TERRAPEX

595831 ONTARIO INC.

PHASE TWO
ENVIRONMENTAL SITE ASSESSMENT

5646 & 5650 Manotick Main Street, Ottawa, Ontario

FINAL REPORT

November 1, 2023

Terrapex Environmental Ltd.
20 Gurdwara Road, Unit 1
Ottawa, Ontario, K2E 8B3
Telephone: (613) 745-6471
Website: www.terrapex.com

DISTRIBUTION: **595831 ONTARIO INC.** **1 DIGITAL COPY**
TERRAPEX ENVIRONMENTAL LTD. **1 DIGITAL COPY**
PROJECT # CO884.02

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

FIGURES

TABLES

TABLE OF CONTENTS (CONTINUED)

APPENDICES

1.0 EXECUTIVE SUMMARY

Terrapex Environmental Ltd. (Terrapex) was retained by 595831 Ontario Inc., otherwise known as Hawkins Properties Ltd. (Hawkins), to complete a Phase Two Environmental Site Assessment (ESA) of the properties located at 5646 and 5650 Manotick Main Street in Manotick (part of the City of Ottawa), Ontario ("the Site"). The Phase Two ESA was conducted as part of a Site Plan Control (SPC) application to the City of Ottawa associated with the proposed redevelopment of the Site. The work was conducted in accordance with the requirements of Ontario Regulation (O. Reg.) 153/04. However, it is understood that a Record of Site Condition (RSC) is not required as there is no proposed change to a more stringent land use.

The Site is located on the west side of Manotick Main Street, located to the southwest of the intersection with Mahogany Harbour Lane in Ottawa, Ontario. The Site is composed of two municipal addresses: 5646 Manotick Main Street pertaining to the northern portion of the Site, and 5650 Manotick Main Street pertaining to the southern portion of the Site. The Site is irregular in shape and occupies a total area of 4,090 m^2.

Terrapex previously completed a Phase One Environmental Assessment (ESA) for the Site. The findings were provided in the report entitled *Phase One Environmental Site Assessment, 5646 & 5650 Manotick Main Street Ottawa, Ontario,* dated December 16, 2022. Based on the available information, the Site was developed between 1946 and 1959. The 5646 Manotick Main Street parcel was a retail fuel outlet from 1965 to 2004 and currently operates as a carwash with two residential units on the upper floor of the building. The 5650 Manotick Main Street parcel was developed into a residential property in 1940s and is still used as such.

Based on the review, evaluation, and interpretation of the information obtained from the records review, interviews, and Site reconnaissance completed as part of the Phase One ESA, five on-Site Potential Contaminating Activities (PCAs) and two off-Site PCAs relating to activities or incidents within the Phase One study area were identified. The five on-Site PCAs were determined to contribute to Areas of Potential Environmental Concern (APECs) on the Phase One property, as described below:

PCA 1 / APEC 1 (A/B): The former underground storage tanks (USTs) and associated fuel pumps related to the former use of the Site as retail fuel outlet.

PCA 2 / APEC 2: The presence of fill of unknown quality and unknown origin during redevelopment of the Site in 1965.

PCA 3 / APEC 3: The former use of the commercial building as an automotive garage.

PCA 6 / APEC 4: Staining underneath the ride on lawn mower in the white shed.

PCA 7 / APEC 5: Carwash effluent emanating from the septic system.

Terrapex previously completed a Phase II Environmental Assessment (ESA) (referred to as the "2022 Phase II ESA") for the Site in December 2022. The findings were provided in the report entitled *Phase II Environmental Site Assessment, 5646 & 5650 Manotick Main Street, Manotick (Ottawa), Ontario*, dated December 16, 2022.

In December 2022 a total of thirteen boreholes (MW101, BH102 to BH108, MW109, BH 110, MW111, MW112 and BH113) were drilled across the Site to depths between 1.2 and 9.3 metres below grade (m bg) with four of the twelve boreholes completed as monitoring wells (MW101, MW109, MW111, and MW112). The sampling locations were selected to investigate, in part, the previously identified APECs and for geotechnical purposes at the proposed building locations.

To further investigate certain APECs, a supplemental investigation was completed in October 2023 (referred to as the 2023 Phase Two ESA) that consisted of six additional boreholes (MW201, BH202, BH203, MW204, BH205 and MW206) were drilled to depths between 3.9 and 6.1 m bg with three of the boreholes completed as monitoring wells (MW101, MW204 and MW206). Select soil and groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (collectively BTEX), petroleum hydrocarbon F1 to F4 fractions (PHC F1-F4), volatile organic compounds (VOCs), metals and inorganics and/or polycyclic aromatic hydrocarbons (PAHs).

The Site Condition Standards (SCS) were determined using the criteria established by Ontario Regulation (O. Reg.) 153/04 Records of Site Condition - Part XV.1 of the Act. Based on the intended future use of the Site, the SCS for industrial/commercial/community land use in a potable groundwater situation, with medium to fine textured soil, as specified in Table 2 (hereafter referred to as the Table 2 SCS) of the Ministry of the Environment, Conservation, and Parks (MECP) April 15, 2011, *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the "Environmental Protection Act"* document (hereafter referenced as the *Standards*) were used to evaluate the laboratory analytical results.

The results of the 2022 and 2023 soil and groundwater analytical results were used to update the conceptual site model (CSM) for the Site. Soil analytical results indicated that concentrations of the analytes in the soil samples submitted for analysis did not exceed the applicable Table 2 SCS with the following exceptions:

- Concentrations of ethylbenzene and PHC F1 fraction were greater than the Table 2 SCS in sample MW112-2 (and blind duplicate sample MW112-12);
- Concentration of PHC F1 fraction was greater than the Table 2 SCS in sample MW204-4 (and blind duplicate sample MW1000);
- Concentrations of benzene and/or ethylbenzene were greater than the Table 2 SCS in samples BH205-3 and BH205-6 (benzene only);

- Concentrations of vanadium were greater than the Table 2 SCS in sample MW109-1B and MW3000 (blind duplicate of sample MW206-2);
- Electrical conductivity (EC) was greater than the Table 2 SCS in sample BH105-2; and,
- Sodium adsorption ratio (SAR) was greater than the Table 2 SCS in soil sample MW3000 (blind duplicate of sample MW206-2).

Based on monitoring events completed in December 2022 and October 2023 shallow horizontal groundwater flow across the Site is interpreted to be towards the west/southwest.

Laboratory analysis indicated that concentrations of the analytes in all groundwater samples submitted for analysis did not exceed the applicable Table 2 SCS with the following exceptions:

- Groundwater sample MW112 (and its blind duplicate sample MW122) had concentrations of benzene and ethylbenzene greater than the Table 2 SCS; and,
- Groundwater sample MW206 had concentrations of chloride greater than the Table 2 SCS.

Based on the findings of the Phase Two ESA and previously completed Phase II ESA, the environmental quality of soil and groundwater at the Site does not meet the Table 2 SCS. Therefore, an RSC cannot be filed for the Site unless a full-depth soil remediation and/or a risk assessment is completed in accordance with the requirements of O. Reg. 153/04. However, it is Terrapex's understanding that no change to a more stringent land use is anticipated and that the Site will be used for commercial purposes only.

Terrapex recommends that a remediation be completed to remove the PHC impacted soil that exceeds the Table 2 SCS. Terrapex also recommends that additional investigation be completed to determine if PHC impacts as exhibited in boreholes/monitoring wells MW112, MW204 and BH205 extend to the east of the Site and onto the municipal right-of-way within Manotick Main Street.

Vanadium concentrations that marginally exceeded the Table 2 SCS (MW109-1B and MW3000) are the likely the result of naturally elevated concentrations of metals present in Ottawa Valley clays. It is expected that as a constituent of the soil sample that was collected at those locations the exceedances may be due to natural conditions. Therefore, due to the marginal exceedance and the lack of other known sources of vanadium the qualified person (QP) has determined that the reported vanadium concentrations are representative of local background concentrations and the Table 2 SCS are not considered to have been exceeded in these two sampling locations based on O. Reg 153/04 Section 49.1 (3).

The marginal EC exceedance exhibited in soil sample BH105-2 was located in the parking lot area. Road salt has been applied to the parking lot during the wintertime for safety of vehicles and pedestrian traffic. Based on this rationale, it is the opinion of the QP that the road salt is applied to the area during wintertime then the values for EC would be deemed to have met the Table 2 SCS based on O. Reg 153/04 section 49.1 (1) solely at borehole BH105.

The concentrations of chloride in groundwater and SAR in soil (sample MW206-2) collected from borehole/monitoring well MW206 is likely the result of the effluent emanating from the carwash discharged through the septic system in the western portion of the Site. It is Terapex's understanding that the septic system is to be decommissioned and a new one will be installed in same general area during the anticipated redevelopment of the Site. It is understood that approval will either be required from the City of Ottawa and/or the MECP prior to the installation of the new septic system. Terrapex recommends that the client discuss soil and groundwater analytical results from MW206 during the approval process so that the results can be taken into account during the design of the system.

The potable well currently associated with the 5646 Manotick Main Street property has been observed to be in a state of disrepair. Further, it is located in the vicinity of an area of known soil and groundwater contamination. It is recommended that the well be decommissioned by a licenced well driller in accordance with the requirements of Revised Regulation of Ontario (R.R.O.) 1990, Regulation 903 prior to the remediation, and that a new well be installed as part of the redevelopment.

2.0 INTRODUCTION

Terrapex Environmental Ltd. (Terrapex) was retained by the 595831 Ontario Inc., otherwise known as Hawkins Properties Ltd. (Hawkins) to complete a Phase Two Environmental Site Assessment (ESA) of the properties located at 5646 and 5650 Manotick Main Street in Manotick (part of the City of Ottawa), Ontario ("the Site").

The objective of the Phase Two ESA was to assess the areas of potential environmental concern (APECs) identified by a Phase One ESA (Terrapex, 2022) and supplement soil and groundwater data from a previous Phase II ESA conducted by Terrapex in 2022. It is Terrapex's understanding that the study was required as part of a Site Plan Control (SPC) application to the City of Ottawa associated with the proposed redevelopment of the Site. The work was conducted in accordance with the requirements of Ontario Regulation (O. Reg.) 153/04. However, it is understood that a Record of Site Condition (RSC) is not required as there is no proposed change to a more stringent land use.

2.1 SITE DESCRIPTION

The Site is located on the west side of Manotick Main Street, located to the southwest of the intersection with Mahogany Harbour Lane in Manotick (part of the City of Ottawa), Ontario. The Site is irregular in shape and occupies a footprint of 4,090 m^2. The Site is composed of two municipal addresses: 5646 Manotick Main Street pertaining to the northern portion of the Site, and 5650 Manotick Main Street pertaining to the southern portion of the Site. The Site is developed with a vacant former commercial building located in the middle of the Site with two residential units on the upper floor of the building, two bay car wash located on the northern portion of the Site and a residential dwelling located on the southern portion of the Site.

It is understood that the northern portion of the Site is serviced by an on-Site potable water well (located adjacent to building on the 5646 Manotick Main Street building) and septic system (located on the western portion of the 5646 Manotick Main Street property. Based on the water well record, it appears that the potable water well was installed in 1956 to a depth of 13.4 m. The residential property on the southern portion of the Site is serviced by an on-Site potable water well (located southeast of the residential building) and a septic system (located to the west of the residential building). A well record for this potable supply well was not available.

The property identification number (PIN) and legal property description for the Site are listed below.

TABLE 1: SUMMARY OF PHASE ONE PROPERTY INFORMATION

Address:	5646 & 5650 Manotick Main Street, Ottawa ON
Property Identification Number:	03902-0885 (5646 Manotick Main Street) 03902-0886 (5650 Manotick Main Street)
Legal Description:	Part of Lot 4, Concession A North Gower (aka Concession Broken Front)
UTM Coordinates (centre of Site):	18T 446860 m E 5007642 m N
Name and Address of Owner:	5950831 Ontario Inc. (both properties)
Name and Address of Authorizing Party:	Jade Hawkins 595831 Ontario Inc. 650 Eagleson Road Kanata ON, K2M 1H4
Site Area:	4,089.8 m^2 (total)
Occupants (current):	5646 Manotick Main - car wash, two residential apartments (second storey) 5650 Manotick Main - residential dwelling

The Site Location is shown on Figure 1 and the General Site Layout is shown on Figure 2.

Uses and occupants of the properties in the vicinity of the Site at the time of the field work are listed below.

North: Manotick Main Street and the Rideau River beyond.

Northeast: Manotick Main Street, residential properties, and the Rideau River beyond.

East: Manotick Main Street and residential properties, and the Rideau River beyond.

Southeast: Manotick Main Street, residential properties, a City of Ottawa fire station (5669 Manotick Main Street), residential properties, and the Rideau River beyond.

South: Mahogany Harbour Lane, and residential properties beyond.

Southwest: Residential properties.

West: Residential properties, Mahogany Creek, and residential properties beyond.

Northwest: Commercial properties, Mahogany Creek and residential properties beyond.

Surrounding property use is provided on Figure 3.

2.2 PROPERTY OWNERSHIP

Contact information for the registered owner of the Site and the party authorizing this Phase Two ESA is provided in the table below.

Name and Address of Registered Owner:	595831 Ontario Inc. (both properties)
Name and Address of Authorizing Party:	Jade Hawkins 595831 Ontario Inc. 650 Eagleson Road Kanata ON, K2M 1H4

2.3 CURRENT AND PROPOSED FUTURE USES

The southern portion of the Site is currently used for residential purposes, which is a “residential use” per O. Reg. 153/04. (Records of Site Condition – Part XV.1 of the Act). The northern portion of the Site is used for a carwash and was formerly used as an automotive garage and retail fuel outlet which is a “industrial purpose” as per O. Reg. 153/04, but also had residential apartments. It is Terrapex’s understanding that the Site (i.e., both parcels) will be redeveloped to have “commercial property use” only per O. Reg. 153/04.

2.4 APPLICABLE SITE CONDITION STANDARDS

Generic Ministry of the Environment, Conservation and Parks (MECP) Site Condition Standards (SCS) for evaluating laboratory analytical results were selected from the April 15, 2011 *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (MOE, 2011) document on the basis of the criteria specified in O. Reg. 153/04.

The Site-specific details which influenced the soil and groundwater standards selection are summarized below:

- the Site is not within or adjacent to an area of natural significance as defined within Section 1 (1) of O. Reg. 153/04, and it does not include any land within 30 m of an area of natural significance, and is not otherwise considered ”potentially sensitive”;
- the pH determined for “surface” soil samples (representative of depths not exceeding 1.5 m below ground surface, excluding any surface treatment) analysed as part of this Phase Two ESA (including previous results) ranged from 7.14 to 8.16, which is between the prescribed values of 5 to 9 for the application of generic SCS;
- the pH determined for “subsurface” soil samples (representative of depths greater than 1.5 m below ground surface, excluding any surface treatment) analysed as part of this Phase Two ESA (including previous results) ranged from 7.27 to 8.09, which is between the prescribed values of 5 to 11 for the application of generic SCS;
- more than 2 m of overburden was observed over at least two-thirds of the area of the Site;
- the Site is not located within 30 m of a waterbody;
- stratified site conditions will not be used when evaluating laboratory analytical results;
- proposed future use of the Site is expected to be commercial;
- the Site and properties located (in whole or in part) within 250 m of the Site have a wells that are used or are intended for use as a source of water for human consumption or for agriculture; and,

- the Site is not located in an area designated in a municipal Official Plan as a well-head protection area, or another designation by the municipality intended for the protection of groundwater; and,
- soil texture at the Site has been classified as “fine- to medium-textured” based on the result of grain size analysis conducted for three representative soil samples.

Based on the preceding information and assumptions, the SCS applicable for industrial/commercial/community land use for fine- to medium-textured soil in a potable groundwater condition that are described in Table 2 of the *Standards* have been selected for evaluating laboratory analytical results from the Site at this time.

3.0 BACKGROUND INFORMATION

3.1 PHYSICAL SETTING

3.1.1 WATER BODIES & AREAS OF NATURAL SIGNIFICANCE

Based on the review of the aerial photographs, satellite images, and topographic maps completed as part of the previous Phase One ESA, the nearest water body is the Rideau River, located approximately 45 m to the north of the Site's northern boundary. Mahogany Creek is located approximately 100 m southwest of the Site. No Areas of Natural Significance (ANSI) were identified.

3.1.2 TOPOGRAPHY & SURFACE WATER DRAINAGE

A review of topographic mapping indicates that the Site is located in a mixed residential and commercial area. Google Earth indicates that the Site is at an approximate elevation of 88 m above mean sea level (amsl). The regional topography at the Site slopes down towards Rideau River (located to the north at an elevation of 84 amsl).

3.2 PAST INVESTIGATIONS

Summary of the Phase One ESA, April 2022

A Phase One ESA for the Site was conducted by Terrapex in April 2022 in accordance with the requirements of O. Reg. 153/04, as amended.

The primary objective of the Phase One ESA was to assess the Site and the surrounding lands wholly or partly located within a 250 m radius (Phase One Study Area) for potentially contaminating activities (PCAs) to identify areas of potential environmental concern (APECs) at the Site. Possible environmental concerns were identified through a site reconnaissance, interviews, and a records review consisting of a review of aerial photographs, fire insurance plans (FIPs), a chain of title search, a city directories search, and an Environmental Risk Information Services (ERIS) database search.

Based on the available information the Site was developed between 1946 and 1959. The northern portion of the Site (5646 Manotick Main Street) was a retail fuel outlet from 1965 to 2004. The northern portion of the Site is currently operated as a carwash with two residential units on the upper floor of the building. The southern portion of the Site (5650 Manotick Main Street) was developed into a residential property in 1940s and is still used as such.

Through an evaluation of the information gathered from the records review, interviews, and the site reconnaissance, five APECs were identified at the Site associated with PCAs at the Site, including:

- PCA 1 / APEC 1(A/B): The former USTs and associated fuel pumps related to the former use of the Site as retail fuel outlet.
- PCA 2 / APEC 2: The presence of fill of unknown quality and unknown origin during redevelopment of the Site in 1965.
- PCA 3 / APEC 3: The former use of the commercial building as an automotive garage.
- PCA 6 / APEC 4: Staining underneath the ride on lawn mower in the white shed.
- PCA 7 / APEC 5: Carwash effluent emanating from the septic system.

A Phase Two ESA was recommended to investigate the identified APECs.

A review of other previous environmental reports reviewed can be found in the Phase One ESA Report (Terrapex 2023).

Summary of the Phase II ESA, December 2022

Terrapex previously completed a Phase II Environmental Assessment (ESA) (referred to as the "2022 Phase II ESA") for the Site in December 2022. The findings were provided in the report entitled *Phase II Environmental Site Assessment, 5646 & 5650 Manotick Main Street, Manotick (Ottawa), Ontario*, dated December 16, 2022. The assessment was conducted as a preliminary investigation of the APECs, but also in conjunction with a geotechnical investigation for the proposed development.#

The SCS for industrial/commercial/community land use in a potable groundwater situation, with fine- to medium-textured soil, as specified in Table 2 SCS were used to evaluate the laboratory analytical results (using the same process outlined in Section 2.4)

Between October 11 and 12, 2022, a total of thirteen boreholes (MW101, BH102 to BH108, MW109, BH 110, MW111, MW112 and BH113) were drilled across the Site to depths between 1.2 and 9.3 metres below grade (m bg) with four of the boreholes completed as monitoring wells (MW101, MW109, MW111, and MW112). Select soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (collectively BTEX), petroleum hydrocarbon F1 to F4 fractions (PHC F1-F4), metals and inorganics.

The results of the laboratory analysis indicated that concentrations of the analytes in the soil samples submitted for analysis did not exceed the applicable Table 2 SCS with the following exceptions:

- Concentrations of ethylbenzene and PHC F1 fraction was greater than the Table 2 SCS in sample MW112-2 and its blind duplicate sample (MW112-12);
- Concentration of vanadium was greater than the Table 2 SCS in sample MW109-1B; and,
- Electrical conductivity was greater than the Table 2 SCS in sample BH105-2.

Monitoring of all four monitoring wells was completed on October 27 and 28, 2022 with an additional monitoring event completed on December 2, 2022. Non-aqueous phase liquids (NAPL) was not detected in any of wells during the monitoring events. Depth to groundwater ranged from 2.02 m bg at MW112 to 2.90 m bg at MW109 during the October 27, 2022, monitoring event, 2.87 m bg at MW101 to 5.27 m bg at MW111 during the October 28, 2022 monitoring event, and 1.56 m bg at MW111 to 3.19 m bg at MW109 during the December 2, 2022 monitoring event. Based on December 2, 2022 data, shallow horizontal groundwater flow is interpreted to be towards the southwest (towards Mahogany Creek).

Groundwater samples were submitted for laboratory analysis of BTEX and PHC F1-F4. Laboratory analysis indicated that concentrations of the analytes in all groundwater samples submitted for analysis did not exceed the applicable Table 2 SCS except for sample MW112 and its blind duplicate sample (MW122) which had concentrations of benzene and ethylbenzene greater than the Table 2 SCS.

Based on the results of the 2022 Phase II ESA, PHC impacted soil and groundwater was identified at borehole MW112 in the vicinity of the former pump island (APEC-1B). Metals or inorganics impacts were also identified in the soil at MW109 for vanadium, and BH105 for electrical conductivity (EC).

It should be noted that 2022 Phase II ESA did not investigate all of the APECs for all of the contaminants of potential concern (COPC) as identified in the Phase One ESA. More specifically the following APECs were not investigated:

- No soil or groundwater samples were collected from within the former tank nest (APEC 1A);
- No soil samples were submitted for polycyclic aromatic hydrocarbons (PAHs) related to the importation of fill of an unknown quality imported to the Site (APEC 2);

- No soil or groundwater samples were collected from within APEC 3 related to the former use of the main building as an automotive garage; and,
- No groundwater samples were collected within the vicinity of APEC 5 related to the effluent generated by on-Site the car wash.

Terrapex has included the soil and groundwater analytical data from the 2022 Phase II ESA in the figures and tables of the current report for ease of reference and to provide an updated conceptual site model (CSM) to reflect soil and groundwater conditions at the Site.

4.0 SCOPE OF INVESTIGATION

4.1 OVERVIEW OF SITE INVESTIGATION

The scope of Terrapex's assessment comprised the following:

- Preparing a Sampling and Analysis Plan (SAAP) which outlines the APEC to be assessed, COPCs, the proposed sampling program, and data quality objectives;
- Coordinating with the Client to arrange for access to the Site;
- Obtaining buried service locates from local utilities and retaining a private locating company to identify secondary services and to clear the boring locations prior to commencing the intrusive investigation;
- Preparing a site-specific health and safety plan (HASP) for field personnel and sub-contractors as per Terrapex's standard practice for each component of the work program. Job Safety Analyses (JSAs) was completed in the field for each task;
- Supervising the drilling of six boreholes (MW201, BH202, BH203, BH204, BH205, and MW206, as shown on Figure 2) to depths ranging from 3.9 m to 6.1 m bg) to assess soil and groundwater conditions at their respective APECs and to delineate the previously identified soil and groundwater impacts at MW112 (for MW201, BH205 and MW204).
- Collecting soil samples during drilling, logging samples in the field with respect to soil type, qualitative moisture content and visual/olfactory evidence of chemical impact, and selecting worst-case and/or representative samples for laboratory analysis of COPCs;
- Measuring combustible soil vapour (CSV) concentrations in soil;
- Monitoring groundwater conditions within each monitoring well, including combustible vapour (CV) concentration in the well headspace, depth to water (DTW), and thickness of NAPL, if any;
- Collecting groundwater samples from the newly installed monitoring wells using a using "low-flow" methodology;
- Submitting selected soil and groundwater samples for laboratory analyses of COPCs;
- Surveying the elevation of each monitoring well relative to a temporary benchmark;
- Evaluating laboratory analytical results with respect to the selected SCS;

Terrapex retained Premier Locates Inc. (Premier) of Ottawa, Ontario to conduct the private subsurface utility locates. Borehole drilling and monitoring well installation services for this work program were provided by Strata Drilling Group (Strata) of Carleton Place, Ontario, a MECP licensed well drilling contractor; Disposals of wastes (development/purge water) was conducted by Badger Daylighting (Badger).

Laboratory analytical services for this work program were provided by the AGAT Laboratories (AGAT) of Mississauga, Ontario. At the time of this investigation, AGAT was accredited by the Canadian Association for Laboratory Accreditation (CALA) to International Standard ISO/IEC 17025:2017, *General Requirements for the Competence of Testing and Calibration Laboratories* for the parameters included in the analytical program.

The Sampling and Analysis Plan is provided in Appendix I. The sampling procedures are documented in detail in Section 5.0.

4.2 MEDIA INVESTIGATED

Based on the Phase One ESA findings, the Phase Two ESA work program documented herein included investigation of the environmental quality of both soil and groundwater at the Site.

Soil and groundwater were investigated by drilling boreholes, installing monitoring wells, and sampling groundwater, as described above, and in Section 5.0.

4.3 PHASE ONE CONCEPTUAL SITE MODEL

The Phase One CSM presented in the Phase One ESA report (Terrapex, 2022) included figures and narrative that provided the logical basis for the interpretation of PCAs and APECs on the Phase Two Property. A summary of the CSM is provided below.

Site Features: The Site is located on the west side of Manotick Main Street, approximately 250 m south of Eastman Avenue, north of Mahogany Harbour Lane in Manotick, Ontario. The Site is irregular in shape and occupies a footprint of 4,090 m^2. The Site is composed of two municipal addresses - 5646 Manotick Main Street pertaining to the northern portion of the Site and 5646 Manotick Main Street pertaining to the southern portion of the Site. Specific information for each parcel is provided below.

<u>5646 Manotick Main Street</u>

The 5646 Manotick Main Street property is irregular in shape and occupies a footprint of approximately 2,566 m^2. The property was occupied by a two-storey building that consists of:

- A vacant former commercial space located on the bottom portion of the building;
- Two apartment units (Apartment Units 2 and 3, there is no Unit 1) located on the second storey of the building; and,
- A two-bay car wash that was constructed on the north end of the building.

The property operated as a retail fuel outlet from 1965 to 2004. The former pump island was located to the northeast of the building, and the former tank nest was located to the east of the building.

The eastern portion of the property was covered with asphalt except for the southeast portion which was covered with gravel (the apparent location of the former tank nest). A former concrete pump island with a light standard was located to the northeast of the main building. The northern portion of the building was occupied by an operating two-bay car wash.

The western portion of the property was grass covered and contains the septic tanks and weeping bed. The rear of the building had a wooden staircase and deck which provided access to the two second storey apartments. A vinyl shed was located to the southwest of the building. The backyard was not fenced except for the northern property boundary. It was noted that trees were located on the periphery of the backyard.

5650 Manotick Main Street Property

The 5650 Manotick Main Street property is irregular in shape and occupies a footprint of approximately 1,523 m^2. A single storey residence occupied the central portion of the property. The front yard of the property (located to the east of the residence) had a gravel surface cover while the backyard was largely landscaped with grass cover. Two sheds were located in the backyard of the property. The property was not fenced. However, a stand of trees were located between the property and Mahogany Harbour Lane to the southeast.

The location of the Site and the general Site layout are shown on Figure 1 and 2, respectively. The Phase One study area, illustrating the Site and surrounding lands, is shown on Figure 3.

Geology/Hydrogeology: Based on the 2007 Ontario Geological Survey (OGS) map from *Physiography of Southern Ontario*, the Site is located in a physiographic region known as sand plains.

Based on the OGS map *Surficial Geology of Southern Ontario*, the Site is located in an area of fine-textured glaciomarine deposits characterized silt and clay, minor sand and gravel. Based on the OGS map *2556 (Bedrock Geology of Ontario)*, the Site is underlain by the Beekmantown Group which consists primarily of dolostone and sandstone.

Based on topography, the inferred direction of local groundwater flow is expected to be north-northeast, towards the Rideau River located approximately 45 m north of the Site. Mahogany Creek is located approximately 100 m west of the Site and may also affect groundwater flow.

Potentially Contaminating Activities (PCAs) / Areas of Potential Environmental Concern (APECs): A total of seven PCAs were identified relating to activities or incidents at the Site or within the Phase One Study Area that were evaluated for their potential to contribute to APEC.

Based on a detailed review of the available information relating to the PCAs, a total of five APECs were identified on the Site.

The identified PCAs and APECs associated with the CSM developed during the Terrapex Phase One ESA are illustrated on Figures 4 and 5.

Contaminants of Concern: COPCs associated with the APECs included metals and inorganics, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbon fractions F1 to F4 (PHC F1-F4), volatile organic compounds (VOCs) including benzene, toluene, ethylbenzene and xylenes (collectively BTEX) in soil and groundwater.

Migration Pathways: In general, potential preferential migration pathways for sub-surface contaminants at a Site can include naturally occurring sand seams or similar geologic strata as well as anthropological conduits associated with buried utilities, historical water wells, etc. However, the observed stratigraphy at the Site suggests that natural preferential pathways are not a significant Site feature.

4.4 DEVIATIONS FROM THE SAMPLING AND ANALYSIS PLAN

No deviations from the SAAP were encountered during the Phase Two ESA investigation.

4.5 IMPEDIMENTS

Access to the Site was not impeded at any time during the Phase Two ESA work program. The locations of some of the boreholes were adjusted due to the presence of underground and aerial services, such as water lines, communications lines, and private hydro which are present in some areas of the Site.

5.0 INVESTIGATION METHOD

5.1 GENERAL

The soil and groundwater quality at the Site were investigated at the locations shown on Figure 2 through the advancement of boreholes, and installation of groundwater monitoring wells to characterize environmental conditions at the APECs identified in the Phase One ESA. Investigation methods followed Standard Operating Procedures prepared by Terrapex for the conduct of environmental investigations. Selected photographs are provided in Appendix III.

The methodology for the 2022 Phase II ESA is provided in the separate report, although generally followed similar methodologies and procedures.

5.2 HEALTH AND SAFETY

Prior to drilling at the Site, public utilities were identified and/or cleared by representatives of the local telephone, power, natural gas, water, sewer, and cable television utilities. Private on-Site utilities were identified and/or cleared by Premier. A health and safety plan was prepared and reviewed with the excavating and drilling contractor prior to commencing work.

5.3 DRILLING

Borehole drilling and monitoring well installation services for this work program were provided by Strata using a track mounted drill rig and portable drilling equipment (for the MW201 location inside the building). Strata is an MECP-licensed well drilling contractor.

Measures to minimize potential cross-contamination or other potential bias are described in Terrapex's Standard Operating Procedures (Appendix II) and are further descripted in Section 5.10. There were no deviations from the Standard Operating Procedures regarding borehole drilling during this investigation.

5.4 SOIL

5.4.1 SOIL SAMPLING

A total of six boreholes (MW201 to MW206) were drilled at the Site on October 12th, 2023, to depths from 3.9 m to 6.1 m bg within the various APECs. Borehole drilling was completed under the full-time supervision of Terrapex staff. Soil samples were collected at each borehole location at regular depth intervals using a Geoprobe 420M portable drilling equipment (for MW201) or a Geoprobe 7822 DT drill rig (for BH202, BH203, MW204, BH205, and MW206).

During drilling, 51-mm diameter split-spoon samplers were advanced into the subsurface to facilitate the collection of relatively undisturbed soil samples. Terrapex collected soil samples at depth intervals of approximately 0.76 m, and immediately logged the geologic properties of each sample. Each recovered soil sample was divided into two portions. One portion was placed in a clear sampling bag and combustible soil vapours CSV concentrations were measured in the headspace of each sampling bag with an RKI Eagle 2 Hydrocarbon Surveyor (RKI Eagle) calibrated to n-hexane and operated in the methane elimination mode. The second portion was collected using laboratory supplied sampling containers for analysis of selected COPCs. Samples considered to be "worst-case" based on field screening were submitted for analysis and extracted at the laboratory within the required holding time. Soil descriptions were recorded based on the Unified Soil Classification System (USCS).

Samples for analysis were placed in a cooler with ice and delivered with a signed chain of custody to the project laboratory for analysis. Borehole locations are shown on Figure 2. Borehole logs illustrating the stratigraphy encountered, chemical analysis samples and measured CSV concentrations are included in Appendix IV.

Measures to minimize potential cross-contamination or other potential bias are described in Terrapex's SOPs (Appendix II) and are further described in Section 5.10.

5.4.2 FIELD SCREENING MEASUREMENTS

CSV concentrations were measured in each soil sample using a RKI Eagle 2 Hydrocarbon Surveyor (Eagle) calibrated to n-hexane and operated in "methane elimination" mode. The Eagle can measure combustible organic compounds to a nominal detection level of 5 parts per million (ppm), with an accuracy of ±5%. The Eagle was calibrated according to the manufacturer's instructions and Terrapex SOPs before the field investigation.

Apparent "worst-case" soil samples from each borehole were identified on the basis of vapour screening, visual and olfactory evidence of contamination, and/or sample location in relation to potential point sources of impact.

5.5 GROUNDWATER

5.5.1 MONITORING WELL INSTALLATION

Monitoring well installation services for this work program were provided by Strata, under contract with Terrapex. A monitoring well was installed in select boreholes (all with the exception of BH202, BH203, and BH205) in order to assess groundwater within the various APECs, as shown on Figure 2, to compliment the previously installed monitoring wells (MW101, MW109, MW111, MW112). Two monitoring wells (MW204 and MW206) were constructed using 50 mm inside diameter schedule 40 PVC well pipe and #10 slot screen interval. Monitoring well MW201 was constructed using 38 mm inside diameter schedule 40 PVC well pipe and #10 slot screen. The annulus of each monitoring well was backfilled with washed silica sand to a depth of approximately 0.3 m above the screened interval. A hydrated bentonite seal was placed above the sand pack to prevent infiltration of surface water into the monitoring well. A flush-mount well casing (MW201 and MW204) was cemented in place over each monitoring well for protection. A monument protective casing was set in concrete for monitoring well MW206. There were no deviations from the SAAP regarding the installation of the monitoring wells. Well installation details are provided within the borehole logs in Appendix IV.

The depths to the bottom of the screened intervals of the monitoring wells varied from 3.0, 4.6, and 6.1 m bg for MW201, MW204, and MW206, respectively. The screened interval depths were established to assess the surface of the shallow groundwater table which would be expected to be the “worst-case” conditions for petroleum parameters.

Prior to developing and sampling, the monitoring wells were monitored for combustible vapours in the well headspace, and depths to water and to the bottom were measured in each well. The estimated volume of water in each well and its annulus were calculated based on the depth measurements, diameter of the well standpipe and annulus, and an assumed annulus porosity of 30%.

Well development was conducted on October 13 (MW201 and MW204), and October 16 (MW206), 2023 in accordance with Terrapex’s SOPs. Prior to development, the wells were monitored for DTW and depth to the bottom of the well using a Heron oil/water interface probe. The wells were developed to remove entrained particulate in the well standpipe, well screen and filter pack as well surrounding formation materials. Development of each monitoring well was conducted with a dedicated inertial sampler comprising low density polyethylene (LDPE) tubing and a LDPE foot valve. The development was conducted until the wells yielded water free of visible particulate or until a "dry" condition was encountered for three consecutive cycles. Between 50 L and 30 L of purge water was removed from each of the monitoring wells.

5.5.2 FIELD MEASUREMENTS OF WATER QUALITY PARAMETERS

On October 16, 2023 (prior to conducting groundwater sampling activities), vapour levels were measured within the headspace of each monitoring (100- and 200-series wells) using an RKI Eagle 2. The depth to groundwater and apparent thickness, if any, of NAPL were then measured using a Heron Instruments interface probe. Note that monitoring well MW101 could not be located and was not monitored.
To mitigate cross-contamination, the interface probe was washed with a liquid solution of Alconox detergent and rinsed with potable water between each monitoring well. A fresh pair of nitrile gloves was worn at each well location.

Water quality parameters (i.e., temperature, pH, specific conductivity, dissolved oxygen, and oxidation reduction potential) were measured in monitoring wells prior to sampling activities using a flow-through cell and a YSI 556 Pro water quality sensor, as detailed in the SOPs (Appendix II).

5.5.3 GROUNDWATER SAMPLING

Groundwater sampling was completed on October 16, 2023 (MW201 and MW204), and October 17, 2023 (MW206). Low flow sampling was conducted in order to minimize drawdown of the water table. After water quality parameters stabilized, groundwater samples from the monitoring wells were collected. Sampling was conducted using “low-flow” methodology using a peristaltic pump and dedicated sample tubing, as per Terrapex SOPs (Appendix II).

Groundwater samples for the selected COPCs were collected directly into pre-cleaned, laboratory-supplied sampling bottles, packed in a cooler with ice, and delivered with a signed chain of custody to the project laboratory for analysis.

Measures to minimize potential cross-contamination or other potential bias are described in Terrapex’s SOPs (Appendix II) and are further described in Section 5.10.

5.6 SEDIMENT

Sediment sampling was not completed as sediment is not present at the Site.

5.7 ANALYTICAL TESTING

Laboratory analytical services for this work program involving soil and groundwater media were provided by AGAT Laboratories (AGAT) of Mississauga, Ontario. At the time of this investigation, AGAT is accredited by the Canadian Association for Laboratory Accreditation (CALA) to International Standard ISO/IEC 17025:2017, *General Requirements for the Competence of Testing and Calibration Laboratories* for the parameters included in the analytical program. AGAT provided laboratory analytical services during the previously completed 2022 Phase II ESA completed at the Site.

Soil and groundwater samples were analysed as per the SAAP to address the identified APECs and the respective COPCs identified in the Phase One ESA.

5.8 RESIDUE MANAGEMENT

Soil cuttings and purge water generated during the work program were contained on-Site in drums for future disposal off-Site at a licenced waste disposal facility during the anticipated remediation.

5.9 ELEVATION SURVEYING

Terrapex completed an elevation survey of the top of the pipe and ground surface for each monitoring well. The survey was completed using a Trimble Spectra Geospatial SP80 global navigation satellite system (GNSS) receiver. Monitoring well MW201 could not be surveyed with the GNSS receiver as there was no reception inside the building.

5.10 QUALITY ASSURANCE AND QUALITY CONTROL MEASURES

Quality Assurance and Quality Control (QA/QC) measures were implemented during the Phase Two ESA in accordance with Terrapex SOPs. A summary of these measures follows.

During drilling, well development, and groundwater sampling, to mitigate cross-contamination, fresh nitrile gloves were worn for the handling of each sample.

During groundwater sampling, dedicated sampling equipment was used at each monitoring well location. To mitigate cross-contamination, the interface probe was washed with a liquid solution of Alconox detergent and rinsed with potable water between each monitoring well. A fresh pair of nitrile gloves was donned at each well location.

Pre-cleaned soil and groundwater sample containers for the specific parameters of interest were provided by the laboratory and used at each borehole and monitoring well location for the collection of soil and groundwater samples. Samples for analyses were placed in an enclosed cooler with loose ice and delivered with signed chains of custody and custody seals to AGAT for chemical analysis.

QA/QC samples collected as part of the Phase Two investigation program included the following:

- One blind field duplicate soil sample (MW3000, blind duplicate of MW206-2) for analysis of metals and inorganics, and PAHs parameters.
- One blind field duplicate soil sample (MW1000, duplicate of MW204-4) for analysis of BTEX and PHC F1-F4.
- One methanol blank sample was submitted with the soil samples for analysis of BTEX and PHC F1.
- One blind field duplicate groundwater sample (MW214, duplicate of MW204) for analysis of BTEX and PHC F1-F4.
- One trip blank sample was submitted with the groundwater samples for analysis of BTEX and PHC F1.
- One trip spike sample was submitted with the groundwater samples for analysis of BTEX.

With the exception of the trip blank and spike samples prepared by the laboratory, the laboratory was not informed of the nature or number of the field QA/QC samples outlined above.

6.0 REVIEW AND EVALUATION

6.1 GEOLOGY

A 0.05 to 0.09 m layer of asphalt was present in the surface material for borehole BH202 and BH205, followed by a silty sand layer between 0.1 and 1.5 m bg. At borehole BH203 the silty sand layer was present at surface to a depth of 1.5 m bg. Borehole MW204, drilled in the former UST nest where sandy silt material was encountered from surface to 3.8 m bg. At interior borehole MW201, a 0.10 thick concrete slab was encountered at surface underlain by a gravel layer from 0.1 to 1.6 m bg. Underlying the silty sand and the gravel layer at these boreholes was a native clayey silt and or silty clay layer to the maximum depth of the investigation (6.1 m bg). Bedrock was not encountered during the investigation.

Visual and/or olfactory evidence of PHC impacts were not observed in the soil samples collected from boreholes. Measured CSV concentrations in collected soil samples were all less than 5 ppm except for samples MW204-4 with a concentration of 350 ppm, BH205-3 with concentration of 370 ppm, BH205-5 with a concentration of 70 ppm, and BH205-6 with a concentration of 5 ppm.

The soil stratigraphy and corresponding soil sample CSV concentrations for each borehole are shown in the graphic borehole logs provided in Appendix IV.

6.2 GROUNDWATER

Monitoring of all accessible monitoring wells was completed on October 16, 2023, including both the 100- and 200-series monitoring wells. The CV concentrations in the well headspaces were all less than 10 ppm, with the exception of monitoring well MW204 which had CV concentrations of 175 ppm, and MW206 which had CV concentrations of 12% of the lower explosive limit (LEL). Depth to groundwater ranged from 1.32 m bg at MW204 to 3.09 m bg at MW109. NAPL was not detected during any of these monitoring events. Monitoring well MW101 was not able to be found and thus was not monitored. Monitoring well MW201 was not able to be surveyed and thus the groundwater elevation could not be determined.

Interpreted groundwater elevation contours and the inferred groundwater flow, based on October 16, 2023, data, are shown in Figure 3. As shown in the figure, shallow horizontal groundwater flow is interpreted to the west/southwest towards Mahogany Creek located to the west of the Site. This groundwater flow direction is similar to the groundwater flow direction observed during the 2022 Phase II ESA. It is possible that the northern portions of the Site may be expected to have a flow direction towards the north (i.e., a hydrological divide is located on the Site).

6.3 SOIL TEXTURE

Based on the grain size analysis conducted during the 2022 Phase II ESA, the soil texture was determined to be fine- to medium-textured per the definitions of O. Reg. 153/04. The field observations of the predominance of native silty clay and clayey silt in the boreholes drilled during the 2023 work program support the fine- to medium-texture classification.

6.4 SOIL QUALITY

Laboratory results for the soil samples submitted for analyses of BTEX and PHC F1-F4, VOCs, metals and inorganics, and PAHs are summarized in Tables 2 through 5, respectively. Laboratory results of chemical analysis of the soil samples are presented on Figures 7A through 7D. The laboratory certificates of analysis are provided in Appendix V. Terrapex has included the soil analytical data from the 2022 Phase II ESA in the figures and tables of the current report for ease of reference and are also described below.

As indicated in the tables, concentrations of all parameters in the soil samples submitted for laboratory analysis were less than the Table 2 SCS, except the following:

- Concentrations of ethylbenzene and PHC F1 fraction were greater than the Table 2 SCS in sample MW112-2 (and blind duplicate sample MW112-12);
- The concentration of PHC F1 fraction was greater than the Table 2 SCS in sample MW204-4 (and blind duplicate sample MW1000);
- Concentrations of benzene and/or ethylbenzene were greater than the Table 2 SCS in samples BH205-3 and BH205-6 (benzene only);
- Concentrations of vanadium were greater than the Table 2 SCS in sample MW109-1B and MW3000 (blind duplicate of sample MW206-2);
- Electrical conductivity (EC) was greater than the Table 2 SCS in sample BH105-2; and,
- Sodium adsorption ratio (SAR) was greater than the Table 2 SCS in soil sample MW3000 (blind duplicate of sample MW206-2).

6.5 GROUNDWATER QUALITY

Laboratory results for the groundwater samples submitted for analyses of BTEX and PHC F1-F4, VOCs, metals and inorganics, and PAHs and are summarized in Tables 6 through 9, respectively. Laboratory results of chemical analysis of the groundwater samples are presented on Figures 8A through 8D. The laboratory certificates of analysis are provided in Appendix V. Terrapex has included the soil analytical data from the 2022 Phase II ESA in the figures and tables of the current report for ease of reference and are also described below.

As indicated in the tables, concentrations of all parameters in the groundwater samples were less than the Table 2 SCS, except the following:

- Groundwater sample MW112 (and its blind duplicate sample MW122) had concentrations of benzene and ethylbenzene greater than the Table 2 SCS; and,
- Groundwater sample MW206 had concentrations of chloride greater than the Table 2 SCS.

6.6 SEDIMENT QUALITY

The environmental quality of sediment was not investigated as sediment is not present at the Site.

6.7 QUALITY ASSURANCE AND QUALITY CONTROL RESULTS

The laboratory's QA/QC program consisted of the analysis of laboratory replicates, method and spiked blanks, process percent recoveries, matrix spikes, and surrogate percent recoveries, as appropriate for the particular analysis protocol.

QA/QC Control Limits: A review of the quality assurance reports attached to the laboratory certificates of analyses indicate that the laboratory QA/QC samples were within the quality control limits.

Lab Duplicate Samples: Acceptable correlation was generally observed between the laboratory duplicate and its corresponding sampling pair for each of the tested parameters.

Matrix Spike Recoveries: No issues regarding matrix spike recoveries were outlined in any of the laboratory certificates of analysis with the exception of the following:

Detection Limits: Detection limits generally did not require adjustment.

Field Duplicate Samples: Field duplicate sample results are presented in the soil and groundwater analytical results tables (Table 2 to Table 5 for soil, and Table 6 to Table 9 for groundwater). Relative percent difference (RPD) for field duplicate sample results is calculated as follows:

$$RPD = \left| \frac{result_1 - result_2}{\frac{1}{2}\, x\, (result_1 + result_2)} \right| x\ 100\%$$

The RPD was not calculated where reported concentrations were less than five times the laboratory method detection limit (MDL). Increased RPD values may be encountered whenever duplicate analyses are completed on samples representing heterogeneous fill materials. However, significant concerns regarding the validity of analytical results would generally not be suspected if calculated RPD do not exceed the specified alert criteria by more than a factor of two (i.e., an RPD of >60%).

Quantitative correlation for various parameters was not calculable for many of the blind field duplicate soil or groundwater samples as concentrations were less than five times the MDL. However, where calculated, RPDs between the blind field duplicate samples were less than the alert criteria for all parameters where the RPD was calculated, with the following exception:

- The RPD for soil sample MW206-2 and its duplicate pair sample MW3000 was greater than the alert criteria of 30% for analysis of barium, cobalt, copper, nickel, vanadium, zinc, and EC. The elevated RPD in soil sample MW206-2 and its duplicate pair were likely attributed to sample heterogeneity of the material. Note that analytical results for vanadium and SAR exceeded the Table 2 SCS in blind duplicate sample MW3000 but not in sample MW206-2.
- The RPD for groundwater sample MW204 and its duplicate pair sample MW214 was greater than the alert criteria of 30% for analysis of PHC F1. The elevated RPD marginally exceeds the alter criteria and is expected to be due to low concentration of the analytes.

The overall quality control associated with these results still met the acceptability criteria.

Trip Blank Samples: A methanol blank sample (with the soil samples) and a trip blank (with the groundwater samples) were submitted for analysis of BTEX/PHC F1 as part of the sampling events. Analytical results from the methanol and trip blank samples were not detected at the laboratory MDL for all parameters.

Trip Spike Sample: A trip spike sample was submitted for analysis of BTEX as part of the groundwater sampling event. Analytical results from the trip spike sample were all within the acceptable limit +/- 30%.

Based on the above analysis of the QA/QC program, no concerns regarding the adequacy or representativeness of the sampling and analytical program were identified and, as a result, the decision-making was not affected, and the overall objectives of the investigation and the assessment were met.

7.0 CONCLUSIONS

The objective of the Phase Two ESA was to assess the APECs identified by a Phase One ESA (Terrapex, 2022) and supplement soil and groundwater data from a previous Phase II ESA conducted by Terrapex in 2022. The results of the 2022 and 2023 soil and groundwater samples are summarized below and were used to update the CSM for the Site.

