PATERSON GROUP

Phase II Environmental Site Assessment

2506 Innes Road

Ottawa, Ontario

Prepared for Concorde Properties

Report: PE6214-2R
November 29, 2023

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for the property addressed 2506 Innes Road, in Ottawa, Ontario. The purpose of this Phase II ESA was to address 4 potentially contaminating activities (PCAs) that were identified during the Phase I ESA and considered to result in 4 areas of potential environmental concern (APECs) on the Phase II Property.

The subsurface investigation consisted of placing four (4) boreholes, all of which were instrumented with groundwater monitoring wells. The general stratigraphy encountered during the field program consisted of an asphaltic concrete paved structure or granular fill, followed by fill material consisting of silty sand with traces of gravel, overlying native silty clay with traces of sand. An olfactory odour was noted in all borehole locations in the fill layer at depths ranging from approximately 0.76 to 3.81 mbgs. Boreholes were terminated at a maximum depth of 6.7 m below the existing grade. Bedrock was not encountered during the field program.

Six (6) soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) and petroleum hydrocarbons (PHCs, F1-F4). PHC concentrations were detected in the soil samples analyzed. The PHC, F2 concentration identified in BH2-23-SS4 was in excess of the selected MECP Table 3 Residential Standards. All other identified concentrations comply with MECP Table 3 Residential Standards.

Based on the review of the Remediation Excavation Report completed by Aqua Terre in 2006, confirmatory test results for BTEX (benzene, xylenes) and PHCs (F2 and F3) parameters along the excavation walls and/or floors of Excavation C (EX-C) and Excavation A (EX-A) as well as stockpiles of soil used as backfill material exceeded the MECP Table 3 Residential Standards. As a result of the former remediation program and use of stockpile soils used to backfill the excavations, it is possible that there are pockets of contaminated soil/fill within these former excavation areas.

Groundwater samples from monitoring wells BH1-23, BH2-23, BH3-23 and BH4-23 were collected on August 17, 2023. A second round of sampling was completed on November 6, 2023. No free product or petroleum hydrocarbon sheen was noted on the purge water at any of the borehole locations during the groundwater sampling event.

Groundwater samples were analyzed for BTEX, PHCs (F1-F4), VOCs, PAHs, and/or Lead (Pb). All of the groundwater results comply with the MECP Table 3 Standards.

Recommendations

Based on the findings of the Phase II ESA, further environmental investigation (a supplemental Phase II ESA) is recommended to assess the remaining APECs on the Phase II Property, in order to meet the requirements of the O.Reg. 153/04. This work should be considered once the current automotive service garage operations have been terminated.

Contaminated soil/fill material identified in the immediate area of the former UST nest will require remediation of any PHCs in excess of the selected standards as well as any additional soil/fill material containing BTEX and PHCs from the former remediation excavation that may be encountered during the supplemental subsurface program.

Any soil that meets the MECP Table 3 Residential Standards; however, exceeds the off-site MECP reuse soil standards will require off-site disposal as contaminated soils if it has to be removed for construction purposes.

It is our understanding that the Phase II Property may be redeveloped in the future for a more sensitive land use (commercial to residential). As a result, a record of site condition (RSC) will be required as per O.Reg 154/03.

Excess soil requiring off-site disposal during construction must be managed in accordance with Ontario Regulation 406/19 – On-site and Excess Soil Management. This will require further soil testing and should be carried out closer to the time of site redevelopment.

Monitoring Wells

The monitoring wells installed on the Phase II Property should remain viable for future use. If they are not going to be used in the future, or will be destroyed during site redevelopment, they should be abandoned according to Ontario Regulation 903. The wells will be registered with the MECP under this regulation.

1.0 INTRODUCTION

At the request of Concorde Properties, Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment at 2506 Innes Road (the Phase II Property), in the City of Ottawa, Ontario. The purpose of this Phase II ESA has been to address some areas of potential environmental concern (APECs) identified on the Phase II Property, during the Phase I ESA conducted by Paterson in August 2023.

1.1 Site Description

Address:	2506 Innes Road, Ottawa, Ontario
Legal Description:	Part of Lot 15, Concession 3 of Ottawa River, Gloucester, now in the City of Ottawa.
Location:	The site is located on the south side of Innes Road and east side of Scotland Private, in the City of Ottawa, Ontario. Refer to Figure 1 - Key Plan in the Figures section following the text.
Latitude and Longitude:	45° 25’ 45.59" N, 75° 34' 10.07" W

Site Description:

Configuration:	Rectangular
Area:	4,025m^2 (approximately)
Zoning:	AM11 – Arterial Mainstreet Zone.
Current Use:	The Phase I Property is currently occupied by an operational automotive service garage.
Services:	The Phase I Property is situated in a municipally serviced area.

1.2 Property Ownership

Paterson was engaged to conduct this Phase I-ESA by Mr. Jordan Tannis of Concorde Properties. 408 Tweedsmuir Avenue, Ottawa, Ontario. Mr. Tannis can be reached by telephone at (613) 778-8118.

1.3 Current and Proposed Future Uses

The Phase II Property is currently occupied by an automotive service garage.

It is our understanding that the Phase II Property will be redeveloped for residential purposes. Due to the change in use to a more sensitive land use (commercial to residential), a record of site condition (RSC) will be required as per O.Reg 154/03.

1.4 Applicable Site Condition Standard

The site condition standards for the property were obtained from Table 3 of the document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", prepared by the Ontario Ministry of Environment, Conservation and Parks (MECP), April 2011. The MECP selected Table 3 Standards are based on the following considerations:

- ❒ Coarse-grained soil conditions
- ❒ Full depth generic site conditions
- ❒ Non-potable groundwater conditions
- ❒ Residential land use

Section 35 of O.Reg. 153/04 does apply to the Phase II Property in that the property does not rely upon potable groundwater.

Section 41 of O.Reg. 153/04 does not apply to the Phase II Property, as the property is not within 30m of an environmentally sensitive area.

Section 43.1 of O.Reg. 153/04 does not apply to the Phase II Property in that the property is not a Shallow Soil property.

The intended use of the Phase II Property is residential; therefore, the Residential Standards have been selected for the purpose of this Phase II ESA.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II Property is situated in an area that consists primarily of residential land use with some commercial properties along Innes Road, east of the Phase II Property.

The central portion of the Phase I Property is occupied by a slab-on-grade building that was constructed circa 1975.

The subject building has been used as an automotive service garage and an associated office for the last 30 years. The ground surface of the northern portion of the property is asphaltic paved concrete with two (2) catch basins located at each of the access lanes situated on the west and east sides of the property. The remaining southern half of the Phase II Property is landscaped with a treeline along the southern property boundary.

The site topography is slightly above the grade of Innes Road, while the southern half is relatively flat and at the grade of the adjacent properties to the west, east and south. Site drainage consists of infiltration on the landscaped areas and sheet flow to a catch basin located on-site. The regional topography slopes down in a northerly/north-westerly direction towards Green's Creek.

A depiction of the Phase II Property is shown on Drawing PE6214-1 – Site Plan, appended in the Figures section of this report.

2.2 Past Investigations

The following report addressed to Petro-Canada was reviewed as part of this assessment:

- "Remedial Excavation Monitoring – 2506 Innes Road, Ottawa (formerly Gloucester), Ontario (Former Outlet No. 53620)," prepared by Aqua Terre Solutions, dated August 9, 2006.

Based on the reviewed report, the subject site operated as a retail fuel outlet (RFO) circa 1975 until 1990. The RFO included, two 27,276-L gasoline USTs, one 36,368-L steel gasoline UST, one steel gasoline UST with an unknown capacity, and two pump islands. In 1995, all of the petroleum related equipment (i.e., piping and 4 USTs) were decommissioned by Triangle Pump Ltd., of Gloucester, Ontario.

In May of 2006, a 2,273-L fibreglass re-enforced plastic (FRP) fuel oil UST, a 2,273-L FRP waste oil UST, and a 1,135-L steel furnace oil AST and its associated piping were removed by Clarkway Construction Ltd., of Brampton, Ontario (Aqua Terre Solutions, 2006).

After the decommissioning of the aforementioned USTs and AST, the original subject building remaining on-site included, a service station building and office (J&S Service Station), which ceased operation at the time of the decommissioning work.

The garage consisted of three (3) service bays containing three (3) above ground service hoists, and a 3-chamber oil-water separator, located inside the subject building.

Following the decommissioning of the former USTs and other equipment associated with the RFO, a total of 1,875 metric tonnes of contaminated soil was excavated and disposal of off-site. Approximately 1,750 metric tonnes of soil were stockpiled on-site in order to assess hydrocarbon impacts.

