Phase Two Environmental Site Assessment

117 Durham Street, Cobourg, Ontario

The Corporation of the Town of Cobourg

November 02, 2022

→ The Power of Commitment

Executive Summary

Based on the results of a Phase One Environmental Site Assessment (ESA), a Phase Two ESA was conducted by GHD Limited (GHD) for The Corporation of the Town of Cobourg ("the Client") for land located at the municipal address of 117 Durham Street in Cobourg, Ontario (herein referred to as "the Property"). Prior to 1983, the Property was described by the municipal addresses of 119 Durham Street and 173 Sydenham Street, which were merged when both parcels were purchased by the Kawartha Pine Ridge District School Board. The Property encompasses an area of 2.0 hectares (4.9 acres) and supports a sports field / track and a small storage shed. Municipal water and sanitary services are available to the surrounding area. Based on aerial photographs, the Property was developed with a small structure by 1931; however, the Property use was not known at this time. Several small cabins are shown on the Property in a 1946 Fire Insurance Plan (FIP).

The Phase One ESA identified the following potentially contaminating activities (PCAs) which, in the opinion of GHD, resulted in areas of potential environmental concern (APECs) at the Property:

– Gasoline and Associated Products Storage in Fixed Tanks (PCA #28). This PCA was identified for historical use of the lot across Durham Street to the east, which supported bulk fuel storage. Based on a FIP, the Cobourg waterfront historically supported Shell Oil Company Ltd., Sunoco Oil and Imperial Oil Ltd. Based on aerial photographs, ASTs were present on the lot by 1959 and were removed by the time the lot was re-developed to support the Legion Village in the 1980s.
– Textile Manufacturing and Processing (PCA #54). This PCA was identified for the historical Mat & Matting Factory identified on the adjacent lot to the west in 1911 and 1946 FIPs. The FIPs showed use of gasoline and coal as fuel sources.

The Phase Two ESA was carried out to address the APECs identified in the Phase One ESA and included the exploration of the subsurface by advancing eight (8) boreholes across the Property. Monitoring wells were installed in three (3) of the boreholes.

Soil samples were selected and tested for pH, metals, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons (PHCs) and volatile organic compounds (VOCs). Groundwater was sampled for metals, PAHs, PHCs and VOCs. Results of the chemical analysis were compared to the MECP Table 9: Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (coarse textured soil standards) for a residential / parkland / institutional / industrial / commercial / community (RPIICC) property use (Table 9 Standards).

Based on analytical testing completed at the boreholes, the soil results meet the Table 9 Standards for each of the parameters and boreholes tested with the exception of borehole BH-22-1 at a depth tested between 0.8 – 1.4 m which exceeded the Table 9 Standards for various metals including antimony, lead, mercury, and molybdenum. The material was observed to be fill and was observed to a depth of 2.3 m in BH-22-1. Further work would be required to further delineate the extent of soil impacted with metals.

Groundwater concentrations tested from monitoring wells installed within boreholes BH-22-1, BH-22-3 and BH-22-4 meet the Table 9 Standards for each of the parameters tested including metals, PAHs, PHCs and VOCs.

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*Note: Appendices continue in sequence from the Phase One ESA Report

1. Introduction

This report presents the results of a Phase Two Environmental Site Assessment (ESA) that was completed by GHD Limited (GHD) for The Corporation of the Town of Cobourg ("the Client") for land located at the municipal address of 117 Durham Street in Cobourg, Ontario (herein referred to as "the Property"). Prior to 1983, the Property was described by the municipal addresses of 119 Durham Street and 173 Sydenham Street, which were merged when both parcels were purchased by the Kawartha Pine Ridge District School Board.

1.1 Site Description

The Property encompasses an area of 2.0 hectares (4.9 acres) and supports a sports field / track and a small storage shed. Municipal water and sanitary services are available to the surrounding area. Based on aerial photographs, the Property was developed with a small structure by 1931. Property use at this time is not known. Several small cabins are shown on the Property in a 1946 Fire Insurance Plan, which was reviewed as part of GHD's Phase One ESA.

1.2 Property Ownership

The Property has been owned by Kawartha Pine Ridge School Board (formerly The Northumberland and Newcastle Board of Education) since 1983. GHD's Phase One ESA should be reviewed for further information regarding ownership.

1.3 Current and Proposed Future Uses

The Property supports a fenced sports field / track and a small storage shed. The field is locked and unused. A portion of the Property supports boardwalks which are used as walking trails by the public. It is GHD's understanding that the Property is proposed for purchase and the future use is to remain as parkland.

1.4 Applicable Site Condition Standard

The applicable site condition standard for this Property currently falls under the Ministry of the Environment, Conservation and Parks (MECP) Table 9: Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition for Residential / Parkland / Institutional / Industrial / Commercial / Community (RPIICC) property use (MECP, April 15, 2011, "Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*"). The MECP standards will be referred to as "Table 9 Standards" within this report.

The MECP Standards provide generic soil and groundwater quality standards for certain chemicals based on combinations of the following site-specific conditions:

– *Property Use Type* – Residential / Parkland / Institutional /Industrial / Commercial / Community (RPIICC) Property use. GHD understands the Property is proposed for purchase and the future use is to remain as parkland. Analytical results will be compared with the RPIICC standards.
– *Restoration of Groundwater Quality* – Potable or non-potable. Municipal drinking water is available to the surrounding area. Non-potable groundwater standards apply.
– *Restoration Depth* – Full depth or stratified depth. For comparative purposes, results will be compared to full depth standards.
– *Soil Texture* – Coarse or medium to fine textured soils. Medium to fine textured soils are defined under Section 42 of Ontario Regulation 153/04 as soil that contain more than 50 percent by mass of particles that are 75 µm or smaller in mean diameter. Coarse textured standards may be used if at least 1/3 of the soil at the property by

volume consists of coarse textured soil. Based on field observations and grain size analysis, subsurface material consists primarily of sand and gravel and is classified as coarse textured soil. The coarse textured soil standards apply.

– *Shallow Soil Property* – Based on the subsurface drilling program, the overburden soils are more than two (2) metres in thickness. As such, the Property is not considered to be a shallow soil property.
– *Water Body* – Lake Ontario is present within 30 m of the Property boundary to the south. The specific standards relating to the protection of water bodies will be applied.
– *Environmentally Sensitive Areas* – The Property is not within an area of natural significance or environmentally sensitive areas. The specific standards relating to environmentally sensitive areas is not applicable.

Based upon this information, Table 9 Standards for coarse textured soils will be applied.

2. Background Information

2.1 Physical Setting

The Property is situated within an area which is predominantly developed for residential purposes. Access to the Property is from Durham Street from the east. The Property supports a fenced sports field / track and a small storage shed. The fence around the field is locked and the field is not used. A portion of the Property supports boardwalks which are used as walking tails by the public. Surface water will flow in accordance with the local topography towards drainage ditches along Durham Street and overland towards Lake Ontario. The Property is situated within the physiographic region known as the Iroquois Plain (Chapman and Putnam, 1984).

2.2 Past Investigations

A Phase One ESA for the Property was conducted by GHD in 2022 and is the basis of this Phase Two ESA. GHD's Phase One ESA should be reviewed for further information.

3. Scope of Investigation

3.1 Overview of Site Investigation

The Phase Two ESA activities have been prepared under the supervision of a Qualified Person, as defined by the Environmental Protection Act, using Ontario Regulation (O. Reg.) 153/04 (as periodically amended). The Phase Two ESA is generally based upon the O. Reg. 153/04 document for conducting ESAs.

A field investigation was conducted by GHD to characterize the subsurface conditions including soil and groundwater quality. The following scope of work was conducted during the Phase Two ESA:

1. Advanced, sampled and logged eight (8) boreholes to depths ranging from 2.7 to 4.6 metres below ground surface (mbgs). Monitoring wells were installed in three (3) of the boreholes. Soil samples were collected at regular intervals and monitored for volatile hydrocarbon vapours using an RKI Instruments Eagle 2 hydrocarbon gas detector.
2. Representative samples of the soil were subjected to chemical analyses. Soil samples were analyzed for pH, metals, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons fractions F1 – F4 (PHCs) and volatile organic compounds (VOCs). Groundwater samples were analyzed for metals, PAHs, PHCs and VOCs to assess groundwater quality.

3. Analyzed data obtained and presented the findings in this report with conclusions and recommendations. The analytical results were compared to the Table 9 Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (RPIICC property use) (MECP, April 15, 2011, "Soil, Groundwater and Sediment Standards for use Under Part XV.1 of the *Environmental Protection Act"*) – coarse textured soils.

3.2 Media Investigated

Soil and groundwater conditions were investigated with a focus on PCAs that have resulted in APECs as outlined in the Phase One ESA. The following PCAs, in GHD's opinion, were identified as resulting in APECs on the Property:

– Gasoline and Associated Products Storage in Fixed Tanks (PCA #28). This PCA was identified for historical use of the lot across Durham Street to the east, which supported bulk fuel storage. Based on a FIP, the Cobourg waterfront historically supported Shell Oil Company Ltd., Sunoco Oil and Imperial Oil Ltd. Based on aerial photographs, ASTs were present on the lot by 1959 and were removed by the time the lot was re-developed to support the Legion Village in the 1980s.
– Textile Manufacturing and Processing (PCA #54). This PCA was identified for the historical Mat & Matting Factory identified on the adjacent lot to the west in 1911 and 1946 FIPs. The FIPs showed use of gasoline and coal as fuel sources.

The following field investigation activities were completed:

– Advancement of eight (8) boreholes for soil sampling;
– Installation of monitoring wells within three (3) of the boreholes;
– Water level measurements conducted at the monitoring wells;
– Development of the monitoring wells in preparation of sampling;
– Sampling of the monitoring wells; and,
– Submission of samples to an accredited laboratory for analysis of representative soil and groundwater samples.

The Phase Two investigation locations are presented on the **Test Hole Plan, Figure 6**.

3.3 Phase One Conceptual Site Model

A Phase One Conceptual Site Model is presented on **Figures 4 and 5**. The model provides a basic overview, basic geological and hydrogeological information and any other pertinent data that may affect the ESA. The Property is situated in the physiographic region known as the Iroquois Plain (Chapman and Putnam, 1984). Local groundwater flow direction is generally inferred to be towards Lake Ontario.

Based on information reviewed, the Property was developed with a small structure by 1931; however, the Property use was not known at this time. The Property was later developed with several small cabins, as identified on a 1946 FIP. The Property has been used as a sports field / track since the 1980s. The Phase One ESA identified PCAs within the Phase One Study Area. There were no PCAs identified on the Property itself. PCAs within the Phase One Study Area were identified for historically used lots in the area which included bulk fuel storage and a matting factory, both present on adjacent lots. APECs were identified for these PCAs. The soil and groundwater contaminants of concern for the APECs are metals, PAHs, PHCs and VOCs.

3.4 Deviations from Sampling and Analysis Plan

A sampling and analysis plan was prepared based upon information from the Phase One ESA. The sampling plan is provided in **Appendix E**. There were no deviations from the sampling and analysis plan.

3.5 Impediments

Drilling was not conducted within the footprint of the small storage structure on the Property. The impediment was not significant as the investigation program was conducted within the identified APECs.

4. Investigation Method

4.1 General

This section of the report describes the field methods utilized during the investigation. The field activities were completed as per MECP protocols, GHD standard operating procedures and standard industry practices. The Phase Two drilling was completed on October 13, 2022. The investigative tasks are described in detail in the following subsections:

– Advancement of boreholes at select locations;
– Completion of field screening measurements;
– Collection of soil samples;
– Analytical soil testing;
– Residual soil management;
– Installation of monitoring wells in select boreholes;
– Water levels and development of the monitoring wells;
– Sampling of groundwater for analytical testing; and
– Quality assurance and quality control measures.

Prior to the commencement of the subsurface investigation, GHD completed the appropriate public and private utility notifications.

4.2 Drilling

The subsurface exploration program consisted of the advancement of eight (8) boreholes by GET Drilling Ltd. using a truck-mounted drill rig on October 13, 2022. The boreholes were advanced in the locations illustrated on the **Test Hole Plan, Figure 6** and advanced to depths ranging from 2.7 to 4.6 mbgs.

Boreholes were generally advanced through surficial topsoil and sand fill / silty sand fill material underlain by native gravelly sand. The topsoil ranged in thickness from 50mm to 75mm and in all borehole locations was underlain by fill. The fill underlying the topsoil was generally described as a brown sand that extended to depths ranging from 0.6 to 1.5m. In boreholes BH22-1, BH-22-2 and BH22-5 the sand fill was underlain by a silty sand fill generally described as dark brown in colour. In BH22-1 brick fragments and black solid material was observed in this fill layer that was inferred to be coal related.

The fill was underlain by a gravelly sand described as brown in colour. The gravelly sand was found to be in a relatively very dense state with the exception of BH22-4 and BH22-6 where the density was described as loose. The gravelly sand extended to borehole termination in all locations except for BH22-6 where a silty sand was encountered at 2.3m that extended to borehole termination at 2.7m.

Refusal to practical further advancement was encountered within six (6) of the boreholes at depths ranging from 2.7 to 4.6 mbgs. The presence of bedrock was inferred but not confirmed. BH22-3 and BH-22-4 did not encounter refusal to practical further advancement and were advanced to depths of 3.7 and 4.4 mbgs, respectively. Detailed logs are provided in **Appendix F** and provide an overview of the subsurface conditions encountered during the drilling activities.

Prior to use, during drilling and between each test hole, the sampling equipment was decontaminated. The wash procedure for decontamination of equipment was a water detergent wash and potable water rinse.

4.3 Soil Sampling

Based on the sampling plan, field observations, headspace analysis of organic vapour readings, visual and olfactory evidence of potential contamination and professional judgment, soil samples were selected for chemical analyses. GHD personnel collected soil samples for laboratory analysis directly from the sampling equipment.

The samples to be submitted for analysis were placed into clean laboratory prepared sample bottles. Fresh nitrile gloves were worn when collecting the samples. The soil samples selected for chemical analyses were kept in a cooler on ice and delivered to Caduceon Laboratories (Caduceon). The following soil samples were submitted for analysis during the Phase Two ESA program:

– BH-22-1, SS-2 – pH, metals and PAHs;
– BH-22-2, SS-3 – Metals, PHCs and VOCs;
– BH-22-3, SS-3 – PHCs and VOCs;
– BH-22-4, SS-2 – Metals;
– BH-22-4, SS-4 – pH, PAHs, PHCs and VOCs;
– BH-22-5, SS-3 – Metals and PAHs;
– BH-22-5, SS-4 – PHCs and VOCs; and,
– BH-22-7, SS-2 – Metals and PAHs.

4.4 Field Screening Measurements

Field screening measurements were completed using a RKI Instruments Eagle 2 portable gas detector. The soil samples obtained during the test hole program were subjected to hydrocarbon vapour testing or “headspace analysis” using the gas detector. Prior to sample collection events, the gas detector was inspected and calibrated according to the manufacturer’s recommendations. The vapour readings are shown on the logs in **Appendix F** and were at ambient levels.

4.5 Groundwater: Monitoring Well Installation

As part of the Phase Two ESA, monitoring wells were installed in three (3) of the boreholes during drilling activities. The monitoring wells were installed to assess potential groundwater impacts with the well screens placed to straddle the water table, if possible. The monitoring wells were constructed of 51 mm diameter PVC well pipe consisting of 10-slot well screen. The monitoring wells consisted of screen lengths of 1.5 m as shown in **Appendix F**. A silica sand pack extending above the screen was installed with a bentonite seal above the sand pack to the ground surface of the borehole to prevent the migration of surface water down the borehole annulus. A locked steel stick-up casing was installed to protect and prevent tampering with the monitoring wells.

4.6 Groundwater: Field Measurement of Water Quality

The monitoring wells were measured for groundwater levels and developed with dedicated Waterra tubing outfitted with inertial foot valves. No light or dense non-aqueous phase liquids were observed during the well development activities.

