Phase Two Environmental Site Assessment

570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario

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1 Executive Summary

EXP Services Inc. (EXP) was retained by 2650494 Ontario Inc. ("Client") to complete a Phase One Environmental Site Assessment (ESA) of the property with the municipal address 570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, ON. This parcel of land is hereinafter referred to as the 'Site'.

The Site is located on the northwest corner of the intersection of Upper Ottawa Street and Fennell Avenue East, as shown in Figure 1. The Site is addressed as 570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario. Based on a review of historical aerial photographs, chain of title information, historical maps, and other records, the Site was developed with a commercial building in the 1960's with a second commercial building developed 1975 and 1995.

It is EXP's understanding that this Phase Two ESA is required in order to support future re-development of the Site. The objective of the investigation was to support future filing of a Record of Site Condition (RSC) in accordance with Ontario Regulation 153/04, as amended (O.Reg.153/04).

This Phase Two ESA was conducted in accordance with the Phase Two ESA standard defined by Ontario Regulation 153/04, as amended (O.Reg.153/04); 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.

The objective of the Phase Two ESA was to assess the areas of potential environmental concern (APECs) identified in the Phase One ESA completed by EXP and dated October 20, 2020, and to support the filing of a Record of Site Condition (RSC) on the Ontario Ministry of the Environment, Conservation and Parks (MECP) Environmental Brownfield Site Registry. The detail information of the APECs is outlined in Section 4.0 of the report. The results and findings of the Phase Two ESA conducted at the Site are summarized as follows:

- On October 19th, 29th and 30th, 2020, nine (9) boreholes (BH1 to BH9) were advanced to a maximum depth of 5.64 m bgs at the Site.
- The general stratigraphy at the Site, as observed in the boreholes, asphalt and granular fill, underlain by silty clay and clayey silt fill material, followed predominantly by silty clay and clayey silt, and underlain by assumed bedrock and limestone in three (3) of the boreholes.
- The monitoring well network advanced as part of this Phase Two ESA consisted of three (3) monitoring wells screened within the bedrock layer. Groundwater levels were measured from the three (3) monitoring wells (MW3, MW5 & MW9) between October 30th and November 10th, 2020.
- Based on the groundwater contour map delineated for the Site, the shallow groundwater is anticipated to flow in a southerly direction. However, EXP notes that the direction of localized groundwater flow may be influenced by disturbed soil (fill), underground utilities and/or underground building structures in the area. As such, the measured groundwater flow direction may not be representative of the regional area.
- The horizontal hydraulic gradient on-Site ranged from 0.014 m/m (between MW3 and MW5) and 0.004 m/m (between MW5 and MW9).
- Soil samples were submitted for the analysis of petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene and xylenes (BTEX) and/or metals. An exceedance of zinc above the MECP Table 3 SCS was noted at BH2 SS2 and BH4 SS2. All

remaining analyzed parameters in soil samples were either non-detected or detected below their applicable MECP (2011) Table 3 SCS.

- Groundwater samples were submitted for the analysis of PHCs and VOCs. All parameters were either non-detected or detected below their applicable MECP (2011) Table 3 SCS.
- No evidence of free product (i.e. visible film or sheen), or odour was observed during soil sampling, groundwater purging, or groundwater sampling activities.

Based on the results of the Phase Two ESA, the concentration of select metal parameters (zinc) was noted above the generic MECP (2011) Table 3 SCS. A delineation program is recommended to determine the extent of the metal exceedances in soil at the Site. Following, a remediation program or risk assessment will be required prior to submission of Record of Site Condition (RSC).

2 Introduction

EXP Services Inc. (EXP) was retained by 2650494 Ontario Inc. ("Client") to complete a Phase One Environmental Site Assessment (ESA) of the property with the municipal address 570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, ON. This parcel of land is hereinafter referred to as the 'Site'.

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The objective of the Phase Two ESA was to assess the areas of potential environmental concern (APECs) identified in the Phase One ESA completed by EXP, dated October 20, 2020 to support the filing of an RSC on the Ontario Ministry of the Environment and Climate Change (MECP) Environmental Brownfield Site Registry.

2.1 Site Description

The Site is located on the northwest corner of the intersection of Upper Ottawa Street and Fennell Avenue East. The Site has an area of approximately 1.5 hectares (3.72 acres) and contains two (2) commercial buildings:

- Site Building A: A one-storey building, with a basement and a footprint of approximately 4,560 m^2 (49,083 ft^2). The building is located on the south portion of the Site and is occupied by various commercial establishments (Salti's, Top Games, Sherwood Barber & Hairstyling, Safe Gold, Arepas El Mana, Mirror Ladies Fashions, Mobex Mobile Exploration, Honest Lawyer and Crazy Bill's). Salti's, the largest commercial space, consists of a grocery store, restaurant, office space, storage and vacant bowling alley on the first floor and storage, event space and previous furniture manufacturing in the basement. The remainder of the building consists of various retail space, a hair salon and a restaurant on the first floor.
- Site Building B: a one-storey building, with no basement and a footprint of approximately 250 m^2 (2690 ft^2). The building is located on the east portion of the Site and is occupied by Tim Hortons. The building consists of kitchens, storage and dining space.

The exterior areas surrounding the Site building consist of a paved asphalt parking and laneways to the south and east. The areas surrounding the Site consist of laneways and commercial properties to the south and east, and residential dwellings to the north and west.

Based on a review of historical aerial photographs, chain of title information, historical maps, and other records, the Site was developed with a commercial building in the 1960's with a second commercial building developed 1975 and 1995.

2.2 Legal Description and Property Ownership

Refer to the table below for the Site identification information.

Municipal Address	570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, ON
Current Land Use	Commercial

Proposed Land Use	Residential / Mixed Use
Legal Description	Block B, Plan 1210; Hamilton
Property Identification Number (PIN)	17068-0115 (LT)
Approximate Universal Transverse Mercator (UTM) coordinates	NAD83 17T 594996.22 m E 4786612.51 m N
Accuracy Estimate of UTM	10-15 m
Measurement Method	Georeferenced aerial photograph
Site Area	1.51 hectares (3.72 acres)
Property Owners, Owner Contact and Address	2650494 Ontario Inc.

2.3 Current and Proposed Future Uses

At the time of the Phase Two ESA, the property located at 570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East was occupied by two commercial buildings with various occupants. Residential / Mixed Use development is being proposed at the Site.

2.4 Applicable Site Condition Standards

Analytical results obtained for Site soil and groundwater samples were assessed against Site Condition Standards (SCS) as established under subsection 169.4(1) of the Environmental Protection Act, and presented in the document MECP "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", ("SGWS" Standards), (MECP, 2011). 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 are provided in MECP (2011). 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).

Tables 1 to 9 of MECP (2011a) 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;
- Table 7 – applicable to sites with non-potable groundwater and shallow soils;
- Table 8 – applicable to sites with potable groundwater and that are within 30 m of a water body; and,
- Table 9 – applicable to sites with non-potable groundwater and that are within 30 meters (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 (i.e. surface and subsurface soil), thickness and extent of overburden material, (i.e. shallow soil conditions), and proximity to an

area of environmental sensitivity or of natural significance. For some chemical constituents, 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 MECP (2011) Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition for Residential/Parkland/Institutional Property Use and medium to fine textured soil. The selection of this category was based on the following factors:

- More than 2/3 area of the Site has an overburden thickness greater than 2 m.
- The Site is not located within 30 m of a surface water body or an area of natural significance.
- The soil at the Site has a pH value between 5 and 9 for surficial soils; and, between 5 and 11 for subsurface soils.
- The property is not located within an area of natural significance; does not include, nor is it adjacent to an area of natural significance, nor is it part of such an area; and, it does not include land that is within 30 m of an area of natural significance, nor is it part of such an area. Based on the review of available resources from the Ministry of Natural Resources and Forestry and MECP, no areas of natural significance were identified at the Site or within the Phase One Study Area.
- The Site is serviced by the City of Hamilton water distribution system; and, to the best of EXP's knowledge, all properties within 250 m of the Site are serviced by the municipal water supply (i.e. there are no potable water supply wells located within the Phase One Study Area). A request letter for applying non-potable groundwater use for the purposes of filing record of site condition was sent to the City of Hamilton. The City of Hamilton provided a response to the request for the application of non-potable groundwater use which was received on November 2, 2020 and indicated no objection to the application of non-potable groundwater use. The request letter and response are included in Appendix F.
- The predominant soil type on the Site is considered to be medium to fine textured (as per the soil description identified in the borehole logs in Appendix C, and the results of the 75-micron sieve result included in Appendix E).
- The Site proposed land use is residential.
- There is no intention to carry out a stratified restoration at the Site.

3 Background Information

3.1 Physical Setting

The following physiographic, geological and soil maps were reviewed:

- "Toporama"; Natural Resources Canada. Map 30M11. Scale 1:15,000. 2008.
- Quaternary Geology of Ontario - geology_ll.shp [computer file], Ontario: Ontario Geological Survey, 2000.
- Bedrock Geology of Ontario - geology_ll.shp [computer file], Ontario: Ontario Geological Survey, 2000.

Based on the review of the above maps, the following information was obtained:

- The Site is approximately 190 m above sea level and is generally flat.
- A review of the topographic map indicated that Redhill Creek is located approximately 1.8 km southeast of the Site and flows north/northeast towards Hamilton Harbour located approximately 5 km northwest of the Site. Based on local topography and the proximity to Redhill Creek, the anticipated groundwater flow direction is to the north/northeast.
- The Site and surrounding areas are expected to consist of Glaciolacustrine deposits that predominantly consist of silt and clay, minor sand, basin and quiet water deposits.
- The bedrock in the general area of the Site is part of a group belonging to the Lockport Formation consisting of shale, dolostone and siltstone.

3.2 Previous Environmental Investigations

The following reports were available for review at the time of this Phase One ESA for the surrounding Phase One Study Area.

- A report entitled "Phase One Environmental Site Assessment 1093 – 1115 Fennell Avenue East, 570 & 580 Upper Ottawa Street Hamilton, Ontario" dated May 15, 2013, was prepared for Carriage Gate Homes by Landtek Limited. Pertinent information from the report is as follows:
    - The report consists of a Phase I ESA across the entire property known under the address of 1093, 1095, 1099, 1101, 1103, 1105, 1107, 1109, 1113 and 1115 Fennell Avenue East, and 570 and 580 Upper Ottawa Street, Hamilton, Ontario.
    - The report was written in accordance with the Canadian Standards Association (CSA) Standard Z768-01 and the document entitle "Guideline: Professional Engineers Providing Services in Environmental Site Assessment, Remediation and Management" dated 1996, by the Association of Professional Engineers on Ontario.
    - Aerial photographs indicate that the first commercial property on Site was constructed between 1954 and 1959.
    - Site occupancy records indicate that a drycleaner was present at the Site from approximately 1960 to 1980 and from 1999 to 2012. However, based on information from a property owner, dry cleaning operations were never historically at the Site but was a drop-off location exclusively. Therefore, it is Landtek Limited's opinion that there is low potential for VOC contamination in soil and groundwater at the Site.
    - Due to the age of the building, it is Landtek Limited's opinion that if future redevelopment plans include demolition or renovations of the above grade structures, that a Designated Substance Survey should be completed prior to such activities and that a contingency allowance or a disposal provision for any unsuitable materials or wastes encountered during demolition/excavation.

- FIPs indicate that retail fuel located at 1110 Fennell Avenue East, approximately 35 m south of the Site, has been present since the 1960s and is inferred to be cross-gradient relative to the Site. It is Landtek Limited's opinion that this could result in low to moderate hydrocarbon impacts.
- Based on the findings, a Limited Phase II ESA was recommended to assess impact relating to petroleum hydrocarbon compounds.

- A report entitled "Updated Phase 1 Environmental Site Assessment 1093-1115 Fennell Avenue East and 570 & 580 Upper Ottawa Street Hamilton, Ontario" dated March 15, 2018, was prepared for Carriage Gate Homes by Landtek Limited. Pertinent information from the report is as follows:
  - Information from a report entitled "Limited Phase Two Environmental Site Assessment, 1093-1115 Fennell Avenue East ad 570 and 580 Ottawa Street, Hamilton Ontario" dated June 3, 2013, was prepared for Mr. Nick Carnicelli by Landtek Limited was included.
  - The need for a Limited Phase II ESA was identified during a Phase I ESA in May 2013.
  - The Limited Phase II ESA involved drilling three (3) boreholes that were backfilled with bentonite upon completion of sampling.
  - No water seepage was noted during drilling.
  - Laboratory results were compared to the Table 7 Site Condition Standards for industrial/commercial/community property use with medium and fine textured shallow soils in a non-potable groundwater condition (Table 7 SCS).
  - Four (4) soil samples were analyzed for metals and petroleum hydrocarbons including benzene, toluene, ethylbenzene and xylenes (PHCs including BTEX).
  - All soil samples analyzed for PHCs including BTEX were below the Table 7 SCS.
  - Soil samples analyzed for metals from borehole 2 and borehole 3 contained zinc concentrations in the fill and possible fill material that exceeded the Table 7 SCS. All other metals and inorganics were below the Table 7 SCS.
  - Based on the findings, it is Landtek Limited's opinion that there were no PHC impacts from the retail fuel station south of the Site in soils within the southeast portion of the Site.
  - The Updated Phase I ESA was written in accordance with CSA Standard Z768-01 for the entire property known under the address of 1093, 1095, 1099, 1101, 1103, 1105, 1107, 1109, 1113 and 1115 Fennell Avenue East, and 570 and 580 Upper Ottawa Street, Hamilton, Ontario.
  - A site visit and records review were completed in March 2018 regarding the Site and adjacent properties for the purpose of confirming that Site conditions remained unchanged or similar since the Phase I and Limited Phase II were completed in 2013.
  - Based on the findings, a contingency allowance or a disposal provision for any unsuitable materials or wastes encountered during demolition/excavation was recommended.
  - No further work was recommended at the Site.

- A report entitled "Draft Phase One Environmental Site Assessment – 570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, ON" dated October 20, 2020 by EXP Services Inc., for 2650494 Ontario Inc. The Draft report identified the following APECs at the Site:

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)[1]	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or sediment)
APEC 1: Presence of imported fill material	Entire Site (excluding building footprint)	PCA#30 – Importation of Fill Material.	On-Site	Polycyclic Aromatic Hydrocarbons (PAHs) and Metals	Soil
APEC 2: Presence of USTs and gasoline service stations at 1110 Fennel Avenue East	South portion of the Site	PCA#28- Gasoline and Associated Products Storage in Fixed Tanks PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems.	Off-Site	Petroleum Hydrocarbons (PHCs) and Benzene, Toluene, ethylbenzene and Xylenes (BTEX), and Volatile Organic Compounds (VOCs)	Groundwater
APEC 3: Former USTs and gasoline service stations at 1120 Fennel Avenue East	Southeast portion of the Site	PCA#28- Gasoline and Associated Products Storage in Fixed Tanks PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems.	Off-Site	Petroleum Hydrocarbons (PHCs) and Benzene, Toluene, ethylbenzene and Xylenes (BTEX), and Volatile Organic Compounds (VOCs)	Groundwater
APEC 4: Historic Dry Cleaning Operation at 1104 Fennell Avenue East	South portion of the Site	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used).	Off-Site	Volatile Organic Compounds (VOCs)	Groundwater
APEC 5: Historic Dry Cleaning Operation 1096 Fennell Avenue East	South portion of the Site	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used).	Off-Site	Volatile Organic Compounds (VOCs)	Groundwater

(1) Potentially contaminating activity means a use or activity set out in Column A of Table 2 of Schedule D (O.Reg.153/04, as amended) that is occurring or has occurred in a phase one Study area.

4 Scope of the Investigation

4.1 Overview of Site Investigation

The objective of the Phase Two ESA was to assess the APECs identified in the Phase One ESA (EXP, 2020) to obtain soil and groundwater data to characterize the Site to support the filing of an RSC on the MECP's Environmental Brownfield Site Registry.

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

- Request local utility locating companies (e.g. cable, telephone, gas, hydro, water, sewer and storm water) to mark any underground utilities present at the Site;
- Retain a private utility locating company to mark any underground utilities present in the vicinity of the borehole locations and to clear the individual borehole locations;
- Advance a total of nine (9) boreholes across the Site
- Three (3) of the boreholes (BH3, BH5 and BH9) will be completed as monitoring wells to assess groundwater quality at the Site.
- Collect representative soil samples from the boreholes for laboratory analysis of PHCs, BTEX, Metals, pH, and/or 75-micron sieve;
- Develop the newly installed groundwater monitoring wells;
- Collect groundwater samples from the previous and newly installed monitoring wells for laboratory chemical analysis of PHCs and/or VOCs;
- Complete an elevation survey of all newly installed monitoring wells to determine the groundwater flow direction in the groundwater unit(s) identified beneath the Site; and,
- Analyze the data and prepare a report of the findings, in accordance with O.Reg.153/04.

4.2 Media Investigated

The Phase Two ESA included the investigation of the Site soil and/or groundwater. As there were no surface water bodies on the Site, sediment sampling was not required.

4.3 Phase One Conceptual Site Model

The Phase One Conceptual Site Model (CSM) is incorporated into the Phase Two CSM, presented in Appendix G.

4.4 Deviations from Sampling and Analysis Plan (SAAP)

The field investigative and sampling program was carried out following the requirements of the Site Sampling and Analysis Plan (SAAP in Appendix A).

No significant deviations from the SAAP were reported that affected the sampling and data quality objectives.

4.5 Impediments

The entire Site was accessible at the time of the investigation, and no physical impediments were encountered during the field investigation.

5 Investigation Method

5.1 General

The Site investigative activities consisted of the following:

- Borehole drilling to facilitate the collection of soil samples for geologic characterization and/or chemical analysis; and,
- Monitoring well installation for the collection of groundwater samples for chemical analysis.

Boreholes were advanced in the surficial fill and overburden soils by a licensed drilling company under the full-time supervision of EXP staff. The drilling equipment used to advance the boreholes is described below. No petroleum-based greases or solvents were used during drilling activities.

Monitoring wells were installed in the boreholes by a MECP licensed well contractor in accordance with Ontario Regulation 903/90, as amended (O.Reg. 903) using manufactured well components (i.e. riser pipes and screens) and materials (i.e. sand pack and grout) from documented sources.

5.2 Underground Utilities

Prior to the commencement of drilling activities, the locations of underground utilities including but not limited to cable, telephone, natural gas, electrical lines, water, sewer and storm water conduits were marked out by public locating companies. In addition, a private utility locating service (Frontier) was retained to clear individual borehole locations.

5.3 Borehole Program

The fieldwork for the soil investigative portion of the Phase Two ESA was carried out on October 19th, 29th and 30th, 2020. The boreholes were advanced under full-time supervision of EXP staff.

Five (5) boreholes (BH1, BH2, BH4, BH6 & BH7) were advanced by Elite Drilling Services (Elite) on October 19th and four (4) boreholes (BH3, BH5, BH8 & BH9) were advanced by Terra Firma Environmental Services Ltd. (Terra Firma) to a maximum depth of 5.64 metres below ground surface (m bgs). The boreholes were advanced using a truck-mounted CME 75 and track-mounted Diedrich D-50 equipped with solid stem and split spoon sampling equipment. No petroleum-based greases or solvents were used during drilling activities. A summary of the boreholes advanced is provided in Table 2.

EXP continuously monitored the drilling activities to record the physical characteristics of the soil, depth of soil sample collection and total depth of boreholes. Field observations are summarized on the borehole logs provided in Appendix C. Representative soil samples were recovered in the overburden of the boreholes at regular intervals using a spilt spoon sampler in boreholes.

Efforts to prevent cross contamination during the soil sampling program included the use of dedicated nitrile gloves, sampling containers, hermetic sampling syringes etc. during sampling handling, washing the auger flights between sample locations and cleaning the split spoon sampler between runs

Drill cuttings were temporarily stored in sealed on-Site drums pending analytical results.

5.4 Soil: Sampling

The soil sampling conducted during the completion of this Phase Two ESA was undertaken in accordance with the SAAP presented in Appendix A.

Soil samples for geologic characterization and chemical analysis were collected on a continuous basis in the overburden materials using sampling equipment advanced into the subsurface using a Bosch electric drill (percussive). Upon retrieval from the boreholes, the split spoons were placed on a flat surface and disassembled by drilling personnel to provide access of the recovered cores. Geologic and sampling details of the recovered cores were logged and assessed for the potential presence of non-aqueous phase liquids. Soil stratigraphy encountered in the boreholes were texturally, visually and olfactory classified in the field and in the laboratory. Soil samples were logged for colour, grain size, moisture content, density, structures, texture and/or staining. Field observations are summarized on the borehole logs provided in Appendix C.

Measures were taken in the field and during transport to preserve sample integrity prior to chemical analysis. Recommended volumes of soil samples selected for chemical analysis were collected from the recovered cores into pre-cleaned, laboratory-supplied glass sample jars/vials identified for the specified analytical test group.

All soil samples were placed in clean coolers containing ice prior to and during transportation to the subcontract laboratory, Bureau Veritas Laboratory (BV Labs) of Mississauga, Ontario. The samples were transported/submitted within the acceptable holding time to BV Labs following Chain of Custody protocols for chemical analysis.

Decontamination and other protocols were followed during sample collection and handling to minimize the potential for sample cross-contamination. New disposable nitrile gloves were used for the handling and sampling of each retrieved soil core. The sampling equipment was decontaminated between sampling intervals by the drilling contractor using a potable water/phosphate-free detergent solution followed by rinses with potable water and de-ionized water. Wash and rinse waters were collected in sealed, labeled containers. Drill cuttings were placed in labeled, sealed drums upon completion of sampling pending disposal.

Soil samples submitted for specific chemical analysis were selected on the basis of visual inspection of the recovered cores, sample location and/or depth interval. The rationale for soil sample submission is presented in Table 2.

Geologic details of the soil cores recovered from the boreholes advanced at the Site are provided in finalized boreholes logs presented in Appendix C.

Field duplicate soil samples were collected and analyzed for Quality Assurance/Quality Control (QA/QC) purposes. See Section 5.14 of this report for further details.

5.5 Soil: Field Screening Measurements

A portion of each soil sample was placed in a sealed plastic bag and allowed to reach ambient temperature prior to field screening using an RKI Eagle calibrated with hexane (H) and isobutylene (I). The 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 readings provide a real-time indication of the relative concentration of vapours encountered in the subsurface during drilling and are used to aid in the assessment of the vertical and horizontal extent of contamination and the selection of soil samples for analysis; samples with the highest PID readings were selected for submission to BV Labs for chemical analysis of VOCs or PHCs. Prior to use in the field, the Eagle 2 was calibrated by Spectra Scientific and a copy of the calibration was provided with the instrument. Additionally, an ambient air reading of zero ppm was observed confirming the PID's proper operation. Each sample was additionally examined for visual, textural and olfactory classification at the time of sampling. The field screening measurements, in parts per million (ppm) isobutylene equivalents, are presented on the borehole logs in Appendix C.

5.6 Groundwater: Monitoring Well Installation

The purpose of the monitoring well installation program was to characterize groundwater quality, determine hydraulic gradients and hydraulic conductivity. The monitoring wells were installed in general accordance with the Ontario Water Resources Act - R.R.O. 1990, Regulation 903 - amended to O. Reg. 128/03, and were installed by Sonic.

Three (3) of the boreholes (BH3, BH5 & BH9), advanced on-Site between October 29th and 30th, 2020 were instrumented with a monitoring well to assess the groundwater quality at the Site. Monitoring wells were installed at depths ranging from 5.49 m to 5.64 m bgs. All monitoring wells consisted of a 3 m length, 51 mm diameter number 10 slot size (0.25 mm) PVC well screens and Schedule 40 PVC riser pipe. All pipe connections were factory machined threaded flush couplings. The annular space around the wells was backfilled with silica sand to an average height of 0.6 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 protective well casings flush to the ground surface and reinforced with concrete.

EXP continuously monitored the well installation activities. Well installation details are summarized in Table 4 and on the borehole logs provided in Appendix C.

When the monitoring wells are no longer required, they must be decommissioned in accordance with the procedure outlined in the Ontario Water Resources Act - R.R.O. 1990, Regulation 903 - amended to O. Reg. 128/03.

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 borehole insertion to prevent contact with the ground and other surfaces; and,
- Cleaning of augers between sampling locations.

5.7 Groundwater: Monitoring Well Development

Upon completion of monitoring well installation, the new monitoring wells were developed to remove fine sediment particles from the sand pack and enhance hydraulic communication with the surrounding formation waters. The monitoring wells (MW3, MW5 & MW9), were developed between October 30th and November 4th, 2020 using dedicated inertial tubing and foot valves to disturb the water column and recover groundwater containing dislodged sediment particles.

In addition, groundwater monitoring activities were also conducted on all of the monitoring wells which consisted of measuring the depth to groundwater in each monitoring well so that groundwater flow and direction below the Site could be assessed. Water levels were measured with respect to the top of the casing by means of an electronic water level meter. The water level measurements were recorded on water level log sheets or in a bound field notebook. The water level meter probe was decontaminated between monitoring well locations.

Equipment used during groundwater monitoring was thoroughly cleaned and decontaminated between wells. Well purging details were documented on a log sheet or in a bound hard cover notebook.

5.8 Groundwater: Field Measurements of Water Quality Parameters

Prior to collecting groundwater samples, field measurements of water quality parameters were recorded from the two (2) monitoring wells sampled utilizing low-flow purging and sampling methodologies. Groundwater was purged from each location using a peristaltic pump and dedicated LDPE tubing. Field measurements of dissolved oxygen concentration, electrical conductivity, oxidation-reduction potential, pH, temperature, turbidity and water levels were recorded at three (3) minute intervals during the purging activities using a pre-calibrated multi probe water quality meter, a turbidity meter and a water level meter. Groundwater was considered to be chemically stable when the pH measurements of three (3) successive readings agreed to within ± 1 pH units, the specific conductance within ± 10%, and the temperature within ± 10%. The multi-meter electrodes were calibrated prior to receipt of the meter by the supplier using in-house reference standards.

5.9 Groundwater: Sampling

Groundwater samples were collected from the newly installed monitoring wells on November 10th, 2020. The groundwater sampling conducted during the completion of this Phase Two ESA was generally undertaken in accordance with the SAAP presented in Appendix A.

Upon completion of purging activities, groundwater samples were collected from monitoring wells. Recommended groundwater sample volumes were collected into pre-cleaned laboratory-supplied vials or bottles provided with analytical test group specific preservatives, as required. The samples were placed in an insulated cooler pre-chilled with ice immediately upon collection. Samples for VOCs and/or PHC F1 analysis were collected in triplicate vials prepared with concentrated sodium bisulphate as a preservative. Each VOC/PHC vial was inverted and inspected for gas bubbles prior to being placed in the cooler to ensure that no head-space was present in the samples. Samples for Inductively Coupled Plasma Mass Spectrometry (ICPMS) metals were collected using disposable 0.45 micron field filters, supplied by Spectra, or laboratory filtered.

All groundwater samples were placed in clean coolers containing ice prior to and during transportation to the subcontract laboratory, BV Labs. The samples were transported/submitted following appropriate holding time requirements following Chain of Custody protocols for chemical analysis.

Decontamination and other protocols were followed during sample collection and handling to minimize the potential for sample cross-contamination. New disposable nitrile gloves were used at each monitoring well location.

Groundwater samples submitted for specific chemical analysis were selected on the basis of sample location and/or depth interval. The rationale for groundwater sample submission is presented in Table 5.

Appropriate QA/QC samples were collected during groundwater sampling, including field duplicate samples and trip blanks, where required, as presented in Table 5.

5.10 Sediment Sampling

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

5.11 Analytical Testing

The contractual laboratory selected to perform all chemical analyses was BV Labs. BV Labs is an accredited laboratory under the Standards Council of Canada/Canadian Association of Laboratory Accreditation (CALA), Accredited Laboratory No. 97 and No. A3200, respectively, in accordance with ISO/IEC 17025:2005 – “General Requirements for the Competence of Testing and Calibration Laboratories”.

5.12 Elevation Survey

An elevation survey was conducted during the Phase Two ESA investigative activities, with the purpose of obtaining relative vertical control of the monitoring well locations. The top of pipe and ground surface elevations of each monitoring well were surveyed relative to an arbitrary benchmark. The temporary benchmark was the slab on grade of Tim Hortons, northeast side of building.

5.13 Quality Assurance and Quality Control Measures

Quality Control/Quality Assurance measures, as set out in the Sampling and Analysis Plan, were implemented during sample collection, storage and transport to provide accurate data representative of conditions in the surficial fill and upper overburden soils and the water table aquifer. The QA/QC measures included decontamination procedures to minimize the potential for sample cross contamination, the execution of standard operating procedures to collect representative and unbiased samples, the collection of quality control samples to evaluate sample precision and accuracy, and the implementation of measures to preserve sample integrity.

Decontamination protocols were followed during sample collection and handling to minimize the potential for cross-contamination. During the collection of soil samples, split-spoon and duel tube samplers were scraped and decontaminated between sampling intervals by washing with a potable water/phosphate-free detergent solution followed by a rinse with potable water. New disposable nitrile gloves were used for the handling and collection of samples from each soil core and for sample collection from each borehole.

Soil samples selected for chemical analyses were collected from the retrieved soil cores and placed directly into pre-cleaned, laboratory-supplied glass jars or vials. Sample volumes were consistent with analytical test group requirements as specified by the receiving laboratory.

Groundwater samples were collected into pre-clean laboratory-supplied vials or bottles provided with analytical test group specific preservatives, as required. Recommended analytical test group specific sample volumes were collected as specified by the contractual laboratory. Sample vials for analysis of PHC F1 (BTEX) and VOCs were inspected for the presence of gas bubbles and the presence of head space, where volatiles may partition into.

Measures were followed to preserve sample integrity between collection and receipt by the contractual laboratory. All samples, both soil and groundwater, immediately upon collection were placed in insulated coolers pre-chilled with ice for storage and transport to the contractual laboratory. Samples were received by the contractual laboratory within specific analytical test group holding time requirements.

Documentation procedures were followed to confirm sample identification and tracked sample movement. Each sample was assigned a unique identification ID number, which was recorded along with the date, time of sampling and requested analyses on labels affixed to the sampling containers, and in a bound field notebook. Chain of Custody protocols were followed to track sample handling and movement until receipt by the contractual laboratory. Field QA/QC samples were collected during the soil and groundwater sampling. Duplicate samples were collected to evaluate sampling precision to evaluate the potential for sample cross-contamination during handling and transport.

One (1) duplicate groundwater samples (MW55) was collected from monitoring well MW5 and submitted for analysis of PHCs and VOCs parameters for QA/QC purposes; one (1) trip blank sample was analyzed for VOCs.

6 Review and Evaluation

6.1 Geology

The soil investigation conducted at the Site for the environmental assessment consisted of the advancement of nine (9) boreholes into the topsoil material and the underlying native materials to a maximum depth of 5.64 m bgs. The borehole logs describing geologic details of the soil cores recovered during the Site drilling activities are presented in Appendix C. Boundaries of soil indicated on the log sheets are intended to reflect transition zones for the purpose of environmental assessment and should not be interpreted as exact planes of geological change.

The general stratigraphy at the Site, as observed in the boreholes, asphalt and granular fill, underlain by silty clay and clayey silt fill material, followed predominantly by silty clay and clayey silt, followed by assumed bedrock and limestone in three (3) of the boreholes. A brief description of the soil stratigraphy at the Site, in order of depth, is summarized in the following sections. Refer to borehole logs provided in Appendix C for details of soil stratigraphy. The interpreted Site geology is also shown on the enclosed cross sections (Figures 12A, 13 and 14A).

6.1.1 Surface Material

Asphalt with thickness of between approximately 50 mm and 125 mm was encountered at the surface of all boreholes.

6.1.2 Fill Material

Granular fill was encountered below the asphalt in all the boreholes. Fill material was encountered below the granular fill in all the boreholes. The fill typically consisted of a silty clay and/or clayey silt. This fill layer extended to a maximum depth of 2.06 m bgs.

6.1.3 Native Material

A layer of silty clay, sandy silt and/or clayey silt was encountered below the fill materials and granular fill at all borehole locations.

6.1.4 Bedrock

During the Phase Two ESA, assumed bedrock was encountered to depths ranging 1.68 m bgs (BH7) to 2.62 m bgs (BH1) and limestone in three (3) of the boreholes (BH3, BH5 & BH9). Please notes that bedrock was encountered less than 2 m bgs in two (2) of the boreholes (BH4 and BH7).

6.2 Groundwater: Elevations and Flow Direction

The monitoring well network advanced as part of this Phase Two ESA consisted of three (3) newly installed monitoring wells. (MW3, MW5 & MW9) were screened between 2.59 and 5.64 m bgs, within the limestone layer. Groundwater levels were measured between October 30th and November 10th, 2020. The groundwater levels and corresponding elevations are summarized in Table 6, and presented in the borehole logs provided in Appendix C.

