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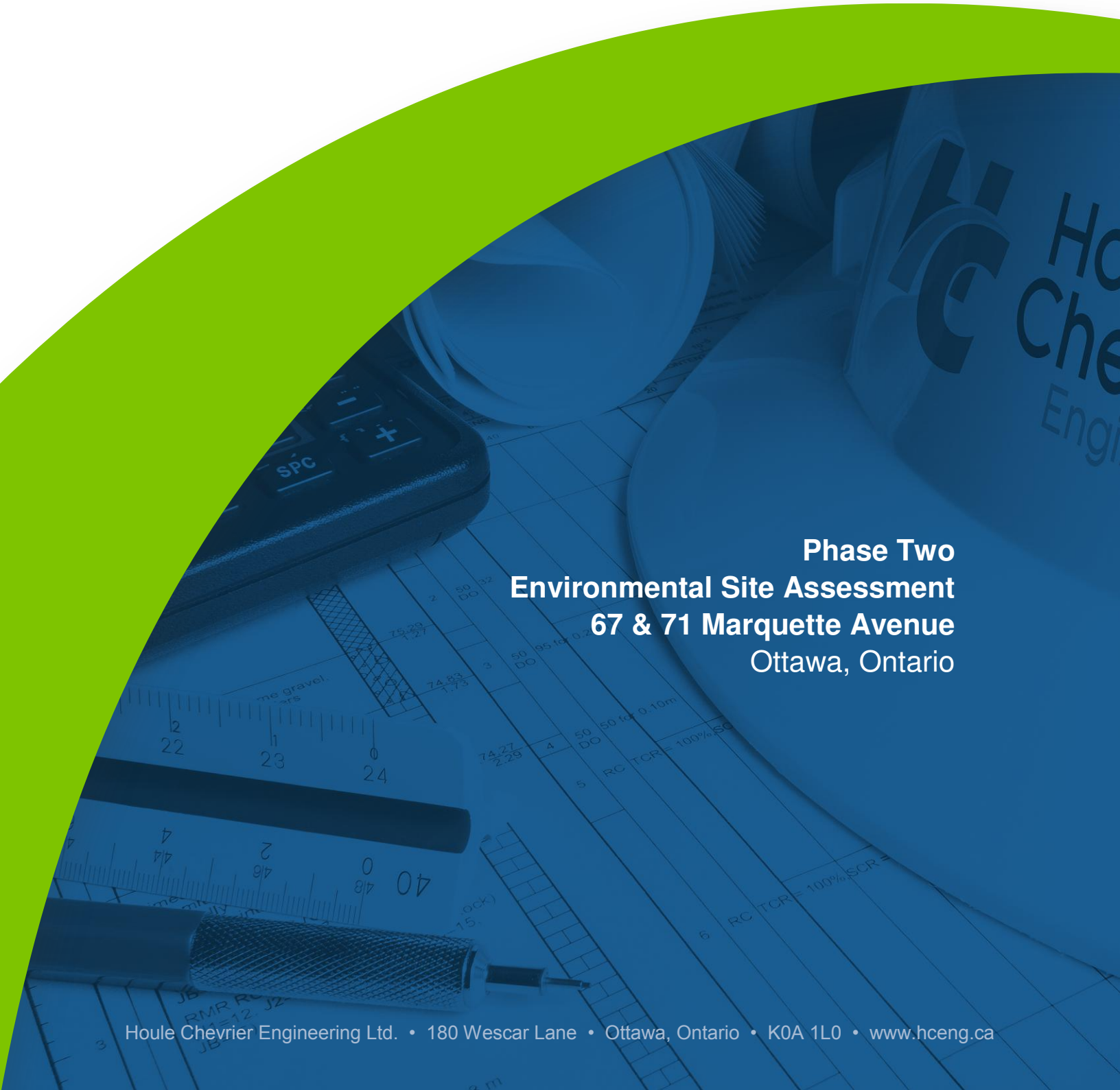

# Phase Two
# Environmental Site Assessment
# 67 & 71 Marquette Avenue
Ottawa, Ontario

Houle Chevrier Engineering Ltd. • 180 Wescar Lane • Ottawa, Ontario • K0A 1L0 • www.hceng.ca

Houle Chevrier Engineering

Submitted to:

Urban Rise Development Inc.
132 Putman Avenue
Ottawa, Ontario
K1M 1Z7

# Phase Two
# Environmental Site Assessment
# 67 & 71 Marquette Avenue
Ottawa, Ontario

June 12, 2014
Project: 14-103

## EXECUTIVE SUMMARY

The Phase One ESA report previously carried out for the subject property recommended that a Phase Two ESA investigation be carried out for the properties located at 67 and 71 Marquette Avenue in Ottawa, Ontario. The Phase Two ESA investigated the following Areas of Potential Environmental Concern (APECs) that were identified in the Phase One ESA:

### *APEC 1: Fill Material Across Subject Property*

Fill material was encountered in three (3) of four (4) boreholes advanced on the subject property during a geotechnical investigation performed by Houle Chevrier Engineering Ltd. in April of 2014. The soil across the subject property could be adversely impacted by presence of the fill material. Due to the unknown origin and quality of the fill material, the associated contaminants of concern are PHCs, metals, and PAHs.

### *APEC 2: Vehicle Maintenance near Rear Shed Workshop*

During the site reconnaissance, it was noted that vehicle and other types of maintenance were performed within and near the shed workshop located at the rear (north) of 67 Marquette Avenue. Products associated with vehicle maintenance were observed within and adjacent to the workshop. Ground staining could not be observed since there was snow cover at the time of our site visit on March 27, 2014. However, there is potential for these products to impact soil and groundwater on the subject property. The contaminants of concern associated with these products and activities are BTEX, PHCs, PAHs and VOCs.

### *APEC 3: Former Use of Subject Property as an Automotive Paint Shop*

According to the 1922 fire insurance plan, the subject property was formerly used as an automotive paint shop. The soil and groundwater at the subject property could be impacted from the historical use of paints and solvents. Since the subject property was listed in the 1922 fire insurance plans, there is potential that lead-based paints were used. The contaminants of concern are metals, PAHs and VOCs.

The Phase Two ESA investigation was carried out during May 2014. The components of the Phase Two ESA investigation consisted of advancing two (2) boreholes and installing two (2) monitoring wells to assess the soil and groundwater in the area of the proposed construction. Soil and groundwater samples were collected and submitted to Paracel Laboratories Ltd. of Ottawa, Ontario for laboratory analyses of selected parameters.

The data collected during the borehole drilling indicated that the site is underlain by a surficial layer of fill material overlying silty sand with varying amounts of cobbles and gravel.

The groundwater levels measured in monitoring wells BH14-1 and BH14-2 on May 15, 2014 were 2.6 and 3.0 metres below ground surface, respectively.

The analytical results of the groundwater sampling meets the applicable MOE Table 3 site condition standards for the parameters analysed (PHCs, Metals, PAHs and VOCs). The analytical results of the soil sampling identified exceedances above the applicable MOE Table 3 site condition standards for various metals and PAHs for the samples taken from 0 to 0.6 metres below ground surface. The sample results are summarized as follows:

***APEC 1: Fill Material Across Subject Property***

As indicated in Tables 1 to 4, the soil samples submitted from boreholes 14-1 and 14-2 at a depth of 0.0 to 0.6 metres below ground surface exceed the applicable MOE Table 3 site condition standards for various metals and PAHs. The exceedances identified in sample SA1 from borehole 14-1 are summarized as follows:

| Parameter | Concentration (µg/g) | Table 3 Standard (µg/g) |
|---|---|---|
| Mercury | 0.5 | 0.27 |
| Lead | 399 | 120 |
| Benzo(a)pyrene | 0.31 | 0.3 |
| Fluoranthene | 0.73 | 0.69 |

The exceedances identified in sample SA1 from borehole 14-2 are summarized as follows:

| Parameter | Concentration (µg/g) | Table 3 Standard (µg/g) |
|---|---|---|
| Mercury | 0.3 | 0.27 |
| Barium | 488 | 390 |
| Lead | 350 | 120 |
| Acenapthylene | 1.53 | 0.15 |
| Anthracene | 1.05 | 0.67 |
| Benzo(a)anthracene | 2.91 | 0.5 |
| Benzo(a)pyrene | 2.97 | 0.3 |
| Benzo(b)fluoranthene | 4.20 | 0.78 |
| Benzo(k)flyoranthene | 1.45 | 0.78 |
| Dibenzo(a,h)anthracene | 0.31 | 0.1 |

| Parameter | Concentration (µg/g) | Table 3 Standard (µg/g) |
|---|---|---|
| Fluoranthene | 2.86 | 0.69 |
| Fluorene | 0.97 | 0.38 |

***APEC 2: Vehicle Maintenance near Rear Shed Workshop***

As indicated in Tables 1 and 4, the shallow soil samples submitted from borehole 14-1 meet the applicable site condition standards for PHCs, BTEX and VOCs, but does not meet the site condition standards for various PAHs and metals. As indicated in Tables 5 to 8, the groundwater sample submitted from borehole 14-1 meets the applicable site condition standards for all parameters analysed.

***APEC 3: Former Use of Subject Property as an Automotive Paint Shop***

As shown in Table 4, the shallow soil sample submitted from borehole 14-2 meets the applicable MOE Table 3 site condition standards for VOCs, but does not meet the site condition standards for various PAHs and metals. As indicated in Tables 5 to 8, the groundwater sample submitted from borehole 14-2 meets the applicable site condition standards for all parameters analysed.

Based on the results of the current investigation, the contaminants within the fill material should be removed as part of the site development and disposed of at a licensed landfill. Delineation of soil exceeding the site condition standards could be performed in order to identify the amount of material required to be disposed at a licensed landfill facility. Confirmation sampling should be carried out by Houle Chevrier Engineering Ltd. following the removal of the contaminated soil to confirm that all contaminants have been removed.

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## 1.0 INTRODUCTION

Houle Chevrier Engineering Ltd. (HCEL) was retained by Urban Rise Development Inc. to carry out a Phase Two Environmental Site Assessment (ESA) for the properties located at 67 and 71 Marquette Avenue in Ottawa, Ontario (hereafter referred to as "the subject property"). The general location of the subject property is illustrated on the Key Plan, Figure 1.

The purpose of the Phase Two ESA was to investigate the areas of potential environmental concern identified in the Phase One ESA dated April 8, 2014, and to assess the potential for environmental impact at the subject property. This Phase Two ESA was completed in general accordance with Ontario Regulation 153/04.

### 1.1 Phase Two Property Description

The subject property is approximately 740 square metres in size. The legal description for the 67 Marquette Avenue property is Lot 137, Plan 4M-27, formerly City of Vanier, City of Ottawa; PIN 04235-0125. The legal description for the 71 Marquette Avenue property is Lot 136, Plan 4M-27, formerly City of Vanier, City of Ottawa; PIN 04235-0124.

### 1.2 Phase Two Property Ownership

The subject property is owned by Lindenlea Apartments Inc. and the contact person is Mr. Mark Larose, President of Urban Rise Development Inc. at 613-796-2652.

### 1.3 Current and Future Land Uses

The building at 67 Marquette Avenue is a two-storey single residential building and the building at 71 Marquette Avenue is a two-storey multi-residential building. The subject property is zoned as residential fourth density. No changes to the future land use are planned for the subject property and therefore Section 168.3.1 of the Environmental Protection Act (Ministry of Environment, December 31, 2011) does not require a Record of Site Condition to be filed for the subject property.

### 1.4 Applicable Site Condition Standard

Site restoration standards were selected for this site in accordance with the requirements of Ontario Regulation 153/04, Record of Site Condition – Part XV.1 of the Environmental Protection Act (O. Reg. 153/04, Ministry of Environment, October 31, 2011).

The following information was considered in selecting the site condition standards:

- The subject property is within an urban area;
- No drinking water wells are located on the subject property or within 250 metres of the subject property;
- The current property use is residential;

- The overburden thickness of the subject property is greater than 2 metres.

Based on the above information, the current Ministry of Environment (MOE) Table 3 full depth generic site condition standards for coarse grained soil, residential property use, in a non-potable groundwater condition as outlined in the MOE, Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act (MOE, April 15, 2011) was selected for the subject property.

## 2.0 BACKGROUND INFORMATION

### 2.1 Physical Setting

The subject property is residential land and has been historically used as residential land since at least 1925. The subject property is currently serviced by overhead hydro, underground sewer, water and natural gas services.

The subject property has a relatively flat topography and is at an elevation of approximately 57 metres above sea level. Surrounding topography generally slopes gradually downwards to the southwest. Based on the topography of the area and the Rideau River located approximately 850 metres southwest, it is expected that the local shallow groundwater flow is towards the southwest.

### 2.2 Past Investigations

A Phase One ESA was conducted by Houle Chevrier Engineering Ltd. for the subject property and is provided in the report titled "Phase One Environmental Site Assessment, 67-71 Marquette Avenue, Ottawa, Ontario" dated April 8, 2014. The Phase One ESA was carried out under the supervision of a qualified person in accordance with the Ontario Regulation 153/04 made under the Environmental Protection Act. The following Areas of Potential Environmental Concern (APECs) were determined through the Phase One ESA to exist for the subject property:

#### *APEC 1: Fill Material Across Subject Property*

Fill material was encountered in three (3) of four (4) boreholes advanced on the subject property during a geotechnical investigation performed by Houle Chevrier Engineering Ltd. in April of 2014. The soil across the subject property could be adversely impacted by presence of the fill material. Due to the unknown origin and quality of the fill material, the associated contaminants of concern are PHCs, metals, and PAHs.

#### *APEC 2: Vehicle Maintenance near Rear Shed Workshop*

During the site reconnaissance, it was noted that vehicle and other types of maintenance were performed within and near the shed workshop located at the rear (north) of 67 Marquette Avenue. Products associated with vehicle maintenance were observed within and adjacent to

the workshop. Ground staining could not be observed since there was snow cover at the time of our site visit on March 27, 2014. However, there is potential for these products to impact soil and groundwater on the subject property. The contaminants of concern associated with these products and activities are BTEX, PHCs, PAHs and VOCs.

***APEC 3: Former Use of Subject Property as an Automotive Paint Shop***

According to the 1922 fire insurance plan, the subject property was formerly used as an automotive paint shop. The soil and groundwater at the subject property could be impacted from the historical use of paints and solvents. Since the subject property was listed in the 1922 fire insurance plans, there is potential that lead-based paints were used. The contaminants of concern are metals, PAHs and VOCs.

## 3.0 SCOPE OF INVESTIGATION

### 3.1 Overview of Site Investigation

The objectives of the Phase Two ESA were based on the results of the Phase One ESA and are to document the presence or absence of contaminants in the land or water on, in or under the subject property, and if contaminants are present, to identify the locations of and concentrations of contaminants in the land or water on, in or under the subject site, and to assess if the subject property meets the applicable Ministry of the Environment site condition standards. The presence or absence of contaminants was investigated at discrete sampling locations using a limited number of samples.

The following tasks were completed during the Phase Two ESA:

- Preparation of a sampling and analysis plan;
- Two (2) boreholes were advanced at the site to collect soil samples;
- The two (2) boreholes were instrumented with monitoring wells in order to collect groundwater samples;
- Soil and groundwater samples were submitted to an accredited laboratory for laboratory analysis of contaminants of concern;
- Comparing the analytical results to the applicable site condition standard; and,
- Preparation of a Phase Two Environmental Site Assessment report.

### 3.2 Media Investigated

This Phase Two ESA included sampling and analysis of soil and groundwater. No sediment sampling was conducted as no surface water bodies are present on the subject property. The rationale for sampling the soil and groundwater was to investigate the potential for contamination at the APECs identified in the Phase One ESA.

The soil quality at discrete locations on the subject property was assessed by collecting soil samples from two (2) boreholes, numbered 14-1 and 14-2 at regular depth intervals. All soil samples were field preserved in methanol and screened in the field and at the office, with a subset being submitted for laboratory analysis of the identified contaminants of concern. The locations of the boreholes are provided on Figure 2.

The groundwater quality at the subject property was assessed through the collection of groundwater samples from the two (2) monitoring wells that were installed. Groundwater samples were collected in laboratory supplied bottles using dedicated sampling equipment.

### 3.3 Phase One Conceptual Site Model

The Phase One Conceptual Site Model (CSM) prepared as part of the Phase One ESA identified the following details:

- One (1) residential building is present on each of the two (2) properties comprising the study site. The 67 Marquette Avenue property also has a shed located at the rear of the property;
- No areas of natural significance are present on the subject property or within the Phase One study area;
- The Phase One study area is located in an urban setting;
- Adjacent property uses are primarily residential;
- Locations of where potentially contaminating activities have occurred;
- Areas of potential environmental concern on the subject property.

The details of the Phase One Conceptual Site Model are presented on Figure 2.

### 3.3.1 Potentially Contaminating Activities

The following potentially contaminating activities were identified during the Phase One ESA:

- A geotechnical investigation conducted by Houle Chevrier Engineering Ltd. for the property encountered fill material.
- Vehicle and other maintenance were performed at the rear (north) end of 67 Marquette Avenue. Products including paints, lubricants, and oil were present in the workshop shed. Potential waste containers of these products were being stored adjacent to the shed.
- According to a 1922 fire insurance plan, the subject property was formerly used as an automotive paint shop.

### 3.3.2 Areas of Potential Environmental Concern

The areas of potential environmental concern (APEC) on the subject property are summarized in the following table:

| APEC | Location of APEC on Phase One Property | PCA | Location of PCA | Contaminants of Potential Concern | Media Potentially Impacted |
|---|---|---|---|---|---|
| APEC 1 | Across subject property | Fill material | On site | • BTEX[1]<br>• PHCs[2]<br>• Metals<br>• PAHs[3] | Soil |
| APEC 2 | Near shed workshop at 67 Marquette Avenue | Vehicle maintenance and storage of associated products | On site | • BTEX<br>• PHCs<br>• PAHs<br>• VOCs[4] | • Soil<br>• Groundwater |

| APEC | Location of APEC on Phase One Property | PCA | Location of PCA | Contaminants of Potential Concern | Media Potentially Impacted |
|---|---|---|---|---|---|
| APEC 3 | Rear of subject property (north side) | Former use as an automotive paint shop | On site | • Metals<br>• PAHs<br>• VOCs | • Soil<br>• Groundwater |

Notes:

1. BTEX – Bezene, Toluene, Ethylbenze and Xylenes
2. PHCs – Petroleum Hydrocarbon
3. PAHs – Polycyclic Aromatic Hydrocarbons
4. VOCs – Volatile Organic Compounds

### 3.4 Deviations from Sampling and Analysis Plan

One (1) deviation occurred during the investigation. High combustible headspace vapour readings (250 and 900) were measured on soil samples SA7 from boreholes 14-1 and 14-2 and therefore these samples were submitted for analysis of volatile organic compounds.

### 3.5 Impediments

No impediments occurred during the investigation.

## 4.0 INVESTIGATION METHODS

### 4.1 General

Two (2) boreholes (numbered 14-1 and 14-2) were advanced on April 30, 2014. Soil samples were recovered at regular depth intervals and screened for combustible headspace gas concentrations and visual and olfactory indications of contamination. Well screens were installed in both of the boreholes. Soil and groundwater samples were collected from the boreholes and well screen, and submitted to Paracel Laboratories Ltd. for chemical analyses of selected parameters.

### 4.2 Borehole Drilling

The boreholes were advanced at the subject property using a direct push drill rig supplied and operated by Strata Drilling Group.

Cross-contamination between samples was minimized by using dedicated tube samplers. Clean gloves were worn and changed between each sample.

### 4.3 Soil Sampling

Soil samples were collected following the Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario (MOE, 1996). Soil samples were collected from the tube sampler and placed directly into sample jars and resealable zipper bags using nitrile gloves. An approximately 5 gram soil sample was also obtained using new disposable syringes and placed into methanol preserved vials for volatile organic compounds (VOCs) analysis.

Geological descriptions of the collected soil samples based on the Record of Borehole sheets in Appendix A are summarized in the following table:

| Borehole | Sample | Sample Depth (metres below ground surface) | Geological Description |
|---|---|---|---|
| BH14-1 | SA1 | 0.0 – 0.6 | Dark brown to grey silty sand to sandy silt, with gravel and shale fragments (FILL) |
| | SA2 | 0.6 – 1.2 | |
| | SA3 | 1.2 – 1.8 | Dark brown silty sand with organics and gravel (FORMER TOPSOIL) |
| | SA4 | 1.8 – 2.4 | Grey sand, some silt and cobbles, trace clay |
| | SA5 | 2.4 – 3.1 | Grey sand, some silt |

| Borehole | Sample | Sample Depth (metres below ground surface) | Geological Description |
|---|---|---|---|
| | SA6 | 3.1 – 3.7 | Medium to coarse sand, some gravel and cobbles |
| | SA7 | 3.7 – 4.3 | |
| | SA8 | 4.3 – 4.9 | |
| BH14-2 | SA1 | 0.0 – 0.6 | Brown fine silty sand, containing organics and gravel (FILL) |
| | SA2 | 0.6 – 1.2 | Dark brown fine silty sand with grey to white marl, trace organics (FILL) |
| | SA3 | 1.2 – 1.8 | Brown silty sand, trace cobbles (POSSIBLE FILL) |
| | SA4 | 1.8 – 2.4 | Brown sand, some silt |
| | SA5 | 2.4 – 3.1 | Brown fine to coarse sand, some gravel with silty sand pockets |
| | SA6 | 3.1 – 3.7 | |
| | SA7 | 3.7 – 4.3 | Dark grey brown fine to coarse sand, some silt, trace clay and organics |
| | SA8 | 4.3 – 4.9 | Dark grey fine to coarse SAND, trace silt with cobbles |

### 4.4 Groundwater Monitoring Well Installation

Groundwater monitoring wells were installed in boreholes 14-1 and 14-2 by Strata Drilling Group at the time of drilling the borehole. The monitoring wells were constructed with 32 mm diameter PVC screens and risers. Silica sand was placed around the screen and to 0.3 metres above the top of the screen. The remaining annulus space to ground surface was sealed with bentonite to minimize cross-contamination. The monitoring well construction details are provided in the Record of Borehole sheets in Appendix A.

