0.000028 | - | 0.000016 | - | 0.005 |
| Calcium | mg/L | 45.5 | 41.3 | 263 | 57.5 | 53.1 | 257 | 130 | 36 | 44.7 | 110 | 53.6 | 43.9 | 51.2 | 49.4 | 55.7 | 54.2 | 51.5 | 51 | 48.5 | 48.9 | 101 | 50.7 | 52.7 | 47.5 | 54.9 | 55.7 | 85.2 | 45.3 | 59.6 | 54.7 | - |
| Chloride | mg/L | 17.5 | 13.1 | 13.2 | 12.4 | 13.3 | 11.2 | 11.4 | 13.6 | 13.2 | 13.1 | 11.7 | 11.8 | 13.9 | 12.4 | 14.8 | 13.7 | 13.7 | 13.2 | 12.2 | 12.2 | 11.9 | 11.5 | - | 12.2 | 11 | 12 | 6 | 13 | 11 | 14 | 250 |
| Chromium | mg/L | <0.001 | 0.0027 | 0.0054 | <0.001 | 0.0021 | 0.0112 | 0.0072 | <0.001 | <0.001 | 0.0097 | <0.001 | 0.0013 | 0.0059 | <0.001 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.00552 | 0.00063 | <0.00010 | <0.00010 | 0.00019 | - | 0.00243 | - | 0.00014 | - | 0.05 |
| Conductivity | µS/cm | 417 | 246 | 441 | 423 | 455 | 406 | 464 | 385 | 423 | 439 | 400 | 370 | 374 | 417 | 462 | 479 | 512 | 473 | 428 | 473 | 457 | 462 | 453 | 395 | 434 | 432 | 487 | 442 | 462 | 455 | - |
| Copper | mg/L | <0.001 | <0.001 | 0.0177 | 0.0029 | 0.0011 | 0.0339 | 0.0214 | 0.0012 | <0.001 | 0.0204 | 0.0014 | 0.0029 | 0.0011 | <0.001 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.0187 | 0.00153 | 0.0119 | 0.003 | 0.0005 | - | 0.0027 | - | 0.0014 | - | 1 |
| Iron | mg/L | 0.1 | <0.02 | **3.56** | 0.21 | 0.046 | **2.9** | **2.27** | 0.177 | <0.02 | **5.95** | <0.02 | <0.02 | 0.033 | <0.02 | <0.010 | 0.014 | < 0.010 | <0.010 | <0.010 | <0.010 | **3.82** | 0.07 | <0.010 | <0.010 | < 0.007 | 0.075 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | 0.3 |
| Lead | mg/L | <0.001 | <0.001 | 0.0026 | <0.001 | <0.001 | 0.0094 | 0.0063 | <0.0001 | <0.0001 | 0.00542 | <0.0001 | <0.0001 | <0.0001 | <0.001 | <0.002 | <0.002 | <0.002 | <0.002 | <0.001 | <0.001 | 0.00616 | <0.000050 | <0.000050 | 0.00008 | < 0.00009 | - | < 0.00009 | - | < 0.00009 | - | 0.01 |
| Magnesium | mg/L | 19.7 | 19 | 91.5 | 18.8 | 23.4 | 44.5 | 39.5 | 20.6 | 22.7 | 39.4 | 21 | 22.7 | 24.8 | 23.3 | 24.1 | 23.4 | 22.8 | 23.3 | 22.5 | 21.8 | 39.6 | 23.9 | 27.2 | 23.7 | 23.3 | 25 | 26.7 | 20.5 | 23.8 | 24.1 | - |
| Manganese | mg/L | 0.009 | 0.0058 | **0.845** | **0.0528** | 0.0051 | **0.842** | **0.429** | 0.0383 | 0.0021 | **0.303** | <0.001 | 0.0023 | <0.001 | 0.0014 | <0.002 | 0.006 | <0.002 | <0.002 | 0.004 | <0.002 | **0.295** | 0.00148 | 0.00087 | 0.00401 | 0.00273 | 0.0134 | 0.00069 | 0.00114 | 0.00112 | 0.00370 | 0.05 |
| Mercury | mg/L | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.0000052 | <0.0000050 | <0.0000050 | <0.0000050 | < 0.00001 | - | < 0.00001 | - | 0.00001 | - | 0.001 |
| Nitrate | mg/L | 0.06 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.05 | <0.05 | 0.06 | <0.05 | <0.05 | <0.05 | <0.020 | 0.045 | 0.022 | 0.033 | < 0.06 | < 0.06 | 0.08 | < 0.06 | <0.06 | < 0.06 | 10 |
| Nitrite | mg/L | <0.02 | <0.03 | NT | NT | NT | NT | NT | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.010 | <0.010 | <0.010 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | <0.03 | < 0.03 | 1 |
| pH | mg/L | 8 | 8.16 | 7.96 | 7.94 | 8.24 | 8.13 | 8.14 | 7.79 | 7.8 | 7.88 | 7.91 | 8.17 | 8.13 | 8.01 | 8.21 | 8.23 | 8.27 | 8.16 | 7.95 | 7.81 | 8.11 | 7.97 | 8.11 | 8.11 | 8.13 | 8.26 | 8.18 | 8.05 | 8.23 | 8.17 | 6.5 - 8.5 |
| Potassium | mg/L | 1.58 | 1.77 | 3.33 | 1.58 | 2.78 | 3.03 | 2.17 | 2.29 | 1.37 | 2.8 | 1.31 | 1.66 | 1.57 | 1.44 | 1.61 | 1.53 | 1.47 | 1.34 | 1.42 | 1.41 | 2.41 | 1.64 | 1.32 | 1.59 | 1.51 | - | 1.72 | - | 1.56 | - | - |
| Sodium | mg/L | 21.9 | 16.6 | 12.5 | 7.99 | 7.97 | 9.6 | 7.94 | 7.75 | 6.64 | 8.49 | 7.34 | 6.45 | 8.54 | 6.95 | 6.8 | 6.52 | 6.06 | 5.8 | 6.22 | 5.94 | 7.98 | 6.99 | 6.11 | 6.14 | 6.43 | 6.96 | 13.6 | 6.36 | 6.62 | 6.92 | 200 |
| Sulphate | mg/L | 27.5 | 24.2 | 21.4 | 21.9 | 27.5 | 25 | 22.7 | 30.1 | 31.4 | 30 | 22.8 | 23.9 | 30.2 | 30.5 | 31.5 | 31.2 | 27.7 | 28.1 | 25.8 | 30.6 | 26.6 | 32.2 | 26.3 | 27.4 | 23 | 29 | 8 | 35 | 27 | 37 | 500 |
| Total Dissolved Solids | mg/L | 260 | 338 | 470 | 360 | 280 | 400 | 160 | 180 | 290 | **2620** | 270 | 360 | 300 | 290 | 258 | 286 | 238 | 266 | 256 | 246 | 308 | 267 | 291 | 254 | 229 | 209 | 300 | 263 | 243 | 257 | 500 |
| TKN | mg/L | 0.14 | 3.41 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.10 | 0.2 | <0.10 | 0.15 | 0.33 | <0.10 | <0.15 | <0.15 | 0.24 | 0.117 | < 0.05 | - | 0.18 | - | 0.07 | - | - |
| Total Phosphorous | mg/L | 0.288 | 0.132 | 1.27 | 0.988 | 1.84 | 4.84 | 2.13 | NT | NT | NT | NT | NT | NT | NT | 0.34 | 1.22 | 0.7 | 0.57 | 0.98 | 0.03 | 1.43 | 0.099 | 0.37 | 0.326 | 0.36 | - | < 0.03 | - | 0.31 | - | - |
| Total Suspended Solids | mg/L | 1880 | 2710 | 1640 | 1620 | 1750 | 3130 | 4250 | 1090 | 964 | 17.6 | 978 | 924 | 1640 | 1600 | 2270 | 3150 | 11000 | 1610 | 1910 | 619 | 3040 | 418 | 1310 | 32.4 | 924 | 7600 | 249 | 752 | 1280 | 821 | - |
| Zinc | mg/L | <0.003 | 0.0026 | 0.017 | 0.0041 | <0.001 | 0.0145 | 0.0131 | 0.0227 | NT | 0.0299 | 0.0078 | NT | 0.0088 | 0.0049 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | 0.0181 | 0.0027 | 0.0035 | 0.0021 | < 0.002 | - | 0.003 | - | < 0.002 | - | 5 |
| **Other Organics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BOD5* | mg/L | <2 | 1.8 | 0.5 | <0.5 | <0.5 | <3 | 0.7 | 0.6 | 1.6 | 4.5 | 0.7 | 0.8 | 3.1 | <0.5 | <5 | <5 | <5 | <5 | <5 | <5 | <2.0 | <2.0 | <2.0 | <2.0 | < 4 | < 4 | < 4 | < 4 | < 4 | < 4 | - |
| COD | mg/L | <3 | <20 | 22 | <5 | <5 | 30 | 33 | 13.3 | 8.8 | 17.7 | 13.3 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 27.000 | <20 | 26.000 | 59.000 | < 8 | 8.000 | < 8 | 14.000 | < 8 | < 8 | - |
| DOC | mg/L | 1 | 2.9 | 1.2 | 1.7 | 1.4 | 1.4 | **5.13** | 1.94 | 2.1 | **7.81** | 1.7 | 1.7 | 1.4 | 1.6 | 2.2 | 1.7 | 1.5 | 2.0 | 2.0 | **11.7** | 3.7 | 2.5 | 1.3 | 1.3 | 2.0 | 4.0 | 4.0 | 2.0 | 4 | 2 | 5 |
| Phenol | ug/L | 0.003 | <0.001 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0017 | 0.0115 | <0.0010 | 0.0019 | < 0.002 | - | < 0.002 | - | < 0.002 | - | - |
| **Volatile Organics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,4-Dichlorobenzene | ug/L | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.50 | <0.50 | <0.5 | <0.5 | <0.5 | - | < 0.5 | - | < 0.5 | - | 5 |
| Benzene | ug/L | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.50 | <0.50 | <0.5 | <0.5 | <0.5 | - | < 0.5 | - | < 0.5 | - | 1 |
| Dichloromethane | ug/L | <0.003 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | - | - | - | - | - | - | <5.0 | <5.0 | <0.5 | <0.5 | <0.5 | - | < 0.5 | - | < 0.5 | - | 50 |
| Toluene | ug/L | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.50 | <0.50 | <0.5 | <0.5 | <0.5 | - | < 0.5 | - | < 0.5 | - | 60 |
| Methylene Chloride | ug/L | | | | | | | | | | | | | | | | | <0.30 | <0.30 | <0.30 | <0.30 | - | - | - | - | - | - | - | - | - | - | - |
| Vinyl Chloride | ug/L | <0.002 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.50 | <0.50 | <0.2 | <0.2 | <0.2 | - | < 0.2 | - | < 0.2 | - | 1 |
| **Field Measurements** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| pH | pH Units | NT | 7.93 | 8.30 | 8.72 | 8.50 | 7.95 | 7.73 | 8.11 | 7.98 | 7.63 | 7.23 | 7.53 | 7.23 | 7.64 | 8.02 | 7.18 | 7.06 | 7.40 | 7.72 | 7.43 | 7.88 | 7.38 | 7.48 | 7.38 | 7.64 | 7.22 | 7.85 | 7.71 | 8.40 | - | - |
| Conductivity | uS/cm | NT | 0.4 | 0.38 | 0.38 | 0.48 | 0.44 | 0.46 | 0.43 | 0.44 | 0.43 | 0.41 | 0.41 | 0.41 | 0.41 | 0.47 | 0.435 | 0.445 | 0.015 | 293 | 0.074 | 320.1 | 577.1 | 243 | 253 | 250 | 315 | 3.17.7 | 315.8 | 281 | - | - |
| Temperature | °C | NT | 8.3 | 7.2 | 9.4 | 12.6 | 9.6 | 7.5 | 8.3 | 7.8 | 9.4 | 6.4 | 8 | 7.4 | 9 | 8.53 | 8.8 | 8.48 | 12.1 | 6.02 | 9.53 | 6.7 | 12.9 | 5.84 | 8.58 | 6.37 | 10.2 | 7.6 | 8.8 | 7.42 | - | - |
| Dissolved Oxygen | % | NT | 40.1 | 35.3 | 28.2 | 21.2 | 44.7 | 40.3 | 52.4 | 38.2 | 36.6 | 27 | 33.6 | 28.1 | 31.3 | 50.6 | 48.2 | 66.8 | 121.2 | 104.3 | 76 | 41 | 34 | 62.1 | 31.1 | 56.3 | 7.08 | 5.71 | 8.55 | - | - | - |

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 Standard

NT — Not Tested

Pinchin File: 204232.008

**TABLE 7**
**Groundwater Quality Results - BH4A (downgradient shallow)**
**Jocelyn Waste Disposal Site**
**Township of Jocelyn, Ontario**

