



**West Side Employment Lands,
Waterloo ON**

FINAL - Phase II Environmental Site
Assessment

August 17, 2018

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Executive Summary

The City of Waterloo retained Stantec Consulting Ltd. (Stantec) to conduct a Phase II Environmental Site Assessment (ESA) to investigate soil and groundwater conditions at the property described as West Side Employment Lands (WSEL) in Waterloo, Ontario, hereinafter referred to as the “Site”. The general location of the Site is shown on **Figure No.1** and the boundaries of the Site and features are shown on **Figure No.2** in **Appendix A**. The Site is bounded by 250 Wilmot Line (undeveloped land with a construction trailer) and Columbia Street West to the north (beyond which is an undeveloped properties for future residential property use), 50 Wilmot Line (an agricultural property with associated buildings), Wilmot Line to the west, (beyond which is 1074 Erb's Road to the west (an agricultural property)), 990 Erb Street West (industrial water pumping facility) and Erb Street West to the south (beyond which is Waterloo Waste Management Centre), and Hydro One Networks Inc. (HONI) Transmission Corridor to the east (beyond which are residential buildings).

A Phase I ESA was completed for the Site by Stantec and documented in the report titled *Final - Phase I Environmental Site Assessment - Erb Street West and Wilmot Line, Waterloo, ON*, dated July 20, 2018 (Stantec, 2018). The Phase I ESA identified potential environmental concerns associated with the presence of two above ground storage tanks (AST) containing fuel at 100 Wilmot Line with no secondary containment and a historical diesel spill was associated with the ASTs. The storage of used oil containers within the maintenance shed at 100 Wilmot Line with no secondary containment and associated staining. The presence of a floor drain, situated within the maintenance building at 100 Wilmot Line, with no associated oil water separator. The unknown quality of imported fill material at 980 Erb Street West.

The City of Waterloo retained Stantec to conduct a Phase II ESA at the property described as WSEL in Waterloo, Ontario. The Phase II ESA was completed to assess the potential for soil and/or groundwater impacts to be present within selected areas at the Site, specially at 100 Wilmot Line and 980 Erb Street West.

Representative soil and/or groundwater samples were collected from the boreholes/monitoring wells and submitted for laboratory analysis of one or more of the following contaminants of potential concern (COPCs): petroleum hydrocarbon fractions 1 to 4 (PHCs F1 to F4), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), pH and metals and inorganics.

Based on the results of the Phase II ESA, the following conclusions are provided:

- Nine boreholes were advanced to a maximum depth of 6.1 metres below ground surface (m BGS), four of which were instrumented as groundwater monitoring wells.
- The overburden at the Site, noted during the Phase II ESA field program, generally consisted of a surficial layer of topsoil or sand and gravel fill, overlying sandy clay till to depths of up to 4.34 m BGS, which in turn was underlain by native silty sand or sandy silt that was typically observed from approximately 1.52 m to 6.10 m BGS. At BH18-7 and BH18-8, a layer of sand and gravel fill material was encountered overlying sandy clay till from 0.09 m to 0.76 m BGS. Bedrock was not encountered at any of the investigated locations during the Phase II ESA.
- Soil sampling at the Site did not identify COPC parameters that exceeded the applicable Ontario Regulation (O. Reg.) 153/04 Table 2 Site Condition Standards (SCS).

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- The depth to groundwater measured on April 4, 2018 ranged from 1.51 m BGS (MW18-1) to 5.71 m BGS (MW18-2), and depth to groundwater measured on April 11, 2018 ranged from 1.59 m BGS (MW18-1) to 5.75 m BGS (MW18-2). The inferred direction of shallow groundwater flow at the southwestern side of the Site is to the southwest.
- On April 4 and April 11, 2018, the headspace combustible vapour concentrations (CVC) and total organic vapour (TOV) measured in the monitoring wells, MW18-1 to MW18-4, was less than 5 ppm_v and 0.02 ppm_v respectively.
- Groundwater sampling at the Site as of April 11, 2018, did not identify COPC parameters that exceeded the applicable SCS.
- Waste characterization testing indicates that the Site soil would be considered non-hazardous waste for off-site disposal purposes, if required. The purged groundwater and soil cuttings are not considered to be impacted above the SCS for the Site and could remain on-site until redevelopment on the Site, for a potential cost savings.

Given the findings of the Phase II ESA, the following recommendations are provided:

- The soil and groundwater investigation did not identify COPC at concentrations above the Table 2 SCS. No further actions are recommended at this time.
- If groundwater monitoring wells are no longer required for future monitoring purposes, they should be decommissioned in accordance with O.Reg.903 under the *Ontario Water Resources Act*.

The statements made in this Executive Summary text are subject to the limitations included in **Section 6.0** and are to be read in conjunction with the remainder of this report.

Introduction
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1.0 INTRODUCTION

The City of Waterloo retained Stantec Consulting Ltd. (Stantec) to conduct a Phase II Environmental Site Assessment (ESA) to investigate soil and groundwater conditions at the property described as West Side Employment Lands (WSEL) in Waterloo, Ontario, hereinafter referred to as the “Site”. The general location of the Site is shown on **Figure No.1** and the boundaries of the Site and features are shown on **Figure No.2** in **Appendix A**. The Site is bounded by 250 Wilmot Line (undeveloped land with a construction trailer) and Columbia Street West to the north (beyond which is an undeveloped properties for future residential property use), 50 Wilmot Line (an agricultural property with associated buildings), Wilmot Line to the west, (beyond which is 1074 Erb's Road to the west (an agricultural property)), 990 Erb Street West (industrial water pumping facility) and Erb Street West to the south (beyond which is Waterloo Waste Management Centre), and Hydro One Networks Inc. (HONI) Transmission Corridor to the east (beyond which are residential buildings).

1.1 BACKGROUND

Stantec understands that the Site consists of the following properties: municipally identified as 100 Wilmot Line, 960 Erb Street West and 980 Erb Street West in Waterloo, Ontario. The 'landlocked' portion of land located at 928 Erb Street West is surrounded by the Site on all sides but 928 Erb Street West is not part of the Site assessed during the Phase II ESA.

A Phase I ESA was completed for the Site by Stantec and documented in the report titled *FINAL - Phase I Environmental Site Assessment - Erb Street West and Wilmot Line, Waterloo, ON*, dated July 20, 2018 (Stantec, 2018). The Phase I ESA identified potential environmental concerns associated with the presence of two above ground storage tanks (AST) containing fuel at 100 Wilmot Line with no secondary containment and a historical diesel spill was associated with the ASTs. The storage of used oil containers within the maintenance shed at 100 Wilmot Line with no secondary containment and associated staining. The presence of a floor drain, situated within the maintenance building at 100 Wilmot Line, with no associated oil water separator. The unknown quality of imported fill material at 980 Erb Street West.

Stantec was subsequently retained to complete a Phase II ESA to assess the soil and groundwater conditions at the Site in areas with potential environmental concerns identified during the Phase I ESA. The results of the Phase II ESA are discussed herein.

Contaminants of potential concern (COPC) associated with the potential environmental concerns at the Site discussed above include: volatile organic compounds (VOC) including benzene, toluene, ethylbenzene and xylenes (BTEX); petroleum hydrocarbon (PHC) fractions 1 to 4 (F1 to F4); metals and inorganics; and polycyclic aromatic hydrocarbons (PAH).

1.2 OBJECTIVE

The objective of the Phase II ESA was to assess the potential presence of COPC in soil and groundwater associated with the potential environmental concerns identified in Stantec's Phase I ESA (Stantec, 2018).

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1.3 SITE DESCRIPTION

The Site is approximately 43.6 hectares (107.7 acres) in area and is situated north of the intersection of Wilmot Line and Erb Street West in Waterloo (see **Figure No. 1** and **2, Appendix A**). The Site consists of a former golf course (formerly operated by the Waterloo Golf Academy) at 100 Wilmot Line, agricultural land, a former residential property at 980 Erb Street West, and a stormwater management (SWM) pond.

1.3.1 Topography and Regional Drainage

Based on observations made during the Phase I ESA (Stantec, 2018a), the observed topography at the Site is relatively at grade with the adjacent properties with the adjoining roadways at a slightly lower elevation. 100 Wilmot Line has a variable hummocky topography (in the vicinity of the golf course).

Based on the “Scoped Subwatershed Study Portions of Subwatersheds 307 and 314 Laurel Creek Watershed” by CH2MHill dated May 2004, there is a groundwater divide that is located on the Site (**Figure 2, Appendix A**). Based on the location of the divide the inferred ground water flow direction on the western portion of the Site is expected to flow to the southwest. It should be noted that the direction of the shallow ground water flow in localized areas can be influenced by the presence of underground utility corridors and is not necessarily a reflection of regional or local ground water flow.

Stormwater is anticipated to generally infiltrate into the ground or drain by overland flow toward the SWM pond and ponds in the vicinity of the golf course; and into roadside ditches that extends along the northern side of Erb Street West and the Eastern side of Wilmot Line.

1.3.2 Geologic Setting

The Quaternary Geology of Ontario (Map 2556) prepared by the Ministry of Natural Resources identified the regional surficial soils to be Maryhill Till consisting of silty clay to clay matrix, moderate to high matrix carbonate content, clast poor.

Based on an available surficial geology map, Ontario Geological Survey GIS data set, the native surficial soils of the Site consist of clay to silt-textured till (derived from glaciolacustrine deposits or shale).

The Site resides in the physiographic region classified by Chapman and Putnam (1984) as the Waterloo Hills with this physiographic feature consisting of sandy hills, ridges of sandy till, kames or kame moraines and intervening hollows of outwash sand and gravel, which all can be capped by glacial till.

Based on the Hydrogeological Investigation (Stantec, 2017a) and Geotechnical Investigation (Stantec, 2017b), the stratigraphy encountered at the Site generally consist of topsoil, which can overlay silty sand, sandy silt and/or clay fill material up to a depth of approximately 2.3 metres below ground surface (m BGS). This fill material was reported to be underlain by native deposits of silt and/or silty clay at depths ranging from 0.8 m to 1.5 m BGS. Beneath these previously mentioned soils it was noted that a sandy to silty clay till that extends to the maximum drilled depth of 12.8 m BGS. In addition, sand to silty sand layers ranging from 0.7 m to 2.7 m were identified between the till layers.

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The Geotechnical Investigation (Stantec, 2017b) did not encounter bedrock at the Site to the maximum borehole depth of 12.8 m BGS. Bedrock in the vicinity of the Site was mapped as sandstone, shale, dolostone, and siltstone of the Guelph Formation (OGS, 2012).

Based on information obtained from the OGS Map 2544, titled *Bedrock Geology of Ontario, Southern Sheet*, bedrock in the area of the Phase One Property is reported to consist of Upper Silurian aged deposits (Salina Formation), consisting of limestone, dolostone, shale, sandstone, gypsum, and salt. The depth to bedrock was not indicated on the map.

1.4 REGULATORY FRAMEWORK

The Phase II ESA was completed in general accordance with the Canadian Standards Association (CSA) Guideline Phase II Environmental Site Assessment Z769 00 (CSA, R2013).

The Phase II ESA was not completed with the intent of filing a Record of Site Condition (RSC); therefore, some requirements of O.Reg.153/04, such as the prescribed report format, were not strictly adhered to.

The roles and powers of the Ontario Ministry of the Environment, Conservation and Parks (MOECP) when dealing with contaminated sites are outlined primarily in the *Environmental Protection Act* (R.S.O. 1990). The MOECP has a mandate to deal with situations where there is an adverse effect, or the likelihood of an adverse effect, associated with the presence or discharge of a contaminant. Ontario Regulation 153/04 (O.Reg.153/04) provides guidance and information to property owners and consultants to use when assessing the environmental condition of a property, when determining whether restoration is required and in determining the kind of restoration needed to allow continued use or reuse of a property.

1.4.1 Generic Soil and Groundwater Quality Standards

To evaluate the soil and groundwater quality at the Site, data were compared with the site condition standards (SCS) established in the MOECP 2011 document *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (MOE, 2011a).

The selection of the applicable SCS to assess soil and groundwater quality considered the following characteristics specific to the Site:

- Groundwater use
- Current/intended property use
- Depth to bedrock
- Proximity to water bodies
- Soil characteristics (e.g., grain size)
- Environmental sensitivity, including:
 - o Soil pH
 - o Proximity to areas of natural significance

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A detailed summary of the selection process for the Site is included in **Appendix B**. Based on this information, the generic SCS were considered applicable for the Site were the MOECP Table 2 Full Depth Generic SCS for a potable groundwater condition for industrial/commercial/community (I/C/C) property use with medium and fine textured soils (Table 2 SCS).

Field Program
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2.0 FIELD PROGRAM

2.1 SCOPE OF WORK

A summary of the completed scope of work is presented below. Detailed methods are presented in **Appendix C**.

The scope of work for this Phase II ESA was completed in March and April 2018. The Phase II ESA consisted of the following activities:

2.1.1 Pre-Field Activities:

- Prepared a health and safety plan (HASP)
- Retained subcontractors for private underground utility location, borehole drilling/monitoring well installation and laboratory analytical services
- Established data quality objectives (DQO)

2.1.2 Field Activities:

- Retained a private utility locator (OnSite Locates Inc.) to locate public and private services in the work areas and requested utility clearances for public utilities (Ontario One Call)
- Observed the advancement of nine (9) boreholes (MW18-1 to MW18-4, and BH18-5 to BH18-9) by Strata Drilling Group Inc. of Markham, Ontario (Strata) to a maximum depth of 6.1 m BGS
- Observed the completion of four boreholes as monitoring wells (MW18-1 to MW18-4)
- Collected soil samples at regular intervals from each borehole, described field observations, and measured soil headspace combustible and organic vapour concentrations
- Submitted selected soil samples to Maxxam Analytics International Corporation (Maxxam) of Mississauga, Ontario, for analysis of PHC F1 to F4, VOC, PAH, and metals and inorganics
- Collected depth to water table measurements and groundwater samples at new monitoring well locations
- Submitted groundwater samples to Maxxam for analysis of PHC F1 to F4, VOC, PAH, and metals and inorganics
- Stantec Geomatics Group completed an elevation survey of the boreholes and monitoring wells relative to an on site benchmark
- Collected and submitted one composite soil sample from the drilling program to Maxxam for waste characterization analysis, including toxicity characteristic leaching procedure (TCLP)-inorganics, TCLP-VOCs, TCLP-semi-VOCs, bulk analysis of polychlorinated biphenyls (PCBs) and testing for ignitability to determine soil disposal requirements.

2.1.3 Data Interpretation and Reporting:

- Interpreted the observations and findings of the field work and the analytical results

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- Evaluated data quality through a review of quality assurance/quality control (QA/QC) measures
- Prepared this report to document the investigation findings

2.1.4 Sampling Location Rationale

Table I below presents the locations and rationale for soil and groundwater sampling completed during the Phase II ESA. A detailed field methodology for the tasks listed above is presented in **Appendix C**.

Table I: Sampling and Analysis Rationale

Borehole Identification	Location	Investigation Rationale
MW18-1, BH18-5 and BH18-6	980 Erb Street West	To investigate soil conditions associated with the unknown fill material associated with the backfill operations of the former residential house. As well as the two stockpiles, approximately 20 cubic metres, consisting of gravel, concrete and asphalt.
MW18-3 and MW18-4	100 Wilmot Line	To investigate soil conditions associated with the maintenance activities located at the former golf course.
MW18-2, BH18-8, and BH18-9	100 Wilmot Line	To investigate soil conditions in proximity to the two ASTs.
BH18-7	100 Wilmot Line	To investigate soil conditions in proximity to the used oil containers.

The depth of soil samples submitted for laboratory analysis from boreholes were based on field observations and/or soil vapour concentrations, staining, odour, and the expected behaviour of COPCs in the environment.

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3.0 RESULTS

3.1 STRATIGRAPHY

Detailed descriptions of stratigraphy observed during borehole advancement are provided on the borehole records in **Appendix D**. During the field activities on March 19, 2018, the overburden at the Site generally consisted of a surficial layer of topsoil or sand and gravel fill, overlying sandy clay till to depths of up to 4.34 m BGS, which in turn was underlain by native silty sand or sandy silt that was typically observed from approximately 1.52 m to 6.10 m BGS. At BH18-7 and BH18-8, a layer of sand and gravel fill material was encountered overlying sandy clay till from 0.09 m to 0.76 m BGS. Bedrock was not encountered at any of the investigated locations during the Phase II ESA. These observations were generally consistent with the findings reported in the Geotechnical Investigation (Stantec, 2017b).

3.2 SOIL VAPOUR CONCENTRATIONS

There are no regulatory criteria for headspace soil vapour concentrations. Headspace soil vapour concentrations are a field screening tool, in addition to field observations of staining, sheens, or odours, to provide a qualitative indication of the presence of volatile COPC (e.g., PHC, VOC).

The headspace combustible vapour concentrations (CVC) and total organic vapour (TOV) concentrations measured in the soil samples recovered from the boreholes are provided on the borehole logs in **Appendix D**.

The CVC measured in the soil samples collected ranged from less than 5 parts per million by volume (ppm_v) (various locations) to 85 ppm_v (0.76 m to 1.5 m BGS, MW18-2). The TOV measured in the soil samples collected ranged from less than 0.02 ppm_v (various locations) to 5 ppm_v (various locations).

3.3 GROUNDWATER MONITORING

This section presents the results of the groundwater monitoring program, including vapour concentrations measured in the monitoring well headspace, water levels, and interpreted groundwater flow direction. Depth to groundwater, vapour concentrations, and presence/absence of LPH, were measured in the monitoring wells on April 4 and April 11, 2018. Groundwater monitoring data are presented in **Table 1** in **Appendix E**.

3.3.1 Well Headspace Vapour and LNAPL Observations

On April 4 and April 11, 2018, the headspace CVC and TOV measured in the monitoring wells, MW18-1 to MW18-4, were less than 5 ppm_v and 0.02 ppm_v respectively.

During the monitoring and sampling event, neither light non aqueous phase liquid (LNAPL) nor dense non aqueous phase liquid (DNAPL) were measured in the monitoring wells.

3.3.2 Groundwater Elevations and Flow Direction

The depth to groundwater measured on April 4, 2018 ranged from 1.51 m BGS (MW18-1) to 5.71 m BGS (MW18-2), and depth to groundwater measured on April 11, 2018 ranged from 1.59 m BGS (MW18-1) to 5.75 m BGS (MW18-2).

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Groundwater elevations and interpreted shallow groundwater contours and flow direction are shown on **Figure No. 3** in **Appendix A**. Based on the elevation survey and depth to groundwater measured on April 11, 2018, the shallow groundwater flow direction in the vicinity of the monitoring wells was inferred to be in a southwestern direction.

3.4 ANALYTICAL RESULTS

This Section presents the soil and groundwater laboratory analytical results.

3.4.1 Soil Quality

Soil analytical results for BH18-01 to BH18-04 are summarized in **Table 2** in **Appendix E** and on **Figure No. 4** in **Appendix A**. Laboratory certificates of analysis are presented in **Appendix G**.

Concentrations of analyzed parameters in the soil samples submitted for laboratory analysis from the boreholes met the applicable Table 2 SCS.

3.4.2 Grain Size Analysis

As part of the Geotechnical Investigation (Stantec, 2017b), Stantec completed grain size analyses on nine representative soil samples recovered from various depths at the Site. Of the nine samples, eight contained greater than 50% by mass of particles smaller than 75 µm.

During the Phase II ESA field program, the majority of the soil observed was clay or silt (i.e. medium and fine textured soil).

Based on the results of the grain size analysis conducted during the Geotechnical Investigation (Stantec, 2017b) and general field observations of medium and fine textured till soils during the Phase II ESA, less than 1/3 of soil (measured by volume) at the Site consisted of coarse textured soils; therefore, the standards medium and fine textured soil have been applied.

3.4.3 Waste Classification

A composite sample collected from drill cuttings was submitted to Maxxam for analysis of TCLP-VOCs, TCLP semi-VOCs, and inorganic compounds, bulk PCBs, and ignitability.

The sample results indicated the analyzed soil would be classified as non-hazardous waste. The analytical results along with the appropriate waste criteria are summarized in **Table 4** in **Appendix E**. Laboratory certificates of analysis are provided in **Appendix G**.

3.4.4 Groundwater Quality

Groundwater analytical results are summarized in **Table 3** and on **Figure No. 5** in **Appendix A**. Laboratory certificates of analysis are provided in **Appendix G**.

Concentrations of analyzed parameters met the applicable Table 2 SCS in the groundwater samples submitted to Maxxam.

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3.4.5 Evaluation of Quality Assurance/Quality Control

The overall data quality objective (DQO) for the investigation was to collect data that were precise, accurate, reproducible, complete, and suitable for the purposes of the Phase II ESA. A detailed summary of the QA/QC evaluation is presented in **Appendix I** and copies of the laboratory certificates of analysis are provided in **Appendix G**.

Based on the QA/QC evaluation described in **Appendix I**, Stantec concluded that the DQO for this investigation was satisfied and that the data were considered acceptable for use in this report.

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4.0 CONCLUSIONS

Based on the results of the Phase II ESA, the following conclusions are provided:

- Nine boreholes were advanced to a maximum depth of 6.1 m BGS, four of which were instrumented as groundwater monitoring wells.
- The overburden at the Site, noted during the Phase II ESA field program, generally consisted of a surficial layer of topsoil or sand and gravel fill, overlying sandy clay till to depths of up to 4.34 m BGS, which in turn was underlain by native silty sand or sandy silt that was typically observed from approximately 1.52 m to 6.10 m BGS. At BH18-7 and BH18-8, a layer of sand and gravel fill material was encountered overlying sandy clay till from 0.09 m to 0.76 m BGS. Bedrock was not encountered at any of the investigated locations during the Phase II ESA.
- Soil sampling at the Site did not identify COPC parameters that exceeded the applicable Table 2 SCS.
- The depth to groundwater measured on April 4, 2018 ranged from 1.51 m BGS (MW18-1) to 5.71 m BGS (MW18-2), and depth to groundwater measured on April 11, 2018 ranged from 1.59 m BGS (MW18-1) to 5.75 m BGS (MW18-2). The inferred direction of shallow groundwater flow at the southwestern side of the Site is to the southwest.
- On April 4 and April 11, 2018, the headspace CVC and TOV measured in the monitoring wells, MW18-1 to MW18-4, was less than 5 ppm_v and 0.02 ppm_v respectively.
- Groundwater sampling at the Site as of April 11, 2018, did not identify COPC parameters that exceeded the applicable Table 2 SCS.
- Waste characterization testing indicates that the Site soil would be considered non-hazardous waste for off-site disposal purposes, if required. The purged groundwater and soil cuttings are not considered to be impacted above the SCS for the Site and could remain on-site until redevelopment on the Site, for a potential cost savings.

5.0 SUMMARY AND RECOMMENDATIONS

The soil and groundwater investigation did not identify COPC at concentrations above the Table 2 SCS. No further actions are recommended at this time.

When the groundwater monitoring wells are no longer required for future monitoring purposes, they should be decommissioned in accordance with O.Reg.903 under the *Ontario Water Resources Act*.

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6.0 CLOSURE AND LIMITATIONS

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This report provides an evaluation of selected environmental conditions associated with the identified portions of the properties that were assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portions of the identified properties that were assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report, and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or subsurface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire Site. As the purpose of this report is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the Site is beyond the scope of this assessment.

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Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.

This report was written by Travis Pawlick, B.Sc. and reviewed by Brent Ferguson, B.Sc., P.Geo.

All of which is respectfully submitted,

STANTEC CONSULTING LTD.

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7.0 REFERENCES

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PHASE II ENVIRONMENTAL SITE ASSESSMENT – WEST SIDE EMPLOYMENT LANDS, WATERLOO ON

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August 17, 2018

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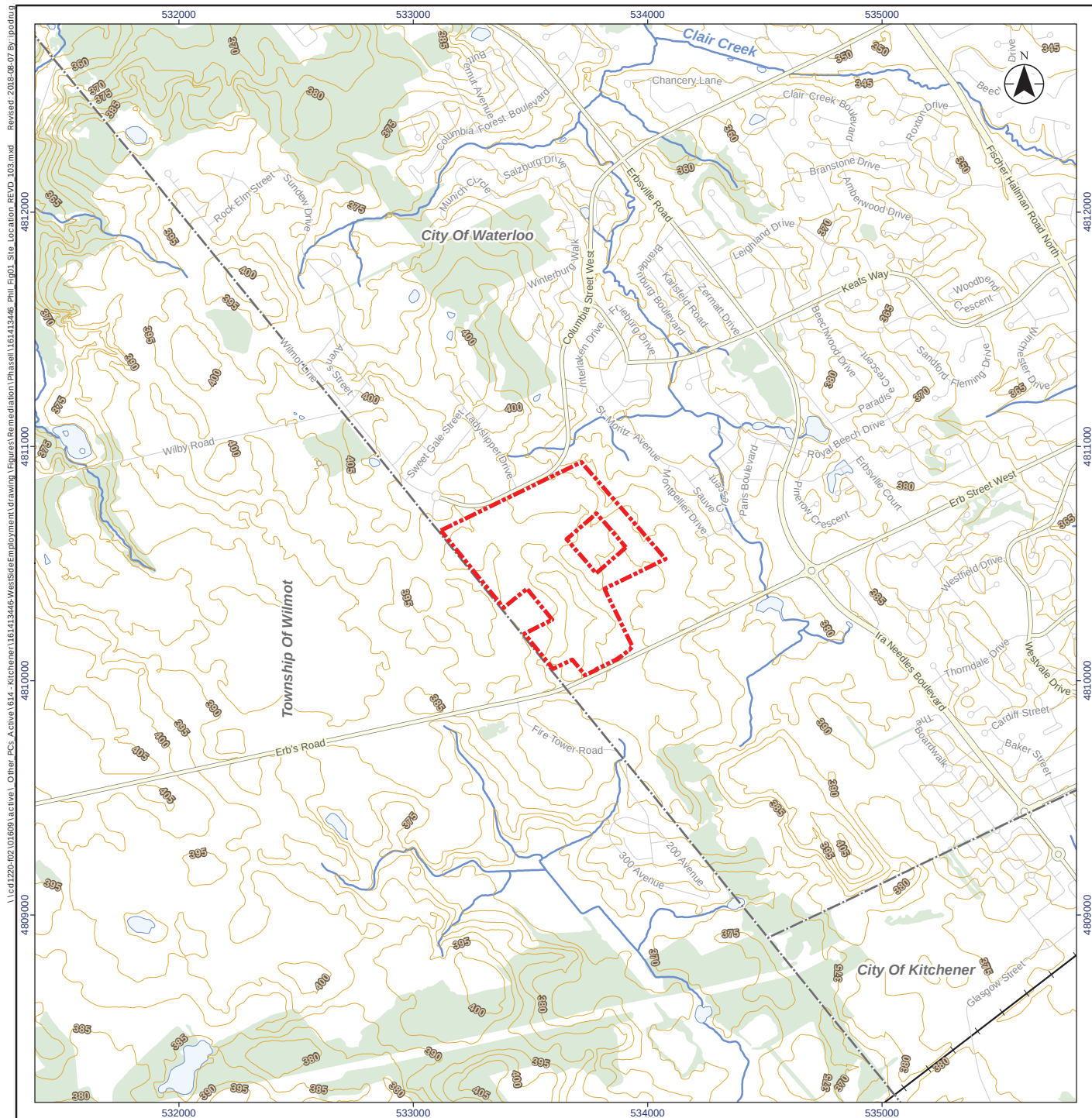
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APPENDIX A: FIGURES



- Approximate Site Boundary
- Municipal Boundary - Lower Tier
- Major Road
- Minor Road
- Railway - Operational
- Topographic Contour (m AMSL)
- Watercourse
- Waterbody
- Wooded Area

0 250 500 metres
1:25,000 (at original document size of 8.5x11)



Project Location: Waterloo, Ontario
161413446 REV'D
Prepared by IP on 2018-08-07
Technical Review by BF on 2018-05-11

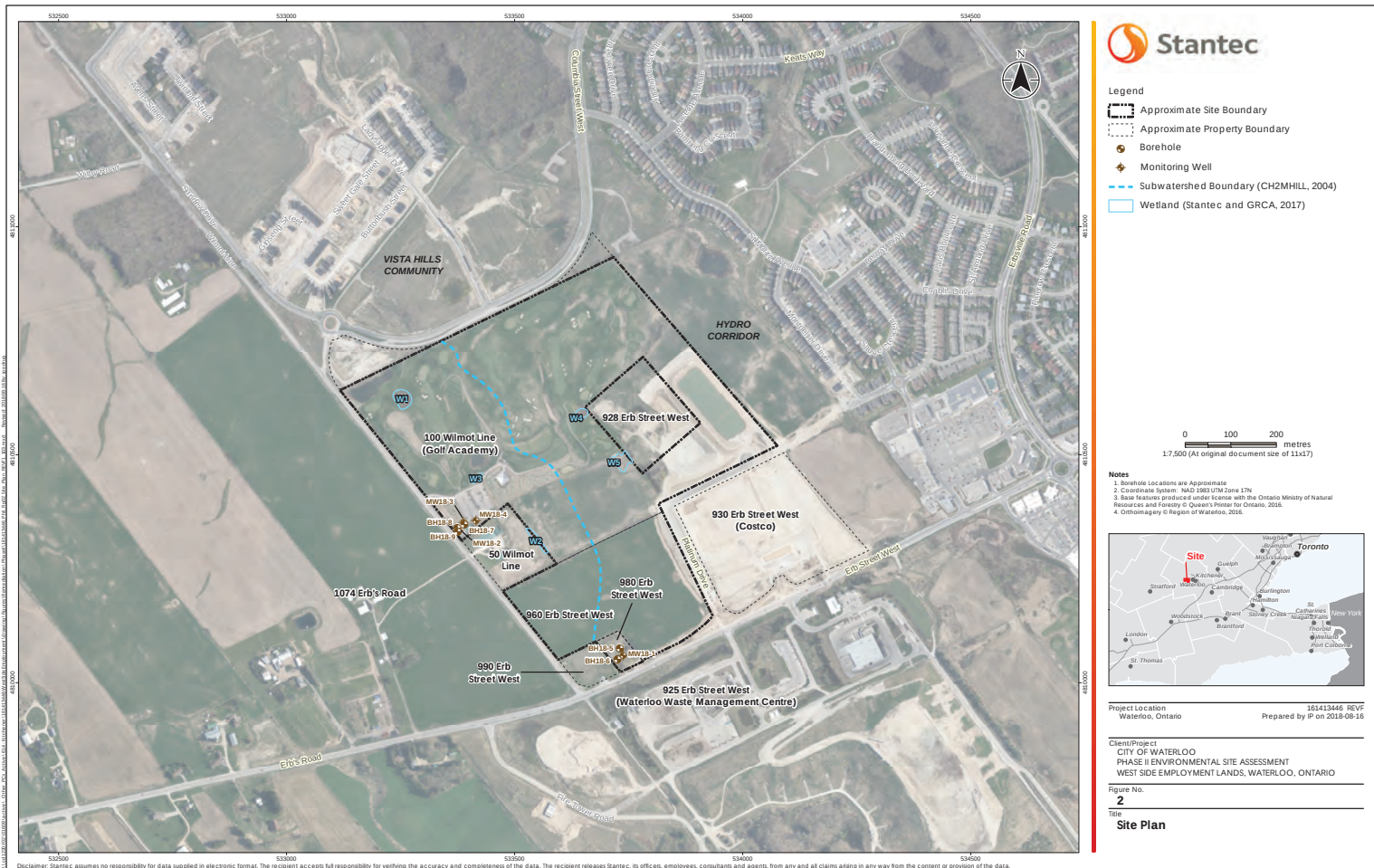
Client/Project
**CITY OF WATERLOO
PHASE II ENVIRONMENTAL SITE ASSESSMENT
WEST SIDE EMPLOYMENT LANDS
WATERLOO, ONTARIO**

Figure No.
1

Title
Site Location

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017.
3. This figure is to be viewed in the context of the accompanying report and is subject to the limitations specified in that report.

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533500 533750

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- Legend**
- Approximate Site Boundary
 - Approximate Property Boundary
 - Monitoring Well
 - Constructed Drain
 - Subwatershed Boundary (CH2MHILL, 2004)
 - Wetland (Stantec and GRCA, 2017)
 - Groundwater Parameters Analyzed were Less Than Regulatory Standards (2011 MOECP O.Reg. 153/04 Table 2 SCS)



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
 2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry's Queen's Printer for Ontario, 2016.
 3. Orthomosaic © Region of Waterloo, 2016.
 4. Site features are based on field observations and should be considered approximate.



Project Location
Waterloo, Ontario

161413446 REVE
Prepared by CL on 2018-08-16
Technical Review by BF on 2018-05-11

Client/Project
CITY OF WATERLOO
PHASE II ENVIRONMENTAL SITE ASSESSMENT
WEST SIDE EMPLOYMENT LANDS

Figure No.
5

Title
Summary of Analytical Results in Groundwater - April 2018

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**APPENDIX B:
GENERIC SITE CONDITION
STANDARDS SELECTION**

Appendix B **GENERIC SITE CONDITION STANDARDS SELECTION**

This appendix summarizes the selection process Stantec Consulting Ltd. (Stantec) used to identify the appropriate standards for the sites based on a review of site-specific characteristics. To evaluate the soil and groundwater quality at the property described as West Side Employment Lands (WSEL) in Waterloo, Ontario, hereinafter referred to as the “Site”, data were compared with the standards established in the Ontario Ministry of the Environment, Conservation and Parks (MOECP) *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (April 15, 2011) Site Condition Standards (SCS) (MOE, 2011a).

B.1 GROUNDWATER USE

The City of Waterloo relies on groundwater as a significant source of potable water. Further, the Region of Waterloo has issued a document that states that only potable site condition standards may be considered for the assessment of soil and ground water quality (Region of Waterloo, 2010).

Therefore, site condition standards (SCS) for potable groundwater conditions were considered applicable at the Site.

B.2 CURRENT/INTENDED PROPERTY USE

The current property use of the Site is combination of agricultural, undeveloped and commercial. According to the market analysis report for the Site (urbanMetrics Inc., 2017), the recommended future use of the Site will be a combination of industrial and commercial property use; therefore, the applicable land use category was considered industrial/commercial/community property use.

B.3 DEPTH TO BEDROCK

Bedrock was not encountered during the current or previous subsurface investigations, to a maximum depth of 12.8 metres below ground surface (m BGS). Therefore, the generic SCS established for properties with shallow bedrock (i.e., less than 2 m) were not considered applicable for use at the Site.

B.4 PROXIMITY TO WATER BODIES

The Site is located greater than 30 m from a water body. The closest tributary to the Site is Clair Creek, which is approximately 90 m northeast of the Site. Therefore, the generic SCS suitable for properties greater than 30 m from a water body were considered applicable for the Site.

B.5 SOIL CHARACTERISTICS

During the field activities on March 19, 2018, the overburden at the Site generally consisted of a surficial layer of topsoil or sand and gravel fill, overlying sandy clay till to depths of up to 4.34 m BGS, which in turn was underlain by native silty sand or sandy silt that was typically observed from approximately 1.52 m to 6.10 m BGS. At BH18-7 and BH18-8, a layer of sand and gravel fill material was encountered overlying sandy clay till from 0.09 m to 0.76 m BGS. Bedrock was not encountered at any of the investigated locations during the Phase II ESA.

Based on the results of the grain size analysis completed during the Stantec Geotechnical Investigation (2017b) and general field observations of medium and fine textured till soils during the Phase II ESA, less than 1/3 of soil (measured by volume) consists of coarse textured soils; therefore, the standards medium and fine textured soil have been applied.

B.6 ENVIRONMENTALLY SENSITIVE AREAS

The O.Reg.153/04 generic SCS cannot be used at properties that are within, include, or are proximate to (i.e., within 30 m of) Environmentally Sensitive Areas, such as areas of natural significance, or when soil pH is not within the allowable ranges for surface and/or subsurface soils. If either condition applies, the Table 1 (background) SCS are used to evaluate soil and groundwater quality.

B.6.1 Areas of Natural Significance

According to information provided by Ontario Ministry of Natural Resources and Forestry online tool (<https://www.ontario.ca/page/make-natural-heritage-area-map>), no areas of natural and scientific interest (ANSI) are present within 1 km of the Site.

B.6.2 Soil pH

The generic SCS cannot be applied to a property if the soil pH has a value outside a range of 5 to 9 for surface soil (less than 1.5 m BGS) or outside a range of 5 to 11 for subsurface soil (greater than 1.5 m BGS).

Six surface soil samples and four subsurface soil samples were submitted for analysis of pH. Results indicated that the samples were within the acceptable ranges.

B.7 APPLICABLE STANDARD

Considering the site characteristics described in the previous sections, the generic SCS considered applicable for the Site were the MOECP 2011 Table 2 Full Depth SCS for a potable groundwater condition for industrial/commercial/community property use with medium and fine textured soils (Table 2 SCS).

APPENDIX C: FIELD METHODOLOGY

Appendix C FIELD METHODOLOGY

This Appendix summarizes the field methodology Stantec followed in completing the Phase II Environmental Site Assessment (ESA).

Monitoring, soil and groundwater sampling were undertaken consistent with the applicable sections of Ontario Regulation (O.Reg.) 153/04, made under Part XV.1 of the *Environmental Protection Act* and elements of the Ministry of the Environment, Conservation and Parks (MOECP) document *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario* (December 1996).

C.1 HEALTH AND SAFETY

Stantec developed a health and safety checklist for this project consistent with the requirements of the Ontario *Occupational Health and Safety Act* (OHSA) to address the fieldwork components, including sampling and handling of soil and groundwater samples potentially containing the contaminants of concern (COC) previously identified. The specific objectives of the health and safety checklist were to:

- Identify potential health and safety concerns or exposure risks associated with activities to be conducted on the Site.
- Identify and describe the control methods designed to reduce on site worker exposure to potential risks.
- Reduce the potential for on-site workers and the public to be exposed to unnecessary or unacceptable risk as part of the work program.
- Undertake the proposed contaminant delineation program field activities in a manner consistent with the applicable legislation and guidelines respecting worker health and safety, and regulations concerning contaminant and waste handling.

A copy of the health and safety checklist was kept on the Site by Stantec field personnel for the duration of the field activities.

C.2 UNDERGROUND UTILITIES

C.2.1 Public and Private Underground Service Locates

Prior to the borehole drilling activities, Stantec contacted Ontario One Call to have publicly owned utilities located in the vicinity of the proposed borehole locations. In addition, Stantec retained OnSite Locates Inc. of Newmarket, Ontario to locate private underground services near the boreholes including, but not limited to, buried private site services, telephone, natural gas, cable, water, and power.

C.3 METHODOLOGY

C.3.1 Borehole Advancement and Monitoring Well Installation

Nine boreholes with six completed as monitoring wells were drilled and completed as groundwater monitoring wells by Strata Drilling Group Inc. of Markham, Ontario (Strata). The boreholes were advanced using direct push Geoprobe 7822DT drill rig equipped with a 100 mm (4¼ in.) diameter dual tube sampling system. Samples from the soils within the boreholes were collected continuously at 1.5 m (5 ft) depth intervals using a soil coring device equipped with disposable sample core tubes. A new disposable sample core tube was used for each sample. The boreholes not intended for monitoring well installation were backfilled with bentonite upon completion.

Groundwater monitoring wells, comprising 50-mm inside diameter (ID) polyvinyl chloride (PVC) well materials, were installed following removal of the continuous sampling equipment and augering of the boreholes to the desired well depth using hollow stem augers (4.24-inch diameter). Monitoring wells were constructed with a 3.0 m long slotted PVC well screen connected to an appropriate length of PVC riser pipe. The PVC screen and riser pipe were flush-threaded and equipped with O-rings to provide watertight joints. A flush-threaded PVC cap was installed at the bottom of the well screen. Silica sand was placed in the borehole annulus around each well screen and extended to approximately 0.3 m above the top of the well screen. A bentonite seal was installed from the top of the silica sand to approximate depths of 0.15 m BGS in each of the monitoring wells. A j-plug was installed at the top of each monitoring well. The monitoring wells were finished with aboveground steel well casings that were concreted in-place.

Well construction details are presented on the borehole records in **Appendix D**.

C.3.2 Soil Screening and Sampling

Soil samples were recovered approximately every 0.8 metres (m) continuously from the borehole using a direct push soil coring device equipped with disposable polyethylene sample core tubes at regular depth intervals (i.e., every 1.5 m). A new disposable sample core tube was used for each sample.

Stantec's field technician visually assessed and logged the recovered soil samples in the field and recorded observations of colour, odour, texture, soil type, and moisture. Each of the soil samples was split into two representative samples. One half of the sample was field tested for combustible vapour concentrations (CVC) and total organic vapour concentrations (TOV) as described below. The second portion of each sample was placed into laboratory-supplied jars and temporarily stored in a cooler on ice prior to transport to Maxxam Analytics International Corporation (Maxxam). Samples to be analyzed for volatile organic compounds (VOC) or petroleum hydrocarbons (PHC), including benzene, toluene, ethylbenzene and xylenes (BTEX) and PHC F1, were recovered from each sampling interval using a hermetic sampling device. This involved collecting approximately 5 gram aliquots of soil from the dual tube and extruding the aliquots directly into laboratory supplied vials containing methanol preservative.

Stantec screened soil samples for presence of CVC and TOV in the field using an RKI Eagle II Hydrocarbon Surveyor (the Eagle II). The Eagle II is equipped with a combustible gas detector to measure CVC and a photoionization detector (PID) to measure TOV. The Eagle II is equipped with a Teflon® lined hose and a 0.4 m (10 in.) long hydrophobic probe. The probe includes a replaceable hydrophobic filter disk that reduces the potential for particulates and water to enter the instrument.

PHASE II ENVIRONMENTAL SITE ASSESSMENT – WEST SIDE EMPLOYMENT LANDS, WATERLOO ON

Appendix C Field Methodology
August 17, 2018

For CVC, the Eagle II can display measurement in parts per million by volume (ppm_v), percent by volume (% volume), and percent of the lower explosive limit (% LEL). TOV measurements are reported in units of ppm_v. The Eagle II was calibrated prior to the soil sampling program. The combustible gas detector was calibrated to n-hexane and operated in methane elimination mode for CVC measurements, and the PID was calibrated to isobutylene and equipped with a 10.6 eV lamp for TOV measurements. Field screening methods measure the total concentration of a range of combustible and volatile contaminants such as PHC and VOC in soil vapour.

The Eagle II was calibrated in the field at the beginning of work each day. The calibration data were recorded when the Eagle II was calibrated.

Borehole logs in **Appendix D** present the CVC/TOV measurements.

Potential for cross-contamination of samples was reduced by using cleaned drilling and sampling equipment. During drilling, soil samples were collected and contained within disposable dual tube liners that were advanced by the Geoprobe. Loose soil was brushed from the stainless steel drive casings between sampling locations and the non-dedicated sampling equipment from the Geoprobe was washed using a solution of Alconox and water and rinsed with water between sample locations. Stantec's field technician wore a new pair of disposable nitrile gloves for each soil sample.

Soil samples were collected in laboratory supplied containers and packed in insulated coolers containing ice prior to transport under chain-of-custody to Maxxam for analysis. Soil samples were typically delivered to the laboratory within five days of collection.

C.3.3 Groundwater Monitoring and Sampling

Headspace soil vapour concentrations (CVC and TOV) in the monitoring wells were measured using an Eagle II, which was calibrated in accordance with the methods described above.

Stantec measured the depth to groundwater and assessed the presence/absence of light and dense non-aqueous phase liquids (LNAPL and DNAPL) with a Heron Model H.Oil oil/water interface probe. The sensor accuracy is ± 1 mm (1/200 ft).