### 4.5 Groundwater Field Measurements

A Heron Instruments oil/water interface meter used to measure groundwater levels and did not detect the presence of free petroleum product in any of the monitoring wells.

### 4.6 Groundwater Sampling

Groundwater samples were collected following the Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario (MOE, 1996). All groundwater samples were collected in laboratory supplied bottles, using a peristaltic groundwater pump with dedicated tubing. Prior to sampling, the monitoring wells were developed by purging the wells using a low flow groundwater pump. The groundwater samples were obtained after field tests showed that the pH, conductivity, total dissolved solids, oxidation reduction potential and temperature had stabilized. All groundwater samples were stored in a cooler filled with ice and were submitted to Paracel Laboratories Ltd. for analyses of selected parameters.

### 4.7 Sediment Sampling

No sediments were sampled as part of the Phase Two ESA work program as there are no surface water bodies present on the site.

### 4.8 Analytical Testing

Laboratory analysis of soil samples and groundwater samples was carried out by Paracel Laboratories Ltd. located at 300-2319 St. Laurent Boulevard in Ottawa, Ontario.

### 4.9 Residue Management Procedures

No excess soil cuttings were produced during the borehole drilling. Water used during cleaning and purged groundwater produced during the well development and groundwater sampling was stored on-site in drums.

### 4.10 Quality Assurance and Quality Control Measures

***Soil Samples***

Soil samples were collected in clear glass jars and vials containing methanol preservative supplied by the laboratory. The jars were partially pre-labeled prior to going out in the field to record the client (Houle Chevrier Engineering Ltd.), project number, borehole number and date of sampling on each laboratory supplied jar. In the field, a black pen or permanent marker was used to fill in the sample number and date. This allowed for the time spent in the field labeling jars to be minimized and reduced possible errors. A chain of custody was clearly completed to include the information for each sample collected and was attached to the sampling cooler storing the samples while the samples were transferred to the analytical laboratory for chemical testing.

A new pair of nitrile gloves was worn for collecting each of the soil samples to minimize cross contamination between samples and to protect staff from exposure to contaminants. The sampling tubes were opened by the contractor and samples were collected directly into laboratory supplied jars using a putty scraper and/or knife which was wiped with a clean cloth and rinsed with a decontamination solution and distilled water following each sampling event.

The samples for the vials containing the methanol preservative were collected using new plastic syringes supplied by the laboratory. Following collection of soil samples in laboratory supplied jars, the remaining soil in the sampling tubes was placed in a plastic resealable zipper bag for combustible headspace gas screening at the end of the day.

The soil samples collected in the laboratory supplied containers were immediately preserved in the field by placing the samples in a laboratory supplied cooler filled with ice packs to maintain the temperature between 4 and 10 degrees Celsius. Soil samples were returned to our office and placed into a dedicated refrigerator for storage of soil and groundwater samples. Soil samples were selected for submission based on combustible gas measurements and visual and olfactory signs of contamination. All samples were submitted within the maximum allowable holding time of 14 days.

### *Groundwater Samples*

The groundwater samples were collected in laboratory supplied bottles and vials specific to the requested analysis. The jars were partially pre-labeled prior to going out in the field to record the client (Houle Chevrier Engineering Ltd.), project number, borehole number and date of sampling on each laboratory supplied jar. In the field a black pen or permanent marker was used to fill in the sample number and date.

A new pair of nitrile gloves was worn during the collection of each of the groundwater samples to minimize cross contamination between samples and to protect staff from exposure to contaminants. Groundwater was sampled from the wells using dedicated sampling equipment for each well.

The groundwater samples collected in the laboratory supplied containers were immediately cooled in the field by placing the samples in a laboratory supplied cooler filled with ice packs. Groundwater samples were submitted to the laboratory the same day for analysis. All samples were submitted within the maximum allowable holding time of 48 hours.

No equipment other than disposable nitrile gloves and dedicated groundwater sampling equipment was used in sampling the groundwater from the wells. No cleaning procedures were required as the gloves and dedicated sampling equipment were disposed of following sample collection.

## 5.0 REVIEW AND EVALUATION OF INFORMATION

### 5.1 Geology

Surficial geology at the subject property was interpreted from the stratigraphic information obtained during drilling at the specific test locations only. Detailed descriptions of soil conditions can be found on the Record of Borehole Sheets in Appendix A.

The following presents an overview of the subsurface conditions encountered in the boreholes advanced during this investigation.

#### *Topsoil Fill*

A surficial layer of topsoil fill was encountered at the borehole locations and had a thickness of approximately 0.1 to 0.2 metres. At borehole 14-2 a former topsoil layer having a thickness of approximately 0.6 metres was encountered at a depth of 1.2 metres.

#### *Fill*

Fill was encountered at the two borehole locations. The fill is generally composed of silty sand to sandy silt. The thickness of the fill ranges from approximately 0.8 to 1.0 metres.

#### *Silty Sand / Sand*

Deposits of silty sand and sand were encountered in all of the boreholes below the fill and former topsoil layers. The silty sand / sand layers had varying amounts of cobbles, clay and gravel.

### 5.2 Groundwater Levels

The groundwater levels were measured in the monitoring wells on May 15 2014. No free product was detected by the Heron Instruments oil/water interface meter. The groundwater levels and combustible headspace vapour readings are summarized in the following table:

| Borehole | Date Measured | Groundwater Depth Below Ground Surface (metres) | Combustible Headspace Vapour Reading (ppm) |
|---|---|---|---|
| 14-1 | 15/05/2014 | 2.63 | 10 |
| 14-2 | 15/05/2014 | 3.03 | 0 |

### 5.3 Site Condition Standards

Site condition standards were selected for this site in accordance with the requirements of Ontario Regulation 153/04, Records of Site Condition – Part XV.1 of the Environmental Protection Act (O. Reg. 153/04, MOE, October 31, 2011).

The following information was considered in selecting the site condition standards:

- The subject property is within an urban area;
- No drinking water wells are located on the subject property or within 250 metres of the subject property;
- The current property use is residential;
- The overburden thickness of the subject property is greater than 2 metres.

Based on the above information, the current Ministry of Environment (MOE) Table 3 full depth generic site condition standards for coarse grained soil, residential property use, in a non-potable groundwater condition as outlined in the MOE, Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act (MOE, April 15, 2011) was selected for the subject property.

### 5.4 Soil Quality

The laboratory certificates of analysis for the selected soil samples are presented in Appendix B. The locations and depths of the selected soil samples submitted for laboratory analysis are summarized in the following table:

| Borehole | Sample | Depth Interval (m bgs[1]) | PHCs[2] F1-F4 / BTEX[3] | PAHs[4] | Metals | VOCs[5] |
|---|---|---|---|---|---|---|
| 14-1 | SA1 | 0.0 – 0.6 | ✓ | ✓ | ✓ | ✓ |
| 14-1 | SA101 | 0.0 – 0.6 | | | | ✓ |
| 14-1 | SA7 | 3.7 – 4.3 | ✓ | | | ✓ |
| 14-2 | SA1 | 0.0 – 0.6 | ✓ | ✓ | ✓ | |
| 14-2 | SA7 | 3.7 – 4.3 | ✓ | | | ✓ |

Notes:

1. m bgs – metres below ground surface
2. PHCs F1 to F4 - Petroleum Hydrocarbon Fractions in the F1 to F4 ranges

3. BTEX – Benzene, Toluene, Ethylbenzene and Xylenes
4. PAHs – Polycyclic Aromatic Hydrocarbons
5. VOCs – Volatile Organic Compounds

The analytical results from the laboratory certificates of analysis were compared with the applicable Table 3 site condition standards (MOE, 2011). The results are summarized in Tables 1 to 4 following the text of the report. As shown in Tables 1 to 4 the soil sample results satisfy the applicable MOE Table 3 site condition standards for all parameters analysed with the exception of the following:

***Borehole 14-1 Sample SA1***

| Parameter | Concentration (µg/g) | Table 3 Standard (µg/g) |
|---|---|---|
| Mercury | 0.5 | 0.27 |
| Lead | 399 | 120 |
| Benzo(a)pyrene | 0.31 | 0.3 |
| Fluoranthene | 0.73 | 0.69 |

***Borehole 14-2 Sample SA1***

| Parameter | Concentration (µg/g) | Table 3 Standard (µg/g) |
|---|---|---|
| Mercury | 0.3 | 0.27 |
| Barium | 488 | 390 |
| Lead | 350 | 120 |
| Acenapthylene | 1.53 | 0.15 |
| Anthracene | 1.05 | 0.67 |
| Benzo(a)anthracene | 2.91 | 0.5 |
| Benzo(a)pyrene | 2.97 | 0.3 |
| Benzo(b)fluoranthene | 4.20 | 0.78 |
| Benzo(k)fluoranthene | 1.45 | 0.78 |
| Dibenzo(a,h)anthracene | 0.31 | 0.1 |
| Fluoranthene | 2.86 | 0.69 |

| Parameter | Concentration (µg/g) | Table 3 Standard (µg/g) |
|---|---|---|
| Fluorene | 0.97 | 0.38 |

### 5.5 Groundwater Quality

The laboratory certificates of analysis for the groundwater samples are presented in Appendix C. The location, date and parameters analysed are summarized in the following table:

| Monitoring Well | Screened Interval (m BGS[1)] | Date Sampled | Water Level (m BGS) | Parameters Analysed |
|---|---|---|---|---|
| 14-1 | 1.52 – 4.57 | 15/05/2014 | 2.63 | PHCs/BTEX, Metals, PAHs, VOCs |
| 14-2 | 1.52 – 4.57 | 15/05/2014 | 3.03 | PHCs/BTEX, Metals, PAHs, VOCs |

Notes:

1. m BGS – metres below ground surface

The analytical results from the laboratory certificates of analysis were compared with the applicable Table 3 site condition standards (MOE, 2011). The results are summarized in Tables 5 to 8 following the text of the report. As indicated in Tables 5 to 8 the groundwater sample results satisfy the applicable MOE Table 3 site condition standards for all parameters analysed.

### 5.6 Sediment Quality

No sediments were investigated as part of the Phase Two ESA as there are no surface water bodies present on the site.

### 5.7 Quality Assurance and Quality Control Results

One (1) duplicate soil sample was submitted to Paracel Laboratories for analysis of VOCs. The soil sample 14-101 SA1 is a duplicate of sample SA1 from borehole 14-1. The results of the duplicate soil sample are non detect for VOCs which is the same as the original sample.

The Laboratory QA/QC results for the soil analysis are included with the laboratory analytical data provided in Appendix B. Soil sample holding times were met, and all laboratory quality control blanks, duplicates and spikes and surrogate compound recoveries met applicable industry criteria with the exception of the following:

- The detection limit was elevated for various PAHs in the soil samples due to the nature of the sample matrix;
- The quality control spike recovery was outside established control limits for chromium (vi) due to sample matrix interference;
- The quality control spike recovery was outside acceptance limits for barium, lead and zinc due to elevated analyte concentration.

The Laboratory QA/QC results for the groundwater analysis are included with the laboratory analytical data provided in Appendix C. Groundwater sample holding times were met, and all laboratory quality control blanks, duplicates and spikes and surrogate compound recoveries met applicable industry criteria with the exception of the following:

- The quality control spike recovery was outside acceptance limits for selenium. The batch was accepted based on other acceptable QC.

Based on the measures discussed above, sample collection and handling protocols are considered acceptable and associated analytical results reproducible. The quality of the field data and laboratory data from the investigation was sufficient in that decision making was not affected and the overall objectives of the investigation and assessment were met.

## 5.8 Phase Two Conceptual Site Model

### 5.8.1 Potentially Contaminating Activities

The following potentially contaminating activities were identified during the Phase One ESA:

- A geotechnical investigation conducted by Houle Chevrier Engineering Ltd. for the property encountered fill material.
- Vehicle and other maintenance were performed at the rear (north) end of 67 Marquette Avenue. Products including paints, lubricants, and oil were present in the workshop shed. Potential waste containers of these products were being stored adjacent to the shed.
- According to a 1922 fire insurance plan, the subject property was formerly used as an automotive paint shop.

### 5.8.2 Areas of Potential Environmental Concern (APECs)

A description and assessment of areas where potentially contaminating activities have occurred and areas of potential environmental concern are summarized in the following table:

| APEC | Location of APEC on Phase One Property | PCA | Location of PCA | Contaminants of Potential Concern | Media Potentially Impacted |
|---|---|---|---|---|---|
| APEC 1 | Across subject property | Fill material | On site | • BTEX<br>• PHCs<br>• Metals<br>• PAHs | Soil |
| APEC 2 | Near shed workshop at 67 Marquette Avenue | Vehicle maintenance and storage of associated products | On site | • BTEX<br>• PHCs<br>• PAHs<br>• VOCs | • Soil<br>• Groundwater |
| APEC 3 | Rear of subject property (north side) | Former use as an automotive paint shop | On site | • Metals<br>• PAHs<br>• VOCs | • Soil<br>• Groundwater |

***Soil Exceedances***

The Phase II ESA identified soil exceedances above the MOE Table 3 Standards for various metals and PAHs in the fill material at boreholes 14-1 and 14-2. Borehole 14-1 was used to investigate the potential for contamination from the fill material (APEC 1) and the vehicle maintenance and storage of associated products (APEC 2). Borehole 14-2 was used to investigate the potential for contamination from the fill material (APEC 1) and the former use of the site as an automotive paint shop (APEC 3).

***Groundwater Exceedances***

No groundwater exceedances above the MOE Table 3 Site Condition Standards were identified during the Phase II ESA. The monitoring well BH12-1 was used to investigate the pontential for contamination to the groundwater from the vehicle maintenance and storage of associated products (APEC 2).

The monitoring well BH14-2 was used to investigate the potential for contamination to the groundwater from the former use of the site as an automotive paint shop (APEC 3).

### 5.8.3 Subsurface Structures

Underground natural gas, sewer and water were identified to exist on the subject property.

### 5.8.4 Physical Settings and Hydrogeological Characteristics of the Subject Property

The stratigraphy of the subject property is generally taken as a surficial layer of fill material overlying silty sand with variable amounts of cobbles and gravel.

The groundwater levels measured in monitoring wells BH14-1 and BH14-2 on May 15, 2014 were 2.6 and 3.0 metres below ground surface, respectively.

### 5.8.5 Selection of Site Condition Standards

Based on the results of the Phase One and Two ESAs conducted for the subject property, the site restoration standards selected for this site are the MOE Table 3 Full Depth Generic Site Condition Standards for Residential Property Use in a Non-Potable Ground Water Condition (coarse textured soils).

### 5.8.6 Identified Contamination and Impacted Medium on the Subject Property

The Phase Two ESA investigated the APECs identified in the Phase One ESA and the results of the investigation for each APEC are summarized below:

***APEC 1: Fill Material Across Subject Property***

As indicated in Tables 1 to 4, the shallow soil samples submitted from boreholes 14-1 and 14-2 at a depth of 0.0 to 0.6 metres below ground surface exceed the applicable MOE Table 3 site condition standards for various metals and PAHs. The exceedances identified in sample SA1 from borehole 14-1 are summarized as follows:

| Parameter | Concentration (µg/g) | Table 3 Standard (µg/g) |
|---|---|---|
| Mercury | 0.5 | 0.27 |
| Lead | 399 | 120 |
| Benzo(a)pyrene | 0.31 | 0.3 |
| Fluoranthene | 0.73 | 0.69 |

The exceedances identified in sample SA1 from borehole 14-2 are summarized as follows:

| Parameter | Concentration (µg/g) | Table 3 Standard (µg/g) |
|---|---|---|
| Mercury | 0.3 | 0.27 |
| Barium | 488 | 390 |
| Lead | 350 | 120 |
| Acenapthylene | 1.53 | 0.15 |
| Anthracene | 1.05 | 0.67 |
| Benzo(a)anthracene | 2.91 | 0.5 |
| Benzo(a)pyrene | 2.97 | 0.3 |

| Parameter | Concentration (µg/g) | Table 3 Standard (µg/g) |
|---|---|---|
| Benzo(b)fluoranthene | 4.20 | 0.78 |
| Benzo(k)flyoranthene | 1.45 | 0.78 |
| Dibenzo(a,h)anthracene | 0.31 | 0.1 |
| Fluoranthene | 2.86 | 0.69 |
| Fluorene | 0.97 | 0.38 |

***APEC 2: Vehicle Maintenance near Rear Shed Workshop***

As indicated in Tables 1 and 4, the shallow soil samples submitted from borehole 14-1 meet the applicable site condition standards for PHCs, BTEX and VOCs, but does not meet the site condition standards for various PAHs and metals. As indicated in Tables 5 to 8, the groundwater sample submitted from borehole 14-1 meets the applicable site condition standards for all parameters analysed.

***APEC 3: Former Use of Subject Property as an Automotive Paint Shop***

As shown in Table 4, the shallow soil sample submitted from borehole 14-2 meets the applicable MOE Table 3 site condition standards for VOCs, but does not meet the site condition standards for various PAHs and metals. As indicated in Tables 5 to 8, the groundwater sample submitted from borehole 14-2 meets the applicable site condition standards for all parameters analysed.

### 5.8.7 Summary of Identified Impacts

The shallow soil samples used to investigate APECs 1 to 3 (boreholes 14-1 and 14-2) exceed the MOE Table 3 site condition standards for various metals and PAHs.

## 6.0 CONCLUSIONS

The Phase One ESA report previously carried out for the subject property recommended that a Phase Two ESA investigation be carried out for the properties located at 67 and 71 Marquette Avenue in Ottawa, Ontario. The Phase Two ESA investigated the following Areas of Potential Environmental Concern (APECs) that were identified in the Phase One ESA:

### *APEC 1: Fill Material Across Subject Property*

Fill material was encountered in three (3) of four (4) boreholes advanced on the subject property during a geotechnical investigation performed by Houle Chevrier Engineering Ltd. in April of 2014. The soil across the subject property could be adversely impacted by presence of the fill material. Due to the unknown origin and quality of the fill material, the associated contaminants of concern are PHCs, metals, and PAHs.

### *APEC 2: Vehicle Maintenance near Rear Shed Workshop*

During the site reconnaissance, it was noted that vehicle and other types of maintenance were performed within and near the shed workshop located at the rear (north) of 67 Marquette Avenue. Products associated with vehicle maintenance were observed within and adjacent to the workshop. Ground staining could not be observed since there was snow cover at the time of our site visit on March 27, 2014. However, there is potential for these products to impact soil and groundwater on the subject property. The contaminants of concern associated with these products and activities are BTEX, PHCs, PAHs and VOCs.

### *APEC 3: Former Use of Subject Property as an Automotive Paint Shop*

According to the 1922 fire insurance plan, the subject property was formerly used as an automotive paint shop. The soil and groundwater at the subject property could be impacted from the historical use of paints and solvents. Since the subject property was listed in the 1922 fire insurance plans, there is potential that lead-based paints were used. The contaminants of concern are metals, PAHs and VOCs.

The Phase Two ESA investigation was carried out during May 2014. The components of the Phase Two ESA investigation consisted of advancing two (2) boreholes and installing two (2) monitoring wells to assess the soil and groundwater in the area of the proposed construction. Soil and groundwater samples were collected and submitted to Paracel Laboratories Ltd. of Ottawa, Ontario for laboratory analyses of selected parameters.

The data collected during the borehole drilling indicated that the site is underlain by a surficial layer of fill material overlying silty sand with varying amounts of cobbles and gravel.

The groundwater levels measured in monitoring wells BH14-1 and BH14-2 on May 15, 2014 were 2.6 and 3.0 metres below ground surface, respectively.