| Parameter | Units | Sample Designation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ODWQS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sample Collection Date (dd/mmm/yy) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | BH4A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | *24-Oct-90* | *18-Apr-91* | *31-Oct-05* | *8-May-07* | *9-Jun-10* | *12-Nov-10* | *19-May-11* | *5-Oct-11* | *25-Apr-12* | *12-Oct-12* | *20-Jun-13* | *3-Oct-13* | *7-May-14* | *8-Oct-14* | *6-May-15* | *13-Oct-15* | *15-Jun-16* | *12-Oct-16* | *12-May-17* | *5-Oct-17* | *3-May-18* | *10-Oct-18* | *7-May-19* | *1-Oct-19* | *5-May-20* | *26-Oct-20* | *5-May-21* | *15-Oct-21* | *4-May-22* | *17-Oct-22* | *19-May-23* | *17-Oct-23* | |
| Alkalinity | mg/L $CaCO_3$ | 107.8 | 133.5 | 207 | 246 | 222 | 241 | 227 | 252 | 257 | 253 | 250 | 223 | 223 | 212 | 201 | 261 | 247 | 226 | 247 | 248 | 280 | 250 | 217 | 232 | 256 | 259 | 254 | 280 | 234 | 261 | 222 | 243 | 30 - 500 |
| Ammonia | mg/L | NT | NT | 0.02 | 0.126 | 0.217 | 0.215 | 0.157 | 0.033 | 0.031 | 0.046 | 0.213 | 0.083 | 0.032 | 0.136 | 0.022 | 0.027 | 0.07 | 0.06 | <0.02 | <0.02 | <0.02 | <0.02 | <0.020 | <0.020 | <0.010 | <0.0050 | < 0.04 | < 0.04 | < 0.04 | < 0.04 | 0.04 | < 0.04 | - |
| Arsenic | mg/L | NT | NT | <0.001 | 0.0049 | 0.0018 | <0.001 | <0.001 | <0.001 | 0.0019 | <0.001 | NT | 0.0037 | <0.001 | NT | <0.001 | <0.001 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.00067 | 0.00026 | 0.00023 | 0.00027 | 0.0002 | - | 0.0012 | - | 0.0003 | - | 0.01 |
| Barium | mg/L | 0.0034 | 0.003 | 0.01 | 0.188 | 0.0884 | 0.151 | 0.119 | 0.0301 | 0.0884 | 0.0736 | 0.0666 | 0.0991 | 0.0214 | 0.126 | 0.139 | 0.0754 | 0.014 | 0.009 | 0.011 | 0.007 | 0.01 | 0.008 | 0.0195 | 0.00643 | 0.00764 | 0.0184 | 0.00905 | 0.0199 | 0.0354 | 0.0208 | 0.00879 | 0.01550 | 1 |
| Boron | mg/L | NT | NT | 0.1 | 0.0516 | 0.0512 | 0.0593 | 0.0275 | 0.0545 | 0.0368 | 0.0761 | 0.0642 | 0.0545 | 0.0215 | 0.0511 | 0.029 | 0.0703 | 0.05 | 0.062 | 0.052 | 0.045 | 0.049 | 0.06 | 0.041 | 0.042 | 0.05 | 0.048 | 0.047 | 0.062 | 0.027 | 0.108 | 0.043 | 0.052 | 5 |
| Cadmium | mg/L | NT | ND | <0.0001 | 0.00759 | 0.00012 | 0.0001 | 0.00012 | <0.0001 | 0.00028 | <0.0001 | <0.0001 | 0.00032 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.0000656 | 0.0000258 | 0.0000244 | 0.000018 | - | - | 0.000022 | - | 0.000018 | - | 0.005 |
| Calcium | mg/L | 24.4 | 35 | 56 | 37.7 | 71 | 41.5 | 49.4 | 58.7 | 65.2 | 38.9 | 43.4 | 70.2 | 54.3 | 44.4 | 43.6 | 53.9 | 60.3 | 54.8 | 57.7 | 56.6 | 57.4 | 64.5 | 59.3 | 54.6 | 58.9 | 54.6 | 66.8 | 63.9 | 65.4 | 59.6 | 68.6 | 60.3 | - |
| Chloride | mg/L | 8.1 | 4.4 | 11 | 7.36 | 7.55 | 7.98 | 12.1 | 7.03 | 6.64 | 7.54 | 5.93 | 5.45 | 4.05 | 3.74 | 4.77 | 4.8 | 3.68 | 3.19 | 2.83 | 2.5 | 2.04 | 2.4 | 2.7 | 2.25 | - | 3.12 | 4 | 5 | 13 | 5 | 5 | 6 | 250 |
| Chromium | mg/L | ND | ND | 0.001 | 0.0055 | <0.0001 | 0.0016 | 0.0028 | 0.0021 | 0.0048 | 0.0028 | 0.0038 | 0.0056 | 0.0026 | 0.0021 | 0.0056 | 0.0022 | <0.003 | <0.003 | 0.004 | <0.003 | <0.003 | <0.003 | 0.00263 | 0.00296 | 0.00195 | 0.00055 | 0.00069 | - | 0.00012 | - | 0.00252 | - | 0.05 |
| Conductivity | µS/cm | 270 | 352 | 420 | 235 | 448 | 462 | 484 | 465 | 527 | 447 | 471 | 464 | 423 | 406 | 394 | 456 | 484 | 453 | 513 | 483 | 496 | 538 | 418 | 434 | 457 | 415 | 455 | 502 | 465 | 503 | 437 | 472 | - |
| Copper | mg/L | 0.005 | 0.0016 | 0.002 | 0.003 | 0.0045 | 0.0017 | 0.0029 | 0.0017 | 0.0082 | 0.0017 | 0.0046 | 0.0088 | 0.0022 | 0.0027 | 0.0031 | 0.0022 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.212 | 0.00484 | 0.00259 | 0.00181 | 0.00222 | 0.0013 | - | 0.001 | - | 0.0028 | - | 1 |
| Iron | mg/L | 0.071 | **0.33** | 0.13 | 0.053 | **1.2** | <0.020 | 0.16 | 0.058 | **1.3** | 0.034 | <0.02 | **2.57** | <0.02 | 0.03 | <0.02 | <0.02 | <0.010 | <0.010 | < 0.010 | <0.010 | <0.010 | <0.010 | **0.908** | 0.054 | 0.045 | 0.023 | < 0.007 | 0.154 | 0.035 | 0.016 | < 0.007 | 0.01 | 0.3 |
| Lead | mg/L | 0.01 | **0.011** | <0.001 | 0.0058 | **0.0218** | <0.001 | 0.0036 | 0.001 | **0.0286** | <0.0001 | 0.00028 | **0.0305** | 0.00011 | <0.0001 | 0.0001 | 0.00018 | <0.002 | <0.002 | <0.002 | <0.002 | <0.001 | **0.012** | 0.00407 | <0.000050 | <0.000050 | 0.000064 | < 0.00009 | - | < 0.00009 | - | < 0.00009 | - | 0.01 |
| Magnesium | mg/L | 7.95 | 12.7 | 17.7 | 12.4 | 22.1 | 12 | 19.5 | 17.7 | 23.4 | 19 | 16.3 | 22.2 | 16.8 | 16.3 | 16 | 18.9 | 19.5 | 15.5 | 17.6 | 17.1 | 18.5 | 18.8 | 18.4 | 16.4 | 20.8 | 18.3 | 19.6 | 21.3 | 29.3 | 19.3 | 19.7 | 19.7 | - |
| Manganese | mg/L | 0.022 | **0.073** | 0.002 | 0.0145 | **0.0897** | 0.006 | 0.0178 | 0.0095 | 0.0773 | 0.0066 | 0.0113 | **0.0665** | 0.0017 | 0.00128 | 0.0145 | 0.011 | 0.009 | 0.005 | <0.002 | <0.002 | <0.002 | 0.002 | **0.0682** | 0.00484 | 0.0007 | 0.0114 | 0.02684 | 0.00828 | 0.00289 | 0.00288 | 0.00056 | 0.00196 | 0.05 |
| Mercury | mg/L | NT | NT | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0000050 | <0.0000050 | <0.0000050 | <0.0000050 | < 0.00001 | - | < 0.00001 | - | 0.00001 | - | 0.001 |
| Nitrate | mg/L | 0.3 | 2.2 | 1.79 | 1.72 | 0.57 | 0.44 | 0.5 | 0.28 | 0.41 | 0.37 | 0.28 | 0.44 | 0.41 | 0.23 | 0.26 | <0.1 | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.020 | <0.020 | <0.020 | <0.020 | 1.39 | < 0.06 | < 0.06 | 0.15 | 0.11 | 0.18 | 10 |
| Nitrite | mg/L | 0.04 | 0.015 | <0.02 | <0.03 | NT | NT | NT | NT | NT | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.010 | <0.010 | <0.010 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | <0.03 | < 0.03 | 1 |
| pH | mg/L | 8.21 | 8.04 | 8 | 7.99 | 8.06 | 8.09 | 8.04 | 8.01 | 8.26 | 7.99 | 7.82 | 7.84 | 7.87 | 8.22 | 8.26 | 7.94 | 8.25 | 8.22 | 8.36 | 8.11 | 7.91 | 7.93 | 8.14 | 7.88 | 8.09 | 8.11 | 8.06 | 8.17 | 8.11 | 8.09 | 8.20 | 8.20 | 6.5 - 8.5 |
| Potassium | mg/L | 5.02 | 3.95 | 1.81 | 4.97 | 3.31 | 2.7 | 3.78 | 2.06 | 2.51 | 1.99 | 2.54 | 2.63 | 2.03 | 2.5 | 2.93 | 2.37 | 2.16 | 1.67 | 1.34 | 1.57 | 1.4 | 1.66 | 1.6 | 1.74 | 1.37 | 1.59 | 1.32 | - | 1.79 | - | 1.35 | - | - |
| Sodium | mg/L | 22.5 | 23.2 | 14.7 | 43.7 | 19.9 | 37.1 | 26.2 | 16 | 25.8 | 19.9 | 28.9 | 22.2 | 27.1 | 30.3 | 44.8 | 26.9 | 21.8 | 17 | 12.5 | 16.4 | 13.8 | 14 | 13.2 | 14.2 | 15.1 | 13.5 | 11.2 | 15.7 | 7.04 | 12.7 | 9.55 | 12.70 | 200 |
| Sulphate | mg/L | 22.88 | NT | 14.3 | 19.3 | 15.4 | 11.9 | 14 | 12.7 | 10.9 | 16.7 | 16.7 | 15 | 10.2 | 8.8 | 17.7 | 18.5 | 10.4 | 8.31 | 8.51 | 8.76 | 8.69 | 6.43 | 7.05 | 6.06 | 7.03 | 4.53 | 6 | 6 | 29 | 11 | 10 | 12 | 500 |
| Total Dissolved Solids | mg/L | 157.9 | NT | 240 | 267 | 340 | 280 | 230 | **660** | 210 | 200 | 320 | 460 | 290 | 360 | 300 | 310 | 264 | 252 | 238 | 274 | 252 | 280 | 242 | 244 | 293 | 276 | 260 | 254 | 306 | 294 | 266 | 277 | 500 |
| TKN | mg/L | NT | NT | 0.27 | <0.08 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | 0.24 | 0.24 | 0.15 | 0.21 | 0.2 | <0.10 | 0.21 | 0.42 | 0.17 | 0.275 | 0.07 | - | 0.11 | - | 0.13 | - | - |
| Total Phosphorous | mg/L | NT | NT | 0.067 | 0.33 | 1.01 | 0.281 | 0.401 | 0.0747 | 0.121 | NT | NT | NT | NT | NT | NT | NT | 0.29 | 0.21 | 0.21 | 0.11 | 0.05 | 0.04 | 0.133 | 0.039 | 0.06 | 0.0745 | 0.04 | - | 0.46 | - | 0.04 | - | - |
| Total Suspended Solids | mg/L | NT | NT | 288 | 1040 | 10.5 | 4410 | 1300 | 2120 | 840 | 5620 | 1830 | 176 | 548 | 7550 | 2390 | 482 | 1430 | 1140 | 686 | 196 | 96 | 354 | 398 | 84.9 | 118 | 120 | 77 | 899 | 1530 | 291 | 120 | 211 | - |
| Zinc | mg/L | 0.0042 | 0.016 | <0.003 | 0.0066 | 0.0185 | 0.0022 | <0.001 | 0.0025 | 0.0159 | 0.0014 | NT | 0.0265 | 0.0042 | NT | 0.0048 | 0.0029 | 0.005 | 0.006 | <0.005 | <0.005 | <0.005 | 0.171 | 0.00091 | 0.003 | 0.002 | 0.0016 | < 0.002 | - | < 0.002 | - | 0.003 | - | 5 |
| **Other Organics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BOD5* | mg/L | NT | NT | <2 | 6.47 | 1.5 | 2.4 | 2.1 | 4.2 | 0.6 | 1.4 | 23.5 | 4.5 | 0.9 | 3.2 | 1.4 | <0.5 | <5 | <5 | <5 | <5 | <5 | <5 | <2.0 | <2.0 | <2.0 | <2.0 | < 4 | < 4 | < 4 | < 4 | < 4 | < 4 | - |
| COD | mg/L | NT | NT | 7 | <20 | 30 | 8.8 | 8.8 | 13 | 34 | 17.7 | 52 | 17.7 | 17.7 | 13.3 | 26 | 26 | 8.000 | <5 | <5 | <5 | <5 | <5 | 29.000 | 27.000 | 16.000 | 26.000 | < 8 | 8.000 | < 8 | < 8 | < 8 | 10 | - |
| DOC | mg/L | NT | NT | 2 | 3.4 | 3.8 | 3.1 | 3.7 | 4.28 | 2.9 | 4.8 | **5.71** | **7.81** | 4.21 | 4.25 | 3.8 | 4.4 | 4.5 | 4.3 | 4.1 | 4.9 | 4.1 | 4.5 | **7.4** | 5.0 | 4.9 | 3.7 | 3.0 | 4.0 | 3.0 | 4.0 | 1 | 4 | 5 |
| Phenol | ug/L | 0.6 | 0.8 | <0.002 | <0.001 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.0010 | 0.0137 | 0.0031 | <0.0010 | < 0.002 | - | < 0.002 | - | < 0.002 | - | |
| **Volatile Organics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,4-Dichlorobenzene | ug/L | NT | NT | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.50 | <0.50 | <0.50 | <0.50 | <0.5 | - | < 0.5 | - | < 0.5 | - | 5 |
| Benzene | ug/L | NT | NT | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.50 | <0.50 | <0.50 | <0.50 | <0.5 | - | < 0.5 | - | < 0.5 | - | 1 |
| Dichloromethane | ug/L | NT | NT | NT | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | | | - | - | - | <5.0 | <5.0 | <5.0 | <5.0 | <0.5 | - | < 0.5 | - | < 0.5 | - | 50 |
| Toluene | ug/L | NT | NT | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.50 | <0.50 | <0.50 | <0.50 | <0.5 | - | < 0.5 | - | < 0.5 | - | 60 |
| Methylene Chloride | ug/L | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.30 | <0.30 | <0.30 | <0.30 | - | - | - | - | - | - | - | - | - | - | - |
| Vinyl Chloride | ug/L | NT | NT | <0.002 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.50 | <0.5 | <0.2 | <0.2 | <0.2 | - | < 0.2 | - | < 0.2 | - | 1 |
| **Field Parameters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| pH | pH Units | NT | NT | 8.07 | 8.07 | 8.32 | 8.59 | 8.36 | 7.58 | 7.59 | 7.83 | 7.90 | 7.61 | 7.41 | 7.54 | 7.08 | 7.66 | 7.94 | 7.34 | 7.59 | 6.99 | 7.51 | 7.27 | 7.76 | 7.36 | 7.08 | 8.38 | 7.62 | 7.33 | 7.49 | 7.86 | 8.87 | - | - |
| Conductivity | uS/cm | NT | NT | 0.33 | 0.33 | 0.38 | 0.41 | 0.49 | 0.5 | 76.1 | 0.49 | 0.45 | 0.4 | 0.43 | 0.45 | 0.47 | 0.43 | 0.495 | 0.454 | 0.44 | 0.023 | 281 | 0.064 | 283.7 | 185.4 | 231 | 204 | 257 | 368 | 309.5 | 0.47 | 292 | - | - |
| Temperature | °C | NT | NT | 8.1 | 8.1 | 8.2 | 9.6 | 14.27 | 11.8 | 6.1 | 10.3 | 9.3 | 11.7 | 4.7 | 10.1 | 5.3 | 11.3 | 9.24 | 9.09 | 8.03 | 13.5 | 4.31 | 10.6 | 5.6 | 13.8 | 4.84 | 9.17 | 5.73 | 12.8 | 5.6 | 10.3 | 7.43 | - | - |
| Dissolved Oxygen | % | NT | NT | 81.3 | 81.3 | 74.7 | 28.5 | 28.1 | 49.1 | 0.51 | 64.2 | 48.7 | 57.4 | 53 | 62.7 | 42.3 | 55.2 | 75.2 | 71.7 | 92.6 | 79.2 | 79.5 | 98.9 | 93.7 | 66.3 | 76.4 | 10.67 | 79.4 | 8.7 | 10.96 | 8.43 | - | - | - |

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 Standard

NT — Not Tested

Pinchin File: 204232.008

**TABLE 8**
**Groundwater Quality Results - BH5 (downgradient deep)**
**Jocelyn Waste Disposal Site**
**Township of Jocelyn, Ontario**

| Parameter | Units | Sample Designation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ODWQS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sample Collection Date (dd/mmm/yy) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | BH5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | *31-Oct-05* | *8-May-07* | *9-Jun-10* | *12-Nov-10* | *19-May-11* | *5-Oct-11* | *25-Apr-12* | *12-Oct-12* | *20-Jun-13* | *3-Oct-13* | *7-May-14* | *8-Oct-14* | *6-May-15* | *13-Oct-15* | *15-Jun-16* | *12-Oct-16* | *12-May-17* | *5-Oct-17* | *3-May-18* | *10-Oct-18* | *7-May-19* | *1-Oct-19* | *5-May-20* | *26-Oct-20* | *5-May-21* | *15-Oct-21* | *4-May-22* | *17-Oct-22* | *19-May-23* | *19-May-23 DUP* | *17-Oct-23* | *17-Oct-23 DUP* | |
| Alkalinity | mg/L $CaCO_3$ | 154 | 184 | 204 | 141 | 163 | 140 | 141 | 151 | 170 | 151 | 151 | 183 | 178 | 177 | 162 | 180 | 167 | 182 | 184 | 174 | 166 | 198 | 191 | 197 | 196 | 199 | 189 | 177 | 160 | 178 | 184 | 183 | 30 - 500 |
| Ammonia | mg/L | 0.02 | 0.0662 | 0.145 | 1.39 | 0.012 | 0.02 | 0.013 | <0.01 | 0.02 | 0.026 | 0.024 | <0.01 | 0.021 | <0.01 | <0.02 | 0.09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.020 | <0.020 | <0.010 | <0.0050 | < 0.04 | 0.04 | < 0.04 | < 0.04 | < 0.04 | 0.04 | < 0.04 | 0.04 | < 0.04 | - |
| Arsenic | mg/L | <0.001 | 0.0037 | 0.0012 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | NT | 0.0019 | <0.001 | NT | <0.001 | <0.001 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.00028 | 0.00024 | 0.00023 | 0.00029 | 0.0002 | - | 0.0003 | - | 0.0002 | 0.0003 | - | - | 0.01 |
| Barium | mg/L | <0.01 | 0.066 | 0.0571 | 0.0295 | 0.024 | 0.046 | 0.0407 | 0.0122 | 0.0129 | 0.091 | 0.0078 | 0.0104 | 0.0088 | 0.0088 | 0.007 | 0.008 | 0.008 | 0.008 | 0.007 | 0.008 | 0.00521 | 0.00684 | 0.00585 | 0.00763 | 0.00668 | 0.0066 | 0.00715 | 0.00616 | 0.00551 | 0.00555 | 0.00565 | 0.00582 | 1 |
| Boron | mg/L | 0.05 | 0.018 | 0.014 | 0.0075 | <0.002 | 0.0095 | <0.002 | 0.0061 | 0.0101 | <0.002 | <0.002 | <0.002 | <0.002 | 0.0084 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.007 | 0.012 | 0.013 | 0.025 | 0.006 | 0.010 | 0.005 | 0.005 | 5 |
| Cadmium | mg/L | <0.0001 | 0.00697 | 0.00013 | 0.00012 | <0.0001 | <0.0001 | 0.00018 | <0.0001 | <0.0001 | 0.00046 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.0000050 | 0.0000052 | <0.0000050 | <0.0000050 | - | - | 0.000004 | - | < 0.000003 | < 0.000003 | - | - | 0.005 |
| Calcium | mg/L | 39.2 | 62.3 | 86.3 | 32.4 | 40.2 | 70.9 | 44.9 | 30.8 | 36.3 | 99.1 | 42.4 | 40.8 | 40.8 | 38 | 39.7 | 43.3 | 36.8 | 42.9 | 40.3 | 43.2 | 40.5 | 44.9 | 43.3 | 42.5 | 46.5 | 46.3 | 61.1 | 41.8 | 44.0 | 44.7 | 42.8 | 43.0 | - |
| Chloride | mg/L | 1.3 | 0.42 | 0.45 | 0.74 | 4.63 | 0.5 | 0.77 | 0.66 | 0.83 | 0.63 | 0.57 | 0.75 | 2.19 | 2.76 | 1.11 | 0.83 | 0.68 | 0.91 | 0.72 | 0.93 | 0.62 | 0.6 | - | 0.94 | 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 | 250 |
| Chromium | mg/L | <0.001 | 0.0052 | 0.0017 | <0.001 | 0.0019 | 0.128 | 0.0029 | <0.001 | 0.0016 | 0.0109 | 0.001 | 0.0016 | 0.0019 | <0.001 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.0005 | 0.00053 | 0.00041 | 0.00044 | 0.00068 | - | 0.00055 | - | 0.00051 | 0.00047 | - | - | 0.05 |
| Conductivity | µS/cm | 269 | 180 | 354 | 253 | 311 | 256 | 278 | 262 | 303 | 302 | 275 | 329 | 324 | 319 | 317 | 354 | 352 | 182 | 311 | 385 | 322 | 371 | 339 | 330 | 334 | 344 | 338 | 329 | 306 | 312 | 343 | 344 | - |
| Copper | mg/L | <0.001 | 0.0051 | 0.0063 | 0.0011 | <0.001 | 0.0164 | 0.0048 | <0.001 | 0.0011 | 0.0205 | 0.0011 | <0.001 | 0.0021 | 0.0013 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.00032 | 0.00044 | 0.00034 | 0.00308 | 0.0004 | - | 0.0023 | - | 0.0006 | 0.0005 | - | - | 1 |
| Iron | mg/L | 0.08 | 0.296 | **3.01** | **0.424** | 0.2 | **12.2** | **1.4** | 0.033 | 0.184 | **8.84** | <0.02 | <0.02 | 0.027 | <0.02 | <0.010 | <0.010 | < 0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.019 | <0.010 | <0.010 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | 0.3 |
| Lead | mg/L | <0.001 | 0.0042 | 0.0014 | <0.001 | <0.001 | 0.005 | 0.0021 | <0.0001 | 0.00013 | 0.0112 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.002 | <0.002 | <0.002 | <0.002 | <0.001 | <0.001 | <0.000050 | <0.000050 | <0.000050 | 0.000062 | < 0.00009 | - | < 0.00009 | - | < 0.00009 | < 0.00009 | - | - | 0.01 |
| Magnesium | mg/L | 15.6 | 12.5 | 23 | 7 | 17 | 26.9 | 20.6 | 13.8 | 17.4 | 47.7 | 15.9 | 18.5 | 19.5 | 16.1 | 17.4 | 17.9 | 16.6 | 18.2 | 17.5 | 18.5 | 17.7 | 20.4 | 20.6 | 19.7 | 19 | 18.8 | 26.3 | 15.8 | 16.3 | 16.4 | 18.0 | 17.9 | - |
| Manganese | mg/L | 0.003 | **0.108** | **1.12** | **0.0685** | 0.0262 | **2.39** | **0.217** | 0.0011 | 0.0169 | **1.1** | <0.001 | 0.0087 | <0.001 | 0.0021 | <0.002 | 0.003 | <0.002 | <0.002 | <0.002 | <0.002 | 0.0273 | 0.00045 | 0.00013 | 0.00022 | 0.00042 | 0.00027 | 0.00027 | 0.00043 | 0.00023 | 0.00017 | 0.00033 | 0.00029 | 0.05 |
| Mercury | mg/L | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.00054 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.000005 | <0.0000050 | <0.0000050 | <0.0000050 | < 0.00001 | - | < 0.00001 | - | < 0.00001 | < 0.00001 | - | - | 0.001 |
| Nitrate | mg/L | 0.19 | 0.27 | <0.1 | 0.25 | 0.29 | 0.14 | 0.16 | 0.1 | <0.1 | 0.28 | 0.16 | 0.55 | 0.25 | 0.97 | 0.17 | 0.22 | 0.24 | 0.18 | 0.14 | 0.25 | 0.529 | 0.574 | 0.879 | 0.781 | 0.78 | 0.68 | 0.97 | 0.61 | < 0.03 | 0.45 | 0.49 | 0.49 | 10 |
| Nitrite | mg/L | <0.02 | <0.03 | NT | NT | NT | NT | NT | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.010 | <0.010 | <0.010 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | 0.45 | <0.03 | < 0.03 | < 0.03 | 1 |
| pH | mg/L | 8 | 7.78 | 7.89 | 7.59 | 7.96 | 7.7 | 8.17 | 7.79 | 7.65 | 7.74 | 7.87 | 8.35 | 8.47 | 7.96 | 8.22 | 8.14 | 8.17 | 8.09 | 7.95 | 7.74 | 8.1 | 7.98 | 8.08 | 8 | 8.04 | 8.05 | 8.14 | 8.07 | 8.24 | 8.21 | 8.13 | 8.11 | 6.5 - 8.5 |
| Potassium | mg/L | 0.3 | 2.21 | 1.83 | 1.22 | 0.84 | 0.75 | 0.51 | 0.56 | 0.47 | 1.07 | 0.36 | 0.54 | 0.44 | 0.44 | 0.57 | 0.55 | 0.68 | 0.39 | 0.36 | 0.46 | 0.34 | 0.476 | 0.341 | 0.459 | 0.45 | - | 0.611 | - | 0.357 | 0.360 | - | - | - |
| Sodium | mg/L | 2.31 | 1.36 | 0.84 | 0.99 | 1.99 | 1.55 | 1.26 | 1.89 | 1.42 | 1.4 | 1.24 | 2.15 | 1.95 | 1.63 | 1.65 | 1.76 | 1.42 | 1.72 | 1.64 | 2.08 | 1.64 | 2.32 | 1.73 | 2.12 | 2.36 | 2.01 | 2.64 | 1.49 | 1.35 | 1.36 | 1.62 | 1.67 | 200 |
| Sulphate | mg/L | 7.6 | 5.3 | 3.6 | 5.4 | 4.5 | 5.8 | 5.8 | 6.1 | 6.5 | 5.1 | 4.3 | 5.6 | 12.5 | 8.4 | 5.96 | 5.44 | 4.8 | 4.72 | 5.05 | 4.64 | 3.31 | 4.26 | 3.56 | 3.94 | 4 | 4 | 4 | 4 | 3 | 3 | 6 | 4 | 500 |
| Total Dissolved Solids | mg/L | 180 | 230 | 220 | 160 | 120 | 270 | 140 | 110 | 300 | 80 | 180 | 200 | 290 | 210 | 158 | 180 | 168 | 176 | 152 | 194 | 170 | 201 | 230 | 198 | 189 | 183 | 203 | 183 | 151 | 166 | 183 | 191 | 500 |
| TKN | mg/L | 0.44 | 1.37 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | 0.11 | 0.19 | 0.1 | 0.14 | 0.22 | <0.10 | <0.15 | 0.38 | 0.18 | 0.162 | < 0.05 | - | 0.1 | - | < 0.05 | 0.08 | - | - | - |
| Total Phosphorous | mg/L | 0.231 | 3.31 | 0.838 | 2.2 | 0.289 | 0.345 | 0.214 | NT | NT | NT | NT | NT | NT | NT | 0.52 | 0.27 | 0.47 | 0.23 | 0.08 | 0.07 | 0.076 | 0.0902 | 0.048 | 0.0347 | 0.03 | - | < 0.03 | - | 0.03 | 0.03 | - | - | - |
| Total Suspended Solids | mg/L | 310 | 8300 | 4140 | 2520 | 579 | 668 | 326 | 424 | 630 | 757 | 1390 | 606 | 928 | 588 | 717 | 508 | 1110 | 278 | 201 | 86 | 115 | 115 | 40.8 | 21.4 | 61 | 43 | 27 | 262 | 67 | 37 | 46 | 31 | - |
| Zinc | mg/L | <0.003 | 0.0072 | **14.3** | 0.0052 | <0.001 | 0.0264 | 0.0067 | 0.0086 | NT | 0.0485 | 0.006 | NT | 0.0138 | 0.0098 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.0010 | <0.0010 | <0.0010 | 0.0054 | < 0.002 | - | 0.003 | - | < 0.002 | < 0.002 | - | - | 5 |
| **Other Organics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BOD5* | mg/L | <2 | 3.3 | 21 | 25 | 3.4 | 3.9 | 0.6 | 0.9 | 0.9 | 0.8 | 0.6 | <3 | 0.9 | <0.5 | <5 | <5 | <5 | <5 | <5 | <5 | <2.0 | <2.0 | <2.0 | <2.0 | < 4 | < 4 | < 4 | < 4 | < 4 | < 4 | < 4 | < 4 | - |
| COD | mg/L | 17 | <20 | 45 | 18 | 26 | 26 | 33 | 55.4 | 37.7 | 45.1 | 30 | 37.7 | <5 | 21.9 | <5 | <5 | <5 | <5 | <5 | <5 | <20 | <20 | <10 | <20 | < 8 | 13 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | - |
| DOC | mg/L | 2 | 4.22 | **6.77** | 1.8 | 1.4 | 2.7 | 1 | 1.65 | 1.9 | 4.76 | 1.5 | 1.6 | 1.3 | 1.3 | 1.5 | 1.2 | 1 | 1.6 | 1.4 | 1.5 | 2.85 | 1.59 | 1.72 | 0.64 | 1 | 2 | 2 | 2 | 8 | 1 | 2 | 1 | 5 |
| Phenol | ug/L | 0.005 | <0.001 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0035 | 0.0087 | 0.0022 | <0.0010 | < 0.002 | - | < 0.002 | - | < 0.002 | < 0.002 | - | - | - |
| **Volatile Organics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,4-Dichlorobenzene | ug/L | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.50 | <0.50 | <0.50 | <0.50 | <0.5 | - | < 0.5 | - | < 0.5 | < 0.5 | - | - | 5 |
| Benzene | ug/L | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.50 | <0.50 | <0.50 | <0.50 | <0.5 | - | < 0.5 | - | < 0.5 | < 0.5 | - | - | 1 |
| Dichloromethane | ug/L | NT | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | - | - | - | - | - | - | <5.0 | <5.0 | <5.0 | <5.0 | <0.5 | - | < 0.5 | - | < 0.5 | < 0.5 | - | - | 50 |
| Toluene | ug/L | <0.001 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.50 | <0.50 | <0.50 | <0.50 | <0.5 | - | < 0.5 | - | < 0.5 | < 0.5 | - | - | 60 |
| Methylene Chloride | ug/L | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.30 | <0.30 | <0.30 | <0.30 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vinyl Chloride | ug/L | <0.002 | <0.00025 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.50 | <0.50 | <0.2 | <0.2 | <0.2 | - | < 0.2 | - | < 0.2 | <0.2 | - | - | 1 |
| **Field Measurements** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| pH | pH Units | NT | 7.64 | 8.02 | 8.62 | 8.57 | 8.02 | 7.79 | 8.09 | 8.09 | 7.76 | 7.40 | 7.67 | 7.42 | 7.77 | 8.11 | 7.71 | 7.78 | 7.82 | 7.62 | 7.16 | 7.90 | 7.49 | 8.17 | 8.28 | 7.14 | 7.46 | 7.51 | 7.55 | 8.20 | 8.20 | - | - | - |
| Conductivity | uS/cm | NT | 0.24 | 0.2 | 0.22 | 0.3 | 0.28 | 0.29 | 0.28 | 0.3 | 0.28 | 0.28 | 0.32 | 0.3 | 0.29 | 0.323 | 0.332 | 0.292 | 0.006 | 206 | 0.257 | 225.3 | 294.3 | 184 | 213 | 194 | 256 | 229.1 | 241 | 181 | 181 | - | - | - |
| Temperature | ℃ | NT | 7.4 | 6.9 | 9.6 | 12.5 | 9.9 | 6.9 | 9 | 7.1 | 9.4 | 6.1 | 8.6 | 6.5 | 9.1 | 6.4 | 6.72 | 8.87 | 16.3 | 6.03 | 9.87 | 6.3 | 12.6 | 5.29 | 8.5 | 5.99 | 10.3 | 6.6 | 9 | 6.38 | 6.38 | - | - | - |
| Dissolved Oxygen | % | NT | 70.5 | 63.2 | 25.8 | 24.5 | 54.1 | 76.5 | 63.5 | 67.2 | 69 | 55.4 | 66.7 | 54.8 | 58.8 | 85.1 | 95.8 | 81 | 93.1 | 67.7 | 115.5 | 86.2 | 66.9 | 79.8 | 95.9 | 90.4 | 7.8 | 9.07 | 9.09 | 0.05mg/l | - | - | - | - |

