

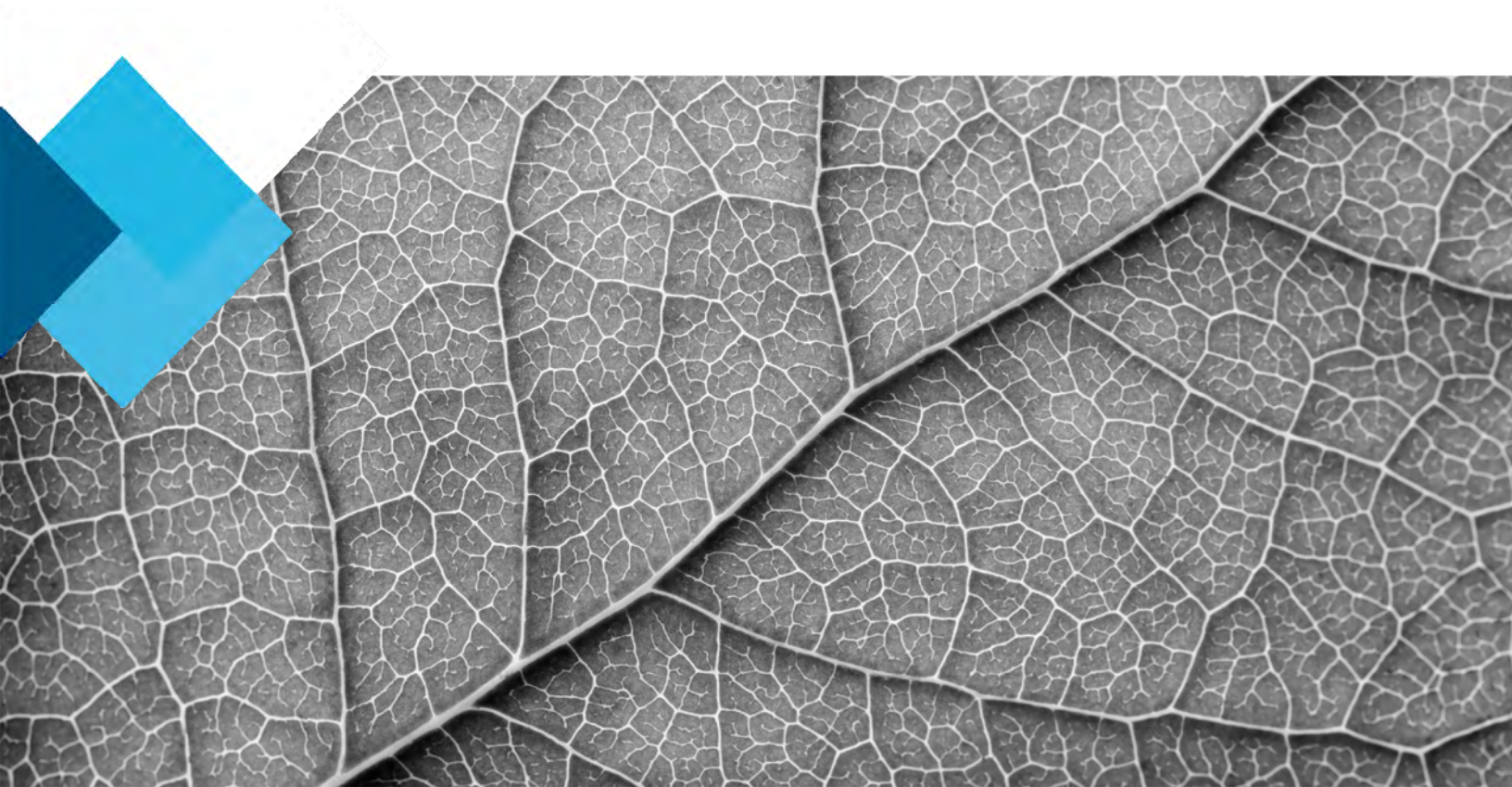


**SNC • LAVALIN**

# Phase II Environmental Site Assessment

2140 Baseline Road, Ottawa, Ontario

City of Ottawa



Environment & Geoscience

January 23, 2017

642920

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The findings, conclusions, and recommendations in this report (i) have been developed in a manner consistent with the level of skill normally exercised by professionals currently practicing under similar conditions in the area, and (ii) reflect SNC-Lavalin's best judgment based on information available at the time of preparation of this report. No other warranties, either expressed or implied, are made as to the professional services provided under the terms of our original contract and included in this report. The findings and conclusions contained in this report are valid only as of the date of this report and may be based, in part, upon information provided by others. If any of the information is inaccurate, new information is discovered, site conditions change, or applicable standards are amended, modifications to this report may be necessary. The results of this assessment should in no way be construed as a warranty that the subject site is free from any and all contamination.

Any soil and rock descriptions in this report and associated logs have been made with the intent of providing general information on the subsurface conditions of the site. This information should not be used as geotechnical data for any purpose unless specifically addressed in the text of this report. Groundwater conditions described in this report refer only to those observed at the location and time of observation noted in the report.

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# 1 Executive Summary

The Environment and Geoscience business unit of SNC-Lavalin Inc. (SNC-Lavalin) was retained by the City of Ottawa (the City) to conduct a Phase II Environmental Site Assessment (ESA) for the City-owned property located at 2140 Baseline Road, in Ottawa, Ontario. The property was formerly part of Constellation Drive and Gemini Way rights of way prior to those roads being realigned in 2009. The site is currently vacant, urban greenspace. Field work activities were completed on December 5, 2016.

The objective of the Phase II ESA was to evaluate soil conditions on the site. The investigation included characterization of potential impacts to soil within the site related to areas of potential environmental concern (APECs) from onsite sources identified and their associated Potential Contaminants of Concern (PCOCs) as identified in the Phase One ESA completed for the property at 2140 Baseline Road (SNC-Lavalin, 2017). Identified APECs include potential import of fill material for roadway base construction and the historical use of the site for roadways. Associated PCOCs include petroleum hydrocarbons (F1-F4 PHCs), benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs) and metals. Electrical conductivity (EC), sodium adsorption ratio (SAR) and volatile organic compounds (VOCs) other than BTEX were not identified as PCOCs and were included as analytical parameters strictly for site characterization purposes. Note that sodium adsorption ratio (SAR), electrical conductivity (EC), sodium (Na) and chloride (Cl<sup>-</sup>) were not included as PCOCs because any application of road salt to roadways would have been for the purpose of keeping highways and roads safe for traffic under conditions of snow and/or ice (O.Reg. 153, Section 48(3)) and no other onsite source of salts was identified.

Based on the results of the current investigation, concentrations of PCOCs, including F1-F4 PHCs, BTEX, PAHs and metals satisfied MOECC Table 2 standards in analysed soil samples collected from the site.

Analysed concentrations of additional parameters (i.e. not identified as PCOCs) of VOCs, EC and SAR satisfied MOECC Table 2 standards with the exception of the EC concentration from one soil sample (BH3-2 collected from silty clay fill in BH3 at a depth of 0.6 to 1.2 m bgs).

Based on the results and conclusions of the current investigation, the following recommendations are offered:

- › Analysed concentrations of all PCOCs identified in the Phase One ESA satisfied MOECC site condition standards selected for the site and no further environmental investigations are required.
- › As EC was not identified in the Phase One ESA as a PCOC for the site and the elevated EC measured at BH3 is likely either due to historical road salt application or naturally occurring, delineation of EC impacts is not considered necessary.

## 2 Introduction

SNC-Lavalin was retained by the City to conduct a Phase II ESA for 2140 Baseline Road, in Ottawa, Ontario (herein referred as the “site”). Field work activities were completed on December 5, 2016.

### 2.1 Site Description

The site is located south of Baseline Road, west of Constellation Drive and north of Gemini Way (Figure 1). The property was formerly part of Constellation Drive and Gemini Way rights of way prior to those roads being realigned in 2009. The site is currently vacant, urban greenspace.

Table A - Site Information

<b>Municipal Address</b>	2140 Baseline Road, Ottawa, Ontario
<b>Legal Description</b>	Part of Lot 35, Concession 2 RF Nepean, Part Block 42 Plan 4M623, Part Block 41 Plan 4M623, all being Parts 2-4, 6-17, 23-35 on Plan 4R26884
<b>Property Identifier Number (PIN)</b>	Part of PIN 04692-0309 Part of PIN 04692-0454 Part of PIN 04692-1301 All of PIN 04692-0323 All of PIN 04692-0478
<b>Approximate Size:</b>	Approximately 0.75 acres (0.3 ha)

A legal survey plan showing the limits of the site has not been completed. The limits of the site were established based on a site sketch provided by the City Infrastructure Services Department, Surveys and Mapping Unit.

### 2.2 Property Ownership

Table B - Property Ownership, Contact Information

<b>Site Owner</b>	City of Ottawa Rich Barker Advisor, Environmental Remediation
<b>Person Requesting Phase One ESA</b>	Environmental Remediation Unit, Realty Initiatives & Development Branch Corporate Real Estate Office, City of Ottawa 110 Laurier Avenue West, 5 <sup>th</sup> Floor West Ottawa, Ontario K1P 1J1

### 2.3 Current Uses

The site is currently vacant, urban greenspace. Historical records and air photos indicate roadways (varying configurations of Constellation Drive and Gemini Way) extended through the site from approximately 1978 to 2008. In 2009, the roadways were realigned to the present day configuration where Constellation Drive borders the eastern property boundary and Gemini Way borders the south



property boundary. As the site is currently vacant and undeveloped, the property use for the site is considered community based on the most recent property use (i.e. use of land for a road), as defined by O. Reg. 153/04. The City has indicated that sale and potential future development of the site is likely; however, the planned future use of the site is not known.

## 2.4 Applicable Site Condition Standards

Site condition standards for use at the site were selected from the Ontario Ministry of the Environment and Climate Change (MOECC) "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" (MOECC, 2011) using the approach described by Ontario Regulation 153/04 (as amended). The following site specific information was used to select standards for the site:

- › The site is not an environmentally sensitive area (as defined by Section 41 of O. Reg. 153/04) since:
  - › The site is not within, does not include, is not adjacent to, is not part of and does not include land that is within 30 m of an area of natural significance (as defined by O. Reg. 153/04); and,
  - › The pH of surface soil is within the 5 to 9 range and sub-surface soil is within the 5 to 11 range (Table 1);
- › The site is not a shallow soil property since more than 2/3 of the site has at least 2 m of soil cover;
- › The site does not include all or part of a water body, is not adjacent to a water body, and does not include land that is within 30 m of a water body (as defined by O. Reg. 153/04);
- › The full depth restoration option is assumed;
- › Restoration of groundwater to potable levels is required since:
  - › Although the site, and all other properties located, in whole or in part, within 250 m of the boundaries of the site, are supplied by a municipal drinking-water system as defined in the Safe Drinking Water Act, 2002 (supply source: Ottawa River), three (3) domestic use wells were identified within 250 m of the site. No records were available confirming the abandonment of the wells; and,
  - › A review of the City Official Plan, Schedule K - Environmental Constraints (City of Ottawa, 2015) identified that the site is within an intake protection zone, for the protection of surface water;
- › The site is vacant. The most recent property use at the site was community (roadways) and planned future use of the site is not known;
- › Soil within the site would be classified as medium and fine textured since more than 2/3 of the soil at the site, measured by volume, consists of soil that contains 50 percent or more by mass of particles that are smaller than 75 µm in mean diameter (Table 1).

Based on the above information, the soil standards selected for this site for comparative purposes correspond to the full depth site condition standards for medium and fine textured soil and industrial/commercial/community property use in a potable groundwater condition (i.e. MOE, 2011; Table 2). Should remediation or filing of a Record of Site Condition be planned, the application of potable standards should be confirmed.

## 3 Background Information

### 3.1 Physical Setting

The site is located at an elevation of approximately 86 m amsl. No buildings or water bodies were identified within the site. Pinecrest Creek is located approximately 200 m northeast of the site and discharges to the Ottawa River approximately 3.1 km to the north. An unnamed water body identified approximately 175 m southwest of the site appears to be a surface water retention feature or recharge area.

The topography in the vicinity of the site is relatively flat. The site is within the Ottawa Valley Clay Plains. Surface geology is described as alluvial deposits, consisting of sand and silt. Bedrock in the Phase One Study Area consists of limestone, dolostone, shale, arkose and sandstone of the Ottawa Group, Simcoe Group, Shadow Lake Formations of the Middle Ordovician. Based on publicly available borehole and water well records, surficial soils in the area were generally described as grey clay to depths of approximately 5.2 to 12.2 m bgs followed by limestone (SNC-Lavalin, 2017).

### 3.2 Past Uses

Based on the results of the Phase One ESA completed by SNC-Lavalin (2017), the property was first developed circa 1978 when excavation work in preparation for the Gemini Way and Constellation Drive roadways can be seen in air photos. Previous ownership records and air photos suggest the site was privately owned prior to 1960 and potentially used for agricultural purposes or left fallow prior to road construction.

By 1985, the initial configuration of Gemini Way and Constellation Drive roadways extended through the middle of the site. In 2009, with all portions of the site owned by the City, the roadways were realigned to the present day configuration where Constellation Drive borders the eastern property boundary and Gemini Way borders the south property boundary of the site. The site has been vacant, urban greenspace since this date.

### 3.3 Past Investigations

No past investigations were available from the City for review, including environmental and geotechnical reports/investigations, site operating records (i.e. related to road realignment) or other site specific records. Based on the findings of the Phase One ESA (SNC-Lavalin, 2017), APECs identified for the site included disturbed soil across the entire property and former roadways across portions of the property. The footprints of the former roadways are shown on Figure 2.



## 4 Scope of Investigation

### 4.1 Overview of Site Investigation and Media Investigated

The objective of this work program was to evaluate soil conditions on the site. The investigation included characterization of potential impacts to soil within the site related to APECs from onsite sources identified by the Phase One ESA (SNC-Lavalin, 2017) and their associated PCOCs.

The following table summarizes APECs and PCOCs within the site that were identified in the Phase One ESA (SNC-Lavalin, 2017).

Table C- APECs and PCOCs for 2140 Baseline Road

APEC Identifier	Description of APECs	Associated PCOCs	Media Potentially Impacted	Included in Current Investigation
<b>Entire Property</b>	Disturbed soil was noted across the site circa 1976 and 2009; potential import of fill material for roadway base construction.	Metals, PAH	Soil Groundwater (if PCOCs confirmed in soil)	Yes
<b>Former Roadways Footprint</b>	The site was historically used for roadways, from approximately 1978 to 2008.	PHC, BTEX, Metals, PAH <sup>4</sup>	Soil Groundwater (if PCOCs confirmed in soil)	Yes

<sup>4</sup> – EC, SAR, Na and CI have not been included as PCOCs because application of road salt to roadways would have been for the purpose of keeping highways and roads safe for traffic under conditions of snow and/or ice (O.Reg. 153, Section 48(3)).

PHCs - Petroleum Hydrocarbons

PAHs - Polycyclic Aromatic Hydrocarbons

BTEX - Benzene, Toluene, Ethylbenzene, Xylenes

EC - Electrical Conductivity

SAR - Sodium Adsorption Ratio

In order to achieve the objective identified above, a scope of work was developed in conjunction with the City consisting of the following tasks:

- › Drill three (3) boreholes;
- › Submit selected soil samples for laboratory analyses of PCOCs including F1-F4 PHCs, BTEX, metals, and PAHs. In addition, submit selected soil samples for VOCs, EC and SAR to supplement site characterization information, and for pH and grain size for standards selection purposes;
- › Submit a soil sample for laboratory analysis of waste characterization parameters for off-site disposal purposes and coordinate off-site disposal of excess soil generated during drilling, if necessary; and,
- › Compare soil analytical results to applicable provincial standards.

### 4.2 Phase One Conceptual Site Model

The Phase One Conceptual Site Model (CSM) was included in the Phase One ESA for the property at 2140 Baseline Road (SNC-Lavalin, 2017).

## 4.3 Deviations from Sampling and Analysis Plan

No significant deviations from the sampling and analysis plan occurred.

## 4.4 Impediments

No significant impediments were encountered during field investigations.

## 5 Investigation Method

### 5.1 General

The field program for the Phase II ESA was completed in December 2016 and consisted of the following elements:

- › Preliminary Activities; and,
- › Borehole Drilling and Soil Sampling.

Preliminary activities, conducted prior to commencing field investigations, included the following:

- › A site-specific health and safety plan was developed and implemented;
- › A utility locates contractor for locating underground utilities was retained;
- › Sampling containers and forms were obtained from the City's contract laboratory;
- › A drilling operator was retained for drilling boreholes; and,
- › Site access was obtained from the City property manager.

The Phase II ESA program was completed by SNC-Lavalin field staff using field and laboratory analysis protocols based on O. Reg. 153/04, as amended, and standard operating procedures (SOPs) described in the SNC-Lavalin Field Work Guidance Manual.

All field tasks completed as part of the investigation were subject to a site specific health and safety program implemented by SNC-Lavalin.

### 5.2 Drilling and Soil Sampling

Prior to conducting any intrusive work, SNC-Lavalin retained USL-1 Underground Service Locators Inc. (USL-1) of Ottawa, Ontario to locate onsite public and private underground services. USL-1 confirmed that each proposed drilling location was free of public and/or private services prior to any ground disturbance. City representatives also assisted in locating and marking property boundaries for the site.