Stantec developed and purged the newly installed monitoring wells using dedicated Waterra® tubing and foot valves. The water levels in the monitoring wells were allowed to recover to approximately 90% of static elevation prior to sample collection.

Stantec developed and purged the newly installed monitoring wells using dedicated Waterra® tubing and foot valves. Monitoring wells MW18-2, MW18-3, and MW18-4 were purged dry three times, with the removal of between four well volumes (MW18-4) and eight well volumes (MW18-2) and were allowed to recover to approximately 90% of static elevation prior to sample collection. 10 well volumes were removed from monitoring well MW18-1 then allowed to recover to approximately 90% of static elevation prior to sample collection.

Groundwater samples were collected using low-flow sampling protocols based on the minimal drawdown procedure developed by the United States Environmental Protection Agency (US EPA, 2017). A Geotech bladder pump system with the pump set near the middle of the monitoring well screen was used to sample the monitoring wells, and was operated at a constant pumping rate of less than 0.5 L/min. New tubing was used at each monitoring well to reduce

PHASE II ENVIRONMENTAL SITE ASSESSMENT – WEST SIDE EMPLOYMENT LANDS, WATERLOO ON

Appendix C Field Methodology

August 17, 2018

the potential for cross-contamination between sampling locations. Field parameter measurements of pH, conductivity, dissolved oxygen, oxidation reduction potential (ORP), and temperature were collected during purging using a YSI-556 MPS water quality meter to assess whether groundwater conditions were stable and suitable prior to sampling. Groundwater conditions were considered stable when three of the four water quality indicators were within the stabilization criteria (± 0.2 pH units, $\pm 3\%$ for conductivity (or specific conductance), $\pm 10\%$ or ± 0.2 mg/L (whichever is greater) for dissolved oxygen, and ± 20 mV for ORP). Samples for dissolved metals analysis were field-filtered using a new, single-use, 0.45 micron, in-line filter.

Stantec's field technicians wore a new pair of disposable nitrile gloves at each monitoring well location. Non-dedicated monitoring equipment (e.g., interface probe, water quality instruments) was decontaminated using a solution of Alconox detergent and distilled water and rinsed with distilled water between each well. Dedicated sampling equipment (Waterra tubing, foot valves, bailers, string, etc.) was used for each monitoring well. The groundwater samples were collected in laboratory supplied containers and packed in insulated sample coolers containing ice for shipment to Maxxam under chain-of-custody. Groundwater samples were typically delivered to the laboratory within 72 hours of collection.

APPENDIX D: BOREHOLE LOGS

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

<i>Rootmat</i>	- vegetation, roots and moss with organic matter and topsoil typically forming a mattress at the ground surface
<i>Topsoil</i>	- mixture of soil and humus capable of supporting vegetative growth
<i>Peat</i>	- mixture of visible and invisible fragments of decayed organic matter
<i>Till</i>	- unstratified glacial deposit which may range from clay to boulders
<i>Fill</i>	- material below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure:

<i>Desiccated</i>	- having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
<i>Fissured</i>	- having cracks, and hence a blocky structure
<i>Varved</i>	- composed of regular alternating layers of silt and clay
<i>Stratified</i>	- composed of alternating successions of different soil types, e.g. silt and sand
<i>Layer</i>	- > 75 mm in thickness
<i>Seam</i>	- 2 mm to 75 mm in thickness
<i>Parting</i>	- < 2 mm in thickness

Terminology describing soil types:

The classification of soil types are made on the basis of grain size and plasticity in accordance with the Unified Soil Classification System (USCS) (ASTM D 2487 or D 2488) which excludes particles larger than 75 mm. For particles larger than 75 mm, and for defining percent clay fraction in hydrometer results, definitions proposed by Canadian Foundation Engineering Manual, 4th Edition are used. The USCS provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris):

Terminology describing materials outside the USCS, (e.g. particles larger than 75 mm, visible organic matter, and construction debris) is based upon the proportion of these materials present:

<i>Trace, or occasional</i>	Less than 10%
<i>Some</i>	10-20%
<i>Frequent</i>	> 20%

Terminology describing compactness of cohesionless soils:

The standard terminology to describe cohesionless soils includes compactness (formerly "relative density"), as determined by the Standard Penetration Test (SPT) N-Value - also known as N-Index. The SPT N-Value is described further on page 3. A relationship between compactness condition and N-Value is shown in the following table.

Compactness Condition	SPT N-Value
<i>Very Loose</i>	<4
<i>Loose</i>	4-10
<i>Compact</i>	10-30
<i>Dense</i>	30-50
<i>Very Dense</i>	>50

Terminology describing consistency of cohesive soils:

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, or unconfined compression tests. Consistency may be crudely estimated from SPT N-Value based on the correlation shown in the following table (Terzaghi and Peck, 1967). The correlation to SPT N-Value is used with caution as it is only very approximate.

Consistency	Undrained Shear Strength		Approximate SPT N-Value
	kips/sq.ft.	kPa	
<i>Very Soft</i>	<0.25	<12.5	<2
<i>Soft</i>	0.25 - 0.5	12.5 - 25	2-4
<i>Firm</i>	0.5 - 1.0	25 - 50	4-8
<i>Stiff</i>	1.0 - 2.0	50 - 100	8-15
<i>Very Stiff</i>	2.0 - 4.0	100 - 200	15-30
<i>Hard</i>	>4.0	>200	>30

ROCK DESCRIPTION

Except where specified below, terminology for describing rock is as defined by the International Society for Rock Mechanics (ISRM) 2007 publication "The Complete ISRM Suggested Methods for Rock Characterization, Testing and Monitoring: 1974-2006"

Terminology describing rock quality:

RQD	Rock Mass Quality
0-25	Very Poor Quality
25-50	Poor Quality
50-75	Fair Quality
75-90	Good Quality
90-100	Excellent Quality

Alternate (Colloquial) Rock Mass Quality	
Very Severely Fractured	Crushed
Severely Fractured	Shattered or Very Blocky
Fractured	Blocky
Moderately Jointed	Sound
Intact	Very Sound

RQD (Rock Quality Designation) denotes the percentage of intact and sound rock retrieved from a borehole of any orientation. All pieces of intact and sound rock core equal to or greater than 100 mm (4 in.) long are summed and divided by the total length of the core run. RQD is determined in accordance with ASTM D6032.

SCR (Solid Core Recovery) denotes the percentage of solid core (cylindrical) retrieved from a borehole of any orientation. All pieces of solid (cylindrical) core are summed and divided by the total length of the core run (It excludes all portions of core pieces that are not fully cylindrical as well as crushed or rubble zones).

Fracture Index (FI) is defined as the number of naturally occurring fractures within a given length of core. The Fracture Index is reported as a simple count of natural occurring fractures.

Terminology describing rock with respect to discontinuity and bedding spacing:

Spacing (mm)	Discontinuities	Bedding
>6000	Extremely Wide	-
2000-6000	Very Wide	Very Thick
600-2000	Wide	Thick
200-600	Moderate	Medium
60-200	Close	Thin
20-60	Very Close	Very Thin
<20	Extremely Close	Laminated
<6	-	Thinly Laminated

Terminology describing rock strength:

Strength Classification	Grade	Unconfined Compressive Strength (MPa)
Extremely Weak	R0	<1
Very Weak	R1	1 – 5
Weak	R2	5 – 25
Medium Strong	R3	25 – 50
Strong	R4	50 – 100
Very Strong	R5	100 – 250
Extremely Strong	R6	>250

Terminology describing rock weathering:

Term	Symbol	Description
Fresh	W1	No visible signs of rock weathering. Slight discoloration along major discontinuities
Slightly	W2	Discoloration indicates weathering of rock on discontinuity surfaces. All the rock material may be discolored.
Moderately	W3	Less than half the rock is decomposed and/or disintegrated into soil.
Highly	W4	More than half the rock is decomposed and/or disintegrated into soil.
Completely	W5	All the rock material is decomposed and/or disintegrated into soil. The original mass structure is still largely intact.
Residual Soil	W6	All the rock converted to soil. Structure and fabric destroyed.

STRATA PLOT

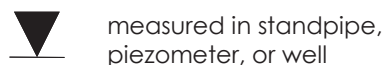
Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.



SAMPLE TYPE

SS	Split spoon sample (obtained by performing the Standard Penetration Test)
ST	Shelby tube or thin wall tube
DP	Direct-Push sample (small diameter tube sampler hydraulically advanced)
PS	Piston sample
BS	Bulk sample
HQ, NQ, BQ, etc.	Rock core samples obtained with the use of standard size diamond coring bits.

WATER LEVEL MEASUREMENT



measured in standpipe, piezometer, or well



inferred

RECOVERY

For soil samples, the recovery is recorded as the length of the soil sample recovered. For rock core, recovery is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

N-VALUE

Numbers in this column are the field results of the Standard Penetration Test: the number of blows of a 140 pound (63.5 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (300 mm) into the soil. In accordance with ASTM D1586, the N-Value equals the sum of the number of blows (N) required to drive the sampler over the interval of 6 to 18 in. (150 to 450 mm). However, when a 24 in. (610 mm) sampler is used, the number of blows (N) required to drive the sampler over the interval of 12 to 24 in. (300 to 610 mm) may be reported if this value is lower. For split spoon samples where insufficient penetration was achieved and N-Values cannot be presented, the number of blows are reported over sampler penetration in millimetres (e.g. 50/75). Some design methods make use of N-values corrected for various factors such as overburden pressure, energy ratio, borehole diameter, etc. No corrections have been applied to the N-values presented on the log.

DYNAMIC CONE PENETRATION TEST (DCPT)

Dynamic cone penetration tests are performed using a standard 60 degree apex cone connected to 'A' size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone one foot (300 mm) into the soil. The DCPT is used as a probe to assess soil variability.

OTHER TESTS

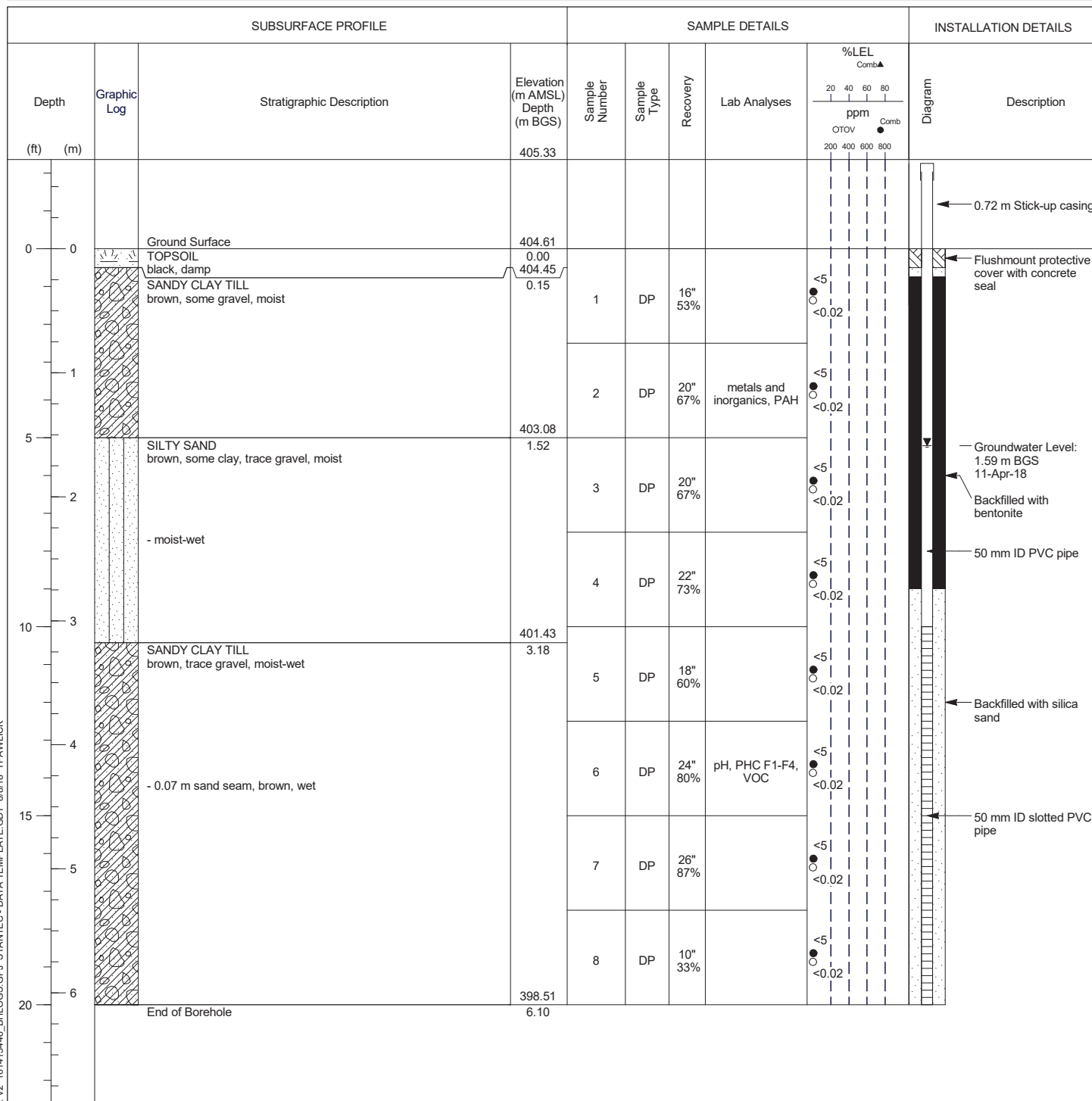
S	Sieve analysis
H	Hydrometer analysis
k	Laboratory permeability
y	Unit weight
G _s	Specific gravity of soil particles
CD	Consolidated drained triaxial
CU	Consolidated undrained triaxial with pore pressure measurements
UU	Unconsolidated undrained triaxial
DS	Direct Shear
C	Consolidation
Q _u	Unconfined compression
I _p	Point Load Index (I _p on Borehole Record equals I _p (50) in which the index is corrected to a reference diameter of 50 mm)

	Single packer permeability test; test interval from depth shown to bottom of borehole
	Double packer permeability test; test interval as indicated
	Falling head permeability test using casing
	Falling head permeability test using well point or piezometer

Monitoring Well: MW18-1

Project: Phase II Environmental Site Assessment
Client: City of Waterloo
Location: West Side Employment Lands, Waterloo, Ontario
Number: 161413446
Field investigator: T. Sokolowski
Contractor: Strata Drilling Group

Drilling method: Geoprobe 7822DT (Direct Push)
Date started/completed: 19-Mar-2018
Ground surface elevation: 404.61 m AMSL
Top of casing elevation: 405.33 m AMSL
Easting: 533737.96
Northing: 4810059.24



Screen Interval: 3.05 - 6.10 m BGS
 Sand Pack Interval: 2.74 - 6.10 m BGS
 Well Seal Interval: 0.23 - 2.74 m BGS

Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 DP - direct push sample
 ppm - parts per million by volume
 n/a - not available

m RTD - metres relative to datum
 PAH - polycyclic aromatic hydrocarbons
 PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
 VOC - volatile organic compounds

TOV - total organic soil vapour concentrations
 Comb - combustible vapour concentrations



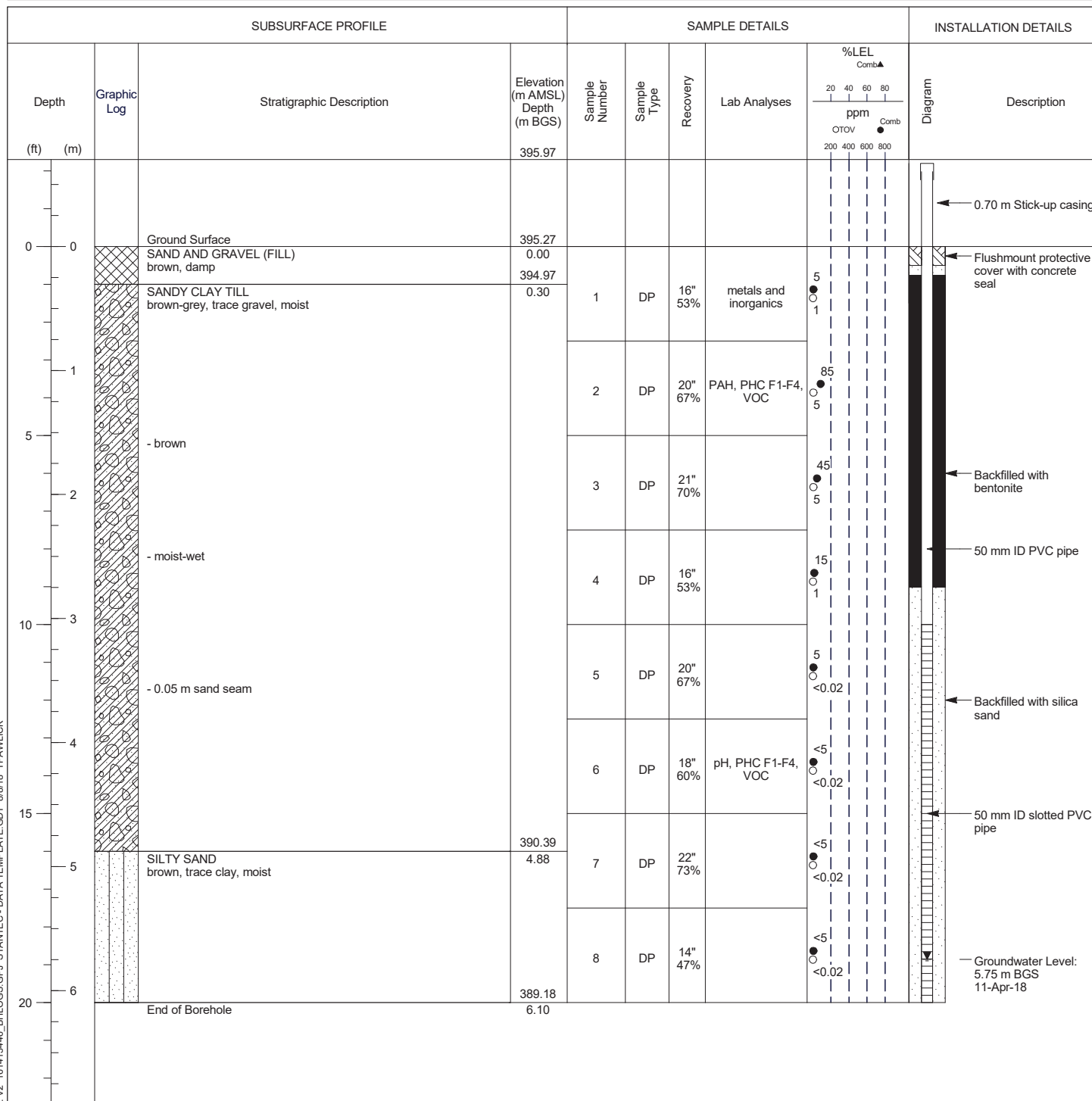
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Sheet 1 of 1

Monitoring Well: MW18-2

Project: Phase II Environmental Site Assessment
Client: City of Waterloo
Location: West Side Employment Lands, Waterloo, Ontario
Number: 161413446
Field investigator: T. Sokolowski
Contractor: Strata Drilling Group

Drilling method: Geoprobe 7822DT (Direct Push)
Date started/completed: 19-Mar-2018
Ground surface elevation: 395.27 m AMSL
Top of casing elevation: 395.97 m AMSL
Easting: 533737.96
Northing: 4810334.49



Screen Interval: 3.05 - 6.10 m BGS
 Sand Pack Interval: 2.74 - 6.10 m BGS
 Well Seal Interval: 0.23 - 2.74 m BGS

Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 DP - direct push sample
 ppm - parts per million by volume
 n/a - not available

m RTD - metres relative to datum
 PAH - polycyclic aromatic hydrocarbons
 PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
 VOC - volatile organic compounds

TOV - total organic soil vapour concentrations
 Comb - combustible vapour concentrations



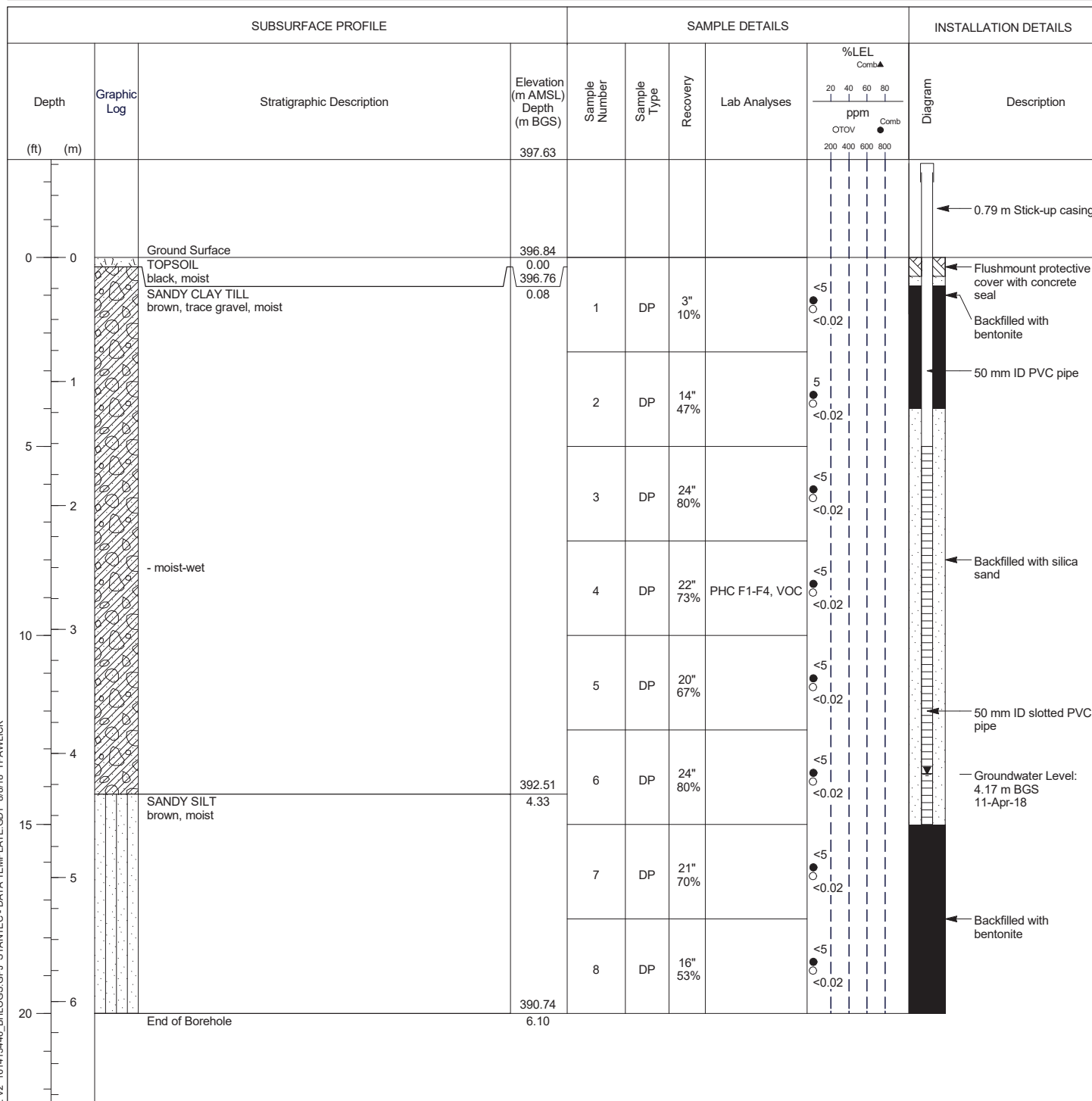
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Sheet 1 of 1

Monitoring Well: MW18-3

Project: Phase II Environmental Site Assessment
Client: City of Waterloo
Location: West Side Employment Lands, Waterloo, Ontario
Number: 161413446
Field investigator: T. Sokolowski
Contractor: Strata Drilling Group

Drilling method: Geoprobe 7822DT (Direct Push)
Date started/completed: 19-Mar-2018
Ground surface elevation: 396.84 m AMSL
Top of casing elevation: 397.63 m AMSL
Easting: 533391.05
Northing: 4810354.22



Screen Interval: 1.52 - 4.57 m BGS
 Sand Pack Interval: 1.22 - 4.57 m BGS
 Well Seal Interval: 0.23 - 1.22 m BGS

Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 DP - direct push sample
 ppm - parts per million by volume
 n/a - not available

m RTD - metres relative to datum
 PAH - polycyclic aromatic hydrocarbons
 PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
 VOC - volatile organic compounds

TOV - total organic soil vapour concentrations
 Comb - combustible vapour concentrations



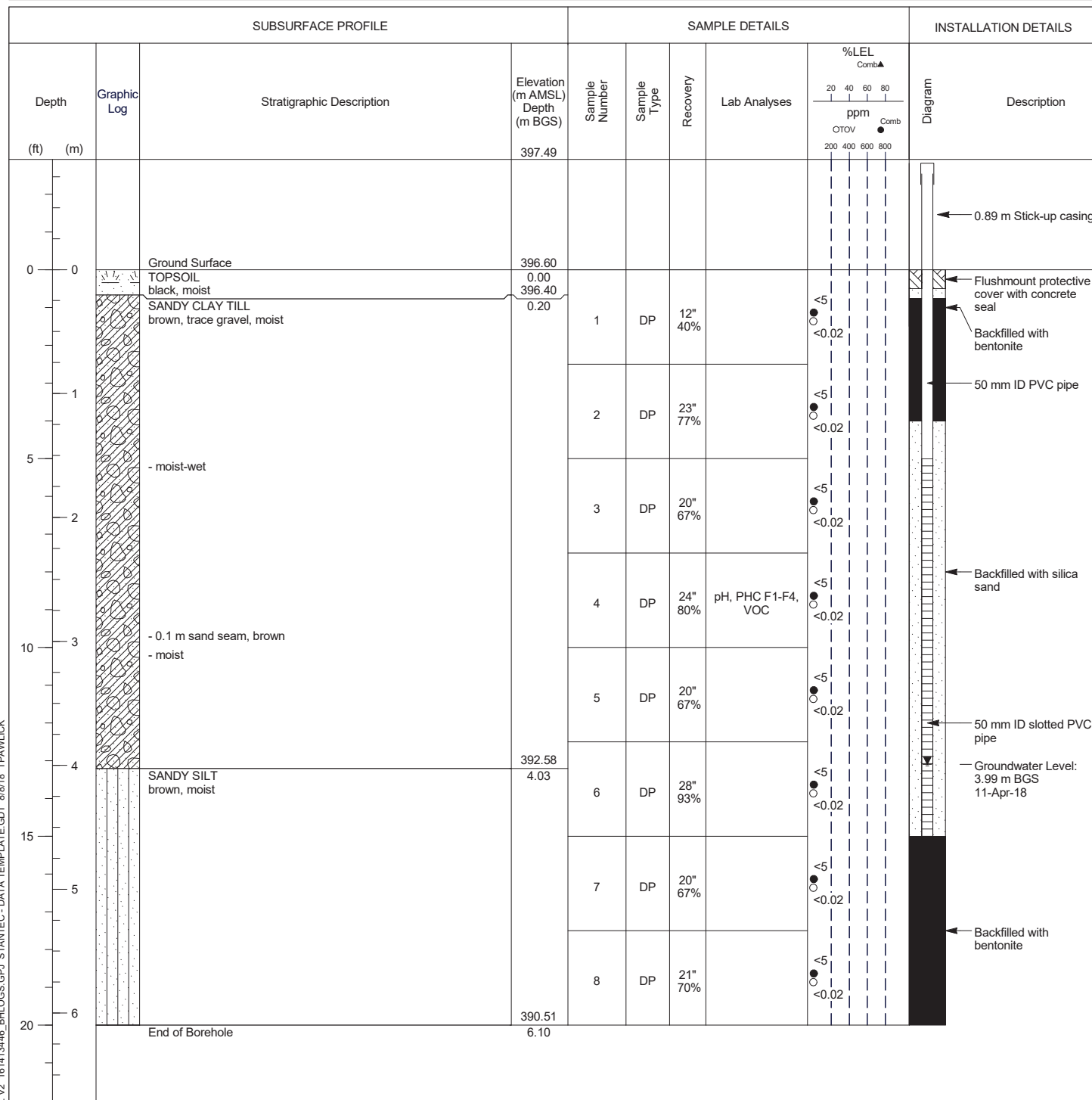
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Sheet 1 of 1

Monitoring Well: MW18-4

Project: Phase II Environmental Site Assessment
Client: City of Waterloo
Location: West Side Employment Lands, Waterloo, Ontario
Number: 161413446
Field investigator: T. Sokolowski
Contractor: Strata Drilling Group

Drilling method: Geoprobe 7822DT (Direct Push)
Date started/completed: 19-Mar-2018
Ground surface elevation: 396.60 m AMSL
Top of casing elevation: 397.49 m AMSL
Easting: 533415.08
Northing: 4810356



Screen Interval: 1.52 - 4.57 m BGS
 Sand Pack Interval: 1.22 - 4.57 m BGS
 Well Seal Interval: 0.23 - 1.22 m BGS

Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 DP - direct push sample
 ppm - parts per million by volume
 n/a - not available

m RTD - metres relative to datum
 PAH - polycyclic aromatic hydrocarbons
 PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
 VOC - volatile organic compounds

TOV - total organic soil vapour concentrations
 Comb - combustible vapour concentrations



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Sheet 1 of 1

Borehole: BH18-5

Project: Phase II Environmental Site Assessment
Client: City of Waterloo
Location: West Side Employment Lands, Waterloo, Ontario
Number: 161413446
Field investigator: T. Sokolowski
Contractor: Strata Drilling Group

Drilling method: Geoprobe 7822DT (Direct Push)
Date started/completed: 19-Mar-2018
Ground surface elevation: 404.77 m AMSL
Top of casing elevation: n/a
Easting: 533731.2
Northing: 4810076.27

SUBSURFACE PROFILE				SAMPLE DETAILS				INSTALLATION DETAILS	
Depth (ft) (m)	Graphic Log	Stratigraphic Description	Elevation (m AMSL) Depth (m BGS)	Sample Number	Sample Type	Recovery	Lab Analyses	%LEL Comb	Diagram
		Ground Surface	404.77						
		TOPSOIL black, moist	0.00						
		SANDY CLAY TILL brown, trace gravel, moist	404.59						
1			0.18						
0.5									
2									
		- moist-wet		1	DP	10" 33%	metals and inorganics, PAH	<5 <0.02	
3									
1.0									
4									
				2	DP	6" 20%	PHC F1-F4, VOC	<5 <0.02	
5									
1.5		End of Borehole	403.25						
			1.52						
6									
2.0									
7									
8									
2.5									
9									
3.0									

← Backfilled with bentonite

Notes:
m AMSL - metres above mean sea level
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

m RTD - metres relative to datum
PAH - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOC - volatile organic compounds

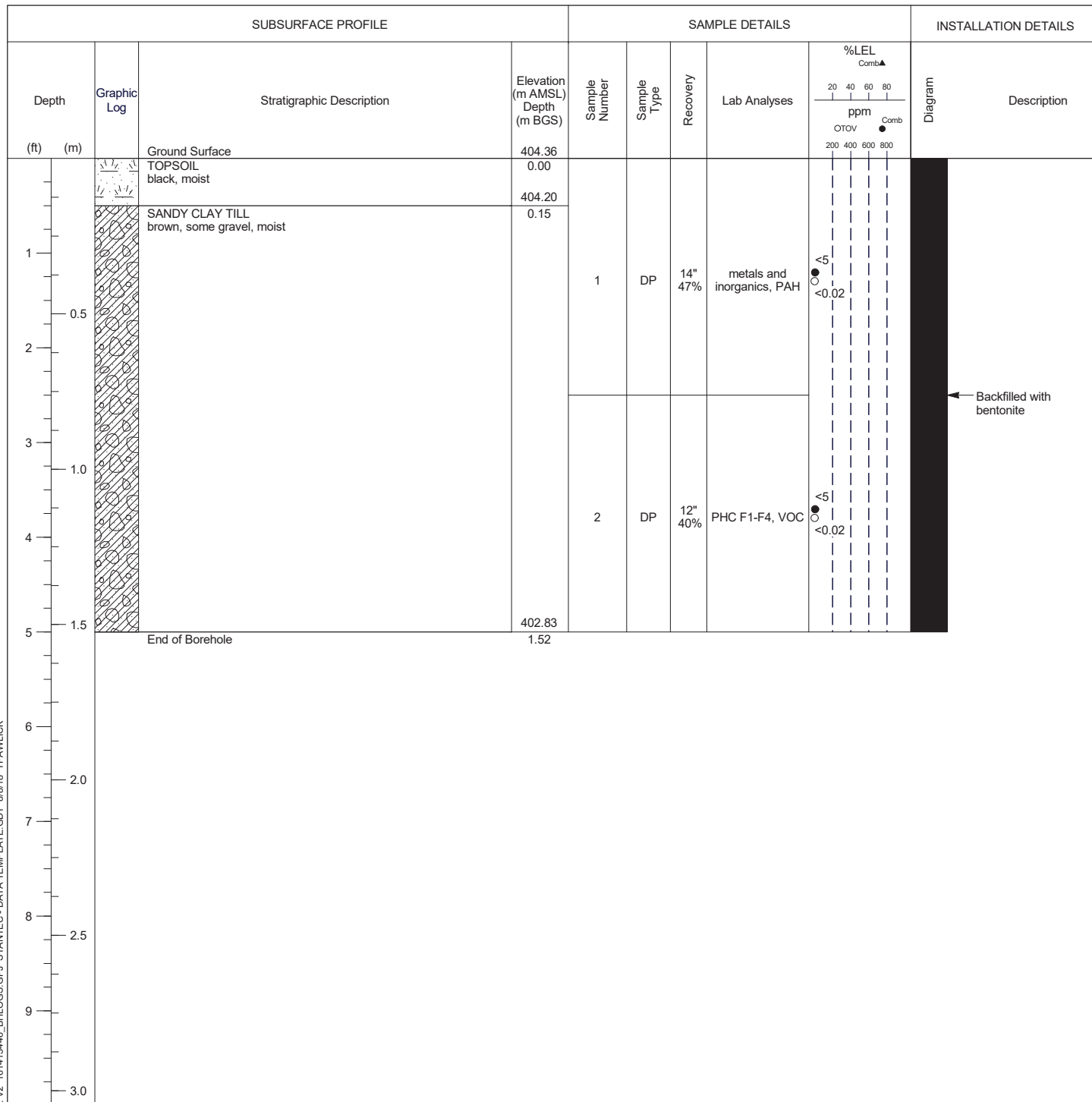
TOV - total organic soil vapour concentrations
Comb - combustible vapour concentrations



Borehole: BH18-6

Project: Phase II Environmental Site Assessment
Client: City of Waterloo
Location: West Side Employment Lands, Waterloo, Ontario
Number: 161413446
Field investigator: T. Sokolowski
Contractor: Strata Drilling Group

Drilling method: Geoprobe 7822DT (Direct Push)
Date started/completed: 19-Mar-2018
Ground surface elevation: 404.36 m AMSL
Top of casing elevation: n/a
Easting: 533725.86
Northing: 4810051.8



Notes:
m AMSL - metres above mean sea level
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

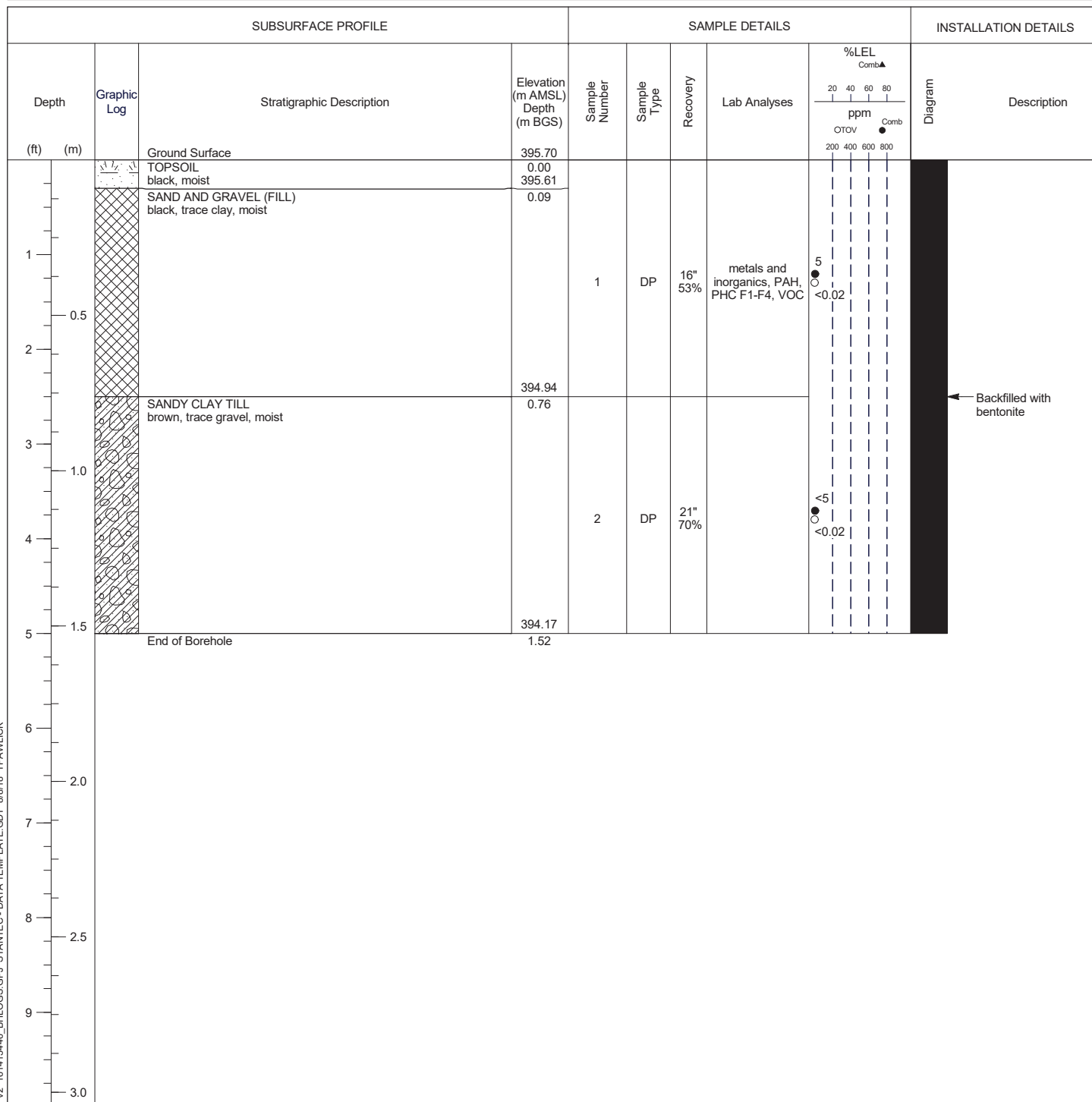
m RTD - metres relative to datum
PAH - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOC - volatile organic compounds
TOV - total organic soil vapour concentrations
Comb - combustible vapour concentrations



Borehole: BH18-7

Project: Phase II Environmental Site Assessment
Client: City of Waterloo
Location: West Side Employment Lands, Waterloo, Ontario
Number: 161413446
Field investigator: T. Sokolowski
Contractor: Strata Drilling Group

Drilling method: Geoprobe 7822DT (Direct Push)
Date started/completed: 19-Mar-2018
Ground surface elevation: 395.70 m AMSL
Top of casing elevation: n/a
Easting: 533389.34
Northing: 4810346.27



Notes:
m AMSL - metres above mean sea level
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

m RTD - metres relative to datum
PAH - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOC - volatile organic compounds

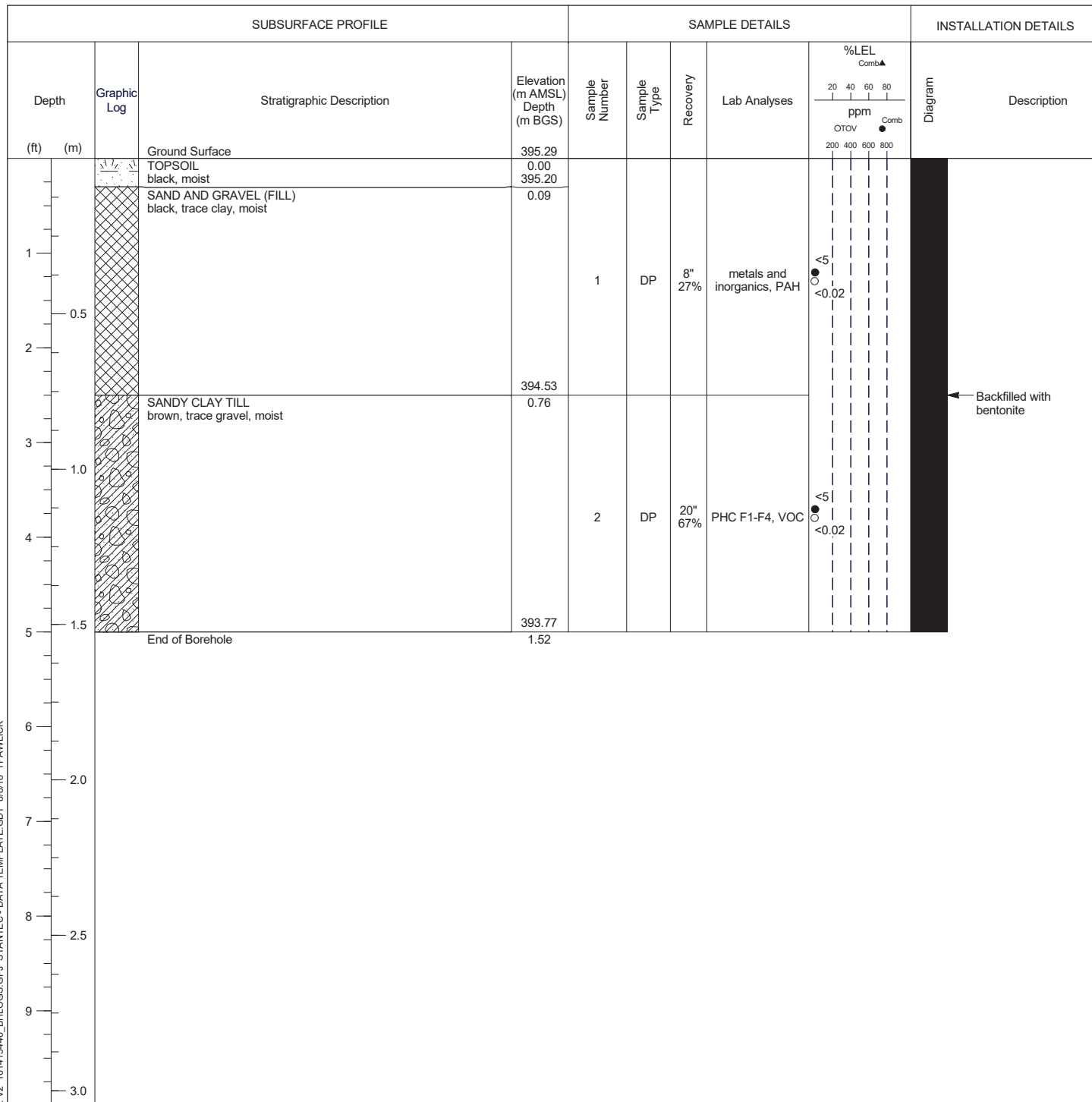
TOV - total organic soil vapour concentrations
Comb - combustible vapour concentrations



Borehole: BH18-8

Project: Phase II Environmental Site Assessment
Client: City of Waterloo
Location: West Side Employment Lands, Waterloo, Ontario
Number: 161413446
Field investigator: T. Sokolowski
Contractor: Strata Drilling Group

