Phase Two Environmental Site Assessment
349 Danforth Avenue, Ottawa, Ontario

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Phase Two Environmental Site Assessment 349 Danforth Avenue, Ottawa, Ontario

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Executive Summary

EXP Services Inc. (EXP) was retained by Ottawa Carleton Construction Group Ltd. to complete a Phase Two Environmental Site Assessment (ESA) of the property located at 349 Danforth Avenue, Ottawa, Ontario hereinafter referred to as the 'Phase Two property'. The objective of the Phase Two ESA investigation is to assess the quality of the groundwater conditions within the areas of potential environmental concern (APEC) identified in a Phase One ESA prepared by EXP.

The most recent use of the property is a custom drapery and supplies business, which is defined by Ontario Regulation 153/04 as a type of commercial property use. It is proposed that the current building on the Phase Two property be demolished and that a three-storey building be constructed. It is understood that the proposed building would be used for commercial purposes on the ground floor and for residential purposes on upper floors. Therefore, as per the amendments to Ontario Regulation 153/04 that came into effect on December 4, 2019, a Record of Site Condition (RSC) is required because the building envelope will be changed. The MECP confirmed this interpretation.

EXP prepared a report entitled *Phase One Environmental Site Assessment, 349 Danforth Avenue, Ottawa, Ontario* dated August 31, 2020. Based on the results of the Phase One ESA, EXP identified two areas of potential environmental concern (APEC).

Areas of Potential Environmental Concern (APEC)	Location of Area of Potential Environmental Concern on Phase Two Property	Potentially Contaminating Activity (PCA)	Location of PCA (On-Site or Off-Site)	Contaminants of Potential Concern (COPC)	Media Potentially Impacted (Groundwater, Soil and/or Sediment)
APEC #1	The 5 m buffer of land extending from Danforth Avenue on the Phase Two property	#37 – Operation of Dry-Cleaning Equipment (where chemicals are used)	#37 - Off-Site	Volatile Organic Compounds (VOC)	Groundwater
APEC #2	The 5 m buffer of land extending from the strip mall property on the Phase Two property	#37 – Operation of Dry-Cleaning Equipment (where chemicals are used)	#37 - Off-Site	Volatile Organic Compounds (VOC)	Groundwater

The scope of work for the Phase Two ESA was as follows:

- Drilling three boreholes on the subject property and completing them as monitoring wells;
- Submitting groundwater samples for laboratory analysis VOC;
- Comparing the results of the groundwater chemical analyses to applicable criteria, as set out by the Ontario Ministry of the Environment, Conservation and Parks (MECP);
- Conducting an elevation survey of the three monitoring wells that were sampled;
- Conducting a hydraulic conductivity test in two of the monitoring wells; and,
- Preparing a report summarizing the results of the assessment activities.

The Phase Two property is located is located approximately 600 metres (m) northwest of the Ottawa River on the south side of Danforth Avenue. The Phase Two property is rectangular in shape with an area of approximately 0.074 acres (0.03 hectares). At the time of the investigation, the Phase Two property was occupied by a two-storey building used as a drapery installation service. Construction of the building on the Phase Two property occurred circa 1901.

A summary of the soil and groundwater sampling program is as follows:

- All groundwater samples exceeded the provincial MECP Table 7 standards for several chlorinated VOC including cis-1,2-dichloroethylene, tetrachloroethylene, trichloroethylene and vinyl chloride;
- The hydraulic conductivity of the bedrock in MW1 was calculated to be 6.6×10^{-6} cm/s;
- The hydraulic conductivity of the bedrock in MW3 was calculated to be 7.4×10^{-4} cm/s; and
- The groundwater flow direction was determined to be northwesterly.

Since several chlorinated VOC were detected in groundwater above the Table 2 SCS there is potential for reductive dechlorination of chlorinated VOC. Under anaerobic conditions, tetrachloroethylene can transform via a microbially mediated reductive dechlorination pathway into daughter products such as trichloroethylene, 1,1-dichloroethylene, cis-1,2-dichloroethylene and vinyl chloride. Evidence of reductive dichlorination of chlorinated VOC has been observed in groundwater on the Phase Two property, as significantly higher concentrations of tetrachloroethylene were observed in MW-3, the monitoring well closest to the contaminant source, and higher concentrations of the daughter product vinyl chloride was observed in MW-1, further downgradient.

The Qualified Person can confirm that the Phase Two Environmental Site Assessment was conducted per the requirements of Ontario Regulation 153/04, as amended, and in accordance with generally accepted professional practices.

This executive summary is a brief synopsis of the report and should not be read in lieu of reading the report in its entirety.

1.0 Introduction

EXP Services Inc. (EXP) was retained by Ottawa Carleton Construction Group Ltd. to complete a Phase Two Environmental Site Assessment (ESA) of the property located at 349 Danforth Avenue, Ottawa, Ontario hereinafter referred to as the 'Phase Two property'. The objective of the Phase Two ESA investigation is to assess the quality of the groundwater conditions within the areas of potential environmental concern (APEC) identified in a Phase One ESA prepared by EXP.

The most recent use of the property is a custom drapery and supplies business, which is defined by Ontario Regulation 153/04 as a type of commercial property use. It is proposed that the current building on the Phase Two property be demolished and that a three-storey building be constructed. It is understood that the proposed building would be used for commercial purposes on the ground floor and for residential purposes on upper floors. Therefore, as per the amendments to Ontario Regulation 153/04 that came into effect on December 4, 2019, a Record of Site Condition (RSC) is required because the building envelope will be changed. The MECP confirmed this interpretation.

This report has been prepared in accordance with the Phase Two ESA standard as defined by Ontario Regulation 153/04 (as amended), and in accordance with generally accepted professional practices. Subject to this standard of care, EXP makes no express or implied warranties regarding its services and no third-party beneficiaries are intended. Limitation of liability, scope of report and third-party reliance are outlined in Section 7 of this report.

Mark Devlin, B.Sc. conducted field assessment work and Leah Wells, E.I.T, was the report author for this project. Both were supervised by Patricia Stelmack, M.Sc., P.Eng. Ms. Stelmack is a Qualified Person, as defined by Ontario Regulation 153/04.

1.1 Site Description

The Phase Two property is located is located approximately 600 metres (m) northwest of the Ottawa River on the south side of Danforth Avenue, as shown on Figure 1 in Appendix A. The Phase Two property is rectangular in shape with an area of approximately 0.074 acres (0.03 hectares). At the time of the investigation, the Phase Two property was occupied by a two-storey building used as a drapery installation service. The site layout is shown on Figure 2 in Appendix A.

Construction of the building on the Phase Two property occurred *circa* 1901.

The legal description of the Phase Two property is described as PT LT 3, PL 204 , N/S OF DANFORTH AV; AS IN CR618520 ; OTTAWA/NEPEAN. The property identification number (PIN) for the site is 04017-0156.

1.2 Property Ownership

Authorization to proceed with this investigation was provided by Fernando Matos on behalf of Ottawa Carleton Construction Group Ltd. Contact information for Mr. Matos is 101-337 Sunnyside Avenue, Ottawa, Ontario, K1S 0R9.

1.3 Current and Proposed Future Use

The most recent use of the property is a custom drapery and supplies business, which is defined by Ontario Regulation 153/04 as a type of commercial property use. The proposed use is a three-storey building with mixed use. The proposed building would be used for commercial purposes on the ground floor and for residential purposes on upper floors.

1.4 Applicable Site Condition Standards

Analytical results obtained for soil and groundwater samples were compared to Site Condition Standards (SCS) established under subsection 169.4(1) of the Environmental Protection Act, and presented in the document entitled *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, 2011. This document provides tabulated background SCS (Table 1) applicable to environmentally sensitive sites and effects-based generic SCS (Tables 2 to 9) applicable to non-environmentally sensitive sites. The effects-based SCS (Tables 2 to 9) are protective of human health and the

environment for different groundwater conditions (potable and non-potable), land use scenarios (residential, parkland, institutional, commercial, industrial, community and agricultural/other), soil texture (coarse or medium/fine) and restoration depth (full or stratified).

Table 1 to 9 SCS are summarized as follows:

- Table 1 – applicable to sites where background concentrations must be met (full depth), such as sensitive sites where site-specific criteria have not been derived
- Table 2 – applicable to sites with potable groundwater and full depth restoration
- Table 3 – applicable to sites with non-potable groundwater and full depth restoration
- Table 4 – applicable to sites with potable groundwater and stratified restoration
- Table 5 – applicable to sites with non-potable groundwater and stratified restoration
- Table 6 – applicable to sites with potable groundwater and shallow soils (bedrock encountered at depths of 2 metres or less across one-third or more of the site)
- Table 7 – applicable to sites with non-potable groundwater and shallow soils (bedrock encountered at depths of 2 metres or less across one-third or more of the site)
- Table 8 – applicable to sites with potable groundwater and that are within 30 m of a water body
- Table 9 – applicable to sites with non-potable groundwater and that are within 30 m of a water body

Application of the generic or background SCS to a specific site is based on a consideration of site conditions related to soil pH, thickness and extent of overburden material, and proximity to an area of environmental sensitivity or of natural significance. For some chemical parameters, consideration is also given to soil textural classification with SCS having been derived for both coarse and medium-fine textured soil conditions.

For assessment purposes, EXP selected the 2011 Table 7 SCS in a non-potable groundwater condition for residential/ parkland/institutional property use. The selection of this category was based on the following factors:

- Bedrock is less than 2 metres below grade across the subject property;
- There are no surface water bodies within 30 metres of the subject property;
- The Phase Two property is not located within an area of natural significance, does not include nor is adjacent to an area of natural significance, and does not include land that is within 30 metres of an area of natural significance;
- Potable water for the Phase Two property is provided by the City of Ottawa through its water distribution system and no potable water wells were identified to be within 250 metres of the Phase Two property;
- The Phase Two property is not located in an area designated in a municipal official plan as a well-head protection area;
- The ground floor of the Phase Two property is planned for commercial use and the upper floors are planned for residential use; and
- It is the opinion of the Qualified Person who oversaw this work that the Phase Two property is not a sensitive site.

2.0 Background Information

2.1 Physical Setting

The Phase Two property has a municipal address of 349 Danforth Avenue in Ottawa, Ontario. The Phase Two property is located approximately 600 metres (m) northwest of the Ottawa River on the south side of Danforth Avenue and is currently used for commercial purposes. The Phase Two property is rectangular in shape with an area of approximately 0.074 acres (0.03 hectares) and is occupied by a two-storey building used as a drapery installation service.

A site plan showing the site is presented as Figure 2 in Appendix A.

The Phase Two property is located in a mixed commercial/residential area. Potable water is available from the City of Ottawa, and there are no potable water wells nearby.

Topographically, the Phase Two property and surrounding areas are relatively flat. The Ottawa River, which is approximately 600 metres northwest of the Phase Two property, is the closest waterbody to the Phase Two property. The inferred groundwater flow direction is northwesterly towards the Ottawa River.

In accordance with Section 41 of the Ontario Regulation 153/04 (as amended), the Phase Two property is not an environmentally sensitive area. In addition, the Phase Two property is not located within an area of natural significance and it does not include land that is within 30 metres of an area of natural significance.

The Phase Two property is a shallow soil property as defined in Section 43.1 of the regulation. It does not include all or part of a water body or is adjacent to a water body or includes land that is within 30 metres of a water body.

Bedrock in the general area of the Phase Two property consists of limestone, dolostone, shale, arkose and sandstone. Native surficial soil consists of clay to silt textured till. Ground surface is approximately 70 metres above sea level (masl) and bedrock outcrops may be present in the Phase Two study area.

2.2 Past Investigations

EXP prepared a report entitled *Phase One Environmental Site Assessment, 349 Danforth Avenue, Ottawa, Ontario* dated August 31, 2020. Based on the results of the Phase One ESA, EXP identified two areas of potential environmental concern (APEC). Table 2.1 provides details of the APEC.

Table 2.1: Findings of Phase I ESA

Areas of Potential Environmental Concern (APEC)	Location of Area of Potential Environmental Concern on Phase Two Property	Potentially Contaminating Activity (PCA)	Location of PCA (On-Site or Off-Site)	Contaminants of Potential Concern (COPC)	Media Potentially Impacted (Groundwater, Soil and/or Sediment)
APEC #1	The 5 m buffer of land extending from Danforth Avenue on the Phase Two property	#37 – Operation of Dry-Cleaning Equipment (where chemicals are used)	#37 - Off-Site	Volatile Organic Compounds (VOC)	Groundwater
APEC #2	The 5 m buffer of land extending from the strip mall property on the Phase Two property	#37 – Operation of Dry-Cleaning Equipment (where chemicals are used)	#37 - Off-Site	Volatile Organic Compounds (VOC)	Groundwater

The locations of the APEC are shown in Figure 2 in Appendix A.

The Phase One ESA was conducted per the requirements of Ontario Regulation 153/04, as amended, and in accordance with generally accepted professional practices. A copy of the Phase One conceptual site model is provided as Figure 3 in Appendix A.

3.0 Scope of the Investigation

3.1 Overview of Site Investigation

The purpose of the Phase Two ESA was to investigate the groundwater quality at the Phase Two property and to characterize conditions in the groundwater related to the PCA described above within the APEC shown on Figure 2 in Appendix A.

The most recent use of the property is a custom drapery and supplies business, which is defined by Ontario Regulation 153/04 as a type of commercial property use. It is proposed that the current building on the Phase Two property be demolished and that a three-storey building be constructed. It is understood that the proposed building would be used for commercial purposes on the ground floor and for residential purposes on upper floors. Therefore, as per the amendments to Ontario Regulation 153/04 that came into effect on December 4, 2019, a Record of Site Condition (RSC) is required because the building envelope will be changed. The MECP confirmed this interpretation.

3.2 Scope of Work

The scope of work for the Phase Two ESA was as follows:

- Drilling three boreholes on the subject property and completing them as monitoring wells;
- Submitting groundwater samples from the monitoring wells for laboratory analysis of volatile organic compounds (VOC);
- Comparing the results of the groundwater chemical analyses to applicable criteria, as set out by the Ontario Ministry of the Environment, Conservation and Parks (MECP);
- Conducting an elevation survey of the three monitoring wells that were sampled;
- Conducting a hydraulic conductivity test in one of the monitoring wells; and,
- Preparing a report summarizing the results of the assessment activities.

This report has been prepared in accordance with the Phase Two ESA standard as defined by Ontario Regulation 153/04 (as amended), and in accordance with generally accepted professional practices. Subject to this standard of care, EXP makes no express or implied warranties regarding its services and no third-party beneficiaries are intended. Limitation of liability, scope of report and third-party reliance are outlined in Section 8 of this report.

3.3 Media Investigated

The Phase Two ESA included the investigation of groundwater on the Phase Two property. Since the PCA are both off-site sources and the water table is in the bedrock, soil sampling was not conducted. As there are no water bodies on the Phase Two property, no surface water or sediment sampling was required.

The contaminants of potential concern (COPC) identified in the Phase One ESA were identified as target parameters for this Phase Two ESA. The APEC and COPC identified in the Phase One ESA are outlined in Section 2.2.

3.4 Phase One Conceptual Site Model

The Phase Two property was first developed circa 1901 as a residential building. The Phase Two property is currently occupied by Ottawa Drapery and Supplies Limited. and is being used as a commercial drapery installation service. The municipal address for the Phase Two property is 349 Danforth Avenue in Ottawa, ON.

The Phase One ESA conducted by EXP identified the following off-site PCA:

- PCA #37 – Operation of Dry-Cleaning Equipment (where chemicals are used).

No on-site PCA were identified.

The Phase One conceptual site model is provided as Figure 3 in Appendix A. The locations of the APEC that may be affected by the PCA are shown on Figure 2 in Appendix A.

3.5 Deviations from Sampling and Analysis Plan

The field investigative and sampling program was carried out following the requirements of the Phase Two property, as described in Section 4. No significant deviations from the sampling and analysis plan (SAAP), as provided in Appendix C, were reported that affected the sampling and data quality objectives for the Phase Two property.

3.6 Impediments

No physical impediments were encountered during the field investigation. The entire Phase Two property was accessible at the time of the investigation.

4.0 Investigation Methodology

4.1 General

The Phase Two property investigative activities consisted of the drilling of boreholes to facilitate the installation of monitoring wells for hydrogeological property characterization and the collection of groundwater samples for chemical analysis.

4.2 Borehole Drilling

The site investigative activities consisted of the drilling of boreholes to facilitate the collection of soil samples for visual inspection, to record relevant geotechnical information and the installation of monitoring wells for hydrogeological property characterization and the collection of groundwater samples for chemical analysis.

Prior to the commencement of drilling, the locations of underground public utilities including telephone, natural gas and electrical lines were marked at the subject property by public locating companies. A private utility locating contractor was also retained to clear the individual borehole locations.

On June 29, 2020, three boreholes (MW1 to MW3) were drilled on the subject property. These boreholes were completed by George Downing Estate Drilling Ltd (Downing), a licensed well contractor, using a CME 55 truck-mounted drill rig. Boreholes were augured to refusal, then cored to depth.

Bedrock was encountered between 0.7 and 0.9 metres below ground surface (mbgs) in all three boreholes. EXP staff continuously monitored the drilling activities to log the stratigraphy observed from the recovered samples, to record the depth of the samples, and to record total depths of borings. Field observations are documented on the borehole logs provided in Appendix D.

The locations of the boreholes and monitoring wells are presented on Figure 2 in Appendix A.

4.3 Soil: Sampling

Based on the nature of the APEC identified in the Phase One report and shallow bedrock, soil sampling was not determined to be required at the Phase Two property.

4.4 Field Screening Measurements

Fill samples were screened during the borehole advancement; however, no soil samples were submitted for analysis.

Soil samples were placed in a sealed Ziploc plastic bag and allowed to reach ambient temperature prior to field screening with a combustible vapour meter calibrated to hexane gas prior to use. The field screening measurements were made by inserting the instrument's probe into the plastic bag while manipulating the sample to ensure volatilization of the soil gases. These 'headspace' readings provide a real-time indication of the relative concentration of combustible vapours encountered in the subsurface during drilling and are used to aid in the assessment of the vertical and horizontal extent of potential impacts and the selection of soil samples for analysis.

Readings of organic vapour concentrations in the soil samples collected during the drilling investigation were recorded using an RKI Eagle 2 with a special photo-ionization detector (PID) sensor, where there was sufficient recovery. This instrument is designed to detect and measure concentrations of combustible gas in the atmosphere in 0.02 parts per million by volume (ppmv) increments from 0 ppmv to 50 ppmv and in 1 ppmv increments from 0 ppmv to 2,000 ppmv.