Based on the groundwater contour map delineated for the Site, the shallow groundwater is anticipated to flow in a southerly direction. A groundwater contour map is presented in Figure 6. However, EXP notes that the direction of localized groundwater flow may be influenced by disturbed soil (fill), underground utilities and/or underground building structures in the area. As such, the measured groundwater flow direction may not be representative of the regional area.

6.2.1 Groundwater: Hydraulic Conductivity

Based on the soil types and textual values provided in the textbook called Groundwater by Alan R. Freeze and John A. Cherry, the value is approximately 1 x 10-6 m/s.

6.2.2 Groundwater: Horizontal Hydraulic Gradients

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.

The horizontal hydraulic gradient on-Site ranged from 0.014 m/m (between MW3 and MW5) and 0.004 m/m (between MW5 and MW9).

6.3 Soil Texture

Based on the 75-micron sieve of representative soil, the soil texture at the Site was determined to be medium to fine textured soils (refer to Appendix E).

6.4 Soil Field Screening

TOV readings from each sample interval were measured for soil sample selected for BTEX/PHC and VOC analysis from all advanced boreholes. Vapour concentrations readings collected during subsurface drilling were measured using the RKI Eagle 2 in ppm calibrated with isobutylene and hexane or equivalent. The vapour readings, in ppm, are provided on the borehole logs in Appendix C.

Soil samples submitted for chemical analysis were selected on the basis of visual inspection of the recovered cores, TOV readings, sample location and/or depth interval. Both hexane and isobutylene readings indicate that there are insignificant volatile particles in the soil vapours.

6.5 Soil Quality

In accordance with the scope of work, chemical analyses were performed on selected soil samples recovered from the boreholes. The selection of representative “worst case” soil samples was based on field screening, visual and/or olfactory evidence of impacts and the presence of potential water bearing zones. Copies of the laboratory Certificates of Analysis for the analyzed soil samples are provided in Appendix E. The locations of the soil samples are shown on Figures 7 and 8.

6.5.1 Soil pH

The Table 3 SCS criteria are applicable if soil pH is in the range of 5 to 9 for surface soil (less than 1.5 m below soil surface) and 5 to 11 for subsurface soil (greater than 1.5 m below soil surface). The reports pH values were 7.69 for surface soils and 7.52 for subsurface soils, which are within the acceptable range to use the Table 3 SCS.

6.5.2 Petroleum Hydrocarbons (PHCs), Benzene, Toluene, Ethylbenzene and Xylenes (BTEX)

Five (5) soil sample were analyzed for PHCs and/or BTEX. The results of the analysis together with the applicable Table 3 SCS are presented in Table D.1 in Appendix D.

As shown in Table D.1, PHCs including BTEX were either not detected or detected below the applicable Table 3 SCS. The laboratory Reporting Detection Limits (RDLs) were below the Table 3 SCS.

6.5.3 Metals

Ten (10) soil samples including one (1) QA/QC field duplicate were analyzed for metals. The results of the analysis together with the applicable Table 3 SCS are presented in Table D.2 in Appendix D.

As shown in Table D.2, metals were either not detected or detected below the applicable Table 3 SCS, except for;

- Zinc in BH2 SS2 and BH4 SS2; and,
- Cadmium and Lead in BH6 SS33 (field duplicate of BH6 SS3) exceed the Table 3 SCS.

Please note that the cadmium and lead concentrations of the original sample of BH6 SS33 are within the Table 3 SCS. The averaged cadmium and lead concentrations of soil samples BH6 SS3 and BH6 SS33 are 1.12 ug/g and 97.5 ug/g, respectively, which are within Table 3 SCS. As such, the concentration at BH6 SS3 is deemed to meet Table 3 SCS.

The laboratory RDLs were below the Table 3 SCS.

6.5.4 Polycyclic Aromatic Hydrocarbons (PAHs)

Five (5) soil samples, were analyzed for metals. The results of the analysis together with the applicable Table 3 SCS are presented in Table D.3 in Appendix D.

As shown in Table D.3, PAHs were either not detected or detected below the applicable Table 3 SCS. The laboratory RDLs were below the Table 3 SCS.

6.5.5 Chemical Transformation and Soil Contaminant Sources

Based on the findings of the current Phase Two ESA, the soil impacts consist of zinc exceedances. The zinc exceedances are likely associated with poor quality fill material.

6.5.6 Evidence of Non-Aqueous Phase Liquid

Inspection of the soil cores retrieved from the boreholes did not indicate the presence of non-aqueous phase liquid (NAPL), staining or sheen.

6.6 Groundwater Quality

In accordance with the scope of work, chemical analyses were performed on groundwater samples recovered from the monitoring wells. The selection of groundwater samples was based on location and/or screen depth. Copies of the laboratory Certificates of Analysis for the analyzed groundwater samples are provided in Appendix E. A summary of the analytical results for the groundwater samples, including the locations of each sample, well screen interval depth, a comparison of parameter concentrations against applicable SCS, and the identification of the PCOCs, are provided in Appendix D.

6.6.1 Petroleum Hydrocarbons

Three (3) groundwater samples including one (1) QA/QC field duplicate were analyzed for PHCs. The results of the analysis together with the applicable Table 3 SCS are presented in Table D-3 in Appendix D.

As shown in Table D-3, PHCs were either not detected or detected below the applicable Table 3 SCS. The laboratory RDLs were below the Table 3 SCS.

6.6.2 Volatile Organic Compounds

Four (4) groundwater samples, including one (1) QA/QC field duplicate and one (1) QA/QC trip blank samples were analyzed for VOCs. The results of the analysis together with the applicable Table 3 SCS are presented in Table D-3 in Appendix D.

As shown in Table D-3, VOCs were either not detected or detected below the applicable Table 3 SCS. The laboratory RDLs were below the Table 3 SCS.

6.6.3 Chemical Transformation and Contaminant Sources

No groundwater impacts were identified in MW5 and MW9.

6.6.4 Evidence of Non-Aqueous Phase Liquid (NAPL)

No evidence of NAPL was observed during groundwater monitoring, purging and sampling activities.

6.7 Sediment Quality

As no surface water body was located on-Site, the Phase Two ESA did not include sediment sampling.

6.8 Quality Assurance and Quality Control Measures

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 overburden and bedrock materials, and water table units at the Site.

Review of field activity documentation indicated that recommended sample volumes were collected from soil and groundwater for each analytical test group into appropriate containers and preserved with proper chemical reagents in accordance with the protocols set out in the “Protocol for Analytical Methods used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act” (MECP, 2004). Samples were preserved at the required temperatures in pre-chilled insulated coolers and met applicable holding time requirements, when relinquished to the receiving laboratory.

Field QA/QC samples were collected during soil and groundwater sampling. A total of one (1) groundwater duplicate sample was collected to evaluate sampling precision. One (1) trip blank samples were analyzed for VOCs. Refer to Tables D-3 for a summary of the QA/QC samples collected and submitted for chemical analysis.

The field duplicate sample results were quantitatively evaluated by calculating the relative percent difference (RPD). Assessment of the duplicate soil and groundwater sample showed that the results generally met analytical test group specific acceptance criteria. The overall assessment indicates that the soil and groundwater samples were collected with an acceptable level of precision, and the data is acceptable quality for meeting the objectives of the Phase Two ESA.

The contractual laboratory selected to perform the chemical analyses was Bureau Veritas Laboratory, of Mississauga, ON. BV Labs is an accredited laboratory under the Standards Council of Canada/Canadian Association of Laboratory Accreditation

(Accredited Laboratory No. 97 and No. A3200, respectively) in accordance with ISO/IEC 17025:2005 – "General Requirements for the Competence of Testing and Calibration Laboratories". Certificates of Analysis were received from BV Labs reporting the results of all the chemical analyses performed on the submitted soil and groundwater samples. Copies of the Certificates of Analysis are provided in Appendix E. Review of the Certificates of Analysis, prepared by BV Labs, indicates that they were in compliance with the requirements set out under subsection 47(3) of O. Reg. 153/04.

The analytical program conducted by BV Labs included analytical test group specific QA/QC measures to evaluate the accuracy and precision of the analytical results and the efficiency of analyte recovery during solute extraction procedures. The laboratory 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 (VOCs only) to evaluate extraction efficiency. The laboratory QA/QC results are presented in the Quality Assurance Report provided in the Certificate of Analysis prepared by BV Labs. The QA/QC results are reported as percent recoveries for matrix spikes, spike blanks and QC standards, relative percent difference for laboratory duplicates and analyte concentrations for method blanks. The QA/QC results were assessed against test group control limits in the case of spiked blanks, matrix spikes and surrogate recoveries and alert criteria in the case of method blanks and laboratory duplicates. Review of the laboratory QA/QC results reported by BV Labs indicated that they were 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 are of acceptable quality and data qualifications are not required.

6.9 Phase Two Conceptual Site Model

This section presents a Phase Two Conceptual Site Model (CSM) providing a narrative, graphical and tabulated description integrating information related to the Site geologic and hydrogeologic conditions, areas of potential environmental concern/potential contaminating activities, the presence and distribution of potential contaminants of concern, contaminant fate and transport, and potential exposure pathways. The Phase Two CSM was completed in accordance with O. Reg.153/04 as defined by the MECP and is presented in Appendix G.

7 Conclusions

The results and findings of the Phase Two ESA conducted at the Site are summarized as follows:

- On October 19th, 29th and 30th, 2020, nine (9) boreholes (BH1 to BH9) were advanced to a maximum depth of 5.64 m bgs at the Site.
- The general stratigraphy at the Site, as observed in the boreholes, asphalt and granular fill, underlain by silty clay and clayey silt fill material, followed predominantly by silty clay and clayey silt, and underlain by assumed bedrock and limestone in three (3) of the boreholes.
- The monitoring well network advanced as part of this Phase Two ESA consisted of three (3) monitoring wells screened within the bedrock layer. Groundwater levels were measured from the three (3) monitoring wells (MW3, MW5 & MW9) between October 30th and November 10th, 2020.
- Based on the groundwater contour map delineated for the Site, the shallow groundwater is anticipated to flow in a southerly direction. However, EXP notes that the direction of localized groundwater flow may be influenced by disturbed soil (fill), underground utilities and/or underground building structures in the area. As such, the measured groundwater flow direction may not be representative of the regional area.
- The horizontal hydraulic gradient on-Site ranged from 0.014 m/m (between MW3 and MW5) and 0.004 m/m (between MW5 and MW9).
- Soil samples were submitted for the analysis of petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene and xylenes (BTEX) and/or metals. An exceedance of zinc above the MECP Table 3 SCS was noted at BH2 SS2 and BH4 SS2. All remaining analyzed parameters in soil samples were either non-detected or detected below their applicable MECP (2011) Table 3 SCS.
- Groundwater samples were submitted for the analysis of PHCs and VOCs. All parameters were either non-detected or detected below their applicable MECP (2011) Table 3 SCS.
- No evidence of free product (i.e. visible film or sheen), or odour was observed during soil sampling, groundwater purging, or groundwater sampling activities.

Based on the results of the Phase Two ESA, the concentration of select metal parameters (zinc) was noted above the generic MECP (2011) Table 3 SCS. A delineation program is recommended to determine the extent of the metal exceedances in soil at the Site. Following, a remediation program or risk assessment will be required prior to submission of Record of Site Condition (RSC).

8 General Limitations

The information presented in this report is based on a limited investigation designed to provide information to support an assessment of the current environmental conditions within the subject property. The conclusions and recommendations presented in this report reflect Site conditions existing at the time of the investigation.

More specific information with respect to the conditions between samples, or the lateral and vertical extent of materials may become apparent during excavation operations. The interpretation of the borehole information must, therefore, be validated during any such excavation operations. Consequently, during the future development of the property, conditions not observed during this investigation may become apparent. Should this occur, EXP Services Inc. should be contacted to assess the situation, and the need for additional testing and reporting. EXP has qualified personnel to provide assistance in regards to any future geotechnical and environmental issues related to this property.

The environmental investigation was carried out to address the intent of applicable provincial Regulations, Guidelines, Policies, Standards, Protocols and Objectives administered by the Ministry of the Environment. It should also be noted that current environmental Regulations, Guidelines, Policies, Standards, Protocols and Objectives are subject to change, and such changes, when put into effect, could alter the conclusions and recommendations noted throughout this report. Achieving the study objectives stated in this report has required us to arrive at conclusions based upon the best information presently known to us. No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce the possibility to an acceptable level. Professional judgment was exercised in gathering and analyzing information obtained and in the formulation of the conclusions. Like all professional persons rendering advice, we do not act as absolute insurers of the conclusions we reach, but we commit ourselves to care and competence in reaching those conclusions.

Our undertaking at EXP, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the engineering profession. It is intended that the outcome of this investigation assist in reducing the client's risk associated with environmental impairment. Our work should not be considered 'risk mitigation'. No other warranty or representation, either expressed or implied, is included or intended in this report.

This report was prepared for the exclusive use of **2650494 Ontario Inc.** and may not be reproduced in whole or in part, without the prior written consent of EXP, or used or relied upon in whole or in part by other parties for any purposes whatsoever. Any use which a third party makes of this report, or any part thereof, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

9 Closure

We trust this report is satisfactory for your purposes. Should you have any questions, please do not hesitate to contact this office.

Yours truly,

EXP Services Inc.

FOR Nicole McQuoid, B.Sc., EPt
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10 References

This study was conducted in general accordance with the applicable Regulations, Guidelines, Policies, Standards, Protocols and Objectives administered by the Ministry of the Environment. Specific reference is made to the following:

1. Canadian Standards Association [CSA] (2000) Z769-00, Phase II Environmental Site Assessment. Canadian Standards Association, March 2000.
2. Environmental Protection Act, R.S.O. 1990, Chapter E.19, as amended, September 2004.
3. First Base Solutions [FBS] (2011) VuMap. First Base Solutions. Available online at: http://vumap.firstbasesolutions.com/index.php.
4. Ministry of the Environment and Climate Change [MECP] (1996) Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario. Ontario Ministry of the Environment, December 1996.
5. MECP (2011a) Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Ontario Ministry of the Environment, March 2004, amended as of July 1, 2011.
6. MECP (2011) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. Ontario Ministry of the Environment, April 15, 20101.
7. Ontario Regulation 153/04, made under the Environmental Protection Act, May 2004, amended.
8. Ontario Water Resources Act – R.R.O. 1990, Regulation 903, amended.

Previous Environmental Investigation Reports include:

1. “Phase One Environmental Site Assessment 1093 – 1115 Fennell Avenue East, 570 & 580 Upper Ottawa Street Hamilton, Ontario” dated May 15, 2013, was prepared for Carriage Gate Homes by Landtek Limited.
2. “Updated Phase 1 Environmental Site Assessment 1093-1115 Fennell Avenue East and 570 & 580 Upper Ottawa Street Hamilton, Ontario” dated March 15, 2018, was prepared for Carriage Gate Homes by Landtek Limited.
3. “Draft Phase One Environmental Site Assessment – 570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, ON” dated October 20, 2020 by EXP Services Inc., for 2650494 Ontario Inc.

Tables

TABLE 1 - Areas of Potential Environmental Concern (APECs)

HAM-00802070-A0 - Phase Two Environmental Site Assessment

570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario

Area of Potential Environmental Concern (APEC)[1]	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)[2]	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern[3]	Media Potentially Impacted (Groundwater, soil and/or sediment)
APEC 1: Presence of imported fill material	Entire Site (excluding building footprint).	PCA#30 – Importation of Fill Material.	On-Site	Polycyclic Aromatic Hydrocarbons (PAHs) and Metals	Soil
APEC 2: Presence of USTs and gasoline service stations at 1110 Fennel Avenue East.	South portion of the Site	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks. PCA#52- Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	Off-Site	Petroleum Hydrocarbons (PHCs) and Benzene, Toluene, ethylbenzene and Xylenes (BTEX) and Volatile Organic Compounds (VOCs).	Groundwater
APEC 3: Former USTs and gasoline service stations at 1120 Fennel Avenue East.	Southeast boundary of the Site	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks. PCA#52- Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	Off-Site	Petroleum Hydrocarbons (PHCs) and Benzene, Toluene, ethylbenzene and Xylenes (BTEX) and Volatile Organic Compounds (VOCs).	Groundwater
APEC 4: Historic Dry Cleaning Operation at 1104 Fennell Avenue East.	South portion of the Site	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used).	Off-Site	Volatile Organic Compounds (VOCs).	Groundwater

Notes:

1. Area of Potential Environmental Concern means the area on, in or under a phase one study area where one or more contaminants are potentially present, as determined through the P One ESA, including through,
(a) identification of post or present uses on, in or under the phase one property, and
(b) identification of potentially contaminating activities.

2. Potentially contaminating activity means a use or activity set out in Column A of Table 2 of Schedule D that is occurring or has occurred in a phase one study area

3. When completing this column, identify all contaminants of potential concern using the Method Groups as identified in the "Protocol for in the Assessment of Properties under Part XV.1 of the Environmental Protection Act, March 9, 2004, amended as of July 1, 2011, as specified below:

ABNs	PCBs	PCBs	Metals	Electrical Conductivity	SAR
CPs	PAHs	PAHs	As, Sb, Se	Cr (VI)	
1,4- Dioxane	THMs	THMs	Na	Hg	
Dioxins/Furans, PCDDs/PCD	VOCs	VOCs	B-HWS	Methyl Mercury	
Ocs	BTEX	BTEX	Cl-	high pH	
PHCs	Ca, Mg	Ca, Mg	CN-	low pH	

4. When submitting a record of site condition for filing, a copy of this table must be attached

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TABLE 2 - Borehole Log Information

HAM-00802070-A0 - Phase Two Environmental Site Assessment

570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario

Location ID	Ground Elevation (m)	Depth of BH (m bgs)	Bottom Elevation (m bgs)	Date Drilled	Drilling Contractor
BH1	190.60	2.62	187.98	19-Oct-20	Elite Drilling Services
BH2	190.50	2.39	188.11	19-Oct-20	Elite Drilling Services
BH/MW3	190.80	5.64	185.16	30-Oct-20	Terra Firma Environmental Services Ltd.
BH4	190.00	1.98	188.02	19-Oct-20	Elite Drilling Services
BH/MW5	189.8	5.61	184.19	29-Oct-20	Terra Firma Environmental Services Ltd.
BH6	190.20	2.29	187.91	19-Oct-20	Elite Drilling Services
BH7	189.50	1.68	187.82	19-Oct-20	Elite Drilling Services
BH8	189.70	2.08	187.62	30-Oct-20	Terra Firma Environmental Services Ltd.
BH/MW9	189.70	5.49	184.21	29-Oct-20	Terra Firma Environmental Services Ltd.

Elevation based on temporary benchmark, elevation of 100 m, located at the slab on grade of Tim Hortons, northeast side of building

TABLE 3 - Summary of Soil Samples Submitted for Chemical Analysis

HAM-00802070-A0 - Phase Two Environmental Site Assessment

570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario

Soil Sample ID	Sample Depth Interval (m)	Rationale	Analysis
BH1 SS2	0.8-1.4	Assess soil quality associated with APEC 1	Metals
BH1 SS3	1.5-2.1	Assess soil quality associated with APEC 1	PHCs (F2-F4), PAHs
BH2 SS2	0.8-1.4	Assess soil quality associated with APEC 1	Metals
BH3 SS2	0.8-1.4		Metals, PAHs
BH4 SS2	0.8-1.4		Metals
BH4 SS3	1.5-2.1	Assess soil quality associated with APEC 3 and Regulatory Sample (>1.5m)	PHCs (F2-F4), pH
BH5 SS1	0.08-0.6	Assess soil quality associated with APEC 1 & 2	PHCs including BTEX
BH5 SS2	0.8-1.4		PHCs (F2-F4), Metals, PAHs
BH6 SS2	0.8-1.4	Assess soil quality associated with APEC 1	PAHs
BH6 SS3	1.5-2.1		Metals
BH7 SS2	0.8-1.4	Assess soil quality associated with APEC 1 and Regulatory Sample (<1.5m)	Metals, pH
BH8 SS2	0.8-1.4	Assess soil quality associated with APEC 1	Metals
BH9 SS1	0.07-0.6	Assess soil quality associated with APEC 1 & 3	PHCs including BTEx, Metals
BH9 SS2	0.8-1.4	Assess soil quality associated with APEC 1	PAHs
QA/QC Samples:			
BH6 SS33	1.5-2.1	Dup of BH6 SS3	Metals

PHC - Petroleum Hydrocarbons
BTEX - Benzene, Toluene, Ethylbenzene, Xylenes
PAH - Polycyclic Aromatic Hydrocarbons

TABLE 4 - Monitoring Well Installation Details

HAM-00802070-A0 - Phase Two Environmental Site Assessment

570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario

Location ID	Ground Elevation (masl)	Stickdown (m)	Top of Pipe Elevation (masl)	Measured Depth of MW (m bgs)	Screen Length (m)	Top of Screen (Measured)	Bottom of Screen (Measured)	Geologic Units Intercepted by Well Screen	Well Condition
BH/MW3	190.80	0.18	190.63	5.64	3.00	188.16	185.16	Limestone	Intact
BH/MW5	189.80	0.10	189.70	5.61	3.00	187.19	184.19	Limestone	Intact
BH/MW9	189.70	0.12	189.58	5.49	3.00	187.21	184.21	Limestone	Intact

Elevation based on temporary benchmark, elevation of 100 m, located at catch basin near the northwest driveway of the Site.

TABLE 5 - Summary of Groundwater Samples Submitted for Chemical Analysis

HAM-00802070-A0 - Phase Two Environmental Site Assessment

570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario

GW Sample ID	Sampling Date	Rationale	Analysis
MW5	10-Nov-20	Assess goundwater quality associated with APEC 2,3 & 4.	PHCs and VOCs
MW9	10-Nov-20		PHCs and VOCs
QA/QC Samples:			
MW55	10-Nov-20	Duplicate of MW5	PHCs and VOCs
TRIP BLANK	10-Nov-20	QA/QC	VOCs

PHC - Petroleum Hydrocarbons
VOC - Volatile Organic Compound

TABLE 6 - Water Level Depths and Elevations

HAM-00802070-A0 - Phase Two Environmental Site Assessment

570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario

Location ID	Ground Elevation (masl)	Stickdown (m)	Top of Pipe Elevation (masl)	Water Level Depth (m bg)	Water Level Depth (m asl)	Date
BH/MW3	190.80	0.18	190.63	-	-	30-Oct-20
				3.73	187.07	2-Nov-20
				-	-	10-Nov-20
BH/MW5	189.80	0.10	189.70	3.47	186.34	30-Oct-20
				4.03	185.77	2-Nov-20
				4.03	185.77	10-Nov-20
BH/MW9	189.70	0.12	189.58	4.10	185.61	30-Oct-20
				4.06	185.64	4-Nov-20
				4.09	185.62	10-Nov-20

TABLE 7 - Summary of Horizontal Hydraulic Gradients (Overburden)

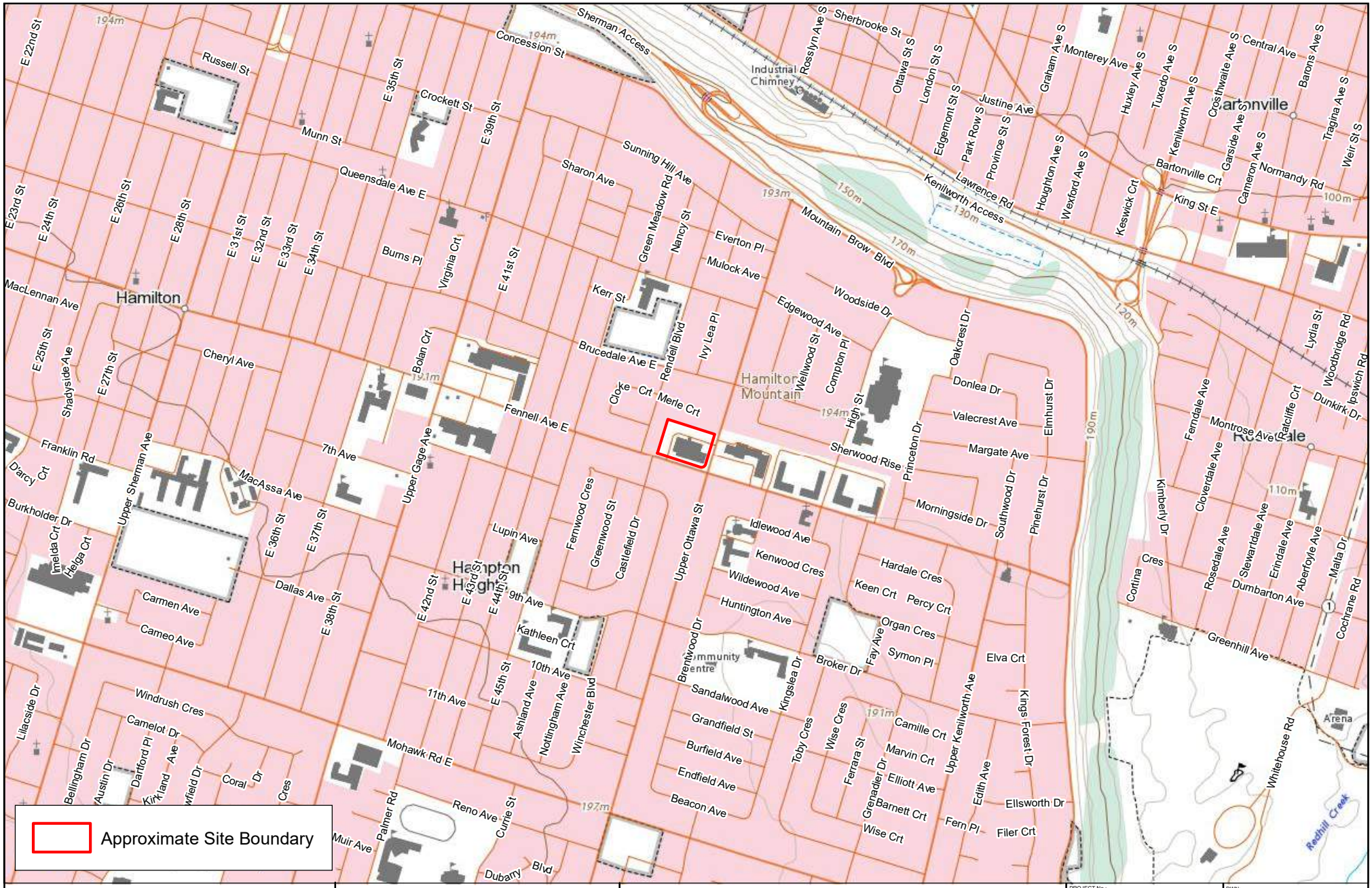
HAM-00802070-A0 - Phase Two Environmental Site Assessment

570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario

Well Pair	Separation Distance (m)	Groundwater Elevations (m)	Elevation Difference (m)	Hydraulic Gradient* (m/m)
MW3 MW5	94.9	187.07 185.77	1.30	0.014
MW5 MW9	35.0	185.77 185.62	0.16	0.004

*The horizontal hydraulic gradient between monitoring well pair is calculated from i = Δh/Δs, where I is the horizontal hydraulic gradient, Δh (m) is the groundwater elevation difference and Δs (m) is the distance apart.

Figures



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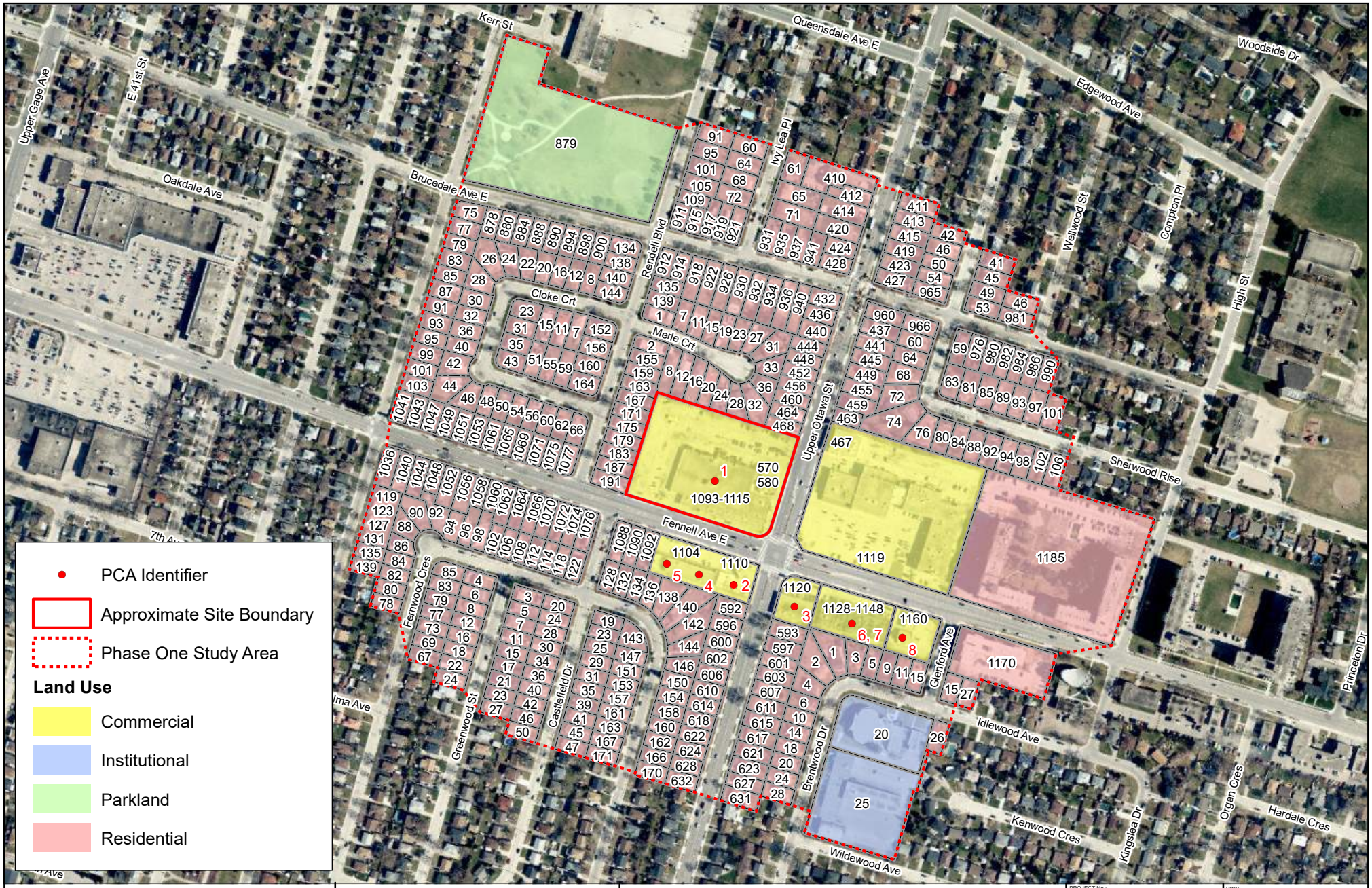
TITLE AND LOCATION:

SITE LOCATION PLAN
Phase Two Environmental Site Assessment
1093 - 1115 Fennell Avenue East and 570, 580 Upper Ottawa Street
Hamilton, Ontario

PROJECT No.: HAM-00802070-A0	DWN: AC
SCALE: AS NOTED	CHKD: SH
DATE: NOVEMBER 2020	FIG. No.: 1



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N

0 50 100 150 200 250 m

TITLE AND LOCATION:

PHASE ONE STUDY AREA, LAND USE PLAN,
AND POTENTIALLY CONTAMINATING ACTIVITIES (PCAs)
Phase Two Environmental Site Assessment
1093 - 1115 Fennell Avenue East and
570, 580 Upper Ottawa Street
Hamilton, Ontario

PROJECT No.: HAM-00802070-A0	DWN: AC
SCALE: AS NOTED	CHKD: SH
DATE: NOVEMBER 2020	FIG. No.: 2

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N

0 10 20 30 40 50 m

TITLE AND LOCATION:

SITE PLAN AND UTILITIES
Phase Two Environmental Site Assessment
1093 - 1115 Fennell Avenue East and 570, 580 Upper Ottawa Street Hamilton, Ontario

PROJECT No.:	DWN:
HAM-00802070-A0	AC
SCALE:	CHKD:
AS NOTED	SH
DATE:	FIG. No.:
NOVEMBER 2020	3

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N

0 10 20 30 40 50 m

TITLE AND LOCATION:

AREAS OF POTENTIAL
ENVIRONMENTAL CONCERN (APECs)
Phase Two Environmental Site Assessment
1093 - 1115 Fennell Avenue East and
570, 580 Upper Ottawa Street
Hamilton, Ontario

PROJECT No.: HAM-00802070-A0	DWN: AC
SCALE: AS NOTED	CHKD: SH
DATE: NOVEMBER 2020	FIG. No.: 4

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N

0 10 20 30 40 50 m

TITLE AND LOCATION:

BOREHOLE / MONITORING WELL
LOCATION PLAN
Phase Two Environmental Site Assessment
1093 - 1115 Fennell Avenue East and
570, 580 Upper Ottawa Street
Hamilton, Ontario

PROJECT No.: HAM-00802070-A0	DWN: AC
SCALE: AS NOTED	CHKD: SH
DATE: NOVEMBER 2020	FIG. No.: 5A

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N

0 10 20 30 40 50 m

TITLE AND LOCATION:

BOREHOLE / MONITORING WELL
LOCATION PLAN AND APECs
Phase Two Environmental Site Assessment
1093 - 1115 Fennell Avenue East and
570, 580 Upper Ottawa Street
Hamilton, Ontario

PROJECT No.: HAM-00802070-A0	DWN: AC
SCALE: AS NOTED	CHKD: SH
DATE: NOVEMBER 2020	FIG. No.: 5B

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N

0 10 20 30 40 50 m

TITLE AND LOCATION:

GROUNDWATER CONTOUR PLAN
Phase Two Environmental Site Assessment
1093 - 1115 Fennel Avenue East and 570, 580 Upper Ottawa Street
Hamilton, Ontario

PROJECT No.: HAM-00802070-A0	DWN: AC
SCALE: AS NOTED	CHKD: SH
DATE: NOVEMBER 2020	FIG. No.: 6

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N

0 10 20 30 40 50 m

TITLE AND LOCATION:

SOIL ANALYTICAL RESULTS -
PETROLEUM HYDROCARBONS (PHCs)
Phase Two Environmental Site Assessment
1093 - 1115 Fennell Avenue East and
570, 580 Upper Ottawa Street
Hamilton, Ontario

PROJECT No.: HAM-00802070-A0	DWN: AC
SCALE: AS NOTED	CHKD: SH
DATE: NOVEMBER 2020	FIG. No.: 7

Location	Sample ID
	Sample Date
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)

2011 MECP Table 3 SCS	
Zinc	340

BOLD Exceedance of MECP 2011 Table 3 SCS

- Sample Exceeds Table 3 SCS for Metals
- Sample Meets Table 3 SCS for Metals
- Approximate Site Boundary

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N

0 10 20 30 40 50 m

TITLE AND LOCATION:

SOIL ANALYTICAL RESULTS - METALS
Phase Two Environmental Site Assessment
1093 - 1115 Fennell Avenue East and
570, 580 Upper Ottawa Street
Hamilton, Ontario

PROJECT No.:	DWN:
HAM-00802070-A0	AC
SCALE:	CHKD:
AS NOTED	SH
DATE:	FIG. No.:
NOVEMBER 2020	8

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N

0 10 20 30 40 50 m

TITLE AND LOCATION:

SOIL ANALYTICAL RESULTS -
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)
Phase Two Environmental Site Assessment
1093 - 1115 Fennell Avenue East and
570, 580 Upper Ottawa Street
Hamilton, Ontario

PROJECT No.: HAM-00802070-A0	DWN: AC
SCALE: AS NOTED	CHKD: SH
DATE: NOVEMBER 2020	FIG. No.: 9

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N

0 10 20 30 40 50 m

TITLE AND LOCATION:

GROUNDWATER ANALYTICAL RESULTS - PETROLEUM HYDROCARBONS (PHCs)
Phase Two Environmental Site Assessment
1093 - 1115 Fennell Avenue East and
570, 580 Upper Ottawa Street
Hamilton, Ontario

PROJECT No.: HAM-00802070-A0	DWN: AC
SCALE: AS NOTED	CHKD: SH
DATE: NOVEMBER 2020	FIG. No.: 10

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N

0 10 20 30 40 50 m

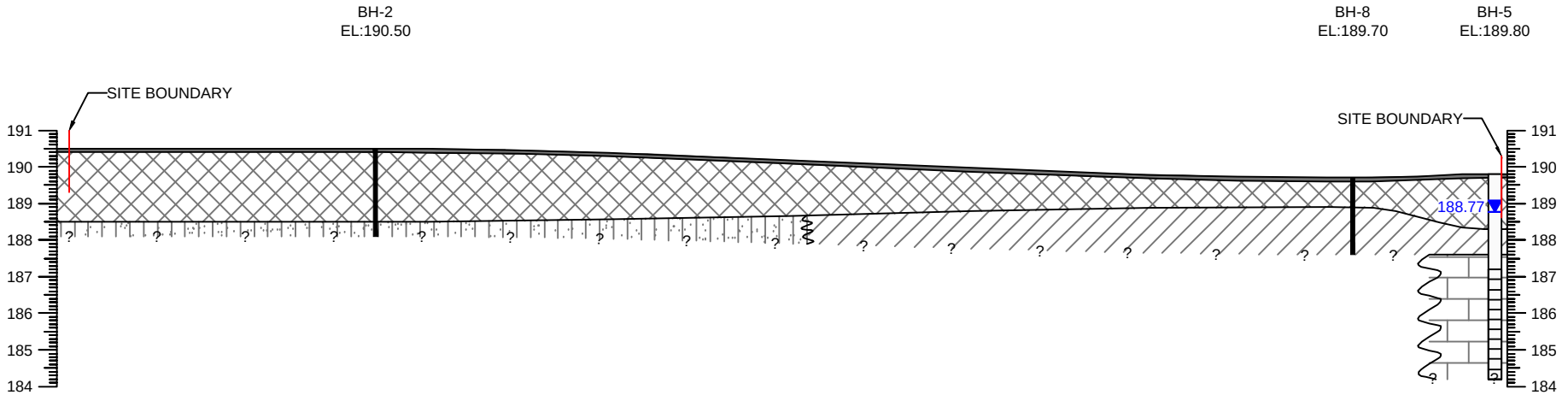
TITLE AND LOCATION:

GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)
Phase Two Environmental Site Assessment
1093 - 1115 Fennell Avenue East and
570, 580 Upper Ottawa Street
Hamilton, Ontario

PROJECT No.: HAM-00802070-A0	DWN: AC
SCALE: AS NOTED	CHKD: SH
DATE: NOVEMBER 2020	FIG. No.: 11

A
NORTH

A'
SOUTH



VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE:
0 5 10 15 20 25 m

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LEGEND:
- ASPHALT
- FILL
- SANDY CLAYEY SILT
- CLAYEY SILT / SILTY CLAY
- LIMESTONE

▼ GROUNDWATER ELEVATION (masl) AS MEASURED ON NOVEMBER 2 AND 10, 2020

TITLE AND LOCATION:
CROSS SECTION A-A'
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
1093-1115 FENNEL AVENUE EAST AND 570, 580 UPPER OTTAWA STREET
HAMILTON, ONTARIO

PROJECT NO.:	DWN.:
HAM-00802070-A0	JA
SCALE: AS NOTED	CK: SH
DATE: DECEMBER 2020	FIG. NO.: 12A

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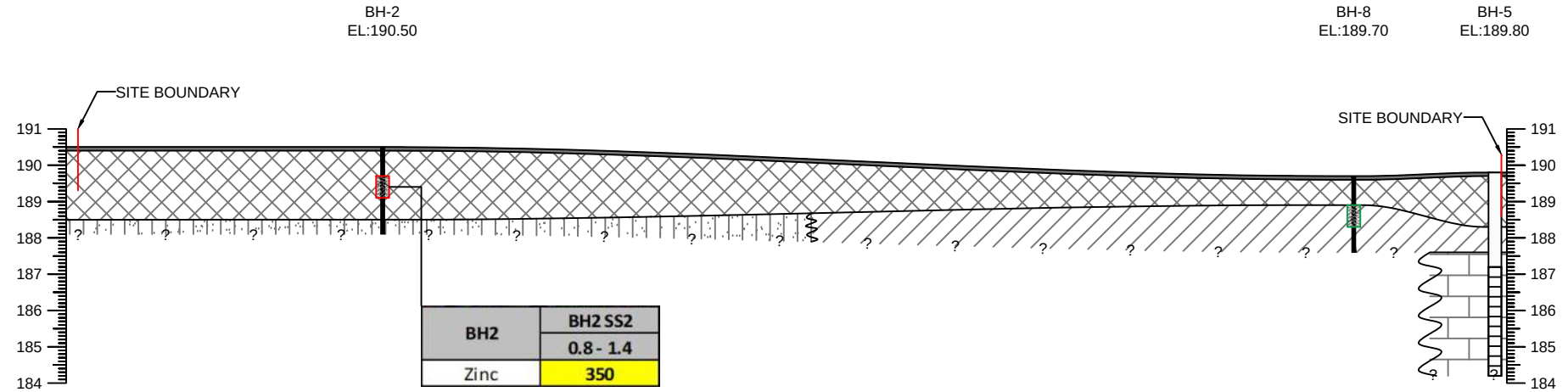
A
NORTH

A'
SOUTH



2011 MECP Table 3 SCS	
Parameter	Concentration (µg/g)
Zinc	340

Sample Location	Sample ID
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)

BOLD Exceedance of 2011 MECP Table 3 SCS

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE:

0 5 10 15 20 25 m

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LEGEND:

- ASPHALT
- FILL
- SANDY CLAYEY SILT
- CLAYEY SILT / SILTY CLAY
- LIMESTONE
- SAMPLE MEETS TABLE 3 SCS
- SAMPLE EXCEEDS TABLE 3 SCS

TITLE AND LOCATION:

CROSS SECTION A-A' -
METALS EXCEEDANCE IN SOIL
PHASE TWO ENVIRONMENTAL
SITE ASSESSMENT
1093-1115 FENNEL AVENUE EAST AND 570, 580
UPPER OTTAWA STREET
HAMILTON, ONTARIO

PROJECT NO.:	DWN.:
HAM-00802070-A0	JA
SCALE:	CK:
AS NOTED	SH
DATE:	FIG. NO.:
DECEMBER 2020	12B

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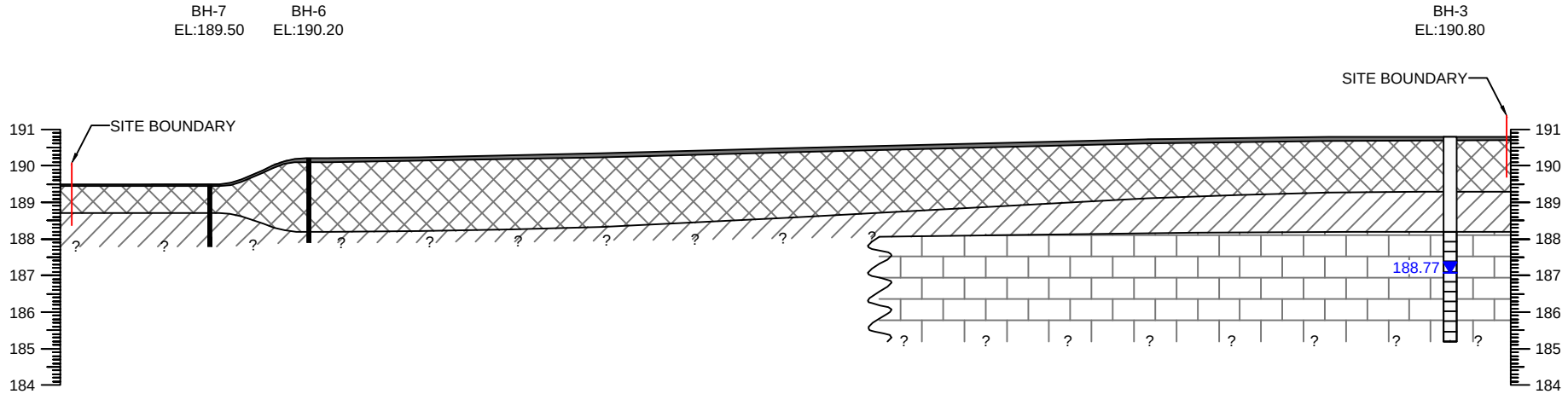
B
WEST

B'
EAST



VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE:

0 6 12 18 24 30 m

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LEGEND:

- ASPHALT
- FILL
- CLAYEY SILT / SILTY CLAY
- LIMESTONE
- GROUNDWATER ELEVATION (masl) AS MEASURED ON NOVEMBER 2 AND 10, 2020

TITLE AND LOCATION:

CROSS SECTION B-B'
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
1093-1115 FENNEL AVENUE EAST AND 570, 580 UPPER OTTAWA STREET
HAMILTON, ONTARIO

PROJECT NO.:	DWN.:
HAM-00802070-A0	JA
SCALE: AS NOTED	CK: SH
DATE: DECEMBER 2020	FIG. NO.: 13

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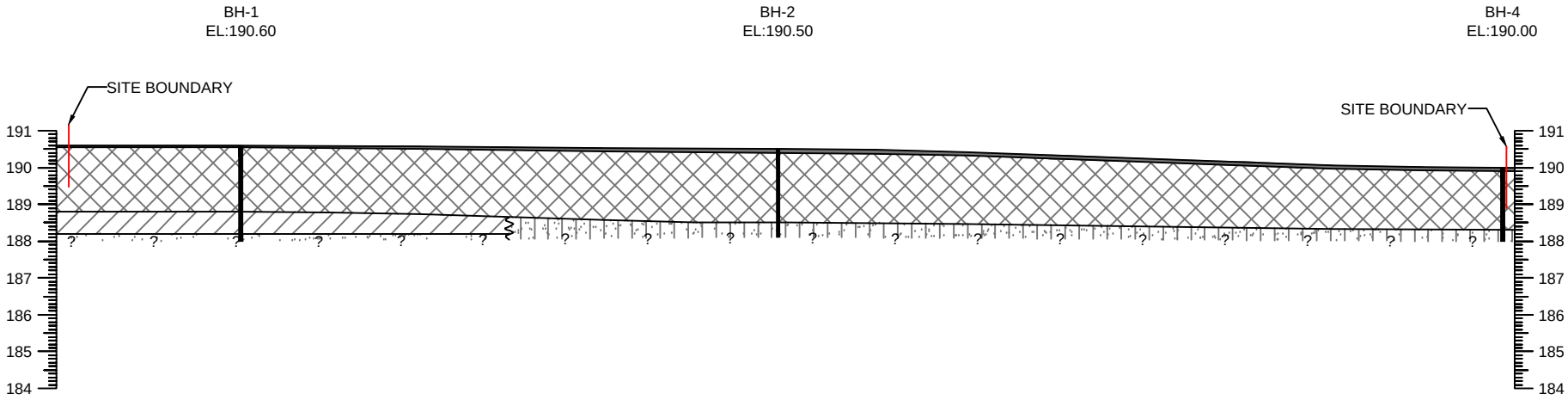
C
NORTHWEST

C'
SOUTHEAST



VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE:
0 6 12 18 24 30 m

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LEGEND:
- ASPHALT
- FILL
- SILTY CLAY
- SANDY CLAYEY SILT / SANDY SILT
- SILTY SAND

TITLE AND LOCATION:
CROSS SECTION C-C'
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
1093-1115 FENNEL AVENUE EAST AND 570, 580 UPPER OTTAWA STREET
HAMILTON, ONTARIO

PROJECT NO.:	DWN.:
HAM-00802070-A0	JA
SCALE: AS NOTED	CK: SH
DATE: DECEMBER 2020	FIG. NO.: 14A

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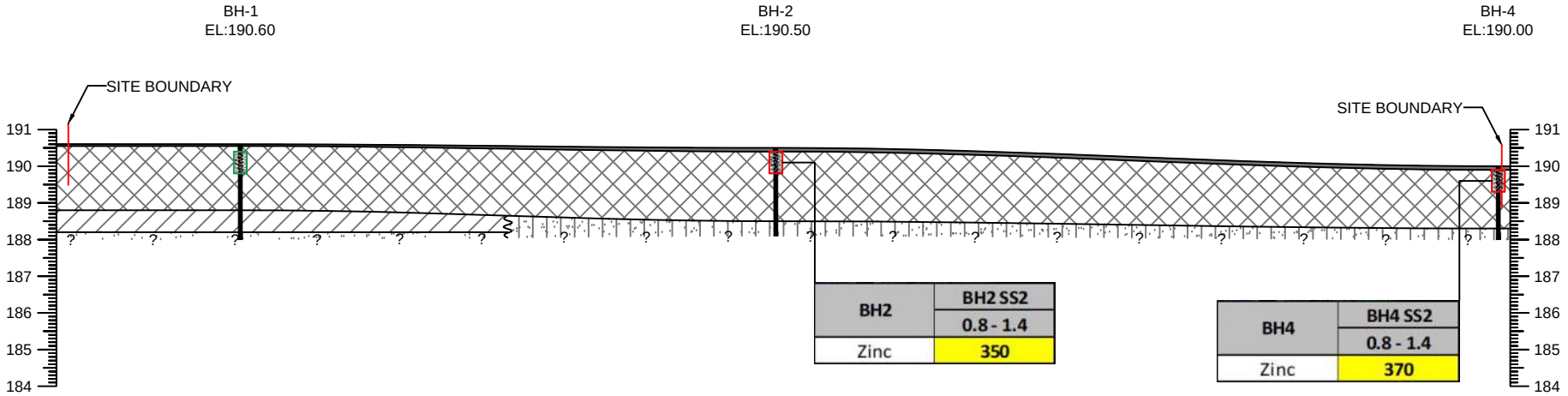
C
NORTHWEST

C'
SOUTHEAST



2011 MECP Table 3 SCS	
Parameter	Concentration (µg/g)
Zinc	340

Sample Location	Sample ID
	Sample Depth (m bgs)
Parameter	Sample Concentration (µg/g)

BOLD Exceedance of 2011 MECP Table 3 SCS

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE:

0 6 12 18 24 30 m

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LEGEND:

- ASPHALT
- FILL
- SILTY CLAY
- SANDY CLAYEY SILT / SANDY SILT
- SILTY SAND
- SAMPLE MEETS TABLE 3 SCS
- SAMPLE EXCEEDS TABLE 3 SCS

TITLE AND LOCATION:

CROSS SECTION C-C' - METALS EXCEEDANCE IN SOIL
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
1093-1115 FENNEL AVENUE EAST AND 570, 580 UPPER OTTAWA STREET
HAMILTON, ONTARIO

PROJECT NO.:	DWN.:
HAM-00802070-A0	JA
SCALE:	CK:
AS NOTED	SH
DATE:	FIG. NO.:
DECEMBER 2020	14B

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Appendix A – Sampling and Analysis Plan

Phase Two Environmental Site Assessment

1. Introduction

This Appendix presents the Sampling and Analysis Plan (SAAP) that was developed in support of the Phase Two Environmental Assessment Work (ESA) for the property located at, 570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario (hereinafter referred to as the 'Site'). The Phase Two ESA will be conducted to provide further characterization of the Site subsurface conditions and address the Areas of Potential Environmental Concerns (APECs) outlined in EXP October 2020 Phase One ESA to the subsequent filing of a Record of Site Condition (RSC) on the Ontario Ministry of the Environment, Conservation & Parks (MECP) Brownfields Environmental Site Registry, which might be required. The SAAP presents the procedures and measures that will be undertaken during field investigative activities to characterize the Site conditions and meet the data quality objectives of the Phase Two ESA.

The SAAP presents the sampling program proposed for the Site, the recommended procedures and protocols for sampling and related field activities, the data quality objectives, and the quality assurance/ quality control measures that will be undertaken to provide for the collection of accurate, reproducible and representative data.

2. Field Sampling Program

The field sampling program was developed to provide for the collection of samples of the surficial and subsurface soil materials for chemical analysis of petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene and xylenes (collectively known as 'BTEX') and Metals in soil and for the analysis of PHCs and VOCs in groundwater. The soil sampling media is to consist of the surface soils and upper overburden materials (depths up to 6.1 m below grade). The soil sampling will be location-specific to assess for the potential presence of PHCs, BTEX and Metals based on the identification of areas of potential environmental concern (APECs). Vapour readings will also be collected in the field to determine samples to be submitted for BTEX and PHC F1-F2 analysis. The soil sample intervals will extend from the surface up to a maximum depth of approximately 6.1 meters (m) below grade surface (bgs) or sample refusal.

The groundwater sampling will be location-specific to assess for the potential presence of PHCs and VOCs, based on the identification of APECs. The monitoring well network will comprise of three (3) newly installed wells.

Vertical control of the boreholes and monitoring wells will be obtained through the completion of an elevation survey with reference to a local structure with a known geodetic elevation. Groundwater flow and direction in the water table aquifer will also be determined through groundwater level measurements and the elevations established from the Site elevation survey.

3. Field Methods

To meet the requirements of the field sampling program, the following field investigative methods will be undertaken:

- Borehole Drilling;
- Soil Sampling;

- Monitoring Well Installation;
- Monitoring Well Development;
- Groundwater Level Measurements;
- Elevation Survey; and,
- Groundwater Sampling.

The field investigative methods will be performed following the procedures and protocols set out in EXP's standard operating procedures and are outlined below:

3.1 Borehole Drilling

Boreholes will be advanced at the Site to facilitate the collection of soil samples for chemical analysis and geologic characterization; and, for the installation of groundwater monitoring wells. A total of nine (9) boreholes are proposed to be advanced at the Site for the environmental investigation, up to a maximum depth of approximately 6.1 m below grade, to provide for the collection of samples of the surficial and overburden materials beneath the Site. The borehole locations will be selected to determine the presence or absence of impacts in the soils and the upper overburden groundwater and to address the APECs outlined in EXP October 2020 Phase One ESA Report.

Prior to borehole drilling, utility clearances will be obtained from public and private locators, as required. If any uncertainty regarding the location of a buried utility at a borehole location is encountered, hand augering or digging will be performed beforehand to confirm the location of the utility.

Where there is overlying asphalt or concrete, the overlying material will be mechanically cored to provide access to the underlying soil materials. The borehole drilling program will be conducted by a licensed driller under the oversight of EXP field staff. Auger flights will be cleaned prior to the commencement of drilling at each borehole location.

3.2 Soil Sampling

Soil samples will be collected for chemical analysis and geologic property characterization. The soil samples will be collected using 5 cm diameter, 61 cm long, split spoons and solid stem augers or a 5 cm diameter, 1.2 m long, duel tube sampling system with interior dedicated vinyl sampling tubes. Upon retrieval from the boreholes, the split spoons or vinyl sampling tubes will be placed on a flat surface and disassembled by drilling personnel to provide access of the recovered cores. Geologic and sampling details of the recovered cores will be logged and the samples will be assessed for the potential presence of non-aqueous phase liquids. Soil stratigraphy encountered in the boreholes will be texturally, visually and olfactory classified in the field and in the laboratory. Soil samples will be logged for colour, grain size, moisture content, density, structures, texture, staining, and field vapour readings. A Photo-ionization Detector (PID) or GastechtorTM will be utilized to screen the soil samples for Total Organic Vapour (TOV). Representative worst-case soil samples from each borehole will be collected and submitted to a certified laboratory for analysis based on TOV readings, sample depth, visual and/or olfactory field observations.

Recommended volumes of soil samples selected for chemical analysis will be collected into pre-cleaned laboratory-supplied glass sample jars/vials identified for the specified analytical test group. Samples intended for PHC/BTEX and VOCs will be collected using a laboratory-supplied soil core sampler, placed into the vials containing methanol for preservation purposes and sealed using Teflon lined septa lids. The samples will be placed into clean insulated coolers chilled with ice for storage and transport. The samples will be assigned unique identification numbers, and the date, time, location, and requested analyses for each sample will be documented in a bound field note book. The samples will be submitted to the contractual laboratory within analytical test group holding times under Chain of Custody protocols. New disposable chemical resistant gloves will be used for each soil core to prevent sample cross-contamination.

3.3 Monitoring Well Installation

A proposed total of three (3) boreholes will be instrumented as groundwater monitoring wells installed with 1.5 to 3 m long screens intercepting the native overburden material, where the shallow water table aquifer is expected, extending to depths of approximately 6.10 m below grade. The monitoring wells will be constructed using 51 mm diameter, Schedule 40, PVC riser pipe and number 10 slot size (0.25 mm) well screens. The base of the well screen will be sealed with threaded flush PVC end caps. All well pipe connections will be factory machined threaded flush couplings. The annular space around the well screen will be backfilled with silica sand, to an average height of 0.6 m above the top of the screen. Granular bentonite will be placed in the borehole annulus from the top of the sand pack to approximately 0.3 m below grade. The monitoring well will be completed with monument protective steel casings cemented into place.

3.4 Monitoring Well Development

The newly installed monitoring wells will be developed to remove fine sediment particles potentially lodged in the sand pack and well screen to enhance hydraulic communication with the surrounding formation waters. The monitoring wells will be developed using a dedicated low-density polyethylene (LDPE) tubing, equipped with an inertial foot valve to disturb the water column. The wells will be developed until approximately 3 to 5 well volumes of water will be removed and/or until purged dry. Well development details will be documented on a well development log sheet or in a bound hard cover notebook. All development waters will be collected and stored in labeled, sealed containers.

3.5 Groundwater Level Measurements

Groundwater level measurement will be recorded for the newly installed monitoring well to determine the depth of the water table aquifer beneath the Site. The water level will be measured with respect to the top of the PVC riser pipe by means of an electronic water level meter. The water levels will be recorded on water level log sheets or in a bound field notebook. The water level meter probe will be decontaminated between monitoring well locations.

3.6 Elevation Survey

An elevation survey will be conducted to obtain vertical control of the newly installed monitoring well location and boreholes. The top of the PVC riser pipe of the monitoring well and ground surface elevation of the monitoring well and borehole locations will be surveyed against an geodetic benchmark, or if unavailable, against a suitable arbitrary benchmark. Elevations measured against a geodetic/arbitrary benchmark will be recorded as meters above mean sea level (m AMSL). The elevation survey will be accurate to within ± 0.3 cm.

3.7 Field Measurements of Water Quality Parameters

Prior to collecting the groundwater sample, field measurements of water quality parameters will be recorded from the monitoring wells utilizing low-flow purging and sampling methodologies. Groundwater will be purged from the monitoring wells using a peristaltic pump and dedicated LDPE tubing. Field measurements of dissolved oxygen concentration, electrical conductivity, oxidation-reduction potential, pH, temperature, turbidity and water levels will be recorded in three (3) minute intervals during the purging activities using a pre-calibrated multi probe water quality meter, a turbidity meter and a water level meter. Generally well purging will continued until the purged water has chemically stabilized as indicated by field parameter measurements and the well head drawdown is maintained within 10 cm for 3 consecutive readings. In the event that the parameters do not stabilize or the well head drawdown is too significant, the groundwater is to recover to approximately 75% of static levels before sampling.

The multi-meter electrodes will be calibrated prior to receipt of the meter by the supplier using in-house pH and conductivity reference standards. All collected purged water will be stored on-Site in labeled, sealed containers. Equipment used during groundwater monitoring will be thoroughly cleaned and decontaminated between wells.

3.8 Groundwater Sampling

Upon completion the field measurements of water quality parameters, groundwater samples will be collected for chemical analysis using the peristaltic pump and dedicated LDPE tubing. Recommended groundwater sample volumes will be collected into pre-clean laboratory-supplied vials or bottles provided with analytical test group specific preservatives, as required. The samples will be placed in an insulated cooler chilled with ice for storage and transport. Samples for BTEX and VOC analysis will be collected in triplicate vials prepared with concentrated hydrochloric acid or an acceptable substitute as a preservative. Each vial will be inverted and inspected for gas bubbles prior to being placed in the cooler to ensure that no head-space is present.

The groundwater sample will be assigned a unique identification number, and the date, time, project number, company name, location and requested analyses will be documented in a bound hard cover notebook. The sample will be submitted to the contractual laboratory within analytical test group holding times under chain of custody protocols. New disposable chemical resistant gloves will be used for each sampling location to prevent sample cross-contamination.

4. Field Quality Assurance/Quality Control Program

The objective of the field quality assurance/quality control (QA/QC) program is to obtain soil and groundwater samples and other field measurements that provide data of acceptable quality that meets the objectives of the Phase Two ESA. The objectives of the QA/QC program will be achieved through the implementation of procedures for the collection of unbiased (i.e. non-contaminated) samples, sample documentation and the collection of appropriate QC samples to provide a measure of sample reproducibility and accuracy. The field QA/QC measures will comprise:

- Decontamination Protocols;
- Equipment Calibration;
- Sample Preservation;
- Sample Documentation; and,
- Field Quality Control Samples.

Details on the field QA/QC measures are provided below.

4.1 Decontamination Protocols

Decontamination protocols will be followed during field sampling where non-dedicated sampling equipment is used to prevent sample cross contamination. For the borehole drilling and soil sampling, soil sampling devices will be cleaned/decontaminated between sampling intervals and auger flights between borehole locations in according with SOP requirements. For the monitoring well installation, well components are not to come into contact with the ground surface prior to insertion into boreholes. Electronic water level meters will be decontaminated between monitoring well locations during well development, and purging activities. For hydraulic conductivity tests, the electronic water level meters will be decontaminated between sampling locations. All decontamination fluids will be collected and stored in sealed, labeled containers.

4.2 Equipment Calibration

All equipment requiring calibration will be calibrated in the field according to manufacturer's requirements using analytical grade reagents, or by the supplier prior to conducting field activities, and subsequently checked in the field. The calibration of all pre-calibrated instruments will be checked in the field using analytical grade reagents and re-calibrated as required. For multiple day sampling events, equipment calibration will be checked prior to the beginning of sampling activities. All calibration data will be documented in a bound hard cover notebook.

4.3 Sample Preservation

All samples will be preserved using appropriate analytical test group specific reagents, as required, and upon collection placed in pre-chilled insulated coolers packed with ice for storage and transport.

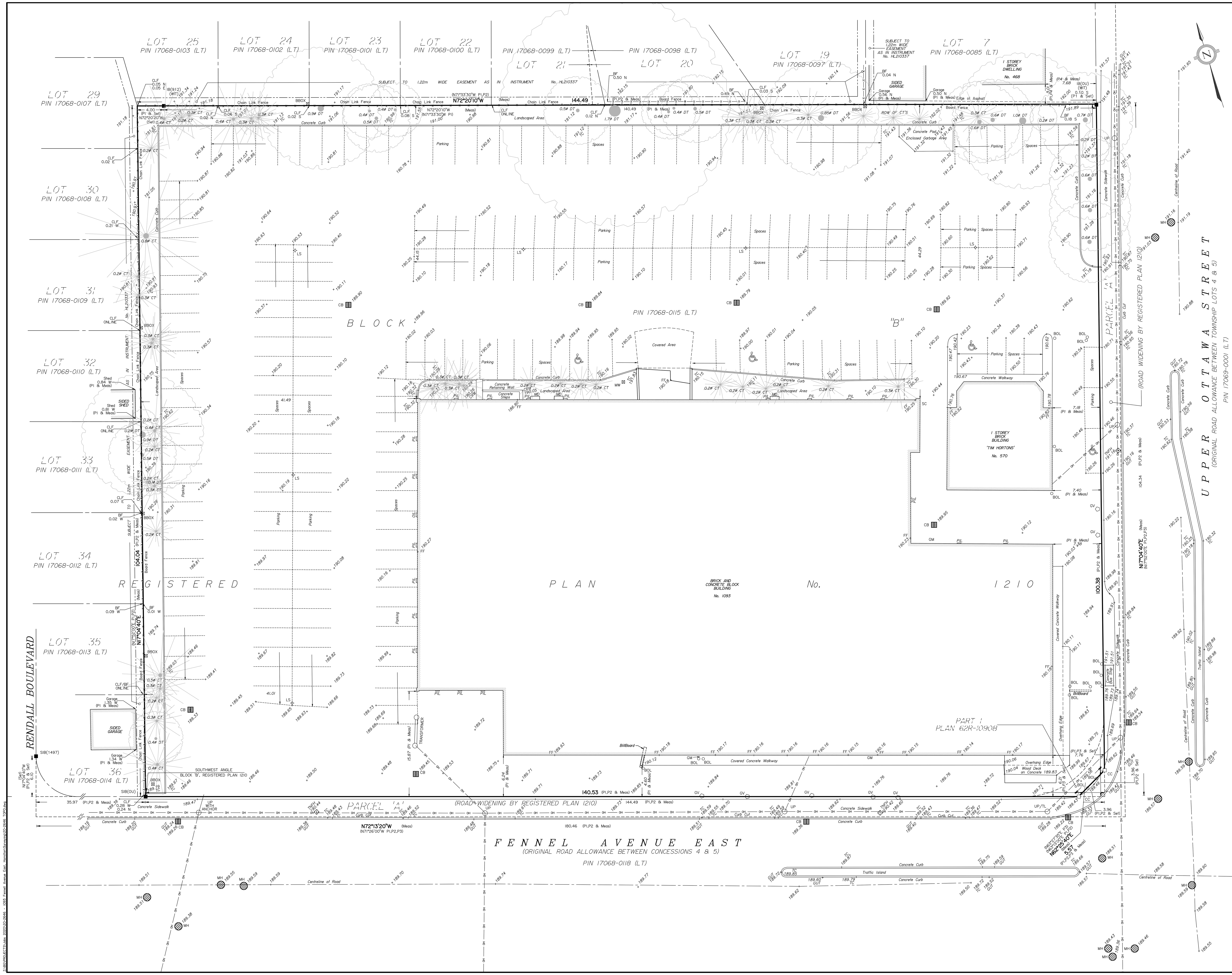
4.4 Sample Documentation

All samples will be assigned a unique identification number, which is to be recorded along with the date, time, project number, company name, location and requested analysis in a bound field notebook. All samples will be handled and transported following COC protocols.

