2024 Annual Water Quality Monitoring Report

St. Charles Landfill
Municipality of St. Charles, Ontario

Prepared for:

Corporation of the
Municipality of St. Charles
2 King Street, P.O. Box 70
St. Charles, Ontario P0M 2W0

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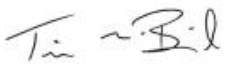

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1.0 INTRODUCTION

Pinchin Ltd. (Pinchin) was retained by the Corporation of the Municipality of St. Charles (Client) to conduct the 2024 Annual Monitoring Program for the St. Charles Landfill (Site) property located at 515 Beauparlant Road, in the Municipality of St. Charles. The Site is operated under Environmental Compliance Approval (ECA, previously referred to as Certificate of Approval (CofA)) Number **A541302**, last amended October 3, 2014. This report has been produced for the purpose of providing a detailed evaluation and summary of the 2024 monitoring data and was completed to constitute the 2024 Annual Monitoring Report. 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 is approximately 3 kilometres (km) to the west of the Municipality of St. Charles at 515 Beauparlant Road. The property boundary is identified as the west half of the Township of Jennings Lot 3, Concession 6, with a contamination attenuation zone (CAZ) extending north into the Township of Appleby Lot 5, Concession 1 located within the District of Sudbury. The Universal Transverse Mercator (UTM) coordinates of the Site are 541,380 Easting and 5,134,503 Northing, Zone 17, relative to the North American Datum (NAD) 83. The Site is approved for the use of 32.4 hectares as a waste disposal and transfer site within a total Site area of 45.87 hectares. The Site location is indicated on Figure 1 (All Figures are provided in Appendix I).

1.1.1 Site Survey and Aerial Photography

At the time of preparation of this report, a cadastral or geodetic survey or aerial photography of the Site was not available for Pinchin to review.

1.2 Ownership and Key Personnel

The Site is owned and operated by the Municipality of St. Charles. The 2024 Monitoring Program was completed for the following Representative on behalf of the Township:

Denis Turcot
Municipality of St. Charles
PO Box 70, 2 King St. E.
St. Charles, Ontario, P0M 2W0
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The Competent Environmental Practitioner (CEP) for the Site groundwater and surface water monitoring program was Mr. Tim McBride of Pinchin Ltd. Mr. McBride's contact information is provided below:

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 owned by the Corporation of the Municipality of St. Charles and has been zoned as "Waste Disposal" by the municipality and has been in operation since approximately 1973. The C of A allows for a maximum fill capacity of 383,500 cubic metres (m^3) including waste, daily and interim cover and final cover. Site development has been designed to maximize waste management capacity while still allowing for natural attenuation of the Site. A Development and Operations (D&O) Plan was first prepared for the Site by WESA in 2013 to satisfy Condition 7(6) of the C of A requirements, as well as provide a clear plan for the continued management of waste on the site, and to ensure that the operation of the Site is in compliance with the waste disposal requirements of the *Environmental Protection Act*. In 2014 WESA prepared an updated D&O Plan.

Starting in 1973, landfill operations were restricted to an area along the north edge of the licensed disposal area near the entrance, which will henceforth be described as Cell 1. The Site D&O Plan; prepared by WESA (WESA, 2013), describes this cell, at least in part, as being located on top of a bedrock outcrop. In a landfill study report by Canadian Shield Consultants (CSC) in 2020, it is stated that Cell 1 was capped by municipal operations personnel using the same general approach used in regular capping of deposited garbage; roughly estimated to be about 100 dump truck loads. Cell 1 contains 86,000 m^3 of waste and cover, standing approximately 12 metres (m) above the ground surface and a footprint that stretches approximately 220 m north-south and 100 m east-west (CSCA, 2020).

Beginning in 2013, fill placement began southeast of the Cell 1 waste footprint following the placement of a least 1 metre of clean fill above the exposed bedrock, this expansion area will henceforth be referred to as Cell 2. The expected fill volume for Cell 2 was 297,530 m^3.

Condition 7(6) of the Site C of A dictates that a Site D&O Report must be submitted to the Ministry of the Environment, Conservation and Parks (MECP) within a 180 days of the C of A issuance for approval and outlines the minimum report requirements. One of the minimum requirements for inclusion is a "*description of the final cover and its estimated permeability, its thickness, the source of the final cover material, the thickness of the of the top soil and the vegetation proposed for the closed waste mound*…". It is assumed that the provided 2014 D&O Plan reflects the approved D&O Report, including the final

cover requirements, outlined in Section 5.5 of the D&O Plan (as referenced in the ECA). The 2020 Landfill Study stated that it was unknown whether the final cover placed over Cell 1 meets the intent of the recommendations in the D&O Plan. If current Cell 1 cover does not meet the standards set in the D&O Plan, then the cell would be considered inactive with interim cover and not formally closed.

The last available waste fill estimate is from the 2020 Landfill Study. CSCA revised earlier waste volume estimates provided by WESA in the Site D&O plan, using the latest available census data for the municipality and a revised per capita waste generation rate based on waste diversion from recycling. In 2023, the Client estimated an annual population growth of two percent or more according to plans for a new subdivision development and increases in lot severances. According to the projected annual municipal population growth rate and a waste production figure of 0.66 kilogram per day per person, CSCA estimated a closure date of 2127 in the 2023 Annual Monitoring Report.

1.3.1 Site Operations

Municipal wastes include domestic waste and nonhazardous solid wastes from industrial, commercial, and institutional sectors such as building contractors, construction companies, automotive, and government facilities. An attendant building is located on the Site; however, weigh scales are not in place and vehicle counts are not conducted. The amount of uncompacted, domestic waste received at the Site each year can therefore not be determined in the absence of regular annual topographic surveys. The amount of waste received at the Site annually, however, has historically been observed as being relatively low volume. The Site is currently the only available landfill under the jurisdiction of the Municipality of St. Charles.

A blue box program was initiated in the mid-2000s. Household recyclable materials, such as polystyrene foam, plastic bags, glass bottles, glass jars, metal containers, paper, cardboard, beverage cartons, plastics (#1, 2, 4, 5 and 6), and empty aerosol cans are accepted at the Site. These materials are deposited directly into recycling bins and temporarily stored on Site. Once the bins reach capacity, the household recyclable materials are transferred to a recycling centre for processing. There is no green bin program for diverting organics and none is planned at this time.

The segregation of white metal goods including fridges and freezers, as well as waste tires was also carried out during the 2023 reporting period. These materials are subsequently removed from the Site and recycled by licensed waste management contractors on an as-required basis.

Application of daily cover is completed by municipal staff.

1.4 Site Document Review

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

- Report entitled *"Development & Operations Plan, St. Charles Waste Disposal Site, Municipality of St. Charles, Ontario"* prepared for the Municipality of St. Charles by WESA, a Division of BluMetric Environmental Inc., dated January 2013 (the 2013 D&O Plan);
- Report entitled *"Development & Operations Plan, St. Charles Waste Disposal Site, Municipality of St. Charles, Ontario"* prepared for the Municipality of St. Charles by WESA, a Division of BluMetric Environmental Inc., dated January 2013;
- Report entitled "*St. Charles Landfill Study"* prepared for the Municipality of St. Charles by Canadian Shield Consultants Agency (CSCA), dated December 10, 2020; and
- Report entitled "*2023 Annual Monitoring Report, St. Charles Landfill, Municipality of St. Charles, Ontario*" prepared for the Municipality of St. Charles by Canadian Shield Consultants Agency (CSCA), dated March 28, 2024.

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.

1.5 Monitoring and Reporting Program Objectives and Requirements

The monitoring and reporting completed by Pinchin has also been generally developed based on the MECP document entitled "Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document" dated November 2010, as well as the Municipality's 2023 Request for Proposal (RFP) Document entitled "Ground Water and Surface Water Monitoring of the St.-Charles Landfill Site", (Request #2023-10).

The ECA for the Site provides detailed monitoring and reporting program objectives and requirements. A copy of the ECA is provided in Appendix II. The ECA for the Site outlines that the Site water quality is to be monitored semi-annually and compared to the standards defined within the 2014 Development & Operations Plan, which outlines that groundwater quality is to be compared to O. Reg. 232/98 (Landfill Standards), Schedule 5, Column 1 and surface water quality is to be monitored semi-annually and compared to O. Reg. 232/98 (Landfill Standards), Schedule 5, Column 3.

1.6 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 to the information provided in the 2013 Annual Monitoring Report and the D&O Plan.

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

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

2.0 PHYSICAL SETTING

2.1 Geology and Hydrogeology

The Site is predominantly a rock knob landform, exposed or covered by a thin veneer of soil, having mainly low undulating to rolling local relief. Borehole logs detailing soil and groundwater conditions for the monitoring well network is provided in Appendix III. Sixteen monitoring wells, SCL1 through SCL16, were installed from 2005 through 2009 by WESA and comprise the current groundwater monitoring well network. According to the borehole logs, a thin layer of soil was encountered at most boreholes, ranging in thickness between 0.2 m in SCL 13 and SCL 14 to 6.0 m in SCL 3. The overburden layer at boreholes SCL 13 through SCL 16 at the south side of the site was less than 0.3 m in thickness. Elsewhere, the overburden comprised layers of sand and gravel, fine sand, silty sand, sandy or silty clay. A clayey layer was observed at all locations except SCL 1, SCL 8, SCL 10 and SCL 12. Thus, a silty sand stratum underlain by a clay stratum was most widely observed overall. WESA noted that the overburden is too thin in most areas to support an aquifer, and where the soil is thicker, it comprises primarily silty clay/clay and so the overburden is more likely to behave as an aquitard than an aquifer and consequently, considered bedrock to be the main potential contaminant pathway of concern (WESA, 2013).

Shallow bedrock was identified in the southern portion of the property, as indicated in SCL13 through SCL16, as well as southwest of SCL1. The borehole logs do not identify the encountered bedrock at the Site. Bedrock deposits of the Site are mapped as primarily comprising metasediments of the Middle and Late Precambrian, specifically biotite gneiss derived from greywacke, siltstone, immature sandstone and minor calcareous siltstone and sandstone In addition, felsic intrusive rocks comprising gneissic quartz monzonite and minor granodiorite granite, and mafic and ultramafic intrusive rocks comprising gneissic gabbro, diorite and amphibolite are found in the area of the landfill (as illustrated on Map 2271 Nipissing, Ontario Geological Survey, 1976).

According to the D&O Plan, WESA completed a hydrogeological study of the Site in 2005 and subsequently installed the sixteen wells comprising the existing groundwater monitoring network from 2005 through 2009. Single well response testing was completed by WESA at thirteen of the monitoring locations resulting in hydraulic conductivity estimates between 2×10^{-7} and 8×10^{-3} cm/s, with a geometric mean of 5×10^{-5} cm/s. The overburden conditions at most borehole locations consisted of a silty sand stratum underlain by a clay stratum.

Local groundwater flow systems form between adjacent recharge and discharge areas, and local system flow paths are relatively short, responding rapidly to increased groundwater recharge. Topographical features are often used in conjunction with water elevations to help identify local groundwater flow patterns within the upper-most saturated zone beneath the land surface, with recharge occurring in upland areas and discharge through adjacent low-lying areas. In general, the historic static groundwater levels indicate a groundwater divide through the Site; thus, to main flow systems can be considered for the Site, a northern flow system (comprising of monitoring wells SCL1 through 9) and a southern flow system (comprising of monitoring wells SCL9 through 16). The northern flow regime has an induced mounding with ponds located in the northeast corner of the Site. Groundwater flow within the southern flow regime is inferred to be northeast, with the inferred receptor ultimately being Tributary A. The inferred receptor within the southern flow regime is expected be both south, in the north end of this area and west in the south end of the property, with the ultimate receptor expected to be Tributary B. Currently, none of the monitoring locations within the southern flow regime are interpreted to be downgradient of the fill area, however, as the future landfill operations progress southward, many of the existing wells are expected to become downgradient monitors.

2.2 Surface Water Features

The nearest surface water courses to the Site are identified as Tributary A and Tributary B both flowing south on Figure 2, the tributaries eventually deposit into the Maskinonge Creek which is a tributary of Lake Nipissing. Maskinonge Creek is located approximately 6 km southeast of the Site.

3.0 METHODOLOGY

3.1 Scope of Work

The objectives of the monitoring program as requested by the client were provided in Pinchin's proposal entitled "Landfill Monitoring 2024 to 2028 – *St. Charles Landfill*", dated December 13, 2023. The objectives of the current monitoring program included the following scope of work:

- Mobilization to the Site during the spring and fall of 2024 and collection of groundwater and surface water samples from the existing well network and surface water monitoring locations;
- Submission of representative spring groundwater samples to an accredited analytical laboratory for analysis of the chemical parameters outlined in in Column 1 of Schedule 5 of the MECP Landfill Standards Guideline and Column 2 of Schedule 5 for the fall event;
- Submission of representative surface water samples to an accredited analytical laboratory for analysis of the chemical parameters outlined in Column 3 of Schedule 5 of

the MECP Landfill Standards Guideline for the spring and Column 4 of Schedule 5 for the fall event;

- Preparation of a report outlining the 2024 field work completed and the analytical results, an evaluation of the results and any subsequent recommendations; and,
- Pinchin shall collect and submit one surface water field duplicate per ten or less samples recovered for quality assurance and quality control purposes (QA/QC), per sampling event.

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 (ODWQS);
- 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 MOEE Groundwater Management Activities, Guideline B-7 (formerly 15-08)*" (Guideline B-7), dated April 1994;
- MECP document entitled "*Determination of Contaminant Limits and Attenuation Zones, Procedure B-7-1*", (formerly referenced by 15-08), dated 2018 and updated in 2021;
- Ontario Regulation 903 R.R.O. 1990 "*Wells*", under the Ontario Water Resources Act, as amended in 2019;
- MECP document entitled "*Water Management Policies Guidelines Provincial Water Quality Objectives*" (PWQO), dated July 1994, revised February 1999;
- MECP document entitled "*Rationale for the Development of Soil and Groundwater Standards for Use at Contaminated Sites in Ontario*" (Table 3.1 - Aquatic Protection Values) dated April 15, 2011 (APV); and

- Canadian Council of Ministers of the Environment (CCME) document entitled "*Canadian Environmental Quality Guidelines*" (Water Quality Guidelines for the Protection of Freshwater Aquatic Life) dated 1999 (CWQG).

3.2 Groundwater Monitoring Well Locations

The Site is currently monitored by sixteen (16) groundwater monitoring wells, SCL1 through SCL16. All groundwater monitoring locations are illustrated on Figure 3. A photographic log of the groundwater monitoring locations is provided in Appendix V. All groundwater monitoring wells were sampled during the 2024 sampling efforts, with the exception of SCL7 during the fall due to insufficient well recovery and SCL9 during the spring and fall due to damage to the monitoring well.

3.3 Surface Water Monitoring Locations

The Site has three (3) historical points for surface water monitoring (SW1 through SW3). All surface water sampling locations are provided in Figure 2. A photographic log of the monitoring locations is provided in Appendix V. All surface water monitoring locations were sampled during the spring 2024 monitoring event; however, all surface water locations were observed to be dry during the fall event.

At the Site intermittent drainage courses including ditches and ponds are present and have initiated the need for three surface water stations. Runoff from the west portion of the fill area is directed north under Beauparlant Road through a culvert and into the Beauparlant Road roadside ditch which is directed east towards a municipal drain which releases into Tributary B

The southern undeveloped portion of the Site is inferred to follow natural drainage courses to drain predominantly west of the predominant north to south topographic plateau with a smaller portion of drainage directed east towards the respective tributaries of the Maskinonge Creek. The southern property boundary drainage pattern is inferred to be influenced by Coursol Road roadside ditching.

The following table provides a summary of the surface water sampling locations.

Location	UTM Coordinates (Zone 17 NAD 83)		Position
	Easting	Northing	
SW1	514,348	5,134,498	south end of culvert under Beauparlant Rd.
SW2	541,492	5,134,530	south end of pond nearest waste pile.
SW3	541,465	5,134,489	ditch outlet of pond south of Beauparlant Rd.

3.4 Monitoring Frequency

Groundwater and surface water monitoring is to occur semi-annually and no restrictions regarding specific dates are indicated within the ECA or in the D&O Plan. Typical sampling dates attempt to capture periods with an elevated groundwater table found to occur during the spring freshet and during recurring or heavy rainstorm events typically found to occur late in the fall. Winter sampling with temperatures below freezing or early spring with frost impacting shallow groundwater deposits is also not preferable as sampling locations are frozen which does not facilitate the ability to collect samples. Summer sampling events typically attempt to capture the seasonal variation in groundwater contours to determine the depleted groundwater level flow regime, challenges occur in obtaining samples in wells which have limited penetration into the aquifer which has a normal seasonal flux that may go beneath the well and make sample collection unattainable. During the 2024 monitoring period Pinchin completed sampling on May 1 and September 13, 2024. The results of inspection and monitoring are to be reported annually to the MECP by March 31 of the following year.

3.5 Monitoring Parameters

3.5.1 Groundwater Monitoring Parameters

During the 2024 monitoring events, groundwater samples were submitted for laboratory analysis of the parameters listed in Column 1 and 2 of Schedule 5 of the MECP Landfill Standards (O. Reg 232/98) for the spring and fall events, respectively. The MECP has also requested that VOCs be analyzed once per year. At the time of sample collection, field readings were also measured for the following parameters: temperature, pH, conductivity, oxidation reduction potential (ORP) and dissolved oxygen.

3.5.2 Surface Water Monitoring Parameters

During the 2024 monitoring events, surface water samples were submitted for laboratory analysis of the parameters listed in in Column 3 and 4 of Schedule 5 of the MECP Landfill Standards for the spring and fall events, respectively. At the time of sample collection, field readings were also measured for the following parameters: temperature, pH, conductivity, ORP and dissolved oxygen.

3.6 Monitoring Procedures and Methods

3.6.1 Standard Operating Procedures

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

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

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

3.6.2 Groundwater Monitoring Activities

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

- Pinchin notified the Client prior to field activities and subsequently mobilized staff from the Sudbury office to the Site;
- Static groundwater levels were collected using a Solinst™ water level tape. Measurements were collected from the top of riser pipe. The meter tape is calibrated in 1.0 mm increments. Reproducibility of the depth measurements is generally within 2.0 mm or less;
- 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) or low-density polyethylene (LDPE) 3/8" tubing and a Waterra™ inertial foot valve 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 Canada Inc. (SGS) in Lakefield, Ontario. All parameters were analyzed by the project laboratory using MECP approved procedures and are consistent with the analytical methods prescribed in the Analytical Methods document; and
- The groundwater samples collected were analyzed at the project laboratory for the parameters listed in Column 1 and 2 of Schedule 5 of the MECP Landfill Standards for the spring and fall events, respectively. 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 Sudbury office to the Site. The spring, summer and fall surface water sampling events coincided with the groundwater monitoring events;
- 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);
- All field activities at each monitoring location were initiated at down-stream locations working up-stream to avoid sediment disturbance and influencing sample integrity;
- 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 for parameters listed in the Column 3 and 4 of Schedule 5 in the MECP Landfill Standards document for the spring and all sampling events, respectively. Sample results were compared to the applicable PWQO, APV and CWQG criteria.

3.6.4 Groundwater and Surface Water Field Measurements

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 2024 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, sulphate 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 and 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 spring, summer and fall water quality monitoring events and recorded relevant observations, including, but not limited to:

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

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

3.7 Quality Assurance for Sampling and Analysis

Pinchin uses recognized industry standards, including the Canadian Council of Ministers of the Environment (CCME) *Subsurface Assessment Handbook for Contaminated Sites* and MECP's manual *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario* for conducting environmental assessments.

For quality assurance, all work is supervised and internally reviewed by senior staff members. As such, various QA/QC protocols were followed during the water quality sampling events to ensure that representative samples were obtained, and that representative analytical data were reported by the laboratory.

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

- Clean, labelled and pre-preserved (when applicable) sample containers were provided by the laboratory;
- Water quality samples were placed in laboratory-supplied sample jars;
- The monitoring wells were purged to remove stagnant water prior to sample collection, so that representative groundwater samples could be obtained. Dedicated purging and sampling equipment was used for monitoring well development, purging and sampling to minimize the potential for cross-contamination;
- All water quality samples were placed in coolers on ice immediately upon collection with appropriate sample temperatures maintained prior submission to the laboratory;
- Dedicated and disposable Nitrile™ gloves were used for all sample handling;
- All non-dedicated monitoring and sampling equipment (i.e. water level meter and YSI-556) was cleaned before initial use and between uses to minimize the potential for cross-contamination by washing with an Alconox™/potable water mixture followed by a deionized water rinse;
- Field duplicate groundwater samples were collected during the spring, summer 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.

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 Flow Interpretation

Depth to groundwater measurements were collected from each available groundwater monitoring well during the 2024 monitoring events. Calculated water table elevations based on groundwater depth measurements, and the monitoring well elevation survey results are presented in Appendix IV. A review of historic water levels indicates locations SCL2 and SCL5 indicate artesian wells, although water levels are typically below the top of the stick-up measuring point, but above the ground surface.

The inferred groundwater flow contours for the spring and fall 2024 monitoring events are provided in Figures 4 and 5, respectively. Based on the contours generated from the elevation survey previously completed at the Site and local topography, there are inferred to be two separate groundwater flow

regimes. Groundwater level elevations ranged from 223.83 m above sea level (masl) at SCL9 to 231.56 masl at SCL14 during the spring and from 222.36 masl at SCL13 to 229.61 masl at SCL14.

Groundwater flow direction in the northern half of the Site, the 'northern flow regime, is inferred to flow towards the northeast and groundwater flow direction in the south half of the Site. Monitoring wells SCL1 through SCL9 are located within the northern flow regime. The 'southern flow regime, is inferred to flow towards the south (SCL10 through SCL12) and west (SCL13 through SCL16), with Tributary A ultimately expected to be the receptor.

4.2 Groundwater Quality Monitoring

4.2.1 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; and,
- 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.

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 the Guideline B-7 were used in assessing the groundwater results obtained during the 2024 monitoring program.

4.2.2 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 contaminates 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 water 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 contaminate 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 for the 2024 results for the rest of the monitoring network, however, as noted in Section 2.1, there is an inferred groundwater divide, monitoring wells SCL10 through SCL16 are expected to be in a separate flow regime; however, as landfill operations progress southward, several of these wells are expected to eventually become downgradient monitors.

The background geochemical profile based on the geometric mean of all results from the background indicator location (SCL1 as indicated in the D&O Plan) and the resultant values were applied along with the ODWQS, to complete a Guideline B-7 analysis for all the groundwater monitoring wells for parameters with criteria was completed.

4.2.3 Trigger Assessment

The trigger mechanism for groundwater ensures that remedial actions will be implemented if leachate degrades the groundwater quality beyond the site-specific criteria derived for the Site. The trigger mechanism for groundwater at the Site is any exceedance of the respective RUC values for cadmium, chloride, lead, 1,4-dichlorobenzene, benzene, dichloromethane, toluene or vinyl chloride.

In case of a trigger exceedance the following actions are to be followed:

Step 1 – Review sampling notes and surface conditions near the sampling location to identify potential external causes for the trigger exceedance. If any obvious sources were observed that are not part of the landfill they will be dealt with and further actions will be taken, otherwise continue to step 2.

Step 2 – A confirmatory sample will be taken seven to fourteen days after receipt of the first exceedance result. During the sampling, the area will be observed closely for anything that may cause and anomalous result. If the confirmatory sample does not exceed the RUC no further actions will be taken, otherwise continue to step 3.

Step 3 – Concentrations found in the confirmatory sample, as well as the regular sample will be compared to historical results. If there is no increasing trend in historical results, then investigations into changes to the area will be conducted. Any new source of concentrations detected will be noted and mitigation measures implemented to minimize environmental impacts. If an increasing trend is apparent in the historical results, proceed to Step 4.

Step 4 – A hydrogeological assessment will be completed to better understand the groundwater conditions in the area of the exceedance. A mitigation plan will be prepared based on the results of the assessment. If mitigation measures are deemed necessary, multiple options will be assessed in detail and then the most appropriate approach selected. Design drawings and operational procedures would then be prepared and submitted to the MECP District Manager for the approval prior to implementation.

4.3 Groundwater Results

The following discussion of parameters documents the groundwater quality in comparison to the calculated RUC as per Guideline B-7. To implement Guideline B-7, groundwater samples collected from downgradient monitoring wells SCL2 through SCL9 have been compared to the calculated RUC values (C_m), as well as the remainder of the monitoring well network. The analytical data for each well in comparison to the applicable regulatory criteria is provided in Tables 2 through 20. An evaluation of the RUC criteria in comparison to the downgradient compliance wells for spring and fall sampling events is provided in Tables 21 and 22, respectively

Copies of the laboratory analytical reports are presented in Appendix VI. The following is a breakdown of the water quality observed the monitoring well locations with comparison to the background quality and leachate being produced on-Site.

4.3.1 Background Water Quality Evaluation (Northern Flow Regime Water)

Background groundwater quality observed at monitoring well location SCL1, located southwest of the fill area, inferred to be within the same groundwater flow regime (the northern flow regime) of all current downgradient monitoring wells. SCL1 sample results generally exhibit low concentrations of common landfill indicator parameters, with the exception of elevated concentrations of iron; elevated concentrations of manganese are also observed sporadically through the monitoring record. These concentrations are interpreted to be naturally occurring and representative of background groundwater conditions within the vicinity of the Site. Iron and manganese are aesthetic objectives (i.e., non-health related parameters) which have been established in the ODWQS to assess potential taste, odour and colour issues that may interfere with drinking water quality. Elevated levels of these parameters do not constitute a health concern and may be attributed to natural process occurring in the aquifer. During the 2024 sampling program, all concentrations observed at SCL1 satisfied the ODWQS.

4.3.2 Downgradient Water Quality Evaluation (Northern Flow Regime Water)

Groundwater quality at the Site is measured at various locations downgradient of the fill area at groundwater monitoring wells SCL2 through SCL9. In comparison to background conditions, downgradient groundwater quality at the aforementioned wells are generally characterized by similar concentrations, with the exception of elevated concentrations of boron, chloride, dissolved organic carbon (DOC), manganese, and total dissolved solids (TDS). During the 2024 monitoring period, concentrations of iron, manganese and TDS were quantified in exceedance of the ODWQS. Several exceedances in Guideline B-7 criteria were identified at the downgradient wells, including the upper alkalinity limit, DOC, iron, manganese, upper pH limit, sulphate and TDS. The iron, manganese and DOC are not interpreted to be the result of a Site-derived impact based on the elevated concentrations within several of the southern flow regime monitoring wells. No trigger parameter exceedances were observed.

4.3.3 Southern Flow Regime Water Quality Evaluation

The groundwater monitoring wells within the southern flow regime includes SCL10 through SCL16. As previously discussed, these monitoring wells are not currently inferred to be impacted by Site-derived impacts, as a result of their position to the south of the groundwater divide that separates them from the existing fill areas.

The groundwater is generally similar with that of background monitoring. In comparison to background conditions, groundwater quality within the southern flow regime wells are generally characterized by similar concentrations, with the exception of lower concentrations of alkalinity and typically elevated concentrations of iron and manganese relative to the background well SCL1. During the 2024 monitoring period, concentrations of iron, manganese and TDS were quantified in exceedance of the ODWQS and concentrations of alkalinity below the lower limit. Several exceedances in Guideline B-7 criteria were identified at the downgradient wells, including the lower alkalinity limit, DOC, iron, manganese and the lower pH limit. No trigger parameter exceedances were observed. None of the exceedances observed are interpreted to be Site-derived.

4.3.4 Trigger Well Water Quality Evaluation

The trigger parameter concentrations complied with their respective RUC during the 2024 monitoring period and thus, no trigger monitoring steps need to be enacted.

4.3.5 Groundwater Field Measurement Results

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 17.

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.

Groundwater Trend Analysis

A series of time versus concentration graphs were developed to evaluate the concentrations of select landfill indicator parameters (boron, chloride and TDS). Current and historical groundwater quality data was utilized to identify any apparent trends or inconsistencies in the water quality within the monitoring well network. The time versus concentration graphs for groundwater are provided in Appendix VII.

In general, concentrations of these parameters generally appear at elevated levels among the downgradient wells (i.e. SCL2 through SCL9). Boron concentrations have generally been the highest at SCL8, however, concentrations have been relatively stable. Recently, boron concentrations have been increasing at SCL2, surpassing concentrations at SCL8 over the past three monitoring events. As landfill operations have progressed southward, SCL2, which has historically been outside of the leachate plume, is now downgradient. Boron concentrations also appear slightly elevated at SCL4 compared to historical concentrations, first increasing in 2021 and remaining elevated since.

Chloride impacts appear to be more widespread among the downgradient monitoring well network, with SCL2, SCL4, SCL6, SCL7 and SCL8 but still remain at concentrations less than half of the Guideline B-7 criteria. Unlike boron concentrations, chloride concentrations began impacting SCL2 far earlier, in 2013, and have consistently remained elevated, peaking in 2019, before dropping to historical lows in October 2022, but appear to be on the rise again. Chloride concentrations in downgradient overburden wells, SCL7 and SCL8, indicate similar trends, with concentrations at each location appearing to peak in 2020 and have been dropping since. Concentrations at the bedrock well, SCL4, near SCL7 and SCL8 steadily declined across the monitoring record from 2005 to 2017 and have been stable since.

With regards to TDS concentrations across the monitoring record, there does not appear to be many significant trends other than concentrations in downgradient monitoring locations from the fill area found at elevated concentrations, relative to the rest of the monitoring network. TDS concentrations at SCL7 and SCL8, similarly to chloride levels, appear to have peaked and have been decreasing since, although peak concentrations were observed in 2021, relative to 2020 at chloride. TDS concentrations at SCL2 are similar to chloride concentrations at that location, appearing to initially peak in the fall of 2021 and decline over the next several events, however, concentrations appear again to be on the rise since the spring of 2023.

In general, the concentrations of boron, chloride, and TDS are demonstrating fairly stable trends with respect to time at all monitoring well locations in recent years with some exceptions. The most significant trend appears to be the rising levels of each of the leachate indicator concentrations at SCL2 (a near field monitoring location relative to the waste deposition activities) over the last several monitoring events, and geochemical results during subsequent events should be closely monitored to see if these trends persist. Despite the higher levels at SCL2, there is over 200 m of distance between the well and the downgradient property boundary and as such, sufficient natural attenuation is expected to occur over that distance.

4.4 Surface Water Quality Monitoring

4.4.1 The Provincial Water Quality Objectives (PWQO)

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

In general, the PWQO stated that the surface water quality of a water body shall be “free from contaminating levels of substances and materials attributable to human activities which in themselves, or in combination with other factors can: settle to form objectionable deposits; float as debris or scum or oil

or other matter to form nuisances; product objectionable colour, odour, taste, or turbidity; injure, are toxic to, or produce adverse physiological or behavioural responses in humans, animals, or plants; or enhance the production of undesirable aquatic life or result in the dominance of nuisance species".

4.4.2 Aquatic Protection Values (APV)

Under Ontario Regulation 153/04, the MECP have developed APVs to protect aquatic organisms exposed to contaminants from migration of contaminated groundwater to surface water. Protection of aquatic biota from migration of contaminants by overland flow is provided by a Site being designated an environmentally sensitive area if the property includes or is adjacent to a water body or includes land that is within 30 m of a water body.

APVs are designed to provide a scientifically defensible and reasonably conservative level of protection for most aquatic organisms from the migration of contaminated groundwater to surface water resources.

4.4.3 Canadian Water Quality Guidelines (CWQG)

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

4.5 Surface Water Results

During the 2024 monitoring program, Pinchin collected surface water samples from each of the established monitoring locations during the spring, however, each of the sample locations were dry during the fall event. A summary of the surface water quality monitoring data relative to the regulatory standards is presented in the attached Tables 21 through 24. Copies of the laboratory analytical reports are presented in Appendix VI.

4.5.1 Downstream Water Quality Evaluation

All three current water stations, SW1 through SW3, are considered downstream monitors from the fill. Consequently, there is no background station for comparison. During 2024, concentrations of boron exceeded the PWQO at all locations and iron concentrations at SW2 and SW3. Iron concentrations also exceeded the CWQG at SW2 and SW3. Based on the sample results, downgradient impacts are not expected to be occurring at the identified downstream surface water receptors, Tributaries A and B.

4.5.2 Surface Water Field Measurement Results

Pinchin collected surface water monitoring parameters from each surface water monitoring location using a YSI-556 water quality meter for real-time in-situ measurement of field parameters. The field parameter measurements are provided in Tables 21 through 24.

A review of the field parameters for the project identified no significant concerns in the water quality during the monitoring event. The quality at the surface water monitoring locations did not change significantly between each of the monitoring locations.

4.6 Leachate Characterization

The existing monitoring well network currently does not include a leachate monitoring well. As such, source groundwater quality conditions are currently not monitored. Monitoring well SCL 2 is directly downgradient of the historic and proposed waste deposition area and therefore may serve as a source well in the future.

4.7 Contamination Attenuation Zone

The Contaminant Attenuation Zone (CAZ) for the Site was determined by WESA. WESA initially devised the CAZ using the MECP Small Landfill Hydrogeological Risk Assessment Guideline (MOE Northern Region, 2000) to calculate boundary distances (2013 D&O Plan), but revised it using hydrogeological modelling (2014 D&O Plan). The location and size of the CAZ were selected using the predicted maximum extents of the simulated chloride plume originating from the existing and future landfill footprints. The dimensions of the CAZ are 999 m long (north-south) and 338 m wide (east-west) with the northern border following Beauparlant Road.

4.8 Adequacy of the Monitoring Program

Based on Pinchin's review of the current and historical groundwater and surface water data, it is Pinchin's opinion that current monitoring program is adequate, with exception of a background surface water monitoring location. No background surface water quality is available for comparison, so the impact of the landfill cannot be determined. Additionally, the current surface water stations are represented by intermittent drainage courses (ditches) and ponded areas, no impact characterization on the nearest surface water bodies identified on provincial mapping as identified as Tributary A and Tributary B on Figure 2 is available.

4.8.1 Monitoring Well Network Efficiency

Based on a visual inspection of the monitoring well installations, Pinchin concludes that the monitoring wells were satisfactory installed. Borehole logs for the monitoring wells installed at the Site are provided in Appendix III.

The monitoring well locations were installed in an effort to determine the groundwater flow direction and were intended to intersect potential groundwater contamination and evaluate the Site's geological and hydrogeological characteristics. As mentioned throughout this report, there is an inferred groundwater divide through the property, creating two primary flow regimes, one in the northern half of the Site, where operations have historically been concentrated, and one in the south end of the Site, where fill operations have not yet occurred. It is noted that filling operations are gradually moving southward and the filling is eventually expected to cross the groundwater divide.

Pinchin concludes that the current groundwater monitoring well network is considered adequate for evaluating the Site's geological and hydrogeological characteristics to the east and northeast of the landfill (for evaluating downgradient groundwater quality migrating from the Site). It is Pinchin's opinion, however, that the current groundwater monitoring well network is not considered adequate for monitoring the source leachate quality as no groundwater monitoring well exists within the waste deposit area. However, given that significant impacts are not considered to be occurring at the downgradient compliance well, the installation of a source monitoring well is not interpreted to be required at this time.

A review of the dataset from SCL1 did not identify elevated levels of common landfill-related contaminant parameters. Given the observed potential mounding within the waste deposits, groundwater quality and elevation data from SCL1 should be reviewed annually to evaluate the continued use of this monitoring well location as being representative of background conditions; viable alternatives to SCL1 are available within the southern portion of the Site.

All wells were observed to be in compliance with O. Reg. 903 with the exception of SCL9, which appears to be potentially damaged as a result of the foreign well materials (sand and bentonite), present at the base of the well. The existing waterra tubing was observed to be clogged during the spring 2024 event thus, new tubing was brought to the Site to instrument the 25 millimetre (mm) well, however, the D-25 (25 mm) foot valve was reportedly too large for successful instrumentation.

4.8.2 Background Monitoring Well Efficiency

It is Pinchin's opinion that monitoring well SCL1 is currently the most representative background water quality at this time given the inferred groundwater flow direction and quantified groundwater concentrations.

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

No supplemental monitoring was completed as part of the 2024 monitoring program completed by Pinchin.

4.10 Waste Disposal Site Gas Impacts

ECA Condition 6 (7) (a) indicates the requirement for annual reporting of landfill gas monitoring and analysis. A methane gas monitor was installed in the attendant building between the spring and fall monitoring events. During the fall monitoring event, Pinchin recorded that no methane gas was detected by the meter. At this time, no evidence has been documented to suggest that methane gas generation from the Site is a significant concern.

4.11 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 Design and Operations Plan. 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 2024 monitoring events, no significant damage or concerns were noted.

4.12 Controls System 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 2024 monitoring program.

4.13 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.

Groundwater duplicate samples pair were collected from the Site at two locations during the spring (SCL5 and SCL16) and fall (SCL1 and SCL2) sampling events. Each sample and duplicate pair were submitted for laboratory analysis of the full suite of analytical parameters. The groundwater duplicate results from the 2024 monitoring events are provided in Tables 20 and 21, respectively.

When compared to concentrations reported in the original samples, duplicate water quality data reported that all parameters were within an acceptable range with respect to relative percent difference (i.e., the industry standard of less than 50%).

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 the 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 2024 water quality monitoring program:

- Groundwater and surface water samples were collected from the existing monitoring well network and surface water monitoring locations on May 1 and September 13, 2024. All groundwater and surface water monitoring locations were sampled during 2024 with the exception of monitoring well SCL7 during the fall due to insufficient well recovery and monitoring SCL9 during the spring and fall due to damage to the monitoring well and surface water sampling locations SW1 through SW3 during fall due to dry conditions observed at the time of sample collection;
- All groundwater and surface water samples were submitted for laboratory analysis of parameters identified in the previous monitoring reports. The groundwater quality was assessed based on the ODWQS and Guideline B-7 monitoring program. Surface water quality was assessed based on the PWQO, APV and CWQG;
- Groundwater level measurements indicate groundwater flow either side of the divide through the Site with a portion flowing north, in the northern half of the Site, and a portion flowing west and south, in the southern half of the Site;
- All reported concentrations in the groundwater samples submitted for analysis satisfied the respective ODWQS limits, with the exception of the following:
  - Alkalinity (low) at SCL10;
  - Alkalinity (high) at SCL2 and SCL16;
  - DOC at SCL2, SCL4, SCL6, SCL7, SCL8 and SCL14;
  - Iron at SCL2, SCL3, SCL6, SCL7, SCL8, SCL11, SCL14 and SCL16;
  - Manganese at SCL2, SCL3, SCL4, SCL6, SCL7, SCL8, SCL11, SCL12 and SCL16;
  - TDS at SCL2, SCL4 and SCL8.
- All reported concentrations in the groundwater samples submitted for analysis satisfied the applicable Guideline B-7 criteria with the exception of the following:
  - Alkalinity (low) at SCL10, SCL11, SCL14 and SCL16;
  - Alkalinity (high) at SCL2, SCL3 and SCL4;
  - Barium at SCL2;
  - DOC at SCL2, SCL4, SCL6, SCL7, SCL8, SCL11 and SCL14;

  - Iron at SCL2, SCL3, SCL6, SCL7, SCL8, SCL11, SCL14 and SCL16;
  - Manganese at SCL2, SCL3, SCL4, SCL6, SCL7, SCL8, SCL11, SCL12, SCL14, SCL15 and SCL16;
  - pH (low) at SCL2, SCL10 and SCL16;
  - pH (high) at SCL5;
  - Sulphate at SCL4;
  - TDS at SCL2, SCL3, SCL4, SCL6 and SCL8.
- The analysis of volatile organic compounds (VOCs) in the groundwater samples during the spring monitoring events have been consistently quantified as non-detectable at all locations, with exception of toluene;
- None of the Site groundwater trigger parameters (i.e., RUC values for cadmium, chloride, lead, 1,4-dichlorobenzene, benzene, dichloromethane, toluene, or vinyl chloride) were observed to be in exceedance;
- Leachate impacts appear to be characterized by elevated levels of alkalinity, boron, chloride and TDS.
- All reported concentrations in the surface water samples submitted for analysis satisfied the respective PWQO, APV and/or CWQG values, with the exception of the following:
  - Boron at SW1, SW2 and SW3, which exceed the respective PWQO; and
  - Iron at SW2 and SW3, which exceed the respective PWQO and CWQG;
- No data was provided regarding waste quantities and remaining capacity during the 2024 monitoring period;
- The Site is continuing to effectively operate as designed; as a natural attenuation type facility with any landfill derived groundwater impacts attenuated to acceptable levels prior to the downgradient property boundaries; and
- The Site is interpreted to be in compliance with respect to landfill gas based on the readings observed at the attendant building.

6.0 RECOMMENDATIONS

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

- Determination of the natural background surface water quality at the Site with the addition of a background surface water station at an upstream location on Tributary B, as wells as

the addition of surface water stations at downstream locations of Tributary A and Tributary B for impact characterization;

- The Client should continue to ensure that the current landfill cover material is inspected and maintained as part of the ongoing monitoring program. In the future, any damage to the cover due to weathering or other cause should be rectified;
- The Client should continue to monitor groundwater, leachate, surface water and landfill gas at the current sampling frequencies; and
- The analysis of volatile organic compounds (VOCs) in the groundwater samples during the spring monitoring events can be removed from the program as these parameters have been consistently quantified as non-detectable at all locations, or at extremely low concentrations in the case of toluene concentrations occasionally observed at SCL7 and SCL8.

7.0 MONITORING AND SCREENING CHECKLIST

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

8.0 DISCLAIMER

This Monitoring Report was performed for the Municipality of St. Charles (Client) in order to investigate the environmental condition of the groundwater and surface water at the St. Charles Landfill (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 Monitoring Report 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 Monitoring Report 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.

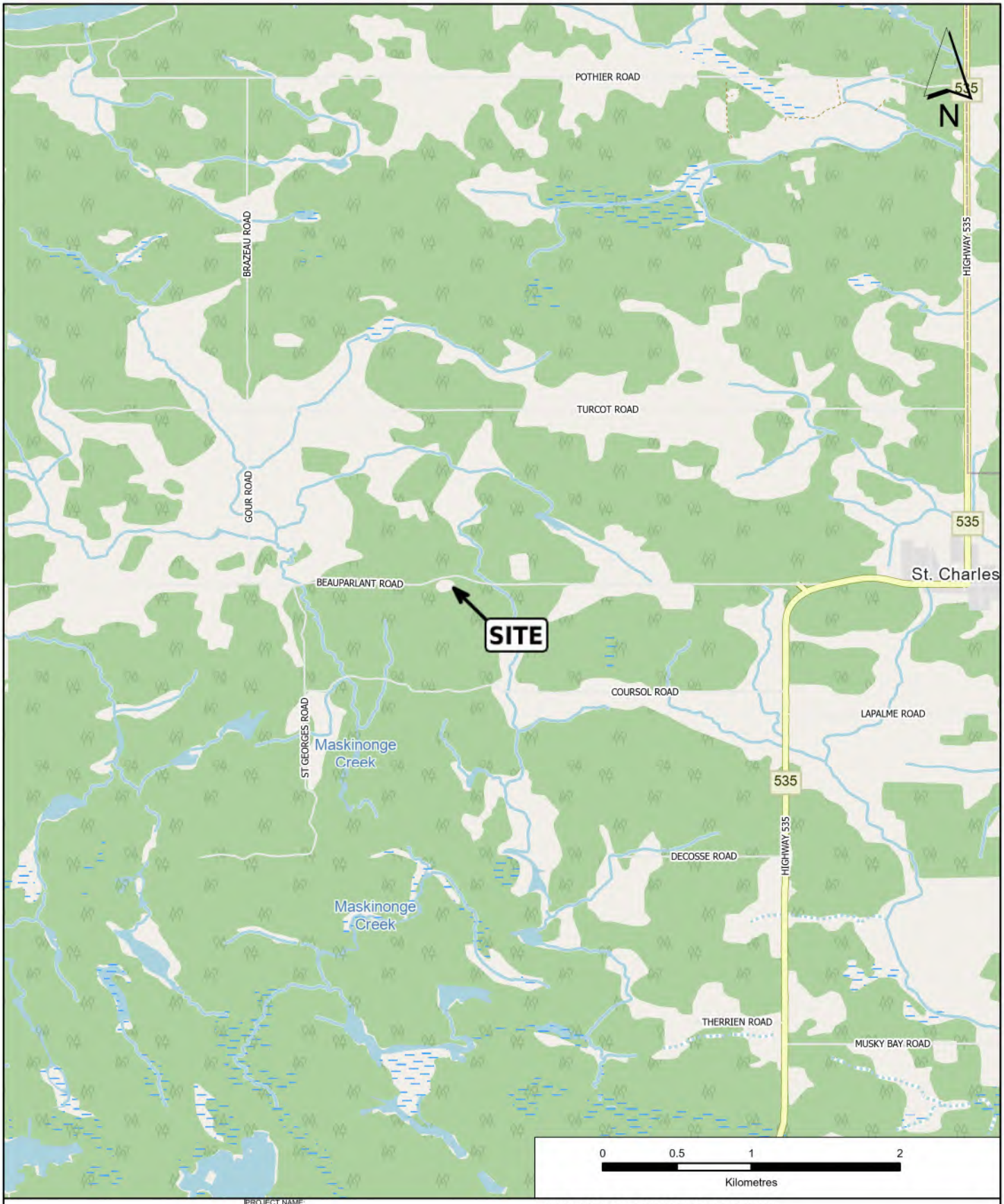
This Monitoring Report was performed in general compliance with currently acceptable practices for environmental site investigations and specific Client requests as applicable to this Site.

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, is 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.