Instrument calibration is conducted using standard gases comprised of known concentrations of isobutylene in air. Instrument calibration is conducted prior to each use. If the instrument readings are within ±10% of the standard gas value, then the instrument is deemed to be calibrated, however if the readings are greater than ±10% of the standard gas value then the instrument is re-calibrated prior to use.

The field screening measurements, in parts per million by volume (ppmv), are presented in the borehole logs provided in Appendix D.

4.5 Groundwater: Monitoring Well Installation

Groundwater monitoring wells were installed in three of the boreholes. The monitoring wells were installed in general accordance with the Ontario Water Resources Act - R.R.O. 1990, Regulation 903 (as amended) and were installed by Downing, a licensed well contractor, using a CME 55 truck-mounted drill rig.

The monitoring wells consisted of a 31 mm diameter Schedule 40 PVC screen that was no more than 3.0 m long and a 31 mm diameter Schedule 40 PVC riser pipe. The annular space around the wells was backfilled with sand to an average height of 0.3 m above the top of the screen. A bentonite seal was added from the top of the sand pack to approximately 0.3 m below ground surface. The monitoring wells were completed with flushmount casings. Details of the monitoring well installations are shown on the borehole logs provided in Appendix D.

Following their installation, the monitoring wells were developed by purging water with an interstitial pump and foot valve until it became clear. The following table provides monitoring well construction details and observations made during monitor development.

Table 4-1: Monitoring Well Construction and Purging Details

Monitoring Well ID	Length of Screen (metres)	Depth of Borehole (metres)	Date of Development	Volume Purged (litres)	Description of Purged Water at Start of Development	Description of Purged Water at End of Development
MW1	3.0	10.07	July 6, 2020	7	Grey, no odour or sheen	Clear, no odour or sheen
MW2	3.0	9.44	July 6, 2020	28	Grey, no odour or sheen	Clear, no odour or sheen
MW3	3.0	9.96	July 6, 2020	40	Grey, no odour or sheen	Clear, no odour or sheen

Measures taken to minimize the potential for cross contamination or the introduction of contaminants during well construction included:

- The use of well pipe components (e.g. riser pipe and well screens) with factory machined threaded flush coupling joints
- Construction of wells without the use of glues or adhesives
- Removing the protective plastic wraps from well components at the time of borehole insertion to prevent contact with the ground and other surfaces
- Cleaning or disposal of drilling equipment between sampling locations

4.6 Groundwater: Field Measurement and Water Quality Parameters

On July 10, 2020, monitoring wells MW1 to MW3 were inspected for general physical condition, groundwater depth, the presence of non-aqueous phase liquid and organic vapour.

All measurements of VOC vapours in the monitor riser were made with an RKI Eagle 2 Multi Gas detector equipped with a photoionization detector (PID). Immediately after removing the well cap, the collection tube of the RKI Eagle 2 was inserted into the riser and the peak instrument reading was recorded. EXP used a Heron water level tape to measure the static water

level in each monitoring well. The measuring tape was cleaned with phosphate-free soap and tap water, rinsed with distilled water after each measurement.

Groundwater monitoring and elevation data are provided below.

Table 4.1 – Monitoring and Elevation Data

Monitoring Well ID/ Installation ID	Grade Elevation (metres)	Top of Casing Elevation (mbTOC)	Screen Depth (mbgs)	VOC Vapour (ppmv)	Depth to LNAPL (mbgs)	Depth to Groundwater (mbTOC)	Groundwater Elevation(metres)
MW1	99.80	99.74	7.0 to 10.1	2	ND	5.59	94.15
MW2	99.72	99.67	6.3 to 9.4	1	ND	4.97	94.69
MW3	100.01	99.96	6.8 to 9.9	0	ND	4.51	95.45

Notes: Elevations were measured to a relative datum.
LNAPL – light non-aqueous phase liquid
ppmv – parts per million by volume
mbgs – metres below ground surface
mbTOC – metres below top of monitor casing
ND – non-detectable

Based on the groundwater elevations for the shallow monitoring wells in the above table, a groundwater contour plan was prepared. The groundwater flow direction was determined to be northwesterly. The groundwater contour plan is provided as Figure 4 in Appendix A.

4.7 Groundwater: Sampling

Groundwater samples from all three monitoring wells were collected via a low flow sampling technique using a YSI 550 multi probe water quality meter. The YSI probe was calibrated using in-house reference standards. Prior to collecting the groundwater samples, water quality field parameters (turbidity, dissolved oxygen, conductivity, temperature, pH, and oxidation reduction potential) were monitored until stable readings were achieved. These parameters are considered to be stable when three consecutive readings meet the following conditions:

- Turbidity: within 10% for values greater than 5 nephelometric turbidity units (NTU), or three values less than 5 NTU;
- Dissolved oxygen: within 10% for values greater than 0.5 mg/L, or three values less than 0.5 mg/L;
- Conductivity: within 3%;
- Temperature: ± 1°C;
- pH: ± 0.1 unit; and,
- Oxidation reduction potential: ±10 millivolts.

When stabilization occurs, equilibrium between groundwater within a monitor and the surrounding formation water is attained. As such, samples collected when stabilization occurs are considered to be representative of formation water.

The groundwater sampling during the completion of this Phase Two ESA was undertaken in general accordance with the SAAP presented in Appendix C. Three groundwater samples and one field duplicate were collected in laboratory provided sample bottles and submitted to Bureau Veritas Laboratories (BV Labs) for analysis of VOCs. The groundwater samples were placed in clean coolers containing ice packs prior to and during transportation to BV Labs. The samples were transported to BV Labs within 24 hours of collection with a chain of custody.

4.8 Sediment: Sampling

As no water body was present at the Phase Two property, sediment sampling was not part of the Phase Two ESA.

4.9 Analytical Testing

The contracted laboratory selected to perform chemical analysis on all groundwater samples was Bureau Veritas (BV) Laboratories. BV is an accredited laboratory under the Standards Council of Canada/Canadian Association for Laboratory Accreditation in accordance with ISO/IEC 17025:1999- General Requirements for the Competence of Testing and Calibration Laboratories.

4.10 Residue Management

The drill cuttings from drilling activities and purged water from groundwater development and sampling were disposed of on site. Fluids from cleaning drilling equipment were disposed of by the driller at their facility.

4.11 Elevation Surveying

An elevation survey was conducted to obtain vertical control of the monitoring well locations. The top of casing and ground surface elevation of each monitoring well location was surveyed using a level and a relative benchmark. The site benchmark was a storm sewer manhole on Danforth Avenue adjacent to the storefront.

4.12 Quality Assurance and Quality Control Measures

All soil and groundwater samples were placed in coolers containing ice packs prior to and during transportation to the contract laboratory, Bureau Veritas Laboratories (BV Labs). Bureau Veritas Laboratories is accredited to the ISO/IEC 17025:2005 standard - *General Requirements for the Competence of Testing and Calibration Laboratories*.

A QA/QC program was also implemented to ensure that the analytical results received are accurate and dependable. A QA/QC program is a system of documented checks that validate the reliability of the data. Quality Assurance is a system that ensures that quality control procedures are correctly performed and documented. Quality Control refers to the established procedures observed both in the field and in the laboratory, designed to ensure that the resulting end data meet intended quality objectives. The QA/QC program implemented by EXP incorporated the following components:

- Collecting and analysing field duplicate groundwater samples to ensure analytical precision;
- Using dedicated and/or disposable sampling equipment;
- Following proper decontamination protocols to minimize cross-contamination;
- Maintaining field notes and completing field forms to document field activities; and
- Using only laboratory-supplied sample containers and following prescribed sample protocols, including using proper preservation techniques, meeting sample hold times, and documenting sample transmission on chains of custody, to ensure the integrity of the samples is maintained.

Bureau Veritas Laboratories QA/QC program involved the systematic analysis of control standards for the purpose of optimizing the measuring system as well as establishing system precision and accuracy and included calibration standards, method blanks, reference standards, spiked samples, surrogates and duplicates.

5.0 Review and Evaluation

5.1 Geology

The detailed soil profiles encountered in the borehole are provided on the borehole logs in Appendix D. Boundaries of soils indicated on the logs are intended to reflect transition zones for the purpose of environmental assessment and should not be interpreted as exact planes of geological change

The terrain at the Phase Two property consisted of crushed gravel fill surrounding the building footprint. Approximately 0.15 m of crushed stone fill was encountered in all three boreholes. Underlying the crushed stone fill was sand silt and gravel fill. The depth of the sand and gravel fill layer was 0.7 m in MW1 and MW3, and 0.6 m in MW2.

Limestone shale bedrock was encountered in beneath the fill layer in all three boreholes. Bedrock was encountered at 0.9 m in MW1 and MW 3, and 0.7 m in MW2.

5.2 Groundwater: Elevations and Flow Direction

Three monitoring wells were installed within the two APEC on the Phase Two property. The monitoring wells were screened so that the screen would straddle the water table, as observed while drilling occurred. The maximum depth of drilling was 9.2 metres below ground surface.

Groundwater elevations and water levels were measured at the Phase Two property on July 10, 2020. These are provided in Table 4.2.

Based on the groundwater level measurements, the groundwater flow direction was inferred to be to the northwest, as shown on Figure 4 in Appendix A. EXP notes that groundwater levels can be influenced by seasonal changes, the presence of subsurface structures, or fill, however based on the presence of the Ottawa River approximately 600 metres northwest of the Phase Two property and the depth of the water table, it is unlikely that any of these factors will affect the groundwater flow direction at the Phase Two property. Similarly, buried utilities are typically present within three metres of ground surface, while the water table is approximately 4.5 metres below ground surface; therefore, it is unlikely that the presence of subsurface utilities has affected the direction of groundwater flow.

5.3 Groundwater: Hydraulic Gradients

Horizontal hydraulic gradients were estimated for the groundwater flow components identified in the overburden aquifer based on the July 10, 2020 groundwater elevations.

The horizontal hydraulic gradient, between each monitoring well pair, is calculated using the following equation:

$i = \Delta h / \Delta s$

Where,

i = horizontal hydraulic gradient;

Δh (m) = groundwater elevation difference; and,

Δs (m) = separation distance.

There are three monitoring wells on the Phase Two property that were used to generate the groundwater flow direction. The horizontal hydraulic gradient, based on the groundwater elevations, is estimated to be 0.048 m/m.

On July 6, 2020, rising head tests were conducted on MW1 and MW3. The rising head test requires that the static water level be measured in each monitoring well prior to the removal of groundwater. Groundwater is removed from the monitoring well using a bailer. After the water level has been sufficiently lowered, an interface probe is lowered into the monitor as quickly as possible to measure the new water level. The time at which the new water level is measured is noted as time equal

zero. Water level readings are subsequently taken at frequent intervals. Both the water levels and the time they were taken are recorded.

The frequency of the time measurement is determined by the rate the water level recovers to the static water level. Measurements are taken until at least 70% recovery has been achieved or, in cases where recovery is extremely slow, until it is deemed that a sufficient amount of time has elapsed.

All water level measurements were made with a Heron oil/water interface probe. Both the probe and the measuring tape that come into contact with liquids within a monitor are cleaned with phosphate-free soap and tap water, rinsed with distilled water and then finally rinsed with methanol after each hydraulic conductivity test is concluded.

The initial static water level in MW1 was 5.96 mbgs. After the removal of approximately 4 litres of water, the water level was 9.19 mbgs. Measurements of water levels within the monitor were made at frequent intervals for 80 minutes, at which time the water level had returned to 59% of its static level. Using the Hvorslev model, the hydraulic conductivity was calculated to be 6.6 x 10-6 cm/s.

The initial static water level in MW3 was 5.46 mbgs. After the removal of approximately 4 litres of water, the water level was 7.62 mbgs. Measurements of water levels within the monitor were made at frequent intervals for 30 minutes, at which time the water level had returned to 80% of its static level. Using the Hvorslev model, the hydraulic conductivity was calculated to be 7.4 x 10-4 cm/s.

The data and the calculations for the hydraulic conductivity testing are provided in Appendix G.

5.4 Soil: Field Screening

Fill samples were screened during the borehole advancement; however, no soil samples were submitted for analysis.

Field screening involved using the combustible vapour meter to organic vapour concentrations, in ppmv, in the collected soil samples in order to assess the presence of soil gases which would imply VOC impact. The vapour readings obtained during the drilling activities are presented on the borehole logs in Appendix D. The boreholes vapour readings ranged from non-detectable to 10 ppmv. No staining or odours were observed in any of the soil samples.

5.5 Soil: Quality

Based on the nature of the APEC identified in the Phase One report, the shallow depth to bedrock, the depth to the water table, and the off-site source of the PCA, soil sampling was not determined to be required at the Phase Two property.

5.6 Groundwater: Quality

Chemical analyses were performed on groundwater samples collected from all three monitoring wells (MW1, MW2 and MW3). All groundwater samples were collected via a low flow sampling technique. EXP monitored several water quality parameters (such as water level, temperature, dissolved oxygen, conductivity, salinity, pH, oxygen reduction potential and turbidity) in order to ensure that the samples collected were representative of actual groundwater conditions. Data were compared to federal and provincial criteria.

Three groundwater samples, one field duplicate, a field blank and a trip blank were submitted for chemical analysis of VOC. The results are presented in Table 1 in Appendix E.

5.6.1 Volatile Organic Compounds

Three groundwater samples, one field duplicate, one field blank, and one trip blank were submitted for chemical analysis of VOC. All of the groundwater samples exceeded the Table 7 SCS.

The VOC results are provided in Table 1 in Appendix E and shown on Figures 5 and 7.

5.6.2 Chemical Transformation and Contaminant Sources

Since several chlorinated VOC were detected in groundwater above the Table 7 SCS there is potential for reductive dechlorination of chlorinated VOC. Under anaerobic conditions, tetrachloroethylene can transform via a microbially mediated reductive dechlorination pathway into daughter products such as trichloroethylene, 1,1-dichloroethylene, cis-1,2-dichloroethylene and vinyl chloride. Evidence of reductive dichlorination of chlorinated VOC has been observed in groundwater on the Phase Two property, as significantly higher concentrations of tetrachloroethylene were observed in MW-3, the monitoring well closest to the contaminant source, and higher concentrations of the daughter product vinyl chloride was observed in MW-1, further downgradient.

5.6.3 Evidence of Non-Aqueous Phase Liquid

Inspection of the groundwater monitoring wells did not indicate the presence of non-aqueous phase liquid (NAPL).

5.6.4 Maximum Concentrations

The Table 7 SCS were exceeded in samples for cis-1,2-dichloroethylene, tetrachloroethylene, trichloroethylene and vinyl chloride. Maximum groundwater concentrations are provided in Table 2 in Appendix E.

5.7 Sediment: Quality

As there were no water bodies on the Phase Two property, surface water and sediment sampling were not required.

5.8 Quality Assurance and Quality Control Results

Quality assurance and quality control measures were taken during the field activities to meet the objectives of the sampling and quality assurance plan to collect unbiased and representative samples to characterize existing conditions in the fill materials and groundwater at the site. QA/QC measures, included:

- Collection and analysis of blind duplicate groundwater samples to ensure sample collection precision;
- Analysis of a groundwater field blank for all parameters that were analysed to assess potential impact during sampling;
- Using dedicated and/or disposable sampling equipment;
- Following proper decontamination protocols to minimize cross-contamination;
- Maintaining field notes and completing field forms to document on-site activities; and
- Using only laboratory supplied sample containers and following prescribed sample protocols, including proper preservation, meeting sample hold times, proper chain of custody documentation, to ensure integrity of the samples.

Bureau Veritas Laboratories' (BV Labs) QA/QC program consisted of the preparation and analysis of laboratory duplicate samples to assess precision and sample homogeneity, method blanks to assess analytical bias, spiked blanks and QC standards to evaluate analyte recovery, matrix spikes to evaluate matrix interferences and surrogate compound recoveries to evaluate extraction efficiency. The laboratory QA/QC results are presented in the Quality Assurance Report provided in the Certificates of Analysis prepared by BV Labs. The QA/QC results are reported as percent recoveries for matrix spikes, spiked blanks and QC standards, relative percent difference for laboratory duplicates and analyte concentrations for method blanks.

Review of the laboratory QA/QC results reported indicated that they were all within acceptable control limits or below applicable alert criteria for the sampled media and analytical test groups. Based on the assessment of the QA/QC, the analytical results reported by BV labs are of acceptable quality and further data qualifications are not required.

For QA/QC purposes, the analytical sample results are quantitatively evaluated by calculating the relative percent difference (RPD) between the samples and their duplicates. To accurately calculate a statistically valid RPD, the concentration of the analytes found in both the original and duplicate sample must be greater than five times the reporting detection limit (RDL).

The results of the RPD calculations are provided in Appendix E in Table 3. All of the RPD were either not calculable or within the applicable alert limits.

A field blank was prepared and submitted for laboratory analysis of all parameters tested in groundwater. The results of the field blank analyses are provided in Table 1 in Appendix E. All parameters in the field blank were non-detectable.

5.9 Phase Two Conceptual Site Model

This section presents a Conceptual Site Model (CSM) providing a narrative, graphical and tabulated description integrating information related to the Phase Two property's geologic and hydrogeological conditions, areas of potential environmental concern/potential contaminating activities, the presence and distribution of contaminants of concern, contaminant fate and transport, and potential exposure pathways.

5.9.1 Introduction

EXP Services Inc. (EXP) was retained by Ottawa Carleton Construction Group Ltd. to complete a Phase Two Environmental Site Assessment (ESA) of the property located at 349 Danforth Avenue, Ottawa, Ontario hereinafter referred to as the 'Phase Two property'. The objective of the Phase Two ESA investigation is to assess the quality of the groundwater conditions within the areas of potential environmental concern (APEC) identified in a Phase One ESA prepared by EXP.

The most recent use of the property is a custom drapery and supplies business, which is defined by Ontario Regulation 153/04 as a type of commercial property use. It is proposed that the current building on the Phase Two property be demolished and that a three-storey building be constructed. It is understood that the proposed building would be used for commercial purposes on the ground floor and for residential purposes on upper floors. Therefore, as per the amendments to Ontario Regulation 153/04 that came into effect on December 4, 2019, a Record of Site Condition (RSC) is required because the building envelope will be changed. The MECP confirmed this interpretation.