4.7 Groundwater: Sampling

After well development, water sampled were collected using dedicated low-flow sampling equipment. The water samples were submitted for the analysis of the following parameters:

– BH-22-1 – Metals, PHCs and VOCs;
– BH-22-3 – Metals, PAHs, PHCs and VOCs; and,
– BH-22-4 – Metals, PAHs, PHCs and VOCs.

4.8 Sediment: Sampling

Sediment sampling is not applicable.

4.9 Analytical Testing

The analytical testing was completed in accordance with the requirements of Ontario Regulation 153/04 (as amended) and associated MECP analytical guidance documents. Sampling was completed based upon information available from the Phase One ESA, visual and olfactory observations, field screening and professional judgment.

The analytical testing was completed at Caduceon, an accredited laboratory with the Canadian Association for Laboratory Accreditation (CALA) for the parameters tested during this investigation. Sampling and analyses were completed for pH, metals, PAHs, PHCs and VOCs. Copies of the Certificates of Analysis are provided in **Appendix G** of this report.

4.10 Elevation Surveying

An elevation survey of the borehole locations was not completed of the test hole locations. If required, topographic elevations can be surveyed.

4.11 Quality Assurance and Quality Control Measures

The Quality Assurance and Quality Control (QA/QC) program was implemented during the ESA to ensure quality data was generated. Soil samples were collected with pre-cleaned sampling equipment and placed directly into laboratory supplied dedicated jars. Samples were submitted under chain-of-custody protocol to an analytical laboratory that is accredited with the CALA for the parameters tested for. From the time of collection to the time of submission to the laboratory, samples were kept cool to maintain sample integrity.

The QA/QC measures implemented by the laboratory were maintained throughout the investigation and are included in the laboratory's Certificates of Chemical Analysis included in **Appendix G**. There were no QA/QC issues.

5. Review and Evaluation

GHD completed the Phase Two ESA investigation activities to address the APECs defined in the Phase One ESA. This review and evaluation section describes the results of the Phase Two ESA.

5.1 Geology

Reference is made to the borehole logs in **Appendix F** for details including local soil and geology classification and stratigraphy. The stratigraphy in the areas where test holes were advanced generally consisted of surficial topsoil and sand fill / silty sand fill material underlain by gravelly sand. Refusal to practical further advancement was encountered within seven (7) of the boreholes at depths ranging from 2.7 to 4.6 mbgs, where bedrock was inferred. BH-22-4 did not encounter refusal to practical further advancement, which was advanced to a depth of 4.4 mbgs.

Gradation analysis conducted on one (1) sample of the fill material indicated the following composition: 2% gravel, 95% sand and 3% silt and clay-sized particles.

Gradation analysis conducted on one (1) sample of the silty sand material indicated the following composition: 13% gravel, 58% sand and 29% silt and clay-sized particles.

Gradation analysis conducted on one (1) sample of the gravelly sand indicated the following composition: 50% gravel, 44% sand and 6% silt and clay-sized particles.

5.2 Groundwater: Elevations and Flow Direction

The groundwater elevations were not assessed in this investigation. Inferred groundwater flow direction is expected to be towards Lake Ontario.

5.3 Groundwater: Hydraulic Gradient

An assessment of the groundwater hydraulic gradient was not calculated for this investigation.

5.4 Fine-Medium Soil Texture

Based upon field observations and grain size analysis, subsurface materials consist largely of sand and gravel materials and are classified as coarse-grained soils.

5.5 Soil: Field Screening

Field screening of total organic vapours was measured by GHD of each sample using a RKI Instruments Eagle 2 hydrocarbon gas detector. Vapour readings are shown on the borehole logs in **Appendix F** and were at ambient levels.

5.6 Soil Quality

Soil samples analyzed were selected from the APECs based upon visual and olfactory observations, field screening activities and professional judgment. The laboratory certificates of analysis are provided in **Appendix G**. Two (2) samples were assessed for pH. The pH results are within the acceptable MECP ranges illustrated in **Table 1**. Five (5) samples were analysed for metals. The results are summarized and compared with the Table 9 Standards in **Tables 1 and 2.** The results meet the MECP Table 9 Standards with the exception of sample BH-22-1, SS-2 which exceeds the Table 9 Standards for antimony, lead, mercury and molybdenum.

Table 1 Summary of pH and Metals in Soil - 1

Parameter	Sample Identification				MECP Table 9 Standards
	BH-22-1, SS-2 (0.8 – 1.4 m) October 13/22	BH-22-2, SS-3 (1.5 – 2.1 m) October 13/22	BH-22-4, SS-2 (0.8 – 1.4 m) October 13/22	BH-22-4, SS-4 (2.3 – 2.9 m) October 13/22	
pH (surface soil < 1.5 m)	7.41	-	-	-	5 – 9
pH (subsurface soil ≥ 1.5 m)	-	-	-	7.67	5 – 11*
Antimony	**4.0**	< 0.5	< 0.5	-	1.3
Arsenic	16.0	1.1	2.3	-	18
Barium	210	10	78	-	220
Beryllium	0.8	< 0.2	0.3	-	2.5
Boron	14.2	10.0	12.8	-	36
Boron (HWS)	0.09	0.03	0.04	-	1.5
Cadmium	0.6	< 0.5	< 0.5	-	1.2
Chromium	16	4	16	-	70
Chromium (VI)	< 0.2	< 0.2	< 0.2	-	0.66
Cobalt	10	2	7	-	22
Copper	47	3	14	-	92
Lead	**202**	11	18	-	120
Mercury	**0.821**	0.035	0.022	-	0.27
Molybdenum	**3**	< 1	< 1	-	2
Nickel	19	1	11	-	82
Selenium	1.1	< 0.5	0.6	-	1.5
Silver	0.3	< 0.2	< 0.2	-	0.5
Thallium	< 0.1	< 0.1	0.1	-	1
Uranium	0.8	0.3	0.5	-	2.5
Vanadium	30	8	29	-	86
Zinc	284	17	41	-	290

Notes: Analytical results presented as µg/g (parts per million) unless otherwise noted. "<" indicates parameter is below the laboratory reporting limit (i.e. non-detect); "-" denotes not analyzed; HWS = hot water soluble
MECP "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA", April 15, 2011. Table 9: Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (coarse textured soils) –RPIICC property use.

Table 2 Summary of Metals in Soil - 2

Parameter	Sample Identification		MECP Table 9 Standards
	BH-22-5, SS-3 (1.5 – 2.1 m) October 13/22	BH-22-7, SS-2 (0.8 – 1.4 m) October 13/22	
Antimony	< 0.5	< 0.5	1.3
Arsenic	3.1	2.4	18
Barium	29	24	220
Beryllium	< 0.2	< 0.2	2.5
Boron	9.1	8.7	36
Boron (HWS)	0.05	0.04	1.5
Cadmium	< 0.5	< 0.5	1.2
Chromium	8	7	70
Chromium (VI)	< 0.2	< 0.2	0.66
Cobalt	3	3	22
Copper	8	4	92
Lead	43	20	120
Mercury	0.029	0.055	0.27
Molybdenum	< 1	< 1	2
Nickel	4	4	82
Selenium	0.6	0.5	1.5
Silver	< 0.2	< 0.2	0.5
Thallium	< 0.1	< 0.1	1
Uranium	0.5	0.5	2.5
Vanadium	15	16	86
Zinc	84	21	290

Notes: Analytical results presented as µg/g (parts per million) unless otherwise noted. "<" indicates parameter is below the laboratory reporting limit (i.e. non-detect). HWS = hot water soluble
MECP "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA", April 15, 2011. Table 9: Generic Site Condition Standards for Use within 30 m in a Non-Potable Ground Water Condition (coarse textured soils) –RPIICC property use.

Four (4) soil samples were submitted for the analysis of PAHs. The results are summarized and compared with Table 9 Standards in **Table 3**. The results meet the MECP Table 9 Standards.

Table 3 Summary of PAHs in Soil

Parameter	Sample Identification				MECP Table 9 Standards
	BH-22-1, SS-2 (0.8 – 1.4 m) October 13/22	BH-22-4, SS-4 (2.3 – 2.9 m) October 13/22	BH-22-5, SS-3 (1.5 – 2.1 m) October 13/22	BH-22-7, SS-2 (0.8 – 1.4 m) October 13/22	
Acenaphthene	< 0.05	< 0.05	< 0.05	< 0.05	0.072
Acenaphthylene	< 0.05	< 0.05	< 0.05	< 0.05	0.093
Anthracene	< 0.05	< 0.05	< 0.05	< 0.05	0.22
Benzo(a)anthracene	< 0.05	< 0.05	< 0.05	0.07	0.36
Benzo(a)pyrene	< 0.05	< 0.05	< 0.05	0.07	0.3
Benzo(b)fluoranthene	< 0.05	< 0.05	< 0.05	0.10	0.47
Benzo(g,h,i)perylene	< 0.05	< 0.05	< 0.05	0.05	0.68
Benzo(k)fluoranthene	< 0.05	< 0.05	< 0.05	< 0.05	0.48
Chrysene	< 0.05	< 0.05	< 0.05	0.09	2.8
Dibenzo(a,h)anthracene	< 0.05	< 0.05	< 0.05	< 0.05	0.1
Fluoranthene	< 0.05	< 0.05	< 0.05	0.14	0.69
Fluorene	< 0.05	< 0.05	< 0.05	< 0.05	0.19
Indeno(1,2,3,-cd)pyrene	< 0.05	< 0.05	< 0.05	0.08	0.23
Methylnaphthalene,1-	< 0.05	< 0.05	< 0.05	< 0.05	0.59
Methylnaphthalene,2-	< 0.05	< 0.05	< 0.05	< 0.05	0.59
Methylnaphthalene 2-(1-)	< 0.05	< 0.05	< 0.05	< 0.05	0.59
Naphthalene	< 0.05	< 0.05	< 0.05	< 0.05	0.09
Phenanthrene	< 0.05	< 0.05	< 0.05	0.05	0.69
Pyrene	< 0.05	< 0.05	< 0.05	0.12	1

Notes: Analytical results presented as µg/g (parts per million) unless otherwise noted. "<" indicates parameter is below the laboratory reporting limit (i.e. non-detect).
MECP "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA", April 15, 2011. Table 9: Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (coarse textured soils) –RPIICC property use.

Four (4) soil samples were submitted for the analysis of PHCs and VOCs. The results are summarized and compared with Table 9 Standards in **Table 4**. The results meet the MECP Table 9 Standards.

Table 4 Summary of PHCs and VOCs in Soil

Parameter	Sample Identification				MECP Table 9 Standards
	BH-22-2, SS-3 (1.5 – 2.1 m) October 13/22	BH-22-3, SS-3 (1.5 – 2.1 m) October 13/22	BH-22-4, SS-4 (2.3 – 2.9 m) October 13/22	BH-22-5, SS-4 (2.3 – 2.9 m) October 13/22	
PHC F1 (C_6 to C_{10})	< 10	< 10	< 10	< 10	25
PHC F2 (C_{10} to C_{16})	< 5	< 5	< 5	< 5	10
PHC F3 (C_{16} to C_{34})	< 10	< 10	11	< 10	240
PHC F4 (C_{34} to C_{50})	< 10	< 10	< 10	< 10	120
Acetone	< 0.5	< 0.5	< 0.5	< 0.5	0.5
Benzene	< 0.02	< 0.02	< 0.02	< 0.02	0.02
Bromodichloromethane	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Bromoform	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Bromomethane	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Carbon Tetrachloride	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Chlorobenzene	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Chloroform	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Dibromochloromethane	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Dichlorobenzene,1,2-	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Dichlorobenzene,1,3-	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Dichlorobenzene,1,4-	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Dichlorodifluoromethane	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Dichloroethane,1,1-	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Dichloroethane,1,2-	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Dichloroethylene,1,1-	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Dichloroethene, cis-1,2-	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Dichloroethene, trans-1,2-	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Dichloropropane,1,2-	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Dichloropropene, cis-1,3-	< 0.02	< 0.02	< 0.02	< 0.02	NS
Dichloropropene, trans-1,3-	< 0.02	< 0.02	< 0.02	< 0.02	NS
Dichloropropene 1,3- cis+trans	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Ethylbenzene	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Ethylene Dibromide	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Hexane	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Methyl Ethyl Ketone	< 0.5	< 0.5	< 0.5	< 0.5	0.5
Methyl Isobutyl Ketone	< 0.5	< 0.5	< 0.5	< 0.5	0.5
Methyl-t-butyl Ether	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Methylene Chloride	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Styrene	< 0.05	< 0.05	< 0.05	< 0.05	0.05

Parameter	Sample Identification				MECP Table 9 Standards
	BH-22-2, SS-3 (1.5 – 2.1 m) October 13/22	BH-22-3, SS-3 (1.5 – 2.1 m) October 13/22	BH-22-4, SS-4 (2.3 – 2.9 m) October 13/22	BH-22-5, SS-4 (2.3 – 2.9 m) October 13/22	
Tetrachloroethane,1,1,1,2-	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Tetrachloroethane,1,1,2,2-	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Tetrachloroethylene	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Toluene	< 0.2	< 0.2	< 0.2	< 0.2	0.2
Trichloroethane,1,1,1-	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Trichloroethane,1,1,2-	< 0.02	< 0.02	< 0.02	< 0.02	0.05
Trichloroethylene	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Trichlorofluoromethane	< 0.02	< 0.02	< 0.02	< 0.02	0.25
Vinyl Chloride	< 0.02	< 0.02	< 0.02	< 0.02	0.02
Xylene, m,p-	< 0.03	< 0.03	< 0.03	< 0.03	NS
Xylene, o-	< 0.03	< 0.03	< 0.03	< 0.03	NS
Xylene, m,p,o-	< 0.03	< 0.03	< 0.03	< 0.03	0.05

Notes: Analytical results presented as µg/g (parts per million) unless otherwise noted. "<" indicates parameter is below the laboratory reporting limit (i.e. non-detect). NS = no standard.
MECP "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA", April 15, 2011. Table 9: Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (coarse textured soils) – RPIICC property use.

5.7 Groundwater Quality

Groundwater samples from the three (3) monitoring wells were collected and submitted for the analysis of metals. The samples were field filtered prior to collection within the laboratory prepared bottles. The sample results are summarized and compared to the MECP Table 9 Standards in **Table 5**. The results meet the MECP Table 9 Standards for all property uses.

Table 5 Summary of Metals in Groundwater

Parameter	Sample Identification			MECP Table 9 Standards
	BH-22-1 October 19/22	BH-22-3 October 19/22	BH-22-4 October 19/22	
Antimony	1.8	0.3	0.2	16000
Arsenic	1.1	0.3	0.5	1500
Barium	168	98	132	23000
Beryllium	< 0.2	< 0.1	< 0.1	53
Boron	100	25	35	36000
Cadmium	< 0.028	< 0.015	< 0.015	2.1
Chromium	< 2	< 2	< 2	640
Chromium (VI)	< 10	< 10	< 10	110
Cobalt	2.1	< 0.1	0.5	52
Copper	< 2	< 2	< 2	69
Lead	0.06	< 0.02	< 0.02	20

Parameter	Sample Identification			MECP Table 9 Standards
	BH-22-1 October 19/22	BH-22-3 October 19/22	BH-22-4 October 19/22	
Mercury	< 0.02	< 0.02	< 0.02	0.29
Molybdenum	4.3	1.7	1.5	7300
Nickel	2.5	0.7	1.0	390
Selenium	< 2	2	< 1	50
Silver	< 0.1	< 0.1	< 0.1	1.2
Thallium	< 0.1	< 0.05	< 0.05	400
Uranium	0.90	1.67	1.38	330
Vanadium	< 0.2	0.3	0.5	200
Zinc	140	< 5	< 5	890

Notes: Analytical results presented as µg/L (parts per billion) unless otherwise noted. "<" indicates parameter is below the laboratory reporting limit (i.e. non-detect).
MECP "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA", April 15, 2011. Table 9: Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (all property uses)

Groundwater samples from two (2) monitoring wells were collected and submitted for the analysis of PAHs. The sample results are summarized and compared to the MECP Table 9 Standards in **Table 6**. The results meet the MECP Table 9 Standards for all property uses.