Soil analysis indicated that concentrations of the analytes in the soil samples submitted for analysis did not exceed the applicable Table 2 SCS with the following exceptions:

- Concentrations of ethylbenzene and PHC F1 were greater than the Table 2 SCS in sample MW112-2 (and blind duplicate sample MW112-12);
- Concentrations of PHC F1 was greater than the Table 2 SCS in sample MW204-4 (and blind duplicate sample MW1000);
- Concentrations of benzene and/or ethylbenzene were greater than the Table 2 SCS in samples BH205-3 and BH205-6 (benzene only);
- Concentrations of vanadium were greater than the Table 2 SCS in sample MW109-1B and MW3000 (blind duplicate of sample MW206-2);
- Electrical conductivity (EC) was greater than the Table 2 SCS in sample BH105-2; and,
- Sodium adsorption ratio (SAR) was greater than the Table 2 SCS in soil sample MW3000 (blind duplicate of sample MW206-2).

Based on monitoring events completed in December 2022 and October 2023 shallow horizontal groundwater flow across the Site is interpreted to be towards the west/southwest, towards Mahogany Creek located to the west of the Site.

Laboratory analysis indicated that concentrations of the analytes in all groundwater samples submitted for analysis did not exceed the applicable Table 2 SCS with the following exceptions:

- Groundwater sample MW112 (and its blind duplicate sample MW122) had concentrations of benzene and ethylbenzene greater than the Table 2 SCS; and,
- Groundwater sample MW206 had concentrations of chloride greater than the Table 2 SCS.

Based on the findings of the Phase Two ESA and previously completed Phase II ESA, the environmental quality of soil and groundwater at the Site does not meet the Table 2 SCS. Therefore, an RSC cannot be filed for the Site unless a full-depth soil remediation and/or a risk assessment is completed in accordance with the requirements of O. Reg. 153/04. However, it is Terrapex's understanding that no change to a more stringent land use is anticipated and that the Site will be used for commercial property use only in the future and an RSC is not required.

Terrapex recommends that a remediation be completed to remove the PHC impacted soil and groundwater that exceeds the Table 2 SCS that appear related to the former pump island and UST tank nest from the former retail fuel outlet (APEC-1A and APEC-1B). Terrapex also recommends that additional investigation be completed (if required) to determine if PHC impacts in soil and/or groundwater as exhibited in boreholes/monitoring wells MW112, MW204 and BH205 extend off-Site to the northeast and onto the municipal right-of-way.

Vanadium concentrations that marginally exceeded the Table 2 SCS in soil samples MW109-1B and MW3000 (blind duplicate of MW206-2) are likely the result of naturally elevated concentrations of certain metals present in Ottawa Valley clay soils (Champlain Sea Clay). It is expected that as a constituent of the soil sample that was collected at those locations the exceedances may be due to natural conditions. Specifically for vanadium, studies indicate that concentrations of up to 123 µg/g are indicative of background conditions. Therefore, due to the marginal exceedance at concentrations less than 123 µg/g, and the lack of other known sources of vanadium, the qualified person (QP) has determined that the reported vanadium concentrations are representative of local background concentrations and the Table 2 SCS are not considered to have been exceeded in these two sampling locations based on O. Reg 153/04 Section 49.1 (3).

The marginal EC exceedance exhibited in soil sample BH105-2 was located in the parking lot area. Road salt has been applied to the parking lot during the wintertime for safety of vehicles and pedestrian traffic. Based on this rationale, it is the opinion of the QP that the road salt is applied to the area during wintertime then the values for EC would be deemed to have met the Table 2 SCS based on O. Reg 153/04 section 49.1 (1) solely at borehole BH105.

The concentrations of chloride in groundwater at MW206 and SAR in soil sample MW3000 (blind duplicate of MW206-2) collected from borehole/monitoring well MW206 is likely the result of the effluent emanating from the carwash. It is Terapex's understanding that the septic system is to be decommissioned and a new one is to be installed in same general same area during the anticipated redevelopment of the Site. It is understood that approval will either be required from the City of Ottawa and/or the MECP prior to the installation of the new septic system. Terrapex recommends that the client discuss soil and groundwater analytical results from MW206 during the approval process so that the results can be taken into account during the design of the system.

The potable well currently associated with the 5646 Manotick Main Street property has been observed to be in a state of disrepair. Further, it is located in the vicinity of an area of known soil and groundwater contamination. It is recommended that the well be decommissioned by a licenced well driller in accordance with the requirements of Revised Regulation of Ontario (R.R.O.) 1990, Regulation 903 prior to the remediation, and that a new well be installed as part of the redevelopment.

7.1 SIGNATURES

This report has been completed in accordance with the terms of reference for this project as agreed upon by 595831 Ontario Inc. (the Client) and Terrapex Environmental Ltd. (Terrapex) and generally accepted engineering or environmental consulting practices in this area.

The reported information is believed to provide a reasonable representation of the general environmental conditions at the site; however, studies of this nature have inherent limitations. The data were collected at specific locations and conditions may vary at other locations, or with the passage of time. The assessment was also limited to a study of those chemical parameters specifically addressed in this report.

Terrapex has relied in good faith on information and representations obtained from the Client and third parties and, except where specifically identified, has made no attempt to verify such information. Terrapex accepts no responsibility for any deficiency or inaccuracy in this report as a result of any misstatement, omission, misrepresentation, or fraudulent act of those providing information. Terrapex shall not be responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed at the time of the study.

This report has been prepared for the sole use of 595831 Ontario Inc. Terrapex accepts no liability for claims arising from the use of this report, or from actions taken or decisions made as a result of this report, by parties other than 595831 Ontario Inc.

Respectfully submitted,
TERRAPEX ENVIRONMENTAL LTD.

Seba Hamdan, MASc., EIT.
Environmental Scientist

Greg Sabourin, P.Eng., QP_{ESA}
Project Manager

Keith Brown, P.Eng., QP_{ESA}
Senior Reviewer

8.0 REFERENCES

Ontario Ministry of the Environment. 2011a. *Ontario Regulation 153/04, Records of Site Condition – Part XV.1 of the Act.* July 1.

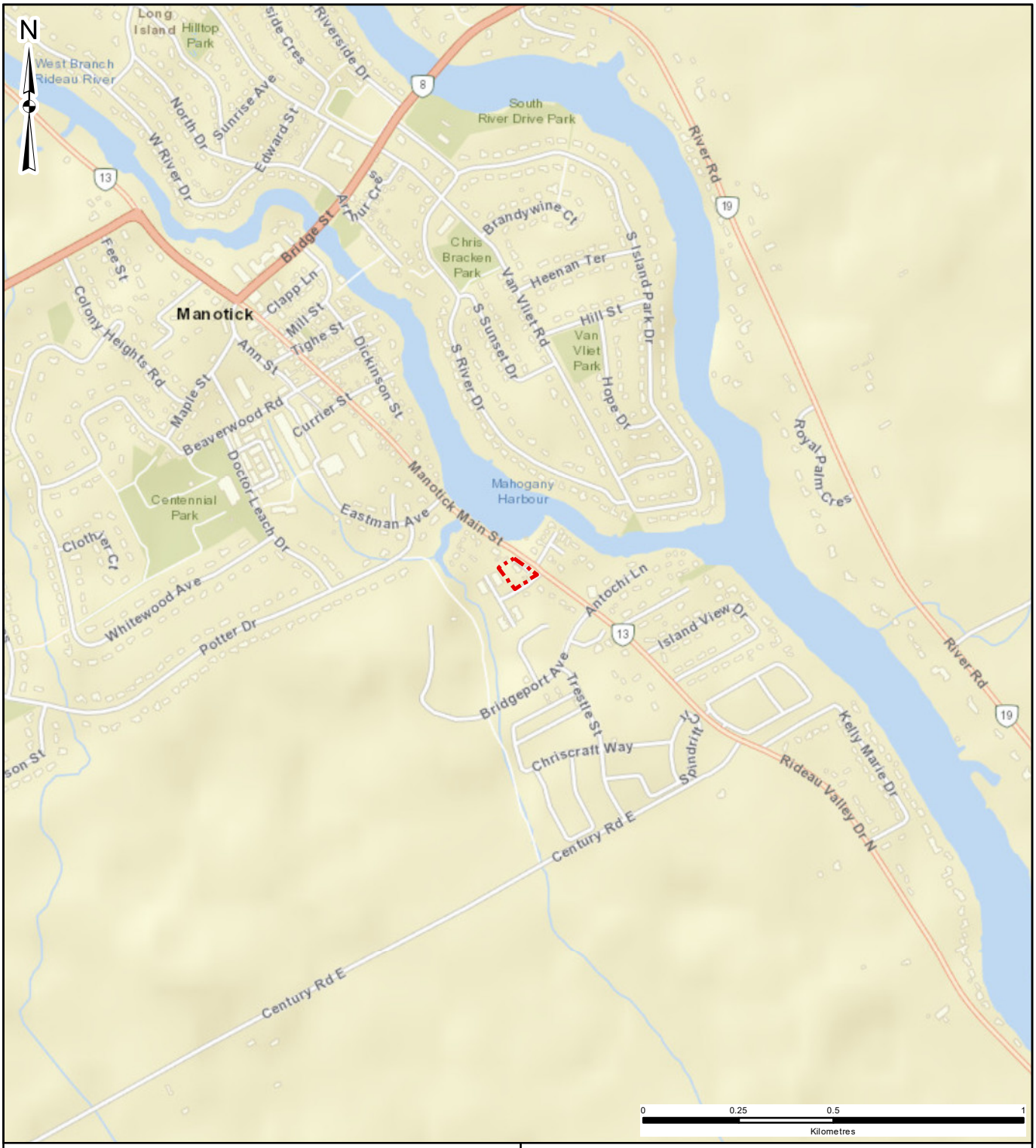
Ontario Ministry of the Environment, 2011b. *Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*. April 15.

Terrapex Environmental Ltd., *Phase One Environmental Site Assessment, 5646 & 5650 Manotick Main Street Ottawa, Ontario,* dated December 16, 2022

Terrapex Environmental Ltd., *Phase II Environmental Site Assessment, 5646 & 5650 Manotick Main Street, Manotick (Ottawa), Ontario*, dated December 16, 2022.

Proposed Geo-regional background values proposed in the paper Elevated Background Metals Concentrations in Champlain Sea Clay – Ottawa Region authored by Sean Sterling et al. dated 2017.

FIGURES



LEGEND

PROPERTY BOUNDARY

DATA SOURCE: ESRI
MAP PROJECTION: NAD 1983 UTM Zone 18N

CLIENT: 595831 ONTARIO INC.

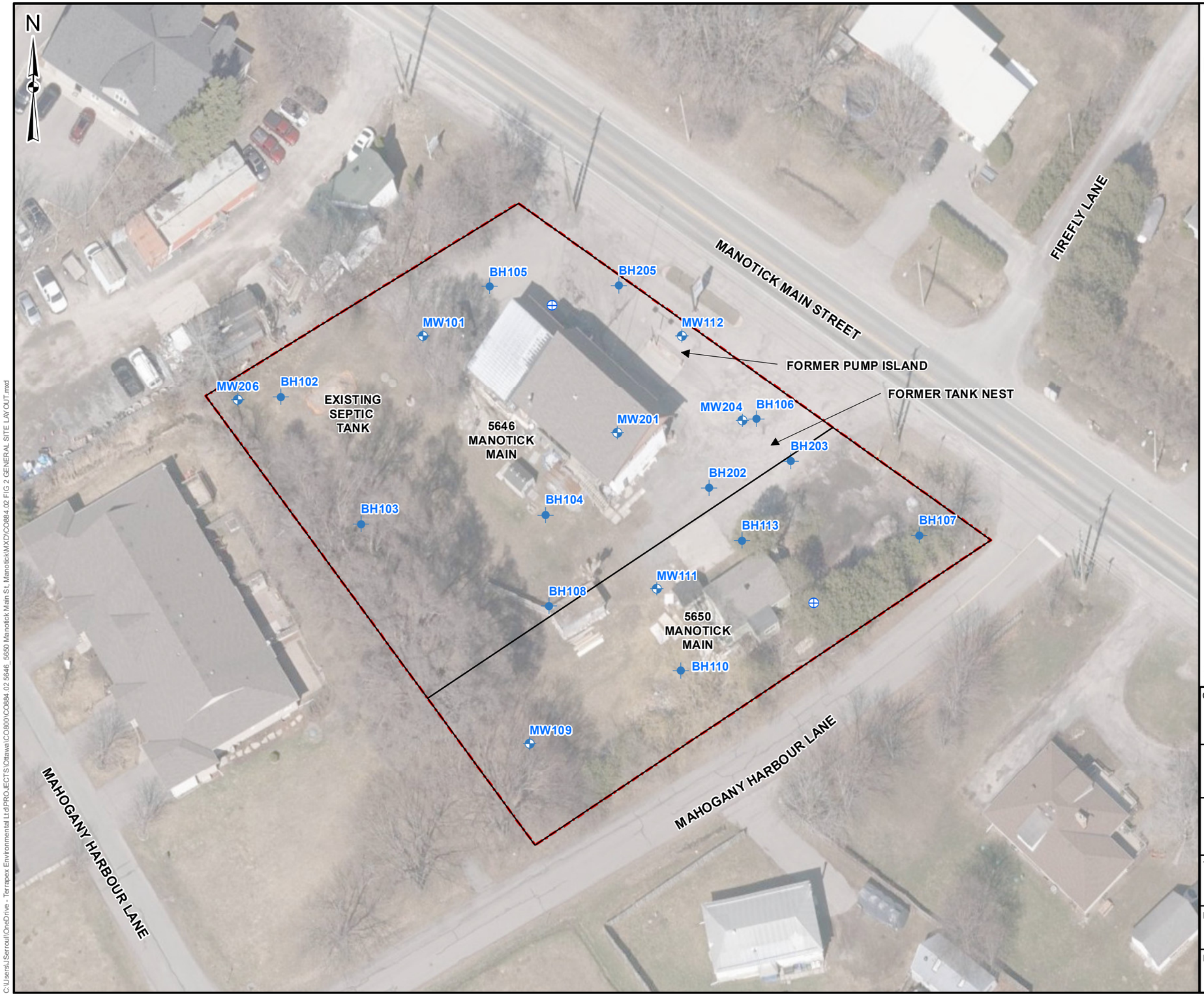
SITE LOCATION: 5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE: **SITE LOCATION**

DRAWN BY: JS	PROJECT NO.: CO884.02	CHECKED BY: GS
REVISION: 00	DATE: OCTOBER 2023	**FIGURE: 1**

jserroul C:\Users\JSerroul\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO800\CO884.02 5646_5650 Manotick Main St, Manotick\MXD\CO884.02 FIG 1 SITE LOCATION.mxd



LEGEND

- PROPERTY BOUNDARY
- PARCEL FABRIC
- DRINKING WATER WELL
- BOREHOLE
- MONITORING WELL

0 10 20 30
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT:
595831 ONTARIO INC.

SITE LOCATION:
5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE:
GENERAL SITE LAYOUT

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS	CO884.02	GS
REVISION: 00	DATE: OCTOBER 2023	FIGURE: **2**

C:\Users\JSerrouit\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO800\CO884.02 5646_5650 Manotick Main St, Manotick\MXD\CO884.02 FIG 2 GENERAL SITE LAYOUT.mxd

N

RIDEAU RIVER

RESIDENTIAL

RESIDENTIAL

RESIDENTIAL

RESIDENTIAL

SOUTH RIVER DRIVE

VAN VLIET ROAD

CHRISTOPHER DRIVE

SOUTH ISLAND PARK DRIVE

GADDIS COURT

EASTMAN AVENUE

MANOTICK MAIN STREET

FIREFLY LANE

POTTER DRIVE

MAHOGANY HARBOUR LANE

ANTOCHI LANE

ORCHARD HOLLOW DRIVE

ASCARI ROAD

ALABASTER HEIGHTS

MORETTO COURT

ISLAND VIEW DRIVE

BRIDGEPORT AVENUE

TRESTLE STREET

SKYSAIL PLACE

SKIPPER DRIVE

WINDY LANE

JETTY DRIVE

CHRISCRAFT WAY

ADRIFT STREET

SPINDRIFT CIRCLE

LEGEND

SITE BOUNDARY

STUDY AREA

0 50 100 150

Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT:

595831 ONTARIO INC.

SITE LOCATION:

5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE:

PHASE ONE STUDY AREA AND SURROUNDING LAND USES

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS	CO884.02	GS
REVISION:	DATE:	FIGURE:
00	OCTOBER 2023	**3**

C:\Users\JSerroul\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO900\CO884.02 5646_5650 Manotick Main St, Manotick\MXD\CO884.02 FIG 3 STUDY AREA.mxd

LEGEND

- SITE BOUNDARY
- STUDY AREA
- POTENTIALLY CONTAMINATING ACTIVITIES

0 50 100 150
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT:
595831 ONTARIO INC,

SITE LOCATION:
5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE:
CONCEPTUAL SITE MODEL AND POTENITALLY CONTAMINATING ACTIVITIES

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS	CO884.02	JS
REVISION:	**DATE:**	**FIGURE:**
00	OCTOBER 2023	**4**

C:\Users\JSerroul\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO800\CO884.02 5646_5650 Manotick Main St, Manotick\MXD\CO884.02 FIG 4 CSM - PCAs.mxd

C:\Users\JSerroul\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO800\CO884.02 5646_5650 Manotick Main St, Manotick\MXD\CO884.02 FIG 5 CSM - APECs.mxd

LEGEND

- PROPERTY BOUNDARY
- DRINKING WATER WELL
- BOREHOLE
- MONITORING WELL

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

- APEC-1A
- APEC-1B
- APEC-2 (ENTIRE PROPERTY)
- APEC-3
- APEC-4
- APEC-5

0 5 10 15
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

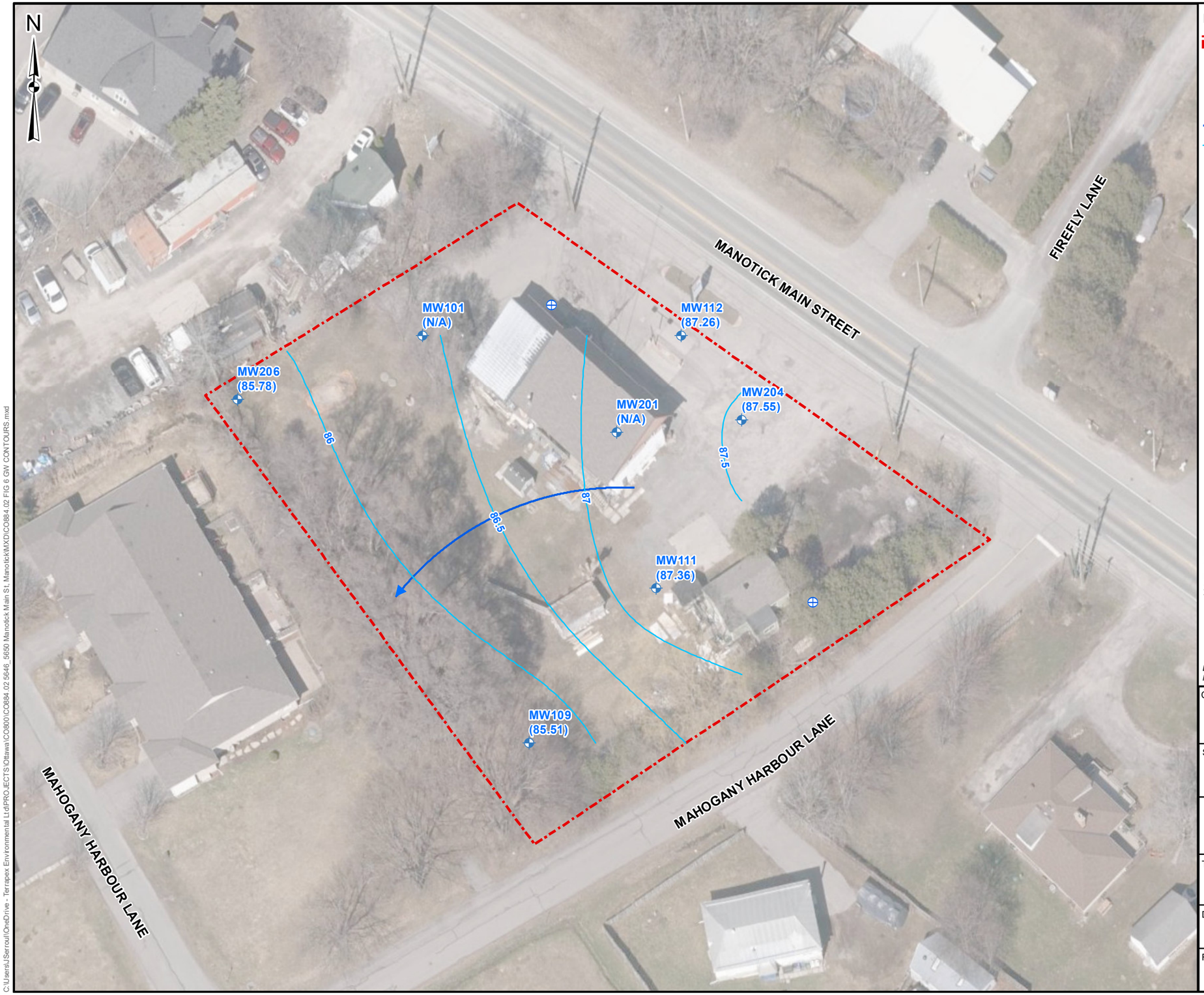
CLIENT:
595831 ONTARIO INC.

SITE LOCATION:
5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE:
CONCEPTUAL SITE MODEL - AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS	CO884.02	GS
REVISION: 00	DATE: OCTOBER 2023	FIGURE: **5**



LEGEND

- PROPERTY BOUNDARY
- DRINKING WATER WELL
- BOREHOLE
- MONITORING WELL
- GROUNDWATER FLOW DIRECTION
- INTERPRETED GROUNDWATER CONTOURS

NOTES:
1. MW101 WAS UNABLE TO BE LOCATED DURING THE MONITORING EVENT.
2. MW201 WAS UNABLE TO BE SURVEYED AND THUS WAS NOT USED IN THE GROUNDWATER FLOW INTERPRETATION.

0 5 10 15 20
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT:
595831 ONTARIO INC.

SITE LOCATION:
5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE:
GROUNDWATER CONTOURS (AS OF OCTOBER 16, 2023)

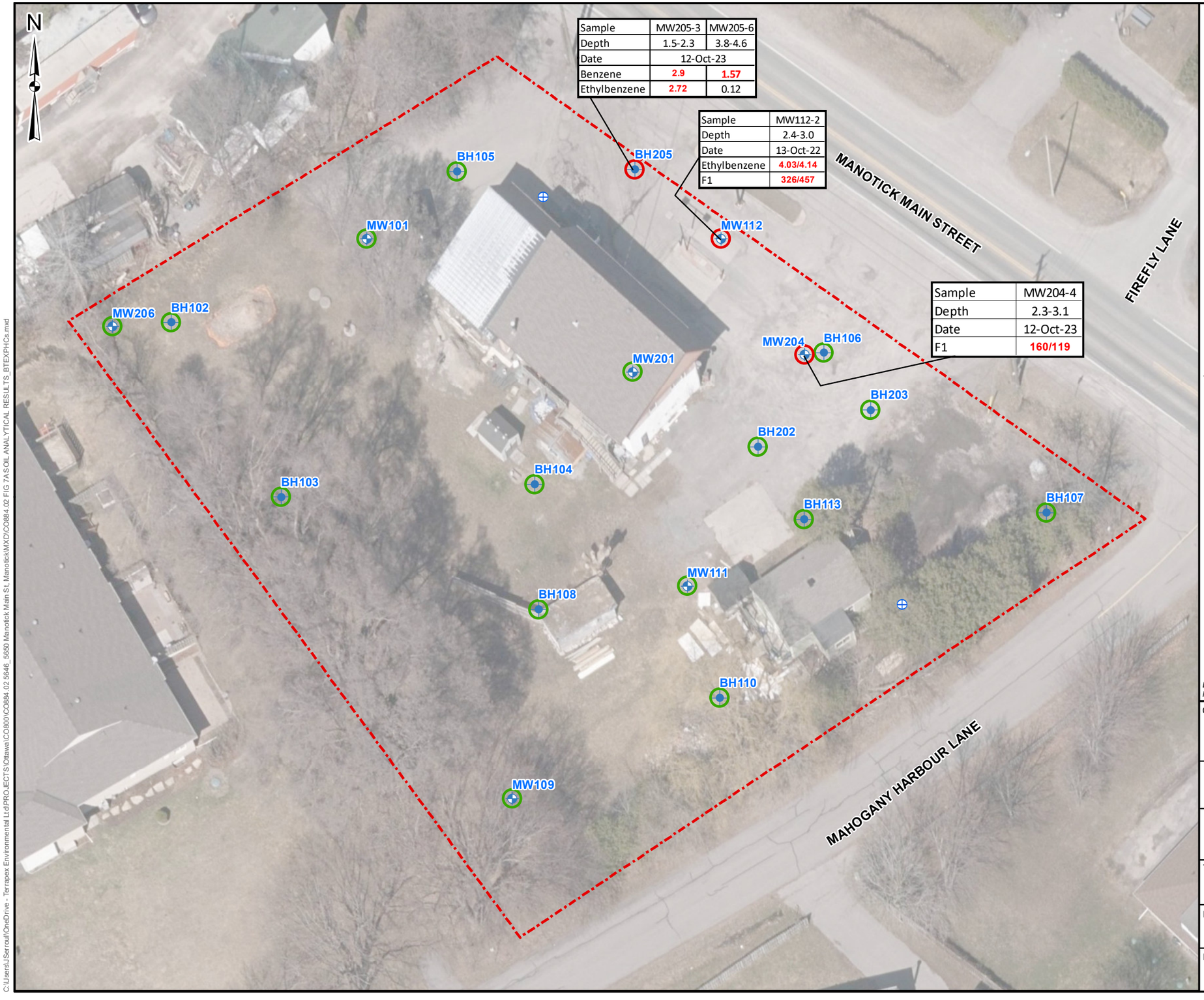
DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS	CO884.02	GS
REVISION: 00	DATE: OCTOBER 2023	FIGURE: **6**

C:\Users\JSerroul\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO800\CO884.02 5646_5650 Manotick Main St, Manotick\MXD\CO884.02 FIG 6 GW CONTOURS.mxd

Sample	MW205-3	MW205-6
Depth	1.5-2.3	3.8-4.6
Date	12-Oct-23	
Benzene	2.9	1.57
Ethylbenzene	2.72	0.12

Sample	MW112-2
Depth	2.4-3.0
Date	13-Oct-22
Ethylbenzene	4.03/4.14
F1	326/457

Sample	MW204-4
Depth	2.3-3.1
Date	12-Oct-23
F1	160/119



LEGEND

- PROPERTY BOUNDARY
- DRINKING WATER WELL
- BOREHOLE
- MONITORING WELL

ANALYSIS INFORMATION

- LESS THAN OR EQUAL TO TABLE 2 SCS
- GREATER THAN TABLE 2 SCS

STANDARD INFORMATION

SAMPLE	
DEPTH	
DATE	
PARAMETER	RESULT
Benzene	
Ethylbenzene	
F1	

MECP TABLE 2 SCS
0.4
1.6
65

VALUE GREATER THAN SCS
VALUE LESS THAN OR EQUAL TO SCS

MECP TABLE 2: FULL DEPTH GENERIC SCS IN A POTABLE GROUND WATER CONDITION FOR INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE WITH FINE TO MEDIUM TEXTURED SOIL.

NOTES
1. ALL UNITS ARE IN µg/g UNLESS OTHERWISE SPECIFIED
2. DEPTHS ARE IN METRES BELOW GROUND SURFACE (mbgs)
3. RESULTS PRESENTED AS # / # REPRESENTS PARENT SAMPLE / FIELD DUPLICATE.

0 5 10 15 20
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT:
595831 ONTARIO INC.

SITE LOCATION:
5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE:
SOIL ANALYTICAL RESULTS - BTEX / PHCS

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS	CO884.02	GS
REVISION:	DATE:	FIGURE:
00	OCTOBER 2023	**7A**

C:\Users\JSerroul\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO800\CO884.02 5646_5650 Manotick Main St, Manotick\MXD\CO884.02 FIG 7A SOIL ANALYTICAL RESULTS_BTEXPHCs.mxd

LEGEND

- PROPERTY BOUNDARY
- DRINKING WATER WELL
- BOREHOLE
- MONITORING WELL

ANALYSIS INFORMATION

- LESS THAN OR EQUAL TO TABLE 2 SCS

STANDARD INFORMATION

MECP TABLE 2: FULL DEPTH GENERIC SCS IN A POTABLE GROUND WATER CONDITION FOR INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE WITH FINE TO MEDIUM TEXTURED SOIL.

NOTES

1. ALL UNITS ARE IN µg/g UNLESS OTHERWISE SPECIFIED
2. DEPTHS ARE IN METRES BELOW GROUND SURFACE (mbgs)
3. RESULTS PRESENTED AS # / # REPRESENTS PARENT SAMPLE / FIELD DUPLICATE.
4. PROPOSED DEVELOPMENT PLAN PROVIDED BY CLIENT.

0 5 10 15 20
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT:
595831 ONTARIO INC.

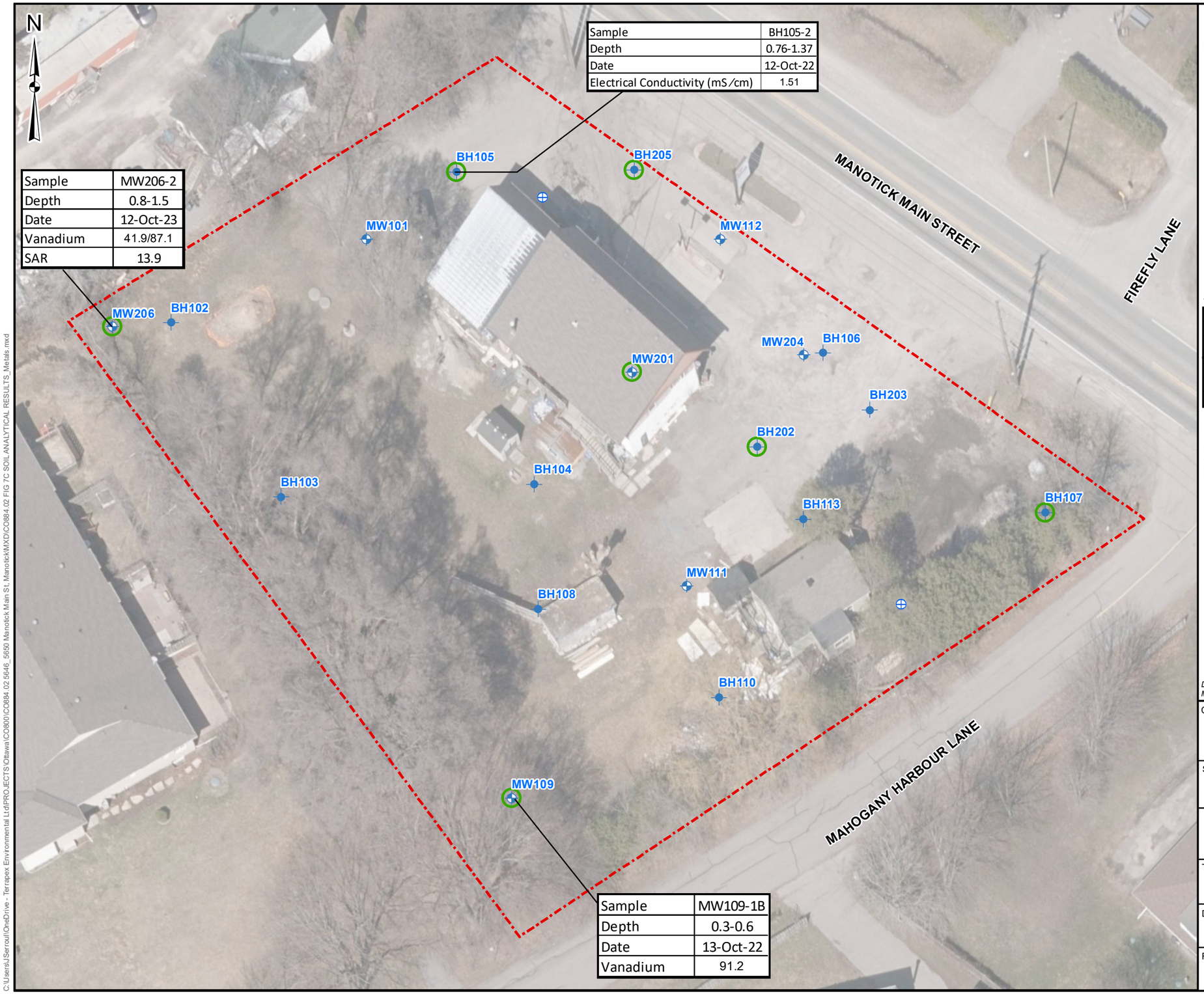
SITE LOCATION:
5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE:
SOIL ANALYTICAL RESULTS - VOCS

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS	CO884.02	GS
REVISION:	DATE:	FIGURE:
00	OCTOBER 2023	**7B**

C:\Users\JSerrou\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO800\CO884.02 5646_5650 Manotick Main St, Manotick\MXD\CO884.02 FIG 7B SOIL ANALYTICAL RESULTS_VOCs.mxd



C:\Users\JSerroul\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO800\CO884.02 5646_5650 Manotick Main St, Manotick\MXD\CO884.02 FIG 7C SOIL ANALYTICAL RESULTS_Metals.mxd

LEGEND

- PROPERTY BOUNDARY
- DRINKING WATER WELL
- BOREHOLE
- MONITORING WELL

ANALYSIS INFORMATION

- LESS THAN OR EQUAL TO TABLE 2 SCS

STANDARD INFORMATION

SAMPLE		MECP TABLE 2 SCS
DEPTH		
DATE		
PARAMETER	RESULT	
Vanadium		86
Electrical Conductivity (mS/cm)		1.4
SAR		12

VALUE GREATER THAN SCS
VALUE LESS THAN OR EQUAL TO SCS

MECP TABLE 2: FULL DEPTH GENERIC SCS IN A POTABLE GROUND WATER CONDITION FOR INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE WITH FINE TO MEDIUM TEXTURED SOIL.

NOTES
1. ALL UNITS ARE IN µg/g UNLESS OTHERWISE SPECIFIED
2. DEPTHS ARE IN METRES BELOW GROUND SURFACE (mbgs)
3. RESULTS PRESENTED AS # / # REPRESENTS PARENT SAMPLE / FIELD DUPLICATE.
4.BASED ON DISCRETION OF QP, THE EC IMPACTS AT BH105 ARE DUE TO SALTING ACTIVITIES DURING WINTER TIME AND THEREFORE IS DEEMED TO MEET THE TABLE 2 SCS BASED ON O. REG 153/04 SECTION 49.1 (1).
5.BASED ON DISCRETION OF QP, THE VANADIUM IMPACTS AT MW206 AND MW109 ARE DUE TO NATURALLY ELEVATED METAL CONCENTRATIONS AND THEREFORE ARE DEEMED TO MEET THE TABLE 2 SCS BASED ON O. REG 153/04 SECTION 49.1 (3).

0 5 10 15 20
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT:
595831 ONTARIO INC.

SITE LOCATION:
5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE:
SOIL ANALYTICAL RESULTS - METALS AND INORGANICS

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS	CO884.02	GS
REVISION:	DATE:	FIGURE:
00	OCTOBER 2023	**7C**

C:\Users\JSerroul\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO800\CO884.02 5646_5650 Manotick Main St, Manotick\MXD\CO884.02 FIG 7D SOIL ANALYTICAL RESULTS_PAHs.mxd

LEGEND

- PROPERTY BOUNDARY
- DRINKING WATER WELL
- BOREHOLE
- MONITORING WELL

ANALYSIS INFORMATION

- LESS THAN OR EQUAL TO TABLE 2 SCS

STANDARD INFORMATION

MECP TABLE 2: FULL DEPTH GENERIC SCS IN A POTABLE GROUND WATER CONDITION FOR INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE WITH FINE TO MEDIUM TEXTURED SOIL.

NOTES

1. ALL UNITS ARE IN µg/g UNLESS OTHERWISE SPECIFIED
2. DEPTHS ARE IN METRES BELOW GROUND SURFACE (mbgs)
3. RESULTS PRESENTED AS # / # REPRESENTS PARENT SAMPLE / FIELD DUPLICATE.
4. PROPOSED DEVELOPMENT PLAN PROVIDED BY CLIENT.

0 5 10 15 20
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT:
595831 ONTARIO INC.

SITE LOCATION:
5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE:
SOIL ANALYTICAL RESULTS - PAHS

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS	CO884.02	GS
REVISION:	DATE:	FIGURE:
00	OCTOBER 2023	**7D**

C:\Users\JSerroul\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO900\CO884.02 5646_5650 Manotick Main St, Manotick\MXD\CO884.02 FIG 8AGW ANALYTICAL RESULTS_BTEXPHCs.mxd

LEGEND

- PROPERTY BOUNDARY
- DRINKING WATER WELL
- MONITORING WELL

ANALYSIS INFORMATION

- LESS THAN OR EQUAL TO TABLE 2 SCS
- GREATER THAN TABLE 2 SCS

STANDARD INFORMATION

SAMPLE		
SCREEN INTERVAL		
DATE		
PARAMETER	RESULT	MECP TABLE 2 SCS
Benzene		5
Ethylbenzene		2.4

MECP TABLE 2: FULL DEPTH GENERIC SCS IN A POTABLE GROUND WATER CONDITION FOR ALL TYPES OF PROPERTY USE WITH FINE TO MEDIUM TEXTURED SOIL.

VALUE GREATER THAN SCS

VALUE LESS THAN OR EQUAL TO SCS

NOTES

1. ALL UNITS ARE IN µg/L UNLESS OTHERWISE SPECIFIED
2. SCREEN INTERVAL IS IN METRES BELOW GROUND SURFACE (mbgs)
3. RESULTS PRESENTED AS # / # REPRESENTS PARENT SAMPLE / FIELD DUPLICATE.
4. MW101, MW109, MW111, MW112 WERE SAMPLED IN OCTOBER 2022. MW201, MW204 AND MW206 WERE SAMPLED IN OCTOVER 2023.

0 5 10 15 20

Metres

DATA SOURCE: CITY OF OTTAWA

MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT:

595831 ONTARIO INC.

SITE LOCATION:

5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE:

GROUNDWATER ANALYTICAL RESULTS - BTEX / PHCS

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS	CO884.02	GS
REVISION:	DATE:	FIGURE:
00	OCTOBER 2023	**8A**

LEGEND

- PROPERTY BOUNDARY
- DRINKING WATER WELL
- MONITORING WELL

ANALYSIS INFORMATION

- LESS THAN OR EQUAL TO TABLE 2 SCS

STANDARD INFORMATION

MECP TABLE 2: FULL DEPTH GENERIC SCS IN A POTABLE GROUND WATER CONDITION FOR ALL TYPES OF PROPERTY USE WITH FINE TO MEDIUM TEXTURED SOIL.

NOTES

1. ALL UNITS ARE IN µg/L UNLESS OTHERWISE SPECIFIED
2. SCREEN INTERVAL IS IN METRES BELOW GROUND SURFACE (mbgs)
3. RESULTS PRESENTED AS # / # REPRESENTS PARENT SAMPLE / FIELD DUPLICATE.

0 5 10 15 20
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT:
595831 ONTARIO INC.

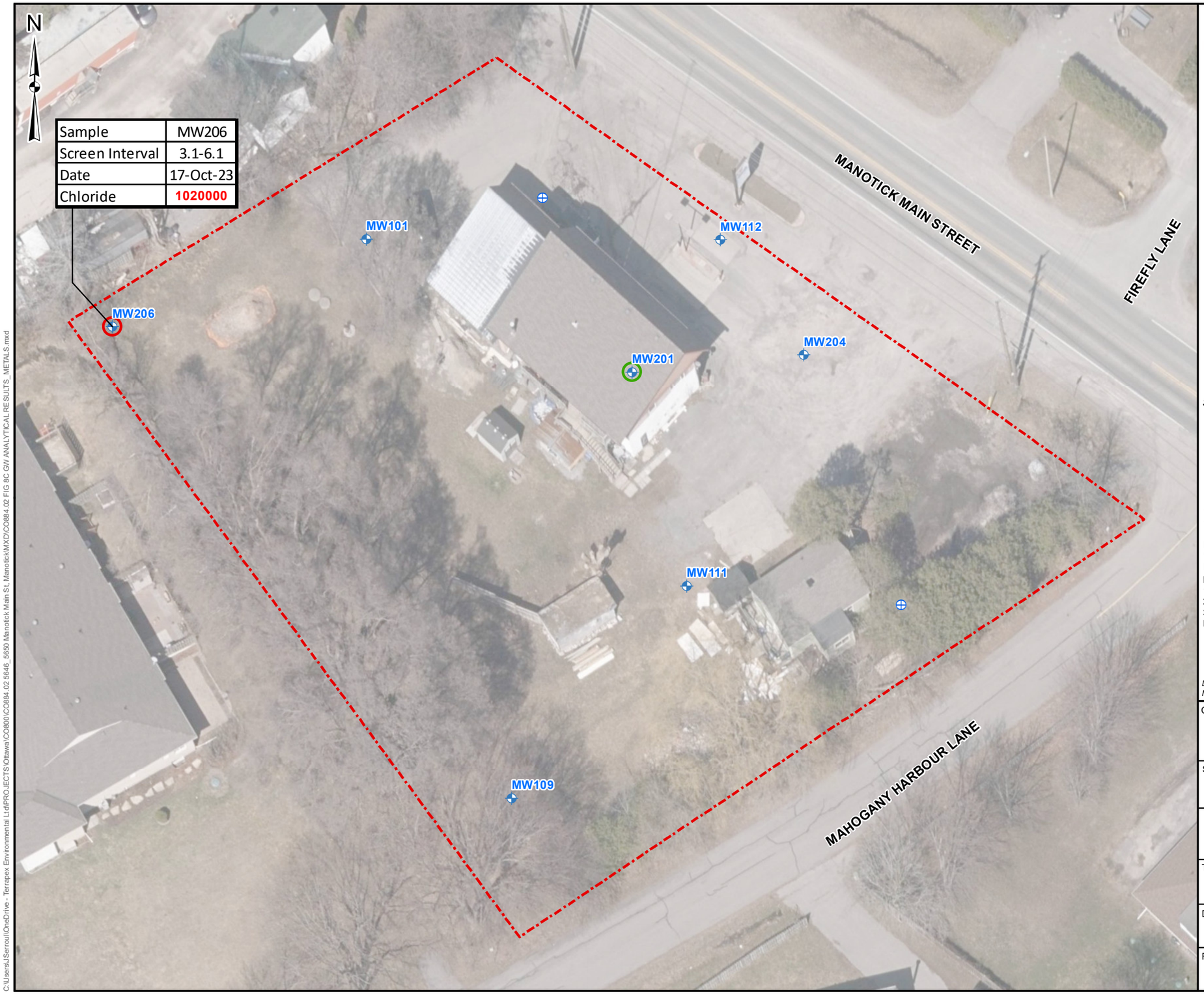
SITE LOCATION:
5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE:
GROUNDWATER ANALYTICAL RESULTS - VOCS

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS	CO884.02	GS
REVISION:	**DATE:**	**FIGURE:**
00	OCTOBER 2023	**8B**

C:\Users\JSerrou\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO800\CO884.02 5646_5650 Manotick Main St, Manotick\MXD\CO884.02 FIG 8B GW ANALYTICAL RESULTS_VOCs.mxd



C:\Users\JSerrou\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO800\CO884.02 5646_5650 Manotick Main St, Manotick\MXD\CO884.02 FIG 8C GW ANALYTICAL RESULTS_METALS.mxd

LEGEND

- PROPERTY BOUNDARY
- DRINKING WATER WELL
- MONITORING WELL

ANALYSIS INFORMATION

- LESS THAN OR EQUAL TO TABLE 2 SCS
- GREATER THAN TABLE 2 SCS

STANDARD INFORMATION

SAMPLE	
SCREEN INTERVAL	
DATE	
PARAMETER	RESULT
Chloride	

MECP TABLE 2 SCS
790,000

VALUE GREATER THAN SCS
VALUE LESS THAN OR EQUAL TO SCS

MECP TABLE 2: FULL DEPTH GENERIC SCS IN A POTABLE GROUND WATER CONDITION FOR ALL TYPES OF PROPERTY USE WITH FINE TO MEDIUM TEXTURED SOIL.

NOTES
1. ALL UNITS ARE IN µg/L UNLESS OTHERWISE SPECIFIED
2. SCREEN INTERVAL IS IN METRES BELOW GROUND SURFACE (mbgs)
3. RESULTS PRESENTED AS # / # REPRESENTS PARENT SAMPLE / FIELD DUPLICATE.

0 5 10 15 20
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT:
595831 ONTARIO INC.

SITE LOCATION:
5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE:
GROUNDWATER ANALYTICAL RESULTS - METALS AND INORGANICS

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS	CO884.02	GS
REVISION:	DATE:	FIGURE:
00	OCTOBER 2023	**8C**

LEGEND

- PROPERTY BOUNDARY
- DRINKING WATER WELL
- MONITORING WELL

ANALYSIS INFORMATION

- LESS THAN OR EQUAL TO TABLE 2 SCS

STANDARD INFORMATION

MECP TABLE 2: FULL DEPTH GENERIC SCS IN A POTABLE GROUND WATER CONDITION FOR ALL TYPES OF PROPERTY USE WITH FINE TO MEDIUM TEXTURED SOIL.

NOTES

1. ALL UNITS ARE IN µg/L UNLESS OTHERWISE SPECIFIED
2. SCREEN INTERVAL IS IN METRES BELOW GROUND SURFACE (mbgs)
3. RESULTS PRESENTED AS # / # REPRESENTS PARENT SAMPLE / FIELD DUPLICATE.

0 5 10 15 20
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT:
595831 ONTARIO INC.

SITE LOCATION:
5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE:
GROUNDWATER ANALYTICAL RESULTS - PAHS

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS	CO884.02	GS
REVISION:	DATE:	FIGURE:
00	OCTOBER 2023	**8D**

C:\Users\JSerrou\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO800\CO884.02 5646_5650 Manotick Main St, Manotick\MXD\CO884.02 FIG 8D GW ANALYTICAL RESULTS_PAHs.mxd

TABLES

TABLE 1 GROUNDWATER MONITORING DATA

5646 and 5650 Manotick Main Street, Manotick, Ontario

WELL NUMBER	DATE	GROUND ELEVATION[1] (m)	T.O.P. ELEVATION[2] (m)	SCREEN LENGTH (m)	BOTTOM OF SCREEN[3] (m)	CV[4]	DEPTH TO WATER FROM T.O.P. (m)	DEPTH TO WATER FROM GROUND (m)	GROUNDWATER ELEVATION[5] (m)	LNAPL THICKNESS[7] (m)
MW101	27-Oct-22	100.63	100.56	3.05	-	<10 ppm	2.49	2.56	98.07	None
	02-Dec-22					<10 ppm	2.73	2.80	97.83	None
	16-Oct-23					-	-	-	-	-
MW109	27-Oct-22	99.91	99.86			<10 ppm	2.85	2.90	97.01	None
	02-Dec-22			3.05	-	<10 ppm	3.14	3.19	96.73	None
	16-Oct-23	88.60	88.54			<5 ppm	3.03	3.09	85.51	None
MW111	27-Oct-22	100.41	100.33	3.05		<10 ppm	1.97	2.05	98.36	None
	02-Dec-22				-	<10 ppm	1.47	1.55	98.86	None
	16-Oct-23	89.05	88.94			<5 ppm	1.58	1.69	87.36	None
MW112	27-Oct-22	100.58	100.47	3.05		10% LEL	1.90	2.01	98.57	None
	02-Dec-22					8% LEL	1.60	1.71	98.87	None
	16-Oct-23	88.79	88.67		-	<5 ppm	1.41	1.53	87.26	None
MW201[8]	16-Oct-23	-	-	2.10	-	<5 ppm	1.37	-	-	None
MW204	16-Oct-23	88.87	88.70	3.05	-	175 ppm	1.15	1.32	87.55	None
MW206	16-Oct-23	88.71	89.63	3.05	-	12% LEL	3.85	2.93	85.78	None

[1] Elevation of ground surface at well location, relative to site benchmark

[2] Elevation of highest point of well pipe ("top of pipe"), relative to site benchmark

[3] Elevation of bottom of well screened interval, relative to site benchmark

[4] Combustible vapour concentration in well headspace in parts per million by volume (ppm) or percent of lower explosive limit (%LEL)

[5] Adjusted static water level elevation, relatve to site benchmark, using indicated relative density of LNAPL to groundwater

[6] Assumed relative density of LNAPL to groundwater

[7] Measured thickness of light, non-aqueous phase liquid, if any

[8] MW201was not able to be surveyed

TABLE 2 SOIL ANALYTICAL RESULTS BTEX and PHCs

5646 and 5650 Manotick Main Street, Manotick, Ontario

Sample Name	Units	STANDARDS Table 2 I/C/C fine/medium	MW101-4	BH102-4	BH103-4	BH104-3	BH105-2	BH106-5B	BH107-3	BH108-2
Vapour Reading	see note	-	<10ppm	<10ppm	<10ppm	<10 ppm	<10 ppm	<10 ppm	<10 ppm	<10ppm
Sample Depth	m bg	-	3.1-3.7	3.1-3.7	3.1-3.7	1.2-1.5	0.76-1.37	3.4-3.7	1.2-1.8	0.6-1.2
Sampling Date	dd-mmm-yy	-	11-Oct-22	11-Oct-22	12-Oct-22	12-Oct-22	12-Oct-22	12-Oct-22	12-Oct-22	12-Oct-22
Analysis Date (on or before)	dd-mmm-yy	-	21-Oct-22	21-Oct-22	21-Oct-22	21-Oct-22	21-Oct-22	21-Oct-22	21-Oct-22	21-Oct-22
Certificate of Analysis No.	-	-	22Z958134	22Z958134	22Z958134	22Z958134	22Z958134	22Z958134	22Z958134	22Z958134
Benzene	ug/g	0.40	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	ug/g	9.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	1.6	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylene Mixture	ug/g	30	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Petroleum Hydrocarbons F1[1]	ug/g	65	<5	<5	<5	<5	<5	<5	<5	<5
Petroleum Hydrocarbons F2	ug/g	250	<10	<10	<10	<10	<10	<10	<10	<10
Petroleum Hydrocarbons F3	ug/g	2,500	<50	<50	<50	<50	<50	<50	<50	<50
Petroleum Hydrocarbons F4	ug/g	6,600	<50	<50	<50	<50	<50	<50	<50	<50
Petroleum Hydrocarbons F4G	ug/g	6,600	NA	NA	NA	NA	NA	NA	NA	NA

Standards from *Soil, Ground Water* and Sediment Standards for Use Under Part XV.1

of the Environmental Protection Act (April 15, 2011 and as amended)

Table 2: Full Depth Generic SCS in a Potable Ground Water Condition

Industrial/Commercial/Community Property-Use, Fine- to Medium-Textured Soil

-	Not analyzed
m bg	meters below grade
ppm	parts per million
% LEL	percent of the lower explosive limit
RPD	Relative percent difference
Value	Exceeds standard
Value	Detection limit exceeds standard
[1]	F1 fraction does not include BTEX.

