Phase Two Environmental Site Assessment

6102 Renaud Road, Ottawa, ON

Type of Document:
Final

Client:
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Project Number:
OTT-00242146-B0

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Date Submitted:
October 30, 2017

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Executive Summary

Exp Services Inc. (**exp**) was retained by 2597237 Ontario Limited to conduct a Phase Two Environmental Site Assessment (ESA) of the property located at 6102 Renaud Road in Ottawa, Ontario hereinafter referred to as the 'site'. The objective of the Phase Two ESA was to address areas of potential environmental concern (APEC) identified in a Phase I ESA conducted at the site by **exp** in September 2017. It is understood that this report is required as part of the permitting process with the City of Ottawa. We understand that a Record of Site Condition (RSC) is not required.

The findings of the Phase I ESA were presented in a report entitled *Phase One Environmental Site Assessment, 6102 Renaud Road, Ottawa, Ontario,* **exp** Services Inc., dated September 18, 2017. The Phase I ESA identified the following APECs:

Table EX.1: Areas of Potential Environmental Concern

Area of Potential Environmental Concern (APEC)	Potentially Contaminating Activity (PCA)	Location of PCA (On-Site or Off-Site)	Contribution to APEC at the Site (Yes/No)	Media Potentially Impacted (Groundwater, Soil and/or Sediment)	Potential Contaminates of Concern
APEC 1: Former AST 1 (located in the residence basement)	#28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	Yes	Soil and groundwater	Petroleum hydrocarbons (PHC) and benzene, toluene, ethylbenzene, xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs)
APEC 2: Former AST 2, 3 and 4 (two interior and one exterior of the commercial building)	#28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	Yes	Soil and groundwater	PHC, BTEX, PAHs
APEC 3: Former commercial printing operated from 1986 to 2000	#31 – Ink Manufacturing, Processing and Bulk Storage	On-Site	Yes	Soil and groundwater	Volatile organic compounds (VOC)

Based on the Phase One ESA findings, a Phase Two ESA was recommended to assess the soil and groundwater quality at the site from the above-noted APECs. A site plan with the APECs is provided on Figure 2.

The Phase Two ESA consisted advancing a total of four (4) boreholes (MW17-1 to MW17-4) at the site. Soil and groundwater samples were collected and submitted for laboratory analysis of PHC, PAHs, BTEX and/or VOC.

For assessment purposes, **exp** selected the Site Condition Standards (SCS), table 3, Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition for residential property use and fine

textured soil, provided in *Soil, Groundwater and Sediment Standards for use Under Part XV.1 of the Environmental Protection Act*, Ministry of the Environment (MOECC), 2011 in accordance with Ontario Regulation 153/04 (as amended).

Based on the Phase Two ESA results, the following summary is provided:

- Below the concrete in MW17-3 was silty sand with gravel. Below the concrete in MW17-1 was silty clay. Monitoring wells MW 17-2 and MW17-4 had silty sandy gravel fill from surface to a maximum depth of 1.84 m depth. No odours or visual indications of impact were observed in the fill material. Below the fill in MW17-1, MW17-2 and MW 17-3 was silty clay or clay which extended to borehole termination 3.66 to 4.58 m. Below the fill in MW17-4 was silty sand with gravel, followed by a layer of clay then glacial till. The till was comprised of clay with silt and gravel some fine sand. No odours or visual indications of impact were observed in the native material.
- On October 5, 2017, groundwater was encountered at a depth of 1.46 m bgs to 1.72 m bgs in MW17-3 and MW17-11. No petroleum sheens were observed in the monitoring wells during either sampling event. Based on the groundwater level measurements, the groundwater flow in the area of the boreholes is to the south.
- The concentrations of PAHs, PHC, BTEX and/or VOC measured in the soil samples and blind duplicate were either less than the laboratory detection limit and/or less then the MOECC 2011 Table 3 SCS.
- The concentrations of PHCs, PAHs, BTEX and/or VOC parameters in all of the groundwater samples were non-detect and/ or less than the MOECC Table 3 SCS, with the exception of PHC F2 and F3 in the duplicate sample collected from MW17-4 on October 10, 2017. These concentrations slightly above the MOECC Table 3 SCS (170 ug/L vs 150 ug/L PHC F2, and 510 ug/L vs 500 ug/L PHC F3).
- An additional groundwater sample was collected and submitted from MW 17-4. This sample had concentrations of PHC F2 and F3 that were less than the MOECC Table 3 SCS. Therefore, **exp** concludes:
    - The monitoring well MW-17-4 is located at the former AST location (APEC-4), and therefore represents a worst-case sample location.
    - PHCs were not detected in the soil sample from MW17-4.
    - Two of the three groundwater samples from MW17-4 had PHC F2 and F3 concentrations that were less than the MOECC Table 3 SCS and the other sample had PHC F2 and F3 concentrations that were slightly above the MOECC Table 3 SCS.
    - The minor PHC F2 and F3 concentrations detected in the groundwater sample from MW17-4 is likely caused by slightly turbid groundwater and is not indicative of groundwater contamination.
    - If dewatering is required during site redevelopment, the groundwater may require treatment prior to disposal or it may require disposal off-site by a licensed waste contractor.

Based on the Phase Two ESA findings, no further work is recommended at this time. If the wells are no longer needed, they should be decommissioned in accordance with Ontario Regulation 903.

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1 Introduction

Exp Services Inc. (**exp**) was retained by 2597237 Ontario Limited to conduct a Phase Two Environmental Site Assessment (ESA) of the property located at 6102 Renaud Road in Ottawa, Ontario, hereinafter referred to as the 'Site'. The objective of the Phase Two ESA was to address areas of potential environmental concern (APEC) identified in a Phase One ESA conducted at the site by **exp** in September 2017. It is understood that this report is required as part of the permitting process with the City of Ottawa. We understand that a Record of Site Condition (RSC) is not required.

This report has been prepared in accordance with the Phase Two ESA standard as defined by Ontario Regulation 153/04 (as amended), and in accordance with generally accepted professional practices. Subject to this standard of care, **exp** makes no express or implied warranties regarding its services and no third-party beneficiaries are intended. Limitation of liability, scope of report and third-party reliance are outlined in Section 9 of this report.

1.1 Site Description

The site is located on the south side of Renaud Road and to the east of Saddleridge Drive in Ottawa. The site is rectangular in shape and covers an area of approximately 0.58 hectares. The site is currently occupied by a residential house in the north part and a commercial building on the south part. The municipal address of the site is 6102 Renaud Road and is legally described as CON 4 OF PT LOT6 RP5R3857;PARTS 1 AND 2, City of Ottawa. The City of Ottawa PIN is 043520429, and 043520430. A site plan is presented as Figure 2 in Appendix B.

Topographically, the Site is relatively flat. The surrounding area has a slight downwards slope towards the south. The closest body of water is the Mer Bleue bog located approximately 500 m south of the Site. The groundwater flow direction was estimated to be southern towards the Mer Bleue bog.

The approximate Universal Transverse Mercator (UTM) coordinates for the Site centroid is NAD83, Zone 18, 459481.91 m E, 5030702.77 m N. The UTM coordinates were based on an estimate derived using Google Earth™. The accuracy of the centroid is estimated to range from 5 to 50 m.

1.2 Property Ownership

At the time of the investigation, the Site was owned by Raymond Perrault and Louis Perrault. The owner contact information is provided below:

Owner Contact: Mr. Raymond Perrault and Mr. Louis Perrault
6102 Renaud Road
Ottawa, Ontario K1W 1E9

1.3 Current and Proposed Future Uses

At the time of the Phase Two ESA investigation, the site consisted of two (2)-storey buildings, one a residential dwelling the other a mixed residential/ commercial building. The site is to be redeveloped with residential buildings.

1.4 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 MOE *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, ("SGWS" Standards), (MOE, 2011a). 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 MOE (2011a). 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 MOE (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 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 MOE (2011) Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition for residential property use and fine textured soil. The selection of this category was based on the following factors:

- The predominant soil type on the site was considered to be fine textured (refer to the results of the Grain Size Analysis as provided in the Certificates of Analysis presented in Appendix E); and,
- There was no intention to carry out a stratified restoration at the site.
- More than two-thirds 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 11 for subsurface soils.
- The property is not 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.
- The site is fully serviced by the City of Ottawa water distribution system and, to the best of **exp**'s knowledge; all properties within 250 m of the site are also serviced by the municipal water supply (i.e. there are no potable water supply wells located within the Phase One Study Area).
- The site was commercial/residential and will be commercial/residential in the future.

2 Background Information

2.1 Past Investigations

The findings of the Phase One ESA were presented in a report entitled *Phase One Environmental Site Assessment, 6102 Renaud Road, Ottawa, Ontario,* **exp** Services Inc., dated September 18, 2017. The Phase One ESA identified the following APECs:

Table 2.1: Areas of Potential Environmental Concern

Area of Potential Environmental Concern (APEC)	Potentially Contaminating Activity (PCA)	Location of PCA (On-Site or Off-Site)	Contribution to APEC at the Site (Yes/No)	Media Potentially Impacted (Groundwater, Soil and/or Sediment)	Potential Contaminates of Concern
APEC 1: Former AST 1 (located in the residence basement)	#28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	Yes	Soil and groundwater	Petroleum hydrocarbons (PHC) and benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs)
APEC 2: Former AST 2, 3 and 4 (two interior and one exterior of the commercial building)	#28 – Gasoline and Associated Products Storage in Fixed Tanks	On-Site	Yes	Soil and groundwater	PHC, BTEX, PAHs
APEC 3: Former commercial printing operated from 1986 to 2000	#31 – Ink Manufacturing, Processing and Bulk Storage	On-Site	Yes	Soil and groundwater	Volatile organic compounds (VOC)

Based on the Phase One ESA findings, a Phase Two ESA was recommended to assess the soil and groundwater quality at the site from the above-noted APECs. A site plan with the APECs is provided on Figure 2.

3 Scope of the Investigation

3.1 Overview of Site Investigation

The purpose of the Phase Two ESA was to investigate the soil and groundwater quality at the site.

It is understood that the site is to be re-developed into a residential and/or commercial land use. As part of the permitting process, the City of Ottawa requires that a Phase Two ESA be completed in accordance with Ontario Regulation 153/04 (as amended).

3.2 Scope of Work

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

- Request local utility locating companies (e.g., cable, telephone, gas, hydro) to mark any underground utilities present at the subject 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 four (4) boreholes and complete them as groundwater monitoring wells;
- Collect representative soil samples for chemical analysis of PHC, PAHs, BTEX and/or VOC;
- Collect representative groundwater samples for chemical analysis of metals, PHC, PAHs, BTEX and/or VOC;
- Measure groundwater levels in the monitoring wells;
- Complete a survey of the monitoring well locations relative to a geodetic or other permanent benchmark and in reference with the Universal Transverse Mercator (UTM) coordinate system for vertical and horizontal control; and,
- Review the analytical data and prepare a report of the findings.

Jeff O'Banion conducted assessment work for this project and was supervised by Daniel Clarke, P.Eng. and Mark McCalla, P.Geo., QP_{ESA}. Mark McCalla is a qualified person as defined by O. Reg. 153/04.

3.3 Media Investigated

The Phase Two ESA included the investigation of on-site soil and groundwater. As there are no water bodies on the site, no surface water or sediment sampling was required.

The potential contaminants of concern (PCOCs) identified in the Phase One ESA were identified as target parameters for this Phase Two ESA. The areas of potential environmental concern (APEC) and PCOCs identified in the Phase One ESA are outlined in Table 2.1.

The rationale for the selection of borehole and monitoring well locations during this investigation were to place them at the former on-site heating oil tanks to assess the soil and groundwater conditions. A copy of the Sampling and Analysis Plan prepared for the site is provided in Appendix A.

3.4 Deviations from Sampling and Analysis Plan

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 Sampling and Analysis Plan were reported that affected the sampling and data quality objectives for the site.

3.5 Impediments

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

4 Investigation Method

4.1 General

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

4.2 Borehole Drilling

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

On October 2, 2017, four (4) boreholes (MW17-1 to MW17-4) were advanced at the site by Strata Drilling Group, a licensed well contractor, under the full-time supervision of **exp** staff. Strata used a direct push probe with acetate liners to drill the borehole and collect the soil samples. The locations of the boreholes and monitoring wells are presented on Figure 3 in Appendix B.

No petroleum-based greases or solvents were used during drilling activities. **Exp** staff continuously monitored the drilling activities and recorded the depth of soil sample collection and total depth of boring. Field observations are summarized on the borehole logs provided in Appendix C.

4.3 Soil Sampling

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

Soil samples for geologic characterization were collected on a continuous basis in the overburden materials using 5 cm diameter, 120 cm long, lined tube samplers advanced into the subsurface using a direct push probe. The soil cores were removed from the samplers upon retrieval by drilling personnel. Geologic details of the recovered cores were logged by **exp** field staff. **Exp** staff continuously monitored the drilling activities to log the stratigraphy observed from the recovered soil cores, to record the depth of soil sample collection, to record total depths of borings, and to record visual or olfactory observations of potential impacts. Field observations are summarized on the borehole logs provided in Appendix C.

Soil samples identified for possible laboratory analysis were collected from the lined tube sampler and placed directly into pre-cleaned, laboratory-supplied glass sample jars/vials. Samples to be analysed for PHC fraction F1, BTEX and VOCs were collected using a soil core sampler and placed in to vials containing methanol as a preservative. The jars and vials were sealed with Teflon-lined lids to minimize head-space and reduce the potential for induced volatilization during storage/transport prior to analysis. All soil samples were placed in clean coolers containing ice prior to and during transportation to the subcontract laboratory, Maxxam Analytics Laboratories (Maxxam) of Ottawa, Ontario. The samples were transported/submitted within 24 hours of collection to Maxxam following chain of custody protocols for chemical analysis.

The dedicated acetate liners were disposed of between sampling intervals by the drilling contractor.

4.4 Field Screening Measurements

The remaining portion of each soil sample was placed in a sealed Ziploc plastic bag and allowed to reach ambient temperature prior to field screening with a combustible vapour meter calibrated to hexane gas prior to use. The field screening measurements were made by inserting the instrument's probe into the plastic bag while manipulating the sample to ensure volatilization of the soil gases. These 'headspace' readings provide a real-time indication of the relative concentration of combustible vapours encountered in the

subsurface during drilling and are used to aid in the assessment of the vertical and horizontal extent of potential impacts and the selection of soil samples for analysis. The field screening measurements, in parts per million (ppm) hexane equivalents, are presented with the borehole logs provided in Appendix C.

4.5 Soil Sample Submission

Soil samples were selected for laboratory analysis based on combustible vapour measurements and visual and olfactory evidence of impacts, where observed. One worst case soil sample from each borehole was submitted for laboratory analysis of PAHs, PHC, BTEX and/or VOCs. One soil sample was also submitted for grain size analysis and pH.

4.6 Groundwater: Monitoring Well Installation

Groundwater monitoring wells were installed in boreholes MW17-1, MW17-2, MW17-3 and MW17-4. The monitoring wells were installed in general accordance with the Ontario Water Resources Act - R.R.O. 1990, Regulation 903 (as-amended) and were installed by Strata Drilling, a licensed well contractor.

The monitoring wells consisted of a 3.0 m length of 31 mm diameter Schedule 40 PVC screen and an appropriate length of PVC riser pipe. The annular space around the wells was backfilled with sand to an average height of 0.3 m above the top of the screen. A bentonite seal was added from the top of the sand pack to approximately 0.3 m below ground surface. The monitoring wells were completed with flush mount protector at the surface. Details of the monitoring well installations are shown on the Borehole Logs provided in Appendix C.

The installation details of the installed monitoring wells are summarized in Table 4.1.

Table 4.1: Monitoring Well Installation Details

Monitoring Well/Piezometer	Ground Elevation (masl)	Top of Sand Elevation (masl)	Top of Screen Elevation (masl)	Bottom of Screen Elevation (masl)	Bottom of Borehole Elevation (masl)	Depth of Borehole (mbgs)
MW17-1	78.63	77.40	77.10	74.05	74.05	3.66
MW17-2	78.04	76.81	76.51	73.46	73.46	4.58
MW17-3	77.52	76.29	75.99	72.94	72.94	4.58
MW17-4	77.13	75.90	75.60	72.55	72.55	4.58

Note: Elevations were collected using a level survey and a topographic survey of the property. A geodetic datum was established at the site (south east of the residential/commercial building) with a known elevation of 76.92 m above sea level.

mbgs – metres below ground surface

masl – metres above sea level

TOC - top of plastic well casing

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 the time of borehole insertion to prevent contact with the ground and other surfaces;
- Cleaning of drilling equipment between sampling locations; and,
- The use of hollow stem augers to prevent loose and potentially contaminated material in overlying layers from sloughing into the boreholes and coming into contact with groundwater.

4.7 Groundwater: Field Measurement of Water Quality Parameters

The static water level was measured, the depth of each well was recorded and the well sampled. **Exp** used an interface probe to measure the possible presence of light non-aqueous phase liquid (LNAPL) in each monitoring well. During development of the wells, pH, conductivity, temperature, and salinity were measured at regular intervals using a YSI 550 multi probe water quality meter that was calibrated using in-house pH and conductivity reference standards.

4.8 Groundwater: Sampling

Groundwater samples were collected from the monitoring wells on October 5 and October 10, 2017. An additional groundwater sample was collected form MW17-4 on October 20, 2017. The monitoring activities consisted of measuring the depth to groundwater in each monitoring well so that groundwater flow and direction below the site could be assessed. The water level measurements were recorded on water level log sheets. The water level meter probe was decontaminated between monitoring well locations with a spray bottle of water and alconox solution, menthol, then potable water.

The wells were then sampled using a “low flow” technique whereby the wells were continuously purged using an electric pump (equipped with dedicated tubing) and parameters within the purged water were monitored using a groundwater chemistry multi-meter at 3 minute intervals. These parameters include: pH, conductivity, temperature, and salinity. Once these parameters were found to deviate less than 10% over three testing events, equilibrium was deemed to have occurred and a sample of the groundwater was collected.

The purge water was also continuously monitored for visual and olfactory evidence of petroleum and solvent impact (sheen and odour).

The groundwater samples and a blind duplicate were collected in laboratory provided sample bottles and submitted to Maxxam for analysis of PHC, PAHs, BTEX and/or VOCs. The groundwater samples were placed in clean coolers containing ice prior to and during transportation to the subcontract laboratory.

4.9 Sediment: Sampling

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

4.10 Analytical Testing

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

4.11 Elevation Survey

An elevation survey was conducted to obtain vertical control of the monitoring well locations. The top of casing and ground surface elevation of each monitoring well location was surveyed using a level and a topographic survey of the property. A geodetic datum was established at the site (south east of the residential/commercial building) with a known elevation of 76.92 m above sea level.

4.12 Residue Management

Due to the type of drilling, minimal drill cuttings were generated. The drill cuttings were disposed of by Strata Drilling.

Due to the low flow sampling method, there was minimal purge water developed, and purged water from groundwater sampling was stored in a pail. Since there were no visual or olfactory evidence of impact, the water was disposed of on the grass at the site.

4.13 Quality Assurance and Quality Control Measures

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

- Collection and analysis of blind duplicate soil and groundwater samples to ensure analytical precision;
- Using dedicated and/or disposal sampling equipment;
- Following proper decontamination protocols to minimize cross-contamination;
- Maintaining field notes and completing field forms to document on-site activities; and,
- Using only laboratory supplied sample containers and following prescribed sample protocols, including proper preservation, meeting sample hold times, proper chain of custody documentation, to ensure integrity of the samples.

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

5 Review and Evaluation

5.1 Geology

The detailed soil profiles encountered in the boreholes are provided on the attached borehole logs (Appendix C). Boundaries of soils indicated on the logs are intended to reflect transition zones for the purpose of environmental assessment and should not be interpreted as exact planes of geological change. A brief description of the soil stratigraphy at the site, in order of depth, is summarized in the following sections. The interpreted site geology is shown on the enclosed cross section (Figure 4, Appendix B).

5.1.1 Asphalt/Concrete

A layer of 100 mm-thick concrete was found at MW17-1 and MW17-3. MW17-2 and MW17-4 had no concrete or asphalt at the ground surface.

5.1.2 Fill Material

Below the concrete in MW17-3 was silty sand with gravel, below the concrete in MW17-1 was silty clay. Monitoring wells MW 17-2 and MW17-4 had silty sandy gravel fill from surface to a maximum depth of 1.84 m depth. No odours or visual indications of impact were observed in the fill material.

5.1.3 Native Material

Below the fill in MW17-1, MW17-2 and MW 17-3 was silty clay or clay which extended to borehole termination 3.66 to 4.58 m. Below the fill in MW17-4 was silty sand with gravel, followed by a layer of clay then glacial till. The till was comprised of clay with silt and gravel some fine sand. No odours or visual indications of impact were observed in the native material.

Based on field observations of soil texture and the grain size analysis conducted on MW17-3 from 1 m to 3 m, the soil at the site is fine grained, shown in appendix E.

5.1.4 Bedrock

Bedrock was not encountered during this drilling program.

5.2 Groundwater: Elevations and Flow Direction

The monitoring well network advanced as part of this Phase Two ESA consists of four (4) monitoring wells screened within the geologic overburden at the site.

Groundwater elevations and water levels were measured at the Site on October 5, 2017. Groundwater was encountered at a depth of 1.46 m bgs to 1.72 m bgs in MW17-3 and MW17-1. No petroleum sheens were observed in the monitoring wells during either sampling event.

A summary of the elevation survey and groundwater levels for each well are shown on Table 5.1.

Table 5.1: Groundwater Elevations

Monitoring Well ID	Ground Elevation (m)	October 5, 2017	
		Water Level (mbgs)	Water Level (MASL)
MW17-1	78.63	1.72	77.08
MW17-2	78.04	1.63	76.59
MW17-3	77.52	1.46	76.26
MW17-4	77.13	1.63	75.50

Note: **m**bgs – metres below ground surface
mASL – metres above sea level
NA – not applicable

Based on the groundwater level measurements, the groundwater flow in the area of the boreholes is to the south as shown on Figure 3 in Appendix B. **Exp** notes that groundwater flow direction and level can be influenced by utility trenches and other subsurface structures and may migrate in the bedding stone of nearby subsurface utility trenches.

5.3 Groundwater: Hydraulic Gradients

Horizontal hydraulic gradients were estimated for the groundwater flow components identified in the overburden aquifer (i.e. southwest flow) based on the October 5, 2017 groundwater elevations.

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

$$i = \Delta h/\Delta s$$

Where,

i = horizontal hydraulic gradient;

Δh (m) = groundwater elevation difference; and,

Δs (m) = separation distance.

There are four wells on the site that were used to generate the groundwater flow direction. The horizontal hydraulic gradient, based on the groundwater elevations, is estimated to be between 0.010 to 0.076.

5.4 Groundwater: Hydraulic Conductivity

The horizontal hydraulic conductivity in the overburden unit was calculated from a rising head test analysis using Hvorslev Method, the hydraulic conductivity of the silty clay was calculated to be less than 3.9×10^{-5} cm/s. The majority of the native soils consisted of silty clay. Based on estimates provided by *Freeze and Cherry (1979)* the approximate horizontal hydraulic conductivity for silty clay is 10^{-10} m/s to 10^{-5} cm/s.

5.5 Soil Texture

Based on field observations, the grain size of the soil at the water table was assessed to be fine textured. Therefore, the soil texture is fine grained, as shown in the results of the Grain Size Analysis provided in the Certificates of Analysis presented in Appendix E

5.6 Soil: Field Screening

Field screening involved using the combustible vapour meter to measure vapour concentrations, in parts per million (ppm) hexane equivalents, in the collected soil samples in order to assess the presence of soil gases which would imply potential petroleum hydrocarbon impact. The vapour readings obtained during the drilling activities are presented on the borehole logs in Appendix C. As indicated, all boreholes had vapour readings that ranged from 0 ppm to 5 ppm. These results do not indicate any significant petroleum impact to soil.

Inspection of the soil cores retrieved from the boreholes did not indicate the presence of sheen, the presence of a separate organic phase, or other evidence of a non-aqueous phase liquid (NAPL) either in the surficial fill or overburden soil materials. No petroleum staining or odours were observed in any of the soil samples.

5.7 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 from each borehole was based on field visual or olfactory evidence of impacts and/or presence of potential water bearing zones. Summaries of the soil analytical results are found in Appendix D. Copies of the Laboratory Certificates of Analysis for the tested soil samples are provided in Appendix E.

The MOECC Table 3 SCS are applicable if soil pH is in the range of 5 to 11 for subsurface soil (greater than 1.5 m below soil surface). The Certificates of Analysis includes a pH measurement taken from the subsurface. One soil sample was submitted for pH analysis with results of 7.00. The pH value was within the acceptable range for the application of MOECC Table 3 SCS.

5.7.1 Petroleum Hydrocarbons and Volatile Organic Compounds

The concentrations of PHC, VOC and/or BTEX measured in the four (4) analysed soil samples and one (1) blind duplicate were less than the laboratory detection limits and/or less than the MOECC 2011 Table 3 SCS. The PHC, VOC and/or BTEX results are shown in Table 1 in Appendix D. The concentrations of PHC, VOC and/or BTEX also were less than the MOECC Table 1 background concentrations.

5.7.2 Polycyclic Aromatic Hydrocarbons

The concentrations of PAHs measured in the four (4) analysed soil samples and one (1) blind duplicate were less than the laboratory detection limits and/or less than the MOECC 2011 Table 3 SCS. The PAH results are shown in Table 2 in Appendix D. In addition, the PAHs concentrations were less than the Table 1 background concentrations in the three soil samples.

5.7.3 Chemical Transformation and Soil Contaminant Sources

There are no soil contaminant sources on the Phase Two property. All parameters met the applicable Table 3 SCS and as such chemical transformations are not a significant concern at the site.

5.7.4 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. Odours were not observed during soil sampling activities. NAPLs are not expected to be present at the Phase Two property.