Table 6 Summary of PAHs in Groundwater

Parameter	Sample Identification		MECP Table 9 Standards
	BH-22-3 October 19/22	BH-22-4 October 19/22	
Acenaphthene	< 0.05	< 0.05	600
Acenaphthylene	< 0.05	< 0.05	1.4
Anthracene	< 0.05	< 0.05	1
Benzo(a)anthracene	< 0.05	< 0.05	1.8
Benzo(a)pyrene	< 0.01	< 0.01	0.81
Benzo(b)fluoranthene	< 0.05	< 0.05	0.75
Benzo(g,h,i)perylene	< 0.05	< 0.05	0.2
Benzo(k)fluoranthene	< 0.05	< 0.05	0.4
Chrysene	< 0.05	< 0.05	0.7
Dibenzo(a,h)anthracene	< 0.05	< 0.05	0.4
Fluoranthene	< 0.05	< 0.05	73
Fluorene	< 0.05	< 0.05	290
Indeno(1,2,3,-cd)pyrene	< 0.05	< 0.05	0.2
Methylnaphthalene,1-	< 0.05	< 0.05	1500
Methylnaphthalene,2-	< 0.05	< 0.05	1500
Methylnaphthalene 2-(1-)	< 1	< 1	1500
Naphthalene	< 0.05	< 0.05	1400

Parameter	Sample Identification		MECP Table 9 Standards
	BH-22-3 October 19/22	BH-22-4 October 19/22	
Phenanthrene	< 0.05	< 0.05	380
Pyrene	< 0.05	< 0.05	5.7

Notes: Analytical results presented as µg/L (parts per billion) unless otherwise noted. "<" indicates parameter is below the laboratory reporting limit (i.e. non-detect).
MECP "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA", April 15, 2011. Table 9: Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (all property uses)

Groundwater samples from the three (3) monitoring wells were collected and submitted for the analysis of PHCs and VOCs. The sample results are summarized and compared to the MECP Table 3 Standards in **Table 7**. The results meet the MECP Table 9 Standards for all property uses.

Table 7 Summary of PHCs and VOCs in Groundwater

Parameter	Sample Identification			MECP Table 9 Standards
	BH-22-1 October 19/22	BH-22-3 October 19/22	BH-22-4 October 19/22	
PHC F1 (C_6 to C_{10})	< 25	< 25	< 25	420
PHC F2 (C_{10} to C_{16})	< 50	< 50	< 50	150
PHC F3 (C_{16} to C_{34})	< 400	< 400	< 400	500
PHC F4 (C_{34} to C_{50})	< 400	< 400	< 400	500
Acetone	< 30	< 30	< 30	100000
Benzene	< 0.5	< 0.5	< 0.5	44
Bromodichloromethane	< 2	< 2	< 2	67000
Bromoform	< 5	< 5	< 5	380
Bromomethane	< 0.5	< 0.5	< 0.5	5.6
Carbon Tetrachloride	< 0.2	< 0.2	< 0.2	0.79
Chlorobenzene	< 0.5	< 0.5	< 0.5	500
Chloroform	< 1	< 1	< 1	2.4
Dibromochloromethane	< 2	< 2	< 2	65000
Dichlorobenzene,1,2-	< 0.5	< 0.5	< 0.5	4600
Dichlorobenzene,1,3-	< 0.5	< 0.5	< 0.5	7600
Dichlorobenzene,1,4-	< 0.5	< 0.5	< 0.5	8
Dichlorodifluoromethane	< 2	< 2	< 2	3500
Dichloroethane,1,1-	< 0.5	< 0.5	< 0.5	320
Dichloroethane,1,2-	< 0.5	< 0.5	< 0.5	1.6
Dichloroethylene,1,1-	< 0.5	< 0.5	< 0.5	1.6
Dichloroethene, cis-1,2-	< 0.5	< 0.5	< 0.5	1.6
Dichloroethene, trans-1,2-	< 0.5	< 0.5	< 0.5	1.6
Dichloropropane,1,2-	< 0.5	< 0.5	< 0.5	16
Dichloropropene, cis-1,3-	< 0.5	< 0.5	< 0.5	NS

Parameter	Sample Identification			MECP Table 9 Standards
	BH-22-1 October 19/22	BH-22-3 October 19/22	BH-22-4 October 19/22	
Dichloropropene, trans-1,3-	< 0.5	< 0.5	< 0.5	NS
Dichloropropene 1,3- cis+trans	< 0.5	< 0.5	< 0.5	5.2
Ethylbenzene	< 0.5	< 0.5	< 0.5	1800
Ethylene Dibromide	< 0.2	< 0.2	< 0.2	0.25
Hexane	< 5	< 5	< 5	51
Methyl Ethyl Ketone	< 20	< 20	< 20	470000
Methyl Isobutyl Ketone	< 20	< 20	< 20	140000
Methyl-t-butyl Ether	< 2	< 2	< 2	190
Methylene Chloride	< 5	< 5	< 5	610
Styrene	< 0.5	< 0.5	< 0.5	1300
Tetrachloroethane,1,1,1,2-	< 0.5	< 0.5	< 0.5	3.3
Tetrachloroethane,1,1,2,2-	< 0.5	< 0.5	< 0.5	3.2
Tetrachloroethylene	< 0.5	< 0.5	< 0.5	1.6
Toluene	< 0.5	< 0.5	< 0.5	14000
Trichloroethane,1,1,1-	< 0.5	< 0.5	< 0.5	640
Trichloroethane,1,1,2-	< 0.5	< 0.5	< 0.5	4.7
Trichloroethylene	< 0.5	< 0.5	< 0.5	1.6
Trichlorofluoromethane	< 5	< 5	< 5	2000
Vinyl Chloride	< 0.2	< 0.2	< 0.2	0.5
Xylene, m,p-	< 1.0	< 1.0	< 1.0	NS
Xylene, o-	< 0.5	< 0.5	< 0.5	NS
Xylene, m,p,o-	< 1.1	< 1.1	< 1.1	3300

Notes: Analytical results presented as µg/L (parts per billion) unless otherwise noted. "<" indicates parameter is below the laboratory reporting limit (i.e. non-detect). NS = no standard.
MECP "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA", April 15, 2011. Table 9: Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (all property uses)

5.8 Sediment Quality

Sediment quality testing is not applicable.

5.9 Quality Assurance and Quality Control Results

The sampling holding times were met and the samples were properly preserved after collection for the Phase Two ESA. The QA/QC measures implemented by the laboratory were maintained throughout the investigation. There were no QA/QC issues, and it is our opinion that the analytical results generated during this ESA can be relied upon.

5.10 Phase Two Conceptual Site Model

APECs related to the PCAs identified in the Phase One ESA are illustrated on **Figures 4 and 5**. Based on the investigative work completed, a Phase Two Conceptual Site Model has been prepared and is summarized on **Figure 7** showing sampling locations and summary of analytical results.

The Phase Two ESA consisted of the advancement of eight (8) boreholes, the collection of soil samples and the sampling of groundwater. Monitoring wells were installed in three (3) of the boreholes. The soil contaminants of concern included metals, PAHs, PHCs and VOCs. The groundwater contaminants of concern included metals, PAHs, PHCs and VOCs.

Based on analytical testing completed at the boreholes, the soil results meet the Table 9 Standards for each of the parameters and boreholes tested, with the exception of borehole BH-22-1 at a depth of 0.8 – 1.4 m that exceeded the Table 9 Standards for various metals including antimony, lead, mercury, and molybdenum. The material was described to be fill and was observed to a depth of 2.3 m in BH-22-1. Further work would be required to further delineate the extent of soil impacted with metals.

Groundwater concentrations tested from monitoring wells installed within boreholes BH-22-1, BH-22-3 and BH-22-4 meet the Table 9 Standards for each of the parameters tested including metals, PAHs, PHCs and VOCs.

6. Conclusions

The supporting data upon which our conclusions are based have been presented in the previous sections of this report. The environmental assessment represents a "snapshot" in time. Consideration has been given to the known Property history, the physical setting, adjacent land use and current regulatory requirements in developing the terms of reference for this study. GHD cannot guarantee the reliability of information provided by others. However, whenever possible, verification of authenticity was attempted.

Based on our observations, the field investigation program and laboratory results, the following conclusions are presented:

– Fill from borehole BH-22-1 (0.8 – 1.4 m) exceeded the Table 9 Standards for RPIICC property use for various metals including antimony, lead, mercury, and molybdenum;
– Further work would be required to further delineate the extent of the soil impacted with metals at BH-22-1. The material was observed to be fill and was observed to a depth of 2.3 m in BH-22-1;
– All other soil concentrations from the locations tested are less than the Table 9 Standards for RPIICC property use for the parameters tested including metals, PAHs, PHCs and VOCs;
– Groundwater concentrations are less than the Table 9 Standards from the locations and parameters tested including metals, PAHs, PHCs and VOCs.

6.1 Signatures

The following signatures are provided of GHD staff that prepared and conducted the Phase Two ESA. Mr. Robert Neck, a Qualified Person within the meaning of the Environmental Protection Act and associated Regulation 153/04, has provided his opinion based on the information provided in this report.

Following the References section of this report is the Statement of Limitations. These limitations are an integral part of this report. Should questions arise regarding any aspect of our report, please contact the undersigned or our office.

Sincerely,

Eric Wierdsma, P.Eng.
Project Manager

Steve Gagné, H.S.Bc.
Associate, Project Director

Robert Neck, P.Geo (Limited)
Senior Geoscientist

7. References

Chapman and Putnam, 1984. The Physiography of Southern Ontario, 3rd Edition. Ministry of Natural Resources.

Environmental Protection Act, R.S.O. 1990, and associated regulations.

GHD Limited, September 28, 2022. Phase One Environmental Site Assessment Report, 117 Durham Street, Cobourg, Ontario. Project No. 12594921-01.

Occupational Health and Safety Act, R.S.O. 1990, and associated regulations.

Ontario Ministry of the Environment, 2011. Ontario Regulation 153/04: Records of Site Condition – Part XV.1 of the Act (Environmental Protection Act 153/04, as amended).

8. Statement of Limitations

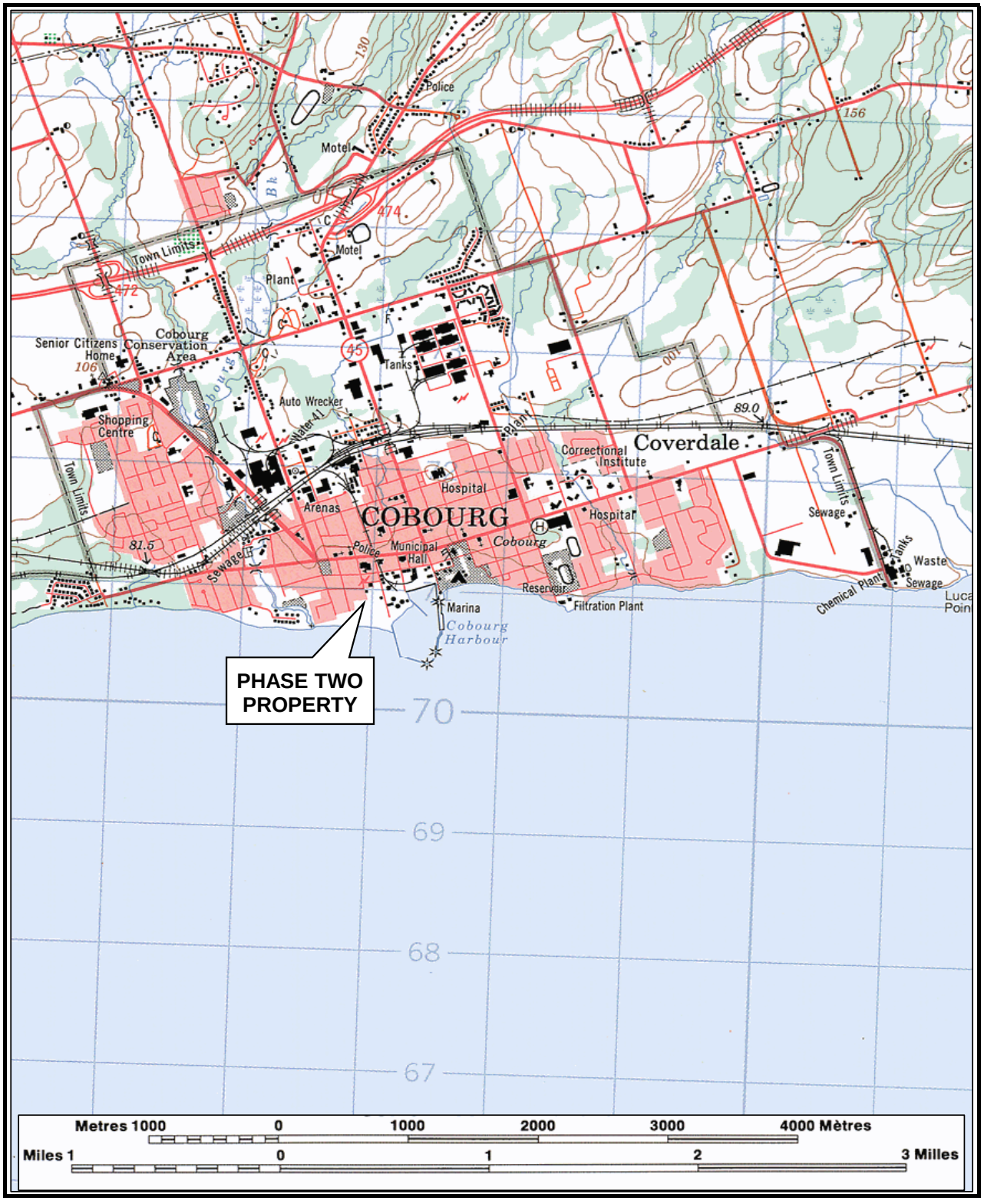
This report is intended solely for The Corporation of the Town of Cobourg in assessing the environmental concerns of land at the municipal address of 117 Durham Street in Cobourg, Ontario and is prohibited for use by others without GHD's prior written consent. This report is considered GHD's professional work product and shall remain the sole property of GHD. Any unauthorized reuse, redistribution of or reliance on the report shall be at the Client and recipient's sole risk, without liability to GHD. Client shall defend, indemnify and hold GHD harmless from any liability arising from or related to Client's unauthorized distribution of the report. No portion of this report may be used as a separate entity; it is to be read in its entirety and shall include all supporting drawings and appendices.

The conclusions and recommendations made in this report are in accordance with our present understanding of the project, the current site use, surface and subsurface conditions, and are based on available information, a site reconnaissance on the date set out in the report, records review and interviews with appropriate people and the work scope approved by the Client and described in the report and should not be construed as a legal opinion. Therefore, our liability is limited to interpreting accurately the information made available to us and assessing the property information investigated during this Phase Two environmental assessment. The services were performed in a manner consistent with that level of care and skill ordinarily exercised by members of environmental engineering professions currently practicing under similar conditions in the same locality. No other representations, and no warranties or representations of any kind, either expressed or implied, are made. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

Soil conditions between and beyond the test locations may differ both horizontally and vertically from those encountered at the test locations and conditions may become apparent during future projects which could not be detected or anticipated at the time of our investigation. Should any conditions at the site be encountered which differ from those found at the test locations, we request that we be notified immediately in order to permit a reassessment of our recommendations. If changed conditions are identified, no matter how minor, the recommendations in this report shall be considered invalid until sufficient review and written assessment of said conditions by GHD is completed.