TABLE 2 SOIL ANALYTICAL RESULTS BTEX and PHCs (CONT'D)

5646 and 5650 Manotick Main Street, Manotick, Ontario

Sample Name	Units	STANDARDS Table 2 I/C/C fine/medium	MW109-4	MW109-14 Field Duplicate of MW109-4	BH110-3B	MW111-3	MW112-2	MW112-12 Field Duplicate of MW112-2	RPD	MW112-3	BH113-3
Vapour Reading	see note	-	<10 ppm	<10 ppm	<10 ppm	<10ppm	8% LEL	8% LEL		10 ppm	<10 ppm
Sample Depth	m bg	-	3.1-3.7	3.1-3.7	1.5-1.8	3.1-4.6	2.4 - 3.0	2.4 - 3.0		3.0 - 3.3	1.2-1.8
Sampling Date	dd-mmm-yy	-	13-Oct-22	13-Oct-22	13-Oct-22	13-Oct-22	13-Oct-22	13-Oct-22		13-Oct-22	13-Oct-22
Analysis Date (on or before)	dd-mmm-yy	-	21-Oct-22	21-Oct-22	21-Oct-22	21-Oct-22	21-Oct-22	21-Oct-22		21-Oct-22	21-Oct-22
Certificate of Analysis No.	-	-	22Z958134	22Z958134	22Z958134	22Z958134	22Z958134	22Z958134		22Z958134	22Z958134
Benzene	ug/g	0.40	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02
Toluene	ug/g	9.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05
Ethylbenzene	ug/g	1.6	<0.05	<0.05	<0.05	<0.05	**4.03**	**4.14**	3%	0.81	<0.05
Xylene Mixture	ug/g	30	<0.05	<0.05	<0.05	<0.05	2.93	4.07	33%	0.4	<0.05
Petroleum Hydrocarbons F1[1]	ug/g	65	<5	<5	<5	<5	**326**	**457**	33%	21	<5
Petroleum Hydrocarbons F2	ug/g	250	<10	<10	<10	<10	25	22	-	<10	<10
Petroleum Hydrocarbons F3	ug/g	2,500	<50	<50	<50	<50	<50	<50	-	<50	<50
Petroleum Hydrocarbons F4	ug/g	6,600	<50	<50	<50	<50	<50	<50	-	<50	<50
Petroleum Hydrocarbons F4G	ug/g	6,600	NA	NA	NA	NA	NA	NA	-	NA	NA

Standards from *Soil, Ground Water* and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 15, 2011 and as amended)

Table 2: Full Depth Generic SCS in a Potable Ground Water Condition

Industrial/Commercial/Community Property-Use, Fine- to Medium-Textured Soil

- Not analyzed
- m bg meters below grade
- ppm parts per million
- % LEL percent of the lower explosive limit
- RPD Relative percent difference
- **Value** Exceeds standard
- *Value* Detection limit exceeds standard
- [1] F1 fraction does not include BTEX.

TABLE 2 SOIL ANALYTICAL RESULTS BTEX and PHCs (CONT'D)

5646 and 5650 Manotick Main Street, Manotick, Ontario

Sample Name	Units	STANDARDS Table 2 I/C/C fine/medium	MW201-5	BH202-4	BH203-3	MW204-4	MW1000 Field Duplicate of MW204-4	RPD	MW204-5	BH205-3	BH205-6
Vapour Reading	see note	-	<5 ppm	<5 ppm	<5 ppm	350 ppm	-	-	<10 ppm	370 ppm	5 ppm
Sample Depth	m bg	-	2.4 - 3.6	2.3 - 3.05	1.5 - 2.3	2.3 - 3.1	2.3 - 3.1	-	3.1 - 3.8	1.5 - 2.3	3.8 - 4.6
Sampling Date	dd-mmm-yy	-	12-Oct-23	12-Oct-23	12-Oct-23	12-Oct-23	12-Oct-23	-	12-Oct-23	12-Oct-23	12-Oct-23
Analysis Date (on or before)	dd-mmm-yy	-	22-Oct-22	24-Oct-22	25-Oct-22	26-Oct-22	28-Oct-22	-	27-Oct-22	30-Oct-22	31-Oct-22
Certificate of Analysis No.	-	-	23Z080368	23Z080368	23Z080368	23Z080368	23Z080368	-	23Z080368	23Z080368	23Z080368
Benzene	ug/g	0.40	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	**2.9**	**1.57**
Toluene	ug/g	9.0	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	0.21	<0.05
Ethylbenzene	ug/g	1.6	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	**2.72**	0.12
Xylene Mixture	ug/g	30	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	2.13	<0.05
Petroleum Hydrocarbons F1[1]	ug/g	65	<5	<5	<5	**160**	**119**	29%	<5	32	<5
Petroleum Hydrocarbons F2	ug/g	250	<10	<10	<10	<10	<10	-	<10	<10	<10
Petroleum Hydrocarbons F3	ug/g	2,500	<50	<50	<50	<50	<50	-	<50	<50	<50
Petroleum Hydrocarbons F4	ug/g	6,600	<50	<50	<50	<50	<50	-	<50	<50	<50
Petroleum Hydrocarbons F4G	ug/g	6,600	NA	NA	NA	NA	NA	-	NA	NA	NA

Standards from *Soil, Ground Water* and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 15, 2011 and as amended)

Table 2: Full Depth Generic SCS in a Potable Ground Water Condition

Industrial/Commercial/Community Property-Use, Fine- to Medium-Textured Soil

- Not analyzed
- m bg meters below grade
- ppm parts per million
- % LEL percent of the lower explosive limit
- RPD Relative percent difference
- **Value** Exceeds standard
- *Value* Detection limit exceeds standard
- [1] F1 fraction does not include BTEX.

TABLE 2 SOIL ANALYTICAL RESULTS BTEX and PHCs (CONT'D)

5646 and 5650 Manotick Main Street, Manotick, Ontario

Sample Name	Units	STANDARDS Table 2 I/C/C fine/medium	MW206-6	Methanol Blank	TRIP BLANK
Vapour Reading	see note	-	<5 ppm	-	-
Sample Depth	m bg	-	3.8 - 4.6	-	-
Sampling Date	dd-mmm-yy	-	12-Oct-23	13-Oct-22	10-Oct-23
Analysis Date (on or before)	dd-mmm-yy	-	2-Nov-22	21-Oct-22	22-Oct-22
Certificate of Analysis No.	-	-	23Z080368	22Z958134	23Z080368
Benzene	ug/g	0.40	<0.02	<0.02	<0.02
Toluene	ug/g	9.0	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	1.6	<0.05	<0.05	<0.05
Xylene Mixture	ug/g	30	<0.05	<0.05	<0.05
Petroleum Hydrocarbons F1[1]	ug/g	65	<5	<5	<5
Petroleum Hydrocarbons F2	ug/g	250	<10	-	-
Petroleum Hydrocarbons F3	ug/g	2,500	<50	-	-
Petroleum Hydrocarbons F4	ug/g	6,600	<50	-	-
Petroleum Hydrocarbons F4G	ug/g	6,600	NA	-	-

Standards from *Soil, Ground Water* and Sediment Standards for Use Under Part XV.1
of the Environmental Protection Act (April 15, 2011 and as amended)
Table 2: Full Depth Generic SCS in a Potable Ground Water Condition
Industrial/Commercial/Community Property-Use, Fine- to Medium-Textured Soil

- Not analyzed
m bg meters below grade
ppm parts per million
% LEL percent of the lower explosive limit
RPD Relative percent difference
Value Exceeds standard
Value Detection limit exceeds standard
[1] F1 fraction does not include BTEX.

TABLE 3 SOIL ANALYTICAL RESULTS VOCs

5646 and 5650 Manotick Main Street, Manotick, Ontario

Sample Name	Units	STANDARDS Table 2 I/C/C fine/medium	MW201-5
Vapour Reading	see note	-	<5 ppm
Sample Depth	m bg	-	2.4 - 3.6
Sampling Date	dd-mmm-yy	-	12-Oct-23
Analysis Date (on or before)	dd-mmm-yy	-	22-Oct-22
Certificate of Analysis No.	-	-	23Z080368
Acetone	ug/g	28	<0.50
Bromodichloromethane	ug/g	1.9	<0.05
Bromoform	ug/g	1.7	<0.05
Bromomethane	ug/g	0.050	<0.05
Carbon Tetrachloride	ug/g	0.71	<0.05
Chlorobenzene	ug/g	2.7	<0.05
Chloroform	ug/g	0.18	<0.04
Dibromochloromethane	ug/g	2.9	<0.05
Dichlorobenzene, 1,2-	ug/g	1.7	<0.05
Dichlorobenzene, 1,3-	ug/g	12	<0.05
Dichlorobenzene, 1,4-	ug/g	0.57	<0.05
Dichlorodifluoromethane	ug/g	25	<0.05
Dichloroethane, 1,1-	ug/g	0.60	<0.02
Dichloroethane, 1,2-	ug/g	0.050	<0.03
Dichloroethylene, 1,1-	ug/g	0.48	<0.05
Dichloroethylene, 1,2-cis-	ug/g	2.5	<0.02
Dichloroethylene, 1,2-trans-	ug/g	2.5	<0.05
Dichloropropane, 1,2-	ug/g	0.68	<0.03
Dichloropropene,1,3-	ug/g	0.081	<0.05
Ethylene dibromide	ug/g	0.050	<0.04
Hexane (n)	ug/g	88	<0.05
Methyl Ethyl Ketone	ug/g	88	<0.50
Methyl Isobutyl Ketone	ug/g	210	<0.50
Methyl tert-Butyl Ether (MTBE)	ug/g	2.3	<0.05
Methylene Chloride	ug/g	2.0	<0.05
Styrene	ug/g	43	<0.05
Tetrachloroethane, 1,1,1,2-	ug/g	0.11	<0.04
Tetrachloroethane, 1,1,2,2-	ug/g	0.094	<0.05
Tetrachloroethylene	ug/g	2.5	<0.05
Trichloroethane, 1,1,1-	ug/g	12	<0.05
Trichloroethane, 1,1,2-	ug/g	0.11	<0.04
Trichloroethylene	ug/g	0.61	<0.03
Trichlorofluoromethane	ug/g	5.8	<0.05
Vinyl Chloride	ug/g	0.25	<0.02

Standards from *Soil, Ground Water* and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 15, 2011 and as amended)

Table 2: Full Depth Generic SCS in a Potable Ground Water Condition

Industrial/Commercial/Community Property-Use, Fine- to Medium-Textured Soil

- Not analyzed
- m bg meters below grade
- RPD Relative percent difference
- **Value** Exceeds standard
- *Value* Detection limit exceeds standard

TABLE 4 SOIL ANALYTICAL RESULTS METALS AND INORGANICS

5646 and 5650 Manotick Main Street, Manotick, Ontario

Sample Name	Units	STANDARDS Table 2 I/C/C fine/medium	BH105-2	BH107-2B	BH107-12 Field Duplicate of BH107-2B	MW109-1B	MW201-5	BH202-1	BH205-2	MW206-2
Sample Depth	m bg	-	0.76-1.37	0.8-1.2	0.8-1.2	0.3-0.6	2.4 - 3.6	0.8 - 1.5	0.8 - 1.5	0.8 - 1.5
Sampling Date	dd-mmm-yy	-	12-Oct-22	12-Oct-22	12-Oct-22	13-Oct-22	12-Oct-23	12-Oct-23	12-Oct-23	12-Oct-23
Analysis Date (on or before)	dd-mmm-yy	-	21-Oct-22	21-Oct-22	21-Oct-22	21-Oct-22	22-Oct-22	23-Oct-22	29-Oct-22	1-Nov-22
Certificate of Analysis No.	-	-	22Z958134	22Z958134	22Z958134	22Z958134	23Z080368	23Z080368	23Z080368	23Z080368
pH	-	NV	7.53	7.84	7.66	7.24	7.38	7.47	7.46	7.14
Antimony	ug/g	50	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	ug/g	18	3	4	4	4	3	2	3	2
Barium	ug/g	670	139	252	265	268	248	72.4	148	71.3
Beryllium	ug/g	10	0.7	0.9	0.9	1.2	0.9	<0.5	0.7	<0.5
Boron (total)	ug/g	120	9	10	11	13	11	6	7	<5
Boron (Hot Water Soluble)[1]	-	2.0	0.19	0.15	0.19	0.13	0.24	0.27	<0.10	0.23
Cadmium	ug/g	1.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium Total	ug/g	160	39	73	69	103	58	23	40	24
Chromium VI	ug/g	10	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cobalt	ug/g	100	11.7	18.7	18.7	22.2	17.6	7	11.2	7.9
Copper	ug/g	300	20.6	35.6	35.9	33.9	34.5	9.4	21.9	9.7
Cyanide (CN-)	-	0.051	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Lead	ug/g	120	7	9	9	11	9	73	6	4
Mercury	ug/g	20	<0.10	<0.10	<0.10	<0.10	0.23	<0.10	<0.10	<0.10
Molybdenum	ug/g	40	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5
Nickel	ug/g	340	22	43	40	52	35	13	22	13
Selenium	ug/g	5.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	ug/g	50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	ug/g	3.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	ug/g	33	0.75	0.79	0.77	0.92	0.74	0.71	0.77	0.65
Vanadium	ug/g	86	57.5	76.8	79.7	**91.2**	76.1	34.2	61.7	41.9
Zinc	ug/g	340	59	96	99	131	99	126	56	31
Electrical Conductivity (mS/cm)	mS/cm	1.4	**1.51**	0.609	0.64	0.284	0.545	0.451	0.382	0.448
Sodium Adsorption Ratio	-	12	6.92	5.29	5.8	1.57	2.17	3.51	4.07	5.19

Standards from *Soil, Ground Water* and Sediment Standards for Use Under Part XV.1
of the Environmental Protection Act (April 15, 2011 and as amended)
Table 2: Full Depth Generic SCS in a Potable Ground Water Condition
Industrial/Commercial/Community Property-Use, Fine- to Medium-Textured Soil

- Not analyzed
m bg meters below grade
RPD Relative percent difference
Value Exceeds standard
Value Detection limit exceeds standard
[1] Hot water soluble boron applies to surface soils (<1.5 m bg).

TABLE 4 SOIL ANALYTICAL RESULTS METALS AND INORGANICS (CONT'D)

5646 and 5650 Manotick Main Street, Manotick, Ontario

Sample Name	Units	STANDARDS Table 2 I/C/C fine/medium	MW3000 Field Duplicate of MW206-2	RPD
Sample Depth	m bg	-	0.8 - 1.5	-
Sampling Date	dd-mmm-yy	-	12-Oct-23	-
Analysis Date (on or before)	dd-mmm-yy	-	2-Nov-22	-
Certificate of Analysis No.	-	-	23Z080368	-
pH	-	NV	7.33	-
Antimony	ug/g	50	<0.8	-
Arsenic	ug/g	18	4	-
Barium	ug/g	670	275	118%
Beryllium	ug/g	10	0.9	-
Boron (total)	ug/g	120	12	-
Boron (Hot Water Soluble)[1]	-	2.0	0.38	-
Cadmium	ug/g	1.9	<0.5	-
Chromium Total	ug/g	160	65	-
Chromium VI	ug/g	10	<0.2	-
Cobalt	ug/g	100	18.3	79%
Copper	ug/g	300	38.1	119%
Cyanide (CN-)	-	0.051	<0.040	-
Lead	ug/g	120	9	-
Mercury	ug/g	20	<0.10	-
Molybdenum	ug/g	40	<0.5	-
Nickel	ug/g	340	39	100%
Selenium	ug/g	5.5	<0.8	-
Silver	ug/g	50	<0.5	-
Thallium	ug/g	3.3	<0.5	-
Uranium	ug/g	33	0.8	-
Vanadium	ug/g	86	**87.1**	70%
Zinc	ug/g	340	108	111%
Electrical Conductivity (mS/cm)	mS/cm	1.4	1.22	93%
Sodium Adsorption Ratio	-	12	**13.9**	-

Standards from *Soil, Ground Water* and Sediment Standards for Use Under Part XV.1
of the Environmental Protection Act (April 15, 2011 and as amended)
Table 2: Full Depth Generic SCS in a Potable Ground Water Condition
Industrial/Commercial/Community Property-Use, Fine- to Medium-Textured Soil

- Not analyzed
m bg meters below grade
RPD Relative percent difference
Value Exceeds standard
Value Detection limit exceeds standard
[1] Hot water soluble boron applies to surface soils (<1.5 m bg).

TABLE 5 SOIL ANALYTICAL RESULTS PAHs

5646 and 5650 Manotick Main Street, Manotick, Ontario

Sample Name	Units	STANDARDS Table 2 I/C/C fine/medium	MW201-5	BH202-1	BH205-2	MW206-2	MW3000 Field Duplicate of MW206-2	RPD
Sample Depth	m bg	-	2.4 - 3.6	0.1 - 0.8	0.8 - 1.5	0.8 - 1.5	0.8 - 1.5	
Sampling Date	dd-mmm-yy	-	12-Oct-23	12-Oct-23	12-Oct-23	12-Oct-23	12-Oct-23	
Analysis Date (on or before)	dd-mmm-yy	-	22-Oct-22	23-Oct-22	29-Oct-22	1-Nov-22	2-Nov-22	
Certificate of Analysis No.	-	-	23Z080368	23Z080368	23Z080368	23Z080368	23Z080368	
Acenaphthene	ug/g	29	<0.05	<0.05	<0.05	<0.05	<0.05	-
Acenaphthylene	ug/g	0.17	<0.05	<0.05	<0.05	<0.05	<0.05	-
Anthracene	ug/g	0.74	<0.05	<0.05	<0.05	<0.05	<0.05	-
Benz[a]anthracene	ug/g	0.96	<0.05	<0.05	<0.05	<0.05	<0.05	-
Benzo[a]pyrene	ug/g	0.30	<0.05	<0.05	<0.05	<0.05	<0.05	-
Benzo[b]fluoranthene	ug/g	0.96	<0.05	<0.05	<0.05	<0.05	<0.05	-
Benzo[ghi]perylene	ug/g	9.6	<0.05	<0.05	<0.05	<0.05	<0.05	-
Benzo[k]fluoranthene	ug/g	0.96	<0.05	<0.05	<0.05	<0.05	<0.05	-
Chrysene	ug/g	9.6	<0.05	<0.05	<0.05	<0.05	<0.05	-
Dibenz[a h]anthracene	ug/g	0.10	<0.05	<0.05	<0.05	<0.05	<0.05	-
Fluoranthene	ug/g	9.6	<0.05	<0.05	<0.05	<0.05	<0.05	-
Fluorene	ug/g	69	<0.05	<0.05	<0.05	<0.05	<0.05	-
Indeno[1 2 3-cd]pyrene	ug/g	0.95	<0.05	<0.05	<0.05	<0.05	<0.05	-
Methlynaphthalene, 2-(1-)[1]	ug/g	42	<0.05	<0.05	0.1	<0.05	<0.05	-
Naphthalene	ug/g	28	<0.05	<0.05	0.07	<0.05	<0.05	-
Phenanthrene	ug/g	16	<0.05	<0.05	<0.05	<0.05	<0.05	-
Pyrene	ug/g	96	<0.05	<0.05	<0.05	<0.05	<0.05	-

Standards from *Soil, Ground Water* and Sediment Standards for Use Under Part XV.1
of the Environmental Protection Act (April 15, 2011 and as amended)
Table 2: Full Depth Generic SCS in a Potable Ground Water Condition
Industrial/Commercial/Community Property-Use, Fine- to Medium-Textured Soil

- Not analyzed
m bg meters below grade
RPD Relative percent difference
Value Exceeds standard
Value Detection limit exceeds standard
[1] the sum of 1-methylnaphthalene and 2- methylnaphthalene.

TABLE 6 GROUNDWATER ANALYTICAL RESULTS BTEX and PHCs

5646 and 5650 Manotick Main Street, Manotick, Ontario

Sample Name	Units	STANDARDS Table 2 fine/medium	MW101	MW109	MW111	MW112	MW122 DUPLICATE OF MW112	RPD	MW 201	MW 206
Vapour Reading	see note	-	<10 ppm	<10 ppm	<10 ppm	10% LEL	10% LEL		< 5 ppm	12% LEL
Screen Interval	m bg	-	5.1-8.1	5.5-8.5	3.1-6.1	3.1-6.1	3.1-6.1		0.91-3.05	3.05-6.10
Sampling Date	dd-mmm-yy	-	28-Oct-22	28-Oct-22	28-Oct-22	28-Oct-22	28-Oct-22		16-Oct-23	17-Oct-23
Analysis Date (on or before)	dd-mmm-yy	-	7-Nov-22	7-Nov-22	7-Nov-22	7-Nov-22	7-Nov-22		21-Oct-23	21-Oct-23
Certificate of Analysis No.	-	-	22T963703	22T963703	22T963703	22T963703	22T963703		23Z081488	23Z081488
Benzene	ug/L	5.0	<0.20	<0.20	<0.20	**18.4**	**21.8**	17%	<0.20	<0.20
Toluene	ug/L	24	<0.20	<0.20	<0.20	0.68	0.8	-	<0.20	<0.20
Ethylbenzene	ug/L	2.4	<0.10	<0.10	<0.10	**42.5**	**47.2**	10%	<0.10	<0.10
Xylene Mixture	ug/L	300	<0.20	<0.20	<0.20	5.06	5.97	17%	<0.20	<0.20
Petroleum Hydrocarbons F1[1]	ug/L	750	<25	<25	<25	156	154	1%	25	<25
Petroleum Hydrocarbons F2	ug/L	150	<100	<100	<100	137	138	-	<100	<100
Petroleum Hydrocarbons F3	ug/L	500	<100	<100	<100	<100	<100	-	<100	<100
Petroleum Hydrocarbons F4	ug/L	500	<100	<100	<100	<100	<100	-	<100	<100
Petroleum Hydrocarbons F4G	ug/L	500	NA	NA	NA	NA	NA	-	NA	NA

Standards from Soil, Ground Water and Sediment Standards for Use Under Part XV.1
of the Environmental Protection Act (April 15, 2011 and as amended)
Table 2: Full Depth Generic SCS in a Potable Ground Water Condition
All Types of Property-Use, Fine- to Medium-Textured Soil

- Not analyzed
m bg meters below grade
ppm parts per million
Value Exceeds standard
[1] F1 fraction does not include BTEX.

TABLE 6 GROUNDWATER ANALYTICAL RESULTS BTEX and PHCs (CONT'D)

5646 and 5650 Manotick Main Street, Manotick, Ontario

Sample Name	Units	STANDARDS Table 2 fine/medium	MW 204	MW 214 DUPLICATE OF MW 204	RPD	TRIP BLANK	TRIP SPIKE % RECOVERY	TRIP BLANK	TRIP SPIKE % RECOVERY
Vapour Reading	see note	-	175 ppm	175 ppm		-	-	-	-
Screen Interval	m bg	-	1.52-4.57	1.52-4.57		-	-	-	-
Sampling Date	dd-mmm-yy	-	16-Oct-23	16-Oct-23		26-Oct-22	26-Oct-22	16-Oct-23	16-Oct-23
Analysis Date (on or before)	dd-mmm-yy	-	20-Oct-23	20-Oct-23		7-Nov-22	7-Nov-22	18-Oct-23	18-Oct-23
Certificate of Analysis No.	-	-	23Z081488	23Z081488		22T963703	22T963703	23Z081488	23Z081488
Benzene	ug/L	5.0	<0.20	<0.20	-	<0.20	91%	<0.20	85%
Toluene	ug/L	24	<0.20	<0.20	-	<0.20	89%	<0.20	82%
Ethylbenzene	ug/L	2.4	0.6	0.49	-	<0.10	98%	<0.10	80%
Xylene Mixture	ug/L	300	<0.20	<0.20	-	<0.20	97%	<0.20	103%
Petroleum Hydrocarbons F1[1]	ug/L	750	258	185	33%	<25	-	<25	-
Petroleum Hydrocarbons F2	ug/L	150	123	121	-	-	-	-	-
Petroleum Hydrocarbons F3	ug/L	500	<100	<100	-	-	-	-	-
Petroleum Hydrocarbons F4	ug/L	500	<100	<100	-	-	-	-	-
Petroleum Hydrocarbons F4G	ug/L	500	NA	NA	-	-	-	-	-

Standards from Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 15, 2011 and as amended)

Table 2: Full Depth Generic SCS in a Potable Ground Water Condition

All Types of Property-Use, Fine- to Medium-Textured Soil

- Not analyzed

m bg meters below grade

ppm parts per million

Value Exceeds standard

[1] F1 fraction does not include BTEX.

TABLE 7 GROUNDWATER ANALYTICAL RESULTS VOCs

5646 and 5650 Manotick Main Street, Manotick, Ontario

Sample Name	Units	STANDARDS Table 2 fine/medium	MW 201	MW 206
Vapour Reading	see note	-	< 5 ppm	12% LEL
Screen Interval	m bg	-	0.91-3.05	3.05-6.1
Sampling Date	dd-mmm-yy	-	16-Oct-23	17-Oct-23
Analysis Date (on or before)	dd-mmm-yy	-	21-Oct-23	21-Oct-23
Certificate of Analysis No.	-	-	23Z081488	23Z081488
Acetone	ug/L	2,700	<1.0	<1.0
Bromodichloromethane	ug/L	16	<0.20	<0.20
Bromoform	ug/L	25	<0.10	<0.10
Bromomethane	ug/L	0.89	<0.20	<0.20
Carbon Tetrachloride	ug/L	5.0	<0.20	<0.20
Chlorobenzene	ug/L	30	<0.10	<0.10
Chloroform	ug/L	22	2.03	<0.20
Dibromochloromethane	ug/L	25	<0.10	<0.10
Dichlorobenzene, 1,2-	ug/L	3.0	<0.10	<0.10
Dichlorobenzene, 1,3-	ug/L	59	<0.10	<0.10
Dichlorobenzene, 1,4-	ug/L	1.0	<0.10	<0.10
Dichlorodifluoromethane	ug/L	590	<0.40	<0.40
Dichloroethane, 1,1-	ug/L	5.0	<0.30	<0.30
Dichloroethane, 1,2-	ug/L	5.0	<0.20	<0.20
Dichloroethylene, 1,1-	ug/L	14	<0.30	<0.30
Dichloroethylene, 1,2-cis-	ug/L	17	<0.20	<0.20
Dichloroethylene, 1,2-trans-	ug/L	17	<0.20	<0.20
Dichloropropane, 1,2-	ug/L	5.0	<0.20	<0.20
Dichloropropene,1,3-	ug/L	0.50	<0.30	<0.30
Ethylene dibromide	ug/L	0.20	<0.10	<0.10
Hexane (n)	ug/L	520	<0.20	<0.20
Methyl Ethyl Ketone	ug/L	1,800	<1.0	<1.0
Methyl Isobutyl Ketone	ug/L	640	<1.0	<1.0
Methyl tert-Butyl Ether (MTBE)	ug/L	15	<0.20	<0.20
Methylene Chloride	ug/L	50	<0.30	<0.30
Styrene	ug/L	5.4	<0.10	<0.10
Tetrachloroethane, 1,1,1,2-	ug/L	1.1	<0.10	<0.10
Tetrachloroethane, 1,1,2,2-	ug/L	1.0	<0.10	<0.10
Tetrachloroethylene	ug/L	17	<0.20	<0.20
Trichloroethane, 1,1,1-	ug/L	200	<0.30	<0.30
Trichloroethane, 1,1,2-	ug/L	5.0	<0.20	<0.20
Trichloroethylene	ug/L	5.0	<0.20	<0.20
Trichlorofluoromethane	ug/L	150	<0.40	<0.40
Vinyl Chloride	ug/L	1.7	<0.17	<0.17

Standards from Soil, Ground Water and Sediment Standards for Use Under Part XV.1
of the Environmental Protection Act (April 15, 2011 and as amended)
Table 2: Full Depth Generic SCS in a Potable Ground Water Condition
All Types of Property-Use, Fine- to Medium-Textured Soil

m bg meters below grade
ppm parts per million
RPD Relative percent difference
Value Exceeds standard
Value Detection limit exceeds standard

TABLE 8 GROUNDWATER ANALYTICAL RESULTS METALS AND INORGANICS

5646 and 5650 Manotick Main Street, Manotick, Ontario

Sample Name	Units	STANDARDS Table 2 fine/medium	MW 201	MW 206
Vapour Reading	see note	-	< 5 ppm	840 ppm
Screen Interval	m bg	-	0.91-3.05	3.05-6.1
Sampling Date	dd-mmm-yy	-	16-Oct-23	17-Oct-23
Analysis Date (on or before)	dd-mmm-yy	-	21-Oct-23	21-Oct-23
Certificate of Analysis No.	-	-	23Z081488	23Z081488
pH	pH Units	NV	7.71	7.68
Antimony	ug/L	6.0	<1.0	<1.0
Arsenic	ug/L	25	<1.0	<1.0
Barium	ug/L	1,000	45	275
Beryllium	ug/L	4.0	<0.50	<0.50
Boron (total)	ug/L	5,000	130	99.3
Cadmium	ug/L	2.7	<0.20	<0.20
Chromium Total	ug/L	50	<2.0	<2.0
Chromium VI	ug/L	25	<2.000	<2.000
Cobalt	ug/L	3.8	0.55	2.47
Copper	ug/L	87	1.7	3.3
Cyanide (CN-)	ug/L	66	<2	<2
Lead	ug/L	10	<0.50	<0.50
Mercury	ug/L	1.0	<0.02	<0.02
Molybdenum	ug/L	70	5.6	8.86
Nickel	ug/L	100	6.5	29
Selenium	ug/L	10	<1.0	1.6
Silver	ug/L	1.5	<0.20	<0.20
Thallium	ug/L	2.0	<0.30	<0.30
Uranium	ug/L	20	1.1	1.43
Vanadium	ug/L	6.2	1.11	4
Zinc	ug/L	1,100	<5.0	7.5
Chloride	ug/L	790,000	331,000	**1,020,000**
Sodium	ug/L	490,000	128,000	412,000

Standards from Soil, Ground Water and Sediment Standards for Use Under Part XV.1
of the Environmental Protection Act (April 15, 2011 and as amended)
Table 2: Full Depth Generic SCS in a Potable Ground Water Condition
All Types of Property-Use, Fine- to Medium-Textured Soil

-	Not analyzed
m bg	meters below grade
ppm	parts per million
RPD	Relative percent difference
Value	Exceeds standard
Value	Detection limit exceeds standard

TABLE 9 GROUNDWATER ANALYTICAL RESULTS PAHs

5646 and 5650 Manotick Main Street, Manotick, Ontario

Sample Name	Units	STANDARDS Table 2 fine/medium	MW 201	MW 206
Vapour Reading	see note	-	< 5 ppm	840 ppm
Screen Interval	m bg	-	0.91-3.05	3.05-6.1
Sampling Date	dd-mmm-yy	-	16-Oct-23	17-Oct-23
Analysis Date (on or before)	dd-mmm-yy	-	21-Oct-23	21-Oct-23
Certificate of Analysis No.	-	-	23Z081488	23Z081488
Acenaphthene	ug/L	4.1	<0.20	<0.20
Acenaphthylene	ug/L	1.0	<0.20	<0.20
Anthracene	ug/L	2.4	<0.10	<0.10
Benz[a]anthracene	ug/L	1.0	<0.20	<0.20
Benzo[a]pyrene	ug/L	0.010	<0.01	<0.01
Benzo[b]fluoranthene	ug/L	0.10	<0.10	<0.10
Benzo[ghi]perylene	ug/L	0.20	<0.20	<0.20
Benzo[k]fluoranthene	ug/L	0.10	<0.10	<0.10
Chrysene	ug/L	0.10	<0.10	<0.10
Dibenz[a h]anthracene	ug/L	0.20	<0.20	<0.20
Fluoranthene	ug/L	0.41	<0.20	<0.20
Fluorene	ug/L	120	<0.20	<0.20
Indeno[1 2 3-cd]pyrene	ug/L	0.20	<0.20	<0.20
Methlynaphthalene, 2-(1-)[1]	ug/L	3.2	<0.20	<0.20
Naphthalene	ug/L	11	<0.20	<0.20
Phenanthrene	ug/L	1.0	<0.10	<0.10
Pyrene	ug/L	4.1	<0.20	<0.20

Standards from Soil, Ground Water and Sediment Standards for Use Under Part XV.1
of the Environmental Protection Act (April 15, 2011 and as amended)
Table 2: Full Depth Generic SCS in a Potable Ground Water Condition
All Types of Property-Use, Fine- to Medium-Textured Soil

- Not analyzed
m bg meters below grade
ppm parts per million
[1] the sum of 1-methylnaphthalene and 2- methylnaphthalene.

APPENDIX I
SAMPLING AND ANALYSIS PLAN

TERRAPEX

SAMPLING AND ANALYSIS PLAN
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

Site: 5646 Manotick Main Street, Ottawa, Ontario
Project No: CO884.02
Date: October 9, 2023

OBJECTIVES

On behalf of the 595831 Ontario Inc.. (Terrapex) has prepared this sampling and analysis plan for a Phase Two Environmental Site Assessment (ESA) at 5646 Manotick main Street Ottawa, Ontario, the "Phase Two Property". The Phase Two ESA is being conducted in accordance with the requirements of Ontario Regulation (O. Reg.) 153/04, *Records of Site Condition - Part XV.1 of the Act.* However, it is understood that a Record of Site Condition (RSC) is not required as there is no intended change in land use (i.e., the Site will remain as a park). The objective of this ESA is to determine the location and concentration of contaminants in the land or water on, in or under the Phase Two Property.

The Phase Two ESA will investigate all Areas of Potential Environmental Concern (APECs) which were identified in a Phase One ESA of the property.

SAMPLING PROGRAM

The media to be investigated and the contaminants of concern have been determined based on findings from previous investigations and potential environmental concerns identified from on-site and off-site activities. The rationale for each sampling location, and the proposed laboratory analytical program for each location, is shown on Table 1. The media, contaminants, investigation and sampling methods are summarized on Table 2. Modifications may be made to the program during the course of implementation, based on field observations, and will be documented in the Phase Two ESA report.

STANDARD OPERATING PROCEDURES

The following Terrapex Standard Operating Procedures (SOPs) may be used:

SOP E01.00 – Field Meter Calibration
SOP E02.00 – Test Pitting
SOP E03.03 – Borehole Advancement Using Direct Push Methodology
SOP E04.00 – Monitoring Well Installation
SOP E05.00 – Monitoring Well Development
SOP E06.00 – Groundwater Monitoring
SOP E07.01 – Groundwater Sampling, Low Volume Purge, Using Peristaltic Pump
SOP E09.00 – Soil Sample Handling
SOP E10.00 – Soil Classification
SOP E11.00 – Measuring and Surveying Using Rod and Level
SOP E12.00 – Field Program Quality Assurance & Quality Control

DATA QUALITY OBJECTIVES

The investigation will be completed following Terrapex SOP *E12.00 - Field Program Quality Assurance & Quality Control*, which specifies requirements for minimizing cross-contamination, record-keeping, sample storage, sample submission, field QA/QC samples and data quality objectives. If the data quality objectives are not met, the Qualified Person for the project will review the results and determine whether the deviation affects decision-making or the overall objectives of the investigation.

LABORATORY PROGRAM

Project Laboratory: AGAT Laboratories

Accreditation: Canadian Association for Laboratory Accreditation Inc. (CALA) in accordance with the International Standard ISO/IEC17025-2005 – *General Requirements for the Competence of Testing and Calibration Laboratories*

Proposed Analytical Program: See Table 3, attached.

Analytical Methods: The laboratory will use the methods specified in the *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act, March 9, 2004, amended as of July 1, 2011 (Analytical Protocol).*

Sample Containers and Preservatives: See Table 4, attached.

Paracel's Quality Assurance/Quality Control (QA/QC) program will consist of the analysis of method blanks, laboratory control samples, matrix spikes, sample duplicates, and surrogates, as appropriate for the particular analysis protocol and as specified in the *Analytical Protocol.*

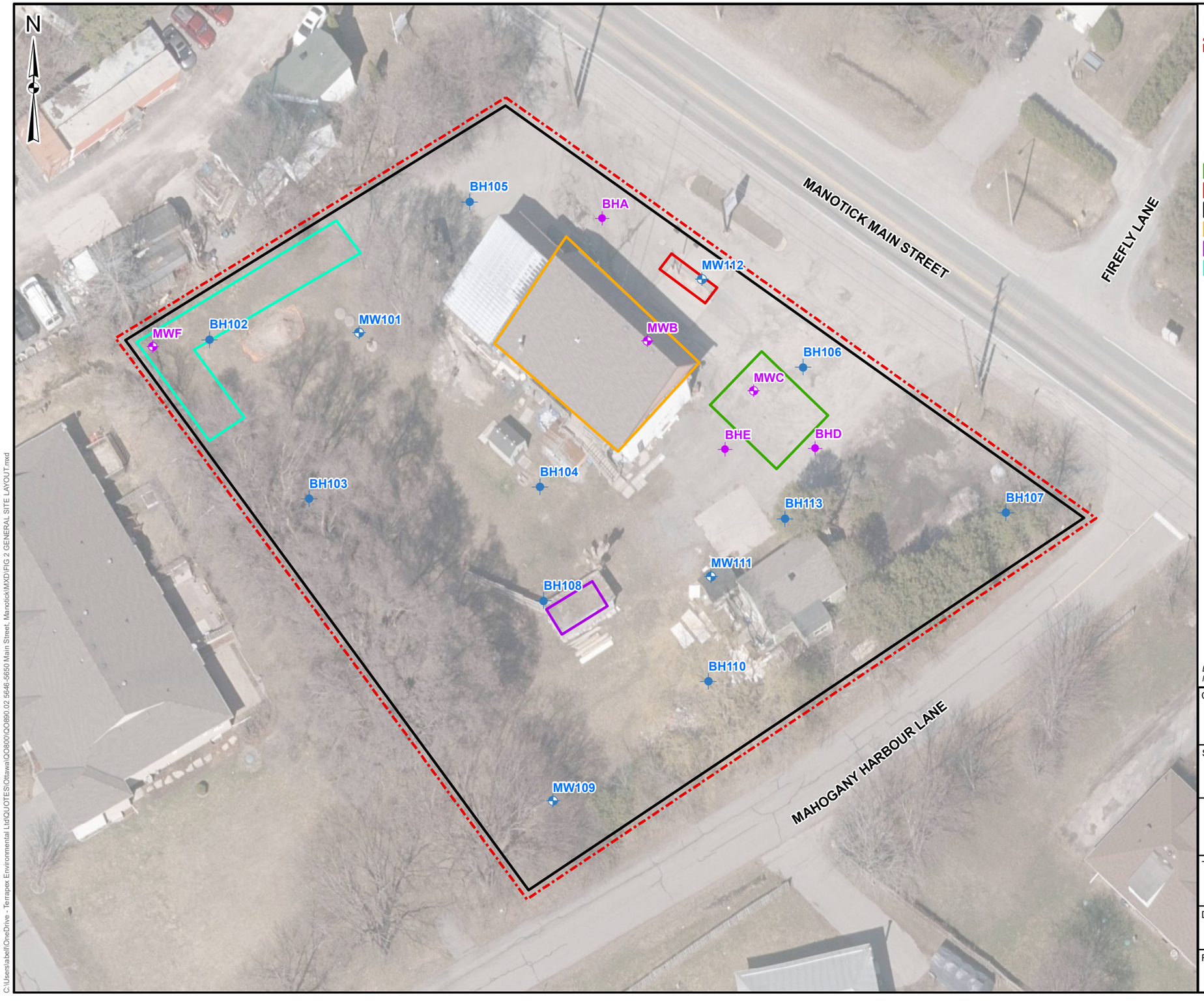
SUB-CONTRACTORS

All sub-contractors used in the Phase Two ESA will be approved suppliers according to Terrapex's ISO 9001:2008 system. The following sub-contractors will be retained for this project:

Private utility locates: Premier Locates Inc.
Borehole drilling and well installation: Strata Soil Sampling
Laboratory analyses: AGAT Laboratories Ltd.

ATTACHMENTS

Figure 1 – Site Location
Figure 2 – Proposed Sample Locations
Table 1 – Proposed Sampling Plan
Table 2 – Media to be Investigated and Chemicals of Concern
Table 3 – Sample Containers and Preservation Plan



LEGEND

- PROPERTY BOUNDARY
- BOREHOLE
- MONITORING WELL
- PROPOSED BOREHOLE
- PROPOSED MONITORING WELL

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

- APEC-1A
- APEC-1B
- APEC-2 (ENTIRE PROPERTY)
- APEC-3
- APEC-4
- APEC-5

0 5 10 15
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT:
595831 ONTARIO INC.

SITE LOCATION:
5646 AND 5650 MANOTICK MAIN STREET, MANOTICK, ONTARIO

TERRAPEX

TITLE:
PROPOSED SAMPLING LOCATIONS

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS/ AB	QO890.02	KB
REVISION: 00	DATE: SEPTEMBER 2023	FIGURE: **2**

C:\Users\sabell\OneDrive - Terrapex Environmental Ltd\QUOTES\Ottawa\QO800\QO890.02 5646-5650 Main Street, Manotick\MXD\FIG 2 GENERAL SITE LAYOUT.mxd

TABLE 1 PROPOSED SUPPLEMENTAL PHASE TWO ESA PROGRAM

PROPOSED SAMPLING LOCATIONS	APEC	ANTICIPATED DEPTH	LABORATORY ANALYSIS	COMMENTS / RATIONALE
BHA	APEC 1B APEC 2	6.0 m	- PHCs - VOCs - PAHs - M&I	- Assess the quality of the fill. - Delineate soil impacts west of MWW112.
MWB	APEC 1B APEC 3	6.0 m	- PHCs - VOCs - PAHs - M&I	- Assess soil and groundwater at the reported former automotive service garage. - Delineate soil and groundwater impacts south of MW112.
MWC	APEC 1A	6.0 m	- PHCs	- Assess soil and groundwater at the former tank nest (to update previous Paterson 2000 results). - Delineate soil and groundwater impacts east of MW112.
BHD	APEC 1A	6.0 m	- PHCs	- Assess soil and groundwater at the former tank nest (to update previous Paterson 2000 results)
BHE	APEC 1A	6.0 m	- PHCs - PAHs - M&I	- Assess soil at the former tank nest (to update previous Paterson 2000 results). - Assess the quality of the fill
MWF	APEC 5 APEC 2	6.0 m	- PHCs - VOCs - PAHs - M&I	- Assess the quality of the fill. - Assess groundwater conditions in the vicinity of the septic field for the discharge from the carwash

Notes:

PHCs - Includes benzene, toluene, ethylbenzene, xylenes (BTEX) and petroleum hydrocarbon fractions (PHC F1-F4).

M&I – metals and inorganics

PAHs – polycyclic aromatic hydrocarbons

VOCs – volatile organic compounds

MW – monitoring well.

TABLE 3 - SAMPLE CONTAINERS AND PRESERVATION

Media	Analytical Parameter	Field Filtered	Sample Container	Preservation	Holding Time (preserved)
Soil	Metals, metal hydrides, hot water soluble boron, chromium VI, SAR, EC, pH	Not applicable	250 mL glass jar	5 ± 3 °C	180 days
	BTEX, PHC F1	Not applicable	40 mL glass vial and 60 mL glass jar, no headspace	10 mL methanol, 5 ± 3 °C	14 days
	BTEX, PHC F1	Not applicable	Hermetic sampler (Encore™)	5 ± 3 oC	Extract within 48 hrs
	PHCs F2-F4	Not applicable	120 mL glass jar, teflon lined lid	5 ± 3 °C	14 days
	VOCs	Not applicable	40 mL glass vial and 60 mL glass jar, no headspace	10 mL methanol, 5 ± 3 °C	14 days
	PAHs	Not applicable	120 mL glass jar, teflon lined lid	5 ± 3 °C	60 days
	Reg. 558 TCLP - non-volatiles	Not applicable	250 mL glass jar	5 ± 3 °C	
	Reg. 558 TCLP - volatiles	Not applicable	120 mL glass jar, teflon lined lid	5 ± 3 °C	
Groundwater	Metals, metal hydrides, sodium	Yes	250 mL HDPE bottle	HNO_3 to pH < 2 5 ± 3 oC	60 days
	Mercury	Yes	125 mL clear glass bottle	HCl to pH < 2 5 ± 3 oC	28 days
	Chromium VI	Yes	250 mL HDPE bottle	$(NH_4)_2SO_4/HN_4OH$ 5 ± 3 oC	28 days
	BTEX, PHC F1	No	3 x 40 mL clear glass septum vial, no headspace	$NaHSO_4$ to pH < 2 5 ± 3 $_o$C	14 days
	PHCs F2-F4	No	2 x 500 mL amber glass bottle	$NaHSO_4$ to pH < 2 5 ± 3 $_o$C	40 days
	VOCs	No	3 x 40 mL clear glass septum vial, no headspace	$NaHSO_4$ to pH < 2 5 ± 3 $_o$C	14 days
	PAHs	No	1 L amber glass bottle	5 ± 3 °C	14 days

BTEX = benzene, toluene, ethylbenzene, xylenes
PHC F1 - F4 = petroleum hydrocarbons F1 to F4 fractions
VOCs = volatile organic compounds
PAHs = polycyclic aromatic hydrocarbons (O. Reg. 153/04)
TCLP = toxicity characterization leachate procedure
HDPE = high density polyethylene

TABLE 2 MEDIA INVESTIGATED, CONTAMINANTS OF CONCERN AND METHODS

Media	Contaminants of Concern	Investigation Method	Equipment	Sample Collection Method
Soil	Petroleum hydrocarbons Polycyclic aromatic hydrocarbons Volatile organic compounds Benzene, toluene, ethylbenzene, xylenes Metals, metal hydrides Mercury Chromium VI Hot water soluble boron	Boreholes	Geoprobe drill rig	Split spoon sampler, sample every 0.75 m
Groundwater	Petroleum hydrocarbons Polycyclic aromatic hydrocarbons Volatile organic compounds Benzene, toluene, ethylbenzene, xylenes Metals, metal hydrides Mercury Chromium VI Sodium, chloride	Monitoring wells	Geoprobe drill rig CME 75 rotary auger rig	Low-flow sampling using peristaltic pump, target top 0.5 m of water column

APPENDIX II
STANDARD OPERATING PROECDURES

TERRAPEX STANDARD OPERATING PROCEDURE
FIELD VAPOUR METER CALIBRATION

GENERAL NOTES

Standard Operating Procedures (SOPs) have been developed by Terrapex Environmental Ltd. to standardize protocols used during environmental assessment work programs. However, certain work programs may warrant deviations from SOPs and some clients may have specific requirements which differ from those outlined in this SOP. Any significant deviations should be discussed with and approved by the project manager. Each deviation, along with the rationale for the deviation, should be documented in the field notes, project scope and/or notes to file.