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 Standard |
| NT | Not Tested |

Pinchin File: 204232.008

**TABLE 9**
**Groundwater Quality Results - BH5A (downgradient shallow)**
**Jocelyn Waste Disposal Site**
**Township of Jocelyn, Ontario**

| Parameter | Units | Sample Designation | | | | | | | | | | | | | | | | | | | | | | | | | | ODWQS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sample Collection Date (dd/mmm/yy) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | BH5A | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | *24-Oct-90* | *18-Apr-91* | *31-Oct-05* | *19-May-11* | *5-Oct-11* | *25-Apr-12* | *12-Oct-12* | *20-Jun-13* | *3-Oct-13* | *7-May-14* | *8-Oct-14* | *6-May-15* | *13-Oct-15* | *15-Jun-16* | *12-Oct-16* | *12-May-17* | *5-Oct-17* | *3-May-18* | *10-Oct-18* | *7-May-19* | *1-Oct-19* | *5-May-20* | *26-Oct-20* | *5-May-21* | *15-Oct-21* | *4-May-22* | *17-Oct-22* | *19-May-23* | *17-Oct-23* | |
| Alkalinity | mg/L $CaCO_3$ | Well Not Tested | Well Not Tested | Dry Well | 163 | 162 | 179 | DRY WELL | 130 | 133 | 125 | 119 | 126 | 201 | 154 | 157 | 136 | 175 | 205 | 95 | 119 | 127 | 128 | 140 | 136 | 190 | 97 | 158 | 120 | - | 30 - 500 |
| Ammonia | mg/L | | | | 0.065 | 0.023 | 0.014 | | 0.042 | 0.052 | 0.054 | 0.026 | <0.01 | <0.01 | <0.02 | 0.09 | <0.02 | 0.04 | <0.02 | <0.02 | <0.020 | 0.075 | 0.021 | <0.0050 | < 0.04 | < 0.04 | < 0.04 | < 0.04 | 0.04 | - | - |
| Arsenic | mg/L | | | | <0.001 | <0.001 | <0.001 | | NT | 0.0016 | <0.001 | NT | <0.001 | <0.001 | <0.003 | <0.003 | <0.003 | <0.03 | <0.003 | <0.003 | 0.0002 | 0.00015 | 0.00012 | 0.00021 | < 0.0002 | - | < 0.0002 | - | < 0.0002 | - | 0.01 |
| Barium | mg/L | | | | 0.0195 | 0.0462 | 0.0335 | | 0.0137 | 0.0808 | 0.0139 | 0.0119 | 0.0115 | 0.0226 | 0.01 | 0.015 | 0.011 | 0.013 | 0.012 | 0.01 | 0.00853 | 0.0115 | 0.00791 | 0.0126 | 0.00958 | 0.0132 | 0.00734 | 0.0452 | 0.00853 | - | 1 |
| Boron | mg/L | | | | <0.002 | 0.016 | <0.002 | | 0.0226 | 0.0021 | <0.002 | <0.008 | 0.0058 | 0.0203 | 0.013 | 0.019 | <0.010 | 0.012 | 0.01 | 0.016 | <0.010 | 0.014 | <0.010 | 0.013 | 0.011 | 0.021 | 0.028 | 0.056 | 0.018 | - | 5 |
| Cadmium | mg/L | | | | <0.0001 | <0.0001 | <0.0001 | | 0.00021 | 0.00042 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.0000078 | 0.0000166 | 0.0000253 | 0.000015 | - | - | 0.000016 | - | 0.000011 | - | 0.005 |
| Calcium | mg/L | | | | 48.4 | 45.5 | 45.6 | | 33.2 | 46.9 | 43.4 | 26.7 | 31.8 | 49.7 | 37.1 | 40.7 | 32.9 | 45.6 | 50 | 27.4 | 33.4 | 31.7 | 29.2 | 32.6 | 40.4 | 48.6 | 32.7 | 53.8 | 34.1 | - | - |
| Chloride | mg/L | | | | 5.68 | 0.52 | 0.8 | | 0.36 | 0.56 | 0.43 | 0.5 | 1.9 | 2.78 | 1.23 | 0.47 | 0.4 | 0.9 | 0.66 | 0.34 | <0.10 | 0.19 | - | <0.22 | 1 | < 1 | < 1 | < 1 | < 1 | - | 250 |
| Chromium | mg/L | | | | 0.002 | **0.416** | 0.0015 | | 0.0011 | 0.0073 | <0.001 | <0.001 | 0.004 | <0.001 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | 0.00032 | 0.00057 | 0.0002 | 0.0003 | 0.00033 | - | 0.00156 | - | 0.00029 | - | 0.05 |
| Conductivity | µS/cm | | | | 310 | 309 | 345 | | 236 | 267 | 232 | 215 | 239 | 350 | 271 | 313 | 285 | 337 | 340 | 216 | 232 | 239 | 224 | 237 | 257 | 335 | 179 | 372 | 219 | - | - |
| Copper | mg/L | | | | 0.0057 | 0.0307 | 0.0055 | | 0.004 | 0.0188 | 0.0022 | 0.003 | 0.0037 | 0.0014 | <0.003 | 0.003 | <0.003 | <0.003 | <0.003 | 0.009 | 0.00226 | 0.00263 | 0.00159 | 0.0048 | 0.0016 | - | 0.0028 | - | 0.0027 | - | 1 |
| Iron | mg/L | | | | 0.3 | **11.7** | **0.452** | | 0.037 | **5.51** | 0.112 | 0.092 | 0.077 | <0.02 | <0.010 | 0.135 | <0.010 | 0.068 | <0.010 | 0.055 | 0.022 | 0.033 | 0.018 | 0.022 | 0.03 | 0.095 | 0.062 | **1.03** | 0.046 | - | 0.3 |
| Lead | mg/L | | | | <0.001 | 0.0049 | <0.001 | | <0.0001 | 0.00599 | <0.0001 | <0.0001 | <0.0001 | 0.00011 | <0.002 | <0.002 | <0.002 | <0.002 | <0.001 | <0.001 | <0.0000050 | <0.0000050 | <0.000050 | 0.000058 | < 0.00009 | - | < 0.00009 | - | < 0.00009 | - | 0.01 |
| Magnesium | mg/L | | | | 9.78 | 18.3 | 13.4 | | 10.5 | 16.3 | 10.9 | 8.08 | 9.81 | 14.4 | 12.2 | 13.1 | 11.5 | 13.9 | 15.9 | 7.91 | 11.5 | 10.4 | 11.2 | 11.4 | 12.3 | 15 | 10.1 | 15.9 | 10.1 | - | - |
| Manganese | mg/L | | | | **0.126** | **0.451** | **0.0773** | | **0.344** | **1.46** | **0.353** | **0.201** | **0.148** | <0.001 | **0.104** | **0.103** | **0.16** | **0.328** | **0.092** | 0.01 | 0.00989 | 0.0126 | **0.0886** | 0.00257 | **0.206** | 0.026 | 0.0236 | **0.185** | **0.104** | - | 0.05 |
| Mercury | mg/L | | | | <0.0001 | <0.0001 | <0.0001 | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.001 | <0.0001 | <0.0001 | <0.0000050 | <0.0000050 | <0.0000050 | <0.0000050 | < 0.00001 | - | < 0.00001 | - | 0.00001 | - | 0.001 |
| Nitrate | mg/L | | | | 0.17 | 1.17 | 0.3 | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.31 | 0.2 | 0.62 | 0.22 | 0.13 | 0.15 | <0.05 | 0.07 | <0.020 | 0.03 | <0.020 | < 0.06 | 0.16 | < 0.06 | 0.51 | <0.06 | - | 10 |
| Nitrite | mg/L | | | | NT | NT | NT | | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.010 | <0.010 | <0.010 | <0.010 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | <0.03 | - | 1 |
| pH | mg/L | | | | 7.89 | 7.89 | 7.66 | | 7.53 | 7.56 | 7.62 | 8.08 | 8.28 | 7.9 | 8.15 | 8.1 | 8.11 | 7.88 | 7.98 | 7.31 | 7.9 | 7.08 | 7.61 | 7.37 | 7.69 | 8.19 | 7.77 | 8.16 | 7.91 | - | 6.5 - 8.5 |
| Potassium | mg/L | | | | 3.28 | 2.39 | 2.18 | | 1.96 | 2.76 | 1.5 | 1.75 | 1.44 | 1.81 | 1.93 | 1.48 | 1.68 | 1.65 | 1.25 | 1.36 | 0.953 | 1.59 | 0.814 | 1.21 | 1 | - | 0.976 | - | 0.712 | - | - |
| Sodium | mg/L | | | | 2.11 | 1.27 | 0.98 | | 0.55 | 0.59 | 0.56 | 0.51 | 0.52 | 0.98 | 0.87 | 0.7 | 0.56 | 0.72 | 0.75 | 0.65 | 0.36 | 0.601 | 0.344 | 0.578 | 0.96 | 0.8 | 0.42 | 0.92 | 0.33 | - | 200 |
| Sulphate | mg/L | | | | 4.8 | 4.5 | 3.6 | | 4 | 2.4 | 2 | 1.6 | 9.3 | 7.5 | 3.76 | 4.42 | 2.68 | 3.21 | 3.89 | 2.94 | 1.17 | 2.15 | 1.05 | 1.71 | 13 | < 2 | < 2 | < 2 | < 2 | - | 500 |
| Total Dissolved Solids | mg/L | | | | 190 | 290 | 210 | | 140 | 400 | 170 | 130 | 180 | 230 | 148 | 188 | 132 | 192 | 148 | 120 | 161 | 126 | 198 | 158 | 137 | 200 | 114 | 229 | 140 | - | 500 |
| TKN | mg/L | | | | NT | NT | NT | | NT | NT | NT | NT | NT | NT | 0.48 | 0.7 | 0.32 | 0.48 | 0.76 | 0.18 | 0.54 | <1.5 | 0.63 | 0.628 | 0.21 | - | 0.3 | - | 0.28 | - | - |
| Total Phosphorous | mg/L | | | | 0.367 | 0.459 | 0.308 | | NT | NT | NT | NT | NT | NT | 0.76 | 1.04 | 0.57 | 0.62 | 0.9 | 0.17 | 0.314 | 0.411 | 0.403 | 0.098 | 0.12 | - | 0.09 | - | 0.04 | - | - |
| Total Suspended Solids | mg/L | | | | 1350 | 1080 | 632 | | 1260 | 50 | 518 | 302 | 139 | 1100 | 1080 | 274 | 1270 | 1450 | 1930 | 234 | 328 | 1060 | 905 | 239 | 211 | 552 | 211 | 630 | 79 | - | - |
| Zinc | mg/L | | | | 0.0034 | 0.0293 | 0.0076 | | NT | 0.0803 | 0.0088 | NT | 0.0096 | 0.0078 | 0.006 | 0.006 | <0.005 | 0.006 | 0.016 | 0.018 | 0.0022 | 0.0071 | 0.0039 | 0.009 | 0.004 | - | 0.003 | - | < 0.002 | - | 5 |
| **Other Organics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BOD5* | mg/L | | | | 2.3 | <0.5 | 1.8 | | 1.3 | 2 | 1.3 | <3 | 1.4 | <0.6 | <5 | <5 | <5 | <5 | <5 | <5 | <2.0 | <2.0 | <2.0 | <2.0 | < 4 | < 4 | < 4 | < 10 | < 4 | - | - |
| COD | mg/L | | | | 30 | 22 | 35 | | 37.7 | 17.7 | 26 | 21.9 | 21.9 | 37.7 | 17 | 12 | 14 | 8 | 7 | 9 | 54 | 44 | 61 | 36 | 18 | 17 | 19 | 36 | 17 | - | - |
| DOC | mg/L | | | | **8.8** | **6.34** | 4.41 | | **10.9** | **9.74** | **6.03** | **8.51** | **5.35** | **6.57** | **7.6** | **5.1** | **5.3** | **8** | **5.3** | **7.9** | **9.62** | **9.22** | **5.64** | **6.34** | **5** | **6** | **8** | **6** | 8 | - | 5 |
| Phenol | ug/L | | | | NT | NT | NT | | NT | NT | NT | NT | NT | NT | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.003 | 0.0084 | 0.0012 | <0.0010 | < 0.002 | - | < 0.002 | - | 0.003 | - | - |
| **Volatile Organics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,4-Dichlorobenzene | ug/L | | | | NT | NT | NT | | NT | NT | NT | NT | NT | NT | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.50 | <0.50 | <0.50 | <0.50 | <0.5 | - | < 0.5 | - | < 0.5 | - | 5 |
| Benzene | ug/L | | | | NT | NT | NT | | NT | NT | NT | NT | NT | NT | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.50 | <0.50 | <0.50 | <0.50 | <0.5 | - | < 0.5 | - | < 0.5 | - | 1 |
| Dichloromethane | ug/L | | | | NT | NT | NT | | NT | NT | NT | NT | NT | NT | - | - | - | - | - | - | <5.0 | <5.0 | <5.0 | <5.0 | <0.5 | - | < 0.5 | - | < 0.5 | - | 50 |
| Toluene | ug/L | | | | NT | NT | NT | | NT | NT | NT | NT | NT | NT | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.50 | <0.50 | <0.50 | <0.50 | <0.5 | - | < 0.5 | - | < 0.5 | - | 60 |
| Methylene Chloride | ug/L | | | | NT | NT | NT | | NT | NT | NT | NT | NT | NT | NT | NT | <0.30 | <0.30 | <0.30 | <0.30 | - | - | - | - | - | - | - | - | - | - | - |
| Vinyl Chloride | ug/L | | | | NT | NT | NT | | NT | NT | NT | NT | NT | NT | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.50 | <0.50 | <0.2 | <0.2 | <0.2 | - | < 0.2 | - | < 0.2 | - | 1 |
| **Field Measurements** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| pH | pH Units | | | | 8.47 | 7.48 | 7.48 | | 7.90 | 7.51 | 7.36 | 7.87 | 7.36 | 7.40 | 8.10 | 7.20 | 7.17 | 7.73 | 7.23 | 6.62 | 7.41 | 6.57 | 8.24 | 7.90 | 7.19 | 7.06 | 7.54 | 7.38 | 8.02 | - | - |
| Conductivity | uS/cm | | | | 0.25 | 0.16 | 0.33 | | 0.18 | 0.24 | 0.23 | 0.17 | 0.17 | 0.3 | 0.225 | 0.148 | 0.183 | 0.023 | 205 | 0.149 | 139.6 | 212.8 | 125 | 14.5 | 147 | 152 | 94.8 | 256.6 | 130 | - | - |
| Temperature | °C | | | | 12.05 | 11.8 | 6.8 | | 10.1 | 11.9 | 4.6 | 10.2 | 5.9 | 11.1 | 8.14 | 9.83 | 9.73 | 17.1 | 3.61 | 11.45 | 7 | 14.3 | 4.56 | 7.3 | 6.47 | 13.1 | 7.2 | 8.7 | 8.08 | - | - |
| Dissolved Oxygen | % | | | | 21.2 | 55.7 | 45.1 | | 39.6 | 38.3 | 22.4 | 50 | 20.1 | 54.4 | 54.4 | 92.4 | 8.23 | 121 | 125.8 | 120.7 | 96.9 | 47.4 | 59.1 | 79.5 | 98.8 | 8.46 | 75.1 | 10.74 | - | - | - |