The conclusions in this report are based on available information, documentation and discussions with appropriate people associated with the property. Therefore, our liability is limited to interpreting accurately the information made available to us and assessing the property information at the test hole locations investigated during the Phase Two ESA.

Figures



Base map compiled from Energy, Mines and Resources Canada Map 30 M/16 published 1994. Information current as of 1989.

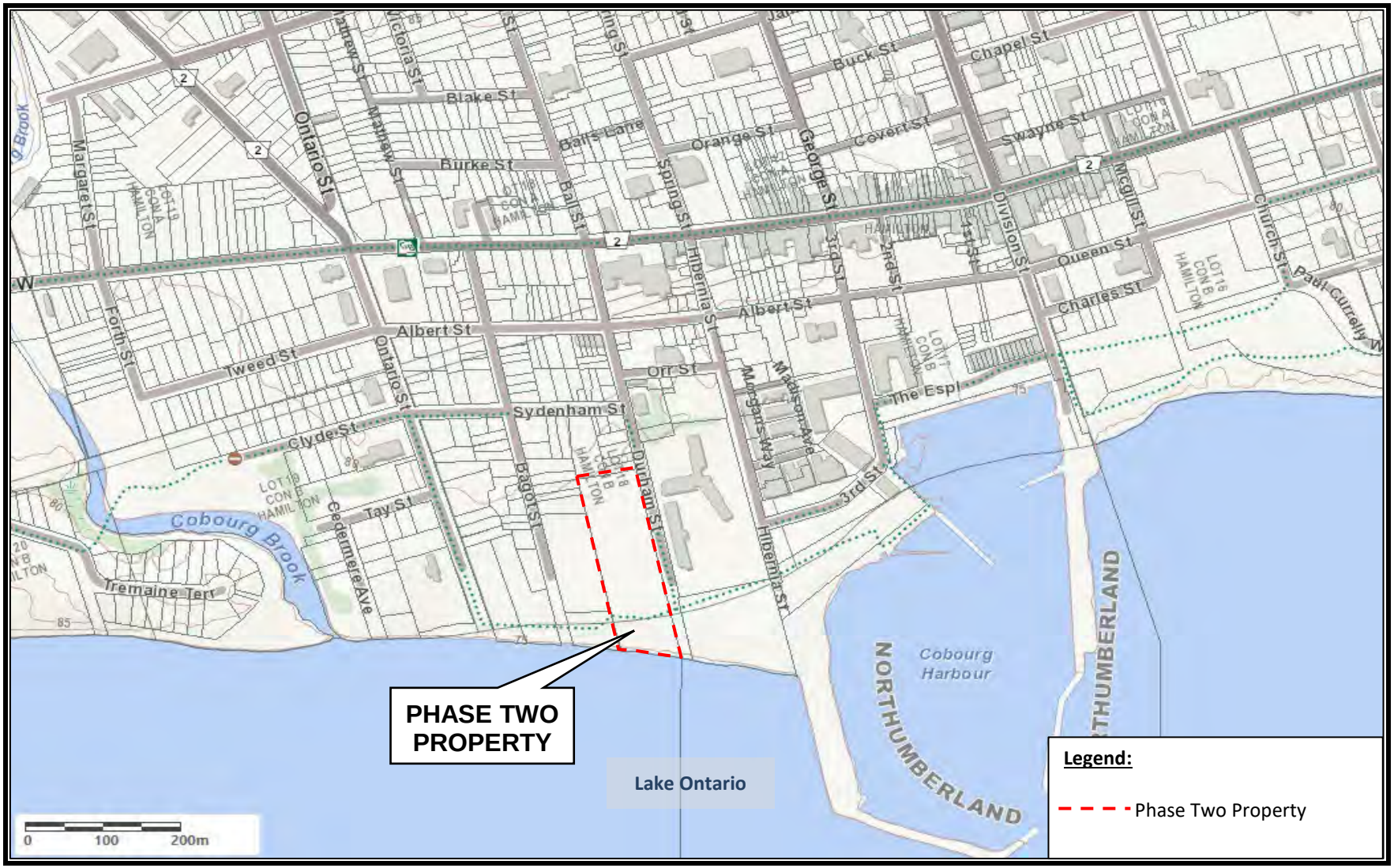
Scale:
1:50000
Coordinate System
NAD 1983 UTM
Zone 17

The Corporation of the Town of Cobourg
117 Durham Street, Cobourg, Ontario
Phase Two ESA

12594921-02
November 2022

Vicinity Plan

FIGURE 1



Source: Ministry of Natural Resources and Forestry. © Queen's Printer for Ontario, 2019.

Scale:
Refer to Scale Bar
Coordinate System:
NAD 1983 UTM Zone 17

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Property Plan

FIGURE 2

Source: Ministry of Natural Resources and Forestry. © Queen's Printer for Ontario, 2019.

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Refer to Scale Bar
Coordinate System:
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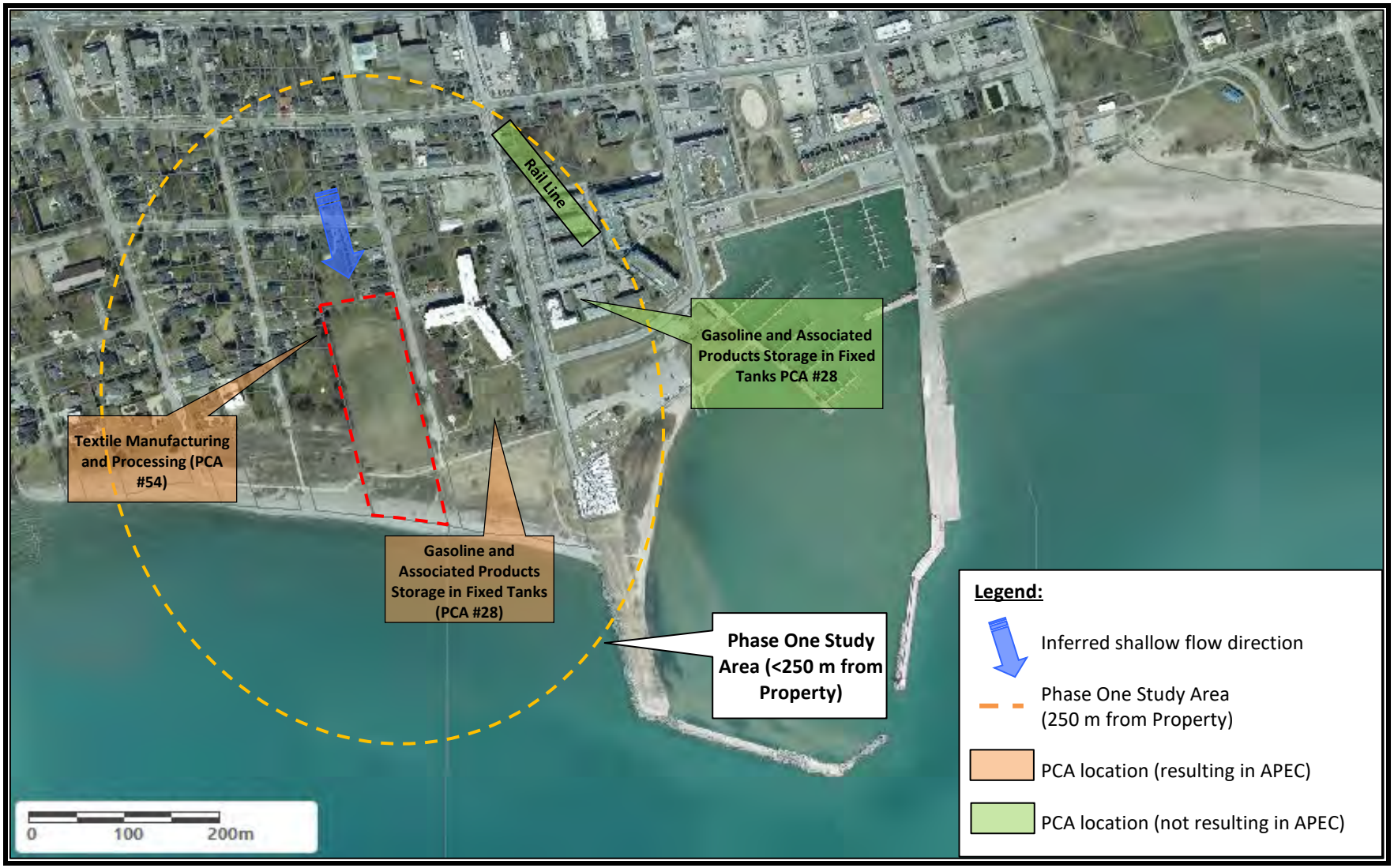
November 2022

Plot Plan

FIGURE 3



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117 Durham Street, Cobourg, Ontario
Phase Two ESA

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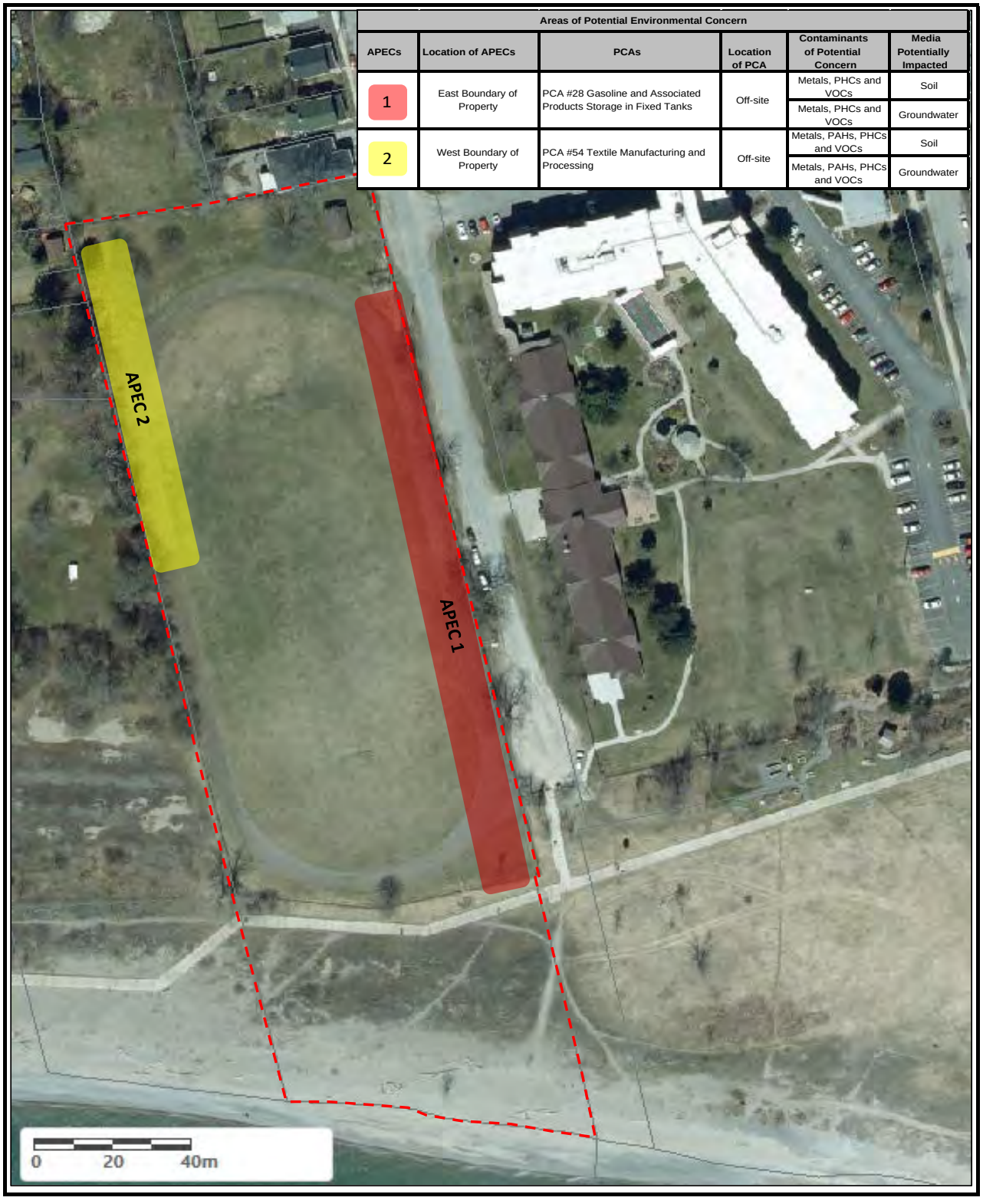
November 2022

CSM - Study Area

FIGURE 4



Areas of Potential Environmental Concern					
APECs	Location of APECs	PCAs	Location of PCA	Contaminants of Potential Concern	Media Potentially Impacted
1	East Boundary of Property	PCA #28 Gasoline and Associated Products Storage in Fixed Tanks	Off-site	Metals, PHCs and VOCs	Soil
				Metals, PHCs and VOCs	Groundwater
2	West Boundary of Property	PCA #54 Textile Manufacturing and Processing	Off-site	Metals, PAHs, PHCs and VOCs	Soil
				Metals, PAHs, PHCs and VOCs	Groundwater

Source: Ministry of Natural Resources and Forestry. © Queen's Printer for Ontario, 2019.

Scale:
1:50000
Coordinate System
NAD 1983 UTM
Zone 17

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CSM - Property

FIGURE 5

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Coordinate System
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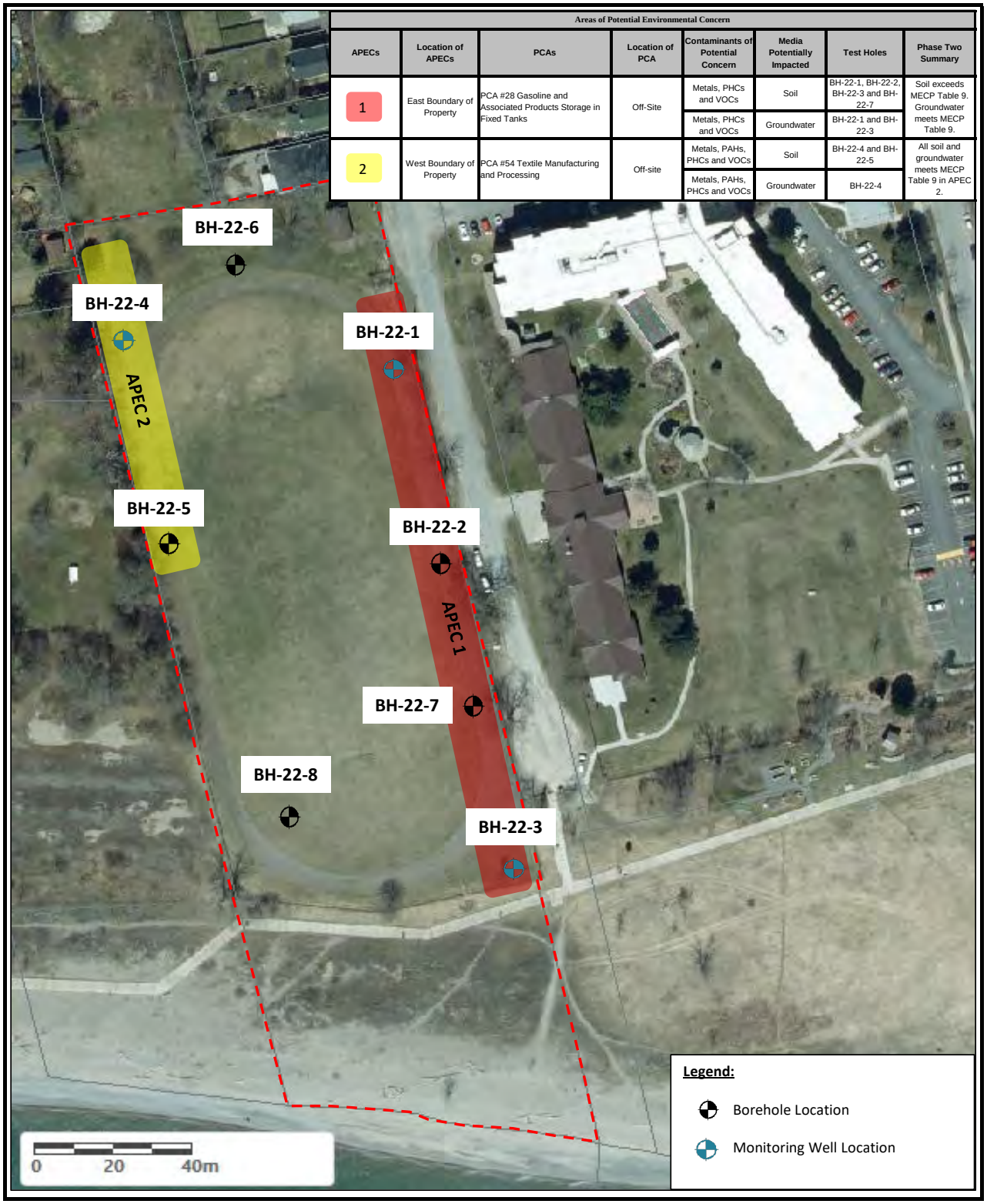
November 2022