5.8 Groundwater Quality

Representative groundwater samples were collected from the monitoring wells to assess groundwater quality at the site. Evidence of free product (i.e. visible film or sheen) and odour was not noted during well development or purging.

The groundwater analytical results are summarized on Table 3 and 4 in Appendix D and the Certificates of Analysis are enclosed in Appendix E.

5.8.1 Petroleum Hydrocarbons and Volatile Organic Compounds

Four (4) groundwater samples and one (1) blind duplicate were submitted for the chemical analysis of PHC, BTEX and/or VOC. As shown in Table 3 in Appendix D, the concentrations of PHC, BTEX and/or VOC parameters in all of the groundwater samples were non-detect and/ or less than the MOECC Table 3 SCS, with the exception of PHC F2 and F3 in the duplicate sample collected from MW17-4 on October 10, 2017. These concentrations slightly exceeded the MOECC Table 3 SCS (170 ug/L vs 150 ug/L PHC F2, and 510 ug/L vs 500 ug/L PHC F3).

An additional groundwater sample was collected and submitted from MW 17-4. This sample had concentrations of PHC F2 and F3 that were less than the MOECC Table 3 SCS.

Therefore, **exp** concludes:

- Monitoring well MW-17-4 is located at the former AST location (APEC-4), and therefore represents a worst-case sample location.
- PHCs were not detected in the soil sample from MW17-4.
- Two of the three groundwater samples from MW17-4 had PHC F2 and F3 concentrations that were less than the MOECC Table 3 SCS and the other sample had PHC F2 and F3 concentrations that were slightly above the MOECC Table 3 SCS.
- The minor PHC F2 and F3 concentrations detected in the groundwater sample from MW17-4 is likely caused by slightly turbid groundwater and is not indicative of groundwater contamination.
- If dewatering is required during site redevelopment, the groundwater may require treatment prior to disposal or it may require disposal off-site by a licensed waste contractor.

5.8.2 Polycyclic Aromatic Hydrocarbons

Four (4) groundwater sample and one (1) blind duplicate were submitted for the chemical analysis of PAHs. As shown in Table 4 in Appendix D, the concentrations of PAHs in the groundwater samples were non-detect and/ or less than the MOECC Table 3 SCS.

5.8.3 Chemical Transformation and Contaminant Sources

There are no groundwater contaminant sources on the Phase Two property. All parameters met the applicable Table 3 SCS and as such chemical transformations are not a significant concern at the site.

5.8.4 Evidence of Non-Aqueous Phase Liquid

Inspection of the groundwater monitoring wells did not indicate the presence of non-aqueous phase liquid (NAPL), staining or sheen. Odours were not observed during groundwater sampling activities. NAPLs are not expected to be present at the Phase Two property.

5.9 Sediment Quality

As there were no water bodies on the site, surface water and sediment sampling was not required.

5.10 Quality Assurance and Quality Control Results

Quality assurance and quality control measures were taken during the field activities to meet the objectives of the sampling and quality assurance plan to collect unbiased and representative samples to characterize existing conditions in the fill/upper overburden materials and groundwater at the Site. QA/QC measures, as described in Section 4.13, included:

- Using dedicated and/or disposal sampling equipment;
- Following proper decontamination protocols to minimize cross-contamination;
- Maintaining field notes and completing field forms to document on-Site activities; and,
- Using only laboratory supplied sample containers and following prescribed sample protocols, including proper preservation, meeting sample hold times, proper chain of custody documentation, to ensure integrity of the samples.

Review of field activity documentation indicated that recommended sample volumes were collected from 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* (MOE, 2004). Samples were preserved at the required temperatures in insulated coolers and met applicable holding time requirements, when relinquished to the receiving laboratory.

Duplicate soil sample pair MW17-3-S13 (MW17-3-S3) were submitted for chemical analysis of PHCs, VOCs and PAHs. For QA/QC purposes, the analytical sample results are quantitatively evaluated by calculating the relative percent difference (RPD) between the samples and their duplicates. The concentrations of PHCs, VOCs, and PAHs were less than the laboratory reported detection limits for both the primary and duplicate samples and therefore RPD could not be calculated and the data are acceptable from a RPD perspective.

Duplicate groundwater samples MW17-14 (MW17-4) were submitted for chemical analysis of PHCs, VOCs and PAHs. The average RPD for PHCs was 19.4 which is less than the recommended limit of 30 for PHCs in groundwater. The average RPD for PAHs was 12.6 which is less than the recommended limit of 30 for PAHs in groundwater. The concentrations of VOCs were less than the laboratory reported detection limits for both the primary and duplicate samples, therefore RPD could not be calculated. Therefore, the data are considered to be acceptable from a RPD perspective.

Certificates of Analysis were received from Maxxam reporting the results of all the chemical analyses performed on the submitted soil and groundwater samples. Copies of the Maxxam Certificates of Analysis are provided in Appendix E. A review of the Certificates of Analysis prepared by Maxxam indicates that they were in compliance with the requirements set out under subsection 47(3) of O.Reg. 511/09.

The analytical program conducted by Maxxam 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 Maxxam 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 Maxxam. 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 Maxxam 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 Maxxam 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 by Maxxam are of acceptable quality and data qualifications are not required.

5.11 Phase Two Conceptual Site Model

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

For the purposes of this Phase Two CSM, the information relied upon was taken from all current and previous environmental reports conducted for the Site. However, the data relied upon was limited to the most recent information to convey the current Site conditions.

5.11.1 Introduction

The site is located on the south side of Renaud Road and to the east of Saddleridge Drive. The site is rectangular in shape and is currently occupied by a residential house in the north part and a commercial/ residential building on the south part. The surrounding properties are residential.

Refer to the following table for the Site identification information.

Civic Address	6102 Renaud Road, Ottawa, ON
Current Land Use	Residential/ Commercial
Proposed Land Use	Residential
Property Identification Number	043520429, and 043520430
UTM Coordinates	NAD83, Zone 18, 459481.91 m E, 5030702.77 m N
Site Area	0.58 hectares
Property Owner	Mr. Raymond Perrault and Mr. Louis Perrault
Owner Contact	Mr. Raymond Perrault and Mr. Louis Perrault
Owner Address	6102 Renaud Road, Ottawa, Ontario K1W 1E9

5.11.2 Physical Site Description

The Phase Two CSM provides a narrative and graphical interpretation of the site surface features, near surface geologic and hydrogeologic conditions, PCOCs, contaminant fate and transport mechanisms, and relevant receptors and exposure pathways. These components are discussed in the following sections and summarized in Table 1 in the Tables appendix.

The site is located in a developed residential area of Ottawa where potable water is supplied by the City of Ottawa and therefore the MOECC Table 3 Site Condition Standard (SCS) is applied to the site.

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

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

5.11.3 Geological and Hydrogeological Setting

Based on the Phase Two ESA, a layer of concrete at the surface was found at MW17-1 and MW17-3, MW17-2 and MW17-4 had fill at surface. Below the concrete in MW17-3 was silty sand with gravel, below the concrete in MW17-1 was silty clay. Monitoring wells MW 17-2 and MW17-4 had silty sandy gravel fill from surface to a maximum depth of 1.84 m depth. No odours or visual indications of impact were observed in the fill material.

Below the fill in MW17-1, MW17-2 and MW 17-3 was silty clay or clay which extended to borehole termination 3.66 to 4.58 m. Below the fill in MW17-4 was silty sand with gravel, followed by a layer of clay then glacial till. The till was comprised of clay with silt and gravel some fine sand. No odours or visual indications of impact were observed in the native material.

The geologic cross-sections prepared from site boreholes are presented on Figure 4 in Appendix B.

Based on the groundwater level measurements, the groundwater flow in the area of the boreholes is to the south.

5.11.4 Underground Utilities

The site is serviced by underground utilities such as bell, gas, water and sewer. The groundwater flow pattern at the site is potentially influenced by buried services since the groundwater was found at a minimum depth of 1.46 m below ground.

5.11.5 Potentially Contaminating Activities

The Phase One ESA conducted by **exp** in September 2017 identified five on-site PCAs and one off-site PCA:

- PCA1 – Former AST-1 located in the basement of the residence on the north part of the Site (PCA# 28 – Gasoline and Associated Products Storage in Fixed Tanks)
- PCA2 – Former AST-2 located on the exterior west side of the commercial building at the subject Site (PCA# 28 – Gasoline and Associated Products Storage in Fixed Tanks).
- PCA3 – Former AST-3 located on the interior west side of the commercial building at the subject Site (PCA# 28 – Gasoline and Associated Products Storage in Fixed Tanks).
- PCA4 – Former AST-4 located on the interior south part of the commercial building at the subject Site (PCA# 28 – Gasoline and Associated Products Storage in Fixed Tanks).
- PCA5 – Former commercial printers located in the commercial building at the subject Site, listed in the Scott's Manufacturing Directory as Orleans Printers Ltd. established in 1986 with a plant size of 2000 ft^2, and four employees. Orleans printing was listed for quick printing, digital printing, other printing and support activities for printing. (PCA# 31 – Ink Manufacturing, Processing and Bulk Storage).

- PCA6 – Former AST-5 and AST-6 located at 3060 Navan Road (Marcel Brazeau Top Soil) approximately 80 m north of the Site. The two ASTs were located approximately 120 m north of the site. The tanks were installed in 2001, single wall, with a capacity of 9,280 L and 1,345 L. Due to the intervening distance, the short duration they were in use for, and the fact they were above ground they are not considered to be an APEC. (PCA# 28 – Gasoline and Associated Products Storage in Fixed Tanks).

5.11.6 Areas of Potential Environmental Concern/Potential Contaminants of Concern

As per Ontario Regulation 153/04 (as amended), Potential Contaminating Activity (PCA) is defined as one of the 59 industrial operations set out in Table 2 of Schedule D that occurs or has occurred on the site or within the Phase I ESA study area. Based on Phase I ESA, the identified areas of potential environmental concern (APEC) and potential contaminants of concern (PCOC) are summarized in the table below and are shown on Figure 2 in Appendix B.

Area of Potential Environmental Concern (APEC)	Potentially Contaminating Activity (PCA)	Location of PCA (On-site or Off-site)	Contribution to APEC at the Site (Yes/No)	Media Potentially Impacted (Groundwater, Soil and/or Sediment)	Potential Contaminates of Concern
APEC 1: Former AST 1 (located in the residence basement)	#28 – Gasoline and Associated Products Storage in Fixed Tanks	On-site	Yes	Soil and groundwater	Petroleum hydrocarbons (PHC) and benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs)
APEC 2: Former AST 2, 3 and 4 (two interior and one exterior of the commercial building)	#28 – Gasoline and Associated Products Storage in Fixed Tanks	On-site	Yes	Soil and groundwater	PHC, BTEX, PAHs
APEC 3: Former commercial printing operated from 1986 to 2000	#31 – Ink Manufacturing, Processing and Bulk Storage	On-site	Yes	Soil and groundwater	Volatile organic compounds (VOC)

5.11.7 Investigation and Remediation

The Phase Two ESA was conducted to assess the soil and groundwater quality at the site. As indicated in the APEC and PCOC Table (above), the analytical program of the Phase Two ESA included testing of soil and groundwater for PHC, PAH, BTEX and/or VOCs from the monitoring wells installed on the site. The borehole and monitoring well locations are shown on Figure 3 in Appendix B.

5.11.8 Contaminants of Concern (COC)

Based on the results of the investigation, all of the soil and groundwater samples had concentrations of PHC, PAHs, BTEX and/or VOC that were less than the 2011 MOECC Table 3 SCS. Therefore, there are no COC on the site.

5.11.9 Contaminant Fate and Transport

Soil COCs

No impacts were observed in the soil at the site and therefore, there are no contaminants of concern in soil at the subject site.

Groundwater COCs

No impacts were observed in the groundwater at the site and therefore, there are no contaminants of concern in groundwater at the subject site.

6 Conclusions

Based on the Phase Two ESA results, the following summary is provided:

- Below the concrete in MW17-3 was silty sand with gravel, below the concrete in MW17-1 was silty clay. Monitoring wells MW 17-2 and MW17-4 had silty sandy gravel fill from surface to a maximum depth of 1.84 m depth. No odours or visual indications of impact were observed in the fill material. Below the fill in MW17-1, MW17-2 and MW 17-3 was silty clay or clay which extended to borehole termination 3.66 to 4.58 m. Below the fill in MW17-4 was silty sand with gravel, followed by a layer of clay then glacial till. The till was comprised of clay with silt and gravel some fine sand. No odours or visual indications of impact were observed in the native material.
- On October 5 and 10, 2017, groundwater was encountered at a depth of1.46 m bgs to 1.72 m bgs in MW17-3 and MW17-11. No petroleum sheens were observed in the monitoring wells during either sampling event. Based on the groundwater level measurements, the groundwater flow in the area of the boreholes is to the southern.
- The concentrations of PAHs, PHC, BTEX and/or VOC measured in the soil samples and blind duplicate were either less than the laboratory detection limit and/or less then the MOECC 2011 Table 3 SCS.
- The concentrations of PHCs, PAHs, BTEX and/or VOC parameters in all of the groundwater samples were non-detect and/ or less than the MOECC Table 3 SCS, with the exception of PHC F2 and F3 in the duplicate sample collected from MW17-4 on October 10, 2017. These concentrations slightly above the MOECC Table 3 SCS (170 ug/L vs 150 ug/L PHC F2, and 510 ug/L vs 500 ug/L PHC F3).
- An additional groundwater sample was collected and submitted from MW 17-4. This sample had concentrations of PHC F2 and F3 that were less than the MOECC Table 3 SCS. Therefore, **exp** concludes:
    - The monitoring well MW-17-4 is located at the former AST location (APEC-4), and therefore represents a worst-case sample location.
    - PHCs were not detected in the soil sample from MW17-4.
    - Two of the three groundwater samples from MW17-4 had PHC F2 and F3 concentrations that were less than the MOECC Table 3 SCS and the other sample had PHC F2 and F3 concentrations that were slightly above the MOECC Table 3 SCS.
    - The minor PHC F2 and F3 concentrations detected in the groundwater sample from MW17-4 is likely caused by slightly turbid groundwater and is not indicative of groundwater contamination.
    - If dewatering is required during site redevelopment, the groundwater may require treatment prior to disposal or it may require disposal off-site by a licensed waste contractor.

Based on the Phase Two ESA findings, no further work is recommended at this time. If the wells are no longer needed, they should be decommissioned in accordance with Ontario Regulation 903.

7 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 regard 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 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 the 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.

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8 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:

- Environmental Protection Act, R.S.O. 1990, Chapter E.19, as amended, September 2004.
- Ministry of the Environment [MOE] (1996) Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario. Ontario Ministry of the Environment, December 1996.
- MOE (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, 2011.
- MOE (2011) Guide for Completing Phase Two Environmental Site Assessments under Ontario Regulation 153/04. Ontario Ministry of the Environment, June 2011.
- MOE (2011) 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.
- Ontario Regulation 153/04, made under the Environmental Protection Act, May 2004, last amended to O.Reg.333/13.
- Ontario Water Resources Act – R.R.O. 1990, Regulation 903, amended to O.Reg. 128/03, August 2003.
- Groundwater, Freeze and Cheery 1979. Prentice Hall.

Tables

Table 1

Characteristic	Description
Minimum Depth to Bedrock	Greater then 4.58 m
Minimum Depth to Overburden Groundwater	1.46 m
Shallow Soil Property	No, greater than 2.0 m
Proximity to water body or ANSI	500 m
Soil pH	7.00
Soil Texture	Fine
Current Property Use	Commercial/Residential
Future Property Use	Residential
Proposed Future Building	Central part of the site
Areas where soil has been brought to the Site	None identified

Appendix A – Sampling and Analysis Plan

1 Introduction

This appendix presents the Sampling and Analysis Plan (SAAP) that was developed in support of the Phase Two Environmental Site Assessment (ESA) for the property located at 6102 Renaud Road in Ottawa, Ontario (hereinafter referred to as the 'site'). 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. These components are described in further detail below.

2 Field Sampling Program

The field sampling program was developed to provide for the collection of samples of the soil and groundwater for chemical analysis of petroleum hydrocarbons (PHC), benzene, toluene, ethylbenzene and xylenes (collectively known as 'BTEX'), and polycyclic aromatic hydrocarbons (PAH) and at three locations additional analysis of volatile organic compounds (VOCs), were included in the soil. The soil sampling media is to consist of the overburden materials (depths up to 6 m of overburden beneath site). The soil sampling will be location-specific to assess for the potential presence of PHC, BTEX and PAHs, and at three locations additional analysis of VOCs, were included based on the identification of potential areas of potential environmental concern identified in a Phase One ESA completed by **exp** in September 2017. Vapour readings will also be taken in the field to determine samples to be submitted for BTEX and PHC analysis. The soil sample intervals will extend from the surface up to a maximum depth of approximately 6 m below grade.

The four groundwater samples will be submitted for analysis of PHC, BTEX and PAHs, and three monitoring well will have an additional VOCs analysis. The monitoring well network is to comprise of four newly installed monitoring wells.

Vertical control of the boreholes and monitoring wells will be obtained through the completion of an elevation survey with reference to a geodetic or assumed benchmark. Groundwater flow and direction in the overburden aquifer will also be determined through groundwater level measurements and the elevations established in 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;
- 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 four (4) boreholes are proposed to be advanced at the site, up to a maximum overburden depth of approximately 6 m below grade, to provide for the collection of samples of the surficial and overburden materials beneath the site. All four (4) of the boreholes are proposed to have monitoring well installed. The borehole locations are selected to assess the soil and groundwater conditions at the area of potential environmental concern (APEC) source identified in the Phase One ESA by **exp** in September 2017.

Prior to borehole drilling, utility clearances will be obtained from public and private locators, as required. The borehole drilling program will be conducted by a licensed driller under the oversight of **exp** field staff. All drilling equipment 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, 1.2 cm long, lined tube samplers at continuous intervals. The sampling devices will be advanced into the soil by means of a direct push hammer. Upon retrieval from the boreholes, the lined tube samplers 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. Samples for chemical analysis will be selected on the basis of visual and olfactory evidence of impacts and at specific intervals to define the lateral and vertical extent of known impacts.

Recommended volumes of soil samples selected for chemical analysis will be collected into pre-cleaned, laboratory supplied, analytical test group specific containers. The samples will be placed into clean insulated coolers chilled with ice for storage and transport. Samples intended for analysis of BTEX, PHC F1 and VOCs will be collected into 40 ml vials. 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 contract laboratory within analytical test group holding times under Chain of Custody (COC) protocols. New disposable chemical resistant gloves will be used for each soil core to prevent sample cross-contamination.

3.3 Monitoring Well Installation

It is proposed that four (4) boreholes will be instrumented as groundwater monitoring wells installed with slotted screens intercepting either the native overburden material or the shallow bedrock, where the water table aquifer is expected, extending to depths of approximately 6 m below grade. The monitoring wells will be constructed using 31 mm diameter, Schedule 40, PVC riser pipe and number 10 slot size (0.25 mm) well screens. The base of the well screens 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 screens will be backfilled with silica sand, to an average height of 0.3 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 wells will be completed with either a flush-mounted protective steel casing or above ground protective 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.

Standing water volumes will be determined by means of an electronic water level meter. Approximately 1 wetted well volume will be removed. 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 measurements will be recorded for all monitoring wells to determine groundwater flow and direction in the water table aquifer beneath the site. Water levels will be measured with respect to the top of the casing by means of an electronic water level meter. The water levels will be recorded on water level log sheets. 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 all monitoring well locations. The top of casing and ground surface elevation of each monitoring well location will be surveyed against a known geodetic benchmark, or if unavailable, against a suitable arbitrary benchmark. Elevations measured against a benchmark with an assumed elevation will be recorded as meters above mean sea level (m AMSL).

3.7 Groundwater Sampling

Groundwater samples will be collected from all monitoring wells for chemical analysis. The wells will be sampled using a “low flow” technique whereby the wells are continuously purged using an electric pump (equipped with dedicated tubing) and parameters within the purged water are monitored using a groundwater chemistry multi-meter at 3 minute intervals. These parameters include: pH, conductivity, temperature, and salinity. Once these parameters are found to deviate less than 10% over three testing events, equilibrium is deemed to have occurred and a sample of the groundwater will be collected. The water sample collected from the deep monitoring well will be collected using a foot valve and plastic tubing. The purge water will also be continuously monitored for visual and olfactory evidence of petroleum and solvent impact (sheen and odour).

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. Each PHC F1, BTEX and VOC vial will be inverted and inspected for gas bubbles prior to being placed in the cooler to ensure that no head-space is present. All groundwater samples will be assigned unique identification numbers, and the date, time, project number, company name, location and requested analyses for each sample will be documented in a bound hard cover notebook. The samples will be submitted to the contractual laboratory within analytical test group holding times under COC 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. The lined tube samplers will be changed between sampling intervals 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.

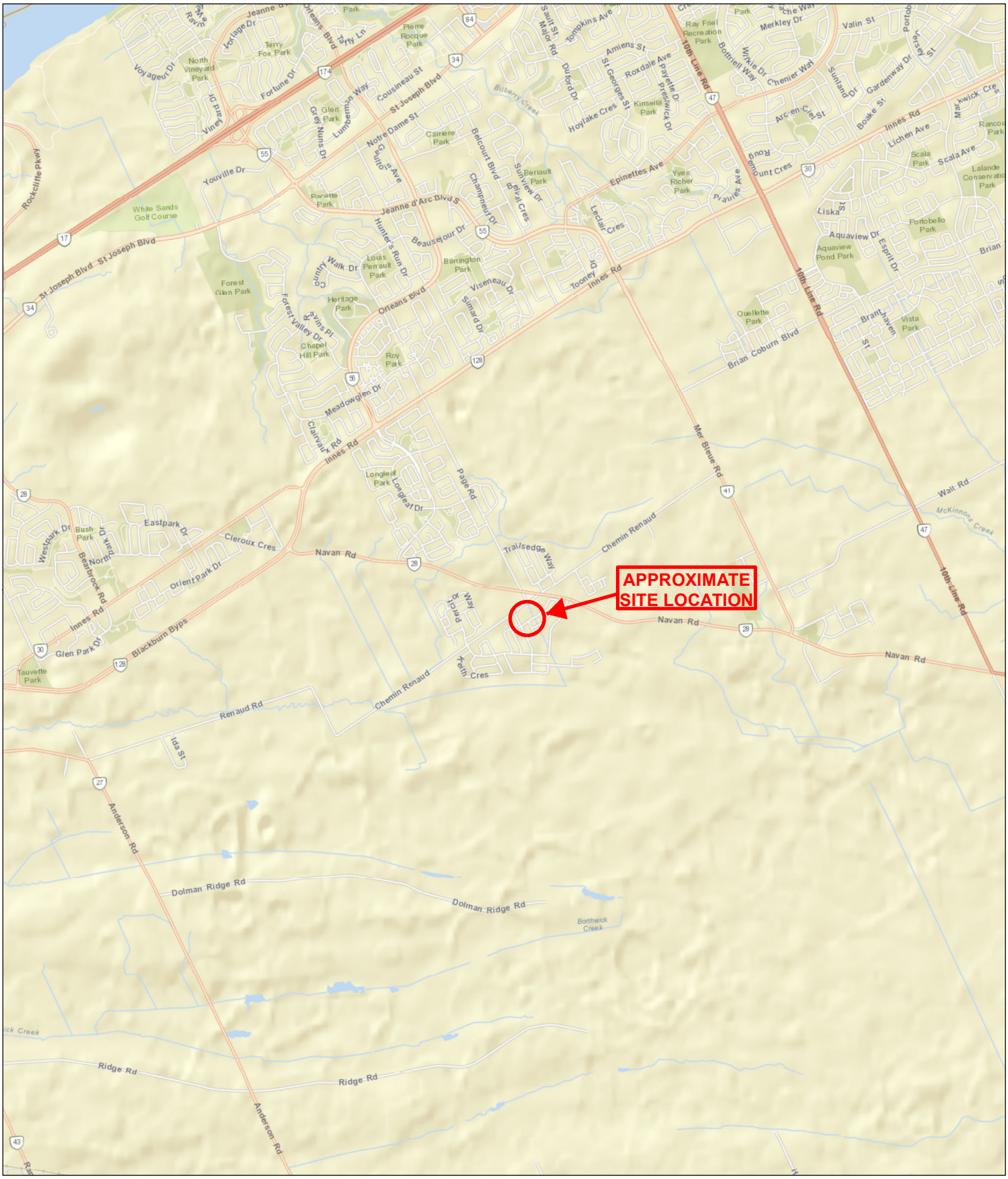
4.4 Sample Documentation

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 controls samples will be collected to evaluate the accuracy and reproducibility of the field sampling procedures. For soil and groundwater sampling, one (1) field duplicate is to be collected for every ten (10) samples 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 – Figures



exp Services Inc.
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PROJECT TITLE:
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
6102 Renaud Road
Ottawa, Ontario

DRAWING TITLE:
SITE LOCATION PLAN

PROJECT No.: OTT-00242146-B0	DWN: DC
SCALE: AS SHOWN	CHKD: MM
DATE: OCTOBER 2017	FIG. No.: 1

LEGEND

- APEC 1
- APEC 2 and APEC 3
- Former Aboveground Storage Tank (AST)
- Approximate Location of Former Domestic Well

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DRAWING TITLE:	SITE PLAN
PROJECT No.:	OTT-00242146-B0
DWN:	DC
SCALE:	AS SHOWN
CHKD:	MM
DATE:	OCTOBER 2017
FIG. No.:	2

LEGEND

- Monitoring Well Location
- Former Aboveground Storage Tank (AST)
- Groundwater Flow Direciton
- Approximate Location of Former Domestic Well
- (77.26 masl) Groundwater elevations October 5, 2017
- (masl) Meters above sea level