Drilling method: Geoprobe 7822DT (Direct Push)
Date started/completed: 19-Mar-2018
Ground surface elevation: 395.29 m AMSL
Top of casing elevation: n/a
Easting: 533374.55
Northing: 4810340.03



Notes:
m AMSL - metres above mean sea level
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

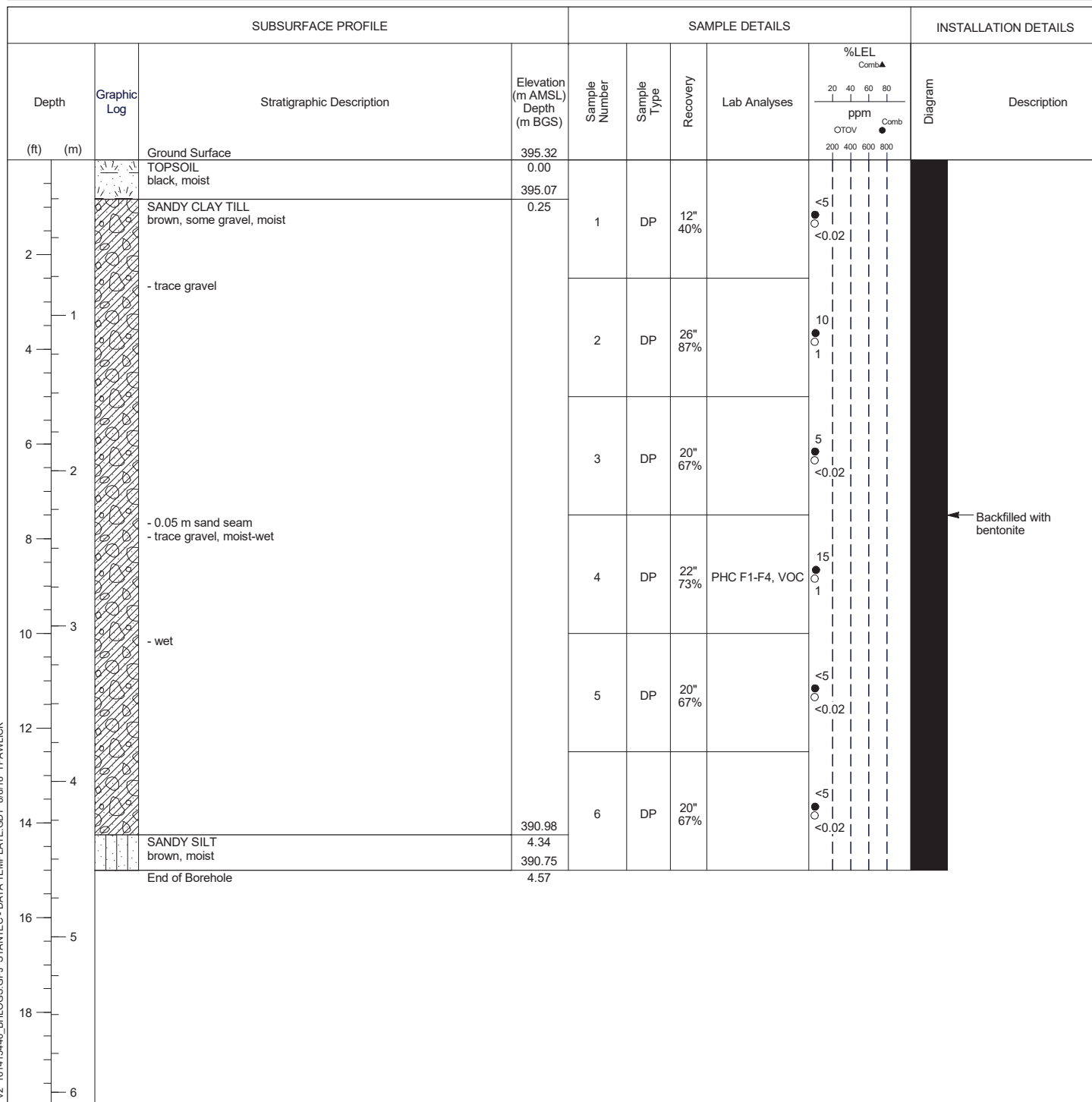
m RTD - metres relative to datum
PAH - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOC - volatile organic compounds
TOV - total organic soil vapour concentrations
Comb - combustible vapour concentrations



Borehole: BH18-9

Project: Phase II Environmental Site Assessment
Client: City of Waterloo
Location: West Side Employment Lands, Waterloo, Ontario
Number: 161413446
Field investigator: T. Sokolowski
Contractor: Strata Drilling Group

Drilling method: Geoprobe 7822DT (Direct Push)
Date started/completed: 19-Mar-2018
Ground surface elevation: 395.32 m AMSL
Top of casing elevation: n/a
Easting: 533375.29
Northing: 4810331.68



Notes:
m AMSL - metres above mean sea level
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

m RTD - metres relative to datum
PAH - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOC - volatile organic compounds
TOV - total organic soil vapour concentrations
Comb - combustible vapour concentrations



APPENDIX E: TABLES

Table 1
Summary of Groundwater Monitoring Field Data
Phase II Environmental Site Assessment
West Side Employment Lands, Waterloo, Ontario
City of Waterloo

Monitoring Location	Monitoring Date	Ground Surface Elevation (m RTD)	Top of Pipe Elevation (m RTD)	Water Level Elevation (m RTD)	Water Level Depth (m BTOC)	Water Level Depth (m BGS)	Liquid-Phase Petroleum Hydrocarbon Apparent Thickness (mm)	Well Headspace Combustible Vapour Concentrations (ppm _v)	Well Headspace Total Organic Vapour Concentration (ppm _v)
MW18-1	04-Apr-18	404.61	405.33	403.10	2.23	1.51	0	<5	<0.02
MW18-2	04-Apr-18	395.27	395.97	389.56	6.41	5.71	0	<5	<0.02
MW18-3	04-Apr-18	396.84	397.63	392.70	4.93	4.14	0	<5	<0.02
MW18-4	04-Apr-18	396.60	397.49	392.65	4.84	3.95	0	<5	<0.02
MW18-1	11-Apr-18	404.61	405.33	403.03	2.31	1.59	0	<5	<0.02
MW18-2	11-Apr-18	395.27	395.97	389.52	6.45	5.75	0	<5	<0.02
MW18-3	11-Apr-18	396.84	397.63	392.67	4.96	4.17	0	<5	<0.02
MW18-4	11-Apr-18	396.60	397.49	392.61	4.88	3.99	0	<5	<0.02

Notes:

m RTD Metres relative to datum
m BTOC Metres below top of casing
m BGS Metres below ground surface
mm Millimetres
ppm_v All units in parts per million unless otherwise noted

Table 2
Summary of Soil Analytical Results
Phase II Environmental Site Assessment
West Side Employment Lands, Waterloo, Ontario
City of Waterloo

Sample Location			BH18-5			BH18-6			BH18-7		BH18-8			BH18-9		MW18-1			MW18-2					
Sample Date			19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18
Sample ID			BH18-5-1	BH18-5-2	BH18-6-1	QC-1	BH18-6-2	BH18-7-1	BH18-8-1	BH18-8-2	BH18-9-4	MW18-1-2	MW18-1-2	MW18-1-4	MW18-1-4	MW18-2-1	MW18-2-2	QC-2						
Sample Depth			0 - 0.8 m	0.8 - 1.5 m	0 - 0.8 m	2.3 - 3 m	0.8 - 1.5 m	0 - 0.8 m	0 - 0.8 m	0.8 - 1.5 m	2.3 - 3 m	0.8 - 1.5 m	0.8 - 1.5 m	3.8 - 4.4 m	3.8 - 4.4 m	0 - 0.8 m	0.8 - 1.5 m	0.8 - 1.5 m	3.8 - 4.4 m	3.8 - 4.4 m	0.8 - 1.5 m	3.8 - 4.4 m	3.8 - 4.4 m	3.8 - 4.4 m
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX
Laboratory Work Order			B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886	B846886
Laboratory Sample ID			GHT262	GHT263	GHT272	GHT265	GHT266	GHT267	GHT268	GHT269	GHT270	GHT256	GHT256	GHT257	GHT257	GHT260	GHT260	GHT260	GHT260	GHT260	GHT260	GHT260	GHT260	GHT260
Sample Type			Units	Ontario SC3		Field Duplicate	RPD (%)					Lab Replicate	Lab Replicate	Lab Replicate	Lab Replicate									
General Chemistry																								
Available (CaCl2) pH		S.U.	5-9/5-11.5 ²	7.42	-	7.67	7.62	nc	-	7.44	7.48	-	-	7.75	-	-	-	7.28	-	-	-	-	-	-
Cyanide (free)		µg/g	0.051 ^A	<0.01	-	<0.01	<0.01	nc	-	<0.01	<0.01	-	-	<0.01	-	-	-	0.01	-	-	-	-	-	-
Electrical Conductivity, Lab		mS/cm	1.5 ^A	0.13	-	0.17	0.15	13%	-	0.15	0.21	-	-	0.15	-	-	-	0.23	-	-	-	-	-	-
Moisture Content		%	n/r	16	13	12	11	9%	17	12	16	15	14	13	12	12	12	12	9.5	14	38%	12	-	-
Sodium Adsorption Ratio (SAR)		none	12 ^A	0.33	-	1.2	0.89	nc	-	0.71	1.1	-	-	0.27	-	-	-	0.22	-	-	-	-	-	-
Soluble (1:1) pH		S.U.	n/r	-	-	-	-	-	-	-	-	-	-	-	-	8.35	8.34	-	-	-	-	-	-	8.39
Petroleum Hydrocarbons																								
PHC 11 (C6-C10 range)	µg/g	nc	-	<10	-	-	-	<10	<10	-	<10	<10	<10	-	-	<10	-	-	<10	<10	nc	<10	<10	<10
PHC 12 (C6-C10 range) minus BTEX	µg/g	65 ^A	-	<10	-	-	-	<10	<10	-	<10	<10	<10	-	-	<10	-	-	<10	<10	nc	<10	<10	<10
PHC 13 (C10-C16 range)	µg/g	250 ^A	-	<10	-	-	-	<10	12	-	<10	<10	<10	-	-	<10	-	-	<10	<10	nc	<10	<10	<10
PHC 14 (C16-C34 range)	µg/g	2,500 ^A	-	<50	-	-	-	<50	160	-	<50	<50	<50	-	-	<50	-	-	<50	<50	nc	<50	<50	<50
PHC 15 (C34-C50 range)	µg/g	6,600 ^A	-	-	-	-	-	-	1,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHC 16 (C34-C50 range)	µg/g	6,600 ^A	-	<50	-	-	-	<50	410	-	<50	<50	<50	-	-	<50	-	-	<50	<50	nc	<50	<50	<50
Chromatogram to baseline at C50	none	n/r	-	YES	-	-	-	YES	NO	-	YES	YES	YES	-	-	YES	-	-	YES	YES	nc	YES	YES	YES
Metals																								
Antimony	µg/g	50 ^A	<0.20	-	<0.20	<0.20	nc	-	<0.20	0.28	-	-	<0.20	-	-	-	-	<0.20	-	-	-	-	-	-
Arsenic	µg/g	18 ^A	2.5	-	2.6	2.8	nc	-	2.2	2.5	-	-	2.3	-	-	-	-	2.1	-	-	-	-	-	-
Barium	µg/g	670 ^A	49	-	55	56	2%	-	39	35	-	-	48	-	-	-	-	30	-	-	-	-	-	-
Beryllium	µg/g	10 ^A	0.42	-	0.52	0.51	nc	-	0.34	0.28	-	-	0.47	-	-	-	-	0.25	-	-	-	-	-	-
Boron	µg/g	120 ^A	7.3	-	6.9	7.2	nc	-	5.7	<5.0	-	-	6.7	-	-	-	-	<5.0	-	-	-	-	-	-
Boron (Available)	µg/g	2 ^A	0.082	-	0.058	0.061	nc	-	0.15	0.25	-	-	0.092	-	-	-	-	0.22	-	-	-	-	-	-
Cadmium	µg/g	1.9 ^A	0.10	-	0.13	0.11	nc	-	0.15	0.30	-	-	<0.10	-	-	-	-	0.17	-	-	-	-	-	-
Chromium	µg/g	160 ^A	13	-	16	15	6%	-	12	14	-	-	15	-	-	-	-	9.5	-	-	-	-	-	-
Chromium (Hexavalent)	µg/g	10 ^A	<0.2	-	<0.2	<0.2	nc	-	<0.2	<0.2	-	-	<0.2	<0.2	-	-	-	<0.2	-	-	-	-	-	-
Cobalt	µg/g	100 ^A	5.8	-	6.8	6.6	3%	-	4.6	4.0	-	-	6.0	-	-	-	-	3.7	-	-	-	-	-	-
Copper	µg/g	300 ^A	14	-	16	15	6%	-	13	14	-	-	15	-	-	-	-	8.9	-	-	-	-	-	-
Lead	µg/g	120 ^A	7.2	-	8.9	8.5	9%	-	14	26	-	-	8.6	-	-	-	-	9.7	-	-	-	-	-	-
Mercury	µg/g	20 ^A	<0.050	-	<0.050	<0.050	nc	-	<0.050	<0.050	-	-	<0.050	-	-	-	-	<0.050	-	-	-	-	-	-
Molybdenum	µg/g	40 ^A	<0.50	-	<0.50	<0.50	nc	-	<0.50	0.55	-	-	<0.50	-	-	-	-	<0.50	-	-	-	-	-	-
Nickel	µg/g	340 ^A	12	-	14	14	0%	-	9.9	8.5	-	-	12	-	-	-	-	7.5	-	-	-	-	-	-
Selenium	µg/g	5.5 ^A	<0.50	-	<0.50	<0.50	nc	-	<0.50	<0.50	-	-	<0.50	-	-	-	-	<0.50	-	-	-	-	-	-
Silver	µg/g	50 ^A	<0.20	-	<0.20	<0.20	nc	-	<0.20	<0.20	-	-	<0.20	-	-	-	-	<0.20	-	-	-	-	-	-
Thallium	µg/g	3.3 ^A	0.078	-	0.097	0.090	nc	-	0.072	0.070	-	-	0.091	-	-	-	-	<0.050	-	-	-	-	-	-
Uranium	µg/g	33 ^A	0.42	-	0.45	0.43	5%	-	0.41	0.38	-	-	0.46	-	-	-	-	0.39	-	-	-	-	-	-
Vanadium	µg/g	28 ^A	23	-	28	25	11%	-	20	21	-	-	25	-	-	-	-	19	-	-	-	-	-	-
Zinc	µg/g	240 ^A	47	-	54	50	8%	-	52	64	-	-	48	-	-	-	-	49	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																								
Acenaphthene	µg/g	29 ^A	<0.0050	-	<0.0050	-	-	-	<0.0050	<0.0050	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	nc	-	-	-	-
Acenaphthylene	µg/g	0.17 ^A	<0.0050	-	<0.0050	-	-	-	0.076	<0.0050	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	nc	-	-	-	-
Anthracene	µg/g	0.74 ^A	<0.0050	-	<0.0050	-	-	-	<0.0050	<0.0050	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	nc	-	-	-	-
Benzo(a)anthracene	µg/g	0.96 ^A	<0.0050	-	<0.0050	-	-	-	0.097	0.0053	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	nc	-	-	-	-
Benzo(a)pyrene	µg/g	0.3 ^A	<0.0050	-	<0.0050	-	-	-	0.10	0.0077	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	nc	-	-	-	-
Benzo(b)fluoranthene	µg/g	0.96 ^A	<0.0050	-	<0.0050	-	-	-	0.13	0.013	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	nc	-	-	-	-
Benzo(g,h,i)perylene	µg/g	9.6 ^A	<0.0050	-	<0.0050	-	-	-	0.093	0.013	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	nc	-	-	-	-
Benzo(k)fluoranthene	µg/g	0.96 ^A	<0.0050	-	<0.0050	-	-	-	<0.0050	<0.0050	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	nc	-	-	-	-
Chrysene	µg/g	9.6 ^A	<0.0050	-	<0.0050	-	-	-	0.082	0.0067	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	nc	-	-	-	-
Dibenzo(a,h)anthracene	µg/g	0.1 ^A	<0.0050	-	<0.0050	-	-	-	<0.0050	<0.0050	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	nc	-	-	-	-
Fluoranthene	µg/g	9.6 ^A	<0.0050	-	<0.0050	-	-	-	0.23	0.014	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	nc	-	-	-	-
Fluorene	µg/g	69 ^A	<0.0050	-	<0.0050	-	-	-	0.090	<0.0050	-	-	<0.0050	-	-	-	-	<0.0050	0.0054	nc	-	-	-	-
Indeno(1,2,3-cd)pyrene	µg/g	0.95 ^A	<0.0050	-	<0.0050	-	-	-	0.093	0.0081	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	nc	-	-	-	-
Methylnaphthalene (Total)	µg/g	42 ^A	<0.0071	-	<0.0071	-	-	-	0.21	<0.0071	-	-	<0.0071	-	-	-	-	0.87	0.73	18%	-	-	-	-
Methylnaphthalene, 1-	µg/g	nc	<0.0050	-	<0.0050	-	-	-	0.076	<0.0050	-	-	<0.0050	-	-	-	-	0.22	0.28	13%	-	-	-	-
Methylnaphthalene, 2-	µg/g	nc	<0.0050	-	<0.0050	-	-	-	0.14	<0.0050	-	-	<0.0050	-	-	-	-	0.55	0.45	20%	-	-	-	-
Naphthalene	µg/g	28 ^A	<0.0050	-	<0.0050	-	-	-	0.13	<0.0050	-	-	<0.0050	-	-	-	-	0.34	0.28	19%	-	-	-	-
Phenanthrene	µg/g	16 ^A	<0.0050	-	<0.0050	-	-	-	0.077	0.0056	-	-	<0.0050	-	-	-	-	0.0065	0.0065	nc	-	-	-	-
Pyrene	µg/g	96 ^A	<0.0050	-	<0.0050	-	-	-	0.19	0.013	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	nc	-	-	-	-

Table 2
Summary of Soil Analytical Results
Phase II Environmental Site Assessment
West Side Employment Lands, Waterloo, Ontario
City of Waterloo

Sample Location			BH18-5		BH18-6		BH18-7		BH18-8		BH18-9		MW18-1		MW18-2		19-Mar-18		
Sample Date			19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18	
Sample ID			BH18-5-1	BH18-5-2	BH18-6-1	QC-1	BH18-6-2	BH18-7-1	BH18-8-1	BH18-8-2	BH18-9-4	MW18-1-2	MW18-1-4	MW18-2-1	MW18-2-2	QC-2			
Sample Depth			0 - 0.8 m	0.8 - 1.5 m	0 - 0.8 m	2.3 - 3 m	0.8 - 1.5 m	0 - 0.8 m	0 - 0.8 m	0.8 - 1.5 m	2.3 - 4.6 m	0.8 - 1.5 m	0.8 - 1.5 m	3.8 - 4.6 m	0.8 - 1.5 m	0.8 - 1.5 m	0.8 - 1.5 m	3.8 - 4.6 m	
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	
Laboratory			MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	
Laboratory Work Order			B844886	B844886	B844886	B844886	B844886	B844886	B844886	B844886	B844886	B844886	B844886	B844886	B844886	B844886	B844886	B844886	
Laboratory Sample ID			GHT262	GHT263	GHT272	GHT266	GHT267	GHT268	GHT269	GHT270	GHT256	GHT257	GHT258	GHT260	GHT258	GHT271	GHT259	GHT261	
Sample Type			Units	Ontario SC3		Field Duplicate	RPD (%)					Lab Replicate	Lab Replicate	Lab Replicate		Field Duplicate	RPD (%)		
Volatile Organic Compounds																			
Acetone	µg/g	28 ^A	-	<0.50	-	-	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	nc	<0.50
Benzene	µg/g	0.4 ^A	-	<0.020	-	-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	-	-	<0.020	<0.020	nc	<0.020
Bromodichloromethane	µg/g	1.9 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Bromofom (Bromomethane)	µg/g	1.7 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Bromomethane (Methyl bromide)	µg/g	0.05 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Carbon Tetrachloride (Tetrachloromethane)	µg/g	0.71 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Chlorobenzene (Monochlorobenzene)	µg/g	2.7 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Chloroform (Trichloromethane)	µg/g	0.16 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Dibromochloromethane	µg/g	2.9 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Dichlorobenzene, 1,2-	µg/g	1.7 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Dichlorobenzene, 1,3-	µg/g	12 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Dichlorobenzene, 1,4-	µg/g	0.57 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Dichlorodifluoromethane (Freon 12)	µg/g	25 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Dichloroethane, 1,1-	µg/g	0.6 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Dichloroethane, 1,2-	µg/g	0.05 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Dichloroethene, 1,1-	µg/g	0.48 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Dichloroethene, cis-1,2-	µg/g	2.5 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Dichloroethene, trans-1,2-	µg/g	2.5 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Dichloropropane, 1,2-	µg/g	0.68 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Dichloropropene, 1,3- (sum of isomers cis + trans)	µg/g	0.082,1 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Dichloropropene, cis-1,3-	µg/g	u ^A	-	<0.030	-	-	<0.030	<0.030	-	<0.030	<0.030	-	<0.030	-	-	<0.030	<0.030	nc	<0.030
Dichloropropene, trans-1,3-	µg/g	u ^A	-	<0.040	-	-	<0.040	<0.040	-	<0.040	<0.040	-	<0.040	-	-	<0.040	<0.040	nc	<0.040
Ethylbenzene	µg/g	1.6 ^A	-	<0.020	-	-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	-	-	0.11	0.66	<0.020	<0.020
Ethylene Dibromide (Dibromoethane, 1,2-)	µg/g	0.05 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Hexane (n-Hexane)	µg/g	88 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Methyl Ethyl Ketone (MEK) (2-Butanone)	µg/g	88 ^A	-	<0.50	-	-	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	nc	<0.50
Methyl isobutyl ketone (MIBK)	µg/g	210 ^A	-	<0.50	-	-	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	-	-	<0.50	<0.50	nc	<0.50
Methyl tert-butyl ether (MTBE)	µg/g	2.3 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Methylene Chloride (Dichloromethane)	µg/g	2 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Styrene	µg/g	4.3 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Tetrachloroethane, 1,1,1,2-	µg/g	0.11 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Tetrachloroethane, 1,1,2,2-	µg/g	0.094 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Tetrachloroethene (PCE)	µg/g	2.5 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Toluene	µg/g	9 ^A	-	<0.020	-	-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	-	-	<0.020	<0.020	nc	<0.020
Trichloroethane, 1,1,1-	µg/g	12 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Trichloroethane, 1,1,2-	µg/g	0.11 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Trichlorofluoromethane (Freon 11)	µg/g	5.8 ^A	-	<0.050	-	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	-	-	<0.050	<0.050	nc	<0.050
Vinyl Chloride	µg/g	0.25 ^A	-	<0.020	-	-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	-	-	<0.020	<0.020	nc	<0.020
Xylene, m & p-	µg/g	u ^A	-	<0.020	-	-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	-	-	0.11	0.95	<0.020	<0.020
Xylene, o-	µg/g	u ^A	-	<0.020	-	-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	-	-	<0.020	<0.020	nc	<0.020
Xylenes, Total	µg/g	30, u ^A	-	<0.020	-	-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	-	-	0.11	0.95	<0.020	<0.020

See notes on last page

Table 2
Summary of Soil Analytical Results
Phase II Environmental Site Assessment
West Side Employment Lands, Waterloo, Ontario
City of Waterloo

Sample Location		MW18-3		MW18-4	
Sample Date		19-Mar-18	19-Mar-18	19-Mar-18	19-Mar-18
Sample ID		MW18-3-4	MW18-3-4	MW18-4-4	MW18-4-4
Sample Depth		2.3 - 3 m	2.3 - 3 m	2.3 - 3 m	2.3 - 3 m
Sampling Company		STANTEC	STANTEC	STANTEC	STANTEC
Laboratory		MAXX	MAXX	MAXX	MAXX
Laboratory Work Order		884886	884886	884886	884886
Laboratory Sample ID		GHT261	GHT261	GHT261	GHT261
Sample Type		Units	Ontario SC3	Lab Replicate	Lab Replicate
General Chemistry					
Available (CaCl2) pH	S.U.	5.9/5.13 _{u2}	-	-	-
Cyanide (Free)	µg/g	0.053 ^A	-	-	-
Electrical Conductivity, Lab	mS/cm	1.4 ^A	-	-	-
Moisture Content	%	n/v	11	-	8.2
Sodium Adsorption Ratio (SAR)		12 ^A	-	-	-
Soluble (1:1) pH	S.U.	n/v	-	-	7.84
Petroleum Hydrocarbons					
PHC 11 (C6-C10 range)	µg/g	2 ^A	<10	-	<10
PHC 13 (C6-C10 range) minus BTEX	µg/g	66 ^A	<10	-	<10
PHC 12 (+C10-C16 range)	µg/g	250 _{u2} ^A	<10	<10	<10
PHC 13 (+C16-C34 range)	µg/g	2,500 _{u2} ^A	<50	<50	<50
PHC 14 (+C34-C50 Gravimetric)	µg/g	6,600 _{u2} ^A	-	-	-
PHC 14 (+C34-C50 range)	µg/g	6,600 _{u2} ^A	<50	<50	<50
Chromatogram to baseline at C50	none	n/v	YES	YES	YES
Metals					
Antimony	µg/g	50 ^A	-	-	-
Arsenic	µg/g	18 ^A	-	-	-
Barium	µg/g	670 ^A	-	-	-
Beryllium	µg/g	10 ^A	-	-	-
Boron	µg/g	120 _{u2} ^A	-	-	-
Boron (Available)	µg/g	2 _{u2} ^A	-	-	-
Cadmium	µg/g	1.9 ^A	-	-	-
Chromium	µg/g	160 ^A	-	-	-
Chromium (Hexavalent)	µg/g	10 ^A	-	-	-
Cobalt	µg/g	100 ^A	-	-	-
Copper	µg/g	300 ^A	-	-	-
Lead	µg/g	120 ^A	-	-	-
Mercury	µg/g	20 ^A	-	-	-
Molybdenum	µg/g	40 ^A	-	-	-
Nickel	µg/g	340 ^A	-	-	-
Selenium	µg/g	5.5 ^A	-	-	-
Silver	µg/g	50 ^A	-	-	-
Thallium	µg/g	3.3 ^A	-	-	-
Uranium	µg/g	33 ^A	-	-	-
Vanadium	µg/g	86 ^A	-	-	-
Zinc	µg/g	340 ^A	-	-	-
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	µg/g	29 ^A	-	-	-
Acenaphthylene	µg/g	0.17 ^A	-	-	-
Anthracene	µg/g	0.74 ^A	-	-	-
Benzo(a)anthracene	µg/g	0.96 ^A	-	-	-
Benzo(a)pyrene	µg/g	0.3 ^A	-	-	-
Benzo(b)fluoranthene	µg/g	0.96 _{u2} ^A	-	-	-
Benzo(g,h,i)perylene	µg/g	9.6 ^A	-	-	-
Benzo(k)fluoranthene	µg/g	0.96 ^A	-	-	-
Chrysene	µg/g	9.6 ^A	-	-	-
Dibenzo(a,h)anthracene	µg/g	0.1 ^A	-	-	-
Fluoranthene	µg/g	9.6 ^A	-	-	-
Fluorene	µg/g	69 ^A	-	-	-
Indeno(1,2,3-cd)pyrene	µg/g	0.96 ^A	-	-	-
Methylnaphthalene (Total)	µg/g	42 _{u2} ^A	-	-	-
Methylnaphthalene, 1-	µg/g	4 ^A	-	-	-
Methylnaphthalene, 2-	µg/g	4 ^A	-	-	-
Naphthalene	µg/g	28 ^A	-	-	-
Phenanthrene	µg/g	16 ^A	-	-	-
Pyrene	µg/g	96 ^A	-	-	-

See notes on last page



Table 2
Summary of Soil Analytical Results
Phase II Environmental Site Assessment
West Side Employment Lands, Waterloo, Ontario
City of Waterloo

Sample Location			MW18-3		MW18-4
			19-Mar-18	19-Mar-18	19-Mar-18
Sample Date			MW18-3-4	MW18-3-4	MW18-4-4
Sample ID			2.3 - 3 m	2.3 - 3 m	2.3 - 3 m
Sample Depth			STANTEC	STANTEC	STANTEC
Sampling Company			MAXX	MAXX	MAXX
Laboratory			884886	884886	884886
Laboratory Work Order			GHT261	GHT261	GHT195
Laboratory Sample ID					
Sample Type	Units	Ontario SCS		Lab Replicate	
Volatile Organic Compounds					
Acetone	µg/g	28 ^A	<0.50	-	<0.50
Benzene	µg/g	0.4 ^A	<0.020	-	<0.020
Bromodichloromethane	µg/g	1.9 ^A	<0.050	-	<0.050
Bromoflorm (tribromomethane)	µg/g	1.7 ^A	<0.050	-	<0.050
Bromomethane (Methyl bromide)	µg/g	0.05 ^A	<0.050	-	<0.050
Carbon Tetrachloride (Tetrachloromethane)	µg/g	0.71 ^A	<0.050	-	<0.050
Chlorobenzene (Monochlorobenzene)	µg/g	2.7 ^A	<0.050	-	<0.050
Chloroform (Trichloromethane)	µg/g	0.19 ^A	<0.050	-	<0.050
Dibromochloromethane	µg/g	2.9 ^A	<0.050	-	<0.050
Dichlorobenzene, 1,2-	µg/g	1.7 ^A	<0.050	-	<0.050
Dichlorobenzene, 1,3-	µg/g	12 ^A	<0.050	-	<0.050
Dichlorobenzene, 1,4-	µg/g	0.57 ^A	<0.050	-	<0.050
Dichlorodifluoromethane (Freon 12)	µg/g	25 ^A	<0.050	-	<0.050
Dichloroethane, 1,1-	µg/g	0.8 ^A	<0.050	-	<0.050
Dichloroethane, 1,2-	µg/g	0.05 ^A	<0.050	-	<0.050
Dichloroethane, 1,1-	µg/g	0.48 ^A	<0.050	-	<0.050
Dichloroethane, cis-1,2-	µg/g	2.5 ^A	<0.050	-	<0.050
Dichloroethane, trans-1,2-	µg/g	2.5 ^A	<0.050	-	<0.050
Dichloropropane, 1,2-	µg/g	0.68 ^A	<0.050	-	<0.050
Dichloropropane, 1,3- (sum of isomers cis + trans)	µg/g	0.082 ^{A,1}	<0.050	-	<0.050
Dichloropropene, cis-1,3-	µg/g	11 ^A	<0.030	-	<0.030
Dichloropropene, trans-1,3-	µg/g	11 ^A	<0.040	-	<0.040
Ethylbenzene	µg/g	1.5 ^A	<0.020	-	<0.020
Ethylene Dibromide (Dibromoethane, 1,2)	µg/g	0.05 ^A	<0.050	-	<0.050
Hexane (n-Hexane)	µg/g	88 ^A	<0.050	-	<0.050
Methyl Ethyl Ketone (MEK) (2-Butanone)	µg/g	88 ^A	<0.50	-	<0.50
Methyl isobutyl Ketone (MIBK)	µg/g	210 ^A	<0.50	-	<0.50
Methyl tert-butyl ether (MTBE)	µg/g	2.3 ^A	<0.050	-	<0.050
Methylene Chloride (Dichloromethane)	µg/g	2 ^A	<0.050	-	<0.050
Styrene	µg/g	43 ^A	<0.050	-	<0.050
Tetrachloroethane, 1,1,1,2-	µg/g	0.11 ^A	<0.050	-	<0.050
Tetrachloroethane, 1,1,2,2-	µg/g	0.094 ^A	<0.050	-	<0.050
Tetrachloroethene (PCE)	µg/g	2.5 ^A	<0.050	-	<0.050
Toluene	µg/g	9 ^A	<0.020	-	<0.020
Trichloroethane, 1,1,1-	µg/g	12 ^A	<0.050	-	<0.050
Trichloroethane, 1,1,2-	µg/g	0.11 ^A	<0.050	-	<0.050
Trichloroethene (TCE)	µg/g	5.8 ^A	<0.050	-	<0.050
Trichlorofluoromethane (Freon 11)	µg/g	0.25 ^A	<0.020	-	<0.020
Vinyl Chloride	µg/g	1 ^A	<0.020	-	<0.020
Xylene, m & p-	µg/g	1 ^A	<0.020	-	<0.020
Xylene, o-	µg/g	1 ^A	<0.020	-	<0.020
Xylenes, Total	µg/g	30, A	<0.020	-	<0.020

Notes:

Ontario SCS Table 2 - Industrial / Commercial / Community Property Use - Medium Fine Textured Soils

6.5^A Concentration exceeds the indicated standard.

15.2 Measured concentration did not exceed the indicated standard.

<0.50 Laboratory reporting limit was greater than the applicable standard.

<0.03 Analyte was not detected at a concentration greater than the laboratory reporting limit.

n/v No standard/guideline value.

- Parameter not analyzed / not available.

n/a Not applicable.

11 Standard is applicable to total xylenes, and m & p-xylenes and o-xylenes should be summed for comparison.

12 Standard is for benzo(b)fluoranthene; however, the analytical laboratory can not distinguish between benzo(b)fluoranthene and benzo(j)fluoranthene, and therefore, the result is a combination of the two isomers, against which the standard has been compared.

13 Standard is applicable to both 1-methylnaphthalene and 2-methylnaphthalene, with the provision that if both are detected the sum of the two must not exceed the standard.

14 Standard is applicable to PHC in the F1 range minus BTEX.

15 Standard is applicable to PHC in the F3 range, minus PAHs (other than naphthalene). If PAHs were not analyzed, the standard is applied to F3.

16 If baseline is not reached during F4 analysis, then gravimetric analysis is to be performed, and the standard is applied to the higher of the two results.

17 Standard is applicable to 1,3-Dichloropropene, and the individual isomers (cis + trans) should be added for comparison.

18 The criteria for pH in surface soils (0 to 1.5 m) is 5 - 8, whereas the criteria for pH in sub-surface soils (1.5 m depth) is 5 - 11.

19 Standard is applicable to PHC in the F2 range minus naphthalene. If naphthalene was not analyzed, the standard is applied to F2.

20 For surface soil, the boron standard is for hot water soluble extract. For subsurface soil, the standard is for total boron (mined strong acid digest), as ecological criteria are not considered.

RPD Relative Percent Difference.

81% RPD exceeds data quality objective of 50%.

n/c RPD is not calculated if one or more values is non detect or if one or more values is less than five times the reportable detection limit.

Table 3
Summary of Waste Characterization Results
Phase II Environmental Site Assessment
West Side Employment Lands, Waterloo, Ontario
City of Waterloo

Sample Location Sample Date Sample ID Sampling Company Laboratory Laboratory Work Order Laboratory Sample ID Sample Type				TCLP 19-Mar-18 TCLP STANTEC MAXX B864856 GHT058	19-Mar-18 TCLP Lab-Dup STANTEC MAXX B864856 GHT058 Lab Replicate
	Units	O.Reg. 347 Sch 4	O.Reg 362		
Inorganics - TCLP					
Cyanide (Free)	mg/L	20 ^A	n/v	<0.010	-
Fluoride	mg/L	150 ^A	n/v	0.20	-
Moisture Content	%	n/v	n/v	11	-
Nitrate (as N)	mg/L	n/v	n/v	<1.0	-
Nitrate + Nitrite (as N)	mg/L	1,000 ^A	n/v	<1.0	-
Nitrite (as N)	mg/L	n/v	n/v	<0.10	-
Leachate Preparation					
Amount Extracted (Wet Weight)	none	n/v	n/v	23	-
Extraction Fluid	none	n/v	n/v	FLUID 1	-
pH Final	S.U.	n/v	n/v	6.16	-
pH Initial	S.U.	n/v	n/v	9.37	-
Soluble (1:1) pH	S.U.	n/v	n/v	8.36	8.35
Total Solids	%	n/v	n/v	100	-
Ignitability					
Ignitability	none	n/v	n/v	NF/NI	-
Metals-TCLP					
Arsenic	mg/L	2.5 ^A	n/v	<0.2	-
Barium	mg/L	100 ^A	n/v	0.4	-
Boron	mg/L	500 ^A	n/v	0.1	-
Cadmium	mg/L	0.5 ^A	n/v	<0.05	-
Chromium	mg/L	5 ^A	n/v	<0.1	-
Lead	mg/L	5 ^A	n/v	<0.1	-
Mercury	mg/L	0.1 ^A	n/v	<0.0010	-
Selenium	mg/L	1 ^A	n/v	<0.1	-
Silver	mg/L	5 ^A	n/v	<0.01	-
Uranium	mg/L	10 ^A	n/v	<0.01	-
Polychlorinated Biphenyls					
Aroclor 1242	µg/g	n/v	n/v	<0.010	-
Aroclor 1248	µg/g	n/v	n/v	<0.010	-
Aroclor 1254	µg/g	n/v	n/v	<0.010	-
Aroclor 1260	µg/g	n/v	n/v	<0.010	-
Polychlorinated Biphenyls (PCBs)	µg/g	n/v	50 ^F	<0.010	-
Semi-Volatile Organic Compounds - TCLP					
Benzo(a)pyrene	µg/L	1 ^A	n/v	<0.10	<0.10
Cresol, m & p- (Methylphenol, 3&4-)	µg/L	n/v	n/v	<2.5	<2.5
Cresol, o- (Methylphenol, 2-)	µg/L	200,000 ^A	n/v	<2.5	<2.5
Cresol, Total Leachable	µg/L	200,000 ^A	n/v	<2.5	<2.5
Dichlorophenol, 2,4-	µg/L	90,000 ^A	n/v	<2.5	<2.5
Dinitrotoluene, 2,4-	µg/L	130 ^A	n/v	<10	<10
Hexachlorobenzene	µg/L	130 ^A	n/v	<10	<10
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	µg/L	500 ^A	n/v	<10	<10
Hexachloroethane	µg/L	3,000 ^A	n/v	<10	<10
Nitrobenzene	µg/L	2,000 ^A	n/v	<10	<10
Pentachlorophenol	µg/L	6,000 ^A	n/v	<2.5	<2.5
Pyridine	µg/L	5,000 ^A	n/v	<10	<10
Tetrachlorophenol, 2,3,4,6-	µg/L	10,000 ^A	n/v	<2.5	<2.5
Trichlorophenol, 2,4,5-	µg/L	400,000 ^A	n/v	<0.50	<0.50
Trichlorophenol, 2,4,6-	µg/L	500 ^A	n/v	<2.5	<2.5
Volatile Organic Compounds - TCLP					
Benzene	mg/L	0.5 ^A	n/v	<0.020	-
Carbon Tetrachloride (Tetrachloromethane)	mg/L	0.5 ^A	n/v	<0.020	-
Chlorobenzene (Monochlorobenzene)	mg/L	8 ^A	n/v	<0.020	-
Chloroform (Trichloromethane)	mg/L	10 ^A	n/v	<0.020	-
Dichlorobenzene, 1,2-	mg/L	20 ^A	n/v	<0.050	-
Dichlorobenzene, 1,4-	mg/L	0.5 ^A	n/v	<0.050	-
Dichloroethane, 1,2-	mg/L	0.5 ^A	n/v	<0.050	-
Dichloroethane, 1,1-	mg/L	1.4 ^A	n/v	<0.020	-
Methyl Ethyl Ketone (MEK) (2-Butanone)	mg/L	200 ^A	n/v	<1.0	-
Methylene Chloride (Dichloromethane)	mg/L	5 ^A	n/v	<0.20	-
Tetrachloroethene (PCE)	mg/L	3 ^A	n/v	<0.020	-
Trichloroethene (TCE)	mg/L	5 ^A	n/v	<0.020	-
Vinyl Chloride	mg/L	0.2 ^A	n/v	<0.020	-

Notes:	
O.Reg. 347 Sch 4	Ontario Ministry of the Environment
A	MOE O.Reg. 347 of R.R.O. 1990 - Schedule 4 - Leachate Quality Criteria
O.Reg 362	R.R.O. 1990, Regulation 362, Waste Management - PCBs
B	MOE O.Reg. 362 of R.R.O. 1990
6.5 ^A	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
<0.50	Laboratory reporting limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
NF/NI	Non Flammable and Non Ignitable.