Test Hole Plan

FIGURE 6



Areas of Potential Environmental Concern

APECs	Location of APECs	PCAs	Location of PCA	Contaminants of Potential Concern	Media Potentially Impacted	Test Holes	Phase Two Summary
1	East Boundary of Property	PCA #28 Gasoline and Associated Products Storage in Fixed Tanks	Off-Site	Metals, PHCs and VOCs	Soil	BH-22-1, BH-22-2, BH-22-3 and BH-22-7	Soil exceeds MECP Table 9. Groundwater meets MECP Table 9.
				Metals, PHCs and VOCs	Groundwater	BH-22-1 and BH-22-3	
2	West Boundary of Property	PCA #54 Textile Manufacturing and Processing	Off-site	Metals, PAHs, PHCs and VOCs	Soil	BH-22-4 and BH-22-5	All soil and groundwater meets MECP Table 9 in APEC 2.
				Metals, PAHs, PHCs and VOCs	Groundwater	BH-22-4	

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117 Durham Street, Cobourg, Ontario
Phase Two ESA

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November 2022

Phase Two CSM FIGURE 7

Appendices

Appendix E

Sampling and Analysis Plan

APPENDIX E: SAMPLING AND ANALYSIS PLAN

PROJECT NO.: 12594921-02
CLIENT: The Corporation of the Town of Cobourg
PROPERTY: 117 Durham Street, Cobourg, ON

APEC	RATIONALE	INVESTIGATION TYPE	SAMPLE IDENTIFICATION	ESTIMATED INVESTIGATION DEPTH	SAMPLE MEDIA	LABORATORY ANALYSIS	PHYSICAL IMPEDIMENTS	SAMPLING GUIDELINES
APEC 1 – East Boundary of Property (PCA #28)	Off-Site PCA: confirm soil and groundwater quality in the area of Property which bordered historical industrial bulk fuel plants	Boreholes	BH-22-1, BH-22-2, BH-22-3 and BH-22-7	Advance boreholes / monitoring wells to approximate depth of 6 metres below ground surface or to practical refusal	Soil	Metals, PHCs and VOCs	No drilling was conducted within buried utility corridors.	Sample from areas of discoloured soil, at highest PID reading at or/above the water table.
		Monitoring Wells	BH-22-1 and BH-22-3		Groundwater	Metals, PHCs and VOCs		Purge well dry three times or three well volumes. Sample from the center of the water column with low-flow sampling equipment.
APEC 2 – West Boundary of Property (PCA #54)	Off-Site PCA: confirm soil and groundwater quality in the area of the Property bordered historical Mat and Matting Factory to the west.	Boreholes	BH-22-4 and BH-22-5		Soil	Metals, PAHs, PHCs and VOCs		Sample from areas of discoloured soil, at highest PID reading at or/above the water table.
		Monitoring Wells	BH-22-4		Groundwater	Metals, PAHs, PHCs and VOCs		Purge well dry three times or three well volumes. Sample from the center of the water column with low-flow sampling equipment.

Notes:

Refer to Test Hole Plan for locations. Refer to Proposal for details.
Samples to be submitted to Caduceon Environmental Laboratories. Standard turnaround time to meet project requirements.
If installed, groundwater monitoring wells or piezometers to be developed and purged minimum of 3 times prior to sampling.
Sample MDLs to meet MECP Table 9 Standards.
If Fill is encountered, confirm quality of fill (metals and pH testing)

1) PHCs and BTEX/VOCs – select soil sample with highest PID reading and/or suspected contamination
2) All soil samples should be collected from at or above water table unless DNAPLs are suspected
3) If impact is encountered, one soil sample should be collected below any “impacted” sample for vertical delineation

Follow GHD collection procedures for soil and groundwater samples including methanol preservative method for soil BTEX/VOCs and PHC F1 analysis

Appendix F

Subsurface Exploration Data

REFERENCE No.: 12594921-02 ENCLOSURE No.: F-1

BOREHOLE No.: BH-22-1

ELEVATION: Not Measured

BOREHOLE LOG

Page: 1 of 1

CLIENT: The Corporation of the Town of Cobourg

PROJECT: Phase Two Environmental Site Assessment

LOCATION: 117 Durham Street, Cobourg, Ontario

DESCRIBED BY: J. Kempt CHECKED BY: E. Wierdsma

DATE (START): 13 October 2022 DATE (FINISH): 13 October 2022

LEGEND

- SS Split Spoon
- ST Shelby Tube
- RC Rock Core
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

Depth BGS (metres)	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	MONITOR WELL	State	Type and Number	Recovery (%)	PID (ppm)	Penetration Index / RQD % (N)
Not Measured			GROUND SURFACE	0.98					
	0.05		**TOPSOIL** (50 mm)						
			FILL Brown Sand, Compact, Moist	Bentonite		SS-1	83	0	10
0.5									
	0.61		Dark Brown Silty Sand with Gravel, Loose, Moist	0.9 Riser 1.1		SS-2	88	0	5
1.0									
1.5						SS-3	79	0	28
	1.83		Wet	Screen WL 2.1 10/19/2022					
2.0									
	2.29		**GRAVELLY SAND** Grey Gravelly Sand, trace Silt, Very Dense, Moist	2.6		SS-4	50	0	100+
2.5									
3.0	2.90		**END OF BOREHOLE**						
3.5			**NOTES:** - Refusal to further practical advancement 2.9 mbgs - Groundwater seepage encountered at 1.8 mbgs - mbgs denotes 'metres below ground surface'						
4.0									
4.5									
5.0									
5.5									
6.0									

SCALE FOR TEST RESULTS: 50kPa 100kPa 150kPa 200kPa; 10 20 30 40 50 60 70 80 90

NOTES:

File: G:\662\12594921\WORKSHARE\FIELD\GINT\12594921-FLD-22-11-02, PHASE TWO ESA LOGS, DURHAM ST, EW.GPJ Library File: GHD_GEOTECH_V10.GLB Report: BOREHOLE LOG Date: 3/11/22

REFERENCE No.: 12594921-02 ENCLOSURE No.: F-2

BOREHOLE No.: BH-22-2

ELEVATION: Not Measured

BOREHOLE LOG

Page: 1 of 1

CLIENT: The Corporation of the Town of Cobourg

PROJECT: Phase Two Environmental Site Assessment

LOCATION: 117 Durham Street, Cobourg, Ontario

DESCRIBED BY: J. Kempt CHECKED BY: E. Wierdsma

DATE (START): 13 October 2022 DATE (FINISH): 13 October 2022

LEGEND

- SS Split Spoon
- ST Shelby Tube
- RC Rock Core
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	PID	Penetration Index / RQD %	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa
metres	Not Measured		GROUND SURFACE			%	ppm	N	10 20 30 40 50 60 70 80 90
	0.08		**TOPSOIL** (75 mm)						
			FILL Brown Sand, trace Gravel, Loose, Moist		SS-1	83	0	8	
0.5									
	0.61		Brown Silty Sand with Gravel, Very Loose, Moist						
			Particle-Size Analysis - SS-2: 13% Gravel 58% Sand 29% Silt and Clay-Sized Particles		SS-2	75	0	3	
1.0									
1.5					SS-3	58	0	28	
	1.83		Wet						
2.0									
	2.29		**GRAVELLY SAND** Grey Gravelly Sand, trace Silt, Very Dense, Wet		SS-4	63	0	19	
2.5									
3.0									
3.5									
4.0	3.96		**END OF BOREHOLE**						
			NOTES: - Refusal to further practical advancement 4.0 mbgs - Groundwater seepage encountered at 1.8 mbgs - mbgs denotes 'metres below ground surface'						
4.5									
5.0									
5.5									
6.0									

NOTES:

File: G:\662\12594921\WORKSHARE\FIELD\GINT\12594921-FLD-22-11-02, PHASE TWO ESA LOGS, DURHAM ST, EW.GPJ Library File: GHD_GEOTECH_V10.GLB Report: BOREHOLE LOG Date: 3/11/22

REFERENCE No.: 12594921-02 ENCLOSURE No.: F-3

BOREHOLE No.: BH-22-3

ELEVATION: Not Measured

BOREHOLE LOG

Page: 1 of 1

CLIENT: The Corporation of the Town of Cobourg

PROJECT: Phase Two Environmental Site Assessment

LOCATION: 117 Durham Street, Cobourg, Ontario

DESCRIBED BY: J. Kempt CHECKED BY: E. Wierdsma

DATE (START): 13 October 2022 DATE (FINISH): 13 October 2022

LEGEND

- SS Split Spoon
- ST Shelby Tube
- RC Rock Core
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

Depth BGS (metres)	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	MONITOR WELL	State	Type and Number	Recovery (%)	PID (ppm)	Penetration Index / RQD % (N)
Not Measured			GROUND SURFACE	0.89					
	0.05		**TOPSOIL** (50 mm)						
			FILL Brown Sand, trace Gravel, Compact, Moist	Bentonite		SS-1	100	0	15
0.5									
	0.76		**GRAVELLY SAND** Grey Gravelly Sand, trace Silt, Very Dense, Moist	1.2 Riser 1.5		SS-2	58	0	20
1.0									
1.5						SS-3	83	0	56
2.0				WL 2.0 10/19/2022					
	2.29		Compact, Wet	Screen		SS-4	88	0	26
2.5									
3.0				3.0		SS-5	100	0	48
3.5									
	3.66		**END OF BOREHOLE**						
4.0			**NOTES:** - End of Borehole at 3.7 mbgs - Groundwater seepage encountered at 2.3 mbgs - mbgs denotes 'metres below ground surface'						
4.5									
5.0									
5.5									
6.0									

SCALE FOR TEST RESULTS: 50kPa 100kPa 150kPa 200kPa; 10 20 30 40 50 60 70 80 90

NOTES:

File: G:\662\12594921\WORKSHARE\FIELD\GINT\12594921-FLD-22-11-02, PHASE TWO ESA LOGS, DURHAM ST, EW.GPJ Library File: GHD_GEOTECH_V10.GLB Report: BOREHOLE LOG Date: 3/11/22

REFERENCE No.: 12594921-02 ENCLOSURE No.: F-4

BOREHOLE No.: BH-22-4

ELEVATION: Not Measured

BOREHOLE LOG

Page: 1 of 1

CLIENT: The Corporation of the Town of Cobourg

PROJECT: Phase Two Environmental Site Assessment

LOCATION: 117 Durham Street, Cobourg, Ontario

DESCRIBED BY: J. Kempt CHECKED BY: E. Wierdsma

DATE (START): 13 October 2022 DATE (FINISH): 13 October 2022

LEGEND

- SS Split Spoon
- ST Shelby Tube
- RC Rock Core
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

Depth BGS (metres)	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	MONITOR WELL	State	Type and Number	Recovery (%)	PID (ppm)	Penetration Index / RQD % (N)
Not Measured			GROUND SURFACE	0.82					
	0.05		**TOPSOIL** (50 mm)						
			FILL Dark Brown Sand, trace Gravel, Loose, Moist	Bentonite		SS-1	67	0	5
0.5									
	0.76		Compact						
1.0				1.2 Riser		SS-2	33	0	15
1.5	1.52		**GRAVELLY SAND** Grey Gravelly Sand, trace Silt, Compact, Moist	1.5					
				WL 2.1 10/19/2022		SS-3	33	0	10
2.0				Screen					
	2.29		Very Loose, Wet						
2.5						SS-4	42	0	2
3.0				3.0					
	3.05		Loose, Grey						
3.5						SS-5	50	0	5
4.0						SS-6	17	0	7
4.5	4.42		**END OF BOREHOLE**						
5.0			**NOTES:** - End of Borehole at 4.4 mbgs - Groundwater seepage encountered at 2.3 mbgs - mbgs denotes 'metres below ground surface'						
5.5									
6.0									

SCALE FOR TEST RESULTS: 50kPa 100kPa 150kPa 200kPa; 10 20 30 40 50 60 70 80 90

NOTES:

File: G:\662\12594921\WORKSHARE\FIELD\GINT\12594921-FLD-22-11-02, PHASE TWO ESA LOGS, DURHAM ST, EW.GPJ Library File: GHD_GEOTECH_V10.GLB Report: BOREHOLE LOG Date: 3/11/22

REFERENCE No.: 12594921-02 ENCLOSURE No.: F-5

BOREHOLE No.: BH-22-5

ELEVATION: Not Measured

BOREHOLE LOG

Page: 1 of 1

CLIENT: The Corporation of the Town of Cobourg

PROJECT: Phase Two Environmental Site Assessment

LOCATION: 117 Durham Street, Cobourg, Ontario

DESCRIBED BY: J. Kempt CHECKED BY: E. Wierdsma

DATE (START): 13 October 2022 DATE (FINISH): 13 October 2022

LEGEND

- SS Split Spoon
- ST Shelby Tube
- RC Rock Core
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	PID	Penetration Index / RQD %	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa
metres	Not Measured		GROUND SURFACE			%	ppm	N	10 20 30 40 50 60 70 80 90
	0.08		**TOPSOIL** (75 mm) **FILL** Dark Brown Sand, trace Gravel, Compact, Moist		SS-1	79	0	9	
0.5									
	0.76		Loose **Particle-Size Analysis - SS-2:** 2% Gravel 95% Sand 3% Silt and Clay-Sized Particles		SS-2	50	0	6	
1.0									
1.5									
	1.52		Dark Brown Sand and Gravel, Compact, Moist		SS-3	38	0	10	
2.0									
	2.29		**GRAVELLY SAND** Grey Gravelly Sand, trace Silt, Dense, Wet		SS-4	29	0	48	
2.5									
3.0					SS-5	42	0	40	
3.5									
	3.66		**END OF BOREHOLE** **NOTES:** - Refusal to further practical advancement 3.7 mbgs - Groundwater seepage encountered at 2.3 mbgs - mbgs denotes 'metres below ground surface'						
4.0									
4.5									
5.0									
5.5									
6.0									

NOTES:

File: G:\662\12594921\WORKSHARE\FIELD\GINT\12594921-FLD-22-11-02, PHASE TWO ESA LOGS, DURHAM ST, EW.GPJ Library File: GHD_GEOTECH_V10.GLB Report: BOREHOLE LOG Date: 3/11/22