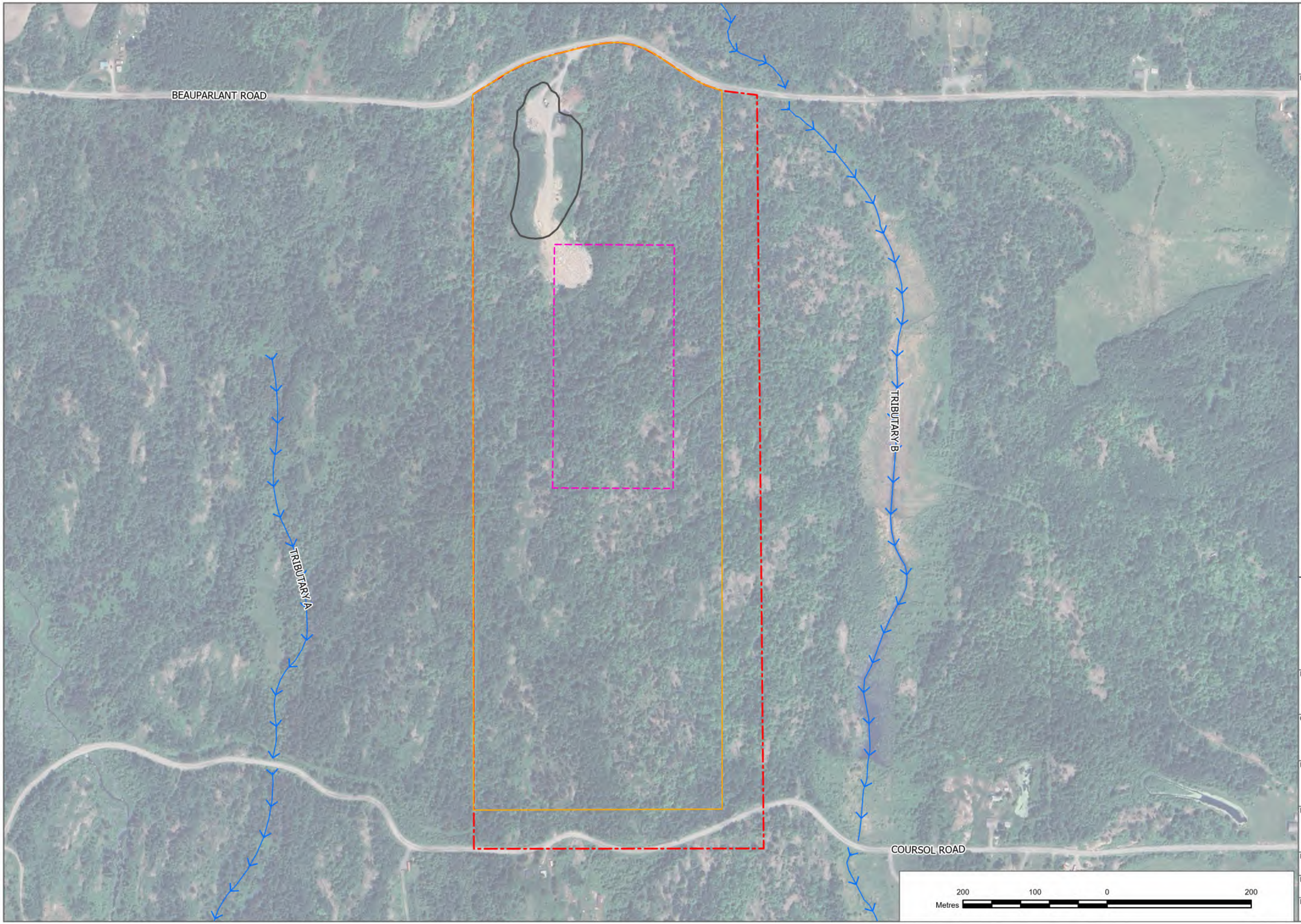
Pinchin makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to ownership of any property, or the application of any law to the facts set forth herein. With respect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

APPENDIX I
Figures



PINCHIN

PROJECT NAME:	2024 ANNUAL MONITORING REPORT				
CLIENT NAME:	CORPORATION OF THE MUNICIPALITY OF ST. CHARLES				
PROJECT LOCATION:	ST. CHARLES LANDFILL, MUNICIPALITY OF ST. CHARLES, ONTARIO				
FIGURE NAME:	KEY MAP				FIGURE NUMBER: 1
PROJECT NUMBER: 335248	SCALE: AS SHOWN	DRAWN BY: CF	REVIEWED BY: TM	DATE: MARCH 2025	



N

LEGEND

- CREEK / TRIBUTARY FLOW DIRECTION
- APPROXIMATE WASTE BOUNDARY
- SITE BOUNDARY
- NEW DEVELOPMENT AREA
- CONTAMINANT ATTENUATION ZONE

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4) Coordinate system: NAD 1983 CSRS UTM Zone 17N.
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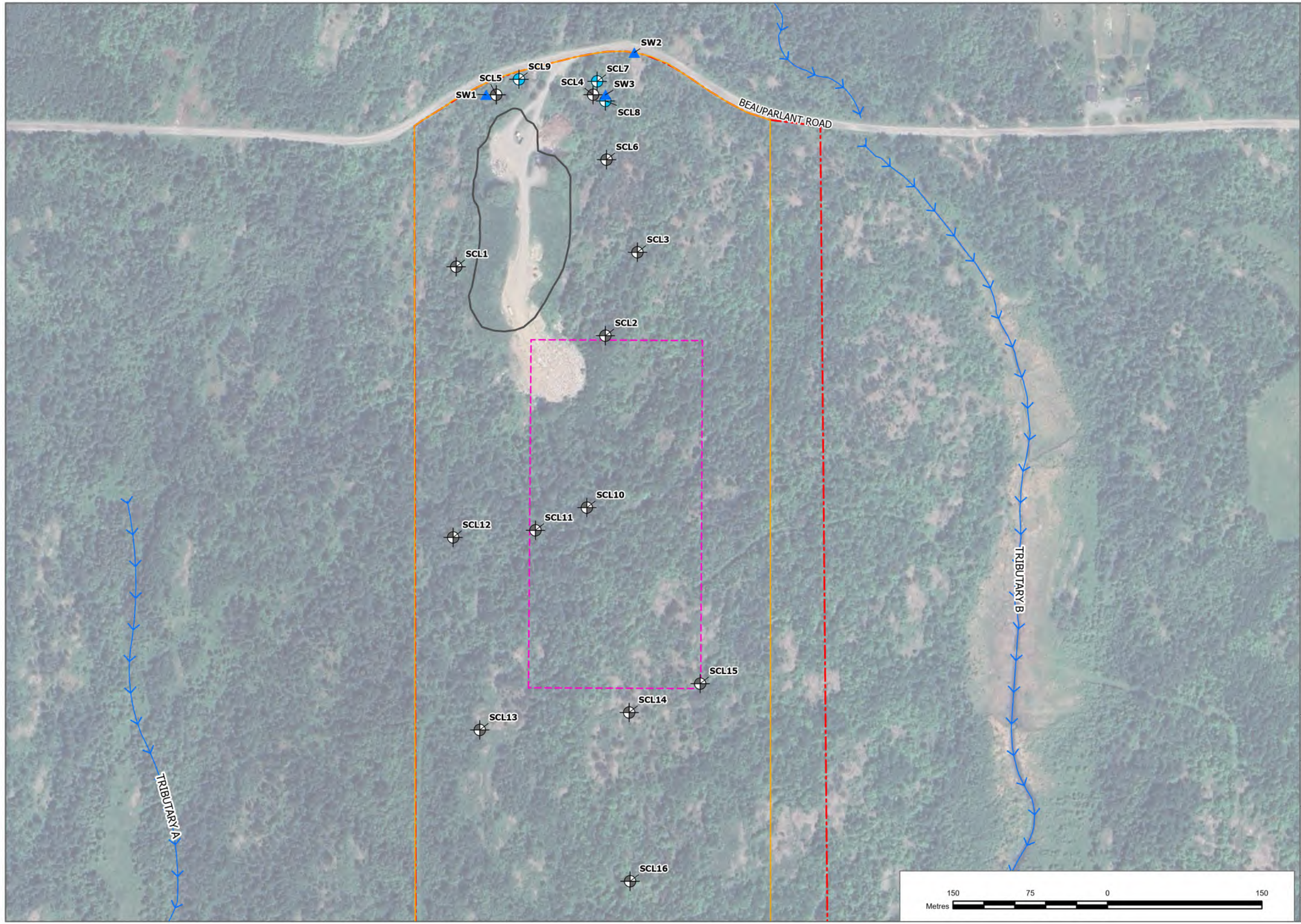
PROJECT NAME
2024 ANNUAL MONITORING REPORT

CLIENT NAME
CORPORATION OF THE MUNICIPALITY OF ST. CHARLES

PROJECT LOCATION
ST. CHARLES LANDFILL, MUNICIPALITY OF ST. CHARLES, ONTARIO

FIGURE NAME
SITE PLAN

PROJECT NUMBER:	SCALE
335248	AS SHOWN
DRAWN BY: CF	REVIEWED BY: TM
DATE: MARCH 2025	FIGURE NUMBER: 2



N

LEGEND

- MONITORING WELL LOCATION (BEDROCK)
- MONITORING WELL LOCATION (OVERBURDEN)
- SURFACE WATER SAMPLE LOCATION
- CREEK / TRIBUTARY FLOW DIRECTION
- APPROXIMATE WASTE BOUNDARY
- SITE BOUNDARY
- NEW DEVELOPMENT AREA
- CONTAMINANT ATTENUATION ZONE

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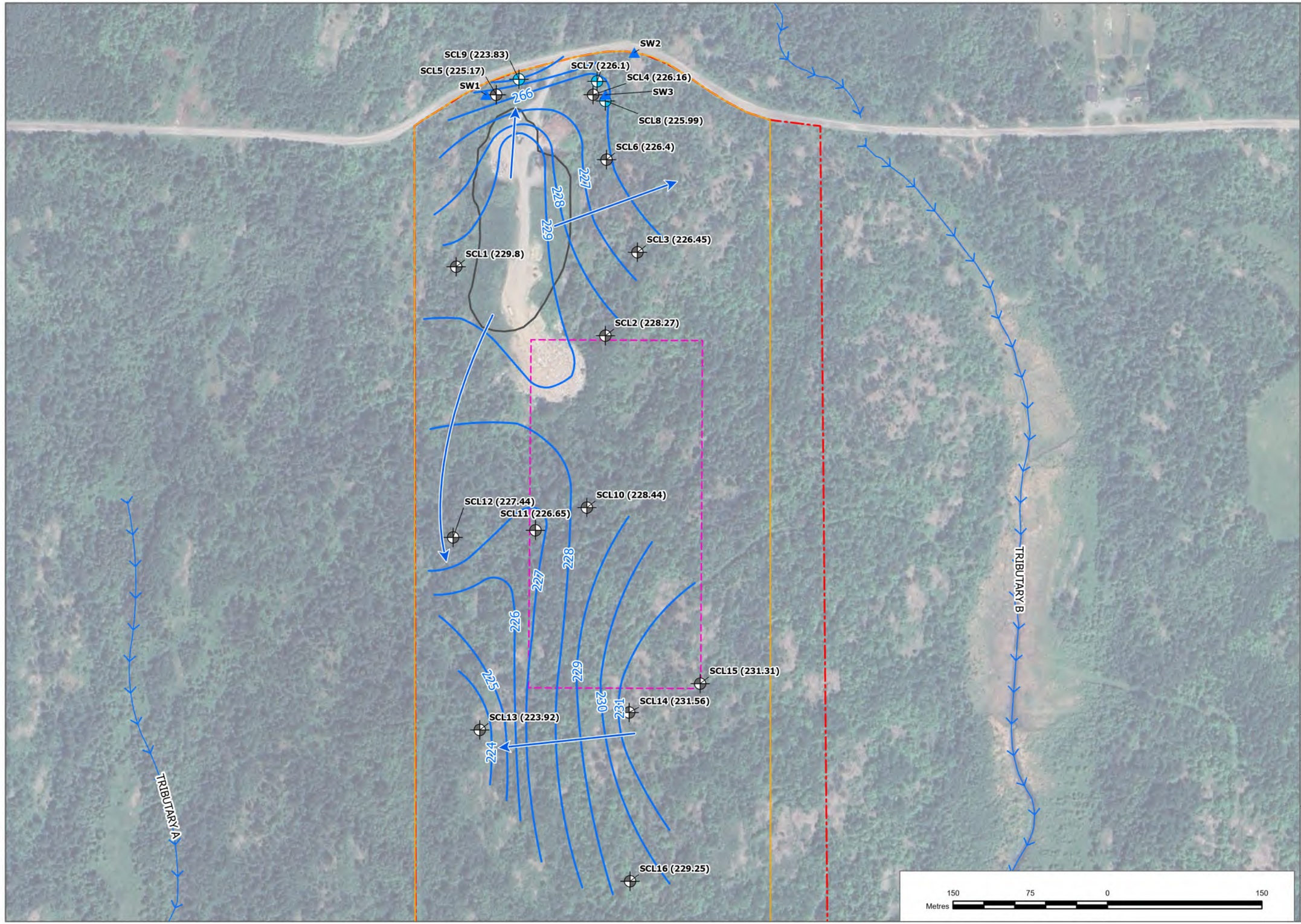
2024 ANNUAL MONITORING REPORT

CLIENT NAME
CORPORATION OF THE MUNICIPALITY OF ST. CHARLES

PROJECT LOCATION
ST. CHARLES LANDFILL, MUNICIPALITY OF ST. CHARLES, ONTARIO

FIGURE NAME
SURFACE AND GROUNDWATER SAMPLING LOCATIONS

PROJECT NUMBER:	SCALE
335248	AS SHOWN
DRAWN BY: CF	REVIEWED BY: TM
DATE: MARCH 2025	FIGURE NUMBER: 3



N

LEGEND

- MONITORING WELL LOCATION (BEDROCK)
- MONITORING WELL LOCATION (OVERBURDEN)
- SURFACE WATER SAMPLE LOCATION
- INFERRED GROUNDWATER CONTOUR LINE (M)
- CREEK / TRIBUTARY FLOW DIRECTION
- APPROXIMATE WASTE BOUNDARY
- SITE BOUNDARY
- NEW DEVELOPMENT AREA
- CONTAMINANT ATTENUATION ZONE
- GROUNDWATER FLOW DIRECTION

(#) GROUNDWATER ELEVATION IN METERS ABOVE SEA LEVEL (MASL)

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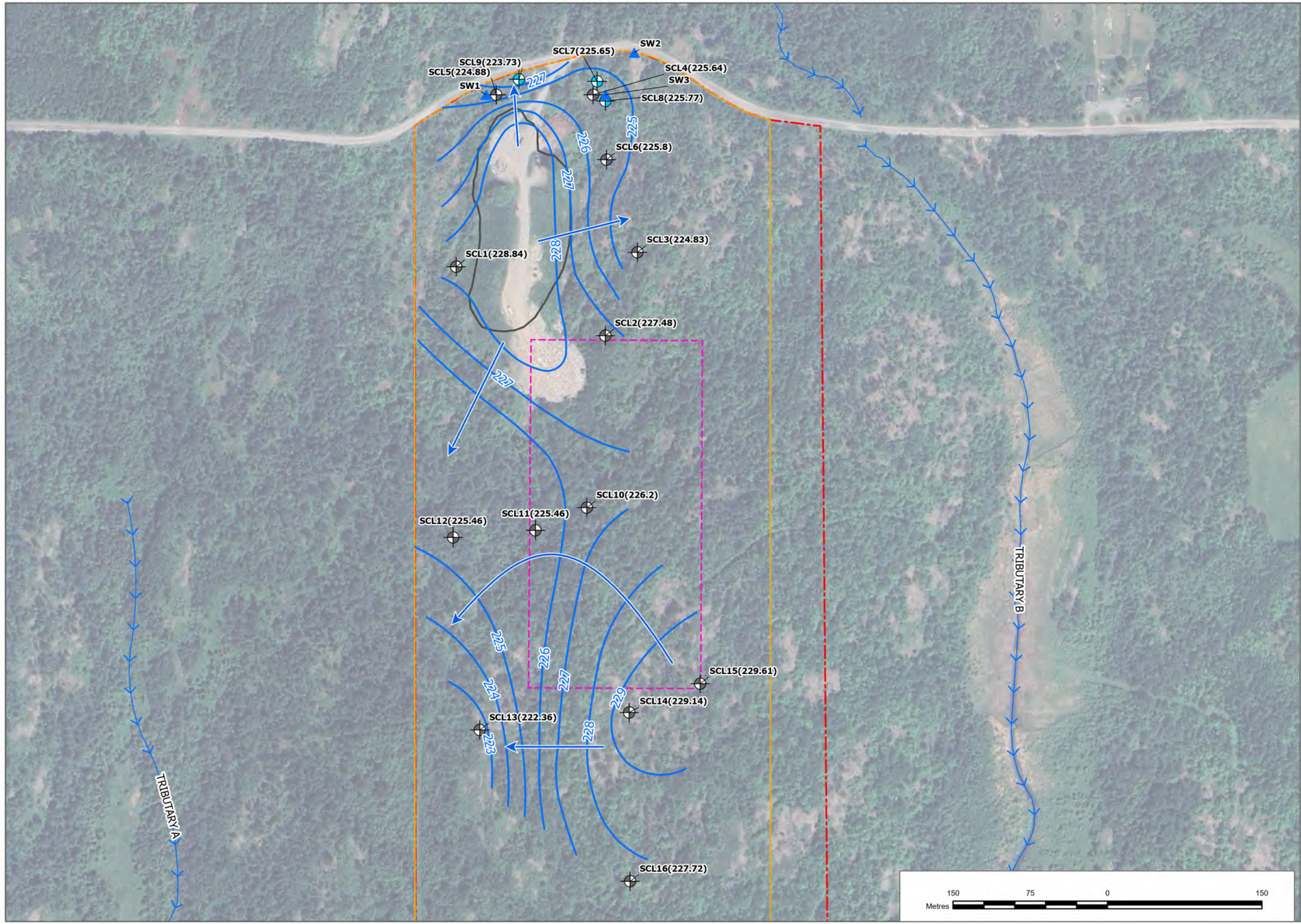
PROJECT NAME
2024 ANNUAL MONITORING REPORT

CLIENT NAME
CORPORATION OF THE MUNICIPALITY OF ST. CHARLES

PROJECT LOCATION
ST. CHARLES LANDFILL, MUNICIPALITY OF ST. CHARLES, ONTARIO

FIGURE NAME
INFERRED GROUNDWATER CONTOUR PLAN – SPRING 2024

PROJECT NUMBER:	SCALE
335248	AS SHOWN
DRAWN BY: CF	REVIEWED BY: TM
DATE: MARCH 2025	FIGURE NUMBER: 4



N

LEGEND

- MONITORING WELL LOCATION (BEDROCK)
- MONITORING WELL LOCATION (OVERBURDEN)
- SURFACE WATER SAMPLE LOCATION
- INFERRED GROUNDWATER CONTOUR LINE
- CREEK / TRIBUTARY FLOW DIRECTION
- APPROXIMATE WASTE BOUNDARY
- SITE BOUNDARY
- NEW DEVELOPMENT AREA
- CONTAMINANT ATTENUATION ZONE
- GROUNDWATER FLOW DIRECTION
- (#) GROUNDWATER ELEVATION IN METERS ABOVE SEA LEVEL (MASL)

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PROJECT NAME
2024 ANNUAL MONITORING REPORT

CLIENT NAME
CORPORATION OF THE MUNICIPALITY OF ST. CHARLES

PROJECT LOCATION
ST. CHARLES LANDFILL, MUNICIPALITY OF ST. CHARLES, ONTARIO

FIGURE NAME
INFERRED GROUNDWATER CONTOUR PLAN – FALL 2024

PROJECT NUMBER:	SCALE
335248	AS SHOWN
DRAWN BY: CF	REVIEWED BY: TM
DATE: MARCH 2025	FIGURE NUMBER: 5

APPENDIX II

Certificate of Approval

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDED PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A541302
Issue Date: November 26, 2009

The Corporation of the Municipality of St. Charles
2 King St E P.O. Box 70
St. Charles, Ontario
P0M 2J0

Site Location: St. Charles Landfill
515 Beauparlant Rd Lot 3, Concession 6, West Half
St. Charles Municipality, District of Sudbury

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

the use and operation of 32.4 hectare waste disposal site within a total site area of 32.4 hectares.

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

"*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";

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

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

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

"Ministry" means the Ontario Ministry of the Environment;

"*NMA*" means *Nutrient Management Act*, 2002, S.O. 2002, c. 4, as amended from time to time;

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

"*Owner"* means any person that is responsible for the establishment or operation of the *Site* being approved by this *Certificate,* and includes The Corporation of the Municipality of St. Charles its successors and assigns;

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

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

"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* or Section 4 of *NMA* or Section 8 of *SDWA*.

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

"*Regulation 347*" or "*Reg. 347*" means Regulation 347, R.R.O. 1990, made under the EPA, as amended;
"*SDWA"* means *Safe Drinking Water Act,* 2002, S.O. 2002, c. 32, as amended from time to time;

"*Site*" means the entire waste disposal site, including the buffer lands, and contaminant attenuation zone at West Half Lot 3, Concession 6, Township of Jennings, District of Sudbury; and

"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; and
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

1. GENERAL

Compliance

(1) 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.

(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 by this *Certificate,* the *Site* shall be designed, developed, built, operated and maintained in accordance with the documentation listed in the attached Schedule "A".

Interpretation

(4) Where there is a conflict between a provision of any document listed in Schedule "A" 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 document 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", 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 Ownership

(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;* and
(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.

(13) In the event of any change in *Ownership* of the works, other than change to a successor Owner, the *Owner* shall notify the successor of and provide the successor with a copy of this *Certificate,* and the *Owner* shall provide a copy of the notification to the *District Manager* and the *Director.*

Certificate of Requirement/Registration on Title -Site

(14) The Owner shall:

(a) Within two (2) years of the date of the issuance of this *Certificate,* submit to the *Director* for review, two copies of a completed Certificate of Requirement with a registerable description of the *Site;* and

(b) Within 10 calendar days of receiving the Certificate of Requirement authorized by the *Director,* register the Certificate of Requirement in the appropriate Land Registry Office on title to the *Site* and submit to the Director the duplicate registered copy immediately following registration.

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

Inspections by the Ministry

(16) No person shall hinder or obstruct a *Provincial Officer* from carrying out any and all inspections authorized by the *OWRA, the EPA,* the *PA,* the *SDWA* or the *NMA,* 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,* the *PA,* the *SDWA* or the *NMA.*

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 *contaminating life span* of the *Site* except for as otherwise authorized in writing by the *Director.*

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

(a) an approval, waiver, or justification by the *Ministry* of any act or omission of any person that contravenes any term or condition of this *Certificate* or any statute, regulation or other legal requirement; or
(b) acceptance by the *Ministry* of the information's completeness or accuracy.

(19) The *Owner* shall ensure that a copy of this *Certificate,* in its entirety and including all its Notices of Amendment, and documentation listed in Schedule "A", are retained at the *Site* at all times.

2. SITE OPERATION

Operation

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

Signs

(2) A sign shall be installed and maintained at the main entrance/exit to the *Site* on which is legibly displayed the following information:

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

(3) The Owner shall install and maintain signs to direct vehicles to working face and recycling areas.

(4) The Owner shall provide signs at the recycling depot informing users what materials are acceptable and directing users to appropriate storage area.

Vermin, Vectors, Dust, Litter, Odour, Noise and Traffic

(5) 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

(6) (a) Burning of waste at the *Site* is prohibited.

(b) Notwithstanding Condition 2. (6) (a) above, burning of segregated, clean wood and brush at the landfill may be carried out in strict compliance with the Ministry of the Environment Document titled "Guideline C-7, Burning at Landfill Sites" dated April 1994.

Site Access

(7) Waste shall only be accepted during the following time periods:
Monday: 8:00 a.m. to 12 p.m.
Wednesday: 11:00 a.m. to 5:00 p.m.
Saturday: 9:00 a.m. to 5:00 p.m.

(8) On-site equipment used for daily site preparation and closing activities may be operated one (1) hour before and one (1) hour after the hours of operation approved by this *Certificate.*

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

Site Security

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

(11) The *Site* shall be operated and maintained in a safe and 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.

3. EMPLOYEE TRAINING

(1) 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*.

4. COMPLAINTS RESPONSE PROCEDURE

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

(a) The *Owner* shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information and the time and date of the complaint;
(b) The *Owner,* upon notification of the complaint, shall initiate appropriate steps to determine all

possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and
(c) The *Owner* shall complete and retain on-site a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents.

5. EMERGENCY RESPONSE

(1) Any spills, fires or other emergency situations shall be forthwith reported directly to the *Ministry's* Spills Action Centre (1-800-268-6060) and shall be cleaned up immediately.

(2) In addition, the *Owner* shall submit, to the *District Manager* a written report within three (3) business days of the emergency situation, outlining the nature of the incident, remedial measures taken, handling of waste generated as a result of the emergency situation and the measures taken to prevent future occurrences at the *Site.*

(3) All wastes resulting from an emergency situation shall be managed and disposed of in accordance with *O.Reg. 347.*

(4) All equipment and materials required to handle the emergency situations shall be:

(a) kept on hand at all times that waste landfilling and/or handling is undertaken at the *Site;* and
(b) adequately maintained and kept in good repair.

(5) The *Owner* shall ensure that the emergency response personnel are familiar with the use of such equipment and its location(s).

6. RECORD KEEPING AND REPORTING

Daily Log Book

(1) A daily log shall be maintained in written format and shall include the following information:

(a) the type, date and time of arrival, hauler, and quantity (tonnes) of all industrial and commercial waste and cover material received at the *Site;*
(b) the area of the *Site* in which waste disposal operations are taking place;
(c) a record of litter collection activities and the application of any dust suppressants;
(d) a record of the daily inspections; and
(e) a description of any out-of-service period of any control, treatment, disposal or monitoring facilities, the reasons for the loss of service, and action taken to restore and maintain service.

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

Daily Inspections and Log Book

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

(4) A record of the inspections shall be kept in a daily log book that includes:

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

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

Annual Report

(6) 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 March 31st of the year following the period being reported upon.

(7) 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 weekly, maximum daily and total annual quantity (tonnes) of waste received at the *Site;*
(g) a summary of any complaints received and the responses made;
(h) a discussion of any operational problems encountered at the *Site* and corrective action taken;
(i) any changes to the Design and Operations Report and the Closure Plan that have been approved by the *Director* since the last *Annual Report;*
(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; and
(l) a summary and analysis of all hydraulic and geochemical monitoring results.

7. LANDFILL DESIGN AND DEVELOPMENT

Approved Waste Types

(1) Only solid non-hazardous municipal waste as defined under *Reg.* 347 shall be accepted at the *Site* for landfilling.

(2) The *Owner* shall develop and implement a program to inspect waste to ensure that the waste received at the *Site* is of a type approved for acceptance under this *Certificate.*

(3) The *Owner* shall ensure that all loads of waste are properly inspected by *Trained personnel* prior to

acceptance at the *Site* and that the waste vehicles are directed to the appropriate areas for disposal or transfer of the waste. The *Owner* shall notify the *District Manager,* in writing, of load rejections at the *Site* within one (1) business day from their occurrence.

Capacity

(4) The calculated maximum theoretical approved capacity of the *Site,* consisting of the waste, daily cover and intermediate cover, but excluding the final cover is 1,820,000 cubic metres.

Design and Operations Report

(5) Within one hundred and eighty (180) days from the date of this *Certificate,* the *Owner* shall submit for the *Director's* approval, a Design and Operations Report that includes as a minimum the following information:

(a) proposed landfill design including the footprint, final contours, capacity and an estimate of the amount of existing waste;
(b) an estimate of waste types and quantities to be landfilled at the site and recycling and resource recovering activities at the *Landfill Site;*
(c) location and description of the access road and the on-site roads at the *Landfill Site;*
(d) description and location of the fencing and the gate(s);
(e) screening of the *Landfill Site* from the public, both visual and the protection from the noise impact;
(f) details of the clean surface water drainage from the *Landfill Site* and any works required to prevent extraneous surface water from contacting the active working face;
(g) description of the fill method, the equipment used at the Site, the areas used for various fill methods of landfilling, and time lines for various phases of the *Landfill Site* development;
(h) the operating hours of the *Landfill Site* and the hours for the various activities to be undertaken at the *Landfill Site,* including waste compaction, waste coverage and other activities within the *Landfill Site;*
(i) details on winter operations;
(j) the equipment used and the procedures used for waste deposition, spreading and covering;
(k) details on *Landfill Site* supervision and monitoring of the activities at the *Landfill Site;*
(l) details on handling of other wastes, including the types and amounts of wastes handled, storage locations, storage facility design/description and the frequency of removal from the *Landfill Site;*
(m) details on housekeeping practices undertaken to control noise, dust, litter, odour, rodents, insects and other disease vectors, scavenging birds or animals;
(n) details on the closure of the *Landfill Site,* including the description of the final cover and its estimated permeability, its thickness, the source of the final cover material, the thickness of the top soil and the vegetation proposed for the closed waste mound, as well as the time frame for the progressive waste coverage;
(o) monitoring program for the surface and ground water;
(p) site-specific trigger mechanism program for the implementation of the groundwater and surface water, contingency measures and a description of such measures;
(q) landfill gas control or management required at the *Landfill Site;*
(r) maintenance activities proposed for the *Landfill* Site and for the monitoring well network, including the type of the activities, the frequency of the activities and the personnel responsible for them;
(s) inspection activities proposed for the *Landfill Site,* including the frequency of the activities and the personnel responsible for them;
(t) details of training provided for the personnel responsible for the activities at the *Landfill Site;*
(u) contingency plans for the emergency situations that may occur at the *Landfill Site;*
(v) storm water management, including the location and the design of any works required;
(w) any other information relevant to the design and operation of the *Landfill Site* or the information required by the *District Manager.*

(6) At least two (2) years prior to utilizing the remaining calculated theoretical maximum volumetric capacity of the *Site*, the *Owner* shall submit to the *Director* for Director's approval, a design and operation plan with up to date engineering and environmental standards and a detailed hydrogeological assessment for proper and safe development of the remainder of the *Site.* If the *Owner* does not intend to use the remaining capacity the *Owner* shall submit a Closure Plans as per Condition 9 of this *Certificate*.

Service Area

(7) Only waste that is generated within the geographic boundaries of the Municipality of St. Charles shall be accepted at the *Site.*

Cover

(8) Alternative materials to soil may be used as weekly and interim cover material, based on an application with supporting information and applicable fee for a trial use or permanent use, submitted by the *Owner* to the *Director,* copied to the *District Manager* and as approved by the *Director* via an amendment to this *Certificate.* The alternative material shall be non-hazardous according to *Reg. 347* and will be expected to perform at least as well as soil in relation to the following functions:

(a) Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires;
(b) Provision for an aesthetic condition of the landfill during the active life of the *Site;*
(c) Provision for vehicle access to the active tipping face; and
(d) Compatibility with the design of the *Site* for groundwater protection, leachate management and landfill gas management.

(9) Cover material shall be applied as follows:

(a) Weekly Cover - Weather permitting, deposited waste shall be covered weekly in a manner acceptable to the *District Manager* so that no waste is exposed to the atmosphere;
(b) Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 millimetre 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 600 millimetre thick layer of soil of medium permeability and 150 millimetres of top soil (vegetative cover) shall be placed. Fill areas shall be progressively completed and rehabilitated as landfill development reaches final contours.

8. LANDFILL MONITORING

Landfill Gas

(1) The *Owner* shall ensure that any buildings or structures at the *Site* contain adequate ventilation systems to relieve any possible landfill gas accumulation. Routine monitoring for explosive methane gas levels shall be conducted in all buildings or structures at the *Site,* especially enclosed structures which at times are occupied by people.

Compliance Limits

(2) The *Site* shall be operated in such a way as to ensure compliance with the following:

(a) Reasonable Use Guideline B-7 for the protection of the groundwater at the *Site;* and

(b) Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives,* as amended from time to time or limits set by the *Regional Director,* for the protection of the surface water at and off the *Site.*

Surface Water and Ground Water

(3) (a) The *Owner* shall construct and maintain to the satisfaction of the *Ministry*, a groundwater monitoring network which fully delineates the horizontal and vertical extend of leachate migration resulting from the landfilling activities at the *Site.* The groundwater monitoring network shall include at least one up-gradient or trans-gradient monitoring well measuring natural uncontaminated groundwater quality and at least one well measuring representative source leachate quality.

(b) Groundwater samples from all wells in the above-described monitoring network shall be obtained and analyzed at least once during maximum water level conditions and at least once during the minimum water level conditions. Groundwater elevations in all monitoring wells shall be measured during each monitoring event prior to obtaining water quality samples.

(c) The proposed design and locations of the groundwater monitoring network shall be included in the Design and Operations Plan as per Condition 7(5) and submitted to the *Director* for approval.

(4) A certified Professional Geoscientist or Engineer possessing appropriate hydrogeologic training and experience shall execute or directly supervise the execution of the groundwater monitoring and reporting program.

Groundwater Wells and Monitors

(5) The *Owner* shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.

(6) Where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells and the wells shall be properly re-secured.

(7) Any groundwater monitoring well included in the on-going monitoring program that are damaged shall be assessed, repaired, replaced or decommissioned by the *Owner,* as required.

(a) The *Owner* shall repair or replace any monitoring well which is destroyed or in any way made to be inoperable for sampling such that no more than one regular sampling event is missed.

(b) All monitoring wells which are no longer required as part of the groundwater monitoring program, and have been approved by the *District Manager* for abandonment, shall be decommissioned by the *Owner,* as required, in accordance with *O.Reg. 903,* that will prevent contamination through the abandoned well. A report on the decommissioning of the well shall be included in the Annual Report for the period during which the well was decommissioned.

Trigger Mechanisms and Contingency Plans

(8) (a) Details of a trigger mechanisms plan for surface water and groundwater quality monitoring for the purpose of initiating investigative activities into a cause of increased contaminant concentrations at the Contaminant Attenuation Zone (*CAZ*) limit shall be included in the Design and Operations Plan as per Condition 7(5) and submitted to the *Director* for approval.

(b) Details of a contingency plan to be implemented in the event that the surface water or groundwater quality exceeds the a trigger mechanism at the *CAZ* limit shall be included in the Design and Operations Plan as per Condition 7(5) and submitted to the *Director* for approval.

(9) In the event of a confirmed exceedence of a site-specific trigger level relating to leachate mounding or groundwater or surface water impacts due to leachate, the *Owner* shall immediately notify the *District Manager,* and an investigation into the cause and the need for implementation of remedial or contingency actions shall be carried out by the *Owner* in accordance with the approved trigger mechanisms and associated

contingency plans.

(10) If monitoring results, investigative activities and/or trigger mechanisms indicate the need to implement contingency measures, the *Owner* shall ensure that the following steps are taken:

(a) The *Owner* shall notify the *District Manager,* in writing of the need to implement contingency measures, no later than 30 days after confirmation of the exceedences;
(b) Detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures shall be prepared and submitted by the *Owner* to the *District Manager* for approval; and
(c) The contingency measures shall be implemented by the *Owner* upon approval by the *District Manager*.

(11) The *Owner* shall ensure that any proposed changes to the site-specific trigger levels for leachate impacts to the surface water or groundwater, are approved in advance by the *Director* via an amendment to this *Certificate.*

Changes to the Monitoring Plan

(12) The *Owner* may request to make changes to the monitoring program(s) to the *District Manager* in accordance with the recommendations of the annual report. The *Owner* shall make clear reference to the proposed changes in separate letter that shall accompany the annual report.

(13) Within fourteen (14) days of receiving the written correspondence from the *District Manager* confirming that the *District Manager* is in agreement with the proposed changes to the environmental monitoring program, the *Owner* shall forward a letter identifying the proposed changes and a copy of the correspondences from the *District Manager* and all other correspondences and responses related to the changes to the monitoring program, to the *Director* requesting the *Certificate* be amended to approve the proposed changes to the environmental monitoring plan prior to implementation.

(14) In the event any other changes to the environmental monitoring program are proposed outside of the recommendation of the annual report, the *Owner* shall follow current ministry procedures for seeking approval for amending the *Certificate.*

9. CLOSURE PLAN

(1) At least 3 years prior to the anticipated date of closure of this *Site,* the *Owner* shall submit to the *Director* for approval, with copies to the *District Manager,* a detailed *Site* closure plan pertaining to the termination of landfilling operations at this *Site,* post-closure inspection, maintenance and monitoring, and end use. The plan shall include the following:

(a) a plan showing *Site* appearance after closure;
(b) a description of the proposed end use of the *Site;*
(c) a descriptions of the procedures for closure of the *Site,* including:

(i) advance notification of the public of the landfill closure;
(ii) posting of a sign at the *Site* entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
(iii) completion, inspection and maintenance of the final cover and landscaping;
(iv) *Site* security;
(v) removal of unnecessary landfill-related structures, buildings and facilities;
(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.

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

10. WASTE DIVERSION

(1) The *Owner* shall ensure that:

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

(2) The *Owner* shall provide a segregated area for the storage of *Refrigerant Appliances* so that the following are ensured:

(a) all *Refrigerant Appliances* have been tagged to indicate that the refrigerant has been removed by a licensed technician. The tag number shall be recorded in the log book and shall remain affixed to the appliance until transferred from the *Site;* **or**
(b) all *Refrigerant Appliances* accepted at the *Site,* which have not been tagged by a licensed technician to verify that the equipment no longer contains refrigerants, are stored segregated, in a clearly marked area, in an upright position and in a manner which allows for the safe handling and transfer from the *Site* for removal of refrigerants as required by O.Reg. 189; and
(c) all *Refrigerant Appliances* received on-site shall either have the refrigerant removed prior to being transferred from the *Site* or shall be shipped off-site only to facilities where the refrigerants can be removed by a licensed technician in accordance with O.Reg. 189.

(3) Propane cylinders shall be stored in a segregated area in a manner which prevents cylinders from being knocked over or cylinder valves from breaking.

(4) The *Owner* shall transfer waste and recyclable materials from the *Site* as follows:

(a) recyclable materials shall be transferred off-site once their storage bins are full;
(b) scrap metal shall be transferred off-site at least twice a year;
(c) tires shall be transferred off-site as soon as a load for the contractor hired by the *Owner* has accumulated or as soon as the accumulated volume exceeds the storage capacity of its bunker; and
(d) immediately, in the event that waste is creating an odour or vector problem.

(5) The *Owner* shall notify the appropriate contractors that waste and recyclable wastes that are to be transferred off-site are ready for removal. Appropriate notice time, as determined by the contract shall be accommodated in the notification procedure.

SCHEDULE "A"

1. Application for a Certificate of Approval for a Waste Disposal Site dated February 17, 1971 including supporting documentation submitted with the application.

2. The development plan submitted for the Township by R.J. Henderson, on October 23, 1973.

3. Application for a Certificate of Approval for a Waste Disposal Site dated September 4, 1998 signed by Gaetane Lemieux.

4. Letter to Tom Brown of the Ministry, from the Corporation of the Township of Casimir, Jennings and Appleby, dated December 7, 1998 and signed by Nicole Gauthier.

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

GENERAL

1. The reason for Conditions 1(1), (2), (4), (5), (6), (7), (8), (9), (10), (17), (18) and (19) is to clarify the legal rights and responsibilities of the *Owner* and *Operator* under this Certificate of Approval.

2. The reasons for Condition 1(3) is to ensure that the *Site* is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the *Owner,* and not in a manner which the *Director* has not been asked to consider.

3. The reasons for Condition 1(11) are to ensure that the *Site* is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the *Director* is informed of any changes.

4. The reasons for Condition 1(12) are to restrict potential transfer or encumbrance of the *Site* without the approval of the *Director* and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this Certificate of Approval.

5. The reason for Condition 1(13) is to ensure that the successor is aware of its legal responsibilities.

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

7. The reason for Condition 1(16) is to ensure that appropriate Ministry staff has 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 *Act*, the *OWRA*, the *PA*, the *NMA* and the *SDWA*.

SITE OPERATION

8. The reasons for Conditions 2(1), 2(5) and 6(3) are to ensure that the *Site* is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.

9. The reason for Conditions 2 (2), 2(3) and 2(4) is to ensure that users of the *Site* are fully aware of important information and restrictions related to *Site* operations and access under this *Certificate.*

10. The reason for Condition 2(6) (a) is that open burning of municipal waste is unacceptable because of concerns with air emissions, smoke and other nuisance affects, and the potential fire hazard.

11. Reasons for 2(6) (b) 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.

12. The reasons for Condition 2(7), 2(8) and 2(9) are to specify the hours of operation for the landfill site and a mechanism for amendment of the hours of operation, as required.

13. The reasons for Condition 2(10) and 2(11) are to ensure that the *Site* is supervised by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person and to ensure the controlled access and integrity of the *Site* by preventing unauthorized access when the Site is closed and no site attendant is on duty.

EMPLOYEE TRAINING

14. The reason for Condition 3(1) is to ensure that the *Site* is supervised and operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.

COMPLAINTS RESPONSE PROCEDURE

15. The reason for Condition 4(1) is to ensure that any complaints regarding landfill operations at this *Site* are responded to in a timely and efficient manner.

EMERGENCY RESPONSE

16. Conditions 5(1) and 5(2) are included to ensure that emergency situations are reported to the Ministry to ensure public health and safety and environmental protection.

17. Conditions 5(3), 5(4) and 5(5) are included to ensure that emergency situations are handled in a manner to minimize the likelihood of an adverse effect and to ensure public health and safety and environmental protection.

RECORD KEEPING AND REPORTING

18. The reason for Conditions 6(1) and 6(2) is to ensure that accurate waste records are maintained to ensure compliance with the conditions in this Certificate of Approval (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the *EPA* and its regulations.

19. The reason for Conditions 6(4) and 6(5) is to ensure that detailed records of *Site* inspections are recorded and maintained for inspection and information purposes.

20. The reasons for Conditions 6(6) and 6(7) are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.

LANDFILL DESIGN AND DEVELOPMENT

21. The reason for Conditions 7(1) to 7(7) inclusive 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.

22. Condition 7(8) is to provide the Owner the process for getting the approval for alternative daily and intermediate cover material.

23. The reasons for Condition 7(9) are to ensure that daily/weekly and intermediate cover are used to control potential nuisance effects, to facilitate vehicle access on the *Site,* and to ensure an acceptable site appearance is maintained. The proper closure of a landfill site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the *Site.*

LANDFILL MONITORING

24. Reasons for Condition 8(1) are to ensure that off-site migration of landfill gas is monitored and all buildings at the *Site* are free of any landfill gas accumulation, which due to a methane gas component may be explosive and thus create a danger to any persons at the *Site.*

25. Condition 8(2) is included to provide the groundwater and surface water limits to prevent water pollution at the *Site.*

26. Conditions 8(3) and 8(4) are included to require the Owner to demonstrate that the *Site* is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.

27. Conditions 8(5), 8(6) and 8(7) are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.

28. Conditions 8(8) to 8(11) inclusive are added to ensure the *Owner* has a plan with an organized set of procedures for identifying and responding to potential issues relating to groundwater and surface water contamination at the *Site's* compliance point.

29. Reasons for conditions 8(12), 8(13) and 8(14) are included to streamline the approval of the changes to the monitoring plan.

CLOSURE PLAN

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

WASTE DIVERSION

31. Condition 10 is included to ensure that the recyclable materials are stored in their temporary storage location in a manner as to minimize a likelihood of an adverse effect or a hazard the natural environment or any person.

This Provisional Certificate of Approval revokes and replaces Certificate(s) of Approval No. A541302 issued on March 22, 1999

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

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

The Notice should also include:

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

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

This Notice must be served upon:

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

AND

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

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

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

DATED AT TORONTO this 26th day of November, 2009

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

RM/
c: District Manager, MOE Sudbury
Rich Schmidt, WESA

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A541302
Notice No. 2
Issue Date: October 3, 2014

The Corporation of the Municipality of St. Charles
2 King St E P.O. Box 70
St. Charles, Ontario
P0M 2J0

Site Location: St. Charles Landfill
515 Beauparlant Rd Lot 3, Concession 6, West Half
St. Charles Municipality, District of Sudbury

You are hereby notified that I have amended Approval No. A541302 issued on November 26, 2009 and amended on August 19, 2011 for the use and operation of 32.4 hectare waste disposal and transfer site within a total site area of 45.87 hectares. *, as follows:*

The definition of "*Certificate*" is hereby revoked and replaced with the following:

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

Conditions 7 (4), 8(3) and 8(8) are hereby revoked and replaced with the following:

7. (4) Development, operation and use of 383,530 cubic meters (includes existing waste) in accordance with the Development and Operations Plan, St. Charles Waste Disposal Site, Items 5 and 6 of Schedule "A" is hereby approved.

8. (3) The *Owner* shall monitor surface water and ground water in accordance with the monitoring programs outlined in Item 5 in Schedule "A".

(8) (a) Trigger mechanisms shall be in accordance with Item 5 in Schedule "A".

(b) Contingency plan in the event of a confirmed exceedance of a site-specific trigger level relating to leachate mounding or groundwater or surface water impacts due to leachate shall be in accordance with Item 5 in Schedule "A".

Item (5) is added to the Schedule "A".

Schedule "A"

5. Report titled "Development and Operations Plan, St. Charles Waste Disposal Site" dated July 2014, prepared by WESA.

6. Amended Section 4.6 of the "Development and Operations Plan, St. Charles Waste Disposal Site" dated August 15, 2014, prepared by WESA.

7. Letter dated September 25, 2014 from Stephen Falvo, B.Sc., Environmental Scientist, WESA to Ranjani Munasinghe, P.Eng., Review Engineer, Ministry of the Environment and Climate Change Re: St. Charles Landfill Property Area.

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

1. The reason for revoking and replacing the condition 7 (4) is to approve the Development and Operations Plan proposed by the *Owner.*

2. The reasons for conditions 8 (3) is to approve the environmental monitoring plans, trigger mechanisms and contingency plans proposed by the *Owner.*

3. Condition 8 (8) is to ensure the *Owner* has a plan with an organized set of procedures for identifying and responding to potential issues relating to groundwater and surface water contamination at the *Site's* compliance point.

This Notice shall constitute part of the approval issued under Approval No. A541302 dated November 26, 2009 as amended.