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 Standard |
| NT | Not Tested |

Pinchin File: 204232.008

**TABLE 10**
**Groundwater Quality Results - BH6 (source well)**
**Jocelyn Waste Disposal Site**
**Township of Jocelyn, Ontario**

| Parameter | Units | Sample Designation | | | | ODWQS |
|---|---|---|---|---|---|---|
| | | Sample Collection Date (dd/mmm/yy) | | | | |
| | | BH6 | | | | |
| | | *31-Oct-05* | *17-Oct-22* | *19-May-23* | *17-Oct-23* | |
| Alkalinity | mg/L $CaCO_3$ | **1510** | 491 | 445 | - | 30 - 500 |
| Ammonia | mg/L | 101 | 17.6 | 18.0 | - | - |
| Arsenic | mg/L | 0.005 | - | 0.0007 | - | 0.01 |
| Barium | mg/L | 0.42 | 0.144 | 0.116 | - | 1 |
| Boron | mg/L | 1.47 | 0.386 | 0.252 | - | 5 |
| Cadmium | mg/L | <0.0001 | - | 0.000007 | - | 0.005 |
| Calcium | mg/L | 182 | 104 | 121 | - | - |
| Chloride | mg/L | 249 | 14 | 9 | - | 250 |
| Chromium | mg/L | **0.076** | - | 0.00209 | - | 0.05 |
| Conductivity | µS/cm | 3040 | 942 | 804 | - | - |
| Copper | mg/L | 0.004 | - | 0.0008 | - | 1 |
| Iron | mg/L | **72.4** | **39.5** | **53.1** | **-** | 0.3 |
| Lead | mg/L | 0.009 | - | < 0.00009 | - | 0.01 |
| Magnesium | mg/L | 81.7 | 22 | 23.7 | - | - |
| Manganese | mg/L | **1.96** | **0.486** | **0.591** | **-** | 0.05 |
| Mercury | mg/L | <0.0001 | - | 0.00001 | - | 0.001 |
| Nitrate | mg/L | 0.06 | 0.72 | <0.06 | - | 10 |
| Nitrite | mg/L | <0.01 | < 0.03 | <0.03 | - | 1 |
| pH | mg/L | 7.7 | 7.44 | 7.41 | - | 6.5 - 8.5 |
| Potassium | mg/L | 195 | - | 12.0 | - | - |
| Sodium | mg/L | **347** | 19.6 | 19.3 | - | 200 |
| Sulphate | mg/L | 194 | 7 | 13 | - | 500 |
| Total Dissolved Solids | mg/L | **2300** | **517** | 406 | - | 500 |
| TKN | mg/L | 110 | - | 17.2 | - | - |
| Total Phosphorous | mg/L | 2.48 | - | 0.97 | - | - |
| Total Suspended Solids | mg/L | 21200 | 1160 | 924 | - | - |
| Zinc | mg/L | <0.003 | - | < 0.002 | - | 5 |
| **Other Organics** | | | | | | |
| BOD5* | mg/L | 173 | 26 | 9 | - | - |
| COD | mg/L | 554 | 33 | 37 | - | - |
| DOC | mg/L | **119** | **10** | **9** | **-** | 5 |
| Phenol | ug/L | 0.057 | - | 0.003 | - | - |
| **Volatile Organics** | | | | | | |
| 1,4-Dichlorobenzene | ug/L | <1 | - | < 0.5 | - | 5 |
| Benzene | ug/L | **4** | - | 1.0 | - | 1 |
| Dichloromethane | ug/L | NT | - | < 0.5 | - | 50 |
| Toluene | ug/L | 10.6 | - | < 0.5 | - | 60 |
| Methylene Chloride | ug/L | NT | - | - | - | - |
| Vinyl Chloride | ug/L | <2 | - | <0.2 | - | 1 |
| **Field Measurements** | | | | | | |
| pH | pH Units | NT | 6.65 | 8.04 | - | - |
| Conductivity | uS/cm | NT | 751 | 618 | - | - |
| Temperature | ℃ | NT | 9.4 | 7.65 | - | - |
| Dissolved Oxygen | % | NT | 5.44 | - | - | - |

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 Standard

NT — Not Tested

**TABLE 11**
**Groundwater Quality Results - BH7-21**
**Jocelyn Waste Disposal Site**
**Township of Jocelyn, Ontario**

| Parameter | Units | Sample Designation | | | | | | ODWQS |
|---|---|---|---|---|---|---|---|---|
| | | Sample Collection Date (dd/mmm/yy) | | | | | | |
| | | BH7-21 | | | | | | |
| | | *5-May-21* | *15-Oct-21* | *4-May-22* | *17-Oct-22* | *19-May-23* | *17-Oct-23* | |
| Alkalinity | mg/L $CaCO_3$ | 269 | - | 213 | - | 235 | - | 30 - 500 |
| Ammonia | mg/L | < 0.04 | - | 0.11 | - | 0.04 | - | - |
| Arsenic | mg/L | 0.0009 | - | 0.0004 | - | 0.0003 | - | 0.01 |
| Barium | mg/L | 0.0436 | - | 0.0147 | - | 0.0113 | - | 1 |
| Boron | mg/L | 0.027 | - | 0.018 | - | 0.007 | - | 5 |
| Cadmium | mg/L | - | - | 0.000048 | - | 0.000003 | - | 0.005 |
| Calcium | mg/L | 49.5 | - | 62.4 | - | 48.8 | - | - |
| Chloride | mg/L | 2 | - | < 1 | - | < 1 | - | 250 |
| Chromium | mg/L | 0.00497 | - | 0.00042 | - | 0.00024 | - | 0.05 |
| Conductivity | µS/cm | 350 | - | 371 | - | 380 | - | - |
| Copper | mg/L | 0.0605 | - | 0.0186 | - | 0.0045 | - | 1 |
| Iron | mg/L | **1.98** | - | 0.233 | - | 0.018 | - | 0.3 |
| Lead | mg/L | 0.00103 | - | < 0.00009 | - | < 0.00009 | - | 0.01 |
| Magnesium | mg/L | 19.6 | - | 27.8 | - | 18.7 | - | - |
| Manganese | mg/L | **0.118** | - | 0.0388 | - | 0.00609 | - | 0.05 |
| Mercury | mg/L | < 0.00001 | - | < 0.00001 | - | < 0.00001 | - | 0.001 |
| Nitrate | mg/L | 0.57 | - | 0.5 | - | 0.32 | - | 10 |
| Nitrite | mg/L | < 0.03 | - | < 0.03 | - | <0.03 | - | 1 |
| pH | mg/L | 8.01 | - | 8.14 | - | 8.25 | - | 6.5 - 8.5 |
| Potassium | mg/L | 1.6 | - | 1.88 | - | 1.02 | - | - |
| Sodium | mg/L | 24.1 | - | 13.5 | - | 10.2 | - | 200 |
| Sulphate | mg/L | 3 | - | 7 | - | 4 | - | 500 |
| Total Dissolved Solids | mg/L | 215 | - | 223 | - | 226 | - | 500 |
| TKN | mg/L | 0.28 | - | 0.28 | - | 0.27 | - | - |
| Total Phosphorous | mg/L | 2.19 | - | 0.57 | - | 1.26 | - | - |
| Total Suspended Solids | mg/L | 7040 | - | 1740 | - | 1780 | - | - |
| Zinc | mg/L | 0.021 | - | 0.005 | - | < 0.002 | - | 5 |
| **Other Organics** | | | | | | | | |
| BOD5* | mg/L | < 4 | - | < 4 | - | < 4 | - | - |
| COD | mg/L | 17 | - | < 8 | - | 14 | - | - |
| DOC | mg/L | 4 | - | 3 | - | 3 | - | 5 |
| Phenol | ug/L | < 0.002 | - | 0.002 | - | < 0.002 | - | - |
| **Volatile Organics** | | | | | | | | |
| 1,4-Dichlorobenzene | ug/L | <0.5 | - | < 0.5 | - | < 0.5 | - | 5 |
| Benzene | ug/L | <0.5 | - | < 0.5 | - | < 0.5 | - | 1 |
| Dichloromethane | ug/L | <0.5 | - | < 0.5 | - | < 0.5 | - | 50 |
| Toluene | ug/L | <0.5 | - | < 0.5 | - | < 0.5 | - | 60 |
| Methylene Chloride | ug/L | - | - | - | - | - | - | - |
| Vinyl Chloride | ug/L | <0.2 | - | < 0.2 | - | <0.2 | - | 1 |
| **Field Measurements** | | | | | | | | |
| pH | pH Units | 7.57 | - | 7.40 | - | 8.44 | - | - |
| Conductivity | uS/cm | 231 | - | 130 | - | 249.00 | - | - |
| Temperature | ℃ | 6.97 | - | 7.8 | - | 8.76 | - | - |
| Dissolved Oxygen | % | 63 | - | 8.27 | - | - | - | - |

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 Standard

NT — Not Tested

**TABLE 12**
**2023 Reasonable Use Criteria Assessment**
**Jocelyn Waste Disposal Site**
**Township of Jocelyn, Ontario**

| Parameter | Units | BH3-10 | | BH4 | | BH4A | | BH5 | | | | BH5A | | BH7-21 | | ODWQS | Guideline B-7 Calculation Cm = Cb + x (Cr - Cb) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *19-May-23* | *17-Oct-23* | *19-May-23* | *17-Oct-23* | *19-May-23* | *17-Oct-23* | *19-May-23* | *19-May-23 DUP* | *17-Oct-23* | *17-Oct-23 DUP* | *19-May-23* | *17-Oct-23* | *19-May-23* | *17-Oct-23* | | Cb | x | Cr | Cm |
| Alkalinity | mg/L $CaCO_3$ | **31** | - | 237 | 203 | 222 | 243 | 160 | 178 | 184 | 183 | 120 | - | 235 | - | 30 - 500 | 167.957 | 0.5 | 30 - 500 | 98.97 - 333.98 |
| Ammonia | mg/L | < 0.04 | - | < 0.04 | < 0.04 | 0.04 | < 0.04 | < 0.04 | < 0.04 | 0.04 | < 0.04 | 0.04 | - | 0.04 | - | - | - | - | - | - |
| Arsenic | mg/L | < 0.0002 | - | 0.0012 | - | 0.0003 | - | 0.0002 | 0.0003 | - | - | < 0.0002 | - | 0.0003 | - | 0.01 | 0.001 | 0.25 | 0.01 | 0.0031 |
| Barium | mg/L | 0.00744 | - | 0.0343 | 0.0329 | 0.00879 | 0.0155 | 0.00551 | 0.00555 | 0.00565 | 0.00582 | 0.00853 | - | 0.0113 | - | 1 | 0.005 | 0.25 | 1 | 0.2539 |
| Boron | mg/L | 0.006 | - | 0.012 | 0.012 | 0.043 | 0.052 | 0.006 | 0.01 | 0.005 | 0.005 | 0.018 | - | 0.007 | - | 5 | 0.006 | 0.25 | 5 | 1.2543 |
| Cadmium | mg/L | 0.000012 | - | 0.000016 | - | 0.000018 | - | < 0.000003 | < 0.000003 | - | - | 0.000011 | - | 0.000003 | - | 0.005 | 0.0002 | 0.25 | 0.005 | 0.0014 |
| Calcium | mg/L | 5.89 | - | 59.6 | 54.7 | 68.6 | 60.3 | 44 | 44.7 | 42.8 | 43 | 34.1 | - | 48.8 | - | - | - | - | - | - |
| Chloride | mg/L | 4 | - | 11 | 14 | 5 | 6 | < 1 | < 1 | < 1 | < 1 | < 1 | - | < 1 | - | 250 | 0.919 | 0.5 | 250 | 125.46 |
| Chromium | mg/L | 0.00066 | - | 0.00014 | - | 0.00252 | - | 0.00051 | 0.00047 | - | - | 0.00029 | - | 0.00024 | - | 0.05 | 0.001 | 0.25 | 0.05 | 0.0135 |
| Conductivity | µS/cm | 72 | - | 462 | 455 | 437 | 472 | 306 | 312 | 343 | 344 | 219 | - | 380 | - | - | - | - | - | - |
| Copper | mg/L | 0.0036 | - | 0.0014 | - | 0.0028 | - | 0.0006 | 0.0005 | - | - | 0.0027 | - | 0.0045 | - | 1 | 0.001 | 0.5 | 1 | 0.5005 |
| Iron | mg/L | 0.065 | - | < 0.007 | < 0.007 | < 0.007 | 0.01 | < 0.007 | < 0.007 | < 0.007 | < 0.007 | 0.046 | - | 0.018 | - | 0.3 | 0.020 | 0.5 | 0.3 | 0.16 |
| Lead | mg/L | < 0.00009 | - | < 0.00009 | - | < 0.00009 | - | < 0.00009 | < 0.00009 | - | - | < 0.00009 | - | < 0.00009 | - | 0.01 | 0.0003 | 0.25 | 0.01 | 0.0027 |
| Magnesium | mg/L | 4.16 | - | 23.8 | 24.1 | 19.7 | 19.7 | 16.3 | 16.4 | 18 | 17.9 | 10.1 | - | 18.7 | - | - | - | - | - | - |
| Manganese | mg/L | 0.00681 | - | 0.00112 | 0.0037 | 0.00056 | 0.00196 | 0.00023 | 0.00017 | 0.00033 | 0.00029 | **0.104** | - | 0.00609 | - | 0.05 | 0.003 | 0.5 | 0.05 | 0.026 |
| Mercury | mg/L | 0.00001 | - | 0.00001 | - | 0.00001 | - | < 0.00001 | < 0.00001 | - | - | 0.00001 | - | < 0.00001 | - | 0.001 | 0.00003 | 0.25 | 0.001 | 0.0003 |
| Nitrate | mg/L | <0.06 | - | <0.06 | < 0.06 | 0.11 | 0.18 | < 0.03 | 0.45 | 0.49 | 0.49 | <0.06 | - | 0.32 | - | 10 | 0.358 | 0.25 | 10 | 2.77 |
| Nitrite | mg/L | <0.03 | - | <0.03 | < 0.03 | <0.03 | < 0.03 | **0.45** | <0.03 | < 0.03 | < 0.03 | <0.03 | - | <0.03 | - | 1 | 0.016 | 0.25 | 1 | 0.26 |
| pH | mg/L | 7.32 | - | 8.23 | 8.17 | 8.2 | 8.2 | 8.24 | 8.21 | 8.13 | 8.11 | 7.91 | - | 8.25 | - | 6.5 - 8.5 | 8.040 | 0.5 | 6.5 - 8.5 | 7.27 - 8.27 |
| Potassium | mg/L | 0.407 | - | 1.56 | - | 1.35 | - | 0.357 | 0.36 | - | - | 0.712 | - | 1.02 | - | - | - | - | - | - |
| Sodium | mg/L | 1.72 | - | 6.62 | 6.92 | 9.55 | 12.7 | 1.35 | 1.36 | 1.62 | 1.67 | 0.33 | - | 10.2 | - | 200 | 6.352 | 0.5 | 200 | 103.18 |
| Sulphate | mg/L | 6 | - | 27 | 37 | 10 | 12 | 3 | 3 | 6 | 4 | < 2 | - | 4 | - | 500 | 5.358 | 0.5 | 500 | 252.68 |
| Total Dissolved Solids | mg/L | 111 | - | 243 | 257 | 266 | 277 | 151 | 166 | 183 | 191 | 140 | - | 226 | - | 500 | 196.756 | 0.5 | 500 | 348.38 |
| TKN | mg/L | 0.31 | - | 0.07 | - | 0.13 | - | < 0.05 | 0.08 | - | - | 0.28 | - | 0.27 | - | - | - | - | - | - |
| Total Phosphorous | mg/L | 0.92 | - | 0.31 | - | 0.04 | - | 0.03 | 0.03 | - | - | 0.04 | - | 1.26 | - | - | - | - | - | - |
| Total Suspended Solids | mg/L | 1110 | - | 1280 | 821 | 120 | 211 | 67 | 37 | 46 | 31 | 79 | - | 1780 | - | - | - | - | - | - |
| Zinc | mg/L | 0.004 | - | < 0.002 | - | 0.003 | - | < 0.002 | < 0.002 | - | - | < 0.002 | - | < 0.002 | - | 5 | 0.004 | 0.5 | 5 | 2.50 |
| **Other Organics** | | | | | | | | | | | | | | | | | | | | |
| BOD5* | mg/L | < 4 | - | < 4 | < 4 | < 4 | < 4 | < 4 | < 4 | < 4 | < 4 | < 4 | - | < 4 | - | - | - | - | - | - |
| COD | mg/L | 24 | - | < 8 | < 8 | < 8 | 10 | < 8 | < 8 | < 8 | < 8 | 17 | - | 14 | - | - | - | - | - | - |
| DOC | mg/L | 2 | - | **4** | 2 | 1 | **4** | **8** | 1 | 2 | 1 | **8** | - | 3 | - | 5.0 | 1.78 | 0.5 | 5 | 3.39 |
| Phenol | ug/L | < 0.002 | - | < 0.002 | - | < 0.002 | - | < 0.002 | < 0.002 | - | - | 0.003 | - | < 0.002 | - | - | - | - | - | - |
| **Volatile Organics** | | | | | | | | | | | | | | | | | | | | |
| 1,4-Dichlorobenzene | ug/L | < 0.5 | - | < 0.5 | - | < 0.5 | - | < 0.5 | < 0.5 | - | - | < 0.5 | - | < 0.5 | - | 5 | 0.02999 | 0.25 | 5 | 1.27 |
| Benzene | ug/L | < 0.5 | - | < 0.5 | - | < 0.5 | - | < 0.5 | < 0.5 | - | - | < 0.5 | - | < 0.5 | - | 1 | 0.06292 | 0.25 | 1 | 0.30 |
| Dichloromethane | ug/L | < 0.5 | - | < 0.5 | - | < 0.5 | - | < 0.5 | < 0.5 | - | - | < 0.5 | - | < 0.5 | - | 50 | 0.437170 | 0.25 | 50 | 12.83 |
| Toluene | ug/L | < 0.5 | - | < 0.5 | - | < 0.5 | - | < 0.5 | < 0.5 | - | - | < 0.5 | - | < 0.5 | - | 60 | 0.08328 | 0.5 | 60 | 30.04 |
| Methylene Chloride | ug/L | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vinyl Chloride | ug/L | < 0.2 | - | < 0.2 | - | < 0.2 | - | < 0.2 | <0.2 | - | - | < 0.2 | - | <0.2 | - | 1 | 0.06070 | 0.25 | 1 | 0.30 |

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 Guideline B-7 |
| RDL | Reportable Detection Limit |
| NA | Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario. |
| Cb | Background Concentration (Geomean of >5 years analytical data from BH1A) |
| Cr | Maximum Acceptable Contaminant Concentration |
| x | Reduction Constant |
| Cm | Maximum Off-Site Acceptable Contaminant Concentration |

**TABLE 13**
**Surface Water Quality Results - SW**
**Jocelyn Waste Disposal Site**
**Township of Jocelyn, Ontario**

| Parameter | Units | Sample Designation / Sample Collection Date (dd/mmm/yy) / SW | | | | | PWQO* |
|---|---|---|---|---|---|---|---|
| | | *31-Oct-05* | *4-May-22* | *17-Oct-22* | *19-May-23* | *17-Oct-23* | |
| Alkalinity | mg/L $CaCO_3$ | 212 | 140 | DRY | 232 | - | - |
| Ammonia | mg/L | 0.19 | 0.11 | - | 1.45 | - | - |
| Arsenic | mg/L | 0.001 | - | - | 0.0005 | - | 0.1 |
| Barium | mg/L | 0.05 | 0.0343 | - | 0.0436 | - | - |
| Boron | mg/L | 0.15 | 0.057 | - | 0.089 | - | 0.2 |
| Cadmium | mg/L | <0.00009 | 0.000067 | - | 0.000069 | - | 0.0002 |
| Chloride | mg/L | 63.4 | 19 | - | 14 | - | - |
| Chromium | mg/L | 0.003 | 0.00118 | - | 0.0007 | - | 0.1 |
| Conductivity | µS/cm | 578 | 314 | - | 497 | - | - |
| Copper | mg/L | 0.001 | 0.004 | - | 0.0023 | - | 0.005 |
| Iron | mg/L | **1.33** | **4.24** | - | **8.74** | - | 0.3 |
| Lead | mg/L | 0.001 | 0.0005 | - | 0.00016 | - | 0.005 |
| Mercury | mg/L | <0.0001 | - | - | <0.00001 | - | 0.0002 |
| Nitrate | mg/L | <0.03 | 0.82 | - | 0.69 | - | - |
| Nitrite | mg/L | 0.38 | < 0.03 | - | <0.03 | - | - |
| TKN | mg/L | 2.39 | 0.48 | - | 2.24 | - | - |
| pH | mg/L | 7.5 | 7.64 | - | 8.03 | - | 6.5 - 8.5 |
| Total Phosphorous | mg/L | **0.192** | **0.124** | - | **0.078** | - | 0.03 |
| Sulphate | mg/L | 4.5 | 16 | - | 13 | - | - |
| Total Dissolved Solids | mg/L | 760 | 200 | - | 300 | - | - |
| Total Suspended Solids | mg/L | 84 | 136 | - | 15 | - | - |
| Zinc | mg/L | <0.003 | **0.044** | - | **0.03** | - | 0.02 |
| **Other Organics** | | | | | | | |
| BOD5* | mg/L | 5 | < 4 | - | <4 | - | - |
| COD | mg/L | 93 | 27 | - | 48 | - | - |
| Phenol | mg/L | **0.014** | < 0.001 | - | <0.001 | - | 0.001 |
| **Field Measurements** | | | | | | | |
| Temperature | ℃ | NT | 14.20 | - | 10.48 | - | - |
| pH | pH units | NT | 7.21 | - | 8.98 | - | - |
| Conductivity | uS/cm | NT | 283.3 | - | 317 | - | - |
| Dissolved Oxygen | % | NT | 11.08 | - | 0.4 | - | - |

Notes:

Provincial Water Quality Objectives* — "Water Management Policies Guidelines Provincial Water Quality Objectives", dated July 1994, revised February 1999.