Based on the review of the report, this stockpile was used to backfill the excavations. In addition to the stockpile, approximately 955 metric tonnes of sand and gravel fill was imported by Clarkway. During the remedial excavations, approximately 166,165 Litres of hydrocarbon impacted groundwater were pumped from the excavations over a seven (7) week period during the interim of June 5 to July 28, 2006.

The previously installed groundwater monitoring wells were also removed during the excavation program.

It should be noted that a site plan with the excavation areas was not provided in the report received. The confirmatory soil results from the remediation excavations (floor and wall excavations) complied with the former MOE (2004) site conditions (Table 3) for commercial land use. It should be noted that the impacted soil (exceeding the former standards) was separated into stockpiles and mixed with imported fill for backfilling the remediation excavations.

The analytical results for the stockpiles used as backfill were compared with the current MECP Table 3 Residential Standards as well as the MECP Excess Soil Standards, Tables 2.1 and Table 3.1. Based on the current MECP Table 3 Residential Standards, the fill material of Excavation C (EX-C – area of the former UST nest and west of the former pump islands) and within Excavation A (EX-A – former UST waste oil) exceeded the MECP Table 3 Residential Standards for BTEX and PHCs, while the majority of the stockpile test results exceeded the MECP Excess Soil Standards, Tables 2.1 and Table 3.1.

The confirmatory results for Excavation B (EX-B – area of the former furnace oil UST), and Excavation BU (EX-BU – beneath the southwest corner of the subject building associated with the fuel oil furnace) exceeded the MECP Excess Soil Standards, Tables 2.1 and Table 3.1.

It is our opinion that there are pockets of fill material within these former excavations that likely exceed the MECP Excess Soil Standards, Tables 2.1 and Table 3.1.

The estimated locations and footprints of the remediation excavation are shown on Drawing PE6214-5R – Soil Remediation Plan, appended in the Figures section of this report.

- ❑ "Phase I-Environmental Site Assessment, 2506 Innes Road, Ottawa, Ontario," prepared by Paterson Group Inc. (Paterson), dated August 23, 2023

Based on the findings of the Phase I ESA, nine (9) on-site potentially contaminating activities (PCAs) were identified and represent areas of potential environmental concern (APECs) on the Phase I Property. The following APECs identified on the Phase I Property are:

- PCA 28 – "Gasoline and Associated Products Storage in Fixed Tanks," due to the historical presence of 4 USTs containing gasoline and diesel fuel (APEC 1);
- PCA 28 – "Gasoline and Associated Products Storage in Fixed Tanks," due to the historical presence of 2 pump islands (APEC 2);
- PCA 52 – "Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems," due to the presence of an automotive service garage (APEC 3);
- PCA 28 – "Gasoline and Associated Products Storage in Fixed Tanks," due to the historical presence of a fuel oil UST (APEC 4);
- PCA 28 – "Gasoline and Associated Products Storage in Fixed Tanks," due to the historical presence of a waste oil UST (APEC 5);
- PCA Other – "Presence of oil-water separator," (APEC 6);
- PCA 28 – "Gasoline and Associated Products Storage in Fixed Tanks," due to the presence of a waste oil AST (APEC 7);
- PCA 30 – "Importation of Fill Material of Unknown Quality," due to the backfill material used after remediation (APEC 8).
- PCA Other – "Use of Road Salt for Deicing," across the Phase I Property (APEC 9).

Although not identified as a specific PCA in Table 2, the application of deicing salts for vehicular and pedestrian safety is considered to represent an APEC (APEC 9). In accordance with Section 49.1 of Ontario Regulation 153/04 standards are deemed to be met if an applicable site condition standard is exceeded at a property solely because the qualified person has determined that a substance has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both. The exemption outlined in Section 49.1 is being relied upon with respect to the Phase I Property; in other words, APEC 9 is exempted.

The locations of the APECs are shown on Drawing PE6214-1–Site Plan. Other off-site PCAs were not considered to result in APECs based on their separation distances and/or orientations (down or cross-gradient) with respect to the Phase I Property.

The off-site PCAs within the Phase I Study Area that do not represent APECs are identified in green on Drawing PE6214-2– Surrounding Land Use Plan.

The rationale for identifying the above APECs is based on a review of a previous report, aerial photographs, field observations, and personal interviews. A Phase II ESA was recommended to address the aforementioned APECs.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation was conducted on August 10 and August 11, 2023. The field program consisted of drilling four (4) boreholes to address 4 APECs (APEC 1, 2, 4and 5) identified on the Phase II Property. All of the boreholes were completed with monitoring well installations. The boreholes were drilled to a maximum depth of 6.71 m below the ground surface (mbgs).

3.2 Media Investigated

During the subsurface investigation, soil samples and groundwater samples were obtained and submitted for laboratory analysis. The rationale for sampling and analyzing this media is based on the Contaminants of Potential Concern identified in the Phase I ESA.

Contaminants of potential concern on the Phase II Property include Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), Petroleum Hydrocarbons (PHCs, F1-F4), Volatile Organic Compounds (VOCs), Polycyclic Organic Hydrocarbons

(PAHs), Lead, Metals, including hydride forming compounds (arsenic, antimony and selenium); and Electrical Conductivity and Sodium Adsorption Ratio (SAR).

These CPCs may be present in the soil and/or groundwater beneath the Phase II Property.

3.3 Phase I Conceptual Site Model

Geological and Hydrogeological Setting

The Geological Survey of Canada website on the Urban Geology of the National Capital Area was consulted as part of this assessment. Based on the information from NRCAN, the bedrock within the area of the subject property consists of shale of the Carlsbad Formation. The surficial geology within the area of the subject property consists of clay and silt. The overburden thickness throughout the subject property ranges from 25 to 50 metres.

Groundwater is expected to flow in a northwesterly direction towards Green's Creek.

Fill Material

No evidence of fill material was noted at the time of the site visit; however, based on the previous report reviewed, fill material of unknown quality was used to backfill the remediation excavations. As such, the quality of the fill material is unknown and therefore, represents an APEC on the Phase I Property.

Existing Buildings and Structures

The Phase I Property is occupied by the 1975 slab-on-grade commercial building consisting of 3 service bays each equipped with an above ground electric hoist and an office. The exterior of the building is finished in brick and metal siding with a flat tar and gravel style roof. The subject building is heated by a natural gas fired suspended ceiling furnace. Temporary structures included 4 sea containers located on the south exterior wall of the subject building, which have been used to store tires. No other structures are present.

Subsurface Structures and Underground Utilities

The Phase I Property is situated in a municipally serviced area. Underground utilities and/or structures includes natural gas, municipal water, sanitary and stormwater sewers. A catch basin was noted on both the entrance and exit laneways.

Underground service locates were completed prior to the subsurface investigations. Buried utilities on the Phase I Property include water and sewer utilities that run parallel to the northern property boundary, and natural gas services that enter the northeastern portion of the Phase I Property from Innes Road.

Areas of Natural Significance and Natural Water Bodies

No areas of natural significance or natural water bodies were identified in the Phase I Study Area.

Drinking Water Wells

The well record search identified domestic wells were on properties within the Phase I Study Area; however, they are not expected to be in use anymore, since municipal water services have been provided in the study area.

Neighbouring Land Use

Neighbouring land use in the Phase I Study Area consists of some commercial along Innes Road, east of the Phase I Property, while the remaining lands consist of residential properties.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

Table 1: Potentially Contaminating Activities and Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1: Resulting from the former of a UST nest	Central west side of the Phase I Property	PCA 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-site	VOCs PHCs (F_1-F_4) Lead	Soil and Groundwater
APEC 2: Resulting from the former of 2 pump islands	Central north side of the Phase I Property	PCA 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-site	VOCs PHCs (F_1-F_4) Lead	Soil and Groundwater

Table 1: Potentially Contaminating Activities and Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 3: Resulting from the presence of an automotive repair garage	Central part of the Phase I Property	PCA 52 – Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems	On-site	VOCs PHCs (F_1-F_4) PAHs	Soil and Groundwater
APEC 4: Resulting from the former of a fuel oil UST	Central west side of the Phase I Property	PCA 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX PHCs (F_1-F_4)	Soil and Groundwater
APEC 5: Resulting from the former waste oil UST	Southeast side of the Phase I Property	PCA 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-site	VOCs PHCs (F_1-F_4) PAHs	Soil and Groundwater
APEC 6: Resulting from the 3-chamber oil water separator	Southeast side of the Phase I Property	PCA Other – oil-oil water separator	On-site	VOCs PHCs (F_1-F_4) PAHs	Soil and Groundwater
APEC 7: Resulting from a waste oil AST	Southeast side of the Phase I Property	PCA 28 – Gasoline and Associated Products Storage in Fixed Tanks	On-site	VOCs PHCs (F_1-F_4) PAHs	Soil and Groundwater
APEC 8: Resulting from fill material of unknown quality	Across the northern portion of the Phase I Property	PCA 30 – Importation of Fill Material of Unknown Quality	On-site	BTEX PHCs (F_1-F_4) Metals As, Sb, Se	Soil
APEC 9[1]: Resulting from the use of salt for deicing purposes for pedestrian and vehicular safety	Across the northern portion of the Phase I Property	Other – Use of Salt for Deicing Purposes	On-site	EC SAR	Soil

1 – In accordance with Section 49.1 of Ontario Regulation 153/04 standards are deemed to be met if an applicable site condition standard is exceeded at a property solely because the qualified person has determined that a substance has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both. The exemption outlined in Section 49.1 is being relied upon with respect to the Phase I Property.

