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Phase Two Environmental Site Assessment
1055 Klondike Road
Ottawa, Ontario

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Submitted to:

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Phase Two Environmental Site Assessment
1055 Klondike Road
Ottawa, Ontario

May 17, 2019
Project: 64153.85 - V02

experience • knowledge • integrity

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May 17, 2019

File: 64153.85 - V02

Brian Saumure, Maple Leaf Homes
C/O Brian Saumure, Maple Leaf Homes
240 Michael Cowpland Drive, Suite 200
Ottawa, Ontario
K2M 1P6

Attention: Mr. Brian Saumure

Re: Phase Two Environmental Site Assessment
1055 Klondike, Ottawa, Ontario

Enclosed is our Phase Two ESA report for the above noted project based on the scope of work presented in our proposal. This report was prepared by Nicole Soucy, B.A.Sc, M.A.Sc. with senior review performed by Katherine Rispoli, M.A.Sc., P.Eng.

Nicole Soucy, B.A.Sc., M.A.Sc.

Katherine Rispoli, M.A.Sc., P.Eng., ing.

Enclosures
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EXECUTIVE SUMMARY

The Phase One Environmental Site Assessment (ESA) report previously carried out for the subject property recommended that a Phase Two ESA investigation be carried out for the property located at 1055 Klondike Road in Ottawa, Ontario (hereafter referred to as "the subject property"). The Phase Two ESA investigated three (3) Areas of Potential Environmental Concern (APECs) identified in the Phase One ESA:

APEC 1: Former Aboveground Fuel Storage Tank

Evidence from one AST was observed during the site reconnaissance. The vent and fill pipes were observed along the eastern wall of the existing structure. The AST was identified in the basement with an approximate capacity of 900 litres and installed in 2003. The tank was likely used for heating oil storage. Due to the nature of the products stored, the contaminants of concern for soil and groundwater were PHC, and BTEX.

APEC 2: Potential Impacts from Offsite Dry cleaning facility

An offsite dry cleaning facility was identified during the site reconnaissance in the study area. Based on the proximity to the subject site, potential environmental concern to the subject site relating to the historic dry cleaning activities may be present along the northwest property boundary of the subject property. Due to the nature of the products stored, the contaminants of concern for soil and groundwater were VOCs.

APEC 3: Debris and fill of unknown origin during the fire

On June 10, 2018, a fire occurred on the subject site following the initial Phase I ESA site visit. The fire significantly damaged the structures on the subject site, and they were demolished following the fire. Based on a visual site inspection, the area within the historic building footprint was filled in. It is our understanding that the AST was removed prior to fire. Due to the fill material and debris within the building footprint and to confirm no fuel was leaked prior to or during the fire, the contaminants of concern for soil and groundwater were PHCs, BTEX, and for soil only were metals and PAHs.

The Phase Two ESA investigation was carried out from March 2018 to March 2019. The components of the Phase Two ESA investigation consisted of sampling three boreholes completed and sampling from three monitoring wells installed on the site. Soil and groundwater samples were collected and submitted to Paracel Laboratories Ltd. of Ottawa, Ontario for laboratory analyses of selected parameters.

The data collected during the sampling indicated that the overburden of the site is generally brown silt and sand overlaying brown silt and clay (weathered crust).

The groundwater levels measured in the monitoring wells BH18-1, BH18-3 and BH18-5 on May 14, 2018 were 2.9, 6.8, and 5.9 metres below ground surface respectively (or elevation 74.8, 71.2, and 71.9 metres geodetic respectively). The groundwater level measured in the monitoring well BH19-2 on April 4, 2019 was 6.3 metres below ground surface (or elevation 71.8 metres geodetic).

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

APEC 1: Aboveground Fuel Storage Tank

Groundwater results indicated PHC F3 contaminated groundwater at monitoring well locations BH18-5 and BH18-3 in May 2018. To confirm the exceedance and assess the groundwater conditions following the fire, additional groundwater sampling following monitoring well development was recommended and carried out in August 2018. The monitoring well BH18-3 was re-sampled for PHCs and BTEX in August 2018. The results were non-detect for all parameters analyzed. Due to low water levels, the monitoring well at BH18-5 could not be resampled. To address this, an additional monitoring well BH19-2 was advanced in March 2019 between the former aboveground fuel storage tank and BH18-5. The groundwater sample from BH19-1 was submitted for PHCs and BTEX, and no exceedances were identified. No PHCs and BTEX impacted soil was identified during the investigation.

APEC 2: Potential Impacts from Offsite Dry cleaning facility

Soil and groundwater results from BH18-5 did not identify any VOC contaminated soils or groundwater.

APEC 3: Debris and fill of unknown origin during the fire

Soil results indicated zinc contaminated soil at GS-N, a grab sample collected the within the footprint of the former structure. No PAH, BTEX, or PHC impacted soil or groundwater were identified.

Discussion

Based on the results of the current investigation, it is expected that contaminated soil as defined by current MECP regulations will be encountered during the proposed construction in the area of GS-N within the former building footprint. Based on the nature of the contaminants identified (Zinc) and debris identified in the former building footprint, it is recommended that soil and debris be disposed of at an approved facility subject to a toxicity characteristic leaching procedure (TCLP) analysis and confirmatory sampling be carried out by a Qualified Person, as defined by O.Reg. 153/04.

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1.0 INTRODUCTION

GEMTEC Consulting Engineers and Scientists Ltd. (GEMTEC) was retained by Novatech to carry out a Phase Two Environmental Site Assessment (ESA) for the property located at 1055 Klondike Road, in Ottawa, Ontario (hereafter referred to as "the subject property"). The general location of the subject property is illustrated on the Key Plan, Figure 1.

The purpose of the Phase Two ESA was to investigate the Areas of Potential Environmental Concern (APECs) identified in the updated Phase One ESA dated October 2018, and to assess the potential for environmental impacts at the subject property. This Phase Two ESA was completed in general accordance with Ontario Regulation 153/04.

1.1 Phase Two Property Description

The subject property is approximately 11 acres in size. The legal description for 1055 Klondike Road is Part of Lot 11, Concession 4, being Part 3 on Plan 5R-3477, City of Ottawa, PIN 04527-0091.

1.2 Phase Two Property Ownership

The subject property was owned by Village at the Schoolyard Inc. as of October 2017. The contact person for the subject property Brian Saumure at 613-913-9330.

1.3 Current and Future Land Uses

The historical land use is agricultural and residential (most recently vacant). Historical land use in the study area was predominantly agricultural with commercial developments concentrated to the south along March Road starting in 2009. It is understood that the proposed future use of the property is residential.

In accordance with Section 168.3.1 of the Environmental Protection Act (Ministry of Environment, December 31, 2011) a Record of Site Condition is not required to be filed for the subject property.

1.4 Applicable Site Condition Standard

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

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

- The site and surrounding properties are serviced with municipal water;
- The current and proposed property use is residential;

- The overburden thickness in the area of the APEC investigated is greater than 2 metres; and,
- The subject property is within 30 metres of a water body.

Based on the above, the MECP Table 9 Generic Site Condition Standards (SCS) for Use within 30 m of a Water Body in a Non-Potable Groundwater Condition was selected for the subject property.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The subject property was first developed for agricultural use sometime before 1934. Structures are visible on the south and northwest portion the subject property in the 1934 aerial photograph and the structures on the northeast portion are removed before 1976. Additional development has occurred to the east between 1976 and 1991. Residential subdivision development is visible in the study area between 2005 and 2008. Construction for the commercial development west of the subject property occurred between 2008 and 2011, where commercial structures are now visible.

The subject property is at an elevation of approximately 70 metres above sea level. Surrounding topography generally slopes gradually northwest. Groundwater flow often reflects topographic features and typically flows toward nearby lakes, rivers and wetland areas. Based on the topography of the area, it is expected that the local shallow groundwater flow is the northwest, towards Shirley's Brook.

2.2 Past Investigations

An updated Phase One ESA was completed by GEMTEC Consulting Engineers and Scientists Ltd. for the subject property in October 2018 and is provided in the report titled "Phase One Environmental Site Assessment, 1055 Klondike Road, Ottawa, Ontario". The Phase One ESA was carried out by or under the supervision of the qualified person in general accordance with Ontario Regulation 153/04 made under the Environmental Protection Act. The following APECs were determined through the Phase One ESA to exist for the subject property:

APEC 1: Former Aboveground Fuel Storage Tank

Evidence from one aboveground fuel storage tank (AST) was observed during the site reconnaissance. The vent and fill pipes were observed along the eastern wall of the existing structure. The AST was identified in the basement with an approximate capacity of 900 litres and installed in 2003. The tank was likely used for heating oil storage. Due to the nature of the products stored, the contaminants of concern for soil and groundwater are petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene and xylene (BTEX).

APEC 2: Potential Impacts from Offsite Dry cleaning facility

An offsite dry cleaning facility was identified during the site reconnaissance in the study area. Based on the proximity to the subject site, potential environmental concern to the subject site relating to the historic dry cleaning activities may be present along the northwest property boundary of the subject property. Due to the nature of the products stored, the contaminants of concern for soil and groundwater are volatile organic compounds (VOCs).

APEC 3: Debris and fill of unknown origin during the fire

On June 10, 2018, a fire occurred on the subject site following the initial Phase I ESA site visit. The fire significantly damaged the structures on the subject site, and they were demolished following the fire. Based on a visual site inspection, the area within the historic building footprint was filled in. It is our understanding that the AST was removed prior to fire. Due to the fill material and debris within the building footprint and to confirm no fuel was leaked prior to or during the fire, the contaminants of concern for soil and groundwater are PHCs, BTEX, and for soil are metals and Polycyclic Aromatic Hydrocarbons (PAHs).

Based on the results from the updated Phase One ESA, a Phase Two ESA was recommended for the subject property in order to investigate the APECs.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The objectives of the Phase Two ESA were based on the results of the Phase One ESA and are as follows:

- To document the presence or absence of contaminants in the soil or groundwater on, in or under the subject property, specifically within the areas of the APECs;
- To identify the locations of, and concentrations of contaminants in the soil or groundwater on, in or under the subject property, if applicable; and,
- To assess if the subject property meets the applicable Ministry of Environment, Conservation and Parks (MECP) Site Condition Standards (SCS).

It is noted that, the presence or absence of contaminants was investigated at discrete sampling locations using a limited number of samples.

The following tasks were completed during the Phase Two ESA:

- A sampling and analysis plan was prepared;
- Seven boreholes were drilled on the subject site between 2018 and 2019, five on March 8 and 9, 2018 (BH18-1, BH18-2, BH18-3, BH18-4, and BH18-5), and two on March 14, 2019 (BH19-1, BH19-2);
- Samples were collected from three of the 2018 (BH18-1, BH18-3, and BH18-5) boreholes at the time of drilling;
- Following the fire in 2018, two soil grab samples (GS-M, GS-N) were also collected in the vicinity of the former building footprint;
- A total of six soil samples including one duplicate were submitted to the analytical laboratory for analysis of contaminants of concern;
- Four of the boreholes were completed as monitoring wells (BH18-1, BH18-3, BH18-5, and BH19-2), and groundwater samples were collected from three of the four locations and submitted to the analytical laboratory for analysis of contaminants of concern;
- An additional groundwater sample was collected from one of the wells (MW18-3 SA3 from BH18-3) in August 2018, following the fire that occurred on the subject site;
- The analytical results were compared with the applicable MECP SCS; and,
- A Phase Two ESA report was prepared.

3.2 Media Investigated

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

The soil quality at discrete locations on the subject property was assessed by collecting soil samples from three borehole locations numbered BH18-1, BH18-3, and BH18-5. Soil samples were field preserved in methanol and submitted for laboratory analysis of the identified contaminants of concern. Two grab samples (GS-M, and GS-N) were also collected from the subject site following the fire that occurred in 2018. The locations of the sampling locations are provided on Figure 2.

The groundwater quality at the subject property was assessed by collecting groundwater samples from three of the four monitoring well locations. Groundwater samples were collected in laboratory supplied bottles using dedicated sampling equipment.

3.2.1 Potentially Contaminating Activities

The following potentially contaminating activities were identified to create an APEC on the subject property:

- Former Aboveground Fuel Storage Tank;
- Potential Impacts from Offsite Dry cleaning facility; and,
- Debris and fill of unknown origin during the fire.

3.2.2 Areas of Potential Environmental Concern

The APECs on the subject property are summarized in Table 3.1.