The analytical results of the groundwater sampling meets the applicable MOE Table 3 site condition standards for the parameters analysed (PHCs, Metals, PAHs and VOCs). The analytical results of the soil sampling identified exceedances above the applicable MOE Table 3 site condition standards for various metals and PAHs for the samples taken from 0 to 0.6 metres below ground surface. The sample results are summarized as follows:

***APEC 1: Fill Material Across Subject Property***

As indicated in Tables 1 to 4, the soil samples submitted from boreholes 14-1 and 14-2 at a depth of 0.0 to 0.6 metres below ground surface exceed the applicable MOE Table 3 site condition standards for various metals and PAHs. The exceedances identified in sample SA1 from borehole 14-1 are summarized as follows:

| Parameter | Concentration (µg/g) | Table 3 Standard (µg/g) |
|---|---|---|
| Mercury | 0.5 | 0.27 |
| Lead | 399 | 120 |
| Benzo(a)pyrene | 0.31 | 0.3 |
| Fluoranthene | 0.73 | 0.69 |

The exceedances identified in sample SA1 from borehole 14-2 are summarized as follows:

| Parameter | Concentration (µg/g) | Table 3 Standard (µg/g) |
|---|---|---|
| Mercury | 0.3 | 0.27 |
| Barium | 488 | 390 |
| Lead | 350 | 120 |
| Acenapthylene | 1.53 | 0.15 |
| Anthracene | 1.05 | 0.67 |
| Benzo(a)anthracene | 2.91 | 0.5 |
| Benzo(a)pyrene | 2.97 | 0.3 |
| Benzo(b)fluoranthene | 4.20 | 0.78 |
| Benzo(k)flyoranthene | 1.45 | 0.78 |
| Dibenzo(a,h)anthracene | 0.31 | 0.1 |

| Parameter | Concentration (µg/g) | Table 3 Standard (µg/g) |
|---|---|---|
| Fluoranthene | 2.86 | 0.69 |
| Fluorene | 0.97 | 0.38 |

***APEC 2: Vehicle Maintenance near Rear Shed Workshop***

As indicated in Tables 1 and 4, the shallow soil samples submitted from borehole 14-1 meet the applicable site condition standards for PHCs, BTEX and VOCs, but does not meet the site condition standards for various PAHs and metals. As indicated in Tables 5 to 8, the groundwater sample submitted from borehole 14-1 meets the applicable site condition standards for all parameters analysed.

***APEC 3: Former Use of Subject Property as an Automotive Paint Shop***

As shown in Table 4, the shallow soil sample submitted from borehole 14-2 meets the applicable MOE Table 3 site condition standards for VOCs, but does not meet the site condition standards for various PAHs and metals. As indicated in Tables 5 to 8, the groundwater sample submitted from borehole 14-2 meets the applicable site condition standards for all parameters analysed.

Based on the results of the current investigation, the contaminants within the fill material should be removed as part of the site development and disposed of at a licensed landfill. Delineation of soil exceeding the site condition standards could be performed in order to identify the amount of material required to be disposed at a licensed landfill facility. Confirmation sampling should be carried out by Houle Chevrier Engineering Ltd. following the removal of the contaminated soil to confirm that all contaminants have been removed.

## 7.0 LIMITATION OF LIABILITY

This report was prepared for and the work referred to within it has been undertaken by Houle Chevrier Engineering Ltd. (HCEL) for the Urban Rise Developments Inc. and is intended for the exclusive use of the Urban Rise Developments Inc. This report may not be relied upon by any other person or entity without the express written consent of HCEL and the Urban Rise Developments Inc. Nothing in this report is intended to provide a legal opinion.

The investigation undertaken by HCEL with respect to this report and any conclusions or recommendations made in this report reflect the best judgements of HCEL based on the site conditions observed during the investigations undertaken at the date(s) identified in the report and on the information available at the time the report was prepared. This report has been prepared for the application noted and it is based, in part, on visual observations made at the site, subsurface investigations at discrete locations and depths and laboratory analyses of specific chemical parameters and material during a specific time interval, all as described in the report. Unless otherwise stated, the findings contained in this report cannot be extrapolated or extended to previous or future site conditions, portions of the site that were unavailable for direct investigation, subsurface locations on the site that were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Chemical parameters other than those addressed by the investigation described in this report may exist in soil and groundwater elsewhere on the site, the chemical parameters addressed in the report may exist in soil and groundwater at other locations at the site that were not investigated and concentrations of the chemical parameters addressed which are different than those reported may exist at other locations on the site than those from where the samples were taken.

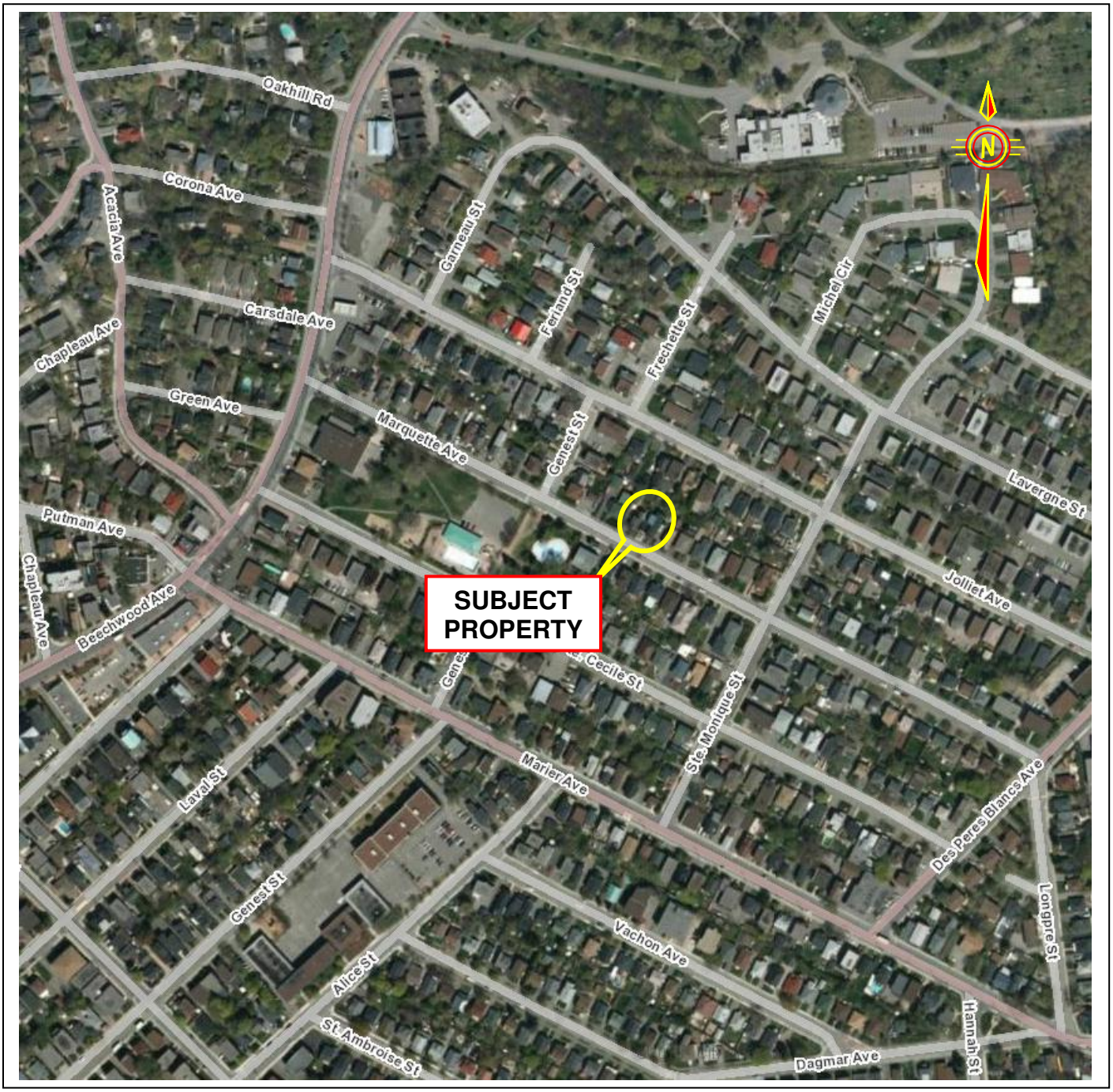
Should new information become available during future work, including excavations, borings or other studies, HCEL should be requested to review the information and, if necessary, re-assess the conclusions presented herein.

We trust this report provides sufficient information for your present purposes. If you have any questions concerning this report, please do not hesitate to contact our office.

Brett Painter, M.Sc.
Environmental Scientist

Andrew Chevrier, M.Eng., P.Eng.
Principal

| KEY PLAN | FIGURE 1 |
|---|---|

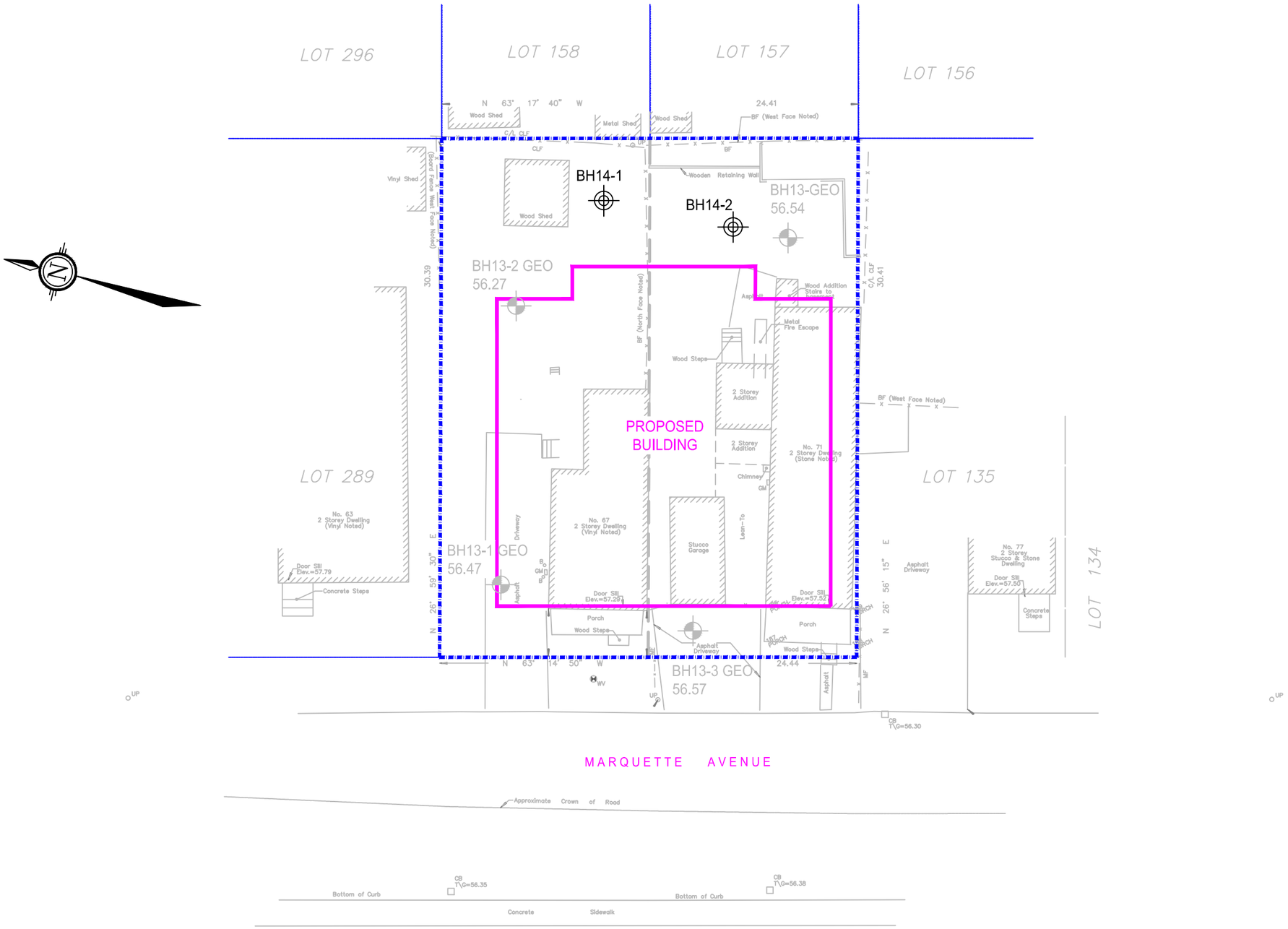



N.T.S

Houle Chevrier Engineering

Date: June 2014

Project: 14-103




LEGEND

BH 14-1 APPROXIMATE BOREHOLE LOCATION IN PLAN, PREVIOUS GEOTECHNICAL INVESTIGATION BY HOULE CHEVRIER ENGINEERING LTD.

BH 13-3 GEO APPROXIMATE BOREHOLE LOCATION IN PLAN, PREVIOUS GEOTECHNICAL INVESTIGATION BY HOULE CHEVRIER ENGINEERING LTD.

| | |
|---|---|
| Drawn By: M.L. | Checked By: B.P. |
| Calculations By: M.L | Checked By: B.P |

Date: June 2014

Project:

PHASE II ESA
67/71 MARQUETTE AVENUE
OTTAWA, ONTARIO

Drawing:

BOREHOLE LOCATION PLAN

Scale: Scale 1 : 250

0 2.5 5 7.5 10 12.5
Metres

| File No. | Drawing | Revision No. |
|---|---|---|
| 14-103 | 2 | 0 |

Houle Chevrier Engineering

## TABLE 1
## SOIL ANALYTICAL RESULTS
## PETROLEUM PARAMETERS

| Parameter | Units | MDL | MOE Table 3* | Sample Location: | BH14-1 | BH14-1 | BH14-2 | BH14-2 |
|---|---|---|---|---|---|---|---|---|
| | | | | Sample ID: | BH14-1 SA1 | BH14-1 SA7 | BH14-2 SA1 | BH14-2 SA7 |
| | | | | Laboratory Sample ID: | 1418292-01 | 1418292-04 | 1418292-02 | 1418292-05 |
| | | | | Sample Depth (mBGS): | 0.0 - 0.6 | 3.7 - 4.3 | 0.0 - 0.6 | 3.7 - 4.3 |
| | | | | Date Sampled: | 2014-04-30 | 2014-04-30 | 2014-04-30 | 2014-04-30 |
| Benzene | µg/g | 0.02 | 0.21 | | ND (0.02) | ND (0.02) | ND (0.02) | ND (0.02) |
| Ethylbenzene | µg/g | 0.05 | 2 | | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Toluene | µg/g | 0.05 | 2.3 | | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| m/p-xylene | µg/g | 0.05 | NS | | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| o-xylene | µg/g | 0.05 | NS | | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Total Xylene** | µg/g | 0.05 | 3.1 | | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| F1 PHC's (C6-C10) | µg/g | 7 | 55 | | ND (7) | ND (7) | ND (7) | ND (7) |
| F2 PHC's (C10-C16) | µg/g | 4 | 98 | | ND (4) | ND (4) | ND (4) | ND (4) |
| F3 PHC's (C16-C34) | µg/g | 8 | 300 | | 99 | ND (8) | ND (8) | ND (8) |
| F4 PHC's (C34-C50) | µg/g | 6 | 2800 | | 17 | ND (6) | ND (6) | ND (6) |

**Notes:**

1 MDL - Method Detection Limit
2 NS - No Standard
3 ND - Not Detected
4 * - Table 3: Full Depth Generic Site Condition Standards for Residential Property Use in a Non-Potable Ground Water Condition (coarse textured soils) (MOE, April 15, 2011)
5 ** - Total Xylene is calculated using the sum of m/p-xylene and o-xylene
6 **Bold** - Exceeds MOE Table 3 Site Condition Standard

**TABLE 2**
**SOIL ANALYTICAL RESULTS**
**METAL PARAMETERS**

| Parameter | Units | MDL | MOE Table 3* | Sample Location: BH14-1 / Sample ID: BH14-1 SA1 / Laboratory Sample ID: 1418292-01 / Sample Depth (mBGS): 0.0 - 0.6 / Date Sampled: 2014-04-30 | Sample Location: BH14-2 / Sample ID: BH14-2 SA1 / Laboratory Sample ID: 1418292-02 / Sample Depth (mBGS): 0.0 - 0.6 / Date Sampled: 2014-04-30 |
|---|---|---|---|---|---|
| Chromium (VI) | µg/g | 0.2 | 8 | ND (0.2) | ND (0.2) |
| Mercury | µg/g | 0.1 | 0.27 | **0.5** | **0.3** |
| Antimony | µg/g | 1.0 | 7.5 | 4.3 | 4.4 |
| Arsenic | µg/g | 1.0 | 18 | 3.9 | 5.3 |
| Barium | µg/g | 1.0 | 390 | 205 | **488** |
| Beryllium | µg/g | 1.0 | 4 | ND (1.0) | ND (1.0) |
| Boron | µg/g | 1.0 | 120 | 6.6 | 8.6 |
| Cadmium | µg/g | 0.5 | 1.2 | 0.7 | 1.2 |
| Chromium | µg/g | 1.0 | 160 | 13.2 | 26.1 |
| Cobalt | µg/g | 1.0 | 22 | 3.8 | 5.2 |
| Copper | µg/g | 1.0 | 140 | 25.0 | 52.9 |
| Lead | µg/g | 1.0 | 120 | **399** | **350** |
| Molybdenum | µg/g | 1.0 | 6.9 | ND (1.0) | 1.3 |
| Nickel | µg/g | 1.0 | 100 | 9.8 | 16.9 |
| Selenium | µg/g | 1.0 | 2.4 | ND (1.0) | ND (1.0) |
| Silver | µg/g | 0.5 | 20 | ND (0.5) | ND (0.5) |
| Thallium | µg/g | 1.0 | 1 | ND (1.0) | ND (1.0) |
| Uranium | µg/g | 1.0 | 23 | ND (1.0) | ND (1.0) |
| Vanadium | µg/g | 1.0 | 86 | 15.3 | 19.4 |
| Zinc | µg/g | 1.0 | 340 | 199 | 304 |

**Notes:**

1 MDL - Method Detection Limit
2 NS - No Standard
3 ND - Not Detected
4 * - Table 3: Full Depth Generic Site Condition Standards for Residential Property Use in a Non-Potable Ground Water Condition (coarse textured soils) (MOE, April 15, 2011)
5 **Bold** - Exceeds MOE Table 3 Site Condition Standard

# TABLE 3
# SOIL ANALYTICAL RESULTS
# POLYCYCLIC AROMATIC HYDROCARBON

| Parameter | Units | MDL | MOE Table 3* | Sample Location: BH14-1<br>Sample ID: BH14-1 SA1<br>Laboratory Sample ID: 1418292-01<br>Sample Depth (mBGS): 0.0 - 0.6<br>Date Sampled: 2014-04-30 | Sample Location: BH14-2<br>Sample ID: BH14-2 SA1<br>Laboratory Sample ID: 1418292-02<br>Sample Depth (mBGS): 0.0 - 0.6<br>Date Sampled: 2014-04-30 |
|---|---|---|---|---|---|
| Acenaphthene | µg/g | 0.02 | 7.9 | ND (0.06) | ND (0.06) |
| Acenaphthylene | µg/g | 0.02 | 0.15 | 0.11 | **1.53** |
| Anthracene | µg/g | 0.02 | 0.67 | 0.15 | **1.05** |
| Benzo[a]anthracene | µg/g | 0.02 | 0.5 | 0.41 | **2.91** |
| Benzo[a]pyrene | µg/g | 0.02 | 0.3 | **0.31** | **2.97** |
| Benzo[b]fluoranthene | µg/g | 0.02 | 0.78 | 0.64 | **4.20** |
| Benzo[g,h,i]perylene | µg/g | 0.02 | 6.6 | 0.19 | 0.98 |
| Benzo[k]fluoranthene | µg/g | 0.02 | 0.78 | 0.22 | **1.45** |
| 1,1-Biphenyl | µg/g | 0.02 | 0.31 | ND (0.06) | ND (0.06) |
| Chrysene | µg/g | 0.02 | 7 | 0.48 | 3.31 |
| Dibenzo[a,h]anthracene | µg/g | 0.02 | 0.1 | ND (0.06) | **0.31** |
| Fluoranthene | µg/g | 0.02 | 0.69 | **0.73** | **2.86** |
| Fluorene | µg/g | 0.02 | 62 | ND (0.06) | 0.10 |
| Indeno[1,2,3-cd]pyrene | µg/g | 0.02 | 0.38 | 0.15 | **0.97** |
| 1-Methylnaphthalene | µg/g | 0.02 | 0.99 | ND (0.06) | ND (0.06) |
| 2-Methylnaphthalene | µg/g | 0.02 | 0.99 | ND (0.06) | ND (0.06) |
| Methylnaphthalene (1&2) | µg/g | 0.04 | 0.99 | ND (0.12) | ND (0.12) |
| Naphthalene | µg/g | 0.01 | 0.6 | ND (0.03) | 0.04 |
| Phenanthrene | µg/g | 0.02 | 6.2 | 0.40 | 0.44 |
| Pyrene | µg/g | 0.02 | 78 | 0.65 | 5.19 |

**Notes:**

1 MDL - Method Detection Limit
2 NS - No Standard
3 ND - Not Detected
4 * - Table 3: Full Depth Generic Site Condition Standards for Residential Property Use in a Non-Potable Ground Water Condition (coarse textured soils) (MOE, April 15, 2011)
5 **Bold** - Exceeds MOE Table 3 Site Condition Standard