**BOLD** — Exceeds PWQO Standard

NT — Not Tested

**APPENDIX VI**

**Laboratory Certificates of Analysis**

# FINAL REPORT

## CA15615-OCT23 R1

**204232.008 - Jocelyn GW Fall**

Prepared for

Pinchin Ltd

# FINAL REPORT

CA15615-OCT23 R1

## First Page

CLIENT DETAILS

| | |
|---|---|
| Client | Pinchin Ltd |
| Address | 189 Upton Street, Unit 2, Sault St. Marie<br>Canada, P6A 3W5<br>Phone: 705-943-8513. Fax: |
| Contact | Cody Wheten |
| Telephone | 705-943-8513 |
| Facsimile | |
| Email | cwheten@Pinchin.com;ON-SAULT-STE-MARIE-ALL@Pinchin. |
| Project | 204232.008 - Jocelyn GW Fall |
| Order Number | |
| Samples | Ground Water (7) |

LABORATORY DETAILS

| | |
|---|---|
| Project Specialist | Maarit Wolfe, Hon.B.Sc |
| Laboratory | SGS Canada Inc. |
| Address | 185 Concession St., Lakefield ON, K0L 2H0 |
| Telephone | 705-652-2000 |
| Facsimile | 705-652-6365 |
| Email | Maarit.Wolfe@sgs.com |
| SGS Reference | CA15615-OCT23 |
| Received | 10/19/2023 |
| Approved | 10/30/2023 |
| Report Number | CA15615-OCT23 R1 |
| Date Reported | 10/30/2023 |

COMMENTS

Temperature of Sample upon Receipt: 8 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: n/a

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

TABLE OF CONTENTS

# FINAL REPORT

CA15615-OCT23 R1

**Client:** Pinchin Ltd
**Project:** 204232.008 - Jocelyn GW Fall
**Project Manager:** Cody Wheten
**Samplers:** N/A

MATRIX: WATER

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sample Number** | | | | 7 | 8 | 9 | 11 | 12 | 13 | 17 |
| **Sample Name** | | | | BH1 | BH1A | BH2 | BH4 | BH4A | BH5 | DUP-SPRING 2022 |
| **Sample Matrix** | | | | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water |
| **Sample Date** | | | | 17/10/2023 | 17/10/2023 | 17/10/2023 | 17/10/2023 | 17/10/2023 | 17/10/2023 | 17/10/2023 |
| **Parameter** | **Units** | **RL** | | **Result** | **Result** | **Result** | **Result** | **Result** | **Result** | **Result** |
| **General Chemistry** | | | | | | | | | | |
| Biochemical Oxygen Demand (BOD5) | mg/L | 2 | | < 4↑ | < 4↑ | < 4↑ | < 4↑ | < 4↑ | < 4↑ | < 4↑ |
| Total Suspended Solids | mg/L | 2 | | 12300 | 3 | 71 | 821 | 211 | 46 | 31 |
| Alkalinity | mg/L as CaCO3 | 2 | | 244 | 195 | 589 | 203 | 243 | 184 | 183 |
| Conductivity | uS/cm | 2 | | 457 | 375 | 1110 | 455 | 472 | 343 | 344 |
| Total Dissolved Solids | mg/L | 30 | | 257 | 229 | 686 | 257 | 277 | 183 | 191 |
| Chemical Oxygen Demand | mg/L | 8 | | < 8 | < 8 | 14 | < 8 | 10 | < 8 | < 8 |
| Ammonia+Ammonium (N) | as N mg/L | 0.04 | | < 0.04 | < 0.04 | < 0.04 | < 0.04 | < 0.04 | 0.04 | < 0.04 |
| Dissolved Organic Carbon | mg/L | 1 | | 2 | 2 | 7 | 2 | 4 | 2 | 1 |
| **Metals and Inorganics** | | | | | | | | | | |
| Sulphate | mg/L | 2 | | 6 | 6 | 26 | 37 | 12 | 6 | 4 |
| Nitrite (as N) | as N mg/L | 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 | | < 0.06 | 1.04 | 0.26 | < 0.06 | 0.18 | 0.49 | 0.49 |
| Barium (dissolved) | mg/L | 0.00008 | | 0.00752 | 0.00637 | 0.0240 | 0.0329 | 0.0155 | 0.00565 | 0.00582 |
| Boron (dissolved) | mg/L | 0.002 | | 0.006 | 0.005 | 0.090 | 0.012 | 0.052 | 0.005 | 0.005 |
| Calcium (dissolved) | mg/L | 0.01 | | 54.9 | 48.3 | 133 | 54.7 | 60.3 | 42.8 | 43.0 |
| Iron (dissolved) | mg/L | 0.007 | | 0.123 | < 0.007 | 0.009 | < 0.007 | 0.010 | < 0.007 | < 0.007 |
| Magnesium (dissolved) | mg/L | 0.001 | | 25.5 | 17.2 | 62.1 | 24.1 | 19.7 | 18.0 | 17.9 |
| Manganese (dissolved) | mg/L | 0.00001 | | 0.0328 | 0.00042 | 0.606 | 0.00370 | 0.00196 | 0.00033 | 0.00029 |
| Sodium (dissolved) | mg/L | 0.01 | | 2.71 | 4.42 | 19.8 | 6.92 | 12.7 | 1.62 | 1.67 |

**Client:** Pinchin Ltd
**Project:** 204232.008 - Jocelyn GW Fall
**Project Manager:** Cody Wheten
**Samplers:** N/A

MATRIX: WATER

| | Sample Number | 7 | 8 | 9 | 11 | 12 | 13 | 17 |
|---|---|---|---|---|---|---|---|---|
| | Sample Name | BH1 | BH1A | BH2 | BH4 | BH4A | BH5 | DUP-SPRING 2022 |
| | Sample Matrix | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water |
| | Sample Date | 17/10/2023 | 17/10/2023 | 17/10/2023 | 17/10/2023 | 17/10/2023 | 17/10/2023 | 17/10/2023 |
| **Parameter** | **Units** | **RL** | | **Result** | **Result** | **Result** | **Result** | **Result** | **Result** | **Result** |
| **Other (ORP)** | | | | | | | | |
| pH | No unit | 0.05 | | 8.13 | 8.28 | 7.64 | 8.17 | 8.20 | 8.13 | 8.11 |
| Chloride | mg/L | 1 | | 2 | < 1 | 37 | 14 | 6 | < 1 | < 1 |

## QC SUMMARY

### Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-[ENV]EWL-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 | EWL0560-OCT23 | mg/L as CaCO3 | 2 | < 2 | 6 | 20 | 100 | 80 | 120 | NA | | |

### Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-[ENV]SFA-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) | SKA0225-OCT23 | mg/L | 0.04 | <0.04 | ND | 10 | 100 | 90 | 110 | 99 | 75 | 125 |

## QC SUMMARY

### Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENV]EWL-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 | DIO5094-OCT23 | mg/L | 1 | <1 | ND | 20 | 102 | 80 | 120 | 106 | 75 | 125 |
| Sulphate | DIO5094-OCT23 | mg/L | 2 | <2 | ND | 20 | 105 | 80 | 120 | 107 | 75 | 125 |

### Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-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) | DIO0609-OCT23 | mg/L | 0.03 | <0.03 | 1 | 20 | 100 | 90 | 110 | 104 | 75 | 125 |
| Nitrate (as N) | DIO0609-OCT23 | mg/L | 0.06 | <0.06 | 0 | 20 | 100 | 90 | 110 | 98 | 75 | 125 |
| Nitrite (as N) | DIO0612-OCT23 | mg/L | 0.03 | <0.03 | ND | 20 | 97 | 90 | 110 | 100 | 75 | 125 |
| Nitrate (as N) | DIO0612-OCT23 | mg/L | 0.06 | <0.06 | ND | 20 | 98 | 90 | 110 | 96 | 75 | 125 |

## QC SUMMARY

### Biochemical Oxygen Demand

Method: SM 5210 I 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-OCT23 | mg/L | 2 | < 2 | 10 | 30 | 104 | 70 | 130 | 108 | 70 | 130 |

### Carbon by SFA

Method: SM 5310 I 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 | SKA0216-OCT23 | mg/L | 1 | <1 | ND | 20 | 100 | 90 | 110 | 99 | 75 | 125 |
| Dissolved Organic Carbon | SKA0227-OCT23 | mg/L | 1 | <1 | 1 | 20 | 100 | 90 | 110 | 92 | 75 | 125 |

## QC SUMMARY

### Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-[ENV]EWL-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 | EWL0528-OCT23 | mg/L | 8 | <8 | ND | 20 | 106 | 80 | 120 | 110 | 75 | 125 |
| Chemical Oxygen Demand | EWL0533-OCT23 | mg/L | 8 | <8 | ND | 20 | 96 | 80 | 120 | 104 | 75 | 125 |

### Conductivity

Method: SM 2510 | Internal ref.: ME-CA-[ENV]EWL-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 | EWL0560-OCT23 | uS/cm | 2 | 2 | 1 | 20 | 99 | 90 | 110 | NA | | |

## QC SUMMARY

### Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-[ENV]SPE-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 |
| Barium (dissolved) | EMS0204-OCT23 | mg/L | 0.00008 | <0.00008 | 1 | 20 | 94 | 90 | 110 | 71 | 70 | 130 |
| Boron (dissolved) | EMS0204-OCT23 | mg/L | 0.002 | <0.002 | ND | 20 | 97 | 90 | 110 | 95 | 70 | 130 |
| Calcium (dissolved) | EMS0204-OCT23 | mg/L | 0.01 | <0.01 | 0 | 20 | 93 | 90 | 110 | 97 | 70 | 130 |
| Iron (dissolved) | EMS0204-OCT23 | mg/L | 0.007 | <0.007 | 1 | 20 | 95 | 90 | 110 | 100 | 70 | 130 |
| Magnesium (dissolved) | EMS0204-OCT23 | mg/L | 0.001 | <0.001 | 0 | 20 | 90 | 90 | 110 | 91 | 70 | 130 |
| Manganese (dissolved) | EMS0204-OCT23 | mg/L | 0.00001 | <0.00001 | 3 | 20 | 96 | 90 | 110 | 94 | 70 | 130 |
| Sodium (dissolved) | EMS0204-OCT23 | mg/L | 0.01 | <0.01 | 0 | 20 | 90 | 90 | 110 | 96 | 70 | 130 |

### pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-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 | EWL0560-OCT23 | No unit | 0.05 | NA | 0 | | 100 | | | NA | | |

## 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 | EWL0585-OCT23 | mg/L | 30 | <30 | 6 | 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 | EWL0564-OCT23 | mg/L | 2 | < 2 | 1 | 10 | 94 | 90 | 110 | NA | | |
| Total Suspended Solids | EWL0568-OCT23 | mg/L | 2 | < 2 | 1 | 10 | 102 | 90 | 110 | NA | | |
| Total Suspended Solids | EWL0632-OCT23 | mg/L | 2 | < 2 | 1 | 10 | 97 | 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.

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 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): 10/19/2023 — LAB LIMS #: CA 15615-OCT23

Received Time (After Hours Only): __:__ — Temperature Upon Receipt (°C): 8x3

## Billing & Reporting Information

Invoice/Receipt to {3}:

Company: Pinchin

Attention: Cody Wheten

Address: 189 Upton Street, Unit 2, Sault Ste. Marie, Ontario, P6A 3W5

Email: cwheten@pinchin.com

Project Name/Number: 204232.008-Jocelyn landfill Fall GW — P.O. #:

Quote #: 2021 373

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: | same as above | Phone Number: | 705-943-8513 |
| 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) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Field Filtered | Field Temp (°C) | Field pH | | GW Package | | | |
| BH1 | 10/17/23 | 15:00 | | | | | | X | | | |
| BH1A | ↓ | ↓ | | | | | | X | | | |
| BH2 | | | | | | | | X | | | |
| BH3-10 | | | | | | | | X | | | |
| BH4 | | | | | | | | X | | | |
| BH4A | | | | | | | | X | | | |
| BH5 | | | | | | | | X | | | |
| BH5A | | | | | | | | X | | | |
| BH6 | | | | | | | | X | | | |
| BH7-21 | | | | | | | | X | | | |
| DUP-Fall 2023 | ↓ | ↓ | | | | | | X | | | |
| | as per client-dkw | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Sampled By {1}: (Name) (Signature) Date: __ __ / __ __ __ __ (mm/dd/yy)

Relinquished by {2}: (Name) (Signature) Date: __ __ / __ __ __ __ (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.



Revision #: 2.3
Date of Issue: 24 Jun. 2014

# FINAL REPORT

## CA14789-MAY23 R1

## 204232.008 - Jocelyn SW Spring

Prepared for

Pinchin Ltd

# FINAL REPORT

CA14789-MAY23 R1

## First Page

CLIENT DETAILS

| | |
|---|---|
| Client | Pinchin Ltd |
| Address | 189 Upton Street, Unit 2, Sault St. Marie<br>Canada, P6A 3W5<br>Phone: 705-943-8513. Fax: |
| Contact | Cody Wheten |
| Telephone | 705-943-8513 |
| Facsimile | |
| Email | cwheten@Pinchin.com;ON-SAULT-STE-MARIE-ALL@Pinchin. |
| Project | 204232.008 - Jocelyn SW Spring |
| Order Number | |
| Samples | Surface Water (1) |

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 | CA14789-MAY23 |
| Received | 05/24/2023 |
| Approved | 05/31/2023 |
| Report Number | CA14789-MAY23 R1 |
| Date Reported | 05/31/2023 |

COMMENTS

Temperature of Sample upon Receipt: 9 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: n/a

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

# FINAL REPORT

CA14789-MAY23 R1

**Client:** Pinchin Ltd
**Project:** 204232.008 - Jocelyn SW Spring
**Project Manager:** Cody Wheten
**Samplers:** Anthony Dicerbo

MATRIX: WATER

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

| | |
|---|---|
| **Sample Number** | 6 |
| **Sample Name** | SW1 |
| **Sample Matrix** | Surface Water |
| **Sample Date** | 19/05/2023 |

| Parameter | Units | RL | L1 | Result |
|---|---|---|---|---|
| **General Chemistry** | | | | |
| Biochemical Oxygen Demand (BOD5) | mg/L | 2 | | < 4 ↑ |
| Total Suspended Solids | mg/L | 2 | | 15 |
| Alkalinity | mg/L as CaCO3 | 2 | | 232 |
| Conductivity | uS/cm | 2 | | 497 |
| Total Dissolved Solids | mg/L | 30 | | 300 |
| Chemical Oxygen Demand | mg/L | 8 | | 48 |
| Total Kjeldahl Nitrogen (N) | as N mg/L | 0.05 | | 2.24 |
| Ammonia+Ammonium (N) | as N mg/L | 0.04 | | 1.45 |
| **Metals and Inorganics** | | | | |
| Sulphate | mg/L | 2 | | 13 |
| Nitrite (as N) | as N mg/L | 0.03 | | < 0.03 |
| Nitrate (as N) | as N mg/L | 0.06 | | 0.69 |
| Arsenic (total) | mg/L | 0.0002 | 0.005 | 0.0005 |
| Barium (total) | mg/L | 0.00002 | | 0.0436 |
| Boron (total) | mg/L | 0.002 | 0.2 | 0.089 |
| Cadmium (total) | mg/L | 0.000003 | 0.0001 | 0.000069 |
| Chromium (total) | mg/L | 0.00008 | 0.1 | 0.00070 |
| Copper (total) | mg/L | 0.0002 | 0.001 | 0.0023 |
| Iron (total) | mg/L | 0.007 | 0.3 | 8.74 |
| Phosphorus (total) | mg/L | 0.003 | 0.01 | 0.078 |
| Lead (total) | mg/L | 0.00009 | 0.025 | 0.00016 |
| Zinc (total) | mg/L | 0.002 | 0.02 | 0.030 |

**Client:** Pinchin Ltd
**Project:** 204232.008 - Jocelyn SW Spring
**Project Manager:** Cody Wheten
**Samplers:** Anthony Dicerbo

MATRIX: WATER

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

| | |
|---|---|
| **Sample Number** | 6 |
| **Sample Name** | SW1 |
| **Sample Matrix** | Surface Water |
| **Sample Date** | 19/05/2023 |

| Parameter | Units | RL | L1 | Result |
|---|---|---|---|---|
| **Metals and Inorganics (continued)** | | | | |
| **Other (ORP)** | | | | |
| pH | No unit | 0.05 | 8.6 | 8.03 |
| Chloride | mg/L | 1 | | 14 |
| Mercury (dissolved) | mg/L | 0.00001 | 0.0002 | < 0.00001 |
| **Phenols** | | | | |
| 4AAP-Phenolics | mg/L | 0.001 | 0.001 | < 0.001 |

## EXCEEDANCE SUMMARY

| Parameter | Method | Units | Result | PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E L1 |
|---|---|---|---|---|
| **SW1** | | | | |
| Copper | SM 3030/EPA 200.8 | mg/L | 0.0023 | 0.001 |
| Iron | SM 3030/EPA 200.8 | mg/L | 8.74 | 0.3 |
| Phosphorus | SM 3030/EPA 200.8 | mg/L | 0.078 | 0.01 |
| Zinc | SM 3030/EPA 200.8 | mg/L | 0.030 | 0.02 |