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

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

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

The Notice should also include:

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

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500

AND

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

Toronto, Ontario
M5G 1E5

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

*** Further information on the Environmental Review Tribunal 's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-3717 or www.ert.gov.on.ca**

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

DATED AT TORONTO this 3rd day of October, 2014

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

RM/
c: District Manager, MOE Sudbury
Richard Schmidt, WESA, A BluMetric Environmental Inc. Company

APPENDIX III

Borehole Logs

Project No: S-B4615

Project: Landfill Hydrogeological Investigation

Client: Municipality of St. Charles

Site Coordinates: 4841 N 2842 E (Local)

Log of Borehole: SCL-1

Field Personnel: M.M.

SUBSURFACE PROFILE				SAMPLE				WELL INSTALLATION	
Depth (ft / m)	Elevation	Symbol	Description	Number	Type	SPT N-Value	Recovery	Well Construction	Comments
0	229.63		Ground Surface						Steel locking protective cover Stickup: 1.06 m
0			***PEAT***	1	SS	2			
2	228.97		***SILTY SAND*** Silty Fine Sand, moist to wet, light grey, very loose. Thin layer (approx. 2") of red Fine to Medium Sand above bedrock.	3	CS				Bentonite seal
1			***BEDROCK***	4	CS				51 mm I.D. Sch. 40 PVC pipe
3				5	CS				#1 silica sand (1mm)
5				6	CS				10' of slot 10 Sch. 40 PVC screen
7				7	CS				
26	222.01		End of Borehole						

Drill Method: HW Casing / HQ Core

Hole Size: 114 mm / 96 mm

Drill Date: October 20, 2005

Ground Elevation: 229.630 masl

T.O.PVC: 230.690 masl

Static WL: 229.510 masl (Sep18/08)

Checked by: RTS

Sheet: 1 of 1

WESA
A Better Environment For Business

Project No: S-B4615

Project: Landfill Hydrogeological Investigation

Client: Municipality of St. Charles

Site Coordinates: 4728 N 2955 E (Local)

Log of Borehole: SCL-2

Field Personnel: M.M.

SUBSURFACE PROFILE				SAMPLE				WELL INSTALLATION	
Depth (ft / m)	Elevation	Symbol	Description	Number	Type	SPT N-Value	Recovery	Well Construction	Comments
0	227.46		Ground Surface						Steel locking protective cover Stickup: 1.05 m
0			***PEAT***						
2	226.87		***SILTY SAND*** Silty Fine Sand, moist, light grey, very loose.	1	SS	3			
4				2	SS	16			
6			***SANDY SILTY CLAY*** Sandy Silty Clay with some fractures and fine sand seams, moist, light brown, very stiff to soft.	3	SS	19			Bentonite seal
8				4	SS	4			
10				5	SS	3			
	224.06			6	SS	>50			51 mm I.D. Sch. 40 PVC pipe
12			***BEDROCK***	7	CS				
14									
16									#1 silica sand (1mm)
18				8	CS				
20									10' of slot 10 Sch. 40 PVC screen
22				9	CS				
24	219.84								
26			End of Borehole						

Drill Method: HW Casing / HQ Core

Hole Size: 114 mm / 96 mm

Drill Date: October 20, 2005

Ground Elevation: 227.460 masl

T.O.PVC: 228.510 masl

Static WL: 227.760 masl (Sep18/08)

Checked by: RTS

Sheet: 1 of 1

WESA
A Better Environment For Business

Project No: S-B4615

Project: Landfill Hydrogeological Investigation

Client: Municipality of St. Charles

Site Coordinates: 4794 N 3012 E

Log of Borehole: SCL-3

Field Personnel: M.M.

SUBSURFACE PROFILE				SAMPLE				WELL INSTALLATION	
Depth	Elevation	Symbol	Description	Number	Type	SPT N-Value	Recovery	Well Construction	Comments
ft / m									
-4 / -2 / 0	226.87		Ground Surface						Steel locking protective cover Stickup: 0.94 m
2 / 4 / 1	225.65		***PEAT***	1	SS	4			
			SILTY SAND Silty Fine Sand, moist, light grey, very loose.	2	SS	15			
	225.21		***SANDY SILTY CLAY*** Sandy Silty Clay with some gravel, moist, light brown, very stiff to soft.	3	SS	19			Bentonite seal
6 / 8 / 10 / 3				4	SS	16			
			SILTY CLAY Silty Clay, moist to wet, light brown, stiff to firm.	5	SS	6			
	223.21			6	SS	5			51 mm I.D. Sch. 40 PVC pipe
12 / 14 / 16 / 5			***CLAY*** Clay, wet, grey, soft to very soft.	7	SS	2			
				8	SS	3			#1 silica sand (1mm)
				9	SS	0			
18	220.90			10	SS	0			
20 / 22 / 24 / 7			***BEDROCK***	11	CS				10' of slot 10 Sch. 40 PVC screen
				12	CS				
26	218.95								

Drill Method: HW Casing / HQ Core

Hole Size: 114 mm / 96 mm

Drill Date: October 21, 2005

Ground Elevation: 226.870 masl

T.O.PVC: 227.810 masl

Static WL: 226.080 masl (Sep18/08)

Checked by: RTS

Sheet: 1 of 1

WESA
A Better Environment For Business

Project No: S-B4615

Project: Landfill Hydrogeological Investigation

Client: Municipality of St. Charles

Site Coordinates: 4961 N 3029 E (Local)

Log of Borehole: SCL-4

Field Personnel: M.M.

SUBSURFACE PROFILE				SAMPLE				WELL INSTALLATION	
Depth (ft / m)	Elevation	Symbol	Description	Number	Type	SPT N-Value	Recovery	Well Construction	Comments
	226.35		Ground Surface						Steel locking protective cover Stickup: 1.05 m
0			***TOPSOIL***	1	SS	3			
2			***SANDY SILTY CLAY*** Sandy Silty Clay, moist, grey to brown, soft.	2	SS	3			
4 (1 m)	224.80								
6				3	CS				Bentonite seal
8									
10 (3 m)									51 mm I.D. Sch. 40 PVC pipe
12				4	CS				
14			***BEDROCK***						#1 silica sand (1mm)
16 (5 m)				5	CS				
18									10' of slot 10 Sch. 40 PVC screen
20				6	CS				
22 (7 m)									
24	218.55			7	CS				
26			End of Borehole						

Drill Method: HW Casing / HQ Core

Hole Size: 114 mm / 96 mm

Drill Date: October 21-22, 2005

Ground Elevation: 226.350 masl

T.O.PVC: 227.400 masl

Static WL: 226.100 masl (Sep18/08)

Checked by: RTS

Sheet: 1 of 1

WESA
A Better Environment For Business

Project No: S-B4615

Project: Landfill Hydrogeological Investigation

Client: Municipality of St. Charles

Site Coordinates: 4985 N 2937

Log of Borehole: SCL-5

Field Personnel: M.M.

SUBSURFACE PROFILE				SAMPLE				WELL INSTALLATION	
Depth (ft / m)	Elevation	Symbol	Description	Number	Type	SPT N-Value	Recovery	Well Construction	Comments
0	224.38		Ground Surface						Steel locking protective cover Stickup: 1.00 m
0 – 2			***TOPSOIL***	1	SS	4			
2	223.62		***SANDY SILTY CLAY*** Silty Fine Sand to primarily Sandy Silty Clay, moist to wet , greyish brown, soft.	2	SS	10			
4 – 6			***SILTY CLAY*** Silty Clay, moist, light brown, very stiff to firm.	3	SS	20			Bentonite seal
8				4	SS	4			
10	221.36			5	CS				51 mm I.D. Sch. 40 PVC pipe
12 – 14				6	CS				#1 silica sand (1mm)
16 – 18			***BEDROCK***	7	CS				10' of slot 10 Sch. 40 PVC screen
20 – 22				8	CS				
24	216.76								
26			End of Borehole						

Drill Method: HW Casing / HQ Core

Hole Size: 114 mm / 96 mm

Drill Date: October 22, 2005

Ground Elevation: 224.380 masl

T.O.PVC: 225.380 masl

Static WL: >225.380 masl (Sep 18/08)

Checked by: RTS

Sheet: 1 of 1

WESA
A Better Environment For Business

Project No: S-B4615

Project: Landfill Hydrogeological Investigation

Client: Municipality of St. Charles

Site Coordinates: 4888 N 3015 E (Local)

Log of Borehole: SCL-6

Field Personnel: M.M.

SUBSURFACE PROFILE				SAMPLE				WELL INSTALLATION	
Depth (ft / m)	Elevation	Symbol	Description	Number	Type	SPT N-Value	Recovery	Well Construction	Comments
0	226.32		Ground Surface						Steel locking protective cover
			PEAT						Stickup: 0.89 m
2 / 1			***CLAY*** Clay, Brown with grey horizons along fractures, moist, stiff.	1	SS	9			
4	224.67								
6			***SAND*** Fine Sand with boulders and trace coarse sand, moist to wet, grey, very dense.	2	SS	>50			Bentonite seal
8	223.43								
10 / 3				3	CS				51 mm I.D. Sch. 40 PVC pipe
12									
14									#3 silica sand (3 mm)
16 / 5			***BEDROCK***	4	CS				
18									10' of slot 10 Sch. 40 PVC screen
20									
22 / 7				5	CS				
24	218.86								
26			End of Borehole						

Drill Method: H.S. Auger / HQ Casing

Hole Size: 203 mm / 86 mm

Drill Date: October 5, 2006

Ground Elevation: 226.535 masl

T.O.PVC: 227.420 masl

Static WL: 226.240 masl (Sep18/08)

Checked by: RTS

Sheet: 1 of 1

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WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-7

Project No.: S-B4615
Client: Municipality of St. Charles
Location: St. Charles Landfill

Northing: 4963 N
Easting: 3033 E
Project Manager: RTS

SUBSURFACE PROFILE				SAMPLE				
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	Recovery	SPT N-Value	Well Completion Details
ft / m		Ground Surface	226.59					Well Stickup: 0.88 m; Steel locking protective cover; 25 mm dia. PVC pipe.
0 / 0		***TOPSOIL***	0.00					
1 / 1		***SANDY SILTY CLAY*** Sandy Silty Clay, moist, grey to brown, soft.						Water level T.O.PVC, Sep 18/08: 226.194 masl; Bentonite seal; #0 (0.5 mm) silica sand; 0.91 m (3 ft.) length of 25 mm dia. Sch. 40 slot 10 screen.
5			224.92					
6 / 2		End of Borehole	1.68					
10 / 3								
13 / 4								
16								

Drilled By: WESA
Drill Method: Pionjar
Drill Date: April 17, 2008

Elevation T.O.PVC: 227.474 masl
Supervised By: M.M.
Checked By: RTS

Datum: Local
Template: Standard MW
Sheet: 1 of 1

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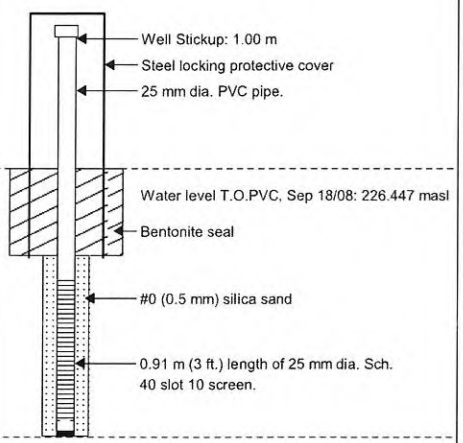
WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-8

Project No.: S-B4615
Client: Municipality of St. Charles
Location: St. Charles Landfill

Northing: 4942 N
Easting: 3034 E
Project Manager: RTS

SUBSURFACE PROFILE				SAMPLE				
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	Recovery	SPT N-Value	Well Completion Details
ft / m								
0		Ground Surface	226.43					
		SAND and GRAVEL Sand and Gravel with silt, moist to wet.	0.00					
			224.85					
		End of Borehole	1.58					



Drilled By: WESA
Drill Method: Pionjar
Drill Date: April 17, 2008

Elevation T.O.PVC: 227.427 masl
Supervised By: M.M.
Checked By: RTS

Datum: Local
Template: St Charles LF
Sheet: 1 of 1

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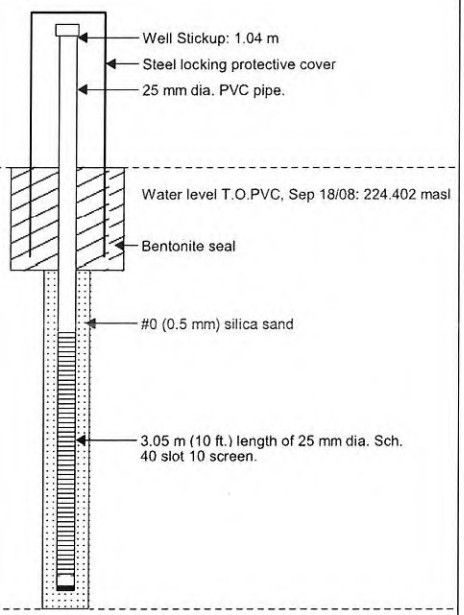
WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-9

Project No.: S-B4615
Client: Municipality of St. Charles
Location: St. Charles Landfill

Northing: 4991 N
Easting: 2962 E
Project Manager: RTS

SUBSURFACE PROFILE				SAMPLE				
Depth (ft / m)	Symbol	Description	Depth/Elev. (m)	Number	Type	Recovery	SPT N-Value	Well Completion Details
0 / 0		Ground Surface	224.49					
		TOPSOIL	0.00					
1 / 2		***SANDY SILTY CLAY*** Silty Fine Sand to primarily Sandy Silty Clay, moist to wet , greyish brown, soft.	223.73					
3 / 1		***SILTY CLAY*** Silty Clay, moist, light brown, very stiff to firm.	0.76					
8 / 2			221.90					
		End of Borehole	2.59					
16 / 4								



Drilled By: WESA
Drill Method: Pionjar
Drill Date: April 17, 2008

Elevation T.O.PVC: 225.532
Supervised By: M.M.
Checked By: RTS

Datum: Local
Template: St Charles LF
Sheet: 1 of 1

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WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-10

Project No.: S-B6975
Client: Municipality of St. Charles
Location: St. Charles Landfill
Northing: 0
Easting: 0
Project Manager: RTS

SUBSURFACE PROFILE				SAMPLE				
Depth (ft / m)	Symbol	Description	Depth/Elev. (m)	Number	Type	Recovery	SPT N-Value	Well Completion Details
0		Ground Surface	0.00					Well Stickup: 0.86 m; Steel locking protective cover
0		***TOPSOIL*** Organics, moist black.	0.00 / -0.36					
1–3		***SILTY SAND and BOULDERS*** Silty Fine Sand and Boulders, moist, brown.	0.36 / -1.07					114 mm dia. annulus
3	1	***BEDROCK***	1.07	C1	CS			Bentonite seal
4–5		Fractures at 1.47 and 1.73 m.						
6–7	2							96 mm dia. annulus
8				C2	CS			Water level T.O.PVC, Dec 16/09: masl
9		Fractures at 2.59, 2.67 and 2.80 m.						#1 (1 mm) silica sand
10	3							
11–12		Fractures from 3.30 to 3.58 m.						
13	4			C3	CS			51 mm dia. PVC pipe
14–15		Fractures at 3.99, 4.26, 4.52 and 4.55 m.						
16	5							3.05 m (10 ft.) length of 25 mm dia. Sch. 40 slot 10 screen
17		Fracture at 5.08 m.						

Drilled By: Landcore Drilling
Drill Method: HW Casing / HQ Core
Drill Date: December 9, 2009
Elevation T.O.PVC: 0
Supervised By: M.M.
Checked By: RTS
Datum: Local
Template: St Charles LF
Sheet: 1 of 2

WESA
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WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-10

Project No.: S-B6975
Client: Municipality of St. Charles
Location: St. Charles Landfill
Northing: 0
Easting: 0
Project Manager: RTS

SUBSURFACE PROFILE				SAMPLE				
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	Recovery	SPT N-Value	Well Completion Details
18		***BEDROCK***		C4	CS			96 mm dia. annulus
19		Fractures at 5.56 and 5.66 m.						
20 – 6								#1 (1 mm) silica sand
21								
22								3.05 m (10 ft.) length of 25 mm dia. Sch. 40 slot 10 screen
23 – 7		Fractures at 6.88 and 6.93 m.		C5	CS			
24								
25		Fracture at 7.54 m.	-7.85					
26 – 8		End of Borehole	7.85					
27								
28								
29 – 9								
30								
31								
32								
33 – 10								
34								
35								
36 – 11								
37								

Drilled By: Landcore Drilling
Drill Method: HW Casing / HQ Core
Drill Date: December 9, 2009
Elevation T.O.PVC: 0
Supervised By: M.M.
Checked By: RTS
Datum: Local
Template: St Charles LF
Sheet: 2 of 2

WESA
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WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-11

Project No.: S-B6975
Client: Municipality of St. Charles
Location: St. Charles Landfill
Northing: 0
Easting: 0
Project Manager: RTS

SUBSURFACE PROFILE				SAMPLE				
Depth (ft / m)	Symbol	Description	Depth/Elev. (m)	Number	Type	Recovery	SPT N-Value	Well Completion Details
0		Ground Surface	0.00					Well Stickup: 0.71 m; Steel locking protective cover; 51 mm dia. PVC pipe
0		***TOPSOIL***	0.00					
1–4		***SANDY SILTY CLAY*** Sandy Silty Clay, moist, brown, soft.	-1.37	S1	G			Water level T.O.PVC, Dec 16/09: masl; 114 mm dia. annulus
5–16		***BEDROCK*** Fractures between 1.35 m and 1.73 m.	1.37	C1	CS			Bentonite seal; 96 mm dia. annulus
7–8		Fractures between 2.11 m and 2.57 m.						#1 (1 mm) silica sand
13		Fractures at 3.71 m and 3.91 m.		C2	CS			3.05 m (10 ft.) length of 25 mm dia. Sch. 40 slot 10 screen
16		Fracture at 4.98 m.						

Drilled By: Landcore Drilling
Drill Method: HW Casing / HQ Core
Drill Date: December 8, 2009
Elevation T.O.PVC: 0
Supervised By: M.M.
Checked By: RTS
Datum: Local
Template: St Charles LF
Sheet: 1 of 2

WESA
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WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-11

Project No.: S-B6975
Client: Municipality of St. Charles
Location: St. Charles Landfill
Northing: 0
Easting: 0
Project Manager: RTS

SUBSURFACE PROFILE				SAMPLE				
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	Recovery	SPT N-Value	Well Completion Details
18		***BEDROCK***		C3	CS			96 mm dia. annulus
19		Fracture at 5.62 m.						#1 (1 mm) silica sand
20 — 6			-6.32					3.05 m (10 ft.) length of 25 mm dia. Sch. 40 slot 10 screen
21		End of Borehole	6.32					
22								
23 — 7								
24								
25								
26 — 8								
27								
28								
29								
30 — 9								
31								
32								
33 — 10								
34								
35								
36 — 11								
37								

Drilled By: Landcore Drilling
Drill Method: HW Casing / HQ Core
Drill Date: December 8, 2009
Elevation T.O.PVC: 0
Supervised By: M.M.
Checked By: RTS
Datum: Local
Template: St Charles LF
Sheet: 2 of 2

WESA
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WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-12

Project No.: S-B6975
Client: Municipality of St. Charles
Location: St. Charles Landfill
Northing: 0
Easting: 0
Project Manager: RTS

SUBSURFACE PROFILE				SAMPLE				
Depth (ft / m)	Symbol	Description	Depth/Elev. (m)	Number	Type	Recovery	SPT N-Value	Well Completion Details
0		Ground Surface	0.00					Well Stickup: 0.86 m; Steel locking protective cover
0		***TOPSOIL***	0.00					
1		***SILTY SAND and BOULDERS*** Silty Fine Sand and Boulders, moist, brown.						114 mm dia. annulus
1				C1-A	CS			
4			-1.32					
4		***BEDROCK***	1.32					Water level T.O.PVC, Dec 16/09: masl
5				C1-B	CS			
6		Fractures at 1.60, 1.93 and 1.96 m.						96 mm dia. annulus
2								
7								
8				C2	CS			Bentonite seal
9								
10								
3		Fractures at 2.62, 2.69, 2.77, 2.90, 3.25, 3.38, 3.58 and 3.66 m.						51 mm dia. PVC pipe
11								
12								
13								
4								#1 (1 mm) silica sand
14				C3	CS			
15		Fractures at 3.94, 3.99, 4.18, 4.29, 4.52, 4.82 and 4.93 m.						
16								
5								
17								

Drilled By: Landcore Drilling
Drill Method: HW Casing / HQ Core
Drill Date: December 10, 2009
Elevation T.O.PVC: 0
Supervised By: M.M.
Checked By: RTS
Datum: Local
Template: St Charles LF
Sheet: 1 of 2

WESA
A Better Environment For Business

WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-12

Project No.: S-B6975
Client: Municipality of St. Charles
Location: St. Charles Landfill
Northing: 0
Easting: 0
Project Manager: RTS

SUBSURFACE PROFILE				SAMPLE				
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	Recovery	SPT N-Value	Well Completion Details
18		***BEDROCK*** Fractures at 5.11, 5.27 and 5.46 m.		C4	CS			96 mm dia. annulus
19								
20	6	Fracture at 6.04 m.						#1 (1 mm) silica sand
21								
22				C5	CS			3.05 m (10 ft.) length of 25 mm dia. Sch. 40 slot 10 screen
23	7							
24								
25		Fractures at 7.17, 7.33, 7.43, 7.46 and 7.85 m.						
26	8		-8.14					
27		End of Borehole	8.14					
28								
29								
30	9							
31								
32								
33	10							
34								
35								
36	11							
37								

Drilled By: Landcore Drilling
Drill Method: HW Casing / HQ Core
Drill Date: December 10, 2009
Elevation T.O.PVC: 0
Supervised By: M.M.
Checked By: RTS
Datum: Local
Template: St Charles LF
Sheet: 2 of 2

WESA
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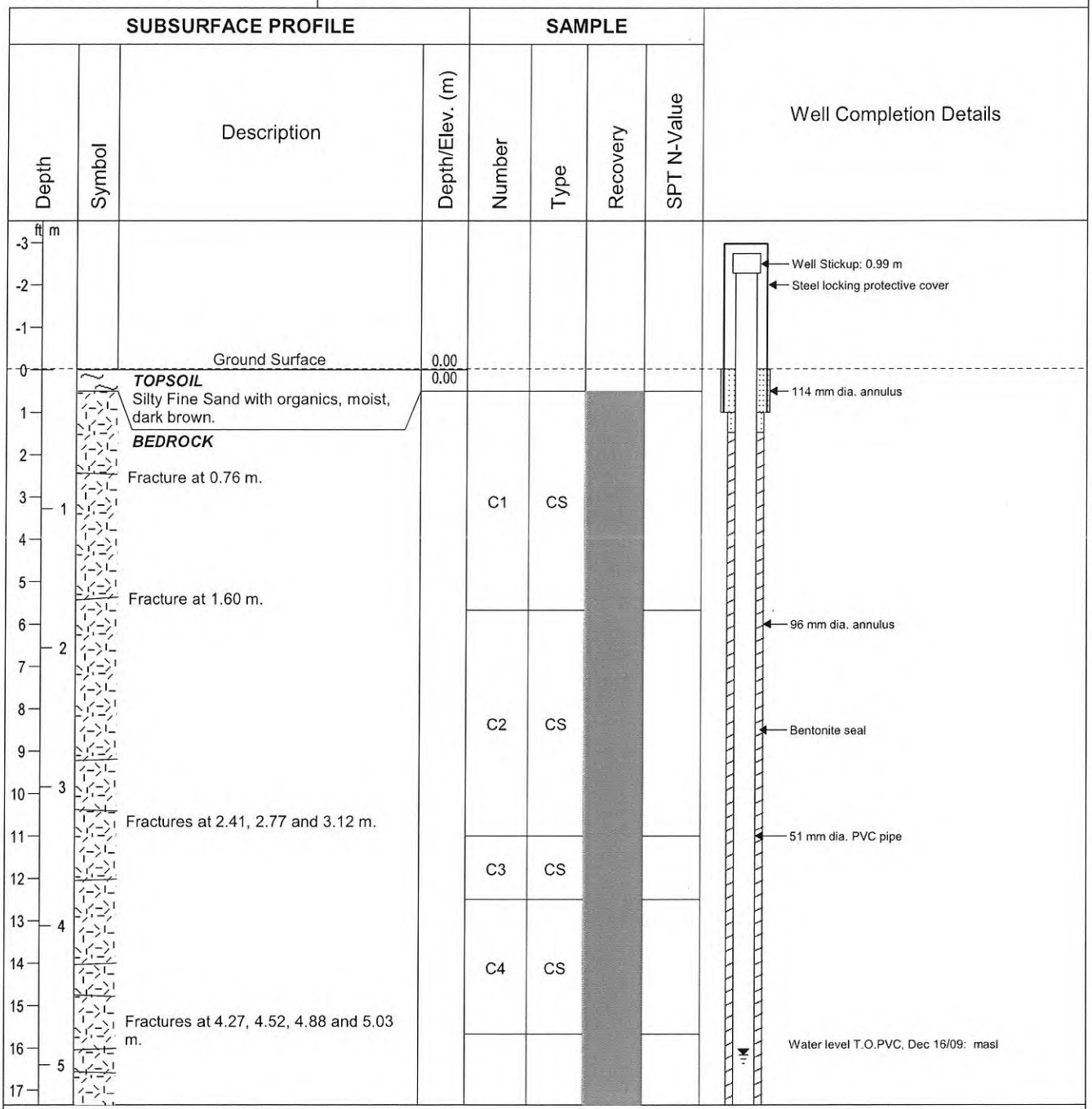
WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-13

Project No.: S-B6975
Client: Municipality of St. Charles
Location: St. Charles Landfill
Northing: 0
Easting: 0
Project Manager: RTS



Drilled By: Landcore Drilling
Drill Method: HW Casing / HQ Core
Drill Date: December 11, 2009
Elevation T.O.PVC: 0
Supervised By: M.M.
Checked By: RTS
Datum: Local
Template: St Charles LF
Sheet: 1 of 2

WESA
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WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-13

Project No.: S-B6975
Client: Municipality of St. Charles
Location: St. Charles Landfill
Northing: 0
Easting: 0
Project Manager: RTS

SUBSURFACE PROFILE				SAMPLE				
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	Recovery	SPT N-Value	Well Completion Details
18		***BEDROCK***		C5	CS			96 mm dia. annulus
19								
20	6	Fractures at 5.87 and 6.15 m.						Bentonite seal
21								
22				C6	CS			51 mm dia. PVC pipe
23	7							
24		Fractures at 7.19 m and between 7.47 and 7.72 m.						#1 (1 mm) silica sand
25								
26	8			C7	CS			
27								
28		Fractures at 8.28 and 8.67 m.						
29								
30	9							
31								3.05 m (10 ft.) length of 25 mm dia. Sch. 40 slot 10 screen
32		Fractures approximately every 0.25 m between 9.09 m and 10.82 m.						
33	10							
34				C8	CS			
35								
36	11		-11.10					
37		End of Borehole	11.10					

Drilled By: Landcore Drilling
Drill Method: HW Casing / HQ Core
Drill Date: December 11, 2009
Elevation T.O.PVC: 0
Supervised By: M.M.
Checked By: RTS
Datum: Local
Template: St Charles LF
Sheet: 2 of 2

WESA
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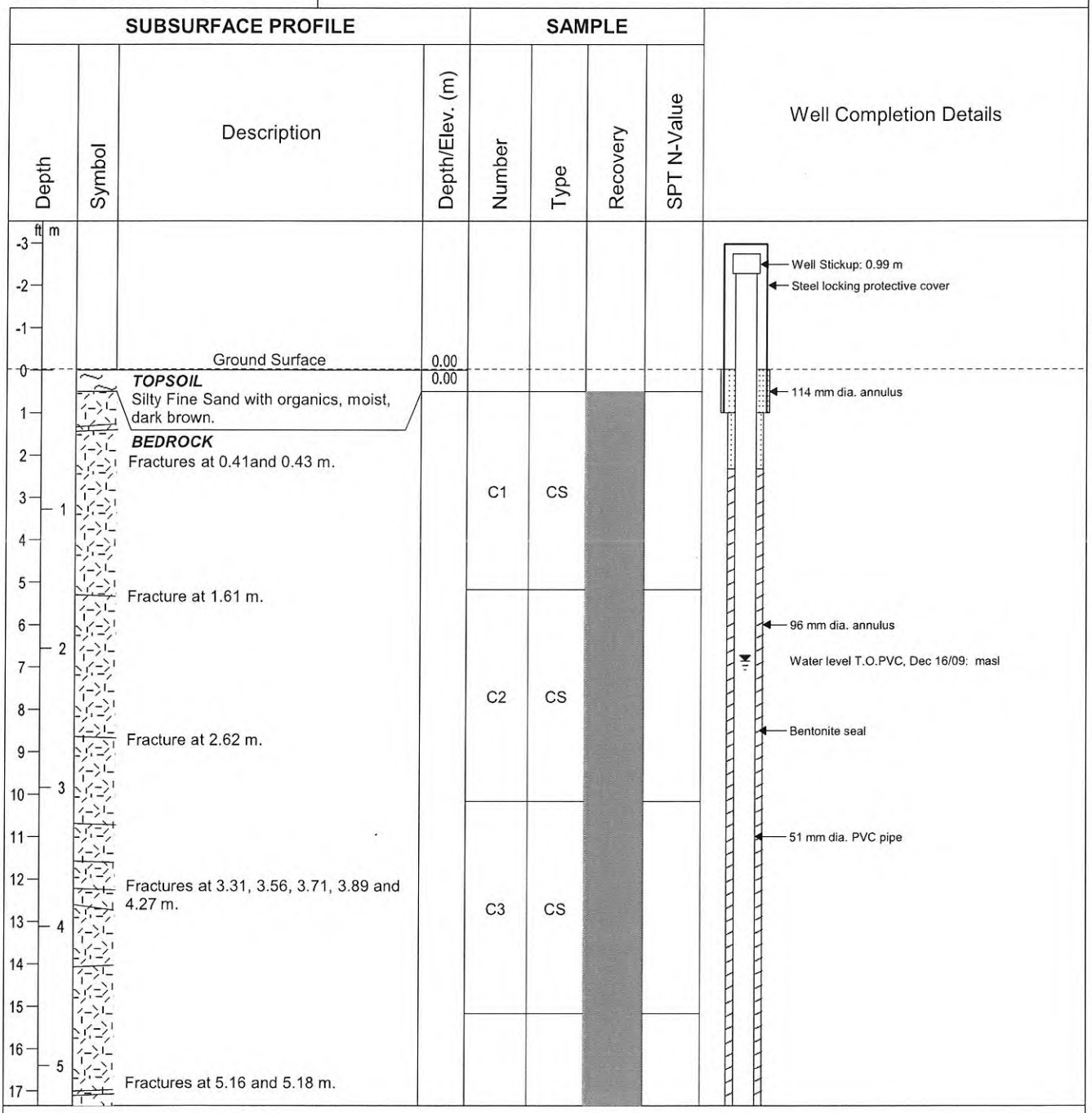
WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-14

Project No.: S-B6975
Client: Municipality of St. Charles
Location: St. Charles Landfill
Northing: 0
Easting: 0
Project Manager: RTS



Drilled By: Landcore Drilling
Drill Method: HW Casing / HQ Core
Drill Date: December 14, 2009
Elevation T.O.PVC: 0
Supervised By: M.M.
Checked By: RTS
Datum: Local
Template: St Charles LF
Sheet: 1 of 2

WESA
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WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-14

Project No.: S-B6975
Client: Municipality of St. Charles
Location: St. Charles Landfill
Northing: 0
Easting: 0
Project Manager: RTS

SUBSURFACE PROFILE				SAMPLE				
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	Recovery	SPT N-Value	Well Completion Details
18		***BEDROCK***		C4	CS			Bentonite seal
19								
20 – 6		Fractures at 5.84 and 6.32 m.						96 mm dia. annulus
21				C5	CS			
22								
23 – 7								51 mm dia. PVC pipe
24								
25								#1 (1 mm) silica sand
26 – 8				C6	CS			
27								
28								
29 – 9								
30								3.05 m (10 ft.) length of 25 mm dia. Sch. 40 slot 10 screen
31								
32								
33 – 10				C7	CS			
34								
35			-10.87					
36 – 11		End of Borehole	10.87					
37								

Drilled By: Landcore Drilling
Drill Method: HW Casing / HQ Core
Drill Date: December 14, 2009
Elevation T.O.PVC: 0
Supervised By: M.M.
Checked By: RTS
Datum: Local
Template: St Charles LF
Sheet: 2 of 2

WESA
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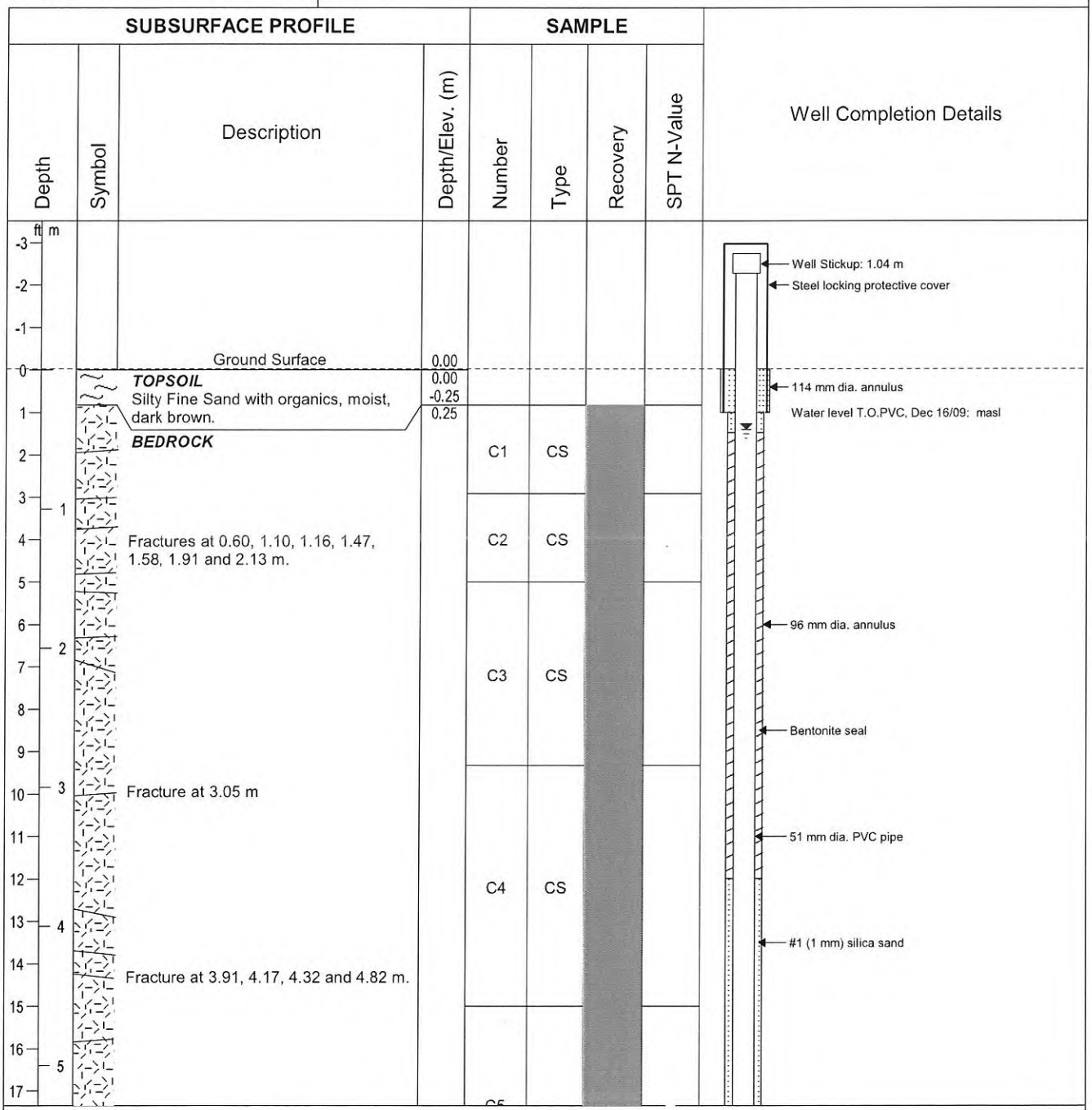
WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-15

Project No.: S-B6975
Client: Municipality of St. Charles
Location: St. Charles Landfill
Northing: 0
Easting: 0
Project Manager: RTS



Drilled By: Landcore Drilling
Drill Method: HW Casing / HQ Core
Drill Date: December 16, 2009
Elevation T.O.PVC: 0
Supervised By: M.M.
Checked By: RTS
Datum: Local
Template: St Charles LF
Sheet: 1 of 2

WESA
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WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-15

Project No.: S-B6975
Client: Municipality of St. Charles
Location: St. Charles Landfill
Northing: 0
Easting: 0
Project Manager: RTS

SUBSURFACE PROFILE				SAMPLE				
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	Recovery	SPT N-Value	Well Completion Details
18		***BEDROCK*** Fracture from 5.23 to 5.89 m.		C5	CS			96 mm dia. annulus; 51 mm dia. PVC pipe
19								
20 – 6								
21								#1 (1 mm) silica sand
22		Fractures at 5.83, 6.50, 6.71 to 7.03 and 7.47 m. Oxidation observed on the surface of the fractures.		C6	CS			
23 – 7								
24								
25								3.05 m (10 ft.) length of 25 mm dia. Sch. 40 slot 10 screen
26 – 8		Fracture at 7.84 m.						
27				C7	CS			
28								
29								
30 – 9			-9.13					
31		End of Borehole	9.13					
32								
33 – 10								
34								
35								
36 – 11								
37								

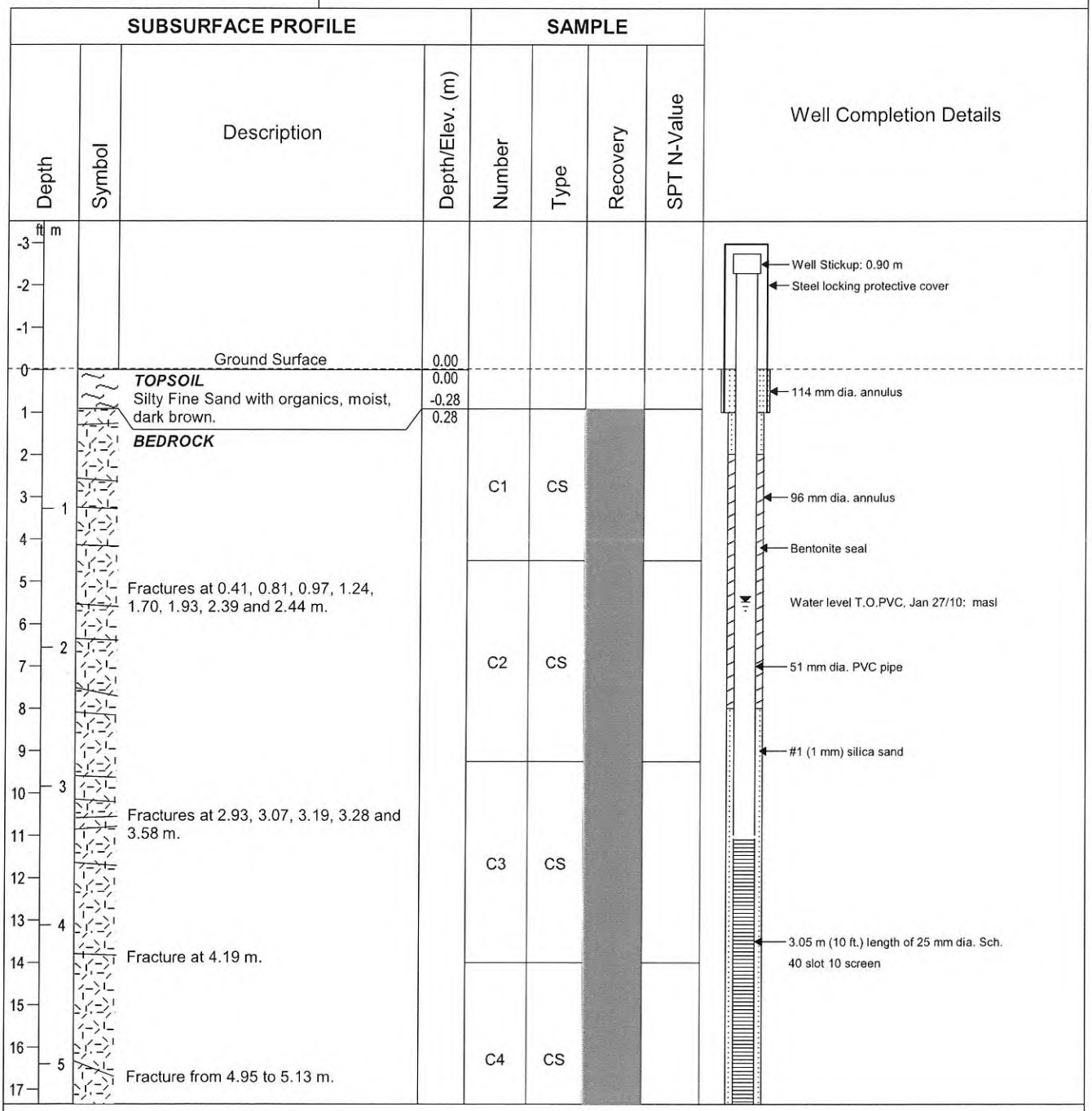
Drilled By: Landcore Drilling
Drill Method: HW Casing / HQ Core
Drill Date: December 16, 2009
Elevation T.O.PVC: 0
Supervised By: M.M.
Checked By: RTS
Datum: Local
Template: St Charles LF
Sheet: 2 of 2

WESA
A Better Environment For Business

WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-16

Project No.: S-B6975
Client: Municipality of St. Charles
Location: St. Charles Landfill
Northing: 0
Easting: 0
Project Manager: RTS



Drilled By: Landcore Drilling
Drill Method: HW Casing / HQ Core
Drill Date: December 14-15, 2009
Elevation T.O.PVC: 0
Supervised By: M.M.
Checked By: RTS
Datum: Local
Template: St Charles LF
Sheet: 1 of 2

WESA
A Better Environment For Business

WESA Inc.
273 Elm St.
Sudbury, ON, Canada P3C 1V5

Borehole/Well ID: SCL-16

Project No.: S-B6975
Client: Municipality of St. Charles
Location: St. Charles Landfill
Northing: 0
Easting: 0
Project Manager: RTS

SUBSURFACE PROFILE				SAMPLE				
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	Recovery	SPT N-Value	Well Completion Details
18		***BEDROCK*** Fracture at 5.28 m.						96 mm dia. annulus
19								#1 (1 mm) silica sand
20	6			C5	CS			3.05 m (10 ft.) length of 25 mm dia. Sch. 40 slot 10 screen
21								
22		Fractures at 6.58 and 6.87 m.	-6.93					
23	7	End of Borehole	6.93					
24								
25								
26	8							
27								
28								
29								
30	9							
31								
32								
33	10							
34								
35								
36	11							
37								

Drilled By: Landcore Drilling
Drill Method: HW Casing / HQ Core
Drill Date: December 14-15, 2009
Elevation T.O.PVC: 0
Supervised By: M.M.
Checked By: RTS
Datum: Local
Template: St Charles LF
Sheet: 2 of 2