## TABLE 4
## SOIL ANALYTICAL RESULTS
## VOLATILE ORGANIC COMPOUNDS

| Parameter | Units | MDL | MOE Table 3* | Sample Location: BH14-1 / Sample ID: BH14-1 SA1 / Laboratory Sample ID: 1418292-01 / Sample Depth (mBGS): 0.0 - 0.6 / Date Sampled: 2014-04-30 | Sample Location: BH14-1 / Sample ID: BH14-101 SA1 / Laboratory Sample ID: 1418292-03 / Sample Depth (mBGS): 0.0 - 0.6 / Date Sampled: 2014-04-30 | Sample Location: BH14-1 / Sample ID: BH14-1 SA7 / Laboratory Sample ID: 1418292-04 / Sample Depth (mBGS): 3.7 - 4.3 / Date Sampled: 2014-04-30 | Sample Location: BH14-2 / Sample ID: BH14-2 SA7 / Laboratory Sample ID: 1418292-05 / Sample Depth (mBGS): 3.7 - 4.3 / Date Sampled: 2014-04-30 |
|---|---|---|---|---|---|---|---|
| Acetone | µg/g | 0.50 | 16 | ND (0.50) | ND (0.50) | ND (0.50) | ND (0.50) |
| Benzene | µg/g | 0.02 | 0.21 | ND (0.02) | ND (0.02) | ND (0.02) | ND (0.02) |
| Bromodichloromethane | µg/g | 0.05 | 13 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Bromoform | µg/g | 0.05 | 0.27 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Bromomethane | µg/g | 0.05 | 0.05 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Carbon Tetrachloride | µg/g | 0.05 | 0.05 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Chlorobenzene | µg/g | 0.05 | 2.4 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Chloroethane | µg/g | 0.05 | NS | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Chloroform | µg/g | 0.05 | 0.05 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Chloromethane | µg/g | 0.20 | NS | ND (0.20) | ND (0.20) | ND (0.20) | ND (0.20) |
| Dibromochloromethane | µg/g | 0.05 | 9.4 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Dichlorodifluoromethane | µg/g | 0.05 | 16 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,2-Dibromoethane | µg/g | 0.05 | 0.05 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,2-Dichlorobenzene | µg/g | 0.05 | 3.4 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,3-Dichlorobenzene | µg/g | 0.05 | 4.8 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,4-Dichlorobenzene | µg/g | 0.05 | 0.083 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,1-Dichloroethane | µg/g | 0.05 | 3.5 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,2-Dichloroethane | µg/g | 0.05 | 0.05 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,1-Dichloroethylene | µg/g | 0.05 | 0.05 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| cis-1,2-Dichloroethylene | µg/g | 0.05 | 3.4 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| trans-1,2-Dichloroethylene | µg/g | 0.05 | 0.084 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,2-Dichloroethylene, total | µg/g | 0.05 | NS | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,2-Dichloropropane | µg/g | 0.05 | 0.05 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| cis-1,3-Dichloropropylene | µg/g | 0.05 | NS | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| trans-1,3-Dichloropropylene | µg/g | 0.05 | NS | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,3-Dichloropropene, total | µg/g | 0.05 | 0.05 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Ethylbenzene | µg/g | 0.05 | 2 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Hexane | µg/g | 0.05 | 2.8 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Methyl Ethyl Ketone (2-Butanor | µg/g | 0.50 | 16 | ND (0.50) | ND (0.50) | ND (0.50) | ND (0.50) |
| Methyl Butyl Ketone (2-Hexano | µg/g | 2.00 | NS | ND (2.00) | ND (2.00) | ND (2.00) | ND (2.00) |
| Methyl Isobutyl Ketone | µg/g | 0.50 | 1.7 | ND (0.50) | ND (0.50) | ND (0.50) | ND (0.50) |
| Methyl tert-butyl ether | µg/g | 0.05 | 0.75 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Methylene Chloride | µg/g | 0.05 | 0.1 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Styrene | µg/g | 0.05 | 0.7 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,1,1,2-Tetrachloroethane | µg/g | 0.05 | 0.058 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,1,2,2-Tetrachloroethane | µg/g | 0.05 | 0.05 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Tetrachloroethylene | µg/g | 0.05 | 0.28 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Toluene | µg/g | 0.05 | 2.3 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,1,1-Trichloroethane | µg/g | 0.05 | 0.38 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,1,2-Trichloroethane | µg/g | 0.05 | 0.05 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Trichloroethylene | µg/g | 0.05 | 0.061 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Trichlorofluoromethane | µg/g | 0.05 | 4 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| 1,3,5-Trimethylbenzene | µg/g | 0.05 | NS | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Vinyl Chloride | µg/g | 0.02 | 0.02 | ND (0.02) | ND (0.02) | ND (0.02) | ND (0.02) |
| m/p-Xylene | µg/g | 0.05 | NS | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| o-Xylene | µg/g | 0.05 | NS | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |
| Xylenes, total | µg/g | 0.05 | 3.1 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) |

**Notes:**

1 MDL - Method Detection Limit
2 NS - No Standard
3 ND - Not Detected
4 * - Table 3: Full Depth Generic Site Condition Standards for Residential Property Use in a Non-Potable Ground Water Condition (coarse textured soils) (MOE, April 15, 2011)
5 **Bold** - Exceeds MOE Table 3 Site Condition Standard

## TABLE 5
## GROUNDWATER ANALYTICAL RESULTS
## PETROLEUM PARAMETERS

| Parameter | Units | MDL | MOE Table 3* | Sample Location: BH14-1 | Sample Location: BH14-2 |
|---|---|---|---|---|---|
| | | | | Sample ID: BH14-1 GW SA1 | Sample ID: BH14-2 GW SA1 |
| | | | | Laboratory Sample ID: 1420252-01 | Laboratory Sample ID: 1420252-02 |
| | | | | Date Sampled: 2014-05-15 | Date Sampled: 2014-05-15 |
| Benzene | µg/L | 0.5 | 44 | ND (0.5) | ND (0.5) |
| Ethylbenzene | µg/L | 0.5 | 2300 | ND (0.5) | ND (0.5) |
| Toluene | µg/L | 0.5 | 18000 | ND (0.5) | ND (0.5) |
| m/p-xylene | µg/L | 0.5 | NS | ND (0.5) | ND (0.5) |
| o-xylene | µg/L | 0.5 | NS | ND (0.5) | ND (0.5) |
| Total Xylene** | µg/L | 0.5 | 4200 | ND (0.5) | ND (0.5) |
| F1 PHC's (C6-C10) | µg/L | 25 | 750 | ND (25) | ND (25) |
| F2 PHC's (C10-C16) | µg/L | 100 | 150 | ND (100) | ND (100) |
| F3 PHC's (C16-C34) | µg/L | 100 | 500 | ND (100) | ND (100) |
| F4 PHC's (C34-C50) | µg/L | 100 | 500 | ND (100) | ND (100) |

**Notes:**

1 MDL - Method Detection Limit

2 NS - No Standard

3 ND - Not Detected

4 * - Table 3: Full Depth Generic Site Condition Standards for Residential Property Use in a Non-Potable Ground Water Condition (coarse textured soils) (MOE, April 15, 2011)

5 ** - Total Xylene is calculated using the sum of m/p-xylene and o-xylene

6 **Bold** - Exceeds MOE Table 3 Site Condition Standard

## TABLE 6
## GROUNDWATER ANALYTICAL RESULTS
## METAL PARAMETERS

| Parameter | Units | MDL | MOE Table 3* | Sample Location: BH14-1<br>Sample ID: BH14-1 GW SA1<br>Laboratory Sample ID: 1420252-01<br>Date Sampled: 2014-05-15 | Sample Location: BH14-2<br>Sample ID: BH14-2 GW SA1<br>Laboratory Sample ID: 1420252-02<br>Date Sampled: 2014-05-15 |
|---|---|---|---|---|---|
| Mercury | µg/L | 0.1 | 0.29 | 0.1 | 0.1 |
| Antimony | µg/L | 0.5 | 20000 | 1.1 | ND (0.5) |
| Arsenic | µg/L | 1 | 1900 | ND (1) | ND (1) |
| Barium | µg/L | 1 | 29000 | 70 | 116 |
| Beryllium | µg/L | 0.5 | 67 | ND (0.5) | ND (0.5) |
| Boron | µg/L | 10 | 45000 | 60 | 103 |
| Cadmium | µg/L | 0.1 | 2.7 | ND (0.1) | ND (0.1) |
| Chromium | µg/L | 1 | 810 | ND (1) | ND (1) |
| Chromium (VI) | µg/L | 10 | 140 | ND (10) | ND (10) |
| Cobalt | µg/L | 0.5 | 66 | 3.1 | 1.7 |
| Copper | µg/L | 0.5 | 87 | 10.1 | 2.1 |
| Lead | µg/L | 0.1 | 25 | 0.1 | ND (0.1) |
| Molybdenum | µg/L | 0.5 | 9200 | 8.7 | 6.9 |
| Nickel | µg/L | 1 | 490 | 13 | 13 |
| Selenium | µg/L | 1 | 63 | ND (1) | ND (1) |
| Silver | µg/L | 0.1 | 1.5 | ND (0.1) | ND (0.1) |
| Sodium | µg/L | 200 | 2300000 | 134000 | 107000 |
| Thallium | µg/L | 0.1 | 510 | ND (0.1) | ND (0.1) |
| Uranium | µg/L | 0.1 | 420 | 9.0 | 14.3 |
| Vanadium | µg/L | 0.5 | 250 | 4.9 | 6.0 |
| Zinc | µg/L | 5 | 1100 | 21 | 23 |

**Notes:**

1 MDL - Method Detection Limit
2 NS - No Standard
3 ND - Not Detected
4 * - Table 3: Full Depth Generic Site Condition Standards for Residential Property Use in a Non-Potable Ground Water Condition (coarse textured soils) (MOE, April 15, 2011)
5 **Bold** - Exceeds MOE Table 3 Site Condition Standard

## TABLE 7
## GROUNDWATER ANALYTICAL RESULTS
## POLYCYCLIC AROMATIC HYDROCARBONS

| Parameter | Units | MDL | MOE Table 3* | Sample Location: BH14-1<br>Sample ID: BH14-1 GW SA1<br>Laboratory Sample ID: 1420252-01<br>Date Sampled: 2014-05-15 | Sample Location: BH14-2<br>Sample ID: BH14-2 GW SA1<br>Laboratory Sample ID: 1420252-02<br>Date Sampled: 2014-05-15 |
|---|---|---|---|---|---|
| Acenaphthene | µg/L | 0.05 | 600 | ND (0.05) | ND (0.05) |
| Acenaphthylene | µg/L | 0.05 | 1.8 | ND (0.05) | ND (0.05) |
| Anthracene | µg/L | 0.01 | 2.4 | ND (0.01) | ND (0.01) |
| Benzo[a]anthracene | µg/L | 0.01 | 4.7 | ND (0.01) | ND (0.01) |
| Benzo[a]pyrene | µg/L | 0.01 | 0.81 | ND (0.01) | ND (0.01) |
| Benzo[b]fluoranthene | µg/L | 0.05 | 0.75 | ND (0.05) | ND (0.05) |
| Benzo[g,h,i]perylene | µg/L | 0.05 | 0.2 | ND (0.05) | ND (0.05) |
| Benzo[k]fluoranthene | µg/L | 0.05 | 0.4 | ND (0.05) | ND (0.05) |
| 1,1-Biphenyl | µg/L | 0.05 | 1000 | ND (0.05) | ND (0.05) |
| Chrysene | µg/L | 0.05 | 1 | ND (0.05) | ND (0.05) |
| Dibenzo[a,h]anthracene | µg/L | 0.05 | 0.52 | ND (0.05) | ND (0.05) |
| Fluoranthene | µg/L | 0.01 | 130 | ND (0.01) | ND (0.01) |
| Fluorene | µg/L | 0.05 | 400 | ND (0.05) | ND (0.05) |
| Indeno[1,2,3-cd]pyrene | µg/L | 0.05 | 0.2 | ND (0.05) | ND (0.05) |
| 1-Methylnaphthalene | µg/L | 0.05 | 1800 | ND (0.05) | ND (0.05) |
| 2-Methylnaphthalene | µg/L | 0.05 | 1800 | ND (0.05) | ND (0.05) |
| Methylnaphthalene (1&2) | µg/L | 0.10 | 1800 | ND (0.10) | ND (0.10) |
| Naphthalene | µg/L | 0.05 | 1400 | ND (0.05) | ND (0.05) |
| Phenanthrene | µg/L | 0.05 | 580 | ND (0.05) | ND (0.05) |
| Pyrene | µg/L | 0.01 | 68 | ND (0.01) | ND (0.01) |

**Notes:**

1 MDL - Method Detection Limit
2 NS - No Standard
3 ND - Not Detected
4 * - Table 3: Full Depth Generic Site Condition Standards for Residential Property Use in a Non-Potable Ground Water Condition (coarse textured soils) (MOE, April 15, 2011)
5 **Bold** - Exceeds MOE Table 3 Site Condition Standard

## TABLE 8
## GROUNDWATER ANALYTICAL RESULTS
## VOLATILE ORGANIC COMPOUNDS

| Parameter | Units | MDL | MOE Table 3* | Sample Location: BH14-1<br>Sample ID: BH14-1 GW SA1<br>Laboratory Sample ID: 1420252-01<br>Date Sampled: 2014-05-15 | Sample Location: BH14-2<br>Sample ID: BH14-2 GW SA1<br>Laboratory Sample ID: 1420252-02<br>Date Sampled: 2014-05-15 |
|---|---|---|---|---|---|
| Acetone | µg/L | 5.0 | 130000 | ND (5.0) | ND (5.0) |
| Benzene | µg/L | 0.5 | 44 | ND (0.5) | ND (0.5) |
| Bromodichloromethane | µg/L | 0.5 | 85000 | ND (0.5) | ND (0.5) |
| Bromoform | µg/L | 0.5 | 380 | ND (0.5) | ND (0.5) |
| Bromomethane | µg/L | 0.5 | 5.6 | ND (0.5) | ND (0.5) |
| Carbon Tetrachloride | µg/L | 0.2 | 0.79 | ND (0.2) | ND (0.2) |
| Chlorobenzene | µg/L | 0.5 | 630 | ND (0.5) | ND (0.5) |
| Chloroethane | µg/L | 1.0 | NS | ND (1.0) | ND (1.0) |
| Chloroform | µg/L | 0.5 | 2.4 | ND (0.5) | ND (0.5) |
| Chloromethane | µg/L | 3.0 | NS | ND (3.0) | ND (3.0) |
| Dibromochloromethane | µg/L | 0.5 | 82000 | ND (0.5) | ND (0.5) |
| Dichlorodifluoromethane | µg/L | 1.0 | 4400 | ND (1.0) | ND (1.0) |
| 1,2-Dibromoethane | µg/L | 0.2 | 0.25 | ND (0.2) | ND (0.2) |
| 1,2-Dichlorobenzene | µg/L | 0.5 | 4600 | ND (0.5) | ND (0.5) |
| 1,3-Dichlorobenzene | µg/L | 0.5 | 9600 | ND (0.5) | ND (0.5) |
| 1,4-Dichlorobenzene | µg/L | 0.5 | 8 | ND (0.5) | ND (0.5) |
| 1,1-Dichloroethane | µg/L | 0.5 | 320 | ND (0.5) | ND (0.5) |
| 1,2-Dichloroethane | µg/L | 0.5 | 1.6 | ND (0.5) | ND (0.5) |
| 1,1-Dichloroethylene | µg/L | 0.5 | 1.6 | ND (0.5) | ND (0.5) |
| cis-1,2-Dichloroethylene | µg/L | 0.5 | 1.6 | ND (0.5) | ND (0.5) |
| trans-1,2-Dichloroethylene | µg/L | 0.5 | 1.6 | ND (0.5) | ND (0.5) |
| 1,2-Dichloroethylene, total | µg/L | 0.5 | NS | ND (0.5) | ND (0.5) |
| 1,2-Dichloropropane | µg/L | 0.5 | 16 | ND (0.5) | ND (0.5) |
| cis-1,3-Dichloropropylene | µg/L | 0.5 | NS | ND (0.5) | ND (0.5) |
| trans-1,3-Dichloropropylene | µg/L | 0.5 | NS | ND (0.5) | ND (0.5) |
| 1,3-Dichloropropene, total | µg/L | 0.5 | 5.2 | ND (0.5) | ND (0.5) |
| Ethylbenzene | µg/L | 0.5 | 2300 | ND (0.5) | ND (0.5) |
| Hexane | µg/L | 1.0 | 51 | ND (1.0) | ND (1.0) |
| Methyl Ethyl Ketone (2-Butanone) | µg/L | 5.0 | 470000 | ND (5.0) | ND (5.0) |
| Methyl Butyl Ketone (2-Hexanone) | µg/L | 10.0 | NS | ND (10.0) | ND (10.0) |
| Methyl Isobutyl Ketone | µg/L | 5.0 | 140000 | ND (5.0) | ND (5.0) |
| Methyl tert-butyl ether | µg/L | 2.0 | 190 | ND (2.0) | ND (2.0) |
| Methylene Chloride | µg/L | 5.0 | 610 | ND (5.0) | ND (5.0) |
| Styrene | µg/L | 0.5 | 1300 | ND (0.5) | ND (0.5) |
| 1,1,1,2-Tetrachloroethane | µg/L | 0.5 | 3.3 | ND (0.5) | ND (0.5) |
| 1,1,2,2-Tetrachloroethane | µg/L | 0.5 | 3.2 | ND (0.5) | ND (0.5) |
| Tetrachloroethylene | µg/L | 0.5 | 1.6 | ND (0.5) | ND (0.5) |
| Toluene | µg/L | 0.5 | 18000 | ND (0.5) | ND (0.5) |
| 1,1,1-Trichloroethane | µg/L | 0.5 | 640 | ND (0.5) | ND (0.5) |
| 1,1,2-Trichloroethane | µg/L | 0.5 | 4.7 | ND (0.5) | ND (0.5) |
| Trichloroethylene | µg/L | 0.5 | 1.6 | ND (0.5) | ND (0.5) |
| Trichlorofluoromethane | µg/L | 1.0 | 2500 | ND (1.0) | ND (1.0) |
| 1,3,5-Trimethylbenzene | µg/L | 0.5 | NS | ND (0.5) | ND (0.5) |
| Vinyl Chloride | µg/L | 0.5 | 0.5 | ND (0.5) | ND (0.5) |
| m/p-Xylene | µg/L | 0.5 | NS | ND (0.5) | ND (0.5) |
| o-Xylene | µg/L | 0.5 | NS | ND (0.5) | ND (0.5) |
| Xylenes, total | µg/L | 0.5 | 4200 | ND (0.5) | ND (0.5) |

**Notes:**

1 MDL - Method Detection Limit
2 NS - No Standard
3 ND - Not Detected
4 * - Table 3: Full Depth Generic Site Condition Standards for Residential Property Use in a Non-Potable Ground Water Condition (coarse textured soils) (MOE, April 15, 2011)
5 **Bold** - Exceeds MOE Table 3 Site Condition Standard

# APPENDIX A

Record of Borehole Sheets

# RECORD OF BOREHOLE 14-1

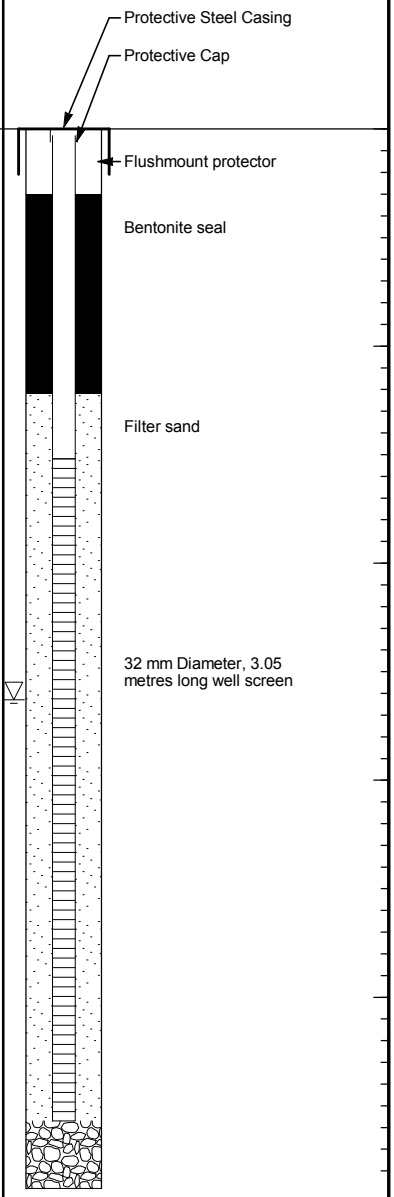
PROJECT: 67/71 Marquette Avenue
OUR PROJECT No.: 14-103
LOCATION: See Borehole Location Plan, Figure 2
BORING DATE: April 30, 2014