#### 5.2.1 Drilling

On December 5, 2016, three (3) boreholes (BH1 to BH3) were drilled under the supervision of SNC-Lavalin personnel. Drilling was conducted using a Geoprobe 7822DT track-mounted rig operated by George Downing Estate Drilling Ltd. (Downing) of Grenville-sur-la-Rouge, Québec. Boreholes were completed to depths ranging from 2.4 m to 3.0 m bgs, terminating in overburden. Boreholes were advanced in overburden using direct push probes (82.5 mm [3.25 in] outer diameter), enabling the collection of continuous soil cores for sampling using 1.2 m (4 ft) long disposable sleeves.

Borehole locations are shown in Figure 2. Borehole logs including sample descriptions are provided in Appendix A.

#### 5.2.2 Soil Sampling

All collected soil samples were identified using nomenclature to identify the borehole (BH) and sequential soil sample (e.g. BH1-2 is the second soil sample from the borehole identified as BH1).

Soil samples were collected approximately every 0.6 m (2 ft). Soil samples were immediately split into two (2) portions for field logging/screening and for possible laboratory analysis. The field logging/screening portion was placed in a sealable plastic bag and logged in the field for soil type (e.g. colour, moisture content, cohesiveness, etc.) and visual evidence of impacts (e.g. staining, presence of fill or debris, etc.). Field screening methods are described in Section 5.2.4. The portion of each soil sample collected for potential laboratory analysis was placed directly into laboratory supplied sample jars and placed in a cooler with ice.

At least one (1) soil sample from each borehole was submitted for laboratory analyses. Thirteen (13) borehole soil samples, including four (4) duplicate soil samples, were submitted for laboratory analyses of PCOCs, including F1-F4 PHCs, BTEX, metals, and/or PAHs, as well as additional parameters of VOCs, SAR, and/or EC. Soil samples collected for quality assurance and quality control (QA/QC) purposes are discussed in Section 5.3.7.

### 5.2.3 Waste Characterization Sampling

A waste characterization sample representative of soil encountered during drilling was submitted for laboratory analyses of waste characterization parameters including toxicity characteristic leaching procedure (TCLP) inorganics, volatiles and PCBs and bulk F1-F4 PHC. The sample was also analysed for flashpoint for comparison to Transport Canada Transportation of Dangerous Goods Regulations. Waste characterization was completed for future off-site disposal purposes; however, due to the limited volume of soil cuttings generated through the drilling process, no excess soil cuttings were drummed/stored during the current investigation.

### 5.2.4 Field Screening Measurements

Any visual/olfactory evidence of impacts, including staining and presence of fill or waste (e.g. metal, concrete, wood, glass, etc.), in soil samples were noted if observed. Other pertinent observations (e.g. roots, mottling, stratification, etc.) of soil samples were also noted if observed.

The portion of each soil sample for field logging/screening was then placed in a sealable plastic bag. Maximum headspace vapour readings in the sample bags were measured in the field using an RKI Eagle 2 organic vapour meter (OVM). The OVM was calibrated in the field in methane-elimination mode to one (1) hexane gas standard. Field screening with the OVM was used to qualitatively direct selection of samples for volatile parameters (i.e. VOCs/F1 PHC).

### 5.2.5 Analytical Testing

All soil samples were collected in laboratory prepared sampling containers and stored in a cooler with ice until delivery to the analytical laboratory. Laboratory analyses of soil were completed by Paracel Laboratories Ltd. (Paracel) of Ottawa, Ontario. Paracel is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA).

### 5.2.6 Elevation Surveying

Borehole locations were not surveyed for ground elevation.

### 5.2.7 Quality Assurance and Quality Control Measures

A QA/QC program was implemented to minimize and quantify impacts introduced during sample collection, handling, shipping and analysis. Details of the QA/QC program are discussed in Appendix III.

## 6 Review and Evaluation

### 6.1 Geology

Borehole BH1 was placed in an area of the site considered to be outside of the footprint of the historical roadways, while boreholes BH2 and BH3 were placed in the footprints of historical roadways. Regardless, stratigraphic information collected during the current intrusive investigation indicates that the overburden at the site generally consists of an initial layer of topsoil (extending from surface to 0.02 to 0.05 m bgs), followed by fill material (extending to 1.3 to 2.7 m bgs), followed by native silty clay and/or silty sand material (extending to the terminal depth of boreholes at 2.4 to 3.0 m bgs).

Coarse sand fill and concrete debris fill was observed in BH3 between 2.0 and 2.7 m bgs; this was below a silty clay fill layer observed from 0.7 to 2.0 m bgs. The same silty clay material was observed in BH1 and BH2 at depths of 1.3 and 1.4 m bgs and was considered to be native material. As such, the silty clay fill layer in BH3 may potentially be original native material used as backfill during roadway related construction work at the site. All three (3) boreholes were considered to have terminated in native material based on field observations. Additional details on the soil stratigraphy are provided in the borehole logs in Appendix I.

### 6.2 Soil Field Screening

Field observations and the results of field screening of soil samples are summarized in the borehole logs (Appendix I). No staining was noted during field screening; however, varying soil fill and asphalt/concrete debris were noted during field screening. All OVM readings measured during borehole drilling were below the instrument detection limit of 5 parts per million by volume (ppmv).

### 6.3 Soil Quality

Analysed concentrations in soil are presented in Tables 1 to 6. As discussed in Section 2.4, soil quality was compared to the applicable MOECC Table 2 potable standards for industrial/commercial/community property use for medium and fine textured soils. Copies of laboratory certificates of analyses are included in Appendix II. The following table summarizes sampling locations where analysed concentrations in soil exceeded MOECC Table 2 standards. Comparisons to MOECC Table 2 standards are further discussed in the following sections.

Table D- Analysed Concentrations in Soil Exceeding MOECC Table 2 Standards

Sampling Location	Sample ID	Sample Depth (m bgs)	Soil Description	Analysed Parameters	Parameters exceeding MOECC Table 2 standards
BH3	BH3-2	0.3 – 1.2	Fill (silty clay)	EC, SAR	EC

### 6.3.1 pH and Grain Size

Two (2) soil samples, one from surface soil (0 – 1.5 m bgs) and one from sub-surface soil (greater than 1.5 m bgs), were analysed for pH and grain size to support the selection of MOECC site condition standards. Analytical results for the soil samples submitted for pH and grain size are provided in Table 1.

Results indicate that surface and sub-surface soil from the site may be considered within the acceptable pH range for applying generic standards, and that the soil texture is considered medium/fine texture.

### 6.3.2 Petroleum Parameters

Results of soil analyses for petroleum parameters (BTEX and F1-F4 PHC) are presented in Table 2. A total of five (5) soil samples (excluding QA/QC samples) were submitted for laboratory analysis of BTEX and F1-F4 PHC as part of the current investigation.

Concentrations of petroleum parameters were less than laboratory method detection limits (MDLs), and all analysed samples satisfied MOECC Table 2 standards for petroleum parameters.

### 6.3.3 Volatile Organic Compounds

Results of soil analyses for VOCs are presented in Table 3. A total of five (5) soil samples (excluding QA/QC samples) were submitted for laboratory analysis of VOCs as part of the current investigation.

Concentrations of VOCs were less than MDLs, and all analysed samples satisfied MOECC Table 2 standards for VOCs.

### 6.3.4 Polycyclic Aromatic Hydrocarbons

Results of soil analyses for PAHs are presented in Table 4. A total of five (5) soil samples (excluding QA/QC samples) were submitted for laboratory analysis of PAHs as part of the current investigation.

Concentrations of PAHs were less than MDLs, and all analysed samples satisfied MOECC Table 2 standards for PAHs.

### 6.3.5 Metals and Inorganics

Results of soil analyses for metals, SAR and EC are presented in Table 5. A total of five (5) soil samples (excluding QA/QC samples) were submitted for laboratory analysis of metals and four (4) soil samples (excluding QA/QC samples) were analysed for SAR and EC.

All analysed samples satisfied MOECC Table 2 standards for metals and SAR. EC (1.61 mS/cm) in soil sample BH3-2 exceeded the MOECC Table 2 standard (1.4 mS/cm). All other soil samples analysed for EC satisfied the MOECC Table 2 standard.

BH3-2 was collected from silty clay fill in BH3, at a depth of approximately 0.6 to 1.2 m bgs. This silty clay fill in BH3 is considered to potentially be native soil used as backfill during roadway related construction work at the site because similar native silty clay material was encountered at the base of boreholes BH1 and BH2. The analysed EC concentration (1.39 mS/cm) for BH2-4, a soil sample of native silty clay in borehole BH2, marginally satisfied the MOECC Table 2 standard (1.4 mS/cm). It is noted that EC was not included as a PCOC because application of road salt to roadways would have been for the purpose of



keeping highways and roads safe for traffic under conditions of snow and/or ice (O.Reg. 153, Section 48(3)).

### 6.3.6 Waste Characterization

One (1) soil sample was analysed for O.Reg. 347 waste characterization. Waste characterization analytical results are provided in Table 6.

Results indicate that soil from the site may be considered non-hazardous waste for the purpose of offsite disposal in the Province of Ontario.

### 6.3.7 Quality Assurance and Quality Control Results

The results of the QA/QC program are discussed in Appendix III. The results of field and laboratory QA/QC measures associated with analysed soil samples were considered acceptable.

## 7 Conclusions and Recommendations

### 7.1 Conclusions

Based on the results of the current investigation, concentrations of PCOCs, including F1-F4 PHCs, BTEX, PAHs and metals satisfied MOECC Table 2 standards in analysed soil samples collected from the site.

Analysed concentrations of additional parameters (i.e. not identified as PCOCs) of VOCs, EC and SAR satisfied MOECC Table 2 standards with the exception of the EC concentration from one soil sample (BH3-2 collected from silty clay fill in BH3 at a depth of 0.6 to 1.2 m bgs). This silty clay fill in BH3 is considered to potentially be native soil used as backfill during roadway related construction work. EC was not included as a PCOC because application of road salt to roadways would have been for the purpose of keeping highways and roads safe for traffic under conditions of snow and/or ice (O.Reg. 153, Section 48(3)).

EC soil impacts were not fully delineated during the current Phase II ESA. Historic infilling extended beyond the limits of the current investigation area and were primarily related to roadway construction and reconfiguration across the site. The delineation of EC impacts was beyond the scope of the current investigation as EC was not identified as a PCOC for the site. Delineation of EC impacts is not considered necessary.

### 7.2 Recommendations

Based on the results and conclusions of the current investigation, the following recommendations are offered:

- › As all analysed concentrations of PCOCs identified in the Phase One ESA satisfied MOECC site condition standards selected for the site, no further environmental investigations are required.
- › As EC was not identified in the Phase One ESA as a PCOC for the site and the elevated EC measured at BH3 is likely either due to historical road salt application or naturally occurring, delineation of EC impacts is not considered necessary.

## 8 References

- Ontario Ministry of the Environment and Climate Change (MOECC), 2011. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
- SNC-Lavalin Inc. (SNC-Lavalin), 2017. DRAFT - Phase One Environmental Site Assessment, 2140 Baseline Road, Ottawa, ON. January 23, 2017.

## 9 Closure

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Environment & Geoscience  
Infrastructure

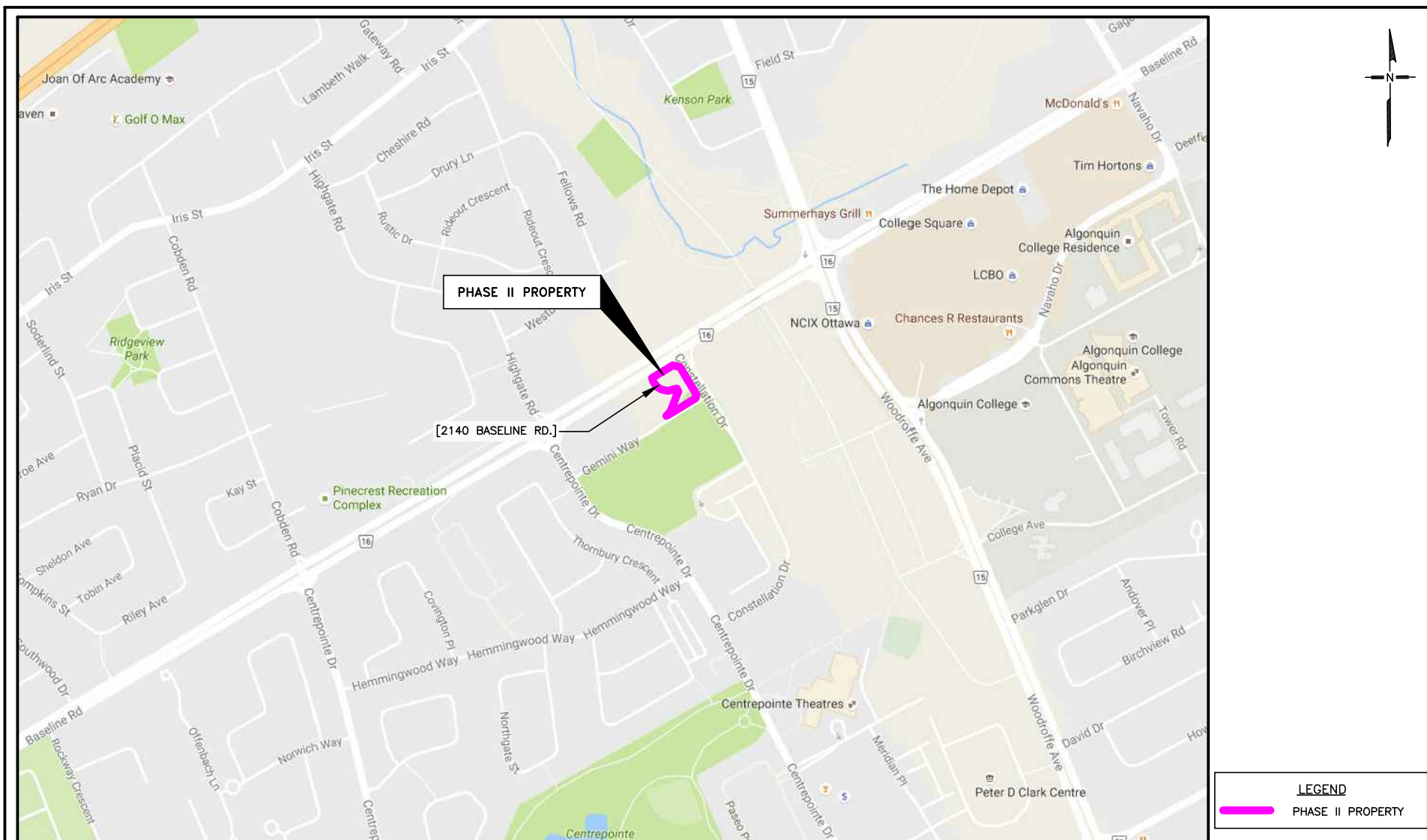


## Figures

Figure 1 Site Location

Figure 2 Current & Historical Site Layout

Figure 3 Soil Analytical Exceedances



**NOTE(S):**

1. SCALE AND SITE INFRASTRUCTURE LOCATIONS ARE APPROXIMATE
2. INFORMATION ON THIS FIGURE MAY BE LOST IF IT IS PHOTOCOPIED, FAXED OR PRINTED IN OTHER THAN ITS ORIGINAL SIZE AND COLOURS
3. 'm' : METRES

**SOURCE(S):**

1. GOOGLE MAP, ACCESSED AUGUST 2016



**SNC-LAVALIN**

Client/Location:

**CITY OF OTTAWA  
2140 BASELINE ROAD  
OTTAWA, ONTARIO**

Title:

**SITE LOCATION**

Project No:

642920

Filename:

642920-SLOC-1.DWG

Date:

DECEMBER 2016

Dwg No:

**FIGURE 1**

Drawn:

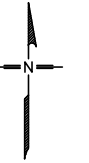
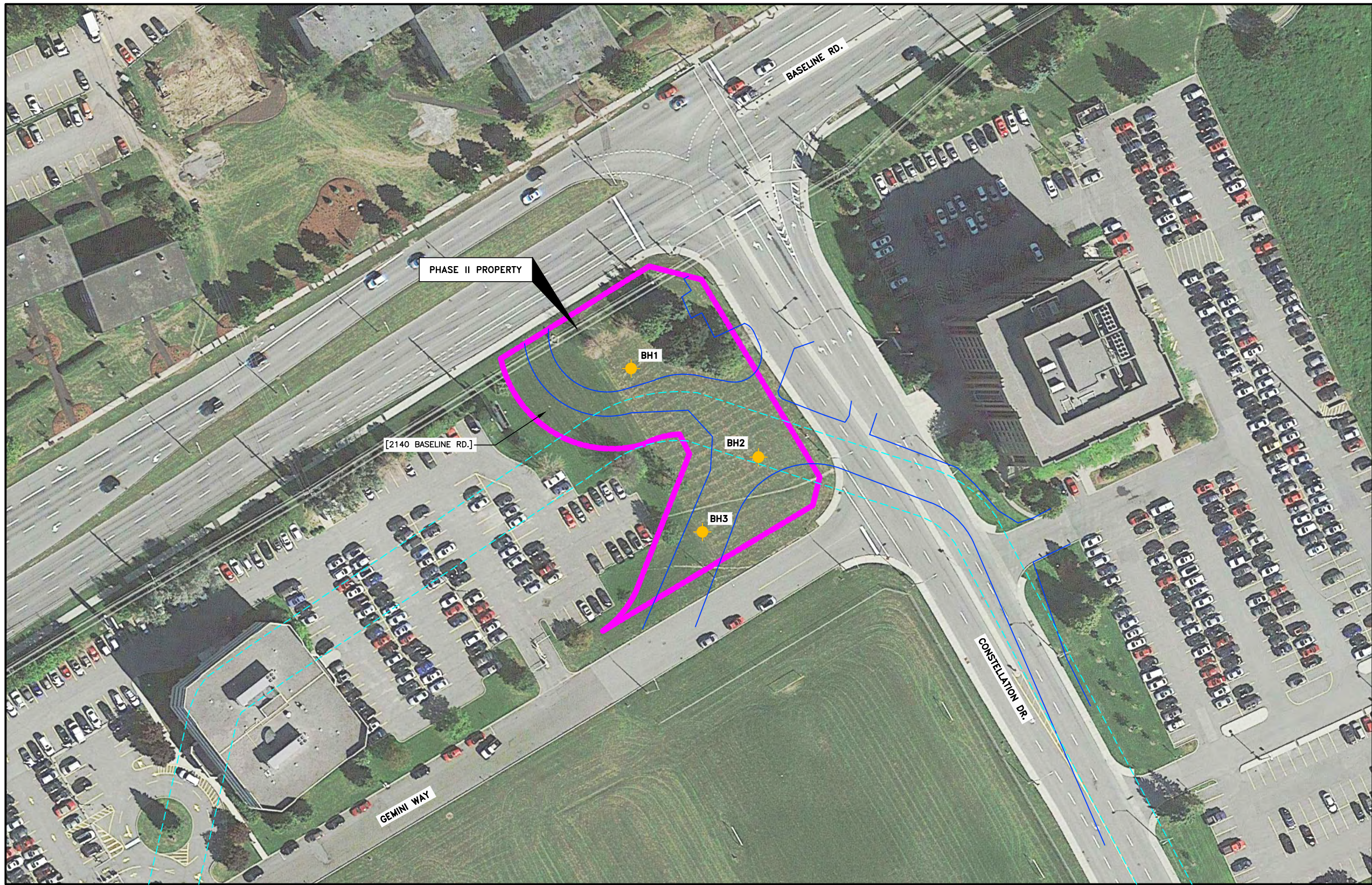
EM

Verified:

Project Manager:

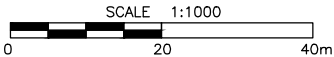
MS






**LEGEND**

- PHASE II PROPERTY
- 1985 ROAD ALIGNMENT
- 1991 ROAD ALIGNMENT
- BOREHOLE (SNC-LAVALIN, 2016)

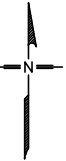
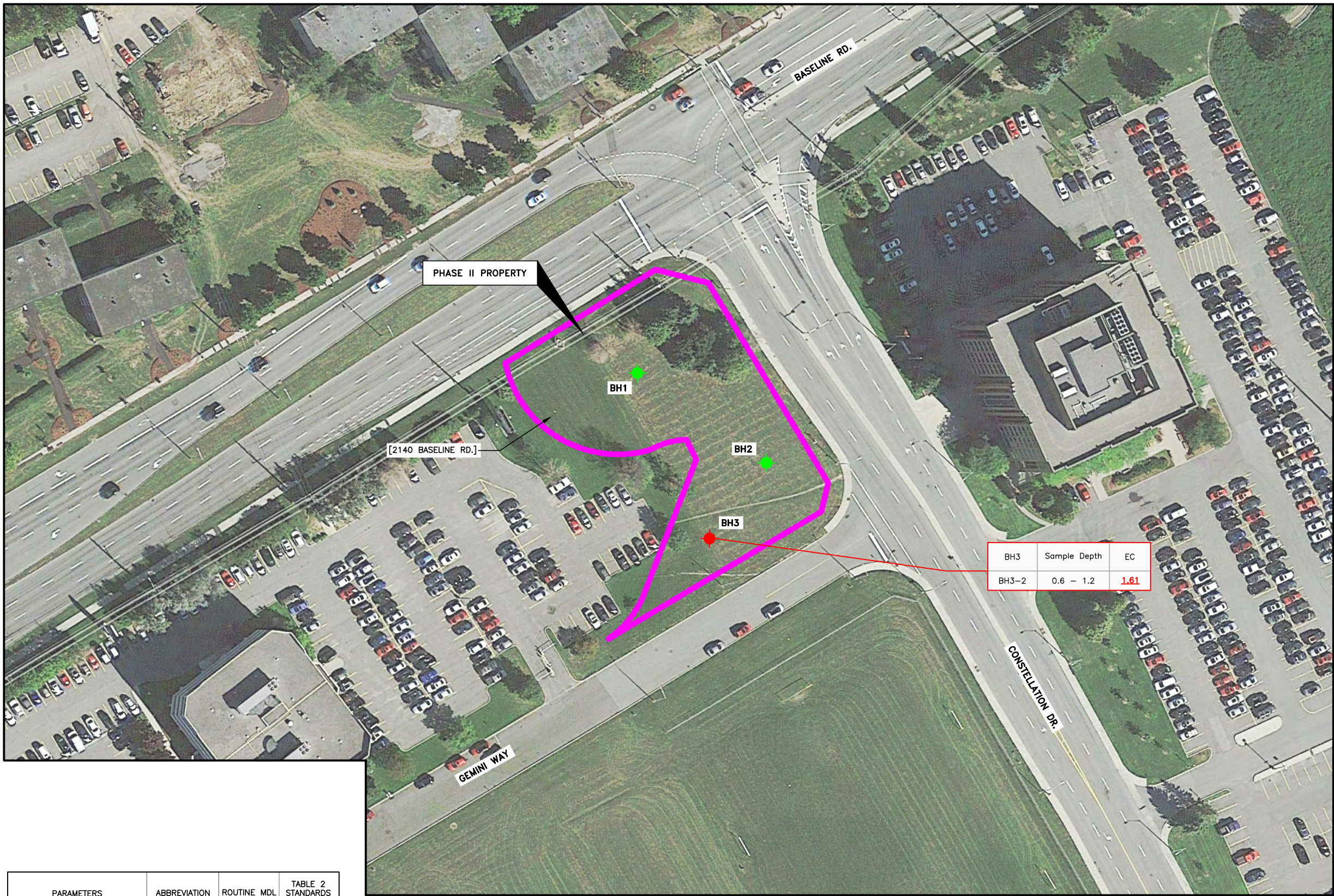


NOTE(S):  
1. SCALE AND SITE INFRASTRUCTURE LOCATIONS ARE APPROXIMATE  
2. INFORMATION ON THIS FIGURE MAY BE LOST IF IT IS PHOTOCOPIED, FAXED OR PRINTED IN OTHER THAN ITS ORIGINAL SIZE AND COLOURS  
3. 'm' : METRES

SOURCE(S):  
1. CITY OF OTTAWA GEOTOWA MAP, [HTTP://MAPS.OTTAWA.CA/GEOTOWATA/](http://maps.ottawa.ca/geotowata/)  
2. CITY OF OTTAWA, 2140 BASELINE ROAD - SURPLUS LANDS PLAN, REF#16599D.DGN, JULY 15, 2016  
3. GOOGLE EARTH AIR PHOTO MAY 9, 2016

	Client/Location:		CITY OF OTTAWA 2140 BASELINE ROAD OTTAWA, ONTARIO		Title:		CURRENT & HISTORICAL SITE LAYOUT	
	Project No:	642920	Filename:	642920-SL-1.DWG	Date:	DECEMBER 2016	Dwg No:	FIGURE 2
	Drawn:	EM	Verified:	EH	Project Manager:	MS		



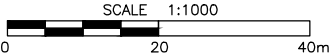


BH3	Sample Depth	EC
BH3-2	0.6 - 1.2	<u>1.61</u>

PARAMETERS	ABBREVIATION	ROUTINE MDL	TABLE 2 STANDARDS
ELECTRICAL CONDUCTIVITY	EC	0.005	1.4
<b>STANDARDS:</b> <ul style="list-style-type: none"><li>TABLE 2 (2011): FULL DEPTH GENERIC SITE CONDITION STANDARDS IN A POTABLE GROUNDWATER CONDITION FOR INDUSTRIAL/COMMERCIAL/COMMUNITY PROPERTY USE, MEDIUM AND FINE TEXTURED SOILS (MOECC, 2011)</li></ul>			
<b>GENERAL NOTES:</b> <ul style="list-style-type: none"><li>EC REPORTED IN UNITS OF MILLSIEMENS PER CENTIMETRE (mS/cm)</li><li>'MDL' : METHOD DETECTION LIMIT</li><li>'*' : FIELD DUPLICATE OF PREVIOUSLY LISTED SAMPLE</li><li>SAMPLE DEPTH IS MEASURED METRES BELOW GRADE UNLESS NOTED OTHERWISE</li></ul>			

<b>NOTE(S):</b> <ul style="list-style-type: none"><li>SCALE AND SITE INFRASTRUCTURE LOCATIONS ARE APPROXIMATE</li><li>INFORMATION ON THIS FIGURE MAY BE LOST IF IT IS PHOTOCOPIED, FAXED OR PRINTED IN OTHER THAN ITS ORIGINAL SIZE AND COLOURS</li><li>'m' : METRES</li></ul>	
<b>SOURCE(S):</b> <ul style="list-style-type: none"><li>CITY OF OTTAWA GEOTOWA MAP, <a href="http://maps.ottawa.ca/geotowaweb/">HTTP://MAPS.OTTAWA.CA/GEOTOWA/</a></li><li>CITY OF OTTAWA, 2140 BASELINE ROAD - SURPLUS LANDS PLAN, REF#16599D.DGN, JULY 15, 2016</li><li>GOOGLE EARTH AIR PHOTO MAY 9, 2016</li></ul>	

LEGEND	
	PHASE II PROPERTY
	BOREHOLE/MONITORING WELL (SNC-LAVALIN, 2016)
	LOCATION WHERE NO SOIL SAMPLES WERE TAKEN, SHOWN IN BLACK
	LOCATION WHERE ALL SOIL SAMPLES ANALYSED MET THE SELECTED STANDARD FOR ALL PARAMETERS ANALYSED SHOWN IN GREEN
	LOCATION WHERE AT LEAST ONE SOIL SAMPLE ANALYSED EXCEEDED THE SELECTED STANDARD FOR AT LEAST ONE PARAMETER, SHOWN IN RED
	RED COLOURED AND UNDERLINED CONCENTRATION EXCEEDED THE MOECC TABLE 2 STANDARD



		Client/Location: CITY OF OTTAWA 2140 BASELINE ROAD OTTAWA, ONTARIO		Title: SOIL ANALYTICAL EXCEEDANCES	
Project No:	642920	Filename:	642920-POPS-3.DWG	Date:	DECEMBER 2016
Drawn:	EM	Verified:	EH	Project Manager:	MS
				Dwg No: <b>FIGURE 3</b>	



## Tables

Table 1	Soil Analytical Results for pH and Grain Size
Table 2	Soil Analytical Results for Petroleum Parameters
Table 3	Soil Analytical Results for VOCs
Table 4	Soil Analytical Results for PAHs
Table 5	Soil Analytical Results for Metals, EC & SAR
Table 6	Waste Characterization Results

**TABLE 1: Soil Analytical Results for pH and Grain Size  
2140 Baseline Road, Ottawa, ON**

<b>Sample Location</b> <b>Laboratory Sample ID</b> <b>SNC-Lavalin Sample ID</b> <b>Sampling Date (yyyy/mm/dd)</b> <b>Depth Interval (mbgs)</b> <b>Field Screen (ppmv)</b>			<b>MOECC Criteria<sup>1</sup></b>	<b>BH1</b> 1650121-03 BH1-1 2016/12/05 0.0 - 0.6 <5	<b>BH2</b> 1650121-05 BH2-4 2016/12/05 1.8 - 2.4 <5
<b>Parameter</b>	<b>MDL</b>	<b>Units</b>			
<b><u>Inorganics</u></b>					
<b>pH<sup>2</sup></b>	0.05	pH	5.0-9.0	7.34	7.30
<b>Coarse grained (&gt;75 µm)</b>	0.1	%	na	47.5	7.40
<b>Fine grained (&lt;75 µm)</b>	0.1	%	na	52.5	92.6
<b>Corresponding Soil Texture</b>	0.1	%	na	Medium/Fine	Medium/Fine

All terms defined within the body of SNC-Lavalin's report.

Laboratory analysis by Paracel Laboratories Ltd., Ottawa, ON

MDL - Method Detection Limit, unless otherwise noted

< - Denotes concentration less than indicated detection limit

"-" - Not analyzed

na - Not applicable

Field Screen - organic vapour meter reading

mbgs - meter below ground surface

ppmv - parts per million by volume (relative to hexane)

µm - micrometers

% - percent

**BOLD** Value greater than selected criteria

<sup>1</sup> MOECC, Record of Site Condition - Part XV.1 of the Environmental Protection Act, O.Reg. 153/04

<sup>2</sup> acceptable pH range for applying generic standards (O. Reg. 153/04, as amended): 5 to 9 for surface soil (0-1.5 mbg); 5 to 11 for subsurface soil (>1.5 mbg)

**TABLE 2:** Soil Analytical Results for Petroleum Parameters  
2140 Baseline Road, Ottawa, ON

Sample Location Laboratory Sample ID SNC-Lavalin Sample ID Sampling Date (yyyy/mm/dd) Depth Interval (mbgs) Field Screen (ppmv)			Table 2 <sup>1</sup> Standard I/C/C FG	BH1 1650121-01 BH1-2 2016/12/05 0.6 - 1.2 <5	BH1 1650121-11 BH1-98 2016/12/05 0.6 - 1.2 <5 Duplicate of BH1-2	BH1 1650121-02 BH1-3 2016/12/05 1.2 - 1.8 <5	BH1 1650121-13 BH1-97 2016/12/05 1.2 - 1.8 <5 Duplicate of BH1-3	BH2 1650121-04 BH2-2 2016/12/05 0.6 - 1.2 <5	BH3 1650121-06 BH3-4 2016/12/05 1.8 - 2.4 <5	BH3 1650121-07 BH3-5 2016/12/05 2.4 - 3.0 <5
Parameter	MDL	Units								
<b>Petroleum Hydrocarbon (PHC) Fractions</b>										
PHC F1	7	µg/g	65	<	<	<	-	<	<	<
PHC F2	4	µg/g	250	<	-	<	<	<	<	<
PHC F3	8	µg/g	2,500	<	-	<	<	<	<	<
PHC F4	6	µg/g	6,600	<	-	<	<	<	<	<

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"- " - Not analyzed  
na - Not applicable  
Field Screen - organic vapour meter reading  
mbgs - meter below ground surface  
ppmv - parts per million by volume (relative to hexane)  
µg/g - micrograms per gram, dry weight basis

**BOLD** Concentration greater than Table 2 Standard

<sup>1</sup> Table 2 full depth generic site condition standards in a potable groundwater condition for industrial/commercial/community property use, medium and fine textured soils (MOE, 2011)

**TABLE 3:** Soil Analytical Results for VOCs  
2140 Baseline Road, Ottawa, ON

Sample Location Laboratory Sample ID SNC-Lavalin Sample ID Sampling Date (yyyy/mm/dd) Depth Interval (mbgs) Field Screen (ppmv)			Table 2 <sup>1</sup> Standard I/C/C FG	BH1 1650121-01 BH1-2 2016/12/05 0.6 - 1.2 <5	BH1 1650121-11 BH1-98 2016/12/05 0.6 - 1.2 <5 Duplicate of BH1-2	BH1 1650121-02 BH1-3 2016/12/05 1.2 - 1.8 <5	BH2 1650121-04 BH2-2 2016/12/05 0.6 - 1.2 <5
Parameter	MDL	Units					
<b>Volatile Organic Compounds</b>							
Acetone	0.50	µg/g	28	<	<	<	<
Benzene	0.02	µg/g	0.4	<	<	<	<
Bromodichloromethane	0.05	µg/g	1.9	<	<	<	<
Bromoform	0.05	µg/g	1.7	<	<	<	<
Bromomethane	0.05	µg/g	0.05	<	<	<	<
Carbon Tetrachloride	0.05	µg/g	0.71	<	<	<	<
Chlorobenzene	0.05	µg/g	2.7	<	<	<	<
Chloroform	0.05	µg/g	0.18	<	<	<	<
Dibromochloromethane	0.05	µg/g	2.9	<	<	<	<
Dichlorobenzene, 1,2- (o-DCB)	0.05	µg/g	1.7	<	<	<	<
Dichlorobenzene, 1,3- (m-DCB)	0.05	µg/g	12	<	<	<	<
Dichlorobenzene, 1,4- (p-DCB)	0.05	µg/g	0.57	<	<	<	<
Dichlorodifluoromethane	0.05	µg/g	25	<	<	<	<
Dichloroethane, 1,1-	0.05	µg/g	0.6	<	<	<	<
Dichloroethane, 1,2-	0.05	µg/g	0.05	<	<	<	<
Dichloroethylene, 1,1-	0.05	µg/g	0.48	<	<	<	<
Dichloroethylene, cis-1,2-	0.05	µg/g	2.5	<	<	<	<
Dichloroethylene, trans-1,2-	0.05	µg/g	2.5	<	<	<	<
Dichloropropane, 1,2-	0.05	µg/g	0.68	<	<	<	<
Dichloropropane, 1,3-	0.05	µg/g	0.081	<	<	<	<
Ethylbenzene	0.05	µg/g	1.6	<	<	<	<
Ethylene Dibromide	0.05	µg/g	0.05	<	<	<	<
Hexane (n)	0.05	µg/g	88	<	<	<	<
Methyl Ethyl Ketone	0.50	µg/g	88	<	<	<	<
Methyl Isobutyl Ketone	0.50	µg/g	210	<	<	<	<
Methyl t-butyl ether (MTBE)	0.05	µg/g	2.3	<	<	<	<
Methylene Chloride	0.05	µg/g	2	<	<	<	<
Styrene	0.05	µg/g	43	<	<	<	<
Tetrachloroethane, 1,1,1,2-	0.05	µg/g	0.11	<	<	<	<
Tetrachloroethane, 1,1,1,2-	0.05	µg/g	0.094	<	<	<	<
Tetrachloroethylene	0.05	µg/g	2.5	<	<	<	<
Toluene	0.05	µg/g	9	<	<	<	<
Trichloroethane, 1,1,1-	0.05	µg/g	12	<	<	<	<
Trichloroethane, 1,1,2-	0.05	µg/g	0.11	<	<	<	<
Trichloroethylene	0.05	µg/g	0.61	<	<	<	<
Trichlorofluoromethane	0.05	µg/g	5.8	<	<	<	<
Vinyl Chloride	0.02	µg/g	0.25	<	<	<	<
Xylenes, m+p-	0.05	µg/g	na	<	<	<	<
Xylenes, o-	0.05	µg/g	na	<	<	<	<
Xylenes	0.05	µg/g	30	<	<	<	<