REFERENCE No.: 12594921-02 ENCLOSURE No.: F-6

BOREHOLE No.: BH-22-6

ELEVATION: Not Measured

BOREHOLE LOG

Page: 1 of 1

CLIENT: The Corporation of the Town of Cobourg

PROJECT: Phase Two Environmental Site Assessment

LOCATION: 117 Durham Street, Cobourg, Ontario

DESCRIBED BY: J. Kempt CHECKED BY: E. Wierdsma

DATE (START): 13 October 2022 DATE (FINISH): 13 October 2022

LEGEND

- SS Split Spoon
- ST Shelby Tube
- RC Rock Core
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	PID	Penetration Index / RQD %	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa
metres	Not Measured		GROUND SURFACE			%	ppm	N	10 20 30 40 50 60 70 80 90
	0.05		**TOPSOIL** (50 mm)						
			FILL Dark Brown Sand, trace Gravel, Compact, Moist		SS-1	42	0	14	
0.5									
1.0					SS-2	54	0	10	
1.5	1.52		**GRAVELLY SAND** Brown Gravelly Sand, trace Silt, Loose, Moist		SS-3	21	0	4	
2.0									
2.5	2.29		**SILTY SAND** Grey Silty Sand, trace Clay and Gravel, Loose, Wet		SS-4	54	0	7	
3.0	2.74		**END OF BOREHOLE**						
3.5			**NOTES:** - Refusal to further practical advancement 2.7 mbgs - Groundwater seepage encountered at 2.3 mbgs - mbgs denotes 'metres below ground surface'						
4.0									
4.5									
5.0									
5.5									
6.0									

NOTES:

File: G:\662\12594921\WORKSHARE\FIELD\GINT\12594921-FLD-22-11-02, PHASE TWO ESA LOGS, DURHAM ST, EW.GPJ Library File: GHD_GEOTECH_V10.GLB Report: BOREHOLE LOG Date: 3/11/22

REFERENCE No.: 12594921-02 ENCLOSURE No.: F-7

BOREHOLE No.: BH-22-7

ELEVATION: Not Measured

BOREHOLE LOG

Page: 1 of 1

CLIENT: The Corporation of the Town of Cobourg

PROJECT: Phase Two Environmental Site Assessment

LOCATION: 117 Durham Street, Cobourg, Ontario

DESCRIBED BY: J. Kempt CHECKED BY: E. Wierdsma

DATE (START): 13 October 2022 DATE (FINISH): 13 October 2022

LEGEND

- SS Split Spoon
- ST Shelby Tube
- RC Rock Core
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	PID	Penetration Index / RQD %	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa
metres	Not Measured		GROUND SURFACE			%	ppm	N	10 20 30 40 50 60 70 80 90
	0.08		**TOPSOIL** (75 mm) **FILL** Brown Sand, trace Gravel, Compact, Moist		SS-1	42	0	14	
0.5									
	0.76		**GRAVELLY SAND** Brown Gravelly Sand, trace Silt, Compact, Wet		SS-2	75	0	18	
1.0									
1.5					SS-3	88	0	50	
2.0									
2.5					SS-4	100	0	28	
3.0									
	3.05		Grading Grey, Dense		SS-5	83	0	46	
3.5									
4.0									
4.5									
	4.57		**END OF BOREHOLE**						
5.0			**NOTES:** - Refusal to further practical advancement 4.6 mbgs - Groundwater seepage encountered at 2.3 mbgs - mbgs denotes 'metres below ground surface'						
5.5									
6.0									

NOTES:

File: G:\662\12594921\WORKSHARE\FIELD\GINT\12594921-FLD-22-11-02, PHASE TWO ESA LOGS, DURHAM ST, EW.GPJ Library File: GHD_GEOTECH_V10.GLB Report: BOREHOLE LOG Date: 3/11/22

REFERENCE No.: 12594921-02 ENCLOSURE No.: F-8

BOREHOLE No.: BH-22-8

ELEVATION: Not Measured

BOREHOLE LOG

Page: 1 of 1

CLIENT: The Corporation of the Town of Cobourg

PROJECT: Phase Two Environmental Site Assessment

LOCATION: 117 Durham Street, Cobourg, Ontario

DESCRIBED BY: J. Kempt CHECKED BY: E. Wierdsma

DATE (START): 13 October 2022 DATE (FINISH): 13 October 2022

LEGEND

- SS Split Spoon
- ST Shelby Tube
- RC Rock Core
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	PID	Penetration Index / RQD %	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa 10 20 30 40 50 60 70 80 90
metres	Not Measured		GROUND SURFACE			%	ppm	N	
			TOPSOIL (75 mm)						
	0.08		**FILL** Brown Sand with Gravel, Compact, Moist		SS-1	83	0	12	
0.5									
1.0					SS-2	46	0	20	
1.5	1.52		**GRAVELLY SAND** Grey Gravelly Sand, trace Silt, Dense, Moist		SS-3	63	0	46	
2.0									
	2.29		Very Dense, Wet						
2.5			**Particle-Size Analysis - SS-4:** 50% Gravel 44% Sand 6% Silt and Clay-Sized Particles		SS-4	42	0	58	
3.0									
3.5					SS-5	100	0	62	
4.0									
	4.14		**END OF BOREHOLE**						
4.5			**NOTES:** - Refusal to further practical advancement 4.1 mbgs - Groundwater seepage encountered at 2.3 mbgs - mbgs denotes 'metres below ground surface'						
5.0									
5.5									
6.0									

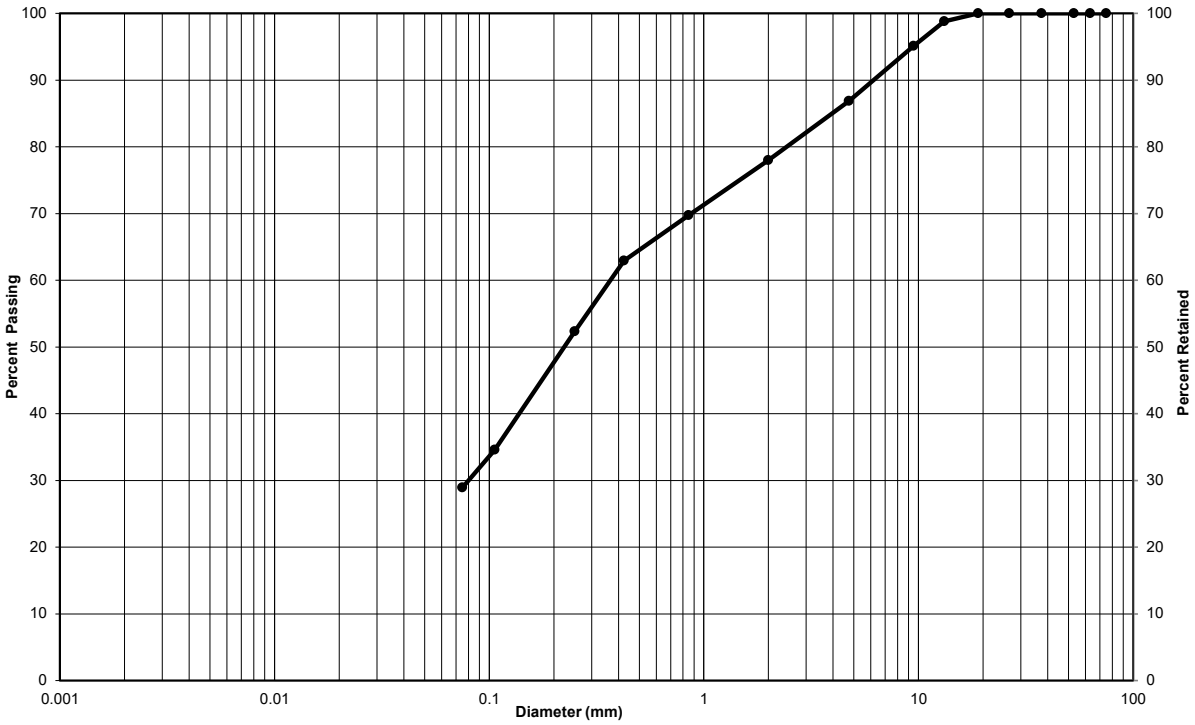
NOTES:

File: G:\662\12594921\WORKSHARE\FIELD\GINT\12594921-FLD-22-11-02, PHASE TWO ESA LOGS, DURHAM ST, EW.GPJ Library File: GHD_GEOTECH_V10.GLB Report: BOREHOLE LOG Date: 3/11/22

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	The Corporation of the Town of Cobourg	**Lab No.:**	SS-22-71
Project/Site:	117 Durham Street, Cobourg	**Project No.:**	12594921-02

Borehole No.:	BH22-2	Sample No.:	SS2
Depth:	0.8 - 1.4 m	Enclosure:	F-9



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
Silty sand with gravel	13	58	29

Additional laboratory reporting information available upon request.

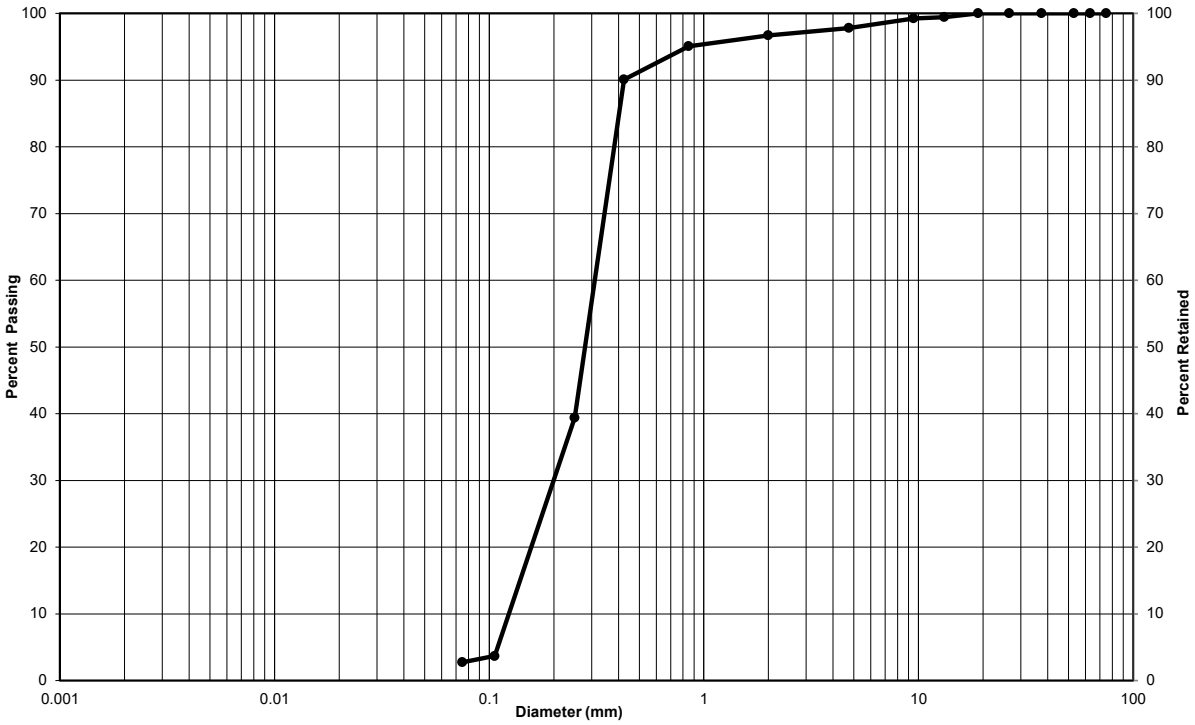
Remarks:

Performed by:	Josh Sullivan	**Date:**	October 19, 2022
Verified by:	Joe Sullivan	**Date:**	October 19, 2022
Laboratory Location:	GHD Limited - 347 Pido Road, Unit 29, Peterborough, ON		

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	The Corporation of the Town of Cobourg	**Lab No.:**	SS-22-71
Project/Site:	117 Durham Street, Cobourg	**Project No.:**	12594921-02

Borehole No.:	BH22-5	Sample No.:	SS2
Depth:	0.8- 1.4 m	Enclosure:	F-10



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
Sand, trace gravel and silt	2	95	3

Additional laboratory reporting information available upon request.

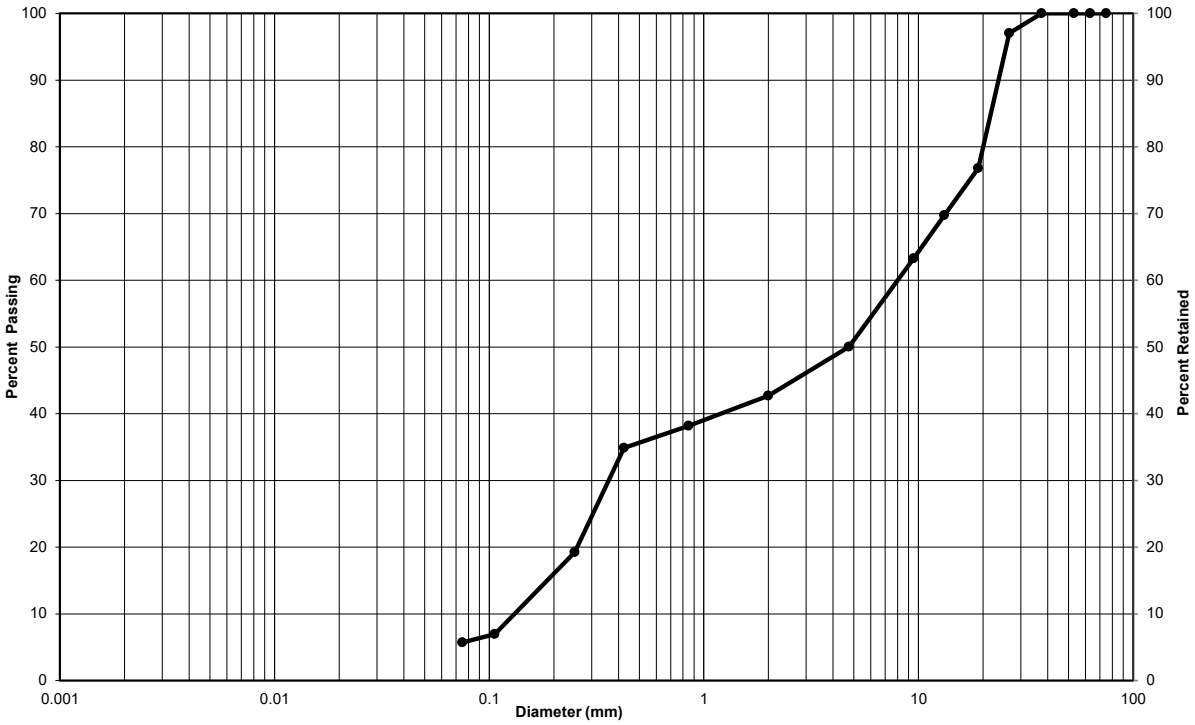
Remarks:

Performed by:	Josh Sullivan	**Date:**	October 19, 2022
Verified by:	Joe Sullivan	**Date:**	October 19, 2022
Laboratory Location:	GHD Limited - 347 Pido Road, Unit 29, Peterborough, ON		

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	The Corporation of the Town of Cobourg	**Lab No.:**	SS-22-71
Project/Site:	117 Durham Street, Cobourg	**Project No.:**	12594921-02

Borehole No.:	BH22-8	Sample No.:	SS4
Depth:	2.3 - 2.9 m	Enclosure:	F-11



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
Sandy gravel, trace silt	50	44	6

Additional laboratory reporting information available upon request.