Where SOPs are appended to reports, all deviations from this SOP, along with the rationale for the deviation, must be documented in the report.

APPLICATION

This SOP describes calibration procedures and requirements for portable meters used to measure combustible vapours, volatile organic compounds, and/or other gases within an atmosphere. The procedures described herein are applicable to calibration both in the office and in the field (using a portable calibration kit).

GENERAL CALIBRATION PROCEDURES

1. Turn on the instrument and allow 5-10 minutes for it to warm up. When calibrating in the field, complete instrument warm up in a sheltered environment, or allow an additional 5-10 minutes for warm up.
2. Attach hoses, water traps, probe ends and other pieces that will be utilized during actual measurement, and set instrument to the intended measurement mode (e.g., on a Gastech Model 1238 ME, turn “methane elimination” on or off, as appropriate).
3. Check instrument flow rate to confirm suitable vapour intake.
4. In a baseline environment (e.g., ambient air), “zero” the instrument. Record any adjustments made on the instrument calibration log, including initial and final (calibrated) readings.
5. Fill an empty Tedlar bag with calibration gas, and connect it to the instrument. If the instrument being calibrated has multiple sensors for different ranges of target vapours (e.g., GasTech model 1238ME), calibrate the coarse range (higher concentrations) first.

6. Allow the instrument to equilibrate with the environment in the Tedlar bag and adjust the instrument span settings as appropriate. Record any adjustments made on the instrument calibration log, including initial and final (calibrated) readings.
7. Remove the Tedlar bag and confirm that the instrument returns to a baseline reading (e.g., zero reading on a combustible vapour meter).
8. Repeat steps 4 through 7, as necessary, for additional sensors and/or target vapours.

CALIBRATION REQUIREMENTS

Portable meters are to be calibrated prior to the start of a site visit, and prior to the start of each successive site visit if the project requires more than a single day onsite.

More frequent calibration may be required on projects where elevated vapour readings are frequently encountered, as such scenarios can results in calibration "drift" (erroneous readings on the instrument). Calibration drift is often characterized by one or more of the following conditions:

- Failure of the instrument to return to a baseline reading in ambient conditions;
- No response or apparently "sluggish" response of the instrument upon exposure to an environment containing target vapours; or,
- Inconsistent instrument readings despite exposure to apparently identical target environments.

Where calibration drift is suspected, the instrument should be recalibrated as soon as practicable. Readings potentially affected by calibration drift should be appropriately annotated on field notes/log sheets.

TERRAPEX STANDARD OPERATING PROCEDURE
BOREHOLE ADVANCEMENT USING PERCUSSIVE-DRIVEN SAMPLERS

GENERAL NOTES

Standard Operating Procedures (SOPs) have been developed by Terrapex Environmental Ltd. to standardize protocols used during environmental assessment work programs. However, certain work programs may warrant deviations from SOPs and some clients may have specific requirements which differ from those outlined in this SOP. Any significant deviations should be discussed with and approved by the project manager. Each deviation, along with the rationale for the deviation, should be documented in the field notes, project scope and/or notes to file.

Where SOPs are appended to reports, all deviations from this SOP, along with the rationale for the deviation, must be documented in the report.

APPLICATION

This SOP is applicable to intrusive environmental investigations involving the advancement of borings using percussive-driven split-spoon samplers (e.g., "Pionjar" sampler) to collect soil samples.

The SOP is applicable whether such activity constitutes the whole of a work program, or part of a larger work program.

EQUIPMENT

The following list details the standard equipment necessary for borehole advancement. Specific sites may require additional or specialized equipment.

- □ Portable combustible vapour meter (e.g., Gastech™ 1238ME), calibrated and charged
- □ Combustible vapour meter field calibration kit, if applicable
- □ tape measure with weighted end
- □ sampling equipment (gloves, bags, permanent marker)
- □ bucket for washing split spoon samplers
- □ detergent solution in spray bottle
- □ distilled/clean water in spray bottle
- □ laboratory-supplied sampling jars appropriate for contaminants of concern

- □ cooler with ice
- □ laboratory chain of custody forms
- □ field notebook
- □ field borehole logs (F025)
- □ site plan
- □ scope of work/field work instructions
- □ site-specific health and safety plan, including Job Safety Analysis and other POST™ documentation
- □ Personal Protective Equipment (hard hat, vest, safety glasses, respirator, steel toe boots, gloves, hearing protection)
- □ Camera
- □ Measuring wheel or similar device

PREPARATION

- □ review scope, proposed borehole locations, and utility locates with project manager
- □ ensure utility locates are complete, contractor is confirmed, and site access is confirmed
- □ ensure equipment booked is suitable for site/work program
- □ calibrate and sign-out field equipment

SPECIAL PLANNING AND PREPARATION REQUIREMENTS

Above ground and underground utilities and other services within the assessment area are to be located and identified in the field prior to drilling. Where appropriate, a private locating contractor should also be retained to identify secondary services such as yard lights, internal computer/communication lines, etc., and clear proposed borehole locations. All exclusions or conditions attached to utility service locates (e.g., notification requirements, “hand dig only” areas) are to be strictly adhered to.

NOMENCLATURE

Boreholes should be uniquely numbered on a sequential basis, and prefaced by ABH".

The initial round of borehole advancement should begin with borehole “BH101”, with subsequent boreholes advanced during this round identified as “BH102”, “BH103”, etc. Additional rounds of

borehole advancement would begin by advancing the borehole count to the next 100 (e.g., the first borehole from the second and third investigation program would be “BH201” and “BH301”, respectively). Borehole numbering is to be maintained irrespective of the manner in which the borehole is advanced (e.g., if the second round of borehole advancement is completed using a method other than percussive-driven samplers, it would still commence with borehole “BH201”).

If a monitoring well is installed in a borehole (refer to *Monitoring Well Installation*, SOP E04.00), the prefix “MW” is to be substituted for “BH”, however, the borehole numbering sequence is to be maintained (e.g., if the second borehole of the first round of investigation is instrumented as a monitoring well, it would be identified as “MW102”, not “MW101”).

Soil samples collected during borehole advancement should be numbered sequentially using the borehole number followed by a dash as a prefix, (e.g., sample ABH101-4", indicating the fourth sample from borehole BH101). Subdivided samples should be labelled with alphabetical suffixes from the top of the sample (e.g., “BH101-4A” and “BH101-4B”, with the later sample located at the greater depth).

All alphabetical prefixes and suffixes should be written in capital letters.

FIELD PROCEDURES

Sampling

Percussive-driven samplers will result in the recovery of soil samples on an effectively continuous basis, meaning that samples are collected from ground surface to a depth equivalent to the length of the split spoon sampler (assuming it is fully driven into the subsurface), with the next sample collected beginning immediately below the preceding sample. It should be noted that percussive-driven samplers typically have very poor (in some cases virtually nil) recovery within large granular soils such as granular base beneath asphalt and similar surface treatments.

It should be noted that boreholes advanced using percussive-driven samplers are not cased; care must be taken to identify soil in recovered samples that represents "caving" or "slough". In addition, it is not uncommon for samplers to be driven less than their full length during each advancement cycle, or for samplers of varying lengths to be employed; the starting and finishing depth must be specifically determined and recorded for each individual split spoon advancement.

Split spoon samples are to be cleaned prior to use using soapy water and a fresh water rinse.

Recovered soil samples should be handled and screened in the field as specified in *Soil Sample Handling* (SOP E09.00). Where appropriate, samples should be divided into two or more sub-samples to facilitate logging of observed changes in geological conditions (stratigraphy, etc.) or evidence of possible impact (staining, odours, etc.). Subdivided samples should be identified

as described in the Nomenclature section above; i.e., assigning the suffix “A” to the sub-sample at the top of the spoon (the sample first collected), then “B”, “C”, etc.

To the extent practicable, boreholes are to be advanced to at least the maximum anticipated depth of potential impact (e.g., at least the water table for investigations of possible petroleum hydrocarbon impacts). Whenever possible, the final depth of the borehole should approximately delineate the vertical extent of contamination in the vicinity of the borehole (e.g., one “clean” sample should be obtained from the base of the borehole).

Where a well is to be installed in the completed boring, it may be preferable to enlarge the boring (to increase the diameter of filter pack placement around the well screen and/or to facilitate the installation of a larger diameter well) by over-drilling the hole using continuous flight augers. The over-drilling practice, and the diameter of the enlarged hole, should be noted on the borehole log.

Note Taking

Use the Terrapex field borehole form (Form F025). Always fill in every field of the top portion of the form completely - logs can easily get separated from each other. It is a good practice to supplement written field notes with pictures, especially of recovered soil cores to illustrate structure (layers, banding), staining, and similar features.

Avoid using non-established short forms on all descriptions. Do not scribble anything out or erase, just place a line through the word.

The type and thickness of surfacing materials (asphalt, concrete and/or crushed stone) should also be recorded.

Record the sampling interval graphically as the interval over which the sampler was driven, not the planned sampling interval.

Label each sample collected as 1, 2, 3, etc. as specified in the Nomenclature section. Do not start a new set of numbers if you change collection methods. Do not use depth intervals for the sample name (e.g. 10'-12').

Record percent recovery based on how far you drove the sampler (actual sampling interval, not the intended sampling interval), rounded to the nearest 5%.

% recovery = (Quantity of soil recovered)/(sampling interval) x 100%

For example, if the sampler was driven 1 m, and 78 cm of soil was recovered,

% recovery = (78 cm / 100 cm) x 100% = 78%, rounded to 80%.

When screening soil headspace vapours, record vapour readings AND units. Note the instrument number used to collect vapour readings. If you are using an instrument other than the default GasTech 1238 combustible meter or equivalent, note the type of instrument.

If there is no deflection on the combustible gas meter (or other field headspace screening instrument) record the reading as less than the effective detection limit (<10 ppm for combustible gas meters), not 0 ppm.

For odours, use NONE, SLIGHT, MODERATE and STRONG. The default is assumed to be hydrocarbon odour; other types of odours require a description entered onto the log. Do not leave this blank unless you did not check for odours.

Refer to the *Soil Classification* (SOP E10.00) for standard terminology for recording sample descriptions. In addition:

- always record the relative grain size of sand particles (fine/medium/coarse), not just "sand";
- note any structural observations (bedding, etc.)
- record presence of rootlets/roots, organic matter, debris, and anything else that might help determine whether the soil is fill or native;
- note fractures and location, width, weathered, staining, open, closed, tight.
- for sand seams, record the depth and thickness as well as a description (coarse, wet, etc.).

Clearly and fully document the stratigraphy encountered during drilling and soil sampling, including the depths of stratigraphic contacts observed **within** split spoons (e.g., located within sampling intervals). If there are distinct layers within a split spoon, the samples should be divided into sub-samples and identified with suffixes A, B, C, etc. as described above.

The depth and reasons for abandoning further borehole advancement (e.g., refusal at bedrock, depth of desired investigation obtained) is to be recorded on the log.

Backfilling

This section applies to boreholes in which monitoring wells are not installed. Refer to Monitoring *Well Installation* (SOP E04.00) for instrumenting boreholes as monitoring wells.

To ensure that the boring does not represent a potential conduit for groundwater flow or contaminant migration, boreholes are to be backfilled using bentonite chips and subsequently hydrated by the addition of a sufficient volume of potable-grade water. Where boreholes have

been advanced through a hole cut through asphalt, concrete or similar hard surfacing, a concrete patch is to be applied to mitigate further cracking/degradation of surface treatments.

Prior to Leaving Site

- Check the scope of work to ensure you have completed project objectives
- Measure the final location of all boreholes from permanent site features and show on site plan (refer to *Measuring and Surveying using Rod and Level*, SOP E11.00)
- Ensure boreholes are properly backfilled and the site is sufficiently restored
- Clean up any garbage or debris and leave the site the way you found it (or better)
- Call the project manager to ensure there is nothing else required, to summarize findings and results**,** and select final lab samples
- Pack and submit samples to lab with chain of custody

UPON RETURN TO OFFICE

□ Clean and sign in all equipment used

□ Log in soil samples in soil bins

□ Complete equipment and supply form

□ Complete field package (place logs and photocopies of relevant field log book pages in project file folder)

□ Submit site drawing depicting borehole locations to drafting.

TERRAPEX STANDARD OPERATING PROCEDURE
MONITORING WELL INSTALLATION

GENERAL NOTES

Standard Operating Procedures (SOPs) have been developed by Terrapex Environmental Ltd. to standardize protocols used during environmental assessment work programs. However, certain work programs may warrant deviations from SOPs and some clients may have specific requirements which differ from those outlined in this SOP. Any significant deviations should be discussed with and approved by the project manager. Each deviation, along with the rationale for the deviation, should be documented in the field notes, project scope and/or notes to file.

Where SOPs are appended to reports, all deviations from this SOP, along with the rationale for the deviation, must be documented in the report.

APPLICATION

This SOP is applicable to the installation of monitoring wells following the vertical advancement of a borehole in overburden or bedrock. Borehole drilling procedures are not covered by this SOP.

EQUIPMENT

The following list details the standard equipment necessary for monitoring well installation over and beyond that required for borehole advancement. Specific sites may require additional or specialized equipment.

- □ Well screen and riser pipe
- □ “well gravel” (silica sand)
- □ Bentonite chips
- □ Cement mix
- □ End caps
- □ Expandable gripper caps (“J-plugs”)
- □ Protective casings
- □ locks
- □ clean, disposable vinyl or nitrile gloves

SPECIAL PLANNING AND PREPARATION REQUIREMENTS

A well record (per R.R.O. 1990, Reg. 903) must be completed by the drilling contractor for all monitoring wells greater than 3 m in depth, or for any well (regardless of depth) installed with a contaminated or potentially contaminated area. All necessary information to complete the well record (e.g., well owner, their address and telephone number, etc.) is to be on hand during installation or provided to the well contractor prior to the start of the work program.

Wells shall not be installed in a manner that would facilitate the migration of liquids between differing water-bearing units, or between overburden and bedrock. The subsurface stratigraphy at the borehole location should be thoroughly assessed prior to well installation.

Monitoring wells to be used for the collection of groundwater samples for laboratory analyses shall be installed such that the saturated portion of the well screen has a length less than or equal to 3.1 m.

NOMENCLATURE

Monitoring wells will be assigned numbers corresponding to the borehole numbering (refer to the appropriate borehole advancement SOP), identified by a “MW” prefix in place of “BH” (e.g., borehole “BH101” becomes “MW101”).

Multi-level well installations, whether installed within a common boring or as a series of separate borings in immediate proximity of each other, will be identified through the use of alphabetical suffixes from the deepest to the shallowest installation (e.g., “MW101A” is deeper than “MW101B”); this convention is based on the principle that numbering begins with the initial installation, and proceeds sequentially thereafter.

All alphabetical prefixes and suffixes should be written in capital letters.

The assigned well name is to be recorded on the well casing, on the outside of the well standpipe, and/or the top (outside) of the well standpipe cap/plug.

FIELD PROCEDURES

Well Construction

Monitoring wells must be constructed of new, clean materials. Every individual (including drilling contractor staff) involved in the installation of a monitoring well shall be provided, and must wear,

a new, clean pair of disposable gloves. Gloves should be changed between installations, and whenever contact with a potential contaminant occurs.

The base of the completed boring should be measured using a weighted tape and recorded prior to well installation. It is not acceptable to rely on estimates of the completed boring depth based on the number of auger sections used to advance the borehole, etc.

The well should be constructed such that the screened portion of the well intersects the depth range of interest (e.g., the top of the unconfined water table for a typical investigation of potential petroleum hydrocarbon impacts).

Well screens shall intersect a single water-bearing unit only. If the depth range of interest comprises multiple water-bearing units, multi-level well installations should be used. Well screens shall not traverse the bedrock-overburden interface. If the depth range of interest includes both bedrock and overburden, multi-level well installations should be used.

To prevent pooling in the bottom cap of the monitoring well that may introduce bias to monitoring results (e.g., when the groundwater table drops below the base of the well), the bottom cap of monitoring wells should include a suitable slot or drainage hole. Where necessary, an undraining bottom cap may be equipped with a slot by making a short cut through the bottom of the cap using a hacksaw or similar tool.

The length of the screened interval, as well as the depth of installation (base of the screened interval) are to be measured and recorded, along with the well slot size, standpipe thickness (e.g., schedule 40, schedule 80, etc.), and standpipe diameter. The length of the screened interval should not exceed 3.1 m (10 ft), and the screened interval of the well should extend no higher than a depth of 1.2 m (4 ft) below ground surface to ensure adequate sealing of the boring annulus.

“Well gravel” (filter pack) should be placed in the annulus of the borehole either by manually filling the annual space, or by using a tremie pipe. The grading classification (e.g., No. 1, No.2, etc.) of well gravel used should be recorded. The top of the filter pack should ideally be located between 15 and 30 cm (6 and 12 in) above the top of the screened interval of the well. The depth of the top of the filter pack should be measured using a weighted tape and recorded. It is not acceptable to rely on estimates of the depth of the top of the filter pack.

The remaining annulus of the well should be backfilled using bentonite chips or an equivalent sealant material, to a depth of approximately 45 cm (18 in) below ground surface. Where applicable, sealant material should be hydrated by the addition of a sufficient volume of potable-grade water during installation (e.g., in lifts) and at the conclusion of sealant placement. The depth of the top of the sealant should be measured and recorded.

A flush-mount or monument ("stick-up") protective casing shall be set in concrete overtop the well. If a monument casing is installed, the height of the above grade portion of the well standpipe (not the casing) is to be measured and recorded.

Surveying, Establishment of Measuring Points

A consistent measuring point for future groundwater monitoring events is to be indicated on each well by placing a shallow notch on the outside of the well standpipe at its highest point. The elevation of the "ground surface" and "top of pipe" are to be surveyed relative to an appropriate temporary or geodetic benchmark. All "top of pipe" elevations are to be surveyed by placing the rod on the shallow notch (measuring point) on the outside of the well standpipe. Refer to SOP E11.00 (*Measuring and Surveying using Rod and Level*) for additional surveying details.

MULTI-LEVEL INSTALLATIONS

The preferred method for completing multi-levelled well installations is to complete a separate boring for each screened interval in the immediate vicinity of each other ("nested installation"). Nested installations should not be separated from the adjoining installation by distances greater than 2 m.

Within nested installations, it is typically only necessary to collect soil samples and log stratigraphy within the deepest boring. However, each well installation is to be logged and recorded on a separate field form/report log with each log illustrating a single standpipe in a unique boring.

If multiple well standpipes are placed within the same boring, an appropriate sealant with a thickness of at least 2 m must be used to mitigate migration of liquids between the screened intervals. Such installations are to be logged and recorded on a single field form/report log that illustrates the multiple standpipes within a common boring.

FIELD DOCUMENTATION

Monitoring well installations should be recorded on field form F025 (field borehole log). Refer to the appropriate borehole advancement SOP for general borehole logging procedures.

TERRAPEX STANDARD OPERATING PROCEDURE
MONITORING WELL DEVELOPMENT

GENERAL NOTE

Standard Operating Procedures (SOPs) have been developed by Terrapex Environmental Ltd. to standardize protocols used during environmental assessment work programs. However, certain work programs may warrant deviations from SOPs and some clients may have specific requirements which differ from those outlined in this SOP. Any significant deviations should be discussed with and approved by the project manager. Each deviation, along with the rationale for the deviation, should be documented in the field notes, project scope and/or notes to file.

Where SOPs are appended to reports, all deviations from this SOP, along with the rationale for the deviation, must be documented in the report.

APPLICATION

These procedures are applicable to developing monitoring wells or piezometers installed for the purposes of monitoring groundwater conditions, hydraulic conductivity or similar in-situ testing, and/or recovering samples for physical inspection/laboratory analytical testing. The procedures are applicable whether such activity constitutes the whole of a work program, or part of a larger work program.

EQUIPMENT

The following list details the standard equipment necessary for groundwater monitoring. Specific sites may require additional or specialized equipment.

- □ Well opening tools (e.g., hex wrench , $^{9}/_{16}$" socket wrench, pry bar, well keys)
- □ bucket for washing down-hole field equipment
- □ detergent solution in spray bottle
- □ distilled/clean water in spray bottle
- □ Surge-block
- □ File for well notching
- □ field notebook
- □ well development field form (F054)
- □ site plan

□ scope of work/field work instructions

□ site-specific health and safety plan, including Job Safety Analysis and other POST™ documentation

□ Personal Protective Equipment (e.g., hard hat, vest, safety glasses, respirator, steel toe boots, gloves, hearing protection)

□ Camera

PREPARATION

- review scope of work with project manager
- ensure site access is confirmed
- calibrate and sign-out field equipment

SPECIAL PLANNING AND PREPARATION REQUIREMENTS

Traffic spotters should be employed when development activities include wells located in the travelled portion of a roadway or in high-traffic areas. A traffic control plan in accordance with Ontario Ministry of Transportation (MTO) guidelines must be implemented for all work in road allowance.

Accumulated headspace vapours, the depth to water, the depth to the bottom of the well, and the depths to any water/non-aqueous phase liquid (NAPL) interfaces within the well should be measured (refer to SOP E06.00, *Groundwater Monitoring*) prior to development so as to establish baseline conditions.

Waters removed from wells in which there is evidence of significant contamination (e.g., NAPL) should be containerized for future disposal off-site.

Well development is NOT synonymous with purging completed prior to groundwater sampling, and wells must be permitted to return to equilibrium conditions prior to subsequent monitoring, in-situ testing, and/or sampling efforts. The period of recovery will vary depending on well construction and subsurface conditions, but will be no less than twenty-four hours regardless.

FIELD PROCEDURES

Objectives

Monitoring wells are developed in order to remove "drilling debris" - entrained particulate in the well standpipe, well screen and filter pack, and surrounding formation materials - thereby

mitigating potential bias that may occur during groundwater monitoring, in-situ hydraulic testing, or laboratory analyses of recovered groundwater samples. A secondary objective of development is to remove waters that may have been introduced during drilling (e.g., water used as coolant during diamond coring), or that may have been impacted by drilling fluids used during drilling (e.g., mud-rotary augering).

Development Requirements

Non-dedicated down hole equipment employed during development must be cleaned using soapy water and a fresh water rinse prior to use within a well.

Development is conducted until the well yields water free of visible particulate. At a minimum, at least one borehole volume of water (defined as the initial volume of water in the well standpipe plus the volume of water in the filter pack surrounding the well) should be removed from the well during surge/purge cycles.

Where water or drilling fluids have been introduced during borehole drilling and/or monitoring well installation, the minimum volume of water to be removed from the well during the surge/purge cycles should be calculated as the greater of:

i. three times the volume of the water/fluids introduced (or "lost") to the subsurface during drilling; and,

ii. one borehole volume of water (defined as the initial volume of water in the well standpipe plus the volume of water in the filter pack surrounding the well).

Under certain circumstances, development may be halted prior to achieving visibly particulate-free discharges waters and removing the required volume of water:

- If the well has been purged to a “dry” condition on three consecutive surge/purge cycles, and where the water column within the well standpipe has been permitted to recover to at least 90% of its initial height between each surge/purge cycle; or,
- If the well has been purged to a “dry” condition during surging/purging, where at least three times the volume of water/fluids introduced ("lost") to the subsurface have been removed, and where the water column within the well standpipe has not returned to at least 90% of its initial height following a recovery period of 24 hours or more; or,
- Following the removal of an “excessive” volume of water from a well that has yielded water continuously during surge/purge cycles, where “excessive” is defined as **the greater of**:
    i. a volume exceeding three times the initial borehole volume of water (where a borehole volume is calculated as the volume of water in the well standpipe plus the volume of water in the filter pack surrounding the well);
    ii. ten times the initial volume of water in the well standpipe; and,

iii. three times the volume of the water/fluids introduced (or "lost") to the subsurface during drilling.

The start and stop time of development, equipment used (e.g., surge block, bailer), the volume of water removed, and the rationale for ceasing development efforts (e.g., particulate-free water obtained, excessive volume of water removed) are to be recorded for each well.

Bailers and Inertial Samplers

Inertial samplers generally exert a weak “surging” action, and as a result typically require significantly more water to be purged from a well to achieve a particulate-free state.

A relatively strong surging action can be achieved using a bailer if:

- the bailer is rapidly removed from the well; and,
- the removal results in a significant instantaneous drop in the water level within the well standpipe.

This generally requires the use of an elongated bailer (e.g., a 36" nominal length rather than a 12" nominal length bailer) with an outside diameter only marginally less than the inside diameter of a well standpipe (e.g., a 1.66" nominal diameter bailer within a 2" nominal diameter monitoring well), as well as a sufficient volume of water in the well to fill or nearly fill the bailer. The well must yield a sufficient volume of water to permit particulate mobilized during the removal of the bailer to be subsequently captured as the bailer is reintroduced into the well. (Otherwise, the particulate will simply settle at the bottom of the well standpipe.)

Because of their relatively weak surging action, the use of bailers and inertial samplers may result in poor development of wells that do not yield water continuously.

Surge Blocks

Surge blocks generates significant surging action and are therefore quite effective for wells that do not yield water continuously and/or that contain a significant amount of particulate (e.g., wells installed in borings advanced through bedrock).

However, surge blocks do not contribute any purging action, and must therefore be combined with a sampling or pumping device (e.g., a bailer or an inertial sampler) to remove mobilized particulate. Moreover, surge blocks generally cannot be employed within a well that has down-hole equipment installed within, necessitating the successive installation and removal of the paired sampling/pumping device. Care must be taking to ensure that neither the surge block nor the sampling/pumping device come into direct contact with the ground while they are being installed, removed, used, or otherwise manipulated.

As surge blocks are not dedicated sampling equipment, they must be cleaned using soapy water and a fresh water rinse prior to use in a well.

PRIOR TO LEAVING SITE

□ Check the scope of work to ensure you have completed project objectives

□ Verify the site plan accurately reflects site features and infrastructure (e.g., plan does not indicate buildings that have since been demolished, wells that have been decommissioned, etc.)

□ Clean up any garbage or debris and leave the site the way you found it (or better)

□ Call the project manager to ensure there is nothing else required, to summarize findings and results

UPON RETURN TO OFFICE

- Clean and sign in all equipment used
- Complete equipment and supply form
- Complete field package (place logs and photocopies of relevant field log book pages in project file folder)
- Submit any necessary revisions to site plan to drafting.

TERRAPEX STANDARD OPERATING PROCEDURE
GROUNDWATER MONITORING

GENERAL NOTE

Standard Operating Procedures (SOPs) have been developed by Terrapex Environmental Ltd. to standardize protocols used during environmental assessment work programs. However, certain work programs may warrant deviations from SOPs and some clients may have specific requirements which differ from those outlined in this SOP. Any significant deviations should be discussed with and approved by the project manager. Each deviation, along with the rationale for the deviation, should be documented in the field notes, project scope and/or notes to file.

Where SOPs are appended to reports, all deviations from this SOP, along with the rationale for the deviation, must be documented in the report.

APPLICATION

These procedures are applicable to monitoring headspace vapours, depth to water, and non-aqueous phase liquid (NAPL) thicknesses within existing groundwater monitoring wells. The procedures are applicable whether such activity constitutes the whole of a work program, or part of a larger work program.

EQUIPMENT

The following list details the standard equipment necessary for groundwater monitoring. Specific sites may require additional or specialized equipment.

- ☐ Portable vapour meter (e.g., Gastech™ 1238ME), calibrated and charged
- ☐ Vapour meter field calibration kit, if applicable
- ☐ “oil/water” interface probe
- ☐ Well opening tools (e.g., hex wrench , $^{9}/_{16}$” socket wrench, pry bar, well keys)
- ☐ File for well notching
- ☐ bucket for washing down-hole field equipment
- ☐ detergent solution in spray bottle
- ☐ distilled/clean water in spray bottle
- ☐ field notebook
- ☐ field groundwater monitoring form (F018)

☐ site plan

☐ scope of work/field work instructions

☐ site-specific health and safety plan, including Job Safety Analysis and other POST™ documentation

☐ Personal Protective Equipment (e.g., hard hat, vest, safety glasses, respirator, steel toe boots, gloves, hearing protection)

☐ Camera

PREPARATION

- review scope of work with project manager
- ensure site access is confirmed
- calibrate and sign-out field equipment

SPECIAL PLANNING AND PREPARATION REQUIREMENTS

Traffic spotters should be employed when monitoring activities include wells located in the travelled portion of a roadway or in high-traffic areas. A traffic control plan in accordance with Ontario Ministry of Transportation (MTO) guidelines must be implemented for all work in road allowance.

Groundwater monitoring should not be conducted on wells that have not been developed (refer to SOP E05.00, *Monitoring Well Development*), and should only be conducted if at least 24 hours has elapsed since well development efforts were completed.

FIELD PROCEDURES

General Instructions

Groundwater monitoring activities comprise the measurement of accumulated headspace vapours, the depth to water, the depth to the bottom of the well, and the depths to any water/NAPL interfaces detected within a well. Vapour measurements should be collected immediately upon removal of the well plug/cap to minimize venting of accumulated vapours.

To minimize contamination of the interface probe and tape, well depths should not be measured if floating (“light”) NAPL is encountered.

As part of the groundwater monitoring activities, each monitored well should be inspected to assess whether the well casing is intact, MOE well record tags (if present) remain attached to the well, and that the well standpipe is equipped with an appropriate plug/cap. Damage to the well or surrounding ground surfacing should be recorded, and broken/missing plugs or caps replaced.

If the well name recorded on the well casing, outside of the well standpipe, or top of the well standpipe cap/plug has faded or smudged, a replacement identifier is to be placed. However; it is imperative that appropriate steps be taken to confirm the well identification before doing so to avoid mislabelling.

Headspace Vapour Measurements

A water trap must be used for the field vapour meter if it is available. The probe tip is to be inserted approximately 15 cm into the well or other headspace being measured, unless this would result in immersing the probe tip in water. Cover the opening as best as possible to mitigate venting of vapours and record the highest vapour level indicated on the meter within the 30 seconds of inserting the probe tip.

When utilizing Gastech 1238 ME combustible (or "hydrocarbon") vapour meters or equivalent devices, switch to the % LEL (percentage of lower explosive limit) scale when measured vapours in excess of 500 parts per million by volume (ppm). Recognize that Gastech 1238 ME and equivalent devices are considered to have an effective detection limit of 10 ppm; readings of zero or readings less than 10 ppm are to be recorded as "< 10 ppm".

Depth to Water and Water/NAPL Interface Measurements

Prior to use in a well, the interface probe is to be cleaned using soapy water and a fresh water rinse. The grounding clip is to be attached to the well casing or an equivalent grounding point before inserting the probe into the well.

Depths to water and any water/NAPL interfaces are to be measured relative to established measuring points (a notch on the outside of the well standpipe). Should a well lack an established measuring point, a file should be used to create a notch on the outside of the well standpoint <u>at its highest point</u>, and this point should be used to measure depths.

Depths are to be recorded to the gradations provided on the probe tape (typically 5 mm), or at least the nearest 0.5 cm if the tape lacks more detailed gradational markings.

If the presence of NAPL is indicated by the interface probe, depths to the interface of water and floating NAPL (LNAPL) in the well are to be determined by lowering the probe past the apparent interface and slowly raising the probe until the presence of NAPL is indicated. For sinking NAPL (DNAPL), depths to the water/NAPL are to be determined by raising the probe above the apparent interface and slowly lowering the probe until the presence of NAPL is indicated. This

approach will limit potential measurement bias associated with adherence of non-polar NAPL to the probe surface as it is raised/lowered in the well water column.

If the interface probe does not indicate the presence of floating NAPL (LNAPL), but other factors suggest LNAPL may be present (e.g., high headspace vapour readings, “sheen” on the probe, historical LNAPL findings), a clean disposable bailer should be used to recover a water sample and visually assess the possible presence of LNAPL. Such verification efforts and their findings should be documented in the field notes.

Prior to Leaving Site

- Check the scope of work to ensure you have completed project objectives
- Verify the site plan accurately reflects site features and infrastructure (e.g., plan does not indicate buildings that have since been demolished, wells that have been decommissioned, etc.)
- Clean up any garbage or debris and leave the site the way you found it (or better)
- Call the project manager to ensure there is nothing else required, to summarize findings and results**,** and select final lab samples

UPON RETURN TO OFFICE

- Clean and sign in all equipment used
- Complete equipment and supply form
- Complete field package (place logs and photocopies of relevant field log book pages in project file folder)
- Submit any necessary revisions to site plan to drafting.

TERRAPEX STANDARD OPERATING PROCEDURE
GROUNDWATER SAMPLING, LOW VOLUME PURGE, USING PERISTALTIC PUMP

GENERAL NOTES

Standard Operating Procedures (SOPs) have been developed by Terrapex Environmental Ltd. to standardize protocols used during environmental assessment work programs. However, certain work programs may warrant deviations from SOPs and some clients may have specific requirements which differ from those outlined in this SOP. Any significant deviations should be discussed with and approved by the project manager. Each deviation, along with the rationale for the deviation, should be documented in the field notes, project scope and/or notes to file.

Where SOPs are appended to reports, all deviations from this SOP, along with the rationale for the deviation, must be documented in the report.

APPLICATION

This SOP is applicable to the collection of groundwater samples from developed monitoring wells using a positive displacement peristaltic pump, or "roller" pump. Procedures for well development are defined in SOP E05.00, *Monitoring Well Development*, while procedures for pre-screening ("monitoring") of groundwater conditions are described in SOP E06.00, *Groundwater Monitoring*.

EQUIPMENT

The following list details the standard equipment necessary for groundwater sampling. Specific sites may require additional or specialized equipment.

- □ Portable combustible vapour meter (e.g., Gastech™ 1238ME), calibrated and charged
- □ Combustible vapour meter field calibration kit, if applicable
- □ Water level indicator or equivalent (e.g., interface probe)
- □ Multi-meter capable of measuring pH, conductivity, ORP/redox potential, and dissolved oxygen
- □ Flow-through cell
- □ Variable-speed Peristaltic Pump
- □ Equipment cleaning/decontamination supplies (spray bottle with detergent solution, spray bottle with distilled/potable-grade water, paper towels)

- □ Well opening tools (hex keys, brass key, socket wrench, screwdriver, pry bar, well key)
- □ Turkey baster or other equipment to purge or bail accumulated water within protective casings
- □ File for well “notching”
- □ bucket with volume markings
- □ laboratory-supplied sampling containers appropriate for contaminants of concern
- □ cooler with ice
- □ laboratory chain of custody forms
- □ field notebook
- □ well sampling form (F028)
- □ site plan
- □ scope of work/field work instructions
- □ site-specific health and safety plan, including Job Safety Analysis and other POST™ documentation
- □ Personal Protective Equipment (hard hat, vest, safety glasses, respirator, steel toe boots, gloves, hearing protection)
- □ Camera
- □ Measuring wheel or similar device

PLANNING

- □ review scope of work and well locations with project manager
- □ ensure site access is confirmed
- □ calibrate and sign-out field equipment

SPECIAL PLANNING AND PREPARATION REQUIREMENTS

Traffic control and, flag persons, and/or spotters should be employed when groundwater sampling activities include wells within a road allowance, or in high-traffic areas of a site (e.g., an operating retail fuel outlet). Traffic control plans must correspond to Ontario Ministry of Transportation guidelines/requirements.

Groundwater samples should not be collected from wells that have not been developed (refer to SOP E05.00, *Monitoring Well Development*).

Care should be taken when handling sampling containers pre-charged with sample preservative for safety reasons (they are generally acids), and so that preservative is not inadvertently lost.

NOMENCLATURE

Groundwater samples are assigned names that correspond to the well from which the sample was collected (e.g., sample name “MW110A” is assigned to the sample recovered from monitoring well MW110A).

FIELD PROCEDURES

Prior to use, the peristaltic pump is to be outfitted with new silicone tubing for the sampling mechanism, and any non-dedicated equipment is to be cleaned using soapy water and a fresh water rinse. New and/or dedicated tubing is to be employed to draw water into and out from the pump.

To mitigate potential cross-contamination:

- always don fresh latex/nitrile gloves for each sample collection;
- do not allow the sampling equipment to touch sample bottles (preservatives from one bottle may be a “contaminant” for another bottle)
- use dedicated sampling equipment to the maximum extent possible;
- decontaminate non-dedicated monitoring equipment between samples; and,
- Wells should be sampled beginning with “least” impacted and progressing to the “most” impacted wells to minimize cross-contamination potential. The determination of relative impact should be made using information obtained during pre-sampling monitoring, previous monitoring/sampling events, site assessment results, or similar data.

Discharge waters are to be inspected to assess for the possibility of contamination of the samplers (e.g., the presence of odours in discharged waters where none had been observed during previous samplings).

Purging

For a well that is screened across the water table, set the pump intake approximately 0.5 m below the initial static water surface level. Otherwise, set the pump intake at the approximate midpoint of the screened interval.

Water is to be purged from the well at a rate between 0.1 to 0.5 L/min. (0.1 L/min = 500 mL in 5 minutes and 0.5 L/min = 2.5 L in 5 minutes). If the pump does not have a flow meter, check the flow rate by pumping into a container of known volume and record the time to fill it. Do not use the flow-through cell to check flow rate.

Water levels should be monitored to ensure that excessive drawdown does not occur within the well (the height of the water column in the well does not drop by more than 25% during purging). To the extent possible, the pump flow rate should be adjusted to maintain a constant water level within the well during purging.

Geochemical parameters should be measured using the multi-meter and flow-through cell assembly approximately every 3 to 5 minutes.

Purging is considered complete once the monitored parameters have "stabilized" for a minimum of three consecutive readings (parameters are within the ranges shown below of the previous reading) and at least one standpipe volume of water (calculated as the volume of water in the well standpipe prior to the commencement of purging) has been removed from the well. Note that dissolved oxygen may not stabilize in all situations; if all parameters other than dissolved oxygen have stabilized for a minimum of five consecutive readings, purging may be considered complete.

Geochemical stabilization Requirements

pH units	+/-0.2
Conductivity	+/-3%
ORP/redox	+/-20 mV
Dissolved Oxygen	+/-0.2 mg/L

(Source: ASTM Standard D6771)

It is not necessary to wait for groundwater levels in the well to recover before recovering samples for laboratory analysis.

Alternative Purging Criteria

Purging may cease once three times the initial volume of water in the well has been removed, regardless of whether the monitored parameters have stabilized, and groundwater samples may be collected. It is not necessary to wait for groundwater levels in the well to recover before recovering samples for laboratory analysis. The reason for ceasing purging should be recorded.

(Well volumes are calculated on the basis of the well standpipe; the volume of any water in the sand pack surrounding the well screen is not included in the calculation of the initial volume of water. For a 2 inch (50 mm) nominal diameter well, one well volume is approximately equal to 2 L per metre of standing water.)

If excessive drawdown cannot be avoided during purging (i.e., the water column height in the well drops more than 25%, even at a purge rate of 0.1 L/min), the well should be purged until a minimum of three times the initial volume of water in the wells has been removed. The well should then be permitted to recover; purging will be considered complete once the well has recovered such that the volume of water in the well is at least 50% of its initial volume.

If the well does not yield three volumes of water (e.g., the well is purged "dry"), the well should be allowed to recover so that the volume of water in the well is at least 50% of its initial volume, and then purged "dry" once more. The well should then be permitted to recover again; purging will be considered complete once the well has recovered such that the volume of water in the well is at least 50% of its initial volume.

Volumes purged, points at which the well went "dry" (if applicable), and well recovery (water height) are to be recorded.

Sampling

Wells are to be sampled immediately following purging (and recovery, if applicable). Sampling is to be completed by disconnecting the flow-through cell and adjusting the pump flow rate to collect groundwater samples into standard laboratory supplied containers for analysis at a steady rate, and under laminar (not turbulent) flow conditions.

Where more than one sampling container is required, filling should be conducted concurrently, alternating filling so that the containers contain the same "mix" of water (e.g., avoid filling bottles sequentially). Turbulent flow conditions should be avoided to minimize loss of volatile or semi-volatile parameters. Vials and bottles should be filled until a convex water surface occurs at the top of the vial or bottle, and the cap carefully placed on the sampling container.

Vials filed for testing of volatile compounds should be inverted (turned upside down) to examine for the presence of air bubbles. If significant bubbles are present, the cap should be removed and additional water added. When using sampling vials pre-charged with sample preservative, no more than two additional attempts to remove excessive bubbles through the addition of extra water are to be made; if after the second attempt significant bubble remain in the sample, the vial should be discarded and another vial filled to mitigate unacceptable preservative loss/dilution in the sample.

Always be aware of the preservatives in the bottles, for safety reasons (they are generally acids) and so that you do not inadvertently wash them out.

To mitigate potential cross-contamination:

- always don fresh latex/nitrile gloves for each sample collection;

- do not allow the sampling equipment to touch sample bottles (preservatives from one bottle may be a “contaminant” for another bottle)
- use dedicated sampling equipment to the maximum extent possible;
- decontaminate non-dedicated monitoring equipment between samples; and,
- Wells should be sampled beginning with “least” impacted and progressing to the “most” impacted wells to minimize cross-contamination potential. The determination of relative impact should be made using information obtained during pre-sampling monitoring, previous monitoring/sampling events, site assessment results, or similar data.

Recovered samples are to be placed in a closed cooler with ice immediately after collection, and maintained in a secure environment to prevent accidental or deliberate tampering.

Field Filtering

Groundwater samples collected for analyses of metallic parameters (including hydride metals, hexavalent chromium, and mercury, but excluding methyl mercury) are to be field filtered during sample collection using dedicated 0.45 µm in-line filters. Groundwater samples for other analyses, including inorganic analyses, are not to be field filtered.

The purpose of filtering groundwater samples for metals analysis is to remove particulate before acidifying the water, so that the acid does not extract metals contained within the particulate.

Each filter is to be fitted to the discharge point of the inertial foot-valve during purging such that a minimum volume of water equal to three times the volume of the filter passes through the filter before sampling containers are filled. In-line filters cannot be re-used. A new filter is required for each well, and each sampling event.

Submission to contract laboratory

All samples are to be packed in coolers with loose ice and appropriate packing materials to mitigate potential breakage during shipment to the contact laboratory. All shipments must be accompanied by completed and signed Chain of Custody form placed inside the cooler. The date and time for each sample recovery is to be recorded on the Chain of Custody.

Each cooler is to be secured with Custody Seals affixed in such a fashion that the cooler may not be opened without breaking one or more of the Custody Seals.

QUALITY ASSURANCE / QUALITY CONTROL SAMPLES

QA/QC sample requirements are specified in SOP E12.00, *Field Program Quality Assurance & Quality Control*.

FIELD DOCUMENTATION

Groundwater sampling should be recorded on the Low Flow Purging and Sampling field form. The form must be filled out completely, and dates should be recorded such that the month, day, and year of the sampling event is unambiguous (e.g., use Feb. 3, 2011, rather than 03/02/11).

Any irregularities or conditions suggestive of possible bias observed during sampling (e.g., sediment within recovered groundwater samples) should be recorded on the form.

TERRAPEX STANDARD OPERATING PROCEDURE
SOIL CLASSIFICATION

GENERAL NOTE

Standard Operating Procedures (SOPs) have been developed by Terrapex Environmental Ltd. to standardize protocols used during environmental assessment work programs. However, certain work programs may warrant deviations from SOPs and some clients may have specific requirements which differ from those outlined in this SOP. Any significant deviations should be discussed with and approved by the project manager. Each deviation, along with the rationale for the deviation, should be documented in the field notes, project scope and/or notes to file.

Where SOPs are appended to reports, all deviations from this SOP, along with the rationale for the deviation, must be documented in the report.

APPLICATION

These procedures are applicable to intrusive investigations involving the completion of localized excavations for the purposes of collecting soil samples and/or documenting subsurface conditions. The procedures are applicable whether such activity constitutes the whole of a work program, or part of a larger work program.

PRESENTATION OF DESCRIPTION

Soils descriptions will be presented in the order specified below:

- Texture Descriptive (applicable for sands and gravels only)
- Major Constituent (principal grain size)
- Minor constituents (major to minor, largest to smallest if same %).
  - include organics after minor constituents
- Colour
- Moisture Descriptive
- Consistency Descriptive (only where appropriate field tests are conducted)
- Plasticity (if applicable)
- Other Modifiers, e.g. laminated, uniform, fissured, etc. (If applicable)
- Odours, where applicable, i.e., slight, moderate, strong with odour type (e.g., earthy, hydrocarbon, etc.)

CLASSIFICATION BY PARTICLE DIAMETER

Description	Range	Notes
BOULDERS	> 300 mm	
COBBLES	75 to 300 mm	
GRAVEL		
Coarse	19 to 75 mm	
Fine	4.75 to 19 mm	
SAND		
Coarse	2.0 to 4.75 mm	individual grains are visible to naked eye; refer to examples for texture descriptive
Medium	0.425 to 2.0 mm	
Fine	0.075 to 0.425 mm	
SILT	0.002 to 0.075 mm	individual grains not visible to naked eye; other methods necessary to mores specifically identify distribution/type of fines
CLAY	< 0.002	

DESCRIPTION OF CONSTITUENT PARTS OF A SOIL

Soils will be principally described on the basis of the largest particle size classification by percentage of particles (e.g. sand, silt), with the dominant texture descriptive, where applicable (e.g. coarse sand). Where two or more classifications are present in approximately equal amounts, the sample will be principally described using the constituents presented from largest to smallest and joined by “and” (e.g. “sand and silt”).

Where two or more texture descriptives are present in approximately equal amounts, the sample will be described using the descriptives presented from largest to smallest and joined by “and” (e.g. “coarse and medium sand”).

Minor constituents are described using the terms defined below

Descriptive Term	Range of Proportion
Trace	1-10%
Some	11-20%
Adjective (i.e. sandy, silty)	21-35%
And	36-50%

COLOUR

Generally soil is described using BROWN, GREY, OLIVE.

Use qualifiers such as LIGHT, DARK, or combination terms like REDDISH-BROWN, BROWN/BLACK

Where more specific colour references are required, scientific colour descriptors from the Munsell Colour Chart should be used.

MOISTURE DESCRIPTIVE

- DRY - absence of moisture
- MOIST - damp, but no visible water
- WET - damp, contains visible water
- SATURATED - soil is completely wetted to excess and may be dripping

CONSISTENCY OF COHESIONLESS SOILS

The standard terminology to describe cohesionless soils (i.e., gravel, sand, or silt) includes the compactness as determined by laboratory test or by the Standard Penetration Test 'N' value.

Descriptive Term	Density Index	Standard Penetration Test (blows per 300 mm)
Very Loose	0-20%	0 - 4
Loose	20-40%	5 - 10
Compact	40-70%	11 - 30
Dense	70-90%	31 - 50
Very Dense	90-100%	over 50

CONSISTENCY OF COHESIVE SOILS

The standard terminology to describe cohesive soils (i.e., clay, or soil containing significant clay content) includes the consistency, which is based on undrained shear strength as measured by in-situ vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

Descriptive Term	Standard Penetration Test (blows per 300 mm)	
Very Soft	Less than 2	penetrate w/fist
Soft	2-4	indent w/fist
Firm	5-8	penetrate w/thumb
Stiff	9-15	indent w/thumb
Very Stiff	16-30	indent w/thumbnail
Hard	over 30	can't indent

Consistency Limits of Cohesive Soil

Applicable if geotechnical laboratory tests are completed.

Descriptive Term	Plasticity Index
Non-plastic	0 - 3
Low plastic	4 - 9
Medium plastic	10 - 30
Highly plastic	over 30

FIELD TESTS FOR COHESIVE SOIL

For determining relative clay content.

Dilatancy – "none", "slow", or "rapid"

Pat of wet soil is shaken in the palm of the hand and alternately squeezed and released. Predominantly silty materials will show a dull, dry surface when squeezed and a glassy wet surface when released/shaken (dilatent). This characteristic becomes less pronounced with increasing clay content, as clays are not dilatant.