Table 3.1: Areas of Potential Environmental Concern

APEC	Location of APEC on Phase One Property	PCA	Location of PCA	Contaminants of Potential Concern	Media Potentially Impacted
APEC 1	Near aboveground fuel storage tank	Fuel storage	On site	• PHCs[1] • BTEX[2]	Soil Groundwater
APEC 2	Near west property boundary	Dry Cleaning	Off site	• VOCs[3]	Soil Groundwater
APEC 3	Near the location of the demolished structures on the subject site	Debris and fill of unknown origin during the fire	On site	• PHC • BTEX • PAH[4] • Metals	Soil Groundwater

1 PHCs – Petroleum hydrocarbons
2 BTEX – Benzene, toluene, ethylbenzene and xylene
3 VOCs – Volatile organic compounds
4 PAHs – Polycyclic Aromatic Hydrocarbons

3.3 Deviations from Sampling and Analysis Plan

Site visits occurred more often than anticipated in order to collect the groundwater samples due to low groundwater yields in the monitoring wells. Furthermore, the 2019 program was driven by geotechnical analysis (GEMTEC, 2019), however the monitoring well installation at MW19-2 was completed based on the calculated groundwater flow direction and identified PHC F3 exceedance in 2018.

4.0 INVESTIGATION METHODS

4.1 General

Boreholes were drilled and soil samples collected March 8 and 9, 2018, and March 14, 2019 following that groundwater samples were collected May 17, 2018, August 3, 2018, and April 8, 2019. Soil and groundwater samples were collected independently and submitted to a CALA-accredited laboratory, Paracel Laboratories Ltd., for chemical analyses of selected parameters.

4.2 Borehole Drilling

Boreholes were advanced at the subject property using a CME truck mounted power auger drill rig, supplied and operated by George Downing Estate Drilling Ltd. of Grenville-sur-la-Rouge, Quebec.

4.3 Soil Sampling

Soil samples were collected following the Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario (MOE, 1996). Soil samples were collected from the subsurface and placed directly into sample jars and resealable zipper bags using nitrile gloves. Approximately 5-gram soil samples were also obtained using new disposable syringes and placed into methanol preserved vials.

4.4 Groundwater Field Measurements

A Heron Instruments oil/water interface meter was used to measure some or all of the groundwater levels on March 15, 2018, May 14, 2018, July 27, 2018, October 4, 2018, March 22, 2019, and April 4, 2019. Free petroleum product was not detected in any of the on-site monitoring wells.

4.5 Groundwater Sampling

Groundwater samples were collected following the Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario (MOE, 1996). All groundwater samples were collected in laboratory supplied bottles, using a peristaltic pump with dedicated tubing. Prior to sampling, the monitoring wells were developed by purging the wells. All groundwater samples were stored in a cooler and were submitted to Paracel Laboratories for analyses of selected parameters.

4.6 Analytical Testing

Laboratory analysis of soil samples and groundwater samples was carried out by Paracel Laboratories located at 2319 St Laurent Blvd, Ottawa, Ontario.

4.7 Elevation Surveying

The ground surface elevations at the location of the boreholes were determined using a Trimble R10 global positioning system. The coordinates of the boreholes are referenced to NAD83 (CSRS) Epoch 2010, vertical network CGVD2013 and are considered to be accurate within the tolerance of the instrument. The ground surface elevations are provided on the Sample Location Plan, Figure 2.

4.8 Quality Assurance and Quality Control Measures

Soil Samples

Soil samples were collected in clear glass jars and vials containing methanol preservative supplied by the laboratory. In the field, a pen or permanent marker was used to record the date of sampling and sample number; the jars were pre-labelled with the client name (GEMTEC), and project number. A chain of custody was completed to include the information for each sample collected.

A new pair of nitrile gloves was worn for collecting each of the soil samples to minimize cross contamination between samples and to protect staff from exposure to contaminants. The samples were collected directly into laboratory supplied jars. The samples for the vials containing the methanol preservative were collected using new plastic syringes supplied by the laboratory.

The soil samples collected in the laboratory supplied containers were immediately preserved in the field by placing the samples in a laboratory supplied cooler. Soil samples were submitted seven (7) days after their collection, well within the maximum allowable holding time.

Groundwater

The groundwater samples were collected in laboratory supplied bottles and vials specific to the requested analysis. In the field, a pen or permanent marker was used to record the date of sampling and sample number; the jars were pre-labelled with the client name (GEMTEC), and project number.

A new pair of nitrile gloves was worn during the collection of each of the groundwater samples to minimize cross contamination between samples and to protect staff from exposure to contaminants. Groundwater was sampled from the wells using dedicated sampling equipment for each well. No cleaning procedures were required as the gloves and dedicated sampling equipment were disposed of following each sample collection.

The groundwater samples collected in the laboratory supplied containers were immediately cooled in the field by placing the samples in a laboratory supplied cooler. Groundwater samples were submitted to the laboratory the same day for analysis, well within the maximum allowable holding time.

5.0 REVIEW AND EVALUATION OF INFORMATION

5.1 Geology

The subsurface conditions described below indicate the conditions at the specific test locations only. Boundaries between zones are often not distinct, but rather are transitional and have been interpreted. The precision with which subsurface conditions are indicated depends on the frequency and recovery of samples, the method of sampling and the uniformity of the subsurface conditions. Subsurface conditions at other than the test locations may vary from the conditions encountered in boreholes.

The soil descriptions in this letter are based on commonly accepted methods of classification and identification employed in practice. Classification and identification of soil involves judgment and GEMTEC does not guarantee descriptions as exact, but infers accuracy to the extent that is common in current geotechnical practice. For a more detailed description of the soils please see the Geotechnical report completed by GEMTEC (GEMTEC, 2018b and GEMTEC, 2019).

The subsurface stratigraphy as identified during the borehole drilling is presented on the Record of Borehole sheets (Appendix C) and summarized below.

5.1.1 Topsoil

A layer of topsoil was encountered from ground surface at borehole location 18-1. The topsoil is composed of dark brown to brown silty sand/ sandy silt with organic material. The thickness of the topsoil layer was approximately 310 millimetres.

5.1.2 Granular Driveway Material

A layer of grey crushed sand and gravel was encountered from ground surface at borehole 18-3 which was advanced through the existing driveway at this site. The granular material has a thickness of about 150 millimetres.

5.1.3 Fill Material

Fill material was encountered below the granular driveway material at borehole 18-3 and from ground surface at borehole 18-5. The fill material can be described as dark brown to brown silty sand with organic material and grey brown silty clay with pockets of dark brown organic material. The fill material extends to depths of about 0.9 and 3.3 metres below ground surface (elevations 74.6 and 77.9 metres, geodetic datum) at the location of boreholes 18-3 and 18-5, respectively.

5.1.4 Silt and Sand

Deposits of silty sand were encountered below the topsoil and fill material at all borehole locations. The silty sand can be described as grey brown to brown silty sand with trace roots at borehole 18-3 and with trace wood at borehole location 18-5.

The thickness of the sand ranges from 1.4 to 2.0 metres and extends to depths of about 0.3 to 0.9 metres below ground surface.

A native deposit of brown silty sand with trace wood was encountered in borehole 18-5 at a depth of about 3.3 metres below ground surface. The silty sand has a thickness of about 1.5 metres and extends to a depth of about 4.7 metres below surface.

5.1.5 Sand

Native deposits of sand were encountered below the silty sand at borehole location 18-3, at a depth ranging from about 2.5 to 3.1 metres below ground surface. The sand can be described as brown, fine to medium grained with trace to some silt and was layered with grey brown silty sand at borehole 18-2. The thickness of the sand ranges from 0.6 to 1.1 metres and extends to depths of about 2.1 to 3.1 metres below ground surface.

5.1.6 Weathered Crust (Silt and Clay)

Native deposits of weathered, grey brown silt and clay with trace amounts of sand (weathered crust) were encountered underlying the sand and silty sand at all borehole locations. The weathered crust was encountered at depths ranging from about 2.3 to 3.3 metres below ground surface. Borehole 18-1 was terminated within the weathered crust at a depth of about 5.9 metres below ground surface (elevation 71.8 metres, geodetic datum).

5.1.7 Silty Clay

The grey brown silty clay weathered crust transitions to grey silty clay at depths of about 6.1 to 7.6 metres below ground surface in borehole 18-3. Borehole 18-3 was terminated within the grey silty clay at a depth of about 8.2 metres below ground surface.

5.2 Groundwater Elevations

Monitoring wells were installed in four of the boreholes in order to measure stabilized groundwater conditions.

The groundwater levels measured in the monitoring wells are presented on the Record of Borehole sheets (Appendix C) and summarized in Table 5.2 below.

Table 5.1: Groundwater Elevations

Location	Measurement Date	Groundwater Depth Below Ground Surface (metres)	Geodetic Elevation (metres)
BH 18-1	15-Mar-18	2.0	75.7
	14-May-18	2.9	74.8
	22-Mar-19	2.2	75.5
BH 18-3	15-Mar-18	6.3	72.5

Location	Measurement Date	Groundwater Depth Below Ground Surface (metres)	Geodetic Elevation (metres)
	14-May-18	6.8	72.0
	27-Jul-18	7.6	71.2
BH 18-5	15-Mar-18	5.5	72.3
	14-May-18	5.9	71.9
	27-Jul-18	6.7	73.5
	04-Oct-18	Dry	Dry
	22-Mar-19	Dry	Dry
BH19-1	22-Mar-19	6.7	71.8
	04-Apr-19	5.1	73.4

It should be noted that the groundwater levels may be higher during wet periods of the year such as the early spring or following periods of precipitation.

5.3 Site Condition Standards

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

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

- The site and surrounding properties are serviced with municipal water;
- Part of the property is within 30 m of a body of water;
- The current property use is residential; and,
- The overburden thickness in the area of the APEC investigated is greater than 2 metres.

Based on the above, the MECP Table 9 Generic Site Condition Standards for use within 30 m of a Water Body in a Non-Potable Groundwater Condition for Residential Property Use (coarse grained soils) was selected for the subject property. Soil results will also be compared to MECP Table 3 Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, and MECP Table 1 Full Depth Background Site Condition Standards. Groundwater Samples were also compared to the City of Ottawa Sewer and Storm Sewer Guidelines.

5.4 Soil Quality

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

Table 5.2: Soil Descriptions and Analytical Testing Summary

Borehole / Monitoring Well	Sample	Sample Description	Depth Interval (m bgs[1])	Metals	VOCs[2]	PAHs[3]	PHCs F1 to F4[4]	BTEX[5]
BH18-1	SA3	Brown silt and sand	1.52 – 2.29				✓	✓
BH18-3	SA9	Grey brown silt and clay	6.10 – 6.71				✓	✓
BH18-301[6]	SA9	Grey brown silt and clay	6.10 – 6.71				✓	✓
BH18-5	SA8	Grey brown silt and clay	5.33 – 5.94		✓		✓	
Grab Sample	GS-N	Brown silty sand with brick, glass and wood debris	0.30	✓		✓	✓	✓
Grab Sample	GS-M	Brown silty sand, plastic debris	0.30	✓		✓	✓	✓

1. m bgs – metres below ground surface
2. VOCs – Volatile Organic Compounds
3. PAHs – Polycyclic Aromatic Hydrocarbon
4. PHCs F1 to F4 – Petroleum Hydrocarbon Fractions in the F1 to F4 ranges
5. BTEX – Benzene, Toluene, Ethylbenzene, Xylene
6. BH18-102 is a duplicate of borehole BH18-2

The following provides a summary of the analytical results of the soil samples:

- The soil sample results exceed the applicable MECP Table 1, 3 and 9 SCS for:
  - Zinc at GS-N.

The analytical soil results from the laboratory certificates of analysis were compared with the applicable standards, the results are summarized in Table A1.

5.5 Groundwater Quality

The laboratory certificates of analysis for the groundwater samples are presented in Appendix B. The location, date and parameters analysed are summarized in Table 5.5.

Table 5.3: Analytical Groundwater summary

Monitoring Well	Date	VOCs[1]	BTEX[2]	PHCs F1 to F4[3]
BH 18-1		Monitoring well not in the vicinity of APECs		
BH18-3	14-May-18		✓	✓
	03-Aug-18		✓	✓
BH18-5	14-May-18	✓		✓
BH19-2	08-Apr-19		✓	✓

1. VOCs – Volatile Organic Compounds
2. BTEX – Benzene, Toluene, Ethylbenzene, Xylene
3. PHCs F1 to F4 – Petroleum Hydrocarbon Fractions in the F1 to F4 ranges

The analytical groundwater results from the laboratory certificates of analysis were compared with the applicable standards, the results are summarized in Table A2.