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MDL - Method Detection Limit, unless otherwise noted  
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"- " - Not analyzed  
na - Not applicable  
Field Screen - organic vapour meter reading  
mbgs - meter below ground surface  
ppmv - parts per million by volume (relative to hexane)  
µg/g - micrograms per gram, dry weight basis

**BOLD** Concentration greater than Table 2 Standard

<sup>1</sup> Table 2 full depth generic site condition standards in a potable groundwater condition for industrial/commercial/community property use, medium and fine textured soils (MOE, 2011)



TABLE 3:

**Soil Analytical Results for VOCs**  
**2140 Baseline Road, Ottawa, ON**

Sample Location Laboratory Sample ID SNC-Lavalin Sample ID Sampling Date (yyyy/mm/dd) Depth Interval (mbgs) Field Screen (ppmv)			Table 2 <sup>1</sup> Standard I/C/C FG	BH3 1650121-06 BH3-4 2016/12/05 1.8 - 2.4 <5	BH3 1650121-07 BH3-5 2016/12/05 2.4 - 3.0 <5
Parameter	MDL	Units			
<b><u>Volatile Organic Compounds</u></b>					
Acetone	0.50	µg/g	28	<	<
Benzene	0.02	µg/g	0.4	<	<
Bromodichloromethane	0.05	µg/g	1.9	<	<
Bromoform	0.05	µg/g	1.7	<	<
Bromomethane	0.05	µg/g	0.05	<	<
Carbon Tetrachloride	0.05	µg/g	0.71	<	<
Chlorobenzene	0.05	µg/g	2.7	<	<
Chloroform	0.05	µg/g	0.18	<	<
Dibromochloromethane	0.05	µg/g	2.9	<	<
Dichlorobenzene, 1,2- (o-DCB)	0.05	µg/g	1.7	<	<
Dichlorobenzene, 1,3- (m-DCB)	0.05	µg/g	12	<	<
Dichlorobenzene, 1,4- (p-DCB)	0.05	µg/g	0.57	<	<
Dichlorodifluoromethane	0.05	µg/g	25	<	<
Dichloroethane, 1,1-	0.05	µg/g	0.6	<	<
Dichloroethane, 1,2-	0.05	µg/g	0.05	<	<
Dichloroethylene, 1,1-	0.05	µg/g	0.48	<	<
Dichloroethylene, cis-1,2-	0.05	µg/g	2.5	<	<
Dichloroethylene, trans-1,2-	0.05	µg/g	2.5	<	<
Dichloropropane, 1,2-	0.05	µg/g	0.68	<	<
Dichloropropane, 1,3-	0.05	µg/g	0.081	<	<
Ethylbenzene	0.05	µg/g	1.6	<	<
Ethylene Dibromide	0.05	µg/g	0.05	<	<
Hexane (n)	0.05	µg/g	88	<	<
Methyl Ethyl Ketone	0.50	µg/g	88	<	<
Methyl Isobutyl Ketone	0.50	µg/g	210	<	<
Methyl t-butyl ether (MTBE)	0.05	µg/g	2.3	<	<
Methylene Chloride	0.05	µg/g	2	<	<
Styrene	0.05	µg/g	43	<	<
Tetrachloroethane, 1,1,1,2-	0.05	µg/g	0.11	<	<
Tetrachloroethane, 1,1,1,2,2-	0.05	µg/g	0.094	<	<
Tetrachloroethylene	0.05	µg/g	2.5	<	<
Toluene	0.05	µg/g	9	<	<
Trichloroethane, 1,1,1-	0.05	µg/g	12	<	<
Trichloroethane, 1,1,2-	0.05	µg/g	0.11	<	<
Trichloroethylene	0.05	µg/g	0.61	<	<
Trichlorofluoromethane	0.05	µg/g	5.8	<	<
Vinyl Chloride	0.02	µg/g	0.25	<	<
Xylenes, m+p-	0.05	µg/g	na	<	<
Xylenes, o-	0.05	µg/g	na	<	<
Xylenes	0.05	µg/g	30	<	<

All terms defined within the body of SNC-Lavalin's report.

Laboratory analysis by Paracel Laboratories Ltd., Ottawa, ON

MDL - Method Detection Limit, unless otherwise noted

< - Denotes concentration less than indicated detection limit

"-" - Not analyzed

na - Not applicable

Field Screen - organic vapour meter reading

mbgs - meter below ground surface

ppmv - parts per million by volume (relative to hexane)

µg/g - micrograms per gram, dry weight basis

**BOLD**

Concentration greater than Table 2 Standard

<sup>1</sup> Table 2 full depth generic site condition standards in a potable groundwater condition for industrial/commercial/community property use, medium and fine textured soils (MOE, 2011)

**TABLE 4:** Soil Analytical Results for PAHs  
2140 Baseline Road, Ottawa, ON

Sample Location Laboratory Sample ID SNC-Lavalin Sample ID Sampling Date (yyyy/mm/dd) Depth Interval (mbgs) Field Screen (ppmv)			Table 2 <sup>1</sup> Standard I/C/C FG	BH1 1650121-01 BH1-2 2016/12/05 0.6 - 1.2 <5	BH1 1650121-02 BH1-3 2016/12/05 1.2 - 1.8 <5	BH2 1650121-04 BH2-2 2016/12/05 0.6 - 1.2 <5	BH2 1650121-12 BH2-99 2016/12/05 0.6 - 1.2 <5 Duplicate of BH2-2	BH3 1650121-08 BH3-1 2016/12/05 0.0 - 0.6 <5	BH3 1650121-06 BH3-4 2016/12/05 1.8 - 2.4 <5
Parameter	MDL	Units							
<b>PAHs</b>									
Acenaphthene	0.02	µg/g	29	<	<	<	<	<	<
Acenaphthylene	0.02	µg/g	0.17	<	<	<	<	<	<
Anthracene	0.02	µg/g	0.74	<	<	<	<	<	<
Benzo(a)anthracene	0.02	µg/g	0.96	<	<	<	<	<	<
Benzo(a)pyrene	0.02	µg/g	0.3	<	<	<	<	<	<
Benzo(b)fluoranthene	0.02	µg/g	0.96	<	<	<	<	<	<
Benzo(g,h,i)perylene	0.02	µg/g	9.6	<	<	<	<	<	<
Benzo(k)fluoranthene	0.02	µg/g	0.96	<	<	<	<	<	<
Chrysene	0.02	µg/g	9.6	<	<	<	<	<	<
Dibenzo(a,h)anthracene	0.02	µg/g	0.1	<	<	<	<	<	<
Fluoranthene	0.02	µg/g	9.6	<	<	<	<	<	<
Fluorene	0.02	µg/g	69	<	<	<	<	<	<
Indeno(1,2,3-cd)pyrene	0.02	µg/g	0.95	<	<	<	<	<	<
Methylnaphthalene, 1-	0.02	µg/g	42	<	<	<	<	<	<
Methylnaphthalene, 2-	0.02	µg/g	42	<	<	<	<	<	<
Methylnaphthalene, 1- & 2-	0.04	µg/g	42	<	<	<	<	<	<
Naphthalene	0.01	µg/g	28	<	<	<	<	<	<
Phenanthrene	0.02	µg/g	16	<	<	<	<	<	<
Pyrene	0.02	µg/g	96	<	<	<	<	<	<

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< - Denotes concentration less than indicated detection limit  
"- " - Not analyzed  
na - Not applicable  
Field Screen - organic vapour meter reading  
mbgs - meter below ground surface  
ppmv - parts per million by volume (relative to hexane)  
µg/g - micrograms per gram, dry weight basis

**BOLD** Concentration greater than Table 2 Standard

<sup>1</sup> Table 2 full depth generic site condition standards in a potable groundwater condition for industrial/commercial/community property use, medium and fine textured soils (MOE, 2011)

**TABLE 5:** Soil Analytical Results for Metals, EC & SAR  
2140 Baseline Road, Ottawa, ON

Sample Location Laboratory Sample ID SNC-Lavalin Sample ID Sampling Date (yyyy/mm/dd) Depth Interval (mbgs) Field Screen (ppmv)			Table 2 <sup>1</sup> Standard I/C/C FG	BH1 1650121-03 BH1-1 2016/12/05 0.0 - 0.6 <5	BH1 1650121-10 BH1-99 2016/12/05 0.0 - 0.6 <5 Duplicate of BH1-1	BH1 1650121-01 BH1-2 2016/12/05 0.6 - 1.2 <5	BH1 1650121-02 BH1-3 2016/12/05 1.2 - 1.8 <5	BH2 1650121-04 BH2-2 2016/12/05 0.6 - 1.2 <5	BH2 1650121-12 BH2-99 2016/12/05 0.6 - 1.2 <5 Duplicate of BH2-2	BH2 1650121-05 BH2-4 2016/12/05 BH2-4 <5	BH3 1650121-08 BH3-1 2016/12/05 0.0 - 0.6 <5	BH3 1650121-09 BH3-2 2016/12/05 0.6 - 1.2 <5
Parameter	MDL	Units										
<b>Inorganics</b>												
Electrical Conductivity	0.005	mS/cm	1.4	0.199	0.207	-	-	-	-	1.39	-	<b>1.61</b>
Sodium Adsorption Ratio (SAR)	0.01	None	12	0.52	0.7	-	-	-	-	5.17	-	<b>3.44</b>
<b>Total Metals</b>												
Antimony	1.0	µg/g	50	-	-	<	<	<	<	-	<	-
Arsenic	1.0	µg/g	18	-	-	<	<	<	<	-	<	-
Barium	1.0	µg/g	670	-	-	44.2	289	159	217	-	66.8	-
Beryllium	1.0	µg/g	10	-	-	<	<	<	<	-	<	-
Boron (Hot Water Soluble)	0.5	µg/g	2	-	-	<	<	<	<	-	<	-
Boron (Total)	1.0	µg/g	120	-	-	2.4	4.8	5.2	7.3	-	3.2	-
Cadmium	0.5	µg/g	1.9	-	-	<	<	<	<	-	<	-
Chromium (total)	1.0	µg/g	160	-	-	20.8	109	58.1	81.1	-	28.8	-
Chromium (VI)	0.2	µg/g	10	-	-	<	0.4	0.5	0.2	-	<	-
Cobalt	1.0	µg/g	100	-	-	4.4	18.6	11.7	15.8	-	5.7	-
Copper	1.0	µg/g	300	-	-	6.5	42.1	24.5	34.7	-	11.5	-
Lead	1.0	µg/g	120	-	-	4.3	9.5	22.6	12.1	-	40.8	-
Mercury	0.1	µg/g	20	-	-	<	<	<	<	-	<	-
Molybdenum	1.0	µg/g	40	-	-	<	<	<	<	-	<	-
Nickel	1.0	µg/g	340	-	-	9.4	48.1	27	37.1	-	12.7	-
Selenium	1.0	µg/g	5.5	-	-	<	<	<	<	-	<	-
Silver	0.5	µg/g	50	-	-	<	<	<	<	-	<	-
Thallium	1.0	µg/g	3.3	-	-	<	<	<	<	-	<	-
Uranium	1.0	µg/g	33	-	-	<	<	<	<	-	<	-
Vanadium	1.0	µg/g	86	-	-	27.2	83.4	51.3	68.5	-	31.9	-
Zinc	1.0	µg/g	340	-	-	27.8	83.5	61.7	70	-	48.1	-

All terms defined within the body of SNC-Lavalin's report.  
Laboratory analysis by Paracel Laboratories Ltd., Ottawa, ON  
MDL - Method Detection Limit, unless otherwise noted  
< - Denotes concentration less than indicated detection limit  
"- " - Not analyzed  
na - Not applicable  
Field Screen - organic vapour meter reading  
mbgs - meter below ground surface  
ppmv - parts per million by volume (relative to hexane)  
µg/g - micrograms per gram, dry weight basis  
mS/cm - milliSiemens per centimetre

**BOLD** Concentration greater than Table 2 Standard

<sup>1</sup> Table 2 full depth generic site condition standards in a potable groundwater condition for industrial/commercial/community property use, medium and fine textured soils (MOE, 2011)

**TABLE 5:** Soil Analytical Results for Metals, EC & SAR  
2140 Baseline Road, Ottawa, ON

Sample Location Laboratory Sample ID SNC-Lavalin Sample ID Sampling Date (yyyy/mm/dd) Depth Interval (mbgs) Field Screen (ppmv)			Table 2 <sup>1</sup> Standard I/C/C FG	BH3 1650121-06 BH3-4 2016/12/05 1.8 - 2.4 <5	BH3 1650121-07 BH3-5 2016/12/05 2.4 - 3.0 <5
Parameter	MDL	Units			
<b>Inorganics</b>					
Electrical Conductivity	0.005	mS/cm	1.4	-	0.669
Sodium Adsorption Ratio (SAR)	0.01	None	12	-	3.87
<b>Total Metals</b>					
Antimony	1.0	µg/g	50	<	-
Arsenic	1.0	µg/g	18	<	-
Barium	1.0	µg/g	670	23.5	-
Beryllium	1.0	µg/g	10	<	-
Boron (Hot Water Soluble)	0.5	µg/g	2	<	-
Boron (Total)	1.0	µg/g	120	4.7	-
Cadmium	0.5	µg/g	1.9	<	-
Chromium (total)	1.0	µg/g	160	10.8	-
Chromium (VI)	0.2	µg/g	10	<	-
Cobalt	1.0	µg/g	100	3.6	-
Copper	1.0	µg/g	300	7.6	-
Lead	1.0	µg/g	120	3.6	-
Mercury	0.1	µg/g	20	<	-
Molybdenum	1.0	µg/g	40	<	-
Nickel	1.0	µg/g	340	5.6	-
Selenium	1.0	µg/g	5.5	<	-
Silver	0.5	µg/g	50	<	-
Thallium	1.0	µg/g	3.3	<	-
Uranium	1.0	µg/g	33	<	-
Vanadium	1.0	µg/g	86	14.8	-
Zinc	1.0	µg/g	340	11.1	-

All terms defined within the body of SNC-Lavalin's report.  
Laboratory analysis by Paracel Laboratories Ltd., Ottawa, ON  
MDL - Method Detection Limit, unless otherwise noted  
< - Denotes concentration less than indicated detection limit  
"- " - Not analyzed  
na - Not applicable  
Field Screen - organic vapour meter reading  
mbgs - meter below ground surface  
ppmv - parts per million by volume (relative to hexane)  
µg/g - micrograms per gram, dry weight basis  
mS/cm - milliSiemens per centimetre

**BOLD** Concentration greater than Table 2 Standard

<sup>1</sup> Table 2 full depth generic site condition standards in a potable groundwater condition for industrial/commercial/community property use, medium and fine textured soils (MOE, 2011)

TABLE 6:

**Waste Characterization Results**  
**2140 Baseline Road, Ottawa, ON**

Sample Location Laboratory Sample ID SNC-Lavalin Sample ID Sampling Date (yyyy/mm/dd)			Leachate Quality Criteria <sup>1</sup>	WASTE 1650126-01 Waste 2016/12/05
Parameter	MDL	Units		
<b><u>TCLP Inorganics</u></b>				
Cadmium	0.01	mg/L	0.5	<
Chromium	0.05	mg/L	5	<
Lead	0.05	mg/L	5	<
<b><u>TCLP Volatiles</u></b>				
Benzene	0.005	mg/L	0.5	<
Carbon Tetrachloride	0.005	mg/L	0.5	<
Chlorobenzene	0.004	mg/L	8	<
Chloroform	0.006	mg/L	10	<
1,2-Dichlorobenzene	0.004	mg/L	20	<
1,4-Dichlorobenzene	0.004	mg/L	0.5	<
1,2-Dichloroethane	0.005	mg/L	0.5	<
1,1-Dichloroethylene	0.006	mg/L	1.4	<
Methylene Chloride	0.04	mg/L	5	<
Methyl Ethyl Ketone	0.30	mg/L	200	<
Tetrachloroethylene	0.005	mg/L	3	<
Trichloroethylene	0.004	mg/L	5	<
Vinyl Chloride	0.005	mg/L	0.2	<
<b><u>PCBs</u></b>				
Polychlorinated Biphenyl (Total PCB)	0.003	mg/L	0.3	<
<b><u>Bulk Soil Parameters</u></b>				
Flashpoint	-	Deg. C	≤60 <sup>2</sup>	>70
PHC F1	7	µg/g	na	<
PHC F2	4	µg/g	na	<
PHC F3	8	µg/g	na	<
PHC F4	6	µg/g	na	<

All terms defined within the body of SNC-Lavalin's report.  
Laboratory analysis by Paracel Laboratories Ltd., Ottawa, ON  
MDL - Method Detection Limit, unless otherwise noted  
< - Denotes concentration less than indicated detection limit  
"- " - Not analyzed  
na - Not applicable  
µg/g - micrograms per gram, dry weight basis  
mg/L - milligrams per litre

**BOLD**

Concentration greater than Leachate Quality Criteria

<sup>1</sup> Ontario Regulation 347 as amended. "Waste Management". Schedule 4 Leachate Quality Criteria.