Table 4
Summary of Groundwater Analytical Results
Phase II Environmental Site Assessment
West Side Employment Lands, Waterloo, Ontario
City of Waterloo

Sample Location			MW18-1		MW18-2		MW18-3		MW18-4		TRIP BLANK
Sample Date			11-Apr-18		11-Apr-18		11-Apr-18		11-Apr-18		11-Apr-18
Sample ID			MW18-2		QC-1		MW18-3		MW18-4		TRIP BLANK
Sampling Company			STANTEC		STANTEC		STANTEC		STANTEC		STANTEC
Laboratory			MAXX		MAXX		MAXX		MAXX		MAXX
Laboratory Work Order			8882096		8882096		8882096		8882096		8882096
Laboratory Sample ID			GLC899		GLC900		GLC903		GLC902		GLC904
Sample Type	Units	Ontario SCS			Field Duplicate	(%)	Lab Replicate		Lab Replicate		Trip Blank
General Chemistry											
Chloride	mg/L	790 ^A	82	83	80	4%	-	-	-	-	-
Cyanide (Free)	µg/L	66 ^A	<1	<1	<1	nc	-	-	-	-	-
Petroleum Hydrocarbons											
PHC F1 (C6-C10 range)	µg/L	n ^A	<25	<25	<25	nc	-	<25	<25	-	<25
PHC F1 (C6-C10 range) minus BTEX	µg/L	750 ^A	<100	<100	<100	nc	<100	<100	<100	<100	<100
PHC F2 (C10-C16 range)	µg/L	1500 ^A	<100	<100	<100	nc	<100	<100	<100	<100	<100
PHC F3 (C16-C34 range)	µg/L	5000 ^A	<200	<200	<200	nc	220	<200	<200	<200	<200
PHC F4 (C34-C50 range)	µg/L	5000 ^A	<200	<200	<200	nc	<200	<200	<200	<200	<200
Chromatogram to baseline at C50	none	n/r	YES	YES	YES	nc	YES	YES	YES	YES	YES
Metals											
Antimony	mg/L	0.006 ^A	<0.0050	<0.0050	<0.0050	nc	-	-	-	-	-
Arsonic	mg/L	0.025 ^A	<0.0010	<0.0010	<0.0010	nc	-	-	-	-	-
Barium	mg/L	1 ^A	0.10	0.10	0.10	0%	-	-	-	-	-
Beryllium	mg/L	0.004 ^A	<0.0050	<0.0050	<0.0050	nc	-	-	-	-	-
Boron	mg/L	5µm ^A	0.028	0.027	0.028	nc	-	-	-	-	-
Cadmium	mg/L	0.0027 ^A	<0.0010	<0.0010	<0.0010	nc	-	-	-	-	-
Chromium	mg/L	0.05 ^A	<0.0050	<0.0050	<0.0050	nc	-	-	-	-	-
Chromium (Hexavalent)	µg/L	25 ^A	0.58	<0.50	0.56	nc	-	-	-	-	-
Cobalt	mg/L	0.0038 ^A	<0.0050	<0.0050	<0.0050	nc	-	-	-	-	-
Copper	mg/L	0.087 ^A	<0.0010	<0.0010	<0.0010	nc	-	-	-	-	-
Lead	mg/L	0.01 ^A	<0.0050	<0.0050	<0.0050	nc	-	-	-	-	-
Mercury	µg/L	1 ^A	<0.1	<0.1	<0.1	nc	-	-	-	-	-
Molybdenum	mg/L	0.07 ^A	0.0018	0.0021	0.0020	nc	-	-	-	-	-
Nickel	mg/L	0.1 ^A	<0.0010	<0.0010	<0.0010	nc	-	-	-	-	-
Selenium	mg/L	0.01 ^A	<0.0020	<0.0020	<0.0020	nc	-	-	-	-	-
Silver	mg/L	0.0015 ^A	<0.0010	<0.0010	<0.0010	nc	-	-	-	-	-
Sodium	mg/L	400 ^A	41	40	41	2%	-	-	-	-	-
Thallium	mg/L	0.002 ^A	<0.00050	<0.00050	<0.00050	nc	-	-	-	-	-
Uranium	mg/L	0.02 ^A	0.0025	0.0025	0.0025	nc	-	-	-	-	-
Vanadium	mg/L	0.0062 ^A	0.0015	0.0010	0.0012	nc	-	-	-	-	-
Zinc	mg/L	1.1 ^A	<0.0050	<0.0050	<0.0050	nc	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons											
Acenaphthene	µg/L	4.1 ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Acenaphthylene	µg/L	1 ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Antracene	µg/L	2.4 ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Benzo(a)anthracene	µg/L	1 ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Benzo(a)pyrene	µg/L	0.01 ^A	<0.010	<0.010	<0.010	nc	<0.010	-	-	-	-
Benzo(b)fluoranthene	µg/L	0.1µ ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Benzo(g,h,i)perylene	µg/L	0.2 ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Benzo(k)fluoranthene	µg/L	0.1 ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Chrysene	µg/L	0.1 ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Dibenz(a,h)anthracene	µg/L	0.2 ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Fluoranthene	µg/L	0.41 ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Fluorene	µg/L	120 ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Indeno(1,2,3-cd)pyrene	µg/L	0.2 ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Methylnaphthalene (Total)	µg/L	3.2µ ^A	<0.071	<0.071	<0.071	nc	-	-	-	-	-
Methylnaphthalene, 1-	µg/L	n ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Methylnaphthalene, 2-	µg/L	n ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Naphthalene	µg/L	11 ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Phenanthrene	µg/L	1 ^A	<0.030	<0.030	<0.030	nc	<0.030	-	-	-	-
Pyrene	µg/L	4.1 ^A	<0.050	<0.050	<0.050	nc	<0.050	-	-	-	-
Volatile Organic Compounds											
Acetone	µg/L	2,700 ^A	<10	<10	<10	nc	-	<10	<10	-	<10
Benzene	µg/L	5 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Bromodichloromethane	µg/L	16 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Bromoform (Tribromomethane)	µg/L	25 ^A	<1.0	<1.0	<1.0	nc	-	<1.0	<1.0	-	<1.0
Bromomethane (Methyl bromide)	µg/L	0.89 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Carbon Tetrachloride (Tetrachloromethane)	µg/L	3 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Chlorobenzene (Monochlorobenzene)	µg/L	30 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Chloroform (Trichloromethane)	µg/L	22 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Dibromochloromethane	µg/L	25 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Dichlorobenzene, 1,2-	µg/L	3 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Dichlorobenzene, 1,3-	µg/L	59 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Dichlorobenzene, 1,4-	µg/L	1 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Dichlorodifluoromethane (Freon 12)	µg/L	590 ^A	<1.0	<1.0	<1.0	nc	-	<1.0	<1.0	-	<1.0
Dichloroethane, 1,1-	µg/L	5 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Dichloroethane, 1,2-	µg/L	5 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Dichloroethene, 1,1-	µg/L	14 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Dichloroethene, cis-1,2-	µg/L	17 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Dichloroethene, trans-1,2-	µg/L	17 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Dichloropropane, 1,2-	µg/L	5 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Dichloropropene, 1,3- (sum of isomers cis + trans)	µg/L	0.1µ ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Dichloropropene, cis-1,3-	µg/L	n ^A	<0.30	<0.30	<0.30	nc	-	<0.30	<0.30	-	<0.30
Dichloropropene, trans-1,3-	µg/L	n ^A	<0.40	<0.40	<0.40	nc	-	<0.40	<0.40	-	<0.40
Ethylbenzene	µg/L	2.4 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Ethylene Dibromide (Dibromoethane, 1,2-)	µg/L	0.2 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Hexane (n-Hexane)	µg/L	520 ^A	<1.0	<1.0	<1.0	nc	-	<1.0	<1.0	-	<1.0
Methyl Ethyl Ketone (MEK) (2-Butanone)	µg/L	1,800 ^A	<1.0	<1.0	<1.0	nc	-	<1.0	<1.0	-	<1.0
Methyl isobutyl Ketone (MIBK)	µg/L	640 ^A	<5.0	<5.0	<5.0	nc	-	<5.0	<5.0	-	<5.0
Methyl tert-butyl ether (MTBE)	µg/L	15 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Methylene Chloride (Dichloromethane)	µg/L	50 ^A	<2.0	<2.0	<2.0	nc	-	<2.0	<2.0	-	<2.0
Styrene	µg/L	5.4 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Tetra chloroethane, 1,1,1,2-	µg/L	1.1 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Tetra chloroethane, 1,1,2,2-	µg/L	1 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Trichloroethene (PCE)	µg/L	17 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Toluene	µg/L	24 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Trichloroethane, 1,1,1-	µg/L	200 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Trichloroethane, 1,1,2-	µg/L	5 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Trichloroethene (TCE)	µg/L	5 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Trichlorofluoromethane (Freon 11)	µg/L	150 ^A	<0.50	<0.50	<0.50	nc	-	<0.50	<0.50	-	<0.50
Vinyl Chloride	µg/L	1.7 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Xylene, m & p-	µg/L	n ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Xylene, o-	µg/L	n ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20
Xylenes, Total	µg/L	300 ^A	<0.20	<0.20	<0.20	nc	-	<0.20	<0.20	-	<0.20

Notes:	
Ontario SCS A	Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act (MOE, 2011) Site Condition Standards (SCS)
Table 2 - All Types of Property Use - Medium Fine Textured Soils	
6.5 ^A	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
<0.50	Laboratory reporting limit was greater than the applicable standard.
<0.03	Analysis was not detected at a concentration greater than the laboratory reporting limit.
n/A	No standard/guideline value
-	Parameter not analyzed / not available.
11	Standard is applicable to total xylenes, and m & p-xylenes and o-xylenes should be summed for comparison.
12	Standard is for benzo(b)fluoranthene; however, the analytical laboratory can not distinguish between benzo(b)fluoranthene and benzo(g)fluoranthene, and therefore, the result is a combination of the two isomers, against which the standard has been compared.
13	Standard is applicable to both 1-methylnaphthalene and 2-methylnaphthalene, with the provision that if both are detected the sum of the two must not exceed the standard.
17	Standard is applicable to PHC in the F3 range minus BTEX.
18	Standard is applicable to PHC in the F3 range, minus PAHs (other than naphthalene). If PAHs were not analyzed, the standard is applied to F3.
19	If baseline is not reached during F4 analysis, then gravimetric analysis is to be performed, and the standard is applied to the higher of the two results.
21	Standard is applicable to 1,3-Dichloropropene, and the individual isomers (cis + trans) should be added for comparison.
25	Standard is applicable to PHC in the F2 range minus naphthalene. If naphthalene was not analyzed, the standard is applied to F2.
26	For surface soil, the bottom standard is for hot water soluble extract. For subsurface soil, the standard is for total boron (mixed strong acid digest), as ecological criteria are not considered.
RPD	Relative Percent Difference.
nc	RPD is not calculated if one or more values is non detect or if one or more values is less than five times the reportable detection limit.

**APPENDIX F:
LABORATORY CERTIFICATES OF
ANALYSIS**

Your Project #: 161413446
Site Location: 100 WILMOT LINE, WATERLOO, ONT
Your C.O.C. #: 654439-05-01

Attention: Travis Pawlick

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
N2L 0A4

Report Date: 2018/03/29
Report #: R5058730
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B864856

Received: 2018/03/22, 15:25

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Semivolatile Organic Compounds (TCLP)	1	2018/03/28	2018/03/29	CAM SOP-00301	EPA 8270D m
Cyanide (WAD) in Leachates	1	N/A	2018/03/27	CAM SOP-00457	OMOE 3015 m
Fluoride by ISE in Leachates	1	2018/03/24	2018/03/26	CAM SOP-00449	SM 23 4500-F- C m
Mercury (TCLP Leachable) (mg/L)	1	N/A	2018/03/26	CAM SOP-00453	EPA 7470A m
Total Metals in TCLP Leachate by ICPMS	1	2018/03/24	2018/03/26	CAM SOP-00447	EPA 6020B m
Ignitability of a Sample	1	2018/03/27	2018/03/27	CAM SOP-00432	EPA 1030 Rev. 0 m
Moisture	1	N/A	2018/03/23	CAM SOP-00445	Carter 2nd ed 51.2 m
Nitrate(NO ₃) + Nitrite(NO ₂) in Leachate	1	N/A	2018/03/26	CAM SOP-00440	SM 23 4500-NO ₃ I/NO ₂ B
Polychlorinated Biphenyl in Soil	1	2018/03/23	2018/03/23	CAM SOP-00309	EPA 8082A m
pH (1:1 extract, soil)	1	N/A	2018/03/27	CAM SOP-00413	EPA 9045 D m
TCLP - % Solids	1	2018/03/23	2018/03/24	CAM SOP-00401	EPA 1311 Update I m
TCLP - Extraction Fluid	1	N/A	2018/03/24	CAM SOP-00401	EPA 1311 Update I m
TCLP - Initial and final pH	1	N/A	2018/03/24	CAM SOP-00401	EPA 1311 Update I m
TCLP Zero Headspace Extraction	1	2018/03/26	2018/03/27	CAM SOP-00430	EPA 1311 m
VOCs in ZHE Leachates	1	2018/03/27	2018/03/27	CAM SOP-00228	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.

Your Project #: 161413446
Site Location: 100 WILMOT LINE, WATERLOO, ONT
Your C.O.C. #: 654439-05-01

Attention: Travis Pawlick

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
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N2L 0A4

Report Date: 2018/03/29
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CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B864856

Received: 2018/03/22, 15:25

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.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Augustyna Dobosz, Project Manager

Email: ADobosz@maxxam.ca

Phone# (905)817-5700 Ext:5798

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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.

O.REG 153 PCBS (SOIL)

Maxxam ID		GHT058		
Sampling Date		2018/03/19		
COC Number		654439-05-01		
	UNITS	TCLP	RDL	QC Batch
Inorganics				
Moisture	%	11	1.0	5454327
PCBs				
Aroclor 1242	ug/g	<0.010	0.010	5454697
Aroclor 1248	ug/g	<0.010	0.010	5454697
Aroclor 1254	ug/g	<0.010	0.010	5454697
Aroclor 1260	ug/g	<0.010	0.010	5454697
Total PCB	ug/g	<0.010	0.010	5454697
Surrogate Recovery (%)				
Decachlorobiphenyl	%	97		5454697
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

O.REG 558 TCLP INORGANICS PACKAGE (SOIL)

Maxxam ID		GHT058		
Sampling Date		2018/03/19		
COC Number		654439-05-01		
	UNITS	TCLP	RDL	QC Batch
Inorganics				
Leachable Fluoride (F-)	mg/L	0.20	0.10	5455694
Leachable WAD Cyanide (Free)	mg/L	<0.010	0.010	5455699
Leachable Nitrite (N)	mg/L	<0.10	0.10	5455696
Leachable Nitrate (N)	mg/L	<1.0	1.0	5455696
Leachable Nitrate + Nitrite (N)	mg/L	<1.0	1.0	5455696
Metals				
Leachable Mercury (Hg)	mg/L	<0.0010	0.0010	5456458
Leachable Arsenic (As)	mg/L	<0.2	0.2	5455760
Leachable Barium (Ba)	mg/L	0.4	0.2	5455760
Leachable Boron (B)	mg/L	0.1	0.1	5455760
Leachable Cadmium (Cd)	mg/L	<0.05	0.05	5455760
Leachable Chromium (Cr)	mg/L	<0.1	0.1	5455760
Leachable Lead (Pb)	mg/L	<0.1	0.1	5455760
Leachable Selenium (Se)	mg/L	<0.1	0.1	5455760
Leachable Silver (Ag)	mg/L	<0.01	0.01	5455760
Leachable Uranium (U)	mg/L	<0.01	0.01	5455760
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

O.REG 558 TCLP LEACHATE PREPARATION (SOIL)

Maxxam ID		GHT058		
Sampling Date		2018/03/19		
COC Number		654439-05-01		
	UNITS	TCLP	RDL	QC Batch
Inorganics				
Final pH	pH	6.16		5455638
Initial pH	pH	9.37		5455638
TCLP - % Solids	%	100	0.2	5455636
TCLP Extraction Fluid	N/A	FLUID 1		5455637
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

O.REG 558 TCLP SEMI-VOLATILE ORGANICS (SOIL)

Maxxam ID		GHT058	GHT058		
Sampling Date		2018/03/19	2018/03/19		
COC Number		654439-05-01	654439-05-01		
	UNITS	TCLP	TCLP Lab-Dup	RDL	QC Batch
Semivolatile Organics					
Leachable Benzo(a)pyrene	ug/L	<0.10	<0.10	0.10	5461238
Leachable m/p-Cresol	ug/L	<2.5	<2.5	2.5	5461238
Leachable o-Cresol	ug/L	<2.5	<2.5	2.5	5461238
Leachable Cresol Total	ug/L	<2.5	<2.5	2.5	5461238
Leachable 2,4-Dichlorophenol	ug/L	<2.5	<2.5	2.5	5461238
Leachable 2,4-Dinitrotoluene	ug/L	<10	<10	10	5461238
Leachable Hexachlorobenzene	ug/L	<10	<10	10	5461238
Leachable Hexachlorobutadiene	ug/L	<10	<10	10	5461238
Leachable Hexachloroethane	ug/L	<10	<10	10	5461238
Leachable Nitrobenzene	ug/L	<10	<10	10	5461238
Leachable Pentachlorophenol	ug/L	<2.5	<2.5	2.5	5461238
Leachable Pyridine	ug/L	<10	<10	10	5461238
Leachable 2,3,4,6-Tetrachlorophenol	ug/L	<2.5	<2.5	2.5	5461238
Leachable 2,4,5-Trichlorophenol	ug/L	<0.50	<0.50	0.50	5461238
Leachable 2,4,6-Trichlorophenol	ug/L	<2.5	<2.5	2.5	5461238
Surrogate Recovery (%)					
Leachable 2,4,6-Tribromophenol	%	66	74		5461238
Leachable 2-Fluorobiphenyl	%	52	70		5461238
Leachable 2-Fluorophenol	%	40	49		5461238
Leachable D14-Terphenyl (FS)	%	97	93		5461238
Leachable D5-Nitrobenzene	%	54	70		5461238
Leachable D5-Phenol	%	20	26		5461238
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate					

O.REG 558 TCLP VOLATILE ORGANICS HS (SOIL)

Maxxam ID		GHT058		
Sampling Date		2018/03/19		
COC Number		654439-05-01		
	UNITS	TCLP	RDL	QC Batch
Charge/Prep Analysis				
Amount Extracted (Wet Weight) (g)	N/A	23	N/A	5456151
Volatile Organics				
Leachable Benzene	mg/L	<0.020	0.020	5458011
Leachable Carbon Tetrachloride	mg/L	<0.020	0.020	5458011
Leachable Chlorobenzene	mg/L	<0.020	0.020	5458011
Leachable Chloroform	mg/L	<0.020	0.020	5458011
Leachable 1,2-Dichlorobenzene	mg/L	<0.050	0.050	5458011
Leachable 1,4-Dichlorobenzene	mg/L	<0.050	0.050	5458011
Leachable 1,2-Dichloroethane	mg/L	<0.050	0.050	5458011
Leachable 1,1-Dichloroethylene	mg/L	<0.020	0.020	5458011
Leachable Methylene Chloride(Dichloromethane)	mg/L	<0.20	0.20	5458011
Leachable Methyl Ethyl Ketone (2-Butanone)	mg/L	<1.0	1.0	5458011
Leachable Tetrachloroethylene	mg/L	<0.020	0.020	5458011
Leachable Trichloroethylene	mg/L	<0.020	0.020	5458011
Leachable Vinyl Chloride	mg/L	<0.020	0.020	5458011
Surrogate Recovery (%)				
Leachable 4-Bromofluorobenzene	%	99		5458011
Leachable D4-1,2-Dichloroethane	%	101		5458011
Leachable D8-Toluene	%	99		5458011
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable				

RESULTS OF ANALYSES OF SOIL

Maxxam ID		GHT058	GHT058	
Sampling Date		2018/03/19	2018/03/19	
COC Number		654439-05-01	654439-05-01	
	UNITS	TCLP	TCLP Lab-Dup	QC Batch
Inorganics				
Soluble (1:1) pH	pH	8.36	8.35	5458176
QC Batch = Quality Control Batch				
Lab-Dup = Laboratory Initiated Duplicate				

Maxxam Job #: B864856
Report Date: 2018/03/29

Stantec Consulting Ltd
Client Project #: 161413446
Site Location: 100 WILMOT LINE, WATERLOO, ONT
Sampler Initials: TS

MISCELLANEOUS (SOIL)

Maxxam ID		GHT058	
Sampling Date		2018/03/19	
COC Number		654439-05-01	
	UNITS	TCLP	QC Batch
Inorganics			
Ignitability	N/A	NF/NI	5458540
QC Batch = Quality Control Batch			

Maxxam Job #: B864856
Report Date: 2018/03/29

Stantec Consulting Ltd
Client Project #: 161413446
Site Location: 100 WILMOT LINE, WATERLOO, ONT
Sampler Initials: TS

TEST SUMMARY

Maxxam ID: GHT058
Sample ID: TCLP
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Semivolatile Organic Compounds (TCLP)	GC/MS	5461238	2018/03/28	2018/03/29	Wendy Zhao
Cyanide (WAD) in Leachates	SKAL/CN	5455699	N/A	2018/03/27	Xuanhong Qiu
Fluoride by ISE in Leachates	ISE	5455694	2018/03/24	2018/03/26	Surinder Rai
Mercury (TCLP Leachable) (mg/L)	CV/AA	5456458	N/A	2018/03/26	Ron Morrison
Total Metals in TCLP Leachate by ICPMS	ICP1/MS	5455760	2018/03/24	2018/03/26	Thao Nguyen
Ignitability of a Sample	BAL	5458540	2018/03/27	2018/03/27	Min Yang
Moisture	BAL	5454327	N/A	2018/03/23	Jatinder Ghumann
Nitrate(NO3) + Nitrite(NO2) in Leachate	LACH	5455696	N/A	2018/03/26	Chandra Nandlal
Polychlorinated Biphenyl in Soil	GC/ECD	5454697	2018/03/23	2018/03/23	Sarah Huang
pH (1:1 extract, soil)	AT	5458176	N/A	2018/03/27	Surinder Rai
TCLP - % Solids	BAL	5455636	2018/03/23	2018/03/24	Raad Kanbour
TCLP - Extraction Fluid		5455637	N/A	2018/03/24	Raad Kanbour
TCLP - Initial and final pH	PH	5455638	N/A	2018/03/24	Raad Kanbour
TCLP Zero Headspace Extraction		5456151	2018/03/26	2018/03/27	Walt Wang
VOCs in ZHE Leachates	GC/MS	5458011	2018/03/27	2018/03/27	Manpreet Sarao

Maxxam ID: GHT058 Dup
Sample ID: TCLP
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Semivolatile Organic Compounds (TCLP)	GC/MS	5461238	2018/03/28	2018/03/29	Wendy Zhao
pH (1:1 extract, soil)	AT	5458176	N/A	2018/03/27	Surinder Rai

GENERAL COMMENTS

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

Package 1	3.0°C
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Sample GHT058 [TCLP] : NF/NI = Non Flammable and Non Ignitable.

Results relate only to the items tested.



Maxxam Job #: B864856
Report Date: 2018/03/29

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 161413446
Site Location: 100 WILMOT LINE, WATERLOO, ONT
Sampler Initials: TS

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS	% Recovery	QC Limits
5454697	Decachlorobiphenyl	2018/03/23	93	60 - 130	87	60 - 130	92	%						
5458011	Leachable 4-Bromofluorobenzene	2018/03/27	101	70 - 130	101	70 - 130	99	%						
5458011	Leachable D4-1,2-Dichloroethane	2018/03/27	100	70 - 130	107	70 - 130	100	%						
5458011	Leachable D8-Toluene	2018/03/27	99	70 - 130	100	70 - 130	99	%						
5461238	Leachable 2,4,6-Tribromophenol	2018/03/29	85	10 - 130	82	10 - 130	80	%						
5461238	Leachable 2-Fluorobiphenyl	2018/03/29	79	30 - 130	72	30 - 130	79	%						
5461238	Leachable 2-Fluorophenol	2018/03/29	60	10 - 130	61	10 - 130	55	%						
5461238	Leachable D14-Terphenyl (FS)	2018/03/29	102	30 - 130	99	30 - 130	94	%						
5461238	Leachable D5-Nitrobenzene	2018/03/29	79	30 - 130	76	30 - 130	79	%						
5461238	Leachable D5-Phenol	2018/03/29	31	10 - 130	29	10 - 130	29	%						
5454327	Moisture	2018/03/23							4.0	20				
5454697	Aroclor 1242	2018/03/23					<0.010	ug/g	NC	50				
5454697	Aroclor 1248	2018/03/23					<0.010	ug/g	NC	50				
5454697	Aroclor 1254	2018/03/23					<0.010	ug/g	NC	50				
5454697	Aroclor 1260	2018/03/23	107	60 - 130	97	60 - 130	<0.010	ug/g	NC	50				
5454697	Total PCB	2018/03/23	107	60 - 130	97	60 - 130	<0.010	ug/g	NC	50				
5455694	Leachable Fluoride (F-)	2018/03/26	91	80 - 120	104	80 - 120	<0.10	mg/L	0.44	25	<0.10	mg/L		
5455696	Leachable Nitrate (N)	2018/03/26	99	80 - 120	100	80 - 120	<1.0	mg/L	NC	25	<1.0	mg/L		
5455696	Leachable Nitrate + Nitrite (N)	2018/03/26	100	80 - 120	100	80 - 120	<1.0	mg/L	NC	25	<1.0	mg/L		
5455696	Leachable Nitrite (N)	2018/03/26	101	80 - 120	99	80 - 120	<0.10	mg/L	NC	25	<0.10	mg/L		
5455699	Leachable WAD Cyanide (Free)	2018/03/27	90	80 - 120	100	80 - 120	<0.0020	mg/L	NC	20	<0.010	mg/L		
5455760	Leachable Arsenic (As)	2018/03/26	96	80 - 120	98	80 - 120			NC	35	<0.2	mg/L		
5455760	Leachable Barium (Ba)	2018/03/26	NC	80 - 120	102	80 - 120			11	35	<0.2	mg/L		
5455760	Leachable Boron (B)	2018/03/26	94	80 - 120	94	80 - 120			16	35	<0.1	mg/L		
5455760	Leachable Cadmium (Cd)	2018/03/26	98	80 - 120	99	80 - 120			NC	35	<0.05	mg/L		
5455760	Leachable Chromium (Cr)	2018/03/26	94	80 - 120	97	80 - 120			NC	35	<0.1	mg/L		
5455760	Leachable Lead (Pb)	2018/03/26	91	80 - 120	95	80 - 120			NC	35	<0.1	mg/L		
5455760	Leachable Selenium (Se)	2018/03/26	97	80 - 120	93	80 - 120			NC	35	<0.1	mg/L		
5455760	Leachable Silver (Ag)	2018/03/26	97	80 - 120	97	80 - 120			NC	35	<0.01	mg/L		
5455760	Leachable Uranium (U)	2018/03/26	90	80 - 120	91	80 - 120			NC	35	<0.01	mg/L		



Maxxam Job #: B864856
Report Date: 2018/03/29

QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 161413446
Site Location: 100 WILMOT LINE, WATERLOO, ONT
Sampler Initials: TS

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS	% Recovery	QC Limits
5456458	Leachable Mercury (Hg)	2018/03/26	100	75 - 125	98	80 - 120	<0.0010	mg/L	NC	25	<0.0010	mg/L		
5458011	Leachable 1,1-Dichloroethylene	2018/03/27	104	70 - 130	100	70 - 130	<0.020	mg/L	NC	30				
5458011	Leachable 1,2-Dichlorobenzene	2018/03/27	93	70 - 130	96	70 - 130	<0.050	mg/L	NC	30				
5458011	Leachable 1,2-Dichloroethane	2018/03/27	100	70 - 130	107	70 - 130	<0.050	mg/L	NC	30				
5458011	Leachable 1,4-Dichlorobenzene	2018/03/27	95	70 - 130	94	70 - 130	<0.050	mg/L	NC	30				
5458011	Leachable Benzene	2018/03/27	99	70 - 130	98	70 - 130	<0.020	mg/L	NC	30				
5458011	Leachable Carbon Tetrachloride	2018/03/27	118	70 - 130	113	70 - 130	<0.020	mg/L	NC	30				
5458011	Leachable Chlorobenzene	2018/03/27	97	70 - 130	99	70 - 130	<0.020	mg/L	NC	30				
5458011	Leachable Chloroform	2018/03/27	101	70 - 130	101	70 - 130	<0.020	mg/L	NC	30				
5458011	Leachable Methyl Ethyl Ketone (2-Butanone)	2018/03/27	96	60 - 140	113	60 - 140	<1.0	mg/L	NC	30				
5458011	Leachable Methylene Chloride(Dichloromethane)	2018/03/27	104	70 - 130	107	70 - 130	<0.20	mg/L	NC	30				
5458011	Leachable Tetrachloroethylene	2018/03/27	100	70 - 130	96	70 - 130	<0.020	mg/L	NC	30				
5458011	Leachable Trichloroethylene	2018/03/27	101	70 - 130	98	70 - 130	<0.020	mg/L	NC	30				
5458011	Leachable Vinyl Chloride	2018/03/27	98	70 - 130	96	70 - 130	<0.020	mg/L	NC	30				
5458176	Soluble (1:1) pH	2018/03/27			101	N/A			0.12	N/A			102	96 - 104
5461238	Leachable 2,3,4,6-Tetrachlorophenol	2018/03/29	94	10 - 130	92	10 - 130	<2.5	ug/L	NC	40				
5461238	Leachable 2,4,5-Trichlorophenol	2018/03/29	80	10 - 130	75	10 - 130	<0.50	ug/L	NC	40				
5461238	Leachable 2,4,6-Trichlorophenol	2018/03/29	80	10 - 130	76	10 - 130	<2.5	ug/L	NC	40				
5461238	Leachable 2,4-Dichlorophenol	2018/03/29	82	10 - 130	77	10 - 130	<2.5	ug/L	NC	40				
5461238	Leachable 2,4-Dinitrotoluene	2018/03/29	85	30 - 130	82	30 - 130	<10	ug/L	NC	40				
5461238	Leachable Benzo(a)pyrene	2018/03/29	109	30 - 130	104	30 - 130	<0.10	ug/L	NC	40				
5461238	Leachable Cresol Total	2018/03/29	73	10 - 130	70	10 - 130	<2.5	ug/L	NC	40				
5461238	Leachable Hexachlorobenzene	2018/03/29	94	30 - 130	91	30 - 130	<10	ug/L	NC	40				
5461238	Leachable Hexachlorobutadiene	2018/03/29	73	30 - 130	68	30 - 130	<10	ug/L	NC	40				
5461238	Leachable Hexachloroethane	2018/03/29	71	30 - 130	68	30 - 130	<10	ug/L	NC	40				
5461238	Leachable m/p-Cresol	2018/03/29	68	10 - 130	64	10 - 130	<2.5	ug/L	NC	40				
5461238	Leachable Nitrobenzene	2018/03/29	81	30 - 130	78	30 - 130	<10	ug/L	NC	40				
5461238	Leachable o-Cresol	2018/03/29	79	10 - 130	77	10 - 130	<2.5	ug/L	NC	40				



Maxxam Job #: B864856
Report Date: 2018/03/29

QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 161413446
Site Location: 100 WILMOT LINE, WATERLOO, ONT
Sampler Initials: TS

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS	% Recovery	QC Limits
5461238	Leachable Pentachlorophenol	2018/03/29	93	30 - 130	91	30 - 130	<2.5	ug/L	NC	40				
5461238	Leachable Pyridine	2018/03/29	22	10 - 130	19	10 - 130	<10	ug/L	NC	40				

N/A = Not Applicable

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

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

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

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.

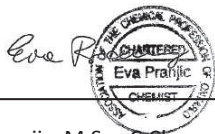
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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).

VALIDATION SIGNATURE PAGE

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



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

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		Maxxam Analytics International Corporation or Maxxam Analytics		STANTEC CHAIN OF CUSTODY RECORD		Page 1 of 1	
INVOICE INFORMATION: Company Name: #9197 Stantec Consulting Ltd Contact Name: Accounts Payable Address: 300 Hagey Blvd Suite 100 Waterloo ON N2L 0A4 Phone: (519) 579-4410 x Fax: (519) 579-6733 x Email: accounts.payable.invoices@stantec.com		REPORT INFORMATION (if differs from invoice): Company Name: Travis Pawlick Contact Name: Travis Pawlick Address: # Phone: (519) 585-7468 x Fax: (519) 579-6733 x Email: Travis.Pawlick@stantec.com		PROJECT INFORMATION: Quotation #: B77373 Task #: 803 Project #: 161413446 Project Centre: 1614 Site #: 100 Wilmot Line, Waterloo, Ont Sampled By: T.S.		Laboratory Use Only: Maxxam Job #: Bottle Order #: COC #: Project Manager: Augustyna Dobosz	
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY				ANALYSIS REQUESTED (PLEASE BE SPECIFIC):			
Regulation 153 (2011) ☒ Table 1 ☐ Res/Park ☐ Medium/Finer ☐ 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		Field Filled (please circle): Metals / Hg / Cr VI (1 Reg 153 VOCs by HS & L / 44 (1 Reg 153 PAHs (1 Reg 153 Metals & Inorganics Pkg pH (11 spots) Specificity (1 Reg 558 TCLP Semi-Volatile Organics (1 Reg 558 TCLP Volatile Organics HS (1 Reg 558 TCLP Inorganics Package (1 Reg 153 PCBs (1 Reg 558 TCLP	
Include Criteria on Certificate of Analysis (Y/N)? ☒				Regular (Standard) TAT: Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as ROD and Dissolved Metals 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: ☐ (not for use for RSC)			
Sample Barcode Label	Sample Location Identification	Date Sampled	Time Sampled	Matrix	# of Bottles Comments		
1	TCLP	2018/05/14		SOIL	X	X	3
2				SOIL			
3				SOIL			
4				SOIL			
5				SOIL			
6				SOIL			
7				SOIL			
8				SOIL			
9				SOIL			
10				SOIL			
* RELINQUISHED BY: (Signature/Print) [Signature]		Date: (YY/MM/DD) 18/03/22	Time 9:00	RECEIVED BY: (Signature/Print) [Signature]	Date: (YY/MM/DD) 20/03/22	Time 15:25	# Jars used and not submitted 0
Laboratory Use Only: Time Sensitive: ☐ Temperature (°C) on Recd: 21.5/2				Custody Seal: Present: ☒ Intact: ☒ White: Maxxam Yellow: Client			
* 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-ZOC-PDF.							

Your Project #: 161413446
Site Location: 100 WILMOT LINE, WATERLOO, ONT
Your C.O.C. #: 654439-08-01, 654439-06-01

Attention: Travis Pawlick

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
N2L 0A4

Report Date: 2018/03/29
Report #: R5059275
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B864886

Received: 2018/03/22, 15:25

Sample Matrix: Soil
Samples Received: 17

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum	7	N/A	2018/03/28	CAM SOP-00301	EPA 8270D m
Hot Water Extractable Boron	7	2018/03/27	2018/03/27	CAM SOP-00408	R153 Ana. Prot. 2011
1,3-Dichloropropene Sum	11	N/A	2018/03/28		EPA 8260C m
Free (WAD) Cyanide	7	2018/03/27	2018/03/28	CAM SOP-00457	OMOE E3015 m
Conductivity	7	2018/03/28	2018/03/28	CAM SOP-00414	OMOE E3530 v1 m
Hexavalent Chromium in Soil by IC (1)	7	2018/03/27	2018/03/28	CAM SOP-00436	EPA 3060/7199 m
Petroleum Hydrocarbons F2-F4 in Soil (2)	8	2018/03/26	2018/03/27	CAM SOP-00316	CCME CWS m
Petroleum Hydrocarbons F2-F4 in Soil (2)	3	2018/03/27	2018/03/28	CAM SOP-00316	CCME CWS m
F4G (CCME Hydrocarbons Gravimetric)	1	2018/03/29	2018/03/29	CAM SOP-00316	CCME PHC-CWS m
Strong Acid Leachable Metals by ICPMS	7	2018/03/27	2018/03/27	CAM SOP-00447	EPA 6020B m
Moisture	10	N/A	2018/03/26	CAM SOP-00445	Carter 2nd ed 51.2 m
Moisture	7	N/A	2018/03/27	CAM SOP-00445	Carter 2nd ed 51.2 m
PAH Compounds in Soil by GC/MS (SIM)	3	2018/03/27	2018/03/27	CAM SOP-00318	EPA 8270D m
PAH Compounds in Soil by GC/MS (SIM)	4	2018/03/27	2018/03/28	CAM SOP-00318	EPA 8270D m
pH CaCl2 EXTRACT	5	2018/03/27	2018/03/27	CAM SOP-00413	EPA 9045 D m
pH CaCl2 EXTRACT	2	2018/03/28	2018/03/28	CAM SOP-00413	EPA 9045 D m
pH (1:1 extract, soil)	3	N/A	2018/03/28	CAM SOP-00413	EPA 9045 D m
Sodium Adsorption Ratio (SAR)	7	N/A	2018/03/29	CAM SOP-00102	EPA 6010C
Volatile Organic Compounds and F1 PHCs	11	N/A	2018/03/27	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.

Your Project #: 161413446
Site Location: 100 WILMOT LINE, WATERLOO, ONT
Your C.O.C. #: 654439-08-01, 654439-06-01

Attention: Travis Pawlick

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
N2L 0A4

Report Date: 2018/03/29
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Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B864886

Received: 2018/03/22, 15:25

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) Soils are reported on a dry weight basis unless otherwise specified.

(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.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Augustyna Dobosz, Project Manager

Email: ADobosz@maxxam.ca

Phone# (905)817-5700 Ext:5798

=====

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.

O.REG 153 METALS & INORGANICS PKG (SOIL)

Maxxam ID		GHT256			GHT256			GHT260		
Sampling Date		2018/03/19 08:05			2018/03/19 08:05			2018/03/19 09:40		
COC Number		654439-08-01			654439-08-01			654439-08-01		
	UNITS	MW18-1-2	RDL	QC Batch	MW18-1-2 Lab-Dup	RDL	QC Batch	MW18-2-1	RDL	QC Batch

Calculated Parameters

Sodium Adsorption Ratio	N/A	0.27		5453375				0.22		5453375
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Inorganics

Conductivity	mS/cm	0.15	0.002	5460381				0.23	0.002	5458630
Moisture	%	13	1.0	5458267	12	1.0	5458267	12	1.0	5458215
Available (CaCl ₂) pH	pH	7.75		5458342				7.28		5460135
WAD Cyanide (Free)	ug/g	<0.01	0.01	5459157				0.01	0.01	5459142
Chromium (VI)	ug/g	<0.2	0.2	5458414	<0.2	0.2	5458414	<0.2	0.2	5458414

Metals

Hot Water Ext. Boron (B)	ug/g	0.092	0.050	5458547				0.22	0.050	5458547
Acid Extractable Antimony (Sb)	ug/g	<0.20	0.20	5458586				<0.20	0.20	5458586
Acid Extractable Arsenic (As)	ug/g	2.3	1.0	5458586				2.1	1.0	5458586
Acid Extractable Barium (Ba)	ug/g	48	0.50	5458586				30	0.50	5458586
Acid Extractable Beryllium (Be)	ug/g	0.47	0.20	5458586				0.25	0.20	5458586
Acid Extractable Boron (B)	ug/g	6.7	5.0	5458586				<5.0	5.0	5458586
Acid Extractable Cadmium (Cd)	ug/g	<0.10	0.10	5458586				0.17	0.10	5458586
Acid Extractable Chromium (Cr)	ug/g	15	1.0	5458586				9.5	1.0	5458586
Acid Extractable Cobalt (Co)	ug/g	6.0	0.10	5458586				3.7	0.10	5458586
Acid Extractable Copper (Cu)	ug/g	15	0.50	5458586				8.9	0.50	5458586
Acid Extractable Lead (Pb)	ug/g	8.6	1.0	5458586				9.7	1.0	5458586
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	0.50	5458586				<0.50	0.50	5458586
Acid Extractable Nickel (Ni)	ug/g	12	0.50	5458586				7.5	0.50	5458586
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	5458586				<0.50	0.50	5458586
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	5458586				<0.20	0.20	5458586
Acid Extractable Thallium (Tl)	ug/g	0.091	0.050	5458586				<0.050	0.050	5458586
Acid Extractable Uranium (U)	ug/g	0.46	0.050	5458586				0.39	0.050	5458586
Acid Extractable Vanadium (V)	ug/g	25	5.0	5458586				19	5.0	5458586
Acid Extractable Zinc (Zn)	ug/g	48	5.0	5458586				49	5.0	5458586
Acid Extractable Mercury (Hg)	ug/g	<0.050	0.050	5458586				<0.050	0.050	5458586

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

Lab-Dup = Laboratory Initiated Duplicate

O.REG 153 METALS & INORGANICS PKG (SOIL)

Maxxam ID		GHT262			GHT265		GHT267	GHT268		
Sampling Date		2018/03/19 09:00			2018/03/19 09:10		2018/03/19 12:00	2018/03/19 11:40		
COC Number		654439-08-01			654439-06-01		654439-06-01	654439-06-01		
	UNITS	BH18-5-1	RDL	QC Batch	BH18-6-1	QC Batch	BH18-7-1	BH18-8-1	RDL	QC Batch
Calculated Parameters										
Sodium Adsorption Ratio	N/A	0.33		5456364	1.2	5456364	0.71	1.1		5456364
Inorganics										
Conductivity	mS/cm	0.13	0.002	5458630	0.17	5460381	0.15	0.21	0.002	5458630
Moisture	%	16	1.0	5458544						
Available (CaCl ₂) pH	pH	7.42		5458342	7.67	5458342	7.44	7.48		5458342
WAD Cyanide (Free)	ug/g	<0.01	0.01	5459157	<0.01	5459157	<0.01	<0.01	0.01	5459157
Chromium (VI)	ug/g	<0.2	0.2	5458414	<0.2	5458414	<0.2	<0.2	0.2	5458414
Metals										
Hot Water Ext. Boron (B)	ug/g	0.082	0.050	5458547	0.058	5458547	0.15	0.25	0.050	5458547
Acid Extractable Antimony (Sb)	ug/g	<0.20	0.20	5458586	<0.20	5458586	<0.20	0.28	0.20	5458586
Acid Extractable Arsenic (As)	ug/g	2.5	1.0	5458586	2.6	5458586	2.2	2.5	1.0	5458586
Acid Extractable Barium (Ba)	ug/g	49	0.50	5458586	55	5458586	39	35	0.50	5458586
Acid Extractable Beryllium (Be)	ug/g	0.42	0.20	5458586	0.52	5458586	0.34	0.28	0.20	5458586
Acid Extractable Boron (B)	ug/g	7.3	5.0	5458586	6.9	5458586	5.7	<5.0	5.0	5458586
Acid Extractable Cadmium (Cd)	ug/g	0.10	0.10	5458586	0.13	5458586	0.15	0.30	0.10	5458586
Acid Extractable Chromium (Cr)	ug/g	13	1.0	5458586	16	5458586	12	14	1.0	5458586
Acid Extractable Cobalt (Co)	ug/g	5.8	0.10	5458586	6.8	5458586	4.6	4.0	0.10	5458586
Acid Extractable Copper (Cu)	ug/g	14	0.50	5458586	16	5458586	13	14	0.50	5458586
Acid Extractable Lead (Pb)	ug/g	7.2	1.0	5458586	8.9	5458586	14	26	1.0	5458586
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	0.50	5458586	<0.50	5458586	<0.50	0.55	0.50	5458586
Acid Extractable Nickel (Ni)	ug/g	12	0.50	5458586	14	5458586	9.9	8.5	0.50	5458586
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	5458586	<0.50	5458586	<0.50	<0.50	0.50	5458586
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	5458586	<0.20	5458586	<0.20	<0.20	0.20	5458586
Acid Extractable Thallium (Tl)	ug/g	0.078	0.050	5458586	0.097	5458586	0.072	0.070	0.050	5458586
Acid Extractable Uranium (U)	ug/g	0.42	0.050	5458586	0.45	5458586	0.41	0.38	0.050	5458586
Acid Extractable Vanadium (V)	ug/g	23	5.0	5458586	28	5458586	20	21	5.0	5458586
Acid Extractable Zinc (Zn)	ug/g	47	5.0	5458586	54	5458586	52	64	5.0	5458586
Acid Extractable Mercury (Hg)	ug/g	<0.050	0.050	5458586	<0.050	5458586	<0.050	<0.050	0.050	5458586
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										

O.REG 153 METALS & INORGANICS PKG (SOIL)

Maxxam ID		GHT272		
Sampling Date		2018/03/19 09:30		
COC Number		654439-06-01		
	UNITS	QC-1	RDL	QC Batch
Calculated Parameters				
Sodium Adsorption Ratio	N/A	0.89		5456364
Inorganics				
Conductivity	mS/cm	0.15	0.002	5458630
Moisture	%	11	1.0	5458215
Available (CaCl ₂) pH	pH	7.62		5460135
WAD Cyanide (Free)	ug/g	<0.01	0.01	5459142
Chromium (VI)	ug/g	<0.2	0.2	5458414
Metals				
Hot Water Ext. Boron (B)	ug/g	0.061	0.050	5458547
Acid Extractable Antimony (Sb)	ug/g	<0.20	0.20	5458586
Acid Extractable Arsenic (As)	ug/g	2.8	1.0	5458586
Acid Extractable Barium (Ba)	ug/g	56	0.50	5458586
Acid Extractable Beryllium (Be)	ug/g	0.51	0.20	5458586
Acid Extractable Boron (B)	ug/g	7.2	5.0	5458586
Acid Extractable Cadmium (Cd)	ug/g	0.11	0.10	5458586
Acid Extractable Chromium (Cr)	ug/g	15	1.0	5458586
Acid Extractable Cobalt (Co)	ug/g	6.6	0.10	5458586
Acid Extractable Copper (Cu)	ug/g	15	0.50	5458586
Acid Extractable Lead (Pb)	ug/g	8.5	1.0	5458586
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	0.50	5458586
Acid Extractable Nickel (Ni)	ug/g	14	0.50	5458586
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	5458586
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	5458586
Acid Extractable Thallium (Tl)	ug/g	0.090	0.050	5458586
Acid Extractable Uranium (U)	ug/g	0.43	0.050	5458586
Acid Extractable Vanadium (V)	ug/g	25	5.0	5458586
Acid Extractable Zinc (Zn)	ug/g	50	5.0	5458586
Acid Extractable Mercury (Hg)	ug/g	<0.050	0.050	5458586
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

O.REG 153 PAHS (SOIL)