Remarks:

Performed by:	Josh Sullivan	**Date:**	October 19, 2022
Verified by:	Joe Sullivan	**Date:**	October 19, 2022
Laboratory Location:	GHD Limited - 347 Pido Road, Unit 29, Peterborough, ON		

Appendix G

Certificates of Chemical Analysis

CADUCEON™
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G098663 **REPORT No. B22-32312 (i)**

Report To:

GHD Limited
455 Phillip Street,
Waterloo Ontario N2L 3X2 Canada
Attention: Eric Wierdsma

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 18-Oct-22
DATE REPORTED: 24-Oct-22
SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 117 Durham St, Cobourg/ 12594921-02
P.O. NUMBER:
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
pH	2	Richmond Hill	JE	24-Oct-22	A-pH-02 (rh)	MOEE3530
Chromium (VI)	5	Holly Lane	ST	20-Oct-22	D-CRVI-02 (o)	EPA7196A
Mercury	5	Holly Lane	PBK	24-Oct-22	D-HG-01 (o)	EPA 7471A
Boron - HWS	5	Holly Lane	hmc	24-Oct-22	D-HWE s	MOE3470
Metals - ICP-OES	5	Holly Lane	hmc	24-Oct-22	D-ICP-02 (o)	EPA 6010
Metals - ICP-MS	5	Holly Lane	TPR	24-Oct-22	D-ICPMS-01 (o)	EPA 6020

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg
F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)
F2 C10-C16 hydrocarbons in µg/g, (F2-napth if requested)
F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)
F4 C34-C50 hydrocarbons in µg/g
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
Any deviations from the method are noted and reported for any particular sample.
nC6 and nC10 response factor is within 30% of response factor for toluene:
nC10,nC16 and nC34 response factors within 10% of each other:
C50 response factors within 70% of nC10+nC16+nC34 average:
Linearity is within 15%:
All results expressed on a dry weight basis.
Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.
If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC
QC will be made available upon request.

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - RPIICC - Table 9 - Res./Park/Ind./Inst./Commercial/Cmty.

Christine Burke
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G098663 **REPORT No. B22-32312 (i)**

Report To:

GHD Limited
455 Phillip Street,
Waterloo Ontario N2L 3X2 Canada
Attention: Eric Wierdsma

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 18-Oct-22
DATE REPORTED: 24-Oct-22
SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 117 Durham St, Cobourg/ 12594921-02
P.O. NUMBER:
WATERWORKS NO.

	Client I.D.		BH-22-1, SS-2	BH-22-2, SS-3	BH-22-4, SS-2	BH-22-4, SS-4	O. Reg. 153 Tbl. 9 - RPIICC	
	Sample I.D.		B22-32312-1	B22-32312-2	B22-32312-4	B22-32312-5		
	Date Collected		13-Oct-22	13-Oct-22	13-Oct-22	13-Oct-22		
Parameter	**Units**	**R.L.**						
pH @25°C	pH Units		7.41			7.67		
Antimony	µg/g	0.5	**4.0**	< 0.5	< 0.5		1.3	
Arsenic	µg/g	0.5	16.0	1.1	2.3		18	
Barium	µg/g	1	210	10	78		220	
Beryllium	µg/g	0.2	0.8	< 0.2	0.3		2.5	
Boron	µg/g	0.5	14.2	10.0	12.8		36	
Boron (HWS)	µg/g	0.02	0.09	0.03	0.04		1.5	
Cadmium	µg/g	0.5	0.6	< 0.5	< 0.5		1.2	
Chromium	µg/g	1	16	4	16		70	
Chromium (VI)	µg/g	0.2	< 0.2	< 0.2	< 0.2		0.66	
Cobalt	µg/g	1	10	2	7		22	
Copper	µg/g	1	47	3	14		92	
Lead	µg/g	5	**202**	11	18		120	
Mercury	µg/g	0.005	**0.821**	0.035	0.022		0.27	
Molybdenum	µg/g	1	**3**	< 1	< 1		2	
Nickel	µg/g	1	19	1	11		82	
Selenium	µg/g	0.5	1.1	< 0.5	0.6		1.5	
Silver	µg/g	0.2	0.3	< 0.2	< 0.2		0.5	
Thallium	µg/g	0.1	< 0.1	< 0.1	0.1		1	
Uranium	µg/g	0.1	0.8	0.3	0.5		2.5	
Vanadium	µg/g	1	30	8	29		86	
Zinc	µg/g	3	284	17	41		290	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - RPIICC - Table 9 - Res./Park/Ind./Inst./Commercial/Cmty.

Christine Burke
Lab Manager

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Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 18-Oct-22
DATE REPORTED: 24-Oct-22
SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 117 Durham St, Cobourg/ 12594921-02
P.O. NUMBER:
WATERWORKS NO.

	Client I.D.		BH-22-5, SS-3	BH-22-7, SS-2			O. Reg. 153 Tbl. 9 - RPIICC	
	Sample I.D.		B22-32312-6	B22-32312-8				
	Date Collected		13-Oct-22	13-Oct-22				
Parameter	**Units**	**R.L.**						
pH @25°C	pH Units							
Antimony	µg/g	0.5	< 0.5	< 0.5			1.3	
Arsenic	µg/g	0.5	3.1	2.4			18	
Barium	µg/g	1	29	24			220	
Beryllium	µg/g	0.2	< 0.2	< 0.2			2.5	
Boron	µg/g	0.5	9.1	8.7			36	
Boron (HWS)	µg/g	0.02	0.05	0.04			1.5	
Cadmium	µg/g	0.5	< 0.5	< 0.5			1.2	
Chromium	µg/g	1	8	7			70	
Chromium (VI)	µg/g	0.2	< 0.2	< 0.2			0.66	
Cobalt	µg/g	1	3	3			22	
Copper	µg/g	1	8	4			92	
Lead	µg/g	5	43	20			120	
Mercury	µg/g	0.005	0.029	0.055			0.27	
Molybdenum	µg/g	1	< 1	< 1			2	
Nickel	µg/g	1	4	4			82	
Selenium	µg/g	0.5	0.6	0.5			1.5	
Silver	µg/g	0.2	< 0.2	< 0.2			0.5	
Thallium	µg/g	0.1	< 0.1	< 0.1			1	
Uranium	µg/g	0.1	0.5	0.5			2.5	
Vanadium	µg/g	1	15	16			86	
Zinc	µg/g	3	84	21			290	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - RPIICC - Table 9 - Res./Park/Ind./Inst./Commercial/Cmty.

Christine Burke
Lab Manager

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Final Report

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Attention: Eric Wierdsma

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 18-Oct-22
DATE REPORTED: 24-Oct-22
SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 117 Durham St, Cobourg/ 12594921-02
P.O. NUMBER:
WATERWORKS NO.

Summary of Exceedances

Table 9 - Res./Park/Ind./Inst./Commercial/Cmty.

BH-22-1, SS-2	Found Value	Limit
Antimony (µg/g)	4.0	1.3
Lead (µg/g)	202	120
Molybdenum (µg/g)	3	2
Mercury (µg/g)	0.821	0.27

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - RPIICC - Table 9 - Res./Park/Ind./Inst./Commercial/Cmty.

Christine Burke
Lab Manager

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DATE RECEIVED: 18-Oct-22
DATE REPORTED: 24-Oct-22
SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 117 Durham St, Cobourg/ 12594921-02
P.O. NUMBER:
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
% Moisture	4	Richmond Hill	FAL	20-Oct-22	A-% moisture RH	
PHC(F2-F4)	4	Kingston	KPR	20-Oct-22	C-PHC-S-001 (k)	CWS Tier 1
VOC's	4	Richmond Hill	FAL	20-Oct-22	C-VOC-02 (rh)	EPA 8260
PHC(F1)	4	Richmond Hill	FAL	20-Oct-22	C-VPHS-01 (rh)	CWS Tier 1

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg
F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)
F2 C10-C16 hydrocarbons in µg/g, (F2-napth if requested)
F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)
F4 C34-C50 hydrocarbons in µg/g
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
Any deviations from the method are noted and reported for any particular sample.
nC6 and nC10 response factor is within 30% of response factor for toluene:
nC10,nC16 and nC34 response factors within 10% of each other:
C50 response factors within 70% of nC10+nC16+nC34 average:
Linearity is within 15%:
All results expressed on a dry weight basis.
Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.
If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC
QC will be made available upon request.

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - RPIICC - Table 9 - Res./Park/Ind./Inst./Commercial/Cmty.

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DATE RECEIVED: 18-Oct-22
DATE REPORTED: 24-Oct-22
SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 117 Durham St, Cobourg/ 12594921-02
P.O. NUMBER:
WATERWORKS NO.

	Client I.D.		BH-22-2, SS-3	BH-22-3, SS-3	BH-22-4, SS-4	BH-22-5, SS-4	O. Reg. 153 Tbl. 9 - RPIICC	
	Sample I.D.		B22-32312-2	B22-32312-3	B22-32312-5	B22-32312-7		
	Date Collected		13-Oct-22	13-Oct-22	13-Oct-22	13-Oct-22		
Parameter	**Units**	**R.L.**						
Acetone	µg/g	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	
Benzene	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02	
Bromodichloromethane	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Bromoform	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Bromomethane	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Carbon Tetrachloride	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Monochlorobenzene (Chlorobenzene)	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Chloroform	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dibromochloromethane	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dichlorobenzene,1,2-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Dichlorobenzene,1,3-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Dichlorobenzene,1,4-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Dichlorodifluoromethane	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Dichloroethane,1,1-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dichloroethane,1,2-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dichloroethylene,1,1-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dichloroethene, cis-1,2-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dichloroethene, trans-1,2-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dichloropropane,1,2-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Dichloropropene, cis-1,3-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02		
Dichloropropene, trans-1,3-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02		

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - RPIICC - Table 9 - Res./Park/Ind./Inst./Commercial/Cmty.

Christine Burke
Lab Manager

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Final Report

C.O.C.: G098663 **REPORT No. B22-32312 (ii)**

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Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 18-Oct-22
DATE REPORTED: 24-Oct-22
SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 117 Durham St, Cobourg/ 12594921-02
P.O. NUMBER:
WATERWORKS NO.

	Client I.D.		BH-22-2, SS-3	BH-22-3, SS-3	BH-22-4, SS-4	BH-22-5, SS-4	O. Reg. 153 Tbl. 9 - RPIICC	
	Sample I.D.		B22-32312-2	B22-32312-3	B22-32312-5	B22-32312-7		
	Date Collected		13-Oct-22	13-Oct-22	13-Oct-22	13-Oct-22		
Parameter	**Units**	**R.L.**						
Dichloropropene 1,3-cis+trans	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Ethylbenzene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Dibromoethane,1,2-(Ethylene Dibromide)	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Hexane	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Methyl Ethyl Ketone	µg/g	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	
Methyl Isobutyl Ketone	µg/g	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	
Methyl-t-butyl Ether	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Dichloromethane (Methylene Chloride)	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Styrene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Tetrachloroethane,1,1,1,2-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Tetrachloroethane,1,1,2,2-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Tetrachloroethylene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Toluene	µg/g	0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.2	
Trichloroethane,1,1,1-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Trichloroethane,1,1,2-	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	
Trichloroethylene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	
Trichlorofluoromethane	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.25	
Vinyl Chloride	µg/g	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02	
Xylene, m,p-	µg/g	0.03	< 0.03	< 0.03	< 0.03	< 0.03		

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - RPIICC - Table 9 - Res./Park/Ind./Inst./Commercial/Cmty.

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Lab Manager

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Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 18-Oct-22
DATE REPORTED: 24-Oct-22
SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 117 Durham St, Cobourg/ 12594921-02
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	Client I.D.		BH-22-2, SS-3	BH-22-3, SS-3	BH-22-4, SS-4	BH-22-5, SS-4	O. Reg. 153 Tbl. 9 - RPIICC	
	Sample I.D.		B22-32312-2	B22-32312-3	B22-32312-5	B22-32312-7		
	Date Collected		13-Oct-22	13-Oct-22	13-Oct-22	13-Oct-22		
Parameter	**Units**	**R.L.**						
Xylene, o-	µg/g	0.03	< 0.03	< 0.03	< 0.03	< 0.03		
Xylene, m,p,o-	µg/g	0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.05	
PHC F1 (C6-C10)	µg/g	10	< 10	< 10	< 10	< 10	25	
PHC F2 (>C10-C16)	µg/g	5	< 5	< 5	< 5	< 5	10	
PHC F3 (>C16-C34)	µg/g	10	< 10	< 10	11	< 10	240	
PHC F4 (>C34-C50)	µg/g	10	< 10	< 10	< 10	< 10	120	
% moisture	%		7.9	4.4	12.7	19.7		

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - RPIICC - Table 9 - Res./Park/Ind./Inst./Commercial/Cmty.

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SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 117 Durham St, Cobourg/ 12594921-02
P.O. NUMBER:
WATERWORKS NO.

Summary of Exceedances

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - RPIICC - Table 9 - Res./Park/Ind./Inst./Commercial/Cmty.

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SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 117 Durham St, Cobourg/ 12594921-02
P.O. NUMBER:
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
SVOC	4	Kingston	esi	21-Oct-22	C-NAB-S-001 (k)	EPA 8270

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg
F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)
F2 C10-C16 hydrocarbons in µg/g, (F2-napth if requested)
F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)
F4 C34-C50 hydrocarbons in µg/g
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
Any deviations from the method are noted and reported for any particular sample.
nC6 and nC10 response factor is within 30% of response factor for toluene:
nC10,nC16 and nC34 response factors within 10% of each other:
C50 response factors within 70% of nC10+nC16+nC34 average:
Linearity is within 15%:
All results expressed on a dry weight basis.
Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.
If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC
QC will be made available upon request.

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - RPIICC - Table 9 - Res./Park/Ind./Inst./Commercial/Cmty.

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Lab Manager

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DATE REPORTED: 24-Oct-22
SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 117 Durham St, Cobourg/ 12594921-02
P.O. NUMBER:
WATERWORKS NO.

	Client I.D.		BH-22-1, SS-2	BH-22-4, SS-4	BH-22-5, SS-3	BH-22-7, SS-2	O. Reg. 153 Tbl. 9 - RPIICC	
	Sample I.D.		B22-32312-1	B22-32312-5	B22-32312-6	B22-32312-8		
	Date Collected		13-Oct-22	13-Oct-22	13-Oct-22	13-Oct-22		
Parameter	**Units**	**R.L.**						
Acenaphthene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.072	
Acenaphthylene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.093	
Anthracene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.22	
Benzo(a)anthracene	µg/g	0.05	< 0.05	< 0.05	< 0.05	0.07	0.36	
Benzo(a)pyrene	µg/g	0.05	< 0.05	< 0.05	< 0.05	0.07	0.3	
Benzo(b)fluoranthene	µg/g	0.05	< 0.05	< 0.05	< 0.05	0.10	0.47	
Benzo(b+k)fluoranthene	µg/g	0.05	< 0.05	< 0.05	< 0.05	0.14		
Benzo(g,h,i)perylene	µg/g	0.05	< 0.05	< 0.05	< 0.05	0.05	0.68	
Benzo(k)fluoranthene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.48	
Chrysene	µg/g	0.05	< 0.05	< 0.05	< 0.05	0.09	2.8	
Dibenzo(a,h)anthracene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.1	
Fluoranthene	µg/g	0.05	< 0.05	< 0.05	< 0.05	0.14	0.69	
Fluorene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.19	
Indeno(1,2,3,-cd)pyrene	µg/g	0.05	< 0.05	< 0.05	< 0.05	0.08	0.23	
Methylnaphthalene,1-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.59	
Methylnaphthalene,2-	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.59	
Methylnaphthalene 2-(1-)	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.59	
Naphthalene	µg/g	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.09	
Phenanthrene	µg/g	0.05	< 0.05	< 0.05	< 0.05	0.05	0.69	
Pyrene	µg/g	0.05	< 0.05	< 0.05	< 0.05	0.12	1	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - RPIICC - Table 9 - Res./Park/Ind./Inst./Commercial/Cmty.

Christine Burke
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G098663 **REPORT No. B22-32312 (iii)**

Report To:

GHD Limited
455 Phillip Street,
Waterloo Ontario N2L 3X2 Canada
Attention: Eric Wierdsma

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 18-Oct-22
DATE REPORTED: 24-Oct-22
SAMPLE MATRIX: Soil

JOB/PROJECT NO.: 117 Durham St, Cobourg/ 12594921-02
P.O. NUMBER:
WATERWORKS NO.

Summary of Exceedances

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - RPIICC - Table 9 - Res./Park/Ind./Inst./Commercial/Cmty.