## QC SUMMARY

### Alkalinity

**Method: SM 2320 I Internal ref.: ME-CA-[ENV]EWL-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 | EWL0671-MAY23 | mg/L as CaCO3 | 2 | < 2 | 1 | 20 | 102 | 80 | 120 | NA | | |

### Ammonia by SFA

**Method: SM 4500 I Internal ref.: ME-CA-[ENV]SFA-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) | SKA0263-MAY23 | mg/L | 0.04 | <0.04 | ND | 10 | 101 | 90 | 110 | 100 | 75 | 125 |

## QC SUMMARY

### Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENVIEWL-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 | DIO5121-MAY23 | mg/L | 1 | <1 | 14 | 20 | 96 | 80 | 120 | 100 | 75 | 125 |
| Sulphate | DIO5121-MAY23 | mg/L | 2 | <2 | 7 | 20 | 106 | 80 | 120 | 104 | 75 | 125 |

### Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENVIIC-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) | DIO0627-MAY23 | mg/L | 0.03 | <0.03 | 8 | 20 | 100 | 90 | 110 | 103 | 75 | 125 |
| Nitrate (as N) | DIO0627-MAY23 | mg/L | 0.06 | <0.06 | ND | 20 | 101 | 90 | 110 | 100 | 75 | 125 |

## QC SUMMARY

### Biochemical Oxygen Demand

Method: SM 5210 I 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) | BOD0046-MAY23 | mg/L | 2 | < 2 | 1 | 30 | 104 | 70 | 130 | 85 | 70 | 130 |

### Chemical Oxygen Demand

Method: HACH 8000 I 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 | EWL0615-MAY23 | mg/L | 8 | <8 | 0 | 20 | 98 | 80 | 120 | 92 | 75 | 125 |

### Conductivity

Method: SM 2510 I 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 | EWL0671-MAY23 | uS/cm | 2 | < 2 | 0 | 20 | 99 | 90 | 110 | NA | | |

## QC SUMMARY

### Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENVISPE-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 |
| Mercury (dissolved) | EHG0052-MAY23 | mg/L | 0.00001 | < 0.00001 | 1 | 20 | 85 | 80 | 120 | 85 | 70 | 130 |

### 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 |
| Arsenic (total) | EMS0229-MAY23 | mg/L | 0.0002 | <0.0002 | 2 | 20 | 102 | 90 | 110 | 107 | 70 | 130 |
| Barium (total) | EMS0229-MAY23 | mg/L | 0.00002 | <0.00008 | 2 | 20 | 100 | 90 | 110 | 115 | 70 | 130 |
| Boron (total) | EMS0229-MAY23 | mg/L | 0.002 | <0.002 | 2 | 20 | 109 | 90 | 110 | 103 | 70 | 130 |
| Cadmium (total) | EMS0229-MAY23 | mg/L | 0.000003 | <0.000003 | 17 | 20 | 98 | 90 | 110 | 100 | 70 | 130 |
| Chromium (total) | EMS0229-MAY23 | mg/L | 0.00008 | <0.00008 | 1 | 20 | 105 | 90 | 110 | 105 | 70 | 130 |
| Copper (total) | EMS0229-MAY23 | mg/L | 0.0002 | <0.0002 | 1 | 20 | 101 | 90 | 110 | 100 | 70 | 130 |
| Iron (total) | EMS0229-MAY23 | mg/L | 0.007 | <0.007 | 1 | 20 | 100 | 90 | 110 | 75 | 70 | 130 |
| Lead (total) | EMS0229-MAY23 | mg/L | 0.00009 | <0.00009 | 7 | 20 | 101 | 90 | 110 | 98 | 70 | 130 |
| Phosphorus (total) | EMS0229-MAY23 | mg/L | 0.003 | <0.003 | 4 | 20 | 101 | 90 | 110 | NV | 70 | 130 |
| Zinc (total) | EMS0229-MAY23 | mg/L | 0.002 | <0.002 | 2 | 20 | 99 | 90 | 110 | 121 | 70 | 130 |

## QC SUMMARY

### pH

Method: SM 4500 I 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 | EWL0671-MAY23 | No unit | 0.05 | NA | 0 | | 100 | | | NA | | |

### Phenols by SFA

Method: SM 5530B-D I 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 | SKA0262-MAY23 | mg/L | 0.001 | <0.001 | NV | 10 | 96 | 80 | 120 | 107 | 75 | 125 |

### Solids Analysis

Method: SM 2540C I 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 | EWL0638-MAY23 | mg/L | 30 | <30 | 2 | 20 | 98 | 80 | 120 | NA | | |

## QC SUMMARY

### Suspended Solids

**Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-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 | EWL0648-MAY23 | mg/L | 2 | < 2 | 1 | 10 | 96 | 90 | 110 | NA | | |

### Total Nitrogen

**Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-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) | SKA0259-MAY23 | mg/L | 0.05 | 0.094 | ND | 10 | 103 | 90 | 110 | 111 | 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 report supersedes all previous versions.

-- End of Analytical Report --

# SGS

## 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): MAY 24 2022 KMM

LAB LIMS #: CA15878-May23 (GW) / CA14789-May23 (SW)

Received Time (After Hours Only): __ __ : __ __

Temperature Upon Receipt (°C): 9x3

**Billing & Reporting Information**

Invoice/Receipt to {3}:

| | |
|---|---|
| Company: | Pinchin |
| Attention: | Cody Wheten |
| Address: | 189 Upton Street, Unit 2<br>Sault Ste. Marie, Ontario<br>P6A 3W5 |
| Email: | cwheten@pinchin.com |

Project Name/Number: 204232.008-Jocelyn landfill Spring GW & SW

P.O. #:

Quote #: 2021 373

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:**

| | | | |
|---|---|---|---|
| Company Name: | same as above | Phone Number: | 705-943-8513 |
| Contact Name: | | Fax Number: | |
| Address: | | E-mail: | |
| Copy to: | | | |

Client Lab #:

**Sample Information**

| Sample Identifier | Date Sampled (mm/dd/yy) | Time Sampled | # of Bottles | Field Filtered | Field Temp (°C) | Field pH | | GW Package | VOCs | SW Package | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BH1 | 05/19/23 | AM | 12 | X | 8.18 | 8.38 | | X | X | | |
| BH1A | | | | X | 7.06 | 8.24 | | X | X | | |
| BH2 | | | | X | 8.44 | 6.10 | | X | X | | |
| BH3-10 | | | | X | 6.64 | 8.12 | | X | X | | |
| BH4 | | | | X | 7.42 | 8.40 | | X | X | | |
| BH4A | | | | X | 7.43 | 8.87 | | X | X | | |
| BH5 | | | | X | 6.38 | 8.20 | | X | X | | |
| BH5A | | | | X | 8.08 | 8.02 | | X | X | | |
| BH6 | | | | X | 7.65 | 8.04 | | X | X | | |
| BH7-21 | | | | X | 8.76 | 8.44 | | X | X | | |
| DUP-Fall 2022 | | | ↓ | X | 6.38 | 8.20 | | X | X | | |
| | | | | | | | | | | | |
| SW1 | ↓ | ↓ | ↓ | | 10.48 | 8.98 | | | | X | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)

| | | | | | |
|---|---|---|---|---|---|
| Sampled By {1}: | (Name) Anthony DiCarbo | (Signature) | | Date: | 05/23/23 (mm/dd/yy) |
| Relinquished by {2}: | (Name) Anthony DiCarbo | (Signature) | | Date: | 05/23/23 (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.



Revision #: 2.3
Date of Issue: 24 Jun. 2014

334119188715
334119188707
KMM 10:00
Collect.

# FINAL REPORT

## CA15878-MAY23 R1

**204232.008 - Jocelyn Landfill Spring GW**

Prepared for

Pinchin Ltd

# FINAL REPORT

CA15878-MAY23 R1

## First Page

CLIENT DETAILS

| | |
|---|---|
| Client | Pinchin Ltd |
| Address | 189 Upton Street, Unit 2, Sault St. Marie<br>Canada, P6A 3W5<br>Phone: 705-943-8513. Fax: |
| Contact | Cody Wheten |
| Telephone | 705-943-8513 |
| Facsimile | |
| Email | cwheten@Pinchin.com;ON-SAULT-STE-MARIE-ALL@Pinchin. |
| Project | 204232.008 - Jocelyn Landfill Spring GW |
| Order Number | |
| Samples | Ground Water (11) |

LABORATORY DETAILS

| | |
|---|---|
| Project Specialist | Maarit Wolfe, Hon.B.Sc |
| Laboratory | SGS Canada Inc. |
| Address | 185 Concession St., Lakefield ON, K0L 2H0 |
| Telephone | 705-652-2000 |
| Facsimile | 705-652-6365 |
| Email | Maarit.Wolfe@sgs.com |
| SGS Reference | CA15878-MAY23 |
| Received | 05/24/2023 |
| Approved | 06/22/2023 |
| Report Number | CA15878-MAY23 R1 |
| Date Reported | 06/22/2023 |

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

TABLE OF CONTENTS

**Client:** Pinchin Ltd
**Project:** 204232.008 - Jocelyn Landfill Spring GW
**Project Manager:** Cody Wheten
**Samplers:** Anthony Dicerbo

MATRIX: WATER

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Number** | | | | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| **Sample Name** | | | | BH1 | BH1A | BH2 | BH3-10 | BH4 | BH4A | BH5 | BH5A |
| **Sample Matrix** | | | | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water |
| **Sample Date** | | | | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 |
| **Parameter** | **Units** | **RL** | | **Result** | **Result** | **Result** | **Result** | **Result** | **Result** | **Result** | **Result** |
| **BTEX** | | | | | | | | | | | |
| Benzene | ug/L | 0.5 | | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Toluene | µg/L | 0.5 | | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| **General Chemistry** | | | | | | | | | | | |
| Biochemical Oxygen Demand (BOD5) | mg/L | 2 | | < 4 ↑ | < 4 ↑ | < 4 ↑ | < 4 ↑ | < 4 ↑ | < 4 ↑ | < 4 ↑ | < 4 ↑ |
| Total Suspended Solids | mg/L | 2 | | 6320 | 11 | 289 | 1110 | 1280 | 120 | 67 | 79 |
| Alkalinity | mg/L as CaCO3 | 2 | | 254 | 200 | 629 | 31 | 237 | 222 | 160 | 120 |
| Conductivity | uS/cm | 2 | | 460 | 364 | 1180 | 72 | 462 | 437 | 306 | 219 |
| Total Dissolved Solids | mg/L | 30 | | 263 | 206 | 689 | 111 | 243 | 266 | 151 | 140 |
| Chemical Oxygen Demand | mg/L | 8 | | < 8 | < 8 | 15 | 24 | < 8 | < 8 | < 8 | 17 |
| Total Kjeldahl Nitrogen (N) | as N mg/L | 0.05 | | 0.07 | < 0.05 | 0.26 | 0.31 | 0.07 | 0.13 | < 0.05 | 0.28 |
| Ammonia+Ammonium (N) | as N mg/L | 0.04 | | < 0.04 | < 0.04 | < 0.04 | < 0.04 | < 0.04 | 0.04 | < 0.04 | 0.04 |
| Dissolved Organic Carbon | mg/L | 1 | | 2 | 2 | 6 | 2 | 4 | 1 | 8 | 8 |
| **Metals and Inorganics** | | | | | | | | | | | |
| Phosphorus (total) | mg/L | 0.03 | | 0.16 | < 0.03 | 0.05 | 0.92 | 0.31 | 0.04 | 0.03 | 0.04 |
| Sulphate | mg/L | 2 | | 5 | 4 | 27 | 6 | 27 | 10 | 3 | < 2 |
| Nitrite (as N) | as N mg/L | 0.03 | | < 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 | | < 0.06 | 0.94 | < 0.06 | < 0.06 | < 0.06 | 0.11 | 0.45 | < 0.06 |
| Arsenic (dissolved) | mg/L | 0.0002 | | 0.0011 | 0.0007 | 0.0003 | < 0.0002 | 0.0012 | 0.0003 | 0.0002 | < 0.0002 |
| Barium (dissolved) | mg/L | 0.00002 | | 0.00776 | 0.00617 | 0.0256 | 0.00744 | 0.0343 | 0.00879 | 0.00551 | 0.00853 |
| Boron (dissolved) | mg/L | 0.002 | | 0.008 | 0.016 | 0.096 | 0.006 | 0.012 | 0.043 | 0.006 | 0.018 |
| Calcium (dissolved) | mg/L | 0.01 | | 62.0 | 54.3 | 149 | 5.89 | 59.6 | 68.6 | 44.0 | 34.1 |

**Client:** Pinchin Ltd
**Project:** 204232.008 - Jocelyn Landfill Spring GW
**Project Manager:** Cody Wheten
**Samplers:** Anthony Dicerbo

MATRIX: WATER

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Sample Number** | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| | **Sample Name** | BH1 | BH1A | BH2 | BH3-10 | BH4 | BH4A | BH5 | BH5A |
| | **Sample Matrix** | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water |
| | **Sample Date** | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 |
| **Parameter** | **Units** | **RL** | | **Result** | **Result** | **Result** | **Result** | **Result** | **Result** | **Result** | **Result** |
| **Metals and Inorganics (continued)** | | | | | | | | | | |
| Cadmium (dissolved) | mg/L | 0.000003 | | 0.000011 | 0.000027 | 0.000047 | 0.000012 | 0.000016 | 0.000018 | < 0.000003 | 0.000011 |
| Chromium (dissolved) | mg/L | 0.00008 | | 0.00014 | 0.00128 | 0.00019 | 0.00066 | 0.00014 | 0.00252 | 0.00051 | 0.00029 |
| Copper (dissolved) | mg/L | 0.0002 | | 0.0003 | 0.0006 | 0.0036 | 0.0036 | 0.0014 | 0.0028 | 0.0006 | 0.0027 |
| Iron (dissolved) | mg/L | 0.007 | | 0.108 | < 0.007 | 0.055 | 0.065 | < 0.007 | < 0.007 | < 0.007 | 0.046 |
| Potassium (dissolved) | mg/L | 0.009 | | 0.478 | 0.399 | 0.894 | 0.407 | 1.56 | 1.35 | 0.357 | 0.712 |
| Magnesium (dissolved) | mg/L | 0.001 | | 25.2 | 17.9 | 62.6 | 4.16 | 23.8 | 19.7 | 16.3 | 10.1 |
| Manganese (dissolved) | mg/L | 0.00001 | | 0.03244 | 0.00028 | 0.655 | 0.00681 | 0.00112 | 0.00056 | 0.00023 | 0.104 |
| Sodium (dissolved) | mg/L | 0.01 | | 2.74 | 4.82 | 23.3 | 1.72 | 6.62 | 9.55 | 1.35 | 0.33 |
| Lead (dissolved) | mg/L | 0.00009 | | < 0.00009 | < 0.00009 | 0.00009 | < 0.00009 | < 0.00009 | < 0.00009 | < 0.00009 | < 0.00009 |
| Zinc (dissolved) | mg/L | 0.002 | | < 0.002 | < 0.002 | < 0.002 | 0.004 | < 0.002 | 0.003 | < 0.002 | < 0.002 |
| **Other (ORP)** | | | | | | | | | | |
| pH | No unit | 0.05 | | 8.22 | 8.24 | 7.73 | 7.32 | 8.23 | 8.20 | 8.24 | 7.91 |
| Chloride | mg/L | 1 | | < 1 | < 1 | 38 | 4 | 11 | 5 | < 1 | < 1 |
| Mercury (dissolved) | mg/L | 0.00001 | | < 0.00001 | 0.00001 | 0.00001 | 0.00001 | 0.00001 | 0.00001 | < 0.00001 | 0.00001 |

**Client:** Pinchin Ltd
**Project:** 204232.008 - Jocelyn Landfill Spring GW
**Project Manager:** Cody Wheten
**Samplers:** Anthony Dicerbo

MATRIX: WATER

| | | | Sample Number | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Sample Name | BH1 | BH1A | BH2 | BH3-10 | BH4 | BH4A | BH5 | BH5A |
| | | | Sample Matrix | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water | Ground Water |
| | | | Sample Date | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 | 19/05/2023 |
| **Parameter** | **Units** | **RL** | | **Result** | **Result** | **Result** | **Result** | **Result** | **Result** | **Result** | **Result** |
| **Phenols** | | | | | | | | | | | |
| 4AAP-Phenolics | mg/L | 0.002 | | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | 0.003 |
| **VOCs** | | | | | | | | | | | |
| 1,4-Dichlorobenzene | µg/L | 0.5 | | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Dichloromethane | µg/L | 0.5 | | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Vinyl Chloride | µg/L | 0.2 | | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |

MATRIX: WATER

| | | | Sample Number | 15 | 16 | 17 |
|---|---|---|---|---|---|---|
| | | | Sample Name | BH6 | BH7-21 | DUP-Fall 2022 |
| | | | Sample Matrix | Ground Water | Ground Water | Ground Water |
| | | | Sample Date | 19/05/2023 | 19/05/2023 | 19/05/2023 |
| **Parameter** | **Units** | **RL** | | **Result** | **Result** | **Result** |
| **BTEX** | | | | | | |
| Benzene | ug/L | 0.5 | | 1.0 | < 0.5 | < 0.5 |
| Toluene | µg/L | 0.5 | | < 0.5 | < 0.5 | < 0.5 |
| **General Chemistry** | | | | | | |
| Biochemical Oxygen Demand (BOD5) | mg/L | 2 | | 9 | < 4↑ | < 4↑ |
| Total Suspended Solids | mg/L | 2 | | 924 | 1780 | 37 |
| Alkalinity | mg/L as CaCO3 | 2 | | 445 | 235 | 178 |
| Conductivity | uS/cm | 2 | | 804 | 380 | 312 |
| Total Dissolved Solids | mg/L | 30 | | 406 | 226 | 166 |
| Chemical Oxygen Demand | mg/L | 8 | | 37 | 14 | < 8 |
| Total Kjeldahl Nitrogen (N) | as N mg/L | 0.05 | | 17.2 | 0.27 | 0.08 |

**Client:** Pinchin Ltd
**Project:** 204232.008 - Jocelyn Landfill Spring GW
**Project Manager:** Cody Wheten
**Samplers:** Anthony Dicerbo

MATRIX: WATER

| | | | |
|---|---|---|---|
| **Sample Number** | 15 | 16 | 17 |
| **Sample Name** | BH6 | BH7-21 | DUP-Fall 2022 |
| **Sample Matrix** | Ground Water | Ground Water | Ground Water |
| **Sample Date** | 19/05/2023 | 19/05/2023 | 19/05/2023 |

| Parameter | Units | RL | Result | Result | Result |
|---|---|---|---|---|---|
| **General Chemistry (continued)** | | | | | |
| Ammonia+Ammonium (N) | as N mg/L | 0.04 | 18.0 | 0.04 | < 0.04 |
| Dissolved Organic Carbon | mg/L | 1 | 9 | 3 | 1 |
| **Metals and Inorganics** | | | | | |
| Phosphorus (total) | mg/L | 0.03 | 0.97 | 1.26 | 0.03 |
| Sulphate | mg/L | 2 | 13 | 4 | 3 |
| 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 | 0.37 | 0.45 |
| Arsenic (dissolved) | mg/L | 0.0002 | 0.0007 | 0.0003 | 0.0003 |
| Barium (dissolved) | mg/L | 0.00002 | 0.116 | 0.0113 | 0.00555 |
| Boron (dissolved) | mg/L | 0.002 | 0.252 | 0.007 | 0.010 |
| Calcium (dissolved) | mg/L | 0.01 | 121 | 48.8 | 44.7 |
| Cadmium (dissolved) | mg/L | 0.000003 | 0.000007 | 0.000003 | < 0.000003 |
| Chromium (dissolved) | mg/L | 0.00008 | 0.00209 | 0.00024 | 0.00047 |
| Copper (dissolved) | mg/L | 0.0002 | 0.0008 | 0.0045 | 0.0005 |
| Iron (dissolved) | mg/L | 0.007 | 53.1 | 0.018 | < 0.007 |
| Potassium (dissolved) | mg/L | 0.009 | 12.0 | 1.02 | 0.360 |
| Magnesium (dissolved) | mg/L | 0.001 | 23.7 | 18.7 | 16.4 |
| Manganese (dissolved) | mg/L | 0.00001 | 0.591 | 0.00609 | 0.00017 |
| Sodium (dissolved) | mg/L | 0.01 | 19.3 | 10.2 | 1.36 |
| Lead (dissolved) | mg/L | 0.00009 | < 0.00009 | < 0.00009 | < 0.00009 |
| Zinc (dissolved) | mg/L | 0.002 | < 0.002 | < 0.002 | < 0.002 |