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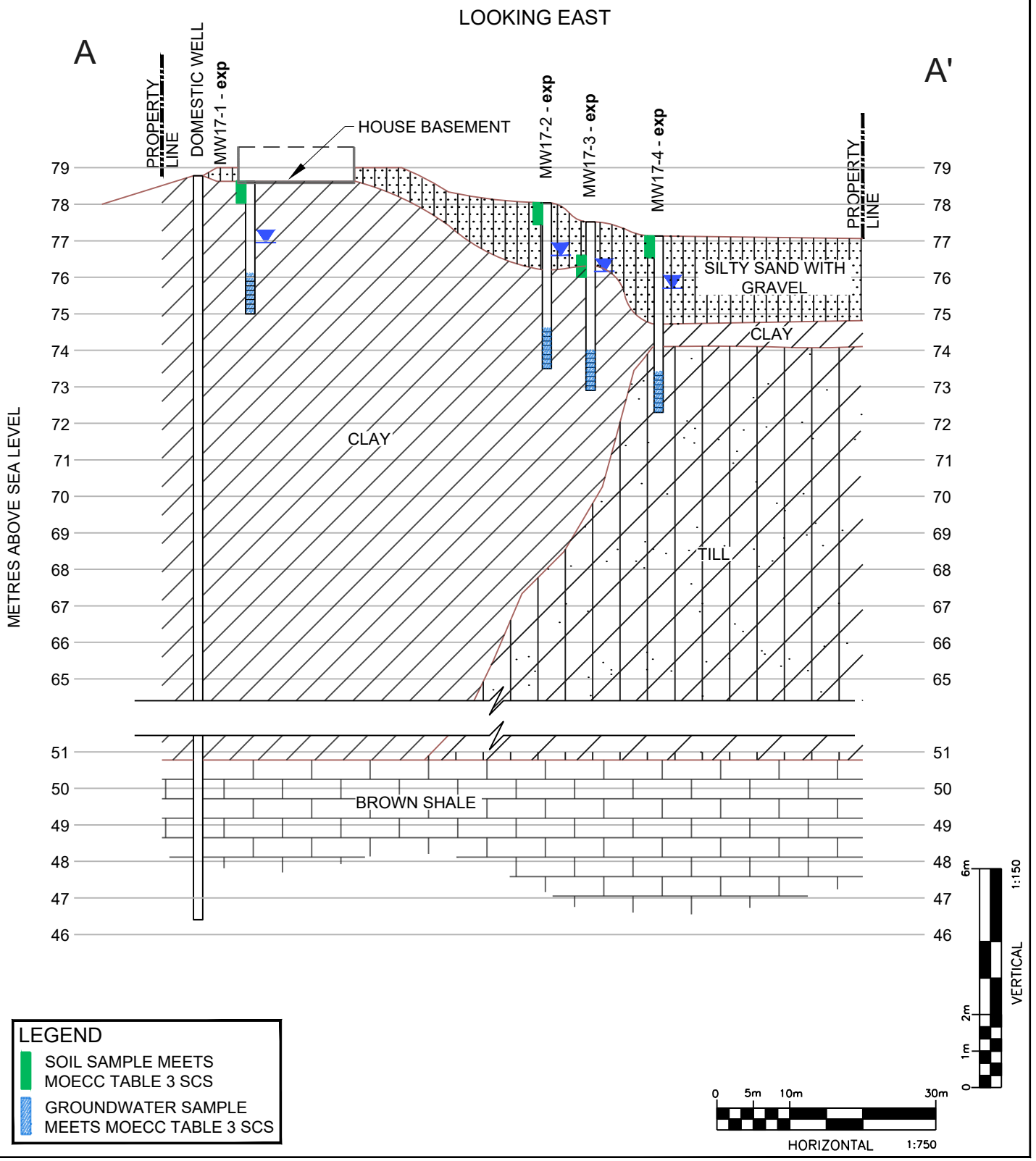
PROJECT TITLE:
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
6102 Renaud Road
Ottawa, Ontario

DRAWING TITLE:
BOREHOLE LOCATION PLAN AND GROUNDWATER ELEVATIONS

PROJECT No.: OTT-00242146-B0	DWN: DC
SCALE: AS SHOWN	CHKD: MM
DATE: OCTOBER 2017	FIG. No.: 3



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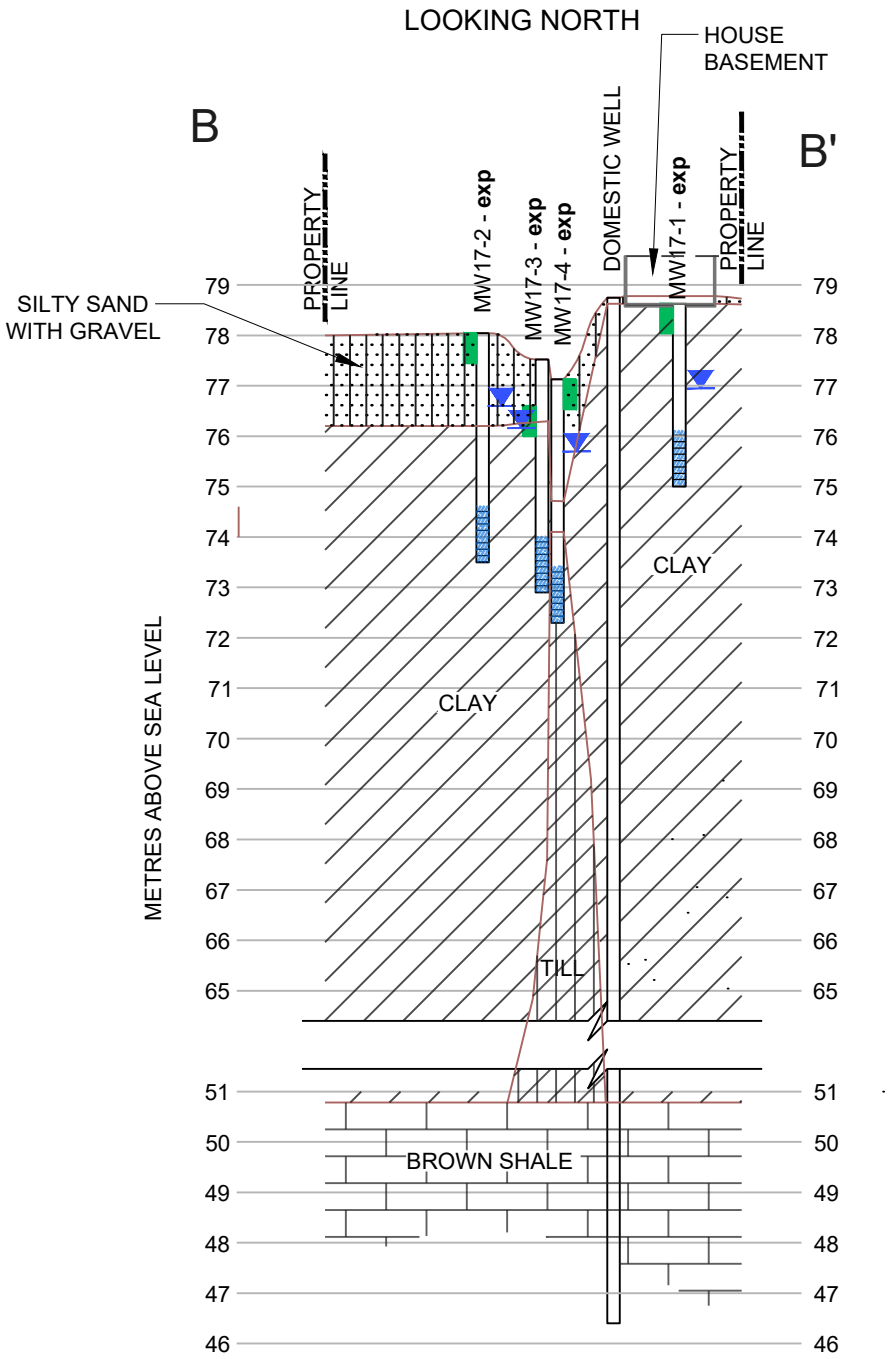
scale: AS NOTED	CLIENT: 2597237 ONTARIO LIMITED	project no.: OTT-00242146-B0
date: OCTOBER 2017	TITLE: CROSS-SECTION A-A' 6102 RENAUD ROAD, OTTAWA, ON	FIG 4A
drawn by: J.R.		

Filename: r:\24000\242000\242146-a0 6102 renaud road, ottawa\242146-xs.dwg
Last Saved: 10/30/2017 1:53:31 PM
Last Plotted: 10/30/2017 1:59:04 PM Plotted by: RevelIJ Pen Table:: trow standard, july 01, 2004.ctb



LEGEND

- SOIL SAMPLE MEETS MOECC TABLE 3 SCS
- GROUNDWATER SAMPLE MEETS MOECC TABLE 3 SCS

VERTICAL 1:150 (0, 1m, 2m, 6m)

HORIZONTAL 1:750 (0, 5m, 10m, 30m)

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scale: AS NOTED	CLIENT: 2597237 ONTARIO LIMITED	project no.: OTT-00242146-B0
date: OCTOBER 2017	TITLE: CROSS-SECTION B-B' 6102 RENAUD ROAD, OTTAWA, ON	FIG 4B
drawn by: J.R.		

Filename: r:\24000\242000\242146-a0 6102 renaud road, ottawa\242146-xs.dwg
Last Saved: 10/30/2017 1:53:31 PM
Last Plotted: 10/30/2017 1:59:16 PM Plotted by: RevellJ Pen Table:: trow standard, july 01, 2004.ctb

Appendix C - Borehole Logs

Explanation of Terms Used on Borehole Records

SOIL DESCRIPTION

Terminology describing common soil genesis:

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

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

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

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

Terminology describing soil structure:

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

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

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

Fissured: material breaks along plane of fracture.

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

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

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

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

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

Homogeneous: same color and appearance throughout.

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

Uniformly Graded: predominantly on grain size.

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

ISSMFE SOIL CLASSIFICATION

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

0.002	0.006	0.02	0.06	0.2	0.6	2.0	6.0	20	60	200

EQUIVALENT GRAIN DIAMETER IN MILLIMETRES

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

UNIFIED SOIL CLASSIFICATION

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

Table a: Percent or Proportion of Soil, Pp

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

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

Table b: Apparent Density of Cohesionless Soil

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

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

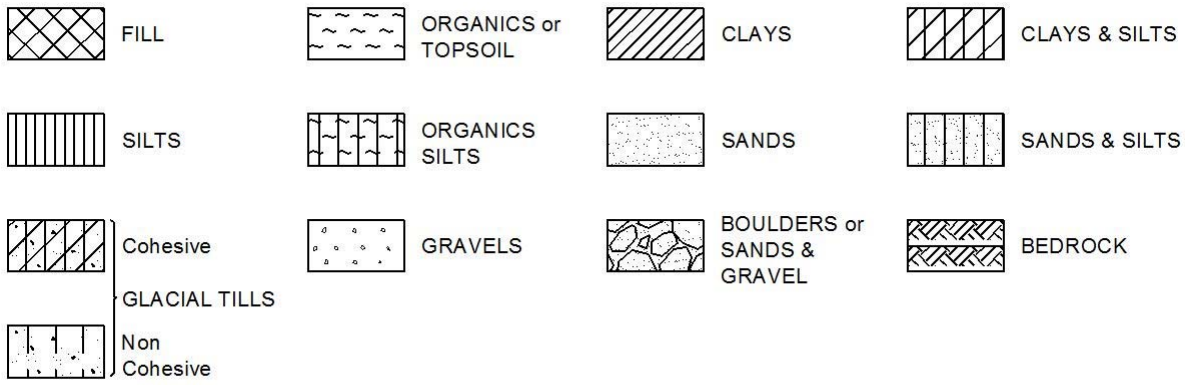
Table c: Consistency of Cohesive Soil

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

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

STRATA PLOT

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



WATER LEVEL MEASUREMENT

Log of Borehole MW17-1

Project No: OTT-00242146-B0

Project: Phase Two Environmental Site Assessment

Location: 6501 Renaud Rd Ottawa Ontario

Figure No. 1

Page. 1 of 1

Date Drilled: 10/2/17

Drill Type: Geoprobe 420

Datum: Geodetic

Logged by: J.O. Checked by: D.C.

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

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

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth
		CONCRETE	78.63	0
		Concrete slab in basement	78.5	
		SILTY CLAY		
		Moist dense, light brown to grey		
				1
			76.95	
				2
		Wet, soft with some gravel at 2.44 m		
				3
			75.0	
		Borehole Terminated at 3.66 m Depth		

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES

Natural Unit Wt. kN/m³

0 at 0 m, 1 m, 2 m, 3 m

LOG OF BOREHOLE LOGS OF BOREHOLES.GPJ TROW OTTAWA.GDT 10/26/17

NOTES:
1. Borehole data requires interpretation by exp. before use by others
2. A flushmount protective casing with 32 mm diameter standpipe was installed
3. Field work supervised by an exp representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-00242146-B0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
3 days	1.7	
8 Days	1.6	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

Log of Borehole MW17-2

Project No: OTT-00242146-B0

Project: Phase Two Environmental Site Assessment

Location: 6501 Renaud Rd Ottawa Ontario

Figure No. 2

Page. 1 of 1

Date Drilled: 10/2/17

Drill Type: Geoprobe 420

Datum: Geodetic

Logged by: J.O. Checked by: D.C.

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

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

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth
		FILL Silty sand with gravel, some shattered rock	78.04	0
			77.4	
		SAND WITH GRAVEL Sand with gravel, dry, light to dark brown		1
			76.5	
			76.2	
		CLAY Trace silt, grey, dense to soft, moist, few random pockets of gravel		2
		Wet at 3.05 m		3
			73.5	4
		Borehole Terminated at 4.58 m Depth		

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES

Natural Unit Wt. kN/m³

5
0
0
0
0

NOTES:
1. Borehole data requires interpretation by exp. before use by others
2. A flushmount protective casing with 32 mm diameter standpipe was installed
3. Field work supervised by an exp representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-00242146-B0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
3 days	1.5	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE LOGS OF BOREHOLES.GPJ TROW OTTAWA.GDT 10/26/17

Log of Borehole MW17-3

Project No: OTT-00242146-B0

Project: Phase Two Environmental Site Assessment

Location: 6501 Renaud Rd Ottawa Ontario

Figure No. 3

Page. 1 of 1

Date Drilled: 10/2/17

Drill Type: Geoprobe 420

Datum: Geodetic

Logged by: J.O. Checked by: D.C.

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

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

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth
		CONCRETE Interior concrete slab	77.52 / 77.4	0
		FILL Dry silty sand with gravel, light to dark brown	76.9	
		SAND Packed silty sand with gravel, moist.	76.3	1
		CLAY Trace silt, dense, moist, light brown to grey	76.16	
		Wet and soft at 3.05m		2
				3
			72.9	4
		Borehole Terminated at 4.58m Depth		

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60
SAMPLES
Natural Unit Wt. kN/m³

0 0 0 0 0

NOTES:
1. Borehole data requires interpretation by exp. before use by others
2. A flushmount protective casing with 32 mm diameter standpipe was installed
3. Field work supervised by an exp representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-00242146-B0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
3 days	1.4	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE LOGS OF BOREHOLES.GPJ TROW OTTAWA.GDT 10/26/17

Log of Borehole MW17-4

Project No: OTT-00242146-B0

Project: Phase Two Environmental Site Assessment

Location: 6501 Renaud Rd Ottawa Ontario

Figure No. 4

Page. 1 of 1

Date Drilled: 10/2/17

Drill Type: Geoprobe 420

Datum: Geodetic

Logged by: J.O. Checked by: D.C.

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

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

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth
		FILL Light to dark brown silty sand with gravel	77.13	0
			76.5	
		SILTY SAND With gravel and rock, light to dark brown, dense, dry to wet		1
			75.59	
				2
			74.7	
		CLAY Trace silty, wet, grey, dense		
			74.1	3
		TILL Clay with silt and gravel, some fine sand, wet, grey		
				4
			72.3	
		Borehole Terminated at 4.88 m Depth		

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES

Natural Unit Wt. kN/m³

5
0
0
0
0
0

NOTES:
1. Borehole data requires interpretation by exp. before use by others
2. A flushmount protective casing with 32 mm diameter standpipe was installed
3. Field work supervised by an exp representative.
4. See Notes on Sample Descriptions
5. This Figure is to read with exp. Services Inc. report OTT-00242146-B0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
3 days	1.5	
8 days	1.5	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE LOGS OF BOREHOLES.GPJ TROW OTTAWA.GDT 10/26/17

Appendix D - Analytical Summary Tables

TABLE 1 SOIL ANALYTICAL RESULTS *(µg/g)*
VOLATILE ORGANIC COMPOUNDS AND PETROLEUM HYDROCARBONS
6102 Renaud Road, Ottawa, Ontario

Parameter	MOECC Table 1[1]	MOECC Table 3[2]	MW17-1-S1	MW17-2-S1	MW17-3-S3	MW17-3-S13 (Dup of MW17-3-S3)	MW17-4-S1
Sample Date (d/m/y)	Background	Residential	2-Oct-17	2-Oct-17	2-Oct-17	2-Oct-17	2-Oct-17
Sample Depth (mbsg)			0 - 1.22	0 - 0.61	1.22 - 1.83	1.22 - 1.83	0 - 0.61
Acetone	0.5	28	NA	<0.50	<0.50	<0.50	<0.50
Benzene	0.02	0.17	<0.020	<0.020	<0.020	<0.020	<0.020
Bromodichloromethane	0.05	13	NA	<0.050	<0.050	<0.050	<0.050
Bromoform	0.05	0.26	NA	<0.050	<0.050	<0.050	<0.050
Bromomethane	0.05	0.05	NA	<0.050	<0.050	<0.050	<0.050
Carbon Tetrachloride	0.05	0.12	NA	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	0.05	2.7	NA	<0.050	<0.050	<0.050	<0.050
Chloroform	0.05	0.18	NA	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane	0.05	9.4	NA	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	0.05	4.3	NA	<0.050	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	0.05	6	NA	<0.050	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	0.05	0.097	NA	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethane	0.05	11	NA	<0.050	<0.050	<0.050	<0.050
1,2-Dichloroethane	0.05	0.05	NA	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethylene	0.05	0.05	NA	<0.050	<0.050	<0.050	<0.050
Cis-1,2-Dichloroethylene	0.05	30	NA	<0.050	<0.050	<0.050	<0.050
Trans-1,2-Dichloroethylene	0.05	0.75	NA	<0.050	<0.050	<0.050	<0.050
1,2-Dichloropropane	0.05	0.085	NA	<0.050	<0.050	<0.050	<0.050
Cis-1,3-Dichloropropylene	NV	0.083	NA	<0.030	<0.030	<0.030	<0.030
Trans-1,3-Dichloropropylene			NA	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	0.05	15	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylene Dibromide	0.05	0.05	NA	<0.050	<0.050	<0.050	<0.050
Methyl Ethyl Ketone	0.5	44	NA	<0.50	<0.50	<0.50	<0.50
Methylene Chloride	0.05	0.96	NA	<0.050	<0.050	<0.050	<0.050
Methyl Isobutyl Ketone	0.5	4.3	NA	<0.50	<0.50	<0.50	<0.50
Methyl-t-Butyl Ether	0.05	1.4	NA	<0.050	<0.050	<0.050	<0.050
Styrene	0.05	2.2	NA	<0.050	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	0.05	0.05	NA	<0.050	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	0.05	0.05	NA	<0.050	<0.050	<0.050	<0.050
Toluene	0.2	6	<0.020	<0.020	<0.020	<0.020	<0.020
Tetrachloroethylene	0.05	2.3	NA	<0.050	<0.050	<0.050	<0.050
1,1,1-Trichloroethane	0.05	3.4	NA	<0.050	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	0.05	0.05	NA	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	0.05	0.52	NA	<0.050	<0.050	<0.050	<0.050
Vinyl Chloride	0.02	0.022	NA	<0.020	<0.020	<0.020	<0.020
Total Xylenes	0.05	25	<0.040	<0.020	<0.020	<0.020	<0.020
Dichlorodifluoromethane	0.05	25	NA	<0.050	<0.050	<0.050	<0.050
Hexane(n)	0.05	34	NA	<0.050	<0.050	<0.050	<0.050
Trichlorofluoromethane	0.25	5.8	NA	<0.050	<0.050	<0.050	<0.050
PHC F1	25	65	<10	<10	<10	<10	<10
PHC F2	10	150	<10	<10	<10	<10	<10
PHC F3	240	1300	<50	120	<50	<50	<50
PHC F4	120	5600	<50	<50	<50	<50	<50

NOTES:

1 MOECC *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 1 background concentrations.*

2 MOECC *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 3 non potable residential standards, fine grained soil.*

Bold Concentration exceeds MOECC Table 1 background concentrations.

Shaded Concentration exceeds MOECC Table 3 residential soil quality standard.

NA not analyzed

TABLE 2 SOIL ANALYTICAL RESULTS *(µg/g)*
POLYCYCLIC AROMATIC HYDROCARBONS
6102 Renaud Road, Ottawa, Ontario

Parameter	MOECC Table 1[1]	MOECC Table 3[2]	MW17-1-S1	MW17-2-S1	MW17-3-S3	MW17-3-S13 (Dup of MW17-3-S3)	MW17-4-S1
Sample Date (d/m/y)	Background	Residential	2-Oct-17	2-Oct-17	2-Oct-17	2-Oct-17	2-Oct-17
Sample Depth (mbsg)			0 - 1.22	0 - 0.61	1.22 - 1.83	1.22 - 1.83	0 - 0.61
Acenaphthene	0.072	58	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.093	0.17	<0.0050	0.016	<0.0050	<0.0050	<0.0050
Anthracene	0.16	0.74	<0.0050	0.029	<0.0050	<0.0050	0.0083
Benzo(a)anthracene	0.36	0.63	<0.0050	0.029	<0.0050	<0.0050	0.031
Benzo(a)pyrene	0.3	0.3	<0.0050	0.026	<0.0050	<0.0050	0.026
Benzo(b/j)fluoranthene	0.47	0.78	<0.0050	0.058	<0.0050	<0.0050	0.042
Benzo(ghi)perylene	0.68	7.8	<0.0050	0.044	<0.0050	<0.0050	0.017
Benzo(k)fluoranthene	0.48	0.78	<0.0050	0.021	<0.0050	<0.0050	0.013
Chrysene	2.8	7.8	<0.0050	0.034	<0.0050	<0.0050	0.028
Dibenzo(a,h)anthracene	0.1	0.1	<0.0050	0.0088	<0.0050	<0.0050	<0.0050
Fluoranthene	0.56	0.69	<0.0050	0.1	<0.0050	<0.0050	0.056
Fluorene	0.12	69	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	0.23	0.48	<0.0050	0.03	<0.0050	<0.0050	0.019
1-Methylnaphthalene	0.59	3.4	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	0.59		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	0.09	0.75	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Phenanthrene	0.69	7.8	<0.0050	0.016	<0.0050	<0.0050	0.037
Pyrene	1	78	<0.0050	0.057	<0.0050	<0.0050	0.041

NOTES:

1	MOECC *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 1 background concentrations.*
2	MOECC *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 3 non potable residential standards, fine grained soil.*
Bold	Concentration exceeds MOECC Table 1 background concentrations.
Shaded	Concentration exceeds MOECC Table 3 residential soil quality standard.
N/A	Not analyzed
NV	no value

TABLE 3 GROUNDWATER ANALYTICAL RESULTS *(µg/L)*
VOLATILE ORGANIC COMPOUNDS AND PETROLEUM HYDROCARBONS
6102 Renaud Road, Ottawa, Ontario

Parameter	MOECC Table 3[1]	MW17-1	MW17-2	MW17-3	MW17-4	MW17-14 (Dup of MW17-4)	MW17-4
Sample Date (d/m/y)		10-Oct-17	5-Oct-17	5-Oct-17	10-Oct-17	10-Oct-17	20-Oct-17
Acetone	130000	NA	<10	<10	<10	<10	NA
Benzene	430	<0.20	<0.20	0.71	<0.20	<0.20	<0.20
Bromodichloromethane	85000	NA	<0.50	<0.50	<0.50	<0.50	NA
Bromoform	770	NA	<1.0	<1.0	<1.0	<1.0	NA
Bromomethane	56	NA	<0.50	<0.50	<0.50	<0.50	NA
Carbon Tetrachloride	8.4	NA	<0.20	<0.20	<0.20	<0.20	NA
Chlorobenzene	630	NA	<0.20	<0.20	<0.20	<0.20	NA
Chloroform	22	NA	<0.20	<0.20	<0.20	<0.20	NA
Dibromochloromethane	82000	NA	<0.50	<0.50	<0.50	<0.50	NA
1,2-Dichlorobenzene	9600	NA	<0.50	<0.50	<0.50	<0.50	NA
1,3-Dichlorobenzene	9600	NA	<0.50	<0.50	<0.50	<0.50	NA
1,4-Dichlorobenzene	67	NA	<0.50	<0.50	<0.50	<0.50	NA
1,1-Dichloroethane	3100	NA	<0.20	<0.20	<0.20	<0.20	NA
1,2-Dichloroethane	12	NA	<0.50	<0.50	<0.50	<0.50	NA
1,1-Dichloroethylene	17	NA	<0.20	<0.20	<0.20	<0.20	NA
Cis-1,2-Dichloroethylene	17	NA	<0.50	<0.50	<0.50	<0.50	NA
Trans-1,2-Dichloroethylene	17	NA	<0.50	<0.50	<0.50	<0.50	NA
1,2-Dichloropropane	140	NA	<0.20	<0.20	<0.20	<0.20	NA
Cis-1,3-Dichloropropylene	45	NA	<0.30	<0.30	<0.30	<0.30	NA
Trans-1,3-Dichloropropylene		NA	<0.40	<0.40	<0.40	<0.40	NA
Ethylbenzene	2300	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylene Dibromide	0.83	NA	<0.20	<0.20	<0.20	<0.20	NA
Methyl Ethyl Ketone	1500000	NA	<10	<10	<10	<10	NA
Methylene Chloride	5500	NA	<2.0	<2.0	<2.0	<2.0	NA
Methyl Isobutyl Ketone	580000	NA	<5.0	<5.0	<5.0	<5.0	NA
Methyl-t-Butyl Ether	1400	NA	<0.50	<0.50	<0.50	<0.50	NA
Styrene	9100	NA	<0.50	<0.50	<0.50	<0.50	NA
1,1,1,2-Tetrachloroethane	28	NA	<0.50	<0.50	<0.50	<0.50	NA
1,1,2,2-Tetrachloroethane	15	NA	<0.50	<0.50	<0.50	<0.50	NA
Toluene	18000	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Tetrachloroethylene	17	NA	<0.20	<0.20	<0.20	<0.20	NA
1,1,1-Trichloroethane	6700	NA	<0.20	<0.20	<0.20	<0.20	NA
1,1,2-Trichloroethane	30	NA	<0.50	<0.50	<0.50	<0.50	NA
Trichloroethylene	17	NA	<0.20	<0.20	<0.20	<0.20	NA
Vinyl Chloride	1.7	NA	<0.20	<0.20	<0.20	<0.20	NA
Total Xylenes	4200	<0.40	<0.20	<0.20	<0.20	<0.20	<0.40
Dichlorodifluoromethane	4400	NA	<1.0	<1.0	<1.0	<1.0	NA
Hexane(n)	520	NA	<1.0	<1.0	<1.0	<1.0	NA
Trichlorofluoromethane	2500	NA	<0.50	<0.50	<0.50	<0.50	NA
PHC F1	750	<25	<25	<25	<25	<25	<25
PHC F2	150	<100	<100	<100	140	**170**	150
PHC F3	500	<200	<200	<200	420	**510**	440
PHC F4	500	<200	<200	<200	<200	<200	<200

NOTES:

1 MOECC *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 3 non potable standards, fine grained soil.*

Shaded Concentration exceeds MOECC Table 3 groundwater quality standard.