4.5 Field Quality Control

Field quality control samples will be collected to evaluate the accuracy and reproducibility of the field sampling procedures. For groundwater sampling, one (1) field duplicate is to be collected for every ten (10) samples submitted for chemical analysis. For multiple day sampling events, at least one (1) field duplicate soil and groundwater sample will be submitted for chemical analysis. The field duplicate samples will be assessed by calculating the relative percent difference and comparing to the analytical test group specific acceptance criteria.

Appendix B – Survey Plan



TOPOGRAPHIC PLAN OF

BLOCK 'B' REGISTERED PLAN 1210 IN THE CITY OF HAMILTON

SCALE & NOTES

Scale 1:250

5 0 5 10 15 METRES

BARICH GRENKIE SURVEYING LTD.
A DIVISION OF GEOMAPLE

METRIC

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

ELEVATION NOTE

ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD–1928:1978) AND ARE DERIVED FROM CITY OF HAMILTON BENCHMARK No. 0011965U098 HAVING AN ELEVATION OF 191.445 m.

BEARING NOTE

BEARINGS ARE UTM GRID, REFERRED TO THE CENTRAL MERIDIAN OF UTM ZONE 17 (81° 00' WEST LONGITUDE) NAD83 (CSRS) (2010.0).

HORIZONTAL DATUM NOTE

PROJECTION: UNIVERSAL TRANSVERSE MERCATOR (UTM, ZONE 17, CM 81°00'W)

DATUM: NAD83 (CSRS)(2010.0)

GRID SCALE CONVERSION

DISTANCES ON THIS PLAN MAY BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY A COMBINED SCALE FACTOR OF 0.999681.

NOTE

BEARING COMPARISONS SHOWN ARE WITH ASTRONOMIC BEARINGS ON UNDERLYING PLANS.

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT PLANTED
IB	DENOTES	IRON BAR
SIB	DENOTES	STANDARD IRON BAR
CC	DENOTES	CUT CROSS
OU	DENOTES	ORIGIN UNKNOWN
1497	DENOTES	J. P. NOUWENS, O.L.S.
912	DENOTES	A. J. CLARKE, O.L.S.
P1	DENOTES	PLAN BY A. J CLARKE AND ASSOCIATES LTD. DATED AUGUST 16, 2013
P2	DENOTES	REGISTERED PLAN 1210
P3	DENOTES	PLAN 62R–10908
P4	DENOTES	PLAN BY A. J CLARKE AND ASSOCIATES LTD. DATED JULY 22, 1963
MH	DENOTES	MANHOLE
CB	DENOTES	CATCHBASIN
LS	DENOTES	LIGHT STANDARD
TC	DENOTES	TOP OF CURB ELEVATION
OH	DENOTES	OVERHEAD UTILITY CABLES
DT	DENOTES	DECIDUOUS TREE
CT	DENOTES	CONIFEROUS TREE
FF	DENOTES	FINISHED FLOOR ELEVATION
TNFH	DENOTES	TOP NUT OF FIRE HYDRANT
GUT	DENOTES	GUTTER ELEVATION
UP	DENOTES	UTILITY POLE
BBOX	DENOTES	BELL BOX
BOL	DENOTES	BOLLARD
GV	DENOTES	GAS VALVE
TL	DENOTES	TRAFFIC LIGHT
SC	DENOTES	SIAMESE CONNECTION
CRW	DENOTES	CONCRETE RETAINING WALL
CLF	DENOTES	CHAIN LINK FENCE
BF	DENOTES	BOARD FENCE
PIL	DENOTES	PILLAR
MD	DENOTES	METAL DUCT
GM	DENOTES	GAS METER
WIT	DENOTES	WITNESS
ø	DENOTES	DIAMETER

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2100862
THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR
In accordance with Regulation 1026, Section 29(3)

THIS PLAN WAS PREPARED FOR ELITE M. D. DEVELOPMENTS AND THE UNDERSIGNED ASSUMES NO RESPONSIBILITY FOR USE BY OTHER PARTIES.

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 MAY 19, 2020.

MAY 21, 2020

MATTHEW DI COSMO
ONTARIO LAND SURVEYOR

Barich Grenkie Surveying Ltd.
297 HWY No. 8 (UNIT 101) - STONEY CREEK, ON
L8G 1E5 (905) 662-6767
A DIVISION OF GEOMAPLE

DWN BY: EWA
CHK BY: MD
JOB No. 20–2646

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Appendix C – Borehole Logs

Log of Borehole BH-1

Project No. HAM-00802070-A0 Drawing No. 1

Project: Phase Two ESA Sheet No. 1 of 1

Location: 570 Upper Ottawa Street, Hamilton

Please refer to the borehole location plan

Date Drilled: October 19, 2020

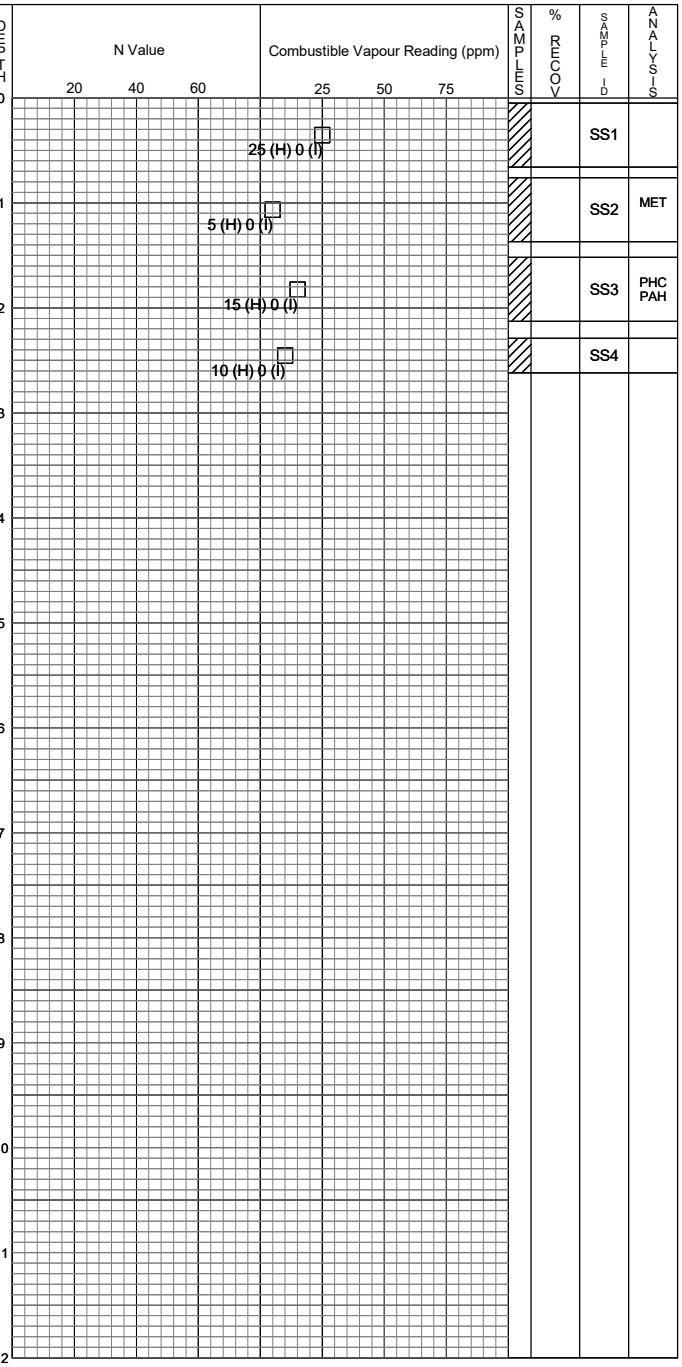
Drill Type: D-50 Track Mount. Solid Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			190.60	0
		ASPHALT: (~50 mm thick)	~190.6	
		GRANULAR FILL: (~250 mm thick)	~190.3	
		FILL: silty clay, trace sand and gravel, dark brown to black, moist		
		some gravel, brown below 0.8 m		1
		125 mm thick layer of black, organic silty clay at 1.7 m	~188.8	2
		SILTY CLAY: trace sand, brown to grey, moist, very stiff	~188.2	
		SILTY SAND: brown, wet, compact	~188.0	
		Borehole terminated at 2.62 m depth on assumed bedrock.		3
		NOTES:		4
		1) This drawing is to be read with the subject report.		5
		2) Vapour readings measured using a Eagle 2 calibrated with hexane (H) and isobutylene (I).		6
				7
				8
				9
				10
				11
				12



SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
		SS1	
		SS2	MET
		SS3	PHC PAH
		SS4	

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exp Services Inc.
Hamilton, Ontario
Telephone: 905-573-4000
Facsimile: 905-573-9693

Time	Water Level (m)	Depth to Cave (m)
October 19, 2020	Dry	

Log of Borehole BH-2

Project No. HAM-00802070-A0 Drawing No. 2

Project: Phase Two ESA Sheet No. 1 of 1

Location: 570 Upper Ottawa Street, Hamilton

Please refer to the borehole location plan

Date Drilled: October 19, 2020

Drill Type: D-50 Track Mount. Solid Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value (20, 40, 60)	Combustible Vapour Reading (ppm) (25, 50, 75)	SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
			190.50	0						
		ASPHALT: (~75 mm thick)	~190.4							
		GRANULAR FILL: (~200 mm thick)	~190.2							
		FILL: silty clay, trace sand, some gravel, dark grey, moist some black staining below 0.8 m		1		15 (H) 0 (I)				MET
		black organic silty clay below 1.5 m								
			~188.5	2		10 (H) 0 (I)				
		SANDY CLAYEY SILT: brown to grey, very moist, loose/firm	~188.1			10 (H) 0 (I)				
		Borehole terminated at 2.39 m depth on assumed bedrock.		3						
		NOTES: 1) This drawing is to be read with the subject report. 2) Vapour readings measured using a Eagle 2 calibrated with hexane (H) and isobutylene (I).		4						
				5						
				6						
				7						
				8						
				9						
				10						
				11						
				12						

ENV_EXP_HAM_UPPER OTTAWA BH LOGS.GPJ 11/24/20

Time	Water Level (m)	Depth to Cave (m)
October 19, 2020	Dry	

exp Services Inc.
Hamilton, Ontario
Telephone: 905-573-4000
Facsimile: 905-573-9693

Log of Borehole BH/MW-3

Project No. HAM-00802070-A0 | Drawing No. 3

Project: Phase Two ESA | Sheet No. 1 of 1

Location: 570 Upper Ottawa Street, Hamilton

Please refer to the borehole location plan

Date Drilled: October 30, 2020

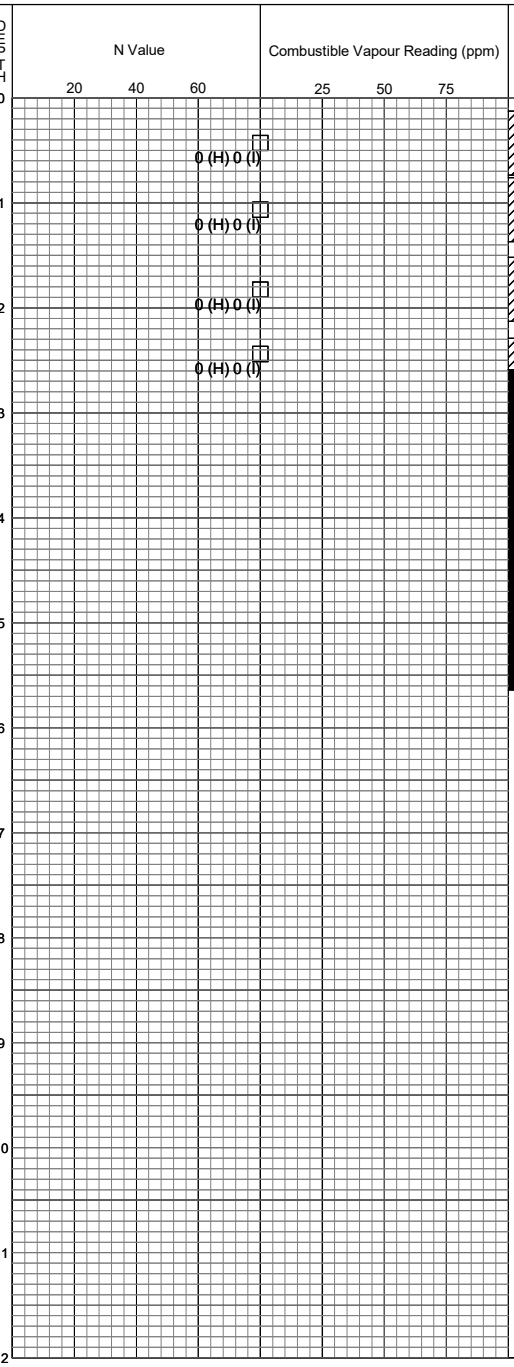
Drill Type: CME 75 Truck Mount. Hollow Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			190.80	0
		ASPHALT: (~125 mm thick)	~190.7	
		GRANULAR FILL: (~110 mm thick)	~190.6	
		FILL: silty clay, trace sand and gravel, greyish brown, black organic staining and odour brown below 0.8 m		1
			~189.3	
		SILTY CLAY: trace sand and gravel, brown, moist, hard limestone inclusions below 2.3 m		2
			~188.2	
		LIMESTONE: RUN 1 (2.59 - 4.04 m): Recovery = 93% RQD = 58% (fair quality)	~187.1	3
		RUN 2 (4.04 - 5.64 m): Recovery = 100% RQD = 81% (good quality)		4
				5
			~185.2	6
		Borehole terminated at 5.64 m depth.		7
		NOTES: 1) This drawing is to be read with the subject report. 2) Vapour readings measured using a Eagle 2 calibrated with hexane (H) and isobutylene (I). 3) 50 mm well installed. 4) Screen depth: 2.59 m - 5.64 m bgs		8
				9
				10
				11
				12



SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
			MET PAH

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exp Services Inc.
Hamilton, Ontario
Telephone: 905-573-4000
Facsimile: 905-573-9693

Time	Water Level (m)	Depth to Cave (m)
October 30, 2020	Dry	
November 2, 2020	3.730	

Log of Borehole BH-4

Project No. HAM-00802070-A0 Drawing No. 4

Project: Phase Two ESA Sheet No. 1 of 1

Location: 570 Upper Ottawa Street, Hamilton

Please refer to the borehole location plan

Date Drilled: October 19, 2020

Drill Type: D-50 Track Mount. Solid Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			190.00	0
		ASPHALT: (~75 mm thick)	~189.9	
		GRANULAR FILL: (~200 mm thick)	~189.7	
		FILL: clayey silt, some sand and gravel, brown, wet		1
		black, organic silty clay below 1.1 m		
			~188.3	2
		SANDY SILT: grey, very moist, loose	~188.0	
		Borehole terminated at 1.98 m depth on assumed bedrock.		3
		NOTES: 1) This drawing is to be read with the subject report. 2) Vapour readings measured using a Eagle 2 calibrated with hexane (H) and isobutylene (I).		4
				5
				6
				7
				8
				9
				10
				11
				12

N Value: 20, 40, 60

Combustible Vapour Reading (ppm): 25, 50, 75

0 (H) 0 (I)

0 (H) 0 (I)

0 (H) 0 (I)

SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
			MET
			PHC pH Grain Size

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Time	Water Level (m)	Depth to Cave (m)
October 19, 2020	1.2	

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Facsimile: 905-573-9693

Log of Borehole BH/MW-5

Project No. HAM-00802070-A0 Drawing No. 5

Project: Phase Two ESA Sheet No. 1 of 1

Location: 570 Upper Ottawa Street, Hamilton

Please refer to the borehole location plan

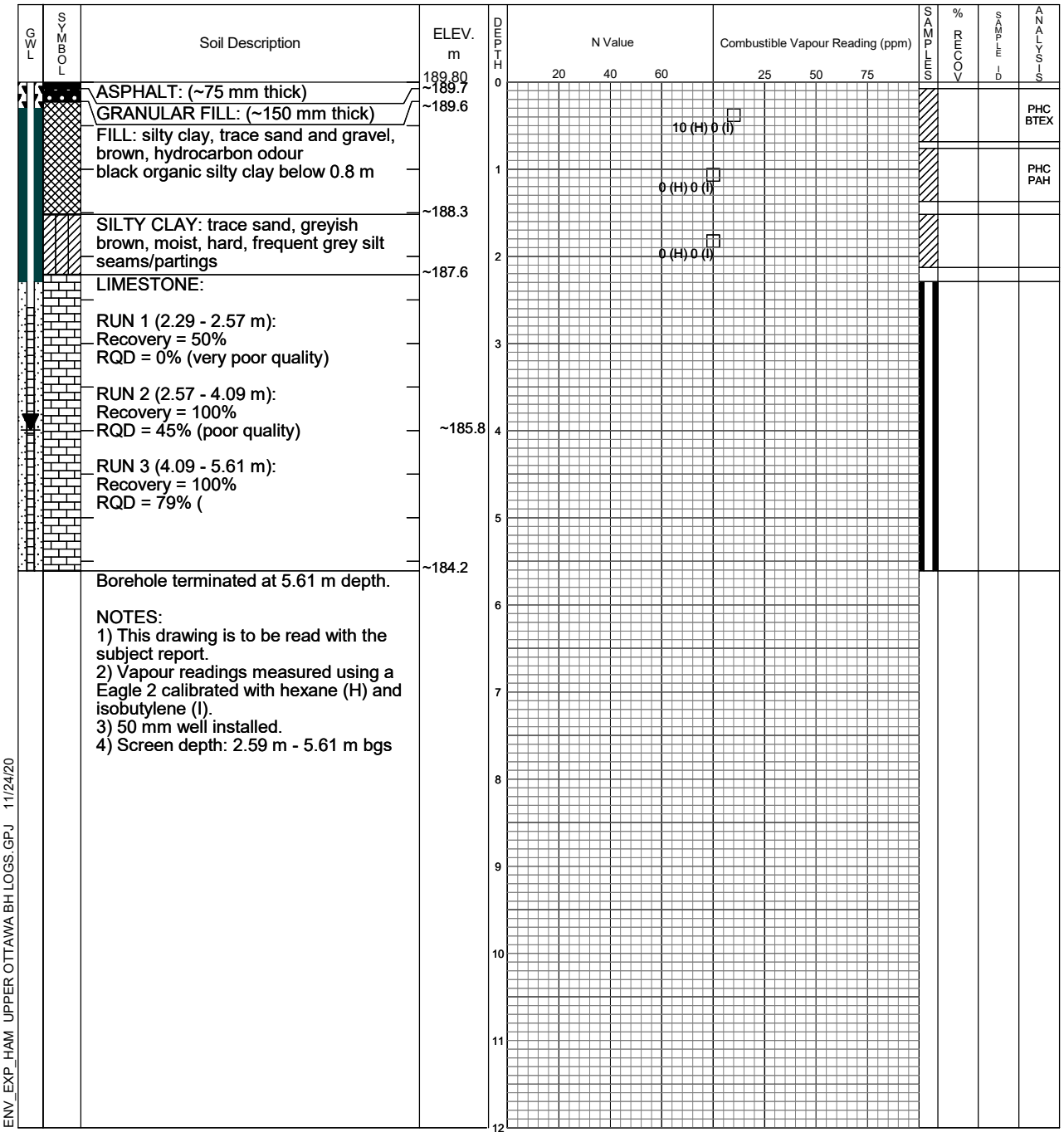
Date Drilled: October 29, 2020

Drill Type: CME 75 Truck Mount. Hollow Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		



ENV_EXP_HAM_UPPER OTTAWA BH LOGS.GPJ 11/24/20

Time	Water Level (m)	Depth to Cave (m)
October 29, 2020	Dry	
October 30, 2020	3.465	
November 2, 2020	4.030	
November 10, 2020	4.030	

exp Services Inc.
Hamilton, Ontario
Telephone: 905-573-4000
Facsimile: 905-573-9693

Log of Borehole BH-6

Project No. HAM-00802070-A0 | Drawing No. 6

Project: Phase Two ESA | Sheet No. 1 of 1

Location: 570 Upper Ottawa Street, Hamilton

Please refer to the borehole location plan

Date Drilled: October 19, 2020

Drill Type: D-50 Track Mount. Solid Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			190.20	0
		ASPHALT: (~75 mm thick)	~190.1	
		GRANULAR FILL: (~200 mm thick)	~189.9	
		FILL: silty clay, some sand and gravel, brown to grey, moist		1
		black organic silty clay below 1.5 m		
			~188.2	2
		CLAYEY SILT: some sand, grey to brown, moist, layer of grey sandy silt, loose/firm	~187.9	
		Borehole terminated at 2.29 m depth on assumed bedrock.		3
		NOTES: 1) This drawing is to be read with the subject report. 2) Vapour readings measured using a Eagle 2 calibrated with hexane (H) and isobutylene (I).		4
				5
				6
				7
				8
				9
				10
				11
				12

N Value: 20, 40, 60

Combustible Vapour Reading (ppm): 25, 50, 75

0 (H) 1 (I)

0 (H) 0 (I)

0 (H) 1 (I)

SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
			PAH
			MET*

ENV_EXP_HAM_UPPER OTTAWA BH LOGS.GPJ 11/24/20

Time	Water Level (m)	Depth to Cave (m)
October 19, 2020	Dry	

exp Services Inc.
Hamilton, Ontario
Telephone: 905-573-4000
Facsimile: 905-573-9693

Log of Borehole BH-7

Project No. HAM-00802070-A0 Drawing No. 7

Project: Phase Two ESA Sheet No. 1 of 1

Location: 570 Upper Ottawa Street, Hamilton

Please refer to the borehole location plan

Date Drilled: October 19, 2020

Drill Type: D-50 Track Mount. Solid Stem

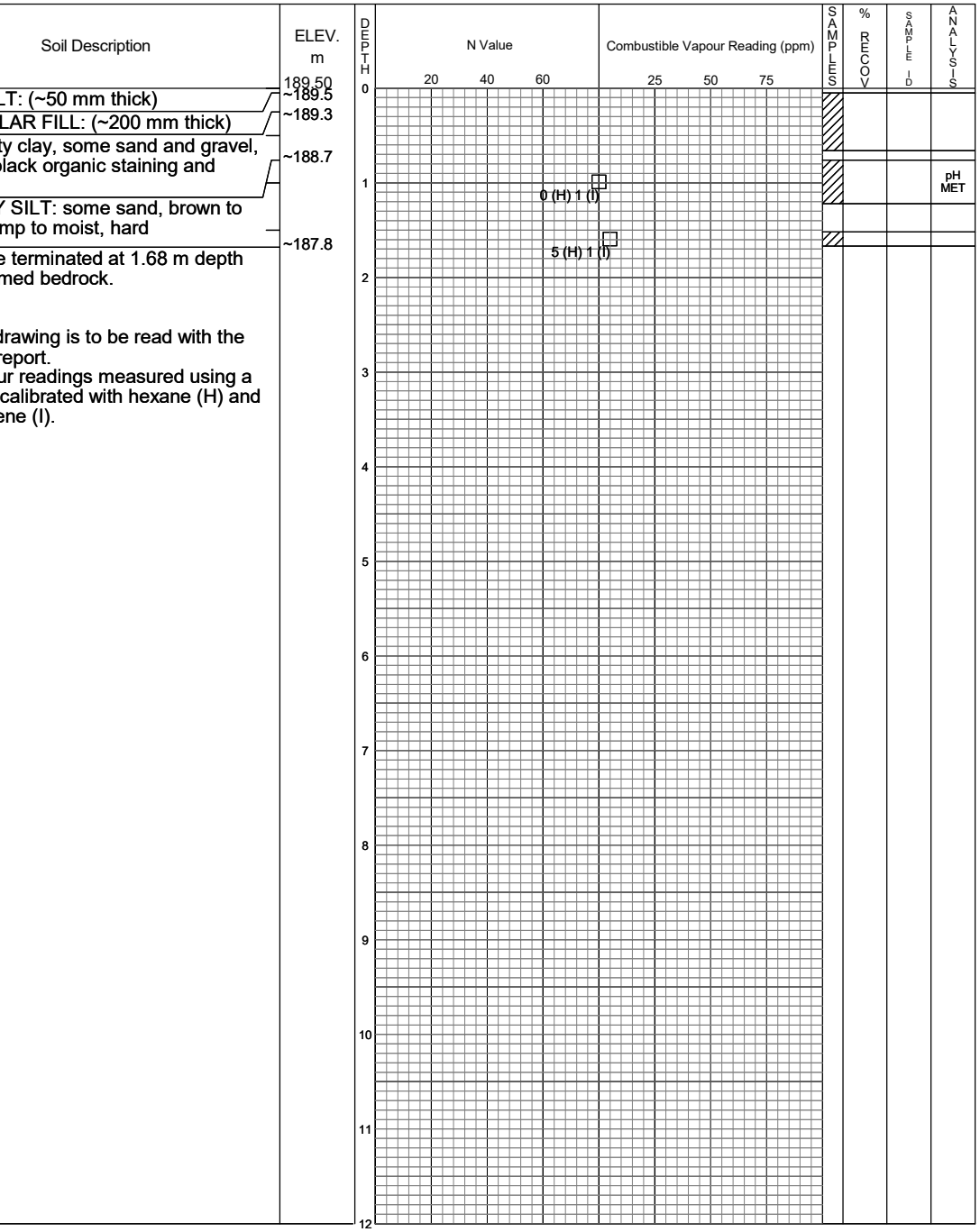
Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m
			189.50
		ASPHALT: (~50 mm thick)	~189.5
		GRANULAR FILL: (~200 mm thick)	~189.3
		FILL: silty clay, some sand and gravel, brown, black organic staining and odour	~188.7
		CLAYEY SILT: some sand, brown to grey, damp to moist, hard	~187.8
		Borehole terminated at 1.68 m depth on assumed bedrock.	

NOTES:
1) This drawing is to be read with the subject report.
2) Vapour readings measured using a Eagle 2 calibrated with hexane (H) and isobutylene (I).



ENV_EXP_HAM_UPPER OTTAWA BH LOGS.GPJ 11/24/20

Time	Water Level (m)	Depth to Cave (m)
October 19, 2020	Dry	

exp Services Inc.
Hamilton, Ontario
Telephone: 905-573-4000
Facsimile: 905-573-9693

Log of Borehole BH-8

Project No. HAM-00802070-A0 Drawing No. 8

Project: Phase Two ESA Sheet No. 1 of 1

Location: 570 Upper Ottawa Street, Hamilton

Please refer to the borehole location plan

Date Drilled: October 30, 2020

Drill Type: CME 75 Truck Mount. Solid Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			189.70	0
		ASPHALT: (~100 mm thick)	~189.6	
		GRANULAR FILL: (~150 mm thick)	~189.5	
		FILL: silty clay, trace sand and gravel, grey, moist	~188.9	1
		CLAYEY SILT: trace sand, trace to some gravel, brown, moist		
		limestone inclusions below 1.5 m		2
			~187.6	
		Borehole terminated at 2.08 m depth on assumed bedrock.		3
		NOTES: 1) This drawing is to be read with the subject report. 2) Vapour readings measured using a Eagle 2 calibrated with hexane (H) and isobutylene (I).		4
				5
				6
				7
				8
				9
				10
				11
				12

N Value: 20, 40, 60

Combustible Vapour Reading (ppm): 25, 50, 75

0 (H) 0 (I)

0 (H) 0 (I)

0 (H) 0 (I)

SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
			MET

ENV_EXP_HAM_UPPER OTTAWA BH LOGS.GPJ 11/24/20

Time	Water Level (m)	Depth to Cave (m)
October 30, 2020	Dry	

exp Services Inc.
Hamilton, Ontario
Telephone: 905-573-4000
Facsimile: 905-573-9693

Log of Borehole BH/MW-9

Project No. HAM-00802070-A0 Drawing No. 9

Project: Phase Two ESA Sheet No. 1 of 1

Location: 570 Upper Ottawa Street, Hamilton

Please refer to the borehole location plan

Date Drilled: October 29, 2020

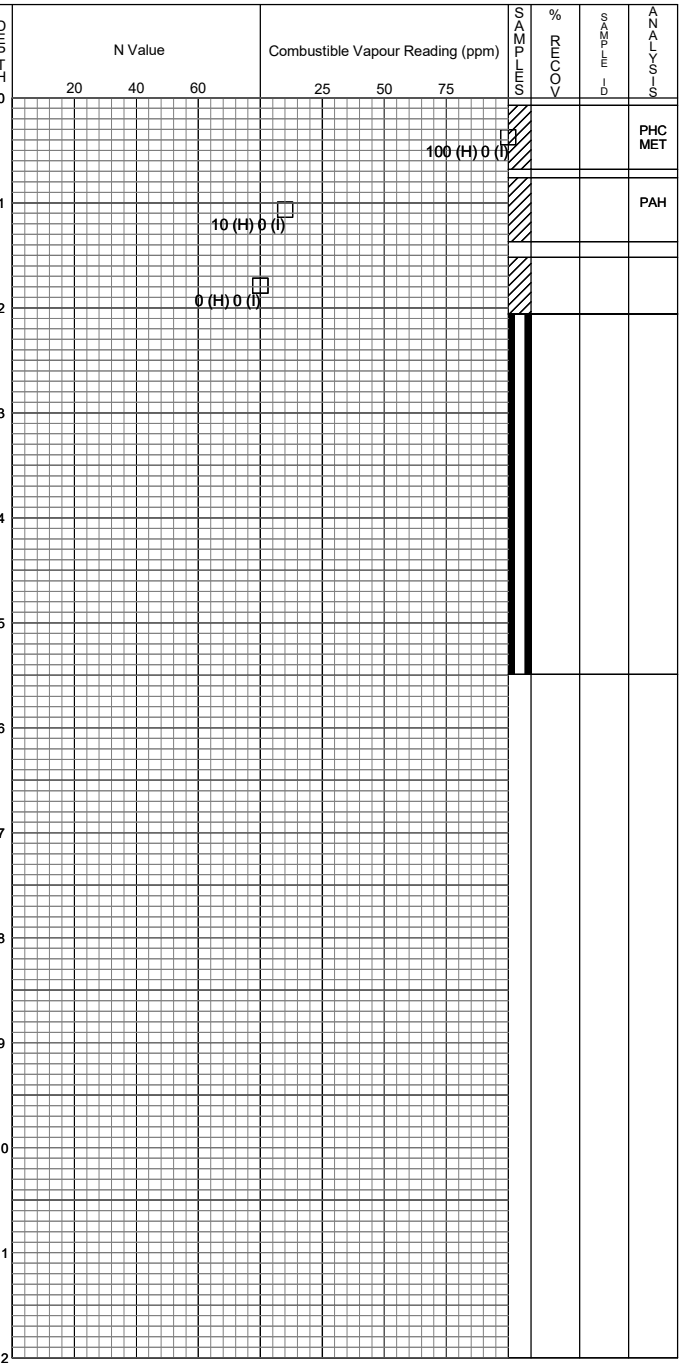
Drill Type: CME 75 Truck Mount. Hollow Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			189.70	0
		ASPHALT: (~70 mm thick)	~189.6	
		GRANULAR FILL: (~125 mm thick)	~189.5	
		FILL: silty clay, trace sand and gravel, grey, very moist, some organic staining and odour brown below 0.8 m		1
			~187.6	2
		LIMESTONE: RUN 1 (2.06 - 3.96 m): Recovery = 97% RQD = 8% (very poor quality) RUN 2 (3.96 - 5.49 m): Recovery = 100% RQD = 82% (good quality)		3
			~185.6	4
				5
			~184.2	6
		Borehole terminated at 5.49 m depth. NOTES: 1) This drawing is to be read with the subject report. 2) Vapour readings measured using a Eagle 2 calibrated with hexane (H) and isobutylene (I). 3) 50 mm well installed. 4) Screen depth: 2.59 m - 5.49 m bgs		7
				8
				9
				10
				11
				12



SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
			PHC MET
			PAH

ENV_EXP_HAM_UPPER OTTAWA BH LOGS.GPJ 11/24/20

exp Services Inc.
Hamilton, Ontario
Telephone: 905-573-4000
Facsimile: 905-573-9693

Time	Water Level (m)	Depth to Cave (m)
October 29, 2020	Dry	
October 30, 2020	4.095	
November 4, 2020	4.061	
November 10, 2020	4.085	

Appendix D – Analytical Results

SOIL ANALYTICAL RESULTS:

Table D.1 - Petroleum Hydrocarbons and Benzene, Toluene, Ethylbenzene and Xylenes in Soil

HAM-00802070-A0, Phase Two ESA - 570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario

Sample ID	**MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland /Instituional Land Use (medium to fine textured soil)**	***Units***	***RDL***	BH1 SS3	BH4 SS3	BH5 SS1	BH5 SS2	BH9 SS1
Lab ID				OBB357	OBB356	OAQ807	OAQ808	OAQ809
Sampling Date				Oct 19, 2020	Oct 19, 2020	Oct 29, 2020	Oct 29, 2020	Oct 29, 2020
Soil Sample Depth (m)				1.5-2.1	1.5-2.1	0.08-0.6	0.8-1.4	0.07-0.6
Consultant				EXP	EXP	EXP	EXP	EXP
Laboratory				BV Labs	BV Labs	BV Labs	BV Labs	BV Labs
Certificate of Analysis Number				C0S9902	C0S9902	C0S8184	C0S8184	C0S8184
Petroleum Hydrocarbons and Benzene, Toluene, Ethylbenzene and Xylenes								
Benzene	0.17	ug/g	0.02	-	-	<0.020	-	<0.020
Toluene	6	ug/g	0.02	-	-	<0.020	-	<0.020
Ethylbenzene	15	ug/g	0.02	-	-	<0.020	-	<0.020
m+p-Xylene	NV	ug/g	0.04	-	-	<0.040	-	<0.040
o-Xylene	NV	ug/g	0.02	-	-	<0.020	-	<0.020
Xylenes, Total	25	ug/g	0.04	-	-	<0.040	-	<0.040
F1 (C6-C10)	65	ug/g	10	-	-	<10	-	<10
F1 (C6-C10) - BTEX	65	ug/g	10	-	-	<10	-	<10
F2 (C10-C16)	150	ug/g	10	<10	<10	28	11	<10
F3 (C16-C34)	1300	ug/g	50	<50	69	1000	310	290
F4 (C34-C50)	5600	ug/g	50	<50	<50	900	210	380
Reached Baseline at C50	NV	ug/g	-	YES	YES	NO	YES	NO
F4G (Gravimetric)	5600	ug/g	100	-	-	3500	-	1300

Legend	
Exceeds Table 3 SCS	**Result**

SOIL ANALYTICAL RESULTS:

Table D.2 - Metals in Soil

HAM-00802070-A0, Phase Two ESA - 570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Institutional Land Use (medium to fine textured soil)	Units	RDL	BH1 SS2	BH2 SS2	BH3 SS2	BH4 SS2	BH4 SS3	BH5 SS2	BH6 SS3	BH6 SS33 (Field Duplicate of BH6 SS3)	BH6 SS3 Average	BH7 SS2	BH8 SS2	BH9 SS1
Lab ID				NYL009	NYL010	OBB353	NYL011	OBB352	OAQ808	NYL012	OGH326	-	NYL013	OBB355	OAQ809
Sampling Date				Oct 19, 2020	Oct 19, 2020	Oct 30, 2020	Oct 19, 2020	Oct 19, 2020	Oct 29, 2020	Oct 19, 2020	Oct 19, 2020	Oct 19, 2020	Oct 19, 2020	Oct 30, 2020	Oct 29, 2020
Soil Sample Depth (m)				0.8-1.4	0.8-1.4	0.8-1.4	0.8-1.4	1.5-2.1	0.8-1.4	1.5-2.1	1.5-2.1	1.5-2.1	0.8-1.4	0.8-1.4	0.07-0.6
Consultant				EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP
Laboratory				BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs	BV Labs
Certificate of Analysis Number				C0R7549	C0R7549	C0S9902	C0R7549	C0S9902	C0S8184	C0R7549	C0V3644	-	C0R7549	C0S9902	C0S8184
Metals (including Hydride-Forming Metals)															
Antimony (Sb)	7.5	ug/g	0.20	<0.20	0.27	<0.20	0.24	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Arsenic (As)	18	ug/g	1.0	6.6	4.6	8.5	5.2	-	3.9	2.5	9.1	5.8	6	5.4	4.9
Barium (Ba)	390	ug/g	0.50	76	65	120	100	-	120	95	130	112.5	170	93	91
Beryllium (Be)	5	ug/g	0.20	0.66	0.59	1.1	0.8	-	0.89	0.75	0.88	0.815	0.83	0.74	0.81
Boron (B)	120	ug/g	5.0	13	8.1	9.5	10	-	10	6.7	7.3	7	9.3	7.6	11
Cadmium (Cd)	1.2	ug/g	0.10	0.7	0.75	0.19	1.1	-	0.81	0.63	1.6	1.115	0.24	0.47	1
Chromium (Cr)	160	ug/g	1.0	22	17	32	24	-	29	22	25	23.5	25	27	31
Cobalt (Co)	22	ug/g	0.10	8.7	7.3	16	9.7	-	9.6	8.6	18	13.3	13	12	9.7
Copper (Cu)	180	ug/g	0.50	21	20	43	26	-	26	19	27	23	27	25	25
Lead (Pb)	120	ug/g	1.0	94	47	20	68	-	45	55	140	97.5	15	22	57
Molybdenum (Mo)	6.9	ug/g	0.50	1.1	0.58	0.58	0.65	-	0.64	<0.50	0.63	0.63	0.58	0.87	0.95
Nickel (Ni)	130	ug/g	0.50	19	16	35	23	-	25	19	27	23	28	24	23
Selenium (Se)	2.4	ug/g	0.50	<0.50	<0.50	<0.50	0.55	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Silver (Ag)	25	ug/g	0.20	<0.20	<0.20	<0.20	<0.20	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)	1	ug/g	0.050	0.15	0.14	0.23	0.2	-	0.18	0.11	0.15	0.13	0.17	0.11	0.21
Uranium (U)	23	ug/g	0.050	0.61	0.7	0.5	1.2	-	1.2	1.1	0.77	0.935	0.59	0.72	1.2
Vanadium (V)	86	ug/g	5.0	26	25	43	32	-	36	30	40	35	37	35	38
Zinc (Zn)	340	ug/g	5.0	270	350	95	370	-	300	260	310	285	66	110	330
Other Regulated Parameters															
Available (CaCl2) pH	NV	pH	-	-	-	-	-	7.52	-	-	-	-	7.69	-	-

Legend	
Exceeds Table 3 SCS	Result

SOIL ANALYTICAL RESULTS:

Table D.3 - Polycyclic Aromatic Hydrocarbons in Soil

HAM-00802070-A0, Phase Two ESA - 570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario

Sample ID	MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Instituional Land Use (medium to fine textured soil)	*Units*	*RDL*	BH1 SS3	BH3 SS2	BH5 SS2	BH6 SS2	BH9 SS2
Lab ID				OGH366	OBB353	OAQ808	OGH367	OAQ810
Sampling Date				Oct 19, 2020	Oct 30, 2020	Oct 29, 2020	Oct 19, 2020	Oct 29, 2020
Soil Sample Depth (m)				1.5-2.1	0.8-1.4	0.8-1.4	0.8-1.4	0.8-1.4
Consultant				EXP	EXP	EXP	EXP	EXP
Laboratory				BV Labs	BV Labs	BV Labs	BV Labs	BV Labs
Certificate of Analysis Number				C0V3650	C0S9902	C0S8184	C0V3650	C0S8184
Polycyclic Aromatic Hydrocarbons (PAHs)								
Acenaphthene	58	ug/g	0.0050	<0.0050	<0.0050	0.01	<0.050	<0.050
Acenaphthylene	0.17	ug/g	0.0050	<0.0050	<0.0050	0.0084	<0.050	<0.050
Anthracene	0.74	ug/g	0.0050	<0.0050	<0.0050	0.03	<0.050	<0.050
Benzo(a)anthracene	0.63	ug/g	0.0050	<0.0050	<0.0050	0.05	<0.050	<0.050
Benzo(a)pyrene	0.3	ug/g	0.0050	<0.0050	0.0063	0.067	0.074	<0.050
Benzo(b/j)fluoranthene	0.78	ug/g	0.0050	0.0056	0.0093	0.076	0.093	0.068
Benzo(g,h,i)perylene	7.8	ug/g	0.0050	0.014	0.01	0.074	0.12	0.072
Benzo(k)fluoranthene	0.78	ug/g	0.0050	<0.0050	<0.0050	0.025	<0.050	<0.050
Chrysene	7.8	ug/g	0.0050	<0.0050	<0.0050	0.041	0.052	<0.050
Dibenzo(a,h)anthracene	0.1	ug/g	0.0050	<0.0050	<0.0050	0.013	<0.050	<0.050
Fluoranthene	0.69	ug/g	0.0050	<0.0050	0.0055	0.1	0.064	0.076
Fluorene	69	ug/g	0.0050	<0.0050	<0.0050	0.0088	<0.050	<0.050
Indeno(1,2,3-cd)pyrene	0.48	ug/g	0.0050	<0.0050	0.0063	0.053	0.074	<0.050
1-Methylnaphthalene	3.4	ug/g	0.0050	<0.0050	<0.0050	0.0059	<0.050	<0.050
2-Methylnaphthalene	3.4	ug/g	0.0050	<0.0050	<0.0050	0.0075	<0.050	<0.050
1+2-Methylnaphthalene	3.4	ug/g	0.0071	<0.0071	<0.0071	0.013	<0.071	<0.071
Naphthalene	0.75	ug/g	0.0050	<0.0050	<0.0050	0.0055	<0.050	<0.050
Phenanthrene	7.8	ug/g	0.0050	<0.0050	<0.0050	0.06	<0.050	<0.050
Pyrene	78	ug/g	0.0050	<0.0050	0.0061	0.12	0.093	0.078

Legend	
Exceeds Table 3 SCS	**Result**

GROUNDWATER ANALYTICAL RESULTS:

Table D.4 - Petroleum Hydrocarbons and Volatile Organic Compounds in Groundwater

HAM-00802070-A0, Phase Two ESA - 570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario

Sample ID	***MECP (2011) Table 3: Full Depth Generic SCS in a Non-Potable Groundwater Condition Residential/Parkland/Instituional Land Use (medium to fine textured soil)***	***Units***	***RDL***	MW5	MW55	MW9	TRIP BLANK LOT #3680
Lab ID				ODI239	ODI240	ODI241	ODI242
Sampling Date				Nov 10, 2020	Nov 10, 2020	Nov 10, 2020	Nov 10, 2020
Screen Depth (m)				2.6-5.6	2.6-5.6	2.4-5.5	-
Consultant				EXP	EXP	EXP	EXP
Laboratory				BV Labs	BV Labs	BV Labs	BV Labs
Certificate of Analysis Number				C0U0119	C0U0119	C0U0119	C0U0119
Petroleum Hydrocarbons (PHCs)							
F1 (C6-C10)	750	ug/L	25	<25	<25	<25	-
F1 (C6-C10) - BTEX	750	ug/L	25	<25	<25	<25	-
F2 (C10-C16)	150	ug/L	100	<100	<100	<100	-
F3 (C16-C34)	500	ug/L	200	<200	210	<200	-
F4 (C34-C50)	500	ug/L	200	<200	<200	<200	-
Reached Baseline at C50	NV	ug/L	-	YES	YES	YES	-
F4G (Gravimetric)	500	ug/L	-	-	-	-	-
Volatile Organic Compounds (VOCs)							
Benzene	430	ug/L	0.20	<0.20	<0.20	<0.20	<0.20
Toluene	18000	ug/L	0.20	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	2300	ug/L	0.20	<0.20	<0.20	<0.20	<0.20
m+p-Xylene	NV	ug/L	0.20	<0.20	<0.20	<0.20	<0.20
o-Xylene	NV	ug/L	0.20	<0.20	<0.20	<0.20	<0.20
Xylenes, Total	4200	ug/L	0.20	<0.20	<0.20	<0.20	<0.20
Acetone	130000	ug/L	10	<10	<10	<10	<10
Bromodichloromethane	85000	ug/L	0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	770	ug/L	1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	56	ug/L	0.50	<0.50	<0.50	<0.50	<0.50
Carbon Tetrachloride	8.4	ug/L	0.19 - 0.20	<0.20	<0.20	<0.20	<0.19
Chlorobenzene	630	ug/L	0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	22	ug/L	0.20	1.9	2	<0.20	<0.20
Dibromochloromethane	82000	ug/L	0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	9600	ug/L	0.40 - 0.50	<0.50	<0.50	<0.50	<0.40
1,3-Dichlorobenzene	9600	ug/L	0.40 - 0.50	<0.50	<0.50	<0.50	<0.40
1,4-Dichlorobenzene	67	ug/L	0.40 - 0.50	<0.50	<0.50	<0.50	<0.40
Dichlorodifluoromethane	4400	ug/L	1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	3100	ug/L	0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane	12	ug/L	0.49 - 0.50	<0.50	<0.50	<0.50	<0.49
1,1-Dichloroethylene	17	ug/L	0.20	<0.20	<0.20	<0.20	<0.20
cis-1,2-Dichloroethylene	17	ug/L	0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethylene	17	ug/L	0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	140	ug/L	0.20	<0.20	<0.20	<0.20	<0.20
cis-1,3-Dichloropropene	45	ug/L	0.30	<0.30	<0.30	<0.30	<0.30
trans-1,3-Dichloropropene	45	ug/L	0.40	<0.40	<0.40	<0.40	<0.40
1,3-Dichloropropene (cis+trans)	45	ug/L	0.50	<0.50	<0.50	<0.50	<0.50
Ethylene Dibromide	0.83	ug/L	0.19 - 0.20	<0.20	<0.20	<0.20	<0.19
Hexane	520	ug/L	1.0	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (MEK)	1500000	ug/L	10	<10	<10	<10	<10
Methyl Isobutyl Ketone (MIBK)	580000	ug/L	5.0	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether (MTBE)	1400	ug/L	0.50	<0.50	<0.50	<0.50	<0.50
Methylene Chloride (Dichloromethane)	5500	ug/L	2.0	<2.0	<2.0	<2.0	<2.0
Styrene	9100	ug/L	0.40 - 0.50	<0.50	<0.50	<0.50	<0.40
1,1,1,2-Tetrachloroethane	28	ug/L	0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	15	ug/L	0.40 - 0.50	<0.50	<0.50	<0.50	<0.40
Tetrachloroethylene	17	ug/L	0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	6700	ug/L	0.20	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethane	30	ug/L	0.40 - 0.50	<0.50	<0.50	<0.50	<0.40
Trichloroethylene	17	ug/L	0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	2500	ug/L	0.50	<0.50	<0.50	<0.50	<0.50
Vinyl Chloride	1.7	ug/L	0.20	<0.20	<0.20	<0.20	<0.20

Legend	
Exceeds Table 3 SCS	**Result**

Appendix E – Laboratory Certificates of Analysis

Your Project #: HAM-00802070-A0
Site Location: UPPER OTTAWA,PHASE II ESA
Your C.O.C. #: 785029-03-01

Attention: Stephanie Hsia

exp Services Inc
Stoney Creek Branch
1266 South Service Rd
Suite C1-1
Stoney Creek, ON
CANADA L8E 5R9

Report Date: 2020/11/27
Report #: R6427644
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C0R7549
Received: 2020/10/21, 15:15

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Strong Acid Leachable Metals by ICPMS	4	2020/10/23	2020/10/26	CAM SOP-00447	EPA 6020B m
Strong Acid Leachable Metals by ICPMS	1	2020/11/26	2020/11/26	CAM SOP-00447	EPA 6020B m
pH CaCl2 EXTRACT	1	2020/10/26	2020/10/26	CAM SOP-00413	EPA 9045 D m
Sieve, 75um	1	N/A	2020/11/26	CAM SOP-00467	ASTM D1140 -17 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.

Your Project #: HAM-00802070-A0
Site Location: UPPER OTTAWA,PHASE II ESA
Your C.O.C. #: 785029-03-01

Attention: Stephanie Hsia

exp Services Inc
Stoney Creek Branch
1266 South Service Rd
Suite C1-1
Stoney Creek, ON
CANADA L8E 5R9

Report Date: 2020/11/27
Report #: R6427644
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C0R7549
Received: 2020/10/21, 15:15

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bvlabs.com
Phone# (519)652-9444
==========
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BV Labs Job #: C0R7549
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-00802070-A0
Site Location: UPPER OTTAWA,PHASE II ESA
Sampler Initials: MH

RESULTS OF ANALYSES OF SOIL

BV Labs ID		NYL013		
Sampling Date		2020/10/19 09:30		
COC Number		785029-03-01		
	UNITS	**BH7 SS2**	**RDL**	**QC Batch**
Inorganics				
Available (CaCl2) pH	pH	7.69		7019758
Miscellaneous Parameters				
Grain Size	%	FINE	N/A	7075118
Sieve - #200 (<0.075mm)	%	94	1	7075118
Sieve - #200 (>0.075mm)	%	6	1	7075118

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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BV Labs Job #: C0R7549
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-00802070-A0
Site Location: UPPER OTTAWA,PHASE II ESA
Sampler Initials: MH

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

BV Labs ID		NYL009	NYL010	NYL011	NYL012		NYL013		
Sampling Date		2020/10/19 10:00	2020/10/19 11:00	2020/10/19 12:30	2020/10/19 11:35		2020/10/19 09:30		
COC Number		785029-03-01	785029-03-01	785029-03-01	785029-03-01		785029-03-01		
	UNITS	**BH1 SS2**	**BH2 SS2**	**BH4 SS2**	**BH6 SS3**	**QC Batch**	**BH7 SS2**	**RDL**	**QC Batch**
Metals									
Acid Extractable Antimony (Sb)	ug/g	<0.20	0.27	0.24	<0.20	7016597	<0.20	0.20	7078003
Acid Extractable Arsenic (As)	ug/g	6.6	4.6	5.2	2.5	7016597	6.0	1.0	7078003
Acid Extractable Barium (Ba)	ug/g	76	65	100	95	7016597	170	0.50	7078003
Acid Extractable Beryllium (Be)	ug/g	0.66	0.59	0.80	0.75	7016597	0.83	0.20	7078003
Acid Extractable Boron (B)	ug/g	13	8.1	10	6.7	7016597	9.3	5.0	7078003
Acid Extractable Cadmium (Cd)	ug/g	0.70	0.75	1.1	0.63	7016597	0.24	0.10	7078003
Acid Extractable Chromium (Cr)	ug/g	22	17	24	22	7016597	25	1.0	7078003
Acid Extractable Cobalt (Co)	ug/g	8.7	7.3	9.7	8.6	7016597	13	0.10	7078003
Acid Extractable Copper (Cu)	ug/g	21	20	26	19	7016597	27	0.50	7078003
Acid Extractable Lead (Pb)	ug/g	94	47	68	55	7016597	15	1.0	7078003
Acid Extractable Molybdenum (Mo)	ug/g	1.1	0.58	0.65	<0.50	7016597	0.58	0.50	7078003
Acid Extractable Nickel (Ni)	ug/g	19	16	23	19	7016597	28	0.50	7078003
Acid Extractable Selenium (Se)	ug/g	<0.50	<0.50	0.55	<0.50	7016597	<0.50	0.50	7078003
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	<0.20	<0.20	7016597	<0.20	0.20	7078003
Acid Extractable Thallium (Tl)	ug/g	0.15	0.14	0.20	0.11	7016597	0.17	0.050	7078003
Acid Extractable Uranium (U)	ug/g	0.61	0.70	1.2	1.1	7016597	0.59	0.050	7078003
Acid Extractable Vanadium (V)	ug/g	26	25	32	30	7016597	37	5.0	7078003
Acid Extractable Zinc (Zn)	ug/g	270	350	370	260	7016597	66	5.0	7078003

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0R7549
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-00802070-A0
Site Location: UPPER OTTAWA,PHASE II ESA
Sampler Initials: MH

TEST SUMMARY

BV Labs ID: NYL009 **Collected:** 2020/10/19
Sample ID: BH1 SS2 **Shipped:**
Matrix: Soil **Received:** 2020/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Strong Acid Leachable Metals by ICPMS	ICP/MS	7016597	2020/10/23	2020/10/26	Viviana Canzonieri

BV Labs ID: NYL010 **Collected:** 2020/10/19
Sample ID: BH2 SS2 **Shipped:**
Matrix: Soil **Received:** 2020/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Strong Acid Leachable Metals by ICPMS	ICP/MS	7016597	2020/10/23	2020/10/26	Viviana Canzonieri

BV Labs ID: NYL011 **Collected:** 2020/10/19
Sample ID: BH4 SS2 **Shipped:**
Matrix: Soil **Received:** 2020/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Strong Acid Leachable Metals by ICPMS	ICP/MS	7016597	2020/10/23	2020/10/26	Viviana Canzonieri

BV Labs ID: NYL012 **Collected:** 2020/10/19
Sample ID: BH6 SS3 **Shipped:**
Matrix: Soil **Received:** 2020/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Strong Acid Leachable Metals by ICPMS	ICP/MS	7016597	2020/10/23	2020/10/26	Viviana Canzonieri

BV Labs ID: NYL013 **Collected:** 2020/10/19
Sample ID: BH7 SS2 **Shipped:**
Matrix: Soil **Received:** 2020/10/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Strong Acid Leachable Metals by ICPMS	ICP/MS	7078003	2020/11/26	2020/11/26	Viviana Canzonieri
pH CaCl2 EXTRACT	AT	7019758	2020/10/26	2020/10/26	Surinder Rai
Sieve, 75um	SIEV	7075118	N/A	2020/11/26	Gurpreet Kaur (ONT)

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BV Labs Job #: C0R7549
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-00802070-A0
Site Location: UPPER OTTAWA,PHASE II ESA
Sampler Initials: MH

GENERAL COMMENTS

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

Package 1	3.0°C

Revised report (2020/11/27): Includes ICPMS and grain size results for BH7 SS2.

Results relate only to the items tested.

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BV Labs Job #: C0R7549
Report Date: 2020/11/27

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: HAM-00802070-A0
Site Location: UPPER OTTAWA,PHASE II ESA
Sampler Initials: MH

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7016597	Acid Extractable Antimony (Sb)	2020/10/26	85	75 - 125	97	80 - 120	<0.20	ug/g	NC	30		
7016597	Acid Extractable Arsenic (As)	2020/10/26	93	75 - 125	101	80 - 120	<1.0	ug/g	4.4	30		
7016597	Acid Extractable Barium (Ba)	2020/10/26	NC	75 - 125	100	80 - 120	<0.50	ug/g	6.6	30		
7016597	Acid Extractable Beryllium (Be)	2020/10/26	88	75 - 125	92	80 - 120	<0.20	ug/g	1.7	30		
7016597	Acid Extractable Boron (B)	2020/10/26	84	75 - 125	92	80 - 120	<5.0	ug/g	8.0	30		
7016597	Acid Extractable Cadmium (Cd)	2020/10/26	92	75 - 125	98	80 - 120	<0.10	ug/g	5.0	30		
7016597	Acid Extractable Chromium (Cr)	2020/10/26	95	75 - 125	102	80 - 120	<1.0	ug/g	3.0	30		
7016597	Acid Extractable Cobalt (Co)	2020/10/26	92	75 - 125	104	80 - 120	<0.10	ug/g	0.66	30		
7016597	Acid Extractable Copper (Cu)	2020/10/26	90	75 - 125	99	80 - 120	<0.50	ug/g	2.7	30		
7016597	Acid Extractable Lead (Pb)	2020/10/26	95	75 - 125	102	80 - 120	<1.0	ug/g	0.47	30		
7016597	Acid Extractable Molybdenum (Mo)	2020/10/26	92	75 - 125	98	80 - 120	<0.50	ug/g	NC	30		
7016597	Acid Extractable Nickel (Ni)	2020/10/26	94	75 - 125	101	80 - 120	<0.50	ug/g	0.76	30		
7016597	Acid Extractable Selenium (Se)	2020/10/26	94	75 - 125	101	80 - 120	<0.50	ug/g	NC	30		
7016597	Acid Extractable Silver (Ag)	2020/10/26	95	75 - 125	97	80 - 120	<0.20	ug/g	NC	30		
7016597	Acid Extractable Thallium (Tl)	2020/10/26	93	75 - 125	101	80 - 120	<0.050	ug/g	7.2	30		
7016597	Acid Extractable Uranium (U)	2020/10/26	94	75 - 125	99	80 - 120	<0.050	ug/g	6.9	30		
7016597	Acid Extractable Vanadium (V)	2020/10/26	NC	75 - 125	105	80 - 120	<5.0	ug/g	3.5	30		
7016597	Acid Extractable Zinc (Zn)	2020/10/26	NC	75 - 125	102	80 - 120	<5.0	ug/g	2.2	30		
7019758	Available (CaCl2) pH	2020/10/26			101	97 - 103			1.8	N/A		
7075118	Sieve - #200 (<0.075mm)	2020/11/25							11	20	57	53 - 58
7075118	Sieve - #200 (>0.075mm)	2020/11/25							4.3	20	43	42 - 47
7078003	Acid Extractable Antimony (Sb)	2020/11/26	89	75 - 125	102	80 - 120	<0.20	ug/g	18	30		
7078003	Acid Extractable Arsenic (As)	2020/11/26	NC	75 - 125	103	80 - 120	<1.0	ug/g	2.5	30		
7078003	Acid Extractable Barium (Ba)	2020/11/26	NC	75 - 125	106	80 - 120	<0.50	ug/g	2.3	30		
7078003	Acid Extractable Beryllium (Be)	2020/11/26	94	75 - 125	98	80 - 120	<0.20	ug/g	2.9	30		
7078003	Acid Extractable Boron (B)	2020/11/26	90	75 - 125	101	80 - 120	<5.0	ug/g	NC	30		
7078003	Acid Extractable Cadmium (Cd)	2020/11/26	98	75 - 125	103	80 - 120	<0.10	ug/g	NC	30		
7078003	Acid Extractable Chromium (Cr)	2020/11/26	101	75 - 125	106	80 - 120	<1.0	ug/g	2.1	30		
7078003	Acid Extractable Cobalt (Co)	2020/11/26	103	75 - 125	106	80 - 120	<0.10	ug/g	11	30		
7078003	Acid Extractable Copper (Cu)	2020/11/26	NC	75 - 125	102	80 - 120	<0.50	ug/g	1.9	30		
7078003	Acid Extractable Lead (Pb)	2020/11/26	NC	75 - 125	106	80 - 120	<1.0	ug/g	1.4	30		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7078003	Acid Extractable Molybdenum (Mo)	2020/11/26	NC	75 - 125	103	80 - 120	<0.50	ug/g	3.4	30		
7078003	Acid Extractable Nickel (Ni)	2020/11/26	100	75 - 125	107	80 - 120	<0.50	ug/g	0.30	30		
7078003	Acid Extractable Selenium (Se)	2020/11/26	104	75 - 125	107	80 - 120	<0.50	ug/g	6.5	30		
7078003	Acid Extractable Silver (Ag)	2020/11/26	98	75 - 125	102	80 - 120	<0.20	ug/g	NC	30		
7078003	Acid Extractable Thallium (Tl)	2020/11/26	100	75 - 125	105	80 - 120	<0.050	ug/g	1.7	30		
7078003	Acid Extractable Uranium (U)	2020/11/26	101	75 - 125	104	80 - 120	<0.050	ug/g	1.1	30		
7078003	Acid Extractable Vanadium (V)	2020/11/26	101	75 - 125	105	80 - 120	<5.0	ug/g	2.5	30		
7078003	Acid Extractable Zinc (Zn)	2020/11/26	101	75 - 125	106	80 - 120	<5.0	ug/g	3.2	30		

N/A = Not Applicable

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.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

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.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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).

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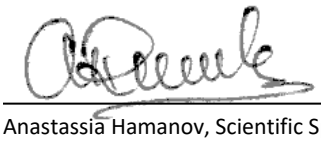
BV Labs Job #: C0R7549
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-00802070-A0
Site Location: UPPER OTTAWA,PHASE II ESA
Sampler Initials: MH

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

Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

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Your P.O. #: HAM-ENV
Your Project #: HAM-00802070-A0
Site Location: PHASE TWO ESA/UPPER OTTAWA
Your C.O.C. #: 796492-03-01

Attention: Stephanie Hsia

exp Services Inc
Brampton Branch
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2020/11/27
Report #: R6427980
Version: 4 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C0S8184
Received: 2020/10/30, 16:39

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Methylnaphthalene Sum	2	N/A	2020/11/27	CAM SOP-00301	EPA 8270D m
Petroleum Hydro. CCME F1 & BTEX in Soil (1)	2	N/A	2020/11/04	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (2)	1	2020/11/10	2020/11/10	CAM SOP-00316	CCME CWS m
Petroleum Hydrocarbons F2-F4 in Soil (2)	2	2020/11/02	2020/11/03	CAM SOP-00316	CCME CWS m
F4G (CCME Hydrocarbons Gravimetric)	2	2020/11/05	2020/11/05	CAM SOP-00316	CCME PHC-CWS m
Strong Acid Leachable Metals by ICPMS	1	2020/11/13	2020/11/13	CAM SOP-00447	EPA 6020B m
Strong Acid Leachable Metals by ICPMS	1	2020/11/03	2020/11/03	CAM SOP-00447	EPA 6020B m
Moisture	2	N/A	2020/11/02	CAM SOP-00445	Carter 2nd ed 51.2 m
Moisture	1	N/A	2020/11/25	CAM SOP-00445	Carter 2nd ed 51.2 m
Moisture	1	N/A	2020/11/06	CAM SOP-00445	Carter 2nd ed 51.2 m
PAH Compounds in Soil by GC/MS (SIM)	2	2020/11/26	2020/11/26	CAM SOP-00318	EPA 8270D 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.

Your P.O. #: HAM-ENV
Your Project #: HAM-00802070-A0
Site Location: PHASE TWO ESA/UPPER OTTAWA
Your C.O.C. #: 796492-03-01

Attention: Stephanie Hsia

exp Services Inc
Brampton Branch
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2020/11/27
Report #: R6427980
Version: 4 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C0S8184

Received: 2020/10/30, 16:39

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.

(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bvlabs.com
Phone# (519)652-9444

==========

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.