The following provides a summary of the analytical results of the groundwater samples:

- The groundwater sample for MW18-5 exceeded the MECP Table 1, and 9 SCS for PHC F3.

5.6 Quality Assurance and Quality Control Results

SOIL SAMPLES

One (1) duplicate soil sample was submitted to Paracel Laboratories Ltd. for analysis of selected parameters. The soil sample BH18-301 SA9 is a duplicate of sample BH18-3 SA9. The results of the duplicate soil samples are similar to the results of the original sample and no significant differences were noted.

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

GROUNDWATER SAMPLES

No duplicate groundwater samples were submitted to Paracel Laboratories Ltd. for analysis.

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

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

5.7 Phase Two Conceptual Site Model

5.7.1 Potentially Contaminating Activities

The Phase One ESA identified the following potentially contaminating activities on the subject property:

- Former Aboveground Fuel Storage Tank;
- Potential Impacts from Offsite Dry cleaning facility; and,
- Debris and fill of unknown origin during the fire.

A description and assessment of areas where potentially contaminating activities have occurred and areas of potential environmental concern are summarized in Table 3.1.

5.7.2 Subsurface Structures

Services including hydro, natural gas, sanitary and storm sewer were identified to exist on the subject property. There is potential that they may affect contaminant distribution and transport.

5.7.3 Physical Settings and Hydrogeological Characteristics of the Subject Property

Surficial and bedrock geology maps of the Ottawa area indicate that the overburden in the vicinity of the subject property generally consists of clay and silt and sand and gravel with a thickness ranging from 5 to 10 metres. The bedrock is mapped as Paleozoic sandstone and dolostone of the March Formation.

Groundwater levels and elevations were plotted using Surfer 15. The plot indicates that the groundwater flow direction is to the northwest towards Shirley's Brook.

5.7.4 Identified Contamination and Impacted Medium on the Subject Property

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

APEC 1: Aboveground Fuel Storage Tank

Groundwater results indicated PHC F3 contaminated groundwater at monitoring well locations BH18-5 and BH18-3 in May 2018. To confirm the exceedance and assess the groundwater conditions following the fire, additional groundwater sampling following monitoring well development was recommended and carried out in August 2018. The monitoring well BH18-3 was re-sampled for PHCs and BTEX in August 2018. The results were non-detect for all parameters analyzed. Due to low water levels, the monitoring well at BH18-5 could not be

resampled. To address this, an additional monitoring well BH19-2 was advanced in March 2019 between the former aboveground fuel storage tank and BH18-5. The groundwater sample from BH19-1 was submitted for PHCs and BTEX, and no exceedances were identified. No PHCs and BTEX impacted soil was identified during the investigation.

APEC 2: Potential Impacts from Offsite Dry cleaning facility

During the site reconnaissance, a dry cleaner was identified within the study area. Analytical results from BH18-5 did not identify any VOC contaminated soils or groundwater.

APEC 3: Debris and fill of unknown origin during the fire

Based on site visit and review of news document, it was identified that a fire occurred on the subject site, causing major damage to the onsite structures resulting in demolition of the structures. Analytical results indicated zinc contaminated soils at GS-N, a grab sample collected at the within the footprint of the structure where the fire occurred. No PAH, BTEX, or PHC impacted soil or groundwater were identified.

5.7.5 Summary of Identified Impacts

A soil exceedance was identified in the vicinity of the former building footprint for zinc.

6.0 CONCLUSIONS

The Phase One ESA report previously carried out for the subject property recommended that a Phase Two ESA investigation be carried out for the property located at 1055 Klondike Road in Kanata, Ontario (hereafter referred to as "the subject property"). The Phase Two ESA investigated the three APECs identified in the Phase One ESA:

APEC 1: Former Aboveground Fuel Storage Tank

Evidence from one AST was observed during the site reconnaissance. The vent and fill pipes were observed along the eastern wall of the existing structure. The AST was identified in the basement with an approximate capacity of 900 litres and installed in 2003. The tank was likely used for heating oil storage. Due to the nature of the products stored, the contaminants of concern for soil and groundwater were PHC, and BTEX.

APEC 2: Potential Impacts from Offsite Dry cleaning facility

An offsite dry cleaning facility was identified during the site reconnaissance in the study area. Based on the proximity to the subject site, potential environmental concern to the subject site relating to the historic dry cleaning activities may be present along the northwest property boundary of the subject property. Due to the nature of the products stored, the contaminants of concern for soil and groundwater were VOCs.

APEC 3: Debris and fill of unknown origin during the fire

On June 10, 2018, a fire occurred on the subject site following the initial Phase I ESA site visit. The fire significantly damaged the structures on the subject site, and they were demolished following the fire. Based on a visual site inspection, the area within the historic building footprint was filled in. It is our understanding that the AST was removed prior to fire. Due to the fill material and debris within the building footprint and to confirm no fuel was leaked prior to or during the fire, the contaminants of concern for soil and groundwater were PHCs, BTEX, and for soil only were metals and PAHs.

The Phase Two ESA investigation was carried out from March 2018 to March 2019. The components of the Phase Two ESA investigation consisted of sampling three boreholes completed and sampling from three monitoring wells installed on the site. Soil and groundwater samples were collected and submitted to Paracel Laboratories Ltd. of Ottawa, Ontario for laboratory analyses of selected parameters.

The data collected during the sampling indicated that the overburden of the site is generally brown silt and sand overlaying brown silt and clay (weathered crust).

The groundwater levels measured in the monitoring wells BH18-1, BH18-3 and BH18-5 on May 14, 2018 were 2.9, 6.8, and 5.9 metres below ground surface respectively (or elevation 74.8, 71.2, and 71.9 metres geodetic respectively). 2018 groundwater levels and elevations were plotted using Surfer 15, which indicated a west-northwest groundwater flow direction towards Shirley's Brook. The groundwater level measured in the monitoring well BH19-2 on April 4, 2019 was 6.3 metres below ground surface (or elevation 71.8 metres geodetic).

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

APEC 1: Aboveground Fuel Storage Tank

Groundwater results indicated PHC F3 contaminated groundwater at monitoring well locations BH18-5 and BH18-3 in May 2018. To confirm the exceedance and assess the groundwater conditions following the fire, additional groundwater sampling following monitoring well development was recommended and carried out in August 2018. The monitoring well BH18-3 was re-sampled for PHCs and BTEX in August 2018. The results were non-detect for all parameters analyzed. Due to low water levels, the monitoring well at BH18-5 could not be resampled. To address this, an additional monitoring well BH19-2 was advanced in March 2019 between the former aboveground fuel storage tank and BH18-5. The groundwater sample from BH19-1 was submitted for PHCs and BTEX, and no exceedances were identified. No PHCs and BTEX impacted soil was identified during the investigation.

APEC 2: Potential Impacts from Offsite Dry cleaning facility

Soil and groundwater results from BH18-5 did not identify any VOC contaminated soils or groundwater.

APEC 3: Debris and fill of unknown origin during the fire

Soil results indicated zinc contaminated soil at GS-N, a grab sample collected at the within the footprint of the former structure. No PAH, BTEX, or PHC impacted soil or groundwater were identified.

Discussion

Based on the results of the current investigation, it is expected that contaminated soil as defined by current MECP regulations will be encountered during the proposed construction in the area of GS-N within the former building footprint. Based on the nature of the contaminants identified (Zinc) and debris identified in the former building footprint, it is recommended that soil and debris be disposed of at an approved facility subject to a toxicity characteristic leaching procedure (TCLP) analysis and confirmatory sampling be carried out by a Qualified Person, as defined by O.Reg. 153/04.

7.0 LIMITATION OF LIABILITY

This report and the work referred to within it have been undertaken by GEMTEC Consulting Engineers and Scientists Ltd (GEMTEC), and prepared for Brian Saumure, Maple Leaf Homes and is intended for the exclusive use of Brian Saumure, Maple Leaf Homes. This report may not be relied upon by any other person or entity without the express written consent of GEMTEC and Brian Saumure, Maple Leaf Homes. Nothing in this report is intended to provide a legal opinion.

The investigation undertaken by GEMTEC with respect to this report and any conclusions or recommendations made in this report reflect the best judgements of GEMTEC based on the site conditions observed during the investigations undertaken at the date(s) identified in the report and on the information available at the time the report was prepared.

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

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

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

Nicole Soucy, B.A.Sc., M.A.Sc.
Environmental Scientist

Katherine Rispoli, P.Eng., ing., M.A.Sc.
Environmental Engineer

8.0 REFERENCES

GEMTEC Consulting Engineers and Scientists Limited (GEMTEC). Phase Two Environmental Site Assessment, 1055 Klondike Road, Ottawa, Ontario. October 2018a.

GEMTEC Consulting Engineers and Scientists Limited (GEMTEC). Geotechnical Investigation, Proposed Residential Subdivision, 1055 Klondike Road, Ottawa, Ontario. April 2018b.

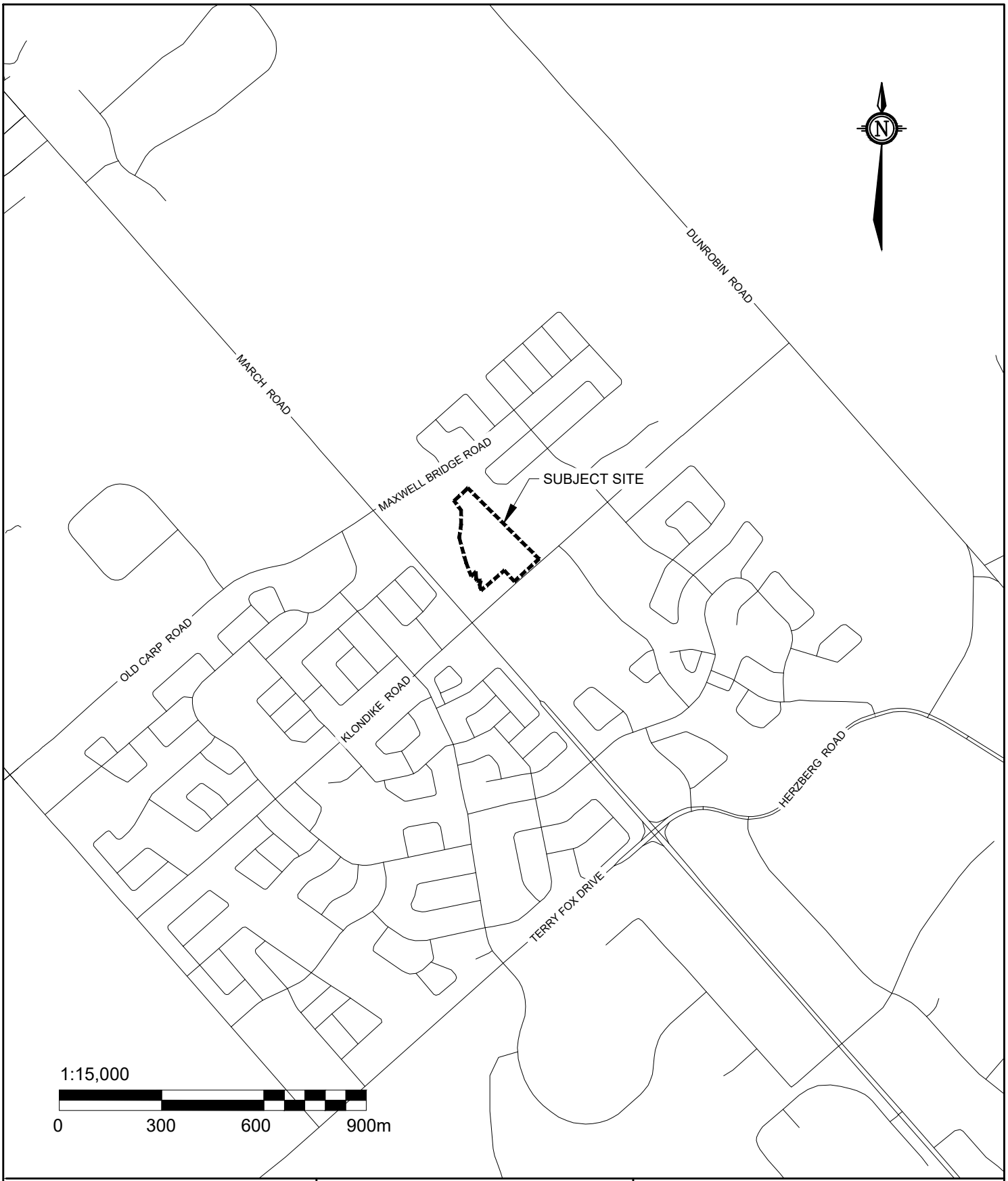
GEMTEC Consulting Engineers and Scientists Limited (GEMTEC). Supplemental Geotechnical Investigation, Proposed Residential Subdivision, 1055 Klondike Road, Ottawa, Ontario. April 2019.