Plasticity from thread test – "none", "low", "medium", or "high"

Attempt to roll a 3 mm thread of soil on a flat surface with the palm of your hand, adding as much water as necessary. Fold the thread and roll until it crumbles. (Note: silts can be plastic as well as clays so this is not a definitive test of particle size.)

- NON-PLASTIC - thread cannot be rolled
- LOW PLASTICITY - thread can barely be rolled
- MEDIUM PLASTICITY - thread can be rolled, but not re-rolled
- HIGH PLASTICITY - can be easily rolled and re-rolled

OTHER MODIFIERS

Sorting

Sorting is a geological term that describes the relative range of particles sizes.

- POORLY SORTED - a wide range of particle sizes is present
- WELL SORTED - a narrow range of particle sizes is present

Sorting is analogous to the geotechnical concept of “grading”, except that opposite descriptors are used (e.g. a poorly sorted soil, geologically, is considered a well graded soil, geotechnically). Geological descriptors are to be used for environmental descriptions of the relative range of particle sizes.

Angularity of Particles

- ANGULAR — Many corners/pointed parts, not smooth
- SUB-ANGULAR — Between angular and rounded
- ROUNDED — Rounded and generally smooth, no corners or pointed parts
- WELL-ROUNDED — Very round and smooth

DESCRIPTIVE SOIL TERMINOLOGY

These terms may be used, where applicable, to further describe soils.

TILL	An unstratified, unsorted glacial deposit of clay, silt, sand, gravel, cobbles and boulders in any combination. Typically dense and heterogeneous.
FILL	Any materials below the surface identified as placed by humans. “FILL (PRESUMED)” may be used when a stratigraphy is suspected as being fill, but the author also wishes to convey uncertainty regarding the accuracy of this determination.
TOPSOIL	Weathered surface materials which are capable of supporting plant life.
INCLUSION	An anomalous substance or fragment incorporated in a soil or rock mass.

STRATIFIED	Containing layers of different soil types (more than 3 mm thick).
LAMINATED	Composed of thin layers (less than 3 mm thick) of varying color and texture.
DESICCATED	Dried by moisture evaporation - desiccated clays are sometimes described as fissured or having nugget structure.
FISSURED	Containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
SENSITIVE	Exhibiting loss of strength on remolding.
FRIABLE	A soil consistency term pertaining to the ease of crumbling of soils. Easily crumbled between the fingers.
CALCAREOUS	Containing appreciable quantities of calcium-carbonate.
LAYER	> 75 mm in thickness
SEAM	2 mm to 75 mm in thickness
PARTING	< 2 mm in thickness
VARVED	Composed of regular alternating layers of silt and clay, often manifesting as alternating light and dark colouring, each usually between 25 and 75 mm in thickness, typically resulting from alternating seasonal deposition in a lacustrine environment.

TERRAPEX STANDARD OPERATING PROCEDURE
FIELD PROGRAM QUALITY ASSURANCE & QUALITY CONTROL

GENERAL NOTES

Standard Operating Procedures (SOPs) have been developed by Terrapex Environmental Ltd. to standardize protocols used during environmental assessment work programs. However, certain work programs may warrant deviations from SOPs and some clients may have specific requirements which differ from those outlined in this SOP. Any significant deviations should be discussed with and approved by the project manager. Each deviation, along with the rationale for the deviation, should be documented in the field notes, project scope and/or notes to file.

Where SOPs are appended to reports, all deviations from this SOP, along with the rationale for the deviation, must be documented in the report.

APPLICATION

This SOP is applicable to intrusive investigations involving the collection of soil, water, and air samples for possible laboratory chemical analyses, including sediment, groundwater, surface water, indoor air, outdoor air, and soil vapour. The SOP addresses only measures required for quality assurance and quality control purposes. Sample collection, nomenclature, documentation, and other requirements associated with specific sampling approaches (e.g., borehole drilling) are described in other SOPs.

SPECIAL PLANNING AND PREPARATION REQUIREMENTS

Liaison with the contract laboratory in advance of field programs will be required as the laboratory will normally be responsible for providing appropriate sampling containers, prepared trip blank and trip spike quality assurance samples, and appropriate analyte-free water for the preparation of field blanks and equipment blanks by Terrapex.

FIELD PROGRAM QUALITY CONTROL REQUIREMENTS

Sample Collection

Quality control measures during sample collection are primarily intended to mitigate the accidental introduction of a contaminant or the loss of a volatile constituent of the sample.

Specific requirements associated with sampling methods are defined in the SOP(s) applicable to those methods. General requirements for all work programs are described below:

- Sampling containers and field preservative (if applicable) will be obtained from the contract laboratory.
- Available information relating to environmental conditions at the site should be reviewed and, to the extent practicable, sampling should commence in the apparent least-impacted area and progress to areas of apparently greater impact, finishing in the apparent "worst-case" area.
- New disposable gloves are to be donned for the collection / handling of each sample.
- To the extent practicable, dedicated sampling equipment is to be employed during sampling collection; any non-dedicated sampling equipment which comes into contact with the sample must be thoroughly washed and rinsed prior to use.
- For water samples, sampling equipment (regardless of whether it is dedicated or non-dedicated) should be purged prior to sample collection by passing a minimum of three times the volume of the sampling equipment of either sample water or analyte-free water supplied by the contract laboratory through the equipment.

  For groundwater samples, purging of sampling equipment is typically completed concurrently with well purging (e.g., by employing the inertial sampler to be used during sample collection during the initial purging of the well).

  It should be noted that "sampling equipment" in this context does not include laboratory-supplied sampling containers.
- Water samples (including groundwater) are to be collected directly into laboratory-supplied containers appropriate for intended/potential analytical requirements; passing the sample through an in-line field filtration device prior to collection into the sampling container is an acceptable practice for samples that require field filtration.
- When more than one groundwater sampling container is involved and/or when duplicate groundwater samples are being collected, filing should be conducted concurrently, alternating filing so that the containers contain the same "mix" of water (i.e., avoid filling bottles sequentially).
- Soil and sediment samples are often split into two portions – one for field screening/logging, and one for (potential) laboratory analyses; to the extent practical, the sample portion for (potential) laboratory analyses should be immediately placed into laboratory-supplied containers appropriate for the intended/potential analytical requirements. Regardless, samples of soil potentially impacted by volatile or organic contaminants should be containerized immediately to minimize potential volatile loss.
- Samples collected for (potential) analyses of organic contaminants should not be subjected to extended contact with plastics.

Quality control measures are also required to ensure that a record of recovered samples, and the location from which they were obtained, is maintained. Specific requirements associated with sampling methods are defined in the SOP(s) applicable to those methods. General requirements for all work programs are described below:

- All recovered samples during a work program are to be assigned a sample identification that is unique during the work program, and sampling details – INCLUDING the time and date of sample collection – are to be recorded on field forms and/or in the field notes.
- In the case of soil or sediment samples, sample identifications are expected to be unique even over several work programs, including work programs that are completed by other parties. In some instances this may require advancing standard Terrapex sampling counts to address sampling identifications used or potentially used by third parties (e.g., if another consultant has already advanced boreholes identified as BH101 through BH110, the first round of Terrapex boreholes should begin at BH201, even though this is normally the count for the second round of Terrapex boreholes).
- In the case of water or groundwater samples, sample identifications are typically tied to a sampling location (e.g., a monitoring well identification), and it is quite common for several water samples (collected on different dates) to have been assigned a common identification. This is acceptable, provided that the date of sample collection is recorded in the field notes and included in work program documentation so as to create unique sample identification information.

Temporary Sample Storage

Temporary sample storage is required between the time of sample collection and the time of sample submission or when the sample is discarded. Quality control measures during temporary sample storage are primarily intended to mitigate the accidental introduction of a contaminant or the loss of a volatile constituent of the sample. Quality control measures are also required to maintain appropriate Chain of Custody of recovered samples.

- Samples must be labelled prior to being placed in temporary storage. Labelling must include the full sample identification, project number, and date of sample recovery on each container.
- Generally, samples are to be maintained in a cool environment, ideally 3 to 5ºC, and protected from direct exposure to sunlight (e.g., within a cooler with loose ice).
- Samples are not to be left unattended in a public space during storage. A public space includes any work site where access is not restricted by a fence or similar physical barrier to prevent unauthorized entry, even if the site is owned by a private corporation or individual.

Terrapex offices, locked vehicles, or work site trailers are not considered public spaces.

- Unpreserved samples submitted for laboratory analyses of VOCs / F1 PHCs and/or volatile gases should be received by the contract laboratory within 36 hours of sample collection (so as to permit the laboratory sufficient time to prepare sample extractions within regulated hold times). Samples submitted for all other analyses should be received by the contract laboratory within 72 hours of sample collection.

  Note that a sample collected using a hermetic sampling device (e.g., En Core sampler) is NOT considered to be preserved.

Sample Submission

Sample submission is the point at which Terrapex ceases to have custody of samples intended for laboratory analyses. This point may occur when the samples are released directly into the custody of the contract laboratory (i.e., hand delivered by Terrapex), or when the samples are released into the custody of a courier for delivery to the laboratory.

Quality control measures associated with sample submission are required to maintain sample integrity and appropriate Chain of Custody:

- Samples for submission are to be placed in an insulated packing container (e.g., a cooler) along with appropriate packing materials (e.g., bubble wrap) to mitigate breakage during transport to the contract laboratory. Do not overpack the cooler; distribute contents between coolers if needed to keep the mass of any cooler less than 20 kg.
- Seal each container tightly and place in sealed bags to prevent water from intruding into the sample and/or degrading the sample label. Group containers with the same sample ID within the same sealed bag. To the extent possible, place the bags into the cooler so that sampling containers sit upright.
- Loose ice is also to be placed in the cooler to assist in maintaining a cool internal temperature (ideally 3 to 5ºC).
- Sample submissions are to be accompanied by a completed Chain of Custody form. The Chain of Custody form is to be signed immediately before sealing the cooler, and placed inside the cooler within a sealed bag.
- Both the date and time of sample collection is to be recorded for each sample on the Chain of Custody form.
- If coolers are to be released into the custody of a party other than the contract laboratory (e.g., a courier), signed and dated custody seals must be placed on the cooler and secured in a manner that it is not possible to open the cooler without breaking one or more seals.

Sample submissions are also to be subjected to a quality assurance process involving a check of both the Chain of Custody and the cooler contents by a second person to ensure the Chain of

Custody is complete and consistent with the cooler contents. The second person shall record their quality assurance check by initialing the Chain of Custody form, ideally in the "Comments" section accompanied by a note indicating the purpose of the initials (e.g., "submission check by XX").

In instances where sample submission is happening directly from a field location at which a second Terrapex employee is not present, second person review should be completed via transmitted photographs or video conferencing. In such instances, the person who prepares the Chain of Custody should note the name of the remote reviewer, and the fact of the remote review, on the Chain of Custody form.

FIELD PROGRAM QUALITY ASSURANCE SAMPLES

Field Quality Assurance sample requirements for work programs are outlined below. These requirements are related to both the frequency of sample submissions (the number of samples submitted) as well as the duration of the field program.

The following terminology is used in defining sample requirements for this SOP:

- ***Field day*:** a work program to which this SOP applies that is completed in the space of a single calendar day.
- ***Sampling round:*** a work program to which this SOP applies that is completed over a period of one or more days, and which are associated with a single submission of samples to the contract laboratory. (Note that a single submission may constitute several coolers; "submission" refers to a batch of samples which are delivered to the laboratory at the same time.)
- ***Number of samples:*** for the purposes of this SOP, the number of samples for the work program comprises the sum of uniquely identified samples, excluding field program quality assurance samples, within each of the Analytical Program Groupings (refer to Table 1, below).

  For example, a work program involving the submission of three samples for VOC analyses with two of these three samples also submitted for analyses of metals would comprise a total of five samples, even though only three sample names might be listed on a chain of custody.

  The number of samples can be determined on both a field day and sampling round basis.

Table 1 Analytical Program Groupings, Quality Assurance Sampling and Analyses

Grouping	Analytical Protocol Section [1]	Notes
Acid/Base/Neutral Compounds (ABNs)	1.1.1	-
Chlorophenols	1.1.2	Not considered to be a separate grouping when analyses completed as part of ABN analyses
1,4-Dioxane	1.1.3	Not considered to be a separate grouping when analyses completed as part of ABN or VOC analyses
Dioxins/Furans, PCDDs/PCDFs	1.1.4	-
Organochlorine Pesticides	1.1.5	-
Petroleum Hydrocarbons (PHCs)	1.1.6	-
Polychlorinated Biphenyls (PCBs)	1.1.7	-
Polycyclic Aromatic Hydrocarbons	1.1.8	-
Trihalomethanes	1.1.9	Not considered to be a separate grouping when analyses completed as part of VOC analyses
Volatile Organic Compounds (VOCs)	1.1.10	-
Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)	1.1.11	Not considered to be a separate grouping when analyses completed as part of VOC analyses
Bromomethane	1.1.12	Not considered to be a separate grouping when analyses completed as part of VOC analyses
Calcium and Magnesium	1.2.1	-
Metals	1.2.2	-
Hydride-Forming Metals	1.2.3	Not considered to be a separate grouping when analyses completed as part of Metals analyses
Sodium	1.2.4	-
Other Regulated Parameters (ORPs)	1.3	Single parameter tests; each analysis is considered a separate grouping

1 *Protocol for Analytical Methods Used in the Assessment of Properties and Excess Soil Quality under Part XV.1 of the Environmental Protection Act*, Ministry of the Environment, Conservation and Parks (November 30, 2020)

Field Duplicates

A field duplicate is a second sample concurrently collected from the same location as another sample and submitted for duplicated analyses. Field duplicates provide information relating to:

- The ability of the contract laboratory to provide reproducible (i.e., similar or the same results) analytical results;
- The ability of Terrapex to consistently collect representative samples (as both the duplicate and its sampling pair are purportedly representative of the sampling location, similar results should be obtained); and,
- Homogeneity of the sampled media.

It is generally preferable to obtain field duplicate samples from sampling locations likely to generate quantified concentrations of the target parameters, as comparisons of quantified results is more informative than comparisons of non-detectable concentrations.

To mitigate potential bias in methodology, etc. at the contract laboratory, field duplicate samples should not be identified as field program quality assurance samples at the time of submission.

Field duplicate sampling requirements are provided in Table 2.

Field Blanks

Field blanks, whether they are accompanying soil, sediment, or groundwater samples, comprise a sample of analyte-free water prepared in the field and submitted for laboratory analyses as a measure of:

- The ability of the laboratory to avoid introducing concentrations of target parameters into analysed samples (i.e., potential analytical bias);
- The ability of Terrapex to avoid introducing concentrations of target parameters into recovered samples (e.g., cross contamination);
- Potential cross-contamination between samples during temporary storage and/or transportation to the contract laboratory; and,
- Potential cross-contamination between samples during temporary storage at the contract laboratory.

Analyte-free water for preparing field blanks should be obtained from the contract laboratory in bulk and transferred to appropriate sampling containers in the field. Ideally, a field blank sample should be prepared (or opened) adjacent to the “worst-case” sampling location. If this is impracticable, field blank samples should be prepared at another location in the field. Field blank

samples should not be prepared at the office or at the laboratory. The location at which a field blank sample was prepared should be recorded in the field notes.

To mitigate potential bias in methodology, etc., at the contract laboratory, field blank samples should not be identified as field program quality assurance samples at the time of submission. Consequently, because a field blank is by definition a water sample, field blanks are not normally part of soil sampling programs.

The exception to these general rules involves the use of methanol-preserved or sodium bisulphate solution-preserved soil samples for analyses of volatile organic constituents. Unused sampling containers precharged with preservative should be used as field blanks. The container(s) for the blank sample(s) should be opened, exposed to ambient atmosphere for approximately 30 seconds (the approximate time required to collect a soil sample into the sampling container), and re-sealed. It is not necessary, and not advisable, to attempt to transfer the preservative to another sampling container.

The “preparation” of the soil sample field blanks should be completed adjacent to the “worst-case” sampling location or condition; if this is impracticable, the activity should be completed at another location in the field at which bias of sampling results could have resulted. The location at which the soil sample field blank was prepared should be recorded in the field notes.

Field blank sampling requirements are provided in Table 2.

Trip Blanks

A trip blank is a sample prepared by the contract laboratory using analyte-free water and obtained by Terrapex immediately prior to the site visit. Trip blanks may also be prepared by the laboratory using methanol or sodium bisulphate solution for sampling programs involving soil samples for analyses of volatile organic constituents.

The trip blank sample accompanies Terrapex during the execution of the sampling activities and is not opened during this time. While in the possession of Terrapex, trip blanks are to be managed as if they were any other sample (e.g., maintained in a cool, dark environment as described above). At the conclusion of the sampling activities, the sample is submitted to the contract laboratory for analyses as a measure of:

- The ability of the laboratory to avoid introducing concentrations of target parameters into analysed samples;
- Potential cross-contamination between samples during temporary storage and/or transportation to the contract laboratory; and,
- Potential cross-contamination between samples during temporary storage at the contract laboratory.

As it is prepared by the contract laboratory, trip blanks will be received bearing a sampling label and associated sample identification. Reasonable efforts are to be made to limit the amount of time a trip blank sample is in possession of Terrapex (e.g., obtaining the sample is close to practicable to the start of sampling activities whilst ensuring it is in Terrapex's possession at the start). Regardless, the trip blank sample is to be received by the laboratory within seven days of the date/time of preparation listed on the sampling label.

Trip blank sampling requirements are provided in Table 2.

Equipment Blanks

An equipment blank is a sample prepared by exposing analyte-free water (supplied by the contract laboratory) to sampling equipment employed during the sampling activities (e.g., passing water through a bailer). Because the objectives of the equipment blank includes assessment of potential cross-contamination associated with the use of non-dedicated sampling equipment, non-dedicated equipment is to be washed in accordance with normal field procedures prior to preparing equipment blank samples.

Notwithstanding the objective of equipment blank samples, it should be noted that equipment blank laboratory results may also be affected by analytical bias or cross-contamination.

Equipment blanks should be prepared at the conclusion of the field day (as representative of "worst-case" cross-contamination potential when non-dedicated sampling equipment is used), as sampling is to commence in the apparent least impacted area and progress to areas of apparent increasing impact), and ideally in the field itself. The time and location of preparing each equipment blank sample is to be recorded in the field notes.

Equipment blank sampling requirements are provided in Table 2.

Trip Spikes

A trip spike is a sample prepared by the contract laboratory using water containing known concentrations of target parameters. The sample is obtained by Terrapex immediately prior to the site visit and accompanies Terrapex during the execution of the sampling activities, but is not opened. While in the possession of Terrapex, trip spikes are to be managed as if it were any other sample. At the conclusion of the sampling round, the sample is submitted to the contract laboratory for analyses.

Trip Spikes are primarily intended as measures of potential loss (low bias) in samples collected for volatile analysis, although results can also be affected by issues associated with laboratory analytical precision (e.g., laboratory equipment calibration) as well as potential cross-contamination between samples during temporary storage and/or transportation.

As it is prepared by the contract laboratory, trip spikes will be received bearing a sampling label and associated sample identification. Reasonable efforts are to be made to limit the amount of time a trip spike sample is in possession of Terrapex (e.g., obtaining the sample as close to practicable to the start of sampling activities whilst ensuring it is in Terrapex's possession at the start of the work program). Regardless, the trip spike sample is to be received by the laboratory within seven days of the date/time of preparation listed on the sampling label.

Trip spike sampling requirements are provided in Table 2.

Table 2 Field Program Quality Assurance Sampling Requirements

Sample Type	Media	Minimum Frequency	Comments
Field Duplicate [1]	Soil / Sediment	1 per 10 samples	Duplicates not required for TCLP extraction analyses
	Water / Groundwater	1 per 10 samples	
	Air / Soil Vapour	1 per 10 samples	
Field Blank [1]	Soil / Sediment	Generally not required [2]	A field blank is not required if a trip blank is being submitted (e.g., analyses of VOCs / F1 PHCs and/or volatile gases)
	Water / Groundwater	1 per sampling round	
	Air / Soil Vapour	1 per sampling round	
Trip Blank	Soil / Sediment	Generally not required [2]	Applicable only for analyses of VOCs / F1 PHCs and/or volatile gases
	Water / Groundwater	1 per sampling round (see comments)	
	Air / Soil Vapour	1 per sampling round (see comments)	
Equipment Blank [1]	Soil / Sediment	Generally not required [3]	Not required if only dedicated sampling equipment employed
	Water / Groundwater	1 per field day	
	Air / Soil Vapour	Not required	It is generally impracticable to attempt collection of equipment blanks during air or soil vapour sampling

Sample Type	Media	Minimum Frequency	Comments
Trip Spike	Soil / Sediment	Generally not required [4]	Applicable only for analyses of VOCs / F1 PHCs and/or volatile gases
	Water / Groundwater	Not required but 1 per sampling round recommended [5]	
	Air / Soil Vapour	Not required	Commercial laboratories are generally unable to provide reliable trip spike samples for air or soil vapour sampling

Notes:

1 To the extent practicable, at least one of each type of field program quality assurance sample should be submitted for the various analytical groupings that comprises the sampling program

2 A trip blank sample OR a field blank sample is required for each sampling round that includes methanol-preserved or sodium bisulphate solution-preserved soil samples for analyses of volatile constituents

3 Equipment blanks are not required if reasonable efforts are made to clean non-dedicated soil or sediment samplers between use (e.g., if split spoon samplers are washed between use, an equipment blank would not be required by this SOP). Otherwise, an equipment blank sample should be prepared by running laboratory-supplied analyte-free water over/through the equipment and collecting these waters for laboratory analyses of the target parameters.

4 Trip Spike samples are not required for soil or sediment analyses, as the laboratory-provided spikes are generally not provided in an equivalent media to the recovered samples (e.g., trip spike samples are generally water, and losses in a water sample may not be representative of the presence, absence, or magnitude of losses in hermetic samplers, methanol preserved samples, etc.)

5 Trip Spike samples are not required field program Quality Assurance elements per O. Reg. 153/04 and consequently are not mandatory per this SOP. However, as loss of volatile constituents during sample storage / transport to the analytical laboratory can significantly affect the reliability of analytical results, analyses of one trip per sampling round is recommended.

Nomenclature for Field Quality Assurance Samples

As a general practice, the contract laboratory should not be informed of the number or nature of field program quality assurance samples submitted as part of a sampling program unless the laboratory's assistance is required in investigating a potential data quality issue (e.g., in the event of a result triggering an alert criteria specified in Data Quality Analysis, below).

Notwithstanding this general principal, both trip blank and trip spike samples are typically prepared and provided by the contract laboratory. Accordingly, these samples will be assigned sample identifications by the laboratory, and the date/time of preparation will typically be recorded on the sampling label. Such samples should be recorded on the Chain of Custody form using the sample identification and date/time of preparation provided by the laboratory.

The remaining field program quality assurance samples (field duplicates, field blanks, and equipment blanks) should be submitted on a “blind” basis so that the laboratory ought to be reasonably unaware of the nature of the sample submission. That is, these samples should be assigned a plausible sampling identification that does not correspond to another actual or potential sampling location at the site, and the true nature of the sample identification recorded in the field notes. Selected sample identifications should not, for example, be identified as or include “DUP”, “BLANK”, or any other nomenclature suggesting that the sample represents a field program quality assurance measure.

This principal extends to field blanks prepared for methanol-preserved or sodium bisulphate solution-preserved soil samples for analyses of volatile constituents. Although field blanks may be readily identified as such at sample reception (through the lack of any soil within the sample container), the nature of such samples would not be readily apparent to other laboratory staff following laboratory extraction procedures. Accordingly, these samples should be assigned a plausible sampling identification that does not correspond to another actual or potential sampling location at the site, and the true nature of the sample identification recorded in the field notes.

LABORATORY QUALITY ASSURANCE

Commercial contract laboratories will have their own internal quality assurance and quality control programs. These programs typically include quality assurance samples in analytical runs, the results of which are provided (in summary form) in the Certificate of Analysis documenting analytical results for a sample submission.

Maintaining overall field program quality assurance and quality control and completing data quality analysis requires a review of the laboratory Certificate of Approval.

For the purposes of this SOP, laboratory quality assurance samples are defined as outlined below. Note that while this nomenclature had been adopted to reflect language typical in the commercial contract laboratory industry, it may not necessarily correlate exactly with that used in the laboratory Certificate of Analysis.

Method Blank: an aliquot prepared using analyte-free water and processed through the entire analytical method, including extracting, digestion, and other preparation procedures.

Blank Spike: an aliquot prepared using water containing known concentrations of target parameters and processed through the entire analytical method, including extracting, digestion, and other preparation procedures.

Matrix Spike: a second aliquot from an analytical sample that is fortified with known concentrations of the target parameters and processed through the entire analytical method, including extracting, digestion, and other preparation procedures. As quality assurance results

are assessed on the basis of comparison of the determined concentration versus the known concentrations, high concentrations of the target parameters in the fortified sample can obscure (mask) matrix spike recovery.

Laboratory Duplicate: a second aliquot from an analytical sample that is included in the analytical run for comparison to results from the corresponding sampling pair.

Certificate Reference Material (CRM): an aliquot that has been certified by a recognized agency to contain specific concentrations of target parameters and which is included in the analytical run. A CRM differs from a blank spike in that it is not prepared internally by the contract laboratory.

Surrogate Recovery: Surrogates are parameters not normally found in nature but that behave chemically and physically similar to the analytical run target parameters, and that are introduced into the aliquot of an analytical sample. Surrogate recovery is the evaluation of the determined concentration of the surrogate versus the known concentration introduced into the sample aliquot.

DATA QUALITY OBJECTIVES

Alert criteria for quality assurance and quality control metrics are summarized in Table 3. Any result triggering the specified alert criteria must be identified in the work program report, and specific commentary regarding the implication of this result on the work program findings (if any) offered.

Note that triggering an alert criteria does not mean that the corresponding laboratory results are invalid; it only indicates a situation where specific commentary regarding the validity of the laboratory results is required in the work program report.

Quality assurance samples involving comparisons of actual results to expected results are evaluated on the basis of ***Recovery***, or recovery percentage. Note that Recovery does not necessarily relate to the ability to provide consistent (similar) quantitations between successive analyses.

Recovery is calculated as follows:

$$Recovery = \frac{reported\ \ concentration}{actual\ \ (expected) concentration}\ \ x\ \ 100\%$$

Quality assurance samples involving comparisons of 'duplicate' analysis are evaluated on the basis of ***Relative Percent Difference (RPD)***. RPD provides a measure of the ability to provide consistent results on successive analyses, but does not necessarily relate to the ability to provide

results that are representative of the actual concentration of the target parameter (e.g., the expected result when comparing against a known standard).

RPD is calculated as follows:

$$RPD = \left| \frac{result_1 - result_2}{\frac{1}{2} \; x \; (result_1 + \; result_2)} \right| \; x \; 100\%$$

RPD values should not be calculated where one or both of the results do not yield quantifiable results (i.e., non-detect findings), or where one or both of the results are less than five times the reported detection limits. RPD values should not be calculated for parameters which are based on calculations using raw data (e.g., sodium adsorption ratio, total xylenes); instead, where applicable, RPD values should be calculated for the 'raw' data (e.g., the m&p-xylenes, o-xylenes parameters).

Note that the mere absence of a calculated RPD is not considered a quality assurance failure, but simply a situation where alert criteria cannot be quantifiably evaluated. Similarly, the absence of a RPD value is not necessarily considered to be an acceptable field quality assurance result (e.g., a non-detect result in a duplicate sample but an elevated concentrations reported for the corresponding sampling pair is suggestive of a potentially significant variance is sampling results, and may warrant commentary in the work program report).

Table 3 Field Program Data Quality Objectives

Field QC Metric	Alert Criteria
Sample integrity	Deviation from this SOP recorded within field notes Significant variance in field screening results (if applicable) recorded within field notes between duplicate samples Laboratory reports average sample temperature at time of receipt greater than 10ºC Incorrect sampling container employed Broken or leaking sampling container reported by laboratory Excessive particulate within received water sample reported by laboratory
Sample identification integrity	Laboratory reports discrepancy between samples reported on Chain of Custody and those actually received (as per sampling container labels) Laboratory reports unlabelled sample received (no sample identification apparent)
Chain of Custody integrity	Laboratory reports missing/damaged custody seal Laboratory reports missing Chain of Custody form Date/time of sample recovery not recorded on Chain of Custody form

Table 3 Field Program Data Quality Objectives

Sample storage (hold time) integrity	Sample for analysis of VOC / F1 PHCs and/or volatile gases received by laboratory more than 36 hours after recorded sample collection Sample for analysis other than VOC / F1 PHCs and volatile gases received by laboratory more than 72 hours after recorded sample collection		
Laboratory QA Metric	**Alert Criteria**		
	Analytical Grouping	**Soil / Sediment**	**Air / Soil Vapour / Water / Groundwater**
Method Blank	ALL	Any concentration in excess of laboratory detection limits	
Blank Spike, Matrix Spike		*results outside:*	*results outside:*
	BNAs, PAHs	50% - 140% Recovery [1]	50% - 140% Recovery [1]
	1,4-Dioxane	50% - 140% Recovery	50% - 140% Recovery
	Dioxins/Furans	50% - 150% Recovery	50% - 150% Recovery
	OC Pesticides	50% - 140% Recovery	50% - 140% Recovery
	PCBs	60% - 140% Recovery	60% - 140% Recovery
	PHCs	60% - 140% Recovery	60% - 140% Recovery
	VOCs	50% - 140% Recovery	50% - 140% Recovery
	Hg, Cr^{6+}, CN^-	70% - 130% Recovery	70% - 130% Recovery
	EC	n/a	n/a
	FOC, Chloride	70% - 130% Recovery	70% - 130% Recovery
	Methyl mercury	60% - 140% Recovery	60% - 140% Recovery
	Metals *(incl. B, HWS B, Ca, Mg, Na)*	70% - 130% Recovery [2]	70% - 130% Recovery [2]
Laboratory Duplicate	BNAs, PAHs	> 40% RPD	> 30% RPD
	1,4-Dioxane	> 50% RPD	> 30% RPD
	Dioxins/Furans	> 40% RPD	> 30% RPD
	OC Pesticides	> 40% RPD	> 30% RPD
	PCBs	> 40% RPD	> 30% RPD
	PHCs	> 30% RPD	> 30% RPD
	VOCs	> 50% RPD	> 30% RPD
	Hg, Cr^{6+}, CN^-	> 35% RPD	> 20% RPD
	EC	> 10% RPD	n/a
	FOC, Chloride	> 35% RPD	> 20% RPD
	Methyl mercury	> 30% RPD	> 20% RPD
	Metals *(incl. B, HWS B, Ca, Mg, Na)*	> 30% RPD [4,5]	> 20% RPD
	pH	[3]	[3]

Table 3 Field Program Data Quality Objectives

Certified Reference Material, Laboratory Control Sample		*results outside:*	*results outside:*
	BNAs, PAHs	50% - 140% Recovery [1]	50% - 140% Recovery [1]
	1,4-Dioxane	50% - 140% Recovery	50% - 140% Recovery
	Dioxins/Furans	50% - 150% Recovery	50% - 150% Recovery
	OC Pesticides	50% - 140% Recovery	50% - 140% Recovery
	PCBs	60% - 140% Recovery	60% - 140% Recovery
	PHCs	80% - 120% Recovery	60% - 140% Recovery
	VOCs	60% - 140% Recovery	60% - 140% Recovery
	Hg, Cr^{6+}, CN^-	80% - 120% Recovery	80% - 120% Recovery
	EC	90% - 110% Recovery	90% - 110% Recovery
	FOC, Chloride	70% - 130% Recovery	70% - 130% Recovery
	Methyl mercury	70% - 130% Recovery	70% - 130% Recovery
	Metals *(incl. B, HWS B, Ca, Mg, Na)*	80% - 120% Recovery [6]	80% - 120% Recovery [6]
Surrogate Recovery		*results outside:*	*results outside:*
	BNAs, PAHs	50% - 140% Recovery	50% - 140% Recovery
	1,4-Dioxane	50% - 140% Recovery	50% - 140% Recovery
	Dioxins/Furans	40% - 140% Recovery	40% - 140% Recovery
	OC Pesticides	50% - 140% Recovery	50% - 140% Recovery
	PCBs	60% - 140% Recovery	60% - 140% Recovery
	PHCs	60% - 140% Recovery	60% - 140% Recovery
	VOCs	50% - 140% Recovery	50% - 140% Recovery
Field Program QA Metric	**Alert Criteria**		
	Analytical Grouping	**Soil / Sediment**	**Air / Soil Vapour / Water / Groundwater**
Field Duplicate	pH	[3]	[3]
	BNAs, PAHs	> 40% RPD [1,4]	>30% RPD [1]
	1,4-Dioxane	> 50% RPD	> 30% RPD
	Dioxins/Furans	> 40% RPD	> 30% RPD
	OC Pesticides	> 40% RPD	> 30% RPD
	PCBs	> 40% RPD	> 30% RPD
	PHCs	> 30% RPD	> 30% RPD
	VOCs	> 50% RPD	> 30% RPD
	Hg, Cr^{6+}, CN^-	> 35% RPD	> 20% RPD
	EC	> 10% RPD	n/a
	FOC, Chloride	> 35% RPD	> 20% RPD
	Methyl mercury	> 30% RPD	> 20% RPD
	Metals *(incl. B, HWS B, Ca, Mg, Na)*	> 30% RPD [4,5]	> 20% RPD
Field Blank	ALL	Any concentration in excess of laboratory detection limits	

Table 3 Field Program Data Quality Objectives

Trip Blank	VOCs / F1 PHCs Volatile Gases	Any concentration in excess of laboratory detection limits
Equipment Blank	ALL	Any concentration in excess of laboratory detection limits
Trip Spike		*results outside:*
	F1 PHC	60% -140% Recovery
	Ketones and Gaseous Compounds at 20°C [7]	60% - 140% Recovery
	Other VOCs	70% - 130% Recovery

Source: adapted from Tables 5-1 through 5-14, Analytical Protocol (November 30, 2020)

Notes:

1 *Alert Criteria for p-chloroaniline, 3,3-dichlorobenzidene, phenol, 2,4-dimethylphenol, and 2,4-dinitrophenol is 30% - 130%*

2 *Alert Criteria for Hot Water Soluble Boron is 60% - 140% Recovery*

3 *RPD values are not calculated for pH analyses; however, results should be within 0.3 pH units*

4 *Increased RPD values may be encountered whenever duplicate analyses are completed on samples representing heterogeneous fill materials. Specific commentary regarding the validity of analytical results should be offered whenever the specified alert criteria is exceeded; however, significant concerns regarding the validity of analytical results would generally not be suspected if calculated RPD do not exceed the specified alert criteria more than a factor of 2.*

5 *Alert Criteria for Hot Water Soluble Boron is >40% RPD*

6 *Alert Criteria for Hot Water Soluble Boron is 70% - 130% Recovery*

7 *In a standard VOC list, this includes acetone, dichlorodifluoromethane, 1,4-dioxane, methyl ethyl ketone, methyl isobutyl ketone, 1,1,1,2-tetrachloroethane, and vinyl chloride*

APPENDIX III
SITE PHOTOGRAPHS

TERRAPEX	PHOTOGRAPHIC LOG		Page 1 of 2
Client: 595831 Ontario Inc.	**Site Location**:	5646 & 5650 Manotick Main Street, Ottawa, Ontario	**Project No**: CO884.02

Photo No: 1 **Date:** 12-October-23 **Viewing Direction:** North **Description:** The drilling of borehole MW2021 inside the main building.	

Photo No: 2 **Date:** 12-October-23 **Viewing Direction:** Northwest **Description:** A view od completed monitoring well MW204 located within the former tank nest.	

TERRAPEX	PHOTOGRAPHIC LOG		Page 2 of 2
Client: 595831 Ontario Inc.	**Site Location**:	5646 & 5650 Manotick Main Street, Ottawa, Ontario	**Project No**: CO884.02

Photo No: 3 **Date:** 12-October-23 **Viewing Direction:** Northwest **Description:** A view of drilling of borehole MW206.	

Photo No: 4 **Date:** 12-October-23 **Viewing Direction:** North **Description:** A view of monitoring well MW206. .	

APPENDIX IV
BOREHOLE LOGS

CLIENT: 595831 Ontario Inc. | PROJECT NO.: CO884.02 | **RECORD OF: MW201**

ADDRESS: 5646-5650 Manotick Main Street

CITY/PROVINCE: OTTAWA, ONTARIO | NORTHING (m): | EASTING (m): | ELEV. (m)

CONTRACTOR: STRATA DRILLING | METHOD: HOLLOW STEM AUGER

BOREHOLE DIAMETER (cm): 20 | WELL DIAMETER (cm): 5 | SCREEN SLOT #: 10 | SAND TYPE: SILICA | SEALANT TYPE: BENTONITE

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	SHEAR STRENGTH (kPa) 40 80 120 160 / N-VALUE (Blows/300mm) 20 40 60 80	WATER CONTENT (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	RECOVERY (%)	CV/TOV (ppm or %LEL)	LABORATORY TESTING	WELL INSTALLATION	REMARKS
		CONCRETE	0										
		moist, grey GRAVEL trace sand	0.5				1			<5			
			1				2		20	<5			
			1.5				3		75	<5			
		moist, grey SILTY CLAY	2				4		100	<5			
			2.5										
		wet	3				5		50	<5	M&I, PAHs, PHCs, VOCs		
		trace coarse gravel	3.5				6		100	<5			
		END OF BOREHOLE											

TERRAPEX

LOGGED BY: GS | DRILLING DATE: 12-OCT-2023

INPUT BY: JS | MONITORING DATE:

REVIEWED BY: GS | PAGE 1 OF 1

CLIENT: 595831 Ontario Inc.	PROJECT NO.: CO884.02	**RECORD OF: BH202**
ADDRESS: 5646-5650 Manotick Main Street		
CITY/PROVINCE: OTTAWA, ONTARIO	NORTHING (m): 5007630	EASTING (m): 446863 ELEV. (m) 89.21
CONTRACTOR: STRATA DRILLING	METHOD: HOLLOW STEM AUGER	
BOREHOLE DIAMETER (cm): 20	WELL DIAMETER (cm):	SCREEN SLOT #: - SAND TYPE: - SEALANT TYPE: -

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	SHEAR STRENGTH (kPa) 40 80 120 160 / N-VALUE (Blows/300mm) 20 40 60 80	WATER CONTENT (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	RECOVERY (%)	CV/TOV (ppm or %LEL)	LABORATORY TESTING	WELL INSTALLATION	REMARKS
		ASPHALT	0	89									
		moist, brown SILTY SAND trace gravel	0.5				1		50	<5	M&I, PAHs		
		moist, brown/olive SILTY CLAY TO CLAYEY SILT	1	88.5									
			1.5	88			2		100	<5			
			2	87.5									
			2.5	87			3		100	<5			
			3	86.5									
			3.5	86			4		100	<5	BTEX, PHCs		
			4	85.5									
			4.5	85			5		100	<5			
		moist to wet	5	84.5									
			5.5	84									
			6	83.5			6		100	<5			
		END OF BOREHOLE											

TERRAPEX

LOGGED BY: SP	DRILLING DATE: 12-OCT-2023
INPUT BY: JS	MONITORING DATE: -
REVIEWED BY: GS	PAGE 1 OF 1

CLIENT: 595831 Ontario Inc. | PROJECT NO.: CO884.02 | **RECORD OF: BH203**

ADDRESS: 5646-5650 Manotick Main Street

CITY/PROVINCE: OTTAWA, ONTARIO | NORTHING (m): 5007626.868 | EASTING (m): 446885.887 | ELEV. (m) 88.97

CONTRACTOR: STRATA DRILLING | METHOD: HOLLOW STEM AUGER

BOREHOLE DIAMETER (cm): | WELL DIAMETER (cm): | SCREEN SLOT #: - | SAND TYPE: - | SEALANT TYPE: -

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	SHEAR STRENGTH (kPa) ● 40 80 120 160 / N-VALUE (Blows/300mm) ▲ 20 40 60 80	WATER CONTENT (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	RECOVERY (%)	CV/TOV (ppm or %LEL)	LABORATORY TESTING	WELL INSTALLATION	REMARKS
		moist, brown SILTY SAND trace gravel	0										
			0.5	88.5			1		30	<5			
			1	88			2		50	<5			
		moist, brown/olive CLAYEY SILT	1.5	87.5									
		grey	2	87			3		100	<5	BTEX, PHCs		
			2.5	86.5			4		100	<5			
		olive	3	86									
			3.5	85.5			5		100	<5			
		brown / grey	4	85			6		100	<5			
			4.5	84.5									
			5	84			7		100	<5			
		grey, moist to wet	5.5	83.5			8		100	<5			
			6	83									
		END OF BOREHOLE											

TERRAPEX

LOGGED BY: SP | DRILLING DATE: 12-OCT-2023

INPUT BY: JS | MONITORING DATE: -

REVIEWED BY: GS | PAGE 1 OF 1

CLIENT: 595831 Ontario Inc.		PROJECT NO.: CO884.02	**RECORD OF: MW204**
ADDRESS: 5646-5650 Manotick Main Street			
CITY/PROVINCE: OTTAWA, ONTARIO	NORTHING (m): 5007632.062	EASTING (m): 446879.755	ELEV. (m) 88.87
CONTRACTOR: STRATA DRILLING	METHOD: HOLLOW STEM AUGER		
BOREHOLE DIAMETER (cm): 13	WELL DIAMETER (cm): 5	SCREEN SLOT #: 10	SAND TYPE: #2	SEALANT TYPE: BENTONITE

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	SHEAR STRENGTH (kPa) 40 80 120 160 / N-VALUE (Blows/300mm) 20 40 60 80	WATER CONTENT (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	RECOVERY (%)	CV/TOV (ppm or %LEL)	LABORATORY TESTING	WELL INSTALLATION	REMARKS
		moist, brown SANDY SILT trace gravel	0	88.5			1		20	<5			
			0.5										
			1	88			2		30	<5			
		wet	1.5	87.5									
			2	87			3		80	<5			
			2.5	86.5									
		grey	3	86			4		20	350	BTEX, PHCs, Duplicate		
			3.5	85.5			5		100	<5	BTEX, PHCs		
		wet, grey CLAYEY SILT	4	85			6		100	<5			
			4.5	84.5									
		END OF BOREHOLE											

TERRAPEX

LOGGED BY: SP	DRILLING DATE: 12-OCT-2023
INPUT BY: JS	MONITORING DATE: 16-OCT-2023
REVIEWED BY: GS	PAGE 1 OF 1

CLIENT: 595831 Ontario Inc.	PROJECT NO.: CO884.02	**RECORD OF:**	
ADDRESS: 5646-5650 Manotick Main Street		**BH205**	
CITY/PROVINCE: OTTAWA, ONTARIO	NORTHING (m): 5007649.286	EASTING (m): 446863.588	ELEV. (m) 88.55
CONTRACTOR: STRATA DRILLING	METHOD: HOLLOW STEM AUGER		
BOREHOLE DIAMETER (cm):	WELL DIAMETER (cm): -	SCREEN SLOT #: -	SAND TYPE: -	SEALANT TYPE: -

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	SHEAR STRENGTH (kPa) 40 80 120 160 / N-VALUE (Blows/300mm) 20 40 60 80	WATER CONTENT (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	RECOVERY (%)	CV/TOV (ppm or %LEL)	LABORATORY TESTING	WELL INSTALLATION	REMARKS
		ASPHALT	0	88.5									
		moist, black SANDY SILT TO SILTY SAND trace gravel	0.5	88			1		50	<5			
		grey/olive	1	87.5			2		90	<5	M&I, PAHs		
		moist, grey/olive CLAYEY SILT	1.5	87			3		100	370	BTEX, PHCs		
		brown/grey	2	86.5									
			2.5	86			4		100	<5			
			3	85.5									
			3.5	85			5		100	70			
			4	84.5			6		100	5	BTEX, PHCs		
		grey	4.5	84									
			5	83.5			7		100	<5			
		wet	5.5	83									
			6	82.5			8		100	<5			
		END OF BOREHOLE											

TERRAPEX

LOGGED BY: SP	DRILLING DATE: 12-OCT-2023
INPUT BY: JS	MONITORING DATE: -
REVIEWED BY: GS	PAGE 1 OF 1

CLIENT: 595831 Ontario Inc. | PROJECT NO.: CO884.02 | **RECORD OF: MW206**

ADDRESS: 5646-5650 Manotick Main Street

CITY/PROVINCE: OTTAWA, ONTARIO | NORTHING (m): 5007634.711 | EASTING (m): 446814.903 | ELEV. (m) 88.71

CONTRACTOR: STRATA DRILLING | METHOD: HOLLOW STEM AUGER

BOREHOLE DIAMETER (cm): 13 | WELL DIAMETER (cm): 5 | SCREEN SLOT #: 10 | SAND TYPE: #2 | SEALANT TYPE: BENTONITE

SAMPLE TYPE: AUGER | DRIVEN | CORING | DYNAMIC CONE | SHELBY | SPLIT SPOON

GWL (m)	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)	ELEVATION (m)	SHEAR STRENGTH (kPa) 40 80 120 160 / N-VALUE (Blows/300mm) 20 40 60 80	WATER CONTENT (%) PL W.C. LL 20 40 60 80	SAMPLE NO.	SAMPLE TYPE	RECOVERY (%)	CV/TOV (ppm or %LEL)	LABORATORY TESTING	WELL INSTALLATION	REMARKS
		TOPSOIL	0	88.5									
		moist to wet, brown SILTY SAND trace organics	0.5				1		80	<5			
		no organics	1	88									
				87.5			2		100	<5	M&I, PAHs, Duplicate		
		moist, grey/olive CLAYEY SILT trace organics	1.5										
			2	87			3		100	<5			
				86.5									
			2.5										
				86			4		100	<5			
		grey	3										
				85.5			5		100	<5			
			3.5										
				85									
			4										
				84.5			6		100	<5	BTEX, PHCs		
		moist to wet	4.5										
				84									
			5				7		100	<5			
				83.5									
			5.5										
				83			8		100	<5			
			6										
		END OF BOREHOLE											

TERRAPEX

LOGGED BY: SP | DRILLING DATE: 12-OCT-2023

INPUT BY: JS | MONITORING DATE: 16-OCT-2023

REVIEWED BY: GS | PAGE 1 OF 1

APPENDIX V
LABORATORY CERTYFICATE OF ANALYSIS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED
20 GURDWARA ROAD, UNIT 1
OTTAWA, ON K2E 8B3
613 745 6471

ATTENTION TO: Keith Brown

PROJECT: CO884.02

AGAT WORK ORDER: 23Z081488

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Inorganic Team Lead

DATE REPORTED: Oct 24, 2023

PAGES (INCLUDING COVER): 28

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

O. Reg. 153(511) - PAHs (Water)

DATE RECEIVED: 2023-10-17

DATE REPORTED: 2023-10-24

				SAMPLE DESCRIPTION:	MW 201	MW 206
				SAMPLE TYPE:	Water	Water
				DATE SAMPLED:	2023-10-16 15:05	2023-10-17 10:16
Parameter	Unit	G / S	RDL		5372993	5373006
Naphthalene	µg/L		0.20		<0.20	<0.20
Acenaphthylene	µg/L		0.20		<0.20	<0.20
Acenaphthene	µg/L		0.20		<0.20	<0.20
Fluorene	µg/L		0.20		<0.20	<0.20
Phenanthrene	µg/L		0.10		<0.10	<0.10
Anthracene	µg/L		0.10		<0.10	<0.10
Fluoranthene	µg/L		0.20		<0.20	<0.20
Pyrene	µg/L		0.20		<0.20	<0.20
Benzo(a)anthracene	µg/L		0.20		<0.20	<0.20
Chrysene	µg/L		0.10		<0.10	<0.10
Benzo(b)fluoranthene	µg/L		0.10		<0.10	<0.10
Benzo(k)fluoranthene	µg/L		0.10		<0.10	<0.10
Benzo(a)pyrene	µg/L		0.01		<0.01	<0.01
Indeno(1,2,3-cd)pyrene	µg/L		0.20		<0.20	<0.20
Dibenz(a,h)anthracene	µg/L		0.20		<0.20	<0.20
Benzo(g,h,i)perylene	µg/L		0.20		<0.20	<0.20
2-and 1-methyl Naphthalene	µg/L		0.20		<0.20	<0.20
Sediment					3	3
Surrogate	Unit	Acceptable Limits				
Naphthalene-d8	%	50-140			79	117
Acridine-d9	%	50-140			102	112
Terphenyl-d14	%	50-140			98	100