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BV Labs Job #: C0S8184
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-00802070-A0
Site Location: PHASE TWO ESA/UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: SH

O.REG 153 ICPMS METALS (SOIL)

BV Labs ID		OAQ808		OAQ809		
Sampling Date		2020/10/29		2020/10/29		
COC Number		796492-03-01		796492-03-01		
	UNITS	**BH5 SS2**	**QC Batch**	**BH9 SS1**	**RDL**	**QC Batch**
Metals						
Acid Extractable Antimony (Sb)	ug/g	<0.20	7054530	<0.20	0.20	7034702
Acid Extractable Arsenic (As)	ug/g	3.9	7054530	4.9	1.0	7034702
Acid Extractable Barium (Ba)	ug/g	120	7054530	91	0.50	7034702
Acid Extractable Beryllium (Be)	ug/g	0.89	7054530	0.81	0.20	7034702
Acid Extractable Boron (B)	ug/g	10	7054530	11	5.0	7034702
Acid Extractable Cadmium (Cd)	ug/g	0.81	7054530	1.0	0.10	7034702
Acid Extractable Chromium (Cr)	ug/g	29	7054530	31	1.0	7034702
Acid Extractable Cobalt (Co)	ug/g	9.6	7054530	9.7	0.10	7034702
Acid Extractable Copper (Cu)	ug/g	26	7054530	25	0.50	7034702
Acid Extractable Lead (Pb)	ug/g	45	7054530	57	1.0	7034702
Acid Extractable Molybdenum (Mo)	ug/g	0.64	7054530	0.95	0.50	7034702
Acid Extractable Nickel (Ni)	ug/g	25	7054530	23	0.50	7034702
Acid Extractable Selenium (Se)	ug/g	<0.50	7054530	<0.50	0.50	7034702
Acid Extractable Silver (Ag)	ug/g	<0.20	7054530	<0.20	0.20	7034702
Acid Extractable Thallium (Tl)	ug/g	0.18	7054530	0.21	0.050	7034702
Acid Extractable Uranium (U)	ug/g	1.2	7054530	1.2	0.050	7034702
Acid Extractable Vanadium (V)	ug/g	36	7054530	38	5.0	7034702
Acid Extractable Zinc (Zn)	ug/g	300	7054530	330	5.0	7034702

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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O.REG 153 PAHS (SOIL)

BV Labs ID		OAQ808			OAQ810		
Sampling Date		2020/10/29			2020/10/29		
COC Number		796492-03-01			796492-03-01		
	UNITS	**BH5 SS2**	**RDL**	**QC Batch**	**BH9 SS2**	**RDL**	**QC Batch**
Inorganics							
Moisture	%				18	1.0	7075315
Calculated Parameters							
Methylnaphthalene, 2-(1-)	ug/g	0.013	0.0071	7074854	<0.071	0.071	7074854
Polyaromatic Hydrocarbons							
Acenaphthene	ug/g	0.010	0.0050	7077280	<0.050	0.050	7077280
Acenaphthylene	ug/g	0.0084	0.0050	7077280	<0.050	0.050	7077280
Anthracene	ug/g	0.030	0.0050	7077280	<0.050	0.050	7077280
Benzo(a)anthracene	ug/g	0.050	0.0050	7077280	<0.050	0.050	7077280
Benzo(a)pyrene	ug/g	0.067	0.0050	7077280	<0.050	0.050	7077280
Benzo(b/j)fluoranthene	ug/g	0.076	0.0050	7077280	0.068	0.050	7077280
Benzo(g,h,i)perylene	ug/g	0.074	0.0050	7077280	0.072	0.050	7077280
Benzo(k)fluoranthene	ug/g	0.025	0.0050	7077280	<0.050	0.050	7077280
Chrysene	ug/g	0.041	0.0050	7077280	<0.050	0.050	7077280
Dibenzo(a,h)anthracene	ug/g	0.013	0.0050	7077280	<0.050	0.050	7077280
Fluoranthene	ug/g	0.10	0.0050	7077280	0.076	0.050	7077280
Fluorene	ug/g	0.0088	0.0050	7077280	<0.050	0.050	7077280
Indeno(1,2,3-cd)pyrene	ug/g	0.053	0.0050	7077280	<0.050	0.050	7077280
1-Methylnaphthalene	ug/g	0.0059	0.0050	7077280	<0.050	0.050	7077280
2-Methylnaphthalene	ug/g	0.0075	0.0050	7077280	<0.050	0.050	7077280
Naphthalene	ug/g	0.0055	0.0050	7077280	<0.050	0.050	7077280
Phenanthrene	ug/g	0.060	0.0050	7077280	<0.050	0.050	7077280
Pyrene	ug/g	0.12	0.0050	7077280	0.078	0.050	7077280
Surrogate Recovery (%)							
D10-Anthracene	%	113		7077280	113		7077280
D14-Terphenyl (FS)	%	103		7077280	118		7077280
D8-Acenaphthylene	%	100		7077280	110		7077280

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs Job #: C0S8184
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-00802070-A0
Site Location: PHASE TWO ESA/UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: SH

O.REG 153 PHCS, BTEX/F1-F4 (SOIL)

BV Labs ID		OAQ807		OAQ809			OAQ809		
Sampling Date		2020/10/29		2020/10/29			2020/10/29		
COC Number		796492-03-01		796492-03-01			796492-03-01		
	UNITS	**BH5 SS1**	**QC Batch**	**BH9 SS1**	**RDL**	**QC Batch**	**BH9 SS1 Lab-Dup**	**RDL**	**QC Batch**
Inorganics									
Moisture	%	10	7033017	18	1.0	7032945	17	1.0	7032945
BTEX & F1 Hydrocarbons									
Benzene	ug/g	<0.020	7036888	<0.020	0.020	7036888			
Toluene	ug/g	<0.020	7036888	<0.020	0.020	7036888			
Ethylbenzene	ug/g	<0.020	7036888	<0.020	0.020	7036888			
o-Xylene	ug/g	<0.020	7036888	<0.020	0.020	7036888			
p+m-Xylene	ug/g	<0.040	7036888	<0.040	0.040	7036888			
Total Xylenes	ug/g	<0.040	7036888	<0.040	0.040	7036888			
F1 (C6-C10)	ug/g	<10	7036888	<10	10	7036888			
F1 (C6-C10) - BTEX	ug/g	<10	7036888	<10	10	7036888			
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	28	7033862	<10	10	7033862			
F3 (C16-C34 Hydrocarbons)	ug/g	1000	7033862	290	50	7033862			
F4 (C34-C50 Hydrocarbons)	ug/g	900	7033862	380	50	7033862			
Reached Baseline at C50	ug/g	No	7033862	No		7033862			
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	100	7036888	101		7036888			
4-Bromofluorobenzene	%	99	7036888	97		7036888			
D10-o-Xylene	%	89	7036888	95		7036888			
D4-1,2-Dichloroethane	%	98	7036888	96		7036888			
o-Terphenyl	%	94	7033862	99		7033862			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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BV Labs Job #: C0S8184
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-00802070-A0
Site Location: PHASE TWO ESA/UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: SH

RESULTS OF ANALYSES OF SOIL

BV Labs ID		OAQ808		
Sampling Date		2020/10/29		
COC Number		796492-03-01		
	UNITS	**BH5 SS2**	**RDL**	**QC Batch**
Inorganics				
Moisture	%	21	1.0	7043216

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Your P.O. #: HAM-ENV
Sampler Initials: SH

PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		OAQ807			OAQ808			OAQ809		
Sampling Date		2020/10/29			2020/10/29			2020/10/29		
COC Number		796492-03-01			796492-03-01			796492-03-01		
	UNITS	**BH5 SS1**	**RDL**	**QC Batch**	**BH5 SS2**	**RDL**	**QC Batch**	**BH9 SS1**	**RDL**	**QC Batch**
F2-F4 Hydrocarbons										
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	3500	100	7039706				1300	100	7039706
F2 (C10-C16 Hydrocarbons)	ug/g				11	10	7047622			
F3 (C16-C34 Hydrocarbons)	ug/g				310	50	7047622			
F4 (C34-C50 Hydrocarbons)	ug/g				210	50	7047622			
Reached Baseline at C50	ug/g				Yes		7047622			
Surrogate Recovery (%)										
o-Terphenyl	%				97		7047622			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0S8184
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-00802070-A0
Site Location: PHASE TWO ESA/UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: SH

TEST SUMMARY

BV Labs ID: OAQ807
Sample ID: BH5 SS1
Matrix: Soil

Collected: 2020/10/29
Shipped:
Received: 2020/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7036888	N/A	2020/11/04	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7033862	2020/11/02	2020/11/03	Jeevaraj Jeevaratrnam
F4G (CCME Hydrocarbons Gravimetric)	BAL	7039706	2020/11/05	2020/11/05	Narinderjeet Kaur
Moisture	BAL	7033017	N/A	2020/11/02	Min Yang

BV Labs ID: OAQ808
Sample ID: BH5 SS2
Matrix: Soil

Collected: 2020/10/29
Shipped:
Received: 2020/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	7074854	N/A	2020/11/27	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7047622	2020/11/10	2020/11/10	Jeevaraj Jeevaratrnam
Strong Acid Leachable Metals by ICPMS	ICP/MS	7054530	2020/11/13	2020/11/13	Azita Fazaeli
Moisture	BAL	7043216	N/A	2020/11/06	Kruti Jitesh Patel
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	7077280	2020/11/26	2020/11/26	Mitesh Raj

BV Labs ID: OAQ809
Sample ID: BH9 SS1
Matrix: Soil

Collected: 2020/10/29
Shipped:
Received: 2020/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	7036888	N/A	2020/11/04	Haibin Wu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7033862	2020/11/02	2020/11/03	Jeevaraj Jeevaratrnam
F4G (CCME Hydrocarbons Gravimetric)	BAL	7039706	2020/11/05	2020/11/05	Narinderjeet Kaur
Strong Acid Leachable Metals by ICPMS	ICP/MS	7034702	2020/11/03	2020/11/03	Daniel Teclu
Moisture	BAL	7032945	N/A	2020/11/02	Chun Yan

BV Labs ID: OAQ809 Dup
Sample ID: BH9 SS1
Matrix: Soil

Collected: 2020/10/29
Shipped:
Received: 2020/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	7032945	N/A	2020/11/02	Chun Yan

BV Labs ID: OAQ810
Sample ID: BH9 SS2
Matrix: Soil

Collected: 2020/10/29
Shipped:
Received: 2020/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	7074854	N/A	2020/11/27	Automated Statchk
Moisture	BAL	7075315	N/A	2020/11/25	Gurpreet Kaur (ONT)
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	7077280	2020/11/26	2020/11/26	Mitesh Raj

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BV Labs Job #: C0S8184
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-00802070-A0
Site Location: PHASE TWO ESA/UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: SH

GENERAL COMMENTS

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

Package 1	4.0°C

Revised report (2020/11/11): Includes F2-F4 analysis on sample BH5 SS2.
Revised report (2020/11/13): Includes ICPMS metals on BH5 SS2.
Revised report (2020/11/27): Includes PAH results for BH5 SS2 and BH9 SS2.

Sample OAQ807 [BH5 SS1] : F1/BTEX Analysis: Soil weight exceeds the protocol specification of approximately 5g in the field preserved vial. Additional methanol was added to the vial to ensure extraction efficiency.

Sample OAQ809 [BH9 SS1] : F1/BTEX Analysis: Soil weight exceeds the protocol specification of approximately 5g in the field preserved vial. Additional methanol was added to the vial to ensure extraction efficiency.

Sample OAQ810 [BH9 SS2] : PAH analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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BV Labs Job #: C0S8184
Report Date: 2020/11/27

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: HAM-00802070-A0
Site Location: PHASE TWO ESA/UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: SH

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7033862	o-Terphenyl	2020/11/03	90	60 - 130	102	60 - 130	94	%		
7036888	1,4-Difluorobenzene	2020/11/04			95	60 - 140	99	%		
7036888	4-Bromofluorobenzene	2020/11/04			100	60 - 140	100	%		
7036888	D10-o-Xylene	2020/11/04			95	60 - 140	88	%		
7036888	D4-1,2-Dichloroethane	2020/11/04			86	60 - 140	93	%		
7047622	o-Terphenyl	2020/11/10	93	60 - 130	93	60 - 130	97	%		
7077280	D10-Anthracene	2020/11/26	116	50 - 130	117	50 - 130	129	%		
7077280	D14-Terphenyl (FS)	2020/11/26	113	50 - 130	114	50 - 130	111	%		
7077280	D8-Acenaphthylene	2020/11/26	100	50 - 130	107	50 - 130	100	%		
7032945	Moisture	2020/11/02							1.7	20
7033017	Moisture	2020/11/02							4.8	20
7033862	F2 (C10-C16 Hydrocarbons)	2020/11/03	91	50 - 130	104	80 - 120	<10	ug/g	NC	30
7033862	F3 (C16-C34 Hydrocarbons)	2020/11/03	99	50 - 130	107	80 - 120	<50	ug/g	5.6	30
7033862	F4 (C34-C50 Hydrocarbons)	2020/11/03	95	50 - 130	107	80 - 120	<50	ug/g	NC	30
7034702	Acid Extractable Antimony (Sb)	2020/11/04	91	75 - 125	103	80 - 120	<0.20	ug/g	25	30
7034702	Acid Extractable Arsenic (As)	2020/11/04	103	75 - 125	103	80 - 120	<1.0	ug/g	1.8	30
7034702	Acid Extractable Barium (Ba)	2020/11/04	NC	75 - 125	102	80 - 120	<0.50	ug/g	11	30
7034702	Acid Extractable Beryllium (Be)	2020/11/04	99	75 - 125	97	80 - 120	<0.20	ug/g	NC	30
7034702	Acid Extractable Boron (B)	2020/11/04	95	75 - 125	97	80 - 120	<5.0	ug/g	1.3	30
7034702	Acid Extractable Cadmium (Cd)	2020/11/04	100	75 - 125	101	80 - 120	<0.10	ug/g	0.76	30
7034702	Acid Extractable Chromium (Cr)	2020/11/04	109	75 - 125	103	80 - 120	<1.0	ug/g	3.8	30
7034702	Acid Extractable Cobalt (Co)	2020/11/04	103	75 - 125	101	80 - 120	<0.10	ug/g	2.2	30
7034702	Acid Extractable Copper (Cu)	2020/11/04	NC	75 - 125	100	80 - 120	<0.50	ug/g	21	30
7034702	Acid Extractable Lead (Pb)	2020/11/04	NC	75 - 125	101	80 - 120	<1.0	ug/g	1.1	30
7034702	Acid Extractable Molybdenum (Mo)	2020/11/04	103	75 - 125	104	80 - 120	<0.50	ug/g	NC	30
7034702	Acid Extractable Nickel (Ni)	2020/11/04	99	75 - 125	102	80 - 120	<0.50	ug/g	2.5	30
7034702	Acid Extractable Selenium (Se)	2020/11/04	100	75 - 125	100	80 - 120	<0.50	ug/g	NC	30
7034702	Acid Extractable Silver (Ag)	2020/11/04	99	75 - 125	102	80 - 120	<0.20	ug/g	NC	30
7034702	Acid Extractable Thallium (Tl)	2020/11/04	94	75 - 125	100	80 - 120	<0.050	ug/g	NC	30
7034702	Acid Extractable Uranium (U)	2020/11/04	96	75 - 125	100	80 - 120	<0.050	ug/g	2.3	30

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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
7034702	Acid Extractable Vanadium (V)	2020/11/04	104	75 - 125	99	80 - 120	<5.0	ug/g	0.92	30
7034702	Acid Extractable Zinc (Zn)	2020/11/04	NC	75 - 125	102	80 - 120	<5.0	ug/g	8.6	30
7036888	Benzene	2020/11/04			97	50 - 140	<0.020	ug/g	4.1	50
7036888	Ethylbenzene	2020/11/04			112	50 - 140	<0.020	ug/g	7.6	50
7036888	F1 (C6-C10) - BTEX	2020/11/04					<10	ug/g		
7036888	F1 (C6-C10)	2020/11/04			89	80 - 120	<10	ug/g	9.0	30
7036888	o-Xylene	2020/11/04			107	50 - 140	<0.020	ug/g	7.6	50
7036888	p+m-Xylene	2020/11/04			106	50 - 140	<0.040	ug/g	7.1	50
7036888	Toluene	2020/11/04			98	50 - 140	<0.020	ug/g	6.6	50
7036888	Total Xylenes	2020/11/04					<0.040	ug/g		
7039706	F4G-sg (Grav. Heavy Hydrocarbons)	2020/11/05	72	65 - 135	104	65 - 135	<100	ug/g	5.7	50
7043216	Moisture	2020/11/06							4.7	20
7047622	F2 (C10-C16 Hydrocarbons)	2020/11/10	98	50 - 130	97	80 - 120	<10	ug/g	9.8	30
7047622	F3 (C16-C34 Hydrocarbons)	2020/11/10	105	50 - 130	104	80 - 120	<50	ug/g	6.6	30
7047622	F4 (C34-C50 Hydrocarbons)	2020/11/10	99	50 - 130	97	80 - 120	<50	ug/g	NC	30
7054530	Acid Extractable Antimony (Sb)	2020/11/13	108	75 - 125	99	80 - 120	<0.20	ug/g	NC	30
7054530	Acid Extractable Arsenic (As)	2020/11/13	114	75 - 125	96	80 - 120	<1.0	ug/g	NC	30
7054530	Acid Extractable Barium (Ba)	2020/11/13	NC	75 - 125	98	80 - 120	<0.50	ug/g	5.7	30
7054530	Acid Extractable Beryllium (Be)	2020/11/13	112	75 - 125	104	80 - 120	<0.20	ug/g	2.3	30
7054530	Acid Extractable Boron (B)	2020/11/13	108	75 - 125	98	80 - 120	<5.0	ug/g	NC	30
7054530	Acid Extractable Cadmium (Cd)	2020/11/13	108	75 - 125	101	80 - 120	<0.10	ug/g	NC	30
7054530	Acid Extractable Chromium (Cr)	2020/11/13	111	75 - 125	100	80 - 120	<1.0	ug/g	5.5	30
7054530	Acid Extractable Cobalt (Co)	2020/11/13	107	75 - 125	99	80 - 120	<0.10	ug/g	0.18	30
7054530	Acid Extractable Copper (Cu)	2020/11/13	106	75 - 125	98	80 - 120	<0.50	ug/g	1.0	30
7054530	Acid Extractable Lead (Pb)	2020/11/13	104	75 - 125	98	80 - 120	<1.0	ug/g	0.82	30
7054530	Acid Extractable Molybdenum (Mo)	2020/11/13	109	75 - 125	101	80 - 120	<0.50	ug/g	NC	30
7054530	Acid Extractable Nickel (Ni)	2020/11/13	109	75 - 125	104	80 - 120	<0.50	ug/g	3.6	30
7054530	Acid Extractable Selenium (Se)	2020/11/13	113	75 - 125	107	80 - 120	<0.50	ug/g	NC	30
7054530	Acid Extractable Silver (Ag)	2020/11/13	108	75 - 125	99	80 - 120	<0.20	ug/g	NC	30
7054530	Acid Extractable Thallium (Tl)	2020/11/13	102	75 - 125	97	80 - 120	<0.050	ug/g	8.8	30

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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
7054530	Acid Extractable Uranium (U)	2020/11/13	109	75 - 125	100	80 - 120	<0.050	ug/g	2.3	30
7054530	Acid Extractable Vanadium (V)	2020/11/13	113	75 - 125	100	80 - 120	<5.0	ug/g	5.4	30
7054530	Acid Extractable Zinc (Zn)	2020/11/13	109	75 - 125	98	80 - 120	<5.0	ug/g	4.6	30
7075315	Moisture	2020/11/25							1.3	20
7077280	1-Methylnaphthalene	2020/11/26	80	50 - 130	87	50 - 130	<0.0050	ug/g	NC	40
7077280	2-Methylnaphthalene	2020/11/26	81	50 - 130	91	50 - 130	<0.0050	ug/g	NC	40
7077280	Acenaphthene	2020/11/26	93	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40
7077280	Acenaphthylene	2020/11/26	93	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40
7077280	Anthracene	2020/11/26	96	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40
7077280	Benzo(a)anthracene	2020/11/26	101	50 - 130	99	50 - 130	<0.0050	ug/g	NC	40
7077280	Benzo(a)pyrene	2020/11/26	99	50 - 130	91	50 - 130	<0.0050	ug/g	16	40
7077280	Benzo(b/j)fluoranthene	2020/11/26	96	50 - 130	98	50 - 130	<0.0050	ug/g	NC	40
7077280	Benzo(g,h,i)perylene	2020/11/26	103	50 - 130	95	50 - 130	<0.0050	ug/g	36	40
7077280	Benzo(k)fluoranthene	2020/11/26	99	50 - 130	98	50 - 130	<0.0050	ug/g	NC	40
7077280	Chrysene	2020/11/26	96	50 - 130	95	50 - 130	<0.0050	ug/g	25	40
7077280	Dibenzo(a,h)anthracene	2020/11/26	108	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40
7077280	Fluoranthene	2020/11/26	92	50 - 130	96	50 - 130	<0.0050	ug/g	NC	40
7077280	Fluorene	2020/11/26	94	50 - 130	94	50 - 130	<0.0050	ug/g	NC	40
7077280	Indeno(1,2,3-cd)pyrene	2020/11/26	100	50 - 130	96	50 - 130	<0.0050	ug/g	16	40
7077280	Naphthalene	2020/11/26	72	50 - 130	88	50 - 130	<0.0050	ug/g	NC	40
7077280	Phenanthrene	2020/11/26	97	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40

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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
7077280	Pyrene	2020/11/26	93	50 - 130	94	50 - 130	<0.0050	ug/g	NC	40

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 (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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).

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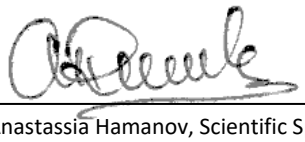
BV Labs Job #: C0S8184
Report Date: 2020/11/27

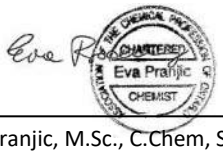
exp Services Inc
Client Project #: HAM-00802070-A0
Site Location: PHASE TWO ESA/UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: SH

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



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

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For Service Group specific validation please refer to the Validation Signature Page.

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Your P.O. #: HAM-ENV
Your Project #: HAM-802070-A0
Site Location: UPPER OTTAWA
Your C.O.C. #: 796879-02-01

Attention: Stephanie Hsia

exp Services Inc
Stoney Creek Branch
1266 South Service Rd
Suite C1-1
Stoney Creek, ON
CANADA L8E 5R9

Report Date: 2020/11/27
Report #: R6427979
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C0S9902
Received: 2020/11/02, 15:05

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Methylnaphthalene Sum	1	N/A	2020/11/27	CAM SOP-00301	EPA 8270D m
Petroleum Hydrocarbons F2-F4 in Soil (1)	2	2020/11/04	2020/11/04	CAM SOP-00316	CCME CWS m
Strong Acid Leachable Metals by ICPMS	1	2020/11/04	2020/11/05	CAM SOP-00447	EPA 6020B m
Strong Acid Leachable Metals by ICPMS	1	2020/11/05	2020/11/05	CAM SOP-00447	EPA 6020B m
Moisture	3	N/A	2020/11/04	CAM SOP-00445	Carter 2nd ed 51.2 m
PAH Compounds in Soil by GC/MS (SIM)	1	2020/11/26	2020/11/26	CAM SOP-00318	EPA 8270D m
pH CaCl2 EXTRACT	1	2020/11/11	2020/11/11	CAM SOP-00413	EPA 9045 D m
Sieve, 75um	1	N/A	2020/11/13	CAM SOP-00467	ASTM D1140 -17 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) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta

Your P.O. #: HAM-ENV
Your Project #: HAM-802070-A0
Site Location: UPPER OTTAWA
Your C.O.C. #: 796879-02-01

Attention: Stephanie Hsia

exp Services Inc
Stoney Creek Branch
1266 South Service Rd
Suite C1-1
Stoney Creek, ON
CANADA L8E 5R9

Report Date: 2020/11/27
Report #: R6427979
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C0S9902
Received: 2020/11/02, 15:05

Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bvlabs.com
Phone# (519)652-9444
==========

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BV Labs Job #: C0S9902
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-802070-A0
Site Location: UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: AC

RESULTS OF ANALYSES OF SOIL

BV Labs ID		OBB352			OBB353		OBB356	OBB357		
Sampling Date		2020/10/19			2020/10/30		2020/10/19	2020/10/19		
COC Number		796879-02-01			796879-02-01		796879-02-01	796879-02-01		
	UNITS	**BH4 SS3**	**RDL**	**QC Batch**	**BH3 SS2**	**QC Batch**	**BH4 SS3**	**BH1 SS3**	**RDL**	**QC Batch**
Inorganics										
Moisture	%				19	7037648	29	18	1.0	7037711
Available (CaCl2) pH	pH	7.52		7050402						
Miscellaneous Parameters										
Grain Size	%	FINE	N/A	7052820						
Sieve - #200 (<0.075mm)	%	86	1	7052820						
Sieve - #200 (>0.075mm)	%	14	1	7052820						

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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BV Labs Job #: C0S9902
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-802070-A0
Site Location: UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: AC

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

BV Labs ID		OBB353	OBB353		OBB355		
Sampling Date		2020/10/30	2020/10/30		2020/10/30		
COC Number		796879-02-01	796879-02-01		796879-02-01		
	UNITS	**BH3 SS2**	**BH3 SS2 Lab-Dup**	**QC Batch**	**BH8 SS2**	**RDL**	**QC Batch**
Metals							
Acid Extractable Antimony (Sb)	ug/g	<0.20	<0.20	7037563	<0.20	0.20	7039442
Acid Extractable Arsenic (As)	ug/g	8.5	8.5	7037563	5.4	1.0	7039442
Acid Extractable Barium (Ba)	ug/g	120	120	7037563	93	0.50	7039442
Acid Extractable Beryllium (Be)	ug/g	1.1	1.1	7037563	0.74	0.20	7039442
Acid Extractable Boron (B)	ug/g	9.5	10	7037563	7.6	5.0	7039442
Acid Extractable Cadmium (Cd)	ug/g	0.19	0.17	7037563	0.47	0.10	7039442
Acid Extractable Chromium (Cr)	ug/g	32	33	7037563	27	1.0	7039442
Acid Extractable Cobalt (Co)	ug/g	16	16	7037563	12	0.10	7039442
Acid Extractable Copper (Cu)	ug/g	43	42	7037563	25	0.50	7039442
Acid Extractable Lead (Pb)	ug/g	20	20	7037563	22	1.0	7039442
Acid Extractable Molybdenum (Mo)	ug/g	0.58	0.65	7037563	0.87	0.50	7039442
Acid Extractable Nickel (Ni)	ug/g	35	37	7037563	24	0.50	7039442
Acid Extractable Selenium (Se)	ug/g	<0.50	<0.50	7037563	<0.50	0.50	7039442
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	7037563	<0.20	0.20	7039442
Acid Extractable Thallium (Tl)	ug/g	0.23	0.22	7037563	0.11	0.050	7039442
Acid Extractable Uranium (U)	ug/g	0.50	0.52	7037563	0.72	0.050	7039442
Acid Extractable Vanadium (V)	ug/g	43	44	7037563	35	5.0	7039442
Acid Extractable Zinc (Zn)	ug/g	95	110	7037563	110	5.0	7039442

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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exp Services Inc
Client Project #: HAM-802070-A0
Site Location: UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: AC

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

BV Labs ID		OBB353		
Sampling Date		2020/10/30		
COC Number		796879-02-01		
	UNITS	**BH3 SS2**	**RDL**	**QC Batch**
Calculated Parameters				
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	0.0071	7074854
Polyaromatic Hydrocarbons				
Acenaphthene	ug/g	<0.0050	0.0050	7077280
Acenaphthylene	ug/g	<0.0050	0.0050	7077280
Anthracene	ug/g	<0.0050	0.0050	7077280
Benzo(a)anthracene	ug/g	<0.0050	0.0050	7077280
Benzo(a)pyrene	ug/g	0.0063	0.0050	7077280
Benzo(b/j)fluoranthene	ug/g	0.0093	0.0050	7077280
Benzo(g,h,i)perylene	ug/g	0.010	0.0050	7077280
Benzo(k)fluoranthene	ug/g	<0.0050	0.0050	7077280
Chrysene	ug/g	<0.0050	0.0050	7077280
Dibenzo(a,h)anthracene	ug/g	<0.0050	0.0050	7077280
Fluoranthene	ug/g	0.0055	0.0050	7077280
Fluorene	ug/g	<0.0050	0.0050	7077280
Indeno(1,2,3-cd)pyrene	ug/g	0.0063	0.0050	7077280
1-Methylnaphthalene	ug/g	<0.0050	0.0050	7077280
2-Methylnaphthalene	ug/g	<0.0050	0.0050	7077280
Naphthalene	ug/g	<0.0050	0.0050	7077280
Phenanthrene	ug/g	<0.0050	0.0050	7077280
Pyrene	ug/g	0.0061	0.0050	7077280
Surrogate Recovery (%)				
D10-Anthracene	%	110		7077280
D14-Terphenyl (FS)	%	112		7077280
D8-Acenaphthylene	%	95		7077280

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs Job #: C0S9902
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-802070-A0
Site Location: UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: AC

PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		OBB356	OBB357		
Sampling Date		2020/10/19	2020/10/19		
COC Number		796879-02-01	796879-02-01		
	UNITS	**BH4 SS3**	**BH1 SS3**	**RDL**	**QC Batch**
F2-F4 Hydrocarbons					
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	10	7037635
F3 (C16-C34 Hydrocarbons)	ug/g	69	<50	50	7037635
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	50	7037635
Reached Baseline at C50	ug/g	Yes	Yes		7037635
Surrogate Recovery (%)					
o-Terphenyl	%	91	90		7037635

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0S9902
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-802070-A0
Site Location: UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: AC

TEST SUMMARY

BV Labs ID: OBB352
Sample ID: BH4 SS3
Matrix: Soil

Collected: 2020/10/19
Shipped:
Received: 2020/11/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH CaCl2 EXTRACT	AT	7050402	2020/11/11	2020/11/11	Neil Dassanayake
Sieve, 75um	SIEV	7052820	N/A	2020/11/13	Min Yang

BV Labs ID: OBB353
Sample ID: BH3 SS2
Matrix: Soil

Collected: 2020/10/30
Shipped:
Received: 2020/11/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	7074854	N/A	2020/11/27	Automated Statchk
Strong Acid Leachable Metals by ICPMS	ICP/MS	7037563	2020/11/04	2020/11/05	Daniel Teclu
Moisture	BAL	7037648	N/A	2020/11/04	Gurpreet Kaur (ONT)
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	7077280	2020/11/26	2020/11/26	Mitesh Raj

BV Labs ID: OBB353 Dup
Sample ID: BH3 SS2
Matrix: Soil

Collected: 2020/10/30
Shipped:
Received: 2020/11/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Strong Acid Leachable Metals by ICPMS	ICP/MS	7037563	2020/11/04	2020/11/05	Daniel Teclu

BV Labs ID: OBB355
Sample ID: BH8 SS2
Matrix: Soil

Collected: 2020/10/30
Shipped:
Received: 2020/11/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Strong Acid Leachable Metals by ICPMS	ICP/MS	7039442	2020/11/05	2020/11/05	Azita Fazaeli

BV Labs ID: OBB356
Sample ID: BH4 SS3
Matrix: Soil

Collected: 2020/10/19
Shipped:
Received: 2020/11/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7037635	2020/11/04	2020/11/04	Anna Stuglik Rolland
Moisture	BAL	7037711	N/A	2020/11/04	Gurpreet Kaur (ONT)

BV Labs ID: OBB357
Sample ID: BH1 SS3
Matrix: Soil

Collected: 2020/10/19
Shipped:
Received: 2020/11/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7037635	2020/11/04	2020/11/04	Anna Stuglik Rolland
Moisture	BAL	7037711	N/A	2020/11/04	Gurpreet Kaur (ONT)

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BV Labs Job #: C0S9902
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-802070-A0
Site Location: UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: AC

GENERAL COMMENTS

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

Package 1	2.7°C

Revised report (2020/11/13): Includes results for pH and Grainsize.
Revised report (2020/11/27): Includes results for PAH on sample BH3 SS2.

Results relate only to the items tested.