**Client:** Pinchin Ltd
**Project:** 204232.008 - Jocelyn Landfill Spring GW
**Project Manager:** Cody Wheten
**Samplers:** Anthony Dicerbo

MATRIX: WATER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | **Sample Number** | 15 | 16 | 17 |
| | | | **Sample Name** | BH6 | BH7-21 | DUP-Fall 2022 |
| | | | **Sample Matrix** | Ground Water | Ground Water | Ground Water |
| | | | **Sample Date** | 19/05/2023 | 19/05/2023 | 19/05/2023 |
| **Parameter** | **Units** | **RL** | | **Result** | **Result** | **Result** |
| **Other (ORP)** | | | | | | |
| pH | No unit | 0.05 | | 7.41 | 8.25 | 8.21 |
| Chloride | mg/L | 1 | | 9 | < 1 | < 1 |
| Mercury (dissolved) | mg/L | 0.00001 | | 0.00001 | < 0.00001 | < 0.00001 |
| **Phenols** | | | | | | |
| 4AAP-Phenolics | mg/L | 0.002 | | 0.003 | < 0.002 | < 0.002 |
| **VOCs** | | | | | | |
| 1,4-Dichlorobenzene | µg/L | 0.5 | | < 0.5 | < 0.5 | < 0.5 |
| Dichloromethane | µg/L | 0.5 | | < 0.5 | < 0.5 | < 0.5 |
| Vinyl Chloride | µg/L | 0.2 | | < 0.2 | < 0.2 | < 0.2 |

## QC SUMMARY

### Alkalinity

**Method: SM 2320 I Internal ref.: ME-CA-[ENV]EWL-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 | EWL0669-MAY23 | mg/L as CaCO3 | 2 | < 2 | 0 | 20 | 98 | 80 | 120 | NA | | |

### Ammonia by SFA

**Method: SM 4500 I Internal ref.: ME-CA-[ENV]SFA-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) | SKA0263-MAY23 | mg/L | 0.04 | <0.04 | ND | 10 | 101 | 90 | 110 | 100 | 75 | 125 |
| Ammonia+Ammonium (N) | SKA0269-MAY23 | mg/L | 0.04 | <0.04 | ND | 10 | 100 | 90 | 110 | NV | 75 | 125 |
| Ammonia+Ammonium (N) | SKA0276-MAY23 | mg/L | 0.04 | <0.04 | 3 | 10 | 97 | 90 | 110 | 99 | 75 | 125 |
| Ammonia+Ammonium (N) | SKA0308-MAY23 | mg/L | 0.04 | <0.04 | 4 | 10 | 100 | 90 | 110 | 91 | 75 | 125 |

## QC SUMMARY

### Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENV]EWL-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 | DIO5129-MAY23 | mg/L | 1 | <1 | ND | 20 | 98 | 80 | 120 | 110 | 75 | 125 |
| Sulphate | DIO5129-MAY23 | mg/L | 2 | <2 | 1 | 20 | 103 | 80 | 120 | 108 | 75 | 125 |

### Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-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) | DIO0632-MAY23 | mg/L | 0.03 | <0.03 | ND | 20 | 100 | 90 | 110 | 101 | 75 | 125 |
| Nitrate (as N) | DIO0632-MAY23 | mg/L | 0.06 | <0.06 | 0 | 20 | 101 | 90 | 110 | 98 | 75 | 125 |

## QC SUMMARY

### Biochemical Oxygen Demand

**Method: SM 5210 I Internal ref.: ME-CA-[ENV]EWL-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) | BOD0046-MAY23 | mg/L | 2 | < 2 | 1 | 30 | 104 | 70 | 130 | 85 | 70 | 130 |

### Carbon by SFA

**Method: SM 5310 I Internal ref.: ME-CA-[ENV]SFA-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 | SKA0257-MAY23 | mg/L | 1 | <1 | ND | 20 | 95 | 90 | 110 | 85 | 75 | 125 |
| Dissolved Organic Carbon | SKA0283-MAY23 | mg/L | 1 | <1 | 2 | 20 | 101 | 90 | 110 | 94 | 75 | 125 |
| Dissolved Organic Carbon | SKA0303-MAY23 | mg/L | 1 | <1 | 1 | 20 | 103 | 90 | 110 | 96 | 75 | 125 |

## QC SUMMARY

### 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 | EWL0615-MAY23 | mg/L | 8 | <8 | 0 | 20 | 98 | 80 | 120 | 92 | 75 | 125 |

### 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 | EWL0669-MAY23 | uS/cm | 2 | 2 | 1 | 20 | 103 | 90 | 110 | NA | | |

### Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-IENVISPE-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 |
| Mercury (dissolved) | EHG0052-MAY23 | mg/L | 0.00001 | < 0.00001 | 1 | 20 | 85 | 80 | 120 | 85 | 70 | 130 |
| Mercury (dissolved) | EHG0055-MAY23 | mg/L | 0.00001 | < 0.00001 | ND | 20 | 99 | 80 | 120 | 95 | 70 | 130 |

## 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 |
| Zinc (dissolved) | EMS0116-JUN23 | mg/L | 0.002 | <0.002 | 2 | 20 | 99 | 90 | 110 | 120 | 70 | 130 |
| Arsenic (dissolved) | EMS0208-MAY23 | mg/L | 0.0002 | <0.0002 | ND | 20 | 104 | 90 | 110 | 85 | 70 | 130 |
| Barium (dissolved) | EMS0208-MAY23 | mg/L | 0.00002 | <0.00008 | 3 | 20 | 99 | 90 | 110 | 101 | 70 | 130 |
| Boron (dissolved) | EMS0208-MAY23 | mg/L | 0.002 | <0.002 | 1 | 20 | 103 | 90 | 110 | 102 | 70 | 130 |
| Calcium (dissolved) | EMS0208-MAY23 | mg/L | 0.01 | <0.01 | 1 | 20 | 101 | 90 | 110 | 101 | 70 | 130 |
| Cadmium (dissolved) | EMS0208-MAY23 | mg/L | 0.000003 | <0.000003 | ND | 20 | 104 | 90 | 110 | 96 | 70 | 130 |
| Chromium (dissolved) | EMS0208-MAY23 | mg/L | 0.00008 | <0.00008 | ND | 20 | 104 | 90 | 110 | 91 | 70 | 130 |
| Copper (dissolved) | EMS0208-MAY23 | mg/L | 0.0002 | <0.0002 | 8 | 20 | 101 | 90 | 110 | 92 | 70 | 130 |
| Iron (dissolved) | EMS0208-MAY23 | mg/L | 0.007 | <0.007 | ND | 20 | 107 | 90 | 110 | 125 | 70 | 130 |
| Potassium (dissolved) | EMS0208-MAY23 | mg/L | 0.009 | <0.009 | 1 | 20 | 105 | 90 | 110 | 72 | 70 | 130 |
| Magnesium (dissolved) | EMS0208-MAY23 | mg/L | 0.001 | <0.001 | 1 | 20 | 101 | 90 | 110 | 72 | 70 | 130 |
| Manganese (dissolved) | EMS0208-MAY23 | mg/L | 0.00001 | <0.00001 | 11 | 20 | 106 | 90 | 110 | 118 | 70 | 130 |
| Sodium (dissolved) | EMS0208-MAY23 | mg/L | 0.01 | <0.01 | 1 | 20 | 100 | 90 | 110 | 103 | 70 | 130 |
| Lead (dissolved) | EMS0208-MAY23 | mg/L | 0.00009 | <0.00009 | ND | 20 | 103 | 90 | 110 | 78 | 70 | 130 |
| Zinc (dissolved) | EMS0208-MAY23 | mg/L | 0.002 | <0.002 | ND | 20 | 101 | 90 | 110 | 121 | 70 | 130 |

## QC SUMMARY

### pH

Method: SM 4500 I 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 |
| pH | EWL0669-MAY23 | No unit | 0.05 | NA | 0 | | 100 | | | NA | | |

### Phenols by SFA

Method: SM 5530B-D I Internal ref.: ME-CA-[ENVISFA-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 | SKA0262-MAY23 | mg/L | 0.002 | <0.002 | NV | 10 | 96 | 80 | 120 | 107 | 75 | 125 |

### Phosphorus by SFA

Method: SM 4500-P J I Internal ref.: ME-CA-[ENVISFA-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) | SKA0249-MAY23 | mg/L | 0.03 | <0.03 | 10 | 10 | 98 | 90 | 110 | 95 | 75 | 125 |

## QC SUMMARY

### Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-[ENVIEWL-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 | EWL0605-MAY23 | mg/L | 30 | <30 | 0 | 20 | 95 | 80 | 120 | NA | | |
| Total Dissolved Solids | EWL0638-MAY23 | mg/L | 30 | <30 | 2 | 20 | 98 | 80 | 120 | NA | | |

### Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENVIEWL-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 | EWL0665-MAY23 | mg/L | 2 | < 2 | 3 | 10 | 96 | 90 | 110 | NA | | |

## QC SUMMARY

### Total Nitrogen

**Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-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) | SKA0259-MAY23 | mg/L | 0.05 | 0.094 | ND | 10 | 103 | 90 | 110 | 111 | 75 | 125 |
| Total Kjeldahl Nitrogen (N) | SKA0284-MAY23 | mg/L | 0.05 | <0.05 | 1 | 10 | 96 | 90 | 110 | 106 | 75 | 125 |

### Volatile Organics

**Method: EPA 5030B/8260C | Internal ref.: ME-CA-[ENV]GC-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 |
| 1,4-Dichlorobenzene | GCM0442-MAY23 | µg/L | 0.5 | <0.5 | ND | 30 | 96 | 60 | 130 | 100 | 50 | 140 |
| Benzene | GCM0442-MAY23 | ug/L | 0.5 | <0.5 | ND | 30 | 95 | 60 | 130 | 103 | 50 | 140 |
| Dichloromethane | GCM0442-MAY23 | µg/L | 0.5 | <0.5 | ND | 30 | 96 | 60 | 130 | 102 | 50 | 140 |
| Toluene | GCM0442-MAY23 | µg/L | 0.5 | <0.5 | ND | 30 | 96 | 60 | 130 | 102 | 50 | 140 |
| Vinyl Chloride | GCM0442-MAY23 | µg/L | 0.2 | <0.2 | ND | 30 | 97 | 50 | 140 | 104 | 50 | 140 |

## 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 report supersedes all previous versions.

-- End of Analytical Report --

# SGS

## 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): MAY/24/2022 KMM

LAB LIMS #: CA 15878-May23 (GW) / CA 14789-May23 (SW)

Received Time (After Hours Only): __:__

Temperature Upon Receipt (°C): 9x3

**Billing & Reporting Information**

Invoice/Receipt to {3}:

Company: Pinchin
Attention: Cody Wheten
Address: 189 Upton Street, Unit 2, Sault Ste. Marie, Ontario, P6A 3W5
Email: cwheten@pinchin.com

Quote #: 2021 373

Attached Parameter List: ☐ YES ☐ NO

**Turnaround Time**

Is *Rush Turnaround Time Required? ☒ YES ☐ NO

Specify:

* Rush TA Requests Require Lab Approval

Project Name/Number: 204232.008-Jocelyn landfill Spring GW & SW

P.O. #:

**Client Information/Report To:**

Client Lab #:

| | | | |
|---|---|---|---|
| Company Name: | same as above | Phone Number: | 705-943-8513 |
| Contact Name: | | Fax Number: | |
| Address: | | E-mail: | |
| Copy to: | | | |

**Sample Information**

| Sample Identifier | Date Sampled (mm/dd/yy) | Time Sampled | # of Bottles | Field Filtered | Field Temp (°C) | Field pH | | GW Package | VOCs | SW Package | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BH1 | 05/19/23 | AM | 12 | X | 8.18 | 8.28 | | X | X | | |
| BH1A | | | | X | 7.26 | 8.24 | | X | X | | |
| BH2 | | | | X | 8.44 | 6.10 | | X | X | | |
| BH3-10 | | | | X | 6.64 | 8.12 | | X | X | | |
| BH4 | | | | X | 7.42 | 8.40 | | X | X | | |
| BH4A | | | | X | 7.43 | 8.87 | | X | X | | |
| BH5 | | | | X | 6.38 | 8.20 | | X | X | | |
| BH5A | | | | X | 8.08 | 8.02 | | X | X | | |
| BH6 | | | | X | 7.65 | 8.04 | | X | X | | |
| BH7-21 | | | | X | 8.76 | 8.44 | | X | X | | |
| DUP-Fall 2022 | | | " | X | 6.38 | 8.20 | | X | X | | |
| | | | | | | | | | | | |
| SW1 | | | | | 10.48 | 8.98 | | | | X | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)

| | | | | | | |
|---|---|---|---|---|---|---|
| Sampled By {1}: | (Name) Anthony DiCarbo | (Signature) | | Date: | 05/23/23 | (mm/dd/yy) |
| Relinquished by {2}: | (Name) Anthony DiCarbo | (Signature) | | Date: | 05/23/23 | (mm/dd/yy) |

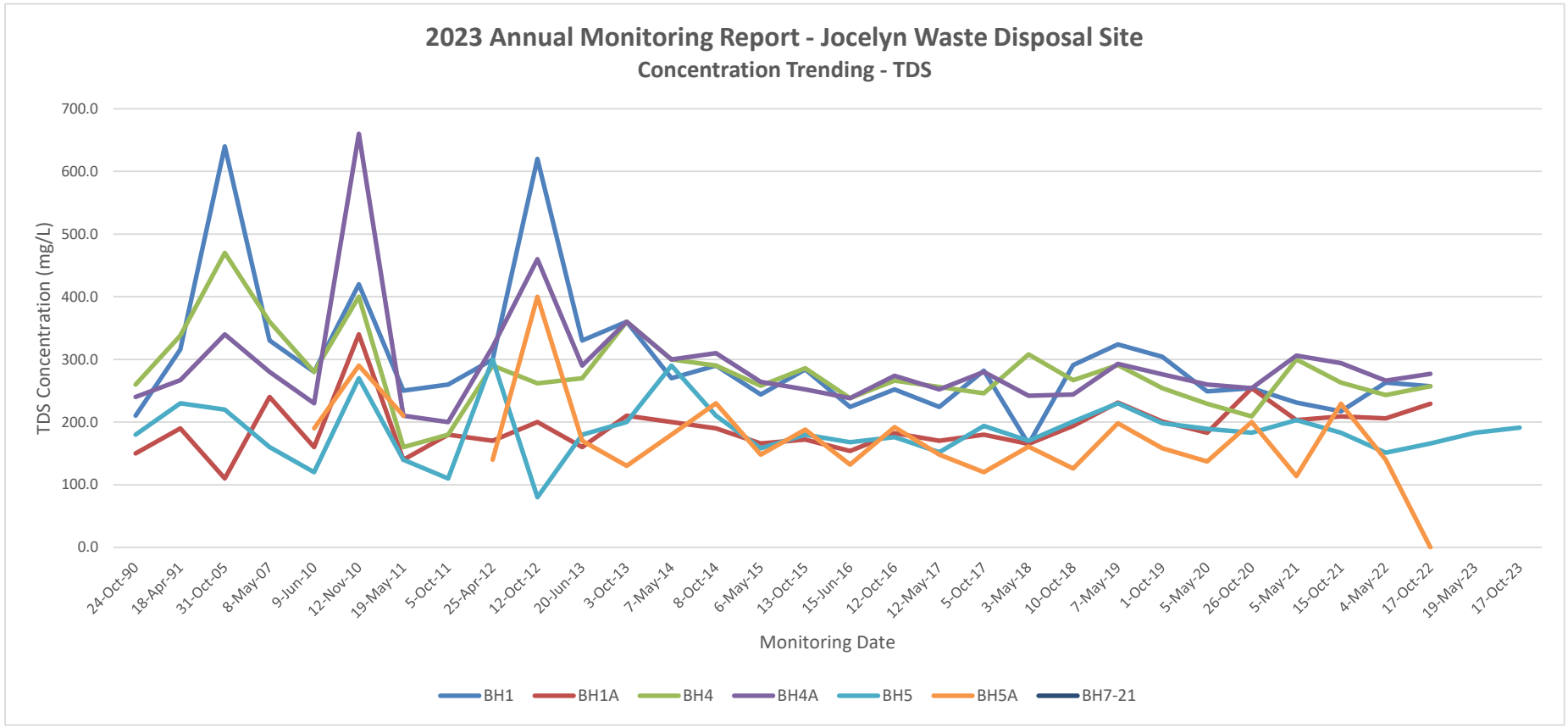
**Note:** {1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file 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.