SHEET 1 OF 1
DATUM: N/A
DRILL RIG: Geoprobe 420 m
SPT HAMMER: Jack Hammer

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLE DATA: NUMBER | TYPE | BLOWS/0.3m | RECOVERY (%) | LABORATORY ANALYSES | COMBUSTIBLE VAPOUR CONCENTRATION (ppm) / COMBUSTIBLE VAPOUR CONCENTRATION (%LEL) |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | Ground Surface | | | | | | | | |
| | | Brown silty sand and organics (FILL) | | 0.08 | | | | | | |
| | | Dark brown topsoil, trace sand (FILL) | | 0.18 | | | | | | |
| | | Dark brown to grey silty sand to sandy silt, with gravel and shale fragments (FILL) | | | 1 | T.O. | | 42 | PHCs, Metals, PAHs, VOCs | |
| 1 | | | | | 2 | T.O. | | 42 | | |
| | | Dark brown silty sand with organics and gravel (FORMER TOPSOIL) | | 1.22 | 3 | T.O. | | 71 | | 0 |
| 2 | Hammer Casing | Grey SAND, some silty and cobbles, trace clay | | 1.83 | 4 | T.O. | | 71 | | 10 |
| | | Grey SAND, some silt | | 2.44 | 5 | T.O. | | 75 | | 85 |
| 3 | | Medium to coarse SAND, some gravel and cobbles | | 3.30 | 6 | T.O. | | 75 | | 0 |
| | | | | | 7 | T.O. | | 46 | PHCs, VOCs | 250 |
| 4 | | | | | 8 | T.O. | | 46 | | 5 |
| | | End of borehole | | 4.88 | | | | | | |

COMBUSTIBLE VAPOUR CONCENTRATION (ppm) ▲: 100 200 300 400
COMBUSTIBLE VAPOUR CONCENTRATION (%LEL) ●: 20 40 60 80

MONITORING WELL INSTALLATION AND NOTES




GROUNDWATER OBSERVATIONS

| DATE | TIME | DEPTH (m) | ELEVATION (m) |
|---|---|---|---|
| May. 15-14 | 00:00 | 2.63 ▽ | |
| | | ▼ | |
| | | ▼ | |

Houle Chevrier Engineering

180 Wescar Lane
R.R. 2
Carp, Ontario, K0A 1L0

LOGGED: M.L.
CHECKED:

ENV BOREHOLE GAS READINGS BY GINT 2012 14-103 ENVIRO GINT LOGS.GPJ HCE SAMPLE PROJECT.GPJ 6-12-14

# RECORD OF BOREHOLE 14-2

PROJECT: 67/71 Marquette Avenue
OUR PROJECT No.: 14-103
LOCATION: See Borehole Location Plan, Figure 2
BORING DATE: April 30, 2014

SHEET 1 OF 1
DATUM: N/A
DRILL RIG: Geoprobe 420 m
SPT HAMMER: Jack Hammer

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLE DATA: NUMBER | TYPE | BLOWS/0.3m | RECOVERY (%) | LABORATORY ANALYSES | COMBUSTIBLE VAPOUR CONCENTRATION (ppm) 100 200 300 400 / COMBUSTIBLE VAPOUR CONCENTRATION (%LEL) 20 40 60 80 | MONITORING WELL INSTALLATION AND NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ground Surface | | | | | | | | | Protective Steel Casing; Protective Cap |
| 0 | Hammer Casing | Dark brown silty sandy with organics TOPSOIL (FILL) | | 0.10 | | | | | | | Flushmount protector |
| | | Brown fine silty sand, containing organics and gravel (FILL) | | | 1 | T.O. | | 56 | PHCs, Metals, PAHs | 0 | Bentonite seal |
| | | Dark brown fine silty sand with grey to white marl, trace organics (FILL) | | 0.53 | | | | | | | |
| 1 | | Brown silty sand, trace cobbles (POSSIBLE FILL) | | 0.86 | 2 | T.O. | | 56 | | 0 | |
| | | | | | 3 | T.O. | | 71 | | 0 | Filter sand |
| 2 | | Brown SAND, some silty | | 1.83 | 4 | T.O. | | 71 | | 0 | |
| | | Dark grey silty sand, trace to some clay and gravel | | 2.26 | | | | | | | |
| | | Brown fine to coarse SAND, some gravel with silty sand pockets | | 2.44 | 5 | T.O. | | 83 | | 40 | 32 mm Diameter, 3.05 metres long well screen |
| 3 | | | | | 6 | T.O. | | 83 | | 10 | |
| | | Dark grey fine to coarse SAND, some silt, trace clay and organics | | 3.66 | 7 | T.O. | | 79 | PHCs, VOCs | >> | |
| 4 | | Dark grey fine to coarse SAND, trace silt with cobbles | | 4.27 | 8 | T.O. | | 79 | | 60 | |
| | | End of borehole | | 4.88 | | | | | | | |

GROUNDWATER OBSERVATIONS

| DATE | TIME | DEPTH (m) | ELEVATION (m) |
|---|---|---|---|
| May. 15-14 | 00:00 | 3.03 ▽ | |
| | | ▼ | |
| | | ▼ | |

Houle Chevrier Engineering
180 Wescar Lane
R.R. 2
Carp, Ontario, K0A 1L0

LOGGED: M.L.
CHECKED:

# APPENDIX B

Soil Laboratory Certificates of Analysis

PARACEL LABORATORIES LTD. | TRUSTED. RESPONSIVE. RELIABLE.

OTTAWA • KINGSTON • NIAGARA • MISSISSAUGA • SARNIA

Head Office
300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

# *Certificate of Analysis*

**Houle Chevrier**
180 Wescar Lane
Ottawa, ON K0A1L0
Attn: Brett Painter

Phone: (613) 836-1422
Fax: (613) 836-9731

Client PO:
Project: 14-103
Custody: 101135

Report Date: 8-May-2014
Order Date: 2-May-2014
**Order #: 1418292**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

| Paracel ID | Client ID |
|---|---|
| 1418292-01 | BH14-1 SA1 |
| 1418292-02 | BH14-2 SA1 |
| 1418292-03 | BH14-101 SA1 |
| 1418292-04 | BH14-1 SA7 |
| 1418292-05 | BH14-2 SA7 |

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

## *Certificate of Analysis*

Report Date: 08-May-2014
Order Date:2-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

## Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|---|---|---|---|
| BTEX by P&T GC-MS | EPA 8260 - P&T GC-MS | 5-May-14 | 7-May-14 |
| Chromium, hexavalent | MOE E3056 - Extraction, colourimetric | 5-May-14 | 6-May-14 |
| Mercury | EPA 7471B - CVAA, digestion | 8-May-14 | 8-May-14 |
| MOE Metals by ICP-OES, soil Reg 153 | based on MOE E3470, ICP-OES | 8-May-14 | 8-May-14 |
| PAHs by GC-MS | EPA 8270 - GC-MS, extraction | 5-May-14 | 6-May-14 |
| PHC F1 | CWS Tier 1 - P&T GC-FID | 5-May-14 | 7-May-14 |
| PHC F2 - F4 | CWS Tier 1 - GC-FID, extraction | 5-May-14 | 6-May-14 |
| Solids, % | Gravimetric, calculation | 7-May-14 | 7-May-14 |
| VOCs by P&T GC-MS | EPA 8260 - P&T GC-MS | 5-May-14 | 7-May-14 |

PARACEL LABORATORIES LTD.

**Order #: 1418292**

## *Certificate of Analysis*

Report Date: 08-May-2014
Order Date:2-May-2014

Client: **Houle Chevrier**
Client PO:

Project Description: 14-103

| | Client ID: | BH14-1 SA1 | BH14-2 SA1 | BH14-101 SA1 | BH14-1 SA7 |
|---|---|---|---|---|---|
| | Sample Date: | 30-Apr-14 | 30-Apr-14 | 30-Apr-14 | 30-Apr-14 |
| | Sample ID: | 1418292-01 | 1418292-02 | 1418292-03 | 1418292-04 |
| | MDL/Units | Soil | Soil | Soil | Soil |
| **Physical Characteristics** | | | | | |
| % Solids | 0.1 % by Wt. | 72.7 | 68.6 | 44.8 | 85.8 |
| **Metals** | | | | | |
| Antimony | 1.0 ug/g dry | 4.3 | 4.4 | - | - |
| Arsenic | 1.0 ug/g dry | 3.9 | 5.3 | - | - |
| Barium | 1.0 ug/g dry | 205 | 488 | - | - |
| Beryllium | 1.0 ug/g dry | <1.0 | <1.0 | - | - |
| Boron | 1.0 ug/g dry | 6.6 | 8.6 | - | - |
| Cadmium | 0.5 ug/g dry | 0.7 | 1.2 | - | - |
| Chromium | 1.0 ug/g dry | 13.2 | 26.1 | - | - |
| Chromium (VI) | 0.2 ug/g dry | <0.2 | <0.2 | - | - |
| Cobalt | 1.0 ug/g dry | 3.8 | 5.2 | - | - |
| Copper | 1.0 ug/g dry | 25.0 | 52.9 | - | - |
| Lead | 1.0 ug/g dry | 399 | 350 | - | - |
| Mercury | 0.1 ug/g dry | 0.5 | 0.3 | - | - |
| Molybdenum | 1.0 ug/g dry | <1.0 | 1.3 | - | - |
| Nickel | 1.0 ug/g dry | 9.8 | 16.9 | - | - |
| Selenium | 1.0 ug/g dry | <1.0 | <1.0 | - | - |
| Silver | 0.5 ug/g dry | <0.5 | <0.5 | - | - |
| Thallium | 1.0 ug/g dry | <1.0 | <1.0 | - | - |
| Uranium | 1.0 ug/g dry | <1.0 | <1.0 | - | - |
| Vanadium | 1.0 ug/g dry | 15.3 | 19.4 | - | - |
| Zinc | 1.0 ug/g dry | 199 | 304 | - | - |
| **Volatiles** | | | | | |
| Acetone | 0.50 ug/g dry | <0.50 | - | <0.50 | <0.50 |
| Benzene | 0.02 ug/g dry | <0.02 | - | <0.02 | <0.02 |
| Bromodichloromethane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Bromoform | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Bromomethane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Carbon Tetrachloride | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Chlorobenzene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Chloroethane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Chloroform | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Chloromethane | 0.20 ug/g dry | <0.20 | - | <0.20 | <0.20 |

## *Certificate of Analysis*

Report Date: 08-May-2014
Order Date:2-May-2014

Client: **Houle Chevrier**
Client PO:

Project Description: 14-103

| | Client ID: | BH14-1 SA1 | BH14-2 SA1 | BH14-101 SA1 | BH14-1 SA7 |
|---|---|---|---|---|---|
| | Sample Date: | 30-Apr-14 | 30-Apr-14 | 30-Apr-14 | 30-Apr-14 |
| | Sample ID: | 1418292-01 | 1418292-02 | 1418292-03 | 1418292-04 |
| | MDL/Units | Soil | Soil | Soil | Soil |
| Dibromochloromethane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Dichlorodifluoromethane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,2-Dibromoethane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,2-Dichlorobenzene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,3-Dichlorobenzene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,4-Dichlorobenzene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,1-Dichloroethane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,2-Dichloroethane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,1-Dichloroethylene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| cis-1,2-Dichloroethylene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| trans-1,2-Dichloroethylene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,2-Dichloroethylene, total | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,2-Dichloropropane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| cis-1,3-Dichloropropylene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| trans-1,3-Dichloropropylene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,3-Dichloropropene, total | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Ethylbenzene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Hexane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Methyl Ethyl Ketone (2-Butanone) | 0.50 ug/g dry | <0.50 | - | <0.50 | <0.50 |
| Methyl Butyl Ketone (2-Hexanone) | 2.00 ug/g dry | <2.00 | - | <2.00 | <2.00 |
| Methyl Isobutyl Ketone | 0.50 ug/g dry | <0.50 | - | <0.50 | <0.50 |
| Methyl tert-butyl ether | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Methylene Chloride | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Styrene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,1,1,2-Tetrachloroethane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,1,2,2-Tetrachloroethane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Tetrachloroethylene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Toluene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,1,1-Trichloroethane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,1,2-Trichloroethane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Trichloroethylene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Trichlorofluoromethane | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 1,3,5-Trimethylbenzene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Vinyl chloride | 0.02 ug/g dry | <0.02 | - | <0.02 | <0.02 |

## *Certificate of Analysis*

Report Date: 08-May-2014
Order Date:2-May-2014

Client: **Houle Chevrier**
Client PO:

Project Description: 14-103

| | Client ID: | BH14-1 SA1 | BH14-2 SA1 | BH14-101 SA1 | BH14-1 SA7 |
|---|---|---|---|---|---|
| | Sample Date: | 30-Apr-14 | 30-Apr-14 | 30-Apr-14 | 30-Apr-14 |
| | Sample ID: | 1418292-01 | 1418292-02 | 1418292-03 | 1418292-04 |
| | MDL/Units | Soil | Soil | Soil | Soil |
| m,p-Xylenes | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| o-Xylene | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| Xylenes, total | 0.05 ug/g dry | <0.05 | - | <0.05 | <0.05 |
| 4-Bromofluorobenzene | Surrogate | 117% | - | 118% | 116% |
| Dibromofluoromethane | Surrogate | 91.3% | - | 91.5% | 90.3% |
| Toluene-d8 | Surrogate | 104% | - | 97.5% | 103% |
| Benzene | 0.02 ug/g dry | - | <0.02 | - | - |
| Ethylbenzene | 0.05 ug/g dry | - | <0.05 | - | - |
| Toluene | 0.05 ug/g dry | - | <0.05 | - | - |
| m,p-Xylenes | 0.05 ug/g dry | - | <0.05 | - | - |
| o-Xylene | 0.05 ug/g dry | - | <0.05 | - | - |
| Xylenes, total | 0.05 ug/g dry | - | <0.05 | - | - |
| Toluene-d8 | Surrogate | - | 103% | - | - |
| **Hydrocarbons** | | | | | |
| F1 PHCs (C6-C10) | 7 ug/g dry | <7 | <7 | - | <7 |
| F2 PHCs (C10-C16) | 4 ug/g dry | <4 | <4 | - | <4 |
| F3 PHCs (C16-C34) | 8 ug/g dry | 99 | <8 | - | <8 |
| F4 PHCs (C34-C50) | 6 ug/g dry | 17 | <6 | - | <6 |
| **Semi-Volatiles** | | | | | |
| Acenaphthene | 0.02 ug/g dry | <0.06 [1] | <0.06 [1] | - | - |
| Acenaphthylene | 0.02 ug/g dry | 0.11 | 1.53 | - | - |
| Anthracene | 0.02 ug/g dry | 0.15 | 1.05 | - | - |
| Benzo [a] anthracene | 0.02 ug/g dry | 0.41 | 2.91 | - | - |
| Benzo [a] pyrene | 0.02 ug/g dry | 0.31 | 2.97 | - | - |
| Benzo [b] fluoranthene | 0.02 ug/g dry | 0.64 | 4.20 | - | - |
| Benzo [g,h,i] perylene | 0.02 ug/g dry | 0.19 | 0.98 | - | - |
| Benzo [k] fluoranthene | 0.02 ug/g dry | 0.22 | 1.45 | - | - |
| Biphenyl | 0.02 ug/g dry | <0.06 [1] | <0.06 [1] | - | - |
| Chrysene | 0.02 ug/g dry | 0.48 | 3.31 | - | - |
| Dibenzo [a,h] anthracene | 0.02 ug/g dry | <0.06 [1] | 0.31 | - | - |
| Fluoranthene | 0.02 ug/g dry | 0.73 | 2.86 | - | - |
| Fluorene | 0.02 ug/g dry | <0.06 [1] | 0.10 | - | - |
| Indeno [1,2,3-cd] pyrene | 0.02 ug/g dry | 0.15 | 0.97 | - | - |
| 1-Methylnaphthalene | 0.02 ug/g dry | <0.06 [1] | <0.06 [1] | - | - |
| 2-Methylnaphthalene | 0.02 ug/g dry | <0.06 [1] | <0.06 [1] | - | - |

## *Certificate of Analysis*

Report Date: 08-May-2014
Order Date:2-May-2014

Client: **Houle Chevrier**
Client PO:

Project Description: 14-103

| | Client ID: | BH14-1 SA1 | BH14-2 SA1 | BH14-101 SA1 | BH14-1 SA7 |
|---|---|---|---|---|---|
| | Sample Date: | 30-Apr-14 | 30-Apr-14 | 30-Apr-14 | 30-Apr-14 |
| | Sample ID: | 1418292-01 | 1418292-02 | 1418292-03 | 1418292-04 |
| | MDL/Units | Soil | Soil | Soil | Soil |
| Methylnaphthalene (1&2) | 0.04 ug/g dry | <0.12 [1] | <0.12 [1] | - | - |
| Naphthalene | 0.01 ug/g dry | <0.03 [1] | 0.04 | - | - |
| Phenanthrene | 0.02 ug/g dry | 0.40 | 0.44 | - | - |
| Pyrene | 0.02 ug/g dry | 0.65 | 5.19 | - | - |
| 2-Fluorobiphenyl | Surrogate | 62.6% | 59.6% | - | - |
| Terphenyl-d14 | Surrogate | 88.4% | 72.8% | - | - |

## *Certificate of Analysis*

Report Date: 08-May-2014
Order Date:2-May-2014

Client: **Houle Chevrier**
Client PO:

Project Description: 14-103

| | Client ID: | BH14-2 SA7 | - | - | - |
|---|---|---|---|---|---|
| | Sample Date: | 30-Apr-14 | - | - | - |
| | Sample ID: | 1418292-05 | - | - | - |
| | MDL/Units | Soil | - | - | - |
| **Physical Characteristics** | | | | | |
| % Solids | 0.1 % by Wt. | 83.4 | - | - | - |
| **Volatiles** | | | | | |
| Acetone | 0.50 ug/g dry | <0.50 | - | - | - |
| Benzene | 0.02 ug/g dry | <0.02 | - | - | - |
| Bromodichloromethane | 0.05 ug/g dry | <0.05 | - | - | - |
| Bromoform | 0.05 ug/g dry | <0.05 | - | - | - |
| Bromomethane | 0.05 ug/g dry | <0.05 | - | - | - |
| Carbon Tetrachloride | 0.05 ug/g dry | <0.05 | - | - | - |
| Chlorobenzene | 0.05 ug/g dry | <0.05 | - | - | - |
| Chloroethane | 0.05 ug/g dry | <0.05 | - | - | - |
| Chloroform | 0.05 ug/g dry | <0.05 | - | - | - |
| Chloromethane | 0.20 ug/g dry | <0.20 | - | - | - |
| Dibromochloromethane | 0.05 ug/g dry | <0.05 | - | - | - |
| Dichlorodifluoromethane | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,2-Dibromoethane | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,2-Dichlorobenzene | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,3-Dichlorobenzene | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,4-Dichlorobenzene | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,1-Dichloroethane | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,2-Dichloroethane | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,1-Dichloroethylene | 0.05 ug/g dry | <0.05 | - | - | - |
| cis-1,2-Dichloroethylene | 0.05 ug/g dry | <0.05 | - | - | - |
| trans-1,2-Dichloroethylene | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,2-Dichloroethylene, total | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,2-Dichloropropane | 0.05 ug/g dry | <0.05 | - | - | - |
| cis-1,3-Dichloropropylene | 0.05 ug/g dry | <0.05 | - | - | - |
| trans-1,3-Dichloropropylene | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,3-Dichloropropene, total | 0.05 ug/g dry | <0.05 | - | - | - |
| Ethylbenzene | 0.05 ug/g dry | <0.05 | - | - | - |
| Hexane | 0.05 ug/g dry | <0.05 | - | - | - |
| Methyl Ethyl Ketone (2-Butanone) | 0.50 ug/g dry | <0.50 | - | - | - |
| Methyl Butyl Ketone (2-Hexanone) | 2.00 ug/g dry | <2.00 | - | - | - |
| Methyl Isobutyl Ketone | 0.50 ug/g dry | <0.50 | - | - | - |

## *Certificate of Analysis*

Report Date: 08-May-2014
Order Date:2-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

| | Client ID: | BH14-2 SA7 | - | - | - |
|---|---|---|---|---|---|
| | Sample Date: | 30-Apr-14 | - | - | - |
| | Sample ID: | 1418292-05 | - | - | - |
| | MDL/Units | Soil | - | - | - |
| Methyl tert-butyl ether | 0.05 ug/g dry | <0.05 | - | - | - |
| Methylene Chloride | 0.05 ug/g dry | <0.05 | - | - | - |
| Styrene | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,1,1,2-Tetrachloroethane | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,1,2,2-Tetrachloroethane | 0.05 ug/g dry | <0.05 | - | - | - |
| Tetrachloroethylene | 0.05 ug/g dry | <0.05 | - | - | - |
| Toluene | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,1,1-Trichloroethane | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,1,2-Trichloroethane | 0.05 ug/g dry | <0.05 | - | - | - |
| Trichloroethylene | 0.05 ug/g dry | <0.05 | - | - | - |
| Trichlorofluoromethane | 0.05 ug/g dry | <0.05 | - | - | - |
| 1,3,5-Trimethylbenzene | 0.05 ug/g dry | <0.05 | - | - | - |
| Vinyl chloride | 0.02 ug/g dry | <0.02 | - | - | - |
| m,p-Xylenes | 0.05 ug/g dry | <0.05 | - | - | - |
| o-Xylene | 0.05 ug/g dry | <0.05 | - | - | - |
| Xylenes, total | 0.05 ug/g dry | <0.05 | - | - | - |
| 4-Bromofluorobenzene | Surrogate | 115% | - | - | - |
| Dibromofluoromethane | Surrogate | 90.3% | - | - | - |
| Toluene-d8 | Surrogate | 102% | - | - | - |
| **Hydrocarbons** | | | | | |
| F1 PHCs (C6-C10) | 7 ug/g dry | <7 | - | - | - |
| F2 PHCs (C10-C16) | 4 ug/g dry | <4 | - | - | - |
| F3 PHCs (C16-C34) | 8 ug/g dry | <8 | - | - | - |
| F4 PHCs (C34-C50) | 6 ug/g dry | <6 | - | - | - |