Contaminants of Potential Concern

As per Section 7.1, the Phase I ESA, the contaminants of potential concern (CPCs) in soil and/or groundwater include Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), Petroleum Hydrocarbons (PHCs, F1-F4), Volatile Organic Compounds (VOCs), Polycyclic Organic Hydrocarbons (PAHs), Lead, Metals, including hydride forming compounds (arsenic, antimony and selenium); and Electrical Conductivity and Sodium Adsorption Ratio (SAR).

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of this Phase I-ESA is considered to be sufficient to conclude that there are on-site PCAs that have resulted in APECs on the Phase I Property.

A variety of independent sources were consulted as part of this assessment, and as such, the conclusions of this report are not affected by uncertainty which may be present with respect to the individual sources.

3.4 Deviations from Sampling and Analysis Plan

There were no deviations from the Sampling and Analysis Plan which is included in Appendix 1 of this report.

3.5 Impediments

No impediments were encountered during the limited Phase II ESA program.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation conducted for this Phase II ESA consisted of drilling four (4) boreholes (BH1-23 through BH4-23) across the Phase II Property. The boreholes were drilled to a maximum depth of 6.71 m below ground surface (bgs) to intercept groundwater.

The boreholes were drilled using a low clearance track mounted drill rig operated by George Downing Estate Drilling of Hawkesbury, Ontario, under full-time supervision of Paterson personnel. The borehole locations are indicated on the attached Drawing PE6214-3R - Test Hole Location Plan.

4.2 Soil Sampling

A total of 32 soil samples were obtained from the boreholes by means of grab sampling from auger flights/auger samples and split spoon sampling. Split spoon samples were taken at approximate 0.76 m intervals.

The depths at which auger samples and split spoon were obtained from the boreholes are shown as "**AU"** and "**SS**", respectively, on the Soil Profile and Test Data Sheets.

The borehole profiles generally consist of an asphaltic concrete structure with engineered fill, followed by a fill material consisting of silty sand with traces of gravel, overlying silty clay with and without traces of sand. Bedrock was not encountered during the field program.

Olfactory odours and some staining were observed in all of the boreholes, except BH1-23, at depths ranging from 0.76 to 3.81 m below the ground surface (mbgs) at during the field program.

4.3 Field Screening Measurements

Soil samples recovered at the time of sampling were placed immediately into airtight plastic bags with nominal headspace.

All lumps of soil inside the bags were broken by hand, and the soil was allowed to come to room temperature prior to conducting the vapour survey. Allowing the samples to stabilize to room temperature ensures consistency of readings between samples.

To measure the soil vapours, the analyser probe is inserted into the nominal headspace above the soil sample. A photo ionization detector (PID) was used to measure the volatile organic vapour concentrations. The sample is agitated/manipulated gently as the measurement is taken. The peak reading registered within the first 15 seconds is recorded as the vapour measurement.

The PID readings were found to range from 3.2 to 311.5 ppm in the soil samples obtained.

These PID results do not indicate the potential for significant contamination from volatile contaminants; however, visual observations and olfactory odours were noted in all of the boreholes at depths ranging from 0.76 to 3.81 mbgs.

Vapour readings are noted on the Soil Profile and Test Data Sheets in Appendix 1. The results of the vapour survey are presented on the Soil Profile and Test Data sheets.

4.4 Groundwater Monitoring Well Installation

Four (4) groundwater monitoring wells (BH1-23, BH2-23, BH3-23, and BH4-23) were installed on the Phase II Property as part of this current subsurface investigation. The monitoring wells consisted of 50 mm diameter, Schedule 40 threaded PVC risers and screens. Monitoring well construction details are listed below in Table 2 and are also presented on the Soil Profile and Test Data Sheets provided in Appendix 1.

Borehole locations and elevations were surveyed geodetically by Paterson personnel.

TABLE 2. Monitoring Well Construction Details

Well ID	Ground Surface Elevation	Total Depth (m BGS)	Screened Interval (m BGS)	Sand Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
BH1-23	74.91	6.10	2.18-5.18	1.52-5.18	0.15-1.52	Flushmount
BH2-23	74.93	6.71	2.18-5.18	1.52-5.18	0.15-1.52	Flushmount
BH3-23	74.93	6.10	2.18-5.18	2.00-5.18	0.15-2.00	Flushmount
BH4-23	75.16	6.10	2.18-5.18	2.03-5.18	0.15-2.03	Flushmount

4.5 Groundwater Sampling

Groundwater sampling protocols were followed using the MECP document entitled “Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario”, dated May 1996.

Groundwater samples were obtained from each monitoring well, using dedicated sampling equipment. Standing water was purged from each well prior to sampling. Samples were stored in coolers to reduce analyte volatilization during transportation. Details of our standard operating procedure for groundwater sampling are provided in the Sampling and Analysis Plan in Appendix 1.

4.6 Analytical Testing

Based on the guidelines outlined in the Sampling and Analysis Plan appended to this report, the following soil and groundwater samples, as well as analyzed parameters are presented in Tables 3 and 4.

TABLE 3: Soil Samples Submitted and Analyzed Parameters

Sample ID	Sample Depth & Stratigraphic Unit	Parameters Analyzed		Rationale
		BTEX	PHCs (F_1-F_4)	
August 10, 2023				
BH1-23-SS5	3.05-3.66m Fill	X	X	Sample depth selected based on the visual, odour and vapour screening.
BH1-23-SS6	3.81-4.42m Native	X	X	Sample depth selected at the approximate depth of the water table.
BH2-23-SS4	2.29-2.90m Fill	X	X	Sample depth selected based on the odour and visual screening.
BH2-23-SS5 (Top)	3.05-3.35m Fill	X	X	Sample depth selected based on the visual, odour and vapour screening near the water table.
August 11, 2023				
BH3-23-SS6	3.81-4.42m Native	X	X	Sample depth selected based on the visual, odour and vapour screening near the water table.
BH4-23-SS3	1.52-2.13m Fill	X	X	Sample depth selected based on the odour and visual screening.

TABLE 4: Groundwater Samples Submitted and Analyzed Parameters

Sample ID	Screened Interval	Parameters Analyzed					Rationale
		BTEX	VOCs	PHCs (F_1-F_4)	Lead	PAHs	
August 17, 2023							
BH1-23-GW	2.18-5.18m	X		X			Assess the potential groundwater impact due to the former fuel oil UST.
BH2-23-GW	2.18-5.18m	X	X	X	X		Assess the potential groundwater impact due to the former UST nest.
BH3-23-GW	2.18-5.18m	X	X	X	X		Assess the potential groundwater impact due to the former pump islands.
BH4-23-GW	2.18-5.18m	X	X	X		X	Assess the potential groundwater impact due to the former waste oil UST.
November 6, 2023							
BH2-23-GW2	2.18-5.18m	X					Assess the potential groundwater impact due to the former UST nest.
BH12-23-GW[1]	2.18-5.18m	X					For laboratory QA/QC purposes.

Notes:
* VOC analyses included the BTEX group
1 – Duplicate sample of BH2-23-GW2

Paracel Laboratories (Paracel), of Ottawa, Ontario, performed the laboratory analysis on the samples submitted for analytical testing. Paracel is a member of the Standards Council of Canada/Canadian Association for Laboratory Accreditation (SCC/CALA). Paracel is accredited and certified by SCC/CALA for specific tests registered with the association.

4.7 Residue Management

All soil cuttings, purge water and fluids from equipment cleaning were retained on-site.