NA not analyzed

TABLE 4 GROUNDWATER ANALYTICAL RESULTS *(µg/L)*
POLYCYCLIC AROMATIC HYDROCARBONS
6102 Renaud Road, Ottawa, Ontario

Parameter	MOECC Table 3[1]	MW17-1	MW17-2	MW17-3	MW17-4-S1	MW17-4 (Dup of MW17-4)
Sample Date (d/m/y)		10-Oct-17	5-Oct-17	5-Oct-17	10-Oct-17	10-Oct-17
Acenaphthene	1700	<0.5	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	1.8	<1	<0.050	<0.050	<0.050	<0.050
Anthracene	2.4	156	<0.050	<0.050	0.28	0.29
Benzo(a)anthracene	4.7	<0.5	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	0.81	60	<0.010	<0.010	<0.010	<0.010
Benzo(b/j)fluoranthene	0.75	<0.1	<0.050	<0.050	<0.050	<0.050
Benzo(ghi)perylene	0.2	<1	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	0.4	<0.5	<0.050	<0.050	<0.050	<0.050
Chrysene	1	1.5	<0.050	<0.050	<0.050	<0.050
Dibenzo(a,h)anthracene	0.52	<0.1	<0.050	<0.050	<0.050	<0.050
Fluoranthene	130	2.1	<0.050	<0.050	<0.050	<0.050
Fluorene	400	1	<0.050	<0.050	0.16	0.12
Indeno(1,2,3-cd)pyrene	0.2	<1	<0.050	<0.050	<0.050	<0.050
1-Methylnaphthalene	1800	<0.1	<0.050	<0.050	<0.050	<0.050
2-Methylnaphthalene		230000	<0.050	<0.050	<0.050	<0.050
Naphthalene	6400	<0.1	<0.050	<0.050	<0.050	<0.050
Phenanthrene	580	9.2	<0.030	<0.030	0.085	0.09
Pyrene	68	<0.5	<0.050	<0.050	<0.050	<0.050

NOTES:

1 MOECC Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 3 non potable standards, fine grained soil.

Shaded Concentration exceeds MOECC Table 3 groundwater quality standard.

Appendix E – Laboratory Certificates of Analysis

Maxxam
A Bureau Veritas Group Company

Your Project #: OTT-002421-A0
Site Location: RENAUD RD
Your C.O.C. #: 631703-01-01

Attention:Daniel Clarke

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

Report Date: 2017/10/10
Report #: R4770418
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7L6823
Received: 2017/10/02, 17:20

Sample Matrix: Soil
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum	5	N/A	2017/10/04	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum (1)	4	N/A	2017/10/06		EPA 8260C m
Petroleum Hydro. CCME F1 & BTEX in Soil (2)	1	N/A	2017/10/04	OTT SOP-00002	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil (3)	3	2017/10/03	2017/10/04	OTT SOP-00001	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil (3)	2	2017/10/03	2017/10/05	OTT SOP-00001	CCME CWS
Moisture	5	N/A	2017/10/04	CAM SOP-00445	McKeague 2nd ed 1978
PAH Compounds in Soil by GC/MS (SIM)	5	2017/10/03	2017/10/03	OTT SOP-00011	EPA 8270D m
pH CaCl2 EXTRACT (1)	1	2017/10/06	2017/10/06	CAM SOP-00413	EPA 9045 D m
Sieve, 75um (1)	1	N/A	2017/10/10	CAM SOP-00467	Carter 2nd ed m
Volatile Organic Compounds and F1 PHCs (1)	4	N/A	2017/10/05	CAM SOP-00230	EPA 8260C m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam 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.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam 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 Maxxam, unless otherwise agreed in writing.

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.

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 #: OTT-002421-A0
Site Location: RENAUD RD
Your C.O.C. #: 631703-01-01

Attention:Daniel Clarke

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

Report Date: 2017/10/10
Report #: R4770418
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7L6823
Received: 2017/10/02, 17:20

(1) This test was performed by Maxxam Analytics Mississauga
(2) 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.
(3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam 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.
Alison Cameron, Project Manager
Email: ACameron@maxxam.ca
Phone# (613) 274-0573

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B7L6823
Report Date: 2017/10/10

exp Services Inc
Client Project #: OTT-002421-A0
Site Location: RENAUD RD
Sampler Initials: JO

RESULTS OF ANALYSES OF SOIL

Maxxam ID		FGA205	FGA206	FGA207	FGA208	FGA209	FGA210		
Sampling Date		2017/10/02 09:30	2017/10/02 11:00	2017/10/02 13:15	2017/10/02 13:20	2017/10/02 15:30	2017/10/02 13:35		
COC Number		631703-01-01	631703-01-01	631703-01-01	631703-01-01	631703-01-01	631703-01-01		
	UNITS	**MW1-S1**	**MW2-S1**	**MW3-S3**	**MW3-S13**	**MW4-S1**	**MW3-GRAIN**	**RDL**	**QC Batch**
Inorganics									
Moisture	%	23	10	24	32	23		0.2	5194340
Available (CaCl2) pH	pH						7.00		5199398
Miscellaneous Parameters									
Grain Size	%						FINE	N/A	5202942
Sieve - #200 (<0.075mm)	%						89	1	5202942
Sieve - #200 (>0.075mm)	%						11	1	5202942

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B7L6823
Report Date: 2017/10/10

exp Services Inc
Client Project #: OTT-002421-A0
Site Location: RENAUD RD
Sampler Initials: JO

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		FGA205	FGA206	FGA207	FGA208	FGA209		
Sampling Date		2017/10/02 09:30	2017/10/02 11:00	2017/10/02 13:15	2017/10/02 13:20	2017/10/02 15:30		
COC Number		631703-01-01	631703-01-01	631703-01-01	631703-01-01	631703-01-01		
	UNITS	**MW1-S1**	**MW2-S1**	**MW3-S3**	**MW3-S13**	**MW4-S1**	**RDL**	**QC Batch**
Calculated Parameters								
Methylnaphthalene, 2-(1-)	ug/g	<0.014	<0.014	<0.014	<0.014	<0.014	0.014	5194058
Polyaromatic Hydrocarbons								
Acenaphthene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	5194341
Acenaphthylene	ug/g	<0.0050	0.016	<0.0050	<0.0050	<0.0050	0.0050	5194341
Anthracene	ug/g	<0.0050	0.029	<0.0050	<0.0050	0.0083	0.0050	5194341
Benzo(a)anthracene	ug/g	<0.0050	0.029	<0.0050	<0.0050	0.031	0.0050	5194341
Benzo(a)pyrene	ug/g	<0.0050	0.026	<0.0050	<0.0050	0.026	0.0050	5194341
Benzo(b/j)fluoranthene	ug/g	<0.0050	0.058	<0.0050	<0.0050	0.042	0.0050	5194341
Benzo(g,h,i)perylene	ug/g	<0.0050	0.044	<0.0050	<0.0050	0.017	0.0050	5194341
Benzo(k)fluoranthene	ug/g	<0.0050	0.021	<0.0050	<0.0050	0.013	0.0050	5194341
Chrysene	ug/g	<0.0050	0.034	<0.0050	<0.0050	0.028	0.0050	5194341
Dibenz(a,h)anthracene	ug/g	<0.0050	0.0088	<0.0050	<0.0050	<0.0050	0.0050	5194341
Fluoranthene	ug/g	<0.0050	0.069	<0.0050	<0.0050	0.056	0.0050	5194341
Fluorene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	5194341
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	0.030	<0.0050	<0.0050	0.019	0.0050	5194341
1-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	5194341
2-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	5194341
Naphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	5194341
Phenanthrene	ug/g	<0.0050	0.016	<0.0050	<0.0050	0.037	0.0050	5194341
Pyrene	ug/g	<0.0050	0.057	<0.0050	<0.0050	0.041	0.0050	5194341
Surrogate Recovery (%)								
D10-Anthracene	%	80	79	81	78	81		5194341
D14-Terphenyl (FS)	%	81	85	83	79	84		5194341
D8-Acenaphthylene	%	95	91	95	92	95		5194341

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B7L6823
Report Date: 2017/10/10

exp Services Inc
Client Project #: OTT-002421-A0
Site Location: RENAUD RD
Sampler Initials: JO

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		FGA206	FGA207	FGA208	FGA209		
Sampling Date		2017/10/02 11:00	2017/10/02 13:15	2017/10/02 13:20	2017/10/02 15:30		
COC Number		631703-01-01	631703-01-01	631703-01-01	631703-01-01		
	UNITS	**MW2-S1**	**MW3-S3**	**MW3-S13**	**MW4-S1**	**RDL**	**QC Batch**
Calculated Parameters							
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5194060
Volatile Organics							
Acetone (2-Propanone)	ug/g	<0.50	<0.50	<0.50	<0.50	0.50	5196629
Benzene	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	5196629
Bromodichloromethane	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Bromoform	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Bromomethane	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Carbon Tetrachloride	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Chlorobenzene	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Chloroform	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Dibromochloromethane	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
1,2-Dichlorobenzene	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
1,3-Dichlorobenzene	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
1,4-Dichlorobenzene	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
1,1-Dichloroethane	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
1,2-Dichloroethane	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
1,1-Dichloroethylene	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
cis-1,2-Dichloroethylene	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
trans-1,2-Dichloroethylene	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
1,2-Dichloropropane	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
cis-1,3-Dichloropropene	ug/g	<0.030	<0.030	<0.030	<0.030	0.030	5196629
trans-1,3-Dichloropropene	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	5196629
Ethylbenzene	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	5196629
Ethylene Dibromide	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Hexane	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Methylene Chloride(Dichloromethane)	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	<0.50	<0.50	<0.50	0.50	5196629
Methyl Isobutyl Ketone	ug/g	<0.50	<0.50	<0.50	<0.50	0.50	5196629
Methyl t-butyl ether (MTBE)	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Styrene	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
1,1,1,2-Tetrachloroethane	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
1,1,2,2-Tetrachloroethane	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Report Date: 2017/10/10

exp Services Inc
Client Project #: OTT-002421-A0
Site Location: RENAUD RD
Sampler Initials: JO

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		FGA206	FGA207	FGA208	FGA209		
Sampling Date		2017/10/02 11:00	2017/10/02 13:15	2017/10/02 13:20	2017/10/02 15:30		
COC Number		631703-01-01	631703-01-01	631703-01-01	631703-01-01		
	UNITS	**MW2-S1**	**MW3-S3**	**MW3-S13**	**MW4-S1**	**RDL**	**QC Batch**
Tetrachloroethylene	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Toluene	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	5196629
1,1,1-Trichloroethane	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
1,1,2-Trichloroethane	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Trichloroethylene	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	5196629
Vinyl Chloride	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	5196629
p+m-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	5196629
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	5196629
Total Xylenes	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	5196629
F1 (C6-C10)	ug/g	<10	<10	<10	<10	10	5196629
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	10	5196629
Surrogate Recovery (%)							
4-Bromofluorobenzene	%	97	96	94	96		5196629
D10-o-Xylene	%	92	91	92	89		5196629
D4-1,2-Dichloroethane	%	89	93	95	93		5196629
D8-Toluene	%	95	94	96	97		5196629

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Report Date: 2017/10/10

exp Services Inc
Client Project #: OTT-002421-A0
Site Location: RENAUD RD
Sampler Initials: JO

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		FGA205	FGA206	FGA207	FGA208	FGA209		
Sampling Date		2017/10/02 09:30	2017/10/02 11:00	2017/10/02 13:15	2017/10/02 13:20	2017/10/02 15:30		
COC Number		631703-01-01	631703-01-01	631703-01-01	631703-01-01	631703-01-01		
	UNITS	**MW1-S1**	**MW2-S1**	**MW3-S3**	**MW3-S13**	**MW4-S1**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons								
Benzene	ug/g	<0.02					0.02	5194466
Toluene	ug/g	<0.02					0.02	5194466
Ethylbenzene	ug/g	<0.02					0.02	5194466
o-Xylene	ug/g	<0.02					0.02	5194466
p+m-Xylene	ug/g	<0.04					0.04	5194466
Total Xylenes	ug/g	<0.04					0.04	5194466
F1 (C6-C10)	ug/g	<10					10	5194466
F1 (C6-C10) - BTEX	ug/g	<10					10	5194466
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	<10	<10	10	5194343
F3 (C16-C34 Hydrocarbons)	ug/g	<50	120	<50	<50	<50	50	5194343
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	<50	<50	50	5194343
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	Yes		5194343
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	106						5194466
4-Bromofluorobenzene	%	89						5194466
D10-Ethylbenzene	%	117						5194466
D4-1,2-Dichloroethane	%	114						5194466
o-Terphenyl	%	91	94	92	92	90		5194343

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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exp Services Inc
Client Project #: OTT-002421-A0
Site Location: RENAUD RD
Sampler Initials: JO

TEST SUMMARY

Maxxam ID: FGA205
Sample ID: MW1-S1
Matrix: Soil

Collected: 2017/10/02
Shipped:
Received: 2017/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5194058	N/A	2017/10/04	Liliana Gaburici
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5194466	N/A	2017/10/04	Lyndsey Hart
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5194343	2017/10/03	2017/10/04	Arezoo Habibagahi
Moisture	BAL	5194340	N/A	2017/10/04	Liliana Gaburici
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5194341	2017/10/03	2017/10/03	Liliana Gaburici

Maxxam ID: FGA206
Sample ID: MW2-S1
Matrix: Soil

Collected: 2017/10/02
Shipped:
Received: 2017/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5194058	N/A	2017/10/04	Liliana Gaburici
1,3-Dichloropropene Sum	CALC	5194060	N/A	2017/10/06	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5194343	2017/10/03	2017/10/04	Arezoo Habibagahi
Moisture	BAL	5194340	N/A	2017/10/04	Liliana Gaburici
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5194341	2017/10/03	2017/10/03	Liliana Gaburici
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5196629	N/A	2017/10/05	Yang (Philip) Yu

Maxxam ID: FGA207
Sample ID: MW3-S3
Matrix: Soil

Collected: 2017/10/02
Shipped:
Received: 2017/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5194058	N/A	2017/10/04	Liliana Gaburici
1,3-Dichloropropene Sum	CALC	5194060	N/A	2017/10/06	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5194343	2017/10/03	2017/10/04	Arezoo Habibagahi
Moisture	BAL	5194340	N/A	2017/10/04	Liliana Gaburici
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5194341	2017/10/03	2017/10/03	Liliana Gaburici
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5196629	N/A	2017/10/05	Yang (Philip) Yu

Maxxam ID: FGA208
Sample ID: MW3-S13
Matrix: Soil

Collected: 2017/10/02
Shipped:
Received: 2017/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5194058	N/A	2017/10/04	Liliana Gaburici
1,3-Dichloropropene Sum	CALC	5194060	N/A	2017/10/06	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5194343	2017/10/03	2017/10/05	Arezoo Habibagahi
Moisture	BAL	5194340	N/A	2017/10/04	Liliana Gaburici
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5194341	2017/10/03	2017/10/03	Liliana Gaburici
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5196629	N/A	2017/10/05	Yang (Philip) Yu

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Report Date: 2017/10/10

exp Services Inc
Client Project #: OTT-002421-A0
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Sampler Initials: JO

TEST SUMMARY

Maxxam ID: FGA209
Sample ID: MW4-S1
Matrix: Soil

Collected: 2017/10/02
Shipped:
Received: 2017/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5194058	N/A	2017/10/04	Liliana Gaburici
1,3-Dichloropropene Sum	CALC	5194060	N/A	2017/10/06	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5194343	2017/10/03	2017/10/05	Arezoo Habibagahi
Moisture	BAL	5194340	N/A	2017/10/04	Liliana Gaburici
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5194341	2017/10/03	2017/10/03	Liliana Gaburici
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5196629	N/A	2017/10/05	Yang (Philip) Yu

Maxxam ID: FGA210
Sample ID: MW3-GRAIN
Matrix: Soil

Collected: 2017/10/02
Shipped:
Received: 2017/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH CaCl2 EXTRACT	AT	5199398	2017/10/06	2017/10/06	Tahir Anwar
Sieve, 75um	SIEV	5202942	N/A	2017/10/10	Chun Yan

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GENERAL COMMENTS

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

Package 1	7.0°C

PETROLEUM HYDROCARBONS (CCME)

Petroleum Hydrocarbons F2-F4 in Soil: F2-F4 Analysis: Matrix spiked recoveries were not calculated (NC) because of high concentration of target compounds in the parent sample.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: OTT-002421-A0
Site Location: RENAUD RD
Sampler Initials: JO

			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
5194341	D10-Anthracene	2017/10/03	77	50 - 130	81	50 - 130	87	%				
5194341	D14-Terphenyl (FS)	2017/10/03	86	50 - 130	80	50 - 130	82	%				
5194341	D8-Acenaphthylene	2017/10/03	93	50 - 130	99	50 - 130	104	%				
5194343	o-Terphenyl	2017/10/05	93	30 - 130	100	30 - 130	79	%				
5194466	1,4-Difluorobenzene	2017/10/04	79	60 - 140	101	60 - 140	101	%				
5194466	4-Bromofluorobenzene	2017/10/04	78	60 - 140	100	60 - 140	95	%				
5194466	D10-Ethylbenzene	2017/10/04	130	30 - 130	121	30 - 130	122	%				
5194466	D4-1,2-Dichloroethane	2017/10/04	99	60 - 140	122	60 - 140	120	%				
5196629	4-Bromofluorobenzene	2017/10/05	103	60 - 140	104	60 - 140	95	%				
5196629	D10-o-Xylene	2017/10/05	104	60 - 130	112	60 - 130	92	%				
5196629	D4-1,2-Dichloroethane	2017/10/05	90	60 - 140	94	60 - 140	88	%				
5196629	D8-Toluene	2017/10/05	100	60 - 140	104	60 - 140	96	%				
5194340	Moisture	2017/10/04							5.8	50		
5194341	1-Methylnaphthalene	2017/10/03	99	50 - 130	105	50 - 130	<0.0050	ug/g	NC	40		
5194341	2-Methylnaphthalene	2017/10/03	93	50 - 130	100	50 - 130	<0.0050	ug/g	5.3	40		
5194341	Acenaphthene	2017/10/03	96	50 - 130	96	50 - 130	<0.0050	ug/g	38	40		
5194341	Acenaphthylene	2017/10/03	98	50 - 130	105	50 - 130	<0.0050	ug/g	NC	40		
5194341	Anthracene	2017/10/03	90	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40		
5194341	Benzo(a)anthracene	2017/10/03	95	50 - 130	108	50 - 130	<0.0050	ug/g	14	40		
5194341	Benzo(a)pyrene	2017/10/03	71	50 - 130	89	50 - 130	<0.0050	ug/g	22	40		
5194341	Benzo(b/j)fluoranthene	2017/10/03	77	50 - 130	88	50 - 130	<0.0050	ug/g	24	40		
5194341	Benzo(g,h,i)perylene	2017/10/03	67	50 - 130	88	50 - 130	<0.0050	ug/g	30	40		
5194341	Benzo(k)fluoranthene	2017/10/03	78	50 - 130	89	50 - 130	<0.0050	ug/g	5.9	40		
5194341	Chrysene	2017/10/03	90	50 - 130	105	50 - 130	<0.0050	ug/g	14	40		
5194341	Dibenz(a,h)anthracene	2017/10/03	56	50 - 130	84	50 - 130	<0.0050	ug/g	5.3	40		
5194341	Fluoranthene	2017/10/03	79	50 - 130	100	50 - 130	<0.0050	ug/g	39	40		
5194341	Fluorene	2017/10/03	110	50 - 130	107	50 - 130	<0.0050	ug/g	34	40		
5194341	Indeno(1,2,3-cd)pyrene	2017/10/03	74	50 - 130	94	50 - 130	<0.0050	ug/g	34	40		
5194341	Naphthalene	2017/10/03	71	50 - 130	77	50 - 130	<0.0050	ug/g	37	40		
5194341	Phenanthrene	2017/10/03	75	50 - 130	93	50 - 130	<0.0050	ug/g	37	40		
5194341	Pyrene	2017/10/03	77	50 - 130	92	50 - 130	<0.0050	ug/g	1.1	40		

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QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc
Client Project #: OTT-002421-A0
Site Location: RENAUD RD
Sampler Initials: JO

			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
5194343	F2 (C10-C16 Hydrocarbons)	2017/10/05	NC	50 - 130	111	80 - 120	<10	ug/g	3.6	50		
5194343	F3 (C16-C34 Hydrocarbons)	2017/10/05	NC	50 - 130	111	80 - 120	<50	ug/g	8.8	50		
5194343	F4 (C34-C50 Hydrocarbons)	2017/10/05	NC	50 - 130	111	80 - 120	<50	ug/g	13	50		
5194466	Benzene	2017/10/04	117	60 - 140	98	60 - 140	<0.02	ug/g				
5194466	Ethylbenzene	2017/10/04	129	60 - 140	102	60 - 140	<0.02	ug/g				
5194466	F1 (C6-C10) - BTEX	2017/10/04					<10	ug/g	NC	50		
5194466	F1 (C6-C10)	2017/10/04	90	60 - 140	92	80 - 120	<10	ug/g	NC	50		
5194466	o-Xylene	2017/10/04	132	60 - 140	102	60 - 140	<0.02	ug/g				
5194466	p+m-Xylene	2017/10/04	132	60 - 140	103	60 - 140	<0.04	ug/g				
5194466	Toluene	2017/10/04	109	60 - 140	96	60 - 140	<0.02	ug/g				
5194466	Total Xylenes	2017/10/04					<0.04	ug/g				
5196629	1,1,1,2-Tetrachloroethane	2017/10/05	100	60 - 140	103	60 - 130	<0.050	ug/g	NC	50		
5196629	1,1,1-Trichloroethane	2017/10/05	95	60 - 140	96	60 - 130	<0.050	ug/g	NC	50		
5196629	1,1,2,2-Tetrachloroethane	2017/10/05	85	60 - 140	98	60 - 130	<0.050	ug/g	NC	50		
5196629	1,1,2-Trichloroethane	2017/10/05	80	60 - 140	92	60 - 130	<0.050	ug/g	NC	50		
5196629	1,1-Dichloroethane	2017/10/05	99	60 - 140	101	60 - 130	<0.050	ug/g	NC	50		
5196629	1,1-Dichloroethylene	2017/10/05	106	60 - 140	107	60 - 130	<0.050	ug/g	NC	50		
5196629	1,2-Dichlorobenzene	2017/10/05	98	60 - 140	100	60 - 130	<0.050	ug/g	NC	50		
5196629	1,2-Dichloroethane	2017/10/05	87	60 - 140	94	60 - 130	<0.050	ug/g	NC	50		
5196629	1,2-Dichloropropane	2017/10/05	85	60 - 140	94	60 - 130	<0.050	ug/g	NC	50		
5196629	1,3-Dichlorobenzene	2017/10/05	107	60 - 140	103	60 - 130	<0.050	ug/g	NC	50		
5196629	1,4-Dichlorobenzene	2017/10/05	105	60 - 140	103	60 - 130	<0.050	ug/g	NC	50		
5196629	Acetone (2-Propanone)	2017/10/05	92	60 - 140	109	60 - 140	<0.50	ug/g	NC	50		
5196629	Benzene	2017/10/05	100	60 - 140	102	60 - 130	<0.020	ug/g	NC	50		
5196629	Bromodichloromethane	2017/10/05	82	60 - 140	93	60 - 130	<0.050	ug/g	NC	50		
5196629	Bromoform	2017/10/05	89	60 - 140	100	60 - 130	<0.050	ug/g	NC	50		
5196629	Bromomethane	2017/10/05	97	60 - 140	102	60 - 140	<0.050	ug/g	NC	50		
5196629	Carbon Tetrachloride	2017/10/05	98	60 - 140	98	60 - 130	<0.050	ug/g	NC	50		
5196629	Chlorobenzene	2017/10/05	100	60 - 140	100	60 - 130	<0.050	ug/g	NC	50		
5196629	Chloroform	2017/10/05	91	60 - 140	94	60 - 130	<0.050	ug/g	NC	50		
5196629	cis-1,2-Dichloroethylene	2017/10/05	96	60 - 140	99	60 - 130	<0.050	ug/g	NC	50		