APPENDIX IV

Summary Tables

TABLE 1
Groundwater Elevation Data
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Well ID Number	Date (dd/mm/yyyy)	Ground Surface Elevation (masl)	TOC Elevation (masl)	Height of TOC from Ground Surface (m)	Water Level Measurement from TOC (m)	Total Well Depth from TOC (m)	Depth to Groundwater (mbgs)	Calculated Water Level Elevation (masl)	UTM Coordinates			Comments
									Zone	Easting (m)	Northing (m)	
SCL1	05/06/2012	-	230.69	-	1.51	-	-	229.18	17T	541321	5134317	-
	05/06/2022				1.35			229.34				
	05/10/2022				1.41			229.28				
	05/06/2023				0.96			229.73				
	05/10/2023				0.88			229.81				
	05/06/2024				0.89			229.80				
	05/10/2024				1.85			228.84				
SCL2	05/06/2012		228.51		0.78			227.73	17T	541464	5134284	-
	05/06/2022				0.47			228.04				
	05/10/2022				0.97			227.54				
	05/06/2023				0.43			228.08				
	05/10/2023				0.43			228.08				
	05/06/2024				0.24			228.27				
	05/10/2024				1.03			227.48				
SCL3	05/06/2012		227.81		1.48			226.33	17T	541485	5134335	-
	05/06/2022				1.82			225.99				
	05/10/2022				2.57			225.24				
	05/06/2023				1.54			226.27				
	05/10/2023				1.46			226.35				
	05/06/2024				1.36			226.45				
	05/10/2024				2.98			224.83				
SCL4	05/06/2012		227.40		1.30			226.10	17T	541482	5134488	-
	05/06/2022				1.36			226.04				
	05/10/2022				1.59			225.81				
	05/06/2023				1.3			226.10				
	05/10/2023				1.23			226.17				
	05/06/2024				1.24			226.16				
	05/10/2024				1.76			225.64				
SCL5	05/06/2012		225.38		0.01			225.37	17T	541358	5134488	-
	05/06/2022				0.09			225.29				
	05/10/2022				0.49			224.89				
	05/06/2023				0.35			225.03				
	05/10/2023				0.3			225.08				
	05/06/2024				0.21			225.17				
	05/10/2024				0.5			224.88				
SCL6	05/06/2012		227.42		1.15			226.27	17T	541485	5134425	-
	05/06/2022				1.32			226.10				
	05/10/2022				1.33			226.09				
	05/06/2023				1.04			226.38				
	05/10/2023				1.06			226.36				
	05/06/2024				1.02			226.40				
	05/10/2024				1.62			225.80				
SCL7	05/06/2012		227.47		1.28			226.20	17T	541456	5134801	-
	05/06/2022				1.55			225.92				
	05/10/2022				1.5			225.97				
	05/06/2023				1.36			226.11				
	05/10/2023				1.28			226.19				
	05/06/2024				1.37			226.10				
	05/10/2024				1.82			225.65				
SCL8	05/06/2012		227.43		1.33			226.09	17T	541464	5134482	-
	05/06/2022				1.58			225.85				
	05/10/2022				1.67			225.76				
	05/06/2023				1.4			226.03				
	05/10/2023				1.29			226.14				
	05/06/2024				1.44			225.99				
	05/10/2024				1.66			225.77				
SCL9	05/06/2012		225.53		1.74			223.79	17T	541380	5134803	-
	05/06/2022							225.53				
	05/10/2022							225.53				
	05/06/2023							225.53				
	05/10/2023							225.53				
	05/06/2024				1.7			223.83				
	05/10/2024				1.8			223.73				
SCL10	05/06/2012		230.93		2.97			227.96	17T	541441	5134096	-
	05/06/2022				3.39			227.54				
	05/10/2022				4.93			226.00				
	05/06/2023				3.05			227.88				
	05/10/2023				2.62			228.31				
	05/06/2024				2.69			228.24				
	05/10/2024				4.73			226.20				
SCL11	05/06/2012		227.88		1.22			226.66	17T	541397	5134070	-
	05/06/2022				1.63			226.25				
	05/10/2022				2.1			225.78				
	05/06/2023				1.29			226.59				
	05/10/2023				1.04			226.84				
	05/06/2024				1.23			226.65				
	05/10/2024				2.42			225.46				
SCL12	05/06/2012		228.57		1.33			227.24	17T	541312	5134068	-
	05/06/2022				1.89			226.68				
	05/10/2022				3.11			225.46				
	05/06/2023				1.37			227.20				
	05/10/2023				1.48			227.09				
	05/06/2024				1.13			227.44				
	05/10/2024				3.11			225.46				
SCL13	05/06/2012		228.68		4.84			223.83	17T	541341	5133887	-
	05/06/2022				5.26			223.42				
	05/10/2022				6.09			222.59				
	05/06/2023				5			223.68				
	05/10/2023				5.08			223.60				
	05/06/2024				4.76			223.92				
	05/10/2024				6.32			222.36				
SCL14	05/06/2012		233.56		2.25			231.31	17T	541492	5133889	-
	05/06/2022				3.03			230.53				
	05/10/2022				3.26			230.30				
	05/06/2023				4.18			229.38				
	05/10/2023				1.99			231.57				
	05/06/2024				2			231.56				
	05/10/2024				3.97			229.59				
SCL15	05/06/2012		232.70		1.56			231.14	17T	541557	5133921	-
	05/06/2022				3.91			228.79				
	05/10/2022				2.6			230.10				
	05/06/2023				1.77			230.93				
	05/10/2023				1.34			231.36				
	05/06/2024				1.39			231.31				
	05/10/2024				3.09			229.61				
SCL16	05/06/2012		230.70		1.59			229.11	17T	541474	5133721	-
	05/06/2022				2.78			227.92				
	05/10/2022				2.59			228.11				
	05/06/2023				1.7			229.00				
	05/10/2023				1.43			229.27				
	05/06/2024				1.45			229.25				
	05/10/2024				2.98			227.72				

Notes:

mbgs	Meters below ground surface
masl	Meters above sea level
m	Meters
TOC	Top of casing
-	No data available