4.8 Elevation Surveying

Boreholes were surveyed at geodetic elevations by Paterson personnel.

4.9 Quality Assurance and Quality Control Measures

A summary of quality assurance and quality control (QA/QC) measures, including sampling containers, preservation, labelling, handling, and custody, equipment cleaning procedures, and field quality control measurements is provided in the Sampling and Analysis Plan in Appendix 1.

5.0 REVIEW AND EVALUATION

5.1 Geology

Site soils consisted of an asphalt concrete structure at locations BH2-23, BH3-23 and BH4-23, and a granular/engineered fill at location BH1-23, followed by fill material, overlying silty clay with and without traces of sand. Fill material consisting of silty sand and traces of gravel was encountered at all borehole locations.

Bedrock was not encountered during the field program as bedrock is expected to be at an approximate depth of 20 to 25 mbgs.

Groundwater was encountered within the overburden at depths ranging from 2.60 to 2.82 mbgs.

Site geology details are provided in the Soil Profile and Test Data Sheets provided in Appendix 1.

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured in all on-site monitoring wells using an electronic water level meter on November 6, 2023. The groundwater levels are summarized below in Table 5.

TABLE 5: Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH1-23	74.91	2.60	72.31	August 17, 2023
BH2-23	74.93	2.82	72.11	August 17, 2023
BH3-23	74.93	2.76	72.17	August 17, 2023
BH4-23	75.16	2.78	72.38	August 17, 2023
BH1-23	74.91	2.94	71.97	November 6, 2023
BH2-23	74.93	3.02	71.91	November 6, 2023
BH3-23	74.93	2.93	72.00	November 6, 2023
BH4-23	75.16	3.05	72.11	November 6, 2023

Based on the groundwater elevations measured during the sampling events, groundwater contour mapping was completed. Groundwater contours are shown on Drawing PE6214-3R – Test Hole Location Plan.

Based on the contour mapping, groundwater flow at the subject site is in a westerly direction. A horizontal hydraulic gradient of approximately 0.006m/m was calculated.

5.3 Fine-Coarse Soil Texture

Grain-size analysis was not completed for the Phase II Property. As such, the more stringent, coarse-grained soil standards were used.

5.4 Soil: Field Screening

Field screening of the soil samples collected during drilling resulted in vapour readings ranging from 3.2 to 311.5 ppm. Visual observations and olfactory odours were noted in all of the boreholes, except BH1-23, at depths ranging from 0.76 to 3.81 mbgs.

The field screening results of each individual soil sample are provided on the Soil Profile and Test Data Sheets appended to this report.

5.5 Soil Quality

Six (6) soil samples were submitted for BTEX and PHCs (F1-F4) analysis. The results of the analytical testing are presented in Table 6. The laboratory Certificate of Analysis is provided in Appendix 1.

TABLE 6: Analytical Test Results – Soil
BTEX and PHCs F_1-F_4

Parameter	MDL (µg/g)	Soil Samples (µg/g) August 10, 2023				MECP Table 3 Residential Standards (µg/g)
		BH1-23-SS5	BH1-23-SS6	BH2-23-SS4	BH2-23-SS5 (Top)	
Benzene	0.02	nd	nd	nd	nd	0.21
Toluene	0.05	nd	nd	nd	nd	2.3
Ethylbenzene	0.05	nd	nd	nd	nd	2
Xylenes	0.05	nd	nd	nd	nd	3.1
PHC F_1	7	nd	nd	nd	nd	55
PHC F_2	4	(14)	nd	**(101)**	7	98
PHC F_3	8	77	nd	168	25	300
PHC F_4	6	40	nd	31	17	2800

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and underlined** - analyzed parameter exceeds the selected MECP standard
- Parameters in parenthesis exceed the MECP Tables 2.1 and 3.1

TABLE 6 CONTINUED: Analytical Test Results – Soil
BTEX and PHCs F_1-F_4

Parameter	MDL (µg/g)	Soil Samples (µg/g) August 11, 2023		MECP Table 3 Residential Standards (µg/g)
		BH3-23-SS6	BH4-23-SS3	
Benzene	0.02	nd	nd	0.21
Toluene	0.05	nd	nd	2.3
Ethylbenzene	0.05	nd	nd	2
Xylenes	0.05	nd	nd	3.1
PHC F_1	7	nd	nd	55
PHC F_2	4	nd	nd	98
PHC F_3	8	nd	159	300
PHC F_4	6	nd	59	2800

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL

No detectable BTEX were identified in any of the soil samples analyzed. PHC concentrations were detected in all but 2 soil samples. PHC, fraction F2 was identifed in soil sample BH2-23-SS4 in excess of the selected MECP Table 3 Residential Standards, while all other soil samples complied.

The analytical results for BTEX and PHCs in soil are shown on Drawing PE6214-4R – Analytical Testing Plan.

The maximum concentrations of analyzed parameters in the soil at the Phase II Property are summarized in Table 7.

TABLE 7: Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Soil Sample	Depth Interval (m BGS)
PHC F_2	**101**	BH2-23-SS4	2.29-2.9m
PHC F_3	168		Fill
PHC F_4	59	BH4-23-SS3	1.52-2.13m Fill

Notes:
- **Bold and underlined** - analyzed parameter exceeds the selected MECP standard

No other parameters were identified above the laboratory method detection limits.

5.6 Groundwater Quality

Groundwater samples from monitoring wells installed in BH1-23 through BH4-23, were collected and submitted for laboratory analysis of BTEX, PHC (fractions, F1-F4), VOCs, lead and/or PAH analyses. The groundwater samples were obtained from the screened intervals noted in Table 2.

The results of the analytical testing are presented in Tables 8 through 10. The laboratory Certificates of Analysis are provided in Appendix 1.

TABLE 8: Analytical Test Results – Groundwater
BTEX and PHCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)						MECP Table 3 Standards (µg/L)
		August 17, 2023				November 6, 2023		
		BH1-23-GW	BH2-23-GW	BH3-23-GW	BH3-23-GW	BH2-23-GW2	BH12-23-GW[1]	
		2.18-5.18m						
Benzene	0.5	nd	1.1	nd	nd	1.5	1.5	44
Toluene	0.5	nd	1.1	nd	nd	nd	nd	18000
Ethylbenzene	0.5	nd	nd	nd	nd	nd	nd	2300
Xylenes	0.5	nd	nd	nd	nd	nd	nd	4200
PHC F_1	25	nd	nd	nd	nd	NA	NA	750
PHC F_2	100	nd	nd	nd	nd	NA	NA	150
PHC F_3	100	nd	nd	nd	nd	NA	NA	500
PHC F_4	100	nd	nd	nd	nd	NA	NA	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- NA – parameter not analyzed
- 1 - Duplicate sample of BH2-23-GW2

No detectable PHC concentrations were identified in the groundwater samples analyzed. Concentrations of benzene and toluene were identified in two of the groundwater samples; however, all of the groundwater results comply with the MECP Table 3 Standards.

TABLE 9: Analytical Test Results – Groundwater
Lead and VOCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)			MECP Table 3 Standards (µg/L)
		August 17, 2023			
		BH2-23-GW	BH3-23-GW	BH3-23-GW	
		2.28-5.18m			
Lead	0.1	nd	nd	NA	25
Acetone	5.0	nd	nd	nd	130,000
Benzene	0.5	1.1	nd	nd	44
Bromodichloromethane	0.5	nd	nd	nd	85,000
Bromoform	0.5	nd	nd	nd	380
Bromomethane	0.5	nd	nd	nd	5.6
Carbon Tetrachloride	0.2	nd	nd	nd	0.79
Chlorobenzene	0.5	nd	nd	nd	630
Chloroform	0.5	nd	nd	nd	2.4
Dibromochloromethane	0.5	nd	nd	nd	82,000
Dichlorodifluoromethane	1.0	nd	nd	nd	4,400
1,2-Dichlorobenzene	0.5	nd	nd	nd	4,600
1,3-Dichlorobenzene	0.5	nd	nd	nd	9,600
1,4-Dichlorobenzene	0.5	nd	nd	nd	8
1,1-Dichloroethane	0.5	nd	nd	nd	320
1,2-Dichloroethane	0.5	nd	nd	nd	1.6
1,1-Dichloroethylene	0.5	nd	nd	nd	1.6
cis-1,2-Dichloroethylene	0.5	nd	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	nd	16
1,3-Dichloropropene, total	0.5	nd	nd	nd	5.2
Ethylbenzene	0.5	nd	nd	nd	2,300
Ethylene dibromide (dibromoethane, 1,2-)	0.2	nd	nd	nd	0.25
Hexane	1.0	nd	nd	nd	51
Methyl Ethyl Ketone (2-Butanone)	5.0	nd	nd	nd	470,000
Methyl Isobutyl Ketone	5.0	nd	nd	nd	140,000
Methyl tert-butyl ether	2.0	nd	nd	nd	190
Methylene Chloride	5.0	nd	nd	nd	610
Styrene	0.5	nd	nd	nd	1,300
1,1,1,2-Tetrachloroethane	0.5	nd	nd	nd	3.3
1,1,2,2-Tetrachloroethane	0.5	nd	nd	nd	3.2
Tetrachloroethylene	0.5	nd	nd	nd	1.6