5.9.2 Physical Site Description

The Phase Two ESA Property is located at 349 Danforth Avenue, Ottawa, as shown on Figure 1 in Appendix A. The Phase Two property is comprised of a single two-storey building with gravel parking and landscaped areas. The surrounding properties are used for commercial purposes. Future use of the property is intended to be commercial/residential.

Refer to Table 5.1 for the Site identification information.

Table 5.1: Site Identification Details

Civic Address	349 Danforth Avenue, Ottawa, Ontario
Current Land Use	Commercial
Proposed Future Land Use	Commercial/Residential
Property Identification Number	04017-0156
UTM Coordinates	NAD83 18T 440963 m E and 5026698 m N
Site Area	0.074 acres (0.03 hectares)
Property Owner	Ottawa Carleton Construction Limited

The Phase One Conceptual Site Model is provided as Figure 3 in Appendix A.

Potable water is available from the City of Ottawa, however, there are no potable water wells within the Phase Two study area. Topographically, the Phase Two property is relatively flat. The closest body of water is the Ottawa River, which is approximately 600 m northwest of the Phase Two property.

In accordance with Section 41 of the Ontario Regulation 153/04 (as amended), the Phase Two property is not an environmentally sensitive area. In addition, the Phase Two property is not located within an area of natural significance and it does not include land that is within 30 metres of an area of natural significance.

The Phase Two property is a shallow soil property as defined in Section 43.1 of the regulation. It does not include all or part of a water body or is adjacent to a water body or includes land that is within 30 metres of a water body.

5.9.3 Geological and Hydrogeological

The terrain at the Phase Two property consisted of crushed gravel fill surrounding the building footprint. Approximately 0.15 m of crushed stone fill was encountered in all three boreholes. Underlying the crushed stone fill was sand silt and gravel fill. The depth of the sand and gravel fill layer was 0.7 m in MW1 and MW3, and 0.6 m in MW2. No native soil was encountered during the investigation.

Limestone shale bedrock was encountered in beneath the fill layer in all three boreholes. Bedrock was encountered at 0.9 m in MW1 and MW 3, and 0.7 m in MW2.

Ground surface is approximately 70 metres above sea level (masl) and bedrock is approximately 69 to 70 masl at the Phase Two property. Based on the geological profile, cross-sections of the site were prepared, as shown on Figure 6 and 7 in Appendix A. The groundwater flow direction is to the northwest, as shown in Figure 4 in Appendix A. The hydraulic conductivity of the bedrock in MW1 was calculated to be 6.6×10^{-6} cm/s and the hydraulic conductivity of the bedrock in MW3 was calculated to be 7.4×10^{-4} cm/s.

A summary of factors that apply to the Phase Two property is provided in Table 5.2

Table 5-2: Site Characteristics

Characteristic	Description
Minimum Depth to Bedrock	0.7 mbgs
Minimum Depth to Overburden Groundwater	4.51 mbgs (July 10, 2020)
Shallow Soil Property	Yes, bedrock is less than 2.0 mbgs
Proximity to water body or ANSI	600 m northwest
Soil pH	N/A
Soil Texture	Coarse
Current Property Use	Commercial
Future Property Use	Commercial/residential
Proposed Future Building	Multi-storey commercial/residential
Areas Containing Suspected Fill	None

The depth to groundwater was measured to range between 4.51 mbgs and 5.59 mbgs. Based on the groundwater level measurements, groundwater contours in the bedrock were plotted, as shown on Figure 4 Appendix A. The groundwater flow direction was inferred to be to the northwest. EXP notes that groundwater levels can be influenced by seasonal changes, the presence of subsurface structures, or fill, however based on the presence of the Ottawa River approximately 600 metres northwest of the Phase Two property and the depth of the water table, it is unlikely that any of these factors will affect the groundwater flow direction at the Phase Two property.

5.9.4 Utilities

The approximate location of underground utilities was based on locates obtained prior to drilling. The underground utility corridors for hydro, gas, phone, sanitary sewer, and municipal water are typically present within 3 metres of ground surface, while the water table is approximately 4.5 metres below ground surface; therefore, it is unlikely that the presence of subsurface utilities has affected the direction of groundwater flow.

5.9.5 Potentially Contaminating Activities

Ontario Regulation 153/04 defines a PCA as one of 59 operations set out in Table 2 of Schedule D that occurs or has occurred in a Phase Two study area. The following PCAs were identified:

- PCA #37 – Operation of Dry-Cleaning Equipment (where chemicals are used).

PCA (PCA #37) relates to the active and historic dry cleaner operations in the Phase Two study area. Laundry Land is the currently active dry-cleaning business that is located approximately 25 m southeast of the Phase Two property. Pearl Cleaners was a dry cleaner business that was previously active from 1995 to 2001 and located immediately adjacent to the north of the Phase Two property.

There was no evidence of a railway being present on the Phase Two property. A tramway was historically present approximately 40 m south of the Phase Two property

5.9.6 Areas of Potential Environmental Concern/Potential Contaminants of Concern

Ontario Regulation 153/04 defines an APEC as an area on a property where one or more contaminants are potentially present. The following APEC were identified on the Phase Two property, as shown on Figure 2 in Appendix A:

- APEC #1 – Part of Phase Two property that includes a 5 m buffer of land extending from Danforth Avenue and is a result of an active dry cleaner operation (Laundry Land) located approximately 25 m from the property boundary and upgradient to the inferred groundwater flow direction; and,
- APEC #2 – Part of Phase Two property that includes a 5 m buffer of land extending from the strip mall. Pearl Cleaners was a former dry-cleaning operation that was located immediately adjacent to the north and cross gradient to the inferred groundwater flow direction.

5.9.7 Investigation

The Phase Two ESA was conducted to assess the groundwater quality at the Phase Two property. As indicated above, the analytical program of the Phase Two ESA included testing of groundwater for VOC from the monitoring wells installed on the Phase Two property. The monitoring well locations are shown on Figure 2 in Appendix A.

5.9.8 Contaminants of Concern

Based on the results of the investigation, several chlorinated VOC, cis-1,2-dichloroethylene, tetrachloroethylene, trichloroethylene and vinyl chloride, exceeded the applicable MECP Table 7 SCS and were considered groundwater COC. Groundwater analytical results are provided on Figure 5 and 7 in Appendix A.

5.9.9 Contaminant Fate and Transport

Since several chlorinated VOC were detected in groundwater above the Table 2 SCS there is potential for reductive dechlorination of chlorinated VOC. Under anaerobic conditions, tetrachloroethylene can transform via a microbially mediated reductive dechlorination pathway into daughter products such as trichloroethylene, 1,1-dichloroethylene, cis-1,2-dichloroethylene and vinyl chloride. Evidence of reductive dichlorination of chlorinated VOC has been observed in groundwater on the Phase Two property, as significantly higher concentrations of tetrachloroethylene were observed in MW-3, the monitoring well closest to the contaminant source, and higher concentrations of the daughter product vinyl chloride was observed in MW-1, further downgradient.

Cross-sections that depict the geological, hydrogeological, and groundwater chemical data for the Phase Two property are provided as Figures 6 and 7 in Appendix A.

6.0 Conclusion

A summary of the soil and groundwater sampling program is as follows:

- All groundwater samples exceeded the provincial MECP Table 7 standards for several chlorinated VOC including cis-1,2-dichloroethylene, tetrachloroethylene, trichloroethylene and vinyl chloride;
- The hydraulic conductivity of the bedrock in MW1 was calculated to be 6.6×10^{-6} cm/s;
- The hydraulic conductivity of the bedrock in MW3 was calculated to be 7.4×10^{-4} cm/s; and
- The groundwater flow direction was determined to be northwesterly.

Since several chlorinated VOC were detected in groundwater above the Table 2 SCS there is potential for reductive dechlorination of chlorinated VOC. Under anaerobic conditions, tetrachloroethylene can transform via a microbially mediated reductive dechlorination pathway into daughter products such as trichloroethylene, 1,1-dichloroethylene, cis-1,2-dichloroethylene and vinyl chloride. Evidence of reductive dichlorination of chlorinated VOC has been observed in groundwater on the Phase Two property, as significantly higher concentrations of tetrachloroethylene were observed in MW-3, the monitoring well closest to the contaminant source, and higher concentrations of the daughter product vinyl chloride was observed in MW-1, further downgradient.

The Qualified Person can confirm that the Phase Two Environmental Site Assessment was conducted per the requirements of Ontario Regulation 153/04, as amended, and in accordance with generally accepted professional practices.

7.0 References

This study was conducted in accordance with the applicable Regulations, Guidelines, Policies, Standards, Protocols and Objectives. Specific reference is made to the following documents.

- ASTM International, D5299/D5299M-17, *Standard Guide for Decommissioning of Groundwater Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities*, 2017.
- Canadian Council of Ministers of the Environment, *Guidance Manual on Sampling, Analysis, and Data Management for Contaminated Sites,* 1993.
- Canadian Council of Ministers of the Environment, *A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines,* 2006.
- Canadian Council of Ministers of the Environment, *Canada Wide Standards for Petroleum Hydrocarbons in Soil*, 2008.
- Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines, http://www.ccme.ca/en/resources/canadian_environmental_quality_guidelines, Accessed November 2018.
- Canadian Standards Association, *CSA-Z769-00 (R2013), Phase II Environmental Assessment Standard*, 2013.
- EXP Services Inc., *Phase I Environmental Site Assessment, 875 Heron Road, Ottawa, Ontario,* February 25, 2020.
- Federal Contaminated Sites Action Plan, Advisory Bulletin: *How, when and why do I decommission a groundwater monitoring well?*
- Federal Contaminated Sites Action Plan, *Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites*, June 2016.
- Freeze and Cherry, *Groundwater*, Prentice Hall, 1979.
- LRL Associates Ltd., *Phase II Environmental Site Assessment, Confederation Heights Grounds – Ottawa Technology Center Building, 875 Heron Road, Ottawa, Ontario,* December 22, 2017.
- Ontario Ministry of the Environment, Conservation and Parks, *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*, December 1996.
- Ontario Ministry of the Environment, Conservation and Parks, *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, April 15, 2011.
- Ontario Ministry of the Environment, Conservation and Parks, *Guide for Completing Phase Two Environmental Site Assessments under Ontario Regulation 153/04,* June 2011.
- Ontario Ministry of the Environment, Conservation and Parks, *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act,* July 1, 2011.
- Ontario Ministry of the Environment, Conservation and Parks, *Management of Excess Soil – A Guide for Best Management Practices,* January 2014.
- Ontario Regulation 153/04, made under the *Environmental Protection Act*, as amended.
- Ontario R.R.O. 1990, Regulation 347, made under the *Environmental Protection Act*, as amended.
- Ontario R.R.O. 1990, Regulation 903, made under the *Water Resources Act*, as amended.

8.0 General Limitations

Basis of Report

This report ("Report") is based on site conditions known or inferred by the investigation undertaken as of the date of the Report. Should changes occur which potentially impact the condition of the site the recommendations of EXP may require re-evaluation. Where special concerns exist, or Ottawa Carleton Construction Group Ltd. ("the Client") has special considerations or requirements, these should be disclosed to EXP to allow for additional or special investigations to be undertaken not otherwise within the scope of investigation conducted for the purpose of the Report.

Reliance on Information Provided

The evaluation and conclusions contained in the Report are based on conditions in evidence at the time of site inspections and information provided to EXP by the Client and others. The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose as communicated by the Client. EXP has relied in good faith upon such representations, information and instructions and accepts no responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of any misstatements, omissions, misrepresentation or fraudulent acts of persons providing information. Unless specifically stated otherwise, the applicability and reliability of the findings, recommendations, suggestions or opinions expressed in the Report are only valid to the extent that there has been no material alteration to or variation from any of the information provided to exp. If new information about the environmental conditions at the Site is found, the information should be provided to EXP so that it can be reviewed and revisions to the conclusions and/or recommendations can be made, if warranted.

Standard of Care

The Report has been prepared in a manner consistent with the degree of care and skill exercised by engineering consultants currently practicing under similar circumstances and locale. No other warranty, expressed or implied, is made. Unless specifically stated otherwise, the Report does not contain environmental consulting advice.

Complete Report

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment form part of the Report. This material includes, but is not limited to, the terms of reference given to EXP by the Client, communications between EXP and the Client, other reports, proposals or documents prepared by EXP for the Client in connection with the site described in the Report. In order to properly understand the suggestions, recommendations and opinions expressed in the Report, reference must be made to the Report in its entirety. EXP is not responsible for use by any party of portions of the Report.

Use of Report

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. No other party may use or rely upon the Report in whole or in part without the written consent of EXP. Any use of the Report, or any portion of the Report, by a third party are the sole responsibility of such third party. EXP is not responsible for damages suffered by any third party resulting from unauthorised use of the Report.

Report Format

Where EXP has submitted both electronic file and a hard copy of the Report, or any document forming part of the Report, only the signed and sealed hard copy shall be the original documents for record and working purposes. In the event of a dispute or discrepancy, the hard copy shall govern. Electronic files transmitted by EXP utilize specific software and hardware systems. EXP makes no representation about the compatibility of these files with the Client's current or future software and hardware systems. Regardless of format, the documents described herein are EXP's instruments of professional service and shall not be altered without the written consent of EXP.

9.0 Signatures

We trust this report meets your current needs. If you have any questions pertaining to the investigation undertaken by EXP, please do not hesitate to contact the undersigned.

Leah Wells, B.A.Sc., EIT
Environmental Engineer-in-Training
Earth and Environment

Patricia Stelmack, M.Sc., P.Eng.
Team Lead/Senior Project Manager
Earth and Environment

Appendix A: Figures

0 100m 200m 400m

HORIZONTAL 1:10,000

EXP Services Inc. www.exp.com
t: +1.613.688.1899 | f: +1.613.225.7337
2650 Queensview Drive, Suite 100
Ottawa, ON K2B 8H6, Canada

DATE: JULY 2020	CLIENT: OTTAWA CARLETON CONSTRUCTION GROUP LTD.	project no. OTT-00259161-A0
DESIGN: O.V. / CHECKED: P.S.		scale: 1:10,000
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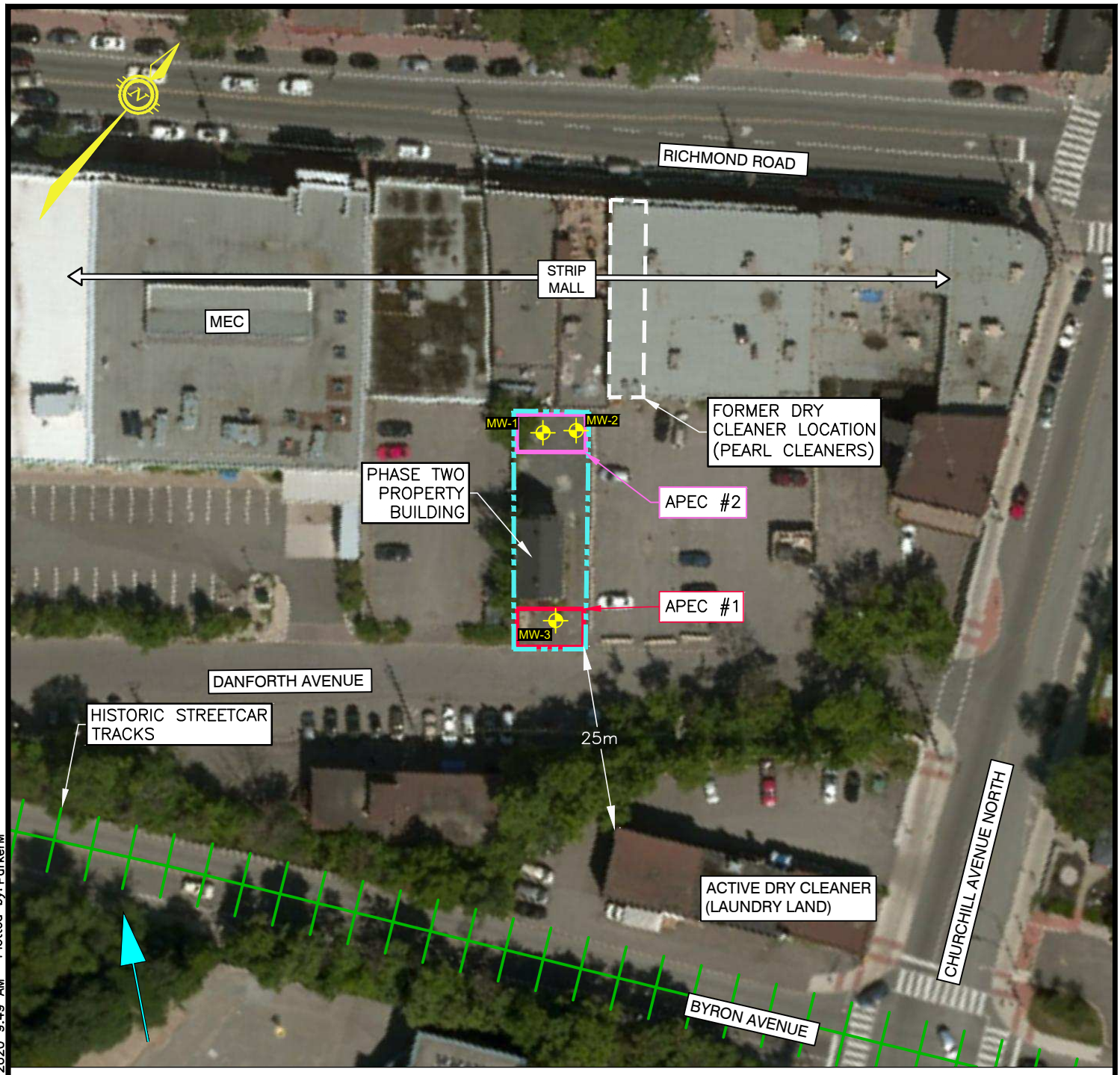

LEGEND

- PHASE ONE PROPERTY BOUNDARY
- INFERRED GROUNDWATER FLOW DIRECTION
- HISTORIC STREETCAR TRACKS
- APEC #1 - PCA #37 — OPERATION OF DRY-CLEANING EQUIPMENT (WHERE CHEMICALS ARE USED)
- APEC #2 - PCA #37 — OPERATION OF DRY-CLEANING EQUIPMENT (WHERE CHEMICALS ARE USED)
- MW-2 — MONITORING WELL LOCATION & NUMBER