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5372993-5373006 Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.
Legend: 1 = no sediment present; 2 = sediment present; 3 = sediment present in trace amount
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&(j)Fluoranthene isomers because the isomers co-elute on the GC column.
2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: NPopowich

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

O. Reg. 153(511) - PHCs F1 - F4 (Water)

DATE RECEIVED: 2023-10-17

DATE REPORTED: 2023-10-24

				SAMPLE DESCRIPTION:	MW 204	MW 214
				SAMPLE TYPE:	Water	Water
				DATE SAMPLED:	2023-10-16 12:10	2023-10-16 12:10
Parameter	Unit	G / S	RDL		5373009	5373013
Benzene	µg/L		0.20		<0.20	<0.20
Toluene	µg/L		0.20		<0.20	<0.20
Ethylbenzene	µg/L		0.10		0.60	0.49
m & p-Xylene	µg/L		0.20		<0.20	<0.20
o-Xylene	µg/L		0.10		<0.10	<0.10
Xylenes (Total)	µg/L		0.20		<0.20	<0.20
F1 (C6 - C10)	µg/L		25		259	185
C6 - C10 (F1 minus BTEX)	µg/L		25		258	185
F2 (C10 to C16)	µg/L		100		123	121
F3 (C16 to C34)	µg/L		100		<100	<100
F4 (C34 to C50)	µg/L		100		<100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500		NA	NA
Sediment					1	1
Surrogate	Unit	Acceptable Limits				
Toluene-d8	% Recovery	60-140			90.0	95.0
Terphenyl	% Recovery	60-140			67	72

Certified By: N Popowkolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

O. Reg. 153(511) - PHCs F1 - F4 (Water)

DATE RECEIVED: 2023-10-17

DATE REPORTED: 2023-10-24

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5373009-5373013 The C6-C10 fraction is calculated using Toluene response factor.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6-C50 results are corrected for BTEX contribution.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153/04, results are considered valid without determining the PAH contribution if not requested by the client.
NA = Not Applicable

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.
Legend: 1 = no sediment present; 2 = sediment present; 3 = sediment present in trace amounts

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: 

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Water)

DATE RECEIVED: 2023-10-17

DATE REPORTED: 2023-10-24

				SAMPLE DESCRIPTION:	MW 201	MW 206
				SAMPLE TYPE:	Water	Water
				DATE SAMPLED:	2023-10-16 15:05	2023-10-17 10:16
Parameter	Unit	G / S	RDL		5372993	5373006
F1 (C6-C10)	µg/L		25		25	<25
F1 (C6 to C10) minus BTEX	µg/L		25		25	<25
F2 (C10 to C16)	µg/L		100		<100	<100
F2 (C10 to C16) minus Naphthalene	µg/L		100		<100	<100
F3 (C16 to C34)	µg/L		100		<100	<100
F3 (C16 to C34) minus PAHs	µg/L		100		<100	<100
F4 (C34 to C50)	µg/L		100		<100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500		NA	NA
Sediment					3	3
Surrogate	Unit	Acceptable Limits				
Toluene-d8	%	50-140			116	98
Terphenyl	% Recovery	60-140			74	69

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5372993-5373006 The C6-C10 fraction is calculated using toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
C>10 – C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.
C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.
Legend: 1 = no sediment present; 2 = sediment present; 3 = sediment present in trace amounts

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

O. Reg. 153(511) - PHCs F1/BTEX (Water)

DATE RECEIVED: 2023-10-17

DATE REPORTED: 2023-10-24

				SAMPLE DESCRIPTION:	Trip Spike
				SAMPLE TYPE:	Water
				DATE SAMPLED:	2023-10-16
Parameter	Unit	G / S	RDL		5373015
Benzene	%				85
Toluene	%				82
Ethylbenzene	%				80
m & p-Xylene	%				95
o-Xylene	%				110
Surrogate	Unit	Acceptable Limits			
Toluene-d8	% Recovery	60-140			108

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

O. Reg. 153(511) - PHCs F1/BTEX (Water)

DATE RECEIVED: 2023-10-17

DATE REPORTED: 2023-10-24

		SAMPLE DESCRIPTION:		Trip Blank
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2023-10-16
Parameter	Unit	G / S	RDL	5373017
Benzene	µg/L		0.20	<0.20
Toluene	µg/L		0.20	<0.20
Ethylbenzene	µg/L		0.10	<0.10
m & p-Xylene	µg/L		0.20	<0.20
o-Xylene	µg/L		0.10	<0.10
Xylenes (Total)	µg/L		0.20	<0.20
F1 (C6-C10)	µg/L		25	<25
F1 (C6 to C10) minus BTEX	µg/L		25	<25
Surrogate	Unit	Acceptable Limits		
Toluene-d8	% Recovery	60-140		105

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5373017 The C6-C10 fraction is calculated using Toluene response factor.
Total C6-C10 results are corrected for BTEX contributions.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
Extraction and holding times were met for this sample.
NA = Not Applicable

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popowkolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

O. Reg. 153(511) - VOCs (with PHC) (Water)

DATE RECEIVED: 2023-10-17

DATE REPORTED: 2023-10-24

				SAMPLE DESCRIPTION:	MW 201	MW 206
				SAMPLE TYPE:	Water	Water
				DATE SAMPLED:	2023-10-16 15:05	2023-10-17 10:16
Parameter	Unit	G / S	RDL		5372993	5373006
Dichlorodifluoromethane	µg/L		0.40		<0.40	<0.40
Vinyl Chloride	µg/L		0.17		<0.17	<0.17
Bromomethane	µg/L		0.20		<0.20	<0.20
Trichlorofluoromethane	µg/L		0.40		<0.40	<0.40
Acetone	µg/L		1.0		<1.0	<1.0
1,1-Dichloroethylene	µg/L		0.30		<0.30	<0.30
Methylene Chloride	µg/L		0.30		<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L		0.20		<0.20	<0.20
Methyl tert-butyl ether	µg/L		0.20		<0.20	<0.20
1,1-Dichloroethane	µg/L		0.30		<0.30	<0.30
Methyl Ethyl Ketone	µg/L		1.0		<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L		0.20		<0.20	<0.20
Chloroform	µg/L		0.20		2.03	<0.20
1,2-Dichloroethane	µg/L		0.20		<0.20	<0.20
1,1,1-Trichloroethane	µg/L		0.30		<0.30	<0.30
Carbon Tetrachloride	µg/L		0.20		<0.20	<0.20
Benzene	µg/L		0.20		<0.20	<0.20
1,2-Dichloropropane	µg/L		0.20		<0.20	<0.20
Trichloroethylene	µg/L		0.20		<0.20	<0.20
Bromodichloromethane	µg/L		0.20		<0.20	<0.20
Methyl Isobutyl Ketone	µg/L		1.0		<1.0	<1.0
1,1,2-Trichloroethane	µg/L		0.20		<0.20	<0.20
Toluene	µg/L		0.20		<0.20	<0.20
Dibromochloromethane	µg/L		0.10		<0.10	<0.10
Ethylene Dibromide	µg/L		0.10		<0.10	<0.10
Tetrachloroethylene	µg/L		0.20		<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L		0.10		<0.10	<0.10
Chlorobenzene	µg/L		0.10		<0.10	<0.10
Ethylbenzene	µg/L		0.10		<0.10	<0.10

Certified By: N Popowkolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

O. Reg. 153(511) - VOCs (with PHC) (Water)

DATE RECEIVED: 2023-10-17

DATE REPORTED: 2023-10-24

				SAMPLE DESCRIPTION:	MW 201	MW 206
				SAMPLE TYPE:	Water	Water
				DATE SAMPLED:	2023-10-16 15:05	2023-10-17 10:16
Parameter	Unit	G / S	RDL		5372993	5373006
m & p-Xylene	µg/L		0.20		<0.20	<0.20
Bromoform	µg/L		0.10		<0.10	<0.10
Styrene	µg/L		0.10		<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L		0.10		<0.10	<0.10
o-Xylene	µg/L		0.10		<0.10	<0.10
1,3-Dichlorobenzene	µg/L		0.10		<0.10	<0.10
1,4-Dichlorobenzene	µg/L		0.10		<0.10	<0.10
1,2-Dichlorobenzene	µg/L		0.10		<0.10	<0.10
1,3-Dichloropropene	µg/L		0.30		<0.30	<0.30
Xylenes (Total)	µg/L		0.20		<0.20	<0.20
n-Hexane	µg/L		0.20		<0.20	<0.20
Surrogate	Unit	Acceptable Limits				
Toluene-d8	% Recovery	50-140			116	98
4-Bromofluorobenzene	% Recovery	50-140			78	66

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5372993-5373006 Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popowkolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

O. Reg. 153(511) - Metals & Inorganics (Water)

DATE RECEIVED: 2023-10-17

DATE REPORTED: 2023-10-24

		SAMPLE DESCRIPTION:		MW 201		MW 206
		SAMPLE TYPE:		Water		Water
		DATE SAMPLED:		2023-10-16 15:05		2023-10-17 10:16
Parameter	Unit	G / S	RDL	5372993	RDL	5373006
Dissolved Antimony	µg/L		1.0	<1.0	1.0	<1.0
Dissolved Arsenic	µg/L		1.0	<1.0	1.0	<1.0
Dissolved Barium	µg/L		2.0	45.0	2.0	275
Dissolved Beryllium	µg/L		0.50	<0.50	0.50	<0.50
Dissolved Boron	µg/L		10.0	130	10.0	99.3
Dissolved Cadmium	µg/L		0.20	<0.20	0.20	<0.20
Dissolved Chromium	µg/L		2.0	<2.0	2.0	<2.0
Dissolved Cobalt	µg/L		0.50	0.55	0.50	2.47
Dissolved Copper	µg/L		1.0	1.7	1.0	3.3
Dissolved Lead	µg/L		0.50	<0.50	0.50	<0.50
Dissolved Molybdenum	µg/L		0.50	5.60	0.50	8.86
Dissolved Nickel	µg/L		1.0	6.5	1.0	29.0
Dissolved Selenium	µg/L		1.0	<1.0	1.0	1.6
Dissolved Silver	µg/L		0.20	<0.20	0.20	<0.20
Dissolved Thallium	µg/L		0.30	<0.30	0.30	<0.30
Dissolved Uranium	µg/L		0.50	1.10	0.50	1.43
Dissolved Vanadium	µg/L		0.40	1.11	0.40	4.00
Dissolved Zinc	µg/L		5.0	<5.0	5.0	7.5
Mercury	µg/L		0.02	<0.02	0.02	<0.02
Chromium VI	µg/L		2.000	<2.000	2.000	<2.000
Cyanide, WAD	µg/L		2	<2	2	<2
Dissolved Sodium	µg/L		50	128000	500	412000
Chloride	µg/L		100	331000	100	1020000
Electrical Conductivity	uS/cm		2	1610	2	4050
pH	pH Units		NA	7.71	NA	7.68

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

O. Reg. 153(511) - Metals & Inorganics (Water)

DATE RECEIVED: 2023-10-17

DATE REPORTED: 2023-10-24

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5372993-5373006 Metals analysis completed on a filtered sample.
pH is a recommended field analysis taken within 15 minutes of sample collection. Due to the potential for rapid change in sample equilibrium chemistry laboratory results may differ from field measured results
Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

Trace Organics Analysis

RPT Date: Oct 24, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Water)															
F1 (C6-C10)	5372993	5372993	<25	<25	NA	< 25	94%	60%	140%	86%	60%	140%	103%	60%	140%
F2 (C10 to C16)	5372993	5372993	< 100	< 100	NA	< 100	109%	60%	140%	62%	60%	140%	75%	60%	140%
F3 (C16 to C34)	5372993	5372993	< 100	< 100	NA	< 100	115%	60%	140%	66%	60%	140%	65%	60%	140%
F4 (C34 to C50)	5372993	5372993	< 100	< 100	NA	< 100	76%	60%	140%	72%	60%	140%	92%	60%	140%
O. Reg. 153(511) - PAHs (Water)															
Naphthalene	5367223		<0.20	<0.20	NA	< 0.20	84%	50%	140%	92%	50%	140%	103%	50%	140%
Acenaphthylene	5367223		<0.20	<0.20	NA	< 0.20	101%	50%	140%	98%	50%	140%	93%	50%	140%
Acenaphthene	5367223		<0.20	<0.20	NA	< 0.20	121%	50%	140%	110%	50%	140%	112%	50%	140%
Fluorene	5367223		<0.20	<0.20	NA	< 0.20	111%	50%	140%	106%	50%	140%	105%	50%	140%
Phenanthrene	5367223		0.11	0.11	NA	< 0.10	121%	50%	140%	118%	50%	140%	113%	50%	140%
Anthracene	5367223		<0.10	<0.10	NA	< 0.10	123%	50%	140%	118%	50%	140%	113%	50%	140%
Fluoranthene	5367223		<0.20	<0.20	NA	< 0.20	118%	50%	140%	121%	50%	140%	102%	50%	140%
Pyrene	5367223		<0.20	<0.20	NA	< 0.20	113%	50%	140%	120%	50%	140%	104%	50%	140%
Benzo(a)anthracene	5367223		<0.20	<0.20	NA	< 0.20	77%	50%	140%	89%	50%	140%	70%	50%	140%
Chrysene	5367223		0.11	<0.10	NA	< 0.10	115%	50%	140%	104%	50%	140%	100%	50%	140%
Benzo(b)fluoranthene	5367223		<0.10	<0.10	NA	< 0.10	112%	50%	140%	66%	50%	140%	74%	50%	140%
Benzo(k)fluoranthene	5367223		<0.10	<0.10	NA	< 0.10	92%	50%	140%	99%	50%	140%	106%	50%	140%
Benzo(a)pyrene	5367223		<0.01	<0.01	NA	< 0.01	79%	50%	140%	70%	50%	140%	62%	50%	140%
Indeno(1,2,3-cd)pyrene	5367223		<0.20	<0.20	NA	< 0.20	84%	50%	140%	69%	50%	140%	79%	50%	140%
Dibenz(a,h)anthracene	5367223		<0.20	<0.20	NA	< 0.20	95%	50%	140%	84%	50%	140%	85%	50%	140%
Benzo(g,h,i)perylene	5367223		<0.20	<0.20	NA	< 0.20	98%	50%	140%	97%	50%	140%	104%	50%	140%
O. Reg. 153(511) - VOCs (with PHC) (Water)															
Dichlorodifluoromethane	5372993	5372993	<0.40	<0.40	NA	< 0.40	99%	50%	140%	88%	50%	140%	76%	50%	140%
Vinyl Chloride	5372993	5372993	<0.17	<0.17	NA	< 0.17	107%	50%	140%	84%	50%	140%	119%	50%	140%
Bromomethane	5372993	5372993	<0.20	<0.20	NA	< 0.20	107%	50%	140%	115%	50%	140%	98%	50%	140%
Trichlorofluoromethane	5372993	5372993	<0.40	<0.40	NA	< 0.40	85%	50%	140%	98%	50%	140%	115%	50%	140%
Acetone	5372993	5372993	<1.0	<1.0	NA	< 1.0	99%	50%	140%	105%	50%	140%	83%	50%	140%
1,1-Dichloroethylene	5372993	5372993	<0.30	<0.30	NA	< 0.30	80%	50%	140%	102%	60%	130%	78%	50%	140%
Methylene Chloride	5372993	5372993	<0.30	<0.30	NA	< 0.30	87%	50%	140%	103%	60%	130%	102%	50%	140%
trans- 1,2-Dichloroethylene	5372993	5372993	<0.20	<0.20	NA	< 0.20	91%	50%	140%	104%	60%	130%	76%	50%	140%
Methyl tert-butyl ether	5372993	5372993	<0.20	<0.20	NA	< 0.20	83%	50%	140%	105%	60%	130%	101%	50%	140%
1,1-Dichloroethane	5372993	5372993	<0.30	<0.30	NA	< 0.30	99%	50%	140%	80%	60%	130%	78%	50%	140%
Methyl Ethyl Ketone	5372993	5372993	<1.0	<1.0	NA	< 1.0	90%	50%	140%	118%	50%	140%	78%	50%	140%
cis- 1,2-Dichloroethylene	5372993	5372993	<0.20	<0.20	NA	< 0.20	99%	50%	140%	110%	60%	130%	85%	50%	140%
Chloroform	5372993	5372993	2.03	1.66	20.1%	< 0.20	94%	50%	140%	113%	60%	130%	88%	50%	140%
1,2-Dichloroethane	5372993	5372993	<0.20	<0.20	NA	< 0.20	100%	50%	140%	104%	60%	130%	110%	50%	140%
1,1,1-Trichloroethane	5372993	5372993	<0.30	<0.30	NA	< 0.30	81%	50%	140%	109%	60%	130%	84%	50%	140%
Carbon Tetrachloride	5372993	5372993	<0.20	<0.20	NA	< 0.20	75%	50%	140%	101%	60%	130%	78%	50%	140%

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

Trace Organics Analysis (Continued)

RPT Date: Oct 24, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Benzene	5372993	5372993	<0.20	<0.20	NA	< 0.20	87%	50%	140%	103%	60%	130%	74%	50%	140%
1,2-Dichloropropane	5372993	5372993	<0.20	<0.20	NA	< 0.20	86%	50%	140%	94%	60%	130%	81%	50%	140%
Trichloroethylene	5372993	5372993	<0.20	<0.20	NA	< 0.20	78%	50%	140%	96%	60%	130%	86%	50%	140%
Bromodichloromethane	5372993	5372993	<0.20	<0.20	NA	< 0.20	89%	50%	140%	95%	60%	130%	86%	50%	140%
Methyl Isobutyl Ketone	5372993	5372993	<1.0	<1.0	NA	< 1.0	103%	50%	140%	106%	50%	140%	80%	50%	140%
1,1,2-Trichloroethane	5372993	5372993	<0.20	<0.20	NA	< 0.20	105%	50%	140%	108%	60%	130%	111%	50%	140%
Toluene	5372993	5372993	<0.20	<0.20	NA	< 0.20	105%	50%	140%	105%	60%	130%	73%	50%	140%
Dibromochloromethane	5372993	5372993	<0.10	<0.10	NA	< 0.10	111%	50%	140%	118%	60%	130%	95%	50%	140%
Ethylene Dibromide	5372993	5372993	<0.10	<0.10	NA	< 0.10	96%	50%	140%	98%	60%	130%	99%	50%	140%
Tetrachloroethylene	5372993	5372993	<0.20	<0.20	NA	< 0.20	90%	50%	140%	95%	60%	130%	95%	50%	140%
1,1,1,2-Tetrachloroethane	5372993	5372993	<0.10	<0.10	NA	< 0.10	116%	50%	140%	92%	60%	130%	103%	50%	140%
Chlorobenzene	5372993	5372993	<0.10	<0.10	NA	< 0.10	106%	50%	140%	93%	60%	130%	92%	50%	140%
Ethylbenzene	5372993	5372993	<0.10	<0.10	NA	< 0.10	87%	50%	140%	112%	60%	130%	73%	50%	140%
m & p-Xylene	5372993	5372993	<0.20	<0.20	NA	< 0.20	105%	50%	140%	105%	60%	130%	96%	50%	140%
Bromoform	5372993	5372993	<0.10	<0.10	NA	< 0.10	117%	50%	140%	95%	60%	130%	94%	50%	140%
Styrene	5372993	5372993	<0.10	<0.10	NA	< 0.10	75%	50%	140%	76%	60%	130%	71%	50%	140%
1,1,2,2-Tetrachloroethane	5372993	5372993	<0.10	<0.10	NA	< 0.10	93%	50%	140%	97%	60%	130%	114%	50%	140%
o-Xylene	5372993	5372993	<0.10	<0.10	NA	< 0.10	111%	50%	140%	104%	60%	130%	97%	50%	140%
1,3-Dichlorobenzene	5372993	5372993	<0.10	<0.10	NA	< 0.10	103%	50%	140%	100%	60%	130%	106%	50%	140%
1,4-Dichlorobenzene	5372993	5372993	<0.10	<0.10	NA	< 0.10	105%	50%	140%	96%	60%	130%	107%	50%	140%
1,2-Dichlorobenzene	5372993	5372993	<0.10	<0.10	NA	< 0.10	118%	50%	140%	103%	60%	130%	107%	50%	140%
n-Hexane	5372993	5372993	<0.20	<0.20	NA	< 0.20	110%	50%	140%	96%	60%	130%	97%	50%	140%
O. Reg. 153(511) - PHCs F1 - F4 (Water)															
Benzene	5373409		0.25	0.29	NA	< 0.20	80%	60%	140%	86%	60%	140%	90%	60%	140%
Toluene	5373409		0.59	0.62	NA	< 0.20	73%	60%	140%	87%	60%	140%	76%	60%	140%
Ethylbenzene	5373409		1.03	1.19	14.4%	< 0.10	67%	60%	140%	98%	60%	140%	83%	60%	140%
m & p-Xylene	5373409		6.83	7.79	13.1%	< 0.20	99%	60%	140%	81%	60%	140%	93%	60%	140%
o-Xylene	5373409		3.47	3.85	10.4%	< 0.10	90%	60%	140%	78%	60%	140%	103%	60%	140%
F1 (C6 - C10)	5373409		44	43	NA	< 25	109%	60%	140%	104%	60%	140%	106%	60%	140%
O. Reg. 153(511) - PHCs F1/BTEX (Water)															
Benzene	5373409		0.25	0.29	NA	< 0.20	80%	60%	140%	86%	60%	140%	90%	60%	140%
Toluene	5373409		0.59	0.62	NA	< 0.20	73%	60%	140%	87%	60%	140%	76%	60%	140%
Ethylbenzene	5373409		1.03	1.19	14.4%	< 0.10	67%	60%	140%	98%	60%	140%	83%	60%	140%
m & p-Xylene	5373409		6.83	7.79	13.1%	< 0.20	99%	60%	140%	81%	60%	140%	93%	60%	140%
o-Xylene	5373409		3.47	3.85	10.4%	< 0.10	90%	60%	140%	78%	60%	140%	103%	60%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED
AGAT WORK ORDER: 23Z081488
PROJECT: CO884.02
ATTENTION TO: Keith Brown
SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario
SAMPLED BY:Seba H.

Trace Organics Analysis (Continued)

RPT Date: Oct 24, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

Water Analysis

RPT Date: Oct 24, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Water)															
Dissolved Antimony	5371859		<1.0	<1.0	NA	< 1.0	103%	70%	130%	105%	80%	120%	109%	70%	130%
Dissolved Arsenic	5371859		7.3	7.1	2.8%	< 1.0	99%	70%	130%	108%	80%	120%	115%	70%	130%
Dissolved Barium	5371859		46.0	46.0	0.0%	< 2.0	100%	70%	130%	101%	80%	120%	108%	70%	130%
Dissolved Beryllium	5371859		<0.50	<0.50	NA	< 0.50	95%	70%	130%	106%	80%	120%	106%	70%	130%
Dissolved Boron	5371859		1700	1700	0.0%	< 10.0	94%	70%	130%	101%	80%	120%	102%	70%	130%
Dissolved Cadmium	5371859		<0.20	<0.20	NA	< 0.20	100%	70%	130%	102%	80%	120%	108%	70%	130%
Dissolved Chromium	5371859		<2.0	<2.0	NA	< 2.0	102%	70%	130%	106%	80%	120%	111%	70%	130%
Dissolved Cobalt	5371859		<0.50	<0.50	NA	< 0.50	104%	70%	130%	106%	80%	120%	109%	70%	130%
Dissolved Copper	5371859		1.6	1.7	NA	< 1.0	100%	70%	130%	102%	80%	120%	104%	70%	130%
Dissolved Lead	5371859		<0.50	<0.50	NA	< 0.50	106%	70%	130%	94%	80%	120%	95%	70%	130%
Dissolved Molybdenum	5371859		47.1	48.4	2.7%	< 0.50	105%	70%	130%	111%	80%	120%	115%	70%	130%
Dissolved Nickel	5371859		<1.0	<1.0	NA	< 1.0	102%	70%	130%	104%	80%	120%	107%	70%	130%
Dissolved Selenium	5371859		5.5	6.2	12.0%	< 1.0	97%	70%	130%	106%	80%	120%	117%	70%	130%
Dissolved Silver	5371859		<0.20	<0.20	NA	< 0.20	102%	70%	130%	103%	80%	120%	101%	70%	130%
Dissolved Thallium	5371859		<0.30	<0.30	NA	< 0.30	103%	70%	130%	100%	80%	120%	101%	70%	130%
Dissolved Uranium	5371859		7.11	7.10	0.1%	< 0.50	96%	70%	130%	106%	80%	120%	110%	70%	130%
Dissolved Vanadium	5371859		2.76	2.88	4.3%	< 0.40	105%	70%	130%	110%	80%	120%	115%	70%	130%
Dissolved Zinc	5371859		<5.0	<5.0	NA	< 5.0	100%	70%	130%	107%	80%	120%	113%	70%	130%
Mercury	5375238		<0.02	<0.02	NA	< 0.02	101%	70%	130%	96%	80%	120%	92%	70%	130%
Chromium VI	5372993	5372993	<2.000	<2.000	NA	< 2	102%	70%	130%	101%	80%	120%	104%	70%	130%
Cyanide, WAD	5369449		<2	<2	NA	< 2	90%	70%	130%	97%	80%	120%	96%	70%	130%
Dissolved Sodium	5371859		98100	97700	0.4%	< 50	94%	70%	130%	99%	80%	120%	97%	70%	130%
Chloride	5371862		46700	46700	0.0%	< 100	95%	70%	130%	102%	80%	120%	103%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.
Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Certified By: Iris Verástegui

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5372993	MW 201	Water	16-OCT-2023	17-OCT-2023

O. Reg. 153(511) - Metals & Inorganics (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Dissolved Antimony	18-OCT-2023	18-OCT-2023	DW
Dissolved Arsenic	18-OCT-2023	18-OCT-2023	DW
Dissolved Barium	18-OCT-2023	18-OCT-2023	DW
Dissolved Beryllium	18-OCT-2023	18-OCT-2023	DW
Dissolved Boron	18-OCT-2023	18-OCT-2023	DW
Dissolved Cadmium	18-OCT-2023	18-OCT-2023	DW
Dissolved Chromium	18-OCT-2023	18-OCT-2023	DW
Dissolved Cobalt	18-OCT-2023	18-OCT-2023	DW
Dissolved Copper	18-OCT-2023	18-OCT-2023	DW
Dissolved Lead	18-OCT-2023	18-OCT-2023	DW
Dissolved Molybdenum	18-OCT-2023	18-OCT-2023	DW
Dissolved Nickel	18-OCT-2023	18-OCT-2023	DW
Dissolved Selenium	18-OCT-2023	18-OCT-2023	DW
Dissolved Silver	18-OCT-2023	18-OCT-2023	DW
Dissolved Thallium	18-OCT-2023	18-OCT-2023	DW
Dissolved Uranium	18-OCT-2023	18-OCT-2023	DW
Dissolved Vanadium	18-OCT-2023	18-OCT-2023	DW
Dissolved Zinc	18-OCT-2023	18-OCT-2023	DW
Mercury	19-OCT-2023	19-OCT-2023	DL
Chromium VI	23-OCT-2023	23-OCT-2023	WZ
Cyanide, WAD	19-OCT-2023	19-OCT-2023	BG
Dissolved Sodium	18-OCT-2023	18-OCT-2023	DW
Chloride	18-OCT-2023	18-OCT-2023	LC
Electrical Conductivity	19-OCT-2023	19-OCT-2023	ND
pH	19-OCT-2023	19-OCT-2023	ND

O. Reg. 153(511) - PAHs (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Naphthalene	21-OCT-2023	21-OCT-2023	JJ
Acenaphthylene	21-OCT-2023	21-OCT-2023	JJ
Acenaphthene	21-OCT-2023	21-OCT-2023	JJ
Fluorene	21-OCT-2023	21-OCT-2023	JJ
Phenanthrene	21-OCT-2023	21-OCT-2023	JJ
Anthracene	21-OCT-2023	21-OCT-2023	JJ
Fluoranthene	21-OCT-2023	21-OCT-2023	JJ
Pyrene	21-OCT-2023	21-OCT-2023	JJ
Benzo(a)anthracene	21-OCT-2023	21-OCT-2023	JJ
Chrysene	21-OCT-2023	21-OCT-2023	JJ
Benzo(b)fluoranthene	21-OCT-2023	21-OCT-2023	JJ

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5372993	MW 201	Water	16-OCT-2023	17-OCT-2023

O. Reg. 153(511) - PAHs (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Benzo(k)fluoranthene	21-OCT-2023	21-OCT-2023	JJ
Benzo(a)pyrene	21-OCT-2023	21-OCT-2023	JJ
Indeno(1,2,3-cd)pyrene	21-OCT-2023	21-OCT-2023	JJ
Dibenz(a,h)anthracene	21-OCT-2023	21-OCT-2023	JJ
Benzo(g,h,i)perylene	21-OCT-2023	21-OCT-2023	JJ
2-and 1-methyl Naphthalene	21-OCT-2023	21-OCT-2023	SYS
Naphthalene-d8	21-OCT-2023	21-OCT-2023	JJ
Acridine-d9	21-OCT-2023	21-OCT-2023	JJ
Terphenyl-d14	21-OCT-2023	21-OCT-2023	JJ
Sediment	20-OCT-2023	20-OCT-2023	MK

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Water)

Parameter	Date Prepared	Date Analyzed	Initials
F1 (C6-C10)	20-OCT-2023	20-OCT-2023	MK
F1 (C6 to C10) minus BTEX	20-OCT-2023	20-OCT-2023	SYS
Toluene-d8	20-OCT-2023	20-OCT-2023	MK
F2 (C10 to C16)	20-OCT-2023	20-OCT-2023	CA
F2 (C10 to C16) minus Naphthalene	21-OCT-2023	21-OCT-2023	SYS
F3 (C16 to C34)	20-OCT-2023	20-OCT-2023	CA
F3 (C16 to C34) minus PAHs	21-OCT-2023	21-OCT-2023	SYS
F4 (C34 to C50)	20-OCT-2023	20-OCT-2023	CA
Gravimetric Heavy Hydrocarbons			
Terphenyl	20-OCT-2023	20-OCT-2023	CA
Sediment	20-OCT-2023	20-OCT-2023	MK

O. Reg. 153(511) - VOCs (with PHC) (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Dichlorodifluoromethane	20-OCT-2023	20-OCT-2023	MK
Vinyl Chloride	20-OCT-2023	20-OCT-2023	MK
Bromomethane	20-OCT-2023	20-OCT-2023	MK
Trichlorofluoromethane	20-OCT-2023	20-OCT-2023	MK
Acetone	20-OCT-2023	20-OCT-2023	MK
1,1-Dichloroethylene	20-OCT-2023	20-OCT-2023	MK
Methylene Chloride	20-OCT-2023	20-OCT-2023	MK
trans- 1,2-Dichloroethylene	20-OCT-2023	20-OCT-2023	MK
Methyl tert-butyl ether	20-OCT-2023	20-OCT-2023	MK
1,1-Dichloroethane	20-OCT-2023	20-OCT-2023	MK
Methyl Ethyl Ketone	20-OCT-2023	20-OCT-2023	MK
cis- 1,2-Dichloroethylene	20-OCT-2023	20-OCT-2023	MK

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5372993	MW 201	Water	16-OCT-2023	17-OCT-2023

O. Reg. 153(511) - VOCs (with PHC) (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Chloroform	20-OCT-2023	20-OCT-2023	MK
1,2-Dichloroethane	20-OCT-2023	20-OCT-2023	MK
1,1,1-Trichloroethane	20-OCT-2023	20-OCT-2023	MK
Carbon Tetrachloride	20-OCT-2023	20-OCT-2023	MK
Benzene	20-OCT-2023	20-OCT-2023	MK
1,2-Dichloropropane	20-OCT-2023	20-OCT-2023	MK
Trichloroethylene	20-OCT-2023	20-OCT-2023	MK
Bromodichloromethane	20-OCT-2023	20-OCT-2023	MK
Methyl Isobutyl Ketone	20-OCT-2023	20-OCT-2023	MK
1,1,2-Trichloroethane	20-OCT-2023	20-OCT-2023	MK
Toluene	20-OCT-2023	20-OCT-2023	MK
Dibromochloromethane	20-OCT-2023	20-OCT-2023	MK
Ethylene Dibromide	20-OCT-2023	20-OCT-2023	MK
Tetrachloroethylene	20-OCT-2023	20-OCT-2023	MK
1,1,1,2-Tetrachloroethane	20-OCT-2023	20-OCT-2023	MK
Chlorobenzene	20-OCT-2023	20-OCT-2023	MK
Ethylbenzene	20-OCT-2023	20-OCT-2023	MK
m & p-Xylene	20-OCT-2023	20-OCT-2023	MK
Bromoform	20-OCT-2023	20-OCT-2023	MK
Styrene	20-OCT-2023	20-OCT-2023	MK
1,1,2,2-Tetrachloroethane	20-OCT-2023	20-OCT-2023	MK
o-Xylene	20-OCT-2023	20-OCT-2023	MK
1,3-Dichlorobenzene	20-OCT-2023	20-OCT-2023	MK
1,4-Dichlorobenzene	20-OCT-2023	20-OCT-2023	MK
1,2-Dichlorobenzene	20-OCT-2023	20-OCT-2023	MK
1,3-Dichloropropene	20-OCT-2023	20-OCT-2023	SYS
Xylenes (Total)	20-OCT-2023	20-OCT-2023	SYS
n-Hexane	20-OCT-2023	20-OCT-2023	MK
Toluene-d8	20-OCT-2023	20-OCT-2023	MK
4-Bromofluorobenzene	20-OCT-2023	20-OCT-2023	MK

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5373006	MW 206	Water	17-OCT-2023	17-OCT-2023

O. Reg. 153(511) - Metals & Inorganics (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Dissolved Antimony	18-OCT-2023	18-OCT-2023	DW
Dissolved Arsenic	18-OCT-2023	18-OCT-2023	DW
Dissolved Barium	18-OCT-2023	18-OCT-2023	DW
Dissolved Beryllium	18-OCT-2023	18-OCT-2023	DW

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5373006	MW 206	Water	17-OCT-2023	17-OCT-2023

O. Reg. 153(511) - Metals & Inorganics (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Dissolved Boron	18-OCT-2023	18-OCT-2023	DW
Dissolved Cadmium	18-OCT-2023	18-OCT-2023	DW
Dissolved Chromium	18-OCT-2023	18-OCT-2023	DW
Dissolved Cobalt	18-OCT-2023	18-OCT-2023	DW
Dissolved Copper	18-OCT-2023	18-OCT-2023	DW
Dissolved Lead	18-OCT-2023	18-OCT-2023	DW
Dissolved Molybdenum	18-OCT-2023	18-OCT-2023	DW
Dissolved Nickel	18-OCT-2023	18-OCT-2023	DW
Dissolved Selenium	18-OCT-2023	18-OCT-2023	DW
Dissolved Silver	18-OCT-2023	18-OCT-2023	DW
Dissolved Thallium	18-OCT-2023	18-OCT-2023	DW
Dissolved Uranium	18-OCT-2023	18-OCT-2023	DW
Dissolved Vanadium	18-OCT-2023	18-OCT-2023	DW
Dissolved Zinc	18-OCT-2023	18-OCT-2023	DW
Mercury	19-OCT-2023	19-OCT-2023	DL
Chromium VI	23-OCT-2023	23-OCT-2023	WZ
Cyanide, WAD	19-OCT-2023	19-OCT-2023	BG
Dissolved Sodium	18-OCT-2023	18-OCT-2023	DW
Chloride	18-OCT-2023	18-OCT-2023	LC
Electrical Conductivity	19-OCT-2023	19-OCT-2023	ND
pH	19-OCT-2023	19-OCT-2023	ND

O. Reg. 153(511) - PAHs (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Naphthalene	21-OCT-2023	21-OCT-2023	JJ
Acenaphthylene	21-OCT-2023	21-OCT-2023	JJ
Acenaphthene	21-OCT-2023	21-OCT-2023	JJ
Fluorene	21-OCT-2023	21-OCT-2023	JJ
Phenanthrene	21-OCT-2023	21-OCT-2023	JJ
Anthracene	21-OCT-2023	21-OCT-2023	JJ
Fluoranthene	21-OCT-2023	21-OCT-2023	JJ
Pyrene	21-OCT-2023	21-OCT-2023	JJ
Benzo(a)anthracene	21-OCT-2023	21-OCT-2023	JJ
Chrysene	21-OCT-2023	21-OCT-2023	JJ
Benzo(b)fluoranthene	21-OCT-2023	21-OCT-2023	JJ
Benzo(k)fluoranthene	21-OCT-2023	21-OCT-2023	JJ
Benzo(a)pyrene	21-OCT-2023	21-OCT-2023	JJ
Indeno(1,2,3-cd)pyrene	21-OCT-2023	21-OCT-2023	JJ
Dibenz(a,h)anthracene	21-OCT-2023	21-OCT-2023	JJ

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5373006	MW 206	Water	17-OCT-2023	17-OCT-2023

O. Reg. 153(511) - PAHs (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Benzo(g,h,i)perylene	21-OCT-2023	21-OCT-2023	JJ
2-and 1-methyl Naphthalene	21-OCT-2023	21-OCT-2023	SYS
Naphthalene-d8	21-OCT-2023	21-OCT-2023	JJ
Acridine-d9	21-OCT-2023	21-OCT-2023	JJ
Terphenyl-d14	21-OCT-2023	21-OCT-2023	JJ
Sediment	20-OCT-2023	20-OCT-2023	MK

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Water)

Parameter	Date Prepared	Date Analyzed	Initials
F1 (C6-C10)	20-OCT-2023	20-OCT-2023	MK
F1 (C6 to C10) minus BTEX	20-OCT-2023	20-OCT-2023	SYS
Toluene-d8	20-OCT-2023	20-OCT-2023	MK
F2 (C10 to C16)	20-OCT-2023	20-OCT-2023	CA
F2 (C10 to C16) minus Naphthalene	21-OCT-2023	21-OCT-2023	SYS
F3 (C16 to C34)	20-OCT-2023	20-OCT-2023	CA
F3 (C16 to C34) minus PAHs	21-OCT-2023	21-OCT-2023	SYS
F4 (C34 to C50)	20-OCT-2023	20-OCT-2023	CA
Gravimetric Heavy Hydrocarbons			
Terphenyl	20-OCT-2023	20-OCT-2023	CA
Sediment	20-OCT-2023	20-OCT-2023	MK

O. Reg. 153(511) - VOCs (with PHC) (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Dichlorodifluoromethane	20-OCT-2023	20-OCT-2023	MK
Vinyl Chloride	20-OCT-2023	20-OCT-2023	MK
Bromomethane	20-OCT-2023	20-OCT-2023	MK
Trichlorofluoromethane	20-OCT-2023	20-OCT-2023	MK
Acetone	20-OCT-2023	20-OCT-2023	MK
1,1-Dichloroethylene	20-OCT-2023	20-OCT-2023	MK
Methylene Chloride	20-OCT-2023	20-OCT-2023	MK
trans- 1,2-Dichloroethylene	20-OCT-2023	20-OCT-2023	MK
Methyl tert-butyl ether	20-OCT-2023	20-OCT-2023	MK
1,1-Dichloroethane	20-OCT-2023	20-OCT-2023	MK
Methyl Ethyl Ketone	20-OCT-2023	20-OCT-2023	MK
cis- 1,2-Dichloroethylene	20-OCT-2023	20-OCT-2023	MK
Chloroform	20-OCT-2023	20-OCT-2023	MK
1,2-Dichloroethane	20-OCT-2023	20-OCT-2023	MK
1,1,1-Trichloroethane	20-OCT-2023	20-OCT-2023	MK
Carbon Tetrachloride	20-OCT-2023	20-OCT-2023	MK

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5373006	MW 206	Water	17-OCT-2023	17-OCT-2023

O. Reg. 153(511) - VOCs (with PHC) (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	20-OCT-2023	20-OCT-2023	MK
1,2-Dichloropropane	20-OCT-2023	20-OCT-2023	MK
Trichloroethylene	20-OCT-2023	20-OCT-2023	MK
Bromodichloromethane	20-OCT-2023	20-OCT-2023	MK
Methyl Isobutyl Ketone	20-OCT-2023	20-OCT-2023	MK
1,1,2-Trichloroethane	20-OCT-2023	20-OCT-2023	MK
Toluene	20-OCT-2023	20-OCT-2023	MK
Dibromochloromethane	20-OCT-2023	20-OCT-2023	MK
Ethylene Dibromide	20-OCT-2023	20-OCT-2023	MK
Tetrachloroethylene	20-OCT-2023	20-OCT-2023	MK
1,1,1,2-Tetrachloroethane	20-OCT-2023	20-OCT-2023	MK
Chlorobenzene	20-OCT-2023	20-OCT-2023	MK
Ethylbenzene	20-OCT-2023	20-OCT-2023	MK
m & p-Xylene	20-OCT-2023	20-OCT-2023	MK
Bromoform	20-OCT-2023	20-OCT-2023	MK
Styrene	20-OCT-2023	20-OCT-2023	MK
1,1,2,2-Tetrachloroethane	20-OCT-2023	20-OCT-2023	MK
o-Xylene	20-OCT-2023	20-OCT-2023	MK
1,3-Dichlorobenzene	20-OCT-2023	20-OCT-2023	MK
1,4-Dichlorobenzene	20-OCT-2023	20-OCT-2023	MK
1,2-Dichlorobenzene	20-OCT-2023	20-OCT-2023	MK
1,3-Dichloropropene	20-OCT-2023	20-OCT-2023	SYS
Xylenes (Total)	20-OCT-2023	20-OCT-2023	SYS
n-Hexane	20-OCT-2023	20-OCT-2023	MK
Toluene-d8	20-OCT-2023	20-OCT-2023	MK
4-Bromofluorobenzene	20-OCT-2023	20-OCT-2023	MK

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5373009	MW 204	Water	16-OCT-2023	17-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	18-OCT-2023	18-OCT-2023	VB
Toluene	18-OCT-2023	18-OCT-2023	VB
Ethylbenzene	18-OCT-2023	18-OCT-2023	VB
m & p-Xylene	18-OCT-2023	18-OCT-2023	VB
o-Xylene	18-OCT-2023	18-OCT-2023	VB
Xylenes (Total)	18-OCT-2023	18-OCT-2023	SYS
F1 (C6 - C10)	18-OCT-2023	18-OCT-2023	VB
C6 - C10 (F1 minus BTEX)	18-OCT-2023	18-OCT-2023	SYS

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5373009	MW 204	Water	16-OCT-2023	17-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Toluene-d8	18-OCT-2023	18-OCT-2023	VB
F2 (C10 to C16)	20-OCT-2023	20-OCT-2023	CA
F3 (C16 to C34)	20-OCT-2023	20-OCT-2023	CA
F4 (C34 to C50)	20-OCT-2023	20-OCT-2023	CA
Gravimetric Heavy Hydrocarbons			
Terphenyl	20-OCT-2023	20-OCT-2023	CA
Sediment	20-OCT-2023	20-OCT-2023	SG

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5373013	MW 214	Water	16-OCT-2023	17-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	18-OCT-2023	18-OCT-2023	VB
Toluene	18-OCT-2023	18-OCT-2023	VB
Ethylbenzene	18-OCT-2023	18-OCT-2023	VB
m & p-Xylene	18-OCT-2023	18-OCT-2023	VB
o-Xylene	18-OCT-2023	18-OCT-2023	VB
Xylenes (Total)	18-OCT-2023	18-OCT-2023	SYS
F1 (C6 - C10)	18-OCT-2023	18-OCT-2023	VB
C6 - C10 (F1 minus BTEX)	18-OCT-2023	18-OCT-2023	SYS
Toluene-d8	18-OCT-2023	18-OCT-2023	VB
F2 (C10 to C16)	20-OCT-2023	20-OCT-2023	CA
F3 (C16 to C34)	20-OCT-2023	20-OCT-2023	CA
F4 (C34 to C50)	20-OCT-2023	20-OCT-2023	CA
Gravimetric Heavy Hydrocarbons			
Terphenyl	20-OCT-2023	20-OCT-2023	CA
Sediment	20-OCT-2023	20-OCT-2023	SG

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5373015	Trip Spike	Water	16-OCT-2023	17-OCT-2023

O. Reg. 153(511) - PHCs F1/BTEX (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	18-OCT-2023	18-OCT-2023	VB
Toluene	18-OCT-2023	18-OCT-2023	VB
Ethylbenzene	18-OCT-2023	18-OCT-2023	VB
m & p-Xylene	18-OCT-2023	18-OCT-2023	VB
o-Xylene	18-OCT-2023	18-OCT-2023	VB
Toluene-d8	18-OCT-2023	18-OCT-2023	VB

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Time Markers

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Keith Brown

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5373017	Trip Blank	Water	16-OCT-2023	17-OCT-2023

O. Reg. 153(511) - PHCs F1/BTEX (Water)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	18-OCT-2023	18-OCT-2023	VB
Toluene	18-OCT-2023	18-OCT-2023	VB
Ethylbenzene	18-OCT-2023	18-OCT-2023	VB
m & p-Xylene	18-OCT-2023	18-OCT-2023	VB
o-Xylene	18-OCT-2023	18-OCT-2023	VB
Xylenes (Total)	18-OCT-2023	18-OCT-2023	SYS
F1 (C6-C10)	18-OCT-2023	18-OCT-2023	VB
F1 (C6 to C10) minus BTEX	18-OCT-2023	18-OCT-2023	SYS
Toluene-d8	18-OCT-2023	18-OCT-2023	VB

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED
AGAT WORK ORDER: 23Z081488
PROJECT: CO884.02
ATTENTION TO: Keith Brown
SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario
SAMPLED BY:Seba H.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Fluorene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Anthracene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Pyrene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(a)anthracene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Chrysene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Sediment			N/A
Benzene	VOL-91-5010	modified from MOE PHC-E3421	(P&T)GC/MS
Toluene	VOL-91-5010	modified from MOE PHC-E3421	(P&T)GC/MS
Ethylbenzene	VOL-91-5010	modified from MOE PHC-E3421	(P&T)GC/MS
m & p-Xylene	VOL-91-5010	modified from MOE PHC-E3421	(P&T)GC/MS
o-Xylene	VOL-91-5010	modified from MOE PHC-E3421	(P&T)GC/MS
Xylenes (Total)	VOL-91-5010	modified from MOE PHC-E3421	(P&T)GC/MS
F1 (C6 - C10)	VOL-91-5010	modified from MOE PHC-E3421	(P&T)GC/FID
C6 - C10 (F1 minus BTEX)	VOL - 5010	MOE E3421	(P&T)GC/MS
Toluene-d8	VOL-91-5010	modified from MOE PHC-E3421	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5010	modified from MOE PHC-E3421	GC/FID
F3 (C16 to C34)	VOL-91-5010	modified from MOE PHC-E3421	GC/FID
F4 (C34 to C50)	VOL-91-5010	modified from MOE PHC-E3421	GC/FID

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Gravimetric Heavy Hydrocarbons	VOL-91-5010	modified from MOE PHC-E3421	BALANCE
Terphenyl	VOL-91-5010	modified from MOE PHC-E3421	GC/FID
F1 (C6-C10)	VOL-91-5010	modified from MOE PHC-E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	modified from MOE PHC-E3421	P&T GC/FID
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
F2 (C10 to C16) minus Naphthalene	VOL-91-5010	modified from MOE PHC-E3421	GC/FID
F3 (C16 to C34)	VOL-91-5010	modified from MOE PHC-E3421	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5010	modified from MOE PHC-E3421	GC/FID
Benzene	VOL-91-5010	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Toluene	VOL-91-5010	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5010	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5010	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5010	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5010	modified from MOE PHC-E3421	(P&T)GC/MS
Xylenes (Total)	VOL-91-5010	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
F1 (C6-C10)	VOL-91-5010	modified from MOE E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	modified from MOE E3421	(P&T)GC/FID
Dichlorodifluoromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Carbon Tetrachloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 23Z081488

PROJECT: CO884.02

ATTENTION TO: Keith Brown

SAMPLING SITE:5646 and 5650 Manotick Main Street, Ottawa, Ontario

SAMPLED BY:Seba H.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Dissolved Antimony	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Arsenic	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Barium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Beryllium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cadmium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Chromium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cobalt	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Copper	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Lead	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Molybdenum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Nickel	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Selenium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silver	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Thallium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Uranium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Vanadium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Zinc	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Chromium VI	INOR-93-6073	modified from SM 3500-CR B	LACHAT FIA
Cyanide, WAD	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	SEGMENTED FLOW ANALYSIS
Dissolved Sodium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE

AGAT Laboratories

Have feedback? Scan here for a quick survey!