Google Earth™ Satellite Imagery, 2019

Ontario Ministry of the Environment (MOE). Revised December 1996. Guidance on sampling and analytical methods for use at contaminated sites in Ontario.

Ontario Ministry of the Environment (MOE), 2011. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April.

Ontario Regulation 153/04, Made under the Environmental Protection Act, Part XV.1 – Records of Site Condition. October 31, 2011 updated July 28, 2017.



GEMTEC
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Project	Drawing
PHASE TWO ESA 1055 KLONDIKE ROAD OTTAWA, ONTARIO	KEY PLAN

Drwn By	Chkd By	Date	Project No.	Revision No.	
P.C.	N.S.	OCTOBER 2018	64153.85	0	**FIGURE 1**

P:\0. Files\64100\64153.85\Phase Two ESA\Drafting\Drawings\64153.85_PhaseTwoESA_FG1_V01_2018-10-02.dwg, FG1-KP, 18/10/02 2:27:48 PM

LEGEND

- **BOREHOLE LOCATION IN PLAN**
  (current investigation by GEMTEC)
- **BOREHOLE WITH MONITORING WELL**
  (current investigation by GEMTEC)
- **GRAB SAMPLE LOCATION (APPROX.)**
  (current investigation by GEMTEC)
- 72.52 **ELEVATION**
  (current investigation by GEMTEC)

BH 18-1 ← BOREHOLE ID
77.61 ← GROUND SURFACE ELEVATION, IN METRES GEODETIC DATUM

Scale 1:1000

0 20 40 60m

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Drawing: BOREHOLE LOCATION PLAN

Client: NOVATECH

Project: 64153.85

PHASE TWO ESA
1055 KLONDIKE ROAD
OTTAWA, ONTARIO

Drwn by: P.C.
Chkd by: N.S.

Date: MAY 2019
Rev.: 1

FIGURE 2

TABLE A1
SOIL ANALYTICAL RESULTS

Parameter	Units	RDL	MECP Table 9*	Sample Location:	1055 Klondike Road		
				Sample ID:	MW18-1 SA3	MW18-3 SA9	MW18-5 SA8	MW18-301 SA9
				Laboratory Sample ID:	1812403-01	1812403-02	1812403-03	1812403-04
				Date Sampled:	16-02-18	16-02-18	16-02-18	16-02-18
Physical Characteristics								
% Solids	% by Wt.	0.1	NS		81.8	66.1	72.8	64.0
Volatiles								
Acetone	ug/g dry	0.50	0.5 ug/g dry		ND (0.50)	N/A	ND (0.50)	N/A
Benzene	ug/g dry	0.02	0.02 ug/g dry		ND (0.02)	N/A	ND (0.02)	N/A
Bromodichloromethane	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Bromoform	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Bromomethane	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Carbon Tetrachloride	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Chlorobenzene	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Chloroform	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Dibromochloromethane	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Dichlorodifluoromethane	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
1,2-Dichlorobenzene	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
1,3-Dichlorobenzene	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
1,4-Dichlorobenzene	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
1,1-Dichloroethane	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
1,2-Dichloroethane	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
1,1-Dichloroethylene	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
cis-1,2-Dichloroethylene	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
trans-1,2-Dichloroethylene	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
1,2-Dichloropropane	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
cis-1,3-Dichloropropylene	ug/g dry	0.05	NS		ND (0.05)	N/A	ND (0.05)	N/A
trans-1,3-Dichloropropylene	ug/g dry	0.05	NS		ND (0.05)	N/A	ND (0.05)	N/A
1,3-Dichloropropene, total	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Ethylbenzene	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Ethylene dibromide	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Hexane	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Methyl Ethyl Ketone	ug/g dry	0.50	0.5 ug/g dry		ND (0.50)	N/A	ND (0.50)	N/A
Methyl Isobutyl Ketone	ug/g dry	0.50	0.5 ug/g dry		ND (0.50)	N/A	ND (0.50)	N/A
Methyl tert-butyl ether	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Methylene Chloride	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Styrene	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
1,1,1,2-Tetrachloroethane	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
1,1,2,2-Tetrachloroethane	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Tetrachloroethylene	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Toluene	ug/g dry	0.05	0.2 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
1,1,1-Trichloroethane	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
1,1,2-Trichloroethane	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Trichloroethylene	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Trichlorofluoromethane	ug/g dry	0.05	0.25 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Vinyl Chloride	ug/g dry	0.02	0.02 ug/g dry		ND (0.02)	N/A	ND (0.02)	N/A
m/p-Xylene	ug/g dry	0.05	NS		ND (0.05)	N/A	ND (0.05)	N/A
o-Xylene	ug/g dry	0.05	NS		ND (0.05)	N/A	ND (0.05)	N/A
Xylenes, total	ug/g dry	0.05	0.05 ug/g dry		ND (0.05)	N/A	ND (0.05)	N/A
Benzene	ug/g dry	0.02	0.02 ug/g dry		N/A	ND (0.02)	N/A	ND (0.02)
Ethylbenzene	ug/g dry	0.05	0.05 ug/g dry		N/A	ND (0.05)	N/A	ND (0.05)
Toluene	ug/g dry	0.05	0.2 ug/g dry		N/A	ND (0.05)	N/A	ND (0.05)
m/p-Xylene	ug/g dry	0.05	NS		N/A	ND (0.05)	N/A	ND (0.05)
o-Xylene	ug/g dry	0.05	NS		N/A	ND (0.05)	N/A	ND (0.05)
Xylenes, total	ug/g dry	0.05	0.05 ug/g dry		N/A	ND (0.05)	N/A	ND (0.05)
Hydrocarbons								
F1 PHCs (C6-C10)	ug/g dry	7	25 ug/g dry		ND (7)	ND (7)	ND (7)	ND (7)
F2 PHCs (C10-C16)	ug/g dry	4	10 ug/g dry		ND (4)	ND (4)	ND (4)	ND (4)
F3 PHCs (C16-C34)	ug/g dry	8	240 ug/g dry		ND (8)	ND (8)	ND (8)	ND (8)
F4 PHCs (C34-C50)	ug/g dry	6	120 ug/g dry		ND (6)	ND (6)	ND (6)	ND (6)

Notes:

1 RDL - Reported Detection Limit
2 N/A - Not Analyzed
3 NS - No Standard
4 ND- Non-detect
5 * - Table 9: Generic Site Condition Standards for Use within 30 metres of Water Body in a Non-Potable Groundwater Condition (MOE, April 15, 2011)
6 **Bold** - Exceeds MECP Table 9 SCS

TABLE A2
GROUNDWATER ANALYTICAL RESULTS

Parameter	Units	RDL	MECP Table 9*	City of Ottawa Sanitary Sewer Geuidelines**	City of Ottawa Storm Sewer Guidelines***	Sample Location:	1055 Klondike Road		
						Sample ID:	BH18-3 SA1	MW18-3 GW3	BH18-5 SA1	BH19-2
						Laboratory Sample ID:	1820545-01	1831559-01	1820545-02	1915143-01
						Date Sampled:	17-05-18	03-08-18	17-05-18	08-04-19
Volatiles										
Acetone	ug/L	5.0	100000 ug/L	NS	NS		N/A	N/A	ND (5.0)	N/A
Benzene	ug/L	0.5	44 ug/L	10 ug/L	2 ug/L		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Bromodichloromethane	ug/L	0.5	67000 ug/L	350 ug/L	NS		N/A	N/A	ND (0.5)	N/A
Bromoform	ug/L	0.5	380 ug/L	630 ug/L	NS		N/A	N/A	ND (0.5)	N/A
Bromomethane	ug/L	0.5	5.6 ug/L	110 ug/L	NS		N/A	N/A	ND (0.5)	N/A
Carbon Tetrachloride	ug/L	0.2	0.79 ug/L	57 ug/L	NS		N/A	N/A	ND (0.2)	N/A
Chlorobenzene	ug/L	0.5	500 ug/L	57 ug/L	NS		N/A	N/A	ND (0.5)	N/A
Chloroform	ug/L	0.5	2.4 ug/L	80 ug/L	2 ug/L		N/A	N/A	ND (0.5)	N/A
Dibromochloromethane	ug/L	0.5	65000 ug/L	57 ug/L	NS		N/A	N/A	ND (0.5)	N/A
Dichlorodifluoromethane	ug/L	1.0	3500 ug/L	NS	NS		N/A	N/A	ND (1.0)	N/A
1,2-Dichlorobenzene	ug/L	0.5	4600 ug/L	88 ug/L	5.6 ug/L		N/A	N/A	ND (0.5)	N/A
1,3-Dichlorobenzene	ug/L	0.5	7600 ug/L	36 ug/L	NS		N/A	N/A	ND (0.5)	N/A
1,4-Dichlorobenzene	ug/L	0.5	8 ug/L	17 ug/L	6.8 ug/L		N/A	N/A	ND (0.5)	N/A
1,1-Dichloroethane	ug/L	0.5	320 ug/L	200 ug/L	NS		N/A	N/A	ND (0.5)	N/A
1,2-Dichloroethane	ug/L	0.5	1.6 ug/L	210 ug/L	NS		N/A	N/A	ND (0.5)	N/A
1,1-Dichloroethylene	ug/L	0.5	1.6 ug/L	40 ug/L	NS		N/A	N/A	ND (0.5)	N/A
cis-1,2-Dichloroethylene	ug/L	0.5	1.6 ug/L	200 ug/L	5.6 ug/L		N/A	N/A	ND (0.5)	N/A
trans-1,2-Dichloroethylene	ug/L	0.5	1.6 ug/L	200 ug/L	NS		N/A	N/A	ND (0.5)	N/A
1,2-Dichloropropane	ug/L	0.5	16 ug/L	850 ug/L	NS		N/A	N/A	ND (0.5)	N/A
cis-1,3-Dichloropropylene	ug/L	0.5	NS	70 ug/L	NS		N/A	N/A	ND (0.5)	N/A
trans-1,3-Dichloropropylene	ug/L	0.5	NS	70 ug/L	5.6 ug/L		N/A	N/A	ND (0.5)	N/A
1,3-Dichloropropene, total	ug/L	0.5	5.2 ug/L	NS	NS		N/A	N/A	ND (0.5)	N/A
Ethylbenzene	ug/L	0.5	1800 ug/L	57 ug/L	2 ug/L		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Ethylene dibromide	ug/L	0.2	0.25 ug/L	NS	NS		N/A	N/A	ND (0.2)	N/A
Hexane	ug/L	1.0	51 ug/L	NS	NS		N/A	N/A	ND (1.0)	N/A
Methyl Ethyl Ketone	ug/L	5.0	470000 ug/L	NS	NS		N/A	N/A	ND (5.0)	N/A
Methyl Isobutyl Ketone	ug/L	5.0	140000 ug/L	NS	NS		N/A	N/A	ND (5.0)	N/A
Methyl tert-butyl ether	ug/L	2.0	190 ug/L	NS	NS		N/A	N/A	ND (2.0)	N/A
Methylene Chloride	ug/L	5.0	610 ug/L	211 ug/L	5.2 ug/L		N/A	N/A	ND (5.0)	N/A
Styrene	ug/L	0.5	1300 ug/L	40 ug/L	NS		N/A	N/A	ND (0.5)	N/A
1,1,1,2-Tetrachloroethane	ug/L	0.5	3.3 ug/L	NS	NS		N/A	N/A	ND (0.5)	N/A
1,1,2,2-Tetrachloroethane	ug/L	0.5	3.2 ug/L	40 ug/L	17 ug/L		N/A	N/A	ND (0.5)	N/A
Tetrachloroethylene	ug/L	0.5	1.6 ug/L	50 ug/L	4.4 ug/L		N/A	N/A	ND (0.5)	N/A
Toluene	ug/L	0.5	14000 ug/L	80 ug/L	2 ug/L		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
1,1,1-Trichloroethane	ug/L	0.5	640 ug/L	54 ug/L	NS		N/A	N/A	ND (0.5)	N/A
1,1,2-Trichloroethane	ug/L	0.5	4.7 ug/L	800 ug/L	NS		N/A	N/A	ND (0.5)	N/A
Trichloroethylene	ug/L	0.5	1.6 ug/L	54 ug/L	7.6 ug/L		N/A	N/A	ND (0.5)	N/A
Trichlorofluoromethane	ug/L	1.0	2000 ug/L	20 ug/L	NS		N/A	N/A	ND (1.0)	N/A
Vinyl Chloride	ug/L	0.5	0.5 ug/L	400 ug/L	NS		N/A	N/A	ND (0.5)	N/A
m/p-Xylene	ug/L	0.5	NS	NS	NS		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
o-Xylene	ug/L	0.5	NS	NS	NS		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Xylenes, total	ug/L	0.5	3300 ug/L	320 ug/L	4.4 ug/L		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Hydrocarbons										
F1 PHCs (C6-C10)	ug/L	25	420 ug/L	NS	NS		ND (25)	ND (25)	ND (25)	ND (25)
F2 PHCs (C10-C16)	ug/L	100	150 ug/L	NS	NS		ND (100)	ND (100)	ND (100)	ND (100)
F3 PHCs (C16-C34)	ug/L	100	500 ug/L	NS	NS		334	ND (100)	**548**	ND (100)
F4 PHCs (C34-C50)	ug/L	100	500 ug/L	NS	NS		ND (100)	ND (100)	113	ND (100)