0 5m 10m 30m

HORIZONTAL 1:750

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DATE: JULY 2020	CLIENT: OTTAWA CARLETON CONSTRUCTION GROUP LTD.	project no. OTT-00259161-A0
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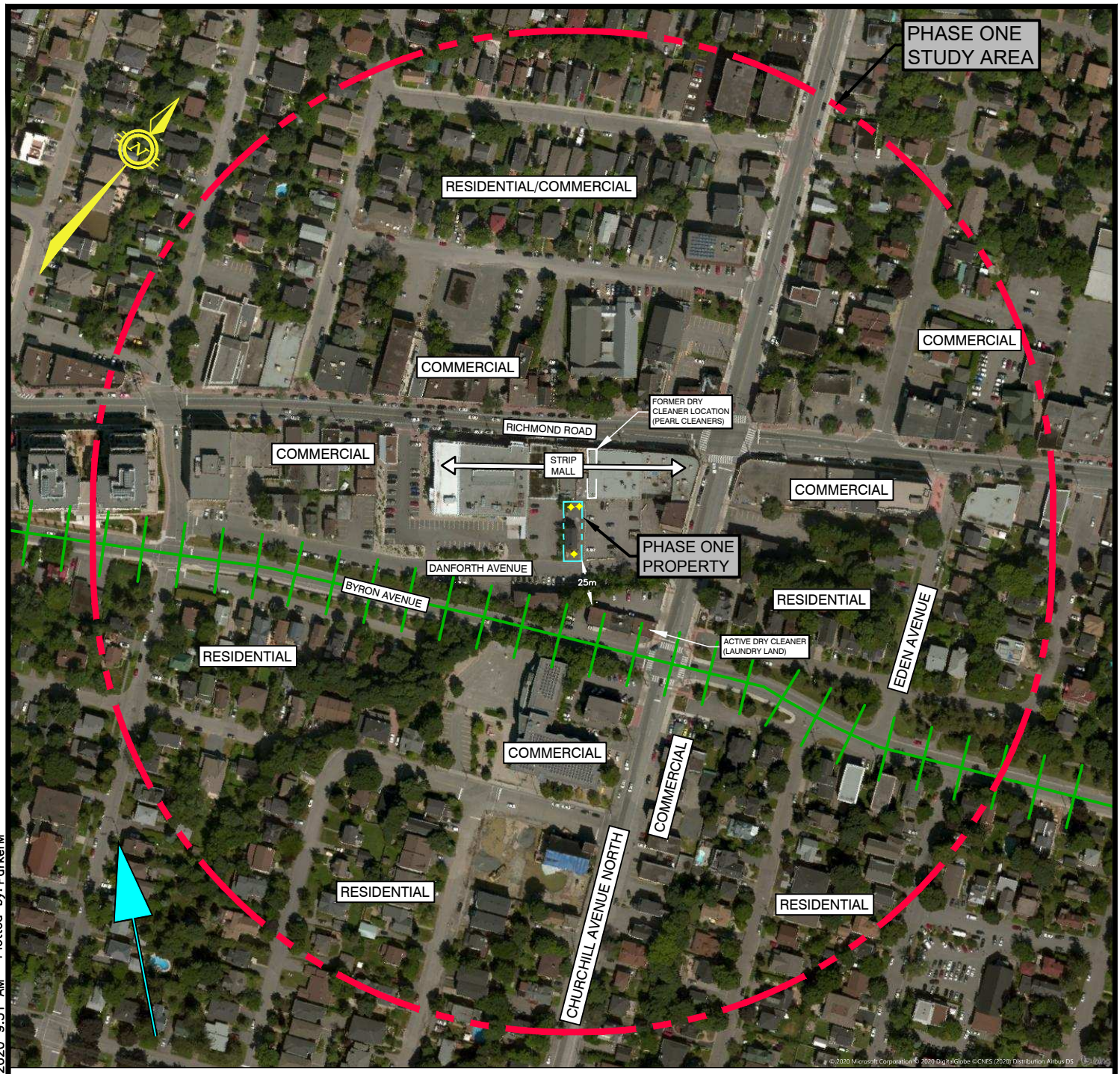

LEGEND

- PHASE ONE PROPERTY
- PHASE ONE STUDY AREA
- INFERRED GROUNDWATER FLOW DIRECTION
- HISTORIC STREETCAR TRACKS

0 30m 60m 120m

HORIZONTAL 1:3,000

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DATE: MARCH 2020	CLIENT: OTTAWA CARLETON CONSTURCTION GROUP LTD.	project no. OTT-00259161-A0
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DRAWN BY: M.P.	TITLE: CONCEPTUAL SITE MODEL - PHASE ONE STUDY AREA 349 DANFORTH AVENUE, OTTAWA, ON	FIG 3

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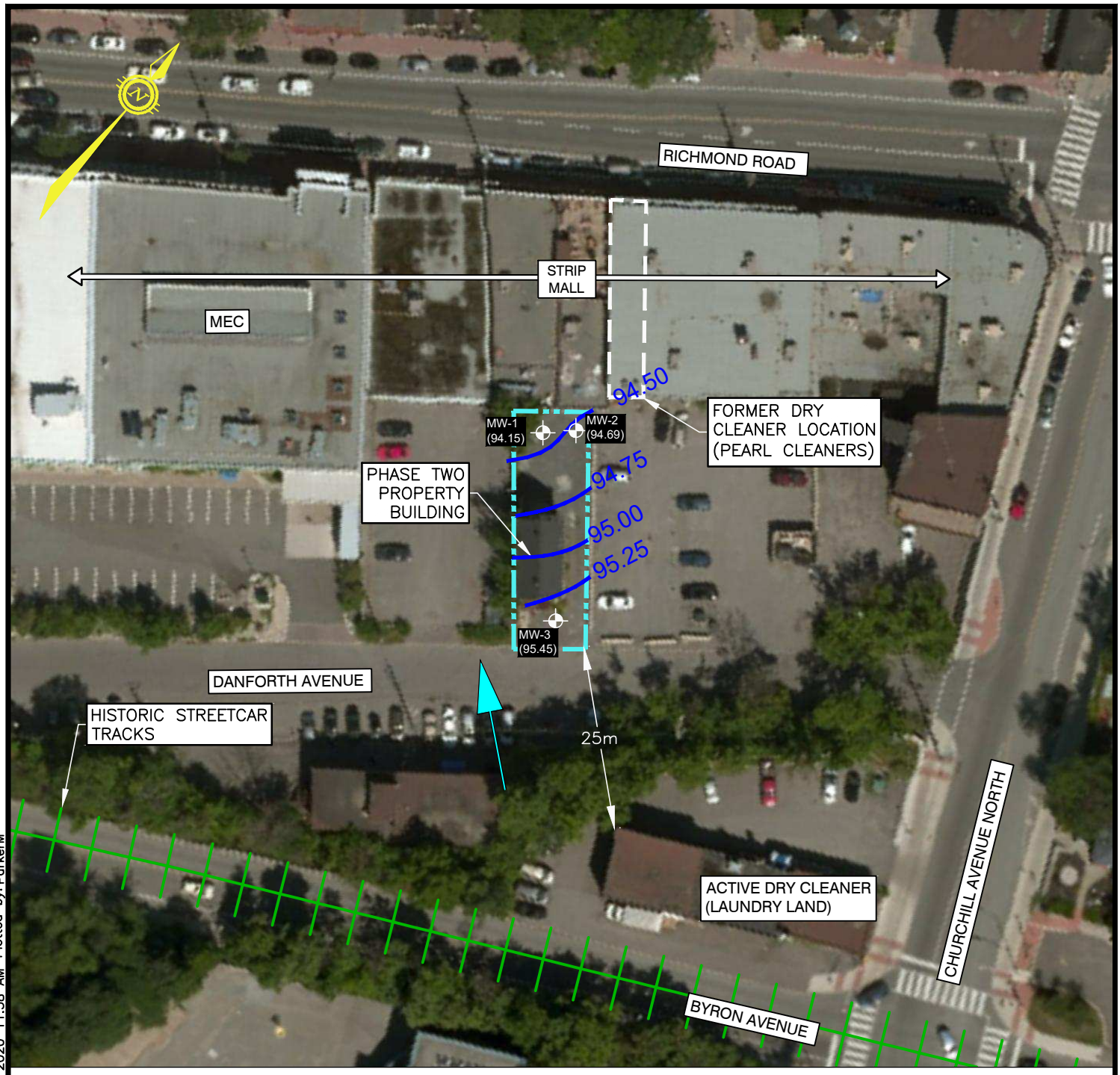

LEGEND

- PHASE ONE PROPERTY BOUNDARY
- INFERRED GROUNDWATER FLOW DIRECTION
- HISTORIC STREETCAR TRACKS
- MW-2 (94.69) MONITORING WELL LOCATION & NUMBER (GROUNDWATER ELEVATION)
- 95.25 GROUNDWATER CONTOUR & ELEVATION

0 5m 10m 30m

HORIZONTAL 1:750

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DATE: JULY 2020	CLIENT: OTTAWA CARLETON CONSTRUCTION GROUP LTD.	project no. OTT-00259161-A0
DESIGN: L.W. / CHECKED: P.S.		scale: 1:750
DRAWN BY: M.P.	TITLE: GROUNDWATER CONTOUR PLAN 349 DANFORTH AVENUE, OTTAWA, ON	FIG 4

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MW1							Screen Interval 7.0-10.1 mbgs	
DATE	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	PCE	TCE	VC
10-Jul-20	<0.20	<0.49	<0.20	17	0.54	0.48	2.1	0.71

MW2							Screen Interval 6.3-9.4 mbgs	
DATE	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	PCE	TCE	VC
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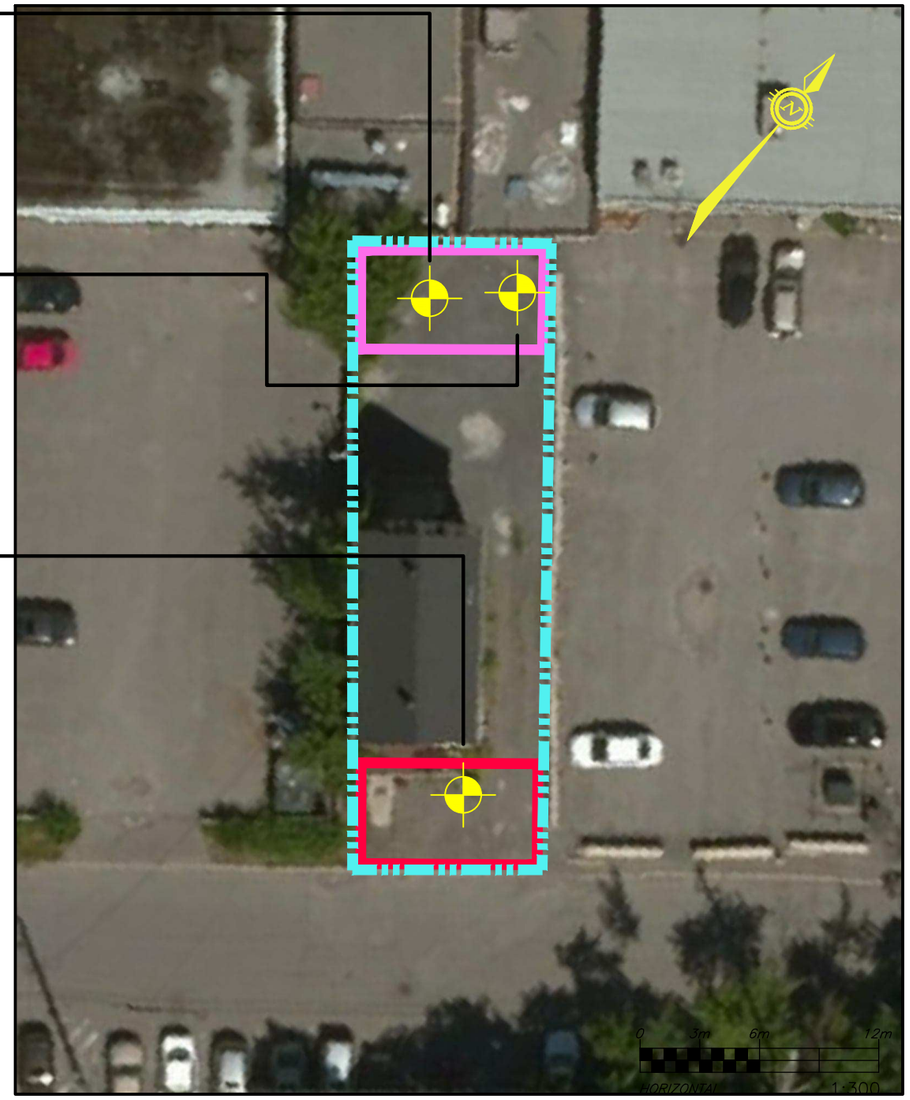
MW3							Screen Interval 6.8-9.9 mbgs	
DATE	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	PCE	TCE	VC
10-Jul-20	<0.20	<0.49	<0.20	75	0.93	150	17	0.30
10-Jul-20 (DUP)	<0.20	<0.49	<0.20	72	1.0	140	16	0.30

PARAMETERS	ABBREVIATION	REG 153/04 TABLE 7 STANDARDS
1,1-Dichloroethane	1,1-DCA	11
1,2-Dichlororethane	1,2-DCA	0.5
1,1-Dichloroethylene	1,1-DCE	0.5
Cis-1,2-Dichloroethylene	c-1,2-DCE	1.6
Trans-1,2,-Dichlorothylene	t-1,2-DCE	1.6
Tetrachloroethylene	PCE	0.5
Trichloroethylene	TCE	0.5
Vinyl Chloride	VC	0.5



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Ottawa, ON K2B 8H6, Canada

DATE	CLIENT:	project no.
JULY 2020	OTTAWA CARLETON CONSTRUCTION GROUP LTD.	OTT-00259161-A0
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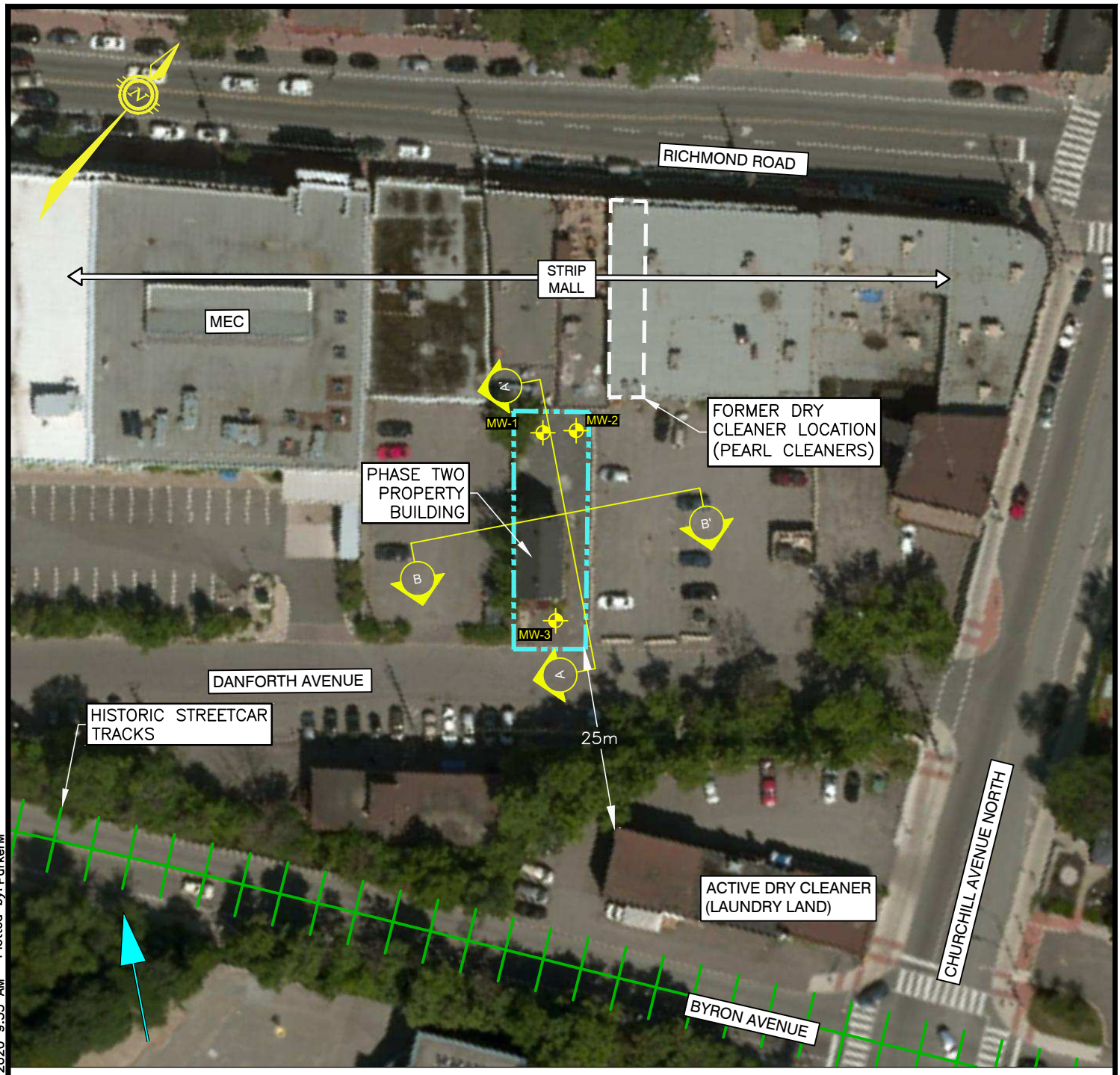
DRAWN BY: M.P.		FIG 5



LEGEND

- PHASE ONE PROPERTY BOUNDARY
- MW-2 — MONITORING WELL LOCATION & NUMBER
- INFERRED GROUNDWATER FLOW DIRECTION
- HISTORIC STREETCAR TRACKS