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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
5196629	cis-1,3-Dichloropropene	2017/10/05	87	60 - 140	99	60 - 130	<0.030	ug/g	NC	50		
5196629	Dibromochloromethane	2017/10/05	89	60 - 140	99	60 - 130	<0.050	ug/g	NC	50		
5196629	Dichlorodifluoromethane (FREON 12)	2017/10/05	100	60 - 140	101	60 - 140	<0.050	ug/g	NC	50		
5196629	Ethylbenzene	2017/10/05	108	60 - 140	105	60 - 130	<0.020	ug/g	NC	50		
5196629	Ethylene Dibromide	2017/10/05	91	60 - 140	101	60 - 130	<0.050	ug/g	NC	50		
5196629	F1 (C6-C10) - BTEX	2017/10/05					<10	ug/g	NC	30		
5196629	F1 (C6-C10)	2017/10/05	104	60 - 140	96	80 - 120	<10	ug/g	NC	30		
5196629	Hexane	2017/10/05	117	60 - 140	113	60 - 130	<0.050	ug/g	NC	50		
5196629	Methyl Ethyl Ketone (2-Butanone)	2017/10/05	88	60 - 140	107	60 - 140	<0.50	ug/g	NC	50		
5196629	Methyl Isobutyl Ketone	2017/10/05	78	60 - 140	100	60 - 130	<0.50	ug/g	NC	50		
5196629	Methyl t-butyl ether (MTBE)	2017/10/05	94	60 - 140	98	60 - 130	<0.050	ug/g	NC	50		
5196629	Methylene Chloride(Dichloromethane)	2017/10/05	84	60 - 140	88	60 - 130	<0.050	ug/g	NC	50		
5196629	o-Xylene	2017/10/05	107	60 - 140	105	60 - 130	<0.020	ug/g	NC	50		
5196629	p+m-Xylene	2017/10/05	89	60 - 140	86	60 - 130	<0.020	ug/g	NC	50		
5196629	Styrene	2017/10/05	80	60 - 140	80	60 - 130	<0.050	ug/g	NC	50		
5196629	Tetrachloroethylene	2017/10/05	96	60 - 140	98	60 - 130	<0.050	ug/g	NC	50		
5196629	Toluene	2017/10/05	95	60 - 140	99	60 - 130	<0.020	ug/g	NC	50		
5196629	Total Xylenes	2017/10/05					<0.020	ug/g	NC	50		
5196629	trans-1,2-Dichloroethylene	2017/10/05	101	60 - 140	102	60 - 130	<0.050	ug/g	NC	50		
5196629	trans-1,3-Dichloropropene	2017/10/05	88	60 - 140	99	60 - 130	<0.040	ug/g	NC	50		
5196629	Trichloroethylene	2017/10/05	96	60 - 140	99	60 - 130	<0.050	ug/g	NC	50		
5196629	Trichlorofluoromethane (FREON 11)	2017/10/05	99	60 - 140	100	60 - 130	<0.050	ug/g	NC	50		
5196629	Vinyl Chloride	2017/10/05	101	60 - 140	101	60 - 130	<0.020	ug/g	NC	50		
5199398	Available (CaCl2) pH	2017/10/06			100	97 - 103			0.51	N/A		
5202942	Sieve - #200 (<0.075mm)	2017/10/10							0.10	20	54	53 - 58

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B7L6823
Report Date: 2017/10/10

QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc
Client Project #: OTT-002421-A0
Site Location: RENAUD RD
Sampler Initials: JO

			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
5202942	Sieve - #200 (>0.075mm)	2017/10/10							NC	20	46	42 - 47

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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Maxxam Job #: B7L6823
Report Date: 2017/10/10

exp Services Inc
Client Project #: OTT-002421-A0
Site Location: RENAUD RD
Sampler Initials: JO

VALIDATION SIGNATURE PAGE

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

Cristina Carriere, Scientific Service Specialist

Paul Rubinato, Analyst, Maxxam Analytics

Steve Roberts, Ottawa Lab Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam
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Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page of

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#17498 exp Services Inc	Company Name:	exp Services	Quotation #:	B45998	Maxxam Job #:	Bottle Order #:
Attention:	Accounts Payable	Attention:	Dan clarke / Jeff o'Brien	P.O. #:			631703
Address:	100-2650 Queensview Drive Ottawa ON K2B 8H6	Address:		Project:	OTT-002421-A0	COC #:	Project Manager:
Tel:	(613) 688-1899 x Fax: (613) 225-7337 x	Tel:	Fax:	Project Name:	Renaud RJ.	C#631703-01-01	Alison Cameron
Email:	accounting.ottawa@exp.com; Karen.Burke@exp.com,	Email:	Danclarke@exp.com Jeffrey.o'brien	Site #:			
				Sampled By:	Jeff O.		

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

Regulation 153 (2011)	Other Regulations	Special Instructions
☐ Table 1 ☐ Res/Park ☐ Medium/Fine	☐ CCME ☐ Sanitary Sewer Bylaw	
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ Reg 558. ☐ Storm Sewer Bylaw	
☐ Table 3 ☐ Agri/Other ☐ For RSC	☐ MISA Municipality _____	
☐ Table ___	☐ PWQO	
	☐ Other _____	

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

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	O.Reg 153 VOCs by HS & F1-F4 (Soil)	O.Reg 153 PAHs (Soil)	O.Reg 153 Petroleum Hydrocarbons (Soil)		pH CaCl2 EXTRACT	Sieve, 75um					# of Bottles	Comments
1		MW1-S1	10.02.17		Soil			✓	✓								3	
2		MW2-S1	"		"		✓	✓	✓								3	
3		MW3-S3	"		"		✓	✓	✓								3	
4		MW3-S13	"		"		✓	✓	✓								3	
5		MW4-S1	"		"		✓	✓	✓								3	
6		MW3 Grain	"		"						✓	✓					1	
7																		
8																		
9																		
10																		

02-Oct-17 17:20
Alison Cameron
B7L6823
KIV OTT 001

RECEIVED IN OTTAWA

On ice

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

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

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

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Jeff o'Brien	17.10.02	17:20	Mariana Bascan Kascan	2017/10/02	17:20	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	7.7.7	Present		
		Intact	✓	

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

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

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

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

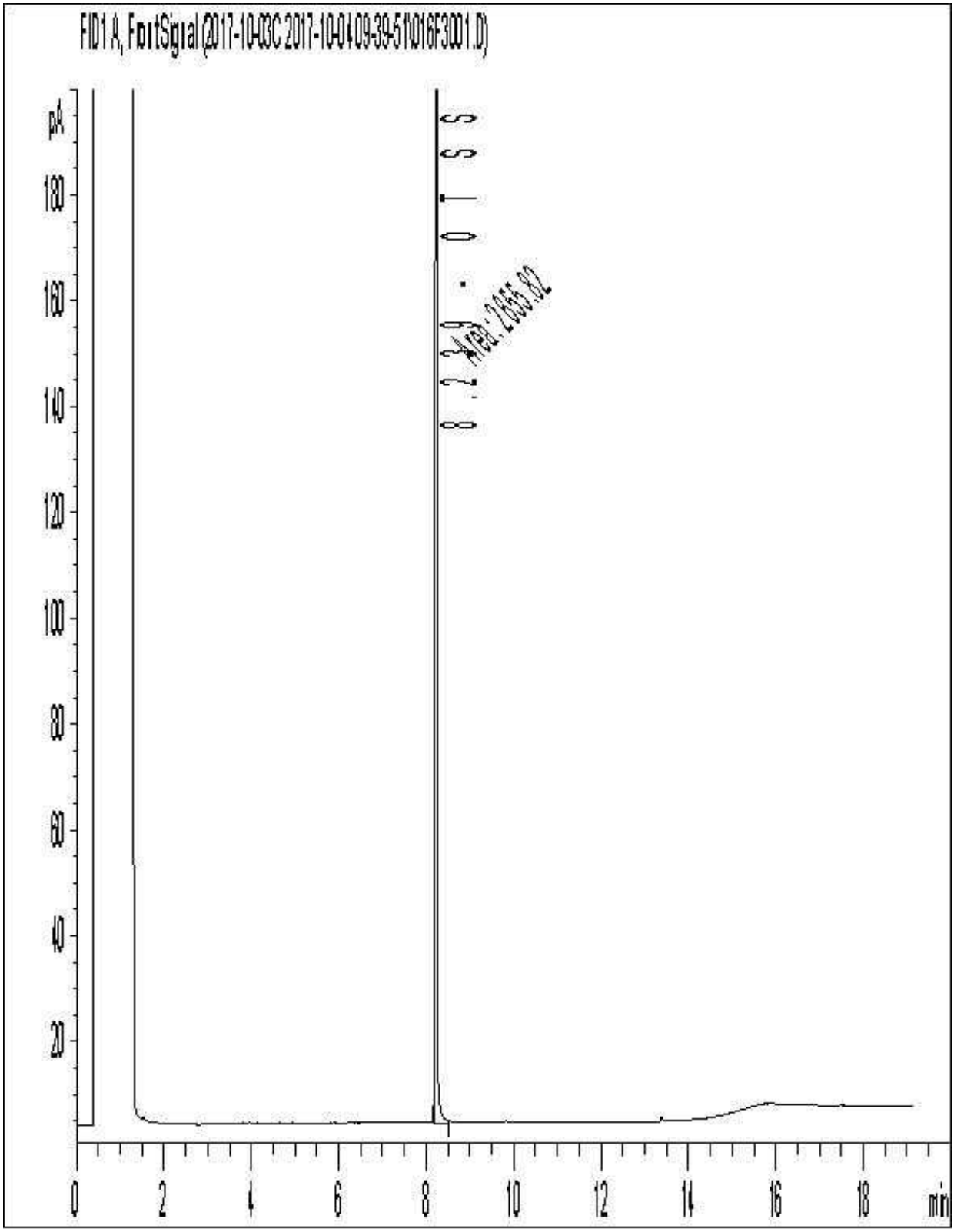
White: Maxxa Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam Job #: B7L6823
Report Date: 2017/10/10
Maxxam Sample: FGA205

exp Services Inc
Client Project #: OTT-002421-A0
Project name: RENAUD RD
Client ID: MW1-S1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

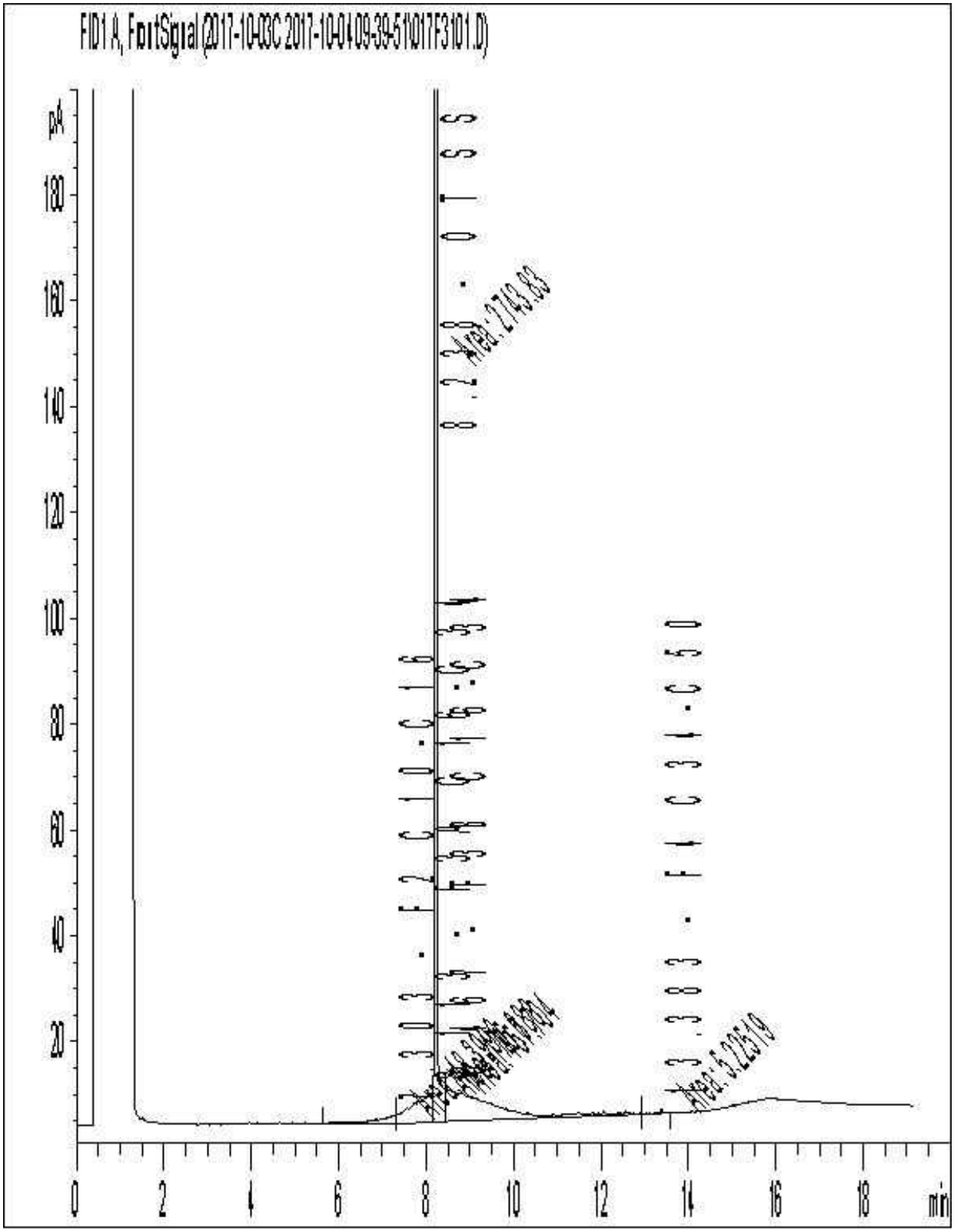


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B7L6823
Report Date: 2017/10/10
Maxxam Sample: FGA206

exp Services Inc
Client Project #: OTT-002421-A0
Project name: RENAUD RD
Client ID: MW2-S1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

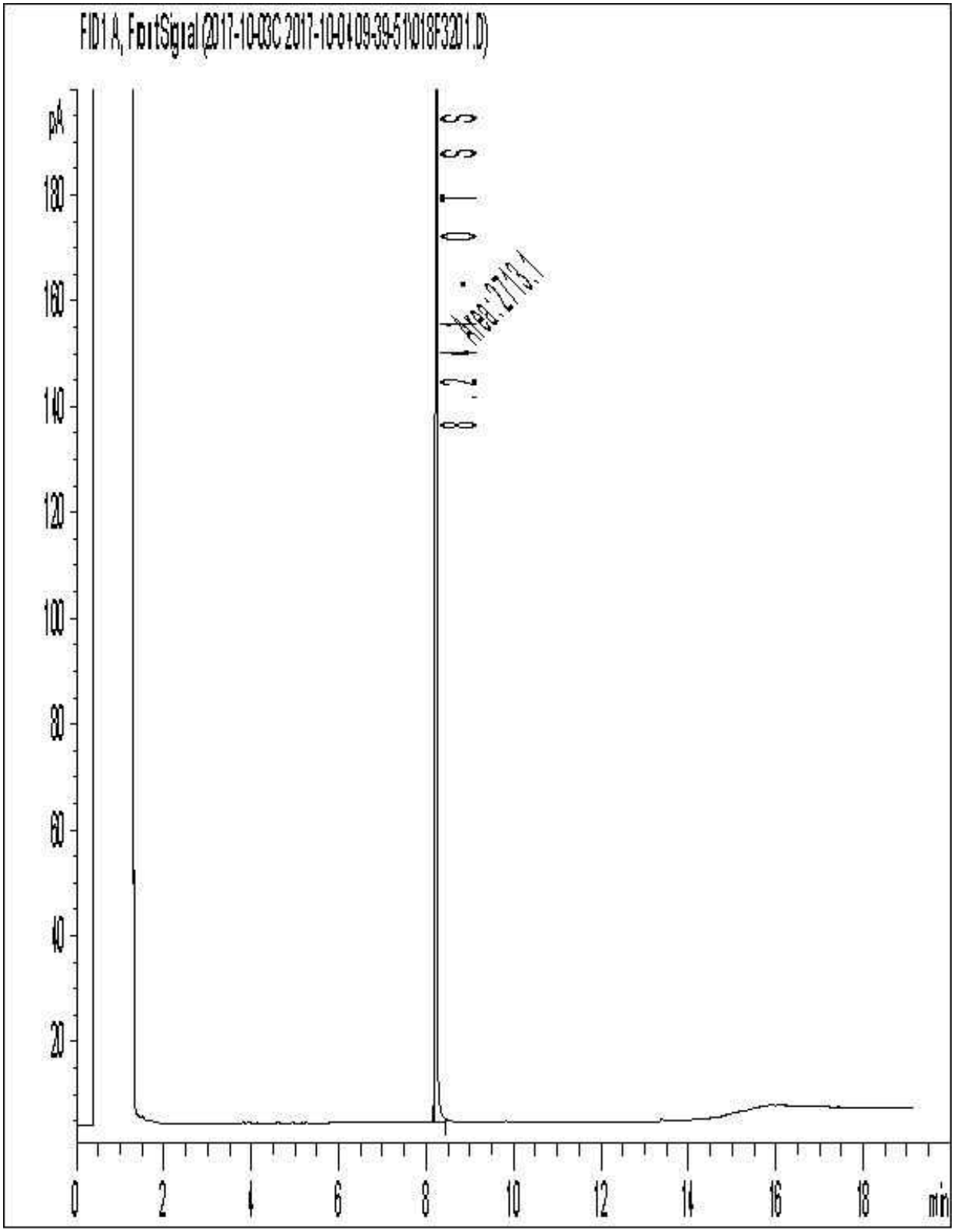


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B7L6823
Report Date: 2017/10/10
Maxxam Sample: FGA207

exp Services Inc
Client Project #: OTT-002421-A0
Project name: RENAUD RD
Client ID: MW3-S3

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

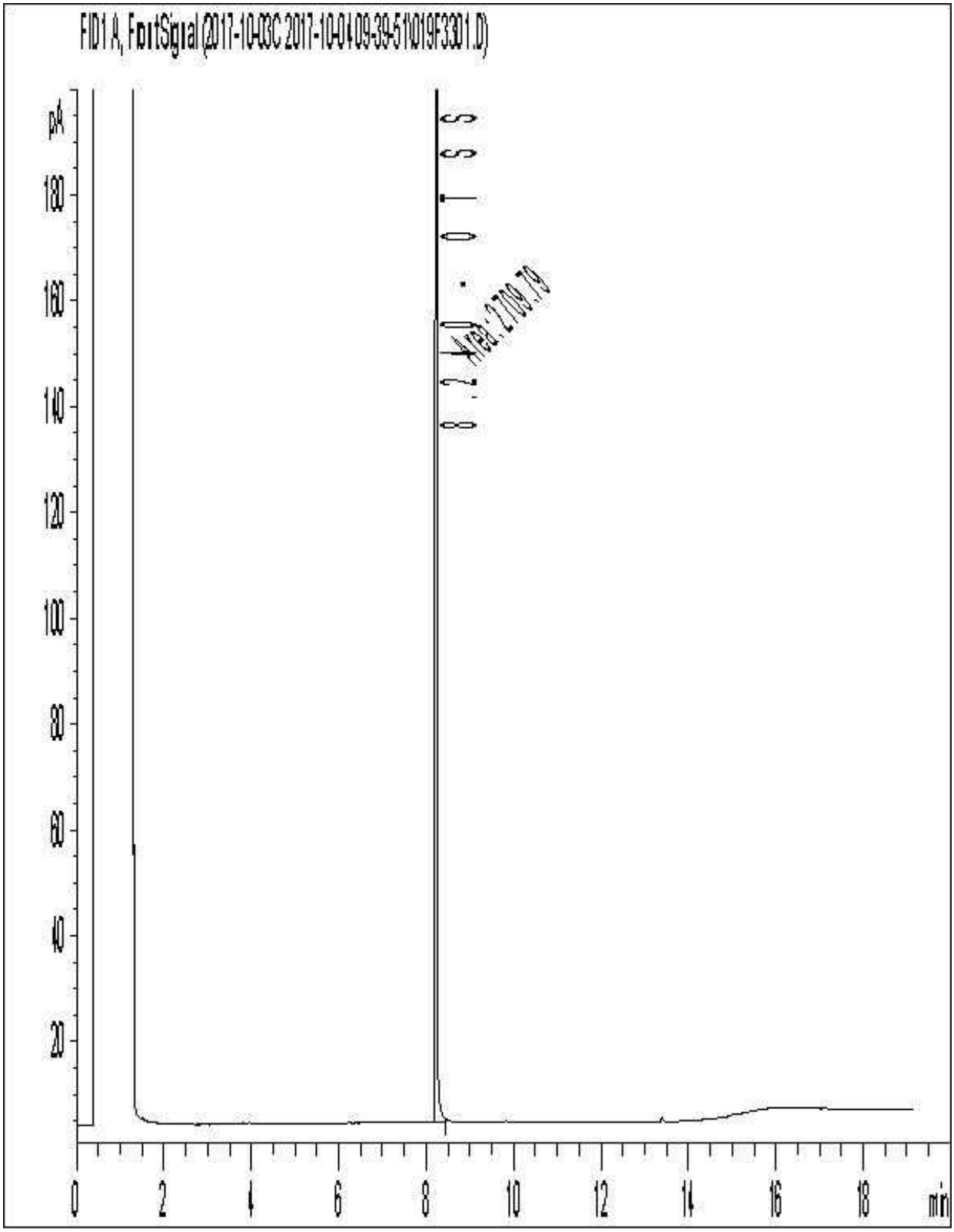


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B7L6823
Report Date: 2017/10/10
Maxxam Sample: FGA208

exp Services Inc
Client Project #: OTT-002421-A0
Project name: RENAUD RD
Client ID: MW3-S13

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

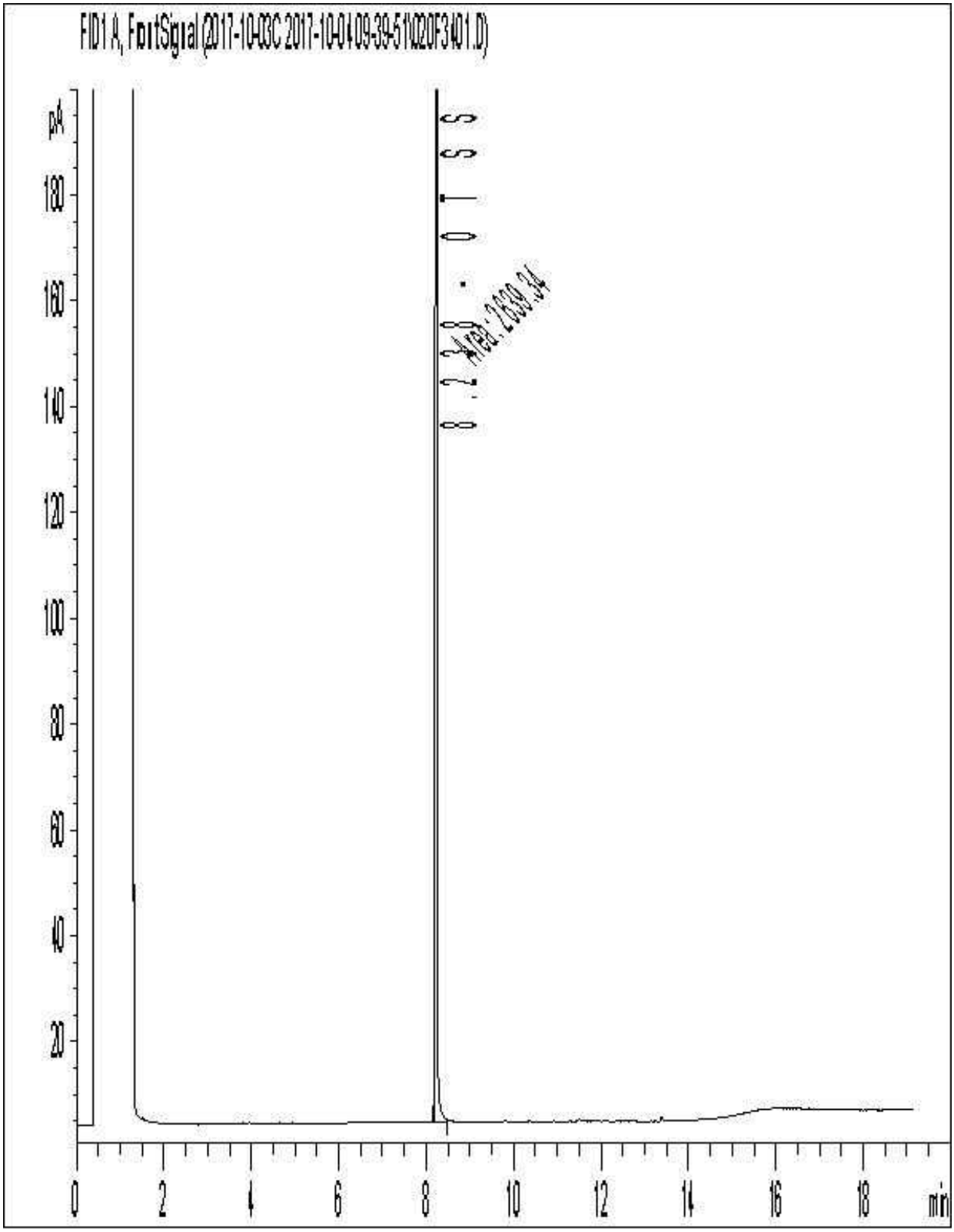


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B7L6823
Report Date: 2017/10/10
Maxxam Sample: FGA209

exp Services Inc
Client Project #: OTT-002421-A0
Project name: RENAUD RD
Client ID: MW4-S1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam
A Bureau Veritas Group Company

Your Project #: OTT-00242146-A0
Site Location: RENAUD RD.
Your C.O.C. #: 631707-01-01

Attention:Daniel Clarke

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

Report Date: 2017/10/16
Report #: R4785795
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7M0697
Received: 2017/10/05, 16:10

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum	2	N/A	2017/10/13	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum (1)	2	N/A	2017/10/12		EPA 8260C m
Petroleum Hydrocarbons F2-F4 in Water (2)	2	2017/10/10	2017/10/12	OTT SOP-00001	CCME Hydrocarbons
PAH Compounds in Water by GC/MS (SIM)	2	2017/10/12	2017/10/12	OTT SOP-00011	EPA 8270D m
Volatile Organic Compounds and F1 PHCs (1)	2	N/A	2017/10/11	CAM SOP-00230	EPA 8260C m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam 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.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam 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 Maxxam, unless otherwise agreed in writing.