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 23Z081488

Cooler Quantity: one - loose ice

Arrival Temperatures: 6.8 | 7.0 | 7.1 / 2.1 | 2.0 | 2.4

Custody Seal Intact: ☐ Yes ☐ No ☑ N/A

Notes: bagged ice

Report Information:

Company: Terrapex Environmental Ltd
Contact: Keith Brown
Address: 1-20 Gurwara Rd
Ottawa, ON, K2E 8B3
Phone: ____ Fax: ____
Reports to be sent to:
1. Email: k.browmn@terrapex.com
2. Email: edd@terrapex.com

Regulatory Requirements:

(Please check all applicable boxes)

☑ Regulation 153/04 — Table 2 (Indicate One) — ☐ Ind/Com ☑ Res/Park ☐ Agriculture — Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Regulation 406 — Table ____ (Indicate One)

☐ Regulation 558

☐ CCME

☐ Sewer Use ☐ Sanitary ☐ Storm — ____ (Region)

☐ Prov. Water Quality Objectives (PWQO)

☐ Other ____ (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply): ____

Please provide prior notification for rush TAT

*TAT is exclusive of weekends and statutory holidays

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: CO884.02
Site Location: 5646 and 5650 Manotick Main Street, Ottawa, Ontario
Sampled By: Seba. H
AGAT Quote #: ____ PO: ____
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company: ____
Contact: ____
Address: ____
Email: ____

Sample Matrix Legend

GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☑ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs	VOC	PAHs	PCBs	PCBs: Aroclors ☐	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Regulation 406 SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Regulation 406 Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Corrosivity: ☐ Moisture ☐ Sulphide	BTEX PHC F1						Potentially Hazardous or High Concentration (Y/N)
1. MW 201	16/10/23	3:05 AM/PM	13	GW		Y	✓	✓	✓	✓	✓													
2. MW 206	17/10/23	10:16 AM/PM	13	GW		Y	✓	✓	✓	✓	✓													
3. MW 204	16/10/23	12:10 AM/PM	5	GW					✓															
4. MW 214	16/10/23	12:10 AM/PM	5	GW					✓															
5. Trip spike	-	- AM/PM	3	-													X							
6. Trip Blank	-	- AM/PM	3	-													X							
7.		AM/PM																						
8.		AM/PM																						
9.		AM/PM																						
10.		AM/PM																						
11.		AM/PM																						

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Seba. H	17/10/23	14:00	C. Guthrie	10/17/23	14h20
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Carlo Pua	10/17/23	15h30	TK	Oct 18	8:45 Am
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time

Page ____ of ____

N°:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED
20 GURDWARA ROAD, UNIT 1
OTTAWA, ON K2E 8B3
613 745 6471

ATTENTION TO: Greg Sabourin

PROJECT: CO884.02

AGAT WORK ORDER: 23Z080368

SOIL ANALYSIS REVIEWED BY: Nivine Basily, Inorganic Team Lead

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Oct 26, 2023

PAGES (INCLUDING COVER): 32

VERSION*: 3

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

VERSION 3:V3 issued 2023-10-26. Sample ID revision corrected by client request to Lab IDs ending 706 and 707. Supersedes previous version. (LB)
V2 issued 2023-10-25. Sample IDs revised by client request (BH202-4 and BH204-5 to MW204-4 and MW204-5). Supersedes previous version. (LB)

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z080368

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

SAMPLING SITE:5646 Manotick Main St., Ottawa, ON

SAMPLED BY:SP/GS

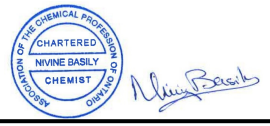
O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2023-10-13

DATE REPORTED: 2023-10-26

				SAMPLE DESCRIPTION:	MW201-5	BH202-1	BH205-2	MW206-2	MW3000
				SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:	2023-10-12 10:15	2023-10-12 09:50	2023-10-12 13:27	2023-10-12 14:57	2023-10-12 14:57
Parameter	Unit	G / S	RDL		5364702	5364703	5364709	5364712	5364715
Antimony	µg/g		0.8		<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g		1		3	2	3	2	4
Barium	µg/g		2.0		248	72.4	148	71.3	275
Beryllium	µg/g		0.5		0.9	<0.5	0.7	<0.5	0.9
Boron	µg/g		5		11	6	7	<5	12
Boron (Hot Water Soluble)	µg/g		0.10		0.24	0.27	<0.10	0.23	0.38
Cadmium	µg/g		0.5		<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g		5		58	23	40	24	65
Cobalt	µg/g		0.8		17.6	7.0	11.2	7.9	18.3
Copper	µg/g		1.0		34.5	9.4	21.9	9.7	38.1
Lead	µg/g		1		9	73	6	4	9
Molybdenum	µg/g		0.5		<0.5	0.8	<0.5	<0.5	<0.5
Nickel	µg/g		1		35	13	22	13	39
Selenium	µg/g		0.8		<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g		0.5		<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g		0.5		<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g		0.50		0.74	0.71	0.77	0.65	0.80
Vanadium	µg/g		2.0		76.1	34.2	61.7	41.9	87.1
Zinc	µg/g		5		99	126	56	31	108
Chromium, Hexavalent	µg/g		0.2		<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g		0.040		<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g		0.10		0.23	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm		0.005		0.545	0.451	0.382	0.448	1.22
Sodium Adsorption Ratio (2:1) (Calc.)	N/A		N/A		2.17	3.51	4.07	5.19	13.9
pH, 2:1 CaCl2 Extraction	pH Units		NA		7.38	7.47	7.46	7.14	7.33

Certified By:



AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z080368
PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED
ATTENTION TO: Greg Sabourin

SAMPLING SITE:5646 Manotick Main St., Ottawa, ON
SAMPLED BY:SP/GS

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2023-10-13
DATE REPORTED: 2023-10-26

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5364702-5364715 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio. SAR is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z080368
PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED
SAMPLING SITE:5646 Manotick Main St., Ottawa, ON

ATTENTION TO: Greg Sabourin
SAMPLED BY:SP/GS

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2023-10-13

DATE REPORTED: 2023-10-26

				SAMPLE DESCRIPTION:	MW201-5	BH202-1	BH205-2	MW206-2	MW3000
				SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:	2023-10-12 10:15	2023-10-12 09:50	2023-10-12 13:27	2023-10-12 14:57	2023-10-12 14:57
Parameter	Unit	G / S	RDL		5364702	5364703	5364709	5364712	5364715
Naphthalene	µg/g		0.05		<0.05	<0.05	0.07	<0.05	<0.05
Acenaphthylene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Benz(a)anthracene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05
1 and 2 Methlynaphthalene	µg/g		0.05		<0.05	<0.05	0.10	<0.05	<0.05
Moisture Content	%		0.1		26.9	17.3	20.0	16.9	27.4
Surrogate	Unit	Acceptable Limits							
Naphthalene-d8	%	50-140			100	80	80	110	110
Acridine-d9	%	50-140			105	100	95	105	100
Terphenyl-d14	%	50-140			85	80	75	75	85

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5364702-5364715 Results are based on the dry weight of the soil.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&j)Fluoranthene isomers because the isomers co-elute on the GC column.
2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: NPopowkolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z080368

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

SAMPLING SITE:5646 Manotick Main St., Ottawa, ON

SAMPLED BY:SP/GS

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

DATE RECEIVED: 2023-10-13

DATE REPORTED: 2023-10-26

		SAMPLE DESCRIPTION:		BH202-4	BH203-3	MW204-4	MW204-5	MW1000	BH205-3	BH205-6	MW206-6
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2023-10-12 10:15	2023-10-12 11:06	2023-10-12 12:38	2023-10-12 12:50	2023-10-12 12:38	2023-10-12 13:39	2023-10-12 14:10	2023-10-12 15:35
Parameter	Unit	G / S	RDL	5364704	5364705	5364706	5364707	5364708	5364710	5364711	5364713
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	2.90	1.57	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.21	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2.72	0.12	<0.05
m & p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2.13	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2.13	<0.05	<0.05
F1 (C6 - C10)	µg/g		5	<5	<5	160	<5	119	40	<5	<5
F1 (C6 to C10) minus BTEX	µg/g		5	<5	<5	160	<5	119	32	<5	<5
F2 (C10 to C16)	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g		50	<50	<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g		50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	26.2	28.1	15.7	33.3	13.0	27.9	24.7	30.5
Surrogate	Unit	Acceptable Limits									
Toluene-d8	% Recovery	60-140		91	86	94	94	115	88	86	122
Terphenyl	%	60-140		81	97	98	98	79	93	75	75

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z080368

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

SAMPLING SITE:5646 Manotick Main St., Ottawa, ON

SAMPLED BY:SP/GS

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

DATE RECEIVED: 2023-10-13

DATE REPORTED: 2023-10-26

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5364704-5364713 Results are based on sample dry weight.
The C6-C10 fraction is calculated using Toluene response factor.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contribution.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.
Quality Control Data is available upon request.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popowkolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z080368
PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED
SAMPLING SITE:5646 Manotick Main St., Ottawa, ON

ATTENTION TO: Greg Sabourin
SAMPLED BY:SP/GS

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)

DATE RECEIVED: 2023-10-13 DATE REPORTED: 2023-10-26

				SAMPLE DESCRIPTION:	MW201-5
				SAMPLE TYPE:	Soil
				DATE SAMPLED:	2023-10-12 10:15
Parameter	Unit	G / S	RDL		5364702
F1 (C6 - C10)	µg/g		5		<5
F1 (C6 to C10) minus BTEX	µg/g		5		<5
F2 (C10 to C16)	µg/g		10		<10
F2 (C10 to C16) minus Naphthalene	µg/g		10		<10
F3 (C16 to C34)	µg/g		50		<50
F3 (C16 to C34) minus PAHs	µg/g		50		<50
F4 (C34 to C50)	µg/g		50		<50
Gravimetric Heavy Hydrocarbons	µg/g		50		NA
Moisture Content	%		0.1		26.9
Surrogate	Unit	Acceptable Limits			
Toluene-d8	%	50-140			98
Terphenyl	%	60-140			95

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5364702 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
C>10 – C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.
C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popowkolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z080368

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

SAMPLING SITE:5646 Manotick Main St., Ottawa, ON

SAMPLED BY:SP/GS

O. Reg. 153(511) - PHCs F1/BTEX (MeOH)

DATE RECEIVED: 2023-10-13

DATE REPORTED: 2023-10-26

		SAMPLE DESCRIPTION:		TRIP BLANK
		SAMPLE TYPE:		MeOH
		DATE SAMPLED:		2023-10-10
Parameter	Unit	G / S	RDL	5364716
Benzene	µg/g		0.02	<0.02
Toluene	µg/g		0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05
m & p-Xylene	µg/g		0.05	<0.05
o-Xylene	µg/g		0.05	<0.05
Xylenes (Total)	µg/g		0.05	<0.05
F1 (C6 - C10)	µg/g		5	<5
F1 (C6 to C10) minus BTEX	µg/g		5	<5
Surrogate	Unit	Acceptable Limits		
Toluene-d8	% Recovery	60-140		107

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5364716 A small amount of the methanol extract was diluted in water and the purge & trap GC/MS/FID analysis was performed.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popowkolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z080368

PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

SAMPLING SITE:5646 Manotick Main St., Ottawa, ON

SAMPLED BY:SP/GS

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2023-10-13

DATE REPORTED: 2023-10-26

		SAMPLE DESCRIPTION:		MW201-5
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2023-10-12 10:15
Parameter	Unit	G / S	RDL	5364702
Dichlorodifluoromethane	µg/g		0.05	<0.05
Vinyl Chloride	ug/g		0.02	<0.02
Bromomethane	ug/g		0.05	<0.05
Trichlorofluoromethane	ug/g		0.05	<0.05
Acetone	ug/g		0.50	<0.50
1,1-Dichloroethylene	ug/g		0.05	<0.05
Methylene Chloride	ug/g		0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g		0.05	<0.05
Methyl tert-butyl Ether	ug/g		0.05	<0.05
1,1-Dichloroethane	ug/g		0.02	<0.02
Methyl Ethyl Ketone	ug/g		0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g		0.02	<0.02
Chloroform	ug/g		0.04	<0.04
1,2-Dichloroethane	ug/g		0.03	<0.03
1,1,1-Trichloroethane	ug/g		0.05	<0.05
Carbon Tetrachloride	ug/g		0.05	<0.05
Benzene	ug/g		0.02	<0.02
1,2-Dichloropropane	ug/g		0.03	<0.03
Trichloroethylene	ug/g		0.03	<0.03
Bromodichloromethane	ug/g		0.05	<0.05
Methyl Isobutyl Ketone	ug/g		0.50	<0.50
1,1,2-Trichloroethane	ug/g		0.04	<0.04
Toluene	ug/g		0.05	<0.05
Dibromochloromethane	ug/g		0.05	<0.05
Ethylene Dibromide	ug/g		0.04	<0.04
Tetrachloroethylene	ug/g		0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g		0.04	<0.04
Chlorobenzene	ug/g		0.05	<0.05
Ethylbenzene	ug/g		0.05	<0.05

Certified By: N Popowkolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23Z080368
PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED
SAMPLING SITE:5646 Manotick Main St., Ottawa, ON

ATTENTION TO: Greg Sabourin
SAMPLED BY:SP/GS

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2023-10-13

DATE REPORTED: 2023-10-26

				SAMPLE DESCRIPTION:	MW201-5
				SAMPLE TYPE:	Soil
				DATE SAMPLED:	2023-10-12 10:15
Parameter	Unit	G / S	RDL		5364702
m & p-Xylene	ug/g		0.05		<0.05
Bromoform	ug/g		0.05		<0.05
Styrene	ug/g		0.05		<0.05
1,1,2,2-Tetrachloroethane	ug/g		0.05		<0.05
o-Xylene	ug/g		0.05		<0.05
1,3-Dichlorobenzene	ug/g		0.05		<0.05
1,4-Dichlorobenzene	ug/g		0.05		<0.05
1,2-Dichlorobenzene	ug/g		0.05		<0.05
Xylenes (Total)	ug/g		0.05		<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g		0.05		<0.05
n-Hexane	µg/g		0.05		<0.05
Moisture Content	%		0.1		26.9
Surrogate	Unit	Acceptable Limits			
Toluene-d8	% Recovery	50-140			98
4-Bromofluorobenzene	% Recovery	50-140			104

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5364702 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 23Z080368

PROJECT: CO884.02

ATTENTION TO: Greg Sabourin

SAMPLING SITE:5646 Manotick Main St., Ottawa, ON

SAMPLED BY:SP/GS

Soil Analysis

RPT Date: Oct 26, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	5364480		<0.8	<0.8	NA	< 0.8	120%	70%	130%	96%	80%	120%	101%	70%	130%
Arsenic	5364480		6	6	0.0%	< 1	118%	70%	130%	110%	80%	120%	108%	70%	130%
Barium	5364480		99.7	104	4.2%	< 2.0	105%	70%	130%	107%	80%	120%	104%	70%	130%
Beryllium	5364480		<0.5	<0.5	NA	< 0.5	103%	70%	130%	104%	80%	120%	106%	70%	130%
Boron	5364480		10	11	NA	< 5	87%	70%	130%	102%	80%	120%	98%	70%	130%
Boron (Hot Water Soluble)	5364702	5364702	0.24	0.25	NA	< 0.10	111%	60%	140%	105%	70%	130%	102%	60%	140%
Cadmium	5364480		<0.5	<0.5	NA	< 0.5	104%	70%	130%	108%	80%	120%	116%	70%	130%
Chromium	5364480		16	16	NA	< 5	100%	70%	130%	110%	80%	120%	101%	70%	130%
Cobalt	5364480		9.4	10.6	12.0%	< 0.8	108%	70%	130%	109%	80%	120%	109%	70%	130%
Copper	5364480		26.0	27.2	4.5%	< 1.0	102%	70%	130%	110%	80%	120%	108%	70%	130%
Lead	5364480		7	7	0.0%	< 1	109%	70%	130%	98%	80%	120%	102%	70%	130%
Molybdenum	5364480		0.7	0.7	NA	< 0.5	115%	70%	130%	112%	80%	120%	115%	70%	130%
Nickel	5364480		18	20	10.5%	< 1	107%	70%	130%	105%	80%	120%	110%	70%	130%
Selenium	5364480		<0.8	<0.8	NA	< 0.8	118%	70%	130%	107%	80%	120%	103%	70%	130%
Silver	5364480		<0.5	<0.5	NA	< 0.5	111%	70%	130%	104%	80%	120%	104%	70%	130%
Thallium	5364480		<0.5	<0.5	NA	< 0.5	114%	70%	130%	103%	80%	120%	108%	70%	130%
Uranium	5364480		0.56	0.59	NA	< 0.50	124%	70%	130%	104%	80%	120%	114%	70%	130%
Vanadium	5364480		25.3	25.1	0.8%	< 2.0	115%	70%	130%	112%	80%	120%	104%	70%	130%
Zinc	5364480		46	48	4.3%	< 5	106%	70%	130%	112%	80%	120%	109%	70%	130%
Chromium, Hexavalent	5364386		<0.2	<0.2	NA	< 0.2	101%	70%	130%	92%	80%	120%	99%	70%	130%
Cyanide, WAD	5364386		<0.040	<0.040	NA	< 0.040	96%	70%	130%	101%	80%	120%	92%	70%	130%
Mercury	5364480		<0.10	<0.10	NA	< 0.10	108%	70%	130%	102%	80%	120%	108%	70%	130%
Electrical Conductivity (2:1)	5372940		0.498	0.510	2.4%	< 0.005	91%	80%	120%						
Sodium Adsorption Ratio (2:1) (Calc.)	5372940		1.80	1.79	0.6%	NA									
pH, 2:1 CaCl2 Extraction	5364586		7.87	7.73	1.8%	NA	100%	80%	120%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 23Z080368

PROJECT: CO884.02

ATTENTION TO: Greg Sabourin

SAMPLING SITE:5646 Manotick Main St., Ottawa, ON

SAMPLED BY:SP/GS

Trace Organics Analysis

RPT Date: Oct 26, 2023

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)															
F1 (C6 - C10)	5361087		<5	<5	NA	< 5	118%	60%	140%	107%	60%	140%	90%	60%	140%
F2 (C10 to C16)	5364710	5364710	< 10	< 10	NA	< 10	114%	60%	140%	99%	60%	140%	99%	60%	140%
F3 (C16 to C34)	5364710	5364710	< 50	< 50	NA	< 50	110%	60%	140%	107%	60%	140%	112%	60%	140%
F4 (C34 to C50)	5364710	5364710	< 50	< 50	NA	< 50	90%	60%	140%	110%	60%	140%	100%	60%	140%
O. Reg. 153(511) - VOCs (with PHC) (Soil)															
Dichlorodifluoromethane	5361087		<0.05	<0.05	NA	< 0.05	99%	50%	140%	88%	50%	140%	93%	50%	140%
Vinyl Chloride	5361087		<0.02	<0.02	NA	< 0.02	107%	50%	140%	84%	50%	140%	87%	50%	140%
Bromomethane	5361087		<0.05	<0.05	NA	< 0.05	107%	50%	140%	115%	50%	140%	79%	50%	140%
Trichlorofluoromethane	5361087		<0.05	<0.05	NA	< 0.05	85%	50%	140%	98%	50%	140%	92%	50%	140%
Acetone	5361087		<0.50	<0.50	NA	< 0.50	99%	50%	140%	105%	50%	140%	93%	50%	140%
1,1-Dichloroethylene	5361087		<0.05	<0.05	NA	< 0.05	95%	50%	140%	90%	60%	130%	99%	50%	140%
Methylene Chloride	5361087		<0.05	<0.05	NA	< 0.05	87%	50%	140%	103%	60%	130%	112%	50%	140%
Trans- 1,2-Dichloroethylene	5361087		<0.05	<0.05	NA	< 0.05	91%	50%	140%	104%	60%	130%	75%	50%	140%
Methyl tert-butyl Ether	5361087		<0.05	<0.05	NA	< 0.05	83%	50%	140%	105%	60%	130%	113%	50%	140%
1,1-Dichloroethane	5361087		<0.02	<0.02	NA	< 0.02	99%	50%	140%	80%	60%	130%	79%	50%	140%
Methyl Ethyl Ketone	5361087		<0.50	<0.50	NA	< 0.50	90%	50%	140%	118%	50%	140%	107%	50%	140%
Cis- 1,2-Dichloroethylene	5361087		<0.02	<0.02	NA	< 0.02	99%	50%	140%	110%	60%	130%	87%	50%	140%
Chloroform	5361087		<0.04	<0.04	NA	< 0.04	94%	50%	140%	113%	60%	130%	94%	50%	140%
1,2-Dichloroethane	5361087		<0.03	<0.03	NA	< 0.03	100%	50%	140%	104%	60%	130%	111%	50%	140%
1,1,1-Trichloroethane	5361087		<0.05	<0.05	NA	< 0.05	81%	50%	140%	109%	60%	130%	78%	50%	140%
Carbon Tetrachloride	5361087		<0.05	<0.05	NA	< 0.05	75%	50%	140%	101%	60%	130%	78%	50%	140%
Benzene	5361087		<0.02	<0.02	NA	< 0.02	87%	50%	140%	103%	60%	130%	79%	50%	140%
1,2-Dichloropropane	5361087		<0.03	<0.03	NA	< 0.03	86%	50%	140%	94%	60%	130%	85%	50%	140%
Trichloroethylene	5361087		<0.03	<0.03	NA	< 0.03	78%	50%	140%	96%	60%	130%	107%	50%	140%
Bromodichloromethane	5361087		<0.05	<0.05	NA	< 0.05	89%	50%	140%	95%	60%	130%	88%	50%	140%
Methyl Isobutyl Ketone	5361087		<0.50	<0.50	NA	< 0.50	103%	50%	140%	106%	50%	140%	92%	50%	140%
1,1,2-Trichloroethane	5361087		<0.04	<0.04	NA	< 0.04	105%	50%	140%	108%	60%	130%	107%	50%	140%
Toluene	5361087		<0.05	<0.05	NA	< 0.05	105%	50%	140%	105%	60%	130%	100%	50%	140%
Dibromochloromethane	5361087		<0.05	<0.05	NA	< 0.05	111%	50%	140%	118%	60%	130%	107%	50%	140%
Ethylene Dibromide	5361087		<0.04	<0.04	NA	< 0.04	96%	50%	140%	98%	60%	130%	114%	50%	140%
Tetrachloroethylene	5361087		<0.05	<0.05	NA	< 0.05	108%	50%	140%	101%	60%	130%	91%	50%	140%
1,1,1,2-Tetrachloroethane	5361087		<0.04	<0.04	NA	< 0.04	116%	50%	140%	92%	60%	130%	109%	50%	140%
Chlorobenzene	5361087		<0.05	<0.05	NA	< 0.05	106%	50%	140%	93%	60%	130%	98%	50%	140%
Ethylbenzene	5361087		<0.05	<0.05	NA	< 0.05	87%	50%	140%	112%	60%	130%	78%	50%	140%
m & p-Xylene	5361087		<0.05	<0.05	NA	< 0.05	105%	50%	140%	105%	60%	130%	98%	50%	140%
Bromoform	5361087		<0.05	<0.05	NA	< 0.05	117%	50%	140%	95%	60%	130%	111%	50%	140%
Styrene	5361087		<0.05	<0.05	NA	< 0.05	75%	50%	140%	76%	60%	130%	79%	50%	140%
1,1,2,2-Tetrachloroethane	5361087		<0.05	<0.05	NA	< 0.05	93%	50%	140%	97%	60%	130%	88%	50%	140%
o-Xylene	5361087		<0.05	<0.05	NA	< 0.05	111%	50%	140%	104%	60%	130%	96%	50%	140%

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED
AGAT WORK ORDER: 23Z080368
PROJECT: CO884.02
ATTENTION TO: Greg Sabourin
SAMPLING SITE:5646 Manotick Main St., Ottawa, ON
SAMPLED BY:SP/GS

Trace Organics Analysis (Continued)

RPT Date: Oct 26, 2023

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
1,3-Dichlorobenzene	5361087		<0.05	<0.05	NA	< 0.05	103%	50%	140%	100%	60%	130%	118%	50%	140%
1,4-Dichlorobenzene	5361087		<0.05	<0.05	NA	< 0.05	105%	50%	140%	96%	60%	130%	113%	50%	140%
1,2-Dichlorobenzene	5361087		<0.05	<0.05	NA	< 0.05	118%	50%	140%	103%	60%	130%	105%	50%	140%
n-Hexane	5361087		<0.05	<0.05	NA	< 0.05	110%	50%	140%	96%	60%	130%	116%	50%	140%
O. Reg. 153(511) - PAHs (Soil)															
Naphthalene	5364585		<0.05	<0.05	NA	< 0.05	90%	50%	140%	75%	50%	140%	85%	50%	140%
Acenaphthylene	5364585		<0.05	<0.05	NA	< 0.05	88%	50%	140%	68%	50%	140%	73%	50%	140%
Acenaphthene	5364585		<0.05	<0.05	NA	< 0.05	84%	50%	140%	80%	50%	140%	80%	50%	140%
Fluorene	5364585		<0.05	<0.05	NA	< 0.05	82%	50%	140%	73%	50%	140%	78%	50%	140%
Phenanthrene	5364585		<0.05	<0.05	NA	< 0.05	78%	50%	140%	70%	50%	140%	75%	50%	140%
Anthracene	5364585		<0.05	<0.05	NA	< 0.05	75%	50%	140%	65%	50%	140%	88%	50%	140%
Fluoranthene	5364585		<0.05	<0.05	NA	< 0.05	80%	50%	140%	73%	50%	140%	88%	50%	140%
Pyrene	5364585		<0.05	<0.05	NA	< 0.05	76%	50%	140%	70%	50%	140%	78%	50%	140%
Benz(a)anthracene	5364585		<0.05	<0.05	NA	< 0.05	85%	50%	140%	65%	50%	140%	85%	50%	140%
Chrysene	5364585		<0.05	<0.05	NA	< 0.05	105%	50%	140%	68%	50%	140%	83%	50%	140%
Benzo(b)fluoranthene	5364585		<0.05	<0.05	NA	< 0.05	82%	50%	140%	95%	50%	140%	85%	50%	140%
Benzo(k)fluoranthene	5364585		<0.05	<0.05	NA	< 0.05	87%	50%	140%	78%	50%	140%	75%	50%	140%
Benzo(a)pyrene	5364585		<0.05	<0.05	NA	< 0.05	67%	50%	140%	85%	50%	140%	90%	50%	140%
Indeno(1,2,3-cd)pyrene	5364585		<0.05	<0.05	NA	< 0.05	93%	50%	140%	83%	50%	140%	88%	50%	140%
Dibenz(a,h)anthracene	5364585		<0.05	<0.05	NA	< 0.05	71%	50%	140%	70%	50%	140%	83%	50%	140%
Benzo(g,h,i)perylene	5364585		<0.05	<0.05	NA	< 0.05	79%	50%	140%	88%	50%	140%	98%	50%	140%
O. Reg. 153(511) - PHCs F1 - F4 (Soil)															
Benzene	5364711	5364711	1.57	1.82	14.7%	< 0.02	98%	60%	140%	93%	60%	140%	101%	60%	140%
Toluene	5364711	5364711	<0.05	<0.05	NA	< 0.05	82%	60%	140%	112%	60%	140%	75%	60%	140%
Ethylbenzene	5364711	5364711	0.12	0.12	NA	< 0.05	96%	60%	140%	89%	60%	140%	75%	60%	140%
m & p-Xylene	5364711	5364711	<0.05	<0.05	NA	< 0.05	100%	60%	140%	95%	60%	140%	106%	60%	140%
o-Xylene	5364711	5364711	<0.05	<0.05	NA	< 0.05	98%	60%	140%	97%	60%	140%	114%	60%	140%
F1 (C6 - C10)	5364711	5364711	<5	<5	NA	< 5	94%	60%	140%	117%	60%	140%	112%	60%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Time Markers

AGAT WORK ORDER: 23Z080368
PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364702	MW201-5	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - Metals & Inorganics (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Antimony	18-OCT-2023	18-OCT-2023	SE
Arsenic	18-OCT-2023	18-OCT-2023	SE
Barium	18-OCT-2023	18-OCT-2023	SE
Beryllium	18-OCT-2023	18-OCT-2023	SE
Boron	18-OCT-2023	18-OCT-2023	SE
Boron (Hot Water Soluble)	19-OCT-2023	19-OCT-2023	ZK
Cadmium	18-OCT-2023	18-OCT-2023	SE
Chromium	18-OCT-2023	18-OCT-2023	SE
Cobalt	18-OCT-2023	18-OCT-2023	SE
Copper	18-OCT-2023	18-OCT-2023	SE
Lead	18-OCT-2023	18-OCT-2023	SE
Molybdenum	18-OCT-2023	18-OCT-2023	SE
Nickel	18-OCT-2023	18-OCT-2023	SE
Selenium	18-OCT-2023	18-OCT-2023	SE
Silver	18-OCT-2023	18-OCT-2023	SE
Thallium	18-OCT-2023	18-OCT-2023	SE
Uranium	18-OCT-2023	18-OCT-2023	SE
Vanadium	18-OCT-2023	18-OCT-2023	SE
Zinc	18-OCT-2023	18-OCT-2023	SE
Chromium, Hexavalent	16-OCT-2023	16-OCT-2023	DG
Cyanide, WAD	17-OCT-2023	17-OCT-2023	BG
Mercury	18-OCT-2023	18-OCT-2023	SE
Electrical Conductivity (2:1)	18-OCT-2023	18-OCT-2023	XL
Sodium Adsorption Ratio (2:1) (Calc.)	18-OCT-2023	18-OCT-2023	XH
pH, 2:1 CaCl2 Extraction	17-OCT-2023	17-OCT-2023	XL

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Naphthalene	19-OCT-2023	19-OCT-2023	SB
Acenaphthylene	19-OCT-2023	19-OCT-2023	SB
Acenaphthene	19-OCT-2023	19-OCT-2023	SB
Fluorene	19-OCT-2023	19-OCT-2023	SB
Phenanthrene	19-OCT-2023	19-OCT-2023	SB
Anthracene	19-OCT-2023	19-OCT-2023	SB
Fluoranthene	19-OCT-2023	19-OCT-2023	SB
Pyrene	19-OCT-2023	19-OCT-2023	SB
Benz(a)anthracene	19-OCT-2023	19-OCT-2023	SB
Chrysene	19-OCT-2023	19-OCT-2023	SB
Benzo(b)fluoranthene	19-OCT-2023	19-OCT-2023	SB

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Time Markers

AGAT WORK ORDER: 23Z080368
PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364702	MW201-5	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzo(k)fluoranthene	19-OCT-2023	19-OCT-2023	SB
Benzo(a)pyrene	19-OCT-2023	19-OCT-2023	SB
Indeno(1,2,3-cd)pyrene	19-OCT-2023	19-OCT-2023	SB
Dibenz(a,h)anthracene	19-OCT-2023	19-OCT-2023	SB
Benzo(g,h,i)perylene	19-OCT-2023	19-OCT-2023	SB
1 and 2 Methlynaphthalene	19-OCT-2023	19-OCT-2023	SYS
Naphthalene-d8	19-OCT-2023	19-OCT-2023	SB
Acridine-d9	19-OCT-2023	19-OCT-2023	SB
Terphenyl-d14	19-OCT-2023	19-OCT-2023	SB
Moisture Content			

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
F1 (C6 - C10)	18-OCT-2023	18-OCT-2023	AG
F1 (C6 to C10) minus BTEX	18-OCT-2023	18-OCT-2023	SYS
Toluene-d8	18-OCT-2023	18-OCT-2023	AG
F2 (C10 to C16)	18-OCT-2023	18-OCT-2023	SS
F2 (C10 to C16) minus Naphthalene	19-OCT-2023	19-OCT-2023	SYS
F3 (C16 to C34)	18-OCT-2023	18-OCT-2023	SS
F3 (C16 to C34) minus PAHs	19-OCT-2023	19-OCT-2023	SYS
F4 (C34 to C50)	18-OCT-2023	18-OCT-2023	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content			
Terphenyl	18-OCT-2023	18-OCT-2023	SS

O. Reg. 153(511) - VOCs (with PHC) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Dichlorodifluoromethane	18-OCT-2023	18-OCT-2023	AG
Vinyl Chloride	18-OCT-2023	18-OCT-2023	AG
Bromomethane	18-OCT-2023	18-OCT-2023	AG
Trichlorofluoromethane	18-OCT-2023	18-OCT-2023	AG
Acetone	18-OCT-2023	18-OCT-2023	AG
1,1-Dichloroethylene			
Methylene Chloride	18-OCT-2023	18-OCT-2023	AG
Trans- 1,2-Dichloroethylene	18-OCT-2023	18-OCT-2023	AG
Methyl tert-butyl Ether	18-OCT-2023	18-OCT-2023	AG
1,1-Dichloroethane	18-OCT-2023	18-OCT-2023	AG
Methyl Ethyl Ketone	18-OCT-2023	18-OCT-2023	AG
Cis- 1,2-Dichloroethylene	18-OCT-2023	18-OCT-2023	AG

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364702	MW201-5	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - VOCs (with PHC) (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Chloroform	18-OCT-2023	18-OCT-2023	AG
1,2-Dichloroethane	18-OCT-2023	18-OCT-2023	AG
1,1,1-Trichloroethane	18-OCT-2023	18-OCT-2023	AG
Carbon Tetrachloride	18-OCT-2023	18-OCT-2023	AG
Benzene	18-OCT-2023	18-OCT-2023	AG
1,2-Dichloropropane	18-OCT-2023	18-OCT-2023	AG
Trichloroethylene	18-OCT-2023	18-OCT-2023	AG
Bromodichloromethane	18-OCT-2023	18-OCT-2023	AG
Methyl Isobutyl Ketone	18-OCT-2023	18-OCT-2023	AG
1,1,2-Trichloroethane	18-OCT-2023	18-OCT-2023	AG
Toluene	18-OCT-2023	18-OCT-2023	AG
Dibromochloromethane	18-OCT-2023	18-OCT-2023	AG
Ethylene Dibromide	18-OCT-2023	18-OCT-2023	AG
Tetrachloroethylene			
1,1,1,2-Tetrachloroethane	18-OCT-2023	18-OCT-2023	AG
Chlorobenzene	18-OCT-2023	18-OCT-2023	AG
Ethylbenzene	18-OCT-2023	18-OCT-2023	AG
m & p-Xylene	18-OCT-2023	18-OCT-2023	AG
Bromoform	18-OCT-2023	18-OCT-2023	AG
Styrene	18-OCT-2023	18-OCT-2023	AG
1,1,2,2-Tetrachloroethane	18-OCT-2023	18-OCT-2023	AG
o-Xylene	18-OCT-2023	18-OCT-2023	AG
1,3-Dichlorobenzene	18-OCT-2023	18-OCT-2023	AG
1,4-Dichlorobenzene	18-OCT-2023	18-OCT-2023	AG
1,2-Dichlorobenzene	18-OCT-2023	18-OCT-2023	AG
Xylenes (Total)	18-OCT-2023	18-OCT-2023	SYS
1,3-Dichloropropene (Cis + Trans)	18-OCT-2023	18-OCT-2023	SYS
n-Hexane	18-OCT-2023	18-OCT-2023	AG
Toluene-d8	18-OCT-2023	18-OCT-2023	AG
4-Bromofluorobenzene	18-OCT-2023	18-OCT-2023	AG
Moisture Content			

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364703	BH202-1	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - Metals & Inorganics (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Antimony	18-OCT-2023	18-OCT-2023	SE
Arsenic	18-OCT-2023	18-OCT-2023	SE
Barium	18-OCT-2023	18-OCT-2023	SE

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Time Markers

AGAT WORK ORDER: 23Z080368
PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364703	BH202-1	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - Metals & Inorganics (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Beryllium	18-OCT-2023	18-OCT-2023	SE
Boron	18-OCT-2023	18-OCT-2023	SE
Boron (Hot Water Soluble)	19-OCT-2023	19-OCT-2023	ZK
Cadmium	18-OCT-2023	18-OCT-2023	SE
Chromium	18-OCT-2023	18-OCT-2023	SE
Cobalt	18-OCT-2023	18-OCT-2023	SE
Copper	18-OCT-2023	18-OCT-2023	SE
Lead	18-OCT-2023	18-OCT-2023	SE
Molybdenum	18-OCT-2023	18-OCT-2023	SE
Nickel	18-OCT-2023	18-OCT-2023	SE
Selenium	18-OCT-2023	18-OCT-2023	SE
Silver	18-OCT-2023	18-OCT-2023	SE
Thallium	18-OCT-2023	18-OCT-2023	SE
Uranium	18-OCT-2023	18-OCT-2023	SE
Vanadium	18-OCT-2023	18-OCT-2023	SE
Zinc	18-OCT-2023	18-OCT-2023	SE
Chromium, Hexavalent	16-OCT-2023	16-OCT-2023	DG
Cyanide, WAD	17-OCT-2023	17-OCT-2023	BG
Mercury	18-OCT-2023	18-OCT-2023	SE
Electrical Conductivity (2:1)	18-OCT-2023	18-OCT-2023	XL
Sodium Adsorption Ratio (2:1) (Calc.)	18-OCT-2023	18-OCT-2023	XH
pH, 2:1 CaCl2 Extraction	17-OCT-2023	17-OCT-2023	XL

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Naphthalene	19-OCT-2023	19-OCT-2023	SB
Acenaphthylene	19-OCT-2023	19-OCT-2023	SB
Acenaphthene	19-OCT-2023	19-OCT-2023	SB
Fluorene	19-OCT-2023	19-OCT-2023	SB
Phenanthrene	19-OCT-2023	19-OCT-2023	SB
Anthracene	19-OCT-2023	19-OCT-2023	SB
Fluoranthene	19-OCT-2023	19-OCT-2023	SB
Pyrene	19-OCT-2023	19-OCT-2023	SB
Benz(a)anthracene	19-OCT-2023	19-OCT-2023	SB
Chrysene	19-OCT-2023	19-OCT-2023	SB
Benzo(b)fluoranthene	19-OCT-2023	19-OCT-2023	SB
Benzo(k)fluoranthene	19-OCT-2023	19-OCT-2023	SB
Benzo(a)pyrene	19-OCT-2023	19-OCT-2023	SB
Indeno(1,2,3-cd)pyrene	19-OCT-2023	19-OCT-2023	SB

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364703	BH202-1	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Dibenz(a,h)anthracene	19-OCT-2023	19-OCT-2023	SB
Benzo(g,h,i)perylene	19-OCT-2023	19-OCT-2023	SB
1 and 2 Methlynaphthalene	19-OCT-2023	19-OCT-2023	SYS
Naphthalene-d8	19-OCT-2023	19-OCT-2023	SB
Acridine-d9	19-OCT-2023	19-OCT-2023	SB
Terphenyl-d14	19-OCT-2023	19-OCT-2023	SB
Moisture Content			

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364704	BH202-4	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	16-OCT-2023	16-OCT-2023	VB
Toluene	16-OCT-2023	16-OCT-2023	VB
Ethylbenzene	16-OCT-2023	16-OCT-2023	VB
m & p-Xylene	16-OCT-2023	16-OCT-2023	VB
o-Xylene	16-OCT-2023	16-OCT-2023	VB
Xylenes (Total)	16-OCT-2023	16-OCT-2023	SYS
F1 (C6 - C10)	16-OCT-2023	16-OCT-2023	VB
F1 (C6 to C10) minus BTEX	16-OCT-2023	16-OCT-2023	SYS
Toluene-d8	16-OCT-2023	16-OCT-2023	VB
F2 (C10 to C16)	18-OCT-2023	18-OCT-2023	SS
F3 (C16 to C34)	18-OCT-2023	18-OCT-2023	SS
F4 (C34 to C50)	18-OCT-2023	18-OCT-2023	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content			
Terphenyl	18-OCT-2023	18-OCT-2023	SS

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364705	BH203-3	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	16-OCT-2023	16-OCT-2023	VB
Toluene	16-OCT-2023	16-OCT-2023	VB
Ethylbenzene	16-OCT-2023	16-OCT-2023	VB
m & p-Xylene	16-OCT-2023	16-OCT-2023	VB
o-Xylene	16-OCT-2023	16-OCT-2023	VB
Xylenes (Total)	16-OCT-2023	16-OCT-2023	SYS

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364705	BH203-3	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
F1 (C6 - C10)	16-OCT-2023	16-OCT-2023	VB
F1 (C6 to C10) minus BTEX	16-OCT-2023	16-OCT-2023	SYS
Toluene-d8	16-OCT-2023	16-OCT-2023	VB
F2 (C10 to C16)	18-OCT-2023	18-OCT-2023	SS
F3 (C16 to C34)	18-OCT-2023	18-OCT-2023	SS
F4 (C34 to C50)	18-OCT-2023	18-OCT-2023	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content			
Terphenyl	18-OCT-2023	18-OCT-2023	SS

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364706	MW204-4	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	16-OCT-2023	16-OCT-2023	VB
Toluene	16-OCT-2023	16-OCT-2023	VB
Ethylbenzene	16-OCT-2023	16-OCT-2023	VB
m & p-Xylene	16-OCT-2023	16-OCT-2023	VB
o-Xylene	16-OCT-2023	16-OCT-2023	VB
Xylenes (Total)	16-OCT-2023	16-OCT-2023	SYS
F1 (C6 - C10)	16-OCT-2023	16-OCT-2023	VB
F1 (C6 to C10) minus BTEX	16-OCT-2023	16-OCT-2023	SYS
Toluene-d8	16-OCT-2023	16-OCT-2023	VB
F2 (C10 to C16)	18-OCT-2023	18-OCT-2023	SS
F3 (C16 to C34)	18-OCT-2023	18-OCT-2023	SS
F4 (C34 to C50)	18-OCT-2023	18-OCT-2023	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content			
Terphenyl	18-OCT-2023	18-OCT-2023	SS

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364707	MW204-5	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	16-OCT-2023	16-OCT-2023	VB
Toluene	16-OCT-2023	16-OCT-2023	VB
Ethylbenzene	16-OCT-2023	16-OCT-2023	VB
m & p-Xylene	16-OCT-2023	16-OCT-2023	VB

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364707	MW204-5	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
o-Xylene	16-OCT-2023	16-OCT-2023	VB
Xylenes (Total)	16-OCT-2023	16-OCT-2023	SYS
F1 (C6 - C10)	16-OCT-2023	16-OCT-2023	VB
F1 (C6 to C10) minus BTEX	16-OCT-2023	16-OCT-2023	SYS
Toluene-d8	16-OCT-2023	16-OCT-2023	VB
F2 (C10 to C16)	18-OCT-2023	18-OCT-2023	SS
F3 (C16 to C34)	18-OCT-2023	18-OCT-2023	SS
F4 (C34 to C50)	18-OCT-2023	18-OCT-2023	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content			
Terphenyl	18-OCT-2023	18-OCT-2023	SS

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364708	MW1000	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	16-OCT-2023	16-OCT-2023	VB
Toluene	16-OCT-2023	16-OCT-2023	VB
Ethylbenzene	16-OCT-2023	16-OCT-2023	VB
m & p-Xylene	16-OCT-2023	16-OCT-2023	VB
o-Xylene	16-OCT-2023	16-OCT-2023	VB
Xylenes (Total)	16-OCT-2023	16-OCT-2023	SYS
F1 (C6 - C10)	16-OCT-2023	16-OCT-2023	VB
F1 (C6 to C10) minus BTEX	16-OCT-2023	16-OCT-2023	SYS
Toluene-d8	16-OCT-2023	16-OCT-2023	VB
F2 (C10 to C16)	18-OCT-2023	18-OCT-2023	SS
F3 (C16 to C34)	18-OCT-2023	18-OCT-2023	SS
F4 (C34 to C50)	18-OCT-2023	18-OCT-2023	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content			
Terphenyl	18-OCT-2023	18-OCT-2023	SS

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364709	BH205-2	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - Metals & Inorganics (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Antimony	18-OCT-2023	18-OCT-2023	SE
Arsenic	18-OCT-2023	18-OCT-2023	SE

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Time Markers

AGAT WORK ORDER: 23Z080368
PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364709	BH205-2	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - Metals & Inorganics (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Barium	18-OCT-2023	18-OCT-2023	SE
Beryllium	18-OCT-2023	18-OCT-2023	SE
Boron	18-OCT-2023	18-OCT-2023	SE
Boron (Hot Water Soluble)	19-OCT-2023	19-OCT-2023	ZK
Cadmium	18-OCT-2023	18-OCT-2023	SE
Chromium	18-OCT-2023	18-OCT-2023	SE
Cobalt	18-OCT-2023	18-OCT-2023	SE
Copper	18-OCT-2023	18-OCT-2023	SE
Lead	18-OCT-2023	18-OCT-2023	SE
Molybdenum	18-OCT-2023	18-OCT-2023	SE
Nickel	18-OCT-2023	18-OCT-2023	SE
Selenium	18-OCT-2023	18-OCT-2023	SE
Silver	18-OCT-2023	18-OCT-2023	SE
Thallium	18-OCT-2023	18-OCT-2023	SE
Uranium	18-OCT-2023	18-OCT-2023	SE
Vanadium	18-OCT-2023	18-OCT-2023	SE
Zinc	18-OCT-2023	18-OCT-2023	SE
Chromium, Hexavalent	16-OCT-2023	16-OCT-2023	DG
Cyanide, WAD	17-OCT-2023	17-OCT-2023	BG
Mercury	18-OCT-2023	18-OCT-2023	SE
Electrical Conductivity (2:1)	18-OCT-2023	18-OCT-2023	XL
Sodium Adsorption Ratio (2:1) (Calc.)	18-OCT-2023	18-OCT-2023	XH
pH, 2:1 CaCl2 Extraction	17-OCT-2023	17-OCT-2023	XL

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Naphthalene	19-OCT-2023	19-OCT-2023	SB
Acenaphthylene	19-OCT-2023	19-OCT-2023	SB
Acenaphthene	19-OCT-2023	19-OCT-2023	SB
Fluorene	19-OCT-2023	19-OCT-2023	SB
Phenanthrene	19-OCT-2023	19-OCT-2023	SB
Anthracene	19-OCT-2023	19-OCT-2023	SB
Fluoranthene	19-OCT-2023	19-OCT-2023	SB
Pyrene	19-OCT-2023	19-OCT-2023	SB
Benz(a)anthracene	19-OCT-2023	19-OCT-2023	SB
Chrysene	19-OCT-2023	19-OCT-2023	SB
Benzo(b)fluoranthene	19-OCT-2023	19-OCT-2023	SB
Benzo(k)fluoranthene	19-OCT-2023	19-OCT-2023	SB
Benzo(a)pyrene	19-OCT-2023	19-OCT-2023	SB

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364709	BH205-2	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Indeno(1,2,3-cd)pyrene	19-OCT-2023	19-OCT-2023	SB
Dibenz(a,h)anthracene	19-OCT-2023	19-OCT-2023	SB
Benzo(g,h,i)perylene	19-OCT-2023	19-OCT-2023	SB
1 and 2 Methlynaphthalene	19-OCT-2023	19-OCT-2023	SYS
Naphthalene-d8	19-OCT-2023	19-OCT-2023	SB
Acridine-d9	19-OCT-2023	19-OCT-2023	SB
Terphenyl-d14	19-OCT-2023	19-OCT-2023	SB
Moisture Content			

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364710	BH205-3	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	16-OCT-2023	16-OCT-2023	VB
Toluene	16-OCT-2023	16-OCT-2023	VB
Ethylbenzene	16-OCT-2023	16-OCT-2023	VB
m & p-Xylene	16-OCT-2023	16-OCT-2023	VB
o-Xylene	16-OCT-2023	16-OCT-2023	VB
Xylenes (Total)	16-OCT-2023	16-OCT-2023	SYS
F1 (C6 - C10)	16-OCT-2023	16-OCT-2023	VB
F1 (C6 to C10) minus BTEX	16-OCT-2023	16-OCT-2023	SYS
Toluene-d8	16-OCT-2023	16-OCT-2023	VB
F2 (C10 to C16)	18-OCT-2023	18-OCT-2023	SS
F3 (C16 to C34)	18-OCT-2023	18-OCT-2023	SS
F4 (C34 to C50)	18-OCT-2023	18-OCT-2023	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content			
Terphenyl	18-OCT-2023	18-OCT-2023	SS