Notes:

1 RDL - Reported Detection Limit
2 N/A - Not Analyzed
3 NS - No Standard
4 ND- Non-detect
5 * - Table 9: Generic Site Condition Standards for Use within 30 metres of Water Body in a Non-Potable Groundwater Condition (MOE, April 15, 2011)
6 ** - City of Ottawa Sanitary Sewer Use Guideline (By-Law No. 2003-514)
7 *** - City of Ottawa Storm Sewer Use Guideline (By-Law No. 2003-514)
8 Bold - Exceeds MECP Table 9 SCS
9 Underlined - Exceeds Ottawa Sanitary Sewer Guidelines
10 *Italicized* - Exceeds Ottawa Storm Sewer Guidelines

APPENDIX A

Soil - Laboratory Certificates of Analysis

PARACEL LABORATORIES LTD.
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Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive
Kanata, ON K2K 2A9
Attn: Katherine Rispoli

Client PO:
Project: 64153.85
Custody: 116349

Report Date: 27-Mar-2018
Order Date: 21-Mar-2018

Order #: 1812403

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

Paracel ID	Client ID
1812403-01	BH18-1 SA-3
1812403-02	BH18-3 SA-9
1812403-03	BH18-5 SA-8
1812403-04	BH18-301 SA-9

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: GEMTEC Consulting Engineers and Scientists Limited
Client PO:

Report Date: 27-Mar-2018
Order Date: 21-Mar-2018
Project Description: 64153.85

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	22-Mar-18	22-Mar-18
PHC F1	CWS Tier 1 - P&T GC-FID	22-Mar-18	22-Mar-18
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	21-Mar-18	22-Mar-18
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	22-Mar-18	22-Mar-18
Solids, %	Gravimetric, calculation	26-Mar-18	26-Mar-18

Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 27-Mar-2018

Order Date: 21-Mar-2018

Project Description: 64153.85

	Client ID:	BH18-1 SA-3	BH18-3 SA-9	BH18-5 SA-8	BH18-301 SA-9
	Sample Date:	09-Mar-18	09-Mar-18	08-Mar-18	09-Mar-18
	Sample ID:	1812403-01	1812403-02	1812403-03	1812403-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	81.8	66.1	72.8	64.0
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	-
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 (dibromoethan	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	-

Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 27-Mar-2018

Order Date: 21-Mar-2018

Project Description: 64153.85

	Client ID:	BH18-1 SA-3	BH18-3 SA-9	BH18-5 SA-8	BH18-301 SA-9
	Sample Date:	09-Mar-18	09-Mar-18	08-Mar-18	09-Mar-18
	Sample ID:	1812403-01	1812403-02	1812403-03	1812403-04
	MDL/Units	Soil	Soil	Soil	Soil
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	-
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	88.9%	-	91.8%	-
Dibromofluoromethane	Surrogate	109%	-	111%	-
Toluene-d8	Surrogate	92.7%	-	92.5%	-
Benzene	0.02 ug/g dry	-	<0.02	-	<0.02
Ethylbenzene	0.05 ug/g dry	-	<0.05	-	<0.05
Toluene	0.05 ug/g dry	-	<0.05	-	<0.05
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
Toluene-d8	Surrogate	-	94.5%	-	95.5%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
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	*3.00*		*ug/g*		*93.9*	*50-140*			
Surrogate: Dibromofluoromethane	*3.63*		*ug/g*		*113*	*50-140*			
Surrogate: Toluene-d8	*3.08*		*ug/g*		*96.4*	*50-140*			
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*3.08*		*ug/g*		*96.4*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
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)	37	8	ug/g dry	28			28.5	30	
F4 PHCs (C34-C50)	33	6	ug/g dry	37			11.8	30	
Physical Characteristics									
% Solids	90.3	0.1	% by Wt.	90.0			0.4	25	
Volatiles									
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	
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	*2.13*		*ug/g dry*		*93.0*	*50-140*			
Surrogate: Dibromofluoromethane	*2.03*		*ug/g dry*		*88.6*	*50-140*			
Surrogate: Toluene-d8	*2.18*		*ug/g dry*		*94.8*	*50-140*			
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	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: Toluene-d8	*2.18*		*ug/g dry*		*94.8*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	189	7	ug/g		94.4	80-120			
F2 PHCs (C10-C16)	94	4	ug/g	ND	101	60-140			
F3 PHCs (C16-C34)	238	8	ug/g	28	109	60-140			
F4 PHCs (C34-C50)	170	6	ug/g	37	103	60-140			
Volatiles									
Acetone	11.0	0.50	ug/g		110	50-140			
Benzene	4.64	0.02	ug/g		116	60-130			
Bromodichloromethane	4.67	0.05	ug/g		117	60-130			
Bromoform	4.50	0.05	ug/g		113	60-130			
Bromomethane	4.93	0.05	ug/g		123	50-140			
Carbon Tetrachloride	5.05	0.05	ug/g		126	60-130			
Chlorobenzene	3.61	0.05	ug/g		90.2	60-130			
Chloroform	4.84	0.05	ug/g		121	60-130			
Dibromochloromethane	3.49	0.05	ug/g		87.4	60-130			
Dichlorodifluoromethane	3.78	0.05	ug/g		94.4	50-140			
1,2-Dichlorobenzene	3.39	0.05	ug/g		84.6	60-130			
1,3-Dichlorobenzene	3.34	0.05	ug/g		83.6	60-130			
1,4-Dichlorobenzene	3.42	0.05	ug/g		85.5	60-130			
1,1-Dichloroethane	4.63	0.05	ug/g		116	60-130			
1,2-Dichloroethane	4.76	0.05	ug/g		119	60-130			
1,1-Dichloroethylene	3.99	0.05	ug/g		99.6	60-130			
cis-1,2-Dichloroethylene	4.42	0.05	ug/g		110	60-130			
trans-1,2-Dichloroethylene	3.47	0.05	ug/g		86.8	60-130			
1,2-Dichloropropane	4.49	0.05	ug/g		112	60-130			
cis-1,3-Dichloropropylene	4.78	0.05	ug/g		119	60-130			
trans-1,3-Dichloropropylene	4.97	0.05	ug/g		124	60-130			
Ethylbenzene	3.94	0.05	ug/g		98.5	60-130			
Ethylene dibromide (dibromoethane	3.44	0.05	ug/g		85.9	60-130			
Hexane	3.85	0.05	ug/g		96.1	60-130			
Methyl Ethyl Ketone (2-Butanone)	9.08	0.50	ug/g		90.8	50-140			
Methyl Isobutyl Ketone	10.5	0.50	ug/g		105	50-140			
Methyl tert-butyl ether	11.3	0.05	ug/g		113	50-140			
Methylene Chloride	4.64	0.05	ug/g		116	60-130			
Styrene	3.87	0.05	ug/g		96.7	60-130			
1,1,1,2-Tetrachloroethane	3.72	0.05	ug/g		92.9	60-130			
1,1,2,2-Tetrachloroethane	4.48	0.05	ug/g		112	60-130			
Tetrachloroethylene	3.72	0.05	ug/g		92.9	60-130			
Toluene	3.67	0.05	ug/g		91.7	60-130			
1,1,1-Trichloroethane	5.04	0.05	ug/g		126	60-130			
1,1,2-Trichloroethane	4.62	0.05	ug/g		115	60-130			
Trichloroethylene	4.34	0.05	ug/g		109	60-130			
Trichlorofluoromethane	4.82	0.05	ug/g		121	50-140			
Vinyl chloride	4.61	0.02	ug/g		115	50-140			
m,p-Xylenes	8.08	0.05	ug/g		101	60-130			
o-Xylene	4.11	0.05	ug/g		103	60-130			
Surrogate: 4-Bromofluorobenzene	*2.33*		*ug/g*		*72.9*	*50-140*			
Benzene	4.64	0.02	ug/g		116	60-130			
Ethylbenzene	3.94	0.05	ug/g		98.5	60-130			
Toluene	3.67	0.05	ug/g		91.7	60-130			
m,p-Xylenes	8.08	0.05	ug/g		101	60-130			
o-Xylene	4.11	0.05	ug/g		103	60-130			

Qualifier Notes:

None

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.

PARACEL LABORATORIES LTD.

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Paracel ID: 1812403

Chain of Custody
(Lab Use Only)
№ 116349

Page ___ of ___

Client Name: GEMTEC	Project Reference: 64153.85
Contact Name: K. RISPOLI	Quote #
Address: 32 STEACIE	PO #
Telephone: (613) 836-1422	Email Address: Katherine.rispoli@gemtec.ca

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☑ Regular
Date Required: _____

Criteria: ~~☑~~ O. Reg. 153/04 (As Amended) Table 1 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

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

Required Analyses

Paracel Order Number: 1812403

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	
1	BH18-1 SA-3	S		2	MAR 9/18		X	X						250mL + vial
2	BH18-3 SA-9	S		2	"		X							
3	BH18-5 SA-8	S		2	MAR 6/18	2PM	X	X						
4	BH18-301 SA-9	S		2	March 9/18		X							
5														
6														
7														
8														
9														
10														

Comments:

Method of Delivery: Walk-in

Relinquished By (Sign): K. Rispoli	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): K. RISPOLI	Date/Time:	Date/Time: 03/21/18 4:04pm	Date/Time: 03/21/18 4:11pm
Date/Time: MAR 21/2018	Temperature: °C	Temperature: 16.8 °C	pH Verified [ ] By:

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www.paracellabs.com

Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive
Kanata, ON K2K 2A9
Attn: Nicole Soucy

Client PO:
Project: 64153.85
Custody: 115677

Report Date: 10-Aug-2018
Order Date: 3-Aug-2018

Order #: 1831557

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

Paracel ID	Client ID
1831557-01	GS-N
1831557-02	GS-M

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: GEMTEC Consulting Engineers and Scientists Limited
Client PO:

Report Date: 10-Aug-2018
Order Date: 3-Aug-2018
Project Description: 64153.85

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	5-Aug-18	8-Aug-18
PHC F1	CWS Tier 1 - P&T GC-FID	5-Aug-18	8-Aug-18
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	7-Aug-18	8-Aug-18
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	7-Aug-18	8-Aug-18
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	7-Aug-18	9-Aug-18
Solids, %	Gravimetric, calculation	7-Aug-18	7-Aug-18

Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 10-Aug-2018

Order Date: 3-Aug-2018

Project Description: 64153.85

	Client ID:	GS-N	GS-M	-	-
	Sample Date:	08/03/2018 09:00	08/03/2018 09:00	-	-
	Sample ID:	1831557-01	1831557-02	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	88.0	84.1	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	-	-
Arsenic	1.0 ug/g dry	2.4	<1.0	-	-
Barium	1.0 ug/g dry	55.5	41.4	-	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	-	-
Boron	5.0 ug/g dry	<5.0	<5.0	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	5.0 ug/g dry	19.0	16.3	-	-
Cobalt	1.0 ug/g dry	4.7	4.1	-	-
Copper	5.0 ug/g dry	17.0	8.5	-	-
Lead	1.0 ug/g dry	95.7	19.5	-	-
Molybdenum	1.0 ug/g dry	<1.0	<1.0	-	-
Nickel	5.0 ug/g dry	10.3	9.5	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
Thallium	1.0 ug/g dry	<1.0	<1.0	-	-
Uranium	1.0 ug/g dry	<1.0	<1.0	-	-
Vanadium	10.0 ug/g dry	24.8	21.3	-	-
Zinc	20.0 ug/g dry	439	46.1	-	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	-	-
Toluene	0.05 ug/g dry	<0.05	<0.05	-	-
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	-	-
Toluene-d8	Surrogate	101%	107%	-	-
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	-	-

Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 10-Aug-2018

Order Date: 3-Aug-2018

Project Description: 64153.85

	Client ID:	GS-N	GS-M	-	-
	Sample Date:	08/03/2018 09:00	08/03/2018 09:00	-	-
	Sample ID:	1831557-01	1831557-02	-	-
	MDL/Units	Soil	Soil	-	-
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	0.03	<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	0.03	<0.02	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	-	-
Fluoranthene	0.02 ug/g dry	0.04	<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	0.03	<0.02	-	-
2-Fluorobiphenyl	Surrogate	67.2%	54.2%	-	-
Terphenyl-d14	Surrogate	70.4%	70.9%	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
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	*1.48*		*ug/g*		*111*	*50-140*			
Surrogate: Terphenyl-d14	*1.46*		*ug/g*		*109*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*3.17*		*ug/g*		*99.1*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	8	4	ug/g dry	7			11.9	30	
F3 PHCs (C16-C34)	189	8	ug/g dry	183			3.2	30	
F4 PHCs (C34-C50)	56	6	ug/g dry	59			4.3	30	
Metals									
Antimony	2.3	1.0	ug/g dry	ND			0.0	30	
Arsenic	3.8	1.0	ug/g dry	3.7			3.0	30	
Barium	65.1	1.0	ug/g dry	59.9			8.3	30	
Beryllium	ND	0.5	ug/g dry	ND			0.0	30	
Boron	14.2	5.0	ug/g dry	10.2			32.5	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium	13.9	5.0	ug/g dry	13.0			6.9	30	
Cobalt	4.6	1.0	ug/g dry	4.4			3.9	30	
Copper	22.4	5.0	ug/g dry	21.8			2.9	30	
Lead	50.2	1.0	ug/g dry	48.6			3.2	30	
Molybdenum	ND	1.0	ug/g dry	ND			0.0	30	
Nickel	11.9	5.0	ug/g dry	11.3			5.2	30	
Selenium	ND	1.0	ug/g dry	ND			0.0	30	
Silver	ND	0.3	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			0.0	30	
Vanadium	23.4	10.0	ug/g dry	22.0			6.1	30	
Zinc	151	20.0	ug/g dry	147			2.2	30	
Physical Characteristics									
% Solids	91.4	0.1	% by Wt.	91.3			0.1	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND				40	
Acenaphthylene	ND	0.02	ug/g dry	ND			0.0	40	
Anthracene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [a] pyrene	ND	0.02	ug/g dry	0.026			0.0	40	
Benzo [b] fluoranthene	ND	0.02	ug/g dry	0.024			0.0	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	0.022			0.0	40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND			0.0	40	
Chrysene	ND	0.02	ug/g dry	0.026			0.0	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND				40	
Fluoranthene	0.022	0.02	ug/g dry	0.035			45.1	40	QR-01
Fluorene	ND	0.02	ug/g dry	ND				40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND			0.0	40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
Naphthalene	ND	0.01	ug/g dry	ND			0.0	40	
Phenanthrene	ND	0.02	ug/g dry	0.022			0.0	40	
Pyrene	0.024	0.02	ug/g dry	0.031			25.3	40	
Surrogate: 2-Fluorobiphenyl	*1.08*		*ug/g dry*		*71.2*	*50-140*			
Surrogate: Terphenyl-d14	*1.08*		*ug/g dry*		*71.2*	*50-140*			
Volatiles									
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	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: Toluene-d8	*3.71*		*ug/g dry*		*105*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	205	7	ug/g		103	80-120			
F2 PHCs (C10-C16)	93	4	ug/g	7	99.9	60-140			
F3 PHCs (C16-C34)	399	8	ug/g	183	102	60-140			
F4 PHCs (C34-C50)	220	6	ug/g	59	121	60-140			
Metals									
Antimony	44.1		ug/L	ND	87.4	70-130			
Arsenic	44.6		ug/L	1.5	86.2	70-130			
Barium	73.1		ug/L	24.0	98.3	70-130			
Beryllium	49.3		ug/L	ND	98.3	70-130			
Boron	50.9		ug/L	ND	93.5	70-130			
Cadmium	44.8		ug/L	ND	89.4	70-130			
Chromium	54.4		ug/L	5.2	98.4	70-130			
Cobalt	50.3		ug/L	1.8	97.0	70-130			
Copper	57.1		ug/L	8.7	96.8	70-130			
Lead	67.7		ug/L	19.4	96.5	70-130			
Molybdenum	43.4		ug/L	ND	86.3	70-130			
Nickel	52.7		ug/L	ND	96.4	70-130			
Selenium	42.7		ug/L	ND	85.3	70-130			
Silver	44.0		ug/L	ND	87.9	70-130			
Thallium	49.6		ug/L	ND	99.1	70-130			
Uranium	50.7		ug/L	ND	101	70-130			
Vanadium	60.0		ug/L	ND	102	70-130			
Zinc	103		ug/L	58.9	88.0	70-130			
Semi-Volatiles									
Acenaphthene	0.117	0.02	ug/g	ND	61.7	50-140			
Acenaphthylene	0.098	0.02	ug/g	ND	51.6	50-140			
Anthracene	0.103	0.02	ug/g	ND	54.4	50-140			
Benzo [a] anthracene	0.134	0.02	ug/g	ND	70.9	50-140			
Benzo [a] pyrene	0.129	0.02	ug/g	0.026	54.5	50-140			
Benzo [b] fluoranthene	0.169	0.02	ug/g	0.024	77.1	50-140			
Benzo [g,h,i] perylene	0.157	0.02	ug/g	0.022	71.4	50-140			
Benzo [k] fluoranthene	0.155	0.02	ug/g	ND	81.7	50-140			
Chrysene	0.174	0.02	ug/g	0.026	78.2	50-140			
Dibenzo [a,h] anthracene	0.132	0.02	ug/g	ND	69.8	50-140			
Fluoranthene	0.117	0.02	ug/g	0.035	43.3	50-140			QM-06
Fluorene	0.106	0.02	ug/g	ND	56.0	50-140			
Indeno [1,2,3-cd] pyrene	0.147	0.02	ug/g	ND	77.6	50-140			
1-Methylnaphthalene	0.116	0.02	ug/g	ND	61.3	50-140			
2-Methylnaphthalene	0.128	0.02	ug/g	ND	67.8	50-140			
Naphthalene	0.133	0.01	ug/g	ND	70.0	50-140			
Phenanthrene	0.129	0.02	ug/g	0.022	56.6	50-140			
Pyrene	0.118	0.02	ug/g	0.031	46.0	50-140			QM-06
Surrogate: 2-Fluorobiphenyl	*1.08*		*ug/g*		*71.3*	*50-140*			
Volatiles									
Benzene	4.84	0.02	ug/g		121	60-130			
Ethylbenzene	5.04	0.05	ug/g		126	60-130			
Toluene	4.25	0.05	ug/g		106	60-130			
m,p-Xylenes	9.68	0.05	ug/g		121	60-130			
o-Xylene	5.02	0.05	ug/g		125	60-130			

Qualifier Notes:

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:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

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Paracel ID: 1831557

Chain of Custody (Lab Use Only) № 115677

Page 1 of 1

Client Name: Gemtec	Project Reference: 64153.85	**Turnaround Time:**
Contact Name: Nicole Soucy	Quote #	☐ 1 Day ☐ 3 Day
Address: 32 Steacie Dr.	PO #	☐ 2 Day ☒ Regular
Telephone: 613-836-1422	Email Address: nicole.soucy@gemtec.ca	Date Required:

Criteria: ☒ O. Reg. 153/04 (As Amended) Table __ ☐ 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: 1831557 - Soil, 1831559 - Water

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	
1	GS-N	S		2	3/8/18		X		X	X				250mL + 1 vial
2	GS-M						X		X	X				2x 250mL
3	GS-COMP													250mL + 1 vial
4	GS-E (HOLD)													
5	GS-W													
6	GS-S													
7	MW18-3 GW3	GW		3			X							
8														
9														
10														

Comments:

Method of Delivery: Paracel

Relinquished By (Sign): K. Rispoli	Received by Driver/Depot: T. Tessier	Received at Lab: SURREY DROP	Verified By:
Relinquished By (Print): K. RISPOLI	Date/Time: 03/08/18 10:25 AM	Date/Time: AUG 03, 2018 01:03	Date/Time: 08/03/18 3:21pm
Date/Time: Aug 3/2018	Temperature: °C	Temperature: 6.1 °C	pH Verified [ ] By:

APPENDIX B

Groundwater - Laboratory Certificate of Analysis

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Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive
Kanata, ON K2K2A9
Attn: Lucas Moran

Client PO:
Project: 64153.85
Custody: 116409

Report Date: 22-May-2018
Order Date: 17-May-2018

Order #: 1820545

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

Paracel ID	Client ID
1820545-01	BH18-3 SA1
1820545-02	BH18-5 SA1

Approved By:

Tim McCooeye
Senior Advisor

Certificate of Analysis
Client: GEMTEC Consulting Engineers and Scientists Limited
Client PO:

Report Date: 22-May-2018
Order Date: 17-May-2018
Project Description: 64153.85

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	19-May-18	19-May-18
PHC F1	CWS Tier 1 - P&T GC-FID	19-May-18	19-May-18
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	19-May-18	19-May-18
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	19-May-18	19-May-18

Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 22-May-2018

Order Date: 17-May-2018

Project Description: 64153.85

	Client ID:	BH18-3 SA1	BH18-5 SA1	-	-
	Sample Date:	05/17/2018 09:50	05/17/2018 11:00	-	-
	Sample ID:	1820545-01	1820545-02	-	-
	MDL/Units	Water	Water	-	-
Volatiles					
Acetone	5.0 ug/L	-	<5.0	-	-
Benzene	0.5 ug/L	-	<0.5	-	-
Bromodichloromethane	0.5 ug/L	-	<0.5	-	-
Bromoform	0.5 ug/L	-	<0.5	-	-
Bromomethane	0.5 ug/L	-	<0.5	-	-
Carbon Tetrachloride	0.2 ug/L	-	<0.2	-	-
Chlorobenzene	0.5 ug/L	-	<0.5	-	-
Chloroform	0.5 ug/L	-	<0.5	-	-
Dibromochloromethane	0.5 ug/L	-	<0.5	-	-
Dichlorodifluoromethane	1.0 ug/L	-	<1.0	-	-
1,2-Dichlorobenzene	0.5 ug/L	-	<0.5	-	-
1,3-Dichlorobenzene	0.5 ug/L	-	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	-	<0.5	-	-
1,1-Dichloroethane	0.5 ug/L	-	<0.5	-	-
1,2-Dichloroethane	0.5 ug/L	-	<0.5	-	-
1,1-Dichloroethylene	0.5 ug/L	-	<0.5	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	-	<0.5	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	-	<0.5	-	-
1,2-Dichloropropane	0.5 ug/L	-	<0.5	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	-	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	-	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	-	<0.5	-	-
Ethylbenzene	0.5 ug/L	-	<0.5	-	-
Ethylene dibromide (dibromoethan	0.2 ug/L	-	<0.2	-	-
Hexane	1.0 ug/L	-	<1.0	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	-	<5.0	-	-
Methyl Isobutyl Ketone	5.0 ug/L	-	<5.0	-	-
Methyl tert-butyl ether	2.0 ug/L	-	<2.0	-	-
Methylene Chloride	5.0 ug/L	-	<5.0	-	-
Styrene	0.5 ug/L	-	<0.5	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	-	<0.5	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	-	<0.5	-	-
Tetrachloroethylene	0.5 ug/L	-	<0.5	-	-
Toluene	0.5 ug/L	-	<0.5	-	-
1,1,1-Trichloroethane	0.5 ug/L	-	<0.5	-	-

Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 22-May-2018

Order Date: 17-May-2018

Project Description: 64153.85

	Client ID:	BH18-3 SA1	BH18-5 SA1	-	-
	Sample Date:	05/17/2018 09:50	05/17/2018 11:00	-	-
	Sample ID:	1820545-01	1820545-02	-	-
	MDL/Units	Water	Water	-	-
1,1,2-Trichloroethane	0.5 ug/L	-	<0.5	-	-
Trichloroethylene	0.5 ug/L	-	<0.5	-	-
Trichlorofluoromethane	1.0 ug/L	-	<1.0	-	-
Vinyl chloride	0.5 ug/L	-	<0.5	-	-
m,p-Xylenes	0.5 ug/L	-	<0.5	-	-
o-Xylene	0.5 ug/L	-	<0.5	-	-
Xylenes, total	0.5 ug/L	-	<0.5	-	-
4-Bromofluorobenzene	Surrogate	-	93.2%	-	-
Dibromofluoromethane	Surrogate	-	92.5%	-	-
Toluene-d8	Surrogate	-	95.5%	-	-
Benzene	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-
Toluene-d8	Surrogate	96.2%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	-	-
F3 PHCs (C16-C34)	100 ug/L	334	548	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	113	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*75.2*		*ug/L*		*94.0*	*50-140*			
Surrogate: Dibromofluoromethane	*81.2*		*ug/L*		*102*	*50-140*			
Surrogate: Toluene-d8	*76.3*		*ug/L*		*95.4*	*50-140*			
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*76.3*		*ug/L*		*95.4*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Volatiles									
Acetone	ND	5.0	ug/L	ND				30	
Benzene	ND	0.5	ug/L	ND				30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	ND	0.5	ug/L	ND				30	
Chloroform	ND	0.5	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Ethylene dibromide (dibromoethane	ND	0.2	ug/L	ND				30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	ND	0.5	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	*75.4*		*ug/L*		*94.2*	*50-140*			
Surrogate: Dibromofluoromethane	*72.4*		*ug/L*		*90.6*	*50-140*			
Surrogate: Toluene-d8	*76.9*		*ug/L*		*96.1*	*50-140*			
Benzene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: Toluene-d8	*76.9*		*ug/L*		*96.1*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1930	25	ug/L		96.6	68-117			
F2 PHCs (C10-C16)	2250	100	ug/L		125	60-140			
F3 PHCs (C16-C34)	4300	100	ug/L		116	60-140			
F4 PHCs (C34-C50)	2990	100	ug/L		120	60-140			
Volatiles									
Acetone	79.4	5.0	ug/L		79.4	50-140			
Benzene	39.8	0.5	ug/L		99.6	60-130			
Bromodichloromethane	35.1	0.5	ug/L		87.7	60-130			
Bromoform	31.6	0.5	ug/L		78.9	60-130			
Bromomethane	51.1	0.5	ug/L		128	50-140			
Carbon Tetrachloride	35.4	0.2	ug/L		88.5	60-130			
Chlorobenzene	43.9	0.5	ug/L		110	60-130			
Chloroform	36.2	0.5	ug/L		90.4	60-130			
Dibromochloromethane	35.3	0.5	ug/L		88.4	60-130			
Dichlorodifluoromethane	43.0	1.0	ug/L		108	50-140			
1,2-Dichlorobenzene	39.1	0.5	ug/L		97.8	60-130			
1,3-Dichlorobenzene	39.6	0.5	ug/L		99.0	60-130			
1,4-Dichlorobenzene	39.1	0.5	ug/L		97.8	60-130			
1,1-Dichloroethane	42.4	0.5	ug/L		106	60-130			
1,2-Dichloroethane	41.6	0.5	ug/L		104	60-130			
1,1-Dichloroethylene	43.1	0.5	ug/L		108	60-130			
cis-1,2-Dichloroethylene	37.3	0.5	ug/L		93.2	60-130			
trans-1,2-Dichloroethylene	44.6	0.5	ug/L		111	60-130			
1,2-Dichloropropane	41.6	0.5	ug/L		104	60-130			
cis-1,3-Dichloropropylene	28.9	0.5	ug/L		72.2	60-130			
trans-1,3-Dichloropropylene	30.2	0.5	ug/L		75.5	60-130			
Ethylbenzene	41.2	0.5	ug/L		103	60-130			
Ethylene dibromide (dibromoethane	43.2	0.2	ug/L		108	60-130			
Hexane	47.6	1.0	ug/L		119	60-130			
Methyl Ethyl Ketone (2-Butanone)	82.2	5.0	ug/L		82.2	50-140			
Methyl Isobutyl Ketone	80.9	5.0	ug/L		80.9	50-140			
Methyl tert-butyl ether	96.9	2.0	ug/L		96.9	50-140			
Methylene Chloride	44.6	5.0	ug/L		112	60-130			
Styrene	44.2	0.5	ug/L		111	60-130			
1,1,1,2-Tetrachloroethane	44.2	0.5	ug/L		110	60-130			
1,1,2,2-Tetrachloroethane	51.2	0.5	ug/L		128	60-130			
Tetrachloroethylene	48.7	0.5	ug/L		122	60-130			
Toluene	42.9	0.5	ug/L		107	60-130			
1,1,1-Trichloroethane	37.7	0.5	ug/L		94.3	60-130			
1,1,2-Trichloroethane	42.2	0.5	ug/L		105	60-130			
Trichloroethylene	39.3	0.5	ug/L		98.2	60-130			
Trichlorofluoromethane	45.1	1.0	ug/L		113	60-130			
Vinyl chloride	42.5	0.5	ug/L		106	50-140			
m,p-Xylenes	90.6	0.5	ug/L		113	60-130			
o-Xylene	45.6	0.5	ug/L		114	60-130			
Surrogate: 4-Bromofluorobenzene	*72.0*		*ug/L*		*90.0*	*50-140*			
Benzene	39.8	0.5	ug/L		99.6	60-130			
Ethylbenzene	41.2	0.5	ug/L		103	60-130			
Toluene	42.9	0.5	ug/L		107	60-130			
m,p-Xylenes	90.6	0.5	ug/L		113	60-130			
o-Xylene	45.6	0.5	ug/L		114	60-130			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

Paracel ID: 1820545

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Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com

Chain of Custody
(Lab Use Only)
№ 116409

Page 1 of 1

Client Name: Gemtec	Project Reference: 64153.85	**Turnaround Time:**
Contact Name: Lucas Moran	Quote #	☐ 1 Day ☐ 3 Day
Address: 32 Steacie Dr, Kanata	PO #	☐ 2 Day ☒ Regular
Telephone: 613-836-1422	Email Address: Lucas.moran@gemtec.ca cc. Katherine.rispoli@gemtec.ca	Date Required:

Criteria: ☒ O. Reg. 153/04 (As Amended) Table 1 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ☐ Other:

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

Required Analyses

Paracel Order Number: 1820545

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	BH18-3 SA1	GW		3	May 17/18	9:50 am	X	X	X				
2	BH18-5 SA1	GW		3	May 17/18	11:00 am	X	X					
3													
4													
5													
6													
7													
8													
9													
10													

Comments: Sample #1 Analyze for PHCs + btex only

Method of Delivery: Walk-in

Relinquished By (Sign):	Received by Driver/Depot: Kevin Cull	Received at Lab:	Verified By:
Relinquished By (Print): Lucas Moran	Date/Time: May 17/18 11:35	Date/Time: May 17 2018 5:30	Date/Time: May 17 2018 5:15
Date/Time: May 17/18 11:25 am	Temperature: 8.6 °C	Temperature: 9.2 °C	pH Verified [ ] By:

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Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive
Kanata, ON K2K 2A9
Attn: Nicole Soucy

Client PO:
Project: 64153.85
Custody: 115677

Report Date: 10-Aug-2018
Order Date: 3-Aug-2018

Order #: 1831559

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

Paracel ID	Client ID
1831559-01	MW18-3 GW3

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: GEMTEC Consulting Engineers and Scientists Limited
Client PO:

Report Date: 10-Aug-2018
Order Date: 3-Aug-2018
Project Description: 64153.85

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	7-Aug-18	7-Aug-18
PHC F1	CWS Tier 1 - P&T GC-FID	6-Aug-18	7-Aug-18
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	9-Aug-18	9-Aug-18

Certificate of Analysis

Client: GEMTEC Consulting Engineers and Scientists Limited

Client PO:

Report Date: 10-Aug-2018

Order Date: 3-Aug-2018

Project Description: 64153.85

	Client ID:	MW18-3 GW3	-	-	-
	Sample Date:	08/03/2018 09:00	-	-	-
	Sample ID:	1831559-01	-	-	-
	MDL/Units	Water	-	-	-
Volatiles					
Benzene	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-
Toluene-d8	Surrogate	94.8%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*72.5*		*ug/L*		*90.6*	*50-140*			

Certificate of Analysis
Client: GEMTEC Consulting Engineers and Scientists Limited
Client PO:

Report Date: 10-Aug-2018
Order Date: 3-Aug-2018
Project Description: 64153.85

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Volatiles									
Benzene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: Toluene-d8	*74.2*		*ug/L*		*92.7*	*50-140*			

Certificate of Analysis
Client: GEMTEC Consulting Engineers and Scientists Limited
Client PO:

Report Date: 10-Aug-2018
Order Date: 3-Aug-2018
Project Description: 64153.85

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1760	25	ug/L		88.0	68-117			
F2 PHCs (C10-C16)	1780	100	ug/L		111	60-140			
F3 PHCs (C16-C34)	5050	100	ug/L		129	60-140			
F4 PHCs (C34-C50)	3140	100	ug/L		127	60-140			
Volatiles									
Benzene	35.5	0.5	ug/L		88.7	60-130			
Ethylbenzene	40.1	0.5	ug/L		100	60-130			
Toluene	37.9	0.5	ug/L		94.8	60-130			
m,p-Xylenes	84.2	0.5	ug/L		105	60-130			
o-Xylene	41.9	0.5	ug/L		105	60-130			
Surrogate: Toluene-d8	*66.6*		*ug/L*		*83.3*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

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Paracel ID: 1831559

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№ 115677

Page 1 of 1

Client Name: Gemtec	Project Reference: 64153.85
Contact Name: Nicole Soucy	Quote #
Address: 32 Steacie Dr.	PO #
	Email Address: nicole.soucy@gemtec.ca
Telephone: 613-836-1422	

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular
Date Required:

Criteria: ☒ O. Reg. 153/04 (As Amended) Table __ ☐ 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: 1831557 - Soil; 1831559 - Water

Required Analyses

#	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)							
1	GS-N	S		2	3/8/18		X		X	X						250ml + 1 vial				
2	GS-M	↓		↓	↓		X		X	X						↓				
3	GS-COMP } HOLD	↓		↓	↓											2x250ml				
4	GS-E } HOLD	↓		↓	↓											250ml + 1 vial				
5	GS-W } HOLD	↓		↓	↓											↓				
6	GS-S } HOLD	↓		↓	↓											↓				
7	MW18-3 GW3	GW		3	↓		X													
8																				
9																				
10																				

Comments:

Method of Delivery: Paracel

Relinquished By (Sign): K. Rispoli	Received by Driver/Depot: M. Rouse	Received at Lab: Sunverporn Dowmi	Verified By: [signature]
Relinquished By (Print): K. RISPOLI	Date/Time: 03/08/18 10:25	Date/Time: AUG 03, 2018 01:03	Date/Time: 08/03/18 3:21pm
Date/Time: Aug 3/2018	Temperature: / °C AT	Temperature: 6.1 °C	pH Verified [ ] By:

APPENDIX C

Record of Boreholes

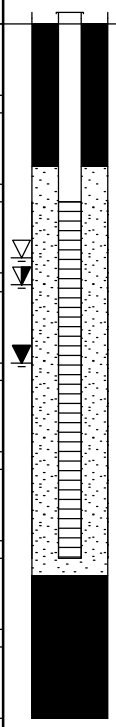
RECORD OF BOREHOLE 18-1

CLIENT: Novatech
PROJECT: 1055 Klondike
JOB#: 64153.85
LOCATION: See Borehole Location Plan, Figure 2

SHEET: 1 OF 1
DATUM: Geodetic
BORING DATE: Mar 9 2018

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY (mm)	BLOWS/0.3m	LABORATORY ANALYSES	COMBUSTIBLE VAPOUR CONCENTRATION (ppm)	ODOUR	TPH (mg/kg)
		Ground Surface		77.69								
0	150 mm Diameter Power Auger	Dark brown silty sand, some organic material (TOPSOIL)		77.4 / 0.00	1	50 D.O.		4				
		Brown SILT and SAND			2	50 D.O.		4				
1					3	50 D.O.		6				
2				75.4								
		Very stiff to stiff, grey brown SILT and CLAY (WEATHERED CRUST)		0.31	4	50 D.O.		5				
3					5	50 D.O.		5				
4					6	50 D.O.		3				
					7	50 D.O.		4				
5					8	50 D.O.		3				
				71.7								
		End of borehole		2.29								