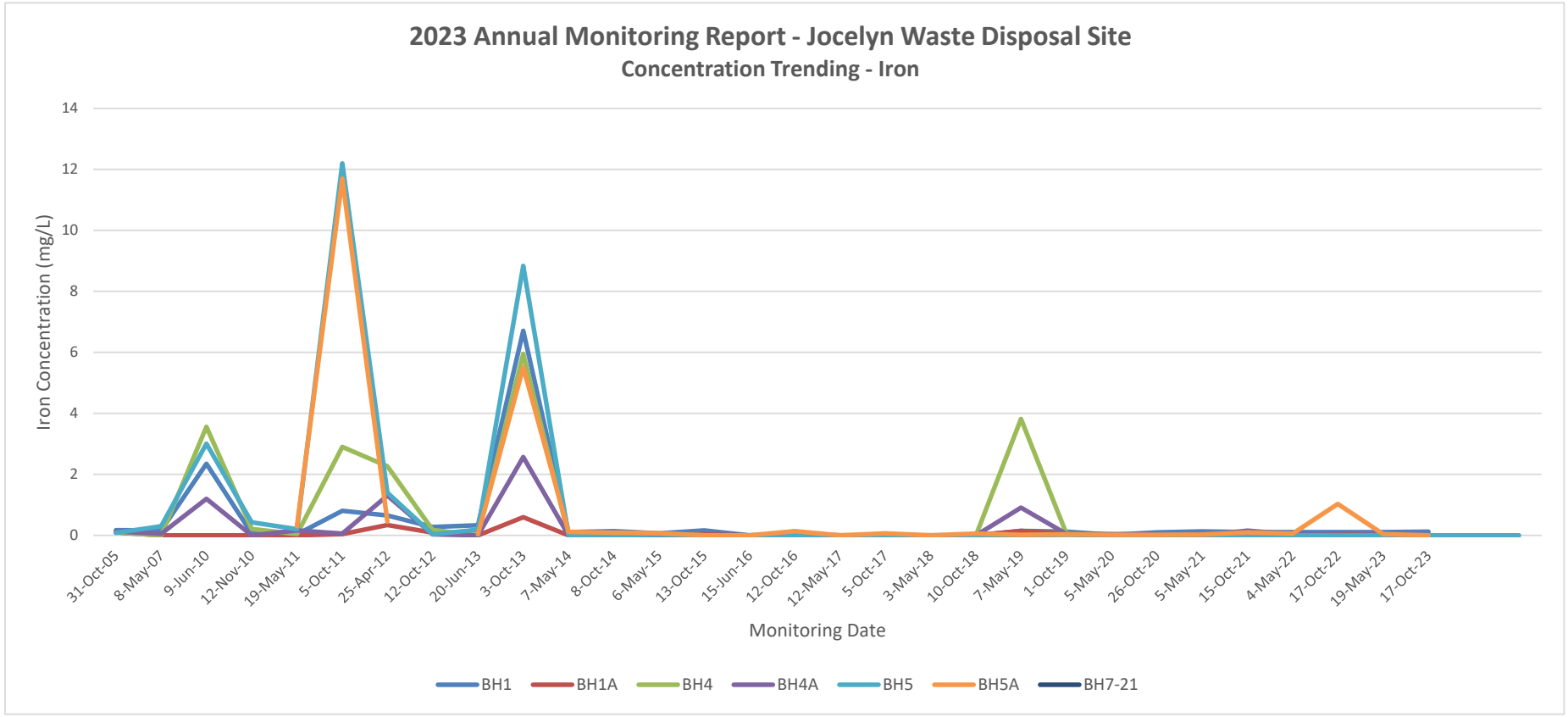


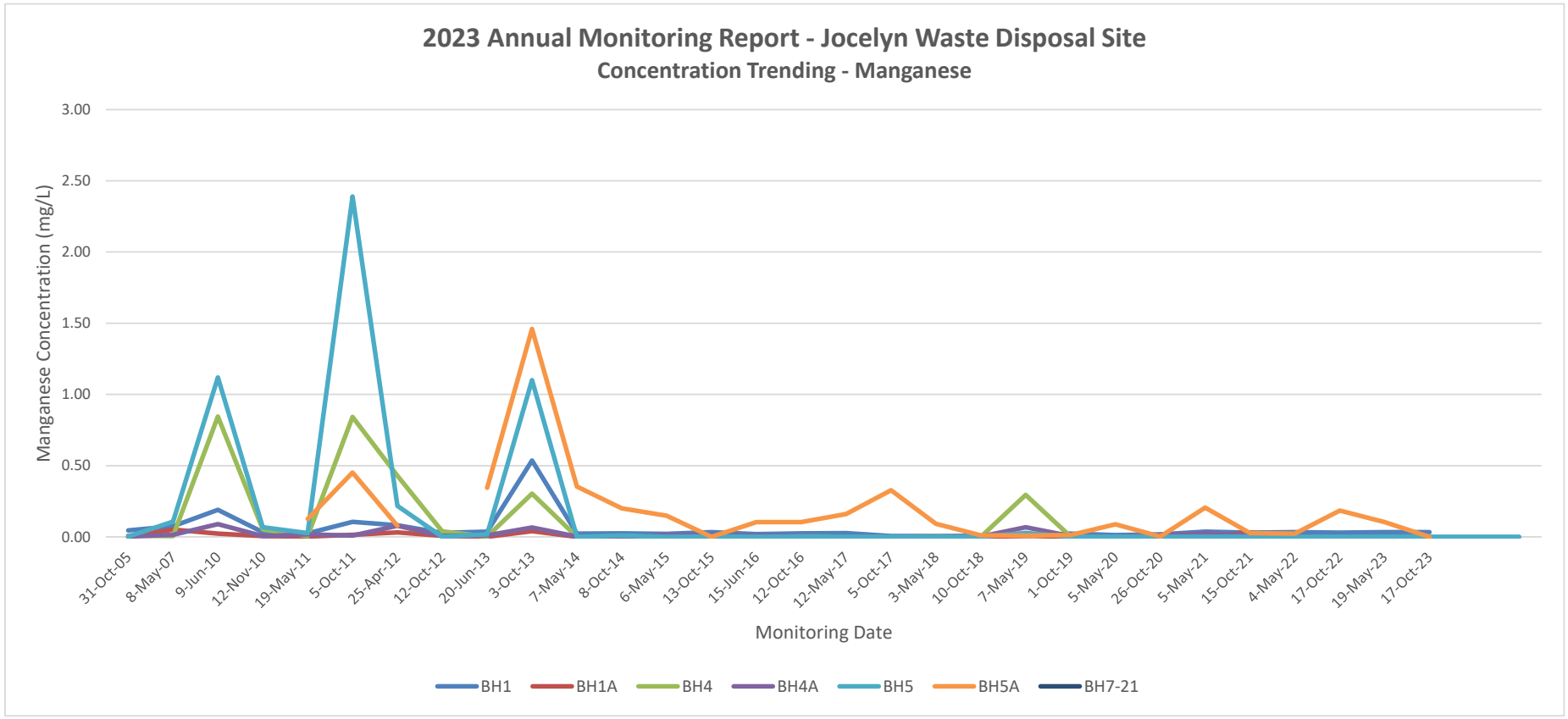
Revision #: 2.3
Date of Issue: 24 Jun. 2014

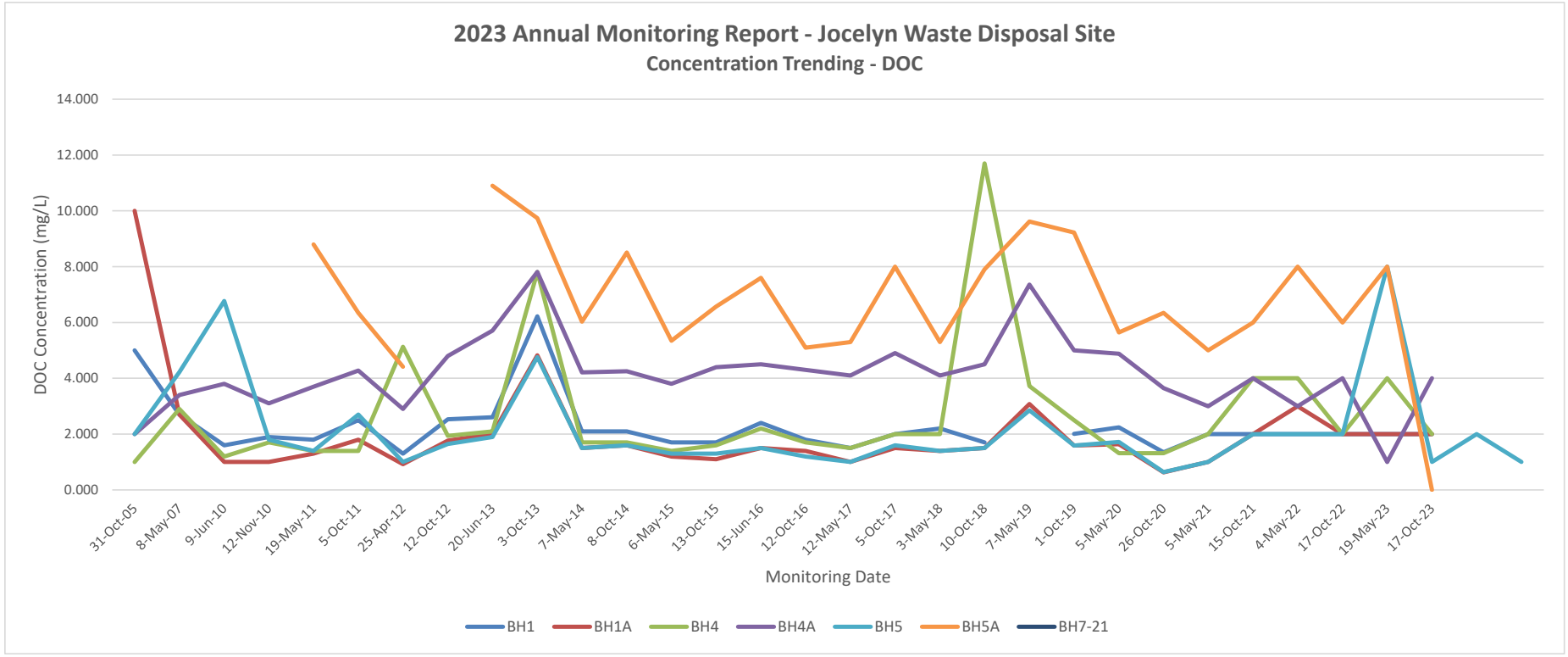
334119188715
334119188707
KMM 10:00
Collect.

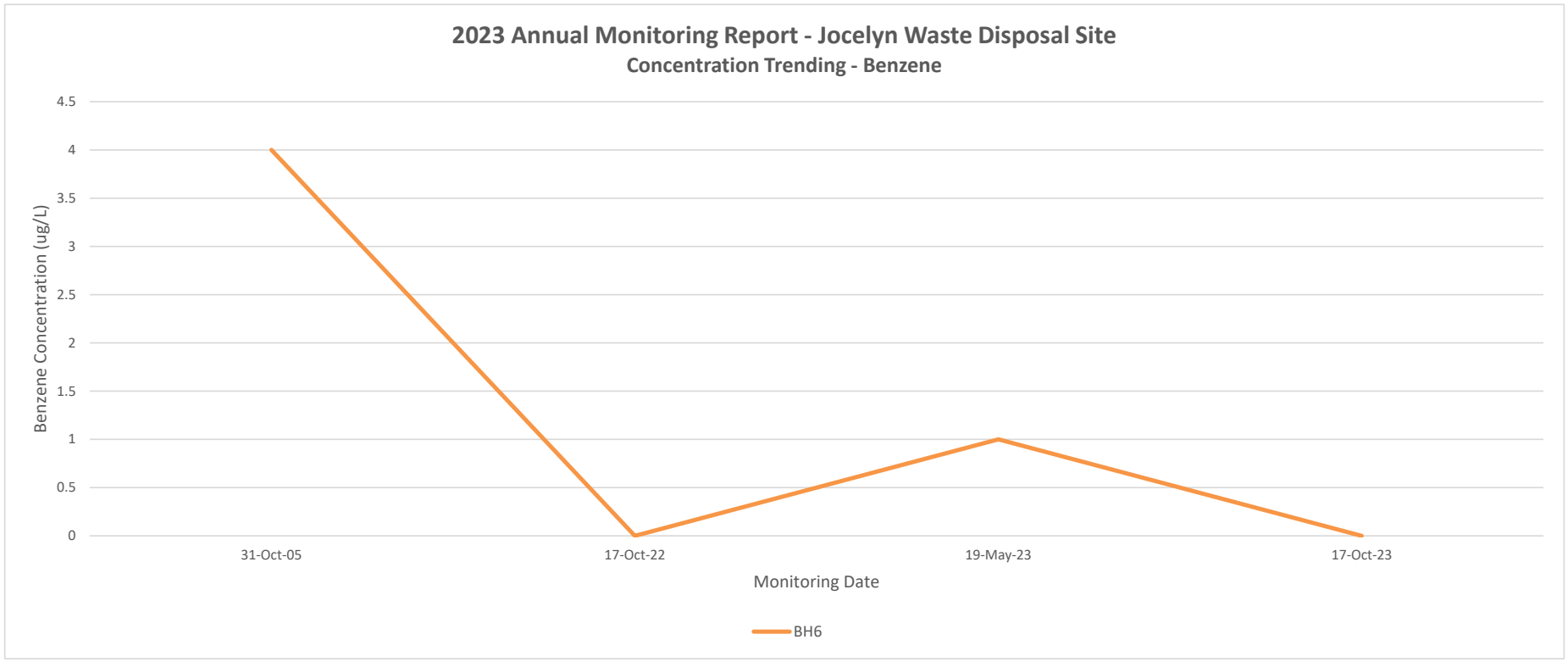
# APPENDIX VII
## Concentration Trends


2023 Annual Monitoring Report - Jocelyn Waste Disposal Site
Concentration Trending - TDS
TDS Concentration (mg/L)
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
24-Oct-90
18-Apr-91
31-Oct-05
8-May-07
9-Jun-10
12-Nov-10
19-May-11
5-Oct-11
25-Apr-12
12-Oct-12
20-Jun-13
3-Oct-13
7-May-14
8-Oct-14
6-May-15
13-Oct-15
15-Jun-16
12-Oct-16
12-May-17
5-Oct-17
3-May-18
10-Oct-18
7-May-19
1-Oct-19
5-May-20
26-Oct-20
5-May-21
15-Oct-21
4-May-22
17-Oct-22
19-May-23
17-Oct-23
Monitoring Date
BH1
BH1A
BH4
BH4A
BH5
BH5A
BH7-21


2023 Annual Monitoring Report - Jocelyn Waste Disposal Site
Concentration Trending - Iron
Iron Concentration (mg/L)
14
12
10
8
6
4
2
0
31-Oct-05
8-May-07
9-Jun-10
12-Nov-10
19-May-11
5-Oct-11
25-Apr-12
12-Oct-12
20-Jun-13
3-Oct-13
7-May-14
8-Oct-14
6-May-15
13-Oct-15
15-Jun-16
12-Oct-16
12-May-17
5-Oct-17
3-May-18
10-Oct-18
7-May-19
1-Oct-19
5-May-20
26-Oct-20
5-May-21
15-Oct-21
4-May-22
17-Oct-22
19-May-23
17-Oct-23
Monitoring Date
BH1
BH1A
BH4
BH4A
BH5
BH5A
BH7-21


2023 Annual Monitoring Report - Jocelyn Waste Disposal Site
Concentration Trending - Manganese
Manganese Concentration (mg/L)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
31-Oct-05
8-May-07
9-Jun-10
12-Nov-10
19-May-11
5-Oct-11
25-Apr-12
12-Oct-12
20-Jun-13
3-Oct-13
7-May-14
8-Oct-14
6-May-15
13-Oct-15
15-Jun-16
12-Oct-16
12-May-17
5-Oct-17
3-May-18
10-Oct-18
7-May-19
1-Oct-19
5-May-20
26-Oct-20
5-May-21
15-Oct-21
4-May-22
17-Oct-22
19-May-23
17-Oct-23
Monitoring Date
BH1
BH1A
BH4
BH4A
BH5
BH5A
BH7-21


2023 Annual Monitoring Report - Jocelyn Waste Disposal Site
Concentration Trending - DOC
DOC Concentration (mg/L)
14.000
12.000
10.000
8.000
6.000
4.000
2.000
0.000
31-Oct-05
8-May-07
9-Jun-10
12-Nov-10
19-May-11
5-Oct-11
25-Apr-12
12-Oct-12
20-Jun-13
3-Oct-13
7-May-14
8-Oct-14
6-May-15
13-Oct-15
15-Jun-16
12-Oct-16
12-May-17
5-Oct-17
3-May-18
10-Oct-18
7-May-19
1-Oct-19
5-May-20
26-Oct-20
5-May-21
15-Oct-21
4-May-22
17-Oct-22
19-May-23
17-Oct-23
Monitoring Date
BH1
BH1A
BH4
BH4A
BH5
BH5A
BH7-21


2023 Annual Monitoring Report - Jocelyn Waste Disposal Site
Concentration Trending - Benzene
Benzene Concentration (ug/L)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
31-Oct-05
17-Oct-22
19-May-23
17-Oct-23
Monitoring Date
BH6

## 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 | |
|---|---|
| **Waste Disposal Site Name** | Jocelyn Waste Disposal Site |
| **Location (e.g. street address, lot, concession)** | 3670 5th Side Road, PR#1 |
| **GPS Location (taken within the property boundary at front gate/ front entry)** | Easting: 274768 / Northing: 5110193 / Zone: 17T |
| **Municipality** | Jocelyn |
| **Client and/or Site Owner** | Township of Jocelyn |
| **Monitoring Period (Year)** | 2023 |
| This Monitoring Report is being submitted under the following: | |
| **Certificate of Approval No.:** | A561001 |
| **Director's Order No.:** | |
| **Provincial Officer's Order No.:** | |
| **Other:** | |

| | | |
|---|---|---|
| **Report Submission Frequency** | ◉ **Annual**<br>○ **Other** | Specify (Type Here): |
| **The site is:** | ◉ **Active**<br>○ **Inactive**<br>○ **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?** | ○ **Yes**<br>◉ **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)** | ○ Yes<br>◉ No | |

## Groundwater WDS Verification:

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

## Sampling and Monitoring Program Status:

| | | |
|---|---|---|
| **1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:** | (●) **Yes**<br>( ) **No** | |
| **2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document(s):** | ( ) **Yes**<br>(●) **No**<br>( ) **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** |
|---|---|---|
| BH7-21 | Well was found dry during the Fall sampling period. | 17-Oct-2023 |
| BH3-10 | Well was found dry during the Fall sampling period. | 17-Oct-2023 |
| 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.** | ◯ **Yes**<br>◉ **No**<br>◯ **Not Applicable** | |
| **b) If yes, the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:** | ◯ **Yes**<br>◯ **No**<br>◉ **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):** | ◉ **Yes**<br>◯ **No** | If no, specify (Type Here): |

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

| | | | |
|---|---|---|---|
| **5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.** | ◉ **Yes**<br>○ **No** | | |
| **6) The site meets compliance and assessment criteria.** | ◉ **Yes**<br>○ **No** | | |
| **7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.** | ◉ **Yes**<br>○ **No** | | |
| **1) Is one or more of the following risk reduction practices in place at the site:**<br>***(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**<br>***(b)*** **There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or**<br>***(c)*** **The site meets the following two conditions (typically achieved after 15 years or longer of site operation):**<br>***i.*** **The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and**<br>***ii.*** **Seasonal and annual water levels and water quality fluctuations are well understood.** | ◉ **Yes**<br>○ **No** | **Note which practice(s):** | ☐ **(a)**<br>☐ **(b)**<br>☒ **(c)** |
| **9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):** | ○ **Yes**<br>○ **No**<br>◉ **Not Applicable** | If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here): | |

## 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:**

**21-Feb-2024**

## Recommendations:

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

| | |
|---|---|
| ◉ **No changes to the monitoring program are recommended**<br><br>○ **The following change(s) to the monitoring program is/are recommended:** | |
| ◉ **No Changes to site design and operation are recommended**<br><br>○ **The following change(s) to the site design and operation is/ are recommended:** | Type Here |

| | | | |
|---|---|---|---|
| **Name:** | Tim McBride | | |
| **Seal:** | Add Image | | |
| **Signature:** | Tim McBride 2024.02.21 15:50:11 -05'00' | **Date:** | 21-Feb-2024 |
| **CEP Contact Information:** | Mr. Tim McBride | | |
| **Company:** | Pinchin | | |
| **Address:** | 662 Falconbridge Road, Unit 3, Sudbury, Ontario, 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)** | Seasonal ponding on the Site (Southwest toe of waste mound) |
| **Distance(s)** | Approximately 200 m southwest of main entrance |

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

## Sampling and Monitoring Program Status:

| | | |
|---|---|---|
| **1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:** | ○ Yes<br>◉ No | |
| **2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):** | ○ Yes<br>○ No<br>◉ **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 |
|---|---|---|
| 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 surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.** | ○ **Yes**<br>◉ **No**<br>○ **Not Applicable** | |
| **b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:** | ○ **Yes**<br>○ **No**<br>◉ **Not Applicable** | If no, specify below or provide details in an attachment. |

| **Surface Water Sampling Location** | **Description/Explanation for change (change in name or location, additions, deletions)** | **Date** |
|---|---|---|
| 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 surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/ outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):** | ◉ **Yes**<br>○ **No** | If no, specify (Type Here): |

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

| | |
|---|---|
| **5) The receiving water body meets surface water-related compliance criteria and assessment criteria: i.e., there are no exceedances of criteria, based on MOE legislation, regulations, Water Management Policies, Guidelines and Provincial Water Quality Objectives and other assessment criteria (e.g., CWQGs, APVs), as noted in Table A or Table B in the Technical Guidance Document (Section 4.6):** | ○ **Yes**<br>◉ **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 |
| Iron | PWQO | 8.74 mg/L versus 0.3 mg/L |
| Total Phosphorus | PWQO | 0.078 mg/L versus 0.03 mg/L |
| Zinc | PWQO | 0.03 mg/L versus 0.02 mg/L |
| 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)?** | ○ **Yes**<br>◉ **No** | If yes, specify (Type Here) |

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

## 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.**

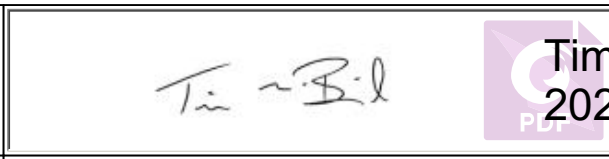
**If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning 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:**

21-Feb-2024

## Recommendations:

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

| | |
|---|---|
| ◉ **No Changes to the monitoring program are recommended** | Type Here |
| ○ **The following change(s) to the monitoring program is/are recommended:** | |
| ◉ **No changes to the site design and operation are recommended** | Type Here |
| ○ **The following change(s) to the site design and operation is/are recommended:** | |

| | |
|---|---|
| **CEP Signature** |  Tim McBride 2024.02.21 15:51:14-05'00' |
| **Relevant Discipline** | Hydrogeologist |
| **Date:** | 21-Feb-2024 |
| **CEP Contact Information:** | Mr. Tim McBride |
| **Company:** | Pinchin |
| **Address:** | 662 Falconbridge Road, Unit 3, Sudbury, Ontario, P3A 4S4 |
| **Telephone No.:** | 705-521-0560 |
| **Fax No. :** | 705-521-1309 |
| **E-mail Address:** | tmcbride@pinchin.com |

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