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- NA – parameter not analyzed

TABLE 9: Analytical Test Results – Groundwater - Continued
Lead and VOCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)			MECP Table 3 Standards (µg/L)
		August 17, 2023			
		BH2-23-GW	BH3-23-GW	BH3-23-GW	
		2.28-5.18m			
Toluene	0.5	1.1	nd	nd	18,000
1,1,1-Trichloroethane	0.5	nd	nd	nd	640
1,1,2-Trichloroethane	0.5	nd	nd	nd	4.7
Trichloroethylene	0.5	nd	nd	nd	1.6
Trichlorofluoromethane	1.0	nd	nd	nd	2,500
Vinyl Chloride	0.5	nd	nd	nd	0.5
Xylenes, total	0.5	nd	nd	nd	4,200

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- NA – parameter not analyzed

No detectable VOC concentrations were identified, with the exception of benzene and toluene in BH2-23-GW. All of the groundwater results comply with the MECP Table 3 Standards.

TABLE 10: Analytical Test Results – Groundwater
PAHs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)	MECP Table 3 Standards (µg/L)
		August 17, 2023	
		2.18-5.18m	
Acenaphthene	0.05	nd	600
Acenaphthylene	0.05	nd	1.8
Anthracene	0.01	nd	2.4
Benzo[a]anthracene	0.01	nd	4.7
Benzo[a]pyrene	0.01	nd	0.81
Benzo[b]fluoranthene	0.05	nd	0.75
Benzo[g,h,i]perylene	0.05	nd	0.2
Benzo[k]fluoranthene	0.05	nd	0.4
Chrysene	0.05	nd	1
Dibenzo[a,h]anthracene	0.05	nd	0.52
Fluoranthene	0.01	nd	130
Fluorene	0.05	nd	400
Indeno [1,2,3-cd] pyrene	0.05	nd	0.2

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL

TABLE 10: Analytical Test Results – Groundwater - Continued
PAHs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)	MECP Table 3 Standards (µg/L)
		August 17, 2023	
		BH4-23-GW	
		2.18-5.18m	
1-Methylnaphthalene	0.05	nd	1800
2-Methylnaphthalene	0.05	nd	1800
Methylnaphthalene (1&2)	0.10	nd	1800
Naphthalene	0.05	nd	1400
Phenanthrene	0.05	nd	580
Pyrene	0.01	nd	68

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL

No detectable PAHs were identified in the groundwater sample analyzed. All of the groundwater results comply with the MECP Table 3 Standards.

The analytical results for groundwater are shown on Drawing PE6214-4R – Analytical Testing Plan.

The maximum concentrations of analyzed parameters in the groundwater at the site are summarized in Table 11.

TABLE 11: Maximum Concentrations – Groundwater

Parameter	Maximum Concentration (µg/L)	Groundwater Sample	Screened Interval (m BGS)
Benzene	1.5	BH2-23-GW2	2.28-5.18m
Toluene	1.1	BH2-23-GW	

All remaining parameters analyzed were unidentified above the laboratory method detection limits.

5.7 Quality Assurance and Quality Control Results

All samples submitted as part of the August sampling events were handled in accordance with the Analytical Protocol with respect to preservation method, storage requirement, and container type.

As per Subsection 47(3) of O.Reg. 153/04, as amended, under the Environmental Protection Act, a Certificate of Analysis has been received for each sample submitted for analysis and all Certificates of Analysis are appended to this report.

A duplicate groundwater sample was obtained from sample BH2-23-GW2 and submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX). The duplicates were collected with the intent of calculating the relative percent difference (RPD) between duplicate sample values, as a way of assessing the quality of the analytical test results. Several parameter concentrations were not detected in both the original sample and duplicate. The RPD values are therefore considered to be 0% and therefore meet the 20% target. The relative percent difference (RPD) calculations for the original and duplicate samples are provided below in Table 12.

TABLE 12: QA/QC Calculations
Groundwater

Parameter	MDL (go/L)	BH2-23-GW2	BH12-23-GW (DUP)	RPD (%)	QA/QC Result (Target: <20% RPD)
Benzene	0.5	1.5	1.5	0	Meets Target

Since the detected benzene concentration was observed to be the same in both the original and duplicate, the quality of the field data collected during the Phase II ESA is considered to be sufficient to meet the overall objectives of the assessment.

5.8 Phase II Conceptual Site Model

The following section has been prepared in accordance with the requirements of O.Reg. 153/04, as amended by the Environmental Protection Act. Conclusions and recommendations are discussed in a subsequent section.

Site Description

Potentially Contaminating Activity and Areas of Potential Environmental Concern

As indicated in Table 1, Section 2.2 of this report, the on-site PCAs that were identified to have resulted in APECs on the Phase II Property are as follows:

- PCA 28 – “Gasoline and Associated Products Storage in Fixed Tanks,” due to the historical presence of 4 USTs containing gasoline and diesel fuel (APEC 1);
- PCA 28 – “Gasoline and Associated Products Storage in Fixed Tanks,” due to the historical presence of 2 pump islands (APEC 2);

- ❒ PCA 52 – "Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems," due to the presence of an automotive service garage (APEC 3);
- ❒ PCA 28 – "Gasoline and Associated Products Storage in Fixed Tanks," due to the historical presence of a fuel oil UST (APEC 4);
- ❒ PCA 28 – "Gasoline and Associated Products Storage in Fixed Tanks," due to the historical presence of a waste oil UST (APEC 5);
- ❒ PCA Other – "Presence of oil-water separator," (APEC 6);
- ❒ PCA 28 – "Gasoline and Associated Products Storage in Fixed Tanks," due to the presence of a waste oil AST (APEC 7);
- ❒ PCA 30 – "Importation of Fill Material of Unknown Quality," due to the backfill material used after remediation (APEC 8).
- ❒ PCA Other – "Use of Road Salt for Deicing," across the Phase I Property (APEC 9).

In accordance with Section 49.1 of O.Reg. 153/04, the application of road salt is not considered a PCA that would result in an APEC on the Phase II Property, if the application of road salt was applied to the surface of the parking lot and laneway for the safety of vehicular and pedestrian traffic under conditions of ice and/or snow. Therefore, APEC 9 is exempted.

Contaminants of Potential Concern

The following Contaminants of Potential Concern (CPCs) were identified with respect to the soil and/or groundwater on the Phase II Property:

- ❒ Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX);
- ❒ Petroleum Hydrocarbons (PHCs, F1-F4);
- ❒ Volatile Organic Compounds (VOCs);
- ❒ Polycyclic Organic Hydrocarbons (PAHs);
- ❒ Metals, including hydride forming compounds (arsenic, antimony and selenium); and
- ❒ Electrical Conductivity and Sodium Adsorption Ratio (SAR).

Subsurface Structures and Utilities

Underground service locates were completed prior to the subsurface investigations. Buried utilities on the Phase II Property include water and sewer utilities that run perpendicular from the subject building to the municipal services along Innes Road.

Two (2) catch basins are situated on each access lane on the eastern and western lanes. Natural gas service enters the northcentral portion of the Phase II Property from Innes Road.

Based on standard practice for subsurface utility installation, service trenches are expected to be present approximately 1 to 2 m below existing grade. In general, trench backfill may provide a preferential pathway for contaminant transport if the water table is at or above the base of the trenches.

Based on the findings of this limited Phase II ESA, service trenches are not considered to have created preferential pathways for contaminant migration.

Physical Setting

Site Stratigraphy

The site stratigraphy, from ground surface to the deepest aquifer or aquitard investigated, consists of:

- Granular engineering fill with an approximate thickness of 0.1 to 0.41m was encountered in all of the boreholes, underlying asphaltic concrete in BH2-23 to BH4-23. Groundwater was not encountered in this layer.
- Fill material consisting of silty sand with some, or traces of gravel were encountered in all of the boreholes, extending to depths of approximately 3.05 to 3.81m below ground surface (bgs). Groundwater was encountered in this layer in all of the boreholes.
- Silty clay with and without traces of sand was encountered beneath the fill material in all of the boreholes. All boreholes were terminated in this native layer at depths ranging from approximately 6.1 to 6.7mbgs.