Maxxam ID		GHT256			GHT258			GHT262		
Sampling Date		2018/03/19 08:05			2018/03/19 09:45			2018/03/19 09:00		
COC Number		654439-08-01			654439-08-01			654439-08-01		
	UNITS	MW18-1-2	RDL	QC Batch	MW18-2-2	RDL	QC Batch	BH18-5-1	RDL	QC Batch
Inorganics										
Moisture	%				9.5	1.0	5456683			
Calculated Parameters										
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	0.0071	5453374	0.87	0.0071	5453374	<0.0071	0.0071	5456362
Polyaromatic Hydrocarbons										
Acenaphthene	ug/g	<0.0050	0.0050	5458069	<0.0050	0.0050	5458781	<0.0050	0.0050	5458069
Acenaphthylene	ug/g	<0.0050	0.0050	5458069	<0.0050	0.0050	5458781	<0.0050	0.0050	5458069
Anthracene	ug/g	<0.0050	0.0050	5458069	<0.0050	0.0050	5458781	<0.0050	0.0050	5458069
Benzo(a)anthracene	ug/g	<0.0050	0.0050	5458069	<0.0050	0.0050	5458781	<0.0050	0.0050	5458069
Benzo(a)pyrene	ug/g	<0.0050	0.0050	5458069	<0.0050	0.0050	5458781	<0.0050	0.0050	5458069
Benzo(b,j)fluoranthene	ug/g	<0.0050	0.0050	5458069	<0.0050	0.0050	5458781	<0.0050	0.0050	5458069
Benzo(g,h,i)perylene	ug/g	<0.0050	0.0050	5458069	<0.0050	0.0050	5458781	<0.0050	0.0050	5458069
Benzo(k)fluoranthene	ug/g	<0.0050	0.0050	5458069	<0.0050	0.0050	5458781	<0.0050	0.0050	5458069
Chrysene	ug/g	<0.0050	0.0050	5458069	<0.0050	0.0050	5458781	<0.0050	0.0050	5458069
Dibenz(a,h)anthracene	ug/g	<0.0050	0.0050	5458069	<0.0050	0.0050	5458781	<0.0050	0.0050	5458069
Fluoranthene	ug/g	<0.0050	0.0050	5458069	<0.0050	0.0050	5458781	<0.0050	0.0050	5458069
Fluorene	ug/g	<0.0050	0.0050	5458069	<0.0050	0.0050	5458781	<0.0050	0.0050	5458069
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	0.0050	5458069	<0.0050	0.0050	5458781	<0.0050	0.0050	5458069
1-Methylnaphthalene	ug/g	<0.0050	0.0050	5458069	0.32	0.0050	5458781	<0.0050	0.0050	5458069
2-Methylnaphthalene	ug/g	<0.0050	0.0050	5458069	0.55	0.0050	5458781	<0.0050	0.0050	5458069
Naphthalene	ug/g	<0.0050	0.0050	5458069	0.34	0.0050	5458781	<0.0050	0.0050	5458069
Phenanthrene	ug/g	<0.0050	0.0050	5458069	0.0065	0.0050	5458781	<0.0050	0.0050	5458069
Pyrene	ug/g	<0.0050	0.0050	5458069	<0.0050	0.0050	5458781	<0.0050	0.0050	5458069
Surrogate Recovery (%)										
D10-Anthracene	%	100		5458069	96		5458781	91		5458069
D14-Terphenyl (FS)	%	95		5458069	101		5458781	89		5458069
D8-Acenaphthylene	%	88		5458069	92		5458781	85		5458069
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										

O.REG 153 PAHS (SOIL)

Maxxam ID		GHT265			GHT267			GHT268		
Sampling Date		2018/03/19 09:10			2018/03/19 12:00			2018/03/19 11:40		
COC Number		654439-06-01			654439-06-01			654439-06-01		
	UNITS	BH18-6-1	RDL	QC Batch	BH18-7-1	RDL	QC Batch	BH18-8-1	RDL	QC Batch
Inorganics										
Moisture	%	12	1.0	5458514				16	1.0	5458544
Calculated Parameters										
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	0.0071	5456362	0.21	0.071	5456362	<0.0071	0.0071	5456362
Polyaromatic Hydrocarbons										
Acenaphthene	ug/g	<0.0050	0.0050	5458069	<0.050	0.050	5458781	<0.0050	0.0050	5458069
Acenaphthylene	ug/g	<0.0050	0.0050	5458069	0.076	0.050	5458781	<0.0050	0.0050	5458069
Anthracene	ug/g	<0.0050	0.0050	5458069	<0.050	0.050	5458781	<0.0050	0.0050	5458069
Benzo(a)anthracene	ug/g	<0.0050	0.0050	5458069	0.097	0.050	5458781	0.0053	0.0050	5458069
Benzo(a)pyrene	ug/g	<0.0050	0.0050	5458069	0.10	0.050	5458781	0.0077	0.0050	5458069
Benzo(b,j)fluoranthene	ug/g	<0.0050	0.0050	5458069	0.13	0.050	5458781	0.013	0.0050	5458069
Benzo(g,h,i)perylene	ug/g	<0.0050	0.0050	5458069	0.093	0.050	5458781	0.013	0.0050	5458069
Benzo(k)fluoranthene	ug/g	<0.0050	0.0050	5458069	<0.050	0.050	5458781	<0.0050	0.0050	5458069
Chrysene	ug/g	<0.0050	0.0050	5458069	0.082	0.050	5458781	0.0067	0.0050	5458069
Dibenz(a,h)anthracene	ug/g	<0.0050	0.0050	5458069	<0.050	0.050	5458781	<0.0050	0.0050	5458069
Fluoranthene	ug/g	<0.0050	0.0050	5458069	0.23	0.050	5458781	0.014	0.0050	5458069
Fluorene	ug/g	<0.0050	0.0050	5458069	0.090	0.050	5458781	<0.0050	0.0050	5458069
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	0.0050	5458069	0.093	0.050	5458781	0.0081	0.0050	5458069
1-Methylnaphthalene	ug/g	<0.0050	0.0050	5458069	0.076	0.050	5458781	<0.0050	0.0050	5458069
2-Methylnaphthalene	ug/g	<0.0050	0.0050	5458069	0.14	0.050	5458781	<0.0050	0.0050	5458069
Naphthalene	ug/g	<0.0050	0.0050	5458069	0.13	0.050	5458781	<0.0050	0.0050	5458069
Phenanthrene	ug/g	<0.0050	0.0050	5458069	0.077	0.050	5458781	0.0056	0.0050	5458069
Pyrene	ug/g	<0.0050	0.0050	5458069	0.19	0.050	5458781	0.013	0.0050	5458069
Surrogate Recovery (%)										
D10-Anthracene	%	99		5458069	110		5458781	88		5458069
D14-Terphenyl (FS)	%	95		5458069	126		5458781	89		5458069
D8-Acenaphthylene	%	89		5458069	117		5458781	84		5458069
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										

O.REG 153 PAHS (SOIL)

Maxxam ID		GHT271		
Sampling Date		2018/03/19 10:00		
COC Number		654439-06-01		
	UNITS	QC-2	RDL	QC Batch
Calculated Parameters				
Methylnaphthalene, 2-(1-)	ug/g	0.73	0.0071	5456362
Polyaromatic Hydrocarbons				
Acenaphthene	ug/g	<0.0050	0.0050	5458781
Acenaphthylene	ug/g	<0.0050	0.0050	5458781
Anthracene	ug/g	<0.0050	0.0050	5458781
Benzo(a)anthracene	ug/g	<0.0050	0.0050	5458781
Benzo(a)pyrene	ug/g	<0.0050	0.0050	5458781
Benzo(b/j)fluoranthene	ug/g	<0.0050	0.0050	5458781
Benzo(g,h,i)perylene	ug/g	<0.0050	0.0050	5458781
Benzo(k)fluoranthene	ug/g	<0.0050	0.0050	5458781
Chrysene	ug/g	<0.0050	0.0050	5458781
Dibenz(a,h)anthracene	ug/g	<0.0050	0.0050	5458781
Fluoranthene	ug/g	<0.0050	0.0050	5458781
Fluorene	ug/g	0.0054	0.0050	5458781
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	0.0050	5458781
1-Methylnaphthalene	ug/g	0.28	0.0050	5458781
2-Methylnaphthalene	ug/g	0.45	0.0050	5458781
Naphthalene	ug/g	0.28	0.0050	5458781
Phenanthrene	ug/g	0.0065	0.0050	5458781
Pyrene	ug/g	<0.0050	0.0050	5458781
Surrogate Recovery (%)				
D10-Anthracene	%	94		5458781
D14-Terphenyl (FS)	%	106		5458781
D8-Acenaphthylene	%	98		5458781
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

O.REG 153 VOCs BY HS & F1-F4 (SOIL)

Maxxam ID		GHT257			GHT258			GHT259		
Sampling Date		2018/03/19 08:35			2018/03/19 09:45			2018/03/19 10:05		
COC Number		654439-08-01			654439-08-01			654439-08-01		
	UNITS	MW18-1-6	RDL	QC Batch	MW18-2-2	RDL	QC Batch	MW18-2-6	RDL	QC Batch
Inorganics										
Moisture	%	12	1.0	5456683				12	1.0	5456683
Calculated Parameters										
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	0.050	5453232	<0.050	0.050	5453232	<0.050	0.050	5453232
Volatile Organics										
Acetone (2-Propanone)	ug/g	<0.50	0.50	5456815	<0.50	0.50	5456815	<0.50	0.50	5456815
Benzene	ug/g	<0.020	0.020	5456815	<0.020	0.020	5456815	<0.020	0.020	5456815
Bromodichloromethane	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Bromoform	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Bromomethane	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Carbon Tetrachloride	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Chlorobenzene	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Chloroform	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Dibromochloromethane	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
1,2-Dichlorobenzene	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
1,3-Dichlorobenzene	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
1,4-Dichlorobenzene	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
1,1-Dichloroethane	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
1,2-Dichloroethane	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
1,1-Dichloroethylene	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
cis-1,2-Dichloroethylene	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
trans-1,2-Dichloroethylene	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
1,2-Dichloropropane	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
cis-1,3-Dichloropropene	ug/g	<0.030	0.030	5456815	<0.030	0.030	5456815	<0.030	0.030	5456815
trans-1,3-Dichloropropene	ug/g	<0.040	0.040	5456815	<0.040	0.040	5456815	<0.040	0.040	5456815
Ethylbenzene	ug/g	<0.020	0.020	5456815	0.11	0.020	5456815	<0.020	0.020	5456815
Ethylene Dibromide	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Hexane	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Methylene Chloride(Dichloromethane)	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	0.50	5456815	<0.50	0.50	5456815	<0.50	0.50	5456815
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										

O.REG 153 VOCs BY HS & F1-F4 (SOIL)

Maxxam ID		GHT257			GHT258			GHT259		
Sampling Date		2018/03/19 08:35			2018/03/19 09:45			2018/03/19 10:05		
COC Number		654439-08-01			654439-08-01			654439-08-01		
	UNITS	MW18-1-6	RDL	QC Batch	MW18-2-2	RDL	QC Batch	MW18-2-6	RDL	QC Batch
Methyl Isobutyl Ketone	ug/g	<0.50	0.50	5456815	<0.50	0.50	5456815	<0.50	0.50	5456815
Methyl t-butyl ether (MTBE)	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Styrene	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
1,1,1,2-Tetrachloroethane	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
1,1,2,2-Tetrachloroethane	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Tetrachloroethylene	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Toluene	ug/g	<0.020	0.020	5456815	<0.020	0.020	5456815	<0.020	0.020	5456815
1,1,1-Trichloroethane	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
1,1,2-Trichloroethane	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Trichloroethylene	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	0.050	5456815	<0.050	0.050	5456815	<0.050	0.050	5456815
Vinyl Chloride	ug/g	<0.020	0.020	5456815	<0.020	0.020	5456815	<0.020	0.020	5456815
p+m-Xylene	ug/g	<0.020	0.020	5456815	0.11	0.020	5456815	<0.020	0.020	5456815
o-Xylene	ug/g	<0.020	0.020	5456815	<0.020	0.020	5456815	<0.020	0.020	5456815
Total Xylenes	ug/g	<0.020	0.020	5456815	0.11	0.020	5456815	<0.020	0.020	5456815
F1 (C6-C10)	ug/g	<10	10	5456815	<10	10	5456815	<10	10	5456815
F1 (C6-C10) - BTEX	ug/g	<10	10	5456815	<10	10	5456815	<10	10	5456815
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	5457018	<10	10	5458762	<10	10	5457018
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	5457018	<50	50	5458762	<50	50	5457018
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	5457018	<50	50	5458762	<50	50	5457018
Reached Baseline at C50	ug/g	Yes		5457018	Yes		5458762	Yes		5457018
Surrogate Recovery (%)										
o-Terphenyl	%	103		5457018	87		5458762	103		5457018
4-Bromofluorobenzene	%	95		5456815	94		5456815	93		5456815
D10-o-Xylene	%	94		5456815	93		5456815	94		5456815
D4-1,2-Dichloroethane	%	101		5456815	102		5456815	101		5456815
D8-Toluene	%	100		5456815	101		5456815	101		5456815
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										

O.REG 153 VOCs BY HS & F1-F4 (SOIL)

Maxxam ID		GHT261			GHT261			GHT263		
Sampling Date		2018/03/19 10:00			2018/03/19 10:00			2018/03/19 09:05		
COC Number		654439-08-01			654439-08-01			654439-08-01		
	UNITS	MW18-3-4	RDL	QC Batch	MW18-3-4 Lab-Dup	RDL	QC Batch	BH18-5-2	RDL	QC Batch

Inorganics										
Moisture	%	11	1.0	5456683				13	1.0	5456683
Calculated Parameters										
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	0.050	5453232				<0.050	0.050	5456363
Volatile Organics										
Acetone (2-Propanone)	ug/g	<0.50	0.50	5456815				<0.50	0.50	5456815
Benzene	ug/g	<0.020	0.020	5456815				<0.020	0.020	5456815
Bromodichloromethane	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Bromoform	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Bromomethane	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Carbon Tetrachloride	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Chlorobenzene	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Chloroform	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Dibromochloromethane	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
1,2-Dichlorobenzene	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
1,3-Dichlorobenzene	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
1,4-Dichlorobenzene	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
1,1-Dichloroethane	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
1,2-Dichloroethane	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
1,1-Dichloroethylene	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
cis-1,2-Dichloroethylene	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
trans-1,2-Dichloroethylene	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
1,2-Dichloropropane	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
cis-1,3-Dichloropropene	ug/g	<0.030	0.030	5456815				<0.030	0.030	5456815
trans-1,3-Dichloropropene	ug/g	<0.040	0.040	5456815				<0.040	0.040	5456815
Ethylbenzene	ug/g	<0.020	0.020	5456815				<0.020	0.020	5456815
Ethylene Dibromide	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Hexane	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Methylene Chloride(Dichloromethane)	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	0.50	5456815				<0.50	0.50	5456815

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

O.REG 153 VOCs BY HS & F1-F4 (SOIL)

Maxxam ID		GHT261			GHT261			GHT263		
Sampling Date		2018/03/19 10:00			2018/03/19 10:00			2018/03/19 09:05		
COC Number		654439-08-01			654439-08-01			654439-08-01		
	UNITS	MW18-3-4	RDL	QC Batch	MW18-3-4 Lab-Dup	RDL	QC Batch	BH18-5-2	RDL	QC Batch
Methyl Isobutyl Ketone	ug/g	<0.50	0.50	5456815				<0.50	0.50	5456815
Methyl t-butyl ether (MTBE)	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Styrene	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
1,1,1,2-Tetrachloroethane	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
1,1,2,2-Tetrachloroethane	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Tetrachloroethylene	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Toluene	ug/g	<0.020	0.020	5456815				<0.020	0.020	5456815
1,1,1-Trichloroethane	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
1,1,2-Trichloroethane	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Trichloroethylene	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	0.050	5456815				<0.050	0.050	5456815
Vinyl Chloride	ug/g	<0.020	0.020	5456815				<0.020	0.020	5456815
p+m-Xylene	ug/g	<0.020	0.020	5456815				<0.020	0.020	5456815
o-Xylene	ug/g	<0.020	0.020	5456815				<0.020	0.020	5456815
Total Xylenes	ug/g	<0.020	0.020	5456815				<0.020	0.020	5456815
F1 (C6-C10)	ug/g	<10	10	5456815				<10	10	5456815
F1 (C6-C10) - BTEX	ug/g	<10	10	5456815				<10	10	5456815
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	5457018	<10	10	5457018	<10	10	5457018
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	5457018	<50	50	5457018	<50	50	5457018
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	5457018	<50	50	5457018	<50	50	5457018
Reached Baseline at C50	ug/g	Yes		5457018	Yes		5457018	Yes		5457018
Surrogate Recovery (%)										
o-Terphenyl	%	99		5457018	96		5457018	97		5457018
4-Bromofluorobenzene	%	93		5456815				93		5456815
D10-o-Xylene	%	97		5456815				95		5456815
D4-1,2-Dichloroethane	%	100		5456815				102		5456815
D8-Toluene	%	102		5456815				100		5456815
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										

O.REG 153 VOCs BY HS & F1-F4 (SOIL)

Maxxam ID		GHT266		GHT267		GHT269	GHT270		
Sampling Date		2018/03/19 09:15		2018/03/19 12:00		2018/03/19 11:50	2018/03/19 11:10		
COC Number		654439-06-01		654439-06-01		654439-06-01	654439-06-01		
	UNITS	BH18-6-2	QC Batch	BH18-7-1	QC Batch	BH18-8-2	BH18-9-4	RDL	QC Batch
Inorganics									
Moisture	%	17	5456683	12	5458544	15	14	1.0	5456683
Calculated Parameters									
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	5456363	<0.050	5456363	<0.050	<0.050	0.050	5456363
Volatile Organics									
Acetone (2-Propanone)	ug/g	<0.50	5456815	<0.50	5456815	<0.50	<0.50	0.50	5456815
Benzene	ug/g	<0.020	5456815	<0.020	5456815	<0.020	<0.020	0.020	5456815
Bromodichloromethane	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Bromoform	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Bromomethane	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Carbon Tetrachloride	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Chlorobenzene	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Chloroform	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Dibromochloromethane	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
1,2-Dichlorobenzene	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
1,3-Dichlorobenzene	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
1,4-Dichlorobenzene	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
1,1-Dichloroethane	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
1,2-Dichloroethane	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
1,1-Dichloroethylene	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
cis-1,2-Dichloroethylene	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
trans-1,2-Dichloroethylene	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
1,2-Dichloropropane	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
cis-1,3-Dichloropropene	ug/g	<0.030	5456815	<0.030	5456815	<0.030	<0.030	0.030	5456815
trans-1,3-Dichloropropene	ug/g	<0.040	5456815	<0.040	5456815	<0.040	<0.040	0.040	5456815
Ethylbenzene	ug/g	<0.020	5456815	<0.020	5456815	<0.020	<0.020	0.020	5456815
Ethylene Dibromide	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Hexane	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Methylene Chloride(Dichloromethane)	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	5456815	<0.50	5456815	<0.50	<0.50	0.50	5456815
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									

O.REG 153 VOCs BY HS & F1-F4 (SOIL)

Maxxam ID		GHT266		GHT267		GHT269	GHT270		
Sampling Date		2018/03/19 09:15		2018/03/19 12:00		2018/03/19 11:50	2018/03/19 11:10		
COC Number		654439-06-01		654439-06-01		654439-06-01	654439-06-01		
	UNITS	BH18-6-2	QC Batch	BH18-7-1	QC Batch	BH18-8-2	BH18-9-4	RDL	QC Batch
Methyl Isobutyl Ketone	ug/g	<0.50	5456815	<0.50	5456815	<0.50	<0.50	0.50	5456815
Methyl t-butyl ether (MTBE)	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Styrene	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
1,1,1,2-Tetrachloroethane	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
1,1,2,2-Tetrachloroethane	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Tetrachloroethylene	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Toluene	ug/g	<0.020	5456815	<0.020	5456815	<0.020	<0.020	0.020	5456815
1,1,1-Trichloroethane	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
1,1,2-Trichloroethane	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Trichloroethylene	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	5456815	<0.050	5456815	<0.050	<0.050	0.050	5456815
Vinyl Chloride	ug/g	<0.020	5456815	<0.020	5456815	<0.020	<0.020	0.020	5456815
p+m-Xylene	ug/g	<0.020	5456815	<0.020	5456815	<0.020	<0.020	0.020	5456815
o-Xylene	ug/g	<0.020	5456815	<0.020	5456815	<0.020	<0.020	0.020	5456815
Total Xylenes	ug/g	<0.020	5456815	<0.020	5456815	<0.020	<0.020	0.020	5456815
F1 (C6-C10)	ug/g	<10	5456815	<10	5456815	<10	<10	10	5456815
F1 (C6-C10) - BTEX	ug/g	<10	5456815	<10	5456815	<10	<10	10	5456815
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	<10	5457018	12	5458762	<10	<10	10	5457018
F3 (C16-C34 Hydrocarbons)	ug/g	<50	5457018	160	5458762	<50	<50	50	5457018
F4 (C34-C50 Hydrocarbons)	ug/g	<50	5457018	410	5458762	<50	<50	50	5457018
Reached Baseline at C50	ug/g	Yes	5457018	No	5458762	Yes	Yes		5457018
Surrogate Recovery (%)									
o-Terphenyl	%	112	5457018	92	5458762	104	99		5457018
4-Bromofluorobenzene	%	92	5456815	92	5456815	92	91		5456815
D10-o-Xylene	%	94	5456815	91	5456815	96	94		5456815
D4-1,2-Dichloroethane	%	102	5456815	101	5456815	103	104		5456815
D8-Toluene	%	100	5456815	100	5456815	100	100		5456815
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									

O.REG 153 VOCs BY HS & F1-F4 (SOIL)

Maxxam ID		GHT271		GHU195		
Sampling Date		2018/03/19 10:00		2018/03/19 14:30		
COC Number		654439-06-01		654439-08-01		
	UNITS	QC-2	QC Batch	MW18-4-4	RDL	QC Batch
Inorganics						
Moisture	%	14	5456683	8.2	1.0	5456683
Calculated Parameters						
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	5456363	<0.050	0.050	5453232
Volatile Organics						
Acetone (2-Propanone)	ug/g	<0.50	5456815	<0.50	0.50	5456815
Benzene	ug/g	<0.020	5456815	<0.020	0.020	5456815
Bromodichloromethane	ug/g	<0.050	5456815	<0.050	0.050	5456815
Bromoform	ug/g	<0.050	5456815	<0.050	0.050	5456815
Bromomethane	ug/g	<0.050	5456815	<0.050	0.050	5456815
Carbon Tetrachloride	ug/g	<0.050	5456815	<0.050	0.050	5456815
Chlorobenzene	ug/g	<0.050	5456815	<0.050	0.050	5456815
Chloroform	ug/g	<0.050	5456815	<0.050	0.050	5456815
Dibromochloromethane	ug/g	<0.050	5456815	<0.050	0.050	5456815
1,2-Dichlorobenzene	ug/g	<0.050	5456815	<0.050	0.050	5456815
1,3-Dichlorobenzene	ug/g	<0.050	5456815	<0.050	0.050	5456815
1,4-Dichlorobenzene	ug/g	<0.050	5456815	<0.050	0.050	5456815
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	5456815	<0.050	0.050	5456815
1,1-Dichloroethane	ug/g	<0.050	5456815	<0.050	0.050	5456815
1,2-Dichloroethane	ug/g	<0.050	5456815	<0.050	0.050	5456815
1,1-Dichloroethylene	ug/g	<0.050	5456815	<0.050	0.050	5456815
cis-1,2-Dichloroethylene	ug/g	<0.050	5456815	<0.050	0.050	5456815
trans-1,2-Dichloroethylene	ug/g	<0.050	5456815	<0.050	0.050	5456815
1,2-Dichloropropane	ug/g	<0.050	5456815	<0.050	0.050	5456815
cis-1,3-Dichloropropene	ug/g	<0.030	5456815	<0.030	0.030	5456815
trans-1,3-Dichloropropene	ug/g	<0.040	5456815	<0.040	0.040	5456815
Ethylbenzene	ug/g	0.66	5456815	<0.020	0.020	5456815
Ethylene Dibromide	ug/g	<0.050	5456815	<0.050	0.050	5456815
Hexane	ug/g	<0.050	5456815	<0.050	0.050	5456815
Methylene Chloride(Dichloromethane)	ug/g	<0.050	5456815	<0.050	0.050	5456815
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	5456815	<0.50	0.50	5456815
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

O.REG 153 VOCs BY HS & F1-F4 (SOIL)

Maxxam ID		GHT271		GHU195		
Sampling Date		2018/03/19 10:00		2018/03/19 14:30		
COC Number		654439-06-01		654439-08-01		
	UNITS	QC-2	QC Batch	MW18-4-4	RDL	QC Batch
Methyl Isobutyl Ketone	ug/g	<0.50	5456815	<0.50	0.50	5456815
Methyl t-butyl ether (MTBE)	ug/g	<0.050	5456815	<0.050	0.050	5456815
Styrene	ug/g	<0.050	5456815	<0.050	0.050	5456815
1,1,1,2-Tetrachloroethane	ug/g	<0.050	5456815	<0.050	0.050	5456815
1,1,2,2-Tetrachloroethane	ug/g	<0.050	5456815	<0.050	0.050	5456815
Tetrachloroethylene	ug/g	<0.050	5456815	<0.050	0.050	5456815
Toluene	ug/g	<0.020	5456815	<0.020	0.020	5456815
1,1,1-Trichloroethane	ug/g	<0.050	5456815	<0.050	0.050	5456815
1,1,2-Trichloroethane	ug/g	<0.050	5456815	<0.050	0.050	5456815
Trichloroethylene	ug/g	<0.050	5456815	<0.050	0.050	5456815
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	5456815	<0.050	0.050	5456815
Vinyl Chloride	ug/g	<0.020	5456815	<0.020	0.020	5456815
p+m-Xylene	ug/g	0.95	5456815	<0.020	0.020	5456815
o-Xylene	ug/g	<0.020	5456815	<0.020	0.020	5456815
Total Xylenes	ug/g	0.95	5456815	<0.020	0.020	5456815
F1 (C6-C10)	ug/g	<10	5456815	<10	10	5456815
F1 (C6-C10) - BTEX	ug/g	<10	5456815	<10	10	5456815
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/g	<10	5458762	<10	10	5457018
F3 (C16-C34 Hydrocarbons)	ug/g	<50	5458762	<50	50	5457018
F4 (C34-C50 Hydrocarbons)	ug/g	<50	5458762	<50	50	5457018
Reached Baseline at C50	ug/g	Yes	5458762	Yes		5457018
Surrogate Recovery (%)						
o-Terphenyl	%	89	5458762	102		5457018
4-Bromofluorobenzene	%	93	5456815	91		5456815
D10-o-Xylene	%	99	5456815	86		5456815
D4-1,2-Dichloroethane	%	103	5456815	99		5456815
D8-Toluene	%	100	5456815	102		5456815
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

RESULTS OF ANALYSES OF SOIL

Maxxam ID		GHT257	GHT257	GHT259	GHU195	
Sampling Date		2018/03/19 08:35	2018/03/19 08:35	2018/03/19 10:05	2018/03/19 14:30	
COC Number		654439-08-01	654439-08-01	654439-08-01	654439-08-01	
	UNITS	MW18-1-6	MW18-1-6 Lab-Dup	MW18-2-6	MW18-4-4	QC Batch
Inorganics						
Soluble (1:1) pH	pH	8.35	8.34	8.39	7.84	5460489
QC Batch = Quality Control Batch						
Lab-Dup = Laboratory Initiated Duplicate						

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GHT267		
Sampling Date		2018/03/19 12:00		
COC Number		654439-06-01		
	UNITS	BH18-7-1	RDL	QC Batch
F2-F4 Hydrocarbons				
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	1400	100	5462478
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

TEST SUMMARY

Maxxam ID: GHT256
Sample ID: MW18-1-2
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5453374	N/A	2018/03/28	Automated Statchk
Hot Water Extractable Boron	ICP	5458547	2018/03/27	2018/03/27	Suban Kanapathipplai
Free (WAD) Cyanide	TECH	5459157	2018/03/27	2018/03/28	Louise Harding
Conductivity	AT	5460381	2018/03/28	2018/03/28	Tahir Anwar
Hexavalent Chromium in Soil by IC	IC/SPEC	5458414	2018/03/27	2018/03/28	Rupinder Sihota
Strong Acid Leachable Metals by ICPMS	ICP/MS	5458586	2018/03/27	2018/03/27	Daniel Teclu
Moisture	BAL	5458267	N/A	2018/03/27	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5458069	2018/03/27	2018/03/27	Mitesh Raj
pH CaCl2 EXTRACT	AT	5458342	2018/03/27	2018/03/27	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	5453375	N/A	2018/03/29	Automated Statchk

Maxxam ID: GHT256 Dup
Sample ID: MW18-1-2
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hexavalent Chromium in Soil by IC	IC/SPEC	5458414	2018/03/27	2018/03/28	Rupinder Sihota
Moisture	BAL	5458267	N/A	2018/03/27	Min Yang

Maxxam ID: GHT257
Sample ID: MW18-1-6
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5453232	N/A	2018/03/28	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5457018	2018/03/26	2018/03/27	Dorina Popa
Moisture	BAL	5456683	N/A	2018/03/26	Chun Yan
pH (1:1 extract, soil)	AT	5460489	N/A	2018/03/28	Surinder Rai
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5456815	N/A	2018/03/27	Xueming Jiang

Maxxam ID: GHT257 Dup
Sample ID: MW18-1-6
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH (1:1 extract, soil)	AT	5460489	N/A	2018/03/28	Surinder Rai

Maxxam ID: GHT258
Sample ID: MW18-2-2
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5453374	N/A	2018/03/28	Automated Statchk
1,3-Dichloropropene Sum	CALC	5453232	N/A	2018/03/28	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5458762	2018/03/27	2018/03/28	Zhiyue (Frank) Zhu

TEST SUMMARY

Maxxam ID: GHT258
Sample ID: MW18-2-2
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5456683	N/A	2018/03/26	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5458781	2018/03/27	2018/03/28	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5456815	N/A	2018/03/27	Xueming Jiang

Maxxam ID: GHT259
Sample ID: MW18-2-6
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5453232	N/A	2018/03/28	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5457018	2018/03/26	2018/03/27	Dorina Popa
Moisture	BAL	5456683	N/A	2018/03/26	Chun Yan
pH (1:1 extract, soil)	AT	5460489	N/A	2018/03/28	Surinder Rai
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5456815	N/A	2018/03/27	Xueming Jiang

Maxxam ID: GHT260
Sample ID: MW18-2-1
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5458547	2018/03/27	2018/03/27	Suban Kanapathipillai
Free (WAD) Cyanide	TECH	5459142	2018/03/27	2018/03/28	Louise Harding
Conductivity	AT	5458630	2018/03/28	2018/03/28	Tahir Anwar
Hexavalent Chromium in Soil by IC	IC/SPEC	5458414	2018/03/27	2018/03/28	Rupinder Sihota
Strong Acid Leachable Metals by ICPMS	ICP/MS	5458586	2018/03/27	2018/03/27	Daniel Teclu
Moisture	BAL	5458215	N/A	2018/03/27	Min Yang
pH CaCl2 EXTRACT	AT	5460135	2018/03/28	2018/03/28	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	5453375	N/A	2018/03/29	Automated Statchk

Maxxam ID: GHT261
Sample ID: MW18-3-4
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5453232	N/A	2018/03/28	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5457018	2018/03/26	2018/03/27	Dorina Popa
Moisture	BAL	5456683	N/A	2018/03/26	Chun Yan
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5456815	N/A	2018/03/27	Xueming Jiang

Maxxam ID: GHT261 Dup
Sample ID: MW18-3-4
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5457018	2018/03/26	2018/03/27	Dorina Popa

TEST SUMMARY

Maxxam ID: GHT262
Sample ID: BH18-5-1
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5456362	N/A	2018/03/28	Automated Statchk
Hot Water Extractable Boron	ICP	5458547	2018/03/27	2018/03/27	Suban Kanapathipplai
Free (WAD) Cyanide	TECH	5459157	2018/03/27	2018/03/28	Louise Harding
Conductivity	AT	5458630	2018/03/28	2018/03/28	Tahir Anwar
Hexavalent Chromium in Soil by IC	IC/SPEC	5458414	2018/03/27	2018/03/28	Rupinder Sihota
Strong Acid Leachable Metals by ICPMS	ICP/MS	5458586	2018/03/27	2018/03/27	Daniel Teclu
Moisture	BAL	5458544	N/A	2018/03/27	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5458069	2018/03/27	2018/03/27	Mitesh Raj
pH CaCl2 EXTRACT	AT	5458342	2018/03/27	2018/03/27	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	5456364	N/A	2018/03/29	Automated Statchk

Maxxam ID: GHT263
Sample ID: BH18-5-2
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5456363	N/A	2018/03/28	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5457018	2018/03/26	2018/03/27	Dorina Popa
Moisture	BAL	5456683	N/A	2018/03/26	Chun Yan
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5456815	N/A	2018/03/27	Xueming Jiang

Maxxam ID: GHT265
Sample ID: BH18-6-1
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5456362	N/A	2018/03/28	Automated Statchk
Hot Water Extractable Boron	ICP	5458547	2018/03/27	2018/03/27	Suban Kanapathipplai
Free (WAD) Cyanide	TECH	5459157	2018/03/27	2018/03/28	Louise Harding
Conductivity	AT	5460381	2018/03/28	2018/03/28	Tahir Anwar
Hexavalent Chromium in Soil by IC	IC/SPEC	5458414	2018/03/27	2018/03/28	Rupinder Sihota
Strong Acid Leachable Metals by ICPMS	ICP/MS	5458586	2018/03/27	2018/03/27	Daniel Teclu
Moisture	BAL	5458514	N/A	2018/03/27	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5458069	2018/03/27	2018/03/27	Mitesh Raj
pH CaCl2 EXTRACT	AT	5458342	2018/03/27	2018/03/27	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	5456364	N/A	2018/03/29	Automated Statchk

Maxxam ID: GHT266
Sample ID: BH18-6-2
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5456363	N/A	2018/03/28	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5457018	2018/03/26	2018/03/27	Dorina Popa

TEST SUMMARY

Maxxam ID: GHT266
Sample ID: BH18-6-2
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5456683	N/A	2018/03/26	Chun Yan
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5456815	N/A	2018/03/27	Xueming Jiang

Maxxam ID: GHT267
Sample ID: BH18-7-1
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5456362	N/A	2018/03/28	Automated Statchk
Hot Water Extractable Boron	ICP	5458547	2018/03/27	2018/03/27	Suban Kanapathipplai
1,3-Dichloropropene Sum	CALC	5456363	N/A	2018/03/28	Automated Statchk
Free (WAD) Cyanide	TECH	5459157	2018/03/27	2018/03/28	Louise Harding
Conductivity	AT	5458630	2018/03/28	2018/03/28	Tahir Anwar
Hexavalent Chromium in Soil by IC	IC/SPEC	5458414	2018/03/27	2018/03/28	Rupinder Sihota
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5458762	2018/03/27	2018/03/28	Zhiyue (Frank) Zhu
F4G (CCME Hydrocarbons Gravimetric)	BAL	5462478	2018/03/29	2018/03/29	Dhara Patel
Strong Acid Leachable Metals by ICPMS	ICP/MS	5458586	2018/03/27	2018/03/27	Daniel Teclu
Moisture	BAL	5458544	N/A	2018/03/27	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5458781	2018/03/27	2018/03/28	Mitesh Raj
pH CaCl2 EXTRACT	AT	5458342	2018/03/27	2018/03/27	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	5456364	N/A	2018/03/29	Automated Statchk
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5456815	N/A	2018/03/27	Xueming Jiang

Maxxam ID: GHT268
Sample ID: BH18-8-1
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5456362	N/A	2018/03/28	Automated Statchk
Hot Water Extractable Boron	ICP	5458547	2018/03/27	2018/03/27	Suban Kanapathipplai
Free (WAD) Cyanide	TECH	5459157	2018/03/27	2018/03/28	Louise Harding
Conductivity	AT	5458630	2018/03/28	2018/03/28	Tahir Anwar
Hexavalent Chromium in Soil by IC	IC/SPEC	5458414	2018/03/27	2018/03/28	Rupinder Sihota
Strong Acid Leachable Metals by ICPMS	ICP/MS	5458586	2018/03/27	2018/03/27	Daniel Teclu
Moisture	BAL	5458544	N/A	2018/03/27	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5458069	2018/03/27	2018/03/28	Mitesh Raj
pH CaCl2 EXTRACT	AT	5458342	2018/03/27	2018/03/27	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	5456364	N/A	2018/03/29	Automated Statchk

TEST SUMMARY

Maxxam ID: GHT269
Sample ID: BH18-8-2
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5456363	N/A	2018/03/28	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5457018	2018/03/26	2018/03/27	Dorina Popa
Moisture	BAL	5456683	N/A	2018/03/26	Chun Yan
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5456815	N/A	2018/03/27	Xueming Jiang

Maxxam ID: GHT270
Sample ID: BH18-9-4
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5456363	N/A	2018/03/28	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5457018	2018/03/26	2018/03/27	Dorina Popa
Moisture	BAL	5456683	N/A	2018/03/26	Chun Yan
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5456815	N/A	2018/03/27	Xueming Jiang

Maxxam ID: GHT271
Sample ID: QC-2
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5456362	N/A	2018/03/28	Automated Statchk
1,3-Dichloropropene Sum	CALC	5456363	N/A	2018/03/28	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5458762	2018/03/27	2018/03/28	Zhiyue (Frank) Zhu
Moisture	BAL	5456683	N/A	2018/03/26	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5458781	2018/03/27	2018/03/28	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5456815	N/A	2018/03/27	Xueming Jiang

Maxxam ID: GHT272
Sample ID: QC-1
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5458547	2018/03/27	2018/03/27	Suban Kanapathipillai
Free (WAD) Cyanide	TECH	5459142	2018/03/27	2018/03/28	Louise Harding
Conductivity	AT	5458630	2018/03/28	2018/03/28	Tahir Anwar
Hexavalent Chromium in Soil by IC	IC/SPEC	5458414	2018/03/27	2018/03/28	Rupinder Sihota
Strong Acid Leachable Metals by ICPMS	ICP/MS	5458586	2018/03/27	2018/03/27	Daniel Teclu
Moisture	BAL	5458215	N/A	2018/03/27	Min Yang
pH CaCl2 EXTRACT	AT	5460135	2018/03/28	2018/03/28	Surinder Rai
Sodium Adsorption Ratio (SAR)	CALC/MET	5456364	N/A	2018/03/29	Automated Statchk

Maxxam Job #: B864886
Report Date: 2018/03/29

Stantec Consulting Ltd
Client Project #: 161413446
Site Location: 100 WILMOT LINE, WATERLOO, ONT
Sampler Initials: TS

TEST SUMMARY

Maxxam ID: GHU195
Sample ID: MW18-4-4
Matrix: Soil

Collected: 2018/03/19
Shipped:
Received: 2018/03/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5453232	N/A	2018/03/28	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5457018	2018/03/26	2018/03/27	Dorina Popa
Moisture	BAL	5456683	N/A	2018/03/26	Chun Yan
pH (1:1 extract, soil)	AT	5460489	N/A	2018/03/28	Surinder Rai
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5456815	N/A	2018/03/27	Xueming Jiang

GENERAL COMMENTS

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

Package 1	1.7°C
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Sample GHT256 [MW18-1-2] : SAR Analysis: Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

Sample GHT260 [MW18-2-1] : SAR Analysis: Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

Sample GHT267 [BH18-7-1] : PAH analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.