0 5m 10m 30m

HORIZONTAL 1:750

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Ottawa, ON K2B 8H6, Canada

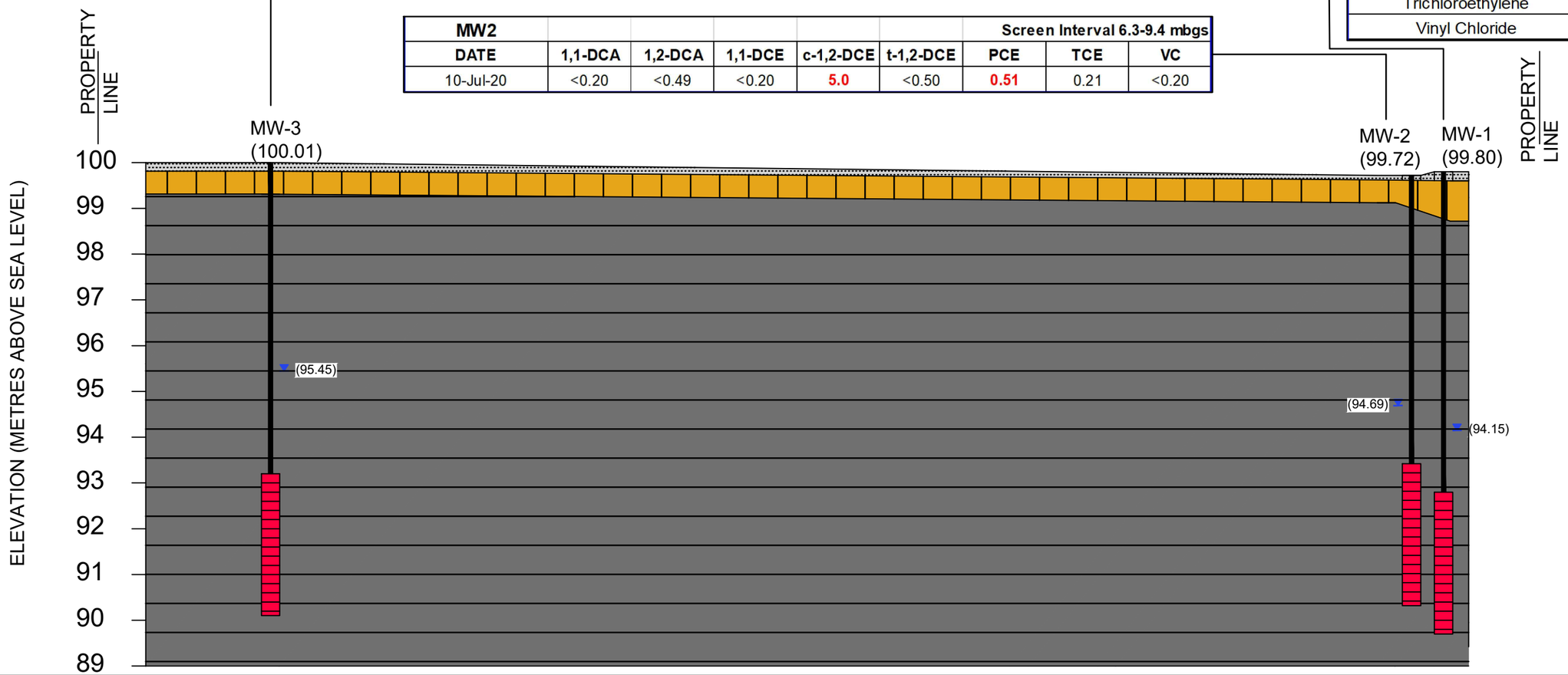
DATE: JULY 2020	CLIENT: OTTAWA CARLETON CONSTRUCTION GROUP LTD.	project no. OTT-00259161-A0
DESIGN: L.W. / CHECKED: P.S.		scale: 1:750
DRAWN BY: M.P.	TITLE: CROSS SECTION PLAN 349 DANFORTH AVENUE, OTTAWA, ON	FIG 6

MW1								Screen Interval 7.0-10.1 mbgs
DATE	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	PCE	TCE	VC
10-Jul-20	<0.20	<0.49	<0.20	17	0.54	0.48	2.1	0.71

MW3								Screen Interval 6.8-9.9 mbgs
DATE	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	PCE	TCE	VC
10-Jul-20	<0.20	<0.49	<0.20	75	0.93	150	17	0.30
10-Jul-20 (DUP)	<0.20	<0.49	<0.20	72	1.0	140	16	0.30

MW2								Screen Interval 6.3-9.4 mbgs
DATE	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	PCE	TCE	VC
10-Jul-20	<0.20	<0.49	<0.20	5.0	<0.50	0.51	0.21	<0.20

PARAMETERS	ABBREVIATION	REG 153/04 TABLE 7 STANDARDS
1,1-Dichloroethane	1,1-DCA	11
1,2-Dichlororethane	1,2-DCA	0.5
1,1-Dichloroethylene	1,1-DCE	0.5
Cis-1,2-Dichloroethylene	c-1,2-DCE	1.6
Trans-1,2,-Dichlorothylene	t-1,2-DCE	1.6
Tetrachloroethylene	PCE	0.5
Trichloroethylene	TCE	0.5
Vinyl Chloride	VC	0.5



LEGEND

- MBGS - METRES BELOW GROUND SURFACE
- ALL RESULTS ARE IN µg/L UNLESS OTHERWISE NOTED
- ALL SAMPLE INTERVALS MEASURE FROM THE GROUND SURFACE
- *STANDARD SHOWN ARE FOR MECP 2011 TABLE 2 FULL DEPTH GENERIC SITE CONDITION STANDARDS IN A POTABLE GROUNDWATER CONDITION AND INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE AND MEDIUM TO FINE TEXTURED SOIL
- LOCATION WHERE SAMPLE IS WITHIN TABLE 2 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
- LOCATION WHERE SAMPLE EXCEEDS TABLE 2 STANDARDS FOR AT LEAST ONE PARAMETER IS SHOWN IN RED
- CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 2 STANDARDS SHOWN IN TEXT IN RED

CRUSHED STONE FILL

SAND SILT AND GRAVEL FILL

TEST HOLE

LIMESTONE SHALE BEDROCK

GROUNDWATER ELEVATION (METRES ABOVE SEA LEVEL)

SCREEN INTERVAL

0 1m 2m 4m

HORIZONTAL 1:100

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2650 Queensview Drive, Suite 100
Ottawa, ON K2B 8H6, Canada

DATE: JULY 2020
DESIGN: L.W. CHECKED: P.S.
DRAWN BY: M.P.

CLIENT: OTTAWA CARLETON CONSTRUCTION GROUP LTD.

TITLE: CROSS SECTION A-A' GROUNDWATER ANALYTICAL RESULTS - VOC
349 DANFORTH AVENUE, OTTAWA, ON

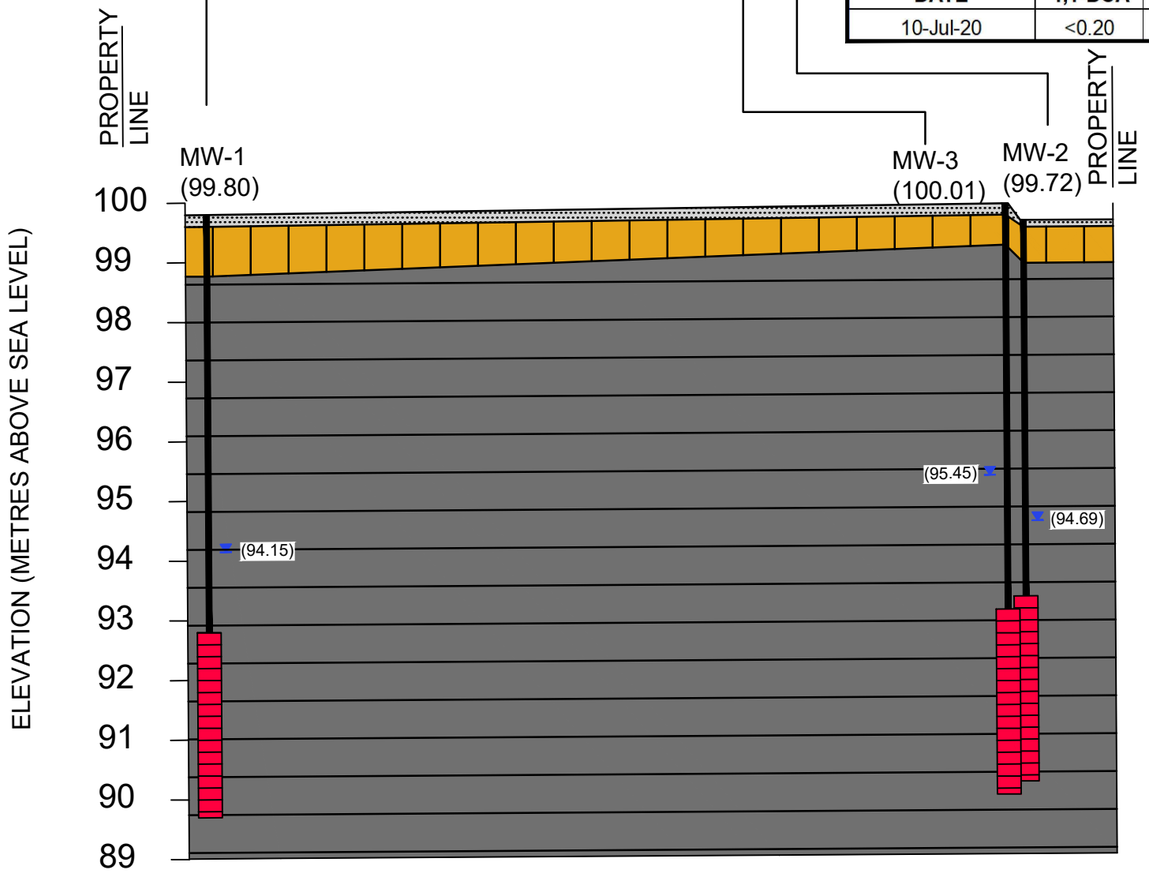
project no. OTT-00259161-A0
scale 1:100
FIG 7

E:\OTT\OTT-00259161-A0\60 Execution\65 Drawings\7-28-2020\349 DANFORTH - FIG1-3.dwg
Last Saved: Jul 28, 2020 12:08 PM Last Plotted: Aug 4, 2020 2:59 PM Plotted by: ParkerM

MW1								Screen Interval 7.0-10.1 mbgs
DATE	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	PCE	TCE	VC
10-Jul-20	<0.20	<0.49	<0.20	17	0.54	0.48	2.1	0.71

MW3								Screen Interval 6.8-9.9 mbgs
DATE	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	PCE	TCE	VC
10-Jul-20	<0.20	<0.49	<0.20	75	0.93	150	17	0.30
10-Jul-20 (DUP)	<0.20	<0.49	<0.20	72	1.0	140	16	0.30

MW2								Screen Interval 6.3-9.4 mbgs
DATE	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	PCE	TCE	VC
10-Jul-20	<0.20	<0.49	<0.20	5.0	<0.50	0.51	0.21	<0.20



PARAMETERS	ABBREVIATION	REG 153/04 TABLE 7 STANDARDS
1,1-Dichloroethane	1,1-DCA	11
1,2-Dichlororethane	1,2-DCA	0.5
1,1-Dichloroethylene	1,1-DCE	0.5
Cis-1,2-Dichloroethylene	c-1,2-DCE	1.6
Trans-1,2,-Dichlorothylene	t-1,2-DCE	1.6
Tetrachloroethylene	PCE	0.5
Trichloroethylene	TCE	0.5
Vinyl Chloride	VC	0.5

LEGEND

- MBGS - METRES BELOW GROUND SURFACE
- ALL RESULTS ARE IN µg/L UNLESS OTHERWISE NOTED
- ALL SAMPLE INTERVALS MEASURE FROM THE GROUND SURFACE
- *STANDARD SHOWN ARE FOR MECP 2011 TABLE 2 FULL DEPTH GENERIC SITE CONDITION STANDARDS IN A POTABLE GROUNDWATER CONDITION AND INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE AND MEDIUM TO FINE TEXTURED SOIL
- LOCATION WHERE SAMPLE IS WITHIN TABLE 2 STANDARDS FOR ALL PARAMETERS ANALYZED IS SHOWN IN GREEN
- LOCATION WHERE SAMPLE EXCEEDS TABLE 2 STANDARDS FOR AT LEAST ONE PARAMETER IS SHOWN IN RED
- CONCENTRATION OF CONTAMINANT EXCEEDING TABLE 2 STANDARDS SHOWN IN TEXT IN RED

CRUSHED STONE FILL

SAND SILT AND GRAVEL FILL

TEST HOLE

LIMESTONE SHALE BEDROCK

GROUNDWATER ELEVATION (METRES ABOVE SEA LEVEL)

SCREEN INTERVAL

0 1m 2m 4m

HORIZONTAL 1:100

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2650 Queensview Drive, Suite 100
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DATE	CLIENT:	project no.
JULY 2020	OTTAWA CARLETON CONSTRUCTION GROUP LTD.	OTT-00259161-A0
DESIGN L.W. / CHECKED P.S.		scale 1:100
DRAWN BY M.P.	TITLE: CROSS SECTION B-B' GROUNDWATER ANALYTICAL RESULTS - VOC 349 DANFORTH AVENUE, OTTAWA, ON	FIG 8

Appendix B: Survey Plan

TOPOGRAPHICAL PLAN OF SURVEY

PART OF LOT 3
REGISTERED PLAN 204
CITY OF OTTAWA

Prepared by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 150

6 4.5 3.0 1.5 0 3 6 Metres

Metric

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the regulations made under them.
2. The survey was completed on the 8th day of June, 2020.

June 24/20
Date

T. Hartwick
Ontario Land Surveyor

Notes & Legend

Denotes		
—□—	"	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
CC	"	Cut Cross
CP	"	Concrete Pin
IBØ	"	Round Iron Bar
(WIT)	"	Witness
Meas.	"	Measured
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(PI)	"	(AOG) Plan, Dated December 1st, 2003
(P2)	"	4R-22856
(P3)	"	(1692) Plan, Dated October 2nd, 2007
(P4)	"	4R-27018
(DI)	"	Inst. CR618520
○ MH-ST	"	Maintenance Hole (Storm Sewer)
○ MH-S	"	Maintenance Hole (Sanitary)
⊖ VC	"	Valve Chamber (Watermain)
o UP	"	Utility Pole
o LS	"	Light Standard
□ CB	"	Catch Basin
○ FH	"	Fire Hydrant
⊖ WV	"	Water Valve
T/G	"	Top of Grate
▭ GM	"	Gas Meter
	"	Deciduous Tree
OHW	"	Overhead Wires
△ S	"	Sign
BF	"	Board Fence
▯ AC	"	Air Conditioner
Ø	"	Diameter
+65.00	"	Location of Elevations
+65.00	"	Top of Concrete Curb Elevation
C/L	"	Centreline
o B	"	Bollard
Acc.	"	Accepted

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2127696

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29 (3).

ELEVATION NOTES

1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

For bearing comparisons, a rotation of 0°42'50" counter-clockwise was applied to bearings on plan P1, P2

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations, and are referred to MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 20615-20 Ottawa Contractors PtL13 PLAN 204 POS D4 | CA

Appendix C: Sampling and Analysis Plan

OTT-00259161-A0
349 Danforth Avenue, Ottawa, Ontario
Sampling and Analysis Plan

Project Objective

The most recent use of the property is a custom drapery and supplies business, which is defined by Ontario Regulation 153/04 as a type of commercial property use. The proposed use is a three-storey building with mixed use. The proposed building would be used for commercial purposes on the ground floor and for residential purposes on upper floors. Therefore, as per the amendments to Ontario Regulation 153/04 that came into effect on December 4, 2019, it appears that a Record of Site Condition (RSC) is not required.

SAFETY FIRST

- Lead Safety Discussion
- All workers to orient themselves to site
- Plan sequence of drilling and take note of terrain conditions between BH/MW locations
- Check locates
- Review HASP
- Review forecast and plan for changing weather conditions

Drilling

A total of 3 BH will be drilled and MW will be installed in all of them.

Based on the previous uses of the Phase One property, the following off-site potentially contaminating activities (PCA) were identified:

- PCA #37 – Operation of Dry-Cleaning Equipment (where chemicals are used).

No on-site PCA were identified.

Consequently, the following areas of potential environmental concern (APEC) were identified:

- APEC #1 – Part of Phase One property that includes a 5 m buffer of land extending from Danforth Avenue and is a result of an active dry cleaner operation (Laundry Land) located approximately 25 m from the property boundary and upgradient to the inferred groundwater flow direction; and,
- APEC #2 - Part of Phase One property that includes a 5 m buffer of land extending from the strip mall. Pearl Cleaners was a former dry-cleaning operation that was located immediately adjacent to the north and cross gradient to the inferred groundwater flow direction.

- All three monitoring wells to be screened across water table (3.0 metre screen)
- Monitoring wells should be fitted with flush mount casing
- Bedrock is expected to be present between 0 to 2.5 mbgs
- As drilling progresses, log each sample, describing soil/rock type, colour, staining, odour, organic vapour.

Locates

- See project folder and HASP binder.

Soil Sampling

- Due to the shallow depth to bedrock and nature of the PCAs identified, soil sampling was not required.

Soil Cuttings

- Soil cuttings may be left on site

Monitor Development

- Develop wells at least 3 x well volumes or until clear
- Purge water should be removed by CWW
- Do not purge if monitor contains LNAPL. Contact Project Manager immediately if you see any.
- All MW top of casing should be surveyed. UTM coordinates should also be recorded.

Low Flow Groundwater Sampling

- Monitor all 3 monitoring wells and record organic vapours, depth to water, and depth to LNAPL, if any (if there is LNAPL, contact Project Manager immediately)
- One groundwater sample from each of the 3 MW and 1 field duplicate should be submitted for analysis of VOCs.
- One blank to be submitted for analysis of VOCs.
- One trip blank to be submitted for analysis of VOCs.
- Be careful to sample from near top of water table and use low flow rate to avoid collecting any fine sediment
- Prior to sampling, ensure the following field parameters are stable (per the field measurement table): pH, conductivity, turbidity, DO, temperature and ORP

Appendix D: Borehole Logs

Explanation of Terms Used on Borehole Records

SOIL DESCRIPTION

Terminology describing common soil genesis:

Topsoil: mixture of soil and humus capable of supporting good vegetative growth.

Peat: fibrous fragments of visible and invisible decayed organic matter.

Fill: where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc.; none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional geotechnical site investigation.

Till: the term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

Terminology describing soil structure:

Desiccated: having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.

Stratified: alternating layers of varying material or color with the layers greater than 6 mm thick.

Laminated: alternating layers of varying material or color with the layers less than 6 mm thick.

Fissured: material breaks along plane of fracture.

Varved: composed of regular alternating layers of silt and clay.

Slickensided: fracture planes appear polished or glossy, sometimes striated.