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BV Labs Job #: C0S9902
Report Date: 2020/11/27

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: HAM-802070-A0
Site Location: UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: AC

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7037635	o-Terphenyl	2020/11/04	88	60 - 130	93	60 - 130	96	%				
7077280	D10-Anthracene	2020/11/26	116	50 - 130	117	50 - 130	129	%				
7077280	D14-Terphenyl (FS)	2020/11/26	113	50 - 130	114	50 - 130	111	%				
7077280	D8-Acenaphthylene	2020/11/26	100	50 - 130	107	50 - 130	100	%				
7037563	Acid Extractable Antimony (Sb)	2020/11/05	82	75 - 125	101	80 - 120	<0.20	ug/g	NC	30		
7037563	Acid Extractable Arsenic (As)	2020/11/05	92	75 - 125	98	80 - 120	<1.0	ug/g	0.31	30		
7037563	Acid Extractable Barium (Ba)	2020/11/05	NC	75 - 125	100	80 - 120	<0.50	ug/g	1.7	30		
7037563	Acid Extractable Beryllium (Be)	2020/11/05	94	75 - 125	94	80 - 120	<0.20	ug/g	1.6	30		
7037563	Acid Extractable Boron (B)	2020/11/05	75	75 - 125	94	80 - 120	<5.0	ug/g	7.8	30		
7037563	Acid Extractable Cadmium (Cd)	2020/11/05	94	75 - 125	98	80 - 120	<0.10	ug/g	6.6	30		
7037563	Acid Extractable Chromium (Cr)	2020/11/05	NC	75 - 125	103	80 - 120	<1.0	ug/g	4.0	30		
7037563	Acid Extractable Cobalt (Co)	2020/11/05	90	75 - 125	99	80 - 120	<0.10	ug/g	0.53	30		
7037563	Acid Extractable Copper (Cu)	2020/11/05	NC	75 - 125	98	80 - 120	<0.50	ug/g	1.2	30		
7037563	Acid Extractable Lead (Pb)	2020/11/05	88	75 - 125	99	80 - 120	<1.0	ug/g	1.2	30		
7037563	Acid Extractable Molybdenum (Mo)	2020/11/05	92	75 - 125	99	80 - 120	<0.50	ug/g	11	30		
7037563	Acid Extractable Nickel (Ni)	2020/11/05	NC	75 - 125	100	80 - 120	<0.50	ug/g	3.3	30		
7037563	Acid Extractable Selenium (Se)	2020/11/05	93	75 - 125	103	80 - 120	<0.50	ug/g	NC	30		
7037563	Acid Extractable Silver (Ag)	2020/11/05	93	75 - 125	96	80 - 120	<0.20	ug/g	NC	30		
7037563	Acid Extractable Thallium (Tl)	2020/11/05	89	75 - 125	98	80 - 120	<0.050	ug/g	2.9	30		
7037563	Acid Extractable Uranium (U)	2020/11/05	86	75 - 125	94	80 - 120	<0.050	ug/g	3.4	30		
7037563	Acid Extractable Vanadium (V)	2020/11/05	NC	75 - 125	99	80 - 120	<5.0	ug/g	3.2	30		
7037563	Acid Extractable Zinc (Zn)	2020/11/05	NC	75 - 125	97	80 - 120	<5.0	ug/g	10	30		
7037635	F2 (C10-C16 Hydrocarbons)	2020/11/04	90	50 - 130	94	80 - 120	<10	ug/g	NC	30		
7037635	F3 (C16-C34 Hydrocarbons)	2020/11/04	99	50 - 130	103	80 - 120	<50	ug/g	NC	30		
7037635	F4 (C34-C50 Hydrocarbons)	2020/11/04	98	50 - 130	102	80 - 120	<50	ug/g	NC	30		
7037648	Moisture	2020/11/04							1.9	20		
7037711	Moisture	2020/11/04							4.1	20		
7039442	Acid Extractable Antimony (Sb)	2020/11/05	83	75 - 125	106	80 - 120	<0.20	ug/g	NC	30		
7039442	Acid Extractable Arsenic (As)	2020/11/05	98	75 - 125	102	80 - 120	<1.0	ug/g	20	30		
7039442	Acid Extractable Barium (Ba)	2020/11/05	NC	75 - 125	104	80 - 120	<0.50	ug/g	2.3	30		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7039442	Acid Extractable Beryllium (Be)	2020/11/05	106	75 - 125	104	80 - 120	<0.20	ug/g	4.3	30		
7039442	Acid Extractable Boron (B)	2020/11/05	90	75 - 125	99	80 - 120	<5.0	ug/g	1.7	30		
7039442	Acid Extractable Cadmium (Cd)	2020/11/05	101	75 - 125	104	80 - 120	<0.10	ug/g	20	30		
7039442	Acid Extractable Chromium (Cr)	2020/11/05	NC	75 - 125	104	80 - 120	<1.0	ug/g	2.5	30		
7039442	Acid Extractable Cobalt (Co)	2020/11/05	102	75 - 125	102	80 - 120	<0.10	ug/g	3.1	30		
7039442	Acid Extractable Copper (Cu)	2020/11/05	NC	75 - 125	102	80 - 120	<0.50	ug/g	2.5	30		
7039442	Acid Extractable Lead (Pb)	2020/11/05	99	75 - 125	103	80 - 120	<1.0	ug/g	2.1	30		
7039442	Acid Extractable Molybdenum (Mo)	2020/11/05	100	75 - 125	103	80 - 120	<0.50	ug/g	NC	30		
7039442	Acid Extractable Nickel (Ni)	2020/11/05	NC	75 - 125	103	80 - 120	<0.50	ug/g	0.34	30		
7039442	Acid Extractable Selenium (Se)	2020/11/05	101	75 - 125	105	80 - 120	<0.50	ug/g	NC	30		
7039442	Acid Extractable Silver (Ag)	2020/11/05	98	75 - 125	103	80 - 120	<0.20	ug/g	NC	30		
7039442	Acid Extractable Thallium (Tl)	2020/11/05	97	75 - 125	102	80 - 120	<0.050	ug/g	3.1	30		
7039442	Acid Extractable Uranium (U)	2020/11/05	101	75 - 125	104	80 - 120	<0.050	ug/g	4.1	30		
7039442	Acid Extractable Vanadium (V)	2020/11/05	NC	75 - 125	102	80 - 120	<5.0	ug/g	0.72	30		
7039442	Acid Extractable Zinc (Zn)	2020/11/05	NC	75 - 125	104	80 - 120	<5.0	ug/g	1.5	30		
7050402	Available (CaCl2) pH	2020/11/11			100	97 - 103			0.25	N/A		
7052820	Sieve - #200 (<0.075mm)	2020/11/13							0.010	20	54	53 - 58
7052820	Sieve - #200 (>0.075mm)	2020/11/13							NC	20	46	42 - 47
7077280	1-Methylnaphthalene	2020/11/26	80	50 - 130	87	50 - 130	<0.0050	ug/g	NC	40		
7077280	2-Methylnaphthalene	2020/11/26	81	50 - 130	91	50 - 130	<0.0050	ug/g	NC	40		
7077280	Acenaphthene	2020/11/26	93	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40		
7077280	Acenaphthylene	2020/11/26	93	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40		
7077280	Anthracene	2020/11/26	96	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40		
7077280	Benzo(a)anthracene	2020/11/26	101	50 - 130	99	50 - 130	<0.0050	ug/g	NC	40		
7077280	Benzo(a)pyrene	2020/11/26	99	50 - 130	91	50 - 130	<0.0050	ug/g	16	40		
7077280	Benzo(b/j)fluoranthene	2020/11/26	96	50 - 130	98	50 - 130	<0.0050	ug/g	NC	40		
7077280	Benzo(g,h,i)perylene	2020/11/26	103	50 - 130	95	50 - 130	<0.0050	ug/g	36	40		
7077280	Benzo(k)fluoranthene	2020/11/26	99	50 - 130	98	50 - 130	<0.0050	ug/g	NC	40		
7077280	Chrysene	2020/11/26	96	50 - 130	95	50 - 130	<0.0050	ug/g	25	40		
7077280	Dibenzo(a,h)anthracene	2020/11/26	108	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7077280	Fluoranthene	2020/11/26	92	50 - 130	96	50 - 130	<0.0050	ug/g	NC	40		
7077280	Fluorene	2020/11/26	94	50 - 130	94	50 - 130	<0.0050	ug/g	NC	40		
7077280	Indeno(1,2,3-cd)pyrene	2020/11/26	100	50 - 130	96	50 - 130	<0.0050	ug/g	16	40		
7077280	Naphthalene	2020/11/26	72	50 - 130	88	50 - 130	<0.0050	ug/g	NC	40		
7077280	Phenanthrene	2020/11/26	97	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40		
7077280	Pyrene	2020/11/26	93	50 - 130	94	50 - 130	<0.0050	ug/g	NC	40		

N/A = Not Applicable

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.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

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 (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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).

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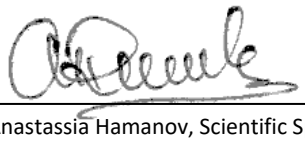
BV Labs Job #: C0S9902
Report Date: 2020/11/27

exp Services Inc
Client Project #: HAM-802070-A0
Site Location: UPPER OTTAWA
Your P.O. #: HAM-ENV
Sampler Initials: AC

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

Brad Newman, B.Sc., C.Chem., Scientific Service 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.

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Your P.O. #: HAM-ENV
Your Project #: HAM-00802070-B0
Site Location: UPPER OTTAWA,HAMILTON
Your C.O.C. #: n/a

Attention: Samuel Lee

exp Services Inc
Stoney Creek Branch
1266 South Service Rd
Suite C1-1
Stoney Creek, ON
CANADA L8E 5R9

Report Date: 2020/11/17
Report #: R6414651
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0U0119
Received: 2020/11/11, 15:12

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
1,3-Dichloropropene Sum	3	N/A	2020/11/16		EPA 8260C m
1,3-Dichloropropene Sum	1	N/A	2020/11/17		EPA 8260C m
Petroleum Hydrocarbons F2-F4 in Water (1)	3	2020/11/14	2020/11/16	CAM SOP-00316	CCME PHC-CWS m
Volatile Organic Compounds and F1 PHCs	3	N/A	2020/11/16	CAM SOP-00230	EPA 8260C m
Volatile Organic Compounds in Water	1	N/A	2020/11/17	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) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Your P.O. #: HAM-ENV
Your Project #: HAM-00802070-B0
Site Location: UPPER OTTAWA,HAMILTON
Your C.O.C. #: n/a

Attention: Samuel Lee

exp Services Inc
Stoney Creek Branch
1266 South Service Rd
Suite C1-1
Stoney Creek, ON
CANADA L8E 5R9

Report Date: 2020/11/17
Report #: R6414651
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0U0119
Received: 2020/11/11, 15:12

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bvlabs.com
Phone# (519)652-9444
==========
This report has been generated and distributed using a secure automated process.
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 #: C0U0119
Report Date: 2020/11/17

exp Services Inc
Client Project #: HAM-00802070-B0
Site Location: UPPER OTTAWA,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: MH

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		ODI239	ODI240	ODI241			ODI242		
Sampling Date		2020/11/10 09:50	2020/11/10 10:00	2020/11/10 10:40			2020/11/10		
COC Number		n/a	n/a	n/a			n/a		
	UNITS	**MW5**	**MW55**	**MW9**	**RDL**	**QC Batch**	**TRIP BLANK LOT #3680**	**RDL**	**QC Batch**
Calculated Parameters									
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	<0.50	<0.50	0.50	7052741	<0.50	0.50	7052741
Volatile Organics									
Acetone (2-Propanone)	ug/L	<10	<10	<10	10	7054663	<10	10	7057386
Benzene	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.20	0.20	7057386
Bromodichloromethane	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.50	0.50	7057386
Bromoform	ug/L	<1.0	<1.0	<1.0	1.0	7054663	<1.0	1.0	7057386
Bromomethane	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.50	0.50	7057386
Carbon Tetrachloride	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.19	0.19	7057386
Chlorobenzene	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.20	0.20	7057386
Chloroform	ug/L	1.9	2.0	<0.20	0.20	7054663	<0.20	0.20	7057386
Dibromochloromethane	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.50	0.50	7057386
1,2-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.40	0.40	7057386
1,3-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.40	0.40	7057386
1,4-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.40	0.40	7057386
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	<1.0	<1.0	1.0	7054663	<1.0	1.0	7057386
1,1-Dichloroethane	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.20	0.20	7057386
1,2-Dichloroethane	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.49	0.49	7057386
1,1-Dichloroethylene	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.20	0.20	7057386
cis-1,2-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.50	0.50	7057386
trans-1,2-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.50	0.50	7057386
1,2-Dichloropropane	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.20	0.20	7057386
cis-1,3-Dichloropropene	ug/L	<0.30	<0.30	<0.30	0.30	7054663	<0.30	0.30	7057386
trans-1,3-Dichloropropene	ug/L	<0.40	<0.40	<0.40	0.40	7054663	<0.40	0.40	7057386
Ethylbenzene	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.20	0.20	7057386
Ethylene Dibromide	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.19	0.19	7057386
Hexane	ug/L	<1.0	<1.0	<1.0	1.0	7054663	<1.0	1.0	7057386
Methylene Chloride(Dichloromethane)	ug/L	<2.0	<2.0	<2.0	2.0	7054663	<2.0	2.0	7057386
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	<10	<10	10	7054663	<10	10	7057386
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	<5.0	5.0	7054663	<5.0	5.0	7057386

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0U0119
Report Date: 2020/11/17

exp Services Inc
Client Project #: HAM-00802070-B0
Site Location: UPPER OTTAWA,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: MH

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		ODI239	ODI240	ODI241			ODI242		
Sampling Date		2020/11/10 09:50	2020/11/10 10:00	2020/11/10 10:40			2020/11/10		
COC Number		n/a	n/a	n/a			n/a		
	UNITS	**MW5**	**MW55**	**MW9**	**RDL**	**QC Batch**	**TRIP BLANK LOT #3680**	**RDL**	**QC Batch**
Methyl t-butyl ether (MTBE)	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.50	0.50	7057386
Styrene	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.40	0.40	7057386
1,1,1,2-Tetrachloroethane	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.50	0.50	7057386
1,1,2,2-Tetrachloroethane	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.40	0.40	7057386
Tetrachloroethylene	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.20	0.20	7057386
Toluene	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.20	0.20	7057386
1,1,1-Trichloroethane	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.20	0.20	7057386
1,1,2-Trichloroethane	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.40	0.40	7057386
Trichloroethylene	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.20	0.20	7057386
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	<0.50	<0.50	0.50	7054663	<0.50	0.50	7057386
Vinyl Chloride	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.20	0.20	7057386
p+m-Xylene	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.20	0.20	7057386
o-Xylene	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.20	0.20	7057386
Total Xylenes	ug/L	<0.20	<0.20	<0.20	0.20	7054663	<0.20	0.20	7057386
F1 (C6-C10)	ug/L	<25	<25	<25	25	7054663			
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25	25	7054663			
Surrogate Recovery (%)									
4-Bromofluorobenzene	%	84	85	85		7054663			
D4-1,2-Dichloroethane	%	101	107	106		7054663			
D8-Toluene	%	96	96	96		7054663			
4-Bromofluorobenzene	%						95		7057386
D4-1,2-Dichloroethane	%						100		7057386
D8-Toluene	%						101		7057386

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0U0119
Report Date: 2020/11/17

exp Services Inc
Client Project #: HAM-00802070-B0
Site Location: UPPER OTTAWA,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: MH

PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		ODI239	ODI240	ODI241		
Sampling Date		2020/11/10 09:50	2020/11/10 10:00	2020/11/10 10:40		
COC Number		n/a	n/a	n/a		
	UNITS	**MW5**	**MW55**	**MW9**	**RDL**	**QC Batch**
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	100	7056653
F3 (C16-C34 Hydrocarbons)	ug/L	<200	210	<200	200	7056653
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	200	7056653
Reached Baseline at C50	ug/L	Yes	Yes	Yes		7056653
Surrogate Recovery (%)						
o-Terphenyl	%	84	85	86		7056653

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0U0119
Report Date: 2020/11/17

exp Services Inc
Client Project #: HAM-00802070-B0
Site Location: UPPER OTTAWA,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: MH

TEST SUMMARY

BV Labs ID: ODI239
Sample ID: MW5
Matrix: Water

Collected: 2020/11/10
Shipped:
Received: 2020/11/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	7052741	N/A	2020/11/16	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7056653	2020/11/14	2020/11/16	Prabhjot Gulati
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7054663	N/A	2020/11/16	Xueming Jiang

BV Labs ID: ODI240
Sample ID: MW55
Matrix: Water

Collected: 2020/11/10
Shipped:
Received: 2020/11/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	7052741	N/A	2020/11/16	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7056653	2020/11/14	2020/11/16	Prabhjot Gulati
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7054663	N/A	2020/11/16	Xueming Jiang

BV Labs ID: ODI241
Sample ID: MW9
Matrix: Water

Collected: 2020/11/10
Shipped:
Received: 2020/11/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	7052741	N/A	2020/11/16	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	7056653	2020/11/14	2020/11/16	Prabhjot Gulati
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7054663	N/A	2020/11/16	Xueming Jiang

BV Labs ID: ODI242
Sample ID: TRIP BLANK LOT #3680
Matrix: Water

Collected: 2020/11/10
Shipped:
Received: 2020/11/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	7052741	N/A	2020/11/17	Automated Statchk
Volatile Organic Compounds in Water	GC/MS	7057386	N/A	2020/11/17	Juan Pangilinan

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

BV Labs Job #: C0U0119
Report Date: 2020/11/17

exp Services Inc
Client Project #: HAM-00802070-B0
Site Location: UPPER OTTAWA,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: MH

GENERAL COMMENTS

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

Package 1	4.0°C

Results relate only to the items tested.

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

BV Labs Job #: C0U0119
Report Date: 2020/11/17

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: HAM-00802070-B0
Site Location: UPPER OTTAWA,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: MH

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7054663	4-Bromofluorobenzene	2020/11/15	101	70 - 130	101	70 - 130	86	%		
7054663	D4-1,2-Dichloroethane	2020/11/15	102	70 - 130	101	70 - 130	104	%		
7054663	D8-Toluene	2020/11/15	103	70 - 130	105	70 - 130	96	%		
7056653	o-Terphenyl	2020/11/15	102	60 - 130	91	60 - 130	88	%		
7057386	4-Bromofluorobenzene	2020/11/17	97	70 - 130	96	70 - 130	95	%		
7057386	D4-1,2-Dichloroethane	2020/11/17	100	70 - 130	95	70 - 130	98	%		
7057386	D8-Toluene	2020/11/17	102	70 - 130	103	70 - 130	102	%		
7054663	1,1,1,2-Tetrachloroethane	2020/11/16	90	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
7054663	1,1,1-Trichloroethane	2020/11/16	95	70 - 130	104	70 - 130	<0.20	ug/L	NC	30
7054663	1,1,2,2-Tetrachloroethane	2020/11/16	83	70 - 130	90	70 - 130	<0.50	ug/L	NC	30
7054663	1,1,2-Trichloroethane	2020/11/16	92	70 - 130	98	70 - 130	<0.50	ug/L	NC	30
7054663	1,1-Dichloroethane	2020/11/16	89	70 - 130	97	70 - 130	<0.20	ug/L	NC	30
7054663	1,1-Dichloroethylene	2020/11/16	94	70 - 130	102	70 - 130	<0.20	ug/L	NC	30
7054663	1,2-Dichlorobenzene	2020/11/16	91	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
7054663	1,2-Dichloroethane	2020/11/16	88	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
7054663	1,2-Dichloropropane	2020/11/16	88	70 - 130	96	70 - 130	<0.20	ug/L	NC	30
7054663	1,3-Dichlorobenzene	2020/11/16	91	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
7054663	1,4-Dichlorobenzene	2020/11/16	82	70 - 130	89	70 - 130	<0.50	ug/L	NC	30
7054663	Acetone (2-Propanone)	2020/11/16	87	60 - 140	92	60 - 140	<10	ug/L	NC	30
7054663	Benzene	2020/11/16	87	70 - 130	94	70 - 130	<0.20	ug/L	NC	30
7054663	Bromodichloromethane	2020/11/16	91	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
7054663	Bromoform	2020/11/16	85	70 - 130	91	70 - 130	<1.0	ug/L	NC	30
7054663	Bromomethane	2020/11/16	89	60 - 140	93	60 - 140	<0.50	ug/L	NC	30
7054663	Carbon Tetrachloride	2020/11/16	94	70 - 130	103	70 - 130	<0.20	ug/L	NC	30
7054663	Chlorobenzene	2020/11/16	90	70 - 130	97	70 - 130	<0.20	ug/L	NC	30
7054663	Chloroform	2020/11/16	91	70 - 130	99	70 - 130	<0.20	ug/L	NC	30
7054663	cis-1,2-Dichloroethylene	2020/11/16	94	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
7054663	cis-1,3-Dichloropropene	2020/11/16	80	70 - 130	76	70 - 130	<0.30	ug/L	NC	30
7054663	Dibromochloromethane	2020/11/16	85	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
7054663	Dichlorodifluoromethane (FREON 12)	2020/11/16	103	60 - 140	113	60 - 140	<1.0	ug/L	NC	30

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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
7054663	Ethylbenzene	2020/11/16	81	70 - 130	88	70 - 130	<0.20	ug/L	NC	30
7054663	Ethylene Dibromide	2020/11/16	85	70 - 130	91	70 - 130	<0.20	ug/L	NC	30
7054663	F1 (C6-C10) - BTEX	2020/11/16					<25	ug/L	NC	30
7054663	F1 (C6-C10)	2020/11/16	94	60 - 140	97	60 - 140	<25	ug/L	NC	30
7054663	Hexane	2020/11/16	95	70 - 130	105	70 - 130	<1.0	ug/L	NC	30
7054663	Methyl Ethyl Ketone (2-Butanone)	2020/11/16	78	60 - 140	83	60 - 140	<10	ug/L	NC	30
7054663	Methyl Isobutyl Ketone	2020/11/16	84	70 - 130	92	70 - 130	<5.0	ug/L	NC	30
7054663	Methyl t-butyl ether (MTBE)	2020/11/16	83	70 - 130	89	70 - 130	<0.50	ug/L	NC	30
7054663	Methylene Chloride(Dichloromethane)	2020/11/16	92	70 - 130	98	70 - 130	<2.0	ug/L	NC	30
7054663	o-Xylene	2020/11/16	82	70 - 130	90	70 - 130	<0.20	ug/L	NC	30
7054663	p+m-Xylene	2020/11/16	67 (1)	70 - 130	73	70 - 130	<0.20	ug/L	NC	30
7054663	Styrene	2020/11/16	67 (1)	70 - 130	74	70 - 130	<0.50	ug/L	NC	30
7054663	Tetrachloroethylene	2020/11/16	87	70 - 130	93	70 - 130	<0.20	ug/L	NC	30
7054663	Toluene	2020/11/16	84	70 - 130	91	70 - 130	<0.20	ug/L	NC	30
7054663	Total Xylenes	2020/11/16					<0.20	ug/L	NC	30
7054663	trans-1,2-Dichloroethylene	2020/11/16	92	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
7054663	trans-1,3-Dichloropropene	2020/11/16	84	70 - 130	80	70 - 130	<0.40	ug/L	NC	30
7054663	Trichloroethylene	2020/11/16	98	70 - 130	105	70 - 130	<0.20	ug/L	NC	30
7054663	Trichlorofluoromethane (FREON 11)	2020/11/16	95	70 - 130	104	70 - 130	<0.50	ug/L	NC	30
7054663	Vinyl Chloride	2020/11/16	95	70 - 130	103	70 - 130	<0.20	ug/L	NC	30
7056653	F2 (C10-C16 Hydrocarbons)	2020/11/16	109	50 - 130	105	60 - 130	<100	ug/L	NC	30
7056653	F3 (C16-C34 Hydrocarbons)	2020/11/16	125	50 - 130	121	60 - 130	<200	ug/L	NC	30
7056653	F4 (C34-C50 Hydrocarbons)	2020/11/16	129	50 - 130	122	60 - 130	<200	ug/L	NC	30
7057386	1,1,1,2-Tetrachloroethane	2020/11/17	99	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
7057386	1,1,1-Trichloroethane	2020/11/17	98	70 - 130	99	70 - 130	<0.20	ug/L	NC	30
7057386	1,1,2,2-Tetrachloroethane	2020/11/17	108	70 - 130	104	70 - 130	<0.40	ug/L	NC	30
7057386	1,1,2-Trichloroethane	2020/11/17	110	70 - 130	107	70 - 130	<0.40	ug/L	NC	30
7057386	1,1-Dichloroethane	2020/11/17	101	70 - 130	102	70 - 130	<0.20	ug/L	2.6	30
7057386	1,1-Dichloroethylene	2020/11/17	102	70 - 130	103	70 - 130	<0.20	ug/L	NC	30
7057386	1,2-Dichlorobenzene	2020/11/17	97	70 - 130	100	70 - 130	<0.40	ug/L	NC	30

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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
7057386	1,2-Dichloroethane	2020/11/17	99	70 - 130	96	70 - 130	<0.49	ug/L	NC	30
7057386	1,2-Dichloropropane	2020/11/17	109	70 - 130	108	70 - 130	<0.20	ug/L	NC	30
7057386	1,3-Dichlorobenzene	2020/11/17	93	70 - 130	99	70 - 130	<0.40	ug/L	NC	30
7057386	1,4-Dichlorobenzene	2020/11/17	109	70 - 130	116	70 - 130	<0.40	ug/L	NC	30
7057386	Acetone (2-Propanone)	2020/11/17	141 (2)	60 - 140	121	60 - 140	<10	ug/L	NC	30
7057386	Benzene	2020/11/17	102	70 - 130	102	70 - 130	<0.20	ug/L	NC	30
7057386	Bromodichloromethane	2020/11/17	101	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
7057386	Bromoform	2020/11/17	96	70 - 130	94	70 - 130	<1.0	ug/L	NC	30
7057386	Bromomethane	2020/11/17	95	60 - 140	89	60 - 140	<0.50	ug/L	NC	30
7057386	Carbon Tetrachloride	2020/11/17	92	70 - 130	94	70 - 130	<0.19	ug/L	NC	30
7057386	Chlorobenzene	2020/11/17	100	70 - 130	101	70 - 130	<0.20	ug/L	0.88	30
7057386	Chloroform	2020/11/17	99	70 - 130	99	70 - 130	<0.20	ug/L	NC	30
7057386	cis-1,2-Dichloroethylene	2020/11/17	108	70 - 130	108	70 - 130	<0.50	ug/L	NC	30
7057386	cis-1,3-Dichloropropene	2020/11/17	93	70 - 130	80	70 - 130	<0.30	ug/L	NC	30
7057386	Dibromochloromethane	2020/11/17	97	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
7057386	Dichlorodifluoromethane (FREON 12)	2020/11/17	91	60 - 140	87	60 - 140	<1.0	ug/L	NC	30
7057386	Ethylbenzene	2020/11/17	98	70 - 130	102	70 - 130	<0.20	ug/L	NC	30
7057386	Ethylene Dibromide	2020/11/17	104	70 - 130	101	70 - 130	<0.19	ug/L	NC	30
7057386	Hexane	2020/11/17	112	70 - 130	112	70 - 130	<1.0	ug/L	NC	30
7057386	Methyl Ethyl Ketone (2-Butanone)	2020/11/17	144 (2)	60 - 140	128	60 - 140	<10	ug/L	NC	30
7057386	Methyl Isobutyl Ketone	2020/11/17	136 (2)	70 - 130	129	70 - 130	<5.0	ug/L	NC	30
7057386	Methyl t-butyl ether (MTBE)	2020/11/17	102	70 - 130	102	70 - 130	<0.50	ug/L	NC	30
7057386	Methylene Chloride(Dichloromethane)	2020/11/17	103	70 - 130	101	70 - 130	<2.0	ug/L	NC	30
7057386	o-Xylene	2020/11/17	97	70 - 130	101	70 - 130	<0.20	ug/L	NC	30
7057386	p+m-Xylene	2020/11/17	99	70 - 130	104	70 - 130	<0.20	ug/L	NC	30
7057386	Styrene	2020/11/17	107	70 - 130	112	70 - 130	<0.40	ug/L	NC	30
7057386	Tetrachloroethylene	2020/11/17	84	70 - 130	89	70 - 130	<0.20	ug/L	NC	30
7057386	Toluene	2020/11/17	98	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
7057386	Total Xylenes	2020/11/17					<0.20	ug/L	NC	30
7057386	trans-1,2-Dichloroethylene	2020/11/17	99	70 - 130	103	70 - 130	<0.50	ug/L	NC	30

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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
7057386	trans-1,3-Dichloropropene	2020/11/17	99	70 - 130	81	70 - 130	<0.40	ug/L	NC	30
7057386	Trichloroethylene	2020/11/17	100	70 - 130	103	70 - 130	<0.20	ug/L	NC	30
7057386	Trichlorofluoromethane (FREON 11)	2020/11/17	90	70 - 130	91	70 - 130	<0.50	ug/L	NC	30
7057386	Vinyl Chloride	2020/11/17	102	70 - 130	103	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).

(1) The recovery was below the lower control limit. This may represent a low bias in some results for this specific analyte.

(2) The recovery was above the upper control limit. This may represent a high bias in some results for this specific analyte. For results that were not detected (ND), this potential bias has no impact.

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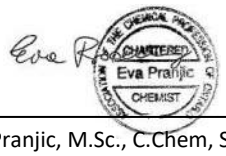
BV Labs Job #: C0U0119
Report Date: 2020/11/17

exp Services Inc
Client Project #: HAM-00802070-B0
Site Location: UPPER OTTAWA,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: MH

VALIDATION SIGNATURE PAGE

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



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

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For Service Group specific validation please refer to the Validation Signature Page.

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Your P.O. #: HAM-ENV
Your Project #: HAM-00802070
Site Location: UPPER OTTAWA STREET,HAMILTON
Your C.O.C. #: na

Attention: Samuel Lee

exp Services Inc
Stoney Creek Branch
1266 South Service Rd
Suite C1-1
Stoney Creek, ON
CANADA L8E 5R9

Report Date: 2020/11/30
Report #: R6430701
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0V3644
Received: 2020/11/25, 14:55

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Strong Acid Leachable Metals by ICPMS	1	2020/11/28	2020/11/30	CAM SOP-00447	EPA 6020B 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.

Your P.O. #: HAM-ENV
Your Project #: HAM-00802070
Site Location: UPPER OTTAWA STREET,HAMILTON
Your C.O.C. #: na

Attention: Samuel Lee

exp Services Inc
Stoney Creek Branch
1266 South Service Rd
Suite C1-1
Stoney Creek, ON
CANADA L8E 5R9

Report Date: 2020/11/30
Report #: R6430701
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0V3644
Received: 2020/11/25, 14:55

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bvlabs.com
Phone# (519)652-9444
==========
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BV Labs Job #: C0V3644
Report Date: 2020/11/30

exp Services Inc
Client Project #: HAM-00802070
Site Location: UPPER OTTAWA STREET,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: SG

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

BV Labs ID		OGH326		
Sampling Date		2020/10/19		
COC Number		na		
	UNITS	**BH6 SS33**	**RDL**	**QC Batch**
Metals				
Acid Extractable Antimony (Sb)	ug/g	<0.20	0.20	7082098
Acid Extractable Arsenic (As)	ug/g	9.1	1.0	7082098
Acid Extractable Barium (Ba)	ug/g	130	0.50	7082098
Acid Extractable Beryllium (Be)	ug/g	0.88	0.20	7082098
Acid Extractable Boron (B)	ug/g	7.3	5.0	7082098
Acid Extractable Cadmium (Cd)	ug/g	1.6	0.10	7082098
Acid Extractable Chromium (Cr)	ug/g	25	1.0	7082098
Acid Extractable Cobalt (Co)	ug/g	18	0.10	7082098
Acid Extractable Copper (Cu)	ug/g	27	0.50	7082098
Acid Extractable Lead (Pb)	ug/g	140	1.0	7082098
Acid Extractable Molybdenum (Mo)	ug/g	0.63	0.50	7082098
Acid Extractable Nickel (Ni)	ug/g	27	0.50	7082098
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	7082098
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	7082098
Acid Extractable Thallium (Tl)	ug/g	0.15	0.050	7082098
Acid Extractable Uranium (U)	ug/g	0.77	0.050	7082098
Acid Extractable Vanadium (V)	ug/g	40	5.0	7082098
Acid Extractable Zinc (Zn)	ug/g	310	5.0	7082098

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0V3644
Report Date: 2020/11/30

exp Services Inc
Client Project #: HAM-00802070
Site Location: UPPER OTTAWA STREET,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: SG

TEST SUMMARY

BV Labs ID: OGH326
Sample ID: BH6 SS33
Matrix: Soil

Collected: 2020/10/19
Shipped:
Received: 2020/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Strong Acid Leachable Metals by ICPMS	ICP/MS	7082098	2020/11/28	2020/11/30	Viviana Canzonieri

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BV Labs Job #: C0V3644
Report Date: 2020/11/30

exp Services Inc
Client Project #: HAM-00802070
Site Location: UPPER OTTAWA STREET,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: SG

GENERAL COMMENTS

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

Package 1	3.3°C

Results relate only to the items tested.

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BV Labs Job #: C0V3644
Report Date: 2020/11/30

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: HAM-00802070
Site Location: UPPER OTTAWA STREET,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: SG

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7082098	Acid Extractable Antimony (Sb)	2020/11/30	88	75 - 125	93	80 - 120	<0.20	ug/g	NC	30
7082098	Acid Extractable Arsenic (As)	2020/11/30	92	75 - 125	100	80 - 120	<1.0	ug/g	0.15	30
7082098	Acid Extractable Barium (Ba)	2020/11/30	NC	75 - 125	96	80 - 120	<0.50	ug/g	0.11	30
7082098	Acid Extractable Beryllium (Be)	2020/11/30	91	75 - 125	95	80 - 120	<0.20	ug/g	NC	30
7082098	Acid Extractable Boron (B)	2020/11/30	90	75 - 125	95	80 - 120	<5.0	ug/g	0.57	30
7082098	Acid Extractable Cadmium (Cd)	2020/11/30	92	75 - 125	96	80 - 120	<0.10	ug/g	NC	30
7082098	Acid Extractable Chromium (Cr)	2020/11/30	91	75 - 125	97	80 - 120	<1.0	ug/g	1.3	30
7082098	Acid Extractable Cobalt (Co)	2020/11/30	93	75 - 125	98	80 - 120	<0.10	ug/g	3.1	30
7082098	Acid Extractable Copper (Cu)	2020/11/30	90	75 - 125	95	80 - 120	<0.50	ug/g	0.27	30
7082098	Acid Extractable Lead (Pb)	2020/11/30	NC	75 - 125	100	80 - 120	<1.0	ug/g	0.71	30
7082098	Acid Extractable Molybdenum (Mo)	2020/11/30	91	75 - 125	93	80 - 120	<0.50	ug/g	NC	30
7082098	Acid Extractable Nickel (Ni)	2020/11/30	93	75 - 125	97	80 - 120	<0.50	ug/g	2.3	30
7082098	Acid Extractable Selenium (Se)	2020/11/30	96	75 - 125	106	80 - 120	<0.50	ug/g	NC	30
7082098	Acid Extractable Silver (Ag)	2020/11/30	92	75 - 125	96	80 - 120	<0.20	ug/g	NC	30
7082098	Acid Extractable Thallium (Tl)	2020/11/30	91	75 - 125	99	80 - 120	<0.050	ug/g	3.1	30
7082098	Acid Extractable Uranium (U)	2020/11/30	91	75 - 125	98	80 - 120	<0.050	ug/g	6.0	30
7082098	Acid Extractable Vanadium (V)	2020/11/30	NC	75 - 125	97	80 - 120	<5.0	ug/g	4.2	30
7082098	Acid Extractable Zinc (Zn)	2020/11/30	NC	75 - 125	93	80 - 120	<5.0	ug/g	1.3	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.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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).

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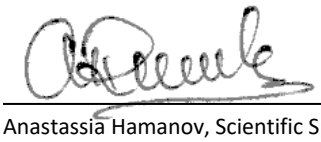
BV Labs Job #: C0V3644
Report Date: 2020/11/30

exp Services Inc
Client Project #: HAM-00802070
Site Location: UPPER OTTAWA STREET,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: SG

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

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Your P.O. #: HAM-ENV
Your Project #: HAM-00802070
Site Location: UPPPER OTTAWA STREET,HAMILTON
Your C.O.C. #: na

Attention: Samuel Lee

exp Services Inc
Stoney Creek Branch
1266 South Service Rd
Suite C1-1
Stoney Creek, ON
CANADA L8E 5R9

Report Date: 2020/11/30
Report #: R6430990
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0V3650
Received: 2020/11/25, 14:55

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Methylnaphthalene Sum	2	N/A	2020/11/30	CAM SOP-00301	EPA 8270D m
Moisture	2	N/A	2020/11/26	CAM SOP-00445	Carter 2nd ed 51.2 m
PAH Compounds in Soil by GC/MS (SIM)	2	2020/11/29	2020/11/30	CAM SOP-00318	EPA 8270D 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.