Maxxam Job #: B864886
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QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 161413446
Site Location: 100 WILMOT LINE, WATERLOO, ONT
Sampler Initials: TS

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5456815	4-Bromofluorobenzene	2018/03/27	97	60 - 140	97	60 - 140	92	%				
5456815	D10-o-Xylene	2018/03/27	100	60 - 130	99	60 - 130	93	%				
5456815	D4-1,2-Dichloroethane	2018/03/27	100	60 - 140	102	60 - 140	102	%				
5456815	D8-Toluene	2018/03/27	105	60 - 140	105	60 - 140	99	%				
5457018	o-Terphenyl	2018/03/27	110	60 - 130	107	60 - 130	107	%				
5458069	D10-Anthracene	2018/03/27	91	50 - 130	96	50 - 130	91	%				
5458069	D14-Terphenyl (FS)	2018/03/27	94	50 - 130	93	50 - 130	88	%				
5458069	D8-Acenaphthylene	2018/03/27	80	50 - 130	85	50 - 130	80	%				
5458762	o-Terphenyl	2018/03/27	90	60 - 130	88	60 - 130	93	%				
5458781	D10-Anthracene	2018/03/27	91	50 - 130	85	50 - 130	90	%				
5458781	D14-Terphenyl (FS)	2018/03/27	112	50 - 130	109	50 - 130	111	%				
5458781	D8-Acenaphthylene	2018/03/27	92	50 - 130	85	50 - 130	89	%				
5456683	Moisture	2018/03/26							1.4	20		
5456815	1,1,1,2-Tetrachloroethane	2018/03/27	98	60 - 140	100	60 - 130	<0.050	ug/g	NC	50		
5456815	1,1,1-Trichloroethane	2018/03/27	96	60 - 140	98	60 - 130	<0.050	ug/g	NC	50		
5456815	1,1,2,2-Tetrachloroethane	2018/03/27	94	60 - 140	97	60 - 130	<0.050	ug/g	NC	50		
5456815	1,1,2-Trichloroethane	2018/03/27	100	60 - 140	103	60 - 130	<0.050	ug/g	NC	50		
5456815	1,1-Dichloroethane	2018/03/27	98	60 - 140	100	60 - 130	<0.050	ug/g	NC	50		
5456815	1,1-Dichloroethylene	2018/03/27	98	60 - 140	101	60 - 130	<0.050	ug/g	NC	50		
5456815	1,2-Dichlorobenzene	2018/03/27	97	60 - 140	99	60 - 130	<0.050	ug/g	NC	50		
5456815	1,2-Dichloroethane	2018/03/27	95	60 - 140	99	60 - 130	<0.050	ug/g	NC	50		
5456815	1,2-Dichloropropane	2018/03/27	92	60 - 140	95	60 - 130	<0.050	ug/g	NC	50		
5456815	1,3-Dichlorobenzene	2018/03/27	99	60 - 140	101	60 - 130	<0.050	ug/g	NC	50		
5456815	1,4-Dichlorobenzene	2018/03/27	100	60 - 140	101	60 - 130	<0.050	ug/g	NC	50		
5456815	Acetone (2-Propanone)	2018/03/27	86	60 - 140	88	60 - 140	<0.50	ug/g	NC	50		
5456815	Benzene	2018/03/27	93	60 - 140	96	60 - 130	<0.020	ug/g	NC	50		
5456815	Bromodichloromethane	2018/03/27	94	60 - 140	97	60 - 130	<0.050	ug/g	NC	50		
5456815	Bromoform	2018/03/27	94	60 - 140	98	60 - 130	<0.050	ug/g	NC	50		
5456815	Bromomethane	2018/03/27	95	60 - 140	101	60 - 140	<0.050	ug/g	NC	50		
5456815	Carbon Tetrachloride	2018/03/27	96	60 - 140	98	60 - 130	<0.050	ug/g	NC	50		
5456815	Chlorobenzene	2018/03/27	97	60 - 140	100	60 - 130	<0.050	ug/g	NC	50		



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QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 161413446
Site Location: 100 WILMOT LINE, WATERLOO, ONT
Sampler Initials: TS

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5456815	Chloroform	2018/03/27	94	60 - 140	97	60 - 130	<0.050	ug/g	NC	50		
5456815	cis-1,2-Dichloroethylene	2018/03/27	93	60 - 140	97	60 - 130	<0.050	ug/g	NC	50		
5456815	cis-1,3-Dichloropropene	2018/03/27	88	60 - 140	95	60 - 130	<0.030	ug/g	NC	50		
5456815	Dibromochloromethane	2018/03/27	95	60 - 140	98	60 - 130	<0.050	ug/g	NC	50		
5456815	Dichlorodifluoromethane (FREON 12)	2018/03/27	88	60 - 140	92	60 - 140	<0.050	ug/g	NC	50		
5456815	Ethylbenzene	2018/03/27	98	60 - 140	100	60 - 130	<0.020	ug/g	NC	50		
5456815	Ethylene Dibromide	2018/03/27	94	60 - 140	98	60 - 130	<0.050	ug/g	NC	50		
5456815	F1 (C6-C10) - BTEX	2018/03/27					<10	ug/g	NC	30		
5456815	F1 (C6-C10)	2018/03/27	105	60 - 140	94	80 - 120	<10	ug/g	NC	30		
5456815	Hexane	2018/03/27	94	60 - 140	97	60 - 130	<0.050	ug/g	NC	50		
5456815	Methyl Ethyl Ketone (2-Butanone)	2018/03/27	91	60 - 140	94	60 - 140	<0.50	ug/g	NC	50		
5456815	Methyl Isobutyl Ketone	2018/03/27	92	60 - 140	96	60 - 130	<0.50	ug/g	NC	50		
5456815	Methyl t-butyl ether (MTBE)	2018/03/27	93	60 - 140	97	60 - 130	<0.050	ug/g	NC	50		
5456815	Methylene Chloride(Dichloromethane)	2018/03/27	97	60 - 140	100	60 - 130	<0.050	ug/g	NC	50		
5456815	o-Xylene	2018/03/27	97	60 - 140	99	60 - 130	<0.020	ug/g	NC	50		
5456815	p+m-Xylene	2018/03/27	96	60 - 140	98	60 - 130	<0.020	ug/g	NC	50		
5456815	Styrene	2018/03/27	96	60 - 140	98	60 - 130	<0.050	ug/g	NC	50		
5456815	Tetrachloroethylene	2018/03/27	99	60 - 140	100	60 - 130	<0.050	ug/g	NC	50		
5456815	Toluene	2018/03/27	97	60 - 140	99	60 - 130	<0.020	ug/g	NC	50		
5456815	Total Xylenes	2018/03/27					<0.020	ug/g	NC	50		
5456815	trans-1,2-Dichloroethylene	2018/03/27	93	60 - 140	96	60 - 130	<0.050	ug/g	NC	50		
5456815	trans-1,3-Dichloropropene	2018/03/27	95	60 - 140	104	60 - 130	<0.040	ug/g	NC	50		
5456815	Trichloroethylene	2018/03/27	94	60 - 140	96	60 - 130	<0.050	ug/g	NC	50		
5456815	Trichlorofluoromethane (FREON 11)	2018/03/27	96	60 - 140	98	60 - 130	<0.050	ug/g	NC	50		
5456815	Vinyl Chloride	2018/03/27	101	60 - 140	103	60 - 130	<0.020	ug/g	NC	50		
5457018	F2 (C10-C16 Hydrocarbons)	2018/03/27	107	50 - 130	103	80 - 120	<10	ug/g	NC	30		
5457018	F3 (C16-C34 Hydrocarbons)	2018/03/27	108	50 - 130	105	80 - 120	<50	ug/g	NC	30		
5457018	F4 (C34-C50 Hydrocarbons)	2018/03/27	106	50 - 130	103	80 - 120	<50	ug/g	NC	30		
5458069	1-Methylnaphthalene	2018/03/27	108	50 - 130	108	50 - 130	<0.0050	ug/g	NC	40		
5458069	2-Methylnaphthalene	2018/03/27	92	50 - 130	93	50 - 130	<0.0050	ug/g	NC	40		
5458069	Acenaphthene	2018/03/27	97	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40		



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QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 161413446
Site Location: 100 WILMOT LINE, WATERLOO, ONT
Sampler Initials: TS

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5458069	Acenaphthylene	2018/03/27	94	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40		
5458069	Anthracene	2018/03/27	95	50 - 130	96	50 - 130	<0.0050	ug/g	NC	40		
5458069	Benzo(a)anthracene	2018/03/27	95	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40		
5458069	Benzo(a)pyrene	2018/03/27	85	50 - 130	98	50 - 130	<0.0050	ug/g	NC	40		
5458069	Benzo(b/j)fluoranthene	2018/03/27	92	50 - 130	103	50 - 130	<0.0050	ug/g	NC	40		
5458069	Benzo(g,h,i)perylene	2018/03/27	88	50 - 130	94	50 - 130	<0.0050	ug/g	NC	40		
5458069	Benzo(k)fluoranthene	2018/03/27	90	50 - 130	103	50 - 130	<0.0050	ug/g	NC	40		
5458069	Chrysene	2018/03/27	93	50 - 130	97	50 - 130	<0.0050	ug/g	NC	40		
5458069	Dibenz(a,h)anthracene	2018/03/27	99	50 - 130	105	50 - 130	<0.0050	ug/g	NC	40		
5458069	Fluoranthene	2018/03/27	101	50 - 130	98	50 - 130	<0.0050	ug/g	NC	40		
5458069	Fluorene	2018/03/27	97	50 - 130	101	50 - 130	<0.0050	ug/g	NC	40		
5458069	Indeno(1,2,3-cd)pyrene	2018/03/27	98	50 - 130	94	50 - 130	<0.0050	ug/g	NC	40		
5458069	Naphthalene	2018/03/27	91	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40		
5458069	Phenanthrene	2018/03/27	93	50 - 130	96	50 - 130	<0.0050	ug/g	NC	40		
5458069	Pyrene	2018/03/27	102	50 - 130	98	50 - 130	<0.0050	ug/g	NC	40		
5458215	Moisture	2018/03/27							4.2	20		
5458267	Moisture	2018/03/27							2.4	20		
5458342	Available (CaCl2) pH	2018/03/27			99	97 - 103			0.028	N/A		
5458414	Chromium (VI)	2018/03/28	86	75 - 125	89	80 - 120	<0.2	ug/g	NC	35		
5458514	Moisture	2018/03/27							3.6	20		
5458544	Moisture	2018/03/27							0.82	20		
5458547	Hot Water Ext. Boron (B)	2018/03/27	98	75 - 125	98	75 - 125	<0.050	ug/g	3.3	40		
5458586	Acid Extractable Antimony (Sb)	2018/03/27	86	75 - 125	107	80 - 120	<0.20	ug/g	NC	30		
5458586	Acid Extractable Arsenic (As)	2018/03/27	96	75 - 125	102	80 - 120	<1.0	ug/g	5.9	30		
5458586	Acid Extractable Barium (Ba)	2018/03/27	NC	75 - 125	103	80 - 120	<0.50	ug/g	1.6	30		
5458586	Acid Extractable Beryllium (Be)	2018/03/27	101	75 - 125	104	80 - 120	<0.20	ug/g	4.8	30		
5458586	Acid Extractable Boron (B)	2018/03/27	96	75 - 125	103	80 - 120	<5.0	ug/g	11	30		
5458586	Acid Extractable Cadmium (Cd)	2018/03/27	101	75 - 125	103	80 - 120	<0.10	ug/g	15	30		
5458586	Acid Extractable Chromium (Cr)	2018/03/27	98	75 - 125	98	80 - 120	<1.0	ug/g	2.6	30		
5458586	Acid Extractable Cobalt (Co)	2018/03/27	94	75 - 125	99	80 - 120	<0.10	ug/g	3.0	30		
5458586	Acid Extractable Copper (Cu)	2018/03/27	92	75 - 125	97	80 - 120	<0.50	ug/g	0.90	30		



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Stantec Consulting Ltd
Client Project #: 161413446
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Sampler Initials: TS

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5458586	Acid Extractable Lead (Pb)	2018/03/27	99	75 - 125	103	80 - 120	<1.0	ug/g	3.0	30		
5458586	Acid Extractable Mercury (Hg)	2018/03/27	96	75 - 125	103	80 - 120	<0.050	ug/g	NC	30		
5458586	Acid Extractable Molybdenum (Mo)	2018/03/27	100	75 - 125	103	80 - 120	<0.50	ug/g	NC	30		
5458586	Acid Extractable Nickel (Ni)	2018/03/27	95	75 - 125	98	80 - 120	<0.50	ug/g	0.38	30		
5458586	Acid Extractable Selenium (Se)	2018/03/27	100	75 - 125	105	80 - 120	<0.50	ug/g	NC	30		
5458586	Acid Extractable Silver (Ag)	2018/03/27	99	75 - 125	102	80 - 120	<0.20	ug/g	NC	30		
5458586	Acid Extractable Thallium (Tl)	2018/03/27	97	75 - 125	101	80 - 120	<0.050	ug/g	7.1	30		
5458586	Acid Extractable Uranium (U)	2018/03/27	97	75 - 125	101	80 - 120	<0.050	ug/g	4.2	30		
5458586	Acid Extractable Vanadium (V)	2018/03/27	NC	75 - 125	97	80 - 120	<5.0	ug/g	4.8	30		
5458586	Acid Extractable Zinc (Zn)	2018/03/27	NC	75 - 125	100	80 - 120	<5.0	ug/g	2.0	30		
5458630	Conductivity	2018/03/28			99	90 - 110	<0.002	mS/cm	3.0	10		
5458762	F2 (C10-C16 Hydrocarbons)	2018/03/28	88	50 - 130	89	80 - 120	<10	ug/g	NC	30		
5458762	F3 (C16-C34 Hydrocarbons)	2018/03/28	93	50 - 130	95	80 - 120	<50	ug/g	NC	30		
5458762	F4 (C34-C50 Hydrocarbons)	2018/03/28	96	50 - 130	96	80 - 120	<50	ug/g	NC	30		
5458781	1-Methylnaphthalene	2018/03/27	111	50 - 130	109	50 - 130	<0.0050	ug/g	NC	40		
5458781	2-Methylnaphthalene	2018/03/27	93	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40		
5458781	Acenaphthene	2018/03/27	90	50 - 130	89	50 - 130	<0.0050	ug/g	NC	40		
5458781	Acenaphthylene	2018/03/27	98	50 - 130	89	50 - 130	<0.0050	ug/g	NC	40		
5458781	Anthracene	2018/03/27	88	50 - 130	80	50 - 130	<0.0050	ug/g	NC	40		
5458781	Benzo(a)anthracene	2018/03/27	96	50 - 130	88	50 - 130	<0.0050	ug/g	NC	40		
5458781	Benzo(a)pyrene	2018/03/27	91	50 - 130	89	50 - 130	<0.0050	ug/g	NC	40		
5458781	Benzo(b,j)fluoranthene	2018/03/27	83	50 - 130	89	50 - 130	<0.0050	ug/g	NC	40		
5458781	Benzo(g,h,i)perylene	2018/03/27	87	50 - 130	90	50 - 130	<0.0050	ug/g	NC	40		
5458781	Benzo(k)fluoranthene	2018/03/27	98	50 - 130	86	50 - 130	<0.0050	ug/g	NC	40		
5458781	Chrysene	2018/03/27	93	50 - 130	89	50 - 130	<0.0050	ug/g	NC	40		
5458781	Dibenz(a,h)anthracene	2018/03/27	94	50 - 130	96	50 - 130	<0.0050	ug/g	NC	40		
5458781	Fluoranthene	2018/03/27	115	50 - 130	106	50 - 130	<0.0050	ug/g	NC	40		
5458781	Fluorene	2018/03/27	97	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40		
5458781	Indeno(1,2,3-cd)pyrene	2018/03/27	94	50 - 130	96	50 - 130	<0.0050	ug/g	NC	40		
5458781	Naphthalene	2018/03/27	89	50 - 130	89	50 - 130	<0.0050	ug/g	NC	40		
5458781	Phenanthrene	2018/03/27	93	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40		



Maxxam Job #: B864886
Report Date: 2018/03/29

QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 161413446
Site Location: 100 WILMOT LINE, WATERLOO, ONT
Sampler Initials: TS

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5458781	Pyrene	2018/03/27	114	50 - 130	107	50 - 130	<0.0050	ug/g	NC	40		
5459142	WAD Cyanide (Free)	2018/03/28	90	75 - 125	98	80 - 120	<0.01	ug/g	NC	35		
5459157	WAD Cyanide (Free)	2018/03/28	93	75 - 125	98	80 - 120	<0.01	ug/g	NC	35		
5460135	Available (CaCl2) pH	2018/03/28			100	97 - 103			0.048	N/A		
5460381	Conductivity	2018/03/28			100	90 - 110	<0.002	mS/cm	1.1	10		
5460489	Soluble (1:1) pH	2018/03/28			101	N/A			0.028	N/A	102	96 - 104
5462478	F4G-sg (Grav. Heavy Hydrocarbons)	2018/03/29	106	65 - 135	101	65 - 135	<100	ug/g	0	50		

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).

VALIDATION SIGNATURE PAGE

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

Cristina Carriere

Cristina Carriere, Scientific Service Specialist

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 Maxxam Analytical International Corporation a/k/a Maxxam Analytics
 1040 Campbell Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 917-5700 Toll-free: 800-563-6266 Fax: (905) 917-5777 www.maxxam.ca

IMMEDIATE

Company Name: #9197 Stantec Consulting Ltd
 Contact Name: Accounts Payable
 Address: 300 Hagey Blvd Suite 100
 Waterloo ON N2L 0A4
 Phone: (519) 579-4410 x
 Email: accounts.payable.invoices@stantec.com

Company Name: Travis Pawlick
 Contact Name: Travis Pawlick
 Address: (519) 585-7468 x
 Email: Travis.Pawlick@stantec.com

PROJECT INFORMATION:
 Quotation #: B77373
 Task #: 803
 Project #: 161413446
 Profit Centre: 1614
 Site #: 100 Wilmot Line, Waterloo, Ont
 Sampled By: TS

22-Mar-18 15:25
 Augustyna Dobosz
 B864886
 MAF ENV-878
 CUL #:
 C8654439-08-01

Page 1 of 2
 ly: Bottle Order #: B864886
 Project Manager: Augustyna Dobosz

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/Part ☐ Medium/Fine
☐ Table 2 ☐ Sed/Coarse ☐ 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

Field Filled (please circle):
 Metals / Hg / Cr-VI
☐ D Reg 153 VOCs by HS & T-1-4
☐ D Reg 153 PCBs
☐ D Reg 153 Metals & Inorganic P
☐ pH (1-11 water)
☐ Alkalinity
☐ D Reg 153 TCLP Semi-Volatile
☐ D Reg 558 TCLP Volatile Organics HS
☐ D Reg 558 TCLP Inorganic Package
☐ D Reg 153 PCBs

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 Dissolved Solids 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 Filled (please circle):	D Reg 153 VOCs by HS & T-1-4	D Reg 153 PCBs	D Reg 153 Metals & Inorganic P	pH (1-11 water)	Alkalinity	D Reg 153 TCLP Semi-Volatile	D Reg 558 TCLP Volatile Organics HS	D Reg 558 TCLP Inorganic Package	D Reg 153 PCBs	# of Bottles	Comments
1	MW18-1-2	2018/03/19	805	SOIL	nk		X	X							3	
2	MW18-1-6	2018/03/19	835	SO		X			X						34	
3	MW18-2-2	2018/03/19	945	SO		X	X								3	
4	MW18-2-6	2018/03/19	1005	SO		X			X						4	
5	MW18-2-1	2018/03/19	940	SO				X							1	
6	MW18-2-5	2018/03/19	1000	SO				X							4	
7	MW18-3-4	2018/03/19	1250	SO		X									4	
8	MW18-4-4	2018/03/19	1430	SO		X			X						4	
9	BH18-5-1	2018/03/19	900	SO			X	X							4	4
10	BH18-5-2	2018/03/19	905	SO	✓	X									4	

RELINQUISHED BY: (Signature/Print) *ATP* Date: (YY/MM/DD) 2018/03/22 Time: 9:00
 RECEIVED BY: (Signature/Print) *DOBOSZ* Date: (YY/MM/DD) 2018/03/22 Time: 15:25

Jars used and not submitted: 0
 Laboratory Use Only:
 Time Sensitive: 3/10/2
 Temperature (°C) on Receipt: 15
 Custody Seal: Yes No
 Intact: Yes No

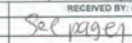
White: Maxxam Yellow: Client

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

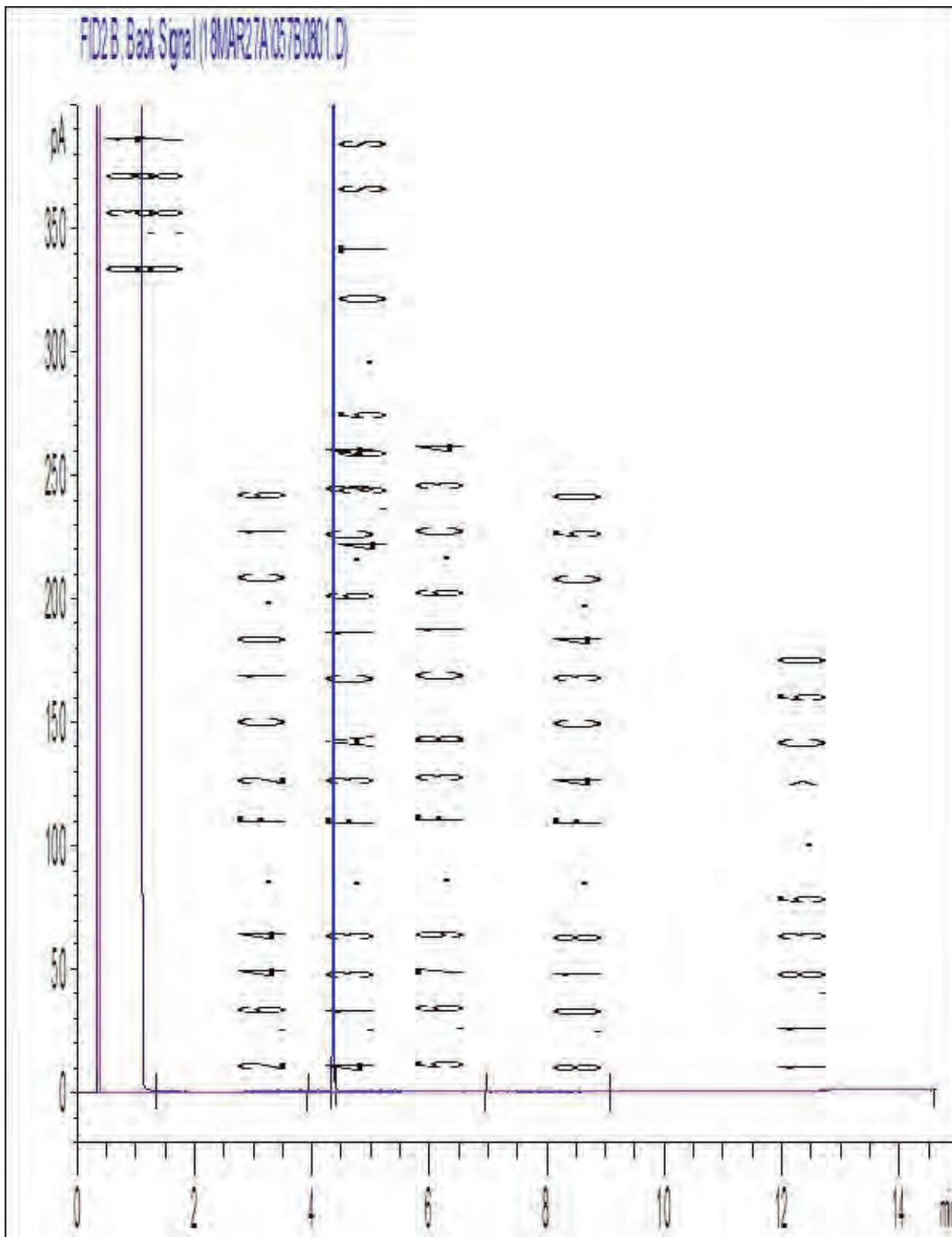
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Maxxam Analytical International Corporation a/k/a Maxxam Analytics

hw #422329

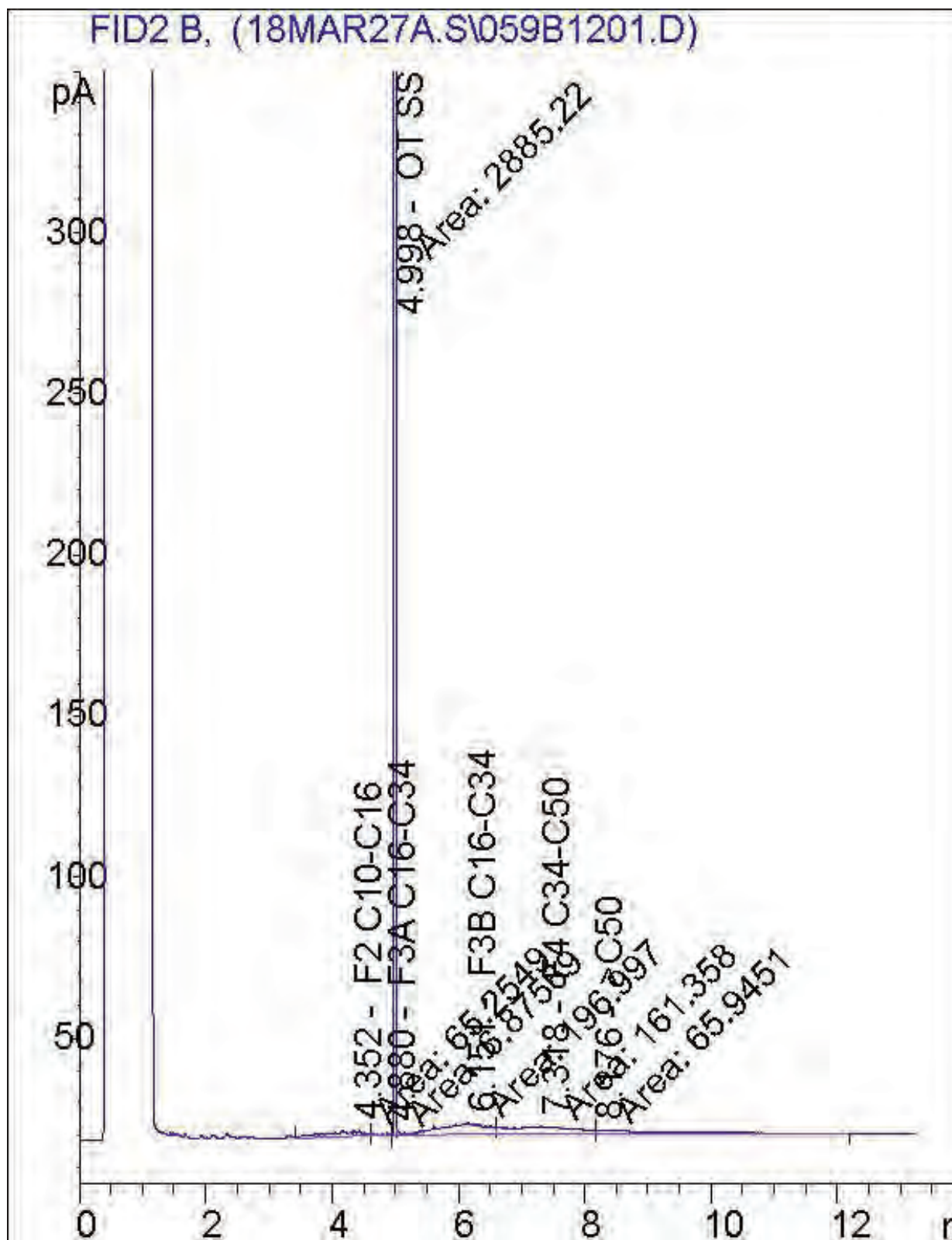
Maxxam		Maxxam Analytics International Corporation or its Maxxam Analytics		STANTEC CHAIN OF CUSTODY RECORD		Page 2 of 2	
INVOICE INFORMATION: Company Name: 99197 Stantec Consulting Ltd Contact Name: Accounts Payable Address: 300 Hager Blvd Suite 100 Waterloo ON N2L 0A4 Phone: (519) 579-4410 x Email: accounts.payable.invoices@stantec.com		REPORT INFORMATION (if differs from invoice): Company Name: Travis Pawlick Contact Name: Travis Pawlick Address: (519) 585-7468 x Email: Travis.Pawlick@stantec.com		PROJECT INFORMATION: Quotation #: B77373 Task #: 803 Project #: 161413446 Project Centre: 1614 Site #: 100 Wilnot Line, Waterloo, Ont Sampled By: T.S.		Laboratory Use Only: Maxxam Job #: 8864 8864 Bottle Order #: 654439 CDC #:  Project Manager: Augustyna Dobosz	
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 ☐ Table 2 ☐ Table 3 ☐ Table		Other Regulations ☐ CCME ☐ Reg 555 ☐ MISA ☐ PHQG ☐ Other		Special Instructions Field Filtered (please circle): Metals / Hg / Cr VI O Reg 153 VOCs by HS & F-1-4 O Reg 153 Metals O Reg 153 Metals & Inorganics Pkg pH (1-1 extract) Ignitability O Reg 558 TCLP Semi-Volatile Organics O Reg 558 TCLP Volatile Organics HS O Reg 558 TCLP Inorganics Package O Reg 153 PCBs		Turnaround Time (TAT) Required: Please provide Advance Notice for Rush projects Regular (Standard) TAT: (not applicable 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 Dissolved Phosphorus 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 for details)	
Include Criteria on Certificate of Analysis (Y/N)? ☒							
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix			
1	BH18-6-1	2018/03/19	9:10	SOIL	n/a	X	43
2	BH18-6-2	2018/03/19	9:15	SOIL	X	X	4
3	BH18-7-1	2018/03/19	12:00	SOIL	X	X	4
4	BH18-8-1	2018/03/19	11:40	SOIL	X	X	4
5	BH18-8-2	2018/03/19	11:50	SOIL	X		4
6	BH18-9-4	2018/03/19	11:10	SOIL	X		4
7	QC-2	2018/03/19	10:00	SOIL	X	X	3
8	QC-1	2018/03/19	9:30	SOIL		X	1
9				SOIL			
10				SOIL			
RELINQUISHED BY: (Signature/Print) 		RECEIVED BY: (Signature/Print) 		Date: (YYMMDD) 2018/03/22		Time 9:00	
Time Set/ative 9:00		Time 9:00		# jars used and not submitted 6		Laboratory Use Only Time Set/ative Temperature (°C) on Race 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/MP-CONTENT/UPLOADS/ONTARIO-COC.PDF. SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM. White: Maxxam Yellow: Client							

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.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

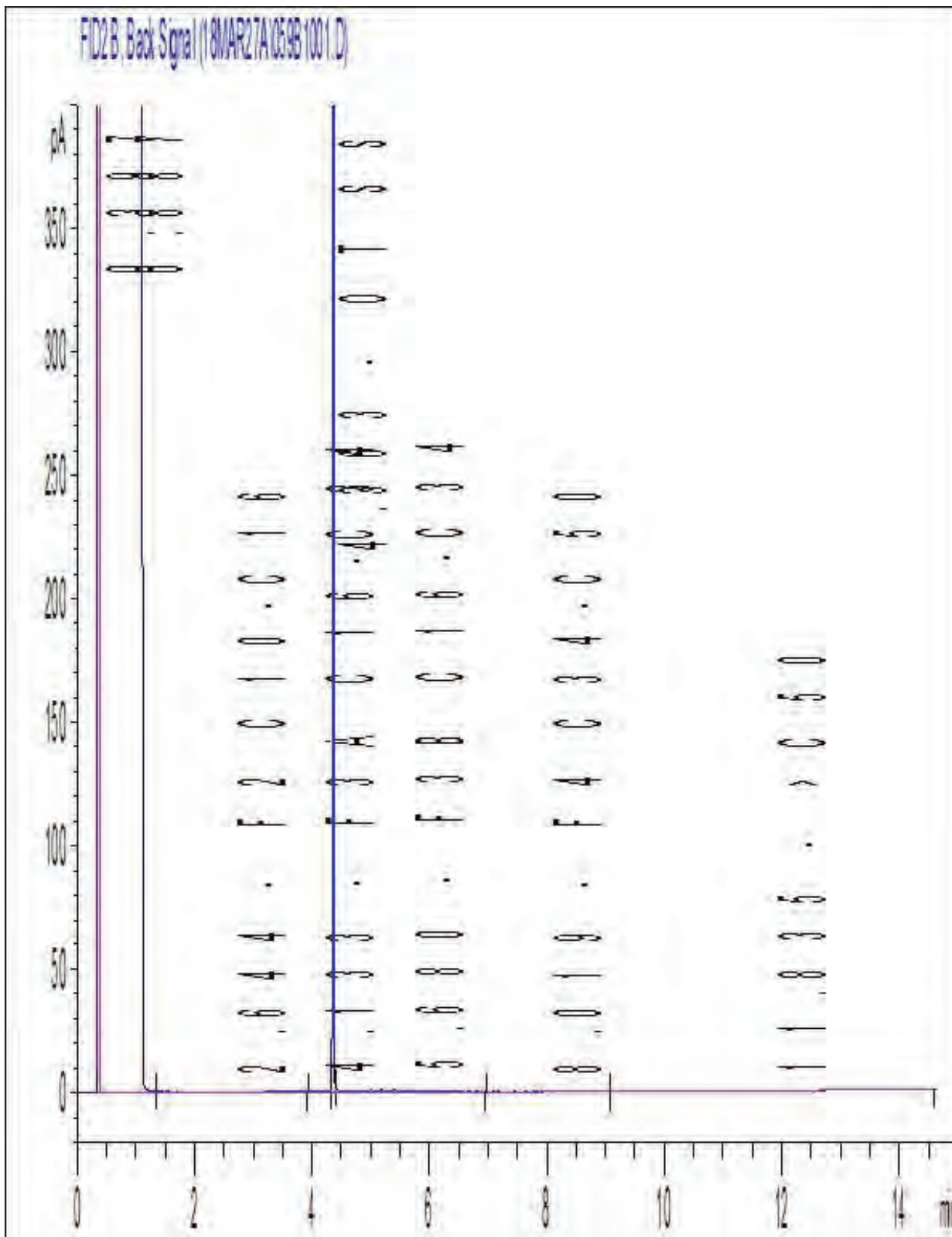


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Chromatogram showing detector response (pA) versus time (min). The plot displays several sharp peaks at retention times 2.644, 4.133, 5.679, 8.018, and 11.835 minutes. Each peak is labeled with its retention time and a corresponding sample identifier: F2C10C16, F3AC16C16, F3BC16C16, F4C34C50, and C50 respectively. The baseline is stable at approximately 350 pA.

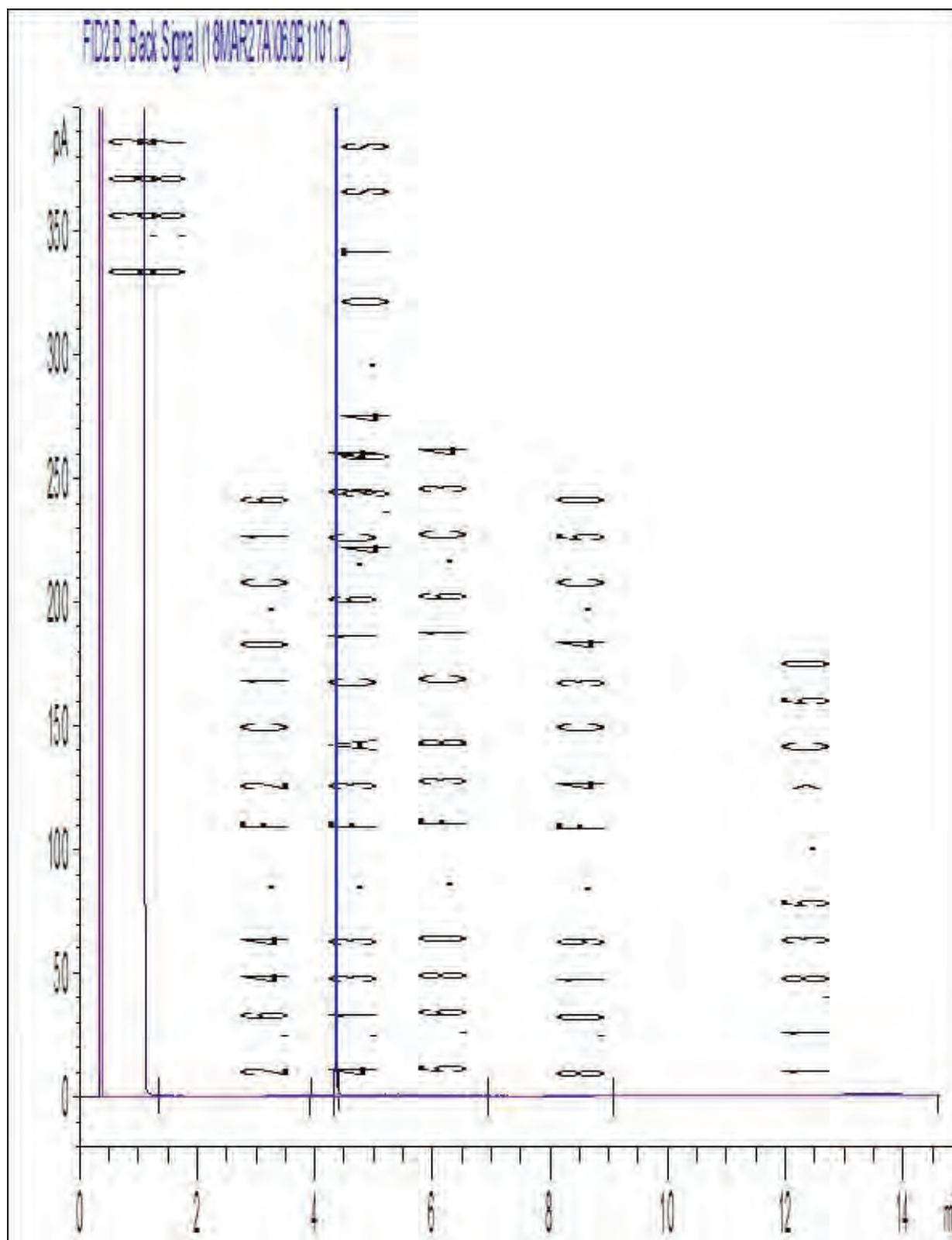
Page 36 of 45

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



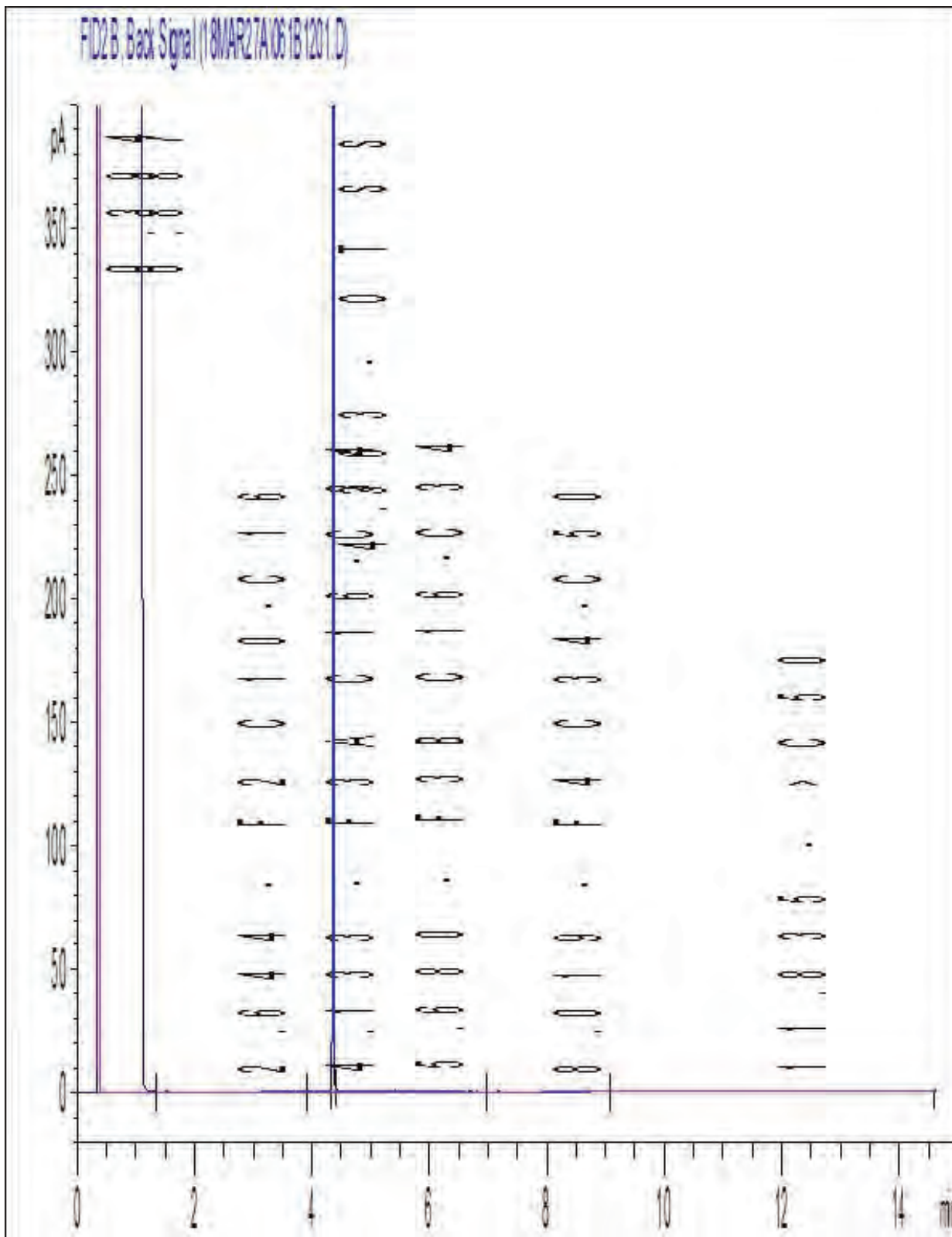
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



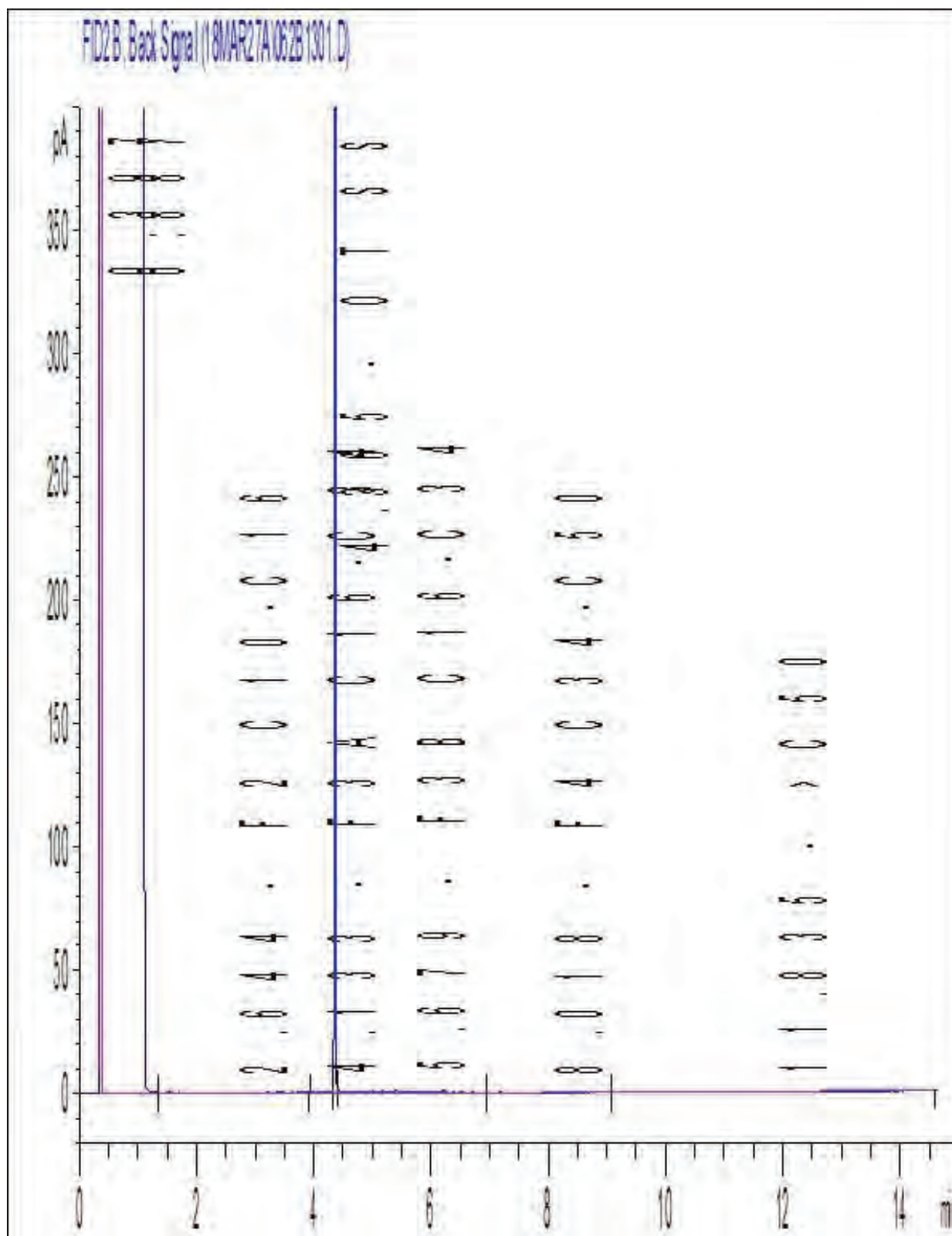
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Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



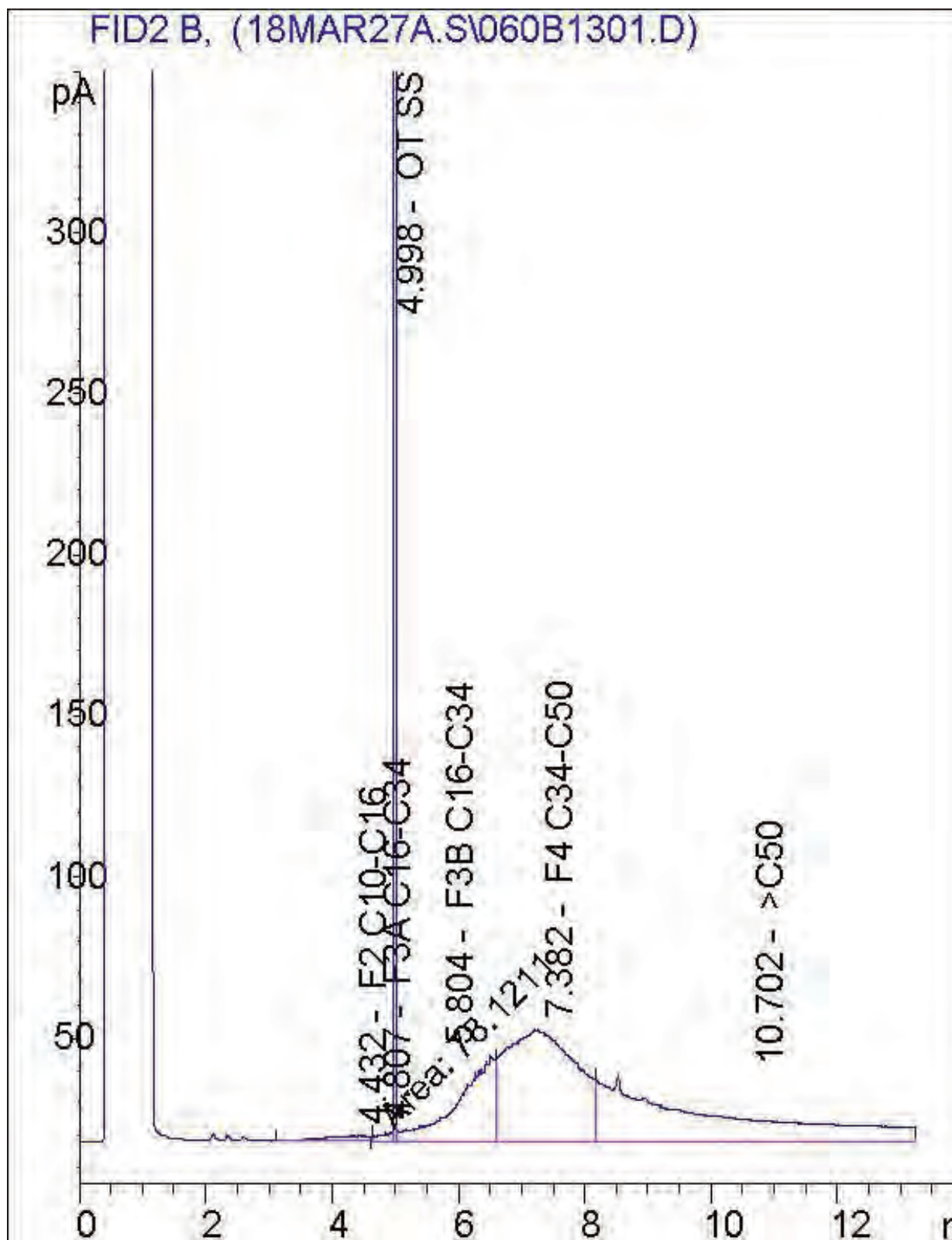
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Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