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.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Analytics Mississauga
(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam 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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Your Project #: OTT-00242146-A0
Site Location: RENAUD RD.
Your C.O.C. #: 631707-01-01

Attention:Daniel Clarke

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

Report Date: 2017/10/16
Report #: R4785795
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7M0697
Received: 2017/10/05, 16:10

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Alison Cameron, Project Manager
Email: ACameron@maxxam.ca
Phone# (613) 274-0573
==========
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Maxxam Job #: B7M0697
Report Date: 2017/10/16

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD.
Sampler Initials: JO

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		FGT460	FGT460	FGT461		
Sampling Date		2017/10/05 14:00	2017/10/05 14:00	2017/10/05 14:30		
COC Number		631707-01-01	631707-01-01	631707-01-01		
	UNITS	**MW17-2**	**MW17-2 Lab-Dup**	**MW17-3**	**RDL**	**QC Batch**
Calculated Parameters						
Methylnaphthalene, 2-(1-)	ug/L	<0.071		<0.071	0.071	5200784
Polyaromatic Hydrocarbons						
Acenaphthene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Anthracene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Benzo(a)anthracene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	0.010	5208061
Benzo(b/j)fluoranthene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Chrysene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Fluoranthene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Fluorene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Naphthalene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Phenanthrene	ug/L	<0.030	<0.030	<0.030	0.030	5208061
Pyrene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Surrogate Recovery (%)						
D10-Anthracene	%	109	111	100		5208061
D14-Terphenyl (FS)	%	107	104	96		5208061
D8-Acenaphthylene	%	107	105	102		5208061

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

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Maxxam Job #: B7M0697
Report Date: 2017/10/16

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD.
Sampler Initials: JO

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		FGT460	FGT460	FGT461		
Sampling Date		2017/10/05 14:00	2017/10/05 14:00	2017/10/05 14:30		
COC Number		631707-01-01	631707-01-01	631707-01-01		
	UNITS	**MW17-2**	**MW17-2 Lab-Dup**	**MW17-3**	**RDL**	**QC Batch**
Calculated Parameters						
1,3-Dichloropropene (cis+trans)	ug/L	<0.50		<0.50	0.50	5200426
Volatile Organics						
Acetone (2-Propanone)	ug/L	<10	<10	<10	10	5203671
Benzene	ug/L	<0.20	<0.20	0.71	0.20	5203671
Bromodichloromethane	ug/L	<0.50	<0.50	<0.50	0.50	5203671
Bromoform	ug/L	<1.0	<1.0	<1.0	1.0	5203671
Bromomethane	ug/L	<0.50	<0.50	<0.50	0.50	5203671
Carbon Tetrachloride	ug/L	<0.20	<0.20	<0.20	0.20	5203671
Chlorobenzene	ug/L	<0.20	<0.20	<0.20	0.20	5203671
Chloroform	ug/L	<0.20	<0.20	<0.20	0.20	5203671
Dibromochloromethane	ug/L	<0.50	<0.50	<0.50	0.50	5203671
1,2-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	5203671
1,3-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	5203671
1,4-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	5203671
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	<1.0	<1.0	1.0	5203671
1,1-Dichloroethane	ug/L	<0.20	<0.20	<0.20	0.20	5203671
1,2-Dichloroethane	ug/L	<0.50	<0.50	<0.50	0.50	5203671
1,1-Dichloroethylene	ug/L	<0.20	<0.20	<0.20	0.20	5203671
cis-1,2-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	0.50	5203671
trans-1,2-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	0.50	5203671
1,2-Dichloropropane	ug/L	<0.20	<0.20	<0.20	0.20	5203671
cis-1,3-Dichloropropene	ug/L	<0.30	<0.30	<0.30	0.30	5203671
trans-1,3-Dichloropropene	ug/L	<0.40	<0.40	<0.40	0.40	5203671
Ethylbenzene	ug/L	<0.20	<0.20	<0.20	0.20	5203671
Ethylene Dibromide	ug/L	<0.20	<0.20	<0.20	0.20	5203671
Hexane	ug/L	<1.0	<1.0	<1.0	1.0	5203671
Methylene Chloride(Dichloromethane)	ug/L	<2.0	<2.0	<2.0	2.0	5203671
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	<10	<10	10	5203671
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	<5.0	5.0	5203671
Methyl t-butyl ether (MTBE)	ug/L	<0.50	<0.50	<0.50	0.50	5203671
Styrene	ug/L	<0.50	<0.50	<0.50	0.50	5203671
1,1,1,2-Tetrachloroethane	ug/L	<0.50	<0.50	<0.50	0.50	5203671

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

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Maxxam Job #: B7M0697
Report Date: 2017/10/16

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD.
Sampler Initials: JO

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		FGT460	FGT460	FGT461		
Sampling Date		2017/10/05 14:00	2017/10/05 14:00	2017/10/05 14:30		
COC Number		631707-01-01	631707-01-01	631707-01-01		
	UNITS	**MW17-2**	**MW17-2 Lab-Dup**	**MW17-3**	**RDL**	**QC Batch**
1,1,2,2-Tetrachloroethane	ug/L	<0.50	<0.50	<0.50	0.50	5203671
Tetrachloroethylene	ug/L	<0.20	<0.20	<0.20	0.20	5203671
Toluene	ug/L	<0.20	<0.20	<0.20	0.20	5203671
1,1,1-Trichloroethane	ug/L	<0.20	<0.20	<0.20	0.20	5203671
1,1,2-Trichloroethane	ug/L	<0.50	<0.50	<0.50	0.50	5203671
Trichloroethylene	ug/L	<0.20	<0.20	<0.20	0.20	5203671
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	<0.50	<0.50	0.50	5203671
Vinyl Chloride	ug/L	<0.20	<0.20	<0.20	0.20	5203671
p+m-Xylene	ug/L	<0.20	<0.20	<0.20	0.20	5203671
o-Xylene	ug/L	<0.20	<0.20	<0.20	0.20	5203671
Total Xylenes	ug/L	<0.20	<0.20	<0.20	0.20	5203671
F1 (C6-C10)	ug/L	<25	<25	<25	25	5203671
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25	25	5203671
Surrogate Recovery (%)						
4-Bromofluorobenzene	%	95	93	93		5203671
D4-1,2-Dichloroethane	%	101	104	103		5203671
D8-Toluene	%	93	92	93		5203671

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

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Maxxam Job #: B7M0697
Report Date: 2017/10/16

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD.
Sampler Initials: JO

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		FGT460	FGT461	FGT461		
Sampling Date		2017/10/05 14:00	2017/10/05 14:30	2017/10/05 14:30		
COC Number		631707-01-01	631707-01-01	631707-01-01		
	UNITS	**MW17-2**	**MW17-3**	**MW17-3 Lab-Dup**	**RDL**	**QC Batch**
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	100	5204534
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	200	5204534
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	200	5204534
Reached Baseline at C50	ug/L	Yes	Yes	Yes		5204534
Surrogate Recovery (%)						
o-Terphenyl	%	85	81	85		5204534

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

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Maxxam Job #: B7M0697
Report Date: 2017/10/16

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD.
Sampler Initials: JO

TEST SUMMARY

Maxxam ID: FGT460
Sample ID: MW17-2
Matrix: Water

Collected: 2017/10/05
Shipped:
Received: 2017/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5200784	N/A	2017/10/13	Liliana Gaburici
1,3-Dichloropropene Sum	CALC	5200426	N/A	2017/10/12	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5204534	2017/10/10	2017/10/12	Arezoo Habibagahi
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5208061	2017/10/12	2017/10/12	Liliana Gaburici
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5203671	N/A	2017/10/11	Karen Hughes

Maxxam ID: FGT460 Dup
Sample ID: MW17-2
Matrix: Water

Collected: 2017/10/05
Shipped:
Received: 2017/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5208061	2017/10/12	2017/10/12	Liliana Gaburici
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5203671	N/A	2017/10/11	Karen Hughes

Maxxam ID: FGT461
Sample ID: MW17-3
Matrix: Water

Collected: 2017/10/05
Shipped:
Received: 2017/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5200784	N/A	2017/10/13	Liliana Gaburici
1,3-Dichloropropene Sum	CALC	5200426	N/A	2017/10/12	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5204534	2017/10/10	2017/10/12	Arezoo Habibagahi
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5208061	2017/10/12	2017/10/12	Liliana Gaburici
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5203671	N/A	2017/10/11	Karen Hughes

Maxxam ID: FGT461 Dup
Sample ID: MW17-3
Matrix: Water

Collected: 2017/10/05
Shipped:
Received: 2017/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5204534	2017/10/10	2017/10/12	Arezoo Habibagahi

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Maxxam Job #: B7M0697
Report Date: 2017/10/16

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD.
Sampler Initials: JO

GENERAL COMMENTS

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

Package 1	11.3°C

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD.
Sampler Initials: JO

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5203671	4-Bromofluorobenzene	2017/10/11	101	70 - 130	102	70 - 130	93	%		
5203671	D4-1,2-Dichloroethane	2017/10/11	101	70 - 130	99	70 - 130	99	%		
5203671	D8-Toluene	2017/10/11	100	70 - 130	100	70 - 130	94	%		
5204534	o-Terphenyl	2017/10/12	87	30 - 130	86	30 - 130	87	%		
5208061	D10-Anthracene	2017/10/12	105	50 - 130	105	50 - 130	110	%		
5208061	D14-Terphenyl (FS)	2017/10/12	102	50 - 130	99	50 - 130	106	%		
5208061	D8-Acenaphthylene	2017/10/12	99	50 - 130	99	50 - 130	91	%		
5203671	1,1,1,2-Tetrachloroethane	2017/10/11	101	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
5203671	1,1,1-Trichloroethane	2017/10/11	96	70 - 130	95	70 - 130	<0.20	ug/L	NC	30
5203671	1,1,2,2-Tetrachloroethane	2017/10/11	102	70 - 130	97	70 - 130	<0.50	ug/L	NC	30
5203671	1,1,2-Trichloroethane	2017/10/11	97	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
5203671	1,1-Dichloroethane	2017/10/11	102	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
5203671	1,1-Dichloroethylene	2017/10/11	104	70 - 130	102	70 - 130	<0.20	ug/L	NC	30
5203671	1,2-Dichlorobenzene	2017/10/11	90	70 - 130	87	70 - 130	<0.50	ug/L	NC	30
5203671	1,2-Dichloroethane	2017/10/11	95	70 - 130	91	70 - 130	<0.50	ug/L	NC	30
5203671	1,2-Dichloropropane	2017/10/11	93	70 - 130	91	70 - 130	<0.20	ug/L	NC	30
5203671	1,3-Dichlorobenzene	2017/10/11	91	70 - 130	90	70 - 130	<0.50	ug/L	NC	30
5203671	1,4-Dichlorobenzene	2017/10/11	91	70 - 130	90	70 - 130	<0.50	ug/L	NC	30
5203671	Acetone (2-Propanone)	2017/10/11	92	60 - 140	85	60 - 140	<10	ug/L	NC	30
5203671	Benzene	2017/10/11	105	70 - 130	102	70 - 130	<0.20	ug/L	NC	30
5203671	Bromodichloromethane	2017/10/11	94	70 - 130	90	70 - 130	<0.50	ug/L	NC	30
5203671	Bromoform	2017/10/11	100	70 - 130	96	70 - 130	<1.0	ug/L	NC	30
5203671	Bromomethane	2017/10/11	111	60 - 140	107	60 - 140	<0.50	ug/L	NC	30
5203671	Carbon Tetrachloride	2017/10/11	96	70 - 130	95	70 - 130	<0.20	ug/L	NC	30
5203671	Chlorobenzene	2017/10/11	94	70 - 130	92	70 - 130	<0.20	ug/L	NC	30
5203671	Chloroform	2017/10/11	98	70 - 130	96	70 - 130	<0.20	ug/L	NC	30
5203671	cis-1,2-Dichloroethylene	2017/10/11	103	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
5203671	cis-1,3-Dichloropropene	2017/10/11	81	70 - 130	77	70 - 130	<0.30	ug/L	NC	30
5203671	Dibromochloromethane	2017/10/11	99	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
5203671	Dichlorodifluoromethane (FREON 12)	2017/10/11	91	60 - 140	90	60 - 140	<1.0	ug/L	NC	30
5203671	Ethylbenzene	2017/10/11	86	70 - 130	85	70 - 130	<0.20	ug/L	NC	30

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Maxxam Job #: B7M0697
Report Date: 2017/10/16

QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD.
Sampler Initials: JO

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5203671	Ethylene Dibromide	2017/10/11	103	70 - 130	98	70 - 130	<0.20	ug/L	NC	30
5203671	F1 (C6-C10) - BTEX	2017/10/11					<25	ug/L	NC	30
5203671	F1 (C6-C10)	2017/10/11	91	60 - 140	92	60 - 140	<25	ug/L	NC	30
5203671	Hexane	2017/10/11	97	70 - 130	97	70 - 130	<1.0	ug/L	NC	30
5203671	Methyl Ethyl Ketone (2-Butanone)	2017/10/11	91	60 - 140	85	60 - 140	<10	ug/L	NC	30
5203671	Methyl Isobutyl Ketone	2017/10/11	79	70 - 130	75	70 - 130	<5.0	ug/L	NC	30
5203671	Methyl t-butyl ether (MTBE)	2017/10/11	87	70 - 130	84	70 - 130	<0.50	ug/L	NC	30
5203671	Methylene Chloride(Dichloromethane)	2017/10/11	111	70 - 130	107	70 - 130	<2.0	ug/L	NC	30
5203671	o-Xylene	2017/10/11	86	70 - 130	84	70 - 130	<0.20	ug/L	NC	30
5203671	p+m-Xylene	2017/10/11	84	70 - 130	83	70 - 130	<0.20	ug/L	NC	30
5203671	Styrene	2017/10/11	80	70 - 130	78	70 - 130	<0.50	ug/L	NC	30
5203671	Tetrachloroethylene	2017/10/11	102	70 - 130	101	70 - 130	<0.20	ug/L	NC	30
5203671	Toluene	2017/10/11	93	70 - 130	91	70 - 130	<0.20	ug/L	NC	30
5203671	Total Xylenes	2017/10/11					<0.20	ug/L	NC	30
5203671	trans-1,2-Dichloroethylene	2017/10/11	106	70 - 130	104	70 - 130	<0.50	ug/L	NC	30
5203671	trans-1,3-Dichloropropene	2017/10/11	83	70 - 130	77	70 - 130	<0.40	ug/L	NC	30
5203671	Trichloroethylene	2017/10/11	99	70 - 130	97	70 - 130	<0.20	ug/L	NC	30
5203671	Trichlorofluoromethane (FREON 11)	2017/10/11	108	70 - 130	107	70 - 130	<0.50	ug/L	NC	30
5203671	Vinyl Chloride	2017/10/11	104	70 - 130	102	70 - 130	<0.20	ug/L	NC	30
5204534	F2 (C10-C16 Hydrocarbons)	2017/10/12	77	50 - 130	83	80 - 120	<100	ug/L	NC	50
5204534	F3 (C16-C34 Hydrocarbons)	2017/10/12	77	50 - 130	83	80 - 120	<200	ug/L	NC	50
5204534	F4 (C34-C50 Hydrocarbons)	2017/10/12	77	50 - 130	83	80 - 120	<200	ug/L	NC	50
5208061	1-Methylnaphthalene	2017/10/12	104	50 - 130	104	50 - 130	<0.050	ug/L	NC	30
5208061	2-Methylnaphthalene	2017/10/12	98	50 - 130	97	50 - 130	<0.050	ug/L	NC	30
5208061	Acenaphthene	2017/10/12	105	50 - 130	104	50 - 130	<0.050	ug/L	NC	30
5208061	Acenaphthylene	2017/10/12	90	50 - 130	91	50 - 130	<0.050	ug/L	NC	30
5208061	Anthracene	2017/10/12	100	50 - 130	99	50 - 130	<0.050	ug/L	NC	30
5208061	Benzo(a)anthracene	2017/10/12	115	50 - 130	116	50 - 130	<0.050	ug/L	NC	30
5208061	Benzo(a)pyrene	2017/10/12	98	50 - 130	99	50 - 130	<0.010	ug/L	NC	30
5208061	Benzo(b/j)fluoranthene	2017/10/12	99	50 - 130	103	50 - 130	<0.050	ug/L	NC	30
5208061	Benzo(g,h,i)perylene	2017/10/12	80	50 - 130	71	50 - 130	<0.050	ug/L	NC	30

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QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD.
Sampler Initials: JO

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5208061	Benzo(k)fluoranthene	2017/10/12	105	50 - 130	101	50 - 130	<0.050	ug/L	NC	30
5208061	Chrysene	2017/10/12	93	50 - 130	93	50 - 130	<0.050	ug/L	NC	30
5208061	Dibenz(a,h)anthracene	2017/10/12	78	50 - 130	75	50 - 130	<0.050	ug/L	NC	30
5208061	Fluoranthene	2017/10/12	102	50 - 130	99	50 - 130	<0.050	ug/L	NC	30
5208061	Fluorene	2017/10/12	104	50 - 130	105	50 - 130	<0.050	ug/L	NC	30
5208061	Indeno(1,2,3-cd)pyrene	2017/10/12	94	50 - 130	91	50 - 130	<0.050	ug/L	NC	30
5208061	Naphthalene	2017/10/12	90	50 - 130	87	50 - 130	<0.050	ug/L	NC	30
5208061	Phenanthrene	2017/10/12	96	50 - 130	95	50 - 130	<0.030	ug/L	NC	30
5208061	Pyrene	2017/10/12	96	50 - 130	93	50 - 130	<0.050	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).

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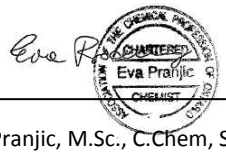
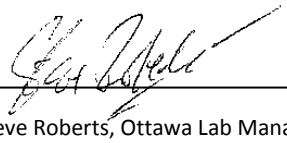
exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD.
Sampler Initials: JO

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



Steve Roberts, Ottawa Lab Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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05-Oct-17 16:10

Alison Cameron

B7M0697

KIV OTT-001

CAM FCD-01013/4

Presence of Visible Particulate/Sediment

When there is >1cm of visible particulate/sediment, the amount will be recorded in the field below

	Bottle Types																														
	Inorganics						Organics										Hydrocarbons							Volatiles				Other				
Sample ID	All	Cr VI	CN	General	Hg	Metals (Diss.)	Organic 1 of 2	Organic 2 of 2	PCB 1 of 2	PCB 2 of 2	Pest/ Herb 1 of 2	Pest/ Herb 2 of 2	SVOC/ ABN 1 of 2	SVOC/ ABN 2 of 2	PAH 1 of 2	PAH 2 of 2	Dioxin /Furan	F1 Vial 1	F1 Vial 2	F1 Vial 3	F1 Vial 4	F2-F4 1 of 2	F2-F4 2 of 2	F4G	VOC Vial 1	VOC Vial 2	VOC Vial 3	VOC Vial 4					
MW17-4 (M2)																		0.5 cm	0.5 cm			0.5 cm	0.5 cm	0.5 cm							

Comments:

Legend:	
P	Suspended Particulate
TP	Trace Settled Particulate (just covers bottom of container or less)
TS	Trace Settled Sediment (just covers bottom of container or less)
S	Sediment greater than (>) Trace, but less than (<) 1 cm

Recorded By: (signature/print)	Kerri Jayasekera

Maxxam
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Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page of

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#17498 exp Services Inc	Company Name:	Exp. Services Inc.	Quotation #:	B45998	Maxxam Job #:	Bottle Order #: 631707
Attention:	Accounts Payable	Attention:	Dan Clarke	P.O. #:			
Address:	100-2650 Queensview Drive Ottawa ON K2B 8H6	Address:		Project:	OTT-00242146-A0	COC #: C#631707-01-01	Project Manager: Alison Cameron
Tel:	(613) 688-1899 x Fax: (613) 225-7337 x	Tel:	613-688-1899 Fax:	Project Name:	Renaud RI.		
Email:	accounting.ottawa@exp.com; Karen.Burke@exp.com,	Email:	Dan.Clarke@exp.com	Site #:			
				Sampled By:	Jeff O'Banion		

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

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

Other Regulations
- ☐ CCME ☐ Sanitary Sewer Bylaw
- ☐ Reg 558. ☐ Storm Sewer Bylaw
- ☐ MISA Municipality _____
- ☐ PWQO
- ☐ Other _____

Special Instructions

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

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

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

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

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	ANALYSIS REQUESTED (PLEASE BE SPECIFIC): O.Reg 153 VOCs by HS & F1-F4 (Water)	O.Reg 153 PAHs (Water)	# of Bottles	Comments
1		MW2	05.10.2017	2:00	GW		✓	✓		BOTTLES Labelled MW17-4
2		MW3		2:30			✓	✓		MW17-2
3		MW4		2:45						MW17-3
4										To correspond with
5		MW4 = Limited Sample								number.
6										
7										
8										
9										
10										ON Ocre

05-Oct-17 16:10
Alison Cameron
B7M0697
KIV OTT 001

RECEIVED IN OTTAWA

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
	17.10.05	4:10		2017/10/05	16.10	

Laboratory Use Only
Time Sensitive
Temperature (°C) on Recei: 12, 10, 12
Custody Seal: Present / Intact — Yes ✓ — No

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

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

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

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

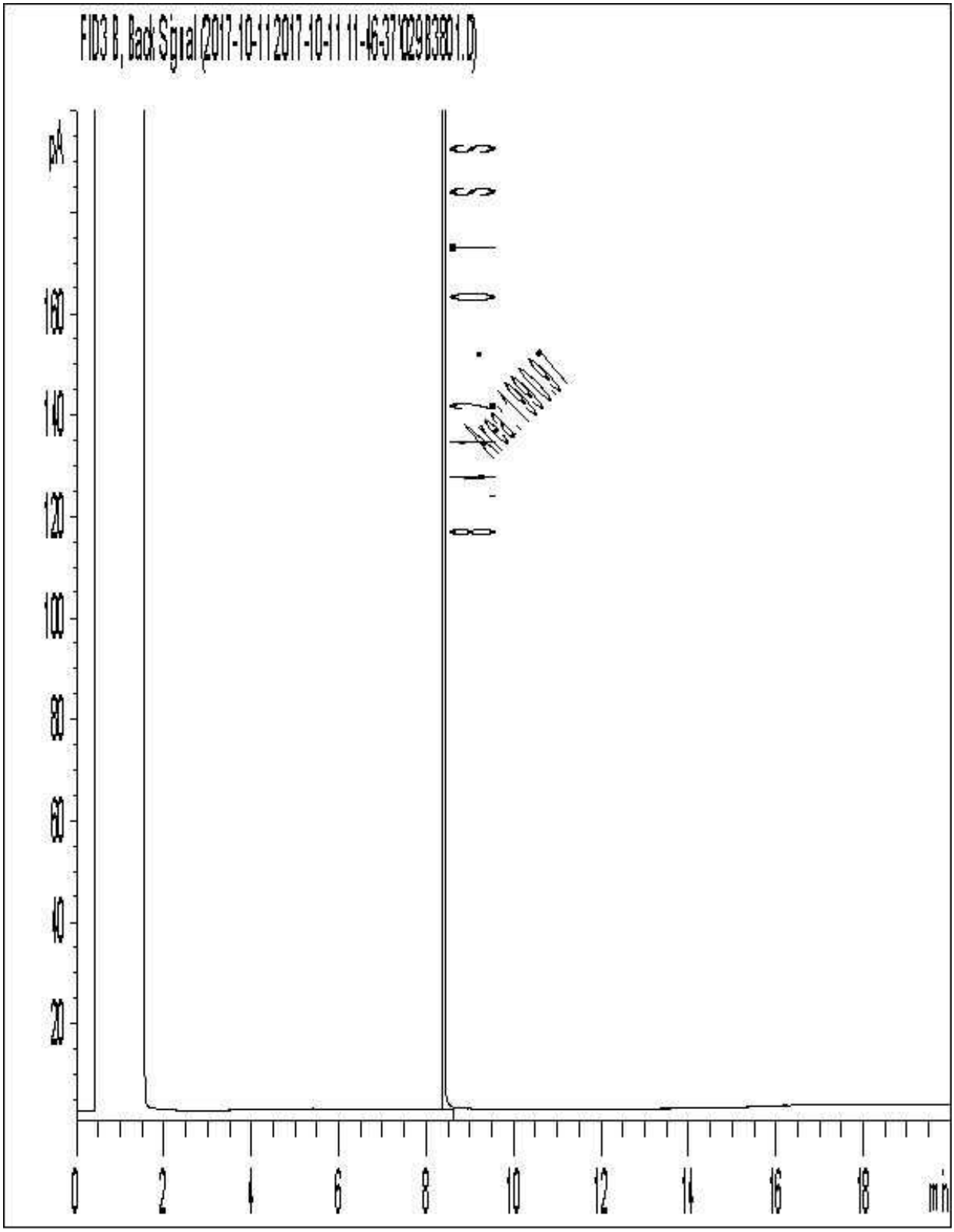
White: Maxxa Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam Job #: B7M0697
Report Date: 2017/10/16
Maxxam Sample: FGT460

exp Services Inc
Client Project #: OTT-00242146-A0
Project name: RENAUD RD.
Client ID: MW17-2