TABLE 2
Groundwater Quality Results - SCL1
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																		ODWQS
		Sample Collection Date (dd/mm/yyyy)																		
		SCL1																		
		Nov-15	Jun-16	Nov-16	Jun-17	Nov-17	Jun-18	Nov-18	Jun-19	19-Oct	Apr-20	Nov-20	Jun-21	Nov-21	Jun-22	Oct-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	116	117	107	127	135	127	125	117	136	127	122	123	127	132	129	123	125	123	128	30 - 500
Ammonia	pH Units	< 0.01	<0.01	0.02	<0.01	<0.01	0.09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01			
Ammonia+Ammonium (N)	as N mg/L																		< 0.04	< 0.1	
COD	mg/L	8.8	9	10	30	<5	<5	<5	9	9	9	9	26.00	<5	<5	<5	9	13	< 8	< 8	
Conductivity	mg/L	242	294	240	426	299	302.00	298	280	290	301	293	306	299	290	303	274	284	294	297	
pH	mg/L	8.1	7.92	7.77	6.94	8.14	8.13	8.1	7.99	7.92	7.57	8.02	7.87	8.01	8.13	8.18	7.63	7.22	8.24	8.06	6.5 - 8.5
DOC	mg/L	1.9	2.1	2.1	**9.53**	1.9	3.10	2.2	2.5	1.8	1.70	2.90	**7.40**	1.7	1.9	3.4	2.8	2	2.0	2.0	5.0
Phosphorous	mg/L	0.01	0.11	0.01	0.01	0.04	0.02	0.03	0.04	0.04	0.04	0.03	0.06	0.04	0.00	0.02	<0.05	0.20	0.04	< 0.03	
Chloride	mg/L	4.13	6.36	4.23	37.30	4.81	6.13	5.22	4.50	5.20	6.80	5.10	4.70	5.20	6.10	9.40	7.00	8.40	6.00	5.00	250
Nitrate	mg/L	< 0.1	<0.1	<0.1	<0.1	<0.1	<01	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	0.10	<0.05	0.16	<0.05	0.08	< 0.06	10
Nitrite	mg/L	< 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	<.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	1.00
Sulphate	mg/L	14.6	17.0	13.8	15.8	18.6	19.1	20.3	18.2	19.2	19.3	17.5	17.8	19.8	21.5	20.8	21.9	18.9	21.0	19.0	500
TDS	mg/L	140	150	170	160	170	260	<30	100	150	140	180	200	290	320	270	130	210	191	171	500
TKN	mg/L	< 0.2	<0.2	<0.2	0.30	<0.2	0.31	0.50	1.10	<0.2	0.40	1.30	<0.2	0.30	<0.2	<0.2	<0.2	0.20	< 0.05	< 0.5	
Total Phenols	mg/L	< 0.001	<0.001	<0.001	0.0010	0.0013	<0.001	<0.001	<0.001	0.0021	<0.0004	0.0011	0.0033	0.0017	0.0017	0.0043	0.0028	0.0048	< 0.002	< 0.002	
Calcium	mg/L	36.8	36.9	33.7	32.9	39.7	24.60	35.6	29.3	34.7	35.2	30.9	35.30	39	38.5	46.4	38.4	39.2	48.1	55.6	
Magnesium	mg/L	7.75	7.68	6.81	11.10	9.17	6.27	7.38	6.51	9.12	7.19	6.94	7.46	7.96	7.98	9.05	8.16	8.19	7.99	7.86	
Potassium	mg/L	3.24	3.16	2.72	2.99	3.92	2.62	3.00	2.60	2.90	2.90	2.8	3	3.00	3.10	3.80	3.20	3.20	2.95	3.02	
Sodium	mg/L	9.71	9.40	9.02	9.13	10.60	7.69	9.20	7.70	9.40	9.30	8.70	8.90	9.80	8.70	9.70	10.20	9.70	9.48	9.89	200
Aluminum	mg/L																		0.004	0.002	0.025
Arsenic	mg/L	< 0.001	<0.001	<0.001	0.0010	<1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000	0.000	0.025
Barium	mg/L	0.026	0.03	0.03	0.03	0.03	0.03	0.027	0.03	0.00	0.02	0.02	0.03	0.03	0.03	0.04	0.03	0.03	0.03	0.03	1.00
Boron	mg/L	0.069	0.06	0.06	0.06	0.07	0.05	0.06	0.05	0.00	0.06	0.06	0.063	0.06	0.05	0.05	0.05	0.06	0.06	0.06	5.0
Cadmium	mg/L	< 0.0001	<0.0001	<0.0001	<0.0001	<0.1	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000003	0.00000	0.005
Chromium	mg/L	<0.001	<0.001	<0.001	0.001	<1	<0.001	0.001	0.001	<0.001	0.002	0.00	0.001	0.001	<0.001	0.001	0.001	<0.001	0.000	0.00017	0.05
Cobalt	mg/L																		0.000	0.00001	
Copper	mg/L	< 0.001	0.004	0.002	0.004	2.80	0.002	0.003	0.01	0.003	<0.001	0.001	0.01	0.004	0.002	0.004	0.003	0.003	< 0.001	< 0.001	
Iron	mg/L	**0.360**	0.17	<0.02	**4.50**	**0.48**	**0.33**	**0.37**	**0.60**	0.30	0.08	<0.02	**0.84**	**0.61**	0.24	**0.59**	0.17	0.20	< 0.007	< 0.007	0.3
Lead	mg/L	0.001	0.001	0.0001	0.003	0.33	0.0002	0.0003	0.001	0.0002	<0.0001	<0.0001	0.001	0.0004	0.0002	0.0004	0.0001	0.0002	< 0.00009	< 0.00009	0.01
Manganese	mg/L	0.002	0.01	0.003	**0.21**	0.01	0.01	0.01	0.02	0.01	<0.001	<0.001	0.04	0.02	0.01	0.03	0.01	0.01	0.001	0.0002	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	<0.001	<0.0001	<0.0001	< 0.00001	0.00001	0.001
Zinc	mg/L	0.002	0.0043	0.001	0.0021	0.0032	0.00	0.004	0.012	0.001	<0.001	0.002	0.005	0.004	0.003	0.005	0.002	0.003	< 0.002	< 0.002	5.0
1,4-Dichlorobenzene	mg/L		<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5	-	1.0
Benzene	mg/L		<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.5	-	5.0
Dichloromethane	mg/L	< 1	<1	<1	<0.2	<1	<0.2	-	<0.3	-	<1	-	<1	-	<1	-	<1	-	< 0.5	-	50
Toluene	mg/L	< 0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5	-	60
Vinylchloride	mg/L	< 0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.2	-	1.00
Field Measurements																					
Temperature	°C	10.60	11.40	16.20	16.40	12.20	-	-	-	10.02	15.20	15.00	12.40	13.20	11.21	6.65	16.50	11.80	9.80	13.30	-
pH	pH Units	6.77	6.86	-	5.63	6.08	-	-	-	5.77	6.69	6.12	6.86	5.84	6.30	6.34	5.79	6.10	7.52	7.95	-
Conductivity	uS/cm	402.10	497.80	-	802.00	661.00	-	-	-	281.00	722.00	932.00	108.70	548.00	772.00	240.00	156.10	790.00	212.90	226.90	-
Oxidation Reduction Potential	mV	155.20	232.10	-	-	-	-	-	-	141.40	77.10	109.40	325.30	181.00	225.50	140.00	109.20	103.00	-22.70	105.40	-
Dissolved Oxygen	mg/L	4.06	9.56	6.70	-	5.42	-	-	-	10.24	4.10	8.26	1.77	8.02	10.94	4.47	2.50	5.90	12.95	6.89	-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 3
Groundwater Quality Results - SCL2
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																		ODWQS
		Sample Collection Date (dd/mm/yyyy)																		
		SCL2																		
		Nov-15	Jun-16	Nov-16	Jun-17	Nov-17	Jun-18	Nov-18	Jun-19	19-Oct	Apr-20	Nov-20	Jun-21	Nov-21	Jun-22	Oct-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	117	92	133	137	165	166	294	169	360	171	236	170	431	175	165	187	444	257	**562**	30 - 500
Ammonia	pH Units	<0.01	<0.01	0.02	<0.01	<0.01	0.01	1.26	0.52	1.31	0.49	0.6	0.49	0.02	0.24	0.4	0.30	1.98			
Ammonia+Ammonium (N)	as N mg/L																		0.84	3.20	
COD	mg/L	26	18	26	30	55.4	71.20	180	80	284	96	141	93.00	26	91	91	85	271	106	178	
Conductivity	mg/L	351	295	417	426	511	544.00	1090	548	1210	589	863	538	1450	572	570	592	1260	789	1330	
pH	mg/L	7.89	7.03	6.56	6.94	7.32	6.15	6.24	6.15	6.14	5.96	6.2	6.18	6.65	6.62	6.29	6.08	6.35	6.84	7.07	6.5 - 8.5
DOC	mg/L	**6.03**	3.3	0.6	**9.53**	0.0179	**20.60**	**128**	**38**	**66**	**30.00**	**91.00**	**33.70**	**7**	**41**	**31.6**	**29.2**	**83**	**43**	**52**	5.0
Phosphorous	mg/L	0.03	0.13	0.05	3.28	0.18	0.14	0.09	0.34	0.46	0.08	0.12	0.05	0.02	0.03	0.03	0.06	0.02	0.07	< 0.03	
Chloride	mg/L	32.6	18.4	42.8	37.3	50.6	60.7	159.0	62.2	180.0	71.7	111.0	49.1	68.5	56.9	0.7	56	131	60	88	250
Nitrate	mg/L	< 0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.06	< 0.06	10
Nitrite	mg/L	< 0.03	<0.03	<0.03	<0.03	<0.03	<0.3	<0.03	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.3	1.00
Sulphate	mg/L	18.3	16.4	18.9	20.8	19.7	26.8	27.7	33.3	25.1	36.2	27.9	24.2	401.0	33.7	32.2	50.8	18.9	76.0	71.0	500
TDS	mg/L	250	150	380	310	370	**550**	**640**	360	**770**	480	**680**	**520**	**1040**	420	**530**	310	**790**	**533**	**880**	500
TKN	mg/L	0.39	0.30	0.30	0.57	0.69	1.10	4.10	2.30	4.00	1.80	3.80	1.40	0.30	1.30	1.00	1.00	5.00	1.88	5.20	
Total Phenols	mg/L	< 0.001	0.0000	<0.001	0.0010	<0.001	<0.001	0.0020	<0.001	0.0006	<0.0004	0.0019	0.0054	0.0037	0.0036	0.0042	0.0063	0.0023	0.01	0.00	
Calcium	mg/L	57.3	36.9	61.1	51.8	67.0	42.7	113.0	48.8	116.0	65.1	83.4	55.9	158.0	61.3	66.0	69.3	132.0	88.1	165.0	
Magnesium	mg/L	12.30	8.09	12.20	11.10	16.80	11.60	29.20	13.40	30.90	16.10	19.90	14.60	95.60	16.90	17.50	19.60	41.20	23.20	41.60	
Potassium	mg/L	4.02	2.59	3.82	4.17	5.26	3.78	7.50	4.30	7.20	4.60	6	5.9	2.50	4.50	4.60	4.30	9.90	5.14	11.50	
Sodium	mg/L	9.93	6.42	11.20	15.40	20.40	17.00	60.00	23.20	61.00	30.00	45.00	27.10	40.40	28.10	29.00	30.50	79.00	40.50	74.40	200
Aluminum	mg/L																		0.09	0.12	0.025
Arsenic	mg/L	0.001	0.0010	0.0049	0.0031	0.001	0.00	0.004	0.002	0.004	0.003	<0.01	0.002	<0.001	0.002	0.002	0.002	0.004	0.002	0.004	0.025
Barium	mg/L	0.086	0.05	0.09	0.11	0.13	0.13	0.28	0.13	0.32	0.15	0.21	0.14	0.05	0.14	0.14	0.14	0.39	0.18	0.37	1.00
Boron	mg/L	0.144	0.07	0.15	0.15	0.19	0.13	0.46	0.16	0.42	0.22	0.32	0.205	0.28	0.20	0.31	0.26	1.47	0.53	1.24	5.0
Cadmium	mg/L	< 0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.00	0.0004	0.0001	0.00	0.0004	<0.001	0.0001	0.0001	0.0002	0.0001	0.0002	0.0004	< 0.000003	< 0.000003	0.005
Chromium	mg/L	<0.001	0.00	0.00	0.00	0.00	0.00	0.015	0.005	0.009	0.007	<0.01	0.004	0.002	0.003	0.018	0.006	0.011	0.003	0.00448	0.05
Cobalt	mg/L																		0.0049	0.01540	
Copper	mg/L	0.005	0.00	0.003	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.003	0.002	0.01	0.002	< 0.001	
Iron	mg/L	**1.030**	**1.10**	**5.64**	**4.50**	**3.43**	**4.26**	**11.40**	**5.60**	**12.50**	**4.00**	**7.70**	**6.60**	0.07	**5.90**	**5.80**	**4.10**	**17.70**	**7.01**	**17.80**	0.3
Lead	mg/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0004	0.0020	0.00	<0.0001	0.01	0.00	0.00	0.00	< 0.00009	< 0.00009	0.01
Manganese	mg/L	**0.19**	**0.13**	**0.21**	**0.21**	**0.32**	**0.30**	**2.04**	**0.70**	**2.54**	**1.05**	**1.66**	**1.11**	**0.59**	**1.38**	**1.45**	**1.93**	**4.54**	**2.31**	**4.66**	0.05
Mercury	mg/L	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.00001	0.00	0.001
Zinc	mg/L	0.002	0.0044	0.002	0.0055	0.0067	0.01	0.005	0.009	0.002	<0.001	<0.01	0.018	0.005	0.017	0.002	0.003	0.002	< 0.002	< 0.002	5.0
1,4-Dichlorobenzene	mg/L	< 0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5		1.0
Benzene	mg/L	< 0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.5		5.0
Dichloromethane	mg/L	< 0.2	<1	<1	<1	<1	<1	-	<0.3	-	<1	-	<1	-	<1	-	<1	-	< 0.5		50
Toluene	mg/L	< 0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5		60
Vinylchloride	mg/L	< 0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.2		1.00
Field Measurements																					
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.20	10.5	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.44	5.53	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1015	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	86.00	93.1	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.73	-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 4
Groundwater Quality Results - SCL3
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																			ODWQS
		Sample Collection Date (dd/mm/yyyy)																			
		SCL3																			
		May-15	Nov-15	May-16	Nov-16	May-17	Nov-17	May-18	Nov-18	May-19	Nov-19	May-20	Nov-20	May-21	Nov-21	May-22	Nov-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	305	146	308	104	236	301	265	142	229	130	320	230	243	220	369	199	118	247	322	241	30 - 500
Ammonia	pH Units	<0.01	<0.01	<0.01	0.05	0.02	<0.01	0.03	0.07	0.03	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.02	0.02			
Ammonia+Ammonium (N)	as N mg/L																			0.05	< 0.1	
COD	mg/L	<5	68.1	34	10	45	0.049	42.00	34	171	85	62	183	<5	42	<5	9	52	<5	9	8	
Conductivity	mg/L	453	259	597	220	430	535	499.00	127	406	255	595	463	428	423	637	393	244	459	591	448	
pH	mg/L	8.01	8.08	7.71	6.93	7.32	7.95	7.24	8.25	7.09	7.28	7.12	7.62	6.88	7.56	7.62	7.04	6.89	7.39	7.98	7.93	6.5 - 8.5
DOC	mg/L	1.0	2.1	1.4	**7.2**	1.6	3.7	3.7	**6.1**	**5.3**	**7.9**	1.5	4.6	2.8	**7.7**	1.5	3.4	**7.6**	4.0	2.0	3.0	5.0
Phosphorous	mg/L	0.24	0.68	5.08	0.94	3.28	7.79	6.17	2.83	8.26	6.18	5.23	8.31	4.55	9.92	0.32	3.07	<0.05	1.64	1.80	1.03	
Chloride	mg/L	1.80	0.78	1.60	1.40	1.10	1.40	2.41	2.70	2.10	2.60	3.80	2.30	2.50	2.80	2.40	<0.05	3.10	5.00	2.00	2.00	250
Nitrate	mg/L	< 0.1	< 0.1	<0.1	<0.1	<0.01	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.06	< 0.06	10
Nitrite	mg/L	< 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	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	1.00
Sulphate	mg/L	10.60	5.50	9.90	11.50	8.90	10.50	9.60	8.01	9.60	8.50	15.80	8.40	11.60	7.70	16.00	11.00	21.90	11.70	14.00	8.00	500
TDS	mg/L	390	200	210	200	280	350	410	80	190	190	330	260	350	220	370	360	130	**980**	351	246	500
TKN	mg/L	0.71	0.27	0.30	<0.2	0.31	0.42	2.21	5.00	0.90	0.60	1.30	3.50	0.60	2.30	<0.2	<0.2	<0.2	0.80	0.13	< 0.5	
Total Phenols	mg/L	< 0.001	< 0.001	<0.001	<0.001	0.0018	0.0016	<0.001	0.0010	0.0010	0.0007	<0.0004	0.0024	0.0022	0.0030	<0.0004	0.0045	0.0035	0.0017	< 0.002	< 0.002	
Calcium	mg/L	69.6	99.6	81.5	25.6	58.7	234	39.00	70	149	49.3	75.9	49.5	124.00	140	88.8	162	100	161	74.4	60.4	
Magnesium	mg/L	25.10	24.80	30.80	9.07	21.60	140.00	18.30	37.30	111.00	15.10	27.80	15.80	59.90	54.40	37.40	56.60	38.80	63.70	29.00	21.40	
Potassium	mg/L	0.87	3.5	1.66	0.92	2.74	16.70	2.64	5.40	13.00	1.30	1.20	1	5.1	6.70	1.70	2.20	3.20	2.10	0.93	0.89	
Sodium	mg/L	8.80	6.30	10.60	9.52	19.10	26.00	11.40	9.70	12.10	7.10	11.40	9.00	14.60	9.30	11.90	12.60	10.20	9.90	11.10	9.40	200
Aluminum	mg/L																			0.01	0.02	0.025
Arsenic	mg/L	<0.01	0.011	0.0020	0.0020	0.0039	0.021	0.00	0.006	0.018	0.003	<0.001	<0.01	0.010	0.008	0.002	0.004	0.004	0.005	0.001	0.001	0.025
Barium	mg/L	0.07	0.558	0.10	0.05	0.14	1.02	0.08	0.28	0.75	0.16	0.06	0.05	0.38	0.49	0.11	0.31	0.29	0.35	0.05	0.04	1.00
Boron	mg/L	0.01	0.017	0.01	0.01	0.01	0.03	0.01	0.02	0.02	<0.002	0.01	<0.02	0.013	0.00	<0.002	0.00	<0.002	0.02	0.01	0.04	5.0
Cadmium	mg/L	0.00	0.00080	<0.0001	0.0001	0.0003	0.0021	0.00	0.0006	0.0013	0.00	<0.0001	<0.001	0.0009	0.0007	0.0002	0.0004	0.0006	0.0005	0.000010	0.00001	0.005
Chromium	mg/L	0.0041	0.00630	0.00	0.00	0.00	**0.31**	0.00	**0.077**	**0.33**	0.005	0.005	<0.01	**0.066**	0.031	0.017	0.008	0.011	0.006	0.000	0.00034	0.05
Cobalt	mg/L																			0.0003	0.00027	
Copper	mg/L	0.02	0.149	0.01	0.014	0.02	0.36	0.01	0.10	0.30	0.04	<0.001	<0.01	0.15	0.15	0.02	0.077	0.067	0.05	< 0.001	< 0.001	
Iron	mg/L	**1.28**	**7.110**	**1.32**	**1.50**	**4.04**	**126.00**	**2.02**	**33.10**	**152.00**	**4.10**	**0.39**	<0.2	**34.70**	**19.60**	**7.30**	**10.90**	**13.00**	**11.00**	**0.57**	0.15	0.3
Lead	mg/L	0.00	0.03	0.00	0.00	0.01	0.09	0.01	0.03	0.07	0.01	<0.0001	<0.001	0.04	0.04	0.00	0.00	0.01	0.00	< 0.00009	< 0.00009	0.01
Manganese	mg/L	**0.09**	**0.35**	**0.09**	**0.26**	**0.61**	**3.11**	**0.40**	**0.73**	**3.10**	**0.24**	0.04	0.03	**0.99**	**0.89**	**0.26**	**0.78**	**0.48**	**0.69**	**0.15**	**0.11**	0.05
Mercury	mg/L	< 0.0001	< 0.0001	<0.0001	<0.0001	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.00001	0.00	0.001
Zinc	mg/L	0.0104	0.035	0.0054	0.0069	0.0135	0.344	0.01	0.095	0.357	0.014	<0.001	<0.01	0.114	0.075	0.019	0.04	0.002	0.041	< 0.002	0.00	5.0
1,4-Dichlorobenzene	mg/L		< 0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5		1.0
Benzene	mg/L		< 0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.5		5.0
Dichloromethane	mg/L	< 1	< 1	<1	<1	<1	<1	<1	-	<0.3	-	<1	-	<1	-	<1	-	<1	-	< 0.5		50
Toluene	mg/L	< 0.2	< 0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5		60
Vinylchloride	mg/L	< 0.3	< 0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.2		1.00
Field Measurements																						
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.40	9.2	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.27	7.25	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	307.8	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	132	9.5	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.66	-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 5
Groundwater Quality Results - SCL4
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																		ODWQS
		Sample Collection Date (dd/mm/yyyy)																		
		SCL4																		
		Nov-15	May-16	Nov-16	May-17	Nov-17	May-18	Nov-18	May-19	Nov-19	May-20	Nov-20	May-21	Nov-21	May-22	Nov-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	346	428	327	464	442	402	392	407	419	375	380	398	424	428	402	401	402	413	422	30 - 500
Ammonia	pH Units	< 0.01	<0.01	0.02	0.02	<0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	2.30	<0.01	<0.01	<0.01	<0.01	<0.01			
Ammonia+Ammonium (N)	as N mg/L																		0.05	< 0.1	
COD	mg/L	21.9	10	17	18	18	18.00	22	22	22	18	18	134.00	26	13	22	22	13	17	23	
Conductivity	mg/L	1390	1530	1340	1420	1520	1300.00	1540	1380	1500	1500	1650	782	1490	1230	1510	1310	1610	1370	1520	
pH	mg/L	7.93	6.62	6.92	7.47	7.72	6.53	7.2	6.72	7.17	6.63	6.94	6.47	6.85	7.25	6.87	6.57	6.88	7.52	7.44	6.5 - 8.5
DOC	mg/L	**6.7**	**6.8**	**7.5**	**6.3**	**6.9**	**6.8**	**7.9**	**8.8**	**7.8**	**7.4**	**10.1**	**31.4**	**7.5**	**7.3**	**8.5**	**8.3**	**7.0**	**6.0**	**7.0**	5.0
Phosphorous	mg/L	0.02	0.05	0.03	0.01	0.02	0.04	0.02	0.04	0.05	0.10	0.05	0.62	0.07	<0.002	0.02	<0.05	0.17	< 0.03	< 0.03	
Chloride	mg/L	68.80	66.60	83.70	74.30	69.70	71.90	71.10	62.00	72.70	65.00	64.00	22.50	68.90	62.00	66.00	72.70	56.30	51.00	57.00	250
Nitrate	mg/L	< 0.1	<0.1	0.10	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.25	<0.1	<0.15	<0.2	0.12	< 0.06	10
Nitrite	mg/L	< 0.3	<0.03	<0.03	<0.03	<0.3	<0.03	<0.03	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.25	<0.1	<0.15	<0.2	< 0.03	< 0.03	1.00
Sulphate	mg/L	457	303	397	264	358	304	416	299	379	421	**515**	2	426	294	**510**	326	507	340	410	500
TDS	mg/L	**1260**	**1170**	**1300**	**1390**	**1100**	**1410**	**980**	**960**	**950**	**1310**	**1420**	**600**	**1040**	**860**	**1600**	**810**	**1350**	**997**	**1070**	500
TKN	mg/L	0.46	0.30	0.30	0.40	0.31	0.39	0.50	0.90	<0.2	0.70	1.90	4.80	0.50	<0.2	<0.2	0.30	0.30	0.14	< 0.5	
Total Phenols	mg/L	< 0.001	<0.001	<0.001		0.0010	<0.001	<0.001	<0.001	<0.0004	0.0008	0.0004	0.0042	0.0004	0.0034	0.0017	0.0016	0.0022	< 0.002	< 0.002	
Calcium	mg/L	194	159	164	157	158	84.80	150	116	149	160	150	88.80	176	142	184	154	194	146	180	
Magnesium	mg/L	104.00	94.70	95.90	94.30	92.70	48.30	89.70	68.30	91.10	92.50	77.20	27.80	105.00	78.70	104.00	88.60	106.00	81.50	89.20	
Potassium	mg/L	3.26	2.86	2.84	2.73	2.94	2.06	2.80	2.50	2.70	2.70	3	11	2.90	2.70	3.20	2.50	3.20	2.31	2.71	
Sodium	mg/L	37.30	31.10	33.50	34.40	37.30	26.70	35.00	27.00	35.00	35.00	34.00	27.10	46.10	38.40	46.10	41.40	45.00	38.20	46.60	200
Aluminum	mg/L																		0.0020	0.001	0.025
Arsenic	mg/L	< 0.001	<0.001	<0.001	<0.001	0.001	<.001	<0.001	<0.001	0.001	0.002	<0.01	0.004	<0.001	<0.001	0.001	<0.001	<0.001	0.0002	0.0002	0.025
Barium	mg/L	0.075	0.06	0.07	0.06	0.07	0.05	0.071	0.05	0.06	0.05	0.06	0.16	0.08	0.05	0.06	0.05	0.07	0.04	0.05	1.00
Boron	mg/L	0.124	0.09	0.14	0.13	0.15	0.12	0.14	0.13	0.11	0.17	0.18	0.109	0.33	0.19	0.37	0.24	0.22	0.24	0.32	5.0
Cadmium	mg/L	0.00062	0.0001	0.0004	<0.001	0.0001	<0.0001	0.0001	0.0001	0.00	0.0002	<0.001	0.0008	0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.000060	0.00002	0.005
Chromium	mg/L	0.00100	0.00	<0.001	0.00	0.00	0.00	0.004	0.004	0.002	0.006	<0.01	0.014	0.005	<0.001	0.014	0.003	0.006	0.000	0.00018	0.05
Cobalt	mg/L																		0.0048	0.00506	
Copper	mg/L	0.014	0.01	0.009	0.00	0.01	0.01	0.01	0.01	0.01	0.00	<0.01	0.04	0.01	0.01	0.005	0.005	0.02	0.003	0.001	
Iron	mg/L	0.036	0.07	0.06	0.05	0.17	**0.40**	**0.70**	**0.62**	**0.90**	0.29	<0.2	**26.90**	**1.12**	0.17	**0.45**	0.10	**1.92**	0.01	0.02	0.3
Lead	mg/L	<0.0001	<0.0001	<0.0001	<0.001	0.00	0.00	<0.0001	0.00	<0.0001	<0.0001	<0.001	0.02	0.00	<0.0001	<0.0001	<0.0001	0.00	< 0.00009	< 0.00009	0.01
Manganese	mg/L	**0.68**	**0.72**	**0.71**	**0.66**	**0.73**	**0.54**	**0.71**	**0.66**	**0.92**	**0.97**	**0.84**	**3.47**	**0.91**	**0.72**	**0.84**	**0.80**	**1.00**	**0.81**	**0.84**	0.05
Mercury	mg/L	< 0.0001	<0.001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.00001	0.00001	0.001
Zinc	mg/L	0.005	0.002	0.0055	0.0027	0.0023	0.01	0.005	0.002	0.003	0.002	<0.01	0.045	0.006	0.005	0.003	0.006	0.011	< 0.002	0.00300	5.0
1,4-Dichlorobenzene	mg/L	< 0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5		1.0
Benzene	mg/L	< 0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.5		5.0
Dichloromethane	mg/L	< 1	<1	<1	<1	<1	<1	-	<0.3	-	<1	-	<1	-	<1	-	<1	-	< 0.5		50
Toluene	mg/L	< 0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	0.50	-	<0.3	-	<0.3	-	< 0.5		60
Vinylchloride	mg/L	< 0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.2		1.00
Field Measurements																					
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.5	11.5	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.79	6.17	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1134	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	228	125.3	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.07	-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 6
Groundwater Quality Results - SCL5
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																		ODWQS
		Sample Collection Date (dd/mm/yyyy)																		
		SCL5																		
		Nov-15	May-16	Nov-16	May-17	Nov-17	May-18	Nov-18	May-19	Nov-19	May-20	Nov-20	May-21	Nov-21	May-22	Nov-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	94	97	96	100	116	112	108	95	118	107	109	94	107	104	107	111	110	108	113	30 - 500
Ammonia	pH Units	0.102	0.08	0.10	0.06	0.14	<0.01	0.03	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	<0.01	0.10			
Ammonia+Ammonium (N)	as N mg/L																		0.10	0.10	
COD	mg/L	8.8	9	<5	<5	<5	<5	9	9	9	9	<5	<5	<5	<5	<5	<5	<5	< 8	< 8	
Conductivity	mg/L	259	338	326	285	334	335.00	329	287	333	322	336	279	309	297	307	310	315	332	337	
pH	mg/L	7.9	7.91	7.9	7.76	7.99	8.00	8.13	7.85	7.88	7.79	7.93	7.67	7.79	8.1	7.81	7.6	7.39	8.24	7.95	6.5 - 8.5
DOC	mg/L	1.2	1.8	2.1	0.8	1.3	2.0	1.7	2.2	1.7	1.2	1.7	2.8	1.4	1.5	1.9	2.2	1.3	1.0	2.0	5.0
Phosphorous	mg/L	0.02	0.02	0.01	0.01	0.02	0.01	0.03	0.03	0.02	0.01	0.02	0.01	0.04	0.02	0.02	<0.05	0.02	< 0.03	< 0.03	
Chloride	mg/L	8.91	8.20	8.42	8.07	10.30	12.50	10.10	9.80	12.10	12.50	11.70	13.30	0.20	12.30	11.70	14.40	13.60	13.00	14.00	250
Nitrate	mg/L	< 0.1	<0.1	0.30	<0.01	0.14	0.20	<0.1	0.30	0.19	0.18	0.15	0.13	0.17	0.21	0.26	0.06	<0.5	0.08	0.23	10
Nitrite	mg/L	< 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	0.08	<0.05	<0.05	<0.5	< 0.03	< 0.03	1.00
Sulphate	mg/L	38.1	37.3	39.1	34.4	39.4	42.3	40.9	34.1	40.0	38.8	38.4	29.5	41.0	38.7	41.4	44.7	37.2	42.0	42.0	500
TDS	mg/L	160	160	140	170	210	280	<30	120	190	90	260	180	190	220	260	120	210	171	151	500
TKN	mg/L	0.70	0.40	0.90	0.39	<0.2	0.30	0.30	0.90	<0.2	0.40	2.10	0.30	<0.2	<0.2	<0.2	<0.2	0.40	0.08	< 0.5	
Total Phenols	mg/L	< 0.001	<0.001	<0.001	0.0020	0.0013	0.00	0.0010	0.0010	<0.0004	<0.0004	0.0008	0.0037	0.0016	0.0027	<0.0004	0.0034	0.0025	< 0.002	< 0.002	
Calcium	mg/L	27	27.2	26.8	22.6	23.9	16.70	24.7	20	25.4	25.2	25.3	22.60	0.05	25.5	27.1	30.2	26.8	26.4	33.3	
Magnesium	mg/L	7.21	7.52	7.15	6.35	6.37	5.77	6.86	6.07	8.93	7.17	7.03	6.04	7.01	6.96	7.46	0.48	7.72	6.70	7.49	
Potassium	mg/L	4.65	4.70	4.53	3.99	3.84	3.41	4.40	3.80	4.40	4.50	5.1	7.9	0.00	4.30	4.70	5.00	4.80	3.97	4.60	
Sodium	mg/L	27.60	29.10	28.40	25.20	24.80	21.70	26.60	22.20	26.50	27.10	28.00	24.60	25.90	24.10	26.70	33.20	27.00	25.30	28.40	200
Aluminum	mg/L																		0.00	0.00	0.025
Arsenic	mg/L	0.001	<0.001	0.0010	<0.001	0.001	<0.001	0.001	<0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	<0.001	0.002	0.001	0.001	0.025
Barium	mg/L	0.007	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1.00
Boron	mg/L	0.156	0.15	0.16	0.13	0.12	0.13	0.14	0.12	0.11	0.15	0.16	0.130	0.17	0.12	0.19	0.17	0.13	0.13	0.15	5.0
Cadmium	mg/L	0.00030	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.000003	0.00001	0.005
Chromium	mg/L	<0.001	0.00	<0.001	<0.001	0.00	<0.001	0.002	0.001	<0.001	0.002	0.00	<0.001	<0.001	<0.001	0.003	<0.001	0.002	0.000	0.00018	0.05
Cobalt	mg/L																		0.0000	0.00001	
Copper	mg/L	0.002	0.00	0.001	0.00	0.00	0.00	0.00	0.00	0.00	<0.001	<0.001	0.00	0.00	0.00	0.001	0.001	0.00	0.004	< 0.001	
Iron	mg/L	0.086	0.15	0.13	0.16	**0.41**	0.15	**0.57**	**0.41**	0.23	0.11	<0.02	**0.38**	0.07	**0.51**	0.30	0.09	**1.31**	0.15	0.01	0.3
Lead	mg/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.0001	<0.0001	0.00	<0.0001	0.00	0.00	<0.0001	0.00	< 0.00009	< 0.00009	0.01
Manganese	mg/L	0.02	0.03	0.03	0.03	0.04	0.01	0.05	0.04	0.02	0.01	0.00	0.04	0.02	0.03	0.02	0.02	**0.08**	0.01	0.01	0.05
Mercury	mg/L	< 0.0001	<0.001	<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	< 0.00001	0.00	0.001
Zinc	mg/L	0.003	0.0063	3.5	0.0019	0.0025	0.00	0.001	0.007	0.005	<0.001	<0.001	0.009	0.002	0.005	0.002	0.001	0.022	< 0.002	< 0.002	5.0
1,4-Dichlorobenzene	mg/L	<0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5		1.0
Benzene	mg/L	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.5		5.0
Dichloromethane	mg/L	<1	<1	2.00	<1	<1	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-	< 0.5		50
Toluene	mg/L	< 0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5		60
Vinylchloride	mg/L	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.2		1.00
Field Measurements																					
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.8	11.7	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.79	7.8	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	248.8	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	238	140.6	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.21	-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 7
Groundwater Quality Results - SCL6
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																		ODWQS
		Sample Collection Date (dd/mm/yyyy)																		
		SCL6																		
		Nov-15	May-16	Nov-16	May-17	Nov-17	May-18	Nov-18	May-19	Nov-19	May-20	Nov-20	May-21	Nov-21	May-22	Nov-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	115	155	155	205	204	205	218	196	207	171	185	176	178	195	164	192	199	207	218	30 - 500
Ammonia	pH Units	0.237	<0.01	0.03	0.01	0.02	<0.01	0.02	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.09	<0.01			
Ammonia+Ammonium (N)	as N mg/L																		< 0.04	< 0.1	
COD	mg/L	21.9	18	10	8.8	13	18.00	18	18	22	18	18	22.00	18	13	9	13	22	18	13	
Conductivity	mg/L	455	556	501	605	597	615.00	624	572	623	576	623	595	554	612	601	598	598	622	659	
pH	mg/L	7.51	7.09	6.83	7.71	7.81	7.26	7.46	6.65	6.83	6.47	7.3	6.62	6.53	7.23	6.73	6.61	6.93	7.38	7.64	6.5 - 8.5
DOC	mg/L	4.3	4.1	**5.7**	4.5	**5.1**	4.9	**6.0**	**6.6**	**6.0**	**5.3**	**8.5**	**10.2**	**5.5**	**6.2**	**6.0**	**6.6**	**9.1**	**7.0**	5.0	5.0
Phosphorous	mg/L	0.07	0.10	0.06	0.11	0.07	0.24	0.06	0.19	0.09	0.06	0.09	0.12	0.13	0.02	0.04	0.09	0.00	0.05	0.06	
Chloride	mg/L	64.0	53.8	51.7	48.7	50.7	50.5	49.5	65.4	63.4	64.8	57.9	70.6	63.6	63.5	69.4	65.9	57.5	51.0	48.0	250
Nitrate	mg/L	< 0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.15	< 0.06	< 0.06	10
Nitrite	mg/L	< 0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.15	< 0.03	< 0.03	1.00
Sulphate	mg/L	36.20	28.30	37.40	40.90	40.20	37.00	39.20	40.50	40.30	43.10	39.00	33.10	42.30	42.50	55.40	42.40	39.80	36.00	61.00	500
TDS	mg/L	350	420	260	480	340	**620**	300	450	350	420	490	**640**	350	380	**560**	320	440	383	420	500
TKN	mg/L	0.40	<0.2	<0.2	0.47	0.43	0.41	0.60	1.00	<0.2	0.40	1.50	0.40	0.60	<0.2	<0.2	<0.2	2.50	0.27	< 0.5	
Total Phenols	mg/L	< 0.001	<0.001	<0.001	0.0010	0.0011	<0.001	<0.001	0.0020	0.0005	0.0032	0.0039	0.0026	0.0019	<0.0004	0.0020	0.0032	0.0014	< 0.002	< 0.002	
Calcium	mg/L	62.2	67.2	65.7	71.1	72.5	40.90	69.9	60.2	70.1	65.4	69.2	64.00	60.5	73.1	72.7	76.8	59.3	69.90	88.20	
Magnesium	mg/L	19.60	20.30	19.30	22.70	24.90	15.80	21.50	21.40	23.70	22.10	25.90	20.80	20.70	23.90	24.40	24.30	22.10	23.90	25.20	
Potassium	mg/L	4.01	4.00	3.89	4.12	4.95	2.82	4.10	4.20	4.30	3.80	4.8	18	3.50	4.00	4.60	4.20	4.00	3.61	4.75	
Sodium	mg/L	10.6	8.7	9.2	10.6	12.8	7.1	9.6	10.2	10.5	11.8	15.6	11.7	14.6	12.5	13.4	13.0	25.1	20.0	14.0	200
Aluminum	mg/L																		0.02	< 0.001	0.025
Arsenic	mg/L	0.013	0.0081	0.0044	0.0068	0.008	0.01	0.004	0.012	0.003	0.002	0.002	**0.031**	0.007	0.010	0.006	0.009	0.022	0.002	0.001	0.025
Barium	mg/L	0.050	0.05	0.05	0.05	0.06	0.04	0.049	0.07	0.06	0.05	0.05	0.07	0.05	0.07	0.06	0.06	0.06	0.05	0.06	1.00
Boron	mg/L	0.043	0.06	0.08	0.09	0.09	0.75	0.08	0.06	0.04	0.07	0.10	0.070	0.11	0.07	0.12	0.09	<0.0005	0.12	0.14	5.0
Cadmium	mg/L	<0.0001	<0.001	<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	0.000031	0.00002	0.005
Chromium	mg/L	< 0.001	0.00	0.00	<0.001	0.00	<0.001	<0.001	0.003	<0.001	0.003	0.00	0.002	<0.001	<0.001	<0.0001	0.001	0.003	0.000	0.00026	0.05
Cobalt	mg/L																		0.0068	0.00125	
Copper	mg/L	0.002	0.00	0.001	0.00	0.00	0.00	0.00	0.00	0.00	<0.001	0.00	0.00	0.00	0.00	0.002	0.003	0.01	0.002	0.002	
Iron	mg/L	**5.940**	**3.39**	**4.10**	**3.23**	**7.93**	**0.78**	**3.10**	**11.30**	**1.40**	**0.34**	**0.63**	**12.70**	**5.50**	**5.20**	**4.10**	**3.90**	**16.60**	**6.73**	**0.45**	0.3
Lead	mg/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.0001	<0.0001	<0.0001	0.00	0.00	0.00	0.00	0.00	0.00	< 0.00009	< 0.00009	0.01
Manganese	mg/L	**0.51**	**0.29**	**0.46**	**0.33**	**0.46**	**0.20**	**0.32**	**0.53**	**0.42**	**0.50**	**0.57**	**0.57**	**0.53**	**0.68**	**0.56**	**0.57**	**0.81**	**0.63**	**0.46**	0.05
Mercury	mg/L	< 0.0001	<0.001	<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	< 0.00001	0.00	0.001
Zinc	mg/L	0.003	0.0032	0.001	0.0019	3.4	0.00	0.004	0.004	0.002	<0.001	<0.001	0.011	0.002	0.003	0.002	0.003	0.0042	0.002	< 0.002	5.0
1,4-Dichlorobenzene	mg/L	< 0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	<0.3	<0.3	-	<0.3	-	< 0.5		1.0
Benzene	mg/L	< 0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	< 0.5		5.0
Dichloromethane	mg/L	< 1	<1	<1	<1	<1	<1	-	<1	-	<0.1	-	<1	<1	<1	-	<1	-	< 0.5		50
Toluene	mg/L	< 0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	<0.3	<0.3	-	<0.3	-	< 0.5		60
Vinylchloride	mg/L	< 0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	-	< 0.2		1.00
Field Measurements																					
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.80	10	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.78	6.53	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	472.5	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	97	84	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.12	-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 8
Groundwater Quality Results - SCL7
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																		ODWQS
		Sample Collection Date (dd/mm/yyyy)																		
		SCL2																		
		Nov-15	June-16	Nov-16	Jun-17	Nov-17	July 18	Nov 18	June 19	Oct-19	Apr-20	Nov-20	Jun-21	Nov-21	Jun-22	Oct-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	234	234	367	366	418	-	196	256	230	175	333	426	362	303	242	369	341	182	Insufficient	30 - 500
Ammonia	pH Units	0.284	1.61	2.12	1.96	2.27	-	0.48	1.84	0.54	0.64	0.97	<0.01	1.35	1.38	0.91	1.84	1.09		Sample	
Ammonia+Ammonium (N)	as N mg/L						-												0.63	Recovery	
COD	mg/L	119	520	45	180	130	-	141	171	298	183	541	26.00	160	77	45	145	139	50		
Conductivity	mg/L	770	637	780	685	765	-	561	553	1020	394	7.13	1450	827	649	741	920	789	403		
pH	mg/L	8.12	6.69	6.59	7.25	7.82	-	7.12	6.63	6.5	6.49	6.48	6.57	6.65	7.12	6.43	6.6	6.96	7.35		6.5 - 8.5
DOC	mg/L	**19.5**	**31.8**	**29**	**23**	**31**	-	**18.4**	**29**	**18.4**	**17.60**	**29.00**	**9.20**	**25.6**	**34**	**18.4**	**22.4**	**21**	**16.0**		5.00
Phosphorous	mg/L	0.03	2.15	2.12	1.13	1.06	-	0.03	0.87	1.00	0.67	1.88	0.13	0.96	0.54	0.31	0.53	0.31	0.34		
Chloride	mg/L	50.4	21.5	25.9	13.6	15.4	-	29.4	17.3	35.1	20.2	31.3	80.0	35.5	36.9	39.0	49.0	34.1	20.0		250.00
Nitrate	mg/L	< 0.1	<0.1	<0.1	<0.1	<0.1	-	0.51	<0.05	0.15	<0.05	0.17	<0.5	<0.05	0.09	0.05	1.10	0.41	< 0.06		10.00
Nitrite	mg/L	< 0.03	<0.03	<0.03	<0.03	<0.03	-	0.158	<0.05	<0.05	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.15	<0.05	< 0.03		1.00
Sulphate	mg/L	152.0	6.3	5.9	1.6	3.6	-	44.9	2.4	302.0	8.5	19.7	369.0	3.0	1.3	95.1	45.6	46.7	6.0		500.00
TDS	mg/L	**670**	460	**570**	460	500	-	<30	330	**700**	340	**530**	**1530**	**570**	390	**680**	500	**520**	263		500.00
TKN	mg/L	1.50	2.98	7.45	6.17	4.43	-	3.00	4.80	7.30	3.60	15.10	0.30	8.80	2.10	1.30	2.70	1.00	1.46		
Total Phenols	mg/L	< 0.001	<0.001	<0.001	0.0018	<0.001	-	0.0010	0.0010	<0.0004	0.0024	0.0015	0.0032	0.0042	0.0025	0.0090	0.0045	0.0021	< 0.002		
Calcium	mg/L	120	78.6	100	90.1	107	-	56	59.5	107	46.1	78	157.00	96.7	80.9	81.2	85.4	75.2	51.90		
Magnesium	mg/L	31.70	21.50	28.40	23.90	32.30	-	15.00	18.70	39.10	13.60	28.60	86.30	29.10	23.30	22.40	29.30	23.40	14.20		
Potassium	mg/L	27.1	9.56	10.30	9..11	11.50	-	4.40	9.30	13.00	6.30	11.2	2.6	9.50	10.60	11.20	10.90	11.00	6.16		
Sodium	mg/L	45.10	18.30	25.40	17.90	21.10	-	26.60	20.70	36.00	17.00	39.00	39.00	25.60	19.90	23.10	29.40	26.40	15.40		200.00
Aluminum	mg/L						-												0.07		0.025
Arsenic	mg/L	0.002	0.0030	0.0042	0.0033	0.003	-	0.003	0.004	0.005	0.002	0.001	<0.001	0.004	0.004	0.009	0.004	0.008	0.002		0.025
Barium	mg/L	0.128	0.10	0.14	0.12	0.22	-	0.081	0.14	0.17	0.04	0.08	0.06	0.11	0.17	0.15	0.12	0.12	0.04		1.00
Boron	mg/L	0.804	0.11	0.11	0.09	0.07	-	0.00	0.09	0.29	0.08	0.10	0.253	0.11	0.10	0.40	0.12	0.19	0.09		5.00
Cadmium	mg/L	0.00052	0.0008	0.0002	0.0005	0.0007	-	0.0002	0.0005	0.00	<0.0001	<0.0001	<0.0001	0.0003	0.0005	0.0004	0.0003	0.0004	0.000004		0.005
Chromium	mg/L	0.00300	0.00	0.00	0.00	0.03	-	0.003	0.019	0.002	0.004	0.01	0.003	0.003	0.018	0.01	0.007	0.004	0.001		0.05
Cobalt	mg/L						-												0.0049		
Copper	mg/L	0.023	0.01	0.010	0.01	0.05	-	0.02	0.04	0.02	0.01	0.01	0.01	0.02	0.03	0.013	0.002	0.02	0.001		
Iron	mg/L	**3.080**	**8.77**	**26.80**	**13.80**	**32.70**	-	**8.60**	**20.60**	**3.10**	**0.92**	0.23	0.23	**8.80**	**23.90**	**14.70**	**22.10**	**13.10**	**8.59**		0.3
Lead	mg/L	0.01	0.00	0.01	0.01	0.02	-	0.01	0.01	0.01	0.0008	0.0002	<0.0001	0.01	0.01	0.01	0.01	0.01	0.0001		0.01
Manganese	mg/L	**0.42**	**2.60**	**4.27**	**2.64**	**3.54**	-	**1.84**	**2.34**	**3.63**	**1.65**	**0.49**	**0.82**	**3.38**	**2.59**	**2.57**	**3.50**	**2.46**	**1.21**		0.05
Mercury	mg/L	< 0.0001	<0.001	<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	< 0.00001		0.001
Zinc	mg/L	0.028	0.0062	0.0113	0.014	0.0597	-	0.013	0.045	0.021	0.002	0.001	0.004	0.018	0.042	0.048	0.035	0.042	0.002		5.00
1,4-Dichlorobenzene	mg/L	<0.2	<0.3	<0.3	<0.3	<0.3	-	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5		1.00
Benzene	mg/L	<0.2	<0.2	<0.2	<0.1	<0.1	-	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.5		5.00
Dichloromethane	mg/L	<1	<1	<1	<1	<1	-	-	<1	-	<1	-	<1	-	<1	-	<1	-	< 0.5		50.00
Toluene	mg/L	<0.2	<0.3	1.40	3.19	<0.3	-	-	0.70	-	1.00	-	<0.3	-	1.40	-	<0.3	-	0.70		60.00
Vinylchloride	mg/L	<0.2	<0.2	<0.2	<0.1	<0.1	-	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.2		1.00
Field Measurements																					
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.70	Insufficient Volume	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.97		-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-2		-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 9
Groundwater Quality Results - SCL8
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																		ODWQS
		Sample Collection Date (dd/mm/yyyy)																		
		SCL8																		
		Nov-15	Jun-16	Nov-16	Jun-17	Nov-17	July 18	Nov 18	Jun-19	Oct-19	Apr-20	Nov-20	Jun-21	Nov-21	June-22	Oct-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	350	438	290	471	358	-	440	**503**	213	228	340	432	431	387	189	424	269	352	Insufficient	30 - 500
Ammonia	pH Units	0.073	0.484	0.446	0.398	0.735	-	0.29	0.52	0.08	0.12	0.14	0.45	0.14	0.3	0.18	0.23	0.12		Sample	
Ammonia+Ammonium (N)	as N mg/L						-												0.52	Recovery	
COD	mg/L	21.90	220	123	340	180	-	74	220	258	208	284.00	71	139	68	68	106	88	33		
Conductivity	mg/L	1330	1180	926	1150	841	-	1220	1250	705	1220	974	1120	1130	894	1010	1150	819	876		
pH	mg/L	7.78	7.34	7.48	7.77	8.09	-	7.74	7.15	7.11	6.97	7.46	7.21	7.77	7.67	8.03	7.13	7.45	7.94		6.5 - 8.5
DOC	mg/L	**6.73**	**30.3**	**24.5**	**21**	**21.7**	-	**20.4**	**21**	**19.1**	**10.70**	**18.70**	**24.1**	**17.4**	**25**	**19**	**106**	**18.9**	**d**		5.00
Phosphorous	mg/L	0.01	2.16	0.19	9.15	1.22	-	0.40	1.46	1.22	0.15	1.61	0.35	0.75	0.14	0.86	0.18	0.40	0.16		
Chloride	mg/L	68.60	36.10	51.80	46.70	55.90	-	39.70	34.00	30.00	207.00	92.10	84.00	80.20	54.60	68.80	57.60	38.90	28.00		250.00
Nitrate	mg/L	< 1	<0.1	<0.1	<0.1	<0.1	-	<0.02	<0.5	<0.5	<0.5	<0.05	<0.5	<0.05	<0.1	<0.05	<0.15	<0.05	< 0.06		10.00
Nitrite	mg/L	< 0.3	<0.03	<0.03	< 0.03	<0.03	-	<0.208	<0.5	<0.5	<0.5	<0.05	<0.5	<0.05	<0.1	<0.05	<0.15	<0.05	< 0.03		1.00
Sulphate	mg/L	413.0	67.2	68.0	108.0	32.6	-	183.0	189.0	135.0	97.0	65.9	81.0	91.9	51.0	294.0	214.0	66.9	99.0		500.00
TDS	mg/L	**1430**	**820**	**570**	**850**	**520**	-	130	**900**	**630**	**1060**	**760**	**1040**	**670**	420	**930**	**740**	**580**	**620**		500.00
TKN	mg/L	0.52	5.59	3.10	5.94	2.88	-	1.50	3.80	2.90	2.80	7.40	1.40	3.60	1.30	0.70	0.70	3.30	1.03		
Total Phenols	mg/L	< 0.001	<0.001	<0.001	0.001	0.003	-	0.001	0.001	0.001	0.001	<0.0004	0.004	0.002	0.002	<0.0004	0.001	0.002	< 0.002		
Calcium	mg/L	182.00	138	108	144	129	-	152	154	81.5	141.00	122.00	150	157	124	143	160	116	117.00		
Magnesium	mg/L	95.60	38.10	28.40	34.70	49.90	-	36.20	38.00	20.30	34.70	36.70	33.10	35.90	35.40	34.90	34.10	34.40	30.20		
Potassium	mg/L	3.32	28.4	23.4	23.1	30.70	-	23.00	23	15	18	17	21	19.3	22	25	19.8	15	14.10		
Sodium	mg/L	36.80	43.60	41.80	39.60	43.10	-	29.00	29.00	23.80	46.00	36.00	40.00	39.70	34.50	33.90	35.20	28.00	29.50		200.00
Aluminum	mg/L						-												0.03		0.025
Arsenic	mg/L	<0.001	0.003	0.001	0.002	0.004	-	0.003	0.002	0.003	0.005	<0.001	0.002	0.002	0.002	0.004	0.002	0.002	0.001		0.025
Barium	mg/L	0.076	0.12	0.05	0.13	0.71	-	0.09	0.22	0.07	0.06	0.04	0.09	0.09	0.25	0.26	0.08	0.34	0.04		1.00
Boron	mg/L	0.123	0.82	0.60	0.61	0.55	-	0.61	0.67	0.46	0.40	0.43	0.743	0.57	0.64	1.06	0.57	0.49	0.47		5.00
Cadmium	mg/L	0.00049	0.0004	0.0001	0.0003	0.0013	-	0.0002	0.0005	0.0001	<0.0001	<0.0001	0.0004	0.0003	0.0008	0.00	0.0001	0.0005	< 0.000003		0.005
Chromium	mg/L	<0.001	0.00	0.001	0.00	**0.12**	-	0.008	0.03	0.00	0.004	0.01	0.006	0.006	**0.058**	0.03	0.005	0.015	0.00		0.05
Cobalt	mg/L						-												0.00		
Copper	mg/L	0.012	0.01	0.004	0.01	0.04	-	0.01	0.05	0.01	<0.001	0.002	0.03	0.02	0.06	0.004	0.001	<0.001	< 0.001		
Iron	mg/L	0.037	**5.59**	**2.45**	**4.33**	**56.50**	-	**14.30**	**16.40**	**2.60**	0.27	<0.02	**12.90**	**13.70**	**34.00**	**28.00**	**6.70**	**30.60**	**3.25**		0.3
Lead	mg/L	<0.0001	0.013	0.005	0.009	0.049	-	0.007	0.022	0.005	<0.0001	<0.0001	0.015	0.016	0.034	0.007	0.003	0.002	< 0.00009		0.01
Manganese	mg/L	**0.69**	**0.82**	**0.84**	**0.67**	**1.16**	-	**1.41**	**0.81**	**0.57**	**0.30**	0.04	**0.58**	**0.70**	**0.61**	**0.76**	**0.46**	**0.92**	**0.45**		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	< 0.00001		0.001
Zinc	mg/L	0.005	0.0201	0.0087	0.0241	0.166	-	0.022	0.057	0.012	<0.001	<0.001	0.068	0.048	0.133	0.12	0.03	0.103	0.002		5.00
1,4-Dichlorobenzene	mg/L	<0.2	<0.3	<0.3	<0.3	<0.3	-	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5		1.00
Benzene	mg/L	<0.2	<0.2	<0.2	<0.1	<0.1	-	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.5		5.00
Dichloromethane	mg/L	<1	<1	<1	<1	<1	-	-	<1	-	<1	-	<1	-	<1	-	<1	-	< 0.5		50.00
Toluene	mg/L	< 0.2	<0.3	<0.3	<0.3	<0.3	-	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	1.50		60.00
Vinylchloride	mg/L	<0.2	<0.2	<0.2	<0.1	<0.1	-	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.2		1.00
Field Measurements																					
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.70	Insufficient Volume	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.10		-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-7		-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 10
Groundwater Quality Results - SCL9
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																		ODWQS
		Sample Collection Date (dd/mm/yyyy)																		
		SCL9																		
		Nov-15	Jun-16	Nov-16	Jun-17	Nov-17	July 18	Nov 18	Jun-19	Oct-19	Apr-20	Nov-20	Jun-21	Nov-21	June-22	Oct-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	97	101	302	370	400	355	220	282												30 - 500
Ammonia	pH Units	0.034	0.07	0.045	0.01	<0.01	0.04	0.11	0.03												
Ammonia+Ammonium (N)	as N mg/L																				
COD	mg/L	<5	<5	68.10	130	22.00	45.00	71.00	397												
Conductivity	mg/L	266	337	996	1050	1040	1020	890	898												
pH	mg/L	7.77	7.98	7.45	7.86	7.82	7.83	7.95	7.34												6.5 - 8.5
DOC	mg/L	1.30	2.20	**6.15**	4.44	4.58	4.00	**6.50**	**6.40**												5.00
Phosphorous	mg/L	0.02	0.03	1.06	9.15	5.86	11.40	3.68	11.60												
Chloride	mg/L	9.29	8.35	71.80	70.20	76.20	98.30	84.90	92.70												250.00
Nitrate	mg/L	< 0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.06	<0.05												10.00
Nitrite	mg/L	< 0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.008	<0.05												1.00
Sulphate	mg/L	40.30	37.30	143.00	127.00	81.30	84.80	183.00	88.70												500.00
TDS	mg/L	260	110	**760**	**790**	**780**	**560**	130	**560**												500.00
TKN	mg/L	0.25	<0.2	0.81	0.48	0.99	4.26	1.50	1.90												
Total Phenols	mg/L	<0.001	<0.001	<0.001	0.00	0.00	<0.001	<0.001	<0.001												
Calcium	mg/L	26	28	118	452	288	79.20	191	215												
Magnesium	mg/L	6.94	7.65	52.50	178.00	159.00	39.70	87.80	90.20												
Potassium	mg/L	4.51	4.73	2.68	12.20	12.5	3.49	11.5	15.00												
Sodium	mg/L	26.40	29.20	55.10	70.40	61.80	28.00	40.00	42.00	Sample Unable to be Acquired	Sample Unable to be Acquired	Sample Unable to be Acquired	Sample Unable to be Acquired	Sample Unable to be Acquired	Sample Unable to be Acquired	Sample Unable to be Acquired	Sample Unable to be Acquired	Sample Unable to be Acquired	Sample Unable to be Acquired	Sample Unable to be Acquired	200.00
Aluminum	mg/L																				0.025
Arsenic	mg/L	0.001	<0.001	0.00	0.007	0.006	0.001	0.005	0.003												0.025
Barium	mg/L	0.01	0.01	0.31	2.98	2.02	0.37	0.86	1.42												1.00
Boron	mg/L	0.15	0.15	0.50	0.38	0.44	0.29	0.28	0.31												5.00
Cadmium	mg/L	<0.0001	<0.0001	0.0010	0.0039	0.00	0.0002	0.001	0.0022												0.005
Chromium	mg/L	<0.001	<0.001	0.0061	**0.205**	**0.434**	0.019	**0.17**	**0.16**												0.05
Cobalt	mg/L																				
Copper	mg/L	0.00	0.002	0.03	0.33	0.34	0.03	0.24	0.25												
Iron	mg/L	0.08	0.17	**2.93**	**66**	**125**	**6**	**95**	**105**												0.3
Lead	mg/L	0.00	0.00	0.01	0.08	0.08	0.01	0.07	0.17												0.01
Manganese	mg/L	0.03	0.03	**0.19**	**2.68**	**2.77**	**0.34**	**1.60**	**2.00**												0.05
Mercury	mg/L	0.00012	<0.0001	<0.0001	<0.0001	<0.0001	<.0001	<0.0001	<0.0001												0.001
Zinc	mg/L	0.0015	0.005	0.0223	423	0.462	0.05	0.02	0.371												5.00
1,4-Dichlorobenzene	mg/L	<0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3												1.00
Benzene	mg/L	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1												5.00
Dichloromethane	mg/L	<0.2	<1	<1	<1	<1	<1	-	<1												50.00
Toluene	mg/L	< 0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3												60.00
Vinylchloride	mg/L	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1												1.00
Field Measurements																					
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 11
Groundwater Quality Results - SCL10
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																		ODWQS
		Sample Collection Date (dd/mm/yyyy)																		
		SCL10																		
		Nov-15	June-16	Nov-16	Jun-17	Nov-17	Jul-18	Nov-18	Jun-19	Oct-19	Apr-20	Nov-20	Jun-21	Nov-21	Jun-22	Oct-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	**16**	48	32	**24**	39	35	**24**	**24**	**20**	**18**	**24**	**24**	**25**	32	79	**21**	**20**	**22**	59	30 - 500
Ammonia	pH Units	0.15	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			
Ammonia+Ammonium (N)	as N mg/L																		< 0.04	< 0.1	
COD	mg/L	30.00	10.00	10.00	13.0	8.8	<5	13.00	80	13.00	13.00	13.00	13	4.30	<5	9	9	13	< 8	9	
Conductivity	mg/L	44.4	54.7	65.9	55	82.7	81.7	57	53	50	48	57	70	65	67	167	60	24	55	137	
pH	mg/L	6.92	6.65	6.56	6.80	7.21	6.81	7.13	6.51	6.60	**6.48**	6.96	**6.37**	**6.29**	7.12	7.18	6.65	**6.25**	7.04	7.16	6.5 - 8.5
DOC	mg/L	3.2	2.9	4.45	**5.32**	2.7	2.2	4.0	3.3	4.9	2.7	**6.3**	**10.3**	3.8	3.1	3.5	4.0	**6.3**	3.0	3.0	5.00
Phosphorous	mg/L	0.02	0.54	0.21	0.3650	0.20	0.22	0.28	1.92	0.00	0.76	0.35	0.17	0.17	0.04	0.08	0.26	0.14	0.11	0.09	
Chloride	mg/L	3.39	0.20	<0.2	<0.2	0.44	0.74	0.68	<0.2	1.40	1.40	0.50	5.20	1.20	0.50	0.70	2.30	6.50	< 1	< 1	250.00
Nitrate	mg/L	< 0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.06	< 0.06	10.00
Nitrite	mg/L	< 0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	1.00
Sulphate	mg/L	7.3	3.0	2.0	4.7	5.1	5.8	4.0	3.6	4.5	3.7	4.2	3.8	4.3	5.1	8.8	4.7	4.4	4.0	9.0	500.00
TDS	mg/L	50	30	<30	<30	60	150	<30	<20	30	40.00	60	80	70	<20	120	30	20	< 30	40	500.00
TKN	mg/L	0.24	0.50	0.20	0.3200	<0.2	0.39	0.30	0.80	<0.2	0.50	2.10	<0.2	0.40	<0.2	<0.2	<0.2	5.70	0.08	< 0.5	
Total Phenols	mg/L	< 0.001	<0.001	<0.001	0.0010	<0.001	0.0024	0.00	0.00	0.00	0.0007	0.001	0.0043	0.0018	0.0057	0.0078	0.0030	0.0015	< 0.002	< 0.002	
Calcium	mg/L	10.2	6.06	6.27	7.6	11.3	6.43	8.69	6.57	4.64	3.54	3.97	8.2	6.41	8.57	19.4	8.75	6.55	4.99	14.00	
Magnesium	mg/L	3.54	2.45	2.66	3.01	5.45	2.55	4.15	4.67	2.29	1.60	1.84	3.52	2.79	3.88	7.77	4.58	3.26	1.99	4.97	
Potassium	mg/L	1.78	1.38	1.47	1.98	2.67	1.24	2.5	2.20	1.1	1	1.4	5.00	0.174	2.1	2.50	2.4	1.70	1.09	2.02	
Sodium	mg/L	0.96	0.98	1.10	1.11	1.04	0.79	0.80	0.90	0.90	0.80	1.00	1.80	1.00	1.00	1.70	2.40	0.90	1.00	1.73	200.00
Aluminum	mg/L																		0.04	0.017	0.025
Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.00	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.0002	< 0.0002	0.025
Barium	mg/L	0.05	0.02	0.02	0.0313	0.07	0.02	0.07	0.06	0.02	0.01	0.01	0.04	0.02	0.05	0.04	0.06	0.03	0.01	0.027	1.00
Boron	mg/L	0.01	0.01	0.01	0.0040	0.00	0.00	0.00	0.00	<0.02	0.00	0.00	0.00	<0.002	<0.002	0.006	<0.002	0.0040	0.0030	0.011	5.00
Cadmium	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	0.0000	0.000006	0.005
Chromium	mg/L	<0.001	<0.001	<0.001	<0.001	0.0025	<0.001	0.002	0.003	<0.001	<0.001	<0.001	0.001	<0.001	0.001	0.003	0.002	<0.001	0.0002	0.00019	0.05
Cobalt	mg/L																		0.0002	0.00036	
Copper	mg/L	0.019	0.007	0.00	0.0101	0.02	0.007	0.02	0.02	0.01	0.00	0.00	0.01	0.01	0.02	0.01	0.02	0.01	0.0040	0.004	
Iron	mg/L	**0.43**	0.07	0.10	**0.5200**	**4.17**	**0.35**	**3.10**	**4.30**	0.11	0.07	<0.02	**1.53**	**0.45**	**2.17**	**1.08**	**2.46**	**1.20**	0.02	0.011	0.3
Lead	mg/L	0.007	0.002	0.006	0.0025	0.01	0.00	0.01	0.01	0.00	<0.0001	<0.0001	0.01	0.00	0.01	0.00	0.01	0.00	< 0.00009	< 0.00009	0.01
Manganese	mg/L	**0.08**	0.00	0.01	0.0251	**0.14**	0.02	**0.13**	**0.19**	0.00	0.01	<0.001	**0.06**	0.02	0.05	0.04	**0.07**	0.04	0.0012	0.0015	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	<0.001	< 0.00001	0.00001	0.001
Zinc	mg/L	0.0081	5.6	0.003	0.0064	0.0141	0.0049	0.016	0.013	0.002	<0.001	<0.001	0.01	0.004	0.01	0.006	0.017	0.007	< 0.002	0.0030	5.00
1,4-Dichlorobenzene	mg/L	<0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5	-	1.00
Benzene	mg/L	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.5	-	5.00
Dichloromethane	mg/L	< 1	<1	<1	<1	<1	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-	< 0.5	-	50.00
Toluene	mg/L	< 0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5	-	60.00
Vinylchloride	mg/L	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.2	-	1.00
Field Measurements																					
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.00	9.30	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.05	6.59	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33.60	106.10	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37.60	48.90	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.01	2.88	-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 12
Groundwater Quality Results - SCL11
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																		ODWQS
		Sample Collection Date (dd/mm/yyyy)																		
		SCL11																		
		Nov-15	June-16	Nov-16	Jun-17	Nov-17	Jul-18	Nov-18	Jun-19	Oct-19	Apr-20	Nov-20	Jun-21	Nov-21	Jun-22	Oct-22	May-23	May-24	Sep-24	
Alkalinity	mg/L	60	**28**	62	47	96	83	51	58	67	72	46	81	83	69	121	48	66	112	30 - 500
Ammonia	pH Units	< 0.01	<0.01	0.04	<0.01	0.024	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01			
Ammonia+Ammonium (N)	as N mg/L																	0.05	0.20	
COD	mg/L	30	42	26	26	30	22	22	13	22	22	18	42	9	13	9	22	14	12	
Conductivity	mg/L	131	134	137	109	205	189	119	116	147	158	107	192	182	154	272	125	164	267	
pH	mg/L	7.44	7.05	6.89	6.96	7.87	7.18	7.21	6.74	6.91	6.8	7.03	6.95	6.87	7.35	7.22	6.79	7.34	7.61	6.5 - 8.5
DOC	mg/L	**5.46**	**5.60**	**6.94**	**5.32**	**5.27**	4.46	**6.9**	**6.7**	**6.5**	**6.0**	**8.4**	**5.6**	**5.6**	**5.9**	**5.7**	**7.1**	4.0	5.0	5.00
Phosphorous	mg/L	0.07	0.35	0.20	0.1470	0.43	0.47	0.10	1.26	0.27	0.16	0.08	1.56	0.75	0.24	0.05	0.07	0.04	0.14	
Chloride	mg/L	3.92	0.68	0.90	0.74	1.80	2.13	1.69	1.0	2.1	2.7	1.5	6.6	3.2	1.8	<0.05	5.0	4.0	12.0	250.00
Nitrate	mg/L	< 0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.06	< 0.06	10.00
Nitrite	mg/L	< 0.03	<0.03	<0.03	<0..03	<0.03	<0.03	<0.008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	1.00
Sulphate	mg/L	9.5	4.5	4.9	6.7	10.8	9.5	5.7	5.5	7.1	8.2	4.7	6.5	7.2	7.5	11.7	6.7	13.0	11.0	500.00
TDS	mg/L	100	60	130.00	80	90	230	<30	40	80		110	130	150	230	180	80	117	143	500.00
TKN	mg/L	0.39	4.61	0.50	0.4300	0.60	0.46	0.40	0.90	<0.2	0.70	1.50	0.50	0.30	<0.2	<0.2	<0.2	0.14	< 0.5	
Total Phenols	mg/L	< 0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00	<0.0004	0.0021	0.0046	0.0046	0.0059	0.0029	0.0030	< 0.002	< 0.002	
Calcium	mg/L	27.8	23.4	23.70	15.8	38.3	16.8	15.9	21.3	19.8	23.10	13.3	26.7	27.4	28.6	39.3	18	25.3	44.70	
Magnesium	mg/L	3.98	3.47	3.25	2.54	11.00	3.04	2.84	9.23	3.90	3.48	2.12	4.87	4.94	7.81	5.86	3.24	3.87	5.76	
Potassium	mg/L	2.73	2.09	1.91	1.81	5.43	1.6	1.9	5.60	1.9	1.8	1.9	6.50	2.9	4.3	0.09	2	1.84	2.54	
Sodium	mg/L	1.45	1.46	1.36	1.17	2.13	1.35	1.00	1.20	1.40	1.30	1.30	2.20	1.50	1.40	1.90	1.30	1.52	2.27	200.00
Aluminum	mg/L																	0.06	0.03	0.025
Arsenic	mg/L	0.00	0.00	0.0010	0.0023	0.005	<0.001	0.00	0.006	<0.001	<0.001	<0.001	0.003	0.001	0.008	0.001	0.001	0.000	0.0004	0.025
Barium	mg/L	0.07	0.06	0.03	0.0262	0.15	0.03	0.03	0.11	0.03	0.01	0.02	0.07	0.05	0.12	0.04	0.03	0.02	0.03	1.00
Boron	mg/L	0.01	0.01	0.01	0.0067	0.01	0.01	0.01	0.11	<0.002	<0.0005	0.01	0.01	0.01	<0.002	0.002	<0.002	0.01	0.01	5.00
Cadmium	mg/L	0.0006	0.0002	0.0001	0.0002	0.0006	<0.0001	<0.0001	0.0004	<0.0001	**0.008**	<0.0001	0.003	0.0001	0.0005	<0.0001	0.0001	< 0.000003	< 0.000003	0.005
Chromium	mg/L	0.00	0.001	0.0010	0.0017	0.0258	<0.001	0.003	0.021	<0.001	0.001	0.003	0.004	0.002	0.018	0.002	0.002	0.00058	0.0006	0.05
Cobalt	mg/L																	0.00	0.0001	
Copper	mg/L	0.023	0.035	0.01	0.0139	0.11	0.006	0.02	0.04	0.01	0.01	0.00	0.03	0.01	0.05	0.01	0.01	0.00	0.00	
Iron	mg/L	**2.05**	**1.31**	**1.37**	**3.6900**	**17.20**	**0.57**	**3.10**	**23.10**	**0.58**	0.09	**0.75**	**5.10**	**2.07**	**18.70**	**1.38**	**2.12**	**0.35**	0.24	0.3
Lead	mg/L	0.004	0.003	0.001	0.0012	0.01	0.00	0.00	0.02	0.00	<0.0001	0.00	0.01	0.00	0.01	0.00	0.00	< 0.00009	< 0.00009	0.01
Manganese	mg/L	**0.16**	**0.17**	**0.15**	**0.1360**	**0.44**	**0.17**	**0.17**	**0.40**	**0.13**	**0.08**	0.02	**0.27**	**0.25**	**0.42**	**0.28**	**0.32**	**0.15**	**0.30**	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	< 0.00001	0.00	0.001
Zinc	mg/L	0.0054	0.0044	0.00	0.0056	0.0403	0.0025	0.006	0.048	0.002	<0.001	0.00	0.011	0.006	0.034	0.004	0.004	< 0.002	< 0.002	5.00
1,4-Dichlorobenzene	mg/L	<0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	< 0.5	-	1.00
Benzene	mg/L	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	< 0.5	-	5.00
Dichloromethane	mg/L	<1	<1	<1	<1	<1	<1	-	<1	-	<1	-	<1	-	<1	-	<1	< 0.5	-	50.00
Toluene	mg/L	<0.2	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	< 0.5	-	60.00
Vinylchloride	mg/L	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	< 0.2	-	1.00
Field Measurements																				
Temperature	^{o}C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.80	10.20	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.59	6.82	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	112.10	198.50	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10	15.60	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.63	10.83	-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 13
Groundwater Quality Results - SCL12
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																		ODWQS
		Sample Collection Date (dd/mm/yyyy)																		
		SCL12																		
		Nov-15	June-16	Nov-16	Jun-17	Nov-17	Jul-18	Nov-18	Jun-19	Oct-19	Apr-20	Nov-20	Jun-21	Nov-21	Jun-22	Oct-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	78	40	**24**	49	96	98	103	109	122	102	103	100	115	107	163	110	178	124	160	30 - 500
Ammonia	pH Units	<0.01	<0.01	-	-	0.023	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04			
Ammonia+Ammonium (N)	as N mg/L	-	-	< 0.04	< 0.1														0.06	< 0.1	
COD	mg/L	52.00	<5	< 8	8.0	<5	<5	<5	<5	<5	<5	<5	<5	9.00	<5	9	9	22	< 8	11	
Conductivity	mg/L	165	85	56	102	247	307	263	226	283	251	276	250	295	246	466	286	500	311	414	
pH	mg/L	7.16	6.55	6.80	7.38	7.79	7.58	7.87	7.17	7.40	7.26	7.54	7.27	7.33	7.62	7.65	7.44	7.29	7.83	7.94	6.5 - 8.5
DOC	mg/L	2.40	1.90	2.00	2.00	1.20	1.70	1.70	2.00	1.90	1.50	2.40	4.00	1.90	2.20	**6.50**	2.90	4.60	2.00	4.00	5.00
Phosphorous	mg/L	1.98	0.22	0.30	0.2000	0.14	0.35	0.10	0.56	0.62	0.14	0.50	0.98	0.44	0.26	0.18	0.28	0.03	0.06	0.12	
Chloride	mg/L	0.5	3.9	< 1	< 1	13.3	26.6	11.2	10.8	14.0	14.8	13.0	12.1	18.5	13.6	43.0	18.3	39.3	17.0	26.0	250.00
Nitrate	mg/L	<0.05	<0.05	< 0.06	< 0.06	<0.1	<0.1	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.06	< 0.06	10.00
Nitrite	mg/L	<0.05	<0.05	< 0.03	< 0.03	<0.03	<0.03	<0.008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	1.00
Sulphate	mg/L	7.0	5.5	4.0	4.0	12.7	12.8	13.0	10.9	14.3	10.8	10.7	10.2	13.1	11.9	20.6	13.1	22.7	15.0	16.0	500.00
TDS	mg/L	200	40	< 30	66	80	230	<30	100	140	120	230	220	220	100	270	110	320	189	229	500.00
TKN	mg/L	<0.2	40.00	< 0.05	< 0.5	0.24	0.26	<0.2	0.50	<0.2	0.50	1.40	<0.2	<0.2	<0.2	<0.2	<0.2	0.40	0.13	< 0.5	
Total Phenols	mg/L	0.0035	0.0016	< 0.002	< 0.002	<0.001	<0.001	<0.001	<0.001	<0.0004	0.0024	0.0012	0.0024	0.0017	0.0047	0.0024	0.0049	0.0021	< 0.002	< 0.002	
Calcium	mg/L	30.7	10.4	5.8	13.6	36.3	20.1	36.7	32.5	42.2	35.9	39.9	39.7	44.6	41.6	76.4	45.0	102.0	49.3	74.5	
Magnesium	mg/L	9.60	3.80	1.52	3.15	4.75	2.82	4.41	4.65	6.42	4.04	4.57	4.88	5.47	5.09	8.81	5.60	12.70	5.60	7.65	
Potassium	mg/L	3.9	2.2	0.80	1.47	3.02	1.68	2.6	3.00	2.7	2.4	3	3.70	3	2.9	3.80	3	4.10	2.68	3.33	
Sodium	mg/L	1.70	1.40	0.96	1.35	2.70	1.62	2.00	2.40	2.60	2.60	3.00	2.80	2.50	2.50	3.10	3.00	4.30	2.83	3.35	200.00
Aluminum	mg/L	-	-	0.08	0.0110														0.00	0.001	0.025
Arsenic	mg/L	<0.001	<0.001	0.0002	0.0003	0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.002	0.002	<0.001	<0.001	0.001	<0.001	<0.001	< 0.0002	< 0.0002	0.025
Barium	mg/L	0.15	0.04	0.01	0.0126	0.04	0.03	0.03	0.06	0.04	0.02	0.02	0.06	0.04	0.04	0.06	0.04	0.07	0.03	0.035	1.00
Boron	mg/L	<0.002	0.01	0.01	0.0060	0.02	0.02	0.02	0.02	<0.002	0.02	0.02	0.02	0.02	0.01	0.035	0.01	0.10	0.03	0.037	5.00
Cadmium	mg/L	<0.0001	<0.0001	0.0000	< 0.000003	<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	< 0.000003	0.000003	0.005
Chromium	mg/L	0.02	0.003	0.0004	0.0002	0.0015	<0.001	<0.001	0.003	<0.001	0.001	0.002	0.002	<0.001	0.002	0.003	0.001	<0.0001	0.0001	0.00014	0.05
Cobalt	mg/L	-	-	0.0003	0.0003														0.0001	0.00011	
Copper	mg/L	0.030	0.003	< 0.001	< 0.001	0.01	0.005	0.01	0.02	0.01	<0.001	0.00	0.01	0.01	0.01	0.01	0.01	0.00	< 0.001	0.001	
Iron	mg/L	**7.10**	**3.50**	**0.32**	**0.6530**	**1.29**	**0.59**	**1.40**	**7.20**	**1.00**	0.03	0.17	**5.80**	**1.30**	**2.47**	**1.87**	**1.28**	**1.47**	0.09	0.048	0.3
Lead	mg/L	0.003	0.001	< 0.00009	< 0.00009	0.00	0.00	0.00	0.00	0.00	<0.0001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	< 0.00009	< 0.00009	0.01
Manganese	mg/L	**0.46**	**0.20**	**0.07**	**0.2200**	**0.59**	**0.42**	**0.44**	**2.48**	**0.74**	**0.29**	0.04	**1.78**	**0.95**	**0.92**	**1.14**	**0.72**	**1.24**	**0.55**	**0.73**	0.05
Mercury	mg/L	<0.0001	<0.0001	< 0.00001	0.00002	<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	< 0.00001	0.00	0.001
Zinc	mg/L	0.029	0.011	< 0.002	< 0.002	0.0038	0.0015	0.004	0.007	0.002	<0.001	<0.001	0.009	0.003	0.004	0.003	0.002	0.002	< 0.002	< 0.002	5.00
1,4-Dichlorobenzene	mg/L	<0.3	-	< 0.5	-	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5	-	1.00
Benzene	mg/L	<0.1	-	< 0.5	-	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.5	-	5.00
Dichloromethane	mg/L	<1	-	< 0.5	-	<1	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-	< 0.5	-	50.00
Toluene	mg/L	<0.3	-	< 0.5	-	<0.3	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5	-	60.00
Vinylchloride	mg/L	<0.3	-	< 0.2	-	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.2	-	1.00
Field Measurements																					
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.40	8.60	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.78	7.44	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	185.00	282.60	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-7.00	15.50	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.42	1.41	-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 14
Groundwater Quality Results - SCL13
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation													ODWQS
		Sample Collection Date (dd/mm/yyyy)													
		SCL13													
		Jul-18	Nov-18	Jun-19	Oct-19	Apr-20	Nov-20	Jun-21	Nov-21	Jun-22	Oct-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	103	105	103	108	98	99	100	101	107	101	103	104	102	100	30 - 500
Ammonia	pH Units	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			
Ammonia+Ammonium (N)	as N mg/L													0.04	< 0.1	
COD	mg/L	13.00	<5	<5	5	<5	<5	<5	<5	<5	<5	<5	<5	11	11	
Conductivity	mg/L	221.00	220	201	215	217	217	208	201	216	207	214	230	223	220	
pH	mg/L	7.99	8.15	7.86	7.58	7.78	8.12	7.7	7.86	8.02	7.82	7.58	7.43	8.12	7.99	6.5 - 8.5
DOC	mg/L	2.1	1.6	2.1	1.5	1.2	2.1	1.4	1.3	1.4	1.8	2.1	2.2	1.0	2.0	5.0
Phosphorous	mg/L	1.27	1.96	0.76	0.60	0.32	0.42	0.37	0.40	0.03	0.19	0.19	0.23	0.06	0.0800	
Chloride	mg/L	1.10	0.51	<0.2	0.60	1.70	0.40	1.80	0.50	0.50	0.50	2.70	1.40	< 1	< 1	250
Nitrate	mg/L	<0.1	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.06	< 0.06	10
Nitrite	mg/L	<0.03	<0.003	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	1.00
Sulphate	mg/L	10.3	10.7	9.9	10.0	10.0	8.4	9.3	11.6	13.1	11.8	14.4	11.3	12.0	11.0	500
TDS	mg/L	40.00	<30	80	160	70.00	210	150	160	20	50	120	210	109	134	500
TKN	mg/L	0.54	0.30	0.50	<0.2	1.00	1.40	<0.2	<0.2	<0.2	<0.2	<0.2	0.30	< 0.05	< 0.5	
Total Phenols	mg/L	0.00	<0.001	0.00	<0.0004	0.0015	<0.0004	0.0032	0.0032	<0.0004	0.0053	0.0060	0.0010	< 0.002	< 0.002	
Calcium	mg/L	16.80	41.2	27.7	28.4	28.50	29.5	29.1	28.5	34.2	32.1	31.9	31.6	34.70	39.6	
Magnesium	mg/L	4.91	21.20	10.90	8.00	5.87	5.78	7.28	7.11	10.00	8.46	8.67	9.65	6.51	6.48	
Potassium	mg/L	2.38	8.2	4.6	3.9	3.7	3.9	3.6	3.3	4	3.9	4	3.9	3.92	3.97	
Sodium	mg/L	2.83	3.40	2.30	2.40	2.40	2.60	2.90	2.20	2.70	2.30	2.80	2.50	2.75	2.78	200
Aluminum	mg/L													0.01	0.0070	
Arsenic	mg/L	0.00	0.004	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0004	0.0004	0.025
Barium	mg/L	0.10	0.33	0.15	0.12	0.07	0.08	0.12	0.10	0.14	0.11	0.11	0.13	0.08	0.0832	1.00
Boron	mg/L	0.28	0.03	0.03	<0.002	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.04	0.04	0.0340	5.0
Cadmium	mg/L	<0.0001	0.00	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	< 0.000003	0.0000	0.005
Chromium	mg/L	0.00	0.028	0.01	<0.001	0.001	0.00	0.00	0.00	0.007	0.005	0.00	0.004	0.0001	0.0001	0.05
Cobalt	mg/L													0.00005	0.00002	
Copper	mg/L	0.01	0.05	0.01	0.00	<0.001	<0.001	0.007	0.003	0.013	0.006	0.006	0.010	< 0.001	0.0010	
Iron	mg/L	**2.10**	0.20	**8.60**	**0.80**	0.04	**0.37**	**3.20**	**1.38**	**7.20**	**3.50**	**2.90**	**5.00**	0.01	0.0070	0.3
Lead	mg/L	0.00	0.013	0.004	0.001	<0.0001	0.000	0.003	0.001	0.004	0.0016	0.002	0.004	< 0.00009	< 0.00009	0.01
Manganese	mg/L	**0.17**	**0.24**	**0.10**	0.02	0.01	0.01	**0.06**	0.02	**0.07**	0.04	**0.05**	**0.07**	0.01	0.0025	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	< 0.00001	0.00001	0.001
Zinc	mg/L	0.03	0.142	0.035	0.01	<0.001	0.002	0.023	0.007	0.038	0.02	0.019	0.041	< 0.002	< 0.002	5.0
1,4-Dichlorobenzene	mg/L	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5	-	1.0
Benzene	mg/L	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.5	-	5.0
Dichloromethane	mg/L	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-	< 0.5	-	50
Toluene	mg/L	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5	-	60
Vinylchloride	mg/L	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.2	-	1.00
Field Measurements																
Temperature	^{o}C	-	-	-	-	-	-	-	-	-	-	-	-	7.70	8.70	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	7.09	7.12	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	150.60	156.40	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	19.90	24.60	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	6.60	1.47	-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 15
Groundwater Quality Results - SCL14
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation													ODWQS
		Sample Collection Date (dd/mm/yyyy)													
		SCL14													
		Jul-18	Nov-18	Jun-19	Oct-19	Apr-20	Nov-20	Jun-21	Nov-21	Jun-22	Oct-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	121	71	42	80	82	54	**29**	39	59	83	**22**	52	53	51	30 - 500
Ammonia	pH Units	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	83.00	<0.01	<0.01			
Ammonia+Ammonium (N)	as N mg/L													< 0.04	< 0.1	
COD	mg/L	8.80	9	42	9	13.00	<5	22	18.00	<5	<5	22	9	14	15	
Conductivity	mg/L	257.00	156	95	161	182	127	72	86	131	194	55	103	116	109	
pH	mg/L	7.91	7.68	7.26	7.27	7.16	7.51	6.97	7.04	7.70	8.07	6.95	6.83	7.35	7.36	6.5 - 8.5
DOC	mg/L	2.20	3.7	4.6	2.20	1.80	**6.10**	4.7	**5.50**	4.30	**5.30**	**7.90**	**5.50**	**6.00**	**6.00**	5.0
Phosphorous	mg/L	1.07	0.39	0.93	0.80	0.22	0.24	0.21	0.21	0.01	0.19	0.12	0.20	0.53	0.24	
Chloride	mg/L	0.63	0.40	0.30	0.40	2.00	0.30	2.80	0.30	0.40	3.60	0.50	3.10	< 1	< 1	250
Nitrate	mg/L	<0.1	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	< 0.06	< 0.06	10
Nitrite	mg/L	<0.03	<0.008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	1.00
Sulphate	mg/L	13.50	8.18	7.7	9.3	11.4	6.6	4.1	4.1	4.7	7.5	3.6	4.3	6.0	3.0	500
TDS	mg/L	220.00	<30	80	130	140.00	180	80	150	<20	30	130	80	40	66	500
TKN	mg/L	0.34	0.30	1.20	<0.2	0.40	1.70	0.40	0.50	<0.2	<0.2	<0.2	0.30	0.13	< 0.5	
Total Phenols	mg/L	<0.001	<0.001	0.00	<0.0004	0.001	<0.0004	0.0049	0.0036	0.0024	0.0021	0.0052	0.0017	< 0.002	< 0.002	
Calcium	mg/L	17.60	18.6	15.3	20.9	25.80	16.2	8	11.5	19.2	23.7	7.52	18.4	6.64	9.2	
Magnesium	mg/L	4.88	4.66	7.59	3.97	3.75	2.49	2.07	2.94	4.27	4.55	1.83	4.53	1.42	1.62	
Potassium	mg/L	2.22	1.8	3.2	1.5	1.8	1.4	1.6	1.1	1.3	1.6	0.7	1.4	0.39	0.52	
Sodium	mg/L	11.60	6.70	5.40	5.00	4.20	2.80	2.10	1.80	2.20	1.80	1.40	1.60	1.29	1.18	200
Aluminum	mg/L													0.41	0.2270	
Arsenic	mg/L	0.00	0.002	0.004	0.001	<0.001	<0.001	<0.001	0.00	<0.001	0.00	<0.001	0.00	0.0004	0.0004	0.025
Barium	mg/L	0.03	0.02	0.06	0.01	0.01	0.01	0.01	0.02	0.00	0.02	0.01	0.02	0.00	0.0033	1.00
Boron	mg/L	0.02	0.01	0.01	<0.02	0.01	0.01	0.00	0.00	<0.002	<0.002	<0.002	0.01	0.00	0.0040	5.0
Cadmium	mg/L	0.00	0.00	0.00	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0001	0.0000	0.0000	0.005
Chromium	mg/L	0.01	0.007	0.03	<0.001	0.01	0.00	0.00	0.00	0.004	0.005	0.00	0.004	0.0009	0.0007	0.05
Cobalt	mg/L													0.0006	0.0002	
Copper	mg/L	0.05	0.06	0.07	0.02	0.00	0.005	0.014	0.024	0.020	0.025	0.015	0.022	0.01	0.0060	
Iron	mg/L	**3.05**	**4.00**	**14.10**	**0.80**	0.07	0.10	**0.80**	**2.30**	**2.50**	**3.30**	**1.07**	**3.20**	**0.40**	0.1990	0.3
Lead	mg/L	0.01	0.005	0.015	0.004	<0.0001	0.000	0.003	0.004	0.004	0.0051	0.002	0.004	0.001	< 0.00009	0.01
Manganese	mg/L	**0.18**	**0.19**	**0.27**	**0.18**	**0.09**	**0.10**	0.05	**0.17**	**0.18**	**0.20**	**0.10**	**0.21**	0.02	0.0361	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	< 0.00001	0.00001	0.001
Zinc	mg/L	0.03	0.041	0.13	0.02	<0.001	0.002	0.023	0.041	0.034	0.038	0.036	0.035	0.03	0.0250	5.0
1,4-Dichlorobenzene	mg/L	<0.3	N/R	<0.3	N/R	<0.3	N/R	<0.3	N/R	<0.3	N/R	<0.3	N/R	< 0.5		1.0
Benzene	mg/L	<0.1	N/R	<0.1	N/R	<0.1	N/R	<0.1	N/R	<0.1	N/R	<0.1	N/R	< 0.5		5.0
Dichloromethane	mg/L	<1	N/R	<1	N/R	<1	N/R	<1	N/R	<1	N/R	<1	N/R	< 0.5		50
Toluene	mg/L	<0.3	N/R	<0.3	N/R	<0.3	N/R	<0.3	N/R	<0.3	N/R	<0.3	N/R	< 0.5		60
Vinylchloride	mg/L	<0.1	N/R	<0.1	N/R	<0.1	N/R	<0.1	N/R	<0.1	N/R	<0.1	N/R	< 0.2		1.00
Field Measurements																
Temperature	^{o}C	-	-	-	-	-	-	-	-	-	-	-	-	7.90	10.20	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	6.73	6.88	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	75.60	83.20	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	51.00	2.80	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	7.75	4.55	-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 16
Groundwater Quality Results - SCL15
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation													ODWQS
		Sample Collection Date (dd/mm/yyyy)													
		SCL15													
		Jul-18	Nov-18	Jun-19	Oct-19	Apr-20	Nov-20	Jun-21	Nov-21	Jun-22	Oct-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	147	108	113	123	117	117	115	111	125	119	118	115	120	113	30 - 500
Ammonia	pH Units	0.09	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			
Ammonia+Ammonium (N)	as N mg/L													< 0.04	< 0.1	
COD	mg/L	18.00	26	18	13	13.00	<5	<5	9.00	<5	<5	9	13	< 8	9	
Conductivity	mg/L	286.00	229	254	254	240	255	239	217	254	244	241	238	250	233	
pH	mg/L	7.75	7.85	7.42	7.51	7.1	7.72	7.35	7.56	7.84	7.69	7.24	7.09	7.87	7.93	6.5 - 8.5
DOC	mg/L	**5.57**	2.7	3.6	2.2	2.5	2.9	**6.8**	1.9	2.2	2.7	2.8	1.7	2.0	2.0	5.00
Phosphorous	mg/L	0.28	0.68	0.09	0.19	0.05	0.05	0.14	0.07	0.01	0.12	<0.05	0.08	0.14	< 0.03	
Chloride	mg/L	2.46	0.76	0.60	0.50	1.80	0.40	2.50	0.50	0.60	3.40	0.80	0.80	< 1	< 1	250
Nitrate	mg/L	<0.1	0.13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	< 0.06	10.00
Nitrite	mg/L	<0.03	<.008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	1.00
Sulphate	mg/L	1.10	9.94	16.8	18.2	16.4	11.6	4.7	11.1	13.1	10.3	11.6	9.0	11.0	10.0	500
TDS	mg/L	260.00	<30	140	210	180.00	140	200	190	150	60	210	220	146	149	500
TKN	mg/L	0.57	0.70	0.80	<0.2	0.40	1.20	0.40	0.20	<0.2	<0.2	<0.2	0.20	< 0.05	< 0.5	
Total Phenols	mg/L	0.00	<0.001	<0.001	<0.0004	0.0015	<0.0004	0.0034	0.0013	0.0026	<0.0004	0.0055	0.0037	< 0.002	< 0.002	
Calcium	mg/L	18.90	28	29.5	29.6	32.00	29	29.5	29.1	34.4	36.4	33.6	31.3	40.10	39.8	
Magnesium	mg/L	5.84	7.48	6.93	8.75	7.23	6.56	6.38	6.87	7.71	0.35	8.41	8.15	8.13	7.02	
Potassium	mg/L	2.68	3.4	3.3	3	3.1	3.4	5.6	2.7	3.2	3.6	3.4	3.1	3.08	2.79	
Sodium	mg/L	5.76	5.00	5.90	8.90	7.10	7.10	6.50	5.50	6.30	5.80	4.60	3.60	4.10	4.77	200
Aluminum	mg/L													0.01	0.0020	
Arsenic	mg/L	0.00	0.004	0.004	0.002	<0.001	0.00	0.00	0.00	0.002	0.00	0.00	0.00	0.0006	0.0007	0.025
Barium	mg/L	0.04	0.05	0.04	0.05	0.02	0.03	0.04	0.04	0.04	0.05	0.04	0.05	0.04	0.0328	1.00
Boron	mg/L	0.03	0.02	0.02	<0.002	0.02	0.02	0.02	0.02	0.00	0.00	0.01	0.02	0.02	0.0130	5.00
Cadmium	mg/L	0.00	0.00	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0000	0.0000	0.0050
Chromium	mg/L	0.00	0.005	0.00	<0.001	0.002	0.00	<0.001	<0.001	<0.001	0.004	<0.001	0.001	0.0002	0.0002	0.05
Cobalt	mg/L													0.0001	0.0001	
Copper	mg/L	0.01	0.02	0.01	0.01	<0.001	<0.001	0.003	0.003	0.004	0.006	0.004	0.003	< 0.001	0.0010	
Iron	mg/L	**1.40**	**3.50**	**2.20**	**0.60**	0.07	<0.02	**0.64**	**0.74**	**0.81**	**2.09**	**0.51**	**1.40**	0.05	0.0120	0.3
Lead	mg/L	0.00	0.004	0.003	0.005	<0.0001	0.000	0.001	0.001	0.001	0.0013	0.001	0.002	< 0.00009	< 0.00009	0.01
Manganese	mg/L	**0.30**	**0.15**	**0.32**	**0.07**	0.04	**0.17**	**0.14**	**0.13**	**0.14**	**0.35**	**0. 149**	**0.28**	0.05	0.0231	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	< 0.00001	0.00002	0.001
Zinc	mg/L	0.04	0.093	0.041	0.032	0.00	0.002	0.015	0.012	0.015	0.025	0.016	0.023	0.01	0.0040	5.00
1,4-Dichlorobenzene	mg/L	<0.3	N/R	<0.3	N/R	<0.3	N/R	<0.3	N/R	<0.3	N/R	<0.3	N/R	< 0.5		1.00
Benzene	mg/L	<0.1	N/R	<0.1	N/R	<0.1	N/R	<0.1	N/R	<0.1	N/R	<0.1	N/R	< 0.5		5.00
Dichloromethane	mg/L	<1	N/R	<1	N/R	<1	N/R	<1	N/R	<1	N/R	<1	N/R	< 0.5		50.00
Toluene	mg/L	<0.3	N/R	<0.3	N/R	<0.3	N/R	<0.3	N/R	<0.3	N/R	<0.3	N/R	< 0.5		60.00
Vinylchloride	mg/L	<0.1	N/R	<0.1	N/R	<0.1	N/R	<0.1	N/R	<0.1	N/R	<0.1	N/R	< 0.2		1.00
Field Measurements																
Temperature	^{o}C	-	-	-	-	-	-	-	-	-	-	-	-	7.50	9.80	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	6.87	6.86	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	169	164.70	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	73.20	38.50	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	27.11	5.00	-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 17
Groundwater Quality Results - SCL16
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation													ODWQS
		Sample Collection Date (dd/mm/yyyy)													
		SCL16													
		Jul-18	Nov-18	Jun-19	Oct-19	Apr-20	Nov-20	Jun-21	Nov-21	Jun-22	Oct-22	May-23	Nov-23	May-24	Sep-24	
Alkalinity	mg/L	-	**26**	37	36	43	43	43	42	59	38	78	40	**24**	49	30 - 500
Ammonia	pH Units	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	
Ammonia+Ammonium (N)	as N mg/L	-	-	-	-	-	-	-	-	-	-	-	-	< 0.04	< 0.1	
COD	mg/L	-	<5	70	9	22	<5	9	9	<5	<5	52	<5	< 8	8	
Conductivity	mg/L	-	63	70	78	107	98	99	92	130	82	165	85	56	102	
pH	mg/L	-	6.73	6.51	6.59	7.01	7.06	6.73	6.63	7.45	6.82	7.16	6.55	6.80	7.38	6.5 - 8.5
DOC	mg/L	-	2.2	2.2	1.8	1.4	3.6	2.7	1.5	1.5	2.1	2.4	1.9	2.0	2.0	5.00
Phosphorous	mg/L	-	0.88	2.02	1.30	0.55	1.73	2.05	1.25	0.06	0.08	1.98	0.22	0.30	0.20	
Chloride	mg/L	-	0.35	0.40	0.40	2.80	0.30	1.60	0.30	0.30	0.80	0.50	3.90	< 1	< 1	250
Nitrate	mg/L	-	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.06	< 0.06	10.00
Nitrite	mg/L	-	<0.008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	< 0.03	1.00
Sulphate	mg/L	-	4.62	4.9	5.1	5.4	5.3	4.0	5.1	6.4	5.7	7.0	5.5	4.0	4.0	500
TDS	mg/L	-	<30	<20	20	60.00	30	70	50	330	20	200	40	< 30	66	500
TKN	mg/L	-	0.20	0.60	<0.2	0.80	0.40	<0.2	0.30	<0.2	<0.2	<0.2	40.00	< 0.05	< 0.5	
Total Phenols	mg/L	-	<0.001	<0.001	<0.0004	0.0013	<0.0004	0.0045	0.0035	0.0026	0.0056	0.0035	0.0016	< 0.002	< 0.002	
Calcium	mg/L	-	9.07	11.8	9.05	6.78	10.2	14.7	13.6	16.2	8.96	30.7	10.4	5.80	13.6	
Magnesium	mg/L	-	5.76	6.94	2.91	1.88	2.91	5.56	4.38	5.56	2.21	9.60	3.80	1.52	3.15	
Potassium	mg/L	-	4.2	6	1.4	1.1	2.7	3.4	3	2.4	1.5	3.9	2.2	0.80	1.47	
Sodium	mg/L	-	1.20	1.10	1.30	1.00	1.90	1.80	1.30	1.40	1.30	1.70	1.40	0.96	1.35	200
Aluminum	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.08	0.011	
Arsenic	mg/L	-	0.002	0.001	0.001	<0.001	<0.001	0.00	<0.001	0.001	<0.001	<0.001	<0.001	0.0002	0.0003	0.025
Barium	mg/L	-	0.09	0.12	0.03	0.01	0.04	0.07	0.05	0.05	0.02	0.15	0.04	0.01	0.0126	1.00
Boron	mg/L	-	0.00	0.01	<0.002	0.00	0.01	0.01	0.01	<0.002	<0.002	<0.002	0.01	0.01	0.0060	5.00
Cadmium	mg/L	-	0.00	0.00	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000003	< 0.000003	0.0050
Chromium	mg/L	-	0.015	0.02	<0.001	<0.001	0.00	0.01	0.00	0.005	0.003	0.02	0.003	0.0004	0.0002	0.05
Cobalt	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.0003	0.0003	
Copper	mg/L	-	0.04	0.03	0.01	<0.001	0.004	0.019	0.014	0.010	0.002	0.030	0.003	< 0.001	< 0.001	
Iron	mg/L	-	**10.20**	**10.70**	**0.80**	0.06	**1.36**	**7.20**	**3.80**	**4.60**	**1.18**	**7.10**	**3.50**	**0.32**	**0.65**	0.3
Lead	mg/L	-	0.004	0.004	0.001	<0.0001	0.001	0.004	0.003	0.002	0.0002	0.003	0.001	< 0.00009	< 0.00009	0.01
Manganese	mg/L	-	**0.26**	**0.31**	**0.15**	**0.08**	**0.13**	**0.34**	**0.26**	**0.34**	**0.15**	**0.46**	**0.20**	**0.07**	**0.22**	0.05
Mercury	mg/L	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	< 0.00001	0.00002	0.001
Zinc	mg/L	-	0.049	0.054	0.006	<0.001	0.004	0.035	0.17	0.015	0.003	0.029	0.011	< 0.002	< 0.002	5.00
1,4-Dichlorobenzene	mg/L	-	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5	-	1.00
Benzene	mg/L	-	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	< 0.5	-	5.00
Dichloromethane	mg/L	-	-	<1	-	<1	-	<1	-	<1	-	<1	-	< 0.5	-	50.00
Toluene	mg/L	-	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	<0.3	-	< 0.5	-	60.00
Vinylchloride	mg/L	-	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.3	-	< 0.2	-	1.00
Field Measurements																
Temperature	^{o}C	-	-	-	-	-	-	-	-	-	-	-	-	6.40	10.40	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	6.42	6.94	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	32.20	65.00	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	52.20	17.00	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	10.49	7.08	-