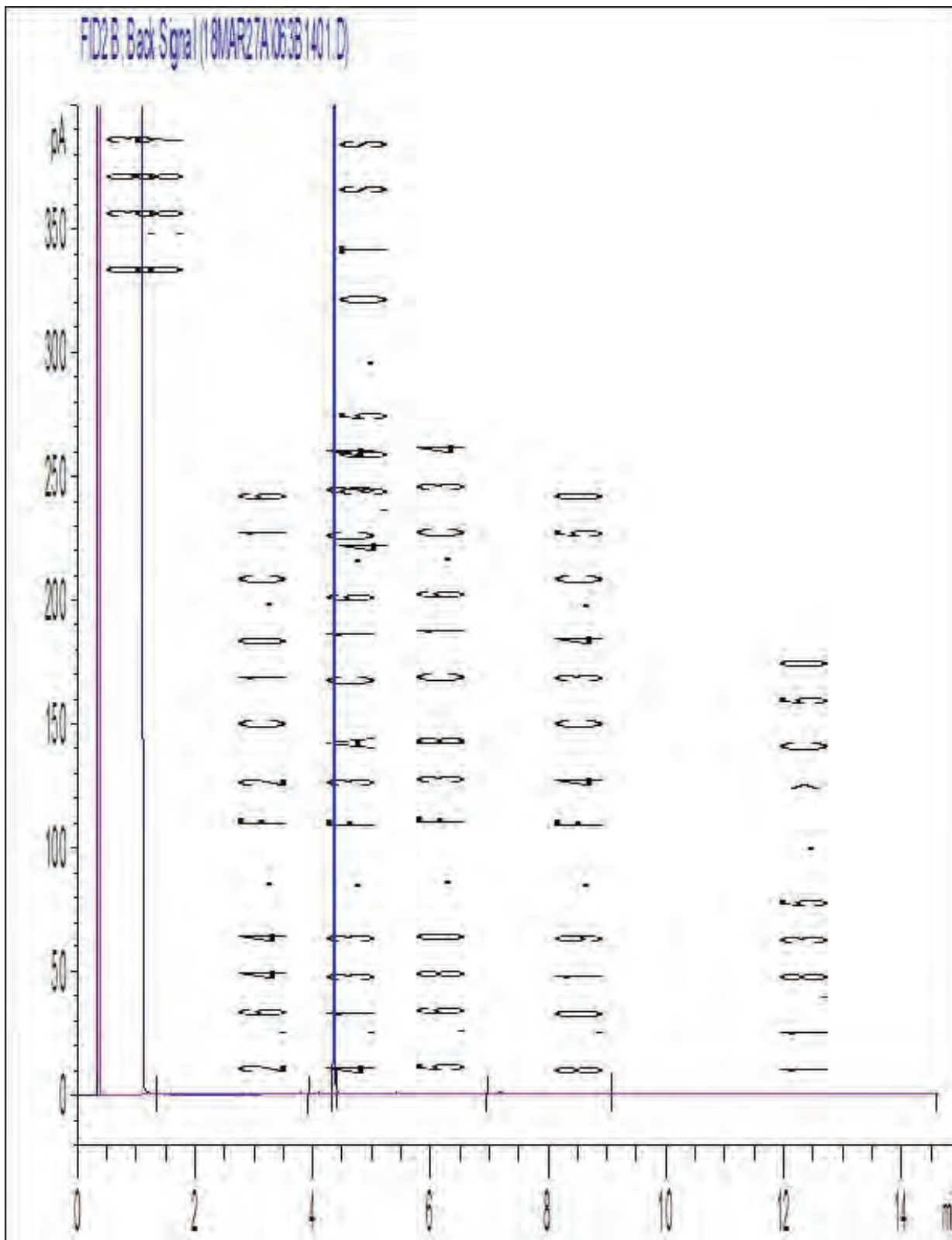
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Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



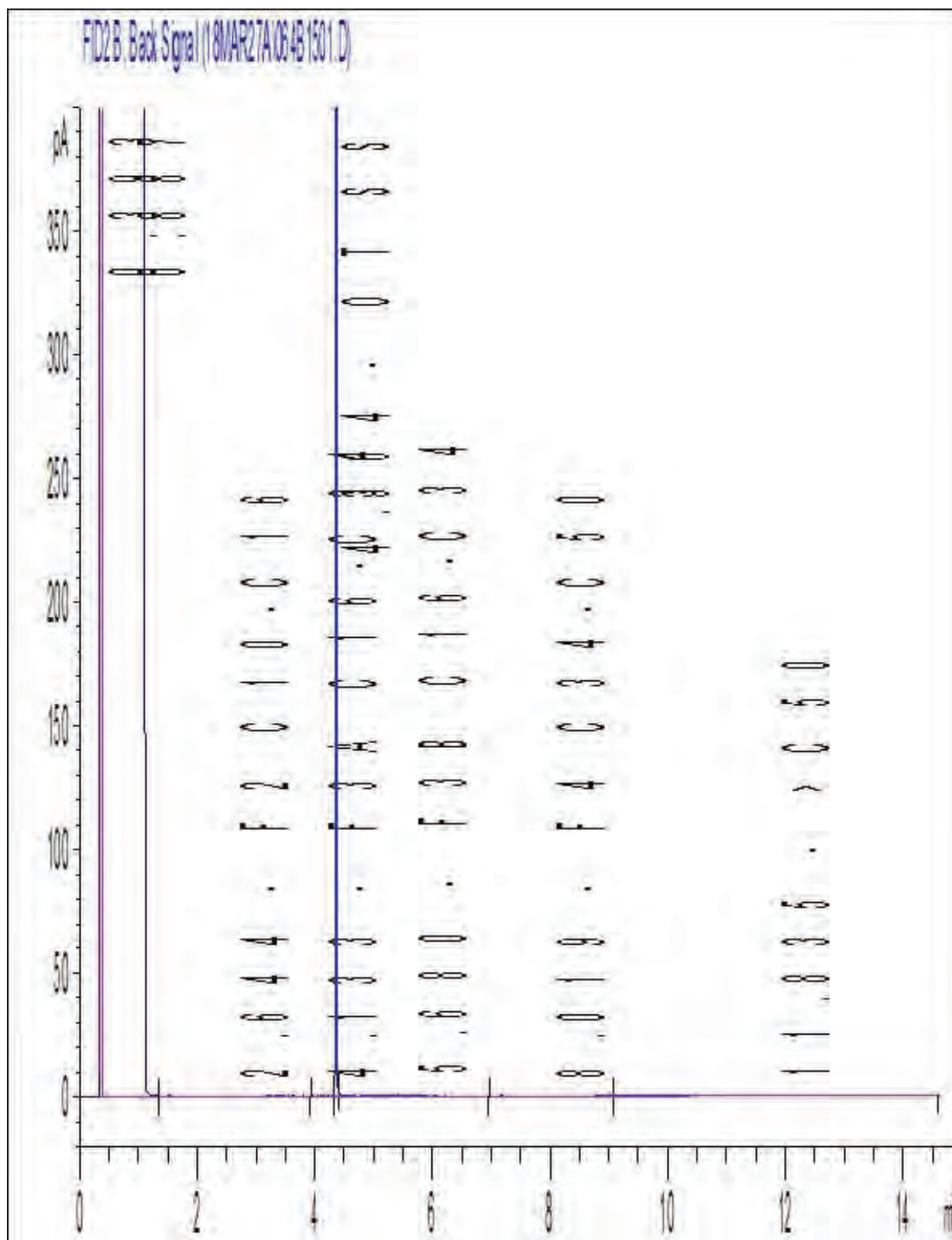
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Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



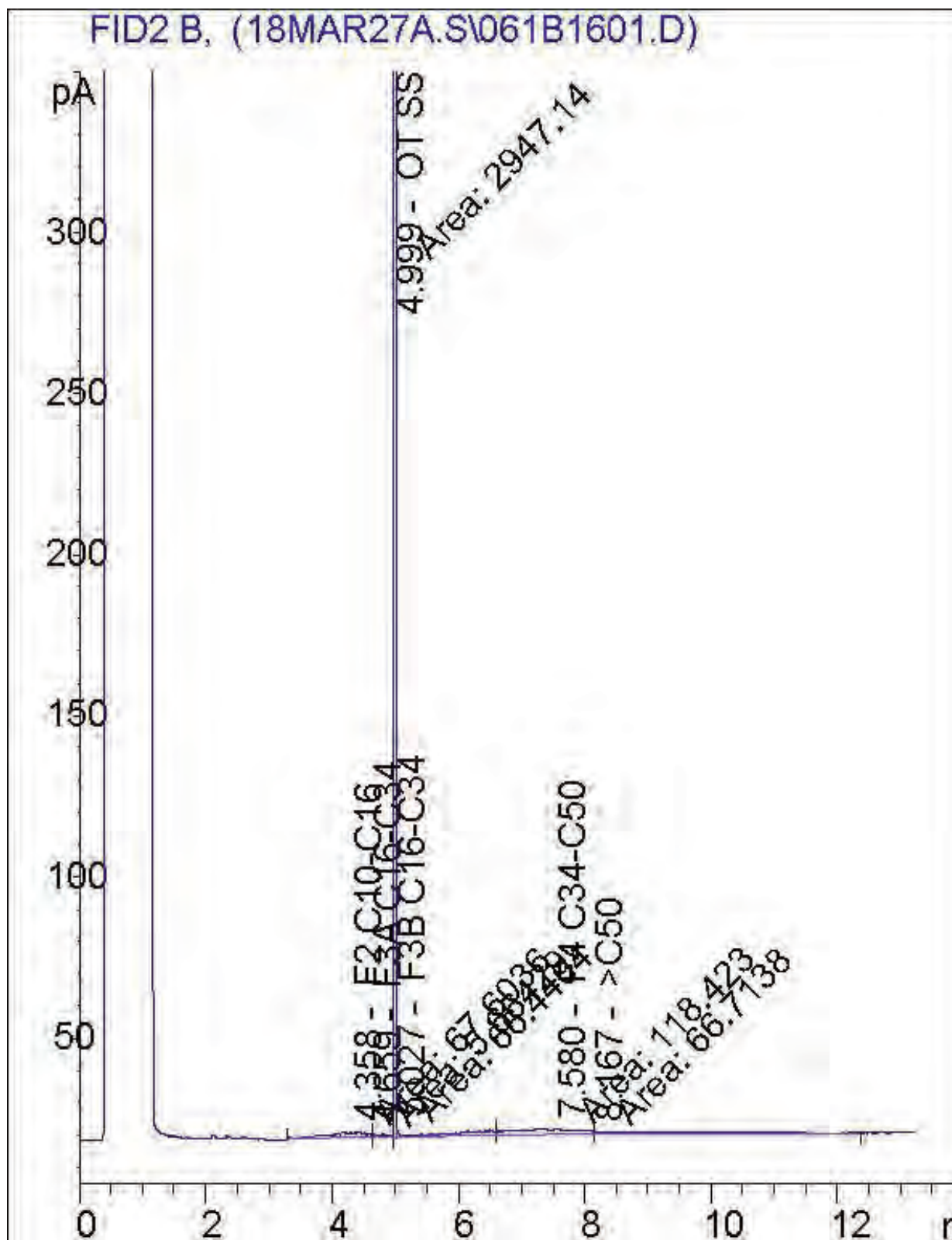
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Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



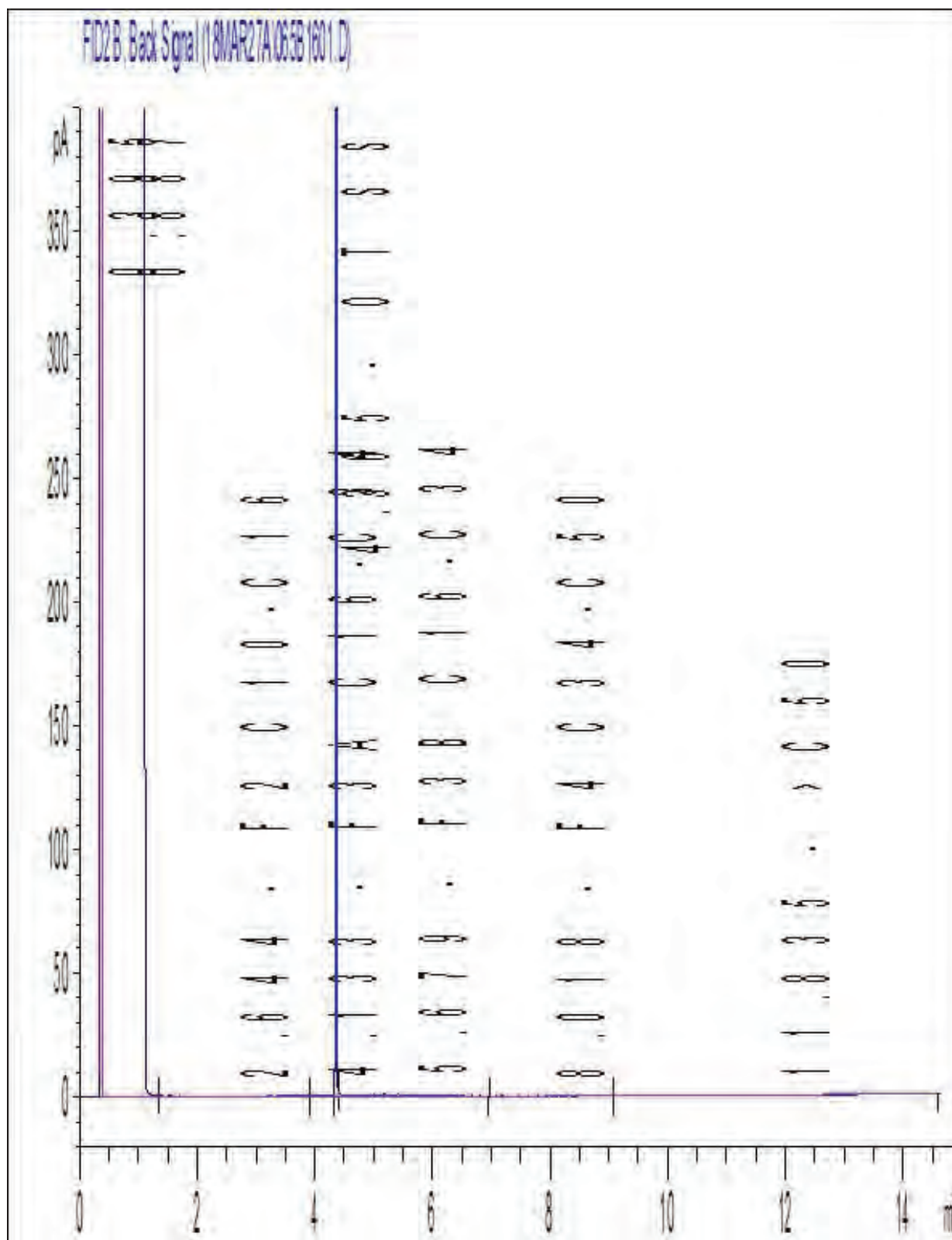
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Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



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

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.

Your Project #: 161413446
Site Location: 100 WILMOT LINE, ONTARIO
Your C.O.C. #: 657718-01-01

Attention: Travis Pawlick

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
N2L 0A4

Report Date: 2018/04/19
Report #: R5083939
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B882096

Received: 2018/04/12, 10:49

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum	2	N/A	2018/04/17	CAM SOP-00301	EPA 8270D m
Methylnaphthalene Sum	1	N/A	2018/04/18	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum	6	N/A	2018/04/18		EPA 8260C m
Chloride by Automated Colourimetry	3	N/A	2018/04/16	CAM SOP-00463	EPA 325.2 m
Chromium (VI) in Water	3	N/A	2018/04/17	CAM SOP-00436	EPA 7199 m
Free (WAD) Cyanide	3	N/A	2018/04/13	CAM SOP-00457	OMOE E3015 m
Petroleum Hydrocarbons F2-F4 in Water (1)	3	2018/04/16	2018/04/17	CAM SOP-00316	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	1	2018/04/17	2018/04/17	CAM SOP-00316	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	2018/04/17	2018/04/18	CAM SOP-00316	CCME PHC-CWS m
Mercury	3	2018/04/16	2018/04/18	CAM SOP-00453	EPA 7470A m
Dissolved Metals by ICPMS	3	N/A	2018/04/13	CAM SOP-00447	EPA 6020B m
PAH Compounds in Water by GC/MS (SIM)	3	2018/04/16	2018/04/17	CAM SOP-00318	EPA 8270D m
Volatile Organic Compounds and F1 PHCs	6	N/A	2018/04/17	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.

Your Project #: 161413446
Site Location: 100 WILMOT LINE, ONTARIO
Your C.O.C. #: 657718-01-01

Attention: Travis Pawlick

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
N2L 0A4

Report Date: 2018/04/19
Report #: R5083939
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B882096

Received: 2018/04/12, 10:49

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.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Augustyna Dobosz, Project Manager

Email: ADobosz@maxxam.ca

Phone# (905)817-5700 Ext:5798

=====

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.

O.REG 153 METALS & INORGANICS PKG (WTR)

Maxxam ID		GLC899	GLC900	GLC903		
Sampling Date		2018/04/11 09:45	2018/04/11 10:45	2018/04/11 11:00		
COC Number		657718-01-01	657718-01-01	657718-01-01		
	UNITS	MW18-1	MW18-2	QC-1	RDL	QC Batch
Inorganics						
WAD Cyanide (Free)	ug/L	<1	<1	<1	1	5483886
Dissolved Chloride (Cl)	mg/L	82	83	80	1.0	5484545
Metals						
Chromium (VI)	ug/L	0.58	<0.50	0.56	0.50	5482462
Mercury (Hg)	ug/L	<0.1	<0.1	<0.1	0.1	5485695
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	5483417
Dissolved Arsenic (As)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	5483417
Dissolved Barium (Ba)	mg/L	0.10	0.10	0.10	0.0020	5483417
Dissolved Beryllium (Be)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	5483417
Dissolved Boron (B)	mg/L	0.028	0.027	0.028	0.010	5483417
Dissolved Cadmium (Cd)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	5483417
Dissolved Chromium (Cr)	mg/L	<0.0050	<0.0050	<0.0050	0.0050	5483417
Dissolved Cobalt (Co)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	5483417
Dissolved Copper (Cu)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	5483417
Dissolved Lead (Pb)	mg/L	<0.00050	<0.00050	<0.00050	0.00050	5483417
Dissolved Molybdenum (Mo)	mg/L	0.0018	0.0021	0.0020	0.00050	5483417
Dissolved Nickel (Ni)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	5483417
Dissolved Selenium (Se)	mg/L	<0.0020	<0.0020	<0.0020	0.0020	5483417
Dissolved Silver (Ag)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	5483417
Dissolved Sodium (Na)	mg/L	41	40	41	0.10	5483417
Dissolved Thallium (Tl)	mg/L	<0.000050	<0.000050	<0.000050	0.000050	5483417
Dissolved Uranium (U)	mg/L	0.0025	0.0025	0.0025	0.00010	5483417
Dissolved Vanadium (V)	mg/L	0.0015	0.0010	0.0012	0.00050	5483417
Dissolved Zinc (Zn)	mg/L	<0.0050	<0.0050	<0.0050	0.0050	5483417
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

O.REG 153 PAHS (WATER)

Maxxam ID		GLC899	GLC900	GLC903			GLC903		
Sampling Date		2018/04/11 09:45	2018/04/11 10:45	2018/04/11 11:00			2018/04/11 11:00		
COC Number		657718-01-01	657718-01-01	657718-01-01			657718-01-01		
	UNITS	MW18-1	MW18-2	QC-1	RDL	QC Batch	QC-1 Lab-Dup	RDL	QC Batch

Calculated Parameters									
Methylnaphthalene, 2-(1-)	ug/L	<0.071	<0.071	<0.071	0.071	5480968			
Polyaromatic Hydrocarbons									
Acenaphthene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
Anthracene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
Benzo(a)anthracene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	0.010	5486386	<0.010	0.010	5486386
Benzo(b/j)fluoranthene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
Chrysene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
Fluoranthene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
Fluorene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
Naphthalene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
Phenanthrene	ug/L	<0.030	<0.030	<0.030	0.030	5486386	<0.030	0.030	5486386
Pyrene	ug/L	<0.050	<0.050	<0.050	0.050	5486386	<0.050	0.050	5486386
Surrogate Recovery (%)									
D10-Anthracene	%	92	93	87		5486386	92		5486386
D14-Terphenyl (FS)	%	99	97	94		5486386	98		5486386
D8-Acenaphthylene	%	93	94	90		5486386	94		5486386
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate									

O.REG 153 VOCs BY HS & F1-F4 (WATER)

Maxxam ID		GLC899	GLC900		GLC901	GLC902		
Sampling Date		2018/04/11 09:45	2018/04/11 10:45		2018/04/11 11:45	2018/04/11 12:30		
COC Number		657718-01-01	657718-01-01		657718-01-01	657718-01-01		
	UNITS	MW18-1	MW18-2	QC Batch	MW18-3	MW18-4	RDL	QC Batch
Calculated Parameters								
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	<0.50	5481012	<0.50	<0.50	0.50	5481012
Volatile Organics								
Acetone (2-Propanone)	ug/L	<10	<10	5482985	<10	<10	10	5482985
Benzene	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
Bromodichloromethane	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
Bromoform	ug/L	<1.0	<1.0	5482985	<1.0	<1.0	1.0	5482985
Bromomethane	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
Carbon Tetrachloride	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
Chlorobenzene	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
Chloroform	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
Dibromochloromethane	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
1,2-Dichlorobenzene	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
1,3-Dichlorobenzene	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
1,4-Dichlorobenzene	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	<1.0	5482985	<1.0	<1.0	1.0	5482985
1,1-Dichloroethane	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
1,2-Dichloroethane	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
1,1-Dichloroethylene	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
cis-1,2-Dichloroethylene	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
trans-1,2-Dichloroethylene	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
1,2-Dichloropropane	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
cis-1,3-Dichloropropene	ug/L	<0.30	<0.30	5482985	<0.30	<0.30	0.30	5482985
trans-1,3-Dichloropropene	ug/L	<0.40	<0.40	5482985	<0.40	<0.40	0.40	5482985
Ethylbenzene	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
Ethylene Dibromide	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
Hexane	ug/L	<1.0	<1.0	5482985	<1.0	<1.0	1.0	5482985
Methylene Chloride(Dichloromethane)	ug/L	<2.0	<2.0	5482985	<2.0	<2.0	2.0	5482985
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	<10	5482985	<10	<10	10	5482985
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	5482985	<5.0	<5.0	5.0	5482985
Methyl t-butyl ether (MTBE)	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								

O.REG 153 VOCs BY HS & F1-F4 (WATER)

Maxxam ID		GLC899	GLC900		GLC901	GLC902		
Sampling Date		2018/04/11 09:45	2018/04/11 10:45		2018/04/11 11:45	2018/04/11 12:30		
COC Number		657718-01-01	657718-01-01		657718-01-01	657718-01-01		
	UNITS	MW18-1	MW18-2	QC Batch	MW18-3	MW18-4	RDL	QC Batch
Styrene	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
1,1,1,2-Tetrachloroethane	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
1,1,2,2-Tetrachloroethane	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
Tetrachloroethylene	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
Toluene	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
1,1,1-Trichloroethane	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
1,1,2-Trichloroethane	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
Trichloroethylene	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	<0.50	5482985	<0.50	<0.50	0.50	5482985
Vinyl Chloride	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
p+m-Xylene	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
o-Xylene	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
Total Xylenes	ug/L	<0.20	<0.20	5482985	<0.20	<0.20	0.20	5482985
F1 (C6-C10)	ug/L	<25	<25	5482985	<25	<25	25	5482985
F1 (C6-C10) - BTEX	ug/L	<25	<25	5482985	<25	<25	25	5482985
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	5486389	<100	<100	100	5487527
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	5486389	<200	<200	200	5487527
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	5486389	<200	<200	200	5487527
Reached Baseline at C50	ug/L	Yes	Yes	5486389	Yes	Yes		5487527
Surrogate Recovery (%)								
o-Terphenyl	%	102	101	5486389	73	83		5487527
4-Bromofluorobenzene	%	90	92	5482985	89	89		5482985
D4-1,2-Dichloroethane	%	101	100	5482985	102	99		5482985
D8-Toluene	%	96	97	5482985	98	96		5482985
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								

O.REG 153 VOCs BY HS & F1-F4 (WATER)

Maxxam ID		GLC902			GLC903			GLC903		
Sampling Date		2018/04/11 12:30			2018/04/11 11:00			2018/04/11 11:00		
COC Number		657718-01-01			657718-01-01			657718-01-01		
	UNITS	MW18-4 Lab-Dup	RDL	QC Batch	QC-1	RDL	QC Batch	QC-1 Lab-Dup	RDL	QC Batch

Calculated Parameters

1,3-Dichloropropene (cis+trans)	ug/L				<0.50	0.50	5481012			
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Volatile Organics

Acetone (2-Propanone)	ug/L				<10	10	5482985			
Benzene	ug/L				<0.20	0.20	5482985			
Bromodichloromethane	ug/L				<0.50	0.50	5482985			
Bromoform	ug/L				<1.0	1.0	5482985			
Bromomethane	ug/L				<0.50	0.50	5482985			
Carbon Tetrachloride	ug/L				<0.20	0.20	5482985			
Chlorobenzene	ug/L				<0.20	0.20	5482985			
Chloroform	ug/L				<0.20	0.20	5482985			
Dibromochloromethane	ug/L				<0.50	0.50	5482985			
1,2-Dichlorobenzene	ug/L				<0.50	0.50	5482985			
1,3-Dichlorobenzene	ug/L				<0.50	0.50	5482985			
1,4-Dichlorobenzene	ug/L				<0.50	0.50	5482985			
Dichlorodifluoromethane (FREON 12)	ug/L				<1.0	1.0	5482985			
1,1-Dichloroethane	ug/L				<0.20	0.20	5482985			
1,2-Dichloroethane	ug/L				<0.50	0.50	5482985			
1,1-Dichloroethylene	ug/L				<0.20	0.20	5482985			
cis-1,2-Dichloroethylene	ug/L				<0.50	0.50	5482985			
trans-1,2-Dichloroethylene	ug/L				<0.50	0.50	5482985			
1,2-Dichloropropane	ug/L				<0.20	0.20	5482985			
cis-1,3-Dichloropropene	ug/L				<0.30	0.30	5482985			
trans-1,3-Dichloropropene	ug/L				<0.40	0.40	5482985			
Ethylbenzene	ug/L				<0.20	0.20	5482985			
Ethylene Dibromide	ug/L				<0.20	0.20	5482985			
Hexane	ug/L				<1.0	1.0	5482985			
Methylene Chloride(Dichloromethane)	ug/L				<2.0	2.0	5482985			
Methyl Ethyl Ketone (2-Butanone)	ug/L				<10	10	5482985			
Methyl Isobutyl Ketone	ug/L				<5.0	5.0	5482985			
Methyl t-butyl ether (MTBE)	ug/L				<0.50	0.50	5482985			

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

Lab-Dup = Laboratory Initiated Duplicate

O.REG 153 VOCs BY HS & F1-F4 (WATER)

Maxxam ID		GLC902			GLC903			GLC903		
Sampling Date		2018/04/11 12:30			2018/04/11 11:00			2018/04/11 11:00		
COC Number		657718-01-01			657718-01-01			657718-01-01		
	UNITS	MW18-4 Lab-Dup	RDL	QC Batch	QC-1	RDL	QC Batch	QC-1 Lab-Dup	RDL	QC Batch
Styrene	ug/L				<0.50	0.50	5482985			
1,1,1,2-Tetrachloroethane	ug/L				<0.50	0.50	5482985			
1,1,2,2-Tetrachloroethane	ug/L				<0.50	0.50	5482985			
Tetrachloroethylene	ug/L				<0.20	0.20	5482985			
Toluene	ug/L				<0.20	0.20	5482985			
1,1,1-Trichloroethane	ug/L				<0.20	0.20	5482985			
1,1,2-Trichloroethane	ug/L				<0.50	0.50	5482985			
Trichloroethylene	ug/L				<0.20	0.20	5482985			
Trichlorofluoromethane (FREON 11)	ug/L				<0.50	0.50	5482985			
Vinyl Chloride	ug/L				<0.20	0.20	5482985			
p+m-Xylene	ug/L				<0.20	0.20	5482985			
o-Xylene	ug/L				<0.20	0.20	5482985			
Total Xylenes	ug/L				<0.20	0.20	5482985			
F1 (C6-C10)	ug/L				<25	25	5482985			
F1 (C6-C10) - BTEX	ug/L				<25	25	5482985			
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	5487527	<100	100	5486389	<100	100	5486389
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	5487527	<200	200	5486389	220	200	5486389
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	5487527	<200	200	5486389	<200	200	5486389
Reached Baseline at C50	ug/L	Yes		5487527	Yes		5486389	Yes		5486389
Surrogate Recovery (%)										
o-Terphenyl	%	71		5487527	100		5486389	107		5486389
4-Bromofluorobenzene	%				88		5482985			
D4-1,2-Dichloroethane	%				102		5482985			
D8-Toluene	%				97		5482985			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										

O.REG 153 VOCs BY HS & F1-F4 (WATER)

Maxxam ID		GLC904		
Sampling Date		2018/04/11		
COC Number		657718-01-01		
	UNITS	TRIP BLANK	RDL	QC Batch
Calculated Parameters				
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	0.50	5481012
Volatile Organics				
Acetone (2-Propanone)	ug/L	<10	10	5482985
Benzene	ug/L	<0.20	0.20	5482985
Bromodichloromethane	ug/L	<0.50	0.50	5482985
Bromoform	ug/L	<1.0	1.0	5482985
Bromomethane	ug/L	<0.50	0.50	5482985
Carbon Tetrachloride	ug/L	<0.20	0.20	5482985
Chlorobenzene	ug/L	<0.20	0.20	5482985
Chloroform	ug/L	<0.20	0.20	5482985
Dibromochloromethane	ug/L	<0.50	0.50	5482985
1,2-Dichlorobenzene	ug/L	<0.50	0.50	5482985
1,3-Dichlorobenzene	ug/L	<0.50	0.50	5482985
1,4-Dichlorobenzene	ug/L	<0.50	0.50	5482985
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	1.0	5482985
1,1-Dichloroethane	ug/L	<0.20	0.20	5482985
1,2-Dichloroethane	ug/L	<0.50	0.50	5482985
1,1-Dichloroethylene	ug/L	<0.20	0.20	5482985
cis-1,2-Dichloroethylene	ug/L	<0.50	0.50	5482985
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	5482985
1,2-Dichloropropane	ug/L	<0.20	0.20	5482985
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	5482985
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	5482985
Ethylbenzene	ug/L	<0.20	0.20	5482985
Ethylene Dibromide	ug/L	<0.20	0.20	5482985
Hexane	ug/L	<1.0	1.0	5482985
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	5482985
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	10	5482985
Methyl Isobutyl Ketone	ug/L	<5.0	5.0	5482985
Methyl t-butyl ether (MTBE)	ug/L	<0.50	0.50	5482985
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

O.REG 153 VOCs BY HS & F1-F4 (WATER)

Maxxam ID		GLC904		
Sampling Date		2018/04/11		
COC Number		657718-01-01		
	UNITS	TRIP BLANK	RDL	QC Batch
Styrene	ug/L	<0.50	0.50	5482985
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	5482985
1,1,2,2-Tetrachloroethane	ug/L	<0.50	0.50	5482985
Tetrachloroethylene	ug/L	<0.20	0.20	5482985
Toluene	ug/L	<0.20	0.20	5482985
1,1,1-Trichloroethane	ug/L	<0.20	0.20	5482985
1,1,2-Trichloroethane	ug/L	<0.50	0.50	5482985
Trichloroethylene	ug/L	<0.20	0.20	5482985
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	5482985
Vinyl Chloride	ug/L	<0.20	0.20	5482985
p+m-Xylene	ug/L	<0.20	0.20	5482985
o-Xylene	ug/L	<0.20	0.20	5482985
Total Xylenes	ug/L	<0.20	0.20	5482985
F1 (C6-C10)	ug/L	<25	25	5482985
F1 (C6-C10) - BTEX	ug/L	<25	25	5482985
F2-F4 Hydrocarbons				
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	5487527
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	5487527
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	5487527
Reached Baseline at C50	ug/L	Yes		5487527
Surrogate Recovery (%)				
o-Terphenyl	%	85		5487527
4-Bromofluorobenzene	%	91		5482985
D4-1,2-Dichloroethane	%	101		5482985
D8-Toluene	%	96		5482985
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

TEST SUMMARY

Maxxam ID: GLC899
Sample ID: MW18-1
Matrix: Water

Collected: 2018/04/11
Shipped:
Received: 2018/04/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5480968	N/A	2018/04/17	Automated Statchk
1,3-Dichloropropene Sum	CALC	5481012	N/A	2018/04/18	Automated Statchk
Chloride by Automated Colourimetry	KONE	5484545	N/A	2018/04/16	Deonarine Ramnarine
Chromium (VI) in Water	IC	5482462	N/A	2018/04/17	Lang Le
Free (WAD) Cyanide	SKAL/CN	5483886	N/A	2018/04/13	Xuanhong Qiu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5486389	2018/04/16	2018/04/17	Zhiyue (Frank) Zhu
Mercury	CV/AA	5485695	2018/04/16	2018/04/18	Ron Morrison
Dissolved Metals by ICPMS	ICP/MS	5483417	N/A	2018/04/13	Thao Nguyen
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5486386	2018/04/16	2018/04/17	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5482985	N/A	2018/04/17	Denis Reid

Maxxam ID: GLC900
Sample ID: MW18-2
Matrix: Water

Collected: 2018/04/11
Shipped:
Received: 2018/04/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5480968	N/A	2018/04/18	Automated Statchk
1,3-Dichloropropene Sum	CALC	5481012	N/A	2018/04/18	Automated Statchk
Chloride by Automated Colourimetry	KONE	5484545	N/A	2018/04/16	Deonarine Ramnarine
Chromium (VI) in Water	IC	5482462	N/A	2018/04/17	Lang Le
Free (WAD) Cyanide	SKAL/CN	5483886	N/A	2018/04/13	Xuanhong Qiu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5486389	2018/04/16	2018/04/17	Zhiyue (Frank) Zhu
Mercury	CV/AA	5485695	2018/04/16	2018/04/18	Ron Morrison
Dissolved Metals by ICPMS	ICP/MS	5483417	N/A	2018/04/13	Thao Nguyen
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5486386	2018/04/16	2018/04/17	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5482985	N/A	2018/04/17	Denis Reid

Maxxam ID: GLC901
Sample ID: MW18-3
Matrix: Water

Collected: 2018/04/11
Shipped:
Received: 2018/04/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5481012	N/A	2018/04/18	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5487527	2018/04/17	2018/04/17	Barbara Wowk
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5482985	N/A	2018/04/17	Denis Reid

Maxxam ID: GLC902
Sample ID: MW18-4
Matrix: Water

Collected: 2018/04/11
Shipped:
Received: 2018/04/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5481012	N/A	2018/04/18	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5487527	2018/04/17	2018/04/18	Barbara Wowk
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5482985	N/A	2018/04/17	Denis Reid

TEST SUMMARY

Maxxam ID: GLC902 Dup
Sample ID: MW18-4
Matrix: Water

Collected: 2018/04/11
Shipped:
Received: 2018/04/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5487527	2018/04/17	2018/04/18	Barbara Wowk

Maxxam ID: GLC903
Sample ID: QC-1
Matrix: Water

Collected: 2018/04/11
Shipped:
Received: 2018/04/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5480968	N/A	2018/04/17	Automated Statchk
1,3-Dichloropropene Sum	CALC	5481012	N/A	2018/04/18	Automated Statchk
Chloride by Automated Colourimetry	KONE	5484545	N/A	2018/04/16	Deonarine Ramnarine
Chromium (VI) in Water	IC	5482462	N/A	2018/04/17	Lang Le
Free (WAD) Cyanide	SKAL/CN	5483886	N/A	2018/04/13	Xuanhong Qiu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5486389	2018/04/16	2018/04/17	Zhiyue (Frank) Zhu
Mercury	CV/AA	5485695	2018/04/16	2018/04/18	Ron Morrison
Dissolved Metals by ICPMS	ICP/MS	5483417	N/A	2018/04/13	Thao Nguyen
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5486386	2018/04/16	2018/04/17	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5482985	N/A	2018/04/17	Denis Reid

Maxxam ID: GLC903 Dup
Sample ID: QC-1
Matrix: Water

Collected: 2018/04/11
Shipped:
Received: 2018/04/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5486389	2018/04/16	2018/04/17	Zhiyue (Frank) Zhu
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5486386	2018/04/16	2018/04/17	Mitesh Raj

Maxxam ID: GLC904
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2018/04/11
Shipped:
Received: 2018/04/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5481012	N/A	2018/04/18	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5487527	2018/04/17	2018/04/18	Barbara Wowk
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5482985	N/A	2018/04/17	Denis Reid

GENERAL COMMENTS

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

Package 1	0.3°C
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Results relate only to the items tested.