Bedrock depth was not confirmed during the investigations. Based on mapping provided by the Geological Survey of Canada, the bedrock in the area of the Phase II Property is reported to consist of shale of the Carlsbad Formation and is reported to be present at a depth of approximately 20 to 25 m below grade.

Hydrogeological Characteristics

Groundwater levels were measured at the Phase II Property during the August and November groundwater sampling events. The measured levels ranged from approximately 2.60 to 3.05 mbgs. It is noted that groundwater elevations fluctuate seasonally.

Based on the most recent measured water levels, the groundwater is interpreted to flow in a westerly direction. A horizontal hydraulic gradient of 0.006m/m was calculated. Groundwater contours are presented on Drawing PE6214-3R – Test Hole Location Plan.

Free product was not observed in any of the monitoring wells during the sampling event conducted at the Phase II Property.

Approximate Depth to Bedrock

Bedrock depth at the Phase II Property was not confirmed during the subsurface investigations; however, based on available mapping provided by the Geological Survey of Canada, bedrock is reported to be present at a depth of approximately 20 to 25 m below grade.

Approximate Depth to Water Table

The depth to the water table at the Phase II Property varies between approximately 2.60 to 3.05 m below existing grade.

Section 35 of Ontario Regulation 153/04: Non-Potable Groundwater

Section 35 of O.Reg. 153/04 does apply to the Phase II Property in that the property, and the properties within the 250 m study area do not rely upon potable groundwater.

Section 41 of Ontario Regulation 153/04: Environmentally Sensitive Areas

Section 41 of the Regulation (Site Condition Standards, Environmentally Sensitive Areas) does not apply to the Phase II Property, in that the Phase II Property is not within 30m of an environmentally sensitive area.

Section 43.1 of Ontario Regulation 153/04: Shallow Soil Property or Water Body

Section 43.1 of the Regulation does not apply to the Phase II Property as bedrock is not located less than 2 m below ground surface.

Section 43.1 of the regulation does not apply to the Phase II Property, as there are no water bodies located on or within 30 m of the Phase II Property.

Existing Buildings and Structures

The Phase II Property is occupied by the 1975 slab-on-grade commercial building consisting of 3 service bays each equipped with an above ground electric hoist and an office. The exterior of the building is finished in brick and metal siding with a flat tar and gravel style roof. The subject building is heated by a natural gas fired suspended ceiling furnace. Temporary structures included 4 sea containers located on the south exterior wall of the subject building, which have been used to store tires. No other structures are present.

Proposed Buildings and Other Structures

The proposed site redevelopment of the Phase II Property will include three (3) residential buildings with associated vehicular above ground parking.

Environmental Condition

Areas Where Contaminants are Present

Based on the findings of this limited subsurface investigation, PHC -F2 contaminated fill material was identified in BH2-23-SS4, from 2.29 to 2.90 mbgs, which was retrieved from the immediate area of the former UST nest. It should be noted that the underlying soil sample from 3.05 to 3.34 mbgs complied with the selected MECP Table 3 Residential Standards.

Based on the review of the Remediation Excavation Report completed by Aqua Terre in 2006, confirmatory test results for BTEX (benzene, xylenes) and PHCs (F2 and F3) parameters along the excavation walls and/or floors of Excavation C (EX-C) and Excavation A (EX-A) as well as stockpiles of soil used as backfill material exceeded the MECP Table 3 Residential Standards.

All groundwater results complied to the selected MECP Table 3 Standards.

Soil and Groundwater results from this limited program are shown on Drawing PE6214-4R – Analytical Testing Plan.

Types of Contaminants

PHC, fraction F2, contamination was identified in the fill material in the immediate area of the former UST nest. All of the groundwater results complied to the selected MECP Table 3 Standards.

Based on the review of the Remediation Excavation Report completed by Aqua Terre in 2006, confirmatory test results for BTEX (benzene, xylenes) and PHCs (F2 and F3) parameters along the excavation walls and/or floors of Excavation C (EX-C) and Excavation A (EX-A) as well as stockpiles of soil used as backfill material exceeded the MECP Table 3 Residential Standards. These excavation areas in which soil exceedances were identified from the 2006 Remediation Excavation Report are depicted in Drawing PE6214-5R –Soil Remediation Plan.

Contaminated Media

BTEX (benzene, xylenes) and PHCs (F2 and F3) contamination was identified in the fill material in the immediate area of the former UST nest and along the floor and northern wall of EX-C, and along the floor of EX-A.

All of the groundwater results complied to the selected MECP Table 3 Standards.

What Is Known About Areas Where Contaminants Are Present

PHC, fraction F2, contamination identified in the fill material is expected to be a result of the former stockpile that was used to backfill the remediation excavations from 2006. All of the groundwater results complied to the selected MECP Table 3 Standards.

Distribution of Contaminants

The former stockpiles used as backfill on-site in 2006, is expected to have some contaminants (i.e., PHCs, F2) in excess of the selected MECP Table 3 Residential Standards.

The backfill was considered to be clean at the time of use in 2006, based on the former 2004 MOE Site Condition Standards (Table 3) for commercial land use; however, based on the confirmatory soil samples recovered from the remediation excavation (EX-C and EX-A), compared with the selected MECP Table 3 Residential Standards, benzene, xylene and PHCs (F2 and F3) were in excess. These excavation areas in which soil exceedances were identified from the 2006 Remediation Excavation Report are depicted in Drawing PE6214-5R – Soil Remediation Plan. Additionally, the stockpile samples that were tested and used to backfill these excavations also contained PHC (F2) exceedances of the current MECP Table 3 Residential Standards.

Migration of Contaminants

Based on the findings of this limited Phase II ESA, additional contaminants may to be present within pockets of the fill material on-site as well as beneath the subject building.

The groundwater results comply with the selected MECP Table 3 Standards; migration of contaminants does not appear to have occurred on-site.

Discharge of Contaminants

Based on the findings of this limited Phase II ESA, any discharge of contaminants is considered to have been the result of the former presence of the retail fuel outlet on-site.

Climatic and Meteorological Conditions

Given that there are no contaminants currently present in the groundwater beneath the Phase II Property, climatic and meteorological conditions are not considered to have affected contaminant distribution at the Phase II Property.

Potential for Vapour Intrusion

Based on the limited findings of the Phase II ESA, there is no risk of potential vapour intrusion on the Phase II Property.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for the property addressed 2506 Innes Road, in Ottawa, Ontario. The purpose of this Phase II ESA was to address 4 potentially contaminating activities (PCAs) that were identified during the Phase I ESA and considered to result in 4 areas of potential environmental concern (APECs) on the Phase II Property.

The subsurface investigation consisted of placing four (4) boreholes, all of which were instrumented with groundwater monitoring wells. The general stratigraphy encountered during the field program consisted of an asphaltic concrete paved structure or granular fill, followed by fill material consisting of silty sand with traces of gravel, overlying native silty clay with traces of sand. An olfactory odour was noted in all borehole locations in the fill layer at depths ranging from approximately 0.76 to 3.81 mbgs. Boreholes were terminated at a maximum depth of 6.7 m below the existing grade. Bedrock was not encountered during the field program.

Six (6) soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) and petroleum hydrocarbons (PHCs, F1-F4). PHC concentrations were detected in the soil samples analyzed. The PHC, F2 concentration identified in BH2-23-SS4 was in excess of the selected MECP Table 3 Residential Standards. All other identified concentrations comply with MECP Table 3 Residential Standards.

Based on the review of the Remediation Excavation Report completed by Aqua Terre in 2006, confirmatory test results for BTEX (benzene, xylenes) and PHCs (F2 and F3) parameters along the excavation walls and/or floors of Excavation C (EX-C) and Excavation A (EX-A) as well as stockpiles of soil used as backfill material exceeded the MECP Table 3 Residential Standards. As a result of the former remediation program and use of stockpile soils used to backfill the excavations, it is possible that there are pockets of contaminated soil/fill within these former excavation areas.

Groundwater samples from monitoring wells BH1-23, BH2-23, BH3-23 and BH4-23 were collected on August 17, 2023. A second round of sampling was completed on November 6, 2023. No free product or petroleum hydrocarbon sheen was noted on the purge water at any of the borehole locations during the groundwater sampling event.