Blocky: cohesive soil that can be broken down into small angular lumps which resist further breakdown.

Lensed: inclusion of small pockets of different soil, such as small lenses of sand scattered through a mass of clay; not thickness.

Seam: a thin, confined layer of soil having different particle size, texture, or color from materials above and below.

Homogeneous: same color and appearance throughout.

Well Graded: having wide range in grain sized and substantial amounts of all predominantly on grain size.

Uniformly Graded: predominantly on grain size.

All soil sample descriptions included in this report follow the ASTM D2487-11 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System). The system divides soils into three major categories: (1) coarse grained, (2) fine-grained, and (3) highly organic. The soil is then subdivided based on either gradation or plasticity characteristics. The system provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification. The classification excludes particles larger than 76 mm. Please note that, with the exception of those samples where a grain size analysis has been made, all samples are classified visually in accordance with ASTM D2488-09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems. Others may use different classification systems; one such system is the ISSMFE Soil Classification.

ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		

0.002	0.006	0.02	0.06	0.2	0.6	2.0	6.0	20	60	200

EQUIVALENT GRAIN DIAMETER IN MILLIMETRES

CLAY (PLASTIC) TO	FINE	MEDIUM	CRS.	FINE	COARSE
SILT (NONPLASTIC)	SAND			GRAVEL	

UNIFIED SOIL CLASSIFICATION

Terminology describing materials outside the USCS, (e.g. particles larger than 76 mm, visible organic matter, construction debris) is based upon the proportion of these materials present and as described below in accordance with Note 16 in ASTM D2488-09a:

Table a: Percent or Proportion of Soil, Pp

	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5≤Pp≤10%
Little	15≤Pp≤25%
Some	30≤Pp≤45%
Mostly	50≤Pp≤100%

The standard terminology to describe cohesionless soils includes the compactness as determined by the Standard Penetration Test 'N' value:

Table b: Apparent Density of Cohesionless Soil

	'N' Value (blows/0.3 m)
Very Loose	N<5
Loose	5≤N<10
Compact	10≤N<30
Dense	30≤N<50
Very Dense	50≤N

The standard terminology to describe cohesive soils includes consistency, which is based on undrained shear strength as measured by insitu vane tests, penetrometer tests, unconfined compression tests or similar field and laboratory analysis, Standard Penetration Test 'N' values can also be used to provide an approximate indication of the consistency and shear strength of fine grained, cohesive soils:

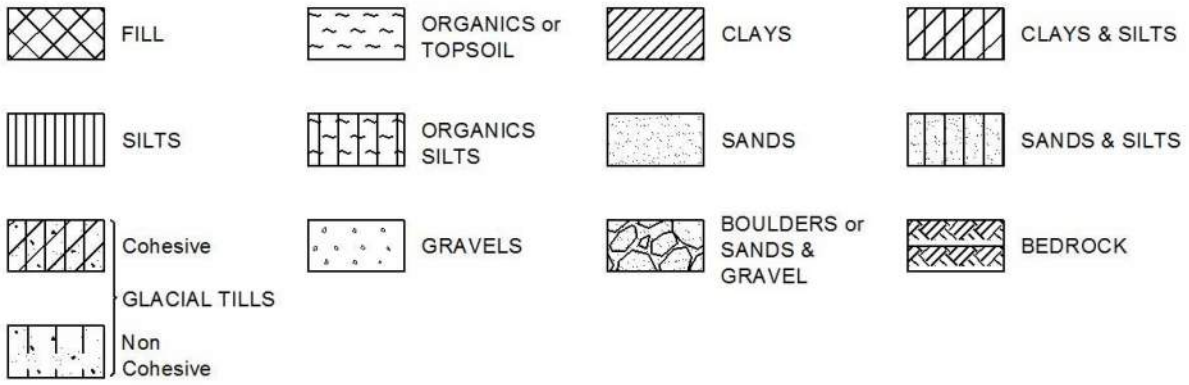
Table c: Consistency of Cohesive Soil

Consistency	Vane Shear Measurement (kPa)	'N' Value
Very Soft	<12.5	<2
Soft	12.5-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

Note: 'N' Value - The Standard Penetration Test records the number of blows of a 140 pound (64kg) hammer falling 30 inches (760mm), required to drive a 2 inch (50.8mm) O.D. split spoon sampler 1 foot (305mm). For split spoon samples where full penetration is not achieved, the number of blows is reported over the sampler penetration in meters (e.g. 50/0.15).

STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols:



WATER LEVEL MEASUREMENT

Log of Borehole MW1

Project No: OTT-00259161-A0

Project: PIIESA and Geotechnical Investigation

Location: 349 Danforth Avenue, Ottawa, Ontario

Figure No. 3

Page. 1 of 2

Date Drilled: June 29th, 2020

Drill Type: CME 55 (truck mount)

Datum: Assumed

Logged by: MD Checked by: PS/IT

Split Spoon Sample ⊠ | Auger Sample ◧ | SPT (N) Value ○ | Dynamic Cone Test —— | Shelby Tube ■ | Shear Strength by Vane Test +S

Combustible Vapour Reading □ | Natural Moisture Content × | Atterberg Limits ⊢○ | Undrained Triaxial at % Strain at Failure ⊕ | Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Assumed m	Depth	Standard Penetration Test N Value (20 40 60 80) / Shear Strength kPa (50 100 150 200)	Combustible Vapour Reading (ppm) (250 500 750) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (20 40 60)	SAMPLES	Natural Unit Wt. kN/m³
		CRUSHED STONE FILL ~ 150 mm	99.795	0				
		Sand and gravel, grey, moist, no odour or staining.	99.6		2 ○	□ 5 ×	SS1	
		SAND SILT AND GRAVEL FILL		1				
		Dark brown and grey, moist, no odour or staining, (very loose).	98.9					
		LIMESTONE SHALE BEDROCK		2			RUN1	
		Grey with dark grey shale partings, (fair to excellent quality).		3			RUN2	
				4				
				5			RUN3	
▽			94.145	6				
				7			RUN4	
				8			RUN5	
				9				
				10			RUN6	

Continued Next Page

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. A flushmount monitoring well with a 32 mm slotted standpipe was installed in the borehole upon completion.
3. Field work was supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00259161-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
completion	1.0	-
1 day	6.0	-
7 days	6.0	-
11 days	5.7	-

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	0.92 - 2.54	100	49
2	2.54 - 4.04	100	78
3	4.04 - 5.56	100	94
4	5.56 - 7.09	99	88
5	7.09 - 8.66	100	91
6	8.66 - 10.16	100	95

LOG OF BOREHOLE LOGS OF BOREHOLES - 349 DANFORTH.GPJ TROW OTTAWA.GDT 7-13-20

Log of Borehole MW1

Project No: OTT-00259161-A0

Project: PIIESA and Geotechnical Investigation

Figure No. 3

Page. 2 of 2

GWL	SYMBOL	SOIL DESCRIPTION	Assumed m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
			89.795		20 40 60 80 / 50 100 150 200	250 500 750 / 20 40 60		
			89.6	10				
		Borehole Terminated at 10.16 m Depth						

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. A flushmount monitoring well with a 32 mm slotted standpipe was installed in the borehole upon completion.
3. Field work was supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00259161-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
completion	1.0	-
1 day	6.0	-
7 days	6.0	-
11 days	5.7	-

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	0.92 - 2.54	100	49
2	2.54 - 4.04	100	78
3	4.04 - 5.56	100	94
4	5.56 - 7.09	99	88
5	7.09 - 8.66	100	91
6	8.66 - 10.16	100	95

LOG OF BOREHOLE LOGS OF BOREHOLES - 349 DANFORTH.GPJ TROW OTTAWA.GDT 7-13-20

Log of Borehole MW2

Project No: OTT-00259161-A0

Project: PIIESA and Geotechnical Investigation

Location: 349 Danforth Avenue, Ottawa, Ontario

Figure No. 4

Page. 1 of 1

Date Drilled: June 29th, 2020

Drill Type: CME 55 (truck mount)

Datum: Assumed

Logged by: MD Checked by: PS/IT

Split Spoon Sample ⊠
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test —
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○⊣
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Assumed m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		CRUSHED STONE FILL ~ 100 mm Sand and gravel, grey, moist, no odour or staining.	99.72 99.6	0	5	10	SS1	
		SAND SILT AND GRAVEL FILL Dark brown and grey, moist, no odour or staining, (loose).	99.0	1			RUN1	
		LIMESTONE SHALE BEDROCK Grey with dark grey shale partings, (fair to excellent quality).		2			RUN2	
				3			RUN3	
				4			RUN4	
			94.69	5			RUN5	
				6			RUN6	
				7			RUN7	
				8				
				9				
			90.2					
		Borehole Terminated at 9.47 m Depth						

LOG OF BOREHOLE LOGS OF BOREHOLES - 349 DANFORTH.GPJ TROW OTTAWA.GDT 7-13-20

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. A flushmount monitoring well with a 32 mm slotted standpipe was installed in the borehole upon completion.
3. Field work was supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00259161-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
1 day	1.9	-
7 days	5.6	-
11 days	5.0	-

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	0.71 - 1.09	100	28
2	1.09 - 2.64	100	51
3	2.64 - 3.97	100	91
4	3.97 - 5.46	100	92
5	5.46 - 6.93	100	82
6	6.93 - 8.54	100	81
7	8.54 - 9.47	100	91

Log of Borehole MW3

Project No: OTT-00259161-A0

Project: PIIESA and Geotechnical Investigation

Location: 349 Danforth Avenue, Ottawa, Ontario

Figure No. 5

Page. 1 of 2

Date Drilled: June 30th, 2020

Drill Type: CME 55 (truck mount)

Datum: Assumed

Logged by: MD Checked by: PS/IT

Split Spoon Sample ⊠
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test —
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○—|
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Assumed m	Depth
			100.005	0
		CRUSHED STONE FILL ~ 150 mm	99.8	
		Sand and gravel, grey, moist, no odour or staining.		
		SAND SILT AND GRAVEL FILL	99.1	
		Dark brown and grey, moist, no odour or staining, (loose).		1
		LIMESTONE SHALE BEDROCK		
		Grey with dark grey shale partings, (fair to good quality).		2
				3
			95.445	4
				5
				6
				7
				8
				9
			90.0	10

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SPT N = 7
66 / 250 mm
Combustible Vapour Reading = 5
Natural Moisture Content = 0

SAMPLES	Natural Unit Wt. kN/m³
SS1	
SS2	
RUN1	
RUN2	
RUN3	
RUN4	
RUN5	
RUN6	
RUN7	

Continued Next Page

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. A flushmount monitoring well with a 32 mm slotted standpipe was installed in the borehole upon completion.
3. Field work was supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00259161-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
completion	1.7	-
6 days	5.5	-
10 days	4.6	-

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	0.79 - 1.12	100	77
2	1.12 - 2.59	98	61
3	2.59 - 4.17	100	65
4	4.17 - 5.61	98	58
5	5.61 - 7.04	100	78
6	7.04 - 8.48	98	88
7	8.48 - 10.03	100	77

LOG OF BOREHOLE LOGS OF BOREHOLES - 349 DANFORTH.GPJ TROW OTTAWA.GDT 7-13-20

Log of Borehole MW3

Project No: OTT-00259161-A0

Project: PIIESA and Geotechnical Investigation

Figure No. 5

GWL	SYMBOL	SOIL DESCRIPTION	Assumed m	Depth	Standard Penetration Test N Value (20 40 60 80) / Shear Strength kPa (50 100 150 200)	Combustible Vapour Reading (ppm) (250 500 750) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (20 40 60)	SAMPLES	Natural Unit Wt. kN/m³
		Borehole Terminated at 10.03 m Depth	90.005					

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. A flushmount monitoring well with a 32 mm slotted standpipe was installed in the borehole upon completion.
3. Field work was supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00259161-A0

WATER LEVEL RECORDS

Date	Water Level (m)	Hole Open To (m)
completion	1.7	-
6 days	5.5	-
10 days	4.6	-

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	0.79 - 1.12	100	77
2	1.12 - 2.59	98	61
3	2.59 - 4.17	100	65
4	4.17 - 5.61	98	58
5	5.61 - 7.04	100	78
6	7.04 - 8.48	98	88
7	8.48 - 10.03	100	77

LOG OF BOREHOLE LOGS OF BOREHOLES - 349 DANFORTH.GPJ TROW OTTAWA.GDT 7-13-20

Appendix E: Analytical Summary Tables

Table 1 - Volatile Organic Compounds in Groundwater
349 Danforth Avenue, Ottawa, ON
OTT-00259161-A0

Sample ID	Units	MECP Table 7 SCS [1]	MW1	MW2	MW3	Dup	Field Blank	Trip Blank
Sampling Date			**10-Jul-20**	**10-Jul-20**	**10-Jul-20**	**10-Jul-20**	**10-Jul-20**	**10-Jul-20**
Screen Interval (mbgs)			**7.0 to 10.0**	**6.5 to 9.5**	**7.0 to 10.0**	**7.0 to 10.0**	**N/A**	**N/A**
Bureau Veritas (BV) ID			**NBY129**	**NBY130**	**NBY131**	**NBY132**	**NBY133**	**NBY134**
Date of Analysis			**13-Jul-20**	**13-Jul-20**	**13-Jul-20**	**13-Jul-20**	**13-Jul-20**	**13-Jul-20**
BV Certificate of Analysis			**C0H3106**	**C0H3106**	**C0H3106**	**C0H3106**	**C0H3106**	**C0H3106**
Acetone	ug/L	100000	<10	<10	<10	<10	<10	<10
Benzene	ug/L	0.5	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	ug/L	67000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	ug/L	5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	ug/L	0.89	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon Tetrachloride	ug/L	0.2	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19
Chlorobenzene	ug/L	140	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	ug/L	2	<0.20	0.45	<0.20	<0.20	<0.20	<0.20
Dibromochloromethane	ug/L	65000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	ug/L	150	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,3-Dichlorobenzene	ug/L	7600	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,4-Dichlorobenzene	ug/L	0.5	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Dichlorodifluoromethane	ug/L	3500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	ug/L	11	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane	ug/L	0.5	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49
1,1-Dichloroethylene	ug/L	0.5	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Cis-1,2-Dichloroethylene	ug/L	1.6	**17**	**5.0**	**75**	**72**	<0.50	<0.50
Trans-1,2-Dichloroethylene	ug/L	1.6	0.54	<0.50	0.93	1.0	<0.50	<0.50
1,3-Dichloropropene (cis + trans)	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	ug/L	0.58	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Cis-1,3-Dichloropropylene	ug/L	NV	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Trans-1,3-Dichloropropylene	ug/L	NV	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Ethylbenzene	ug/L	54	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylene Dibromide	ug/L	0.2	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19
Hexane(n)	ug/L	5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride	ug/L	26	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Methyl Ethyl Ketone	ug/L	21000	<10	<10	<10	<10	<10	<10
Methyl Isobutyl Ketone	ug/L	5200	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methyl-t-Butyl Ether	ug/L	15	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	ug/L	43	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,1,1,2-Tetrachloroethane	ug/L	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	ug/L	0.5	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Tetrachloroethylene	ug/L	0.5	0.48	**0.51**	**150**	**140**	<0.20	<0.20
Toluene	ug/L	320	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	ug/L	23	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethane	ug/L	0.5	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Trichloroethylene	ug/L	0.5	**2.1**	0.21	**17**	**16**	<0.20	<0.20
Trichlorofluoromethane	ug/L	2000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl Chloride	ug/L	0.5	**0.71**	<0.20	0.30	0.30	<0.20	<0.20
m-Xylene & p-Xylene	ug/L	NV	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
o-Xylene	ug/L	NV	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Total Xylenes	ug/L	72	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

NOTES:

1	Ontario Ministry of Environment, Conservation and Parks (MECP), Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011, Table 7 Generic Site Condition Standards (SCS) for Shallow Soils in a Non-Potable Ground Water Condition for all types of property use and coarse textured soils.
<(RDL)	Non-detectable results are shown as "< (RDL)" where RDL represents the reporting detection limit.
NV	No Value
N/A	Not Applicable
-	Parameter not analyzed
m bgs	Metres below ground surface
	Indicates groundwater exceedance of MECP Table 7 SCS

Table 2 - Maximum Concentrations in Groundwater
349 Danforth Avenue, Ottawa, ON
OTT-00259161-A0

Parameter	Sample Location	Sample Depth (mbgs)	Sampling Date	Maximum Concentration	MECP Table 7
Volatile Organic Compounds					
Acetone	All Locations	6.5 to 10.0	10-Jul-20	<10	100000
Benzene	All Locations	6.5 to 10.0	10-Jul-20	<0.20	0.5
Bromodichloromethane	All Locations	6.5 to 10.0	10-Jul-20	<0.50	67000
Bromoform	All Locations	6.5 to 10.0	10-Jul-20	<1.0	5
Bromomethane	All Locations	6.5 to 10.0	10-Jul-20	<0.50	0.89
Carbon Tetrachloride	All Locations	6.5 to 10.0	10-Jul-20	<0.19	0.2
Chlorobenzene	All Locations	6.5 to 10.0	10-Jul-20	<0.20	140
Chloroform	MW2	6.5 to 10.0	10-Jul-20	0.45	2
Dibromochloromethane	All Locations	6.5 to 10.0	10-Jul-20	<0.50	65000
1,2-Dichlorobenzene	All Locations	6.5 to 10.0	10-Jul-20	<0.40	150
1,3-Dichlorobenzene	All Locations	6.5 to 10.0	10-Jul-20	<0.40	7600
1,4-Dichlorobenzene	All Locations	6.5 to 10.0	10-Jul-20	<0.40	0.5
Dichlorodifluoromethane	All Locations	6.5 to 10.0	10-Jul-20	<1.0	3500
1,1-Dichloroethane	All Locations	6.5 to 10.0	10-Jul-20	<0.20	11
1,2-Dichloroethane	All Locations	6.5 to 10.0	10-Jul-20	<0.49	0.5
1,1-Dichloroethylene	All Locations	6.5 to 10.0	10-Jul-20	<0.20	0.5
Cis-1,2-Dichloroethylene	MW3	7.0 to 10.0	10-Jul-20	75	1.6
Trans-1,2-Dichloroethylene	MW3	7.0 to 10.0	10-Jul-20	1.0	1.6
1,3-Dichloropropene (cis + trans)	All Locations	6.5 to 10.0	10-Jul-20	<0.50	0.5
1,2-Dichloropropane	All Locations	6.5 to 10.0	10-Jul-20	<0.20	0.58
Cis-1,3-Dichloropropylene	All Locations	6.5 to 10.0	10-Jul-20	<0.30	NV
Trans-1,3-Dichloropropylene	All Locations	6.5 to 10.0	10-Jul-20	<0.40	NV
Ethylbenzene	All Locations	6.5 to 10.0	10-Jul-20	<0.20	54
Ethylene Dibromide	All Locations	6.5 to 10.0	10-Jul-20	<0.19	0.2
Hexane(n)	All Locations	6.5 to 10.0	10-Jul-20	<1.0	5
Methylene Chloride	All Locations	6.5 to 10.0	10-Jul-20	<2.0	26
Methyl Ethyl Ketone	All Locations	6.5 to 10.0	10-Jul-20	<10	21000
Methyl Isobutyl Ketone	All Locations	6.5 to 10.0	10-Jul-20	<5.0	5200
Methyl-t-Butyl Ether	All Locations	6.5 to 10.0	10-Jul-20	<0.50	15
Styrene	All Locations	6.5 to 10.0	10-Jul-20	<0.40	43
1,1,1,2-Tetrachloroethane	All Locations	6.5 to 10.0	10-Jul-20	<0.50	1.1
1,1,2,2-Tetrachloroethane	All Locations	6.5 to 10.0	10-Jul-20	<0.40	0.5
Tetrachloroethylene	MW3	7.0 to 10.0	10-Jul-20	150	0.5
Toluene	All Locations	6.5 to 10.0	10-Jul-20	<0.20	320
1,1,1-Trichloroethane	All Locations	6.5 to 10.0	10-Jul-20	<0.20	23
1,1,2-Trichloroethane	All Locations	6.5 to 10.0	10-Jul-20	<0.40	0.5
Trichloroethylene	MW3	7.0 to 10.0	10-Jul-20	17	0.5
Trichlorofluoromethane	All Locations	6.5 to 10.0	10-Jul-20	<0.50	2000
Vinyl Chloride	MW1	7.0 to 10.0	10-Jul-20	0.71	0.5
m-Xylene & p-Xylene	All Locations	6.5 to 10.0	10-Jul-20	<0.20	NV
o-Xylene	All Locations	6.5 to 10.0	10-Jul-20	<0.20	NV
Total Xylenes	All Locations	6.5 to 10.0	10-Jul-20	<0.20	72

NOTES:

Analysis by Bureau Veritas Laboratories

Non-detectable results are shown as "< (RDL)" where RDL represents the reporting detection limit.