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

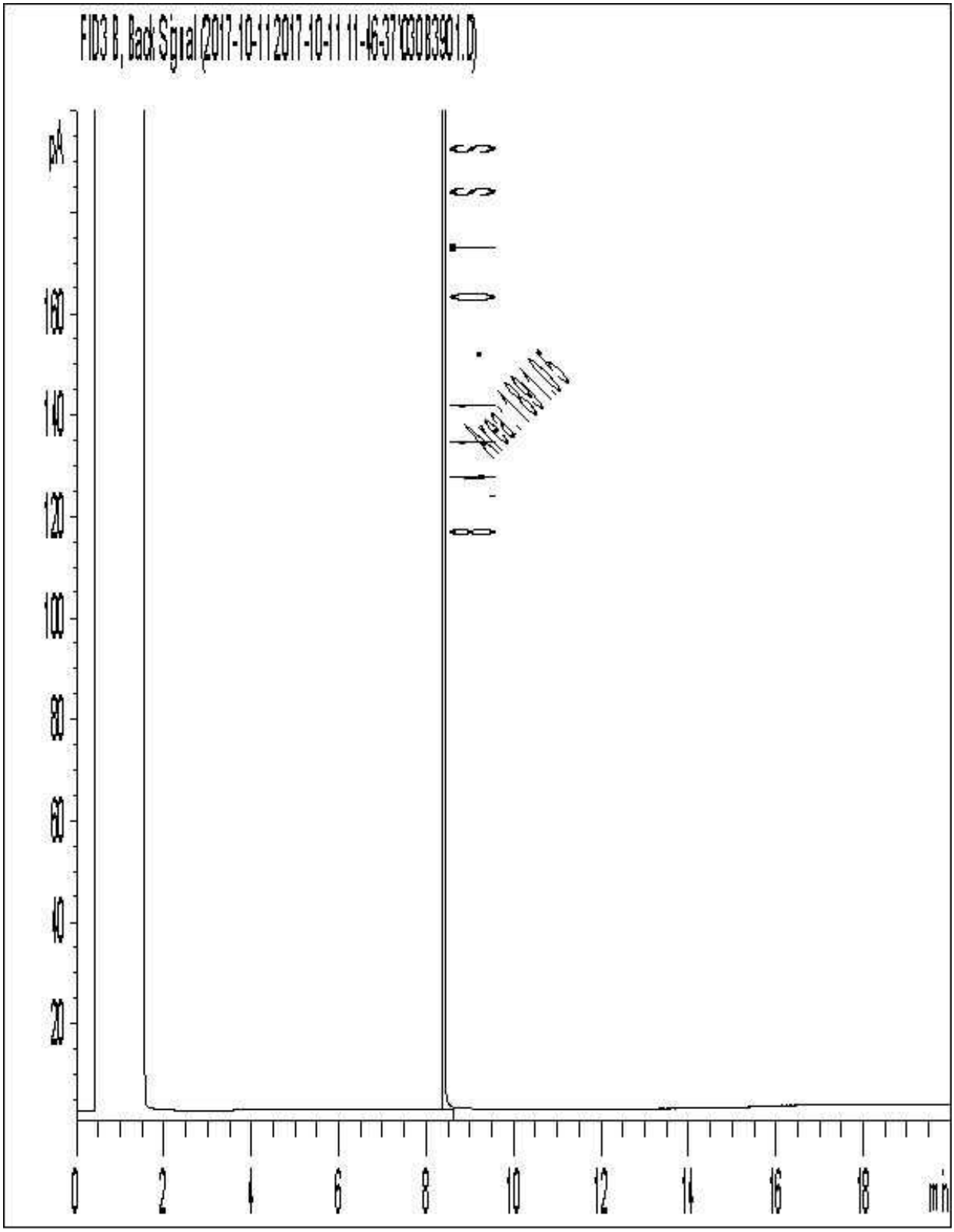


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B7M0697
Report Date: 2017/10/16
Maxxam Sample: FGT461

exp Services Inc
Client Project #: OTT-00242146-A0
Project name: RENAUD RD.
Client ID: MW17-3

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

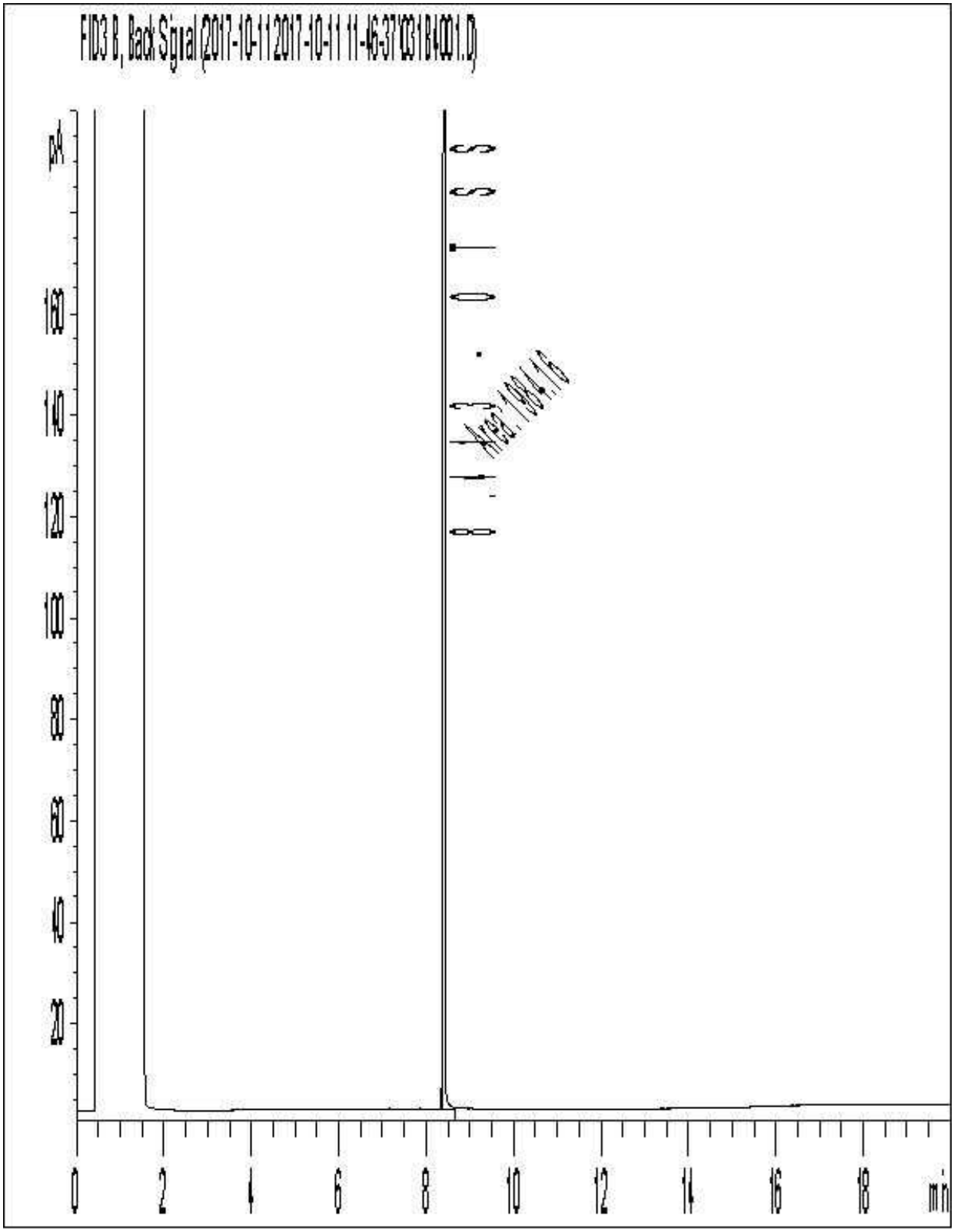


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B7M0697
Report Date: 2017/10/16
Maxxam Sample: FGT461 Lab-Dup

exp Services Inc
Client Project #: OTT-00242146-A0
Project name: RENAUD RD.
Client ID: MW17-3

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam
A Bureau Veritas Group Company

Your Project #: OTT-00242146-A0
Site Location: RENAUD RD
Your C.O.C. #: 631707-01-01

Attention:Daniel Clarke

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

Report Date: 2017/10/16
Report #: R4784851
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7M2879
Received: 2017/10/10, 14:55

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum	3	N/A	2017/10/13	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum (1)	2	N/A	2017/10/13		EPA 8260C m
Petroleum Hydro. CCME F1 & BTEX in Water	1	N/A	2017/10/12	OTT SOP-00002	CCME CWS
Petroleum Hydrocarbons F2-F4 in Water (2)	3	2017/10/11	2017/10/11	OTT SOP-00001	CCME Hydrocarbons
PAH Compounds in Water by GC/MS (SIM)	3	2017/10/12	2017/10/13	OTT SOP-00011	EPA 8270D m
Volatile Organic Compounds and F1 PHCs (1)	2	N/A	2017/10/13	CAM SOP-00230	EPA 8260C m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam 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.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam 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 Maxxam, unless otherwise agreed in writing.

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.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Analytics Mississauga
(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam 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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Your Project #: OTT-00242146-A0
Site Location: RENAUD RD
Your C.O.C. #: 631707-01-01

Attention:Daniel Clarke

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

Report Date: 2017/10/16
Report #: R4784851
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7M2879
Received: 2017/10/10, 14:55

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Alison Cameron, Project Manager
Email: ACameron@maxxam.ca
Phone# (613) 274-0573
==========
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B7M2879
Report Date: 2017/10/16

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD
Sampler Initials: JO

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		FHF823	FHF824	FHF825		
Sampling Date		2017/10/10 09:30	2017/10/10 09:35	2017/10/10 10:30		
	UNITS	**MW-4**	**MW-14**	**MW-1**	**RDL**	**QC Batch**
Calculated Parameters						
Methylnaphthalene, 2-(1-)	ug/L	<0.071	<0.071	<0.071	0.071	5204598
Polyaromatic Hydrocarbons						
Acenaphthene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Anthracene	ug/L	0.28	0.29	<0.050	0.050	5208061
Benzo(a)anthracene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	0.010	5208061
Benzo(b/j)fluoranthene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Chrysene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Fluoranthene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Fluorene	ug/L	0.16	0.12	<0.050	0.050	5208061
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Naphthalene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Phenanthrene	ug/L	0.085	0.090	<0.030	0.030	5208061
Pyrene	ug/L	<0.050	<0.050	<0.050	0.050	5208061
Surrogate Recovery (%)						
D10-Anthracene	%	107	110	104		5208061
D14-Terphenyl (FS)	%	108	111	96		5208061
D8-Acenaphthylene	%	110	101	83		5208061

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7M2879
Report Date: 2017/10/16

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD
Sampler Initials: JO

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		FHF823	FHF824		
Sampling Date		2017/10/10 09:30	2017/10/10 09:35		
	UNITS	**MW-4**	**MW-14**	**RDL**	**QC Batch**
Calculated Parameters					
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	<0.50	0.50	5203997
Volatile Organics					
Acetone (2-Propanone)	ug/L	<10	<10	10	5208289
Benzene	ug/L	<0.20	<0.20	0.20	5208289
Bromodichloromethane	ug/L	<0.50	<0.50	0.50	5208289
Bromoform	ug/L	<1.0	<1.0	1.0	5208289
Bromomethane	ug/L	<0.50	<0.50	0.50	5208289
Carbon Tetrachloride	ug/L	<0.20	<0.20	0.20	5208289
Chlorobenzene	ug/L	<0.20	<0.20	0.20	5208289
Chloroform	ug/L	<0.20	<0.20	0.20	5208289
Dibromochloromethane	ug/L	<0.50	<0.50	0.50	5208289
1,2-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	5208289
1,3-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	5208289
1,4-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	5208289
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	<1.0	1.0	5208289
1,1-Dichloroethane	ug/L	<0.20	<0.20	0.20	5208289
1,2-Dichloroethane	ug/L	<0.50	<0.50	0.50	5208289
1,1-Dichloroethylene	ug/L	<0.20	<0.20	0.20	5208289
cis-1,2-Dichloroethylene	ug/L	<0.50	<0.50	0.50	5208289
trans-1,2-Dichloroethylene	ug/L	<0.50	<0.50	0.50	5208289
1,2-Dichloropropane	ug/L	<0.20	<0.20	0.20	5208289
cis-1,3-Dichloropropene	ug/L	<0.30	<0.30	0.30	5208289
trans-1,3-Dichloropropene	ug/L	<0.40	<0.40	0.40	5208289
Ethylbenzene	ug/L	<0.20	<0.20	0.20	5208289
Ethylene Dibromide	ug/L	<0.20	<0.20	0.20	5208289
Hexane	ug/L	<1.0	<1.0	1.0	5208289
Methylene Chloride(Dichloromethane)	ug/L	<2.0	<2.0	2.0	5208289
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	<10	10	5208289
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	5.0	5208289
Methyl t-butyl ether (MTBE)	ug/L	<0.50	<0.50	0.50	5208289
Styrene	ug/L	<0.50	<0.50	0.50	5208289
1,1,1,2-Tetrachloroethane	ug/L	<0.50	<0.50	0.50	5208289
1,1,2,2-Tetrachloroethane	ug/L	<0.50	<0.50	0.50	5208289
Tetrachloroethylene	ug/L	<0.20	<0.20	0.20	5208289

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7M2879
Report Date: 2017/10/16

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD
Sampler Initials: JO

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		FHF823	FHF824		
Sampling Date		2017/10/10 09:30	2017/10/10 09:35		
	UNITS	**MW-4**	**MW-14**	**RDL**	**QC Batch**
Toluene	ug/L	<0.20	<0.20	0.20	5208289
1,1,1-Trichloroethane	ug/L	<0.20	<0.20	0.20	5208289
1,1,2-Trichloroethane	ug/L	<0.50	<0.50	0.50	5208289
Trichloroethylene	ug/L	<0.20	<0.20	0.20	5208289
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	<0.50	0.50	5208289
Vinyl Chloride	ug/L	<0.20	<0.20	0.20	5208289
p+m-Xylene	ug/L	<0.20	<0.20	0.20	5208289
o-Xylene	ug/L	<0.20	<0.20	0.20	5208289
Total Xylenes	ug/L	<0.20	<0.20	0.20	5208289
F1 (C6-C10)	ug/L	<25	<25	25	5208289
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	5208289
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	91	90		5208289
D4-1,2-Dichloroethane	%	106	107		5208289
D8-Toluene	%	93	92		5208289

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7M2879
Report Date: 2017/10/16

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD
Sampler Initials: JO

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		FHF823	FHF824	FHF825		
Sampling Date		2017/10/10 09:30	2017/10/10 09:35	2017/10/10 10:30		
	UNITS	**MW-4**	**MW-14**	**MW-1**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons						
Benzene	ug/L			<0.20	0.20	5205679
Toluene	ug/L			<0.20	0.20	5205679
Ethylbenzene	ug/L			<0.20	0.20	5205679
o-Xylene	ug/L			<0.20	0.20	5205679
p+m-Xylene	ug/L			<0.40	0.40	5205679
Total Xylenes	ug/L			<0.40	0.40	5205679
F1 (C6-C10)	ug/L			<25	25	5205679
F1 (C6-C10) - BTEX	ug/L			<25	25	5205679
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/L	140	170	<100	100	5205669
F3 (C16-C34 Hydrocarbons)	ug/L	420	510	<200	200	5205669
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	200	5205669
Reached Baseline at C50	ug/L	Yes	Yes	Yes		5205669
Surrogate Recovery (%)						
1,4-Difluorobenzene	%			109		5205679
4-Bromofluorobenzene	%			90		5205679
D10-Ethylbenzene	%			101		5205679
D4-1,2-Dichloroethane	%			99		5205679
o-Terphenyl	%	81	78	85		5205669

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B7M2879
Report Date: 2017/10/16

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD
Sampler Initials: JO

TEST SUMMARY

Maxxam ID: FHF823
Sample ID: MW-4
Matrix: Water

Collected: 2017/10/10
Shipped:
Received: 2017/10/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5204598	N/A	2017/10/13	Liliana Gaburici
1,3-Dichloropropene Sum	CALC	5203997	N/A	2017/10/13	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5205669	2017/10/11	2017/10/11	Arezoo Habibagahi
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5208061	2017/10/12	2017/10/13	Liliana Gaburici
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5208289	N/A	2017/10/13	Karen Hughes

Maxxam ID: FHF824
Sample ID: MW-14
Matrix: Water

Collected: 2017/10/10
Shipped:
Received: 2017/10/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5204598	N/A	2017/10/13	Liliana Gaburici
1,3-Dichloropropene Sum	CALC	5203997	N/A	2017/10/13	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5205669	2017/10/11	2017/10/11	Arezoo Habibagahi
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5208061	2017/10/12	2017/10/13	Liliana Gaburici
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5208289	N/A	2017/10/13	Karen Hughes

Maxxam ID: FHF825
Sample ID: MW-1
Matrix: Water

Collected: 2017/10/10
Shipped:
Received: 2017/10/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5204598	N/A	2017/10/13	Liliana Gaburici
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5205679	N/A	2017/10/12	Paul Rubinato
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5205669	2017/10/11	2017/10/11	Arezoo Habibagahi
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5208061	2017/10/12	2017/10/13	Liliana Gaburici

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Maxxam Job #: B7M2879
Report Date: 2017/10/16

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD
Sampler Initials: JO

GENERAL COMMENTS

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

Package 1	11.0°C

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B7M2879
Report Date: 2017/10/16

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD
Sampler Initials: JO

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5205669	o-Terphenyl	2017/10/11	102	30 - 130	97	30 - 130	95	%		
5205679	1,4-Difluorobenzene	2017/10/11	102	70 - 130	101	70 - 130	107	%		
5205679	4-Bromofluorobenzene	2017/10/11	94	70 - 130	106	70 - 130	91	%		
5205679	D10-Ethylbenzene	2017/10/11	103	70 - 130	109	70 - 130	94	%		
5205679	D4-1,2-Dichloroethane	2017/10/11	102	70 - 130	98	70 - 130	94	%		
5208061	D10-Anthracene	2017/10/12	105	50 - 130	105	50 - 130	110	%		
5208061	D14-Terphenyl (FS)	2017/10/12	102	50 - 130	99	50 - 130	106	%		
5208061	D8-Acenaphthylene	2017/10/12	99	50 - 130	99	50 - 130	91	%		
5208289	4-Bromofluorobenzene	2017/10/12	101	70 - 130	101	70 - 130	92	%		
5208289	D4-1,2-Dichloroethane	2017/10/12	102	70 - 130	101	70 - 130	103	%		
5208289	D8-Toluene	2017/10/12	101	70 - 130	101	70 - 130	94	%		
5205669	F2 (C10-C16 Hydrocarbons)	2017/10/11	95	50 - 130	91	80 - 120	<100	ug/L	NC	50
5205669	F3 (C16-C34 Hydrocarbons)	2017/10/11	95	50 - 130	91	80 - 120	<200	ug/L	NC	50
5205669	F4 (C34-C50 Hydrocarbons)	2017/10/11	95	50 - 130	91	80 - 120	<200	ug/L	NC	50
5205679	Benzene	2017/10/11	92	70 - 130	92	70 - 130	<0.20	ug/L	0.32	40
5205679	Ethylbenzene	2017/10/11	87	70 - 130	91	70 - 130	<0.20	ug/L	1.2	40
5205679	F1 (C6-C10) - BTEX	2017/10/11					<25	ug/L	4.4	40
5205679	F1 (C6-C10)	2017/10/11	108	70 - 130	106	70 - 130	<25	ug/L	2.0	40
5205679	o-Xylene	2017/10/11	86	70 - 130	89	70 - 130	<0.20	ug/L	0.28	40
5205679	p+m-Xylene	2017/10/11	91	70 - 130	94	70 - 130	<0.40	ug/L	1.2	40
5205679	Toluene	2017/10/11	87	70 - 130	88	70 - 130	<0.20	ug/L	0.82	40
5205679	Total Xylenes	2017/10/11					<0.40	ug/L	1.0	40
5208061	1-Methylnaphthalene	2017/10/12	104	50 - 130	104	50 - 130	<0.050	ug/L	NC	30
5208061	2-Methylnaphthalene	2017/10/12	98	50 - 130	97	50 - 130	<0.050	ug/L	NC	30
5208061	Acenaphthene	2017/10/12	105	50 - 130	104	50 - 130	<0.050	ug/L	NC	30
5208061	Acenaphthylene	2017/10/12	90	50 - 130	91	50 - 130	<0.050	ug/L	NC	30
5208061	Anthracene	2017/10/12	100	50 - 130	99	50 - 130	<0.050	ug/L	NC	30
5208061	Benzo(a)anthracene	2017/10/12	115	50 - 130	116	50 - 130	<0.050	ug/L	NC	30
5208061	Benzo(a)pyrene	2017/10/12	98	50 - 130	99	50 - 130	<0.010	ug/L	NC	30
5208061	Benzo(b/j)fluoranthene	2017/10/12	99	50 - 130	103	50 - 130	<0.050	ug/L	NC	30
5208061	Benzo(g,h,i)perylene	2017/10/12	80	50 - 130	71	50 - 130	<0.050	ug/L	NC	30

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Maxxam Job #: B7M2879
Report Date: 2017/10/16

QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD
Sampler Initials: JO

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5208061	Benzo(k)fluoranthene	2017/10/12	105	50 - 130	101	50 - 130	<0.050	ug/L	NC	30
5208061	Chrysene	2017/10/12	93	50 - 130	93	50 - 130	<0.050	ug/L	NC	30
5208061	Dibenz(a,h)anthracene	2017/10/12	78	50 - 130	75	50 - 130	<0.050	ug/L	NC	30
5208061	Fluoranthene	2017/10/12	102	50 - 130	99	50 - 130	<0.050	ug/L	NC	30
5208061	Fluorene	2017/10/12	104	50 - 130	105	50 - 130	<0.050	ug/L	NC	30
5208061	Indeno(1,2,3-cd)pyrene	2017/10/12	94	50 - 130	91	50 - 130	<0.050	ug/L	NC	30
5208061	Naphthalene	2017/10/12	90	50 - 130	87	50 - 130	<0.050	ug/L	NC	30
5208061	Phenanthrene	2017/10/12	96	50 - 130	95	50 - 130	<0.030	ug/L	NC	30
5208061	Pyrene	2017/10/12	96	50 - 130	93	50 - 130	<0.050	ug/L	NC	30
5208289	1,1,1,2-Tetrachloroethane	2017/10/12	103	70 - 130	102	70 - 130	<0.50	ug/L		
5208289	1,1,1-Trichloroethane	2017/10/12	98	70 - 130	99	70 - 130	<0.20	ug/L		
5208289	1,1,2,2-Tetrachloroethane	2017/10/12	103	70 - 130	101	70 - 130	<0.50	ug/L		
5208289	1,1,2-Trichloroethane	2017/10/12	97	70 - 130	97	70 - 130	<0.50	ug/L		
5208289	1,1-Dichloroethane	2017/10/12	106	70 - 130	105	70 - 130	<0.20	ug/L		
5208289	1,1-Dichloroethylene	2017/10/12	108	70 - 130	109	70 - 130	<0.20	ug/L		
5208289	1,2-Dichlorobenzene	2017/10/12	91	70 - 130	90	70 - 130	<0.50	ug/L		
5208289	1,2-Dichloroethane	2017/10/12	96	70 - 130	95	70 - 130	<0.50	ug/L		
5208289	1,2-Dichloropropane	2017/10/12	94	70 - 130	94	70 - 130	<0.20	ug/L		
5208289	1,3-Dichlorobenzene	2017/10/12	93	70 - 130	91	70 - 130	<0.50	ug/L		
5208289	1,4-Dichlorobenzene	2017/10/12	92	70 - 130	91	70 - 130	<0.50	ug/L		
5208289	Acetone (2-Propanone)	2017/10/12	90	60 - 140	92	60 - 140	<10	ug/L		
5208289	Benzene	2017/10/13	106	70 - 130	106	70 - 130	<0.20	ug/L	NC	30
5208289	Bromodichloromethane	2017/10/12	94	70 - 130	94	70 - 130	<0.50	ug/L		
5208289	Bromoform	2017/10/12	100	70 - 130	99	70 - 130	<1.0	ug/L		
5208289	Bromomethane	2017/10/12	120	60 - 140	118	60 - 140	<0.50	ug/L		
5208289	Carbon Tetrachloride	2017/10/12	98	70 - 130	99	70 - 130	<0.20	ug/L		
5208289	Chlorobenzene	2017/10/12	94	70 - 130	94	70 - 130	<0.20	ug/L		
5208289	Chloroform	2017/10/12	101	70 - 130	101	70 - 130	<0.20	ug/L		
5208289	cis-1,2-Dichloroethylene	2017/10/12	104	70 - 130	104	70 - 130	<0.50	ug/L		
5208289	cis-1,3-Dichloropropene	2017/10/12	76	70 - 130	74	70 - 130	<0.30	ug/L		
5208289	Dibromochloromethane	2017/10/12	99	70 - 130	98	70 - 130	<0.50	ug/L		

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Maxxam Job #: B7M2879
Report Date: 2017/10/16

QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD
Sampler Initials: JO

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5208289	Dichlorodifluoromethane (FREON 12)	2017/10/12	115	60 - 140	118	60 - 140	<1.0	ug/L		
5208289	Ethylbenzene	2017/10/13	85	70 - 130	85	70 - 130	<0.20	ug/L	NC	30
5208289	Ethylene Dibromide	2017/10/12	103	70 - 130	102	70 - 130	<0.20	ug/L		
5208289	F1 (C6-C10) - BTEX	2017/10/13					<25	ug/L	NC	30
5208289	F1 (C6-C10)	2017/10/13	99	60 - 140	102	60 - 140	<25	ug/L	NC	30
5208289	Hexane	2017/10/12	102	70 - 130	102	70 - 130	<1.0	ug/L		
5208289	Methyl Ethyl Ketone (2-Butanone)	2017/10/12	88	60 - 140	89	60 - 140	<10	ug/L		
5208289	Methyl Isobutyl Ketone	2017/10/12	76	70 - 130	77	70 - 130	<5.0	ug/L		
5208289	Methyl t-butyl ether (MTBE)	2017/10/13	85	70 - 130	85	70 - 130	<0.50	ug/L	NC	30
5208289	Methylene Chloride(Dichloromethane)	2017/10/12	114	70 - 130	113	70 - 130	<2.0	ug/L		
5208289	o-Xylene	2017/10/13	85	70 - 130	85	70 - 130	<0.20	ug/L	NC	30
5208289	p+m-Xylene	2017/10/13	82	70 - 130	83	70 - 130	<0.20	ug/L	NC	30
5208289	Styrene	2017/10/12	80	70 - 130	80	70 - 130	<0.50	ug/L		
5208289	Tetrachloroethylene	2017/10/12	105	70 - 130	106	70 - 130	<0.20	ug/L		
5208289	Toluene	2017/10/13	95	70 - 130	94	70 - 130	<0.20	ug/L	NC	30
5208289	Total Xylenes	2017/10/13					<0.20	ug/L	NC	30
5208289	trans-1,2-Dichloroethylene	2017/10/12	111	70 - 130	111	70 - 130	<0.50	ug/L		
5208289	trans-1,3-Dichloropropene	2017/10/12	79	70 - 130	75	70 - 130	<0.40	ug/L		
5208289	Trichloroethylene	2017/10/12	100	70 - 130	101	70 - 130	<0.20	ug/L		
5208289	Trichlorofluoromethane (FREON 11)	2017/10/12	115	70 - 130	117	70 - 130	<0.50	ug/L		
5208289	Vinyl Chloride	2017/10/12	118	70 - 130	119	70 - 130	<0.20	ug/L		

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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Maxxam Job #: B7M2879
Report Date: 2017/10/16

exp Services Inc
Client Project #: OTT-00242146-A0
Site Location: RENAUD RD
Sampler Initials: JO

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

Steve Roberts, Ottawa Lab Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page of

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#17498 exp Services Inc	Company Name:	exp Services	Quotation #:	B45998	Maxxam Job #:	Bottle Order #:
Attention:	Accounts Payable	Attention:	Dan Clarke	P.O. #:			631707
Address:	100-2650 Queensview Drive Ottawa ON K2B 8H6	Address:		Project:	OTT-00242146-A0	COC #:	Project Manager:
Tel:	(613) 688-1899 x Fax: (613) 225-7337 x	Tel:	Fax:	Project Name:	Renaud Rd.	C#631707-01-01	Alison Cameron
Email:	accounting.ottawa@exp.com; Karen.Burke@exp.com,	Email:	Daniel.Clarke@exp.com	Site #:			
				Sampled By:	Jeff O.		