Maxxam Job #: B882096
Report Date: 2018/04/19

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 161413446
Site Location: 100 WILMOT LINE, ONTARIO
Sampler Initials: TS

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5482985	4-Bromofluorobenzene	2018/04/17	102	70 - 130	103	70 - 130	97	%		
5482985	D4-1,2-Dichloroethane	2018/04/17	99	70 - 130	96	70 - 130	96	%		
5482985	D8-Toluene	2018/04/17	103	70 - 130	103	70 - 130	96	%		
5486386	D10-Anthracene	2018/04/17	95	50 - 130	93	50 - 130	96	%		
5486386	D14-Terphenyl (FS)	2018/04/17	102	50 - 130	100	50 - 130	103	%		
5486386	D8-Acenaphthylene	2018/04/17	98	50 - 130	92	50 - 130	95	%		
5486389	o-Terphenyl	2018/04/17	106	60 - 130	105	60 - 130	102	%		
5487527	o-Terphenyl	2018/04/17			98	60 - 130	94	%		
5482462	Chromium (VI)	2018/04/17	97	80 - 120	97	80 - 120	<0.50	ug/L	NC	20
5482985	1,1,1,2-Tetrachloroethane	2018/04/17	100	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
5482985	1,1,1-Trichloroethane	2018/04/17	101	70 - 130	103	70 - 130	<0.20	ug/L	NC	30
5482985	1,1,2,2-Tetrachloroethane	2018/04/17	93	70 - 130	89	70 - 130	<0.50	ug/L	NC	30
5482985	1,1,2-Trichloroethane	2018/04/17	96	70 - 130	92	70 - 130	<0.50	ug/L	NC	30
5482985	1,1-Dichloroethane	2018/04/17	94	70 - 130	94	70 - 130	<0.20	ug/L	NC	30
5482985	1,1-Dichloroethylene	2018/04/17	96	70 - 130	98	70 - 130	<0.20	ug/L	NC	30
5482985	1,2-Dichlorobenzene	2018/04/17	97	70 - 130	98	70 - 130	<0.50	ug/L	NC	30
5482985	1,2-Dichloroethane	2018/04/17	96	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
5482985	1,2-Dichloropropane	2018/04/17	93	70 - 130	93	70 - 130	<0.20	ug/L	NC	30
5482985	1,3-Dichlorobenzene	2018/04/17	105	70 - 130	108	70 - 130	<0.50	ug/L	NC	30
5482985	1,4-Dichlorobenzene	2018/04/17	98	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
5482985	Acetone (2-Propanone)	2018/04/17	85	60 - 140	75	60 - 140	<10	ug/L	NC	30
5482985	Benzene	2018/04/17	94	70 - 130	95	70 - 130	<0.20	ug/L	NC	30
5482985	Bromodichloromethane	2018/04/17	96	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
5482985	Bromoform	2018/04/17	96	70 - 130	94	70 - 130	<1.0	ug/L	NC	30
5482985	Bromomethane	2018/04/17	98	60 - 140	91	60 - 140	<0.50	ug/L	NC	30
5482985	Carbon Tetrachloride	2018/04/17	104	70 - 130	107	70 - 130	<0.20	ug/L	NC	30
5482985	Chlorobenzene	2018/04/17	95	70 - 130	97	70 - 130	<0.20	ug/L	NC	30
5482985	Chloroform	2018/04/17	98	70 - 130	98	70 - 130	<0.20	ug/L	NC	30
5482985	cis-1,2-Dichloroethylene	2018/04/17	96	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
5482985	cis-1,3-Dichloropropene	2018/04/17	93	70 - 130	85	70 - 130	<0.30	ug/L	NC	30
5482985	Dibromochloromethane	2018/04/17	98	70 - 130	98	70 - 130	<0.50	ug/L	NC	30



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QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 161413446
Site Location: 100 WILMOT LINE, ONTARIO
Sampler Initials: TS

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5482985	Dichlorodifluoromethane (FREON 12)	2018/04/17	87	60 - 140	88	60 - 140	<1.0	ug/L	NC	30
5482985	Ethylbenzene	2018/04/17	92	70 - 130	96	70 - 130	<0.20	ug/L	NC	30
5482985	Ethylene Dibromide	2018/04/17	95	70 - 130	91	70 - 130	<0.20	ug/L	NC	30
5482985	F1 (C6-C10) - BTEX	2018/04/17					<25	ug/L	NC	30
5482985	F1 (C6-C10)	2018/04/17	100	60 - 140	100	60 - 140	<25	ug/L	NC	30
5482985	Hexane	2018/04/17	90	70 - 130	94	70 - 130	<1.0	ug/L	NC	30
5482985	Methyl Ethyl Ketone (2-Butanone)	2018/04/17	82	60 - 140	74	60 - 140	<1.0	ug/L	NC	30
5482985	Methyl Isobutyl Ketone	2018/04/17	82	70 - 130	79	70 - 130	<5.0	ug/L	NC	30
5482985	Methyl t-butyl ether (MTBE)	2018/04/17	89	70 - 130	89	70 - 130	<0.50	ug/L	NC	30
5482985	Methylene Chloride(Dichloromethane)	2018/04/17	90	70 - 130	88	70 - 130	<2.0	ug/L	NC	30
5482985	o-Xylene	2018/04/17	89	70 - 130	92	70 - 130	<0.20	ug/L	NC	30
5482985	p+m-Xylene	2018/04/17	89	70 - 130	93	70 - 130	<0.20	ug/L	NC	30
5482985	Styrene	2018/04/17	93	70 - 130	98	70 - 130	<0.50	ug/L	NC	30
5482985	Tetrachloroethylene	2018/04/17	103	70 - 130	106	70 - 130	<0.20	ug/L	NC	30
5482985	Toluene	2018/04/17	92	70 - 130	94	70 - 130	<0.20	ug/L	NC	30
5482985	Total Xylenes	2018/04/17					<0.20	ug/L	NC	30
5482985	trans-1,2-Dichloroethylene	2018/04/17	98	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
5482985	trans-1,3-Dichloropropene	2018/04/17	101	70 - 130	86	70 - 130	<0.40	ug/L	NC	30
5482985	Trichloroethylene	2018/04/17	101	70 - 130	103	70 - 130	<0.20	ug/L	NC	30
5482985	Trichlorofluoromethane (FREON 11)	2018/04/17	99	70 - 130	102	70 - 130	<0.50	ug/L	NC	30
5482985	Vinyl Chloride	2018/04/17	89	70 - 130	90	70 - 130	<0.20	ug/L	NC	30
5483417	Dissolved Antimony (Sb)	2018/04/13	97	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
5483417	Dissolved Arsenic (As)	2018/04/13	92	80 - 120	97	80 - 120	<0.0010	mg/L	NC	20
5483417	Dissolved Barium (Ba)	2018/04/13	91	80 - 120	96	80 - 120	<0.0020	mg/L	9.5	20
5483417	Dissolved Beryllium (Be)	2018/04/13	94	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
5483417	Dissolved Boron (B)	2018/04/13	98	80 - 120	98	80 - 120	<0.010	mg/L	8.2	20
5483417	Dissolved Cadmium (Cd)	2018/04/13	95	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
5483417	Dissolved Chromium (Cr)	2018/04/13	91	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
5483417	Dissolved Cobalt (Co)	2018/04/13	91	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
5483417	Dissolved Copper (Cu)	2018/04/13	91	80 - 120	99	80 - 120	<0.0010	mg/L	6.2	20
5483417	Dissolved Lead (Pb)	2018/04/13	87	80 - 120	96	80 - 120	<0.00050	mg/L	NC	20



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QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 161413446
Site Location: 100 WILMOT LINE, ONTARIO
Sampler Initials: TS

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5483417	Dissolved Molybdenum (Mo)	2018/04/13	98	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
5483417	Dissolved Nickel (Ni)	2018/04/13	89	80 - 120	98	80 - 120	<0.0010	mg/L	6.3	20
5483417	Dissolved Selenium (Se)	2018/04/13	95	80 - 120	100	80 - 120	<0.0020	mg/L	NC	20
5483417	Dissolved Silver (Ag)	2018/04/13	75 (1)	80 - 120	99	80 - 120	<0.00010	mg/L	NC	20
5483417	Dissolved Sodium (Na)	2018/04/13	NC	80 - 120	99	80 - 120	<0.10	mg/L	7.6	20
5483417	Dissolved Thallium (Tl)	2018/04/13	87	80 - 120	94	80 - 120	<0.000050	mg/L	NC	20
5483417	Dissolved Uranium (U)	2018/04/13	96	80 - 120	103	80 - 120	<0.00010	mg/L	8.5	20
5483417	Dissolved Vanadium (V)	2018/04/13	93	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
5483417	Dissolved Zinc (Zn)	2018/04/13	90	80 - 120	99	80 - 120	<0.0050	mg/L	NC	20
5483886	WAD Cyanide (Free)	2018/04/13	99	80 - 120	95	80 - 120	<1	ug/L	NC	20
5484545	Dissolved Chloride (Cl)	2018/04/16	NC	80 - 120	103	80 - 120	<1.0	mg/L	5.8	20
5485695	Mercury (Hg)	2018/04/18	110	75 - 125	104	80 - 120	<0.1	ug/L	NC	20
5486386	1-Methylnaphthalene	2018/04/17	129	50 - 130	126	50 - 130	<0.050	ug/L	NC	30
5486386	2-Methylnaphthalene	2018/04/17	113	50 - 130	110	50 - 130	<0.050	ug/L	NC	30
5486386	Acenaphthene	2018/04/17	105	50 - 130	100	50 - 130	<0.050	ug/L	NC	30
5486386	Acenaphthylene	2018/04/17	103	50 - 130	100	50 - 130	<0.050	ug/L	NC	30
5486386	Anthracene	2018/04/17	102	50 - 130	100	50 - 130	<0.050	ug/L	NC	30
5486386	Benzo(a)anthracene	2018/04/17	98	50 - 130	100	50 - 130	<0.050	ug/L	NC	30
5486386	Benzo(a)pyrene	2018/04/17	97	50 - 130	97	50 - 130	<0.010	ug/L	NC	30
5486386	Benzo(b,j)fluoranthene	2018/04/17	99	50 - 130	98	50 - 130	<0.050	ug/L	NC	30
5486386	Benzo(g,h,i)perylene	2018/04/17	98	50 - 130	97	50 - 130	<0.050	ug/L	NC	30
5486386	Benzo(k)fluoranthene	2018/04/17	97	50 - 130	103	50 - 130	<0.050	ug/L	NC	30
5486386	Chrysene	2018/04/17	97	50 - 130	96	50 - 130	<0.050	ug/L	NC	30
5486386	Dibenz(a,h)anthracene	2018/04/17	107	50 - 130	108	50 - 130	<0.050	ug/L	NC	30
5486386	Fluoranthene	2018/04/17	106	50 - 130	105	50 - 130	<0.050	ug/L	NC	30
5486386	Fluorene	2018/04/17	102	50 - 130	96	50 - 130	<0.050	ug/L	NC	30
5486386	Indeno(1,2,3-cd)pyrene	2018/04/17	99	50 - 130	101	50 - 130	<0.050	ug/L	NC	30
5486386	Naphthalene	2018/04/17	113	50 - 130	110	50 - 130	<0.050	ug/L	NC	30
5486386	Phenanthrene	2018/04/17	104	50 - 130	102	50 - 130	<0.030	ug/L	NC	30
5486386	Pyrene	2018/04/17	103	50 - 130	102	50 - 130	<0.050	ug/L	NC	30
5486389	F2 (C10-C16 Hydrocarbons)	2018/04/17	101	50 - 130	97	60 - 130	<100	ug/L	NC	30



Maxxam Job #: B882096
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QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 161413446
Site Location: 100 WILMOT LINE, ONTARIO
Sampler Initials: TS

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5486389	F3 (C16-C34 Hydrocarbons)	2018/04/17	105	50 - 130	104	60 - 130	<200	ug/L	9.5	30
5486389	F4 (C34-C50 Hydrocarbons)	2018/04/17	104	50 - 130	102	60 - 130	<200	ug/L	NC	30
5487527	F2 (C10-C16 Hydrocarbons)	2018/04/18			100	60 - 130	<100	ug/L	NC	30
5487527	F3 (C16-C34 Hydrocarbons)	2018/04/18			103	60 - 130	<200	ug/L	NC	30
5487527	F4 (C34-C50 Hydrocarbons)	2018/04/18			96	60 - 130	<200	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.

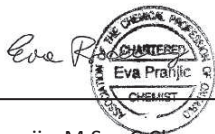
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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 $\leq 2 \times \text{RDL}$).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

VALIDATION SIGNATURE PAGE

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

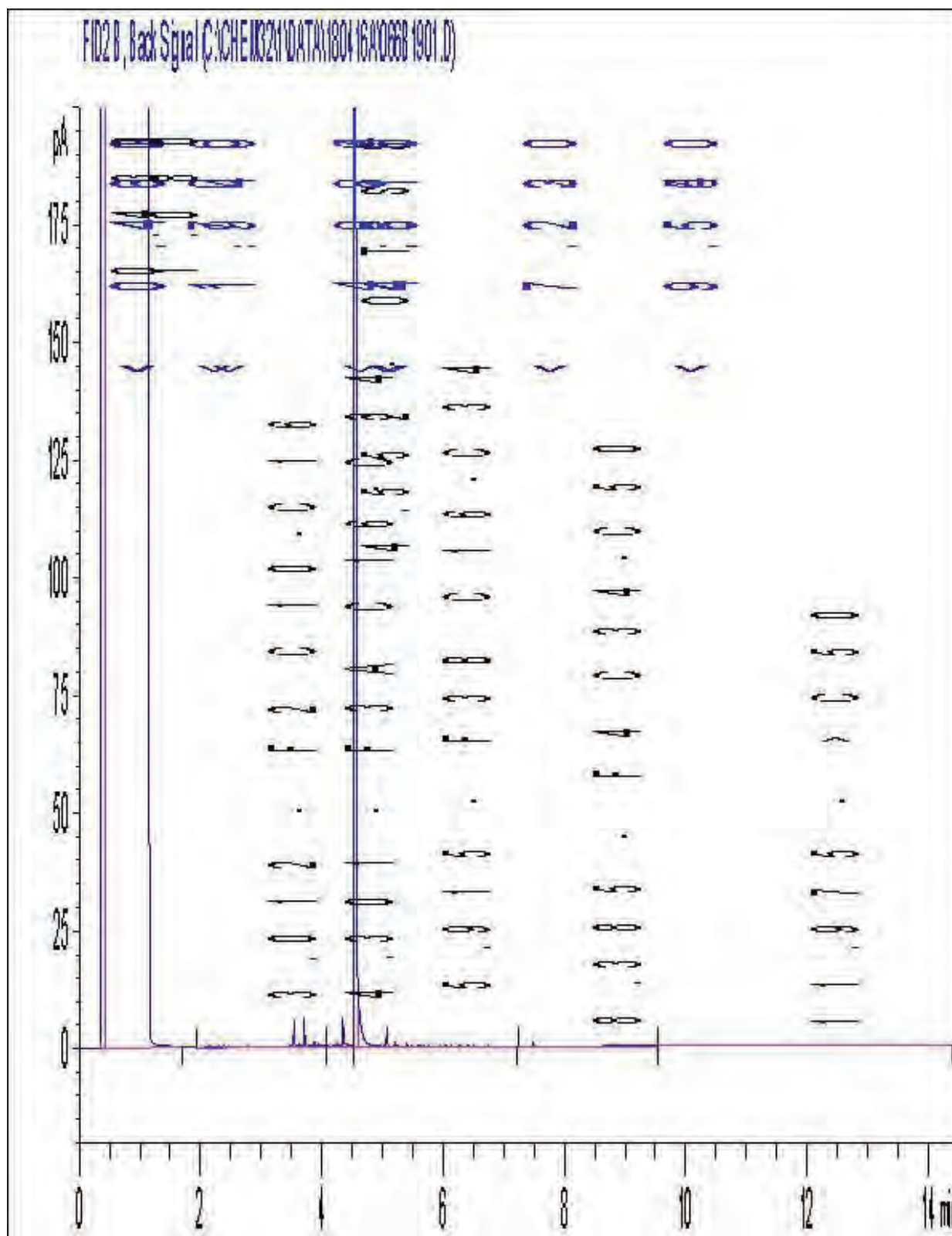


Ewa Pranjić, M.Sc., C.Chem, Scientific Specialist

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.

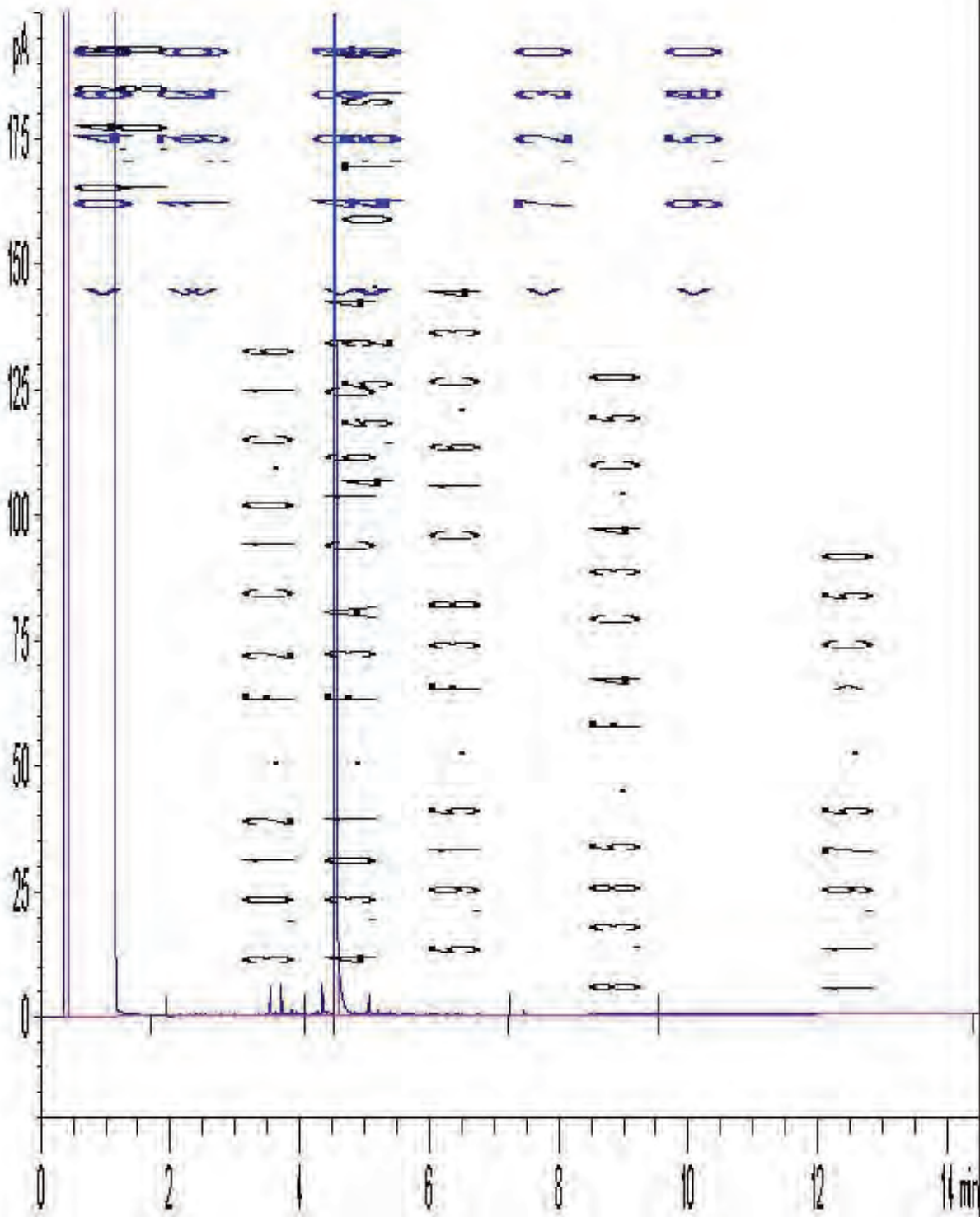
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Petroleum Hydrocarbons F2-F4 in Water Chromatogram



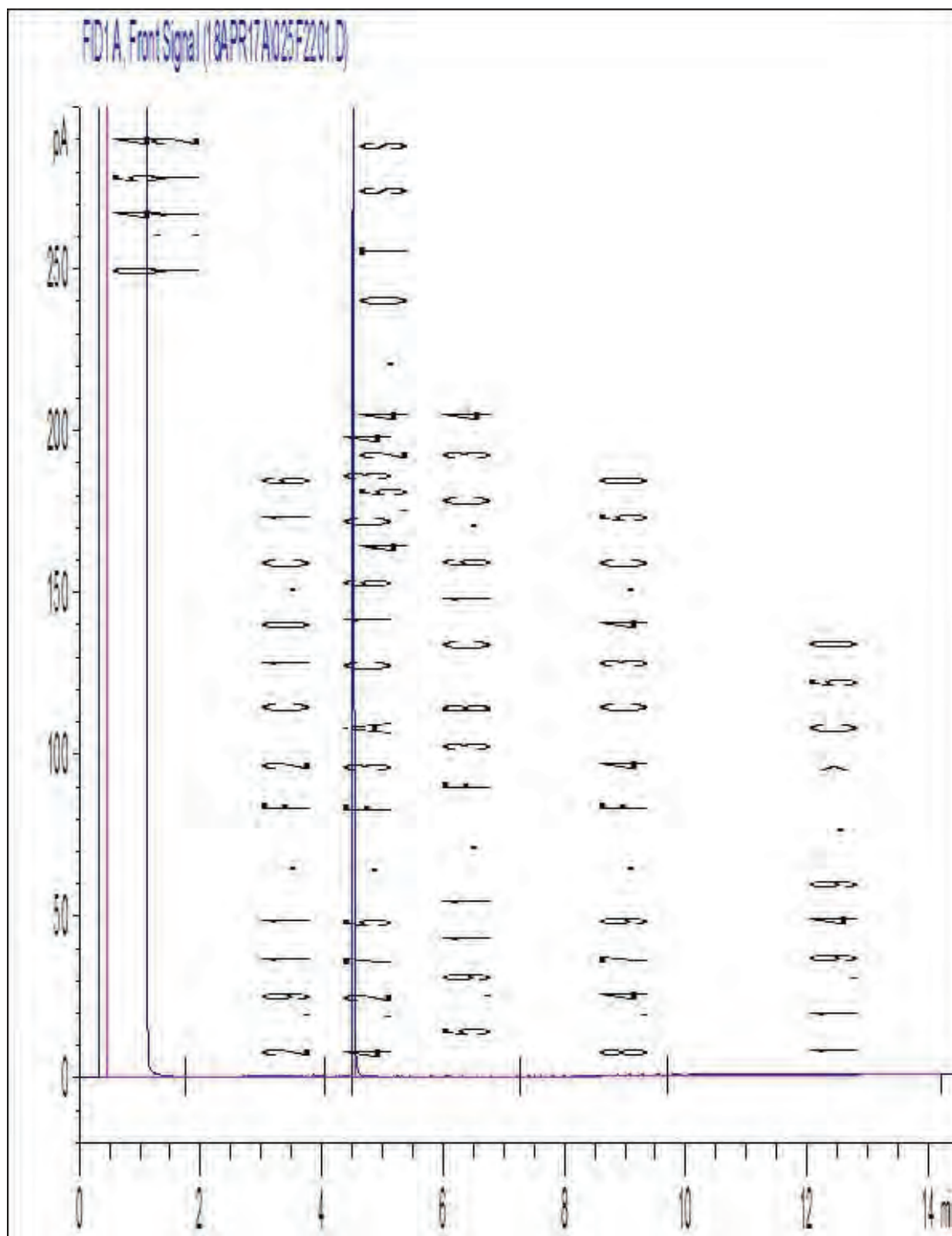
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



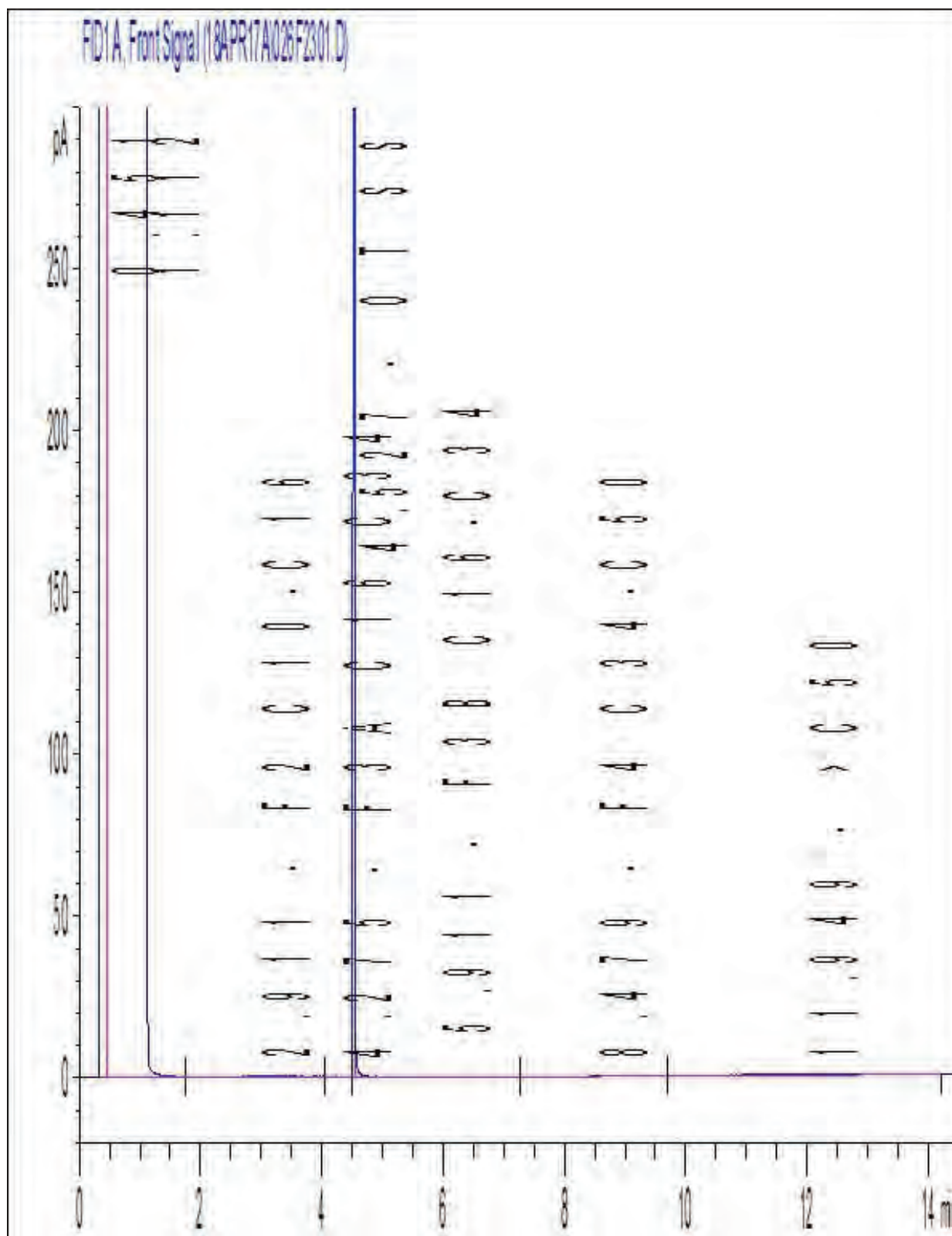
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



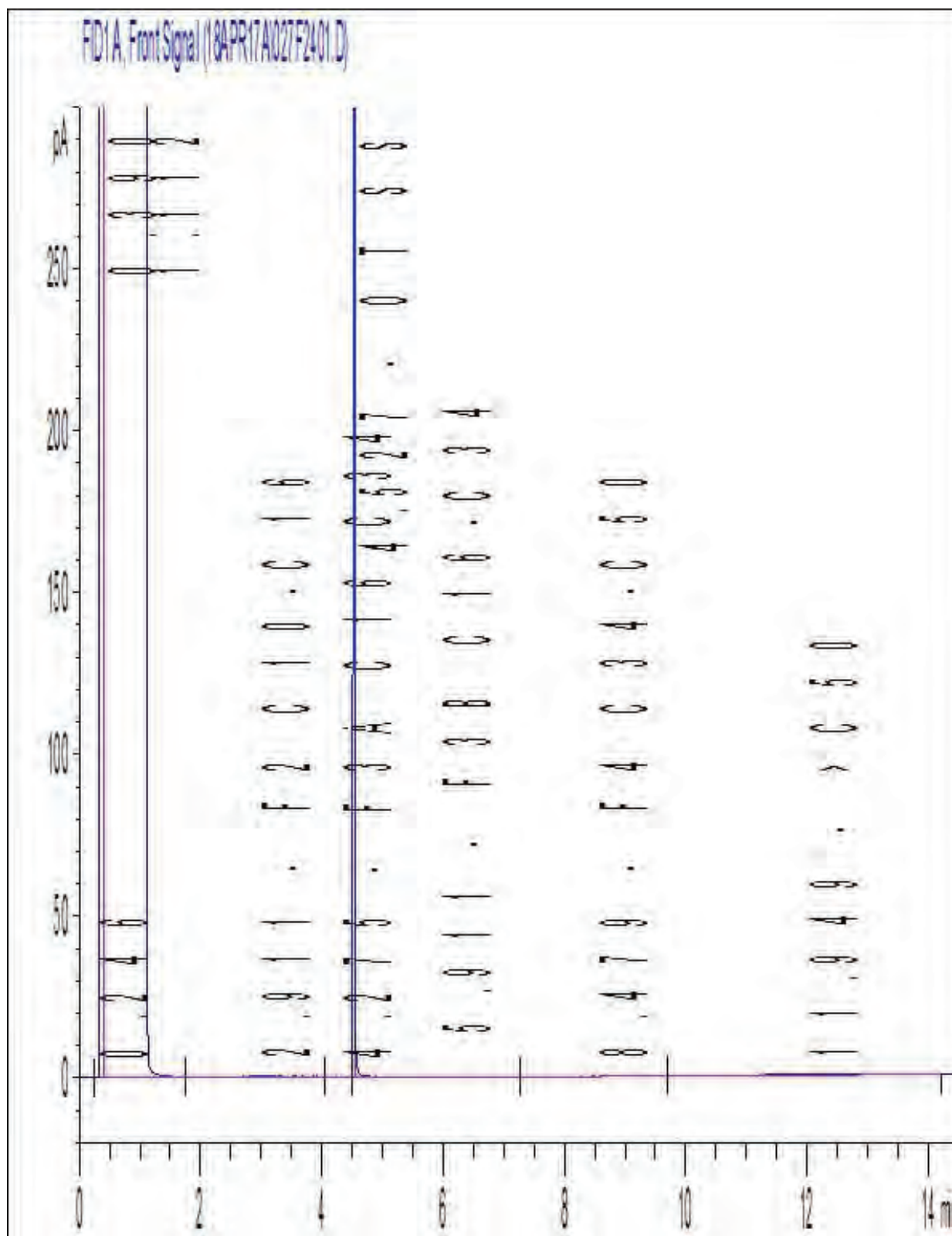
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



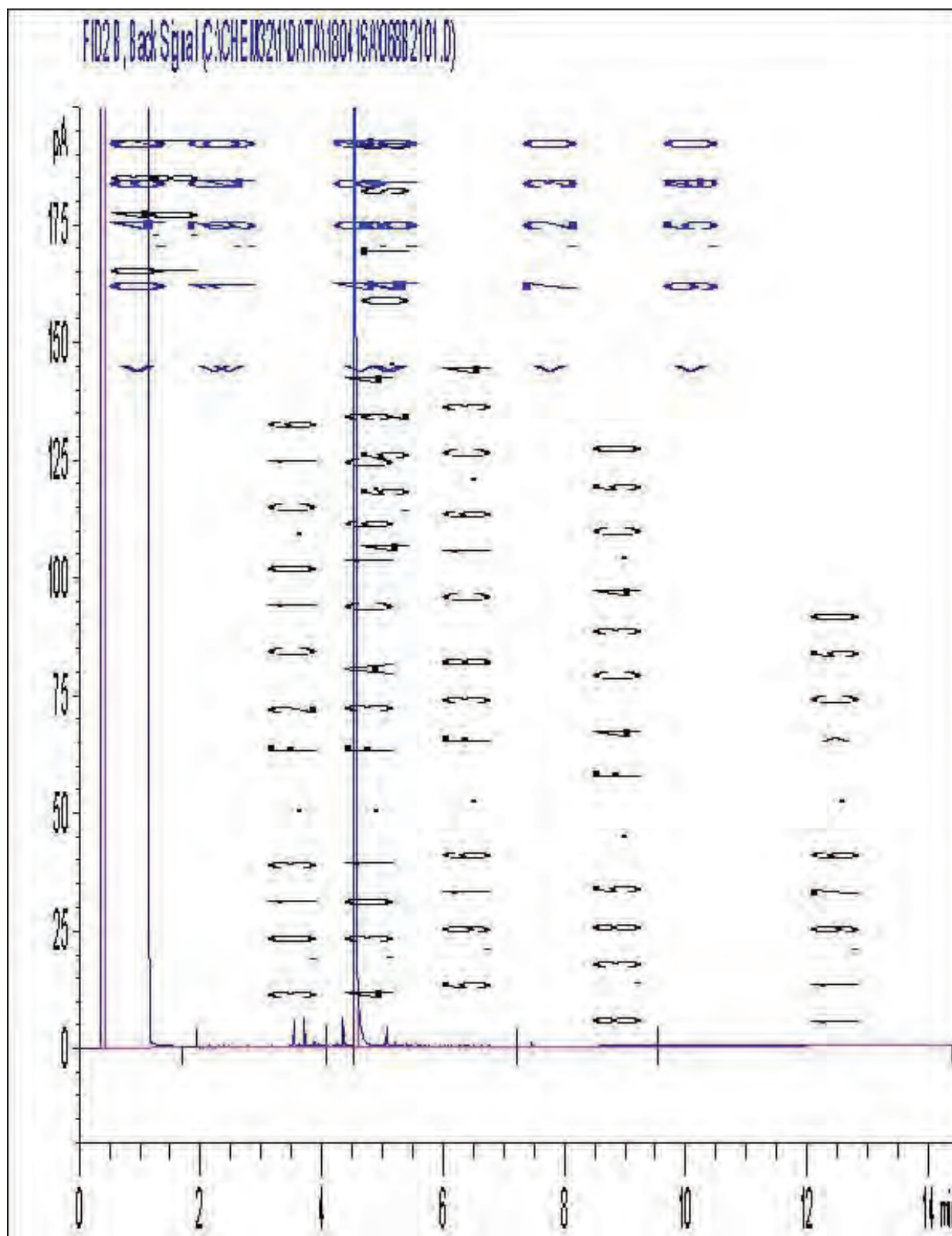
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



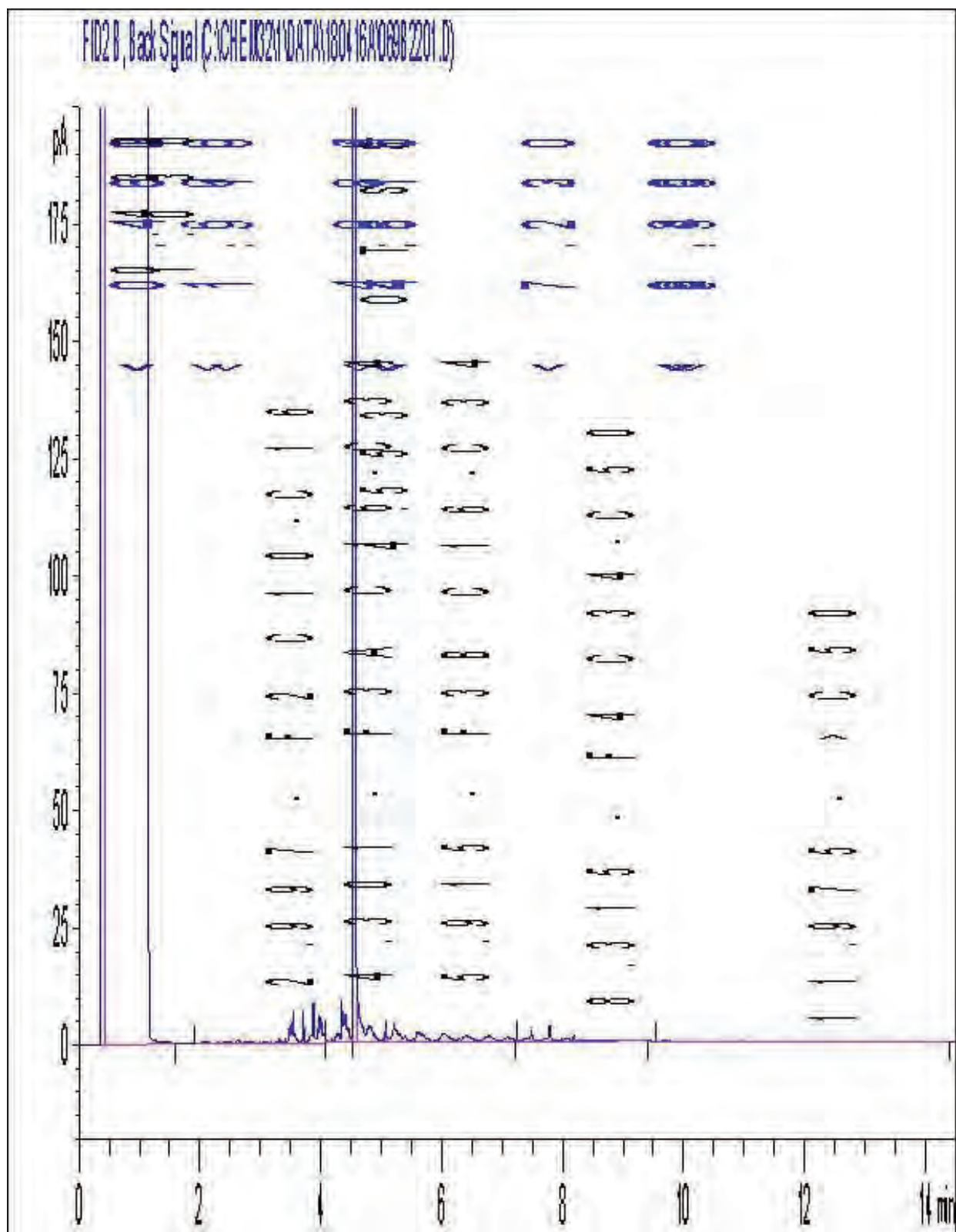
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

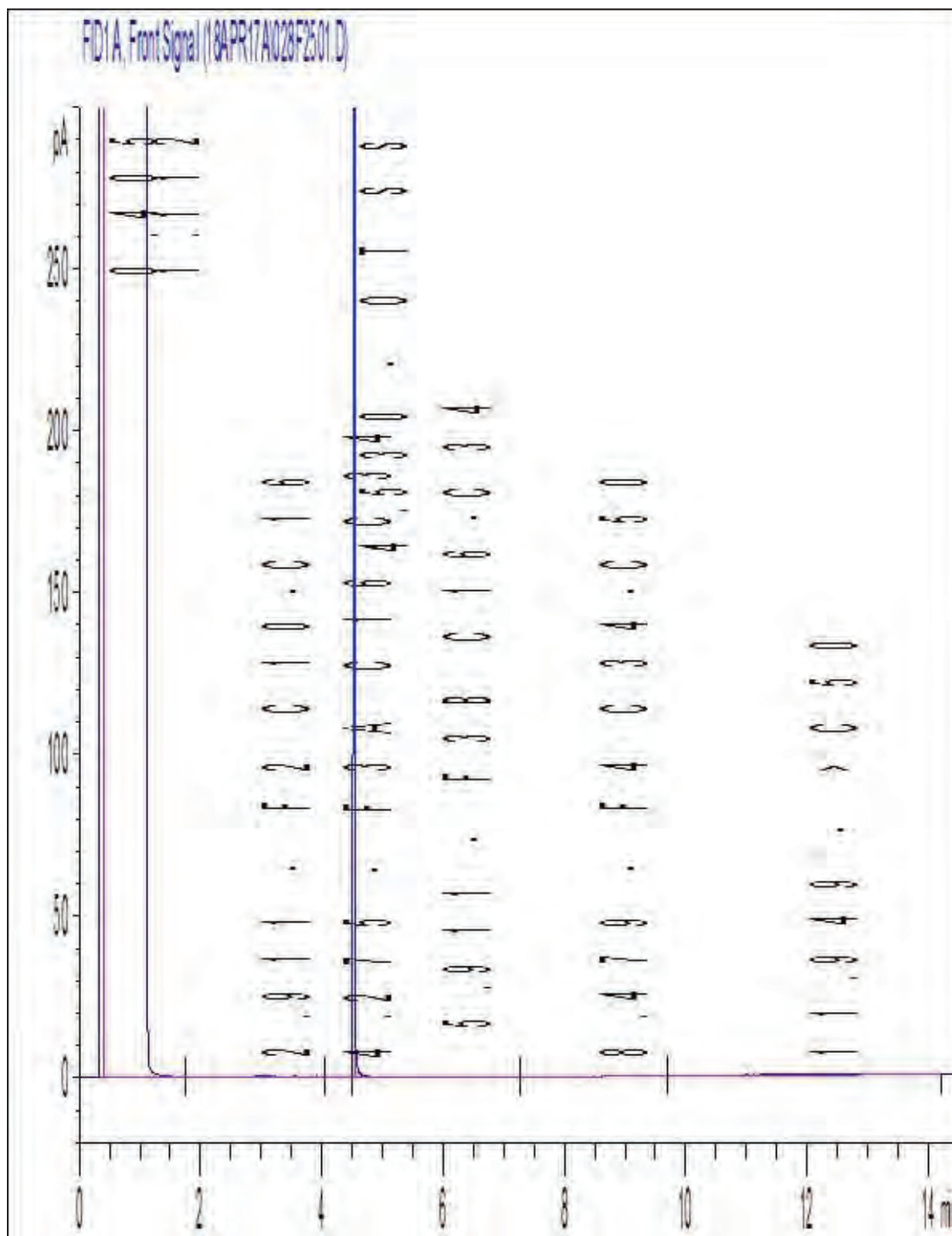


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



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.

APPENDIX G: QUALITY ASSURANCE/QUALITY CONTROL

Appendix G QUALITY ASSURANCE/QUALITY CONTROL

The overall data quality objective (DQO) for the investigation was to collect data that were precise, accurate, reproducible, complete, and suitable for comparison with the applicable Site Condition Standards (SCS).

Soil samples were placed into glass sample jars supplied by Maxxam Analytics International Corporation (Maxxam). Sample jars used for organic parameters (e.g., petroleum hydrocarbons [PHC]) were equipped with Teflon lined caps. Samples for analysis of PHC fraction 1 and volatile organic compounds (VOC) parameters (e.g., benzene, toluene, ethylbenzene, and xylenes [BTEX]) were collected and placed into containers containing methanol that were provided by the laboratory.

Groundwater samples were placed into glass or plastic sample jars supplied by Maxxam, with a preservative appropriate for a given analytical suite. Accordingly, soil and groundwater sampling was completed using a new pair of disposable nitrile gloves for each sample.

Each sample was labeled with a unique identification number, packed into coolers with ice, and transported to Maxxam under chain of custody documentation. To meet the DQO, quality assurance/quality control (QA/QC) procedures were incorporated into both field and laboratory methods. Efforts were made during sampling to reduce the potential for contamination so as to obtain representative samples, as described above.

Calibration checks on field instruments were completed by Stantec field personnel prior to use.

As a check on the laboratory analytical methods and on sample precision, the following QC samples were submitted:

- Two blind field duplicate soil samples (QC-1 and QC-2) from the drilling program
- One blind field duplicate groundwater sample (QC-1)
- One trip blank sample

The blind field duplicate samples were used to assess the precision of the sampling and analytical procedures. Typically, the relative percent different (RPD) is calculated for the concentrations in the original sample and its duplicate. The RPD was calculated using the following formula:

$$RPD = \left| \frac{C_1 - C_2}{(C_1 + C_2)/2} \right| \times 100$$

Where: C1 is the concentration in the original sample
C2 is the concentration in the sample duplicate

If the results for either or both the original sample and the duplicate were below the laboratory reporting limits (RLs), the RPD was not calculated. RPDs were only calculated if both analytical results were greater than five times the RLs.

The recommended alert criteria from Maxxam's Ontario QA/QC Interpretation Guideline for soil field duplicates is 40% for polycyclic aromatic hydrocarbons (PAH), 30% for PHC, 50% for volatile organic compounds (VOC), 30% for metals, inorganics and mercury, 40% for hot water soluble boron, 35% for chromium VI, chloride and cyanide and 10% for electrical conductivity. The recommended alert criteria for groundwater field duplicates is 30% for PAH, PHC and VOC, 20% for metals, inorganics and mercury, 40% for boron, 20% for hexavalent chromium, chloride and cyanide, and 10% for electrical conductivity.

The trip blanks were used to assess whether sample handling and transportation positively biased the sampling results. Trip blanks are containers of water supplied by the laboratory that are not opened during the sampling process.

In addition to the assessment of duplicate samples, Maxxam conducted further internal QA/QC tests, which included replicate sample analyses, process blanks, process recovery and matrix spike analyses. The results of these tests are provided with the laboratory certificates of analysis in **Appendix G**.

G.1 EVALUATION OF QUALITY ASSURANCE/QUALITY CONTROL

This section summarizes the evaluation of the QA/QC program followed by Stantec. The DQO established for this investigation were to collect data that were precise, accurate, reproducible, complete, and suitable for comparison with the applicable Table 2 SCS.

G.1.1 Evaluation of Laboratory QA/QC

As a first step in the review of the laboratory data, the laboratory QA/QC data were assessed (blanks, duplicates analyses, matrix and blank spikes, surrogate analytical recovery), and were determined to be adequate. No quality assurance or quality control issues were noted by Maxxam regarding the groundwater sample analysis and with the exception of the following, no QA/QC issues were identified in their laboratory certificates related to soil sample analysis:

- Samples GHT256 [MW18-1-2] and GHT260 [MW18-2-1]: Maxxam reported that sodium was not detected in the soil sample. To report sodium absorption ratio (SAR), the sodium laboratory reporting limit was used in the calculation. This value therefore represents a maximum ratio. Given that of the reported SAR was less than the Table 2 SCS, this was not considered to affect the interpretation of soil quality.
- Sample GHT267 [BH18-7-1]: Maxxam reported one issue in their laboratory certificates of analysis related to soil samples requiring dilution for PAH analysis. This issue was handled according to Maxxam's standard procedures. The dilution of samples and subsequent adjustment of the RLs did not lead to a situation where the RL was higher than the decision criteria (i.e., the Table 2 SCS for a given parameter). Therefore, this did not affect the overall interpretation of the analytical results.

The laboratory RLs were less than the Table 2 SCS in the analyzed soil and groundwater samples. Based on the evaluation of laboratory QA/QC, the results reported by the laboratory were considered to meet the DQO.

G.1.2 Evaluation of Field QA/QC

During the February/March 2018 SSI field program, the following blind duplicate samples were submitted for laboratory analysis:

- Soil sample QC-1 (metals, inorganics) – field duplicate of original soil sample BH18-6-1.
- Soil sample QC-2 (PAH, PHC F1 to F4 and VOC) – field duplicate of original soil sample MW18-2-2.
- Groundwater sample QC-1 (metals, inorganics, PAH, PHC F1 to F4 and VOC) – field duplicate of original groundwater sample MW18-2.

The analytical results for the field duplicate samples are shown in **Table 2** and **Table 4, Appendix E**.

The following is a discussion related to field duplicate sample analytical results:

The calculated RPDs for xylenes and ethylbenzene for soil sample MW18-2-2 and their field duplicates were greater than the applicable alert criteria. It was noted that both the parent and duplicate the concentrations were below the applicable SCS. As such, the heterogeneity indicated by the results is not considered to have affected the interpretation of the results.

Where calculable, the remaining RPDs for the parent and duplicate soil samples collected at BH18-6-1 and MW18-2-2 were below the applicable alert criteria. The samples were therefore inferred to have a high degree of similarity.

Where calculable, RPDs for the parent and duplicate groundwater samples collected at MW18-2 were below the applicable alert criteria. The samples were therefore inferred to have a high degree of similarity.

G.2 CONCLUSIONS

Based on the QA/QC evaluation, the DQO for this investigation were satisfied and the data were considered to be acceptable for use in this report.