Ontario Ministry of Environment, Conservation and Parks (MECP), Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act, April 2011, Table 7 Generic Site Condition Standards (SCS) for Shallow Soils in a Non-Potable Ground Water Condition for all types of property use and coarse textured soils.

Table 3 - Relative Percent Differences - Inorganic Parameters in Groundwater
349 Danforth Avenue, Ottawa, ON
OTT-00259161-A0

Parameter	Units	RDL	MW3	DUP	RPD (%)	Alert Limit (%)
			10-Jul-20	10-Jul-20		
Volatile Organic Compounds						
Acetone	ug/L	10	<10	<10	nc	60
Benzene	ug/L	0.2	<0.20	<0.20	nc	60
Bromodichloromethane	ug/L	0.5	<0.50	<0.50	nc	60
Bromoform	ug/L	1.0	<1.0	<1.0	nc	60
Bromomethane	ug/L	0.5	<0.50	<0.50	nc	60
Carbon Tetrachloride	ug/L	0.2	<0.19	<0.19	nc	60
Chlorobenzene	ug/L	0.2	<0.20	<0.20	nc	60
Chloroform	ug/L	0.2	<0.20	<0.20	nc	60
Dibromochloromethane	ug/L	0.5	<0.50	<0.50	nc	60
1,2-Dichlorobenzene	ug/L	0.4	<0.40	<0.40	nc	60
1,3-Dichlorobenzene	ug/L	0.4	<0.40	<0.40	nc	60
1,4-Dichlorobenzene	ug/L	0.4	<0.40	<0.40	nc	60
Dichlorodifluoromethane	ug/L	1	<1.0	<1.0	nc	60
1,1-Dichloroethane	ug/L	0.2	<0.20	<0.20	nc	60
1,2-Dichloroethane	ug/L	0.5	<0.49	<0.49	nc	60
1,1-Dichloroethylene	ug/L	0.2	<0.20	<0.20	nc	60
Cis-1,2-Dichloroethylene	ug/L	0.5	75	72	4	60
Trans-1,2-Dichloroethylene	ug/L	0.5	0.93	1.0	nc	60
1,3-Dichloropropene (cis + trans)	ug/L	0.5	<0.50	<0.50	nc	60
1,2-Dichloropropane	ug/L	0.2	<0.20	<0.20	nc	60
Cis-1,3-Dichloropropylene	ug/L	0.3	<0.30	<0.30	nc	60
Trans-1,3-Dichloropropylene	ug/L	0.4	<0.40	<0.40	nc	60
Ethylbenzene	ug/L	0.20	<0.20	<0.20	nc	60
Ethylene Dibromide	ug/L	0.19	<0.19	<0.19	nc	60
Hexane(n)	ug/L	2	<1.0	<1.0	nc	60
Methylene Chloride	ug/L	5	<2.0	<2.0	nc	60
Methyl Ethyl Ketone	ug/L	10	<10	<10	nc	60
Methyl Isobutyl Ketone	ug/L	5	<5.0	<5.0	nc	60
Methyl-t-Butyl Ether	ug/L	0.5	<0.50	<0.50	nc	60
Styrene	ug/L	0.4	<0.40	<0.40	nc	60
1,1,1,2-Tetrachloroethane	ug/L	0.5	<0.50	<0.50	nc	60
1,1,2,2-Tetrachloroethane	ug/L	0.4	<0.40	<0.40	nc	60
Tetrachloroethylene	ug/L	0.2	150	140	7	60
Toluene	ug/L	0.2	<0.20	<0.20	nc	60
1,1,1-Trichloroethane	ug/L	0.2	<0.20	<0.20	nc	60
1,1,2-Trichloroethane	ug/L	0.4	<0.40	<0.40	nc	60
Trichloroethylene	ug/L	0.2	17	16	6	60
Trichlorofluoromethane	ug/L	0.5	<0.50	<0.50	nc	60
Vinyl Chloride	ug/L	0.2	0.30	0.30	nc	60
m-Xylene & p-Xylene	ug/L	0.2	<0.20	<0.20	nc	60
o-Xylene	ug/L	0.2	<0.20	<0.20	nc	60
Total Xylenes	ug/L	0.2	<0.20	<0.20	nc	60

NOTES:

Analysis by Bureau Veritas Laboratories
All results on dry weight basis; <RDL means not detected at reporting detection limit (RDL)
- means "not analysed"
nc means "not calculable" - one (or both) of the results are <5x RDL
Exceedances of alert limits are shown in **bold**

Appendix F: Laboratory Certificates of Analysis

Your Project #: OTT-00259161-A0
Your C.O.C. #: 780768-01-01

Attention: Patricia Stelmack

exp Services Inc
Ottawa Branch
100-2650 Queensview Drive
Ottawa, ON
CANADA K2B 8H6

Report Date: 2020/07/14
Report #: R6245492
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0H3106
Received: 2020/07/10, 16:20

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
1,3-Dichloropropene Sum (1)	6	N/A	2020/07/14		EPA 8260C m
Volatile Organic Compounds in Water (1)	6	N/A	2020/07/13	CAM SOP-00228	EPA 8260C m

Remarks:

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

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

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

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

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Laboratories Mississauga

Your Project #: OTT-00259161-A0
Your C.O.C. #: 780768-01-01

Attention: Patricia Stelmack

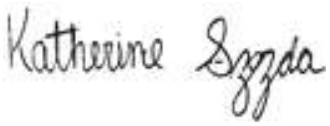
exp Services Inc
Ottawa Branch
100-2650 Queensview Drive
Ottawa, ON
CANADA K2B 8H6

Report Date: 2020/07/14
Report #: R6245492
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0H3106
Received: 2020/07/10, 16:20

Encryption Key



Katherine Szozda
Project Manager
14 Jul 2020 16:15:36

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Katherine Szozda, Project Manager
Email: Katherine.Szozda@bvlabs.com
Phone# (613) 274-0573
==========
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: C0H3106
Report Date: 2020/07/14

exp Services Inc
Client Project #: OTT-00259161-A0
Sampler Initials: MAD

O.REG 153 VOCS BY HS (WATER)

BV Labs ID		NBY129	NBY130	NBY131	NBY132	NBY133		
Sampling Date		2020/07/10 15:00	2020/07/10 14:00	2020/07/10 13:00	2020/07/10	2020/07/10 13:00		
COC Number		780768-01-01	780768-01-01	780768-01-01	780768-01-01	780768-01-01		
	UNITS	**MW1**	**MW2**	**MW3**	**DUP**	**FB**	**RDL**	**QC Batch**
Calculated Parameters								
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6831129
Volatile Organics								
Acetone (2-Propanone)	ug/L	<10	<10	<10	<10	<10	10	6831729
Benzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6831729
Bromodichloromethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6831729
Bromoform	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6831729
Bromomethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6831729
Carbon Tetrachloride	ug/L	<0.19	<0.19	<0.19	<0.19	<0.19	0.19	6831729
Chlorobenzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6831729
Chloroform	ug/L	<0.20	0.45	<0.20	<0.20	<0.20	0.20	6831729
Dibromochloromethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6831729
1,2-Dichlorobenzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6831729
1,3-Dichlorobenzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6831729
1,4-Dichlorobenzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6831729
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6831729
1,1-Dichloroethane	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6831729
1,2-Dichloroethane	ug/L	<0.49	<0.49	<0.49	<0.49	<0.49	0.49	6831729
1,1-Dichloroethylene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6831729
cis-1,2-Dichloroethylene	ug/L	17	5.0	75	72	<0.50	0.50	6831729
trans-1,2-Dichloroethylene	ug/L	0.54	<0.50	0.93	1.0	<0.50	0.50	6831729
1,2-Dichloropropane	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6831729
cis-1,3-Dichloropropene	ug/L	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	6831729
trans-1,3-Dichloropropene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6831729
Ethylbenzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6831729
Ethylene Dibromide	ug/L	<0.19	<0.19	<0.19	<0.19	<0.19	0.19	6831729
Hexane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6831729
Methylene Chloride(Dichloromethane)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6831729
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	<10	<10	<10	<10	10	6831729
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	6831729
Methyl t-butyl ether (MTBE)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6831729
Styrene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6831729
1,1,1,2-Tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6831729
1,1,2,2-Tetrachloroethane	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6831729
Tetrachloroethylene	ug/L	0.48	0.51	150	140	<0.20	0.20	6831729
Toluene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6831729

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 VOCS BY HS (WATER)

BV Labs ID		NBY129	NBY130	NBY131	NBY132	NBY133		
Sampling Date		2020/07/10 15:00	2020/07/10 14:00	2020/07/10 13:00	2020/07/10	2020/07/10 13:00		
COC Number		780768-01-01	780768-01-01	780768-01-01	780768-01-01	780768-01-01		
	UNITS	**MW1**	**MW2**	**MW3**	**DUP**	**FB**	**RDL**	**QC Batch**
1,1,1-Trichloroethane	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6831729
1,1,2-Trichloroethane	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6831729
Trichloroethylene	ug/L	2.1	0.21	17	16	<0.20	0.20	6831729
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6831729
Vinyl Chloride	ug/L	0.71	<0.20	0.30	0.30	<0.20	0.20	6831729
p+m-Xylene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6831729
o-Xylene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6831729
Total Xylenes	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6831729
Surrogate Recovery (%)								
4-Bromofluorobenzene	%	101	102	101	101	101		6831729
D4-1,2-Dichloroethane	%	108	110	109	110	112		6831729
D8-Toluene	%	88	87	86	86	86		6831729

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 VOCS BY HS (WATER)

BV Labs ID		NBY134		
Sampling Date		2020/07/10		
COC Number		780768-01-01		
	UNITS	**TRIP BLANK**	**RDL**	**QC Batch**
Calculated Parameters				
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	0.50	6831129
Volatile Organics				
Acetone (2-Propanone)	ug/L	<10	10	6831729
Benzene	ug/L	<0.20	0.20	6831729
Bromodichloromethane	ug/L	<0.50	0.50	6831729
Bromoform	ug/L	<1.0	1.0	6831729
Bromomethane	ug/L	<0.50	0.50	6831729
Carbon Tetrachloride	ug/L	<0.19	0.19	6831729
Chlorobenzene	ug/L	<0.20	0.20	6831729
Chloroform	ug/L	<0.20	0.20	6831729
Dibromochloromethane	ug/L	<0.50	0.50	6831729
1,2-Dichlorobenzene	ug/L	<0.40	0.40	6831729
1,3-Dichlorobenzene	ug/L	<0.40	0.40	6831729
1,4-Dichlorobenzene	ug/L	<0.40	0.40	6831729
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	1.0	6831729
1,1-Dichloroethane	ug/L	<0.20	0.20	6831729
1,2-Dichloroethane	ug/L	<0.49	0.49	6831729
1,1-Dichloroethylene	ug/L	<0.20	0.20	6831729
cis-1,2-Dichloroethylene	ug/L	<0.50	0.50	6831729
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	6831729
1,2-Dichloropropane	ug/L	<0.20	0.20	6831729
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	6831729
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	6831729
Ethylbenzene	ug/L	<0.20	0.20	6831729
Ethylene Dibromide	ug/L	<0.19	0.19	6831729
Hexane	ug/L	<1.0	1.0	6831729
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	6831729
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	10	6831729
Methyl Isobutyl Ketone	ug/L	<5.0	5.0	6831729
Methyl t-butyl ether (MTBE)	ug/L	<0.50	0.50	6831729
Styrene	ug/L	<0.40	0.40	6831729
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	6831729
1,1,2,2-Tetrachloroethane	ug/L	<0.40	0.40	6831729
Tetrachloroethylene	ug/L	<0.20	0.20	6831729
Toluene	ug/L	<0.20	0.20	6831729

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

O.REG 153 VOCS BY HS (WATER)

BV Labs ID		NBY134		
Sampling Date		2020/07/10		
COC Number		780768-01-01		
	UNITS	**TRIP BLANK**	**RDL**	**QC Batch**
1,1,1-Trichloroethane	ug/L	<0.20	0.20	6831729
1,1,2-Trichloroethane	ug/L	<0.40	0.40	6831729
Trichloroethylene	ug/L	<0.20	0.20	6831729
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	6831729
Vinyl Chloride	ug/L	<0.20	0.20	6831729
p+m-Xylene	ug/L	<0.20	0.20	6831729
o-Xylene	ug/L	<0.20	0.20	6831729
Total Xylenes	ug/L	<0.20	0.20	6831729
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	102		6831729
D4-1,2-Dichloroethane	%	110		6831729
D8-Toluene	%	86		6831729

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

TEST SUMMARY

BV Labs ID: NBY129 **Collected:** 2020/07/10
Sample ID: MW1 **Shipped:**
Matrix: Water **Received:** 2020/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6831129	N/A	2020/07/14	Automated Statchk
Volatile Organic Compounds in Water	GC/MS	6831729	N/A	2020/07/13	Blair Gannon

BV Labs ID: NBY130 **Collected:** 2020/07/10
Sample ID: MW2 **Shipped:**
Matrix: Water **Received:** 2020/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6831129	N/A	2020/07/14	Automated Statchk
Volatile Organic Compounds in Water	GC/MS	6831729	N/A	2020/07/13	Blair Gannon

BV Labs ID: NBY131 **Collected:** 2020/07/10
Sample ID: MW3 **Shipped:**
Matrix: Water **Received:** 2020/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6831129	N/A	2020/07/14	Automated Statchk
Volatile Organic Compounds in Water	GC/MS	6831729	N/A	2020/07/13	Blair Gannon

BV Labs ID: NBY132 **Collected:** 2020/07/10
Sample ID: DUP **Shipped:**
Matrix: Water **Received:** 2020/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6831129	N/A	2020/07/14	Automated Statchk
Volatile Organic Compounds in Water	GC/MS	6831729	N/A	2020/07/13	Blair Gannon

BV Labs ID: NBY133 **Collected:** 2020/07/10
Sample ID: FB **Shipped:**
Matrix: Water **Received:** 2020/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6831129	N/A	2020/07/14	Automated Statchk
Volatile Organic Compounds in Water	GC/MS	6831729	N/A	2020/07/13	Blair Gannon

BV Labs ID: NBY134 **Collected:** 2020/07/10
Sample ID: TRIP BLANK **Shipped:**
Matrix: Water **Received:** 2020/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	6831129	N/A	2020/07/14	Automated Statchk
Volatile Organic Compounds in Water	GC/MS	6831729	N/A	2020/07/13	Blair Gannon

GENERAL COMMENTS

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

Package 1	1.0°C

Results relate only to the items tested.