Notes:

ODWQS	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
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 18
Reasonable Use Calculations (Guideline B-7) - Spring 2024
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Trigger Parameter	SCL 2	SCL 3	SCL 4	SCL 5	SCL 6	SCL 7	SCL 8	SCL 10	SCL 11	SCL 12	SCL 13	SCL 14	SCL 15	SCL 16	Guideline B-7 Calculation $C_m = C_b + x (C_r - C_b)$ Cb	x	Cr	Cm
Health Related																				
Arsenic	mg/L	No	0.0020	0.001	0.0002	0.0007	0.0022	0.002	0.0011	< 0.0002	0.0004	< 0.0002	0.0004	0.0004	0.0006	0.0002	0.0006	0.25	0.03	0.0067
Barium	mg/L	No	0.18	0.05	0.04	0.01	0.05	0.04	0.04	0.01	0.02	0.03	0.08	0.0036	0.04	0.01	0.019	0.25	1	0.26
Boron	mg/L	No	0.53	0.01	0.24	0.13	0.12	0.09	0.47	0.003	0.01	0.03	0.04	0.0030	0.02	0.01	0.051	0.25	5	1.29
Cadmium	mg/L	Yes	< 0.000003	0.00001	0.00006	< 0.000003	0.000031	0.000004	< 0.000003	0.000005	< 0.000003	< 0.000003	< 0.000003	0.000035	0.000009	0.000003	0.0001	0.25	0.005	0.001
Chromium	mg/L	No	0.0031	0.0002	0.0002	0.0002	0.0004	0.0010	0.0008	0.0002	0.0006	0.0001	0.0001	0.0009	0.0002	0.0004	0.0012	0.25	0.05	0.013
Lead	mg/L	Yes	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	0.0001	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	0.0006	< 0.00009	< 0.00009	0.0005	0.25	0.01	0.003
Mercury	mg/L	No	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.0001	0.25	0.00	0.001
Nitrate	mg/L	No	< 0.06	< 0.06	0.12	0.08	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.11	< 0.06	0.05	0.25	10	2.58
Nitrite	mg/L	No	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.025	0.25	1	0.27
1,4-Dichlorobenzene	µg/L	Yes	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.14	0.25	1	0.36
Benzene	ug/L	Yes	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.08	0.25	5	1.31
Dichloromethane	µg/L	Yes	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.33	0.25	50	12.74
Toluene	ug/L	Yes	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.70	1.50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.15	0.25	60	15.11
Vinyl Chloride	µg/L	Yes	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.063	0.25	1	0.30
Non-Health Related																				
Alkalinity (low)	mg/L	No	257	322	413	108	207	182	352	**22**	**66**	124	102	**53**	120	**24**	121.78	0.5	30	76
Alkalinity (high)	mg/L	No	257	**322**	**413**	108	207	182	352	22	66	124	102	53	120	24	121.78	0.5	500	311
Chloride	mg/L	Yes	60	2	51	13	51	20	28	< 1	4	17	< 1	< 1	< 1	< 1	3.26	0.5	250	126.65
Copper	mg/L	No	0.002	< 0.001	0.0030	0.0040	0.0020	0.0010	< 0.001	0.0040	0.0020	< 0.001	< 0.001	0.0140	< 0.001	< 0.001	0.0026	0.5	1	0.50
Dissolved Organic Carbon	mg/L	No	**43**	2	**6**	1	**7**	**16**	**15**	3	**4**	2	1	**6**	2	2	3.10	0.5	5	4.0
Iron	mg/L	No	**7.01**	**0.57**	0.01	0.15	**6.73**	**8.59**	**3.25**	0.02	**0.35**	0.09	0.01	**0.40**	0.05	**0.32**	0.06	0.5	0.30	0.18
Manganese	mg/L	No	**2.310**	**0.150**	**0.808**	0.010	**0.631**	**1.210**	**0.452**	0.001	**0.151**	**0.545**	0.005	0.024	**0.048**	**0.067**	0.005	0.5	0.05	0.027
pH (low)	mg/L	No	**6.8**	8.0	7.5	8.2	7.38	7.35	7.9	**7.0**	7.3	7.83	8.12	7.35	7.87	**6.80**	7.86	0.5	6.5	7.18
pH (high)	mg/L	No	6.8	8.0	7.5	**8.24**	7.38	7.35	7.9	7.0	7.3	7.83	8.12	7.35	7.87	6.80	7.86	0.5	8.5	8.18
Sodium	mg/L	No	40.5	11.1	38.2	25.3	20.00	15.40	29.5	1.0	1.5	2.83	2.75	1.29	4.10	0.96	9.05	0.5	200	105
Sulphate	mg/L	No	76	14	**340**	42	36	6	99	4	13	15	12	6	11	4	16.02	0.5	500	258.0
TDS	mg/L	No	**533**	**351**	**997**	171	**383**	263	**620**	< 30	117	189	109	40	146	< 30	157	0.5	500	328.6
Zinc	mg/L	Yes	< 0.002	< 0.002	< 0.002	< 0.002	0.002	0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.03	0.005	< 0.002	0.002	0.5	5	2.50

Notes:

ODWQS	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.
Trigger Parameter	Tigger Parameters outlined according to the Development and Operations Plan for the St.Charles Wate Disposal Site, dated January 2013, by WESA (BluMetric Environmental Inc.)
BOLD	Exceeds C_m value.
C_b	Background Concentration - average of valid sampling rounds at ackground monitoring well MW-9/11
C_r	Maximum Acceptable Contaminant Concentration - set as ODWQS
x	Reduction Constant
C_m	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 19
Reasonable Use Calculations (Guideline B-7) - Fall 2024
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Trigger Parameter	SCL 2	SCL 3	SCL 4	SCL 5	SCL 6	SCL 10	SCL 11	SCL 12	SCL 13	SCL 14	SCL 15	SCL 16	Guideline B-7 Calculation $C_m = C_b + x (C_r - C_b)$ Cb	x	Cr	Cm
Health Related																		
Arsenic	mg/L	No	0.0035	0.0008	0.0002	0.0009	0.0005	< 0.0002	0.0004	< 0.0002	0.0004	0.0004	0.0007	0.0003	0.0006	0.25	0.03	0.0067
Barium	mg/L	No	**0.37**	0.04	0.05	0.01	0.06	0.03	0.03	0.04	0.08	0.003	0.03	0.01	0.019	0.25	1	0.26
Boron	mg/L	No	1.24	0.04	0.32	0.15	0.14	0.01	0.01	0.04	0.03	0.004	0.01	0.01	0.051	0.25	5	1.29
Cadmium	mg/L	Yes	< 0.000003	0.000006	0.000019	0.000006	0.00002	0.000006	< 0.000003	0.000003	0.000004	0.000032	0.00001	< 0.000003	0.0001	0.25	0.005	0.001
Chromium	mg/L	No	0.0045	0.0003	0.0002	0.0002	0.0003	0.0002	0.0006	0.0001	0.0001	0.0007	0.0002	0.0002	0.0012	0.25	0.05	0.013
Lead	mg/L	Yes	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	0.0005	0.25	0.01	0.003
Mercury	mg/L	No	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00001	0.00001	0.00002	0.00002	0.0001	0.25	0.00	0.001
Nitrate	mg/L	No	< 0.06	< 0.06	< 0.06	0.23	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.05	0.25	10	2.58
Nitrite	mg/L	No	< 0.3	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.025	0.25	1	0.27
Non-Health Related																		
Alkalinity	mg/L	No	562	241	422	113	218	**59**	112	160	100	**51**	113	**49**	121.94	0.5	30	76
Alkalinity	mg/L	No	**562**	241	**422**	113	218	59	112	160	100	51	113	49	121.94	0.5	500	311
Chloride	mg/L	Yes	88	2	57	14	48	< 1	12	26	< 1	< 1	< 1	< 1	3.30	0.5	250	126.65
Copper	mg/L	No	< 0.001	< 0.001	0.0010	< 0.001	0.0020	0.0040	0.0030	0.0010	0.0010	0.0060	0.0010	< 0.001	0.0024	0.5	1	0.50
Dissolved Organic Carbon	mg/L	No	**52**	3	**7**	2	**5**	3	**5**	4	2	**6**	2	2	3.06	0.5	5	4.0
Iron	mg/L	No	**17.80**	0.15	0.02	0.01	**0.45**	0.01	**0.24**	0.05	0.01	**0.20**	0.01	**0.65**	0.06	0.5	0.30	0.18
Manganese	mg/L	No	**4.660**	**0.111**	**0.844**	0.008	**0.464**	0.002	**0.300**	**0.730**	0.002	**0.036**	0.023	**0.220**	0.005	0.5	0.05	0.03
pH	mg/L	No	**7.07**	7.9	7.4	8.0	7.64	**7.16**	7.6	7.94	7.99	7.36	7.93	7.38	7.87	0.5	6.5	7.18
pH	mg/L	No	7.1	7.9	7.4	8.0	7.64	7.2	7.6	7.94	7.99	7.36	7.93	7.38	7.87	0.5	8.5	8.18
Sodium	mg/L	No	74.4	9.4	46.6	28.4	14.00	1.7	2.3	3.35	2.78	1.18	4.77	1.35	9.07	0.5	200	105
Sulphate	mg/L	No	71	8	**410**	42	61	9	11	16	11	3	10	4	16.09	0.5	500	258.0
TDS	mg/L	No	**880**	246	**1070**	151	**420**	40	143	229	134	66	149	66	158	0.5	500	328.8
Zinc	mg/L	Yes	< 0.002	0.003	0.003	< 0.002	< 0.002	0.003	< 0.002	< 0.002	< 0.002	0.03	0.004	< 0.002	0.002	0.5	5	2.50

Notes:

ODWQS	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.
Trigger Parameter	Tigger Paran Tigger Parameters outlined according to the Development and Operations Plan for the St.Charles Wate Disposal Site, dated January 2013, by WESA (BluMetric Environmental Inc.)
BOLD	Exceeds C_m ' Exceeds C_m value.
C_b	Background ' Background Concentration - average of valid sampling rounds at ackground monitoring well MW-9/11
C_r	Maximum Ac Maximum Acceptable Contaminant Concentration - set as ODWQS
x	Reduction C(Reduction Constant
C_m	Maximum Of Maximum Off-Site Acceptable Contaminant Concentration

TABLE 20
Groundwater Duplicate Data - Spring 2024
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	RDL	PQL	SCL16	GW DUP 1	Relative Percent Difference (%)	SCL5	GW DUP 2	Relative Percent Difference (%)
Alkalinity	mg/L as CaCO3	2	10	24	27	11.76	108	105	2.82
Electrical Conductivity	uS/cm	2	10	56	53	5.50	332	324	2.44
pH	No unit	0.05	0.25	6.8	6.93	1.89	8.24	8	0.49
Total Dissolved Solids	as N mg/L	30	150	< 0.05	< 0.05	NC	0.08	0.08	NC
Chloride	mg/L	1	5	< 1	< 1	NC	13	12	8.00
Biochemical Oxygen Demand (BOD5)	mg/L	2	10	< 4	< 4	NC	< 4	< 4	NC
Chemical Oxygen Demand	as N mg/L	8	40	< 0.06	< 0.06	NC	0.08	0.1	NC
Ammonia+Ammonium (N)	mg/L	0.04	0.2	< 8	< 8	NC	< 8	12	NC
Dissolved Organic Carbon	mg/L	1	5	2	2	NC	1	1	NC
Sulphate	mg/L	2	10	< 30	< 30	NC	171	169	1.18
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	< 0.002	< 0.002	NC	< 0.002	< 0.002	NC
Calcium	mg/L	0.01	0.05	5.8	5.84	0.69	26.4	27.7	4.81
Magnesium	mg/L	0.001	0.005	1.52	1.49	1.99	6.7	7.05	5.09
Sodium	mg/L	0.01	0.05	0.96	0.98	2.06	25.3	26.9	6.13
Potassium	mg/L	0.009	0.045	0.798	0.772	3.31	3.97	4.14	4.19
Total Phosphorus	mg/L	0.03	0.15	0.3	0.26	14.29	< 0.03	< 0.03	NC
Nitrate (as N)	as N mg/L	0.03	0.15	< 0.03	< 0.03	NC	< 0.03	< 0.03	NC
Nitrite (as N)	mg/L	0.06	0.3	4	4	0.00	42	42	0.00
Nitrate + Nitrite (as N)	as N mg/L	0.06	0.3	< 0.06	< 0.06	NC	0.08	0.1	NC
4AAP-Phenolics		0.002	0.01	< 0.04	< 0.04	NC	0.1	0.09	10.53
Aluminium	mg/L	0.001	0.005	0.077	0.08	3.82	0.002	0.007	NC
Arsenic	mg/L	0.0002	0.001	0.0002	< 0.0002	NC	0.0007	0.0008	NC
Barium	mg/L	0.00002	0.0001	0.00826	0.00816	1.22	0.00781	0.00792	1.40
Boron	mg/L	0.002	0.01	0.005	0.004	NC	0.133	0.14	5.13
Cadmium	mg/L	0.000003	0.000015	0.000003	0.000004	NC	< 0.000003	< 0.000003	NC
Chromium	mg/L	0.00008	0.0004	0.00037	0.00033	NC	0.00019	0.00012	NC
Cobalt	mg/L	0.000004	0.00002	0.000258	0.00026	0.77	0.000035	0.000018	NC
Copper	mg/L	0.0002	0.001	< 0.001	0.001	NC	0.004	< 0.001	NC
Iron	mg/L	0.007	0.035	0.322	0.33	2.45	0.153	0.029	NC
Lead	mg/L	0.00009	0.00045	< 0.00009	< 0.00009	NC	< 0.00009	< 0.00009	NC
Manganese	mg/L	0.00001	0.00005	0.0667	0.0665	0.30	0.0098	0.00931	5.13
Mercury (dissolved)	mg/L	0.00001	0.00005	< 0.00001	< 0.00001	NC	< 0.00001	< 0.00001	NC
Zinc	mg/L	0.002	0.01	< 0.002	< 0.002	NC	< 0.002	< 0.002	NC
1,4-Dichlorobenzene	µg/L	0.5	0.01	< 0.5	< 0.5	NC	< 0.5	< 0.5	NC
Benzene	ug/L	0.5	2.5	< 0.5	< 0.5	NC	< 0.5	< 0.5	NC
Dichloromethane	µg/L	0.5	2.5	< 0.5	< 0.5	NC	< 0.5	< 0.5	NC
Toluene	ug/L	0.5	2.5	< 0.5	< 0.5	NC	< 0.5	< 0.5	NC
Vinyl Chloride	µg/L	0.2	1	< 0.2	< 0.2	NC	< 0.2	< 0.2	NC

Notes:

NC

BOLD

RDL

PQL

TABLE 21
Groundwater Duplicate Data - Fall 2024
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	RDL	PQL	SCL1	GW DUP 1	Relative Percent Difference (%)	SCL2	GW DUP 2	Relative Percent Difference (%)
Alkalinity	mg/L as CaCO3	2	10	128	129	0.78	562	555	1.25
Electrical Conductivity	uS/cm	2	10	297	297	0.00	1330	1340	0.75
pH	No unit	0.05	0.25	8.06	8.06	0.00	7.07	7	0.71
Total Dissolved Solids	as N mg/L	30	150	< 0.5	< 0.5	NC	5.2	5.3	NC
Chloride	mg/L	1	5	5	5	NC	88	99	11.76
Biochemical Oxygen Demand (BOD5)	mg/L	2	10	< 4	< 4	NC	5	5	NC
Chemical Oxygen Demand	as N mg/L	8	40	< 0.06	< 0.06	NC	< 0.06	< 0.06	NC
Ammonia+Ammonium (N)	mg/L	0.04	0.2	< 8	8	NC	178	186	4.40
Dissolved Organic Carbon	mg/L	1	5	2	2	NC	52	60	14.29
Sulphate	mg/L	2	10	171	154	10.46	880	880	0.00
Total Kjeldahl Nitrogen	mg/L	0.05	0.25	< 0.002	< 0.002	NC	0.004	0.004	NC
Calcium	mg/L	0.01	0.05	55.6	54.2	2.55	165	165	0.00
Magnesium	mg/L	0.001	0.005	7.86	7.82	0.51	41.6	41.7	0.24
Sodium	mg/L	0.01	0.05	9.89	10	1.11	74.4	74.3	0.13
Potassium	mg/L	0.009	0.045	3.02	3.04	0.66	11.5	11.3	1.75
Total Phosphorus	mg/L	0.03	0.15	< 0.03	< 0.03	NC	< 0.03	< 0.03	NC
Nitrate (as N)	as N mg/L	0.03	0.15	< 0.03	< 0.03	NC	< 0.3	< 0.3	NC
Nitrite (as N)	mg/L	0.06	0.3	19	19	0.00	71	66	7.30
Nitrate + Nitrite (as N)	as N mg/L	0.06	0.3	< 0.06	< 0.06	NC	< 0.3	< 0.3	NC
Nitrate + Nitrite (as N)	mg/L	0.06	0.3	< 0.06	< 0.06	NC	< 0.3	< 0.3	NC
Aluminium	mg/L	0.001	0.005	0.002	0.002	NC	0.121	0.119	1.67
Arsenic	mg/L	0.0002	0.001	0.0004	0.0004	NC	0.0035	0.0034	2.90
Barium	mg/L	0.00002	0.0001	0.0271	0.0282	3.98	0.367	0.366	0.27
Boron	mg/L	0.002	0.01	0.062	0.055	11.97	1.24	1.21	2.45
Cadmium	mg/L	0.000003	0.000015	0.000004	0.000003	NC	< 0.000003	< 0.000003	NC
Chromium	mg/L	0.00008	0.0004	0.00017	0.00022	NC	0.00448	0.00437	2.49
Cobalt	mg/L	0.000004	0.00002	0.000011	0.00001	NC	0.0154	0.0153	0.65
Copper	mg/L	0.0002	0.001	< 0.001	0.001	NC	< 0.001	< 0.001	NC
Iron	mg/L	0.007	0.035	< 0.007	< 0.007	NC	17.8	17.3	2.85
Lead	mg/L	0.00009	0.00045	< 0.00009	< 0.00009	NC	< 0.00009	< 0.00009	NC
Manganese	mg/L	0.00001	0.00005	0.0002	0.00016	22.22	4.66	4.61	1.08
Mercury (dissolved)	mg/L	0.00001	0.00005	0.00001	0.00002	NC	0.00002	< 0.00001	NC
Zinc	mg/L	0.002	0.01	< 0.002	< 0.002	NC	< 0.002	< 0.002	NC

Notes:

NC

BOLD

RDL

PQL

TABLE 22
Surface Water Quality Results - SW1
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																PWQO	APV	CWQG
		Sample Collection Date (dd/mm/yyyy)																		
		SW1																		
		Jun-17	Nov-17	July-18	Nov-18	June-19	Oct-19	Apr-20	Nov-20	Jun-21	Nov-21	Jun-22	Oct-22	May-23	Nov-23	May-24	Sep-24			
Alkalinity	mg/L as CaCO3	342	283	-	116	170	225	252	288	335	359	201	268	239	266.00	123	DRY	-	-	-
Ammonia		**0.056**	0.02	-	<0.01	**0.08**	<0.01	0.02	<0.01	**0.1**	<0.01	**0.26**	<0.01	0.0100	<0.01	-	-	0.02	-	-
Ammonia+Ammonium (N)	as N mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.04	-	-	-	-
BOD	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 4	-	-	-	-
COD	mg/L	220.00	0.42	-	26	3530	34	311	30	42	22	128	71	113	26	25	-	-	-	-
Dissolved Organic Carbon	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.80	-	-	-	-
Hardness	mg/L as CaCO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	167	-	-	-	-
Chloride	mg/L	90.40	45.10	-	39.20	61.20	76.80	101	94.10	84	96.80	113	156	78.00	83.90	26	-	-	180	120
Conductivity	uS/cm	1050	688	-	403	444	758	991	989	1040	1060	747	1030	-	-	391	-	-	-	-
Nitrate	as N mg/L	0.14	0.24	-	0.68	<0.05	0.34	2.70	2.80	<0.5	2.69	0.13	0.06	0.75	0.70	0.46	-	-	-	2.9
Nitrite	as N mg/L	<0.03	0.03	-	<0.008	<0.05	<0.05	<0.5	<0.05	<0.5	<0.05	<0.05	0.33	<0.15	<0.1	< 0.03	-	-	-	0.06
Nitrate + Nitrite (as N)	as N mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.46	-			
pH	No unit	7.82	7.90	-	8.21	6.82	7.36	7.27	7.58	7.23	7.41	7.59	8.07	7.45	7.29	8.00	-	6.5-8.5	-	6.5-9.0
4AAP-Phenolics	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.002	-			
Phenols	mg/L	0.001	**0.002**	-	<0.001	**0.002**	<0.0004	**0.0023**	**0.002**	**0.0049**	**0.0038**	**0.0012**	**0.0059**	**0.0014**	0.001	-	-	0.001	0.961	0.004
Calcium	mg/L	362	45	-	34	161	83	114	115	456	133	188	130	88	126	46	-	-	-	-
Phosphate	mg/L	-	-	-	-	17.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-			
Potassium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.10	-			
Sulphate	mg/L	95	34	-	23	1	63	98	63	91	83	21	73	107	68	41	-	-	100	-
Sodium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	-			
TDS	mg/L	790	470	-	110	310	460	720	690	820	670	560	740	590	520	234	-	-	-	-
TKN	as N mg/L	9.00	5.03	-	0.70	56.20	0.40	6.30	0.80	26.00	0.8	1.8	0.5	1.60	0.70	0.32	-	-	-	-
TSS	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47.00	-	-	-	-
Arsenic	mg/L	0.0250	0.0061	-	<0.001	0.0410	0.0010	0.0020	<0.01	0.0460	0.0010	0.0500	0.0030	0.0010	<0.001	0.0004	-	0.1	0.15	0.005
Barium	mg/L	**3.33**	0.25	-	0.023	**1.58**	0.047	0.053	0.06	**3.43**	0.102	**1.9**	0.108	0.210	0.07	0.03	-	-	2.3	-
Boron	mg/L	**0.678**	0.16	-	0.089	0.116	**0.248**	**0.31**	**0.33**	**0.561**	**0.399**	**0.32**	**0.427**	**0.2830**	**0.43**	**0.21**	-	0.2	3.55	1.5
Cadmium	mg/L	**0.05**	<0.0001	-	0.0001	**0.01**	0.0002	0.0002	<0.001	**0.0813**	**0.0012**	**0.03**	**0.0012**	**0.0014**	**0.0004**	0.000029	-	0.0002	0.00021	0.00026
Chromium	mg/L	**0.058**	0.02	-	0.001	**0.13**	<0.001	0.004	<0.01	**0.1**	0.003	**0.2**	0.004	0.0030	<0.001	0.00072	-	0.0089	0.064	0.001
Copper	mg/L	***0.63***	***0.04***	-	***0.007***	***0.47***	0.004	0.003	<0.01	***1.02***	***0.019***	***0.66***	***0.02***	***0.0230***	0.003	0.003	-	0.005	0.0069	0.004
Iron	mg/L	**451**	**67.50**	-	**1.4**	**775**	**0.5**	0.13	<0.2	**862**	**4.3**	**331**	**8.9**	**6.90**	**1.10**	0.14	-	0.3	-	0.3
Lead	mg/L	***0.1950***	***0.02***	-	0.001	***0.1810***	<0.0001	<0.0001	<0.001	**0.229**	*0.0041*	***0.2830***	*0.0030*	***0.006***	0.0001	0.00021	-	0.005	0.002	0.01
Magnesium	mg/L	53.50	17.50	-	6.22	30.50	14.60	19.40	17.10	46.70	22.70	66.10	23.10	26.00	21.90	12.80	-	-	-	-
Manganese	mg/L	**11.8**	**4.77**	-	0.048	**11.8**	0.008	0.02	0.01	**29.6**	**0.192**	**24.8**	**0.261**	**5.7**	**0.14**	-	-	-	-	-
Mercury	mg/L	<0.001	<0.0001	-	<0.0001	0.0005	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	< 0.00001	-	0.04	0.73	
Molybdenum	mg/L	<0.010	<0.001	-	<0.001	0.002	<0.001	<0.001	<0.01	0.003	<0.001	<0.01	<0.001	<0.001	<0.001	-	-	0.04	0.73	0.073
Zinc	mg/L	***33.5***	0.02	-	***0.159***	***3.54***	***0.327***	***0.129***	***0.61***	***44.9***	<0.001	***15.9***	***0.644***	***0.192***	***0.42***	0.01	-	0.03	0.089	0.093
Benzene	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-			
1,4-Dichlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-			
Dichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-			
Toluene	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-			
Vinyl Chloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	-			
Field Measurements																				
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.00	-	-	-	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.44	-	-	-	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	471	-	-	-	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	95.70	-	-	-	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.48	-	-	-	-

Notes:

PWQO	Provincial Water Quality Objective
APV	Aquatic Protection Values
CWQG	Canadian Water Quality Guidelines
BOLD	Exceeds PWQO
ITALICS	Exceeds APV
UNDERLINED	Exceeds CWQG
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 23
Surface Water Quality Results - SW2
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																PWQO	APV	CWQG
		Sample Collection Date (dd/mm/yyyy)																		
		SW2																		
		Nov-16	Jun-17	Nov-17	July-18	Nov-18	June-19	Oct-19	Apr-20	Nov-20	Jun-21	Nov-21	June-22	Oct-22	May-23	Nov-23	May-24	Sep-24			
Alkalinity	mg/L as CaCO3	221	307	244	-	119	312	94	257	91	376	281	233	97	348	127	250	DRY	-	-	-
Ammonia		<0.01	<0.01	0.018	-	0.02	0.02	<0.01	<0.01	<0.01	**0.05**	**0.25**	**0.03**	<0.01	<0.01	<0.01	-	-	0.02	-	-
Ammonia+Ammonium (N)	as N mg/L	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.04	-	0.02	-	-
BOD	mg/L	1.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 4	-	-	-	-
COD	mg/L	30.00	134.00	58.70	-	68.00	258.00	62.00	34.00	62.00	80.00	147.00	77.00	77.00	55.00	62.00	37	-	-	-	-
Dissolved Organic Carbon	mg/L	201.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.80	-	-	-	-
Hardness	mg/L as CaCO3	201.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	293	-	-	-	-
Chloride	mg/L	43.00	25.10	36.00	-	24.40	19.00	21.60	*226.00*	38.30	70.30	50.70	46.10	46.50	51.70	37.60	22	-	-	180	120
Conductivity	uS/cm	671	664	580	-	387	641	413	1380	373	968	672	588	833	963	437	642	-	-	-	-
Nitrate	as N mg/L	<0.1	<0.1	<0.1	-	0.03	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	0.27	<0.15	<0.05	0.09	-	-	-	2.9
Nitrite	as N mg/L	<0.03	<0.03	<0.03	-	<0.008	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.15	<0.05	< 0.03	-	-	-	0.06
Nitrate + Nitrite (as N)	as N mg/L	7.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09	-			
pH	No unit	7.05	7.95	7.83	-	8.22	7.39	6.97	7.40	**6.45**	7.47	7.30	7.97	7.88	7.67	7.62	8.12	-	6.5-8.5	-	6.5-9.0
4AAP-Phenolics	mg/L				-												0.004	-			
Phenols	mg/L	**0.015**	**0.0013**	**0.0019**	-	<0.001	<0.001	**0.0047**	**0.0013**	**0.0061**	**0.0082**	**0.0069**	<0.0004	**0.0041**	**0.0014**	**0.0011**	-	-	0.001	0.961	0.004
Calcium	mg/L	70.80	74.50	54.50	-	33.80	73.60	39.30	151.00	35.80	148.00	86.30	66.50	98.70	128.00	45.60	86	-	-	-	-
Phosphate	mg/L	0.0198	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	mg/L	0.0198	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-			
Potassium	mg/L	0.0198	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.20	-			
Sulphate	mg/L	19	26	10	-	27	43	79	95	25	52	14	14	280	*165*	53	68	-	-	100	-
Sodium	mg/L	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	-			
TDS	mg/L	530	520	420	-	<30	500	230	1040	240	700	430	410	530	670	360	420	-	-	-	-
TKN	as N mg/L	2.40	4.00	1.40	-	1.00	5.10	1.30	1.00	1.10	10.60	21.60	0.7	0.7	0.8	1.30	0.70	-	-	-	-
TSS	mg/L	112.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.00	-	-	-	-
Arsenic	mg/L	0.0010	0.0015	<0.0001	-	<0.001	0.0010	<0.01	0.0050	<0.001	0.0040	0.0020	0.0010	0.0020	<0.001	0.0020	0.0005	-	0.1	0.15	0.005
Barium	mg/L	**45.60**	0.0528	0.0616	-	0.023	0.051	0.031	0.06	0.021	0.16	0.078	0.039	0.067	0.052	0.037	0.03	-	-	2.3	-
Boron	mg/L	**0.39**	**0.257**	**0.272**	-	0.122	**0.348**	**0.241**	**0.384**	0.161	**0.573**	**0.261**	**0.311**	**0.869**	**0.476**	**0.2810**	**0.33**	-	0.2	3.55	1.5
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	***0.161***	***0.0006***	***0.0007***	<0.0001	<0.0001	<0.0001	<0.0001	0.00001	-	0.0002	0.00021	0.00026
Chromium	mg/L	<0.001	0.0021	0.0014	-	0.001	0.003	<0.001	0.005	0.002	0.005	0.002	0.001	0.003	0.002	0.0010	0.00084	-	0.0089	0.064	0.001
Copper	mg/L	<0.001	0.0035	0.0026	-	***0.006***	0.004	0.004	0.002	<0.001	***0.017***	***0.017***	0.002	0.002	0.002	0.004	0.002	-	0.005	0.0069	0.004
Iron	mg/L	**0.90**	**4.89**	**3.1**	-	**2**	**2.5**	**1.6**	0.18	**2.4**	**36.3**	**4.8**	**1.98**	**2.14**	**0.31**	**1.90**	**0.42**	-	0.3	-	0.3
Lead	mg/L	0.003	0.00138	0.0003	-	0.0006	0.001	0.0002	<0.0001	<0.0001	0.004	0.008	0.0003	0.0002	0.0001	0.001	0.00020	-	0.005	0.002	0.01
Magnesium	mg/L	19.40	22.90	18.70	-	9.43	19.70	9.63	37.50	11.40	29.40	119.90	18.00	23.30	31.50	13.60	19.00	-	-	-	-
Manganese	mg/L	0.524	1.11	0.727	-	0.26	0.43	0.73	0.013	1.07	2.12	0.42	0.32	0.33	0.034	0.29	-	-	-	-	-
Mercury	mg/L	<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	<0.0001	< 0.00001	-	0.04	0.73	
Molybdenum	mg/L	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	0.04	0.73	0.073
Zinc	mg/L	0.003	0.0089	0.008	-	0.013	0.016	0.02	0.005	<0.001	***0.128***	*0.092*	0.004	0.021	0.01	0.009	0.004	-	0.03	0.089	0.093
Benzene	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-			
1,4-Dichlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-			
Dichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-			
Toluene	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-			
Vinyl Chloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	-			
Field Measurements																					
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not	-	-	-	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Taken	-	-	-	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

PWQO	Provincial Water Quality Objective
APV	Aquatic Protection Values
CWQG	Canadian Water Quality Guidelines
BOLD	Exceeds PWQO
ITALICS	Exceeds APV
UNDERLINED	Exceeds CWQG
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 24
Surface Water Quality Results - SW3
St. Charles Landfill Site
Municipality of St. Charles, Ontario

Parameter	Units	Sample Designation																PWQO	APV	CWQG
		Sample Collection Date (dd/mm/yyyy)																		
		SW3																		
		Nov-16	Jun-17	Nov-17	July-18	Nov-18	June-19	Oct-19	Apr-20	Nov-20	Jun-21	Nov-21	June-22	Oct-22	May-23	Nov-23	May-24	Sep-24			
Alkalinity	mg/L as CaCO3	253	376	430	-	114	225	89	263	194	375	448	224	176	363	116.00	295	DRY	-	-	-
Ammonia		<0.01	<0.01	0.03	-	<0.01	<0.01	<0.01	0.02	<0.01	**0.06**	**0.03**	**0.03**	**0.03**	<0.01	**0.29**	-	-	0.02	-	-
Ammonia+Ammonium (N)	as N mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-
BOD	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 4	-	-	-	-
COD	mg/L	85.40	88.10	163.00	-	59.00	311.00	88.00	38.00	38.00	128.00	83.00	126.00	159.00	80.00	85.00	41	-	-	-	-
Dissolved Organic Carbon	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.30	-	-	-	-
Hardness	mg/L as CaCO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	364	-	-	-	-
Chloride	mg/L	47.50	27.50	61.30	-	23.90	9.40	21.00	***203.00***	70.60	71.00	89.40	32.00	61.60	52.00	24.50	22	-	-	180	120
Conductivity	uS/cm	798	882	960	-	442	414	354	1350	640	1040	1130	521	1010	1060	351.00	728	-	-	-	-
Nitrate	as N mg/L	<0.1	<0.1	<0.1	-	<0.02	<0.05	<0.05	<0.5	0.08	<0.5	<0.05	<0.05	0.05	<0.15	<0.05	< 0.06	-	-	-	2.9
Nitrite	as N mg/L	<0.03	<0.03	<0.03	-	<.008	<0.05	<0.05	<0.5	<0.05	<0.5	<0.05	<0.05	<0.05	<0.15	<0.05	< 0.03	-	-	-	0.06
Nitrate + Nitrite (as N)	as N mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.06	-		-	
pH	No unit	7.49	7.97	8.02	-	8.21	7.23	6.95	7.48	7.51	7.19	7.25	7.47	8.06	7.57	7.33	7.93	-	6.5-8.5	-	6.5-9.0
4AAP-Phenolics	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.003	-	-	-	-
Phenols	mg/L	<0.001	<0.001	**0.0012**	-	<0.001	<0.001	**0.0045**	**0.0017**	**0.0012**	**0.0019**	<0.0004	**0.0061**	**0.0036**	**0.0043**	**0.002**	-	-	0.001	0.961	0.004
Calcium	mg/L	89.10	108.00	119.00	-	37.50	54.00	33.40	154.00	95.80	171.00	165.00	71.60	176.00	156.00	47.80	107	-	-	-	-
Phosphate	mg/L	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	-	-	-	-
Potassium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.50	-	-	-	-
Sulphate	mg/L	49	86	24	-	60	22	63	**107**	16	82	97	11	**330**	**181**	45	75	-	-	100	-
Sodium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	-	-	-	-
TDS	mg/L	560	680	680	-	50	320	240	1090	440	770	760	640	770	700	310	489	-	-	-	-
TKN	as N mg/L	1.80	1.30	4.77	-	0.80	5.00	1.30	0.90	0.60	145	9.5	1.3	1.5	0.90	1.60	0.72	-	-	-	-
TSS	mg/L	60.50			-												26.00	-	-	-	-
Arsenic	mg/L	0.0010	0.0012	0.0034	-	<0.001	0.0020	0.0010	0.0050	<0.001	0.0040	0.0060	0.0050	0.0020	0.0010	0.001	0.0006	-	0.1	0.15	0.005
Barium	mg/L	0.035	0.0612	0.08	-	0.025	0.061	0.027	0.057	0.032	0.095	0.096	0.17	0.102	0.070	0.05	0.04	-	-	2.3	-
Boron	mg/L	**0.503**	**0.553**	**0.55**	-	0.18	**0.247**	0.193	**0.392**	**0.39**	**0.647**	0.002	**0.226**	**1.27**	**0.5190**	**0.29**	**0.38**	-	0.2	3.55	1.5
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	-	0.0001	0.0001	<0.0001	<0.0001	<0.0001	***0.0003***	***0.0003***	***0.0006***	***0.0006***	0.0001	0.0001	0.00001	-	0.0002	0.00021	0.00026
Chromium	mg/L	0.001	0.0011	0.0013	-	<0.001	0.003	<0.001	0.005	0.006	0.005	0.002	0.009	0.001	0.002	0.0010	0.00076	-	0.0089	0.064	0.001
Copper	mg/L	0.001	0.001	0.0021	-	**0.006**	0.004	***0.007***	0.001	0.002	***0.015***	**0.008**	***0.02***	***0.009***	0.004	0.005	0.001	-	0.005	0.0069	0.004
Iron	mg/L	**2.43**	**2.2**	**10.90**	-	**1.2**	**10.1**	**0.7**	0.21	<0.02	**15.1**	**16.3**	**63**	**17**	**4.40**	**6.50**	**1.31**	-	0.3	-	0.3
Lead	mg/L	<0.001	0.0001	0.0004	-	0.0004	0.0009	0.0004	<0.0001	<0.0001	0.005	0.0017	***0.0062***	0.0006	0.001	0.0007	0.00015	-	0.005	0.002	0.01
Magnesium	mg/L	23.90	30.70	36.50	-	9.36	12.70	9.68	35.40	29.90	33.60	37.60	18.20	31.40	33.50	13.50	23.60	-	-	-	-
Manganese	mg/L	0.31	0.956	0.73	-	0.28	1.42	0.37	0.02	<0.001	0.37	0.88	3.6	1.75	0.201	0.94	-	-	-	-	-
Mercury	mg/L	<0.001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	< 0.00001	-	0.04	0.73	
Molybdenum	mg/L	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	0.04	0.73	0.073
Zinc	mg/L	0.003	0.0105	0.01	-	0.028	0.024	0.018	0.005	0.002	**0.069**	**0.047**	***0.111***	***0.139***	0.021	0.03	0.003	-	0.03	0.089	0.093
Benzene	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-	-	-	-
1,4-Dichlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-	-	-	-
Dichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-	-	-	-
Toluene	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-	-	-	-
Vinyl Chloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	-	-	-	-
Field Measurements																					
Temperature	^{o}C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.50		-	-	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.55		-	-	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	605		-	-	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	67.40		-	-	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.13		-	-	-

Notes:

PWQO	Provincial Water Quality Objective
APV	Aquatic Protection Values
CWQG	Canadian Water Quality Guidelines
BOLD	Exceeds PWQO
ITALICS	Exceeds APV
UNDERLINED	Exceeds CWQG
Units	All Units in mg/L Unless Otherwise Noted.