MONITORING WELL INSTALLATION AND NOTES



GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEVATION (m)
Mar. 15/18	2.00 ▽	75.69
May. 14/18	2.90 ▼	74.79
Mar. 22/19	2.23 ▼	75.46

GEMTEC
Consulting Engineers and Scientists

LOGGED: AN
CHECKED:

RECORD OF BOREHOLE 18-2

CLIENT: Novatech
PROJECT: 1055 Klondike
JOB#: 64153.85
LOCATION: See Borehole Location Plan, Figure 2

SHEET: 1 OF 1
DATUM: Geodetic
BORING DATE: Mar 8 2018

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY (mm)	BLOWS/0.3m	LABORATORY ANALYSES	COMBUSTIBLE VAPOUR CONCENTRATION (ppm)	ODOUR	TPH (mg/kg)	MONITORING WELL INSTALLATION AND NOTES
		Ground Surface		78.38									
0	150 mm Diameter Power Auger	Brown sandy silt with organic material (TOPSOIL)		78.1 / 0.00	1	50 D.O.		4					
		Grey brown SILT and SAND											
1		Brown, fine to medium grained SAND, trace to some silt, layered with grey brown SILTY SAND		77.3 / 0.25	2	50 D.O.		7					
					3	50 D.O.		5					
2		Very stiff to stiff, grey brown SILT and CLAY (WEATHERED CRUST)		76.3 / 1.04	4	50 D.O.		4					
3					5	50 D.O.		3					
4					6	50 D.O.		3					
5					7	50 D.O.		7					Borehole backfilled with auger cuttings
		Very stiff to stiff, grey SILTY CLAY		73.2 / 2.11									
6					8	50 D.O.		2					
7													
8					9	50 D.O.		2					
9		Compact, grey sand and silt, trace to some clay, some gravel and cobbles (GLACIAL TILL)		69.2 / 5.18	10	50 D.O.		15					
10					11	50 D.O.		27					Soil becomes saturated at about 2.3 metres below ground surface.
		Sampler refusal End of borehole		68.2 / 9.14									

GEMTEC
Consulting Engineers and Scientists

LOGGED: AN
CHECKED:

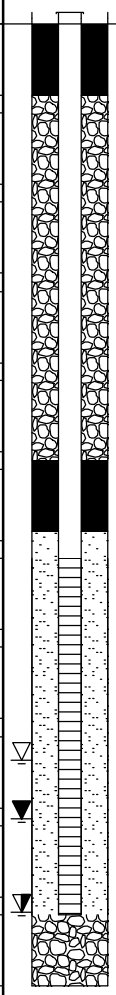
RECORD OF BOREHOLE 18-3

CLIENT: Novatech
PROJECT: 1055 Klondike
JOB#: 64153.85
LOCATION: See Borehole Location Plan, Figure 2

SHEET: 1 OF 1
DATUM: Geodetic
BORING DATE: Mar 9 2018

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY (mm)	BLOWS/0.3m	LABORATORY ANALYSES	COMBUSTIBLE VAPOUR CONCENTRATION (ppm)	ODOUR	TPH (mg/kg)
		Ground Surface		78.79								
0	150 mm Diameter Power Auger	Grey, crushed sand and gravel, trace silt (DRIVEWAY MATERIAL)		78.6 / 0.00	1	50 D.O.		46				
		Dark brown and brown silty sand, some gravel, and organic material (FILL MATERIAL)		77.9								
1		Brown SILT and SAND		0.15	2	50 D.O.		7				
					3	50 D.O.		7				
2												
				76.3	4	50 D.O.		5				
		Brown, fine to medium grained SAND, trace to some silt		0.91 / 75.7								
3		Very stiff to stiff, grey brown SILT and CLAY (WEATHERED CRUST)		2.49	5	50 D.O.		4				
					6	50 D.O.		3				
4												
					7	50 D.O.		4				
5												
					8	50 D.O.		3				
6												
					9	50 D.O.		2				
7					10	50 D.O.						
				71.2								
		Stiff, grey Silty Clay		3.05 / 70.6	11	50 D.O.		1				
8		End of borehole		7.63								

MONITORING WELL INSTALLATION AND NOTES



GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEVATION (m)
Mar. 15/18	6.30 ▽	72.49
May. 14/18	6.80 ▼	71.99
Jul. 27/18	7.60 ▼	71.19

GEMTEC
Consulting Engineers and Scientists

LOGGED: AN
CHECKED:

ENV - BOREHOLE LOG 6415385_BOREHOLE LOGS_GNT_V01_2018-03-14.GPJ GEMTEC 2018.GDT 3/5/19

RECORD OF BOREHOLE 18-4

CLIENT: Novatech
PROJECT: 1055 Klondike
JOB#: 64153.85
LOCATION: See Borehole Location Plan, Figure 2

SHEET: 1 OF 1
DATUM: Geodetic
BORING DATE: Mar 8 2018

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY (mm)	BLOWS/0.3m	LABORATORY ANALYSES	COMBUSTIBLE VAPOUR CONCENTRATION (ppm)	ODOUR	TPH (mg/kg)	MONITORING WELL INSTALLATION AND NOTES
		Ground Surface		77.61									
0	150 mm Diameter Power Auger	Dark brown silty sand / sandy silt, some organic material (TOPSOIL)		77.4 / 0.00	1	50 D.O.		3					
		Brown SILT and SAND, trace roots											
1				76.5 / 0.18	2	50 D.O.		7					
		Brown, fine to medium grained SAND, trace to some silt			3	50 D.O.		10					
2				75.5 / 1.12									
		Very stiff, grey brown SILT and CLAY (WEATHERED CRUST)			4	50 D.O.		4					
3					5	50 D.O.		4					
4					6	50 D.O.		2					Borehole backfilled with auger cuttings
					7	50 D.O.		2					
5													
6				71.5 / 2.13									
		Stiff, grey SILTY CLAY			8	50 D.O.		W.H.					
7													
					9	50 D.O.		1					
8				69.2									Soil becomes saturated at about 2.3 metres below ground surface.
		Grey sand and silt, some gravel, possible cobbles (GLACIAL TILL)		6.10 / 69.1	10	50 D.O.		50 for 0.1m					
		Auger refusal on possible bedrock End of borehole		8.38									

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Consulting Engineers and Scientists

LOGGED: AN
CHECKED:

ENV - BOREHOLE LOG 6415385_BOREHOLE LOGS_GNT_V01_2018-03-14.GPJ GEMTEC 2018.GDT 3/5/19

RECORD OF BOREHOLE 18-5

CLIENT: Novatech
PROJECT: 1055 Klondike
JOB#: 64153.85
LOCATION: See Borehole Location Plan, Figure 2

SHEET: 1 OF 1
DATUM: Geodetic
BORING DATE: Mar 8 2018

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLE DATA: NUMBER	TYPE	RECOVERY (mm)	BLOWS/0.3m	LABORATORY ANALYSES	COMBUSTIBLE VAPOUR CONCENTRATION (ppm)	ODOUR	TPH (mg/kg)	MONITORING WELL INSTALLATION AND NOTES
0		Ground Surface		77.80									Above ground protector
	150 mm Diameter Power Auger	Grey brown silty clay, with dark brown pockets, some organic material (FILL MATERIAL)			1	50 D.O.		8					Bentonite
1					2	50 D.O.		5					
2					3	50 D.O.		3					Filter sand
					4	50 D.O.		4					TOP OF SCREEN ELEV.: 75.36 m
3				74.5									
		Brown silty sand, trace wood		0.00	5	50 D.O.		5					
4					6	50 D.O.		8					50 mm diameter, 3m length slotted PVC screen
				73.1									
		Very stiff to stiff, grey brown SILT and CLAY (WEATHERED CRUST)		3.25	7	50 D.O.		12					
5					8	50 D.O.		5					
6					9	50 D.O.		3					BOTTOM OF SCREEN ELEV.: 72.31 m
					10	50 D.O.		2					
7													
				70.1	11	50 D.O.		50 for 0.13m					Well observed to be dry on October , 2018, and March 22, 2019.
		Auger refusal on possible bedrock End of borehole		4.72									

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEVATION (m)
Mar. 15/18	5.50 ▽	72.30
May. 14/18	5.90 ▼	71.90
Jul. 27/18	6.70 ▼	71.10

GEMTEC
Consulting Engineers and Scientists

LOGGED: AN
CHECKED:

ENV - BOREHOLE LOG 6415385_BOREHOLE LOGS_GNT_V01_2018-03-14.GPJ GEMTEC 2018.GDT 3/5/19

RECORD OF BOREHOLE 19-1

CLIENT: Novatech
PROJECT: 1055 Kondike Road
JOB#: 64153.85
LOCATION: See Borehole Location Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD2013
BORING DATE: Mar 14 2019

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLE DATA: NUMBER	TYPE	RECOVERY (mm)	BLOWS/0.3m	LABORATORY ANALYSES	COMBUSTIBLE VAPOUR CONCENTRATION (ppm)	ODOUR	TPH (mg/kg)	MONITORING WELL INSTALLATION AND NOTES
		Ground Surface		77.98									
0	Power Auger / Hollow Stem Auger (210mm OD)	Dark brown silty sand with organic material (TOPSOIL)		77.83 / 0.15	1A 1B	SS		3					
		Loose, brown SILTY SAND											
1					2	SS		7					
					3	SS		7					
2				75.82									
		Stiff to very stiff, brown silty clay (WEATHERED CRUST)		2.16	4	SS		4					
3					5	SS		5					
4					6	SS		2					Backfilled with auger cuttings
5					7	TO							
6					8	SS		2					
7		Stiff, grey SILTY CLAY		70.98 / 7.00	9	TO							
8					10	TO							
9		End of Borehole Refusal on inferred Bedrock		68.84 / 9.14									

GEMTEC
Consulting Engineers and Scientists

LOGGED: BWW
CHECKED: GD

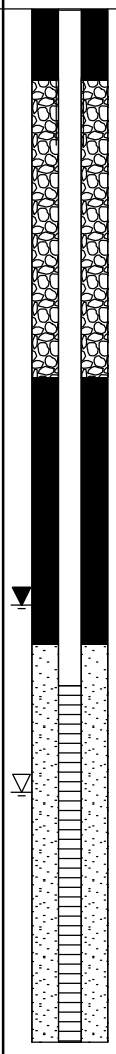
ENV - BOREHOLE LOG 64153.85_GNT_V01_2019-03-15.GPJ GEMTEC 2018.GDT 3/5/19

RECORD OF BOREHOLE 19-2

CLIENT: Novatech
PROJECT: 1055 Kondike Road
JOB#: 64153.85
LOCATION: See Borehole Location Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD2013
BORING DATE: Mar 14 2019

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLE DATA: NUMBER	TYPE	RECOVERY (mm)	BLOWS/0.3m	LABORATORY ANALYSES	COMBUSTIBLE VAPOUR CONCENTRATION (ppm)	ODOUR	TPH (mg/kg)	MONITORING WELL INSTALLATION AND NOTES
		Ground Surface		78.55									
0	Power Auger / Hollow Stem Auger (210mm OD)	Soil stratigraphy not logged											
1													
2													
3													
4													
5													
6													
7													
8				69.71									
		End of Borehole		8.84									



GROUNDWATER OBSERVATIONS

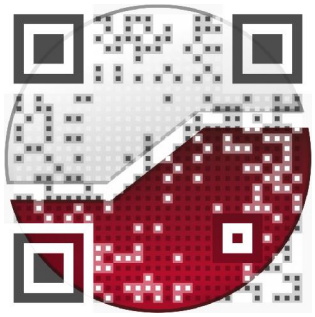
DATE	DEPTH (m)	ELEVATION (m)
Mar. 19/22	6.70 ▽	71.85
Apr. 04/19	5.10 ▼	73.45

GEMTEC
Consulting Engineers and Scientists

LOGGED: BWW
CHECKED: GD

ENV - BOREHOLE LOG 64153.85_GNT_V01_2019-03-15.GPJ GEMTEC 2018.GDT 3/5/19

experience • knowledge • integrity



civil	civil
geotechnical	géotechnique
environmental	environnementale
field services	surveillance de chantier
materials testing	service de laboratoire des matériaux

expérience • connaissance • intégrité