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6831729	4-Bromofluorobenzene	2020/07/13	111	70 - 130	112	70 - 130	107	%		
6831729	D4-1,2-Dichloroethane	2020/07/13	103	70 - 130	101	70 - 130	104	%		
6831729	D8-Toluene	2020/07/13	100	70 - 130	98	70 - 130	89	%		
6831729	1,1,1,2-Tetrachloroethane	2020/07/13	103	70 - 130	106	70 - 130	<0.50	ug/L	NC	30
6831729	1,1,1-Trichloroethane	2020/07/13	97	70 - 130	99	70 - 130	<0.20	ug/L	NC	30
6831729	1,1,2,2-Tetrachloroethane	2020/07/13	98	70 - 130	98	70 - 130	<0.40	ug/L	NC	30
6831729	1,1,2-Trichloroethane	2020/07/13	93	70 - 130	93	70 - 130	<0.40	ug/L	NC	30
6831729	1,1-Dichloroethane	2020/07/13	89	70 - 130	90	70 - 130	<0.20	ug/L	NC	30
6831729	1,1-Dichloroethylene	2020/07/13	95	70 - 130	98	70 - 130	<0.20	ug/L	NC	30
6831729	1,2-Dichlorobenzene	2020/07/13	92	70 - 130	93	70 - 130	<0.40	ug/L	NC	30
6831729	1,2-Dichloroethane	2020/07/13	111	70 - 130	112	70 - 130	<0.49	ug/L	NC	30
6831729	1,2-Dichloropropane	2020/07/13	85	70 - 130	87	70 - 130	<0.20	ug/L	NC	30
6831729	1,3-Dichlorobenzene	2020/07/13	89	70 - 130	92	70 - 130	<0.40	ug/L	NC	30
6831729	1,4-Dichlorobenzene	2020/07/13	96	70 - 130	99	70 - 130	<0.40	ug/L	NC	30
6831729	Acetone (2-Propanone)	2020/07/13	94	60 - 140	85	60 - 140	<10	ug/L	NC	30
6831729	Benzene	2020/07/13	93	70 - 130	94	70 - 130	<0.20	ug/L	NC	30
6831729	Bromodichloromethane	2020/07/13	96	70 - 130	98	70 - 130	<0.50	ug/L	NC	30
6831729	Bromoform	2020/07/13	111	70 - 130	113	70 - 130	<1.0	ug/L	NC	30
6831729	Bromomethane	2020/07/13	94	60 - 140	93	60 - 140	<0.50	ug/L	NC	30
6831729	Carbon Tetrachloride	2020/07/13	98	70 - 130	100	70 - 130	<0.19	ug/L	NC	30
6831729	Chlorobenzene	2020/07/13	93	70 - 130	95	70 - 130	<0.20	ug/L	NC	30
6831729	Chloroform	2020/07/13	92	70 - 130	92	70 - 130	<0.20	ug/L	NC	30
6831729	cis-1,2-Dichloroethylene	2020/07/13	93	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
6831729	cis-1,3-Dichloropropene	2020/07/13	96	70 - 130	98	70 - 130	<0.30	ug/L	NC	30
6831729	Dibromochloromethane	2020/07/13	104	70 - 130	107	70 - 130	<0.50	ug/L	NC	30
6831729	Dichlorodifluoromethane (FREON 12)	2020/07/13	91	60 - 140	95	60 - 140	<1.0	ug/L	NC	30
6831729	Ethylbenzene	2020/07/13	87	70 - 130	90	70 - 130	<0.20	ug/L	NC	30
6831729	Ethylene Dibromide	2020/07/13	102	70 - 130	101	70 - 130	<0.19	ug/L	NC	30
6831729	Hexane	2020/07/13	88	70 - 130	92	70 - 130	<1.0	ug/L	NC	30
6831729	Methyl Ethyl Ketone (2-Butanone)	2020/07/13	96	60 - 140	91	60 - 140	<10	ug/L	NC	30
6831729	Methyl Isobutyl Ketone	2020/07/13	96	70 - 130	98	70 - 130	<5.0	ug/L	NC	30
6831729	Methyl t-butyl ether (MTBE)	2020/07/13	86	70 - 130	88	70 - 130	<0.50	ug/L	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6831729	Methylene Chloride(Dichloromethane)	2020/07/13	91	70 - 130	91	70 - 130	<2.0	ug/L	NC	30
6831729	o-Xylene	2020/07/13	89	70 - 130	96	70 - 130	<0.20	ug/L	NC	30
6831729	p+m-Xylene	2020/07/13	97	70 - 130	101	70 - 130	<0.20	ug/L	NC	30
6831729	Styrene	2020/07/13	96	70 - 130	101	70 - 130	<0.40	ug/L	NC	30
6831729	Tetrachloroethylene	2020/07/13	96	70 - 130	97	70 - 130	<0.20	ug/L	NC	30
6831729	Toluene	2020/07/13	90	70 - 130	91	70 - 130	<0.20	ug/L	NC	30
6831729	Total Xylenes	2020/07/13					<0.20	ug/L	NC	30
6831729	trans-1,2-Dichloroethylene	2020/07/13	90	70 - 130	92	70 - 130	<0.50	ug/L	NC	30
6831729	trans-1,3-Dichloropropene	2020/07/13	101	70 - 130	97	70 - 130	<0.40	ug/L	NC	30
6831729	Trichloroethylene	2020/07/13	105	70 - 130	108	70 - 130	<0.20	ug/L	2.0	30
6831729	Trichlorofluoromethane (FREON 11)	2020/07/13	99	70 - 130	102	70 - 130	<0.50	ug/L	NC	30
6831729	Vinyl Chloride	2020/07/13	85	70 - 130	87	70 - 130	<0.20	ug/L	NC	30

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

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

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

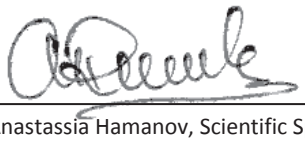
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Anastassia Hamanov, Scientific Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

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6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvlabs.com

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#17498 exp Services Inc	Company Name:		Quotation #:	B91718	BV Labs Job #:	Bottle Order #: 780768
Attention:	Accounts Payable	Attention:	Patricia Stelmack / Mark Devlin	P.O. #:			
Address:	100-2650 Queensview Drive	Address:		Project:	OTT-00259161-A0	COC #: C#780768-01-01	Project Manager: Katherine Szozda
	Ottawa ON K2B 8H6			Project Name:			
Tel:	(613) 688-1899 Fax: (613) 225-7337	Tel:	Fax:	Site #:			
Email:	accounting.ottawa@exp.com; Karen.Burke@exp.com;	Email:	patricia.stelmack@exp.com / mark.devlin@exp.com	Sampled By:	MAD		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011): ☐ Table 1 ☒ Res/Park ☐ Medium/Fine ☐ Table 2 ☐ Ind/Comm ☒ Coarse ☒ Table 3 ☐ Agri/Other ☒ For RSC ☒ Table 7

Other Regulations: ☐ CCME ☐ Sanitary Sewer Bylaw ☐ Reg 558 ☐ Storm Sewer Bylaw ☐ MISA Municipality ☐ PWQO ☐ Reg 406 Table ☐ Other

Special Instructions:

Include Criteria on Certificate of Analysis (Y/N)?

ANALYSIS REQUESTED (PLEASE BE SPECIFIC): Field Filtered (please circle): Metals / Hg / Cr VI; O Reg 153 VOCs by HS (Water)

Turnaround Time (TAT) Required: Please provide advance notice for rush projects

Regular (Standard) TAT: ☒ (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission) Date Required: Time Required: ☐ Rush Confirmation Number: (call lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered	O Reg 153 VOCs by HS (Water)	# of Bottles	Comments
1		MW1	July 10 2020	3:00pm	GW		X	3	
2		MW2	↓	2:00pm	↓		↓	↓	
3		MW3	↓	1:00pm	↓		↓	↓	
4		Dup	↓		↓		↓	↓	
5		FB	↓	1:00pm	DI		↓	↓	10-Jul-20 16:20
6		Trip Blank	↓		DI		↓	↓	Katherine Szozda C0H3106
7									
8									GID ENV-1369
9									on ice
10									RECEIVED IN OTTAWA

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Time Sensitive	Laboratory Use Only
Mark Devlin	20/07/10	3:56pm	Serge Léger	20/07/10	16:20			Temperature (°C) on Recei: 2, 1, 0
			CYRUSHGN Tchiu	2020/07/11	08:30			Custody Seal: Present Yes X; Intact Yes X

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS. 7, 6, 7

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

White: BV Labs Yellow: Client

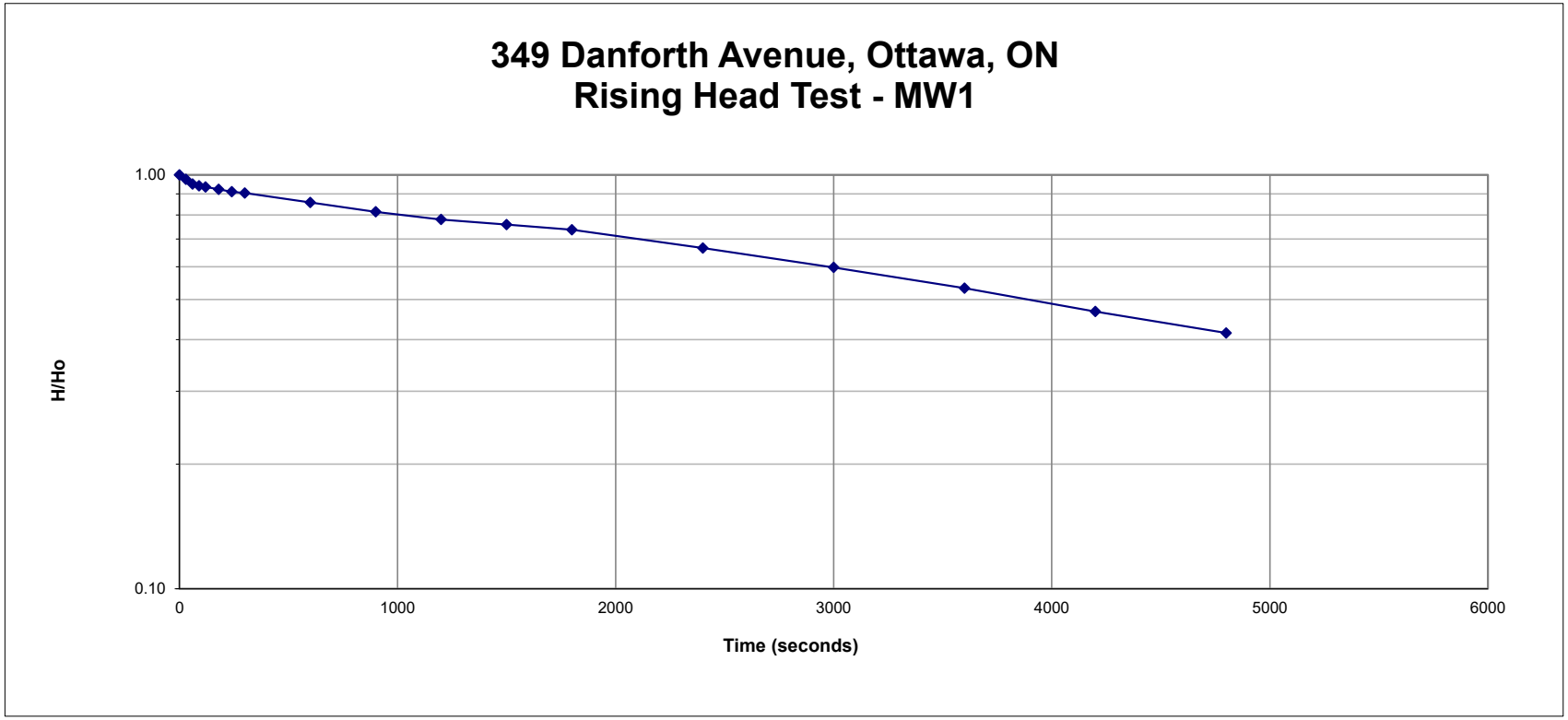
Bureau Veritas Canada (2019) Inc.

Appendix G: Hydraulic Conductivity Tests

Falling Head Test Analysis (Bail Test) - MW1
Hvorslev Method (1951)
349 Danforth Avenue, Ottawa, Ontario
OTT-00259161-A0
July 6, 2020

H_0 5.96 m
(static water level in metres)

Time		Water Level	Drawdown	H-h/H-h0	Recovery to Original
(s)	(min)	(m)	(m)		Water Level (%)
0	0.00	9.190	3.230	1.00	0
30	0.50	9.110	3.150	0.98	2
60	1.00	9.030	3.070	0.95	5
90	1.50	9.000	3.040	0.94	6
120	2.00	8.980	3.020	0.93	7
180	3.00	8.940	2.980	0.92	8
240	4.00	8.900	2.940	0.91	9
300	5.00	8.880	2.920	0.90	10
600	10.00	8.730	2.770	0.86	14
900	15.00	8.590	2.630	0.81	19
1200	20.00	8.480	2.520	0.78	22
1500	25.00	8.410	2.450	0.76	24
1800	30.00	8.340	2.380	0.74	26
2400	40.00	8.110	2.150	0.67	33
3000	50.00	7.890	1.930	0.60	40
3600	60.00	7.680	1.720	0.53	47
4200	70.00	7.470	1.510	0.47	53
4800	80.00	7.300	1.340	0.41	59


349 Danforth Avenue, Ottawa, ON
Rising Head Test - MW1
H/Ho
1.00
0.10
0
1000
2000
3000
4000
5000
6000
Time (seconds)

Falling Head Test Analysis (Bail Test) - MW-1
Hvorslev Method (1951)
349 Danforth Avenue, Ottawa, Ontario
OTT-00259161-A0
July 6, 2020

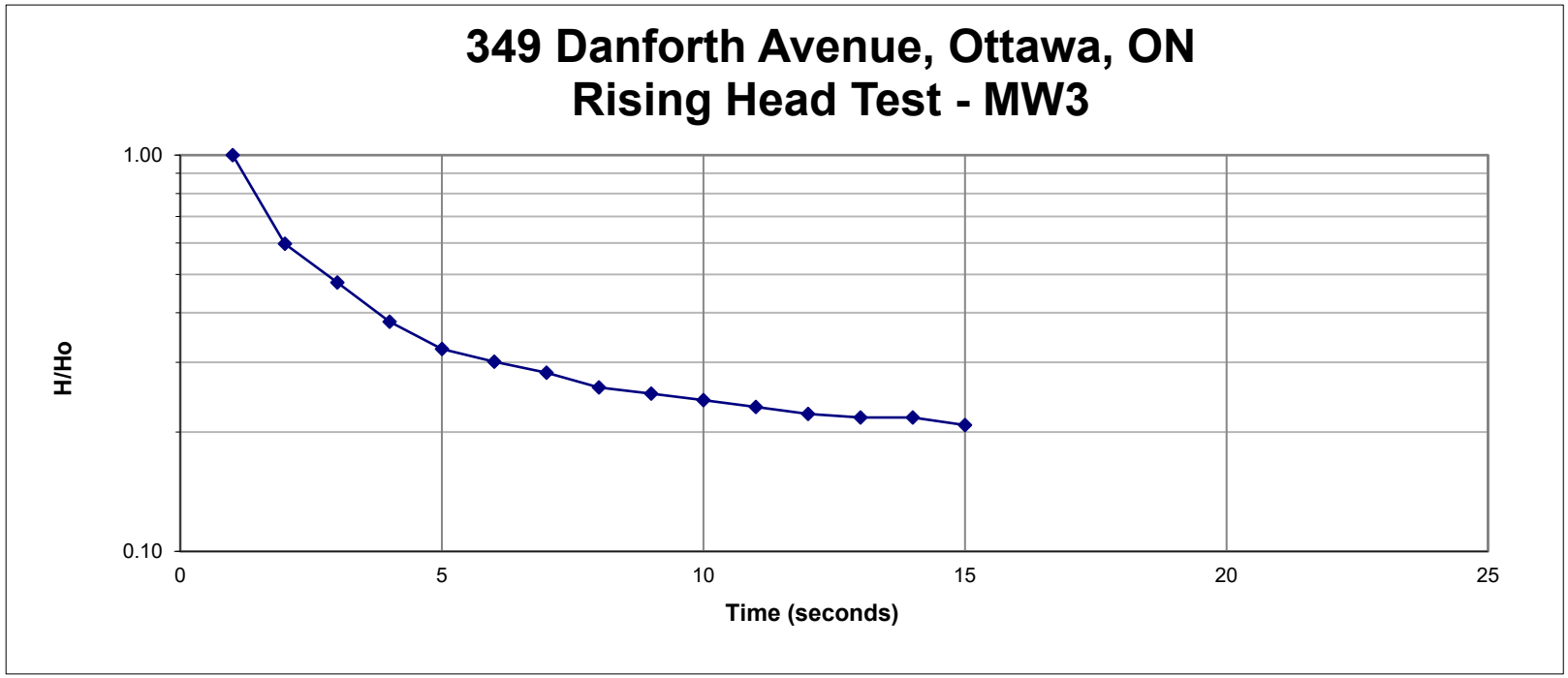
Standpipe radius:	r =	0.016	
Borehole radius:	R =	0.038	
Length of gravel pack z	L_e =	3.05	m
Static water level:	H_0=	5.96	m
First water level reading:		9.19	m
Time for 37% change	t37	2800	sec
Hydraulic Conductivity:	K =	$r^2\ln(L_e/R)/\ 2L_et_{37}$	
Hydraulic Conductivity:	K	6.57283E-08	(m/s)
Hydraulic Conductivity:	K	6.5728E-06	(cm/s)

Data Quality High: 70 to 100% recovery to original water level
Medium: 50 to 69% recovery to original water level
Low: Less than 50% recovery to original water level

Falling Head Test Analysis (Bail Test)
Hvorslev Method (1951)
349 Danforth Avenue, Ottawa, Ontario
OTT-00259161-A0
July 6, 2020

H_0 5.46 m
(static water level in metres)

Time		Water Level	Drawdown	H-h/H-h0	Recovery to Original
(s)	(min)	(m)	(m)		Water Level (%)
0	0.00	7.620	2.160	1.00	0
30	0.50	6.750	1.290	0.60	40
60	1.00	6.490	1.030	0.48	52
90	1.50	6.280	0.820	0.38	62
120	2.00	6.160	0.700	0.32	68
150	2.50	6.110	0.650	0.30	70
180	3.00	6.070	0.610	0.28	72
240	4.00	6.020	0.560	0.26	74
300	5.00	6.000	0.540	0.25	75
360	6.00	5.980	0.520	0.24	76
480	8.00	5.960	0.500	0.23	77
600	10.00	5.940	0.480	0.22	78
900	15.00	5.930	0.470	0.22	78
1200	20.00	5.930	0.470	0.22	78
1800	30.00	5.910	0.450	0.21	79


349 Danforth Avenue, Ottawa, ON
Rising Head Test - MW3
H/Ho
1.00
0.10
0
5
10
15
20
25
Time (seconds)

Falling Head Test Analysis (Bail Test)
Hvorslev Method (1951)
349 Danforth Avenue, Ottawa, Ontario
OTT-00259161-A0
July 6, 2020

Standpipe radius:	r =	0.016	
Borehole radius:	R =	0.038	
Length of gravel pack zone	L_e =	3.05	m
Static water level:	H_0=	5.45	m
First water level reading:		7.62	m
Time for 37% change	t37	25	sec
Hydraulic Conductivity:	K =	$r^2\ln(L_e/R)/\ 2L_et_{37}$	
Hydraulic Conductivity:	K	7.36157E-06	(m/s)
Hydraulic Conductivity:	K	7.3616E-04	(cm/s)

Data Quality: High: 70 to 100% recovery to original water level
Medium: 50 to 69% recovery to original water level
Low: Less than 50% recovery to original water level