## *Certificate of Analysis*

Report Date: 08-May-2014
Order Date:2-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

## *Method Quality Control: Blank*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 7 | ug/g | | | | | | |
| F2 PHCs (C10-C16) | ND | 4 | ug/g | | | | | | |
| F3 PHCs (C16-C34) | ND | 8 | ug/g | | | | | | |
| F4 PHCs (C34-C50) | ND | 6 | ug/g | | | | | | |
| **Metals** | | | | | | | | | |
| Antimony | ND | 1.0 | ug/g | | | | | | |
| Arsenic | ND | 1.0 | ug/g | | | | | | |
| Barium | ND | 1.0 | ug/g | | | | | | |
| Beryllium | ND | 1.0 | ug/g | | | | | | |
| Boron | ND | 1.0 | ug/g | | | | | | |
| Cadmium | ND | 0.5 | ug/g | | | | | | |
| Chromium (VI) | ND | 0.2 | ug/g | | | | | | |
| Chromium | ND | 1.0 | ug/g | | | | | | |
| Cobalt | ND | 1.0 | ug/g | | | | | | |
| Copper | ND | 1.0 | ug/g | | | | | | |
| Lead | ND | 1.0 | ug/g | | | | | | |
| Mercury | ND | 0.1 | ug/g | | | | | | |
| Molybdenum | ND | 1.0 | ug/g | | | | | | |
| Nickel | ND | 1.0 | ug/g | | | | | | |
| Selenium | ND | 1.0 | ug/g | | | | | | |
| Silver | ND | 0.5 | ug/g | | | | | | |
| Thallium | ND | 1.0 | ug/g | | | | | | |
| Uranium | ND | 1.0 | ug/g | | | | | | |
| Vanadium | ND | 1.0 | ug/g | | | | | | |
| Zinc | ND | 1.0 | ug/g | | | | | | |
| **Semi-Volatiles** | | | | | | | | | |
| Acenaphthene | ND | 0.02 | ug/g | | | | | | |
| Acenaphthylene | ND | 0.02 | ug/g | | | | | | |
| Anthracene | ND | 0.02 | ug/g | | | | | | |
| Benzo [a] anthracene | ND | 0.02 | ug/g | | | | | | |
| Benzo [a] pyrene | ND | 0.02 | ug/g | | | | | | |
| Benzo [b] fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Benzo [g,h,i] perylene | ND | 0.02 | ug/g | | | | | | |
| Benzo [k] fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Biphenyl | ND | 0.02 | ug/g | | | | | | |
| Chrysene | ND | 0.02 | ug/g | | | | | | |
| Dibenzo [a,h] anthracene | ND | 0.02 | ug/g | | | | | | |
| Fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Fluorene | ND | 0.02 | ug/g | | | | | | |
| Indeno [1,2,3-cd] pyrene | ND | 0.02 | ug/g | | | | | | |
| 1-Methylnaphthalene | ND | 0.02 | ug/g | | | | | | |
| 2-Methylnaphthalene | ND | 0.02 | ug/g | | | | | | |
| Methylnaphthalene (1&2) | ND | 0.04 | ug/g | | | | | | |
| Naphthalene | ND | 0.01 | ug/g | | | | | | |
| Phenanthrene | ND | 0.02 | ug/g | | | | | | |
| Pyrene | ND | 0.02 | ug/g | | | | | | |
| *Surrogate: 2-Fluorobiphenyl* | *0.757* | | *ug/g* | | *56.8* | *50-140* | | | |
| *Surrogate: Terphenyl-d14* | *1.22* | | *ug/g* | | *91.4* | *50-140* | | | |
| **Volatiles** | | | | | | | | | |
| Acetone | ND | 0.50 | ug/g | | | | | | |
| Benzene | ND | 0.02 | ug/g | | | | | | |
| Bromodichloromethane | ND | 0.05 | ug/g | | | | | | |
| Bromoform | ND | 0.05 | ug/g | | | | | | |
| Bromomethane | ND | 0.05 | ug/g | | | | | | |
| Carbon Tetrachloride | ND | 0.05 | ug/g | | | | | | |

## *Certificate of Analysis*

Report Date: 08-May-2014
Order Date:2-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

## *Method Quality Control: Blank*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Chlorobenzene | ND | 0.05 | ug/g | | | | | | |
| Chloroethane | ND | 0.05 | ug/g | | | | | | |
| Chloroform | ND | 0.05 | ug/g | | | | | | |
| Chloromethane | ND | 0.20 | ug/g | | | | | | |
| Dibromochloromethane | ND | 0.05 | ug/g | | | | | | |
| Dichlorodifluoromethane | ND | 0.05 | ug/g | | | | | | |
| 1,2-Dibromoethane | ND | 0.05 | ug/g | | | | | | |
| 1,2-Dichlorobenzene | ND | 0.05 | ug/g | | | | | | |
| 1,3-Dichlorobenzene | ND | 0.05 | ug/g | | | | | | |
| 1,4-Dichlorobenzene | ND | 0.05 | ug/g | | | | | | |
| 1,1-Dichloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,2-Dichloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,1-Dichloroethylene | ND | 0.05 | ug/g | | | | | | |
| cis-1,2-Dichloroethylene | ND | 0.05 | ug/g | | | | | | |
| trans-1,2-Dichloroethylene | ND | 0.05 | ug/g | | | | | | |
| 1,2-Dichloroethylene, total | ND | 0.05 | ug/g | | | | | | |
| 1,2-Dichloropropane | ND | 0.05 | ug/g | | | | | | |
| cis-1,3-Dichloropropylene | ND | 0.05 | ug/g | | | | | | |
| trans-1,3-Dichloropropylene | ND | 0.05 | ug/g | | | | | | |
| 1,3-Dichloropropene, total | ND | 0.05 | ug/g | | | | | | |
| Ethylbenzene | ND | 0.05 | ug/g | | | | | | |
| Hexane | ND | 0.05 | ug/g | | | | | | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 0.50 | ug/g | | | | | | |
| Methyl Butyl Ketone (2-Hexanone) | ND | 2.00 | ug/g | | | | | | |
| Methyl Isobutyl Ketone | ND | 0.50 | ug/g | | | | | | |
| Methyl tert-butyl ether | ND | 0.05 | ug/g | | | | | | |
| Methylene Chloride | ND | 0.05 | ug/g | | | | | | |
| Styrene | ND | 0.05 | ug/g | | | | | | |
| 1,1,1,2-Tetrachloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,1,2,2-Tetrachloroethane | ND | 0.05 | ug/g | | | | | | |
| Tetrachloroethylene | ND | 0.05 | ug/g | | | | | | |
| Toluene | ND | 0.05 | ug/g | | | | | | |
| 1,1,1-Trichloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,1,2-Trichloroethane | ND | 0.05 | ug/g | | | | | | |
| Trichloroethylene | ND | 0.05 | ug/g | | | | | | |
| Trichlorofluoromethane | ND | 0.05 | ug/g | | | | | | |
| 1,3,5-Trimethylbenzene | ND | 0.05 | ug/g | | | | | | |
| Vinyl chloride | ND | 0.02 | ug/g | | | | | | |
| m,p-Xylenes | ND | 0.05 | ug/g | | | | | | |
| o-Xylene | ND | 0.05 | ug/g | | | | | | |
| Xylenes, total | ND | 0.05 | ug/g | | | | | | |
| *Surrogate: 4-Bromofluorobenzene* | *8.81* | | *ug/g* | | *110* | *50-140* | | | |
| *Surrogate: Dibromofluoromethane* | *7.82* | | *ug/g* | | *97.7* | *50-140* | | | |
| *Surrogate: Toluene-d8* | *8.06* | | *ug/g* | | *101* | *50-140* | | | |
| Benzene | ND | 0.02 | ug/g | | | | | | |
| Ethylbenzene | ND | 0.05 | ug/g | | | | | | |
| Toluene | ND | 0.05 | ug/g | | | | | | |
| m,p-Xylenes | ND | 0.05 | ug/g | | | | | | |
| o-Xylene | ND | 0.05 | ug/g | | | | | | |
| Xylenes, total | ND | 0.05 | ug/g | | | | | | |
| *Surrogate: Toluene-d8* | *8.06* | | *ug/g* | | *101* | *50-140* | | | |

## *Certificate of Analysis*

Report Date: 08-May-2014
Order Date:2-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

## *Method Quality Control: Duplicate*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | 20 | 7 | ug/g dry | 21 | | | 4.4 | 40 | |
| F2 PHCs (C10-C16) | ND | 4 | ug/g dry | ND | | | | 30 | |
| F3 PHCs (C16-C34) | ND | 8 | ug/g dry | ND | | | | 30 | |
| F4 PHCs (C34-C50) | ND | 6 | ug/g dry | ND | | | | 30 | |
| **Metals** | | | | | | | | | |
| Antimony | ND | 1.0 | ug/g dry | ND | | | | 30 | |
| Arsenic | 4.59 | 1.0 | ug/g dry | 4.76 | | | 3.7 | 30 | |
| Barium | 97.6 | 1.0 | ug/g dry | 100 | | | 2.9 | 30 | |
| Beryllium | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Boron | 7.28 | 1.0 | ug/g dry | 5.83 | | | 22.1 | 30 | |
| Cadmium | ND | 0.5 | ug/g dry | ND | | | 0.0 | 30 | |
| Chromium (VI) | ND | 0.2 | ug/g dry | ND | | | | 35 | |
| Chromium | 12.5 | 1.0 | ug/g dry | 12.7 | | | 1.3 | 30 | |
| Cobalt | 4.34 | 1.0 | ug/g dry | 4.57 | | | 5.0 | 30 | |
| Copper | 17.7 | 1.0 | ug/g dry | 17.8 | | | 1.1 | 30 | |
| Lead | 107 | 1.0 | ug/g dry | 101 | | | 5.7 | 30 | |
| Mercury | 0.475 | 0.1 | ug/g dry | 0.440 | | | 7.7 | 35 | |
| Molybdenum | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Nickel | 9.48 | 1.0 | ug/g dry | 10.3 | | | 8.5 | 30 | |
| Selenium | ND | 1.0 | ug/g dry | ND | | | | 30 | |
| Silver | ND | 0.5 | ug/g dry | ND | | | 0.0 | 30 | |
| Thallium | ND | 1.0 | ug/g dry | ND | | | | 30 | |
| Uranium | ND | 1.0 | ug/g dry | ND | | | | 30 | |
| Vanadium | 18.7 | 1.0 | ug/g dry | 20.8 | | | 10.4 | 30 | |
| Zinc | 113 | 1.0 | ug/g dry | 111 | | | 1.8 | 30 | |
| **Physical Characteristics** | | | | | | | | | |
| % Solids | 70.2 | 0.1 | % by Wt. | 72.7 | | | 3.5 | 25 | |
| **Semi-Volatiles** | | | | | | | | | |
| Acenaphthene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Acenaphthylene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Anthracene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Benzo [a] anthracene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Benzo [a] pyrene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Benzo [b] fluoranthene | ND | 0.02 | ug/g dry | ND | | | 0.0 | 40 | |
| Benzo [g,h,i] perylene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Benzo [k] fluoranthene | ND | 0.02 | ug/g dry | ND | | | 0.0 | 40 | |
| Biphenyl | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Chrysene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Dibenzo [a,h] anthracene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Fluoranthene | ND | 0.02 | ug/g dry | ND | | | 0.0 | 40 | |
| Fluorene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Indeno [1,2,3-cd] pyrene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| 1-Methylnaphthalene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| 2-Methylnaphthalene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Naphthalene | ND | 0.01 | ug/g dry | ND | | | | 40 | |
| Phenanthrene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Pyrene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| *Surrogate: 2-Fluorobiphenyl* | *1.08* | | *ug/g dry* | *ND* | *66.2* | *50-140* | | | |
| *Surrogate: Terphenyl-d14* | *1.27* | | *ug/g dry* | *ND* | *77.9* | *50-140* | | | |
| **Volatiles** | | | | | | | | | |
| Acetone | ND | 0.50 | ug/g dry | ND | | | | 50 | |
| Benzene | 0.022 | 0.02 | ug/g dry | ND | | | 0.0 | 50 | |
| Bromodichloromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |

## *Certificate of Analysis*

Report Date: 08-May-2014
Order Date:2-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

## *Method Quality Control: Duplicate*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Bromoform | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Bromomethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Carbon Tetrachloride | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Chlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Chloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Chloroform | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Chloromethane | ND | 0.20 | ug/g dry | ND | | | | 50 | |
| Dibromochloromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Dichlorodifluoromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,2-Dibromoethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,2-Dichlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,3-Dichlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,4-Dichlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1-Dichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,2-Dichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1-Dichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| cis-1,2-Dichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| trans-1,2-Dichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,2-Dichloropropane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| cis-1,3-Dichloropropylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| trans-1,3-Dichloropropylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Ethylbenzene | 0.352 | 0.05 | ug/g dry | 0.397 | | | 12.1 | 50 | |
| Hexane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 0.50 | ug/g dry | ND | | | | 50 | |
| Methyl Butyl Ketone (2-Hexanone) | ND | 2.00 | ug/g dry | ND | | | | 50 | |
| Methyl Isobutyl Ketone | ND | 0.50 | ug/g dry | ND | | | | 50 | |
| Methyl tert-butyl ether | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Methylene Chloride | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Styrene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,1,2-Tetrachloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,2,2-Tetrachloroethane | ND | 0.05 | ug/g dry | 0.064 | | | 0.0 | 50 | |
| Tetrachloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Toluene | ND | 0.05 | ug/g dry | ND | | | 0.0 | 50 | |
| 1,1,1-Trichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,2-Trichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Trichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Trichlorofluoromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,3,5-Trimethylbenzene | 0.192 | 0.05 | ug/g dry | 0.219 | | | 13.0 | 50 | |
| Vinyl chloride | ND | 0.02 | ug/g dry | ND | | | | 50 | |
| m,p-Xylenes | 0.491 | 0.05 | ug/g dry | 0.557 | | | 12.7 | 50 | |
| o-Xylene | 0.057 | 0.05 | ug/g dry | 0.065 | | | 13.9 | 50 | |
| *Surrogate: 4-Bromofluorobenzene* | *6.20* | | *ug/g dry* | *ND* | *113* | *50-140* | | | |
| *Surrogate: Dibromofluoromethane* | *4.97* | | *ug/g dry* | *ND* | *90.7* | *50-140* | | | |
| *Surrogate: Toluene-d8* | *5.71* | | *ug/g dry* | *ND* | *104* | *50-140* | | | |
| Benzene | 0.022 | 0.02 | ug/g dry | 0.021 | | | 1.3 | 50 | |
| Ethylbenzene | 0.352 | 0.05 | ug/g dry | 0.397 | | | 12.1 | 50 | |
| Toluene | ND | 0.05 | ug/g dry | ND | | | 0.0 | 50 | |
| m,p-Xylenes | 0.491 | 0.05 | ug/g dry | 0.557 | | | 12.7 | 50 | |
| o-Xylene | 0.057 | 0.05 | ug/g dry | 0.065 | | | 13.9 | 50 | |
| *Surrogate: Toluene-d8* | *5.71* | | *ug/g dry* | *ND* | *104* | *50-140* | | | |

## *Certificate of Analysis*

Report Date: 08-May-2014
Order Date:2-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

## *Method Quality Control: Spike*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | 193 | 7 | ug/g | ND | 96.5 | 80-120 | | | |
| F2 PHCs (C10-C16) | 109 | 4 | ug/g | ND | 96.8 | 60-140 | | | |
| F3 PHCs (C16-C34) | 297 | 8 | ug/g | ND | 128 | 60-140 | | | |
| F4 PHCs (C34-C50) | 233 | 6 | ug/g | ND | 150 | 60-140 | | | |
| **Metals** | | | | | | | | | |
| Antimony | 278 | | ug/L | ND | 111 | 70-130 | | | |
| Arsenic | 345 | | ug/L | 95.2 | 100 | 70-130 | | | |
| Barium | 2180 | | ug/L | 2010 | 67.8 | 70-130 | | | QM-4X |
| Beryllium | 258 | | ug/L | 0.53 | 103 | 70-130 | | | |
| Boron | 430 | | ug/L | 117 | 125 | 70-130 | | | |
| Cadmium | 257 | | ug/L | 5.36 | 100 | 70-130 | | | |
| Chromium (VI) | ND | 0.2 | ug/g | ND | | 70-130 | | | QM-01 |
| Chromium | 470 | | ug/L | 253 | 86.6 | 70-130 | | | |
| Cobalt | 311 | | ug/L | 91.4 | 87.7 | 70-130 | | | |
| Copper | 612 | | ug/L | 357 | 102 | 70-130 | | | |
| Lead | 2140 | | ug/L | 2010 | 49.9 | 70-130 | | | QM-4X |
| Mercury | 1.92 | 0.1 | ug/g | 0.440 | 98.7 | 72-128 | | | |
| Molybdenum | 234 | | ug/L | 10.4 | 89.6 | 70-130 | | | |
| Nickel | 423 | | ug/L | 206 | 86.5 | 70-130 | | | |
| Selenium | 269 | | ug/L | ND | 108 | 70-130 | | | |
| Silver | 242 | | ug/L | 0.33 | 96.8 | 70-130 | | | |
| Thallium | 205 | | ug/L | ND | 81.8 | 70-130 | | | |
| Uranium | 235 | | ug/L | ND | 94.1 | 70-130 | | | |
| Vanadium | 624 | | ug/L | 415 | 83.7 | 70-130 | | | |
| Zinc | 2300 | | ug/L | 2230 | 28.0 | 70-130 | | | QM-4X |
| **Semi-Volatiles** | | | | | | | | | |
| Acenaphthene | 0.201 | 0.02 | ug/g | ND | 98.6 | 50-140 | | | |
| Acenaphthylene | 0.146 | 0.02 | ug/g | ND | 71.5 | 50-140 | | | |
| Anthracene | 0.162 | 0.02 | ug/g | ND | 79.4 | 50-140 | | | |
| Benzo [a] anthracene | 0.170 | 0.02 | ug/g | ND | 83.3 | 50-140 | | | |
| Benzo [a] pyrene | 0.136 | 0.02 | ug/g | ND | 66.7 | 50-140 | | | |
| Benzo [b] fluoranthene | 0.191 | 0.02 | ug/g | ND | 93.6 | 50-140 | | | |
| Benzo [g,h,i] perylene | 0.184 | 0.02 | ug/g | ND | 89.8 | 50-140 | | | |
| Benzo [k] fluoranthene | 0.196 | 0.02 | ug/g | ND | 96.2 | 50-140 | | | |
| Biphenyl | 0.211 | 0.02 | ug/g | ND | 103 | 50-140 | | | |
| Chrysene | 0.178 | 0.02 | ug/g | ND | 87.3 | 50-140 | | | |
| Dibenzo [a,h] anthracene | 0.141 | 0.02 | ug/g | ND | 68.9 | 50-140 | | | |
| Fluoranthene | 0.162 | 0.02 | ug/g | ND | 79.2 | 50-140 | | | |
| Fluorene | 0.117 | 0.02 | ug/g | ND | 57.3 | 50-140 | | | |
| Indeno [1,2,3-cd] pyrene | 0.158 | 0.02 | ug/g | ND | 77.2 | 50-140 | | | |
| 1-Methylnaphthalene | 0.155 | 0.02 | ug/g | ND | 75.9 | 50-140 | | | |
| 2-Methylnaphthalene | 0.155 | 0.02 | ug/g | ND | 75.8 | 50-140 | | | |
| Naphthalene | 0.179 | 0.01 | ug/g | ND | 87.7 | 50-140 | | | |
| Phenanthrene | 0.192 | 0.02 | ug/g | ND | 94.2 | 50-140 | | | |
| Pyrene | 0.167 | 0.02 | ug/g | ND | 81.6 | 50-140 | | | |
| *Surrogate: 2-Fluorobiphenyl* | *1.18* | | *ug/g* | | *72.4* | *50-140* | | | |
| **Volatiles** | | | | | | | | | |
| Acetone | 9.89 | 0.50 | ug/g | ND | 98.9 | 50-140 | | | |

## *Certificate of Analysis*

Report Date: 08-May-2014
Order Date:2-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