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

Regulation 153 (2011)	Other Regulations	Special Instructions
☐ Table 1 ☐ Res/Park ☐ Medium/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☐ Table ___	☐ CCME ☐ Sanitary Sewer Bylaw ☐ Reg 558. ☐ Storm Sewer Bylaw ☐ MISA Municipality _____ ☐ PWQO ☐ Other _____	

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

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	O.Reg 153 VOCs by HS & F1-F4 (Water)	O.Reg 153 PAHs (Water)	PHC (BTEX F1-F4)							# of Bottles	Comments
1		MW4	10.10.2017	9:30	GW		✓	✓	✓								MW4 limited sample
2		MW-14		9:35			✓	✓	✓								MW14 limited sample
3		MW-1		10:30				✓	✓								+ Bottles read "MW17"
4																	follow COC labelling
5																	"MW-"
6																	
7																	Thank you!
8																	
9																	
10																	ON Ice

10-Oct-17 14:55
Alison Cameron
B7M2879
KIV OTT-001

RECEIVED IN OTTAWA

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

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

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

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Jeff O'Brien	17-10-10	2150	Karen Jamieson	2017/10/10	14:55	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	12, 11, 10	Present		
		Intact		X

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

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

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

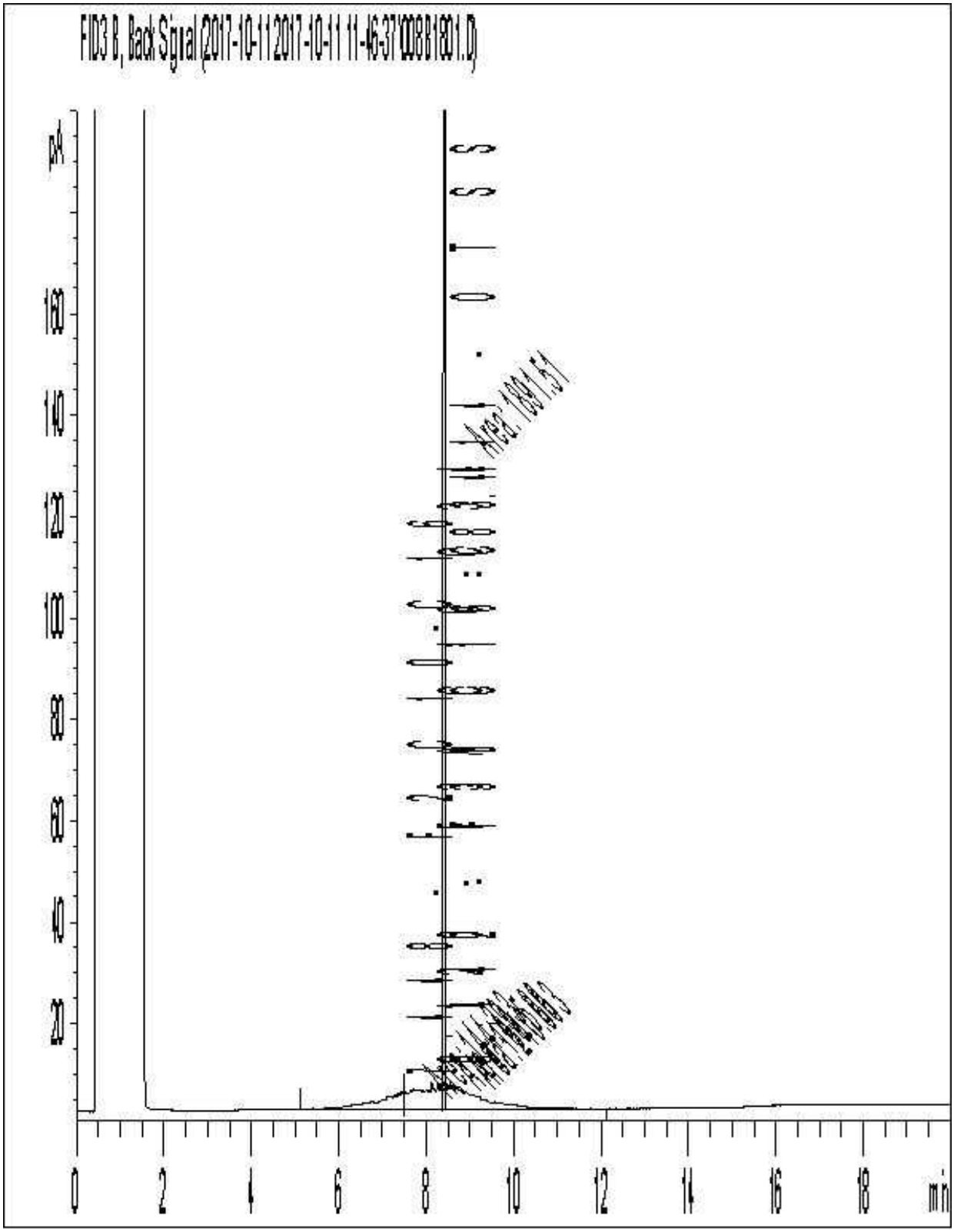
SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxa Yellow: Client

Maxxam Job #: B7M2879
Report Date: 2017/10/16
Maxxam Sample: FHF823

exp Services Inc
Client Project #: OTT-00242146-A0
Project name: RENAUD RD
Client ID: MW-4

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

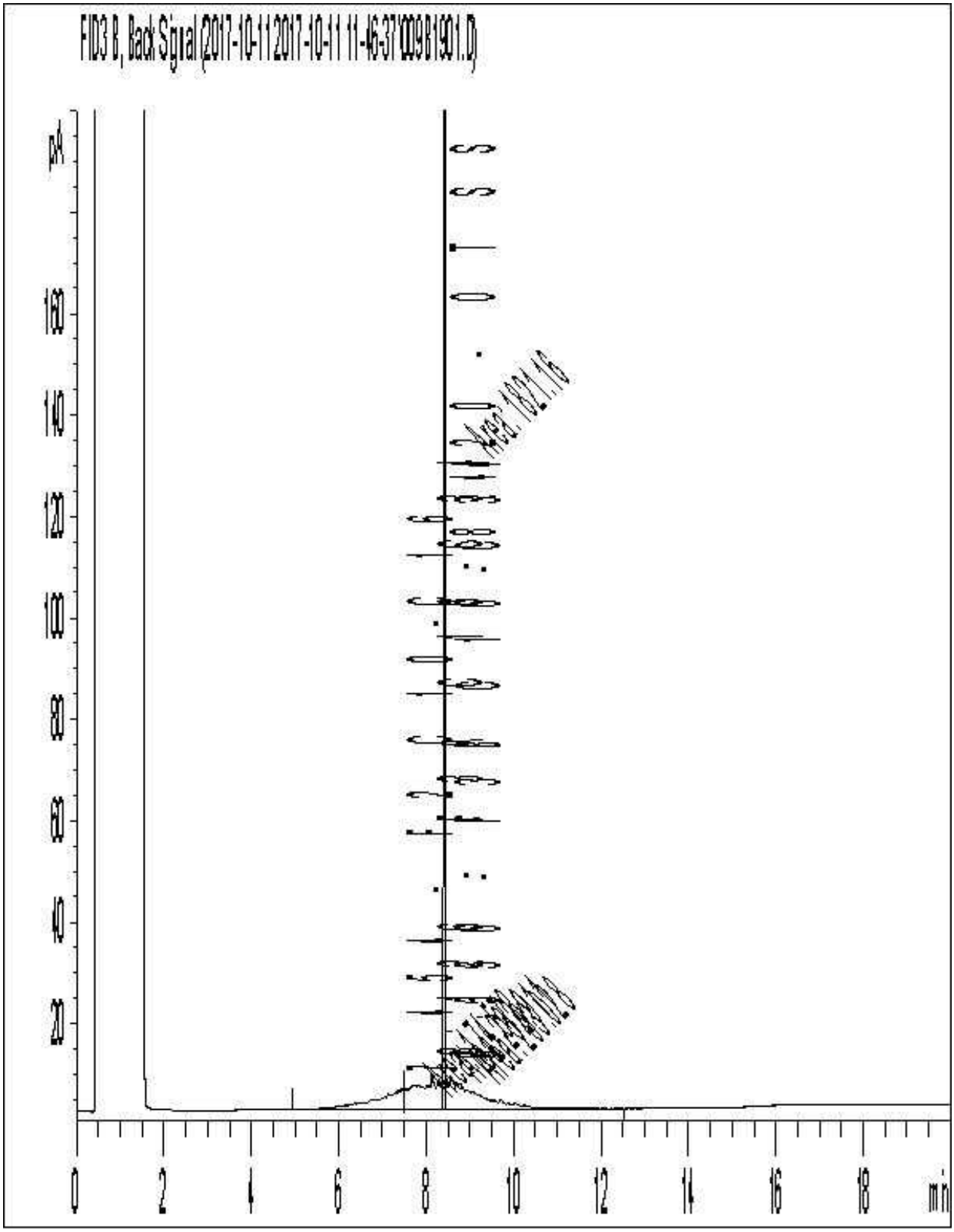


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B7M2879
Report Date: 2017/10/16
Maxxam Sample: FHF824

exp Services Inc
Client Project #: OTT-00242146-A0
Project name: RENAUD RD
Client ID: MW-14

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

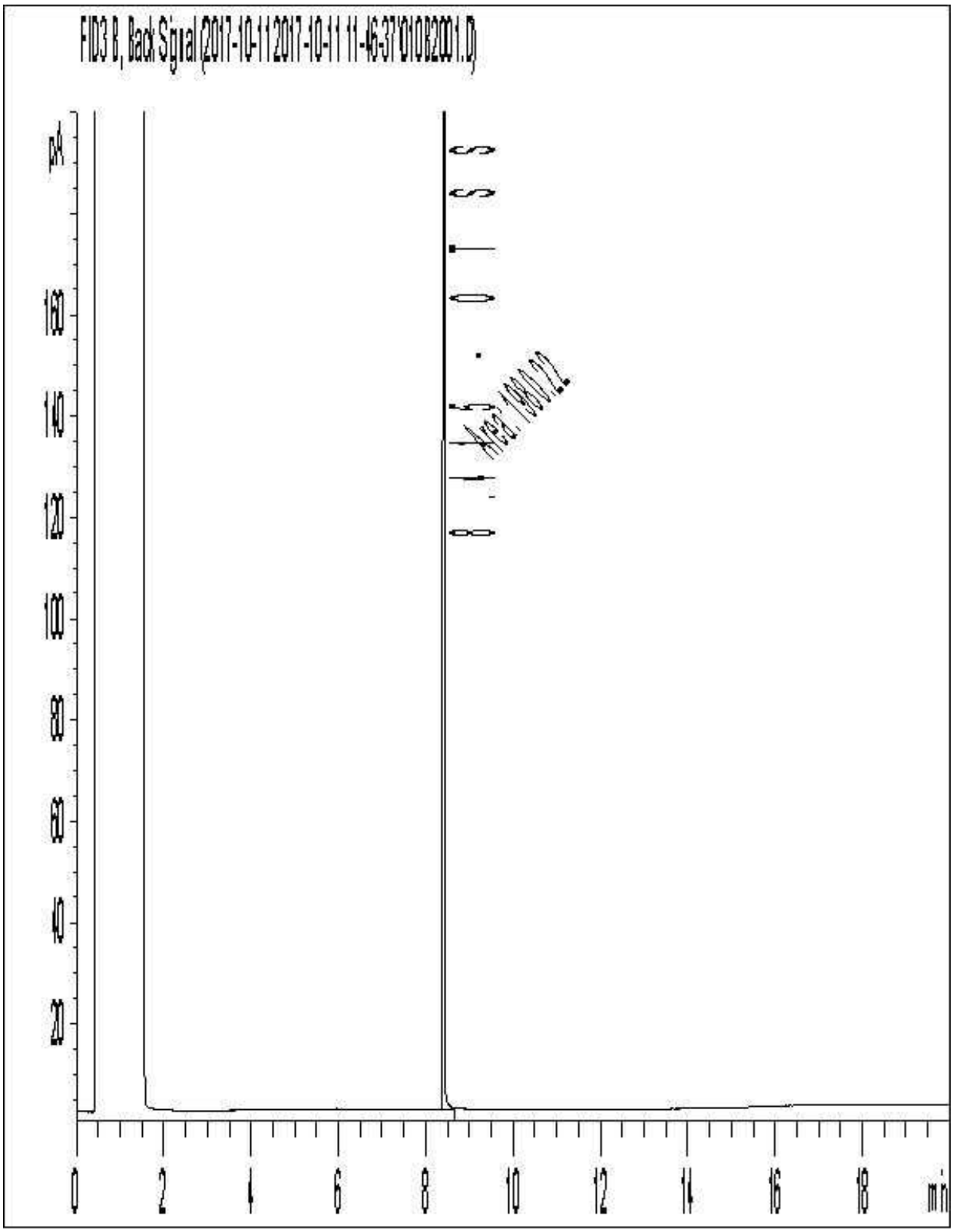


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B7M2879
Report Date: 2017/10/16
Maxxam Sample: FHF825

exp Services Inc
Client Project #: OTT-00242146-A0
Project name: RENAUD RD
Client ID: MW-1

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

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Your Project #: OTT-00242146
Site Location: RANAUD RD
Your C.O.C. #: 628209-02-01

Attention:Daniel Clarke

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

Report Date: 2017/10/24
Report #: R4801081
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7N3357
Received: 2017/10/20, 14:15

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Petroleum Hydro. CCME F1 & BTEX in Water	1	N/A	2017/10/23	OTT SOP-00002	CCME CWS
Petroleum Hydrocarbons F2-F4 in Water (1)	1	2017/10/23	2017/10/23	OTT SOP-00001	CCME Hydrocarbons

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam 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.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam 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 Maxxam, unless otherwise agreed in writing.

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.

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 Maxxam 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 Project #: OTT-00242146
Site Location: RANAUD RD
Your C.O.C. #: 628209-02-01

Attention:Daniel Clarke

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

Report Date: 2017/10/24
Report #: R4801081
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7N3357
Received: 2017/10/20, 14:15

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Alison Cameron, Project Manager
Email: ACameron@maxxam.ca
Phone# (613) 274-0573
==========
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Maxxam Job #: B7N3357
Report Date: 2017/10/24

exp Services Inc
Client Project #: OTT-00242146
Site Location: RANAUD RD
Sampler Initials: JO

O.REG 153 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		FJL776	FJL776		
Sampling Date		2017/10/20 13:20	2017/10/20 13:20		
COC Number		628209-02-01	628209-02-01		
	UNITS	**MW17-4**	**MW17-4 Lab-Dup**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons					
Benzene	ug/L	<0.20	<0.20	0.20	5222883
Toluene	ug/L	<0.20	<0.20	0.20	5222883
Ethylbenzene	ug/L	<0.20	<0.20	0.20	5222883
o-Xylene	ug/L	<0.20	<0.20	0.20	5222883
p+m-Xylene	ug/L	<0.40	<0.40	0.40	5222883
Total Xylenes	ug/L	<0.40	<0.40	0.40	5222883
F1 (C6-C10)	ug/L	<25	<25	25	5222883
F1 (C6-C10) - BTEX	ug/L	<25	<25	25	5222883
F2-F4 Hydrocarbons					
F2 (C10-C16 Hydrocarbons)	ug/L	150		100	5225768
F3 (C16-C34 Hydrocarbons)	ug/L	440		200	5225768
F4 (C34-C50 Hydrocarbons)	ug/L	<200		200	5225768
Reached Baseline at C50	ug/L	Yes			5225768
Surrogate Recovery (%)					
1,4-Difluorobenzene	%	83	88		5222883
4-Bromofluorobenzene	%	83	84		5222883
D10-Ethylbenzene	%	92	98		5222883
D4-1,2-Dichloroethane	%	89	93		5222883
o-Terphenyl	%	108			5225768

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

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Maxxam Job #: B7N3357
Report Date: 2017/10/24

exp Services Inc
Client Project #: OTT-00242146
Site Location: RANAUD RD
Sampler Initials: JO

TEST SUMMARY

Maxxam ID: FJL776
Sample ID: MW17-4
Matrix: Water

Collected: 2017/10/20
Shipped:
Received: 2017/10/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5222883	N/A	2017/10/23	Lyndsey Hart
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5225768	2017/10/23	2017/10/23	Arezoo Habibagahi

Maxxam ID: FJL776 Dup
Sample ID: MW17-4
Matrix: Water

Collected: 2017/10/20
Shipped:
Received: 2017/10/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	5222883	N/A	2017/10/24	Lyndsey Hart

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Maxxam Job #: B7N3357
Report Date: 2017/10/24

exp Services Inc
Client Project #: OTT-00242146
Site Location: RANAUD RD
Sampler Initials: JO

GENERAL COMMENTS

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

Package 1	17.7°C

Results relate only to the items tested.

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Maxxam Job #: B7N3357
Report Date: 2017/10/24

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: OTT-00242146
Site Location: RANAUD RD
Sampler Initials: JO

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5222883	1,4-Difluorobenzene	2017/10/23			87	70 - 130	95	%		
5222883	4-Bromofluorobenzene	2017/10/23			88	70 - 130	94	%		
5222883	D10-Ethylbenzene	2017/10/23			106	70 - 130	95	%		
5222883	D4-1,2-Dichloroethane	2017/10/23			92	70 - 130	104	%		
5225768	o-Terphenyl	2017/10/23	106	30 - 130	109	30 - 130	107	%		
5222883	Benzene	2017/10/24			101	70 - 130	<0.20	ug/L	NC	40
5222883	Ethylbenzene	2017/10/24			101	70 - 130	<0.20	ug/L	NC	40
5222883	F1 (C6-C10) - BTEX	2017/10/24					<25	ug/L	NC	40
5222883	F1 (C6-C10)	2017/10/24			104	70 - 130	<25	ug/L	NC	40
5222883	o-Xylene	2017/10/24			98	70 - 130	<0.20	ug/L	NC	40
5222883	p+m-Xylene	2017/10/24			100	70 - 130	<0.40	ug/L	NC	40
5222883	Toluene	2017/10/24			101	70 - 130	<0.20	ug/L	NC	40
5222883	Total Xylenes	2017/10/24					<0.40	ug/L	NC	40
5225768	F2 (C10-C16 Hydrocarbons)	2017/10/23	107	50 - 130	112	80 - 120	<100	ug/L	NC	50
5225768	F3 (C16-C34 Hydrocarbons)	2017/10/23	107	50 - 130	112	80 - 120	<200	ug/L	NC	50
5225768	F4 (C34-C50 Hydrocarbons)	2017/10/23	107	50 - 130	112	80 - 120	<200	ug/L	NC	50

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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VALIDATION SIGNATURE PAGE

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

Steve Roberts, Ottawa Lab Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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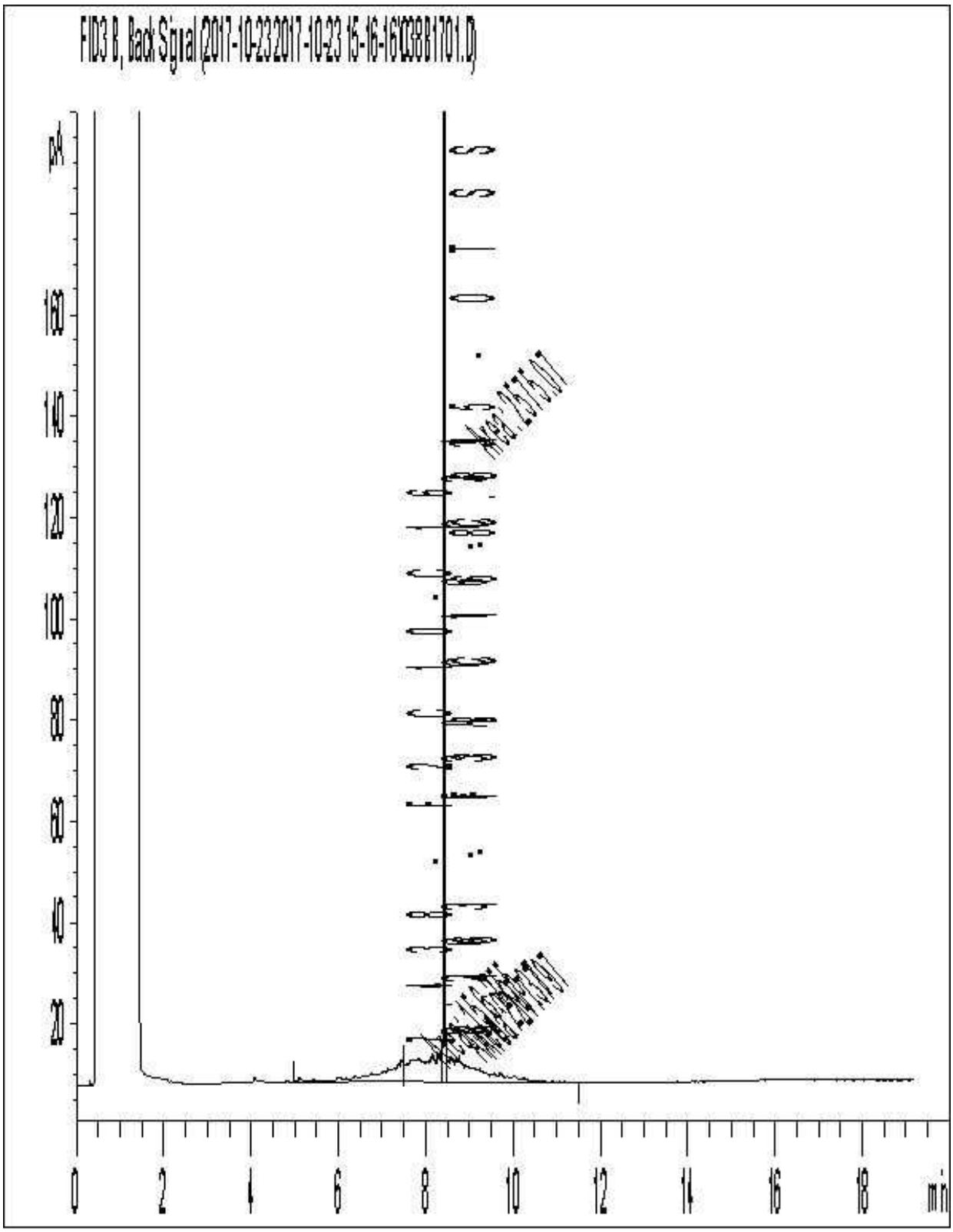
Report Date: 2017/10/24
Maxxam Sample: FJL776

exp Services Inc
Client Project #: OTT-00242146
Project name: RANAUD RD
Client ID: MW17-4

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.