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364711	BH205-6	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	16-OCT-2023	16-OCT-2023	VB
Toluene	16-OCT-2023	16-OCT-2023	VB
Ethylbenzene	16-OCT-2023	16-OCT-2023	VB
m & p-Xylene	16-OCT-2023	16-OCT-2023	VB
o-Xylene	16-OCT-2023	16-OCT-2023	VB

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Time Markers

AGAT WORK ORDER: 23Z080368
PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364711	BH205-6	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Xylenes (Total)	16-OCT-2023	16-OCT-2023	SYS
F1 (C6 - C10)	16-OCT-2023	16-OCT-2023	VB
F1 (C6 to C10) minus BTEX	16-OCT-2023	16-OCT-2023	SYS
Toluene-d8	16-OCT-2023	16-OCT-2023	VB
F2 (C10 to C16)	18-OCT-2023	18-OCT-2023	SS
F3 (C16 to C34)	18-OCT-2023	18-OCT-2023	SS
F4 (C34 to C50)	18-OCT-2023	18-OCT-2023	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content			
Terphenyl	18-OCT-2023	18-OCT-2023	SS

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364712	MW206-2	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - Metals & Inorganics (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Antimony	18-OCT-2023	18-OCT-2023	SE
Arsenic	18-OCT-2023	18-OCT-2023	SE
Barium	18-OCT-2023	18-OCT-2023	SE
Beryllium	18-OCT-2023	18-OCT-2023	SE
Boron	18-OCT-2023	18-OCT-2023	SE
Boron (Hot Water Soluble)	19-OCT-2023	19-OCT-2023	ZK
Cadmium	18-OCT-2023	18-OCT-2023	SE
Chromium	18-OCT-2023	18-OCT-2023	SE
Cobalt	18-OCT-2023	18-OCT-2023	SE
Copper	18-OCT-2023	18-OCT-2023	SE
Lead	18-OCT-2023	18-OCT-2023	SE
Molybdenum	18-OCT-2023	18-OCT-2023	SE
Nickel	18-OCT-2023	18-OCT-2023	SE
Selenium	18-OCT-2023	18-OCT-2023	SE
Silver	18-OCT-2023	18-OCT-2023	SE
Thallium	18-OCT-2023	18-OCT-2023	SE
Uranium	18-OCT-2023	18-OCT-2023	SE
Vanadium	18-OCT-2023	18-OCT-2023	SE
Zinc	18-OCT-2023	18-OCT-2023	SE
Chromium, Hexavalent	16-OCT-2023	16-OCT-2023	DG
Cyanide, WAD	17-OCT-2023	17-OCT-2023	BG
Mercury	18-OCT-2023	18-OCT-2023	SE
Electrical Conductivity (2:1)	18-OCT-2023	18-OCT-2023	XL
Sodium Adsorption Ratio (2:1) (Calc.)	18-OCT-2023	18-OCT-2023	XH

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364712	MW206-2	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - Metals & Inorganics (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
pH, 2:1 CaCl2 Extraction	17-OCT-2023	17-OCT-2023	XL

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Naphthalene	19-OCT-2023	19-OCT-2023	SB
Acenaphthylene	19-OCT-2023	19-OCT-2023	SB
Acenaphthene	19-OCT-2023	19-OCT-2023	SB
Fluorene	19-OCT-2023	19-OCT-2023	SB
Phenanthrene	19-OCT-2023	19-OCT-2023	SB
Anthracene	19-OCT-2023	19-OCT-2023	SB
Fluoranthene	19-OCT-2023	19-OCT-2023	SB
Pyrene	19-OCT-2023	19-OCT-2023	SB
Benz(a)anthracene	19-OCT-2023	19-OCT-2023	SB
Chrysene	19-OCT-2023	19-OCT-2023	SB
Benzo(b)fluoranthene	19-OCT-2023	19-OCT-2023	SB
Benzo(k)fluoranthene	19-OCT-2023	19-OCT-2023	SB
Benzo(a)pyrene	19-OCT-2023	19-OCT-2023	SB
Indeno(1,2,3-cd)pyrene	19-OCT-2023	19-OCT-2023	SB
Dibenz(a,h)anthracene	19-OCT-2023	19-OCT-2023	SB
Benzo(g,h,i)perylene	19-OCT-2023	19-OCT-2023	SB
1 and 2 Methlynaphthalene	19-OCT-2023	19-OCT-2023	SYS
Naphthalene-d8	19-OCT-2023	19-OCT-2023	SB
Acridine-d9	19-OCT-2023	19-OCT-2023	SB
Terphenyl-d14	19-OCT-2023	19-OCT-2023	SB
Moisture Content			

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364713	MW206-6	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	16-OCT-2023	16-OCT-2023	VB
Toluene	16-OCT-2023	16-OCT-2023	VB
Ethylbenzene	16-OCT-2023	16-OCT-2023	VB
m & p-Xylene	16-OCT-2023	16-OCT-2023	VB
o-Xylene	16-OCT-2023	16-OCT-2023	VB
Xylenes (Total)	16-OCT-2023	16-OCT-2023	SYS
F1 (C6 - C10)	16-OCT-2023	16-OCT-2023	VB
F1 (C6 to C10) minus BTEX	16-OCT-2023	16-OCT-2023	SYS
Toluene-d8	16-OCT-2023	16-OCT-2023	VB

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364713	MW206-6	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PHCs F1 - F4 (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
F2 (C10 to C16)	18-OCT-2023	18-OCT-2023	SS
F3 (C16 to C34)	18-OCT-2023	18-OCT-2023	SS
F4 (C34 to C50)	18-OCT-2023	18-OCT-2023	SS
Gravimetric Heavy Hydrocarbons			
Moisture Content			
Terphenyl	18-OCT-2023	18-OCT-2023	SS

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364715	MW3000	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - Metals & Inorganics (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Antimony	18-OCT-2023	18-OCT-2023	SE
Arsenic	18-OCT-2023	18-OCT-2023	SE
Barium	18-OCT-2023	18-OCT-2023	SE
Beryllium	18-OCT-2023	18-OCT-2023	SE
Boron	18-OCT-2023	18-OCT-2023	SE
Boron (Hot Water Soluble)	19-OCT-2023	19-OCT-2023	ZK
Cadmium	18-OCT-2023	18-OCT-2023	SE
Chromium	18-OCT-2023	18-OCT-2023	SE
Cobalt	18-OCT-2023	18-OCT-2023	SE
Copper	18-OCT-2023	18-OCT-2023	SE
Lead	18-OCT-2023	18-OCT-2023	SE
Molybdenum	18-OCT-2023	18-OCT-2023	SE
Nickel	18-OCT-2023	18-OCT-2023	SE
Selenium	18-OCT-2023	18-OCT-2023	SE
Silver	18-OCT-2023	18-OCT-2023	SE
Thallium	18-OCT-2023	18-OCT-2023	SE
Uranium	18-OCT-2023	18-OCT-2023	SE
Vanadium	18-OCT-2023	18-OCT-2023	SE
Zinc	18-OCT-2023	18-OCT-2023	SE
Chromium, Hexavalent	16-OCT-2023	16-OCT-2023	DG
Cyanide, WAD	17-OCT-2023	17-OCT-2023	BG
Mercury	18-OCT-2023	18-OCT-2023	SE
Electrical Conductivity (2:1)	18-OCT-2023	18-OCT-2023	XL
Sodium Adsorption Ratio (2:1) (Calc.)	18-OCT-2023	18-OCT-2023	XH
pH, 2:1 CaCl2 Extraction	17-OCT-2023	17-OCT-2023	XL

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Time Markers

AGAT WORK ORDER: 23Z080368
PROJECT: CO884.02

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

ATTENTION TO: Greg Sabourin

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364715	MW3000	Soil	12-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PAHs (Soil)

Parameter	Date Prepared	Date Analyzed	Initials
Naphthalene	19-OCT-2023	19-OCT-2023	SB
Acenaphthylene	19-OCT-2023	19-OCT-2023	SB
Acenaphthene	19-OCT-2023	19-OCT-2023	SB
Fluorene	19-OCT-2023	19-OCT-2023	SB
Phenanthrene	19-OCT-2023	19-OCT-2023	SB
Anthracene	19-OCT-2023	19-OCT-2023	SB
Fluoranthene	19-OCT-2023	19-OCT-2023	SB
Pyrene	19-OCT-2023	19-OCT-2023	SB
Benz(a)anthracene	19-OCT-2023	19-OCT-2023	SB
Chrysene	19-OCT-2023	19-OCT-2023	SB
Benzo(b)fluoranthene	19-OCT-2023	19-OCT-2023	SB
Benzo(k)fluoranthene	19-OCT-2023	19-OCT-2023	SB
Benzo(a)pyrene	19-OCT-2023	19-OCT-2023	SB
Indeno(1,2,3-cd)pyrene	19-OCT-2023	19-OCT-2023	SB
Dibenz(a,h)anthracene	19-OCT-2023	19-OCT-2023	SB
Benzo(g,h,i)perylene	19-OCT-2023	19-OCT-2023	SB
1 and 2 Methlynaphthalene	19-OCT-2023	19-OCT-2023	SYS
Naphthalene-d8	19-OCT-2023	19-OCT-2023	SB
Acridine-d9	19-OCT-2023	19-OCT-2023	SB
Terphenyl-d14	19-OCT-2023	19-OCT-2023	SB
Moisture Content			

Sample ID	Sample Description	Sample Type	Date Sampled	Date Received
5364716	TRIP BLANK	MeOH	10-OCT-2023	13-OCT-2023

O. Reg. 153(511) - PHCs F1/BTEX (MeOH)

Parameter	Date Prepared	Date Analyzed	Initials
Benzene	16-OCT-2023	16-OCT-2023	VB
Toluene	16-OCT-2023	16-OCT-2023	VB
Ethylbenzene	16-OCT-2023	16-OCT-2023	VB
m & p-Xylene	16-OCT-2023	16-OCT-2023	VB
o-Xylene	16-OCT-2023	16-OCT-2023	VB
Xylenes (Total)	16-OCT-2023	16-OCT-2023	SYS
F1 (C6 - C10)	16-OCT-2023	16-OCT-2023	VB
F1 (C6 to C10) minus BTEX	16-OCT-2023	16-OCT-2023	SYS
Toluene-d8	16-OCT-2023	16-OCT-2023	VB

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 23Z080368

PROJECT: CO884.02

ATTENTION TO: Greg Sabourin

SAMPLING SITE:5646 Manotick Main St., Ottawa, ON

SAMPLED BY:SP/GS

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	modified from EPA 6010D and MSA PART 3, CH 21	ICP/OES
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium, Hexavalent	INOR-93-6068	modified from EPA 3060 and EPA 7196	SPECTROPHOTOMETER
Cyanide, WAD	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	SEGMENTED FLOW ANALYSIS
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6075	modified from MSA PART 3, CH 14 and SM 2510 B	PC TITRATE
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6075	modified from EPA 9045D, MCKEAGUE 3.11 E3137	PC TITRATE

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 23Z080368

PROJECT: CO884.02

ATTENTION TO: Greg Sabourin

SAMPLING SITE:5646 Manotick Main St., Ottawa, ON

SAMPLED BY:SP/GS

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluorene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benz(a)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Chrysene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
1 and 2 Methlynaphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Moisture Content	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Benzene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Toluene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Ethylbenzene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
m & p-Xylene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
o-Xylene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Xylenes (Total)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
F1 (C6 - C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	P&T GC/FID
Toluene-d8	VOL-91-5009	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 23Z080368

PROJECT: CO884.02

ATTENTION TO: Greg Sabourin

SAMPLING SITE:5646 Manotick Main St., Ottawa, ON

SAMPLED BY:SP/GS

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Benzene	VOL-91-5009	modified from EPA SW-846 5035C & 8260D	(P&T)GC/MS
Toluene	VOL-91-5009	modified from EPA SW-846 5035C & 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5009	modified from EPA SW-846 5035C & 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5009	modified from EPA SW-846 5035C & 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5009	modified from EPA SW-846 5035C & 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5009	modified from EPA 5035C and EPA 8260D	(P&T)GC/MS
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	P&T GC/FID
Dichlorodifluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: TERRAPEX ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 23Z080368

PROJECT: CO884.02

ATTENTION TO: Greg Sabourin

SAMPLING SITE:5646 Manotick Main St., Ottawa, ON

SAMPLED BY:SP/GS

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS

AGAT Laboratories

Have feedback? Scan here for a quick survey!

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: Terrapex Environmental Ltd
Contact: Greg Sabourin
Address: 1-26 Guardsman Rd, Nepean, Ottawa, ON
Phone: 613-558-7571 Fax:
Reports to be sent to:
1. Email: G.SABOURIN@terrapex.com
2. Email:

Project Information:

Project: C0884-02
Site Location: 5646 Manotick Main St., Ottawa, ON
Sampled By: SP/GS
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

(Please check all applicable boxes)

☑ Regulation 153/04
Table 2 (Indicate One)
☐ Ind/Com
☑ Res/Park
☐ Agriculture
Soil Texture (Check One)
☐ Coarse
☐ Fine

☐ Regulation 406
Table ____ (Indicate One)

☐ Regulation 558

☐ CCME

☐ Sewer Use ☐ Sanitary ☐ Storm
____ (Region)

☐ Prov. Water Quality Objectives (PWQO)

☐ Other
____ (Indicate One)

Is this submission for a **Record of Site Condition?** ☑ Yes ☐ No

Report Guideline on Certificate of Analysis ☑ Yes ☐ No

Sample Matrix Legend

GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Laboratory Use Only

Work Order #: 23208O3608
Cooler Quantity: one - loose ice.
Arrival Temperatures: 1.6 | 1.5 | 1.6 / 2.3 | 2.7 | 2.9
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs	VOC	PAHs	PCBs	PCBs: Aroclors ☐	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Regulation 406 SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Regulation 406 Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Corrosivity: ☐ Moisture ☐ Sulphide	Potentially Hazardous or High Concentration (Y/N)
1. MW201-5	12/10/2023	10:15 AM/PM	3	S			✓		✓	✓	✓							
2. BH202-1	"	9:50 AM/PM	1	S			✓				✓							
3. BH202-4	"	10:15 AM/PM	2	"					✓									
4. BH203-3	"	11:06 AM/PM	2	"					✓									
5. MW204-4	"	12:38 AM/PM	2	"					✓									
6. MW204-5	"	12:50 AM/PM	2	"					✓									
7. MW1000	"	12:38 AM/PM	2	"					✓									
8. BH205-2	"	13:27 AM/PM	1	"			✓				✓							
9. BH205-3	"	13:39 AM/PM	2	"					✓									
10. BH205-6	"	14:10 AM/PM	2	"					✓									
11.		AM/PM																

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
SREE	13/10/2023	13:54		10/13/23	14h00
	10/13/23	15h30	GWYNETH YOUNG	10/14/23	10:40Am

Page 1 of 2

N°: T-149246

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT

AGAT Laboratories

Have feedback? Scan here for a quick survey!

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: Terraper Environmental Ltd.
Contact: Greg Sabourin
Address: 1-20 Gurdwara Rd, Nepean, Ottawa, ON
Phone: 613-558-7571 Fax:
Reports to be sent to:
1. Email: G. SABOURIN@terraper.com
2. Email:

Project Information:

Project: CO884.02
Site Location: 5646 Manotick Main St, Ottawa, ON.
Sampled By: SP/GS
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

(Please check all applicable boxes)

☑ Regulation 153/04
Table 2 (Indicate One)
☐ Ind/Com ☑ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Regulation 406
Table ____ (Indicate One)

☐ Regulation 558

☐ CCME

☐ Sewer Use ☐ Sanitary ☐ Storm
____ (Region)

☐ Prov. Water Quality Objectives (PWQO)

☐ Other
____ (Indicate One)

Is this submission for a **Record of Site Condition?** ☑ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Laboratory Use Only

Work Order #: 2320803688
Cooler Quantity: ONE - loose ice
Arrival Temperatures: 1.6 | 1.5 | 1.6 | 2.3 | 2.7 | 2.9
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Sample Matrix Legend

GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs	VOC	PAHs	PCBs	PCBs: Aroclors ☐	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Regulation 406 SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Regulation 406 Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Corrosivity: ☐ Moisture ☐ Sulphide	BTEX, F1						Potentially Hazardous or High Concentration (Y/N)
1. MW206-2	12/10/2023	14:57 AM/PM	1	S			✓				✓													
2. MW206-6	"	15:35 AM/PM	2	"					✓															
3. MW 3000	"	14:57 AM/PM	1	"			✓				✓													
4. TRIP BLANK	10/10/23	[redacted] AM/PM	1	—														X						
5.		AM/PM																						
6.		AM/PM																						
7.		AM/PM																						
8.		AM/PM																						
9.		AM/PM																						
10.		AM/PM																						
11.		AM/PM																						

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
SREE	13/10/2023	13:54	C. Gauthier	10/13/23	14h00
C. to Bruno	10/13/23	15h30	GWYNET V	10/14/23	10:40AM

Page 2 of 2
N°: T-149247

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT

APPENDIX VI
QUALIFICATIONS OF ASSESSORS

KEITH BROWN, P.Eng., QP_{ESA}

Education:	B.Sc. (Eng) Environmental	2000	University of Guelph
Professional Associations:	Association of Professional Engineers of Ontario		
Safety Training:	Standard First Aid and CPR Petroleum Oriented Safety Training (POST) Workplace Hazardous Materials Information System (WHMIS) 40-hour OSHA Training Course for Hazardous Waste Operations General Construction Site Safety Course (CSST)		
Continuing Education:	Project Management Training (F&M Management Ltd.)		

EXPERIENCE

2003 to Present – Terrapex Environmental Ltd., Ottawa, Ontario

Senior Project Manager/Team Lead

Responsible for management of Phase I/One, II/Two and III Environmental Site Assessments (ESAs), environmental monitoring programs, site remediations and designated substances surveys for various clients. Directly accountable to clients for successful completion of projects on time and on budget.

Duties and responsibilities included:

- Managing several standing offer agreements (SOAs) acting as the primary contact with selected clients and proving overall project management for projects arising from the SOAs
- Proposal and detailed cost estimate preparation
- Project management including development and implementation of environmental work plans, project scheduling and coordination, and preparation of site-specific health and safety plans
- Oversight of field staff and subcontractors
- Data review, QAQC and interpretation
- Preparation and submission of Record of Site Conditions (RSCs) as a Qualified Person (QP_{ESA})
- Communication with clients providing updates on deliverables and budgets
- Liaison between client and regulatory authorities (when required)
- Preparation of factual environmental reports (Phase I/One, Phase II/Two and Phase III ESA, DSS)
- Peer review of environmental reports
- Providing QA/QC and review of technical reports, proposals, and similar documents
- Business development
- Primary client contact for Parkland Corp. and Valero Energy Inc.

2000 to 2003 – Terrapex Environnement Ltée., Montreal, Quebec

Environmental Scientist

Duties and responsibilities included:

- Conduct Phase I Environmental Site Assessment (ESAs) site visits for commercial, industrial and residential sites, and historical research including City Directory searches, aerial photograph interpretation, Fire insurance plans review and Freedom of Information requests
- Conduct Phase II Environmental Site Assessment (ESAs) including supervision of drilling, soil logging and sampling, installation of monitoring wells, hydrogeological assessment of groundwater movement and contaminant plumes
- Supervision of decommissioning of former petroleum retail service stations, including underground storage tank decommissioning and remedial excavations
- Monitoring of groundwater observation wells and remediation systems
- Environmental report preparation (Phase I and Phase II ESA and remediation)

Mr. Brown has extensive experience in the preparation, management and execution of environmental site assessment and remediation projects at commercial, industrial, and residential properties, including retail fuel outlets, dry cleaners, former coal gasification plants, auto repair garages, and haulage/ transportation depots. Remediation projects include both in-situ and ex-situ treatment/disposal programs on sites impacted by metals, fuels, oils, and chlorinated solvents.

Mr. Brown is a Qualified Person (QP) under Ontario Regulation 153/04 for Phase One and Two ESAs in support of filing for a Record of Site Condition (RSC), and under Ontario Regulation 406/19 for On-Site and Excess Soil Management. He is routinely responsible for team, budget and schedule control, oversight of records reviews, sampling plan development, project team management, data interpretation, technical review and overall client satisfaction.

Project Management

Mr. Brown has successfully managed ESA, monitoring, remediation, and RSC projects ranging from smaller scale assignments with tight timelines, to larger multi-year projects. Mr. Brown has demonstrable experience in project control (task implementation, scheduling, budget control, personnel management, etc.), is detail-orientated and adept at working collaboratively with clients, stakeholders, and regulators. He has an in-depth understanding of the regulatory process allowing him to meet the client's objectives in an efficient manner. He is very skilled at producing innovative technical solutions to meet client needs and is in regular contact with project staff, labs, clients, regulators, subcontractors, residents, and other project stakeholders to keep projects running smoothly.

Environmental Site Assessment

Mr. Brown specializes in conducting ESAs under the current Ontario Regulation (O. Reg 153/04, as amended). Mr. Brown has conducted many ESAs for residential/industrial/commercial properties on behalf government agencies, private industry, insurance companies and banks. Mr. Brown's experience in environmental site assessment includes project management; work plan development to meet project objectives, oversight of health and safety requirements, execution of subsurface field investigations; preparation and review of drawings; preparation of specifications; data management and analysis of soil and groundwater chemistry; compliance evaluations with regulatory criteria; and preparation of detailed reports documenting site assessment findings.

Monitoring

Mr. Brown manages a portfolio of sites for ongoing monitoring as part of Contaminant Management Plans (CMP) at predominantly current or former retail fuel outlets (gas stations). Mr. Brown's role involves project management, understanding of the client's short term and long terms objectives, oversight of health and safety requirements, execution of monitoring programs; preparation and review of drawings; data management and analysis of groundwater monitoring and chemistry data and trend analysis; compliance evaluations with regulatory criteria; and preparation of detailed reports documenting the findings, providing recommendations for additional assessment and/or changes to the CMP and liaison with regulators and other stakeholders (as required).

Contaminated Site Remediation

Mr. Brown has a detailed knowledge of design and implementation of groundwater and soil remediation programs; operational aspects of site remediation; remediation site supervision and monitoring services; quantity estimation; and preparation of remediation technical reports including proposals, remediation options assessments, remediation progress and completion reports, monitoring reports, and ESA update reports.

SELECTED PROJECT EXPERIENCE

Phase I/One Environmental Site Assessments

Various Clients: Completion/management of over 75 Phase I ESAs at various sites in Ontario and Quebec, including manufacturing facilities, industrial sites, commercial and residential properties and vacant lots. The Phase I ESAs were conducted in accordance with the Canadian Standards Association (CSA) Standard Z768-01 (2001, re-affirmed in 2012) including site inspection, historical research and records review, interviews and report preparation.

Various Clients: Completed/management as a Qualified Person (QP) of over thirty Phase One ESAs at various site in Ontario including commercial and industrial properties. The Phase One ESAs were conducted in accordance with the requirements of Ontario Regulation (O. Reg.) 153/04 (with amendments) under the Environmental Protection Act, *Records of Site Condition - Part XV.1 of the Act*, with oversight of all aspects for the Phase One ESAs including review of site information, site inspections, interviews, identifying Potentially Contaminating Activities (PCAs), Areas of Potential Concern (APECs), and Contaminants of Concern (COCs), as well as developing a written and visual Phase One Conceptual Site Model (CSM) for the site and surrounding area.

Phase II/Two Environmental Site Assessments

Various Clients: Supervision/management of over 200 Phase II ESAs at various sites in Ontario and Quebec. The Phase II ESAs typically include supervision of drilling, collection of split-spoon soil samples, logging of soil characteristics and installation of monitoring wells and subsequent groundwater sampling in order to collect soil and groundwater data for the site.

Various Clients: Completed/management as a Qualified Person (QP) of Phase Two ESAs at various site in Ontario including commercial and industrial properties. The Phase Two ESAs were conducted in accordance with the requirements of Ontario Regulation (O. Reg.) 153/04 (with amendments) under the Environmental Protection Act, *Records of Site Condition - Part XV.1 of the Act*, with oversight of all aspects of the Phase Two ESA including preparation of Sampling and Analysis Plans, assessing all Areas of Potential Concern (APECs) for the identified Contaminants of Concern (COCs), data review and QAQC, report preparation or senior technical review as well as developing a written and visual Phase Two Conceptual Site Model (CSM).

Private Client: Completed extensive test pitting program to delineate observed surface petroleum hydrocarbon staining from an unknown source. Based on the finding of the assessment, the source of the observed hydrocarbon impacts in the soil was linked to an off-site source.

Various Clients: Collection of soil data using manual borehole techniques due to limited access. Soil was logged in the field to determine composition and soil sampling was conducted to assess level of contamination, in accordance with applicable provincial guidelines.

Private Client: Conducted a due diligence drilling program to collect soil and groundwater information in order to complete an environmental and geotechnical assessment for a proposed restaurant on a vacant property.

Private Client: Managed the completion of the Phase II ESA in a remote fly-in community in northern Ontario in a First Nation's community. The assessment included the advancement of boreholes using portable drilling equipment and the installation of monitoring wells to assess the groundwater quality. The project also included liaison with the local community, coordination of materials and supplies and preparation of a recommendations letter outlining remedial options.

Private Client: Managed the completion of a Phase II ESA in order to delineate previously identified soil and groundwater impacts on adjacent commercial and residential properties. The work program was developed to address data gaps following the review of previous assessment and remediation reports. Based on the results of the Phase II ESA, Terrapex reviewed remedial options to reduce the risk to downgradient residences. The preferred remedial option was subsequently implemented.

Private Client: Managed the completion of a multi-stage Phase II ESA in order to delineate a plume of volatile organic compounds (VOCs) in bedrock related to a former dry cleaner operation in order to develop risk management options for the client.

Petroleum Client: Managed and was the Qualified Person (QP) for the completion of a multi-stage Phase Two ESA as part of the proposed development of a bulk fuel. Mr. Brown reviewed the previously completed Phase One ESA to identify any data gaps, developed the sampling and analysis plan to assess all the areas of potential environmental concern (APECs) for the identified contaminants of concern (COCs), directed the assessment work, reviewed the analytical results, developed the conceptual site model (CSM) and had overall responsibility for the Phase Two ESA in accordance with the requirements of O. Reg. 153/04.

Soil Vapour/Air Sampling

Private Client: Conducted air sampling at an operating drive-thru restaurant in order to assess potential risk to employees from identified sub-surface soil and groundwater contamination at the site. The project included sampling of the indoor air quality and from outdoor background locations for comparison to appropriate Occupational Health and Safety exposure limits.

Private Client: Conducted an air sampling program at an office building to assess the potential risk to employees following the replacement of carpet at the site. The project included sampling of the air quality and background locations for comparison to appropriate Occupational Health and Safety exposure limits.

Commercial Client: Conducted sub-slab vapour sampling to assess the potential risks of vapour intrusion into the retail store based on previously identified groundwater impacted with volatile organic compounds (VOCs) underneath the building. The project included discussing the work plan with the store operator to review the proposed work. Following initial screening, three probes were installed. Two round of sampling was conducted to assess seasonal/temporal variability).

Site Remediation

Private Client: Conducted confirmatory soil and drinking water samples at a residential property following the remediation of impacted soil the result of a heating oil spill/leak from an above-ground storage tank at a residence. The work included supervision of subcontractors, collection of confirmatory soil and drinking water samples, and preparation of a report providing the findings of the remediation.

Petroleum Client: Conducted on-going groundwater monitoring and sampling program as part of a Contaminant Management Plan (CMP) at an operating service station with groundwater impacted with hydrocarbon and VOCs in order to assess groundwater conditions. Injected a biostimulant (CleanEarth ™) under a Certificate of Approval (C of A) from the Ministry of the Environment (MOE, now MECP) to enhance the groundwater remediation.

Petroleum Client: Performed a pilot testing at a site in order to determine the feasibility of using bioventing in conjunction with enhanced biodegradation to clean up gasoline impacted soils from underneath of a building. The pilot testing involved assessing airflow through the soil in order to determine the potential area of influence for a bioventing system.

Petroleum Client: Based on the findings of a Phase II ESA conducted by Terrapex that included both on- and off-site investigation, preparation and implementation of a CMP for the Technical Standards and Safety Authority (TSSA). The CMP involved long term groundwater monitoring and sampling to assess the effectiveness of natural attenuation at addressing groundwater impacts identified at the site. The project involves preparation of an annual report to the TSSA providing the results of the CMP and recommendation for further study.

Petroleum Client: Supervision of the remediation of impacted soil from a surface diesel fuel spill at an operation gasoline service station. The work program included the review of the incident and initial response to identify likely receptors. Remediation involved manual excavation of impacted surface soil and conducting confirmatory soil sampling to confirm that all contaminated soil had been removed.

Petroleum Client: Supervised the installation of a soil bioventing remediation system at an active bulk plant in order to remediate soil impacted with heating oil.

Petroleum Client: Supervised the remediation of impacted soil from a former gasoline service station. The project involved excavation and off-site disposal of over 4,000 tonnes of contaminated soil and the support of a corner of a building to allow for the removal of impacted soils from underneath the building.

Petroleum Client: Preparation and implementation of a CMP and C of A from the MOE to remediate off-site groundwater impact using enhanced bioremediation with Oxygen Release Compound™ (ORC™). As part of the CMP, conducted ongoing groundwater monitoring and sampling to assess the effectiveness of the groundwater remediation.

Petroleum Client: Installed and monitored a soil vapour extraction system with associated biofilter and activated carbon designed to remediate soil impacted with gasoline. Installation involved connecting the various injection and extraction wells to the blowers and assembling the biofilter. Responsible for on-going monitoring of the system and troubleshooting when required.

Petroleum Client: Preparation and implementation of a CMP using Terrapex's Mobile C of A from the MOE to remediate on- and off-site groundwater impact using Regenox™. As part of the CMP, conducted ongoing groundwater monitoring and sampling to assess the effectiveness of the groundwater remediation.

Petroleum Client: Supervised the remediation of impacted soil from a former gasoline service station. The project involved excavation and off-site disposal of approximately 950 tonnes of contaminated soil and subsequent soil and groundwater sampling. Following the completion of the remediation, a Record of Site Condition was submitted and accepted by the MOE.

Private Client: Following assessment work conducted by Terrapex, supervised the remediation of PAH-impacted soil from a former rail yard. The remediation included the excavation of approximately 384.50 tonnes of contaminated soil and subsequent confirmatory soil sampling. Following the completion of the remediation, a Record of Site Condition was submitted and accepted by the MOE.

Petroleum Client: Conducted on-going groundwater monitoring and sampling program as part of a Contaminant Management Plan (CMP) at an operating service station with groundwater impacted with hydrocarbon in order to assess groundwater conditions. Injected a biostimulant (Regenox ™) with direct injection with a Geoprobe rig under a Certificate of Approval (C of A) from the Ministry of the Environment (MOE) to enhance the groundwater remediation.

Commercial Client: Supervised the remediation of impacted soil from a former gasoline service station/automotive service centre. The project involved excavation and off-site disposal of over 7000 tonnes of contaminated soil.

Private Client: Conducted necessary excavation around the perimeter of two adjacent residences to expose the foundation and to allow for removal of a waterproofing membrane previously applied by others that was linked to chemical odours in the residences. It was further determined that the waterproofing product had been diluted with a xylene-based solved. The former waterproofing membrane was removed and necessary remediation was conducted, including excavation beneath the footing of one of the residences to excavate contaminated soil. In total 412.12 tonnes of soil and 3,620 L of water was pumped from the excavation as part of the remediation. Terrapex also assist with monitoring vapour concentrations inside the residences over the course of the project (indoor air sampling was conducted by another consultant).

Records of Site Condition

Records of Site Condition: A total of four Records of Site Condition prepared, submitted to and acknowledged by the MOEE, MOE, MOECC, or MECP since 2008 for various clients.

Designated Substances Survey

Various Clients: Supervision/management of over 20 Designated Substances Survey (DSS) at various sites in Ontario and Quebec. The DSSs typically include site inspection and sampling of various building materials suspected of containing asbestos, lead, mercury and/or other designated substances and preparation of a report providing the results in comparison to the appropriate regulations.

Petroleum Client: Conducted a Designated Substance Survey on a building to be demolished. The assessment included the sampling of various building material, logging of samples, comparison of the results to the appropriate regulations and report preparation. Based on the findings of the DSS, Terrapex prepared specifications for contractors in terms of the abatement required to address the identified asbestos and lead during the building demolitions.

Private Client: Conducted a Designated Substance Survey on a building under renovation following a Stop Work Order issued by the Ministry of Labour (MOL). The assessment included the sampling of various building material, logging of samples, comparison of the results to the appropriate regulations and report preparation. Terrapex also conducted

liaison with the contractor following the completion of the DSS to inform them of the findings to outline abatement work required in order to lift the MOL Order.

Site Decommissioning

Various Clients: Supervision/management of the decommissioning of five bulk fuel depots at various sites in Ontario. The projects involved the supervision of the removal of the petroleum installations, collection of confirmatory soil sampling and subsequent remediation where required, and preparation of reports documenting the findings. Reports were submitted to appropriate regulatory authorities for the site closure.

Petroleum Client: Managed the removal of underground hoists from an automotive service garage. Evaluation of environmental quality of soil from the excavation following the removal of the hoists.

Petroleum Client: Managed the removal of equipment including underground hoists, oil-water separator and aboveground storage tanks during the decommissioning of an automotive service garage. The environmental quality of soil from the excavations were assessed following the removal of the equipment.

Environmental Management

Petroleum Client: Completed the application for a Permit to Take Water to dewater an excavation during construction. The application process included preparation of supporting documentation required for the PTTW. Designed and supervised a monitoring program during construction to ensure that the terms of the PTTW were upheld and there were no adverse effects on the natural environment and included liaison with the local municipality.

Petroleum Client: Responsible for the on-going management of environmental requirements at an operating bulk fuel depot. The work involves regular water sampling to ensure compliance with regulatory requirements and emergency response in the event of a spill or leak. As part of the services provided, Terrapex has prepared a spill response protocol to be used by the Terminal staff and the preparation of an application for a Permit to Take Water.

Private Client: Prepared in implemented a compliance program to assist a client in meeting the effluent discharge criteria of a municipal sewer use by-law. The compliance program included ongoing monitoring and sampling, data review and interpretation, liaison with the municipality, and development of best practices.

Peer Review

Private Client: Conducted a third party review of other consultants' work as part of a groundwater remediation by pump and treat. The scope of the peer review included the review of work-plans, reports, and field data in order to provide recommendations on the effectiveness of the remediation.

GREGORY SABOURIN, P.Eng.

Education:	B.Eng. Environmental Engineering	2010	Carleton University, Ottawa
Professional Associations:	Professional Engineers of Ontario (PEO) – Membership Number: 100165530		
Safety Training:	Standard First Aid and CPR Work at Heights Training Petroleum Oriented Safety Training (POST) Workplace Hazardous Materials Information System (WHMIS) 40-hour OSHA Training Course for Hazardous Waste Operations		

EXPERIENCE

2010 to present – Terrapex Environmental Ltd., Ottawa, Ontario

Project Manager and Environmental Scientist

Responsible for a variety of office and field tasks for environmental site assessments and remediation projects which include:

- Historical records review, interviews, site inspections, and site interpretations as part of Phase I/One Environmental Assessments (ESAs) to both CSA Z768-01 and O. Reg. 153/04 requirements;
- Writing Phase I / Phase II (ESAs), soil assessments, groundwater monitoring and remediation reports;
- Client liaison, project preparation and coordination, costing, methodology/project analysis, technical proposal preparation;
- Borehole drilling, monitoring well installation, supervision of tank pulls, and groundwater monitoring and sampling;
- Implementation of in-situ and ex-situ remediation methods;
- Interpreting groundwater monitoring data and laboratory soil and groundwater analytical data as compared to applicable federal and provincial standards;
- Preparation of figures and charts for visual representation of data;
- Completion of site data gap analysis for use in a human health and ecological risk assessment;
- Research and preparation as a third party for legal proceedings;
- Quality Assurance/Quality Control (QA/QC) of outgoing documents
- Preparation and submission of Record of Site Conditions (RSCs) as a Qualified Person;
- Sampling of soil, groundwater, surface water, waste water, sanitary effluent, ambient air, and soil vapour for laboratory analysis; and,
- Supervision and direction of remedial excavations and site restorations.

SELECTED PROJECT EXPERIENCE

Phase I Environmental Site Assessments

Municipal client: Completed several Phase I environmental site assessments (ESA) at properties owned by a municipality compliant with CSA standards. The work completed included site inspections to identify visible signs and/or potential sources of contamination possible, contaminant transport pathways, and potential receptors. Conducted interviews with relevant people who had a connection to the site. Conducted research and reviewed available documents including requesting information from public and private entities; interpreting aerial photographs; reviewing city directories, and previous environmental reports and acquired information; drafting of site plans; and, report composition. Additional responsibilities included client and tenant liaison. All Phase I ESAs were finalized with a recommendation for either no further work or the design and completion of a Phase II ESA.

Phase Two Environmental Site Assessments

Municipal Client: Conducted a Phase II ESA compliant with CSA standards at a vacant property in Ottawa, Ontario. The Phase II was based on a recommendations from a previously completed Phase I ESA. The field work included the drilling of three boreholes and installation of three monitoring wells. Responsibilities included the designing the Phase II ESA (ex. number and location of boreholes and monitoring wells, chemical analyses) completion of field work and soil sample selection. Field responsibilities included directing the installation of the three monitoring wells, and sampling the groundwater, surveying monitoring wells onsite to an arbitrary benchmark and report composition to CSA requirements including comparing soil and groundwater results to the applicable site criteria.

RSC Submission and CPU Monitoring

Commercial Client: Was an integral part of a team that completed a Phase One ESA and a subsequent Phase Two ESA at a former industrial Site in Ottawa ON. The ESAs were completed so the Site could be re-developed into childcare facility. Since the Site was to be redeveloped into a more sensitive land use this necessitated the filing of a RSC with the Ministry of Environment, Conservation and Parks (MECP). Responsibilities included developing the conceptual site model (CSM), liaison with the clients and property owner for the supporting documentation needed for the RSC filing, filling out the electronic RSC form and addressing MECP comments during the initial review.

Petroleum Client: Completed a three year vapor monitoring and barrier inspection program as required by a certificate of property use (CPU) for a petroleum impacted property adjacent to a client's gasoline service station. Duties included the collection of soil vapour and sub-slab vapour samples from vapour probes across the Site, completion of semi-annual barrier inspections of the asphalt and landscaped cover of the Site's surface and the completion of annual reports documenting the work completed each year. At the end of the three years, all data was compiled in a single report and recommendations were given for the continuation of the vapor monitoring program.

Air Sampling

Government Client: Conducted an air sampling program at an office building to assess the potential risk to employees following a Level 2 asbestos abatement. The project included sampling of the air quality and background locations for comparison to appropriate Occupational Health and Safety exposure limits before and after abatement activities. Responsibilities included collecting air samples from all enclosures, recording all applicable information, complying with health and safety requirements and wearing the appropriate personal protective equipment.

Excess Soils

Government Client: Conducted a soil characterization program prior to the anticipated redevelopment of an institutional property located along the Ottawa River. Responsibilities included the collection of soil samples from across the site, choosing which samples to submit, and completion of a report for the preparation of a soil management plan.

Site Remediation

Petroleum Client: Conducted field and reporting tasks for a soil remediation project at a former gas station in Pembroke, Ontario impacted by petroleum hydrocarbons (PHCs). Areas of soil contaminated by gasoline were excavated from underground storage tank locations and former pump island. Responsibilities included supervision and direction of all excavation and water treatment activities, collection of confirmatory soil samples, interpretation of laboratory analytical data, drafting of site plans and analytical results figures, and report composition. A total of 7,500 metric tonnes of soil were excavated and removed for offsite disposal.

Petroleum Client: Conducted field and reporting tasks for a soil remediation project at a former gas station and commercial property in Ottawa, Ontario impacted by PHCs. The area excavated was based on results of a previous Phase II ESA and onsite observations of the soil conditions during excavation. The total soil excavated and disposed of offsite was 4,700 metric tonnes. Responsibilities included supervision and direction of all excavation activities,

collection of confirmatory soil samples, interpretation of laboratory analytical data, drafting of site plans and analytical results figures, and report composition.

Government Client: Supervised field works for a soil remediation project at an operating gas station and adjacent neighboring residential properties in Haileybury, Ontario. Areas of soil contaminated by gasoline were excavated to the extent possible from neighboring properties. A geotechnical engineer was onsite throughout the excavation to ensure slope stability due to concerns with nearby buildings. In-situ remediation chemicals were then injected into the subsurface by a sub-contractor where soil excavation was not possible. Responsibilities included management of sub-contractors, liaison with client, health and safety, supervision and direction excavation activities, collection of confirmatory soil samples, selection of remedial injection locations, supervision of environmental injection contractor, drafting of site plans and analytical results figures, and report composition.

Government Client: Conducted field activities for a mercury remediation project at a remote Hydrometric Station near Moosonee, Ontario. The purpose of the project was to conduct a detailed field testing program to dispose of the mercury-contaminated soil and return the site to pristine condition. Responsibilities included completing excavation activities, collecting confirmatory samples, conducting field testing to guide excavation work, interpretation of laboratory analytical data, drafting of site plans and analytical result figures, and report composition.

Petroleum Client: Conducted field activities for an in-situ remediation at an active gas station. Using direct push injection technology provided by a sub-contractor, a Regenox© solution was injected to remediate on-site and off-site petroleum impacts. Responsibilities included notifying the MOECC of the injection of in accordance of Terrapex's Certificate of Approval (now known as Environmental Compliance Approval), calculations of required solution strength and required mass of chemicals, preparation of remedial solutions, and supervision of drilling contractors throughout the injection process.

Technology Client: Conducted field and office activities for Human Health and Ecological Risk Assessment (HHERA) for site located in eastern Ontario that was contaminated by historic use and storage of chlorinated solvents. Responsibilities included management of sub-contractors, liaison with client and land owners, health and safety, groundwater monitoring and sampling, sub-slab vapour and ambient air sampling, supervision of subcontractor during injection of remedial products as part of in-situ remediation, drafting of site plans, review of historic reports, completion of data gap analysis, annual report composition. In order to support the HHERA, Mr. Sabourin conducted a building floor and subgrade investigation which consisted of extracting fifteen concrete cores from around main warehouse building and collection subgrade soil samples and submitting concrete and soil samples, the installation and sampling of sub-slab vapour probes and conducting preliminary pilot sub-slab communicative testing for the eventual design and installation of a sub-slab depressurization system.

Compliance Monitoring

Government Client: Provided multi-year environmental consulting services to a government campus in Ottawa, Ontario with respect to due diligence monitoring of the facilities sanitary effluent flow. Responsibilities included reviewing sanitary sewer plans and selecting sample locations, completion of a health and safety plan, supervising and training Terrapex staff in collection of sanitary effluent samples using manual and automatic sampling methodologies, and writing reports comparing the analytical results to the Ottawa's sewer-use bylaw. The sanitary effluent sampling program has since expanded to include additional buildings and facilities.

Petroleum Client: Conducted field activities for the Certificate of Approval for the operations of a petroleum terminal in Maitland, Ontario. Responsibilities included monthly compliance sampling, quarterly groundwater monitoring and sampling, interpretation of results, and spill response and investigation.

Municipal Client: Managed a biosolids lagoon monitoring program at a wastewater treatment plan for a municipality in eastern Ontario as required by their certificate of approval (C of A). Responsibilities included review of previous consultants reports, review of the applicable C of A, client liaison, coordination of field activities including monitoring and sampling of groundwater monitoring wells and collection biosolids samples from the lagoons, review of laboratory analytical data and interpretation of results and writing of annual report. Based on the interpretation of the laboratory analytical data an assessment was provided to the municipality on the extent of the bisolids lagoon impacts

Storage Tank Management

National Capital Commission: Completed the annual inspection of various aboveground storage tanks across several different Sites in the National Capital region for the National Capital Commission. Duties completed during included liaison with client and tenants, inspection and documenting the conditions at aboveground storage tank, and writing a short factual report listing deficiencies and approximate costs to remedy. The completion of the project required a thorough knowledge of the federal storage regulations and CSA installation codes.

Peer Review

Private Client: Conducted a third party review of other consultants' work as part of a liability review for a number of sites across Ontario and British Columbia. Responsibilities included a detailed report of each report and then summarizing the site conditions and providing recommendations and a risk rating for each site.

SEBA HAMDAN, MASc, EIT

Education:	Masc. in Geo-Environmental Engineering	2021	Queen's University
	Bachelor of Environmental Engineering	2010	Al-Baath University

Safety Training:
Standard First Aid and CPR
Petroleum Oriented Safety Training (POST)
Workplace Hazardous Materials Information System (WHMIS)

EXPERIENCE

2021 to Present – Terrapex Environmental Ltd., Ottawa, Ontario

Environmental Scientist

Ms. Hamdan is an Environmental Scientist responsible for management of a wide range of site assessment and remediation projects for many industrial, government, petroleum clients. Her role includes conducting Phase I / Phase II (ESAs), groundwater monitoring and remediation reports; borehole drilling, monitoring well installation, sampling of soil, groundwater, separator influent/effluent and soil vapour for laboratory analysis; supervision and direction of remedial excavations and site restorations; interpreting groundwater monitoring data and laboratory soil and groundwater analytical data as compared to applicable federal and provincial standards; preparation of figures and charts for visual representation of data; Quality Assurance/ Quality Control of (QA/QC) of outgoing documents; Coordinating field work with clients and subcontractors.

REPRESENTATIVE PROJECT EXPERIENCE

Phase I/One Environmental Site Assessments

Petroleum company (2023): Contributed to the completion of a Phase One ESA at an industrial site in Nepean. The Phase One ESA was completed in accordance with the requirements of Ontario Regulation (O. Reg.) 153/04 (with amendments) under the Environmental Protection Act, *Records of Site Condition – Part XV.1 of the Act,* which included review of the site information, site inspections, identifying PCAs, APECs, and COCs.

Federal Government (2023): Contributed to the completion of a Phase One ESA at six sites in the City of Ottawa. The Phase One ESA was completed in accordance with the requirements of Ontario Regulation (O. Reg.) 153/04 (with amendments) under the Environmental Protection Act, *Records of Site Condition – Part XV.1 of the Act,* which included review of the site information, site inspections, identifying PCAs, APECs, and COCs.

Groundwater Monitoring and Sampling

Conducted a groundwater monitoring and sampling event for various clients and various sites in Ottawa, Renfrew County, and Lanark County. Monitoring tasks included monitoring headspace combustible vapour concentrations and groundwater elevations at individual monitoring wells. Performed groundwater sampling for laboratory analysis under a proper chain of custody for petroleum hydrocarbon contamination delineation. Other tasks included maintaining proper traffic control measures and coordinating with a dedicated Terrapex traffic control personnel to ensure tasks were being safely performed.

Provincial Government 2022: Prepared a technical report for the contaminant migration modelling for the expansion area on an existed landfill in Ontario.

2021 – Queen's University (Geo-Engineering Centre at Queen's- RMC)

Research Assistant

Duties and responsibilities included testing GCL samples used as a liner for a wastewater treatment lagoon in Nunavut. Interpreting and reporting results to the client and training new students on GCL testing methods.

2017 – Queen's University
Geo-Engineering Centre at Queen's- RMC

Graduate Student and Research Assistant

Research scopes focused on barrier systems of landfills and containment facilities and especially the Geosynthetic Clay Liners (GCLs) for landfill cover and base systems. Experienced in designing, running, observing, index testing, and interpreting results of different projects. Ms. Hamdan investigated the hydraulic and physical performance of the GCLs in landfill cover and base systems after long-term exposure to wet and dry cycles. Examined the long-term performance of GCLs under a high hydraulic gradient simulating the GCLs usage for dams and ponds.

Publications

- Rowe, Ronald & Hamdan, Seba. (2022). Performance of GCLs after long term wet-dry cycles under a defect in GMB in a landfill. Geosynthetics International. 30. 1-46. 10.1680/jgein.21.00023a.
- Rowe, Ronald & Hamdan, Seba. (2021). Effect of wet-dry cycles on standard & polymer-amended GCLs in covers subjected to flow over the GCL. Geotextiles and Geomembranes. 49. 10.1016/j.geotexmem.2021.03.010.

2017 – Queen's University

Teaching Assistant

- Geotechnical Engineering course (3rd year _Civil Engineering)

2011 – The General Establishment of Drinking Water & Wastewater Systems Survey Assistant, Syria

Environmental Engineer

Duties and responsibilities included participating in several projects related to designing and executing wastewater networks in the suburban area of the City of Homs.