## *Method Quality Control: Spike*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | 3.56 | 0.02 | ug/g | ND | 89.1 | 60-130 | | | |
| Bromodichloromethane | 3.87 | 0.05 | ug/g | ND | 96.7 | 60-130 | | | |
| Bromoform | 4.73 | 0.05 | ug/g | ND | 118 | 60-130 | | | |
| Bromomethane | 2.72 | 0.05 | ug/g | ND | 67.9 | 50-140 | | | |
| Carbon Tetrachloride | 4.01 | 0.05 | ug/g | ND | 100 | 60-130 | | | |
| Chlorobenzene | 4.01 | 0.05 | ug/g | ND | 100 | 60-130 | | | |
| Chloroethane | 3.18 | 0.05 | ug/g | ND | 79.6 | 50-140 | | | |
| Chloroform | 3.83 | 0.05 | ug/g | ND | 95.7 | 60-130 | | | |
| Chloromethane | 2.48 | 0.20 | ug/g | ND | 62.0 | 50-140 | | | |
| Dibromochloromethane | 4.50 | 0.05 | ug/g | ND | 113 | 60-130 | | | |
| Dichlorodifluoromethane | 2.45 | 0.05 | ug/g | ND | 61.1 | 50-140 | | | |
| 1,2-Dibromoethane | 4.19 | 0.05 | ug/g | ND | 105 | 60-130 | | | |
| 1,2-Dichlorobenzene | 4.19 | 0.05 | ug/g | ND | 105 | 60-130 | | | |
| 1,3-Dichlorobenzene | 4.08 | 0.05 | ug/g | ND | 102 | 60-130 | | | |
| 1,4-Dichlorobenzene | 4.03 | 0.05 | ug/g | ND | 101 | 60-130 | | | |
| 1,1-Dichloroethane | 3.46 | 0.05 | ug/g | ND | 86.5 | 60-130 | | | |
| 1,2-Dichloroethane | 3.69 | 0.05 | ug/g | ND | 92.3 | 60-130 | | | |
| 1,1-Dichloroethylene | 4.15 | 0.05 | ug/g | ND | 104 | 60-130 | | | |
| cis-1,2-Dichloroethylene | 3.84 | 0.05 | ug/g | ND | 96.1 | 60-130 | | | |
| trans-1,2-Dichloroethylene | 3.37 | 0.05 | ug/g | ND | 84.1 | 60-130 | | | |
| 1,2-Dichloropropane | 3.49 | 0.05 | ug/g | ND | 87.3 | 60-130 | | | |
| cis-1,3-Dichloropropylene | 3.74 | 0.05 | ug/g | ND | 93.4 | 60-130 | | | |
| trans-1,3-Dichloropropylene | 3.73 | 0.05 | ug/g | ND | 93.3 | 60-130 | | | |
| Ethylbenzene | 4.23 | 0.05 | ug/g | ND | 106 | 60-130 | | | |
| Hexane | 2.73 | 0.05 | ug/g | ND | 68.2 | 60-130 | | | |
| Methyl Ethyl Ketone (2-Butanone) | 8.47 | 0.50 | ug/g | ND | 84.7 | 50-140 | | | |
| Methyl Butyl Ketone (2-Hexanone) | 10.6 | 2.00 | ug/g | ND | 106 | 50-140 | | | |
| Methyl Isobutyl Ketone | 9.99 | 0.50 | ug/g | ND | 99.9 | 50-140 | | | |
| Methyl tert-butyl ether | 10.1 | 0.05 | ug/g | ND | 101 | 50-140 | | | |
| Methylene Chloride | 3.36 | 0.05 | ug/g | ND | 84.1 | 60-130 | | | |
| Styrene | 4.55 | 0.05 | ug/g | ND | 114 | 60-130 | | | |
| 1,1,1,2-Tetrachloroethane | 4.40 | 0.05 | ug/g | ND | 110 | 60-130 | | | |
| 1,1,2,2-Tetrachloroethane | 4.24 | 0.05 | ug/g | ND | 106 | 60-130 | | | |
| Tetrachloroethylene | 4.12 | 0.05 | ug/g | ND | 103 | 60-130 | | | |
| Toluene | 3.87 | 0.05 | ug/g | ND | 96.9 | 60-130 | | | |
| 1,1,1-Trichloroethane | 3.89 | 0.05 | ug/g | ND | 97.2 | 60-130 | | | |
| 1,1,2-Trichloroethane | 3.94 | 0.05 | ug/g | ND | 98.5 | 60-130 | | | |
| Trichloroethylene | 4.03 | 0.05 | ug/g | ND | 101 | 60-130 | | | |
| Trichlorofluoromethane | 3.54 | 0.05 | ug/g | ND | 88.4 | 50-140 | | | |
| 1,3,5-Trimethylbenzene | 4.18 | 0.05 | ug/g | ND | 104 | 60-130 | | | |
| Vinyl chloride | 2.64 | 0.02 | ug/g | ND | 65.9 | 50-140 | | | |
| m,p-Xylenes | 8.44 | 0.05 | ug/g | ND | 106 | 60-130 | | | |
| o-Xylene | 4.25 | 0.05 | ug/g | ND | 106 | 60-130 | | | |
| Benzene | 3.56 | 0.02 | ug/g | ND | 89.1 | 60-130 | | | |
| Ethylbenzene | 4.23 | 0.05 | ug/g | ND | 106 | 60-130 | | | |
| Toluene | 3.87 | 0.05 | ug/g | ND | 96.9 | 60-130 | | | |
| m,p-Xylenes | 8.44 | 0.05 | ug/g | ND | 106 | 60-130 | | | |
| o-Xylene | 4.25 | 0.05 | ug/g | ND | 106 | 60-130 | | | |

## *Certificate of Analysis*

Report Date: 08-May-2014
Order Date:2-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

**Qualifier Notes:**

***Sample Qualifiers :***

1 : Elevated detection limits due to the nature of the sample matrix.

***QC Qualifiers :***

QM-01 : The spike recovery for this QC sample is outside of established control limits due to sample matrix interference.

QM-4X : The spike recovery was outside of QC acceptance limits due to elevated analyte concentration.

**Sample Data Revisions**

None

**Work Order Revisions / Comments:**

None

**Other Report Notes:**

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

*CCME PHC additional information:*

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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Nº 101135

Page 1 of 1

| | | |
|---|---|---|
| Client Name: Houle Chevrier Engineering Ltd. | Project Reference: 14-103 | TAT: [✓] Regular [ ] 3 Day [ ] 2 Day [ ] 1 Day |
| Contact Name: Brad Painter | Quote # | |
| Address: 180 McKay Lake | PO # | Date Required: |
| Telephone: 613-836-1422 | Email Address: bpainter@hcceng.ca | |

Criteria: [✓] O. Reg. 153/04 (As Amended) Table 3 [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [ ] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

**Required Analyses**

**Paracel Order Number:** 1418292

| | Sample ID/Location Name | Matrix | Air Volume | # of Containers | Sample Taken Date | Sample Taken Time | PHCs F1-F4+BTEX | VOCs | PAHs | Metals by ICP | Hg | CrVI | B (HWS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | BH14-1 SA1 | S | | 2 | April 30/14 | | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| 2 | BH14-2 SA1 | S | | 2 | " | | ✓ | | ✓ | ✓ | ✓ | | |
| 3 | BH14-101 SA1 | S | | 2 | " | | | ✓ | | | | | |
| 4 | BH14-1 SA7 | S | | 2 | " | | ✓ | ✓ | | | | | |
| 5 | BH14-2 SA7 | S | | 2 | " | | ✓ | ✓ | | | | | |
| 6 | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |

Comments:

Method of Delivery: Paracel

| | | | |
|---|---|---|---|
| Relinquished By (Sign): M. LALONDE MAY 2. 2014. | Received by Driver/Depot: T. LOUISE | Received at Lab: MC | Verified By: MC |
| Relinquished By (Print): | Date/Time: 02/05/14 1:56PM | Date/Time: May 2/14 4:00 | Date/Time: May 2/14 4:46 |
| Date/Time: | Temperature: ___ °C | Temperature: 11.4 °C | pH Verified [ ] By: N/A |

# APPENDIX C

Groundwater Laboratory Certificates of Analysis

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www.paracellabs.com

# *Certificate of Analysis*

**Houle Chevrier**
180 Wescar Lane
Ottawa, ON K0A1L0
Attn: Brett Painter

Phone: (613) 836-1422
Fax: (613) 836-9731

Client PO:
Project: 14-103
Custody: 101378

Report Date: 21-May-2014
Order Date: 15-May-2014
**Order #: 1420252**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

| Paracel ID | Client ID |
|---|---|
| 1420252-01 | BH14-1 GW SA1 |
| 1420252-02 | BH14-2 GW SA1 |

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

## *Certificate of Analysis*

Report Date: 21-May-2014
Order Date:15-May-2014

Client: **Houle Chevrier**
Client PO:

Project Description: 14-103

## Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|---|---|---|---|
| Chromium, hexavalent | MOE E3056 - colourimetric | 16-May-14 | 16-May-14 |
| Mercury | EPA 245.1 - Cold Vapour AA | 16-May-14 | 16-May-14 |
| Metals, ICP-MS | EPA 200.8 - ICP-MS | 16-May-14 | 17-May-14 |
| PAHs by GC-MS | EPA 625 - GC-MS, extraction | 20-May-14 | 20-May-14 |
| PHC F1 | CWS Tier 1 - P&T GC-FID | 16-May-14 | 17-May-14 |
| PHC F2 - F4 | CWS Tier 1 - GC-FID, extraction | 16-May-14 | 16-May-14 |
| VOCs by P&T GC-MS | EPA 624 - P&T GC-MS | 16-May-14 | 17-May-14 |

## *Certificate of Analysis*

Report Date: 21-May-2014
Order Date:15-May-2014

Client: **Houle Chevrier**
Client PO:

Project Description: 14-103

| | Client ID: | BH14-1 GW SA1 | BH14-2 GW SA1 | - | - |
|---|---|---|---|---|---|
| | Sample Date: | 15-May-14 | 15-May-14 | - | - |
| | Sample ID: | 1420252-01 | 1420252-02 | - | - |
| | MDL/Units | Water | Water | - | - |
| **Metals** | | | | | |
| Mercury | 0.1 ug/L | 0.1 | 0.1 | - | - |
| Antimony | 0.5 ug/L | 1.1 | <0.5 | - | - |
| Arsenic | 1 ug/L | <1 | <1 | - | - |
| Barium | 1 ug/L | 70 | 116 | - | - |
| Beryllium | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Boron | 10 ug/L | 60 | 103 | - | - |
| Cadmium | 0.1 ug/L | <0.1 | <0.1 | - | - |
| Chromium | 1 ug/L | <1 | <1 | - | - |
| Chromium (VI) | 10 ug/L | <10 | <10 | - | - |
| Cobalt | 0.5 ug/L | 3.1 | 1.7 | - | - |
| Copper | 0.5 ug/L | 10.1 | 2.1 | - | - |
| Lead | 0.1 ug/L | 0.1 | <0.1 | - | - |
| Molybdenum | 0.5 ug/L | 8.7 | 6.9 | - | - |
| Nickel | 1 ug/L | 13 | 13 | - | - |
| Selenium | 1 ug/L | <1 | <1 | - | - |
| Silver | 0.1 ug/L | <0.1 | <0.1 | - | - |
| Sodium | 200 ug/L | 134000 | 107000 | - | - |
| Thallium | 0.1 ug/L | <0.1 | <0.1 | - | - |
| Uranium | 0.1 ug/L | 9.0 | 14.3 | - | - |
| Vanadium | 0.5 ug/L | 4.9 | 6.0 | - | - |
| Zinc | 5 ug/L | 21 | 23 | - | - |
| **Volatiles** | | | | | |
| Acetone | 5.0 ug/L | <5.0 | <5.0 | - | - |
| Benzene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Bromodichloromethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Bromoform | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Bromomethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Carbon Tetrachloride | 0.2 ug/L | <0.2 | <0.2 | - | - |
| Chlorobenzene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Chloroethane | 1.0 ug/L | <1.0 | <1.0 | - | - |
| Chloroform | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Chloromethane | 3.0 ug/L | <3.0 | <3.0 | - | - |
| Dibromochloromethane | 0.5 ug/L | <0.5 | <0.5 | - | - |

## *Certificate of Analysis*

Report Date: 21-May-2014
Order Date:15-May-2014

Client: **Houle Chevrier**
Client PO:

Project Description: 14-103

| | Client ID: | BH14-1 GW SA1 | BH14-2 GW SA1 | - | - |
|---|---|---|---|---|---|
| | Sample Date: | 15-May-14 | 15-May-14 | - | - |
| | Sample ID: | 1420252-01 | 1420252-02 | - | - |
| | MDL/Units | Water | Water | - | - |
| Dichlorodifluoromethane | 1.0 ug/L | <1.0 | <1.0 | - | - |
| 1,2-Dibromoethane | 0.2 ug/L | <0.2 | <0.2 | - | - |
| 1,2-Dichlorobenzene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,3-Dichlorobenzene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,4-Dichlorobenzene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,1-Dichloroethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,2-Dichloroethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,1-Dichloroethylene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| cis-1,2-Dichloroethylene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| trans-1,2-Dichloroethylene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,2-Dichloroethylene, total | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,2-Dichloropropane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| cis-1,3-Dichloropropylene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| trans-1,3-Dichloropropylene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,3-Dichloropropene, total | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Ethylbenzene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Hexane | 1.0 ug/L | <1.0 | <1.0 | - | - |
| Methyl Ethyl Ketone (2-Butanone) | 5.0 ug/L | <5.0 | <5.0 | - | - |
| Methyl Butyl Ketone (2-Hexanone) | 10.0 ug/L | <10.0 | <10.0 | - | - |
| Methyl Isobutyl Ketone | 5.0 ug/L | <5.0 | <5.0 | - | - |
| Methyl tert-butyl ether | 2.0 ug/L | <2.0 | <2.0 | - | - |
| Methylene Chloride | 5.0 ug/L | <5.0 | <5.0 | - | - |
| Styrene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,1,1,2-Tetrachloroethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,1,2,2-Tetrachloroethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Tetrachloroethylene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Toluene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,1,1-Trichloroethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 1,1,2-Trichloroethane | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Trichloroethylene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Trichlorofluoromethane | 1.0 ug/L | <1.0 | <1.0 | - | - |
| 1,3,5-Trimethylbenzene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Vinyl chloride | 0.5 ug/L | <0.5 | <0.5 | - | - |
| m,p-Xylenes | 0.5 ug/L | <0.5 | <0.5 | - | - |

## *Certificate of Analysis*

Report Date: 21-May-2014
Order Date:15-May-2014

Client: **Houle Chevrier**
Client PO:

Project Description: 14-103

| | Client ID: | BH14-1 GW SA1 | BH14-2 GW SA1 | - | - |
|---|---|---|---|---|---|
| | Sample Date: | 15-May-14 | 15-May-14 | - | - |
| | Sample ID: | 1420252-01 | 1420252-02 | - | - |
| | MDL/Units | Water | Water | - | - |
| o-Xylene | 0.5 ug/L | <0.5 | <0.5 | - | - |
| Xylenes, total | 0.5 ug/L | <0.5 | <0.5 | - | - |
| 4-Bromofluorobenzene | Surrogate | 103% | 104% | - | - |
| Dibromofluoromethane | Surrogate | 133% | 129% | - | - |
| Toluene-d8 | Surrogate | 94.9% | 93.9% | - | - |
| **Hydrocarbons** | | | | | |
| F1 PHCs (C6-C10) | 25 ug/L | <25 | <25 | - | - |
| F2 PHCs (C10-C16) | 100 ug/L | <100 | <100 | - | - |
| F3 PHCs (C16-C34) | 100 ug/L | <100 | <100 | - | - |
| F4 PHCs (C34-C50) | 100 ug/L | <100 | <100 | - | - |
| F1 + F2 PHCs | 125 ug/L | <125 | <125 | - | - |
| F3 + F4 PHCs | 200 ug/L | <200 | <200 | - | - |
| **Semi-Volatiles** | | | | | |
| Acenaphthene | 0.05 ug/L | <0.05 | <0.05 | - | - |
| Acenaphthylene | 0.05 ug/L | <0.05 | <0.05 | - | - |
| Anthracene | 0.01 ug/L | <0.01 | <0.01 | - | - |
| Benzo [a] anthracene | 0.01 ug/L | <0.01 | <0.01 | - | - |
| Benzo [a] pyrene | 0.01 ug/L | <0.01 | <0.01 | - | - |
| Benzo [b] fluoranthene | 0.05 ug/L | <0.05 | <0.05 | - | - |
| Benzo [g,h,i] perylene | 0.05 ug/L | <0.05 | <0.05 | - | - |
| Benzo [k] fluoranthene | 0.05 ug/L | <0.05 | <0.05 | - | - |
| Biphenyl | 0.05 ug/L | <0.05 | <0.05 | - | - |
| Chrysene | 0.05 ug/L | <0.05 | <0.05 | - | - |
| Dibenzo [a,h] anthracene | 0.05 ug/L | <0.05 | <0.05 | - | - |
| Fluoranthene | 0.01 ug/L | <0.01 | <0.01 | - | - |
| Fluorene | 0.05 ug/L | <0.05 | <0.05 | - | - |
| Indeno [1,2,3-cd] pyrene | 0.05 ug/L | <0.05 | <0.05 | - | - |
| 1-Methylnaphthalene | 0.05 ug/L | <0.05 | <0.05 | - | - |
| 2-Methylnaphthalene | 0.05 ug/L | <0.05 | <0.05 | - | - |
| Methylnaphthalene (1&2) | 0.10 ug/L | <0.10 | <0.10 | - | - |
| Naphthalene | 0.05 ug/L | <0.05 | <0.05 | - | - |
| Phenanthrene | 0.05 ug/L | <0.05 | <0.05 | - | - |
| Pyrene | 0.01 ug/L | <0.01 | <0.01 | - | - |
| 2-Fluorobiphenyl | Surrogate | 80.5% | 79.5% | - | - |
| Terphenyl-d14 | Surrogate | 75.1% | 78.5% | - | - |

## *Certificate of Analysis*

Report Date: 21-May-2014
Order Date:15-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

## *Method Quality Control: Blank*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 25 | ug/L | | | | | | |
| F2 PHCs (C10-C16) | ND | 100 | ug/L | | | | | | |
| F3 PHCs (C16-C34) | ND | 100 | ug/L | | | | | | |
| F4 PHCs (C34-C50) | ND | 100 | ug/L | | | | | | |
| **Metals** | | | | | | | | | |
| Mercury | ND | 0.1 | ug/L | | | | | | |
| Antimony | ND | 0.5 | ug/L | | | | | | |
| Arsenic | ND | 1 | ug/L | | | | | | |
| Barium | ND | 1 | ug/L | | | | | | |
| Beryllium | ND | 0.5 | ug/L | | | | | | |
| Boron | ND | 10 | ug/L | | | | | | |
| Cadmium | ND | 0.1 | ug/L | | | | | | |
| Chromium (VI) | ND | 10 | ug/L | | | | | | |
| Chromium | ND | 1 | ug/L | | | | | | |
| Cobalt | ND | 0.5 | ug/L | | | | | | |
| Copper | ND | 0.5 | ug/L | | | | | | |
| Lead | ND | 0.1 | ug/L | | | | | | |
| Molybdenum | ND | 0.5 | ug/L | | | | | | |
| Nickel | ND | 1 | ug/L | | | | | | |
| Selenium | ND | 1 | ug/L | | | | | | |
| Silver | ND | 0.1 | ug/L | | | | | | |
| Sodium | ND | 200 | ug/L | | | | | | |
| Thallium | ND | 0.1 | ug/L | | | | | | |
| Uranium | ND | 0.1 | ug/L | | | | | | |
| Vanadium | ND | 0.5 | ug/L | | | | | | |
| Zinc | ND | 5 | ug/L | | | | | | |
| **Semi-Volatiles** | | | | | | | | | |
| Acenaphthene | ND | 0.05 | ug/L | | | | | | |
| Acenaphthylene | ND | 0.05 | ug/L | | | | | | |
| Anthracene | ND | 0.01 | ug/L | | | | | | |
| Benzo [a] anthracene | ND | 0.01 | ug/L | | | | | | |
| Benzo [a] pyrene | ND | 0.01 | ug/L | | | | | | |
| Benzo [b] fluoranthene | ND | 0.05 | ug/L | | | | | | |
| Benzo [g,h,i] perylene | ND | 0.05 | ug/L | | | | | | |
| Benzo [k] fluoranthene | ND | 0.05 | ug/L | | | | | | |
| Biphenyl | ND | 0.05 | ug/L | | | | | | |
| Chrysene | ND | 0.05 | ug/L | | | | | | |
| Dibenzo [a,h] anthracene | ND | 0.05 | ug/L | | | | | | |
| Fluoranthene | ND | 0.01 | ug/L | | | | | | |
| Fluorene | ND | 0.05 | ug/L | | | | | | |
| Indeno [1,2,3-cd] pyrene | ND | 0.05 | ug/L | | | | | | |
| 1-Methylnaphthalene | ND | 0.05 | ug/L | | | | | | |
| 2-Methylnaphthalene | ND | 0.05 | ug/L | | | | | | |
| Methylnaphthalene (1&2) | ND | 0.10 | ug/L | | | | | | |
| Naphthalene | ND | 0.05 | ug/L | | | | | | |
| Phenanthrene | ND | 0.05 | ug/L | | | | | | |
| Pyrene | ND | 0.01 | ug/L | | | | | | |
| *Surrogate: 2-Fluorobiphenyl* | *16.8* | | *ug/L* | | *84.0* | *50-140* | | | |
| *Surrogate: Terphenyl-d14* | *15.3* | | *ug/L* | | *76.4* | *50-140* | | | |
| **Volatiles** | | | | | | | | | |
| Acetone | ND | 5.0 | ug/L | | | | | | |
| Benzene | ND | 0.5 | ug/L | | | | | | |
| Bromodichloromethane | ND | 0.5 | ug/L | | | | | | |
| Bromoform | ND | 0.5 | ug/L | | | | | | |
| Bromomethane | ND | 0.5 | ug/L | | | | | | |