<sup>2</sup> Transport Canada, Transportation of Dangerous Goods Regulations including Amendment SOR/2016-95, flammable liquids have a flashpoint less than or equal to 60°C using the closed-cup test method.

# Appendix I

## Borehole Logs

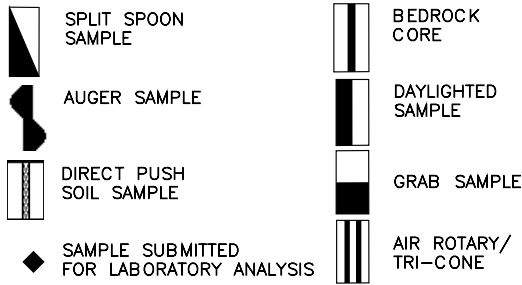




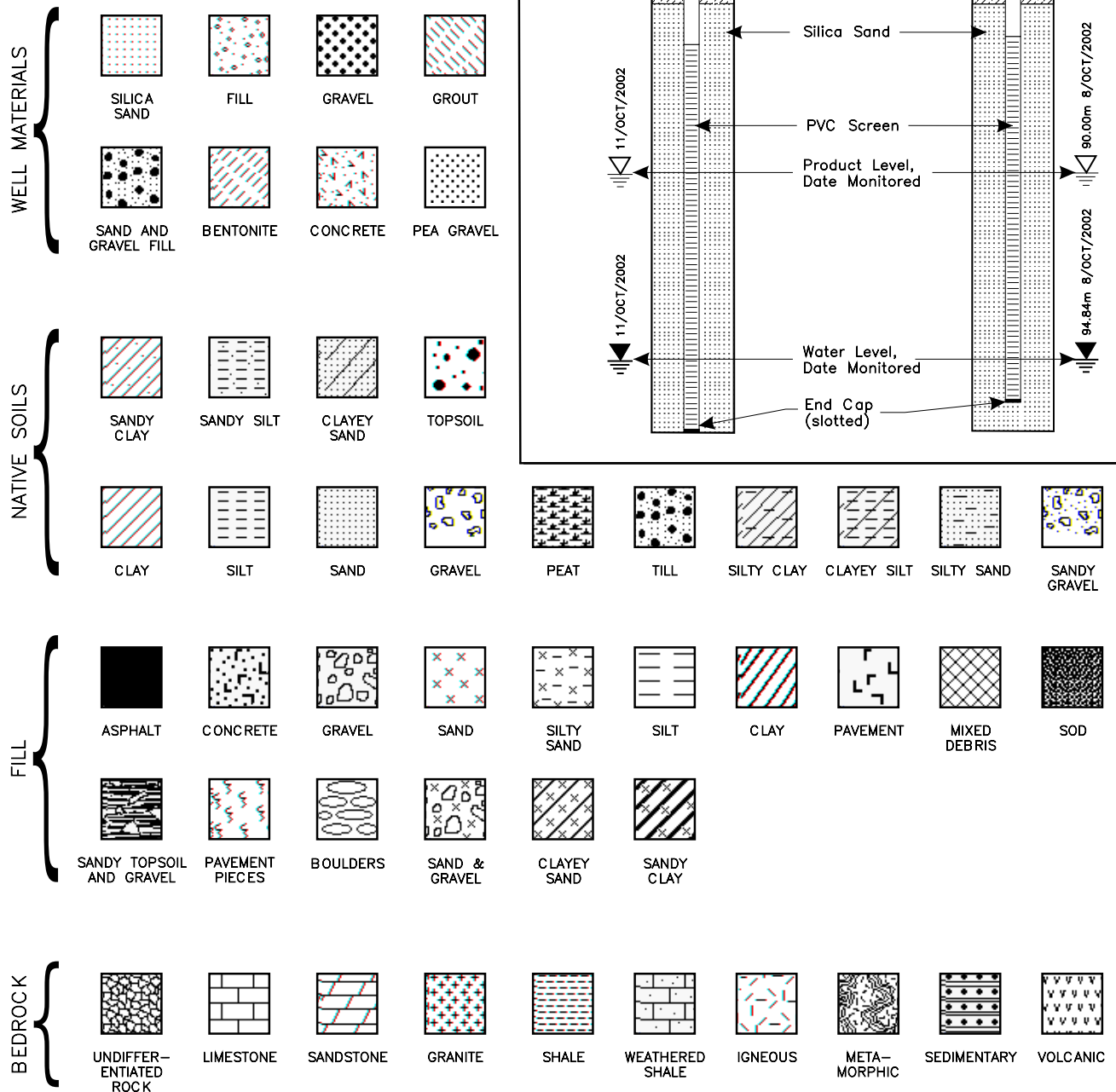
SNC • LAVALIN

## BOREHOLE LOG LEGEND

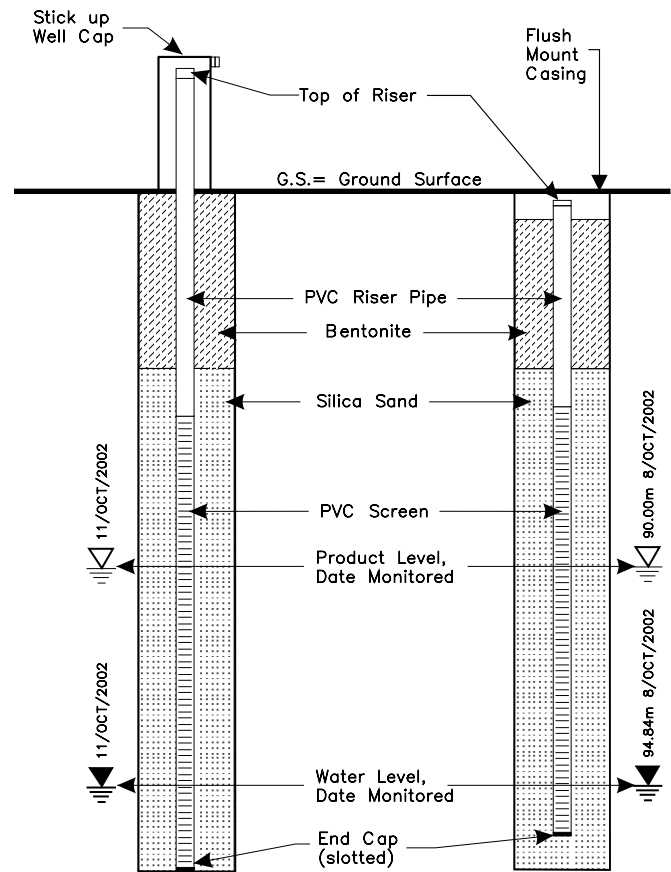
### SAMPLING



### GRAPHIC LOG



### WELL INSTALLATION





SNC • LAVALIN

## Borehole ID: BH1

Page 1 of 1

Project No.: 642920

SLI Supervisor: E. Kelly

Drilling Company: Downing

Client: City of Ottawa

Drilling Method: Direct push

Drilling Equipment: Geoprobe 7822DT

Location: 2140 Baseline Rd, Ottawa, ON

Borehole Diameter: 82.5 mm

OVM: RKI Eagle 2

Date Completed: Dec 5, 2016

Site Datum: n/a

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0							Ground Surface	0.00
1	-	BH1-1	◆	<5	54%		Topsoil/Grass	
2							Silty Sand Fill dark brown, firm	
3	-	BH1-2	◆	<5	54%		Sand Fill	-1.00
4							brown, medium, firm	
5	-	BH1-3	◆	<5	100%		Silty Clay	
6							dry to moist, light brown/grey mottled, firm	
7	-	BH1-4		<5	100%			-2.00
8								
9							End of borehole at 2.4 m bgs	
10								-3.00
11								
12								
13								-4.00
14								
15								
16								-5.00
17								
18								
19								
20								-6.00

(1) Blow count per 0.15 m using conventional hammer and split spoons  
 (2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

◆ Sample submitted for laboratory analysis.

BH1-1 submitted for EC, SAR, pH, grain size  
 BH1-99 (field dup of BH1-1) submitted for EC, SAR  
 BH1-2 submitted for VOCs/BTEX, PHC F1-F4, PAH, metals  
 BH1-98 (field dup of BH1-2) submitted for VOC/BTEX, PHC F1  
 BH1-3 submitted for VOCs/BTEX, PHC F1-F4, PAH, metals  
 BH1-97 (field dup of BH1-3) submitted for PHC F2-F4

SLE 3



Project No.: 642920

SLI Supervisor: E. Kelly

Drilling Company: Downing

Client: City of Ottawa

Drilling Method: Direct push

Drilling Equipment: Geoprobe 7822DT

Location: 2140 Baseline Rd, Ottawa, ON

Borehole Diameter: 82.5 mm

OVM: RKI Eagle 2

Date Completed: Dec 5, 2016

Site Datum: n/a

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0							Ground Surface	0.00
1	-	BH2-1		<5	67%		Topsoil/Grass	
2								
3	-	BH2-2		<5	67%		Sand and Gravel Fill brown/grey, with silt, firm	-1.00
4								
5	-	BH2-3		<5	67%		Silty Clay dry to moist, light brown/grey mottled, firm	
6								
7	-	BH2-4		<5	67%			-2.00
8								
9							End of borehole at 2.4 m bgs	
10								-3.00
11								
12								
13								-4.00
14								
15								
16								-5.00
17								
18								
19								
20								-6.00

(1) Blow count per 0.15 m using conventional hammer and split spoons  
 (2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

◆ Sample submitted for laboratory analysis.

BH2-2 submitted for VOCs/BTEX, PHC F1-F4, PAH, metals  
 BH2-99 (field dup of BH2-2) submitted for PAH, metals  
 BH2-4 submitted for EC, SAR, pH, grain size



Project No.: 642920

SLI Supervisor: E. Kelly

Drilling Company: Downing

Client: City of Ottawa

Drilling Method: Direct push

Drilling Equipment: Geoprobe 7822DT

Location: 2140 Baseline Rd, Ottawa, ON

Borehole Diameter: 82.5 mm

OVM: RKI Eagle 2

Date Completed: Dec 5, 2016

Site Datum: n/a

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0							Ground Surface	0.00
1	-	BH3-1	◆	<5	92%		Topsoil/Grass	
2			◆				Sand and Gravel Fill grey/brown, firm, with silt, some asphalt/gravel	
3	-	BH3-2	◆	<5	92%		Silty Clay Fill dry to moist, light brown/grey mottled, firm	-1.00
4								
5	-	BH3-3		<5	67%			
6			◆				Sand Fill brown, coarse	-2.00
7	-	BH3-4	◆	<5	67%		Concrete Fill broken/pieces	
8			◆				Sand Fill brown, coarse	-3.00
9	-	BH3-5	◆	<5	100%		Silty Sand moist/wet, grey, soft	
10								
11								
12							End of borehole at 3.0 m bgs	
13								-4.00
14								
15								
16								-5.00
17								
18								
19								
20								-6.00

(1) Blow count per 0.15 m using conventional hammer and split spoons  
 (2) Organic Vapour Meter (OVM) reading (ppmv unless noted)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

◆ Sample submitted for laboratory analysis.

BH3-1 submitted for PAH, metals  
 BH3-2 submitted for EC, SAR  
 BH3-4 submitted for VOCs/BTEX, PHC F1-F4, PAH, metals  
 BH3-5 submitted for EC, SAR, VOCs/BTEX, PHC F2-F4

## Appendix II

### Laboratory Certificates of Analysis (Soil)

## Certificate of Analysis

### SNC-Lavalin Inc. (Ottawa)

20 Colonnade Road Suite 110  
Ottawa, ON K2E 7M6  
Attn: Eric Kelly

Client PO: 642920  
Project: 616814-16.142/2140 Baseline Rd.  
Custody: 110487, 34127,

Report Date: 14-Dec-2016  
Order Date: 6-Dec-2016

**Order #: 1650121**

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

Paracel ID	Client ID
1650121-01	BH1-2
1650121-02	BH1-3
1650121-03	BH1-1
1650121-04	BH2-2
1650121-05	BH2-4
1650121-06	BH3-4
1650121-07	BH3-5
1650121-08	BH3-1
1650121-09	BH3-2
1650121-10	BH1-99
1650121-11	BH1-98
1650121-12	BH2-99
1650121-13	BH1-97

Approved By:



Mark Foto, M.Sc.  
Lab Supervisor

Certificate of Analysis  
**Client: SNC-Lavalin Inc. (Ottawa)**  
**Client PO: 642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

**Project Description: 616814-16.142/2140 Baseline Rd.**

## Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Boron, available	MOE (HWE), EPA 200.7 - ICP-OES	7-Dec-16	7-Dec-16
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	9-Dec-16	14-Dec-16
Conductivity	MOE E3138 - probe @25 °C, water ext	7-Dec-16	7-Dec-16
Mercury by CVAA	EPA 7471B - CVAA, digestion	7-Dec-16	7-Dec-16
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	7-Dec-16	7-Dec-16
PHC F1	CWS Tier 1 - P&T GC-FID	7-Dec-16	9-Dec-16
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	6-Dec-16	8-Dec-16
REG 153: Metals by ICP/OES, soil	based on MOE E3470, ICP-OES	7-Dec-16	7-Dec-16
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	6-Dec-16	9-Dec-16
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	7-Dec-16	10-Dec-16
SAR	Calculated	7-Dec-16	7-Dec-16
Solids, %	Gravimetric, calculation	7-Dec-16	7-Dec-16
Texture - Coarse Med/Fine	Based on ASTM D2487	13-Dec-16	13-Dec-16

Certificate of Analysis  
 Client: **SNC-Lavalin Inc. (Ottawa)**  
 Client PO: **642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

Project Description: **616814-16.142/2140 Baseline Rd.**

	<b>Client ID:</b>	BH1-2	BH1-3	BH1-1	BH2-2
	<b>Sample Date:</b>	05-Dec-16	05-Dec-16	05-Dec-16	05-Dec-16
	<b>Sample ID:</b>	1650121-01	1650121-02	1650121-03	1650121-04
	<b>MDL/Units</b>	Soil	Soil	Soil	Soil

#### Physical Characteristics

% Solids	0.1 % by Wt.	87.6	71.2	82.9	79.9
>75 um	0.1 %	-	-	47.5	-
<75 um	0.1 %	-	-	52.5	-
Texture	0.1 %	-	-	Med/Fine	-

#### General Inorganics

SAR	0.01 N/A	-	-	0.52	-
Conductivity	5 uS/cm	-	-	199	-
pH	0.05 pH Units	-	-	7.34	-

#### Metals

Antimony	1.0 ug/g dry	<1.0	<1.0	-	<1.0
Arsenic	1.0 ug/g dry	<1.0	<1.0	-	<1.0
Barium	1.0 ug/g dry	44.2	289	-	159
Beryllium	1.0 ug/g dry	<1.0	<1.0	-	<1.0
Boron	1.0 ug/g dry	2.4	4.8	-	5.2
Boron, available	0.5 ug/g dry	<0.5	<0.5	-	<0.5
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	<0.5
Chromium	1.0 ug/g dry	20.8	109	-	58.1
Chromium (VI)	0.2 ug/g dry	<0.2	0.4	-	0.5
Cobalt	1.0 ug/g dry	4.4	18.6	-	11.7
Copper	1.0 ug/g dry	6.5	42.1	-	24.5
Lead	1.0 ug/g dry	4.3	9.5	-	22.6
Mercury	0.1 ug/g dry	<0.1	<0.1	-	<0.1
Molybdenum	1.0 ug/g dry	<1.0	<1.0	-	<1.0
Nickel	1.0 ug/g dry	9.4	48.1	-	27.0
Selenium	1.0 ug/g dry	<1.0	<1.0	-	<1.0
Silver	0.5 ug/g dry	<0.5	<0.5	-	<0.5
Thallium	1.0 ug/g dry	<1.0	<1.0	-	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	-	<1.0
Vanadium	1.0 ug/g dry	27.2	83.4	-	51.3
Zinc	1.0 ug/g dry	27.8	83.5	-	61.7

#### 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



Certificate of Analysis  
**Client: SNC-Lavalin Inc. (Ottawa)**  
**Client PO: 642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