APPENDIX V

Photographic Log

SCL1

SCL1

SCL2

SCL2

SCL3

SCL3

SCL4

SCL4

SCL5

SCL5

SCL6

SCL6

SCL7

SCL7

SCL8

SCL8

SCL9

SCL9

SCL10

SCL10

SCL11

SCL11

SCL12

SCL12

	**SCL13**
	**SCL13**

	**SCL14**
	**SCL14**

	**SCL15**
	**SCL15**

SCL16

SCL16

SW1

SW1

SW2

SW2

SW3

SW3

APPENDIX VI

Laboratory Certificates of Analysis

FINAL REPORT

CA15551-MAY24 R

335248.000, St. Charles GW

Prepared for

Pinchin Ltd

FINAL REPORT

CA15551-MAY24 R

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	Pinchin Ltd	Project Specialist	Maarit Wolfe, Hon.B.Sc
		Laboratory	SGS Canada Inc.
Address	662 Falconbridge Rd, Unit 3, Sudbury Canada, P3A 4S4 Phone: 705-521-0560 cell: 705-618-0186.	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Greg Way	Telephone	705-652-2000
Telephone	705-521-0560 cell: 705-618-0186	Facsimile	705-652-6365
Facsimile		Email	Maarit.Wolfe@sgs.com
Email	gway@Pinchin.com	SGS Reference	CA15551-MAY24
Project	335248.000, St. Charles GW	Received	05/02/2024
Order Number		Approved	05/13/2024
Samples	Ground Water (18)	Report Number	CA15551-MAY24 R
		Date Reported	05/13/2024

COMMENTS

Temperature of Sample upon Receipt: 6 degrees C

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

TABLE OF CONTENTS

Client: Pinchin Ltd
Project: 335248.000, St. Charles GW
Project Manager: Greg Way
Samplers: Aezlyn Nishet

MATRIX: WATER

Sample Number				5	6	7	8	9	10	11	12
Sample Name				SCL1	SCL2	SCL3	SCL4	SCL5	SCL6	SCL7	SCL8
Sample Matrix				Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date				01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024
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	ug/L	0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.7	1.5
General Chemistry											
Biochemical Oxygen Demand (BOD5)	mg/L	2		< 4 ↑	< 4 ↑	< 4 ↑	< 4 ↑	< 4 ↑	< 4 ↑	< 4 ↑	< 4 ↑
Alkalinity	mg/L as CaCO3	2		123	257	322	413	108	207	182	352
Conductivity	uS/cm	2		294	789	591	1370	332	622	403	876
Total Dissolved Solids	mg/L	30		191	533	351	997	171	383	263	620
Ammonia+Ammonium (N)	as N mg/L	0.04		< 0.04	0.84	0.05	0.05	0.10	< 0.04	0.63	0.52
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05		< 0.05	1.88	0.13	0.14	0.08	0.27	1.46	1.03
Chemical Oxygen Demand	mg/L	8		< 8	106	9	17	< 8	18	50	33
Dissolved Organic Carbon	mg/L	1		2	43	2	6	1	7	16	15
Metals and Inorganics											
Phosphorus (total)	mg/L	0.03		0.04	0.07	1.80	< 0.03	< 0.03	0.05	0.34	0.16
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		0.08	< 0.06	< 0.06	0.12	0.08	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L	0.06		0.08	< 0.06	< 0.06	0.12	0.08	< 0.06	< 0.06	< 0.06
Sulphate	mg/L	2		21	76	14	340	42	36	6	99
Aluminum (dissolved)	mg/L	0.001		0.004	0.094	0.010	0.002	0.002	0.016	0.071	0.031
Arsenic (dissolved)	mg/L	0.0002		0.0003	0.0020	0.0011	0.0002	0.0007	0.0022	0.0016	0.0011
Barium (dissolved)	mg/L	0.00008		0.0277	0.183	0.0494	0.0442	0.00781	0.0528	0.0410	0.0436
Boron (dissolved)	mg/L	0.002		0.063	0.525	0.010	0.237	0.133	0.122	0.093	0.468

Client: Pinchin Ltd
Project: 335248.000, St. Charles GW
Project Manager: Greg Way
Samplers: Aezlyn Nishet

MATRIX: WATER

Sample Number				5	6	7	8	9	10	11	12
Sample Name				SCL1	SCL2	SCL3	SCL4	SCL5	SCL6	SCL7	SCL8
Sample Matrix				Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date				01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024
Parameter	**Units**	**RL**		**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)											
Calcium (dissolved)	mg/L	0.01		48.1	88.1	74.4	146	26.4	69.9	51.9	117
Cadmium (dissolved)	mg/L	0.000003		0.000003	< 0.000003	0.000010	0.000060	< 0.000003	0.000031	0.000004	< 0.000003
Cobalt (dissolved)	mg/L	0.000004		0.000024	0.00489	0.000339	0.00484	0.000035	0.00679	0.00485	0.000410
Chromium (dissolved)	mg/L	0.00008		0.00024	0.00308	0.00020	0.00019	0.00019	0.00041	0.00100	0.00075
Copper (dissolved)	mg/L	0.001		< 0.001	0.002	< 0.001	0.003	0.004	0.002	0.001	< 0.001
Iron (dissolved)	mg/L	0.007		< 0.007	7.01	0.571	0.010	0.153	6.73	8.59	3.25
Lead (dissolved)	mg/L	0.00009		< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	0.00013	< 0.00009
Potassium (dissolved)	mg/L	0.009		2.95	5.14	0.929	2.31	3.97	3.61	6.16	14.1
Magnesium (dissolved)	mg/L	0.001		7.99	23.2	29.0	81.5	6.70	23.9	14.2	30.2
Manganese (dissolved)	mg/L	0.00001		0.00087	2.31	0.150	0.808	0.00980	0.631	1.21	0.452
Sodium (dissolved)	mg/L	0.01		9.48	40.5	11.1	38.2	25.3	20.0	15.4	29.5
Zinc (dissolved)	mg/L	0.002		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002	0.002	0.002
Other (ORP)											
pH	No unit	0.05		8.24	6.84	7.98	7.52	8.24	7.38	7.35	7.94
Chloride	mg/L	1		6	60	2	51	13	51	20	28
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: 335248.000, St. Charles GW
Project Manager: Greg Way
Samplers: Aezlyn Nishet

MATRIX: WATER

Sample Number				5	6	7	8	9	10	11	12
Sample Name				SCL1	SCL2	SCL3	SCL4	SCL5	SCL6	SCL7	SCL8
Sample Matrix				Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date				01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024
Parameter	**Units**	**RL**		**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Phenols											
4AAP-Phenolics	mg/L	0.002		< 0.002	0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
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				13	14	15	16	17	18	19	20
Sample Name				SCL10	SCL11	SCL12	SCL13	SCL14	SCL15	SCL16	GW DUP1
Sample Matrix				Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date				01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024
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	ug/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↑
Alkalinity	mg/L as CaCO3	2		22	66	124	102	53	120	24	27
Conductivity	uS/cm	2		55	164	311	223	116	250	56	53
Total Dissolved Solids	mg/L	30		< 30	117	189	109	40	146	< 30	< 30
Ammonia+Ammonium (N)	as N mg/L	0.04		< 0.04	0.05	0.06	0.04	< 0.04	< 0.04	< 0.04	< 0.04
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05		0.08	0.14	0.13	< 0.05	0.13	< 0.05	< 0.05	< 0.05
Chemical Oxygen Demand	mg/L	8		< 8	14	< 8	11	14	< 8	< 8	< 8

Client: Pinchin Ltd
Project: 335248.000, St. Charles GW
Project Manager: Greg Way
Samplers: Aezlyn Nishet

MATRIX: WATER

Sample Number				13	14	15	16	17	18	19	20
Sample Name				SCL10	SCL11	SCL12	SCL13	SCL14	SCL15	SCL16	GW DUP1
Sample Matrix				Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date				01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024
Parameter	**Units**	**RL**		**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
General Chemistry (continued)											
Dissolved Organic Carbon	mg/L	1		3	4	2	1	6	2	2	2
Metals and Inorganics											
Phosphorus (total)	mg/L	0.03		0.11	0.04	0.06	0.06	0.53	0.14	0.30	0.26
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	< 0.06	< 0.06	< 0.06	< 0.06	0.11	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L	0.06		< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.11	< 0.06	< 0.06
Sulphate	mg/L	2		4	13	15	12	6	11	4	4
Aluminum (dissolved)	mg/L	0.001		0.042	0.058	0.002	0.006	0.408	0.006	0.077	0.080
Arsenic (dissolved)	mg/L	0.0002		< 0.0002	0.0004	< 0.0002	0.0004	0.0004	0.0006	0.0002	< 0.0002
Barium (dissolved)	mg/L	0.00008		0.0124	0.0194	0.0279	0.0836	0.00361	0.0365	0.00826	0.00816
Boron (dissolved)	mg/L	0.002		0.003	0.010	0.026	0.038	0.003	0.017	0.005	0.004
Calcium (dissolved)	mg/L	0.01		4.99	25.3	49.3	34.7	6.64	40.1	5.80	5.84
Cadmium (dissolved)	mg/L	0.000003		0.000005	< 0.000003	< 0.000003	< 0.000003	0.000035	0.000009	0.000003	0.000004
Cobalt (dissolved)	mg/L	0.000004		0.000234	0.000099	0.000108	0.000045	0.000568	0.000102	0.000258	0.000260
Chromium (dissolved)	mg/L	0.00008		0.00020	0.00058	0.00011	0.00010	0.00088	0.00019	0.00037	0.00033
Copper (dissolved)	mg/L	0.001		0.004	0.002	< 0.001	< 0.001	0.014	< 0.001	< 0.001	0.001
Iron (dissolved)	mg/L	0.007		0.021	0.352	0.092	0.008	0.399	0.049	0.322	0.330
Lead (dissolved)	mg/L	0.00009		< 0.00009	< 0.00009	< 0.00009	< 0.00009	0.00060	< 0.00009	< 0.00009	< 0.00009
Potassium (dissolved)	mg/L	0.009		1.09	1.84	2.68	3.92	0.392	3.08	0.798	0.772
Magnesium (dissolved)	mg/L	0.001		1.99	3.87	5.60	6.51	1.42	8.13	1.52	1.49
Manganese (dissolved)	mg/L	0.00001		0.00119	0.151	0.545	0.00546	0.0237	0.0478	0.0667	0.0665
Sodium (dissolved)	mg/L	0.01		1.00	1.52	2.83	2.75	1.29	4.10	0.96	0.98

Client: Pinchin Ltd
Project: 335248.000, St. Charles GW
Project Manager: Greg Way
Samplers: Aezlyn Nishet

MATRIX: WATER

Sample Number				13	14	15	16	17	18	19	20
Sample Name				SCL10	SCL11	SCL12	SCL13	SCL14	SCL15	SCL16	GW DUP1
Sample Matrix				Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date				01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024	01/05/2024
Parameter	**Units**	**RL**		**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)											
Zinc (dissolved)	mg/L	0.002		< 0.002	< 0.002	< 0.002	< 0.002	0.027	0.005	< 0.002	< 0.002
Other (ORP)											
pH	No unit	0.05		7.04	7.34	7.83	8.12	7.35	7.87	6.80	6.93
Chloride	mg/L	1		< 1	4	17	< 1	< 1	< 1	< 1	< 1
Mercury (dissolved)	mg/L	0.00001		< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Phenols											
4AAP-Phenolics	mg/L	0.002		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
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

Client: Pinchin Ltd
Project: 335248.000, St. Charles GW
Project Manager: Greg Way
Samplers: Aezlyn Nishet

MATRIX: WATER

Sample Number	21	22
Sample Name	GW DUP2	FB
Sample Matrix	Ground Water	Ground Water
Sample Date	01/05/2024	01/05/2024

Parameter	Units	RL		Result	Result
BTEX					
Benzene	ug/L	0.5		< 0.5	< 0.5
Toluene	ug/L	0.5		< 0.5	< 0.5
General Chemistry					
Biochemical Oxygen Demand (BOD5)	mg/L	2		< 4↑	< 4↑
Alkalinity	mg/L as CaCO3	2		105	4
Conductivity	uS/cm	2		324	20
Total Dissolved Solids	mg/L	30		169	< 30
Ammonia+Ammonium (N)	as N mg/L	0.04		0.09	< 0.04
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05		0.08	< 0.05
Chemical Oxygen Demand	mg/L	8		12	< 8
Dissolved Organic Carbon	mg/L	1		1	< 1
Metals and Inorganics					
Phosphorus (total)	mg/L	0.03		< 0.03	< 0.03
Nitrite (as N)	as N mg/L	0.03		< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		0.10	< 0.06
Nitrate + Nitrite (as N)	as N mg/L	0.06		0.10	< 0.06
Sulphate	mg/L	2		42	< 2
Aluminum (dissolved)	mg/L	0.001		0.007	0.036
Arsenic (dissolved)	mg/L	0.0002		0.0008	< 0.0002
Barium (dissolved)	mg/L	0.00008		0.00792	0.0141
Boron (dissolved)	mg/L	0.002		0.140	< 0.002

Client: Pinchin Ltd
Project: 335248.000, St. Charles GW
Project Manager: Greg Way
Samplers: Aezlyn Nishet

MATRIX: WATER

Sample Number	21	22
Sample Name	GW DUP2	FB
Sample Matrix	Ground Water	Ground Water
Sample Date	01/05/2024	01/05/2024

Parameter	Units	RL		Result	Result
Metals and Inorganics (continued)					
Calcium (dissolved)	mg/L	0.01		27.7	0.04
Cadmium (dissolved)	mg/L	0.000003		< 0.000003	< 0.000003
Cobalt (dissolved)	mg/L	0.000004		0.000018	0.000033
Chromium (dissolved)	mg/L	0.00008		0.00012	< 0.00008
Copper (dissolved)	mg/L	0.001		< 0.001	< 0.001
Iron (dissolved)	mg/L	0.007		0.029	< 0.007
Lead (dissolved)	mg/L	0.00009		< 0.00009	< 0.00009
Potassium (dissolved)	mg/L	0.009		4.14	< 0.009
Magnesium (dissolved)	mg/L	0.001		7.05	0.002
Manganese (dissolved)	mg/L	0.00001		0.00931	0.00061
Sodium (dissolved)	mg/L	0.01		26.9	0.03
Zinc (dissolved)	mg/L	0.002		< 0.002	< 0.002
Other (ORP)					
pH	No unit	0.05		8.20	6.82
Chloride	mg/L	1		12	< 1
Mercury (dissolved)	mg/L	0.00001		< 0.00001	< 0.00001

Client: Pinchin Ltd
Project: 335248.000, St. Charles GW
Project Manager: Greg Way
Samplers: Aezlyn Nishet

MATRIX: WATER

			Sample Number	21	22	
			Sample Name	GW DUP2	FB	
			Sample Matrix	Ground Water	Ground Water	
			Sample Date	01/05/2024	01/05/2024	
Parameter	**Units**	**RL**		**Result**	**Result**	
Phenols						
4AAP-Phenolics	mg/L	0.002		< 0.002	< 0.002	
VOCs						
1,4-Dichlorobenzene	µg/L	0.5		< 0.5	< 0.5	
Dichloromethane	µg/L	0.5		< 0.5	< 0.5	
Vinyl Chloride	µg/L	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	EWL0066-MAY24	mg/L as CaCO3	2	< 2	4	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)	SKA0046-MAY24	mg/L	0.04	<0.04	1	10	98	90	110	95	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	DIO8027-MAY24	mg/L	1	<1	1	20	95	80	120	86	75	125
Sulphate	DIO8027-MAY24	mg/L	2	<2	1	20	107	80	120	104	75	125
Chloride	DIO8031-MAY24	mg/L	1	<1	ND	20	97	80	120	95	75	125
Sulphate	DIO8031-MAY24	mg/L	2	<2	0	20	109	80	120	103	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
Nitrate + Nitrite (as N)	DIO0084-MAY24	mg/L	0.06	<0.06	NA		NA			NA		
Nitrite (as N)	DIO0084-MAY24	mg/L	0.03	<0.03	NV	20	98	90	110	NV	75	125
Nitrate (as N)	DIO0084-MAY24	mg/L	0.06	<0.06	ND	20	99	90	110	96	75	125
Nitrate + Nitrite (as N)	DIO0085-MAY24	mg/L	0.06	<0.06	NA		NA			NA		
Nitrite (as N)	DIO0085-MAY24	mg/L	0.03	<0.03	ND	20	98	90	110	97	75	125
Nitrate (as N)	DIO0085-MAY24	mg/L	0.06	<0.06	1	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)	BOD0006-MAY24	mg/L	2	< 2	15	30	99	70	130	129	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	SKA0036-MAY24	mg/L	1	<1	1	20	99	90	110	94	75	125
Dissolved Organic Carbon	SKA0059-MAY24	mg/L	1	<1	2	20	94	90	110	95	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	EWL0068-MAY24	mg/L	8	<8	8	20	98	80	120	97	75	125
Chemical Oxygen Demand	EWL0069-MAY24	mg/L	8	<8	ND	20	96	80	120	108	75	125
Chemical Oxygen Demand	EWL0149-MAY24	mg/L	8	<8	4	20	106	80	120	96	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	EWL0066-MAY24	uS/cm	2	< 2	0	20	100	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)	EHG0006-MAY24	mg/L	0.00001	< 0.00001	ND	20	97	80	120	120	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
Aluminum (dissolved)	EMS0027-MAY24	mg/L	0.001	<0.001	ND	20	107	90	110	114	70	130
Barium (dissolved)	EMS0027-MAY24	mg/L	0.00008	<0.00008	5	20	104	90	110	105	70	130
Calcium (dissolved)	EMS0027-MAY24	mg/L	0.01	<0.01	3	20	104	90	110	100	70	130
Cobalt (dissolved)	EMS0027-MAY24	mg/L	0.000004	<0.000004	3	20	108	90	110	105	70	130
Magnesium (dissolved)	EMS0027-MAY24	mg/L	0.001	<0.001	2	20	100	90	110	98	70	130
Manganese (dissolved)	EMS0027-MAY24	mg/L	0.00001	<0.00001	2	20	105	90	110	106	70	130
Sodium (dissolved)	EMS0027-MAY24	mg/L	0.01	<0.01	1	20	102	90	110	77	70	130
Aluminum (dissolved)	EMS0029-MAY24	mg/L	0.001	<0.001	0	20	97	90	110	89	70	130
Arsenic (dissolved)	EMS0029-MAY24	mg/L	0.0002	<0.0002	16	20	102	90	110	104	70	130
Barium (dissolved)	EMS0029-MAY24	mg/L	0.00008	<0.00008	1	20	95	90	110	105	70	130
Boron (dissolved)	EMS0029-MAY24	mg/L	0.002	<0.002	4	20	95	90	110	96	70	130
Calcium (dissolved)	EMS0029-MAY24	mg/L	0.01	<0.01	1	20	103	90	110	103	70	130
Cadmium (dissolved)	EMS0029-MAY24	mg/L	0.000003	<0.000003	ND	20	99	90	110	99	70	130
Cobalt (dissolved)	EMS0029-MAY24	mg/L	0.000004	<0.000004	ND	20	95	90	110	93	70	130
Chromium (dissolved)	EMS0029-MAY24	mg/L	0.00008	<0.00008	ND	20	100	90	110	100	70	130
Copper (dissolved)	EMS0029-MAY24	mg/L	0.001	<0.001	2	20	97	90	110	97	70	130
Iron (dissolved)	EMS0029-MAY24	mg/L	0.007	<0.007	ND	20	106	90	110	100	70	130
Potassium (dissolved)	EMS0029-MAY24	mg/L	0.009	<0.009	4	20	101	90	110	91	70	130
Magnesium (dissolved)	EMS0029-MAY24	mg/L	0.001	<0.001	4	20	102	90	110	99	70	130
Manganese (dissolved)	EMS0029-MAY24	mg/L	0.00001	<0.00001	1	20	94	90	110	93	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

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
Sodium (dissolved)	EMS0029-MAY24	mg/L	0.01	<0.01	1	20	103	90	110	110	70	130
Lead (dissolved)	EMS0029-MAY24	mg/L	0.00009	<0.00009	ND	20	98	90	110	94	70	130
Zinc (dissolved)	EMS0029-MAY24	mg/L	0.002	<0.002	ND	20	102	90	110	107	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	EWL0066-MAY24	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0044-MAY24	mg/L	0.002	<0.002	ND	10	100	80	120	101	75	125

Phosphorus by SFA

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	SKA0049-MAY24	mg/L	0.03	<0.03	4	10	92	90	110	84	75	125

Solids Analysis

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0092-MAY24	mg/L	30	<30	4	20	102	80	120	NA		
Total Dissolved Solids	EWL0095-MAY24	mg/L	30	<30	0	20	90	80	120	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)	SKA0047-MAY24	mg/L	0.05	<0.05	6	10	99	90	110	94	75	125
Total Kjeldahl Nitrogen (N)	SKA0053-MAY24	mg/L	0.05	<0.05	ND	10	98	90	110	102	75	125
Total Kjeldahl Nitrogen (N)	SKA0063-MAY24	mg/L	0.05	<0.05	3	10	95	90	110	91	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	GCM0053-MAY24	ug/L	0.5	<0.5	ND	30	101	60	130	93	50	140
Benzene	GCM0053-MAY24	ug/L	0.5	<0.5	ND	30	102	60	130	93	50	140
Dichloromethane	GCM0053-MAY24	ug/L	0.5	<0.5	ND	30	100	60	130	93	50	140
Toluene	GCM0053-MAY24	ug/L	0.5	<0.5	ND	30	99	60	130	93	50	140
Vinyl Chloride	GCM0053-MAY24	ug/L	0.2	<0.2	ND	30	95	50	140	87	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 02 2024	LAB LIMS #:	CA-15551-May24
Received Time (After Hours Only):	__ : __	Temperature Upon Receipt (°C):	6x3

Billing & Reporting Information

Invoice/Receipt to {3}:			
Company:	Pinchin	Quote #:	2023 1531
Attention:	Greg Way	Attached Parameter List:	☐ YES ☐ NO
Address:	662 Falconbridge Rd, Unit 3 Sudbury, ON P3A 4S4	Turnaround Time	
		Is *Rush Turnaround Time Required?	☐ YES ☒ NO
Email:	gway@pinchin.com	Specify:	
Project Name/Number:	335248.000-St. Charles GW	P.O. #:	* Rush TA Requests Require Lab Approval

Client Information/Report To: | **Client Lab #:**

Company Name:		**Phone Number:**	705-521-0560
Contact Name:		**Fax Number:**	
Address:		**E-mail:**	
Copy to:			

Sample Information

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

Sample Identifier	Date Sampled (mm/dd/yy) ✓	Time Sampled	# of Bottles	Field Filtered		Spring GW Package	Spring VOC's				
SCL1	05/01/24	9am-4pm	12	Y		x	x				
SCL2	↓	↓	12	Y		x	x				
SCL3			12	Y		x	x				
SCL4			12	Y		x	x				
SCL5			12	Y		x	x				
SCL6			12	Y		x	x				
SCL7			12	Y		x	x				
SCL8	↓	↓	12	Y		x	x				
~~SCL9~~						~~x~~	~~x~~				
SCL10	05/01/24	9am-4pm	12	Y		x	x				
SCL11	↓	↓	12	Y		x	x				
SCL12			12	Y		x	x				
SCL13			12	Y		x	x				
SCL14			12	Y		x	x				
SCL15			12	Y		x	x				
SCL16	↓	↓	12	Y		x	x				

Sampled By {1}:	(Name) Aezlyn Nisbet	(Signature) [signature]	Date:	05 01 24	(mm/dd/yy)
Relinquished by {2}:	(Name) Aezlyn Nisbet	(Signature) [signature]	Date:	05 01 24	(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.

~~3346729~~ 334673079474 334673079482

334672935908

10:00 M

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): __/__/____ | LAB LIMS #:

Received Time (After Hours Only): __:__ | Temperature Upon Receipt (°C):

Billing & Reporting Information

Invoice/Receipt to {3}:

Company: Pinchin
Attention: Greg Way
Address: 662 Falconbridge Rd, Unit 3, Sudbury, ON, P3A 4S4
Email: gway@pinchin.com

Quote #: 2023 1531

Attached Parameter List: ☐ YES ☐ NO

Turnaround Time

Is *Rush Turnaround Time Required? ☐ YES ☒ NO

Specify:

* Rush TA Requests Require Lab Approval

Project Name/Number: 335248.000-St. Charles GW | P.O. #:

Client Information/Report To:

				Client Lab #:
Company Name:		**Phone Number:**	705-521-0560	
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		Spring GW Package	Spring VOC's				
GW DUP1	05/01/24	9am-4pm	12	Y		x	x				
GW DUP2	↓	↓	12	Y		x	x				
FB	↓	↓	12	N		x	x				

Sampled By {1}: (Name) Aezlyn Nisbet (Signature) _____ Date: 05/01/24 (mm/dd/yy)

Relinquished by {2}: (Name) Aezlyn Nisbet (Signature) _____ Date: 05/01/24 (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

CA15554-MAY24 R1

335248.000, St. Charles SW

Prepared for

Pinchin Ltd

FINAL REPORT

CA15554-MAY24 R1

First Page

CLIENT DETAILS

Client	Pinchin Ltd
Address	662 Falconbridge Rd, Unit 3, Sudbury Canada, P3A 4S4 Phone: 705-521-0560 cell: 705-618-0186.
Contact	Greg Way
Telephone	705-521-0560 cell: 705-618-0186
Facsimile	
Email	gway@Pinchin.com
Project	335248.000, St. Charles SW
Order Number	
Samples	Surface Water (3)

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	CA15554-MAY24
Received	05/02/2024
Approved	05/14/2024
Report Number	CA15554-MAY24 R1
Date Reported	05/14/2024

COMMENTS

Temperature of Sample upon Receipt: 6 degrees C

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

TABLE OF CONTENTS

Client: Pinchin Ltd
Project: 335248.000, St. Charles SW
Project Manager: Greg Way
Samplers: Aezlyn Nishet

MATRIX: WATER

Sample Number	6	7	8
Sample Name	SW1	SW2	SW3
Sample Matrix	Surface Water	Surface Water	Surface Water
Sample Date	01/05/2024	01/05/2024	01/05/2024

Parameter	Units	RL	Result	Result	Result
BTEX					
Benzene	ug/L	0.5	< 0.5	< 0.5	< 0.5
Toluene	ug/L	0.5	< 0.5	< 0.5	< 0.5
General Chemistry					
Conductivity	uS/cm	2	391	642	728
Biochemical Oxygen Demand (BOD5)	mg/L	2	< 4↑	< 4↑	< 4↑
Total Suspended Solids	mg/L	2	47	13	26
Alkalinity	mg/L as CaCO3	2	123	250	295
Total Dissolved Solids	mg/L	30	234	420	489
Chemical Oxygen Demand	mg/L	8	25	37	41
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05	0.32	0.70	0.72
Ammonia+Ammonium (N)	as N mg/L	0.04	< 0.04	< 0.04	0.04
Dissolved Organic Carbon	mg/L	1.0	10.8	14.8	15.3
Metals and Inorganics					
Sulphate	mg/L	2	41	68	75
Nitrite (as N)	as N mg/L	0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06	0.46	0.09	< 0.06
Nitrate + Nitrite (as N)	as N mg/L	0.06	0.46	0.09	< 0.06
Hardness	mg/L as CaCO3	0.05	167	293	364
Arsenic (total)	mg/L	0.0002	0.0004	0.0005	0.0006
Barium (total)	mg/L	0.00008	0.0314	0.0321	0.0367
Boron (total)	mg/L	0.002	0.213	0.329	0.377

Client: Pinchin Ltd
Project: 335248.000, St. Charles SW
Project Manager: Greg Way
Samplers: Aezlyn Nishet

MATRIX: WATER

Sample Number	6	7	8
Sample Name	SW1	SW2	SW3
Sample Matrix	Surface Water	Surface Water	Surface Water
Sample Date	01/05/2024	01/05/2024	01/05/2024

Parameter	Units	RL		Result	Result	Result
Metals and Inorganics (continued)						
Calcium (total)	mg/L	0.01		46.0	86.2	107
Cadmium (total)	mg/L	0.000003		0.000029	0.000012	0.000011
Chromium (total)	mg/L	0.00008		0.00072	0.00084	0.00076
Copper (total)	mg/L	0.001		0.003	0.002	0.001
Iron (total)	mg/L	0.007		0.137	0.419	1.31
Potassium (total)	mg/L	0.009		8.10	11.2	12.5
Magnesium (total)	mg/L	0.001		12.8	19.0	23.6
Sodium (total)	mg/L	0.01		17.2	22.1	25.0
Lead (total)	mg/L	0.00009		0.00021	0.00020	0.00015
Phosphorus (total)	mg/L	0.003		0.012	0.021	0.050
Zinc (total)	mg/L	0.002		0.005	0.004	0.003
Other (ORP)						
pH	No unit	0.05		8.00	8.12	7.93
Chloride	mg/L	1		26	22	22
Mercury (dissolved)	mg/L	0.00001		< 0.00001	< 0.00001	< 0.00001

Client: Pinchin Ltd
Project: 335248.000, St. Charles SW
Project Manager: Greg Way
Samplers: Aezlyn Nishet

MATRIX: WATER

			Sample Number	6	7	8
			Sample Name	SW1	SW2	SW3
			Sample Matrix	Surface Water	Surface Water	Surface Water
			Sample Date	01/05/2024	01/05/2024	01/05/2024
Parameter	**Units**	**RL**		**Result**	**Result**	**Result**
Phenols						
4AAP-Phenolics	mg/L	0.001		0.002	0.004	0.003
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	EWL0066-MAY24	mg/L as CaCO3	2	< 2	4	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)	SKA0058-MAY24	mg/L	0.04	<0.04	ND	10	100	90	110	103	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	DIO8026-MAY24	mg/L	1	<1	1	20	97	80	120	86	75	125
Sulphate	DIO8026-MAY24	mg/L	2	<2	0	20	108	80	120	99	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
Nitrate + Nitrite (as N)	DIO0086-MAY24	mg/L	0.06	<0.06	NA		NA			NA		
Nitrite (as N)	DIO0086-MAY24	mg/L	0.03	<0.03	ND	20	98	90	110	95	75	125
Nitrate (as N)	DIO0086-MAY24	mg/L	0.06	<0.06	0	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)	BOD0006-MAY24	mg/L	2	< 2	15	30	99	70	130	129	70	130

Carbon by Combustion/Oxidation

Method: SM 5310B I Internal ref.: ME-CA-IENVIEWL-LAK-AN-023

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	EWL0151-MAY24	mg/L	1.0	<1.0	0	20	98	90	110	85	75	125

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	EWL0068-MAY24	mg/L	8	<8	8	20	98	80	120	97	75	125
Chemical Oxygen Demand	EWL0069-MAY24	mg/L	8	<8	ND	20	96	80	120	108	75	125

QC SUMMARY

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	EWL0066-MAY24	uS/cm	2	< 2	0	20	100	90	110	NA		

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENV]SPE-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)	EHG0007-MAY24	mg/L	0.00001	< 0.00001	ND	20	98	80	120	124	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
Arsenic (total)	EMS0055-MAY24	mg/L	0.0002	<0.0002	2	20	98	90	110	112	70	130
Barium (total)	EMS0055-MAY24	mg/L	0.00008	<0.00008	3	20	94	90	110	94	70	130
Boron (total)	EMS0055-MAY24	mg/L	0.002	<0.002	4	20	99	90	110	96	70	130
Calcium (total)	EMS0055-MAY24	mg/L	0.01	<0.01	5	20	100	90	110	101	70	130
Cadmium (total)	EMS0055-MAY24	mg/L	0.000003	<0.000003	11	20	96	90	110	96	70	130
Chromium (total)	EMS0055-MAY24	mg/L	0.00008	<0.00008	11	20	99	90	110	117	70	130
Copper (total)	EMS0055-MAY24	mg/L	0.001	<0.001	0	20	99	90	110	96	70	130
Iron (total)	EMS0055-MAY24	mg/L	0.007	<0.007	5	20	103	90	110	100	70	130
Potassium (total)	EMS0055-MAY24	mg/L	0.009	<0.009	4	20	97	90	110	98	70	130
Magnesium (total)	EMS0055-MAY24	mg/L	0.001	<0.001	0	20	104	90	110	99	70	130
Sodium (total)	EMS0055-MAY24	mg/L	0.01	<0.01	3	20	103	90	110	102	70	130
Lead (total)	EMS0055-MAY24	mg/L	0.00009	<0.00009	10	20	94	90	110	93	70	130
Phosphorus (total)	EMS0055-MAY24	mg/L	0.003	<0.003	5	20	102	90	110	NV	70	130
Zinc (total)	EMS0055-MAY24	mg/L	0.002	<0.002	2	20	98	90	110	97	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	EWL0066-MAY24	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	SKA0044-MAY24	mg/L	0.001	<0.001	ND	10	100	80	120	101	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	EWL0073-MAY24	mg/L	30	<30	5	20	95	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	EWL0091-MAY24	mg/L	2	< 2	2	10	100	90	110	NA		
Total Suspended Solids	EWL0105-MAY24	mg/L	2	< 2	0	10	95	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)	SKA0047-MAY24	mg/L	0.05	<0.05	6	10	99	90	110	94	75	125

QC SUMMARY

Volatile Organics

Method: EPA 5030B/8260C | Internal ref.: ME-CA-[ENVIGC-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	GCM0078-MAY24	ug/L	0.5	<0.5	ND	30	96	60	130	100	50	140
Benzene	GCM0078-MAY24	ug/L	0.5	<0.5	ND	30	101	60	130	102	50	140
Dichloromethane	GCM0078-MAY24	ug/L	0.5	<0.5	ND	30	100	60	130	101	50	140
Toluene	GCM0078-MAY24	ug/L	0.5	<0.5	ND	30	97	60	130	98	50	140
Vinyl Chloride	GCM0078-MAY24	ug/L	0.2	<0.2	ND	30	93	50	140	95	50	140

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.

QC SUMMARY

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 10 2024 | LAB LIMS #: CA-15554-May 24

Received Time (After Hours Only): __ : __ | Temperature Upon Receipt (°C): 6x3

Billing & Reporting Information

Invoice/Receipt to {3}:

Company: Pinchin
Attention: Greg Way
Address: 662 Falconbridge Rd, Unit 3, Sudbury, ON, P3A 4S4
Email: gway@pinchin.com

Quote #: 2023 1531

Attached Parameter List: ☐ YES ☐ NO

Turnaround Time

Is *Rush Turnaround Time Required? ☐ YES ☒ NO

Specify:

* Rush TA Requests Require Lab Approval

Project Name/Number: 335248.000-St. Charles SW | P.O. #:

Client Information/Report To:

Client Lab #:

Company Name:		Phone Number:	705-521-0560
Contact Name:		Fax Number:	
Address:		E-mail:	
Copy to:			

Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested: Field Filtered		Spring SW Package	Spring VOC's				
SW1	05/01/24	9am 4pm	13	N		x	x				
SW2	↓	↓	13	N		x	x				
SW3	↓	↓	13	N		x	x				

Sampled By {1}: (Name) Aezlyn Nisbet (Signature) | Date: 05/01/24 (mm/dd/yy)

Relinquished by {2}: (Name) Aezlyn Nisbet (Signature) | Date: 05/01/24 (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.