# *Certificate of Analysis*

Report Date: 21-May-2014
Order Date:15-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

## *Method Quality Control: Blank*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Carbon Tetrachloride | ND | 0.2 | ug/L | | | | | | |
| Chlorobenzene | ND | 0.5 | ug/L | | | | | | |
| Chloroethane | ND | 1.0 | ug/L | | | | | | |
| Chloroform | ND | 0.5 | ug/L | | | | | | |
| Chloromethane | ND | 3.0 | ug/L | | | | | | |
| Dibromochloromethane | ND | 0.5 | ug/L | | | | | | |
| Dichlorodifluoromethane | ND | 1.0 | ug/L | | | | | | |
| 1,2-Dibromoethane | ND | 0.2 | ug/L | | | | | | |
| 1,2-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |
| 1,3-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |
| 1,4-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |
| 1,1-Dichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,2-Dichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| cis-1,2-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| trans-1,2-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| 1,2-Dichloroethylene, total | ND | 0.5 | ug/L | | | | | | |
| 1,2-Dichloropropane | ND | 0.5 | ug/L | | | | | | |
| cis-1,3-Dichloropropylene | ND | 0.5 | ug/L | | | | | | |
| trans-1,3-Dichloropropylene | ND | 0.5 | ug/L | | | | | | |
| 1,3-Dichloropropene, total | ND | 0.5 | ug/L | | | | | | |
| Ethylbenzene | ND | 0.5 | ug/L | | | | | | |
| Hexane | ND | 1.0 | ug/L | | | | | | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 5.0 | ug/L | | | | | | |
| Methyl Butyl Ketone (2-Hexanone) | ND | 10.0 | ug/L | | | | | | |
| Methyl Isobutyl Ketone | ND | 5.0 | ug/L | | | | | | |
| Methyl tert-butyl ether | ND | 2.0 | ug/L | | | | | | |
| Methylene Chloride | ND | 5.0 | ug/L | | | | | | |
| Styrene | ND | 0.5 | ug/L | | | | | | |
| 1,1,1,2-Tetrachloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1,2,2-Tetrachloroethane | ND | 0.5 | ug/L | | | | | | |
| Tetrachloroethylene | ND | 0.5 | ug/L | | | | | | |
| Toluene | ND | 0.5 | ug/L | | | | | | |
| 1,1,1-Trichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1,2-Trichloroethane | ND | 0.5 | ug/L | | | | | | |
| Trichloroethylene | ND | 0.5 | ug/L | | | | | | |
| Trichlorofluoromethane | ND | 1.0 | ug/L | | | | | | |
| 1,3,5-Trimethylbenzene | ND | 0.5 | ug/L | | | | | | |
| Vinyl chloride | ND | 0.5 | ug/L | | | | | | |
| m,p-Xylenes | ND | 0.5 | ug/L | | | | | | |
| o-Xylene | ND | 0.5 | ug/L | | | | | | |
| Xylenes, total | ND | 0.5 | ug/L | | | | | | |
| *Surrogate: 4-Bromofluorobenzene* | *36.5* | | *ug/L* | | *114* | *50-140* | | | |
| *Surrogate: Dibromofluoromethane* | *27.6* | | *ug/L* | | *86.2* | *50-140* | | | |
| *Surrogate: Toluene-d8* | *37.5* | | *ug/L* | | *117* | *50-140* | | | |

## *Certificate of Analysis*

Report Date: 21-May-2014
Order Date:15-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

## *Method Quality Control: Duplicate*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 25 | ug/L | ND | | | | 30 | |
| **Metals** | | | | | | | | | |
| Mercury | 0.11 | 0.1 | ug/L | 0.10 | | | 0.9 | 20 | |
| Antimony | ND | 0.5 | ug/L | 1.03 | | | 0.0 | 20 | |
| Arsenic | 1.5 | 1 | ug/L | 1.4 | | | 11.9 | 20 | |
| Barium | 52.1 | 1 | ug/L | 52.3 | | | 0.2 | 20 | |
| Beryllium | ND | 0.5 | ug/L | ND | | | 0.0 | 20 | |
| Boron | 185 | 10 | ug/L | 186 | | | 0.5 | 20 | |
| Cadmium | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Chromium (VI) | ND | 10 | ug/L | ND | | | | 20 | |
| Chromium | 3.8 | 1 | ug/L | 4.0 | | | 6.9 | 20 | |
| Cobalt | 2.96 | 0.5 | ug/L | 3.03 | | | 2.3 | 20 | |
| Copper | 2.53 | 0.5 | ug/L | 2.53 | | | 0.0 | 20 | |
| Lead | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Molybdenum | 6.06 | 0.5 | ug/L | 5.96 | | | 1.6 | 20 | |
| Nickel | 10.6 | 1 | ug/L | 10.8 | | | 2.6 | 20 | |
| Selenium | 25.2 | 1 | ug/L | 24.4 | | | 3.2 | 20 | |
| Silver | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Sodium | 78900 | 20000 | ug/L | 79600 | | | 0.8 | 20 | |
| Thallium | 0.13 | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Uranium | 33.4 | 0.1 | ug/L | 34.0 | | | 1.6 | 20 | |
| Vanadium | 21.7 | 0.5 | ug/L | 20.7 | | | 4.7 | 20 | |
| Zinc | 17 | 5 | ug/L | 17 | | | 0.4 | 20 | |
| **Volatiles** | | | | | | | | | |
| Acetone | ND | 5.0 | ug/L | ND | | | | 30 | |
| Benzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Bromodichloromethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Bromoform | ND | 0.5 | ug/L | ND | | | | 30 | |
| Bromomethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Carbon Tetrachloride | ND | 0.2 | ug/L | ND | | | | 30 | |
| Chlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Chloroethane | ND | 1.0 | ug/L | ND | | | | 30 | |
| Chloroform | ND | 0.5 | ug/L | ND | | | | 30 | |
| Chloromethane | ND | 3.0 | ug/L | ND | | | | 30 | |
| Dibromochloromethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Dichlorodifluoromethane | ND | 1.0 | ug/L | ND | | | | 30 | |
| 1,2-Dibromoethane | ND | 0.2 | ug/L | ND | | | | 30 | |
| 1,2-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,3-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,4-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1-Dichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,2-Dichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1-Dichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| cis-1,2-Dichloroethylene | 33.3 | 0.5 | ug/L | 34.1 | | | 2.6 | 30 | |
| trans-1,2-Dichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,2-Dichloropropane | ND | 0.5 | ug/L | ND | | | | 30 | |
| cis-1,3-Dichloropropylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| trans-1,3-Dichloropropylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Ethylbenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Hexane | ND | 1.0 | ug/L | ND | | | | 30 | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 5.0 | ug/L | ND | | | | 30 | |
| Methyl Butyl Ketone (2-Hexanone) | ND | 10.0 | ug/L | ND | | | | 30 | |
| Methyl Isobutyl Ketone | ND | 5.0 | ug/L | ND | | | | 30 | |
| Methyl tert-butyl ether | ND | 2.0 | ug/L | ND | | | | 30 | |
| Methylene Chloride | ND | 5.0 | ug/L | ND | | | | 30 | |

## *Certificate of Analysis*

Report Date: 21-May-2014
Order Date:15-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

## *Method Quality Control: Duplicate*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Styrene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,1,2-Tetrachloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,2,2-Tetrachloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Tetrachloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Toluene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,1-Trichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,2-Trichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Trichloroethylene | 77.7 | 0.5 | ug/L | 77.1 | | | 0.8 | 30 | |
| Trichlorofluoromethane | ND | 1.0 | ug/L | ND | | | | 30 | |
| 1,3,5-Trimethylbenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Vinyl chloride | ND | 0.5 | ug/L | ND | | | | 30 | |
| m,p-Xylenes | ND | 0.5 | ug/L | ND | | | | 30 | |
| o-Xylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| *Surrogate: 4-Bromofluorobenzene* | *36.4* | | *ug/L* | *ND* | *114* | *50-140* | | | |
| *Surrogate: Dibromofluoromethane* | *28.9* | | *ug/L* | *ND* | *90.2* | *50-140* | | | |
| *Surrogate: Toluene-d8* | *36.6* | | *ug/L* | *ND* | *114* | *50-140* | | | |

## *Certificate of Analysis*

Report Date: 21-May-2014
Order Date:15-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

## *Method Quality Control: Spike*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | 1620 | 25 | ug/L | ND | 80.8 | 68-117 | | | |
| F2 PHCs (C10-C16) | 2000 | 100 | ug/L | ND | 111 | 60-140 | | | |
| F3 PHCs (C16-C34) | 3640 | 100 | ug/L | ND | 97.8 | 60-140 | | | |
| F4 PHCs (C34-C50) | 1580 | 100 | ug/L | ND | 63.7 | 60-140 | | | |
| **Metals** | | | | | | | | | |
| Mercury | 3.09 | 0.1 | ug/L | 0.10 | 99.5 | 78-137 | | | |
| Antimony | 46.5 | | ug/L | 1.03 | 90.8 | 80-120 | | | |
| Arsenic | 81.4 | | ug/L | 0.7 | 161 | 80-120 | | | |
| Barium | 99.8 | | ug/L | 52.3 | 95.1 | 80-120 | | | |
| Beryllium | 55.8 | | ug/L | ND | 112 | 80-120 | | | |
| Boron | 227 | | ug/L | 186 | 82.9 | 80-120 | | | |
| Cadmium | 49.5 | | ug/L | 0.06 | 98.8 | 80-120 | | | |
| Chromium (VI) | 194 | 10 | ug/L | ND | 97.0 | 70-130 | | | |
| Chromium | 50.9 | | ug/L | 4.0 | 93.8 | 80-120 | | | |
| Cobalt | 53.7 | | ug/L | 3.03 | 101 | 80-120 | | | |
| Copper | 52.3 | | ug/L | 2.53 | 99.5 | 80-120 | | | |
| Lead | 52.4 | | ug/L | 0.06 | 105 | 80-120 | | | |
| Molybdenum | 54.9 | | ug/L | 5.96 | 97.9 | 80-120 | | | |
| Nickel | 59.1 | | ug/L | 10.8 | 96.5 | 80-120 | | | |
| Selenium | 87.0 | | ug/L | 1.2 | 172 | 80-120 | | | QM-07 |
| Silver | 41.2 | | ug/L | 0.0006 | 82.4 | 80-120 | | | |
| Sodium | 1040 | | ug/L | ND | 104 | 80-120 | | | |
| Thallium | 53.1 | | ug/L | 0.10 | 106 | 80-120 | | | |
| Uranium | 91.2 | | ug/L | 34.0 | 114 | 80-120 | | | |
| Vanadium | 68.4 | | ug/L | 20.7 | 95.5 | 80-120 | | | |
| Zinc | 62 | | ug/L | 17 | 89.5 | 80-120 | | | |
| **Semi-Volatiles** | | | | | | | | | |
| Acenaphthene | 4.19 | 0.05 | ug/L | ND | 83.7 | 50-140 | | | |
| Acenaphthylene | 3.31 | 0.05 | ug/L | ND | 66.2 | 50-140 | | | |
| Anthracene | 3.85 | 0.01 | ug/L | ND | 76.9 | 50-140 | | | |
| Benzo [a] anthracene | 3.96 | 0.01 | ug/L | ND | 79.2 | 50-140 | | | |
| Benzo [a] pyrene | 3.72 | 0.01 | ug/L | ND | 74.4 | 50-140 | | | |
| Benzo [b] fluoranthene | 4.98 | 0.05 | ug/L | ND | 99.5 | 50-140 | | | |
| Benzo [g,h,i] perylene | 3.98 | 0.05 | ug/L | ND | 79.5 | 50-140 | | | |
| Benzo [k] fluoranthene | 4.93 | 0.05 | ug/L | ND | 98.6 | 50-140 | | | |
| Biphenyl | 4.41 | 0.05 | ug/L | ND | 88.2 | 50-140 | | | |
| Chrysene | 4.73 | 0.05 | ug/L | ND | 94.5 | 50-140 | | | |
| Dibenzo [a,h] anthracene | 4.11 | 0.05 | ug/L | ND | 82.1 | 50-140 | | | |
| Fluoranthene | 3.68 | 0.01 | ug/L | ND | 73.6 | 50-140 | | | |
| Fluorene | 4.10 | 0.05 | ug/L | ND | 82.0 | 50-140 | | | |
| Indeno [1,2,3-cd] pyrene | 4.27 | 0.05 | ug/L | ND | 85.4 | 50-140 | | | |
| 1-Methylnaphthalene | 3.97 | 0.05 | ug/L | ND | 79.4 | 50-140 | | | |
| 2-Methylnaphthalene | 4.08 | 0.05 | ug/L | ND | 81.7 | 50-140 | | | |
| Naphthalene | 3.68 | 0.05 | ug/L | ND | 73.6 | 50-140 | | | |
| Phenanthrene | 3.86 | 0.05 | ug/L | ND | 77.3 | 50-140 | | | |
| Pyrene | 3.76 | 0.01 | ug/L | ND | 75.1 | 50-140 | | | |
| *Surrogate: 2-Fluorobiphenyl* | *16.0* | | *ug/L* | | *80.0* | *50-140* | | | |
| **Volatiles** | | | | | | | | | |

## *Certificate of Analysis*

Report Date: 21-May-2014
Order Date:15-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

## *Method Quality Control: Spike*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Acetone | 71.3 | 5.0 | ug/L | ND | 71.3 | 50-140 | | | |
| Benzene | 31.6 | 0.5 | ug/L | ND | 79.1 | 60-130 | | | |
| Bromodichloromethane | 30.1 | 0.5 | ug/L | ND | 75.3 | 60-130 | | | |
| Bromoform | 32.7 | 0.5 | ug/L | ND | 81.6 | 60-130 | | | |
| Bromomethane | 33.5 | 0.5 | ug/L | ND | 83.8 | 50-140 | | | |
| Carbon Tetrachloride | 29.6 | 0.2 | ug/L | ND | 74.1 | 60-130 | | | |
| Chlorobenzene | 36.7 | 0.5 | ug/L | ND | 91.8 | 60-130 | | | |
| Chloroethane | 28.8 | 1.0 | ug/L | ND | 72.0 | 50-140 | | | |
| Chloroform | 31.3 | 0.5 | ug/L | ND | 78.3 | 60-130 | | | |
| Chloromethane | 28.0 | 3.0 | ug/L | ND | 70.0 | 50-140 | | | |
| Dibromochloromethane | 33.5 | 0.5 | ug/L | ND | 83.7 | 60-130 | | | |
| Dichlorodifluoromethane | 29.8 | 1.0 | ug/L | ND | 74.6 | 50-140 | | | |
| 1,2-Dibromoethane | 37.0 | 0.2 | ug/L | ND | 92.4 | 60-130 | | | |
| 1,2-Dichlorobenzene | 36.7 | 0.5 | ug/L | ND | 91.8 | 60-130 | | | |
| 1,3-Dichlorobenzene | 37.6 | 0.5 | ug/L | ND | 93.9 | 60-130 | | | |
| 1,4-Dichlorobenzene | 36.4 | 0.5 | ug/L | ND | 90.9 | 60-130 | | | |
| 1,1-Dichloroethane | 31.2 | 0.5 | ug/L | ND | 78.0 | 60-130 | | | |
| 1,2-Dichloroethane | 31.0 | 0.5 | ug/L | ND | 77.6 | 60-130 | | | |
| 1,1-Dichloroethylene | 32.3 | 0.5 | ug/L | ND | 80.7 | 60-130 | | | |
| cis-1,2-Dichloroethylene | 32.3 | 0.5 | ug/L | ND | 80.8 | 60-130 | | | |
| trans-1,2-Dichloroethylene | 32.0 | 0.5 | ug/L | ND | 79.9 | 60-130 | | | |
| 1,2-Dichloropropane | 30.7 | 0.5 | ug/L | ND | 76.8 | 60-130 | | | |
| cis-1,3-Dichloropropylene | 27.4 | 0.5 | ug/L | ND | 68.4 | 60-130 | | | |
| trans-1,3-Dichloropropylene | 25.4 | 0.5 | ug/L | ND | 63.5 | 60-130 | | | |
| Ethylbenzene | 36.7 | 0.5 | ug/L | ND | 91.7 | 60-130 | | | |
| Hexane | 30.8 | 1.0 | ug/L | ND | 77.0 | 60-130 | | | |
| Methyl Ethyl Ketone (2-Butanone) | 68.9 | 5.0 | ug/L | ND | 68.9 | 50-140 | | | |
| Methyl Butyl Ketone (2-Hexanone) | 74.2 | 10.0 | ug/L | ND | 74.2 | 50-140 | | | |
| Methyl Isobutyl Ketone | 74.4 | 5.0 | ug/L | ND | 74.4 | 50-140 | | | |
| Methyl tert-butyl ether | 74.7 | 2.0 | ug/L | ND | 74.7 | 50-140 | | | |
| Methylene Chloride | 31.5 | 5.0 | ug/L | ND | 78.6 | 60-130 | | | |
| Styrene | 37.1 | 0.5 | ug/L | ND | 92.8 | 60-130 | | | |
| 1,1,1,2-Tetrachloroethane | 34.1 | 0.5 | ug/L | ND | 85.3 | 60-130 | | | |
| 1,1,2,2-Tetrachloroethane | 36.1 | 0.5 | ug/L | ND | 90.3 | 60-130 | | | |
| Tetrachloroethylene | 36.2 | 0.5 | ug/L | ND | 90.5 | 60-130 | | | |
| Toluene | 37.9 | 0.5 | ug/L | ND | 94.8 | 60-130 | | | |
| 1,1,1-Trichloroethane | 29.5 | 0.5 | ug/L | ND | 73.8 | 60-130 | | | |
| 1,1,2-Trichloroethane | 31.4 | 0.5 | ug/L | ND | 78.6 | 60-130 | | | |
| Trichloroethylene | 31.4 | 0.5 | ug/L | ND | 78.4 | 60-130 | | | |
| Trichlorofluoromethane | 31.0 | 1.0 | ug/L | ND | 77.4 | 60-130 | | | |
| 1,3,5-Trimethylbenzene | 37.0 | 0.5 | ug/L | ND | 92.4 | 60-130 | | | |
| Vinyl chloride | 29.3 | 0.5 | ug/L | ND | 73.2 | 50-140 | | | |
| m,p-Xylenes | 74.6 | 0.5 | ug/L | ND | 93.2 | 60-130 | | | |
| o-Xylene | 37.7 | 0.5 | ug/L | ND | 94.2 | 60-130 | | | |

## *Certificate of Analysis*

Report Date: 21-May-2014
Order Date:15-May-2014

Client: **Houle Chevrier**
Client PO: Project Description: 14-103

**Qualifier Notes:**

***QC Qualifiers :***

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

**Sample Data Revisions**

None

**Work Order Revisions / Comments:**

None

**Other Report Notes:**

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

*CCME PHC additional information:*

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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**Chain of Custody**
(Lab Use Only)
**Nº 101378**

Page 1 of 1

| | | | |
|---|---|---|---|
| Client Name: Hoole Cherrier Engineering | Project Reference: 14-103 | TAT: [✓] Regular [ ] 3 Day | |
| Contact Name: Brett Painter | Quote # | [ ] 2 Day [ ] 1 Day | |
| Address: 180 Wescar Lane, Ottawa, Ontario KØA 1LØ | PO # | Date Required: | |
| Telephone: 613-836-1422 | Email Address: bpainter@hceng.ca ssabo@hceng.ca | | |

Criteria: [✓] O. Reg. 153/04 (As Amended) Table 3 [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [ ] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

**Required Analyses**

**Paracel Order Number:** 1420252

| | Sample ID/Location Name | Matrix | Air Volume | # of Containers | Sample Taken Date | Sample Taken Time | PHCs F1-F4+BTEX | VOCs | PAHs | Metals by ICP | Hg | CrVI | B (HWS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | BH14-1 GW SA1 | GW | | | May 15 | 10 am | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| 2 | BH14-2 GW SA1 | GW | | | May 15 | 11:30am | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| 3 | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |

Comments: Metals have been field filtered.

Method of Delivery: Walk-in

| | | | |
|---|---|---|---|
| Relinquished By (Sign): Samantha Sabo | Received by Driver/Depot: Mélanie | Received at Lab: MJC | Verified By: MJC |
| Relinquished By (Print): Samantha Sabo | Date/Time: May 15/14 12:45pm | Date/Time: May 15/14 4:50 | Date/Time: May 15/14 5:25 |
| Date/Time: May 15, 2014 | Temperature: ___ °C 14.5°C | Temperature: 12.1 °C | pH Verified [X] By: Karen Lee |

geotechnical

environmental

hydrogeology

materials testing & inspection

experience • knowledge • reliability