Christine Burke
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B22-32551 (i)

Report To:

GHD Limited
455 Phillip Street,
Waterloo Ontario N2L 3X2 Canada
Attention: Eric Wierdsma

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 20-Oct-22
DATE REPORTED: 28-Oct-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: 12594921-02
P.O. NUMBER: 735-004531
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
Chromium (VI)	3	Holly Lane	ST	26-Oct-22	D-CRVI-01 (o)	MOE E3056
Mercury	3	Holly Lane	PBK	26-Oct-22	D-HG-02 (o)	SM 3112 B
Metals - ICP-OES	3	Holly Lane	hmc	24-Oct-22	D-ICP-01 (o)	SM 3120
Metals - ICP-MS	3	Holly Lane	TPR	25-Oct-22	D-ICPMS-01 (o)	EPA 200.8

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg
F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)
F2 C10-C16 hydrocarbons in µg/g, (F2-napth if requested)
F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)
F4 C34-C50 hydrocarbons in µg/g
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
Any deviations from the method are noted and reported for any particular sample.
nC6 and nC10 response factor is within 30% of response factor for toluene:
nC10,nC16 and nC34 response factors within 10% of each other:
C50 response factors within 70% of nC10+nC16+nC34 average:
Linearity is within 15%:
All results expressed on a dry weight basis.
Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.
If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC
QC will be made available upon request.

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - GW (µg/L) - Table 9 - Ground Water Standards

Christine Burke
Lab Manager

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Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 20-Oct-22
DATE REPORTED: 28-Oct-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: 12594921-02
P.O. NUMBER: 735-004531
WATERWORKS NO.

	Client I.D.		BH-22-1	BH-22-3	BH-22-4		O. Reg. 153 Tbl. 9 - GW (µg/L)	
	Sample I.D.		B22-32551-1	B22-32551-2	B22-32551-3			
	Date Collected		19-Oct-22	19-Oct-22	19-Oct-22			
Parameter	**Units**	**R.L.**						
Antimony	µg/L	0.1	1.8	0.3	0.2		16000	
Arsenic	µg/L	0.1	1.1	0.3	0.5		1500	
Barium	µg/L	1	168	98	132		23000	
Beryllium	µg/L	0.1	< 0.2	< 0.1	< 0.1		53	
Boron	µg/L	5	100	25	35		36000	
Cadmium	µg/L	0.015	< 0.028	< 0.015	< 0.015		2.1	
Chromium	µg/L	2	< 2	< 2	< 2		640	
Chromium (VI)	µg/L	10	< 10 [1]	< 10 [1]	< 10 [1]		110	
Cobalt	µg/L	0.1	2.1	< 0.1	0.5		52	
Copper	µg/L	2	< 2	< 2	< 2		69	
Lead	µg/L	0.02	0.06	< 0.02	< 0.02		20	
Mercury	µg/L	0.02	< 0.02	< 0.02	< 0.02		0.29	
Molybdenum	µg/L	0.1	4.3	1.7	1.5		7300	
Nickel	µg/L	0.2	2.5	0.7	1.0		390	
Selenium	µg/L	1	< 2	2	< 1		50	
Silver	µg/L	0.1	< 0.1	< 0.1	< 0.1		1.2	
Thallium	µg/L	0.05	< 0.1	< 0.05	< 0.05		400	
Uranium	µg/L	0.05	0.90	1.67	1.38		330	
Vanadium	µg/L	0.1	< 0.2	0.3	0.5		200	
Zinc	µg/L	5	140	< 5	< 5		890	

1 . Chromium (VI) result is based on total Chromium

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - GW (µg/L) - Table 9 - Ground Water Standards

Christine Burke
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B22-32551 (i)

Report To:

GHD Limited
455 Phillip Street,
Waterloo Ontario N2L 3X2 Canada
Attention: Eric Wierdsma

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 20-Oct-22
DATE REPORTED: 28-Oct-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: 12594921-02
P.O. NUMBER: 735-004531
WATERWORKS NO.

Summary of Exceedances

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - GW (µg/L) - Table 9 - Ground Water Standards

Christine Burke
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: --- **REPORT No. B22-32551 (iii)**

Report To:

GHD Limited
455 Phillip Street,
Waterloo Ontario N2L 3X2 Canada
Attention: Eric Wierdsma

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 20-Oct-22
DATE REPORTED: 28-Oct-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: 12594921-02
P.O. NUMBER: 735-004531
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
SVOC	2	Kingston	esi	24-Oct-22	C-NAB-W-001 (k)	EPA 8270

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg
F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)
F2 C10-C16 hydrocarbons in µg/g, (F2-napth if requested)
F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)
F4 C34-C50 hydrocarbons in µg/g
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
Any deviations from the method are noted and reported for any particular sample.
nC6 and nC10 response factor is within 30% of response factor for toluene:
nC10,nC16 and nC34 response factors within 10% of each other:
C50 response factors within 70% of nC10+nC16+nC34 average:
Linearity is within 15%:
All results expressed on a dry weight basis.
Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.
If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC
QC will be made available upon request.

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - GW (µg/L) - Table 9 - Ground Water Standards

Christine Burke
Lab Manager

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REPORT No. B22-32551 (iii)

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Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 20-Oct-22
DATE REPORTED: 28-Oct-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: 12594921-02
P.O. NUMBER: 735-004531
WATERWORKS NO.

	Client I.D.		BH-22-3	BH-22-4			O. Reg. 153	
	Sample I.D.		B22-32551-2	B22-32551-3			Tbl. 9 - GW (µg/L)	
	Date Collected		19-Oct-22	19-Oct-22				
Parameter	**Units**	**R.L.**						
Acenaphthene	µg/L	0.05	< 0.05	< 0.05			600	
Acenaphthylene	µg/L	0.05	< 0.05	< 0.05			1.4	
Anthracene	µg/L	0.05	< 0.05	< 0.05			1	
Benzo(a)anthracene	µg/L	0.05	< 0.05	< 0.05			1.8	
Benzo(a)pyrene	µg/L	0.01	< 0.01	< 0.01			0.81	
Benzo(b)fluoranthene	µg/L	0.05	< 0.05	< 0.05			0.75	
Benzo(b+k)fluoranthene	µg/L	0.1	< 0.1	< 0.1				
Benzo(g,h,i)perylene	µg/L	0.05	< 0.05	< 0.05			0.2	
Benzo(k)fluoranthene	µg/L	0.05	< 0.05	< 0.05			0.4	
Chrysene	µg/L	0.05	< 0.05	< 0.05			0.7	
Dibenzo(a,h)anthracene	µg/L	0.05	< 0.05	< 0.05			0.4	
Fluoranthene	µg/L	0.05	< 0.05	< 0.05			73	
Fluorene	µg/L	0.05	< 0.05	< 0.05			290	
Indeno(1,2,3,-cd)pyrene	µg/L	0.05	< 0.05	< 0.05			0.2	
Methylnaphthalene,1-	µg/L	0.05	< 0.05	< 0.05			1500	
Methylnaphthalene,2-	µg/L	0.05	< 0.05	< 0.05			1500	
Methylnaphthalene 2-(1-)	µg/L	1	< 1	< 1			1500	
Naphthalene	µg/L	0.05	< 0.05	< 0.05			1400	
Phenanthrene	µg/L	0.05	< 0.05	< 0.05			380	
Pyrene	µg/L	0.05	< 0.05	< 0.05			5.7	

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - GW (µg/L) - Table 9 - Ground Water Standards

Christine Burke
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B22-32551 (iii)

Report To:

GHD Limited
455 Phillip Street,
Waterloo Ontario N2L 3X2 Canada
Attention: Eric Wierdsma

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 20-Oct-22
DATE REPORTED: 28-Oct-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: 12594921-02
P.O. NUMBER: 735-004531
WATERWORKS NO.

Summary of Exceedances

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - GW (µg/L) - Table 9 - Ground Water Standards

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Christine Burke
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B22-32551 (ii)

Report To:

GHD Limited
455 Phillip Street,
Waterloo Ontario N2L 3X2 Canada
Attention: Eric Wierdsma

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 20-Oct-22
DATE REPORTED: 28-Oct-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: 12594921-02
P.O. NUMBER: 735-004531
WATERWORKS NO.

Parameter	Qty	Site Analyzed	Analyst Initials	Date Analyzed	Lab Method	Reference Method
PHC(F2-F4)	3	Kingston	KPR	21-Oct-22	C-PHC-W-001 (k)	MOE E3421
VOC's	3	Richmond Hill	JE	27-Oct-22	C-VOC-02 (rh)	EPA 8260
PHC(F1)	3	Richmond Hill	JE	27-Oct-22	C-VPHW-01 (rh)	MOE E3421

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg
F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)
F2 C10-C16 hydrocarbons in µg/g, (F2-napth if requested)
F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)
F4 C34-C50 hydrocarbons in µg/g
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
Any deviations from the method are noted and reported for any particular sample.
nC6 and nC10 response factor is within 30% of response factor for toluene:
nC10,nC16 and nC34 response factors within 10% of each other:
C50 response factors within 70% of nC10+nC16+nC34 average:
Linearity is within 15%:
All results expressed on a dry weight basis.
Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.
If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC
QC will be made available upon request.

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - GW (µg/L) - Table 9 - Ground Water Standards

Christine Burke
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Tel: 289-475-5442
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DATE RECEIVED: 20-Oct-22
DATE REPORTED: 28-Oct-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: 12594921-02
P.O. NUMBER: 735-004531
WATERWORKS NO.

	Client I.D.		BH-22-1	BH-22-3	BH-22-4		O. Reg. 153	
	Sample I.D.		B22-32551-1	B22-32551-2	B22-32551-3		Tbl. 9 - GW (µg/L)	
	Date Collected		19-Oct-22	19-Oct-22	19-Oct-22			
Parameter	**Units**	**R.L.**						
Acetone	µg/L	30	< 30	< 30	< 30		100000	
Benzene	µg/L	0.5	< 0.5	< 0.5	< 0.5		44	
Bromodichloromethane	µg/L	2	< 2	< 2	< 2		67000	
Bromoform	µg/L	5	< 5	< 5	< 5		380	
Bromomethane	µg/L	0.5	< 0.5	< 0.5	< 0.5		5.6	
Carbon Tetrachloride	µg/L	0.2	< 0.2	< 0.2	< 0.2		0.79	
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	< 0.5	< 0.5	< 0.5		500	
Chloroform	µg/L	1	< 1	< 1	< 1		2.4	
Dibromochloromethane	µg/L	2	< 2	< 2	< 2		65000	
Dichlorobenzene,1,2-	µg/L	0.5	< 0.5	< 0.5	< 0.5		4600	
Dichlorobenzene,1,3-	µg/L	0.5	< 0.5	< 0.5	< 0.5		7600	
Dichlorobenzene,1,4-	µg/L	0.5	< 0.5	< 0.5	< 0.5		8	
Dichlorodifluoromethane	µg/L	2	< 2	< 2	< 2		3500	
Dichloroethane,1,1-	µg/L	0.5	< 0.5	< 0.5	< 0.5		320	
Dichloroethane,1,2-	µg/L	0.5	< 0.5	< 0.5	< 0.5		1.6	
Dichloroethylene,1,1-	µg/L	0.5	< 0.5	< 0.5	< 0.5		1.6	
Dichloroethene, cis-1,2-	µg/L	0.5	< 0.5	< 0.5	< 0.5		1.6	
Dichloroethene, trans-1,2-	µg/L	0.5	< 0.5	< 0.5	< 0.5		1.6	
Dichloropropane,1,2-	µg/L	0.5	< 0.5	< 0.5	< 0.5		16	
Dichloropropene, cis-1,3-	µg/L	0.5	< 0.5	< 0.5	< 0.5			
Dichloropropene, trans-1,3-	µg/L	0.5	< 0.5	< 0.5	< 0.5			

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - GW (µg/L) - Table 9 - Ground Water Standards

Christine Burke
Lab Manager

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Attention: Eric Wierdsma

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 20-Oct-22
DATE REPORTED: 28-Oct-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: 12594921-02
P.O. NUMBER: 735-004531
WATERWORKS NO.

	Client I.D.		BH-22-1	BH-22-3	BH-22-4		O. Reg. 153	
	Sample I.D.		B22-32551-1	B22-32551-2	B22-32551-3		Tbl. 9 - GW (µg/L)	
	Date Collected		19-Oct-22	19-Oct-22	19-Oct-22			
Parameter	**Units**	**R.L.**						
Dichloropropene 1,3-cis+trans	µg/L	0.5	< 0.5	< 0.5	< 0.5		5.2	
Ethylbenzene	µg/L	0.5	< 0.5	< 0.5	< 0.5		1800	
Dibromoethane,1,2-(Ethylene Dibromide)	µg/L	0.2	< 0.2	< 0.2	< 0.2		0.25	
Hexane	µg/L	5	< 5	< 5	< 5		51	
Methyl Ethyl Ketone	µg/L	20	< 20	< 20	< 20		470000	
Methyl Isobutyl Ketone	µg/L	20	< 20	< 20	< 20		140000	
Methyl-t-butyl Ether	µg/L	2	< 2	< 2	< 2		190	
Dichloromethane (Methylene Chloride)	µg/L	5	< 5	< 5	< 5		610	
Styrene	µg/L	0.5	< 0.5	< 0.5	< 0.5		1300	
Tetrachloroethane,1,1,1,2-	µg/L	0.5	< 0.5	< 0.5	< 0.5		3.3	
Tetrachloroethane,1,1,2,2-	µg/L	0.5	< 0.5	< 0.5	< 0.5		3.2	
Tetrachloroethylene	µg/L	0.5	< 0.5	< 0.5	< 0.5		1.6	
Toluene	µg/L	0.5	< 0.5	< 0.5	< 0.5		14000	
Trichloroethane,1,1,1-	µg/L	0.5	< 0.5	< 0.5	< 0.5		640	
Trichloroethane,1,1,2-	µg/L	0.5	< 0.5	< 0.5	< 0.5		4.7	
Trichloroethylene	µg/L	0.5	< 0.5	< 0.5	< 0.5		1.6	
Trichlorofluoromethane	µg/L	5	< 5	< 5	< 5		2000	
Vinyl Chloride	µg/L	0.2	< 0.2	< 0.2	< 0.2		0.5	
Xylene, m,p-	µg/L	1.0	< 1.0	< 1.0	< 1.0			
Xylene, o-	µg/L	0.5	< 0.5	< 0.5	< 0.5			

O. Reg. 153 - Soil, Ground Water and Sediment Standards
Tbl. 9 - GW (µg/L) - Table 9 - Ground Water Standards

Christine Burke
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B22-32551 (ii)

Report To:

GHD Limited
455 Phillip Street,
Waterloo Ontario N2L 3X2 Canada
Attention: Eric Wierdsma

Caduceon Environmental Laboratories
110 West Beaver Creek Rd Unit 14
Richmond Hill ON L4B 1J9
Tel: 289-475-5442
Fax: 289-562-1963

DATE RECEIVED: 20-Oct-22
DATE REPORTED: 28-Oct-22
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: 12594921-02
P.O. NUMBER: 735-004531
WATERWORKS NO.

	Client I.D.		BH-22-1	BH-22-3	BH-22-4		O. Reg. 153	
	Sample I.D.		B22-32551-1	B22-32551-2	B22-32551-3		Tbl. 9 - GW (µg/L)	
	Date Collected		19-Oct-22	19-Oct-22	19-Oct-22			
Parameter	**Units**	**R.L.**						
Xylene, m,p,o-	µg/L	1.1	< 1.1	< 1.1	< 1.1		3300	
PHC F1 (C6-C10)	µg/L	25	< 25	< 25	< 25		420	
PHC F2 (>C10-C16)	µg/L	50	< 50	< 50	< 50		150	
PHC F3 (>C16-C34)	µg/L	400	< 400	< 400	< 400		500	
PHC F4 (>C34-C50)	µg/L	400	< 400	< 400	< 400		500	

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Christine Burke
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Summary of Exceedances

O. Reg. 153 - Soil, Ground Water and Sediment Standards
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Christine Burke
Lab Manager

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