3 346195675 66
10:00 AM

FINAL REPORT

CA15162-SEP24 R

335248.000, St. Charles GW, Greg Way

Prepared for

Pinchin Ltd

FINAL REPORT

CA15162-SEP24 R

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	Pinchin Ltd	Project Specialist	Jill Campbell, B.Sc.,GISAS
		Laboratory	SGS Canada Inc.
Address	662 Falconbridge Rd, Unit 3, Sudbury Canada, P3A 4S4 Phone: 705-521-0560 cell: 705-618-0186.	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Greg Way	Telephone	2165
Telephone	705-521-0560 cell: 705-618-0186	Facsimile	705-652-6365
Facsimile		Email	jill.campbell@sgs.com
Email	gway@Pinchin.com	SGS Reference	CA15162-SEP24
Project	335248.000, St. Charles GW, Greg Way	Received	09/16/2024
Order Number		Approved	09/25/2024
Samples	Ground Water (16)	Report Number	CA15162-SEP24 R
		Date Reported	09/25/2024

COMMENTS

Temperature of Sample upon Receipt: 19 degrees C

NO2 RL raised for tags #6, 19 due to sample matrix

SIGNATORIES

Jill Campbell, B.Sc.,GISAS

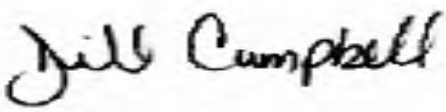


TABLE OF CONTENTS

Client: Pinchin Ltd
Project: 335248.000, St. Charles GW, Greg Way
Project Manager: Greg Way
Samplers: AN + KR + OK

MATRIX: WATER

Sample Number			5	6	7	8	9	10	11	12
Sample Name			SCL1	SCL2	SCL3	SCL4	SCL5	SCL6	SCL10	SCL11
Sample Matrix			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Parameter	**Units**	**RL**		**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
General Chemistry										
Biochemical Oxygen Demand (BOD5)	mg/L	2		< 4↑	5	< 4↑	< 4↑	< 4↑	< 4↑	< 4↑	< 4↑
Alkalinity	mg/L as CaCO3	2		128	562	241	422	113	218	59	112
Conductivity	uS/cm	2		297	1330	448	1520	337	659	137	267
Total Dissolved Solids	mg/L	30		171	880	246	1070	151	420	40	143
Ammonia+Ammonium (N)	as N mg/L	0.1		< 0.1	3.2	< 0.1	< 0.1	0.1	< 0.1	< 0.1	0.2
Total Kjeldahl Nitrogen	as N mg/L	0.5		< 0.5	5.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chemical Oxygen Demand	mg/L	8		< 8	178	8	23	< 8	13	9	12
Dissolved Organic Carbon	mg/L	1		2	52	3	7	2	5	3	5
Metals and Inorganics										
Phosphorus (total)	mg/L	0.03		< 0.03	< 0.03	1.03	< 0.03	< 0.03	0.06	0.09	0.14
Nitrite (as N)	as N mg/L	0.03		< 0.03	< 0.3↑	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		< 0.06	< 0.06	< 0.06	< 0.06	0.23	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)	as N mg/L	0.06		< 0.06	< 0.3↑	< 0.06	< 0.06	0.23	< 0.06	< 0.06	< 0.06
Sulphate	mg/L	2		19	71	8	410	42	61	9	11
Aluminum (dissolved)	mg/L	0.001		0.002	0.121	0.016	0.001	0.002	< 0.001	0.017	0.031
Arsenic (dissolved)	mg/L	0.0002		0.0004	0.0035	0.0008	0.0002	0.0009	0.0005	< 0.0002	0.0004
Barium (dissolved)	mg/L	0.00008		0.0271	0.367	0.0417	0.0492	0.00766	0.0635	0.0272	0.0297
Boron (dissolved)	mg/L	0.002		0.062	1.24	0.036	0.323	0.151	0.137	0.011	0.014
Calcium (dissolved)	mg/L	0.01		55.6	165	60.4	180	33.3	88.2	14.0	44.7
Cadmium (dissolved)	mg/L	0.000003		0.000004	< 0.000003	0.000006	0.000019	0.000006	0.000020	0.000006	< 0.000003
Cobalt (dissolved)	mg/L	0.000004		0.000011	0.0154	0.000269	0.005062	0.000012	0.00125	0.000364	0.000129
Chromium (dissolved)	mg/L	0.00008		0.00017	0.00448	0.00034	0.00018	0.00018	0.00026	0.00019	0.00057

Client: Pinchin Ltd
Project: 335248.000, St. Charles GW, Greg Way
Project Manager: Greg Way
Samplers: AN + KR + OK

MATRIX: WATER

	Sample Number	5	6	7	8	9	10	11	12
	Sample Name	SCL1	SCL2	SCL3	SCL4	SCL5	SCL6	SCL10	SCL11
	Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Parameter	**Units**	**RL**		**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)									
Copper (dissolved)	mg/L	0.001		< 0.001	< 0.001	< 0.001	0.001	< 0.001	0.002	0.004	0.003
Iron (dissolved)	mg/L	0.007		< 0.007	17.8	0.150	0.023	0.007	0.446	0.011	0.243
Lead (dissolved)	mg/L	0.00009		< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Potassium (dissolved)	mg/L	0.009		3.02	11.5	0.885	2.71	4.60	4.75	2.02	2.54
Magnesium (dissolved)	mg/L	0.001		7.86	41.6	21.4	89.2	7.49	25.2	4.97	5.76
Manganese (dissolved)	mg/L	0.00001		0.00020	4.66	0.111	0.844	0.00750	0.464	0.00151	0.300
Sodium (dissolved)	mg/L	0.01		9.89	74.4	9.40	46.6	28.4	14.0	1.73	2.27
Zinc (dissolved)	mg/L	0.002		< 0.002	< 0.002	0.003	0.003	< 0.002	< 0.002	0.003	< 0.002
Other (ORP)									
pH	No unit	0.05		8.06	7.07	7.93	7.44	7.95	7.64	7.16	7.61
Chloride	mg/L	1		5	88	2	57	14	48	< 1	12
Mercury (dissolved)	mg/L	0.00001		0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
Phenols									
4AAP-Phenolics	mg/L	0.002		< 0.002	0.004	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002

Client: Pinchin Ltd
Project: 335248.000, St. Charles GW, Greg Way
Project Manager: Greg Way
Samplers: AN + KR + OK

MATRIX: WATER

Sample Number				13	14	15	16	17	18	19	20
Sample Name				SCL12	SCL13	SCL14	SCL15	SCL16	GW DUP1	GW DUP2	FB
Sample Matrix				Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Parameter		**Units**	**RL**		**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
General Chemistry											
Biochemical Oxygen Demand (BOD5)		mg/L	2		< 4↑	< 4↑	< 4↑	< 4↑	< 4↑	< 4↑	5	< 4↑
Alkalinity		mg/L as CaCO3	2		160	100	51	113	49	129	555	3
Conductivity		uS/cm	2		414	220	109	233	102	297	1340	3
Total Dissolved Solids		mg/L	30		229	134	66	149	66	154	880	< 30
Ammonia+Ammonium (N)		as N mg/L	0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	3.2	< 0.1
Total Kjeldahl Nitrogen		as N mg/L	0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5.3	< 0.5
Chemical Oxygen Demand		mg/L	8		11	11	15	9	8	8	186	< 8
Dissolved Organic Carbon		mg/L	1		4	2	6	2	2	2	60	< 1
Metals and Inorganics											
Phosphorus (total)		mg/L	0.03		0.12	0.08	0.24	< 0.03	0.20	< 0.03	< 0.03	< 0.03
Nitrite (as N)		as N mg/L	0.03		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.3↑	< 0.03
Nitrate (as N)		as N mg/L	0.06		< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Nitrate + Nitrite (as N)		as N mg/L	0.06		< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.3↑	< 0.06
Sulphate		mg/L	2		16	11	3	10	4	19	66	< 2
Aluminum (dissolved)		mg/L	0.001		0.001	0.007	0.227	0.002	0.011	0.002	0.119	< 0.001
Arsenic (dissolved)		mg/L	0.0002		< 0.0002	0.0004	0.0004	0.0007	0.0003	0.0004	0.0034	< 0.0002
Barium (dissolved)		mg/L	0.00008		0.0353	0.0832	0.0033	0.0328	0.0126	0.0282	0.366	< 0.00008
Boron (dissolved)		mg/L	0.002		0.037	0.034	0.004	0.013	0.006	0.055	1.21	0.019
Calcium (dissolved)		mg/L	0.01		74.5	39.6	9.16	39.8	13.6	54.2	165	0.02
Cadmium (dissolved)		mg/L	0.000003		0.000003	0.000004	0.000032	0.000010	< 0.000003	0.000003	< 0.000003	< 0.000003
Cobalt (dissolved)		mg/L	0.000004		0.000114	0.000024	0.000203	0.000074	0.000349	0.000010	0.0153	< 0.000004
Chromium (dissolved)		mg/L	0.00008		0.00014	0.00014	0.00067	0.00024	0.00022	0.00022	0.00437	0.00008

Client: Pinchin Ltd
Project: 335248.000, St. Charles GW, Greg Way
Project Manager: Greg Way
Samplers: AN + KR + OK

MATRIX: WATER

	Sample Number	13	14	15	16	17	18	19	20
	Sample Name	SCL12	SCL13	SCL14	SCL15	SCL16	GW DUP1	GW DUP2	FB
	Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Parameter	**Units**	**RL**		**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)									
Copper (dissolved)	mg/L	0.001		0.001	0.001	0.006	0.001	< 0.001	0.001	< 0.001	< 0.001
Iron (dissolved)	mg/L	0.007		0.048	0.007	0.199	0.012	0.653	< 0.007	17.3	< 0.007
Lead (dissolved)	mg/L	0.00009		< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009	< 0.00009
Potassium (dissolved)	mg/L	0.009		3.33	3.97	0.522	2.79	1.47	3.04	11.3	< 0.009
Magnesium (dissolved)	mg/L	0.001		7.65	6.48	1.62	7.02	3.15	7.82	41.7	0.004
Manganese (dissolved)	mg/L	0.00001		0.730	0.00248	0.0361	0.0231	0.220	0.00016	4.61	0.00025
Sodium (dissolved)	mg/L	0.01		3.35	2.78	1.18	4.77	1.35	10.0	74.3	0.04
Zinc (dissolved)	mg/L	0.002		< 0.002	< 0.002	0.025	0.004	< 0.002	< 0.002	< 0.002	< 0.002
Other (ORP)									
pH	No unit	0.05		7.94	7.99	7.36	7.93	7.38	8.06	7.02	6.51
Chloride	mg/L	1		26	< 1	< 1	< 1	< 1	5	99	< 1
Mercury (dissolved)	mg/L	0.00001		0.00002	0.00001	0.00001	0.00002	0.00002	0.00002	< 0.00001	0.00001
Phenols									
4AAP-Phenolics	mg/L	0.002		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.004	< 0.002

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	EWL0318-SEP24	mg/L as CaCO3	2	< 2	0	20	104	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)	SKA0170-SEP24	as N mg/L	0.1	<0.1	0	10	100	90	110	100	75	125
Ammonia+Ammonium (N)	SKA0172-SEP24	as N mg/L	0.1	<0.1	ND	10	100	90	110	101	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	DIO5012-SEP24	mg/L	1	<1	ND	20	98	80	120	101	75	125
Sulphate	DIO5012-SEP24	mg/L	2	<2	ND	20	105	80	120	102	75	125
Chloride	DIO8023-SEP24	mg/L	1	<1	ND	20	103	80	120	98	75	125
Sulphate	DIO8023-SEP24	mg/L	2	<2	ND	20	106	80	120	104	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
Nitrate + Nitrite (as N)	DIO0380-SEP24	mg/L	0.06	<0.06	NA		NA			NA		
Nitrite (as N)	DIO0380-SEP24	mg/L	0.03	<0.03	ND	20	102	90	110	104	75	125
Nitrate (as N)	DIO0380-SEP24	mg/L	0.06	<0.06	ND	20	100	90	110	103	75	125
Nitrate + Nitrite (as N)	DIO0383-SEP24	mg/L	0.06	<0.06	NA		NA			NA		
Nitrite (as N)	DIO0383-SEP24	mg/L	0.03	<0.03	ND	20	99	90	110	98	75	125
Nitrate (as N)	DIO0383-SEP24	mg/L	0.06	<0.06	ND	20	98	90	110	99	75	125
Nitrite (as N)	DIO0393-SEP24	mg/L	0.03	<0.03	ND	20	103	90	110	101	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)	BOD0031-SEP24	mg/L	2	< 2	1	30	97	70	130	127	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	SKA0158-SEP24	mg/L	1	<1	0	20	100	90	110	101	75	125
Dissolved Organic Carbon	SKA0166-SEP24	mg/L	1	<1	0	20	99	90	110	99	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	EWL0352-SEP24	mg/L	8	<8	11	20	100	80	120	95	75	125
Chemical Oxygen Demand	EWL0363-SEP24	mg/L	8	<8	ND	20	104	80	120	106	75	125
Chemical Oxygen Demand	EWL0374-SEP24	mg/L	8	<8	10	20	96	80	120	95	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	EWL0318-SEP24	uS/cm	2	< 2	1	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)	EHG0027-SEP24	mg/L	0.00001	< 0.00001	ND	20	98	80	120	109	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
Aluminum (dissolved)	EMS0189-SEP24	mg/L	0.001	<0.001	0	20	105	90	110	104	70	130
Arsenic (dissolved)	EMS0189-SEP24	mg/L	0.0002	<0.0002	0	20	103	90	110	104	70	130
Barium (dissolved)	EMS0189-SEP24	mg/L	0.00008	<0.00008	0	20	92	90	110	101	70	130
Boron (dissolved)	EMS0189-SEP24	mg/L	0.002	<0.002	0	20	101	90	110	93	70	130
Calcium (dissolved)	EMS0189-SEP24	mg/L	0.01	<0.01	3	20	103	90	110	106	70	130
Cadmium (dissolved)	EMS0189-SEP24	mg/L	0.000003	<0.000003	ND	20	104	90	110	101	70	130
Cobalt (dissolved)	EMS0189-SEP24	mg/L	0.000004	<0.000004	0	20	97	90	110	92	70	130
Chromium (dissolved)	EMS0189-SEP24	mg/L	0.00008	<0.00008	ND	20	102	90	110	110	70	130
Copper (dissolved)	EMS0189-SEP24	mg/L	0.001	<0.001	0	20	96	90	110	106	70	130
Iron (dissolved)	EMS0189-SEP24	mg/L	0.007	<0.007	0	20	105	90	110	100	70	130
Potassium (dissolved)	EMS0189-SEP24	mg/L	0.009	<0.009	0	20	98	90	110	95	70	130
Magnesium (dissolved)	EMS0189-SEP24	mg/L	0.001	<0.001	1	20	100	90	110	118	70	130
Manganese (dissolved)	EMS0189-SEP24	mg/L	0.00001	<0.00001	0	20	96	90	110	92	70	130
Sodium (dissolved)	EMS0189-SEP24	mg/L	0.01	<0.01	0	20	102	90	110	109	70	130
Lead (dissolved)	EMS0189-SEP24	mg/L	0.00009	<0.00009	ND	20	99	90	110	95	70	130
Zinc (dissolved)	EMS0189-SEP24	mg/L	0.002	<0.002	0	20	103	90	110	92	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	EWL0318-SEP24	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	SKA0144-SEP24	mg/L	0.002	<0.002	ND	10	105	80	120	98	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)	SKA0155-SEP24	mg/L	0.03	<0.03	ND	10	100	90	110	95	75	125

QC SUMMARY

Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-[ENV]EWL-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	EWL0497-SEP24	mg/L	30	<30	1	20	94	80	120	NA		
Total Dissolved Solids	EWL0499-SEP24	mg/L	30	<30	3	20	95	80	120	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	SKA0187-SEP24	as N mg/L	0.5	<0.5	1	10	96	90	110	NV	75	125
Total Kjeldahl Nitrogen	SKA0202-SEP24	as N mg/L	0.5	<0.5	2	10	100	90	110	107	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): __/SEP/16 2024 | LAB LIMS #: GA-15162 Sep 24 NP

Received Time (After Hours Only): __:__ | Temperature Upon Receipt (°C): 19 X 3

Billing & Reporting Information

Invoice/Receipt to {3}:

Company:	Pinchin
Attention:	Greg Way
Address:	662 Falconbridge Rd, Unit 3 Sudbury, ON P3A 4S4
Email:	gway@pinchin.com

Project Name/Number: 335248.000-St. Charles GW | P.O. #:

Quote #: 2023 1531

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:	Pinchin Ltd.	Phone Number:	705-521-0560
Contact Name:	Greg Way	Fax Number:	
Address:	662 Falconbridge Rd.	E-mail:	
Copy to:	gway@pinchin.com		

Client Lab #:

Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested: Field Filtered		Spring GW Package	Spring VOC's				
SCL1	09/13/24	9am-3pm	10	Y		x	x				
SCL2	↓	↓	10	Y		x	x				
SCL3			10	Y		x	x				
SCL4			10	Y		x	x				
SCL5			10	Y		x	x				
SCL6			10	Y		x	x				
~~SCL7~~						x	x				
~~SCL8~~						x	x				
~~SCL9~~						x	x				
SCL10	09/13/24	9am-3pm	10	Y		x	x				
SCL11	↓	↓	10	Y		x	x				
SCL12			10	Y		x	x				
SCL13			10	Y		x	x				
SCL14			10	Y		x	x				
SCL15			10	Y		x	x				
SCL16			10	Y		x	x				

Sampled By {1}: (Name) AN + KR + OK (Signature) [signature] Date: 09/13/24 (mm/dd/yy)

Relinquished by {2}: (Name) Aezlyn Nisbet (Signature) [signature] Date: 09/13/24 (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.

*No VOC's for fall

~~3349/16847~~ NP

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

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

Billing & Reporting Information

Invoice/Receipt to {3}:

Company:	Pinchin
Attention:	Greg Way
Address:	662 Falconbridge Rd, Unit 3 Sudbury, ON P3A 4S4
Email:	gway@pinchin.com

Project Name/Number: 335248.000-St. Charles GW | P.O. #:

Quote #: 2023 1531

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:	Pinchin Ltd.	Phone Number:	705-521-0560
Contact Name:	Greg Way	Fax Number:	
Address:	662 Falconbridge Rd.	E-mail:	
Copy to:	gway@Pinchin.com		

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		Spring GW Package	Spring VOC's				
GW DUP1	09/13/24	9am-3pm	10	Y		x	x				
GW DUP2	↓	↓	10	Y		x	x				
FB	↓	↓	10	N		x	x				

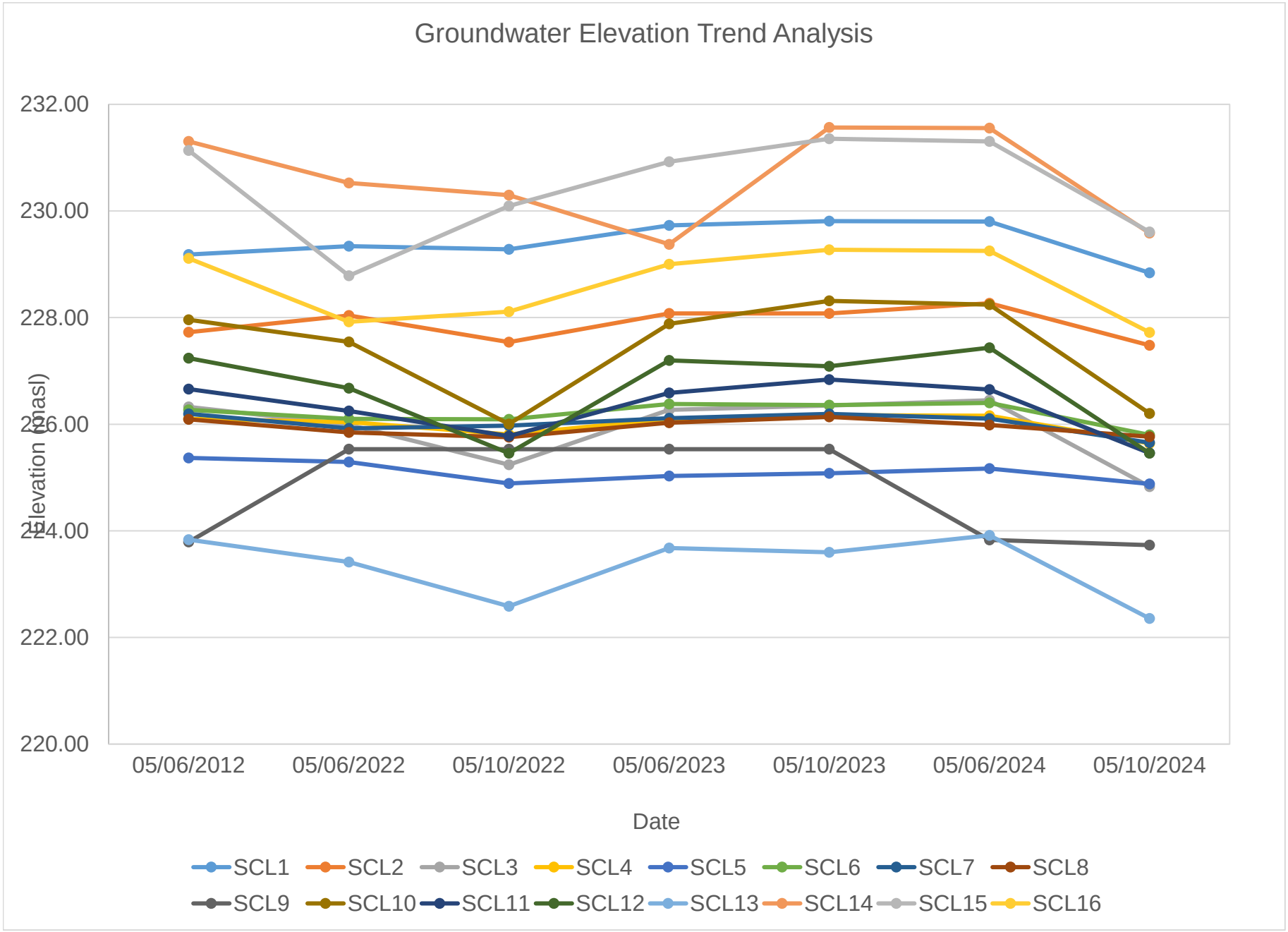
Sampled By {1}:	(Name) AN + KR + OK	(Signature)	Date:	09/13/24 (mm/dd/yy)
Relinquished by {2}:	(Name) Aezlyn Nisbet	(Signature)	Date:	09/13/24 (mm/dd/yy)

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.

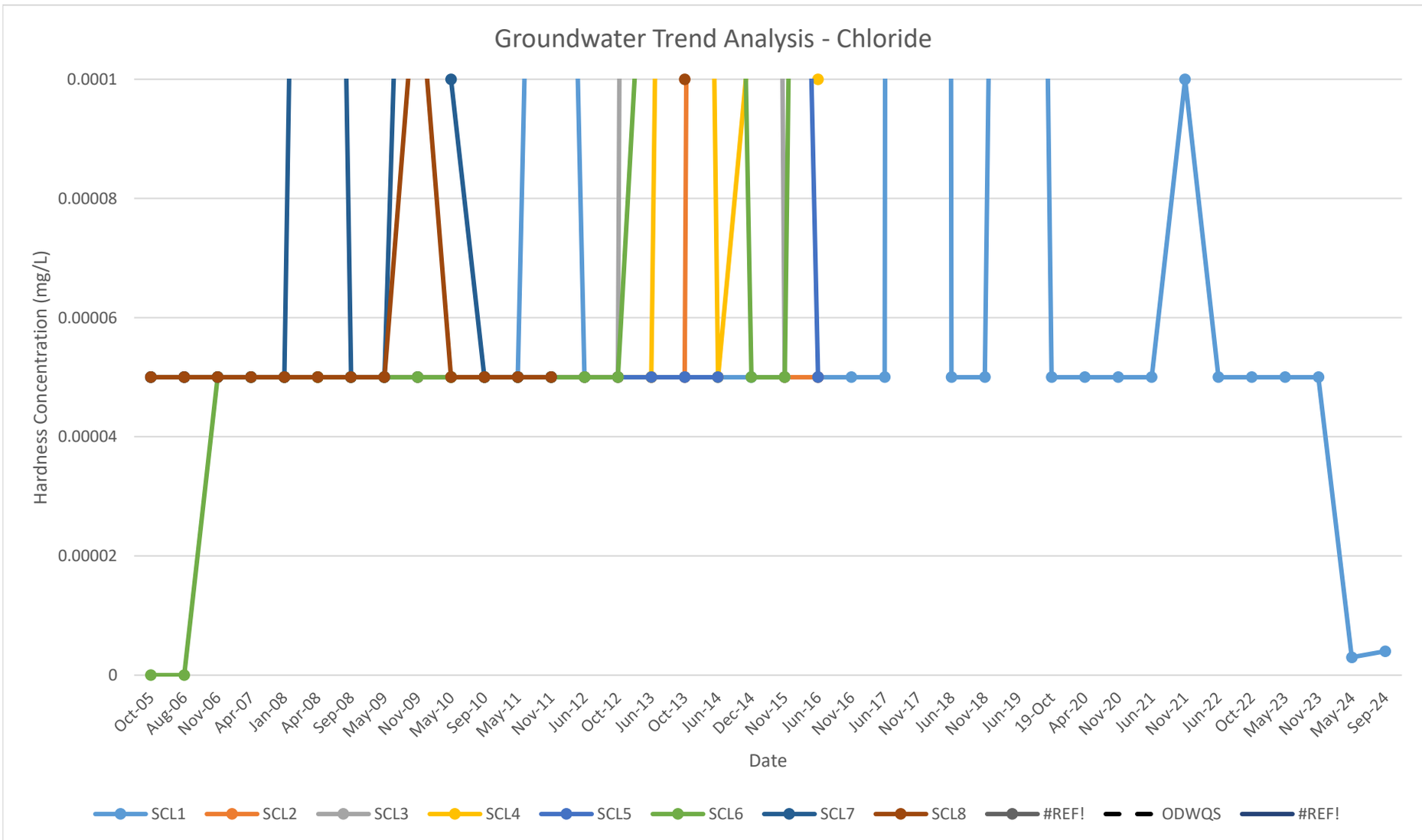
*No VOC's for fall

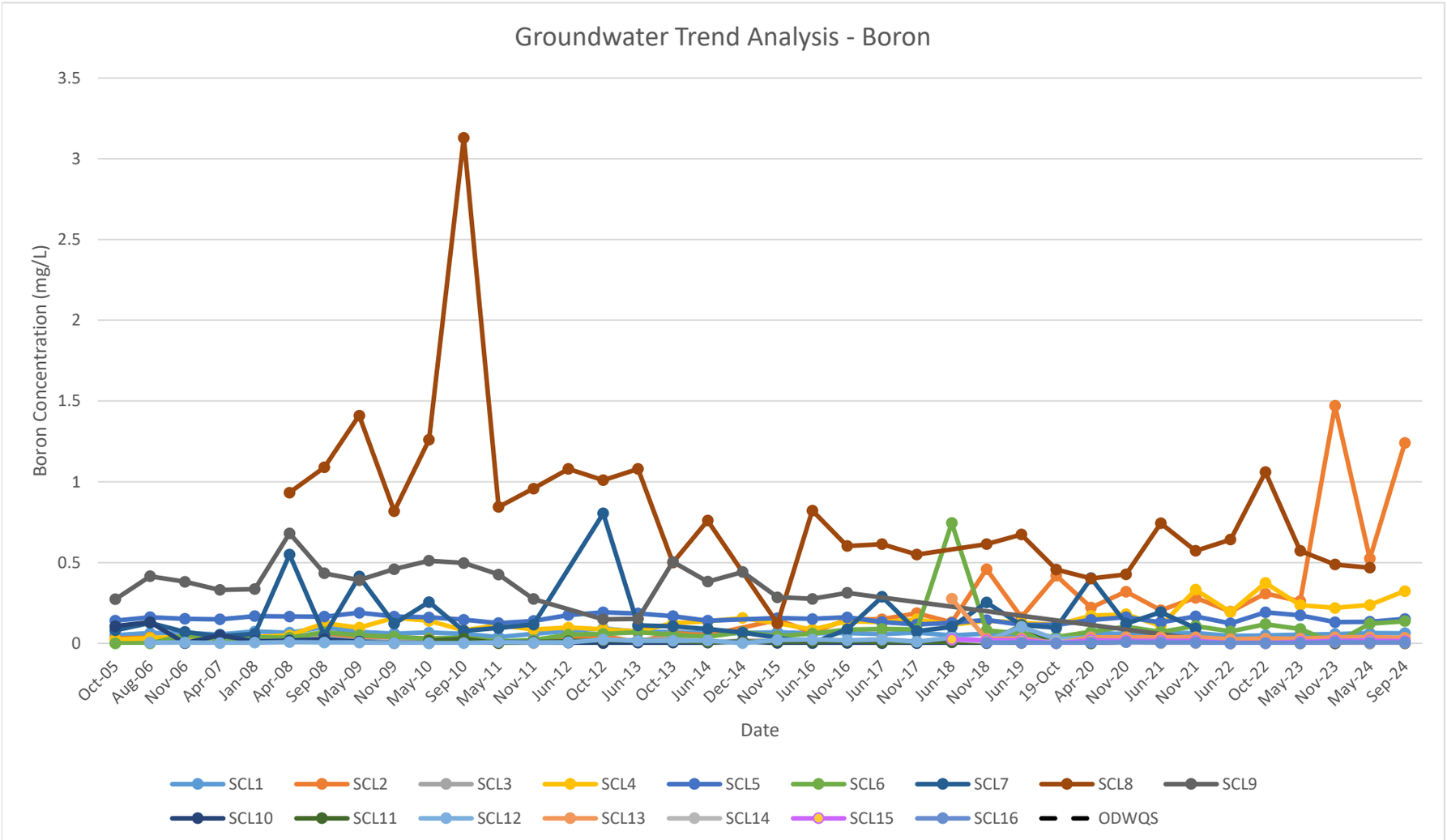
APPENDIX VII

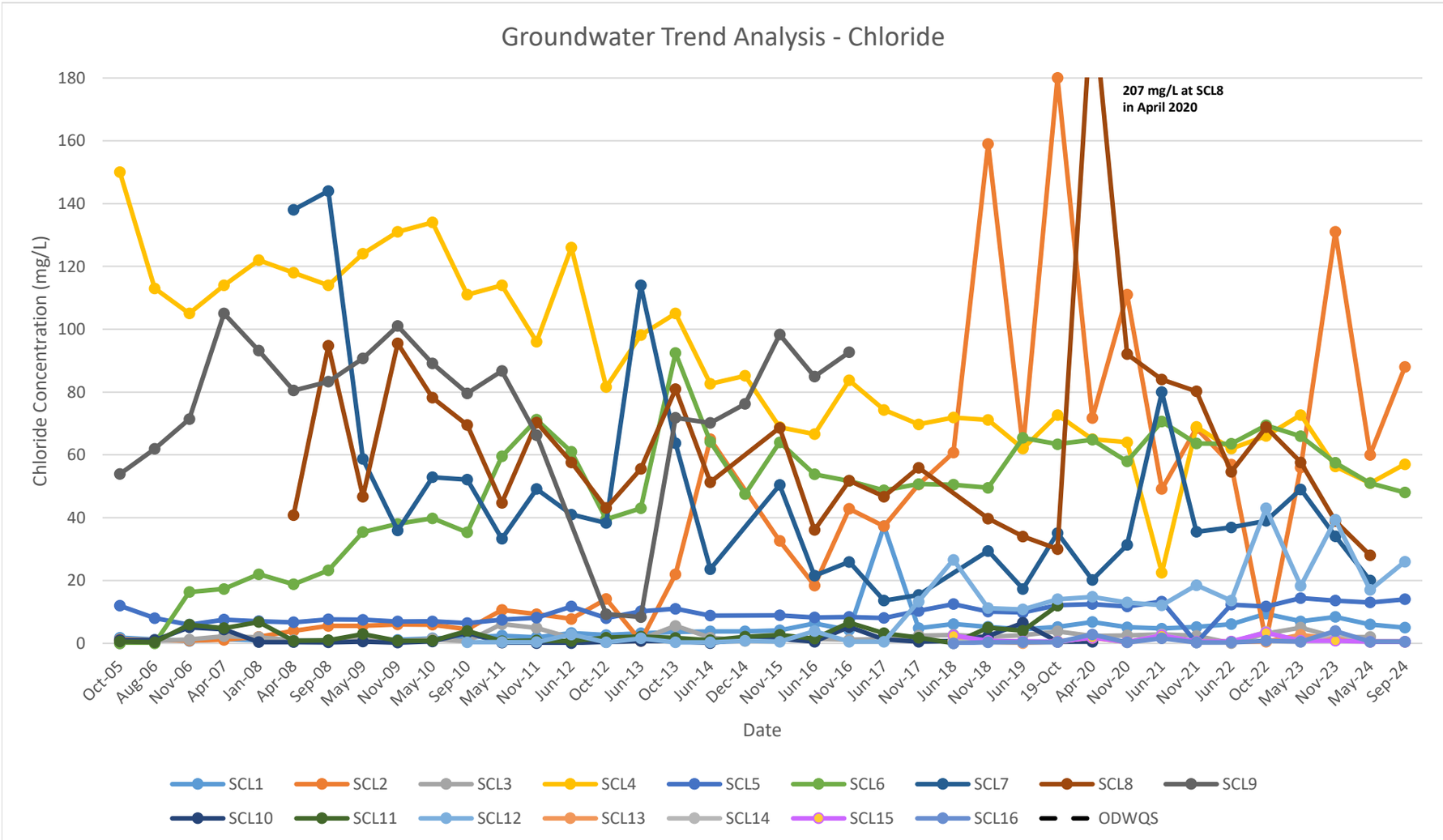
Groundwater Trend Analysis

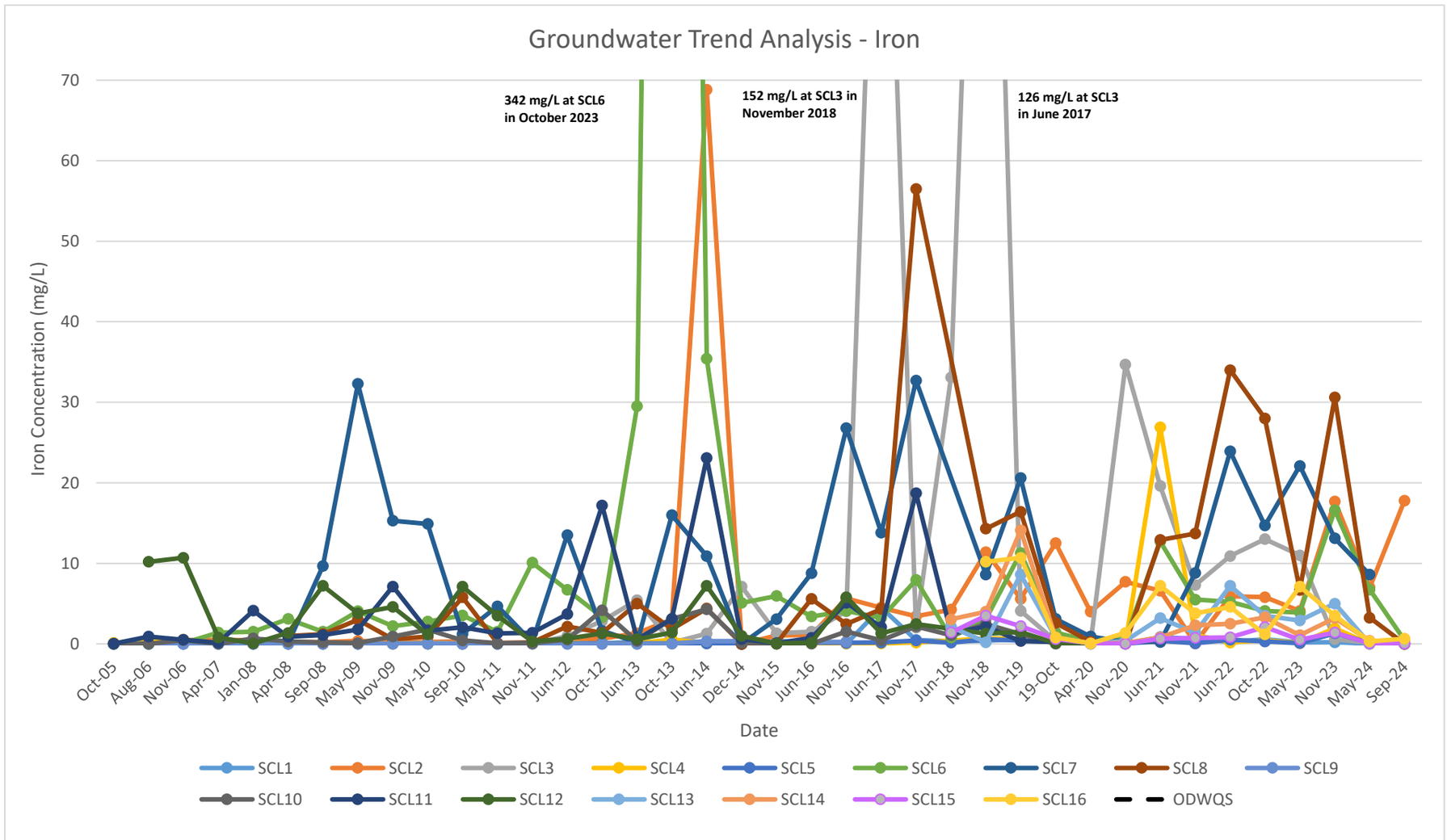


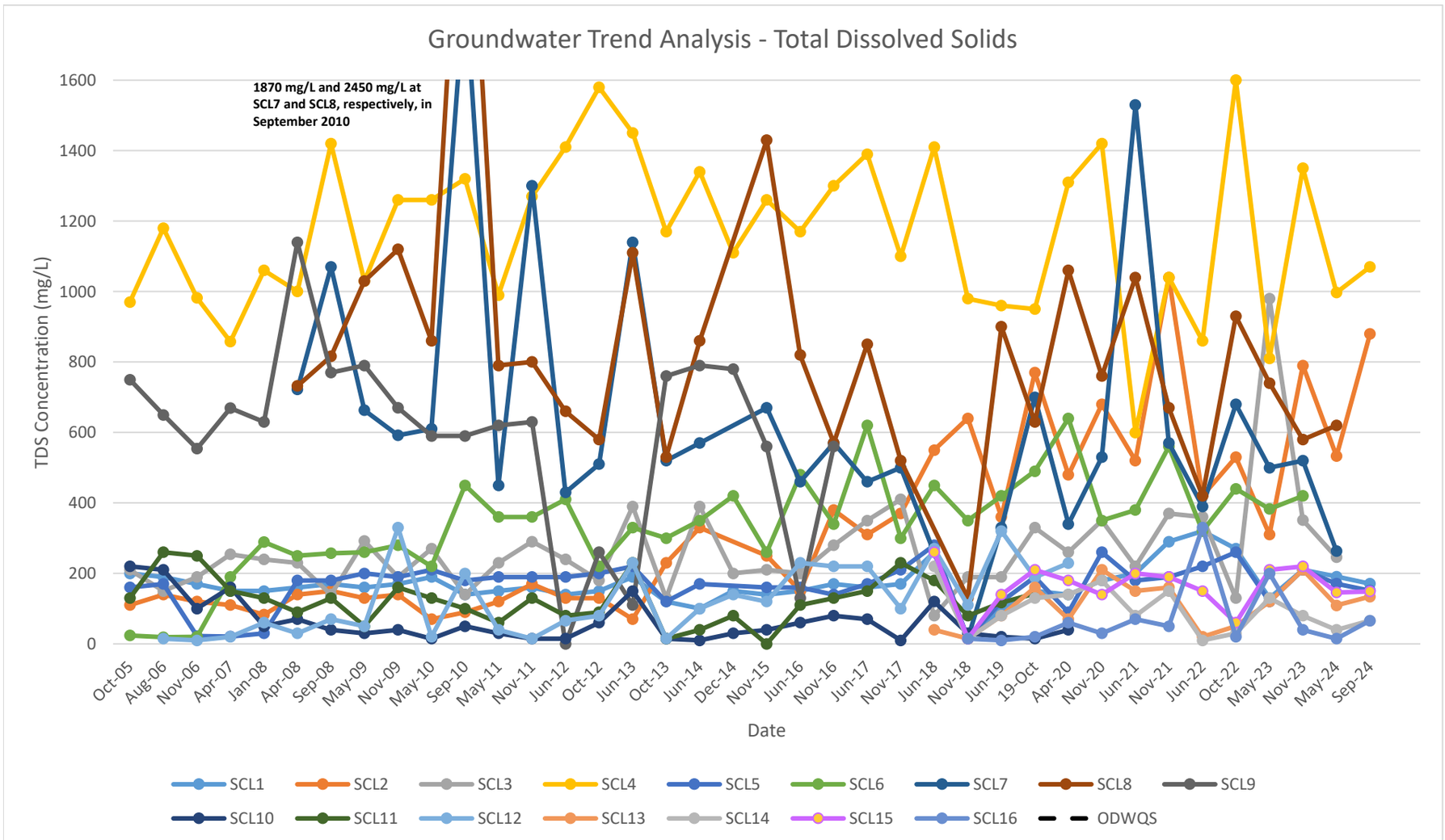
Pinchin File Number: 316057


Groundwater Trend Analysis - Chloride
Hardness Concentration (mg/L)
0.0001
0.00008
0.00006
0.00004
0.00002
0
Oct-05
Aug-06
Nov-06
Apr-07
Jan-08
Apr-08
Sep-08
May-09
Nov-09
May-10
Sep-10
May-11
Nov-11
Jun-12
Oct-12
Jun-13
Oct-13
Jun-14
Dec-14
Nov-15
Jun-16
Nov-16
Jun-17
Nov-17
Jun-18
Nov-18
Jun-19
19-Oct
Apr-20
Nov-20
Jun-21
Nov-21
Jun-22
Oct-22
May-23
Nov-23
May-24
Sep-24
Date
SCL1
SCL2
SCL3
SCL4
SCL5
SCL6
SCL7
SCL8
#REF!
ODWQS
#REF!


Groundwater Trend Analysis - Boron
Boron Concentration (mg/L)
3.5
3
2.5
2
1.5
1
0.5
0
Oct-05
Aug-06
Nov-06
Apr-07
Jan-08
Apr-08
Sep-08
May-09
Nov-09
May-10
Sep-10
May-11
Nov-11
Jun-12
Oct-12
Jun-13
Oct-13
Jun-14
Dec-14
Nov-15
Jun-16
Nov-16
Jun-17
Nov-17
Jun-18
Nov-18
Jun-19
19-Oct
Apr-20
Nov-20
Jun-21
Nov-21
Jun-22
Oct-22
May-23
Nov-23
May-24
Sep-24
Date
SCL1
SCL2
SCL3
SCL4
SCL5
SCL6
SCL7
SCL8
SCL9
SCL10
SCL11
SCL12
SCL13
SCL14
SCL15
SCL16
ODWQS


Groundwater Trend Analysis - Chloride
Chloride Concentration (mg/L)
180
160
140
120
100
80
60
40
20
0
207 mg/L at SCL8
in April 2020
Oct-05
Aug-06
Nov-06
Apr-07
Jan-08
Apr-08
Sep-08
May-09
Nov-09
May-10
Sep-10
May-11
Nov-11
Jun-12
Oct-12
Jun-13
Oct-13
Jun-14
Dec-14
Nov-15
Jun-16
Nov-16
Jun-17
Nov-17
Jun-18
Nov-18
Jun-19
19-Oct
Apr-20
Nov-20
Jun-21
Nov-21
Jun-22
Oct-22
May-23
Nov-23
May-24
Sep-24
Date
SCL1
SCL2
SCL3
SCL4
SCL5
SCL6
SCL7
SCL8
SCL9
SCL10
SCL11
SCL12
SCL13
SCL14
SCL15
SCL16
ODWQS


Groundwater Trend Analysis - Iron
342 mg/L at SCL6 in October 2023
152 mg/L at SCL3 in November 2018
126 mg/L at SCL3 in June 2017
Iron Concentration (mg/L)
70
60
50
40
30
20
10
0
Oct-05
Aug-06
Nov-06
Apr-07
Jan-08
Apr-08
Sep-08
May-09
Nov-09
May-10
Sep-10
May-11
Nov-11
Jun-12
Oct-12
Jun-13
Oct-13
Jun-14
Dec-14
Nov-15
Jun-16
Nov-16
Jun-17
Nov-17
Jun-18
Nov-18
Jun-19
19-Oct
Apr-20
Nov-20
Jun-21
Nov-21
Jun-22
Oct-22
May-23
Nov-23
May-24
Sep-24
Date
SCL1
SCL2
SCL3
SCL4
SCL5
SCL6
SCL7
SCL8
SCL9
SCL10
SCL11
SCL12
SCL13
SCL14
SCL15
SCL16
ODWQS


Groundwater Trend Analysis - Total Dissolved Solids
1870 mg/L and 2450 mg/L at SCL7 and SCL8, respectively, in September 2010
TDS Concentration (mg/L)
1600
1400
1200
1000
800
600
400
200
0
Oct-05
Aug-06
Nov-06
Apr-07
Jan-08
Apr-08
Sep-08
May-09
Nov-09
May-10
Sep-10
May-11
Nov-11
Jun-12
Oct-12
Jun-13
Oct-13
Jun-14
Dec-14
Nov-15
Jun-16
Nov-16
Jun-17
Nov-17
Jun-18
Nov-18
Jun-19
19-Oct
Apr-20
Nov-20
Jun-21
Nov-21
Jun-22
Oct-22
May-23
Nov-23
May-24
Sep-24
Date
SCL1
SCL2
SCL3
SCL4
SCL5
SCL6
SCL7
SCL8
SCL9
SCL10
SCL11
SCL12
SCL13
SCL14
SCL15
SCL16
ODWQS

APPENDIX VIII

MECP 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	St.Charles Landfill
Location (e.g. street address, lot, concession)	515 Beauparlant Road Lot 3, Concession 6, West Half, St.Charles Municipality, District of Sudbury
GPS Location (taken within the property boundary at front gate/ front entry)	UTM Zone 17 NAD 83, 541380 meter Easting and 5134503 meter Northing
Municipality	St.Charles
Client and/or Site Owner	Type Here
Monitoring Period (Year)	2024
This Monitoring Report is being submitted under the following:	
Certificate of Approval No.:	A541302
Director's Order No.:	Type Here
Provincial Officer's Order No.:	Type Here
Other:	Type Here

Report Submission Frequency	◉ **Annual** ○ **Other**	Specify (Type Here):
The site is:	◉ **Active** ○ **Inactive** ○ **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** ◉ **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 ◉ 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** ◉ **No**	Monitoring well SCL9 was unable to be sampled and may be damaged. Attempted maintenance planned for 2025.
2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document(s):	◉ **Yes** ○ **No** ○ **Not Applicable**	If no, list exceptions below or attach information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
SCL7	Insufficient Volume	Fall 2024
SCL8	Insufficient Volume	Fall 2024
SCL9	Damaged Well	Spring and Fall 2024
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** ◉ **No** ○ **Not Applicable**	
b) If yes, the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:	○ **Yes** ○ **No** ◉ **Not Applicable**	If no, list exceptions 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** ○ **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** ( ) **No**	If no, the potential design and operational concerns/exceptions are as follows (Type Here):	
6) The site meets compliance and assessment criteria.	(●) **Yes** ( ) **No**	If no, list and explain exceptions (Type Here):	
7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.	(●) **Yes** ( ) **No**	If no, list exceptions and explain reason for increase/change (Type Here):	
1) Is one or more of the following risk reduction practices in place at the site: ***(a)*** **There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/treatment; or** ***(b)*** **There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or** ***(c)*** **The site meets the following two conditions (typically achieved after 15 years or longer of site operation):** ***i.*** **The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and** ***ii.*** **Seasonal and annual water levels and water quality fluctuations are well understood.**	(●) **Yes** ( ) **No**	**Note which practice(s):**	☐ **(a)** ☐ **(b)** ☒ **(c)**
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	( ) **Yes** (●) **No** ( ) **Not Applicable**		

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.

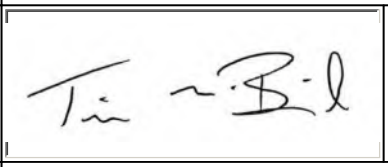
If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances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

11-Mar-2025

Recommendations:

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

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

Name:	Tim McBride		
Seal:	Add Image		
Signature:		**Date:**	11-Mar-2025
CEP Contact Information:	Tim McBride		
Company:	Pinchin		
Address:	662 Falconbridge Road, Sudbury		
Telephone No.:	705.521.0560	Fax No. :	
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)	Intermittent drainage courses including ditches and ponds: SW1-south end of culvert under Beauparlant Rd. SW2-south end of pond nearest waste pile. SW3-ditch outlet of pond south of Beauparlant Rd.
Distance(s)	North side of the fill area

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

Sampling and Monitoring Program Status:

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

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
SW1 through SW3	Dry	Fall 2024
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** ◯ **No** ◯ **Not Applicable**	
b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:	◯ **Yes** ◯ **No** ◯ **Not Applicable**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
	Type Here	Select Date
	Type Here	Select Date
	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** ◯ **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** ◯ **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
SW1	Boron (PWQO) = 0.2 mg/L	Boron = 5 % above (SW1 concentration is 0.21 mg/L)
SW2	Boron (PWQO) = 0.2 mg/L Iron (PWQO & CWQG) = 0.3 mg/L	Boron = 65 % above (SW2 concentration is 0.33 mg/L) Iron = 40 % above (SW2 concentration is 0.42 mg/L)
SW3	Boron (PWQO) = 0.2 mg/L Iron (PWQO & CWQG) = 0.3 mg/L	Boron = 90 % above (SW3 concentration is 0.38 mg/L) Iron = 336.67% above (SW3 concentration is 1.31 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** ◯ **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** ○ **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 ○ No ◉ Not Known ○ 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** ◉ **No** ○ **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.

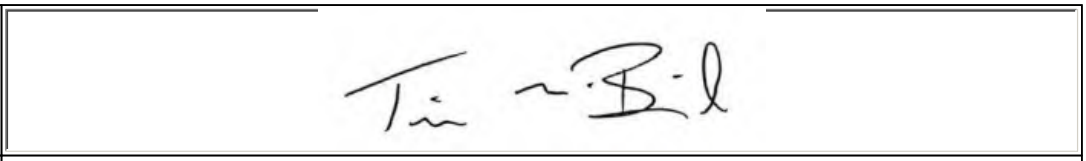
If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the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

11-Mar-2025

Recommendations:

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

○ **No Changes to the monitoring program are recommended**	Addition of a background surface water station at an upstream location on Tributary B & Addition of a downstream surface water stations at Tributary A and Tributary B
◉ **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	
Relevant Discipline	Hydrogoelogist
Date:	11-Mar-2025
CEP Contact Information:	Tim McBride
Company:	Pinchin
Address:	662 Falconbridge Road, Sudbury
Telephone No.:	705.521.0560
Fax No. :	
E-mail Address:	tmcbride@pinchin.com

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