Your P.O. #: HAM-ENV
Your Project #: HAM-00802070
Site Location: UPPPER OTTAWA STREET,HAMILTON
Your C.O.C. #: na

Attention: Samuel Lee

exp Services Inc
Stoney Creek Branch
1266 South Service Rd
Suite C1-1
Stoney Creek, ON
CANADA L8E 5R9

Report Date: 2020/11/30
Report #: R6430990
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0V3650
Received: 2020/11/25, 14:55

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bvlabs.com
Phone# (519)652-9444
==========
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BV Labs Job #: C0V3650
Report Date: 2020/11/30

exp Services Inc
Client Project #: HAM-00802070
Site Location: UPPPER OTTAWA STREET,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: SG

RESULTS OF ANALYSES OF SOIL

BV Labs ID		OGH366	OGH367		
Sampling Date		2020/10/19	2020/10/19		
COC Number		na	na		
	UNITS	**BH1 SS3**	**BH6 SS2**	**RDL**	**QC Batch**
Inorganics					
Moisture	%	15	11	1.0	7078020

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0V3650
Report Date: 2020/11/30

exp Services Inc
Client Project #: HAM-00802070
Site Location: UPPPER OTTAWA STREET,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: SG

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

BV Labs ID		OGH366		OGH367		
Sampling Date		2020/10/19		2020/10/19		
COC Number		na		na		
	UNITS	**BH1 SS3**	**RDL**	**BH6 SS2**	**RDL**	**QC Batch**
Calculated Parameters						
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	0.0071	<0.071	0.071	7075445
Polyaromatic Hydrocarbons						
Acenaphthene	ug/g	<0.0050	0.0050	<0.050	0.050	7082346
Acenaphthylene	ug/g	<0.0050	0.0050	<0.050	0.050	7082346
Anthracene	ug/g	<0.0050	0.0050	<0.050	0.050	7082346
Benzo(a)anthracene	ug/g	<0.0050	0.0050	<0.050	0.050	7082346
Benzo(a)pyrene	ug/g	<0.0050	0.0050	0.074	0.050	7082346
Benzo(b/j)fluoranthene	ug/g	0.0056	0.0050	0.093	0.050	7082346
Benzo(g,h,i)perylene	ug/g	0.014	0.0050	0.12	0.050	7082346
Benzo(k)fluoranthene	ug/g	<0.0050	0.0050	<0.050	0.050	7082346
Chrysene	ug/g	<0.0050	0.0050	0.052	0.050	7082346
Dibenzo(a,h)anthracene	ug/g	<0.0050	0.0050	<0.050	0.050	7082346
Fluoranthene	ug/g	<0.0050	0.0050	0.064	0.050	7082346
Fluorene	ug/g	<0.0050	0.0050	<0.050	0.050	7082346
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	0.0050	0.074	0.050	7082346
1-Methylnaphthalene	ug/g	<0.0050	0.0050	<0.050	0.050	7082346
2-Methylnaphthalene	ug/g	<0.0050	0.0050	<0.050	0.050	7082346
Naphthalene	ug/g	<0.0050	0.0050	<0.050	0.050	7082346
Phenanthrene	ug/g	<0.0050	0.0050	<0.050	0.050	7082346
Pyrene	ug/g	<0.0050	0.0050	0.093	0.050	7082346
Surrogate Recovery (%)						
D10-Anthracene	%	103		98		7082346
D14-Terphenyl (FS)	%	102		98		7082346
D8-Acenaphthylene	%	99		102		7082346

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0V3650
Report Date: 2020/11/30

exp Services Inc
Client Project #: HAM-00802070
Site Location: UPPPER OTTAWA STREET,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: SG

TEST SUMMARY

BV Labs ID: OGH366
Sample ID: BH1 SS3
Matrix: Soil

Collected: 2020/10/19
Shipped:
Received: 2020/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	7075445	N/A	2020/11/30	Automated Statchk
Moisture	BAL	7078020	N/A	2020/11/26	Prgya Panchal
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	7082346	2020/11/29	2020/11/30	Lingyun Feng

BV Labs ID: OGH367
Sample ID: BH6 SS2
Matrix: Soil

Collected: 2020/10/19
Shipped:
Received: 2020/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	7075445	N/A	2020/11/30	Automated Statchk
Moisture	BAL	7078020	N/A	2020/11/26	Prgya Panchal
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	7082346	2020/11/29	2020/11/30	Lingyun Feng

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BV Labs Job #: C0V3650
Report Date: 2020/11/30

exp Services Inc
Client Project #: HAM-00802070
Site Location: UPPPER OTTAWA STREET,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: SG

GENERAL COMMENTS

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

Package 1	3.3°C

Sample OGH367 [BH6 SS2] : PAH analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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BV Labs Job #: C0V3650
Report Date: 2020/11/30

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: HAM-00802070
Site Location: UPPPER OTTAWA STREET,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: SG

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7082346	D10-Anthracene	2020/11/30	102	50 - 130	106	50 - 130	107	%		
7082346	D14-Terphenyl (FS)	2020/11/30	100	50 - 130	102	50 - 130	104	%		
7082346	D8-Acenaphthylene	2020/11/30	96	50 - 130	96	50 - 130	95	%		
7078020	Moisture	2020/11/26							6.4	20
7082346	1-Methylnaphthalene	2020/11/30	97	50 - 130	100	50 - 130	<0.0050	ug/g	NC	40
7082346	2-Methylnaphthalene	2020/11/30	96	50 - 130	98	50 - 130	<0.0050	ug/g	NC	40
7082346	Acenaphthene	2020/11/30	92	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40
7082346	Acenaphthylene	2020/11/30	87	50 - 130	88	50 - 130	<0.0050	ug/g	NC	40
7082346	Anthracene	2020/11/30	94	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40
7082346	Benzo(a)anthracene	2020/11/30	102	50 - 130	101	50 - 130	<0.0050	ug/g	NC	40
7082346	Benzo(a)pyrene	2020/11/30	89	50 - 130	91	50 - 130	<0.0050	ug/g	NC	40
7082346	Benzo(b/j)fluoranthene	2020/11/30	99	50 - 130	107	50 - 130	<0.0050	ug/g	6.9	40
7082346	Benzo(g,h,i)perylene	2020/11/30	105	50 - 130	107	50 - 130	<0.0050	ug/g	NC	40
7082346	Benzo(k)fluoranthene	2020/11/30	107	50 - 130	108	50 - 130	<0.0050	ug/g	NC	40
7082346	Chrysene	2020/11/30	100	50 - 130	104	50 - 130	<0.0050	ug/g	NC	40
7082346	Dibenzo(a,h)anthracene	2020/11/30	122	50 - 130	113	50 - 130	<0.0050	ug/g	NC	40
7082346	Fluoranthene	2020/11/30	98	50 - 130	105	50 - 130	<0.0050	ug/g	0.60	40
7082346	Fluorene	2020/11/30	96	50 - 130	98	50 - 130	<0.0050	ug/g	NC	40
7082346	Indeno(1,2,3-cd)pyrene	2020/11/30	107	50 - 130	106	50 - 130	<0.0050	ug/g	NC	40
7082346	Naphthalene	2020/11/30	89	50 - 130	90	50 - 130	<0.0050	ug/g	NC	40
7082346	Phenanthrene	2020/11/30	96	50 - 130	100	50 - 130	<0.0050	ug/g	NC	40
7082346	Pyrene	2020/11/30	96	50 - 130	102	50 - 130	<0.0050	ug/g	0.14	40

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).

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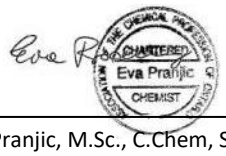
BV Labs Job #: C0V3650
Report Date: 2020/11/30

exp Services Inc
Client Project #: HAM-00802070
Site Location: UPPPER OTTAWA STREET,HAMILTON
Your P.O. #: HAM-ENV
Sampler Initials: SG

VALIDATION SIGNATURE PAGE

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



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

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Appendix F – Non-Potable Groundwater Application

Hamilton Water, Public Works Department
77 James Street North, Suite 400
Hamilton, ON, L8R 2K3
Phone: (905) 546-2424 x.5180
Fax: (905) 546-4491
Email: kyle.rankin@hamilton.ca

File No. 20-30

02 November 2020

EXP
Nicole McQuoid
1266 South Service Road Unit C1-1
Stoney Creek, Ontario L8E 5R9

Dear Nicole McQuoid,

Subject: **Response to notification of Non-Potable Groundwater Conditions – No Objection**

The notification supplied to the City of Hamilton regarding the intent to apply for an Ontario Records of Site Condition Regulation O. Reg 153/04 at 570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario dated 10/30/2020 has been received. In response to your notification, we have no objection, and we offer the following information:

There are two criteria upon which the Municipality can offer confirmation for in reference to as O. Reg. 153/04 Sec 35(3) (a) and (b):

- the property, and all other properties located, in whole or in part, within 250 metres of the boundaries of the property, are supplied by a municipal drinking-water system as defined in the *Safe Drinking Water Act, 2002*; we confirm that City-provided water services are available for properties within 250m of the site.

- the property is not located in an area designated in a municipal official plan as a well-head protection area or other designation identified by the municipality for the protection of groundwater.

Please be advised that there are other circumstances, such as Environmentally Sensitive Areas (O. Reg. 153/04 Sec 41) that preclude the use of the intended criteria, and further that the City is making no statement in regards to these or other circumstances.

The City of Hamilton cannot offer any other information regarding your notification and urges you to ensure any ground water sources on or near the site are identified and appropriately assessed as part of your investigation.

Thank you,

Kyle Rankin

Kyle Rankin, B.A., PG(GIS)
Water Resources Technologist, Source Water Protection
Hamilton Water, City of Hamilton

20-30 Notification submitted by Nicole McQuoid, B.Sc., Ept.
phone: (905) 525 6069

October 30, 2020

Mr. Kyle Rankin
Hamilton Water, Public Works Deportment
77 James Street North, Suite 400
Hamilton, Ontario, Canada
L8P 2K3

Re: HAM-00802070-A0 570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton
Notification to Apply Non-Potable Groundwater Condition

Dear Mr. Rankin:

This submission is to inform the municipality that EXP Services Inc. (EXP) has been retained to undertake Environmental Site Assessment (ESAs) on the land situated on the subject site in preparation for the completion of a Record of Site Condition (RSC).

In this regard, and following the protocols as stipulated in Ontario Regulation 153/04 (*Environmental Protection Act*, Records of Site Condition – Part XV.1 of the Act), EXP, on behalf of the owner, herby informs the municipality that it is our intention to utilize a non-potable groundwater standard for the above-mentioned property.

Should you have any questions or require additional information, please feel free to contact the undersigned.

Yours Truly,
EXP Services Inc.

Nicole McQuoid, B.Sc., EPt,
Environmental Technician
Environmental Services
t : +1.289.860.1424 | m : +1.519.240.1802 | e : nicole.mcquoid@exp.com

Appendix G – Phase Two Conceptual Site Model

Phase Two Conceptual Site Model – 570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, Ontario

This section presents a Phase Two Conceptual Site Model (P2CSM) providing a narrative, graphical and tabulated description integrating information related to the Site geologic and hydrogeologic conditions, areas of potential environmental concern/potential contaminating activities, the presence and distribution of potential contaminants of concern, contaminant fate and transport, and potential exposure pathways. These components are discussed in the following sections. The Phase Two CSM was completed in accordance with O. Reg.153/04 as defined by the Ministry of the Environment, Conservation, and Parks (MECP).

1. Introduction

The Site is located on the northwest corner of the intersection of Upper Ottawa Street and Fennell Avenue East. The Site has an area of approximately 1.5 hectares (3.72 acres) and contains two (2) commercial buildings:

- Site Building A: A one-storey building, with a basement and a footprint of approximately 4,560 m^2 (49,083 ft^2). The building is located on the south portion of the Site and is occupied by various commercial establishments (Salti's, Top Games, Sherwood Barber & Hairstyling, Safe Gold, Arepas El Mana, Mirror Ladies Fashions, Mobex Mobile Exploration, Honest Lawyer and Crazy Bill's). Salti's, the largest commercial space, consists of a grocery store, restaurant, office space, storage and vacant bowling alley on the first floor and storage, event space and previous furniture manufacturing in the basement. The remainder of the building consists of various retail space, a hair salon and a restaurant on the first floor.
- Site Building B: a one-storey building, with no basement and a footprint of approximately 250 m^2 (2690 ft^2). The building is located on the east portion of the Site and is occupied by Tim Hortons. The building consists of kitchens, storage and dining space.

The exterior areas surrounding the Site building consist of a paved asphalt parking and laneways to the south and east. The areas surrounding the Site consist of laneways and commercial properties to the south and east, and residential dwellings to the north and west.

Refer to Table 1 for the Site identification information.

Table 1: Site Identification Information

Municipal Address	570, 580 Upper Ottawa Street, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East, Hamilton, ON
Current Land Use	Commercial
Proposed Land Use	Residential / Mixed Use
Legal Description	Block B, Plan 1210; Hamilton
Property Identification Number (PIN)	17068-0115 (LT)
Approximate Universal Transverse Mercator (UTM) coordinates	NAD83 17T 594996.22 m E 4786612.51 m N

Accuracy Estimate of UTM	10-15 m
Measurement Method	Google Earth
Site Area	1.51 hectares (3.72 acres)
Property Owner	2650494 Ontario Inc.

2. Potentially Contaminating Activities and Areas of Potential Environmental Concern

2.1 Potentially Contaminating Activities

A Phase One ESA, in accordance with O.Reg.153/04, has been conducted by EXP in October 2020 for the Phase One Property. Several potentially contaminating activities (PCAs) were identified on-Site and within 250 m from the Phase One Property site boundaries. All PCAs that were identified within 250 m property are shown on Figure 2. Each PCA was further evaluated to determine if the activity may be contributing to an area of potential environmental concern (APEC) at the Phase One Property.

The QP determined that select PCAs may contribute to an APEC for the property, while several PCAs were determined to not contribute to an APEC at the Phase One Property/Site due to various factors including, but not limited to, relative distance to the Phase One Property/Site, orientation to the Phase One Property/Site; degree and nature of PCA operations, potentially impacted media, etc. Refer to Table 2 for the evaluation of the PCAs in the Phase One Study Area.

Table 2: Potentially Contaminating Activities in the Phase One Study Area

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
Site					
1	Site (570, 580 Upper Ottawa, 1093, 1095, 1099, 1101, 1107, 1109, 1113, 1115 Fennell Avenue East)	Entire Site (excluding building footprint)	PCA#30 – Importation of Fill Material.	Based on the records review and previous reports, fill material is present throughout the Site.	Yes, based on the PCA occurring on-Site.
Surrounding Properties					
2	1110 Fennell Avenue East	25 m south	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks. PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the reviewed ERIS Report and City Directories the property was occupied by Shell Canada and consisted of five (5) underground storage tanks. Additionally, several spills pertaining to gasoline were reported on the property.	Yes, based on the inferred hydraulically up-gradient location and close proximity relative to the Site.

PCA Identifier	Address	Location of Activity (in relation to Site)[1]	Potentially Contaminating Activity (PCA)[2]	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
3	1120 Fennel Avenue East (previously 585 Upper Ottawa Street)	50 m southeast	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks. PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the reviewed City Directories the property was occupied by Esso from 1960 to 1969.	Yes, based on the inferred hydraulically up-gradient location and close proximity relative to the Site.
4	1104 Fennell Avenue East	25 m south	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used).	Based on the reviewed City Directories the property was occupied by Westdale Cleaners from 1969 to 1970.	Yes, based on the inferred hydraulically up-gradient location and close proximity relative to the Site.
5	1096 Fennell Avenue East	25 m south	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used).	Based on the reviewed City Directories the property was occupied by De Luxe Cleaners from 1965 to 1969.	Yes, based on the inferred hydraulically up-gradient location and close proximity relative to the Site.
6	1134 Fennell Avenue East	70 m southeast	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used).	Based on the reviewed ERIS and City Directories, the property, was occupied by various dry-cleaners and were listed as a dry-cleaning facility from 1986 to 2018. In addition, the property was registered as a waste generator of halogenated solvents from 1986 to 2020.	No, based on the inferred hydraulically trans-gradient location relative to the Site.
7	1132 Fennell Avenue East	70 m southeast	PCA#18 - Electricity Generation, Transformation and Power Stations	Based on the reviewed ERIS, the property, reported a spill at Nick's Hair Design in 1998 of 1 L of non-PCB mineral oil to asphalt due to a transformer cooling system leak. Environmental impact was not anticipated.	No, based on the small quantity of mineral oil spilled and the inferred hydraulically trans-gradient location relative to the Site

PCA Identifier	Address	Location of Activity (in relation to Site)(1)	Potentially Contaminating Activity (PCA)(2)	Approximate timeline that PCA occurred	Contributes to APEC (Yes or No)?
8	1160 Fennell Avenue East	145 m southeast	PCA#28 – Gasoline and Associated Products Storage in Fixed Tanks. PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems.	Based on the reviewed ERIS Report and City Directories the property was occupied by several gasoline service stations and consisted of four (4) underground storage tanks containing gasoline and diesel.	No, based on separation distance from the Site.
9	15 Idlewood	175 m southeast	PCA#18 - Electricity Generation, Transformation and Power Stations	Horizon Utilities Corporation reported a spill in 2014 for 3 L of transmission oil to soil due to pole top transformer leak. Environmental impact was not anticipated.	No, based on the small quantity of oil spilled and the inferred hydraulically trans-gradient location relative to the Site

(1) Distances are approximately only. Precise distances are not possible due to the age of some listings and the aggregation and/or loss of addresses.
(2) Potentially contaminating activity means a use or activity set out in Column A of Table 2 of Schedule D (O.Reg 153/04, as amended) that is occurring or had occurred in a phase one study area

2.2 Areas of Potential Environmental Concern

Based on the evaluation of the PCAs located within the Phase One Study Area, areas of potential environmental concern (APECs) were identified, as presented in Figure 4, and summarized in Table 3 below.

Table 3: Areas of Potential Environmental Concern (APECs)

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)1	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or sediment)
APEC 1: Presence of imported fill material	Entire Site (excluding building footprint)	PCA#30 – Importation of Fill Material.	On-Site	Polycyclic Aromatic Hydrocarbons (PAHs) and Metals	Soil
APEC 2: Presence of USTs and gasoline service stations at 1110 Fennel Avenue East (PCA identifier 2)	South portion of the Site	PCA#28- Gasoline and Associated Products Storage in Fixed Tanks PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used	Off-Site	Petroleum Hydrocarbons (PHCs) and Benzene, Toluene, ethylbenzene and Xylenes (BTEX), and Volatile Organic Compounds (VOCs)	Groundwater

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)1	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or sediment)
		to maintain transportation systems.			
APEC 3: Former USTs and gasoline service stations at 1120 Fennel Avenue East (PCA identifier 3)	Southeast portion of the Site	PCA#28- Gasoline and Associated Products Storage in Fixed Tanks PCA#52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems.	Off-Site	Petroleum Hydrocarbons (PHCs) and Benzene, Toluene, ethylbenzene and Xylenes (BTEX), and Volatile Organic Compounds (VOCs)	Groundwater
APEC 4: Historic Dry Cleaning Operation at 1104 Fennell Avenue East (PCA identifier 4)	South portion of the Site	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used).	Off-Site	Volatile Organic Compounds (VOCs)	Groundwater
APEC 5: Historic Dry Cleaning Operation 1096 Fennell Avenue East (PCA identifier 5)	South portion of the Site	PCA#37 – Operation of Dry Cleaning Equipment (where chemicals are used).	Off-Site	Volatile Organic Compounds (VOCs)	Groundwater

Notes:

Area of Potential Environmental Concern means the area on, in or under a phase one study area where one or more contaminants are potentially present, as determined through the PI ESA, including through (a) identification of post or present uses on, in or under the phase one property, and (b) identification of potentially contaminating activities.

(1)Potentially contaminating activity means a use or activity set out in Column A of Table 2 of Schedule D (O.Reg.153/04, as amended) that is occurring or has occurred in a phase one Study area.

Refer to Figures 4 for the location of APECs on the Site. Boreholes/monitoring wells advanced on the Site to investigate the identified APECs are shown on Figures 5.

2.3 Underground Utilities

The Site utilities and services were identified at the Site based on information provided in environmental records, relevant utility infrastructure observed during the Site reconnaissance. The Site utilities are summarized in the table below and noted on Figure 3, where available. It is noted that the precise underground location of the utilities cannot be determined without professional locate services.

Utility	Source	Location	Site Entry
Sanitary Sewer	City of Hamilton	Underground	Unknown

Utility	Source	Location	Site Entry
Storm Sewer	City of Hamilton	Underground	Catch basins located on the northern and western portion of the Site.
Water	City of Hamilton	Underground	Unknown
Electricity	Alectra Utilities	Underground	From pole-mounted transformers near southwest corner of Site, overhead wires travel along the southern portion of the Site.
Telecommunications	Rogers	Overhead	Along the southern side of the Site building A and eastern side of Site building B.
Sanitary Sewer	City of Hamilton	Underground	Unknown

3. Physical Site Description

3.1 Geological and Hydrogeological Conditions

The Site and surrounding areas are expected to consist of Glaciolacustrine deposits that predominantly consist of silt and clay, minor sand, basin and quiet water deposits. The bedrock in the general area of the Site is part of a group belonging to the Lockport Formation consisting of shale, dolostone and siltstone.

According to the topographic map from Natural Resources of Canada (Toporama), the elevation of the Site is approximately 190 m above sea level. A review of the topographic map indicated that Redhill Creek is located approximately 1.8 km southeast of the Site and flows north/northeast towards Hamilton Harbour located approximately 5 km northwest of the Site. Based on local topography and the proximity to Redhill Creek, the anticipated groundwater flow direction is to the north/northeast.

Based on the review of available resources from the Ministry of Natural Resources and Forestry website on October 13, 2020, no areas of natural significance were identified at the Site or within 30 m of the Site.

The general stratigraphy at the Site, as observed in the boreholes, asphalt and granular fill, underlain by silty clay and clayey silt fill material, followed predominantly by silty clay and clayey silt, followed by assumed bedrock and limestone in three (3) of the boreholes. A brief description of the soil stratigraphy at the Site, in order of depth, is summarized in the following sections.

3.1.1 Surface Material

Asphalt with thickness of between approximately 50 mm and 125 mm was encountered at the surface of all boreholes.

3.1.2 Fill Material

Granular fill was encountered below the asphalt in all the boreholes. Fill material was encountered below the granular fill in all the boreholes. The fill typically consisted of a silty clay and/or clayey silt. This fill layer extended to a maximum depth of 2.06 m bgs.

3.1.3. Native Material

A layer of silty clay, sandy silt and/or clayey silt was encountered below the fill materials and granular fill at all borehole locations.

3.1.4 Bedrock

During the Phase Two ESA, assumed bedrock was encountered to the maximum depths of ranging 1.68 m bgs (BH7) to 2.62 m bgs (BH1) and limestone in three (3) of the boreholes (BH3, BH5 & BH9). Please note that bedrock was encountered at less than 2 m bgs in two (2) of the boreholes (BH4 and BH7).).

3.2 Hydrogeology

A minimum of three (3) monitoring wells, screened within the sample geological formation, is required to estimate groundwater flow direction. Groundwater water levels were measured at the Site on between October 30th and November 10th, 2020. Based on the groundwater contour map delineated for the Site, the shallow groundwater is anticipated to flow in a southerly direction. A groundwater contour map is presented in Figure 6. However, EXP notes that the direction of localized groundwater flow may be influenced by disturbed soil (fill), underground utilities and/or underground building structures in the area. As such, the measured groundwater flow direction may not be representative of the regional area. Refer to Table 4 for the Site hydrogeology characteristics based on groundwater monitoring observations.

Table 4: Site Hydrogeology Characteristics

Location	Observation
Depth to Groundwater	3.47 m bgs to 4.10 m bgs
Groundwater Elevation	185.61 m to 187.07 m
Horizontal Hydraulic Gradient	0.014 m/m (between MW3 and MW5) 0.004 m/m (between MW5 and MW9)

3.3 Site Sensitivity

The Site Sensitivity classification with respect to the conditions set out under Section 35, Section 41 and 43.1 of O.Reg.153/04 were evaluated to determine if the Site is sensitive, as presented in Table 5.

Table 5: Site Sensitivity

Sensitivity	Classification	Does Sensitivity Apply to Site?
Section 35 applies if	(i) The full depth generic site condition standards in a non-potable groundwater condition	Yes
	(ii) The stratified site condition standards in a non-potable groundwater condition	No
	(iii) The property, and all other properties located, in whole or in part, within 250 metres of the boundaries of the property, are supplied by a municipal drinking water system	Yes
	(iv) The record of site condition does not specify agricultural or other use as the type of property use	Yes
	(v) The property is located in an area designated in the municipal official plan as a well-head protection area or other designation identified by the municipality for the protection of groundwater	No
	(vi) The property or one of the properties in the phase one study area has a well used or intended for use as a source of water for human consumption or agriculture.	No
	(vii) A person authorized by the owner of a property has given the clerk of the municipality a written notice of intention to apply the standards in preparing a record of site condition for the property;	Yes

Sensitivity	Classification	Does Sensitivity Apply to Site?
	A. the single tier municipality has given written notice that it does not object to the application of the standards	
Section 41 applies if	(i) property is within an area of natural significance	No
	(ii) property includes or is adjacent to an area of natural significance or part of such an area	No
	(iii) property includes land that is within 30 m of an area of natural significance or part of such an area	No
	(iv) soil at property has a pH value for surface soil less than 5 or greater than 9	No
	(v) soil at property has a pH value for sub-surface soil less than 5 or greater than 11	No
	(vi) a qualified person is of the opinion that, given the characteristics of the property and the certifications the qualified person would be required to make in a record of site condition in relation to the property as specified in Schedule A, it is appropriate to apply this section to the property	No
Section 43.1 applies if	(i) property is a shallow soil property	No
	(ii) property includes all or part of a water body or is adjacent to a water body or includes land that is within 30 m of a water body (Redhill Creek)	No

3.3.1 Soil Importation

Fill material is typically brought to a property as a base for buildings and pavement areas. Fill can also be used to re-grade a property, and to backfill excavations.

Based on the reviewed information, it appears that fill material was encountered at the Site. In addition, no fill material has been brought to the Site during the Supplemental Phase Two ESA.

3.4 Land Use

It is understood that the Site is intended to be re-developed for Residential / Mixed Use.

4. Contaminants of Concern

For assessment purposes, EXP selected the MECP (2011) Table 3: Full depth Background Site condition Standards in a Non-Potable Ground Water Condition for Residential/Parkland/Institutional Property Use and medium-fine textured soil was considered applicable for determining contaminants of concern (COCs), based on the rationale presented in Table 6.

Table 6: Site specific Condition

Description	Site Specific Condition
Section 35 Site Sensitivity	Applicable • The full depth generic site condition standards in a non-potable groundwater condition.

Description	Site Specific Condition
	• The property, and all other properties located, in whole or in part, within 250 metres of the boundaries of the property, are supplied by a municipal drinking water system • The Site is not proposed for agricultural or other property use for filing RSC. • The Site was not located within wellhead protection area. • No well within the Phase One Study Area is used as a source of water for human consumption or agriculture. • A person authorized by the owner of a property has given the clerk of the municipality a written notice of intention to apply the non-portable ground water standards. The single tier municipality (City of Hamilton) has given written notice that it does not object to the application of the standards
Section 41 Site Sensitivity	Not applicable • The soil at the Site has pH values between 5 and 9 for surficial soil; and, between 5 and 11 for subsurface soil. • The Site is not located within a Significant Area, and/or located adjacent to an area of natural significance/an environmentally sensitive area.
Section 43.1 Site Sensitivity	Not applicable • The Site is not considered a shallow soil property, based on the recovered soil cores, which indicated that more than two-thirds of the Site has an overburden thickness in excess of 2 m. • The Site is not located within 30 m of a surface water body; the nearest surface water body, Redhill Creek, is located approximately 1.8 m southeast of the Site.
Ground Water	Non-Potable • The Site and surrounding properties within 250 m of the Site are supplied by a municipal drinking water system, and no potable water wells are located on the Site or within 250 m of the Site.
Land Use	Commercial • The proposed future use of the Site is for Residential/Mixed Use.
Soil Texture	Medium-fine textured • The predominant texture of soils at the Site is considered to be coarse textured, based on soil characteristics identified in the borehole logs and 75 micron sieve.

4.1 Soil and Groundwater Impacts

A chemical constituent was selected as a COC if it was detected in soil or groundwater samples obtained from the Site at a concentration in excess of the applicable Table 3 SCS.

Soil samples were submitted for the analysis of Petroleum Hydrocarbons including Benzene, Toluene, Ethylbenzene and Xylenes (PHCs including BTEX), PAHs, and/or Metals. Some parameters were measured above the Table 3 SCS, and the following COCs were identified;

- Zinc in BH2 SS2 and BH4 SS2, measured above the Table 3 SCS.

Groundwater samples were submitted for the analysis of PHCs and VOCs. All groundwater parameters were either non-detected or detected below their applicable MECP (2011) Table 3 SCS.

Analytical results of soil and groundwater samples collected on the Site are presented for soil in a plan view on Figures 7 and 9 and for groundwater in view plan are on Figures 10 and 11. The impacted soil in cross section is represented on Figures 12B and 14B.

4.2 Contaminant Fate and Transport

4.2.1 Soil Media

The soil COCs noted at the Site from the current investigation include zinc. The exceedance of Zinc in soil are likely associated with poor quality fill material.

4.2.2 Preferential Pathways

The preferential pathways for contaminants present in soil media, include various underground utilities, building footings and subsurface features.

Underground utilities were identified at the Site. As such, there is a potential for underground utilities to affect the distribution and transport of soil vapour contaminants located on the Site.

Details on the preferential pathways for the impacts are summarized in Table 13.

Table 13: Preferential Pathways

Anything known about migration of the contaminants present on, in or under the phase two property at a concentration greater than the applicable site condition standard away from any area of potential environmental concern, including the identification of any preferential pathways,	Current utilities may affect soil vapour migration. Future utilities may affect soil vapour migration. Current and future building footings may affect soil vapour and migration.

4.2.3 Climatic Conditions

It is noted that climatic or meteorological conditions may influence the distribution and migration of COCs at the Site. Seasonal fluctuations in groundwater due to cyclical increases and decreases in precipitation can affect groundwater recharge. Groundwater levels may be elevated in the spring and fall due to snow melt and/or increases in precipitation; and, groundwater levels may be lowered in the winter and summer due to snow storage and/or increased evaporation. Such fluctuations can increase the vertical distribution of COCs in the capillary zone, as well as alter the direction of groundwater flow paths based on changes in infiltration rates. However, based on the conditions observed at the Site and the solubility of the COC, it is not anticipated that the climatic or meteorological changes will result in significant alterations in the distribution of contaminants.

4.2.4 Soil Vapour Migration

The identified COC (zinc) in soil is non-volatile and immobile. Therefore, it will pose potential soil vapour migration or vapour intrusion pathway.

5 Exposure Pathways

5.1 Human Health Receptors and Exposure Pathways

The Site is currently occupied by;

- Site Building A: A one-storey building, with a basement and a footprint of approximately 4,560 m^2 (49,083 ft^2).
- Site Building B: A one-storey building, with no basement and a footprint of approximately 250 m^2 (2690 ft^2).

The Site is proposed to be redeveloped for residential purposes. Based on future residential land use of the Site, the receptors that are anticipated to be present include property residents and visitors/trespassers (all ages), indoor long-term workers (adult (i.e., maintenance worker, concierge) and outdoor long-term workers (adult (i.e., landscaper). Subsurface (construction) workers are also considered potential receptors where future utilities or site renovations are planned.

Groundwater at the Site is considered non-potable. Drinking water for the City of Hamilton is sourced from Lake Ontario and is municipally serviced. The minimum depth to groundwater at the Site is 3.47 m bgs.

5.2 Ecological Receptors and Exposure Pathways

The Site is located in an urban environment capable of supporting some terrestrial ecological receptors. There are no on-Site waterbodies. The nearest waterbody is Redhill Creek, located approximately 1.8 km southeast. Consistent with the MECP (2011b), the potential on-Site ecological receptors include terrestrial vegetation such as trees, grasses and shrubs; soil invertebrates such as earthworms; terrestrial birds such as woodcocks and blackbirds; and, terrestrial mammals such as voles and shrews.