**Project Description: 616814-16.142/2140 Baseline Rd.**

	Client ID: Sample Date: Sample ID:	BH1-2 05-Dec-16 1650121-01 Soil	BH1-3 05-Dec-16 1650121-02 Soil	BH1-1 05-Dec-16 1650121-03 Soil	BH2-2 05-Dec-16 1650121-04 Soil
	MDL/Units				
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
Chloroform	0.05 ug/g dry	<0.05	<0.05	-	<0.05
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-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-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
Ethylene dibromide (dibromoethane)	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 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
Vinyl chloride	0.02 ug/g dry	<0.02	<0.02	-	<0.02
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	-	<0.05

Certificate of Analysis  
 Client: **SNC-Lavalin Inc. (Ottawa)**  
 Client PO: **642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

Project Description: **616814-16.142/2140 Baseline Rd.**

	Client ID: Sample Date: Sample ID:	BH1-2 05-Dec-16 1650121-01 Soil	BH1-3 05-Dec-16 1650121-02 Soil	BH1-1 05-Dec-16 1650121-03 Soil	BH2-2 05-Dec-16 1650121-04 Soil
	MDL/Units				
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	96.1%	98.4%	-	97.3%
Dibromofluoromethane	Surrogate	110%	111%	-	115%
Toluene-d8	Surrogate	110%	109%	-	110%

#### 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	<8	<8	-	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	-	<6

#### Semi-Volatiles

Acenaphthene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Anthracene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Chrysene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Fluorene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	-	<0.04
Naphthalene	0.01 ug/g dry	<0.01	<0.01	-	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Pyrene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
2-Fluorobiphenyl	Surrogate	66.4%	55.5%	-	72.1%
Terphenyl-d14	Surrogate	61.8%	61.2%	-	81.2%

Certificate of Analysis  
**Client: SNC-Lavalin Inc. (Ottawa)**  
**Client PO: 642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

**Project Description: 616814-16.142/2140 Baseline Rd.**

Client ID:	BH2-4	BH3-4	BH3-5	BH3-1
Sample Date:	05-Dec-16	05-Dec-16	05-Dec-16	05-Dec-16
Sample ID:	1650121-05	1650121-06	1650121-07	1650121-08
MDL/Units	Soil	Soil	Soil	Soil

#### Physical Characteristics

% Solids	0.1 % by Wt.	75.6	88.6	82.4	85.3
>75 um	0.1 %	7.4	-	-	-
<75 um	0.1 %	92.6	-	-	-
Texture	0.1 %	Med/Fine	-	-	-

#### General Inorganics

SAR	0.01 N/A	5.17	-	3.87	-
Conductivity	5 uS/cm	1390	-	669	-
pH	0.05 pH Units	7.30	-	-	-

#### Metals

Antimony	1.0 ug/g dry	-	<1.0	-	<1.0
Arsenic	1.0 ug/g dry	-	<1.0	-	<1.0
Barium	1.0 ug/g dry	-	23.5	-	66.8
Beryllium	1.0 ug/g dry	-	<1.0	-	<1.0
Boron	1.0 ug/g dry	-	4.7	-	3.2
Boron, available	0.5 ug/g dry	-	<0.5	-	<0.5
Cadmium	0.5 ug/g dry	-	<0.5	-	<0.5
Chromium	1.0 ug/g dry	-	10.8	-	28.8
Chromium (VI)	0.2 ug/g dry	-	<0.2	-	<0.2
Cobalt	1.0 ug/g dry	-	3.6	-	5.7
Copper	1.0 ug/g dry	-	7.6	-	11.5
Lead	1.0 ug/g dry	-	3.6	-	40.8
Mercury	0.1 ug/g dry	-	<0.1	-	<0.1
Molybdenum	1.0 ug/g dry	-	<1.0	-	<1.0
Nickel	1.0 ug/g dry	-	5.6	-	12.7
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	-	14.8	-	31.9
Zinc	1.0 ug/g dry	-	11.1	-	48.1

#### Volatiles

Acetone	0.50 ug/g dry	-	<0.50	<0.50	-
Benzene	0.02 ug/g dry	-	<0.02	<0.02	-
Bromodichloromethane	0.05 ug/g dry	-	<0.05	<0.05	-
Bromoform	0.05 ug/g dry	-	<0.05	<0.05	-

Certificate of Analysis  
**Client: SNC-Lavalin Inc. (Ottawa)**  
**Client PO: 642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

**Project Description: 616814-16.142/2140 Baseline Rd.**

	Client ID: Sample Date: Sample ID:	BH2-4 05-Dec-16 1650121-05 Soil	BH3-4 05-Dec-16 1650121-06 Soil	BH3-5 05-Dec-16 1650121-07 Soil	BH3-1 05-Dec-16 1650121-08 Soil
	MDL/Units				
Bromomethane	0.05 ug/g dry	-	<0.05	<0.05	-
Carbon Tetrachloride	0.05 ug/g dry	-	<0.05	<0.05	-
Chlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
Chloroform	0.05 ug/g dry	-	<0.05	<0.05	-
Dibromochloromethane	0.05 ug/g dry	-	<0.05	<0.05	-
Dichlorodifluoromethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,2-Dichlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
1,3-Dichlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
1,4-Dichlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
1,1-Dichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,2-Dichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,1-Dichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
1,2-Dichloropropane	0.05 ug/g dry	-	<0.05	<0.05	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	<0.05	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	<0.05	-
1,3-Dichloropropene, total	0.05 ug/g dry	-	<0.05	<0.05	-
Ethylbenzene	0.05 ug/g dry	-	<0.05	<0.05	-
Ethylene dibromide (dibromoethane)	0.05 ug/g dry	-	<0.05	<0.05	-
Hexane	0.05 ug/g dry	-	<0.05	<0.05	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	-	<0.50	<0.50	-
Methyl Isobutyl Ketone	0.50 ug/g dry	-	<0.50	<0.50	-
Methyl tert-butyl ether	0.05 ug/g dry	-	<0.05	<0.05	-
Methylene Chloride	0.05 ug/g dry	-	<0.05	<0.05	-
Styrene	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
Tetrachloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
Toluene	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,1-Trichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,2-Trichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
Trichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
Trichlorofluoromethane	0.05 ug/g dry	-	<0.05	<0.05	-
Vinyl chloride	0.02 ug/g dry	-	<0.02	<0.02	-

Certificate of Analysis  
 Client: **SNC-Lavalin Inc. (Ottawa)**  
 Client PO: **642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

Project Description: **616814-16.142/2140 Baseline Rd.**

	Client ID: Sample Date: Sample ID:	BH2-4 05-Dec-16 1650121-05 Soil	BH3-4 05-Dec-16 1650121-06 Soil	BH3-5 05-Dec-16 1650121-07 Soil	BH3-1 05-Dec-16 1650121-08 Soil
	MDL/Units				
m,p-Xylenes	0.05 ug/g dry	-	<0.05	<0.05	-
o-Xylene	0.05 ug/g dry	-	<0.05	<0.05	-
Xylenes, total	0.05 ug/g dry	-	<0.05	<0.05	-
4-Bromofluorobenzene	Surrogate	-	97.4%	98.7%	-
Dibromofluoromethane	Surrogate	-	110%	104%	-
Toluene-d8	Surrogate	-	109%	109%	-

#### Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g dry	-	<7	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	-	<4	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	-	<8	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	-	<6	<6	-

#### Semi-Volatiles

Acenaphthene	0.02 ug/g dry	-	<0.02	-	<0.02
Acenaphthylene	0.02 ug/g dry	-	<0.02	-	<0.02
Anthracene	0.02 ug/g dry	-	<0.02	-	<0.02
Benzo [a] anthracene	0.02 ug/g dry	-	<0.02	-	<0.02
Benzo [a] pyrene	0.02 ug/g dry	-	<0.02	-	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	-	<0.02	-	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	-	<0.02	-	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	-	<0.02	-	<0.02
Chrysene	0.02 ug/g dry	-	<0.02	-	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	-	<0.02	-	<0.02
Fluoranthene	0.02 ug/g dry	-	<0.02	-	<0.02
Fluorene	0.02 ug/g dry	-	<0.02	-	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	-	<0.02	-	<0.02
1-Methylnaphthalene	0.02 ug/g dry	-	<0.02	-	<0.02
2-Methylnaphthalene	0.02 ug/g dry	-	<0.02	-	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	-	<0.04	-	<0.04
Naphthalene	0.01 ug/g dry	-	<0.01	-	<0.01
Phenanthrene	0.02 ug/g dry	-	<0.02	-	<0.02
Pyrene	0.02 ug/g dry	-	<0.02	-	<0.02
2-Fluorobiphenyl	Surrogate	-	76.4%	-	56.8%
Terphenyl-d14	Surrogate	-	88.5%	-	62.5%

Certificate of Analysis  
 Client: **SNC-Lavalin Inc. (Ottawa)**  
 Client PO: **642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

Project Description: **616814-16.142/2140 Baseline Rd.**

	Client ID:	BH3-2	BH1-99	BH1-98	BH2-99
	Sample Date:	05-Dec-16	05-Dec-16	05-Dec-16	05-Dec-16
	Sample ID:	1650121-09	1650121-10	1650121-11	1650121-12
	MDL/Units	Soil	Soil	Soil	Soil
<b>Physical Characteristics</b>					
% Solids	0.1 % by Wt.	67.8	84.3	87.6	79.2
<b>General Inorganics</b>					
SAR	0.01 N/A	3.44	0.70	-	-
Conductivity	5 uS/cm	1610	207	-	-
<b>Metals</b>					
Antimony	1.0 ug/g dry	-	-	-	<1.0
Arsenic	1.0 ug/g dry	-	-	-	<1.0
Barium	1.0 ug/g dry	-	-	-	217
Beryllium	1.0 ug/g dry	-	-	-	<1.0
Boron	1.0 ug/g dry	-	-	-	7.3
Boron, available	0.5 ug/g dry	-	-	-	<0.5
Cadmium	0.5 ug/g dry	-	-	-	<0.5
Chromium	1.0 ug/g dry	-	-	-	81.1
Chromium (VI)	0.2 ug/g dry	-	-	-	0.2
Cobalt	1.0 ug/g dry	-	-	-	15.8
Copper	1.0 ug/g dry	-	-	-	34.7
Lead	1.0 ug/g dry	-	-	-	12.1
Mercury	0.1 ug/g dry	-	-	-	<0.1
Molybdenum	1.0 ug/g dry	-	-	-	<1.0
Nickel	1.0 ug/g dry	-	-	-	37.1
Selenium	1.0 ug/g dry	-	-	-	<1.0
Silver	0.5 ug/g dry	-	-	-	<0.5
Thallium	1.0 ug/g dry	-	-	-	<1.0
Uranium	1.0 ug/g dry	-	-	-	<1.0
Vanadium	1.0 ug/g dry	-	-	-	68.5
Zinc	1.0 ug/g dry	-	-	-	70.0
<b>Volatiles</b>					
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	-
Chloroform	0.05 ug/g dry	-	-	<0.05	-
Dibromochloromethane	0.05 ug/g dry	-	-	<0.05	-

Certificate of Analysis  
**Client: SNC-Lavalin Inc. (Ottawa)**  
**Client PO: 642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

**Project Description: 616814-16.142/2140 Baseline Rd.**

	Client ID: Sample Date: Sample ID:	BH3-2 05-Dec-16 1650121-09 Soil	BH1-99 05-Dec-16 1650121-10 Soil	BH1-98 05-Dec-16 1650121-11 Soil	BH2-99 05-Dec-16 1650121-12 Soil
	MDL/Units				
Dichlorodifluoromethane	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-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	-
Ethylene dibromide (dibromoethar	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 Isobutyl Ketone	0.50 ug/g dry	-	-	<0.50	-
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	-
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	-	-	97.2%	-
Dibromofluoromethane	Surrogate	-	-	110%	-



Certificate of Analysis  
**Client: SNC-Lavalin Inc. (Ottawa)**  
**Client PO: 642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

**Project Description: 616814-16.142/2140 Baseline Rd.**

	Client ID: Sample Date: Sample ID:	BH3-2 05-Dec-16 1650121-09 Soil	BH1-99 05-Dec-16 1650121-10 Soil	BH1-98 05-Dec-16 1650121-11 Soil	BH2-99 05-Dec-16 1650121-12 Soil
	MDL/Units				
Toluene-d8	Surrogate	-	-	111%	-

#### Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g dry	-	-	<7	-
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#### Semi-Volatiles

Acenaphthene	0.02 ug/g dry	-	-	-	<0.02
Acenaphthylene	0.02 ug/g dry	-	-	-	<0.02
Anthracene	0.02 ug/g dry	-	-	-	<0.02
Benzo [a] anthracene	0.02 ug/g dry	-	-	-	<0.02
Benzo [a] pyrene	0.02 ug/g dry	-	-	-	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	-	-	-	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	-	-	-	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	-	-	-	<0.02
Chrysene	0.02 ug/g dry	-	-	-	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	-	-	-	<0.02
Fluoranthene	0.02 ug/g dry	-	-	-	<0.02
Fluorene	0.02 ug/g dry	-	-	-	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	-	-	-	<0.02
1-Methylnaphthalene	0.02 ug/g dry	-	-	-	<0.02
2-Methylnaphthalene	0.02 ug/g dry	-	-	-	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	-	-	-	<0.04
Naphthalene	0.01 ug/g dry	-	-	-	<0.01
Phenanthrene	0.02 ug/g dry	-	-	-	<0.02
Pyrene	0.02 ug/g dry	-	-	-	<0.02
2-Fluorobiphenyl	Surrogate	-	-	-	66.0%
Terphenyl-d14	Surrogate	-	-	-	66.7%

	Client ID: Sample Date: Sample ID:	BH1-97 05-Dec-16 1650121-13 Soil	-	-	-
	MDL/Units		-	-	-

#### Physical Characteristics

% Solids	0.1 % by Wt.	73.8	-	-	-
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#### Hydrocarbons

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  
**Client: SNC-Lavalin Inc. (Ottawa)**  
**Client PO: 642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

**Project Description: 616814-16.142/2140 Baseline Rd.**

## Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>General Inorganics</b>									
Conductivity	ND	5	uS/cm						
<b>Hydrocarbons</b>									
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						
<b>Metals</b>									
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, available	ND	0.5	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						
<b>Semi-Volatiles</b>									
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						
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	0.880		ug/g		66.0	50-140			
Surrogate: Terphenyl-d14	1.01		ug/g		76.0	50-140			
<b>Volatiles</b>									
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						
Chlorobenzene	ND	0.05	ug/g						

Certificate of Analysis  
**Client: SNC-Lavalin Inc. (Ottawa)**  
**Client PO: 642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

**Project Description: 616814-16.142/2140 Baseline Rd.**

### Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	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-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						
Ethylene dibromide (dibromoethane)	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	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						
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	7.70		ug/g		96.2	50-140			
Surrogate: Dibromofluoromethane	9.68		ug/g		121	50-140			
Surrogate: Toluene-d8	8.64		ug/g		108	50-140			

Certificate of Analysis  
**Client: SNC-Lavalin Inc. (Ottawa)**  
**Client PO: 642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

**Project Description: 616814-16.142/2140 Baseline Rd.**

### Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>General Inorganics</b>									
pH	7.40	0.05	pH Units	7.38			0.3	10	
<b>Hydrocarbons</b>									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	16	8	ug/g dry	24			38.2	30	QR-01
F4 PHCs (C34-C50)	18	6	ug/g dry	44			82.6	30	QR-01
<b>Metals</b>									
Antimony	ND	1.0	ug/g dry	ND				30	
Arsenic	ND	1.0	ug/g dry	ND				30	
Barium	27.7	1.0	ug/g dry	29.8			7.3	30	
Beryllium	ND	1.0	ug/g dry	ND			0.0	30	
Boron, available	0.89	0.5	ug/g dry	0.87			2.7	35	
Boron	1.74	1.0	ug/g dry	2.10			19.0	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium (VI)	ND	0.2	ug/g dry	ND				35	
Chromium	26.6	1.0	ug/g dry	30.2			12.7	30	
Cobalt	8.98	1.0	ug/g dry	9.78			8.6	30	
Copper	4.74	1.0	ug/g dry	5.04			6.1	30	
Lead	5.77	1.0	ug/g dry	7.78			29.6	30	
Mercury	ND	0.1	ug/g dry	ND			0.0	30	
Molybdenum	ND	1.0	ug/g dry	ND			0.0	30	
Nickel	11.0	1.0	ug/g dry	11.9			8.5	30	
Selenium	ND	1.0	ug/g dry	ND			0.0	30	
Silver	ND	0.5	ug/g dry	ND			0.0	30	
Thallium	ND	1.0	ug/g dry	ND			0.0	30	
Uranium	ND	1.0	ug/g dry	ND				30	
Vanadium	85.0	1.0	ug/g dry	109			24.6	30	
Zinc	22.3	1.0	ug/g dry	25.4			13.3	30	
<b>Physical Characteristics</b>									
% Solids	56.8	0.1	% by Wt.	57.4			1.0	25	
<b>Semi-Volatiles</b>									
Acenaphthene	ND	0.02	ug/g dry	ND				40	
Acenaphthylene	0.024	0.02	ug/g dry	ND			0.0	40	
Anthracene	0.035	0.02	ug/g dry	ND			0.0	40	
Benzo [a] anthracene	0.070	0.02	ug/g dry	0.043			47.7	40	QR-01
Benzo [a] pyrene	0.087	0.02	ug/g dry	0.053			48.2	40	QR-01
Benzo [b] fluoranthene	0.109	0.02	ug/g dry	0.065			50.9	40	QR-01
Benzo [g,h,i] perylene	0.077	0.02	ug/g dry	0.044			54.1	40	QR-01
Benzo [k] fluoranthene	0.072	0.02	ug/g dry	0.047			42.4	40	QR-01
Chrysene	0.073	0.02	ug/g dry	0.047			43.8	40	QR-01
Dibenzo [a,h] anthracene	0.022	0.02	ug/g dry	ND			0.0	40	
Fluoranthene	0.153	0.02	ug/g dry	0.108			35.0	40	
Fluorene	ND	0.02	ug/g dry	ND				40	
Indeno [1,2,3-cd] pyrene	0.072	0.02	ug/g dry	0.044			49.1	40	QR-01
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	0.074	0.02	ug/g dry	0.056			27.3	40	
Pyrene	0.125	0.02	ug/g dry	0.091			32.0	40	
Surrogate: 2-Fluorobiphenyl	1.05		ug/g dry		63.5	50-140			
Surrogate: Terphenyl-d14	1.18		ug/g dry		71.6	50-140			
<b>Volatiles</b>									
Acetone	ND	0.50	ug/g dry	ND				50	
Benzene	ND	0.02	ug/g dry	ND				50	
Bromodichloromethane	ND	0.05	ug/g dry	ND				50	
Bromoform	ND	0.05	ug/g dry	ND				50	

Certificate of Analysis  
**Client: SNC-Lavalin Inc. (Ottawa)**  
**Client PO: 642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

**Project Description: 616814-16.142/2140 Baseline Rd.**

### Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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	
Chloroform	ND	0.05	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-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	ND	0.05	ug/g dry	ND				50	
Ethylene dibromide (dibromoethane)	ND	0.05	ug/g dry	ND				50	
Hexane	ND	0.05	ug/g dry	ND				50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	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	ND				50	
Tetrachloroethylene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				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	
Vinyl chloride	ND	0.02	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: 4-Bromofluorobenzene	8.16		ug/g dry		98.4	50-140			
Surrogate: Dibromofluoromethane	8.88		ug/g dry		107	50-140			
Surrogate: Toluene-d8	9.18		ug/g dry		111	50-140			

Certificate of Analysis  
**Client: SNC-Lavalin Inc. (Ottawa)**  
**Client PO: 642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

**Project Description: 616814-16.142/2140 Baseline Rd.**

### Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Hydrocarbons</b>									
F1 PHCs (C6-C10)	180	7	ug/g		90.1	80-120			
F2 PHCs (C10-C16)	126	4	ug/g	ND	111	60-140			
F3 PHCs (C16-C34)	277	8	ug/g	24	108	60-140			
F4 PHCs (C34-C50)	189	6	ug/g	44	93.1	60-140			
<b>Metals</b>									
Antimony	288		ug/L	ND	115	70-130			
Arsenic	305		ug/L	ND	122	70-130			
Barium	801		ug/L	596	82.3	70-130			
Beryllium	223		ug/L	ND	89.3	70-130			
Boron, available	5.05	0.5	ug/g	0.87	83.6	70-122			
Boron	293		ug/L	42.0	100	70-130			
Cadmium	253		ug/L	0.72	101	70-130			
Chromium (VI)	4.6	0.2	ug/g		91.5	70-130			
Chromium	862		ug/L	604	103	70-130			
Cobalt	432		ug/L	196	94.6	70-130			
Copper	325		ug/L	101	89.9	70-130			
Lead	366		ug/L	156	84.3	70-130			
Mercury	1.52	0.1	ug/g	ND	101	70-130			
Molybdenum	244		ug/L	3.10	96.3	70-130			
Nickel	438		ug/L	239	79.6	70-130			
Selenium	189		ug/L	ND	75.7	70-130			
Silver	213		ug/L	7.55	82.3	70-130			
Thallium	191		ug/L	15.7	70.2	70-130			
Uranium	316		ug/L	ND	126	70-130			
Vanadium	2350		ug/L	2180	70.6	70-130			
Zinc	703		ug/L	508	77.8	70-130			
<b>Semi-Volatiles</b>									
Acenaphthene	0.210	0.02	ug/g	ND	101	50-140			
Acenaphthylene	0.186	0.02	ug/g	ND	90.0	50-140			
Anthracene	0.205	0.02	ug/g	ND	99.2	50-140			
Benzo [a] anthracene	0.235	0.02	ug/g	0.043	92.6	50-140			
Benzo [a] pyrene	0.269	0.02	ug/g	0.053	105	50-140			
Benzo [b] fluoranthene	0.341	0.02	ug/g	0.065	133	50-140			
Benzo [g,h,i] perylene	0.285	0.02	ug/g	0.044	116	50-140			
Benzo [k] fluoranthene	0.370	0.02	ug/g	0.047	156	50-140			QM-06
Chrysene	0.252	0.02	ug/g	0.047	99.2	50-140			
Dibenzo [a,h] anthracene	0.275	0.02	ug/g	ND	133	50-140			
Fluoranthene	0.296	0.02	ug/g	0.108	91.1	50-140			
Fluorene	0.189	0.02	ug/g	ND	91.5	50-140			
Indeno [1,2,3-cd] pyrene	0.309	0.02	ug/g	0.044	128	50-140			
1-Methylnaphthalene	0.206	0.02	ug/g	ND	99.4	50-140			
2-Methylnaphthalene	0.216	0.02	ug/g	ND	104	50-140			
Naphthalene	0.187	0.01	ug/g	ND	90.6	50-140			
Phenanthrene	0.198	0.02	ug/g	0.056	68.6	50-140			
Pyrene	0.291	0.02	ug/g	0.091	96.8	50-140			
Surrogate: 2-Fluorobiphenyl	1.25		ug/g		75.6	50-140			
<b>Volatiles</b>									
Acetone	7.09	0.50	ug/g		70.9	50-140			
Benzene	3.51	0.02	ug/g		87.7	60-130			
Bromodichloromethane	3.33	0.05	ug/g		83.2	60-130			
Bromoform	3.39	0.05	ug/g		84.7	60-130			

Certificate of Analysis  
**Client: SNC-Lavalin Inc. (Ottawa)**  
**Client PO: 642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

**Project Description: 616814-16.142/2140 Baseline Rd.**

### Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromomethane	4.66	0.05	ug/g		116	50-140			
Carbon Tetrachloride	3.30	0.05	ug/g		82.4	60-130			
Chlorobenzene	3.43	0.05	ug/g		85.8	60-130			
Chloroform	3.38	0.05	ug/g		84.5	60-130			
Dibromochloromethane	3.49	0.05	ug/g		87.2	60-130			
Dichlorodifluoromethane	3.22	0.05	ug/g		80.5	50-140			
1,2-Dichlorobenzene	3.56	0.05	ug/g		89.1	60-130			
1,3-Dichlorobenzene	3.74	0.05	ug/g		93.5	60-130			
1,4-Dichlorobenzene	3.70	0.05	ug/g		92.5	60-130			
1,1-Dichloroethane	3.30	0.05	ug/g		82.4	60-130			
1,2-Dichloroethane	3.54	0.05	ug/g		88.5	60-130			
1,1-Dichloroethylene	3.82	0.05	ug/g		95.4	60-130			
cis-1,2-Dichloroethylene	3.09	0.05	ug/g		77.3	60-130			
trans-1,2-Dichloroethylene	3.36	0.05	ug/g		83.9	60-130			
1,2-Dichloropropane	3.08	0.05	ug/g		77.0	60-130			
cis-1,3-Dichloropropylene	4.69	0.05	ug/g		117	60-130			
trans-1,3-Dichloropropylene	4.85	0.05	ug/g		121	60-130			
Ethylbenzene	3.32	0.05	ug/g		83.0	60-130			
Ethylene dibromide (dibromoethane)	3.31	0.05	ug/g		82.8	60-130			
Hexane	3.40	0.05	ug/g		85.0	60-130			
Methyl Ethyl Ketone (2-Butanone)	5.89	0.50	ug/g		58.9	50-140			
Methyl Isobutyl Ketone	6.01	0.50	ug/g		60.1	50-140			
Methyl tert-butyl ether	8.48	0.05	ug/g		84.8	50-140			
Methylene Chloride	2.72	0.05	ug/g		67.9	60-130			
Styrene	3.15	0.05	ug/g		78.8	60-130			
1,1,1,2-Tetrachloroethane	3.60	0.05	ug/g		90.1	60-130			
1,1,2,2-Tetrachloroethane	2.88	0.05	ug/g		72.0	60-130			
Tetrachloroethylene	3.72	0.05	ug/g		93.0	60-130			
Toluene	3.52	0.05	ug/g		88.0	60-130			
1,1,1-Trichloroethane	3.38	0.05	ug/g		84.5	60-130			
1,1,2-Trichloroethane	2.79	0.05	ug/g		69.8	60-130			
Trichloroethylene	3.01	0.05	ug/g		75.3	60-130			
Trichlorofluoromethane	3.91	0.05	ug/g		97.7	50-140			
Vinyl chloride	4.44	0.02	ug/g		111	50-140			
m,p-Xylenes	6.96	0.05	ug/g		87.0	60-130			
o-Xylene	3.31	0.05	ug/g		82.7	60-130			



Certificate of Analysis  
Client: SNC-Lavalin Inc. (Ottawa)  
Client PO: 642920

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

Project Description: 616814-16.142/2140 Baseline Rd.

**Qualifier Notes:*****Login Qualifiers :***

Samples received submerged in water, possibly melted ice. This condition can compromise sample integrity.

*Applies to samples: BH1-2, BH1-3, BH1-1, BH2-2, BH2-4, BH3-4, BH3-5, BH3-1, BH3-2, BH1-99, BH1-98, BH2-99, BH1-97*

***Sample Qualifiers :******QC Qualifiers :***

QM-06 : Due to noted non-homogeneity of the QC sample matrix, the spike recoveries were out side the accepted range. Batch data accepted based on other QC.

QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.

**Sample Data Revisions**

None

**Work Order Revisions / Comments:**

%moisture taken from sample BH1-2.

**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.

Client Name: <b>SNE Lavalin Inc.</b>	Project Reference: <b>642920</b>	<b>Turnaround Time:</b> <input type="checkbox"/> 1 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input checked="" type="checkbox"/> Regular Date Required: _____
Contact Name: <b>Payables Eric Kelly</b>	Quote # <b>616814-16.142</b>	
Address: <b>Ottawa 20 Colomende Rd</b>	PO # <b>City Ottawa</b>	
Telephone: <b>413-226-2456</b>	Email Address: <b>emily.hopkins@snelavalin.com</b>	

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**

Parcel Order Number:					Matrix	Air Volume	# of Containers	Sample Taken		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	EC/SAR	pH Grain Size							
Sample ID/Location Name								Date	Time																
1	✓	BH1-2	REQ 045	S	✓	4	5 Dec 2016	1045	X	X	X	X	X	X	X										2x 250mL + 2x vials
2	✓	BH1-3	046	S	✓	4	5 Dec 2016	1040	X	X	X	X	X	X	X										↓
3	✓	BH1-1	047	S	✓	1	5 Dec 2016	1035								X	X								- 250mL
4		BH2-2	048	S	✓	4	5 Dec 2016	1055	X	X	X	X	X	X	X										2x 250mL + 2x vials
5		BH2-4	049	S	✓	1	5 Dec 2016	1100								X	X								250mL
6		BH3-4	050	S	✓	4	5 Dec 2016	1130	X	X	X	X	X	X	X										2x 250mL + 2x vials
7		BH3-5	051	S	✓	4	5 Dec 2016	1140	X	X						X									↓
8		BH3-1	052	S	✓	1	5 Dec 2016	1110			X	X	X	X	X										250mL
9		BH3-2	053	S	✓	1	5 Dec 2016	1120								X									↓
10	✓	BH1-99	054	S	✓	1	5 Dec 2016	1055								X									↓

Comments: **Rec'd submerged in water. Melted ice. SC** Method of Delivery: **Paracel**

Relinquished By (Sign):	Received by Driver/Depot: <b>A. J. J. J.</b>	Received at Lab: <b>SUNEPORN DOKMAI</b>	Verified By: <b>S</b>
Relinquished By (Print): <b>Eric Kelly</b>	Date/Time: <b>06/12/16 10:40</b>	Date/Time: <b>DEC 06 2016 01:53</b>	Date/Time: <b>6/12/16 14:53</b>
Date/Time: <b>5 Dec 2016 13:00</b>	Temperature: <b>4°C</b>	Temperature: <b>5.0°C</b>	pH Verified ( ) By: _____



Client Name: <u>SNC Lavalin Inc.</u>	Project Reference: <u>642920</u>	Turnaround Time: <input type="checkbox"/> 1 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input checked="" type="checkbox"/> Regular Date Required: _____
Contact Name: <u>Payables Eric Kelly</u>	Quote # <u>616814-16.142</u>	
Address: <u>payables 20 Glenridge Rd Ottawa</u>	PO # <u>City Ottawa</u>	
Telephone: <u>613 226 2456</u>	Email Address: <u>emily.hopkins@snc-lavalin.com</u>	

Criteria: ☐ O. Reg. 153/04 (As Amended) Table 2 ☒ 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)

Paracel Order Number: <u>1650121</u>			Required Analyses									
Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		VOCs/PAHs	PCP-4PAHs	Metals (As, Cu, Pb, Cr, Ni, B)	pH			
				Date	Time							
1 ✓ BH1-98 BEQ 055	S	✓	2	5 Dec 2016	10:45	X						2x Vials
2 BH2-99 056	S	✓	1	5 Dec 2016	10:55			X	X			250ml
3 BH1-97 057	S	✓	1	5 Dec 2016	10:40	X						
4												
5												
6												
7												
8												
9												
10												

→ use moisture % from BH1-2 as per Eric. Sc.

Comments:	Method of Delivery: <u>Paracel</u>
-----------	------------------------------------

Relinquished By (Sign): <u>[Signature]</u>	Received by Driver/Depot: <u>[Signature]</u>	Received at Lab: <u>ShreePORN DOKMAI</u>	Verified By: <u>[Signature]</u>
Relinquished By (Print): <u>Eric Kelly</u>	Date/Time: <u>06/12/16 10:40 AM</u>	Date/Time: <u>DEC 06 2016 01:35</u>	Date/Time: <u>6/12/16 14:53</u>
Date/Time: <u>5 Dec 2016 13:00</u>	Temperature: _____ °C	Temperature: <u>5.0 °C</u>	pH Verified [ ] By: _____

## Certificate of Analysis

**SNC-Lavalin Inc. (Ottawa)**

20 Colonnade Road Suite 110  
Ottawa, ON K2E 7M6  
Attn: Eric Kelly

Client PO: 642920  
Project: 616814-16.142/2140 Baseline Rd.  
Custody: 110488

Report Date: 14-Dec-2016  
Order Date: 6-Dec-2016

**Order #: 1650126**

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

**Paracel ID**  
1650126-01

**Client ID**  
Waste

Approved By:



Mark Foto, M.Sc.  
Lab Supervisor

Certificate of Analysis  
Client: **SNC-Lavalin Inc. (Ottawa)**  
Client PO: 642920

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

Project Description: 616814-16.142/2140 Baseline Rd.

## Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Flashpoint	Penski Martin Closed Cup	7-Dec-16	7-Dec-16
Metals, ICP-MS	EPA 6020 - Digestion - ICP-MS	8-Dec-16	8-Dec-16
PHC F1	CWS Tier 1 - P&T GC-FID	7-Dec-16	10-Dec-16
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	6-Dec-16	8-Dec-16
REG 558 - PCBs	EPA 608 - GC-ECD	9-Dec-16	9-Dec-16
REG 558 - VOCs	EPA 624 - P&T GC-MS	8-Dec-16	9-Dec-16
Solids, %	Gravimetric, calculation	7-Dec-16	7-Dec-16

Certificate of Analysis  
 Client: **SNC-Lavalin Inc. (Ottawa)**  
 Client PO: **642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

Project Description: **616814-16.142/2140 Baseline Rd.**

Client ID:	Waste	-	-	-
Sample Date:	05-Dec-16	-	-	-
Sample ID:	1650126-01	-	-	-
MDL/Units	Soil	-	-	-

#### Physical Characteristics

% Solids	0.1 % by Wt.	65.9	-	-	-
Flashpoint	°C	>70	-	-	-

#### EPA 1311 - TCLP Leachate Inorganics

Cadmium	0.01 mg/L	<0.01	-	-	-
Chromium	0.05 mg/L	<0.05	-	-	-
Lead	0.05 mg/L	<0.05	-	-	-

#### EPA 1311 - TCLP Leachate Organics

Benzene	0.005 mg/L	<0.005	-	-	-
Carbon Tetrachloride	0.005 mg/L	<0.005	-	-	-
Chlorobenzene	0.004 mg/L	<0.004	-	-	-
Chloroform	0.006 mg/L	<0.006	-	-	-
1,2-Dichlorobenzene	0.004 mg/L	<0.004	-	-	-
1,4-Dichlorobenzene	0.004 mg/L	<0.004	-	-	-
1,2-Dichloroethane	0.005 mg/L	<0.005	-	-	-
1,1-Dichloroethylene	0.006 mg/L	<0.006	-	-	-
Methyl Ethyl Ketone (2-Butanone)	0.30 mg/L	<0.30	-	-	-
Methylene Chloride	0.04 mg/L	<0.04	-	-	-
Tetrachloroethylene	0.005 mg/L	<0.005	-	-	-
Trichloroethylene	0.004 mg/L	<0.004	-	-	-
Vinyl chloride	0.005 mg/L	<0.005	-	-	-
4-Bromofluorobenzene	Surrogate	120%	-	-	-
Dibromofluoromethane	Surrogate	118%	-	-	-
Toluene-d8	Surrogate	103%	-	-	-
PCBs, total	0.003 mg/L	<0.003	-	-	-
Decachlorobiphenyl	Surrogate	76.9%	-	-	-

#### 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  
 Client: **SNC-Lavalin Inc. (Ottawa)**  
 Client PO: **642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

Project Description: **616814-16.142/2140 Baseline Rd.**

### Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>EPA 1311 - TCLP Leachate Inorganics</b>									
Cadmium	ND	0.01	mg/L						
Chromium	ND	0.05	mg/L						
Lead	ND	0.05	mg/L						
<b>EPA 1311 - TCLP Leachate Organics</b>									
Benzene	ND	0.005	mg/L						
Carbon Tetrachloride	ND	0.005	mg/L						
Chlorobenzene	ND	0.004	mg/L						
Chloroform	ND	0.006	mg/L						
1,2-Dichlorobenzene	ND	0.004	mg/L						
1,4-Dichlorobenzene	ND	0.004	mg/L						
1,2-Dichloroethane	ND	0.005	mg/L						
1,1-Dichloroethylene	ND	0.006	mg/L						
Methyl Ethyl Ketone (2-Butanone)	ND	0.30	mg/L						
Methylene Chloride	ND	0.04	mg/L						
Tetrachloroethylene	ND	0.005	mg/L						
Trichloroethylene	ND	0.004	mg/L						
Vinyl chloride	ND	0.005	mg/L						
Surrogate: 4-Bromofluorobenzene	0.769		mg/L		112	83-134			
Surrogate: Dibromofluoromethane	0.732		mg/L		106	78-124			
Surrogate: Toluene-d8	0.690		mg/L		100	76-118			
PCBs, total	ND	0.003	mg/L						
Surrogate: Decachlorobiphenyl	0.00735		mg/L		73.9	62-138			
<b>Hydrocarbons</b>									
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						

Certificate of Analysis  
 Client: **SNC-Lavalin Inc. (Ottawa)**  
 Client PO: **642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

Project Description: **616814-16.142/2140 Baseline Rd.**

### Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>EPA 1311 - TCLP Leachate Inorganics</b>									
Cadmium	0.360	0.01	mg/L	0.365			1.3	33	
Chromium	ND	0.05	mg/L	ND			0.0	32	
Lead	5.47	0.05	mg/L	4.76			13.8	32	
<b>EPA 1311 - TCLP Leachate Organics</b>									
Benzene	ND	0.005	mg/L	ND				25	
Carbon Tetrachloride	ND	0.005	mg/L	ND				25	
Chlorobenzene	ND	0.004	mg/L	ND				25	
Chloroform	ND	0.006	mg/L	ND				25	
1,2-Dichlorobenzene	ND	0.004	mg/L	ND				25	
1,4-Dichlorobenzene	ND	0.004	mg/L	ND				25	
1,2-Dichloroethane	ND	0.005	mg/L	ND				25	
1,1-Dichloroethylene	ND	0.006	mg/L	ND				25	
Methyl Ethyl Ketone (2-Butanone)	ND	0.30	mg/L	ND				25	
Methylene Chloride	ND	0.04	mg/L	ND				25	
Tetrachloroethylene	ND	0.005	mg/L	ND				25	
Trichloroethylene	ND	0.004	mg/L	ND				25	
Vinyl chloride	ND	0.005	mg/L	ND				25	
Surrogate: 4-Bromofluorobenzene	0.733		mg/L		106	83-134			
Surrogate: Dibromofluoromethane	0.751		mg/L		109	78-124			
Surrogate: Toluene-d8	0.719		mg/L		105	76-118			
PCBs, total	ND	0.003	mg/L	ND				30	
Surrogate: Decachlorobiphenyl	0.00799		mg/L		79.9	62-138			
<b>Hydrocarbons</b>									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	16	8	ug/g dry	24			38.2	30	QR-01
F4 PHCs (C34-C50)	18	6	ug/g dry	44			82.6	30	QR-01
<b>Physical Characteristics</b>									
% Solids	56.8	0.1	% by Wt.	57.4			1.0	25	

Certificate of Analysis  
 Client: **SNC-Lavalin Inc. (Ottawa)**  
 Client PO: **642920**

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

**Project Description: 616814-16.142/2140 Baseline Rd.**

### Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>EPA 1311 - TCLP Leachate Inorganics</b>									
Cadmium	81.4		ug/L	36.5	89.7	78-119			
Chromium	46.9		ug/L	1.50	90.9	80-124			
Lead	48.3		ug/L		96.7	77-126			
<b>EPA 1311 - TCLP Leachate Organics</b>									
Benzene	0.036	0.005	mg/L		90.8	55-141			
Carbon Tetrachloride	0.048	0.005	mg/L		120	49-149			
Chlorobenzene	0.043	0.004	mg/L		109	64-137			
Chloroform	0.045	0.006	mg/L		113	58-138			
1,2-Dichlorobenzene	0.047	0.004	mg/L		117	60-150			
1,4-Dichlorobenzene	0.045	0.004	mg/L		113	63-132			
1,2-Dichloroethane	0.044	0.005	mg/L		109	50-140			
1,1-Dichloroethylene	0.048	0.006	mg/L		119	43-153			
Methyl Ethyl Ketone (2-Butanone)	0.091	0.30	mg/L		90.7	26-153			
Methylene Chloride	0.049	0.04	mg/L		122	58-149			
Tetrachloroethylene	0.048	0.005	mg/L		119	51-145			
Trichloroethylene	0.041	0.004	mg/L		104	52-135			
Vinyl chloride	0.045	0.005	mg/L		112	31-159			
Surrogate: 4-Bromofluorobenzene	0.0891		mg/L		111	83-134			
PCBs, total	0.048	0.003	mg/L	ND	120	86-145			
<b>Hydrocarbons</b>									
F1 PHCs (C6-C10)	180	7	ug/g		90.1	80-120			
F2 PHCs (C10-C16)	126	4	ug/g	ND	111	60-140			
F3 PHCs (C16-C34)	277	8	ug/g	24	108	60-140			
F4 PHCs (C34-C50)	189	6	ug/g	44	93.1	60-140			

Certificate of Analysis  
Client: SNC-Lavalin Inc. (Ottawa)  
Client PO: 642920

Report Date: 14-Dec-2016

Order Date: 6-Dec-2016

Project Description: 616814-16.142/2140 Baseline Rd.

**Qualifier Notes:*****Login Qualifiers :***

Samples received submerged in water, possibly melted ice. This condition can compromise sample integrity.

*Applies to samples: Waste*

***QC Qualifiers :***

QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.

**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.





## Appendix III

### Quality Assurance and Quality Control

## **Quality Assurance and Quality Control Program**

A quality assurance and quality control (QA/QC) program was implemented to minimize and quantify data variability introduced during sample collection, handling, shipping and analysis. As part of the QA/QC program, sampling protocols included minimizing sample handling, submitting field QA/QC samples, using dedicated non contaminating sampling equipment, wearing new disposable vinyl gloves for each sample handled, using sample specific identification and labeling procedures and using chain of custody records.

### **Field Quality Assurance and Quality Control**

The field QA/QC program included the analysis of field duplicate samples. Duplicate samples were analysed for each analytical parameter at a frequency of approximately 10% or a minimum of one (1) duplicate for each analytical parameter for petroleum parameters, VOCs, PAHs, metals, EC and SAR. The field duplicates were blind duplicates in that duplicate pairs were not identified to the laboratory. Field duplicate soil and groundwater samples are identified in Tables 2 to 5.

### **Laboratory Quality Assurance and Quality Control**

Chemical analyses were performed by a laboratory accredited by the Standards Council of Canada (SCC). Laboratory analyses for Ontario Regulation 153/04 parameters were completed in accordance with Standard Methods (MOECC, CCME, US EPA or ASTM) and generally accepted industry practices. Laboratory QA/QC measures included analysis of laboratory blank, duplicate and spike samples. Laboratory acceptance criteria reported on laboratory certificates of analyses were used to assess the quality of laboratory QA/QC measures.

## **Results of the QA/QC Program**

### **Field Duplicate Results**

Field duplicates were evaluated by estimating the potential uncertainty, expressed as a relative percent difference (RPD), in the analytical determinations calculated from the blind field duplicate and sample pairs. RPD was determined as follows:

$$RPD = \text{ABS}((S_x - D_x) / \text{avg}(S_x, D_x)) * 100$$

Where: the RPD is a measure of the potential uncertainty (combined field and laboratory variance) in percent between the duplicate and sample;  $\text{ABS}((S_x - D_x))$  represents the absolute value of the difference in reported concentrations of sample x ( $S_x$ ) and the duplicate sample ( $D_x$ ) of sample x; and  $\text{avg}(S_x, D_x)$  is the average concentration of the parameter of interest in the sample and duplicate sample.

Since data quality objectives for field duplicate analyses are not provided by the MOECC, field precision data quality was assessed relative to regulatory guidance provided by the province of British Columbia (BC MWLAP, 2003). Following British Columbia guidance, RPD values were calculated only where detected concentrations in both duplicate pair samples were greater than five (5) times the laboratory detection limit. Calculated RPD values were then compared to an acceptability limit of 50%.

Analytical results for duplicate soil samples are presented alongside the analytical results for their respective duplicate pair in Table III-1.

The calculated RPD value (61%) for lead in field duplicate pair BH2-2 and BH2-99 exceeded the acceptability limit (50%). This may represent an uncertainty for the lead results for these samples. Concentrations of lead in both samples (22.6 and 12.1 µg/g) were well below the selected MOECC Table 2 standard (120 µg/g). Therefore, any potential uncertainty should not materially affect the conclusions based on the reported data.

All remaining calculated RPD values for field duplicate pairs were less than 50% and therefore considered acceptable.

#### Laboratory QA/QC

Results of laboratory QA/QC measures associated with soil analyses are presented in the laboratory certificates of analysis in Appendix II. Laboratory certificates of analysis were reviewed for any potential QA/QC issues identified by the laboratory. All QA/QC issues identified by the laboratory were determined to be negligible based on the review of alternate QA/QC results. Laboratory QC results identified as outside laboratory QC limits were for parameters that were less than RDLs in analysed site samples. Sample integrity was reviewed with the laboratory and it was determined that sample containers had not been compromised by water. Based on these analyses, no QA/QC issues with the potential to affect the conclusions presented in this report were identified.

#### Overall Data Quality

Based on the above discussions, the results of field and laboratory QA/QC measures associated with analysed soil samples were generally acceptable. Where deviations were identified, the effects were determined to be negligible and are not believed to have materially affected the conclusions based on these results.

#### References

British Columbia Ministry of Water, Land, and Air Protection (BC MWLAP), 2003. British Columbia Field Sampling Manual. January 2003.

TABLE III-1: Field Duplicate RPD Calculations  
Soil Samples  
2140 Baseline Road, Ottawa, ON

Sample Location Laboratory Sample ID SNC-Lavalin Sample ID Sampling Date (yyyy/mm/dd) Depth Interval (mbgs) Field Screen (ppmv)		RPD Alert <sup>1</sup> Limit	BH1 1650121-03 BH1-1 2016/12/05 0.0 - 0.6 <5	BH1 1650121-10 BH1-99 2016/12/05 0.0 - 0.6 <5 Duplicate of BH1-1	RPD	BH1 1650121-01 BH1-2 2016/12/05 0.6 - 1.2 <5	BH1 1650121-11 BH1-98 2016/12/05 0.6 - 1.2 <5 Duplicate of BH1-2	RPD	BH1 1650121-02 BH1-3 2016/12/05 1.2 - 1.8 <5	BH1 1650121-13 BH1-97 2016/12/05 1.2 - 1.8 <5 Duplicate of BH1-3	RPD	BH2 1650121-04 BH2-2 2016/12/05 0.6 - 1.2 <5	BH2 1650121-12 BH2-99 2016/12/05 0.6 - 1.2 <5 Duplicate of BH2-2	RPD
Parameter	Units													
<b>Inorganics</b>														
Electrical Conductivity	mS/cm	50%	0.199	0.207	4%	-	-	-	-	-	-	-	-	-
Sodium Adsorption Ratio (SAR)	None	50%	0.52	0.7	30%	-	-	-	-	-	-	-	-	-
<b>Total Metals</b>														
Antimony	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Arsenic	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Barium	µg/g	50%	-	-	-	44.2	-	-	289	-	-	159	217	31%
Beryllium	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Boron (Hot Water Soluble)	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Boron (Total)	µg/g	50%	-	-	-	2.4	-	-	4.8	-	-	5.2	7.3	34%
Cadmium	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Chromium (total)	µg/g	50%	-	-	-	20.8	-	-	109	-	-	58.1	81.1	33%
Chromium (VI)	µg/g	50%	-	-	-	<	-	-	0.4	-	-	0.5	0.2	*
Cobalt	µg/g	50%	-	-	-	4.4	-	-	18.6	-	-	11.7	15.8	30%
Copper	µg/g	50%	-	-	-	6.5	-	-	42.1	-	-	24.5	34.7	34%
Lead	µg/g	50%	-	-	-	4.3	-	-	9.5	-	-	22.6	12.1	<b>61%</b>
Mercury	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Molybdenum	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Nickel	µg/g	50%	-	-	-	9.4	-	-	48.1	-	-	27	37.1	32%
Selenium	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Silver	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Thallium	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Uranium	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Vanadium	µg/g	50%	-	-	-	27.2	-	-	83.4	-	-	51.3	68.5	29%
Zinc	µg/g	50%	-	-	-	27.8	-	-	83.5	-	-	61.7	70	13%
<b>Petroleum Hydrocarbon (PHC) Fractions</b>														
PHC F1	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
PHC F2	µg/g	50%	-	-	-	<	-	-	<	<	*	<	-	-
PHC F3	µg/g	50%	-	-	-	<	-	-	<	<	*	<	-	-
PHC F4	µg/g	50%	-	-	-	<	-	-	<	<	*	<	-	-
<b>Volatile Organic Compounds</b>														
Acetone	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Benzene	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Bromodichloromethane	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Bromoform	µg/g	50%	-	-	-	<	<	*	<	-	-	<	0.2	-
Bromomethane	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Carbon Tetrachloride	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Chlorobenzene	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Chloroform	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Dibromochloromethane	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Dichlorobenzene, 1,2- (o-DCB)	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Dichlorobenzene, 1,3- (m-DCB)	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Dichlorobenzene, 1,4- (p-DCB)	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Dichlorodifluoromethane	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Dichloroethane, 1,1-	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Dichloroethane, 1,2-	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Dichloroethylene, 1,1-	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Dichloroethylene, cis-1,2-	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Dichloroethylene, trans-1,2-	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Dichloropropane, 1,2-	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Dichloropropene, 1,3-	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Ethylbenzene	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Ethylene Dibromide	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Hexane (n)	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Methyl Ethyl Ketone	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Methyl Isobutyl Ketone	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Methyl t-butyl ether (MTBE)	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Methylene Chloride	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Styrene	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Tetrachloroethane, 1,1,1,2-	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Tetrachloroethane, 1,1,2,2-	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Tetrachloroethylene	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Toluene	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Trichloroethane, 1,1,1-	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Trichloroethane, 1,1,2-	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Trichloroethylene	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Trichlorofluoromethane	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Vinyl Chloride	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Xylenes, m+p-	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Xylenes, o-	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
Xylenes	µg/g	50%	-	-	-	<	<	*	<	-	-	<	-	-
<b>PAHs</b>														
Acenaphthene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Acenaphthylene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Anthracene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Benzo(a)anthracene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Benzo(a)pyrene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Benzo(b)fluoranthene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Benzo(g,h,i)perylene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Benzo(k)fluoranthene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Chrysene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Dibenzo(a,h)anthracene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Fluoranthene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Fluorene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Indeno(1,2,3-cd)pyrene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Methylnaphthalene, 1-	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Methylnaphthalene, 2-	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Methylnaphthalene, 1- & 2-	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Naphthalene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Phenanthrene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*
Pyrene	µg/g	50%	-	-	-	<	-	-	<	-	-	<	<	*

All terms defined within the body of SNC-Lavalin's report.  
Laboratory analysis by Paracel Laboratories Ltd., Ottawa, ON  
MDL - Method Detection Limit, unless otherwise noted  
< - Denotes concentration less than indicated detection limit  
"- " - Not analyzed  
na - Not applicable  
Field Screen - organic vapour meter reading  
mbgs - meter below ground surface  
ppmv - parts per million by volume (relative to hexane)  
µg/g - micrograms per gram, dry weight basis  
mS/cm - milliSiemens per centimetre  
RPD - Relative Percent Difference (not calculated  
when one or both results are less than or equal to 5X  
MDL)  
\*\*\* - RPD not calculable

**BOLD** Concentration exceeds RPD Alert Limits

<sup>1</sup> British Columbia Ministry of Water, Land, and Air Protection (BC MWLAP), 2003. British Columbia Field Sampling Manual, January 2003.



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