Groundwater samples were analyzed for BTEX, PHCs (F1-F4), VOCs, PAHs, and/or Lead (Pb). All of the groundwater results comply with the MECP Table 3 Standards.

Recommendations

Based on the findings of the Phase II ESA, further environmental investigation (a supplemental Phase II ESA) is recommended to assess the remaining APECs on the Phase II Property, in order to meet the requirements of the O.Reg. 153/04. This work should be considered once the current automotive service garage operations have been terminated.

Contaminated soil/fill material identified in the immediate area of the former UST nest will require remediation of any PHCs in excess of the selected standards as well as any additional soil/fill material containing BTEX and PHCs from the former remediation excavation that may be encountered during the supplemental subsurface program.

Any soil that meets the MECP Table 3 Residential Standards; however, exceeds the off-site MECP reuse soil standards will require off-site disposal as contaminated soils if it has to be removed for construction purposes.

It is our understanding that the Phase II Property may be redeveloped in the future for a more sensitive land use (commercial to residential). As a result, a record of site condition (RSC) will be required as per O.Reg 154/03.

Excess soil requiring off-site disposal during construction must be managed in accordance with Ontario Regulation 406/19 – On-site and Excess Soil Management. This will require further soil testing and should be carried out closer to the time of site redevelopment.

Monitoring Wells

The monitoring wells installed on the Phase II Property should remain viable for future use. If they are not going to be used in the future, or will be destroyed during site redevelopment, they should be abandoned according to Ontario Regulation 903. The wells will be registered with the MECP under this regulation.

7.0 STATEMENT OF LIMITATIONS

This Phase II - Environmental Site Assessment report has been prepared for the Phase II Property. The conclusions presented herein are based on information gathered from a limited sampling and testing program. The test results represent conditions at specific test locations at the time of the field program.

The client should be aware that any information pertaining to soils and all test hole logs are furnished as a matter of general information only and test hole descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those of the test holes themselves.

Should any conditions be encountered at the subject site and/or historical information that differ from our findings, we request that we be notified immediately in order to allow for a reassessment.

This report was prepared for the sole use of Concorde Properties. Notification from Concorde Properties., and Paterson Group will be required to release this report to any other party.

Paterson Group Inc.

Joshua Dempsey, B.Sc.

Mark D'Arcy, P.Eng., QP_{ESA}

Report Distribution:

- Concorde Properties.
- Paterson Group

FIGURES

Figure 1 - Key Plan

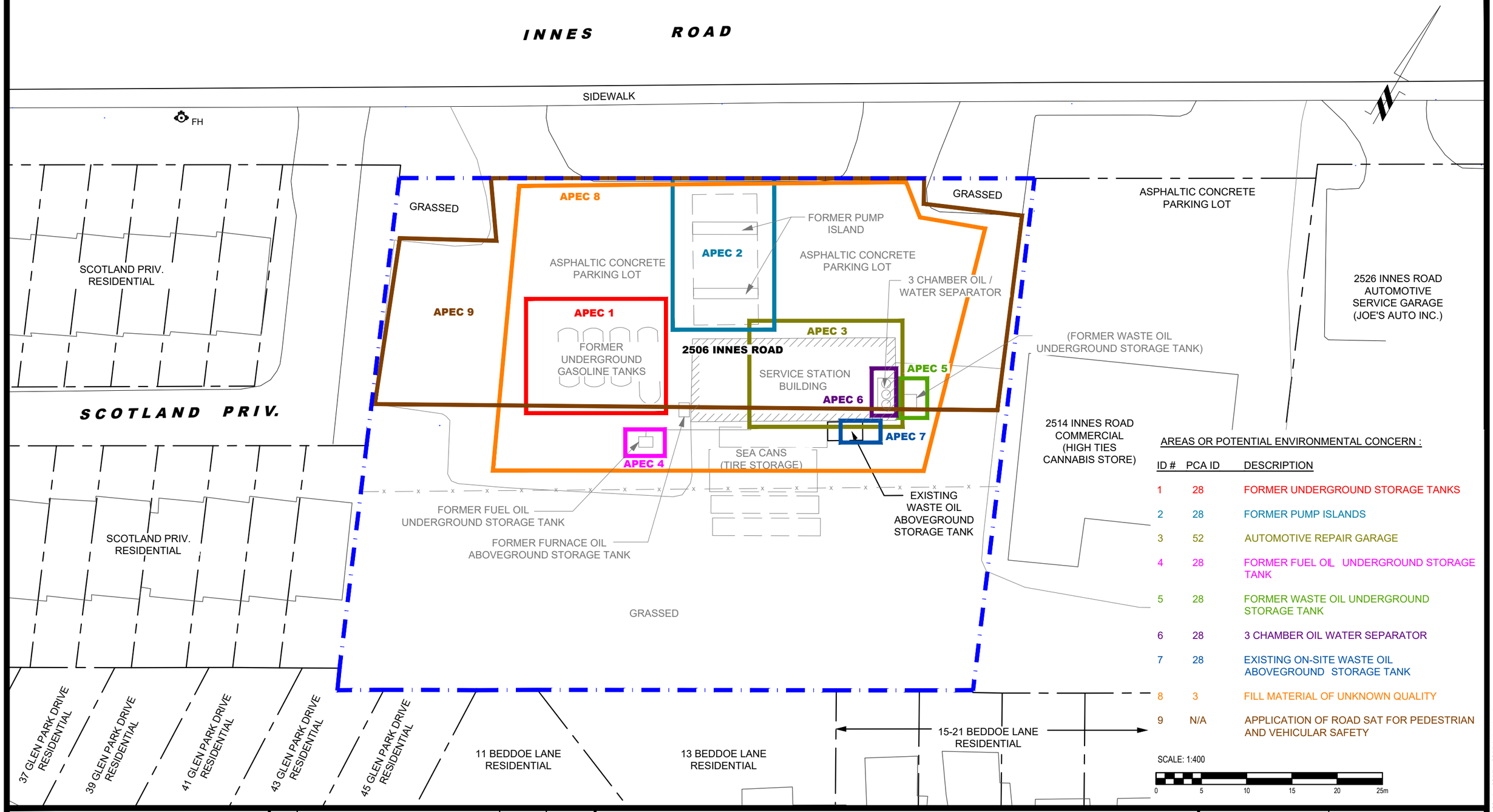
Drawing PE6214-1 – Site Plan

Drawing PE6214-2 – Surrounding Land Use Plan

Drawing PE6214-3R – Test Hole Location Plan (Groundwater Contour Plan)

Drawing PE6214-4R – Analytical Testing Plan – Soil & Groundwater

Drawing PE6214-5R –Soil Remediation Plan



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NO.	REVISIONS	DATE	INITIAL

CONCORDE PROPERTIES

PHASE I - ENVIRONMENTAL SITE ASSESSMENT
2506 INNES ROAD

OTTAWA, ONTARIO

Title: **SITE PLAN**

Scale: 1:400	Date: 08/2023
Drawn by: GK	Report No.: PE6214-1
Checked by: MW	Dwg. No.: PE6214-1
Approved by: MSD	Revision No.:

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11x17

POTENTIALLY CONTAMINATING ACTIVITIES :

ID #	PCA ID	ADDRESS	DESCRIPTION
1	28	ON-SITE	FORMER UNDERGROUND STORAGE TANKS
2	28	ON-SITE	FORMER PUMP ISLANDS
3	52	ON-SITE	AUTOMOTIVE REPAIR GARAGE
4	28	ON-SITE	FORMER FUEL OIL UNDERGROUND STORAGE TANK
5	28	ON-SITE	FORMER WASTE OIL UNDERGROUND STORAGE TANK
6	28	ON-SITE	3 CHAMBER OIL WATER SEPARATOR
7	28	ON-SITE	EXISTING ON-SITE WASTE OIL ABOVEGROUND STORAGE TANK
8	3	ON-SITE	APPLICATION OF ROAD SALT
9	N/A	ON-SITE	FILL MATERIAL OF UNKNOWN QUALITY
10	27, 28	2526 INNES RD.	FORMER RETAIL FUEL OUTLET AND AUTOMOTIVE GARAGE

SCALE: 1:3000

0 25 50 75 100 125 150 200m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

CONCORDE PROPERTIES

PHASE I - ENVIRONMENTAL SITE ASSESSMENT
2506 INNES ROAD

OTTAWA, ONTARIO

Title:

SURROUNDING LAND USE PLAN

Scale: 1:3000	Date: 08/2023
Drawn by: GK	Report No.: PE6214-1
Checked by: MW	Dwg. No.: PE6214-2
Approved by: MSD	Revision No.:

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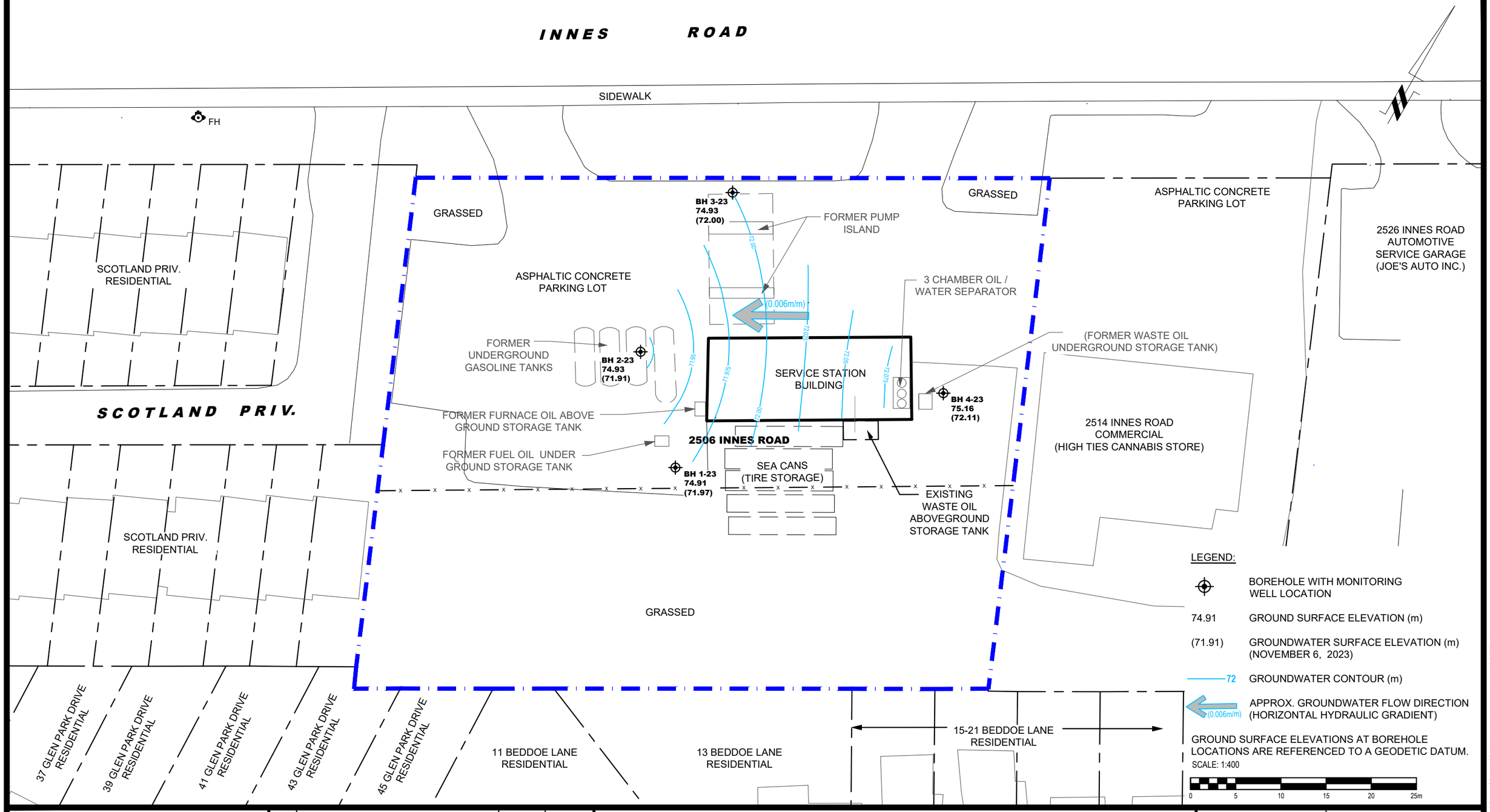

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9 AURIGA DRIVE
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NO.	REVISIONS	DATE	INITIAL

CONCORDE PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
2506 INNES ROAD
OTTAWA, ONTARIO

Title:
TEST HOLE LOCATION PLAN

Scale: 1:400	**Date:** 11/2023
Drawn by: GK	**Report No.:** PE6214-2R
Checked by: MW	**Dwg. No.:** PE6214-3R
Approved by: MSD	**Revision No.:**

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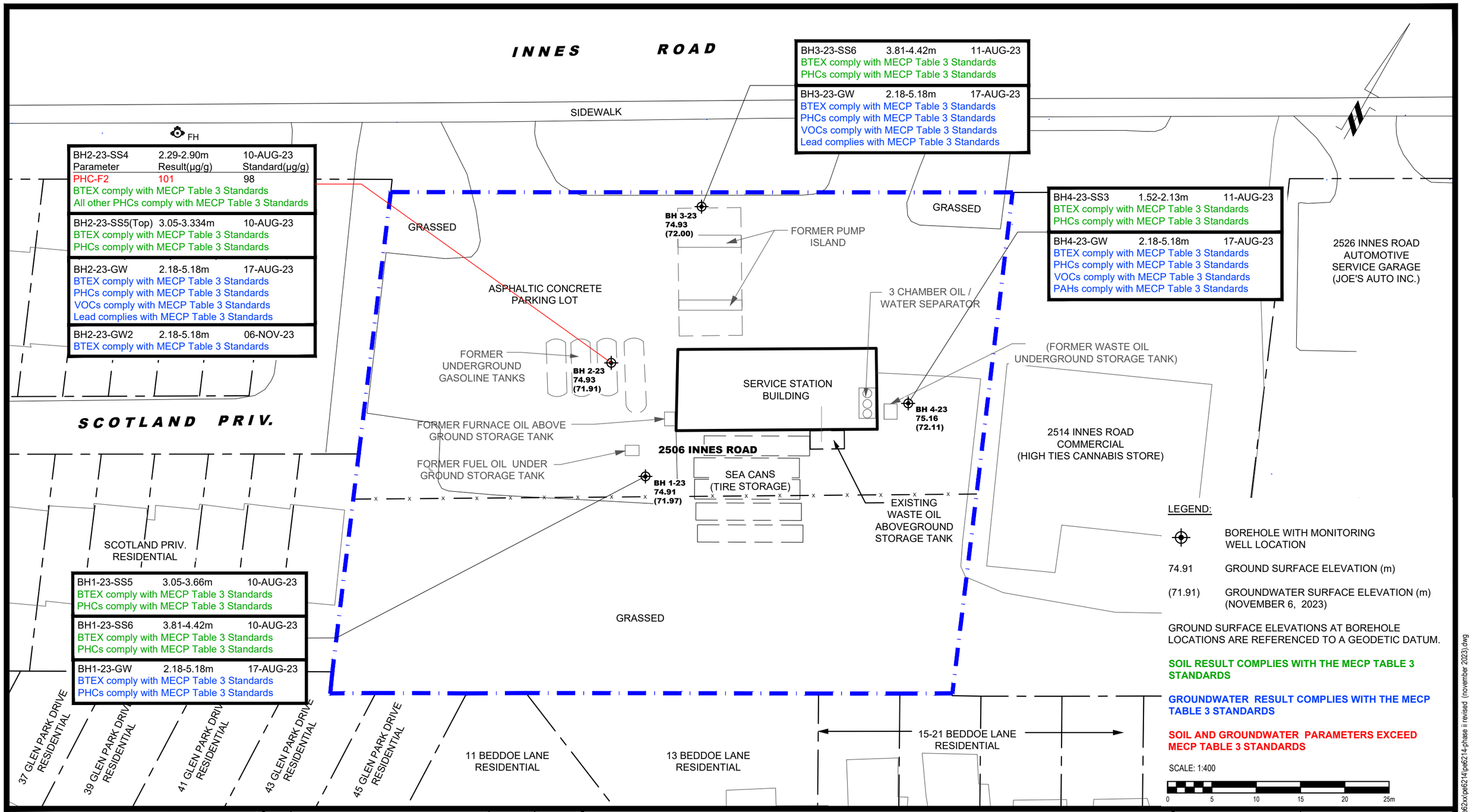

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
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TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

CONCORDE PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
2506 INNES ROAD
OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN (SOIL-GROUNDWATER)

Scale: 1:400	Date: 11/2023
Drawn by: GK	Report No.: PE6214-2R
Checked by: MW	Dwg. No.: PE6214-4R
Approved by: MSD	Revision No.:

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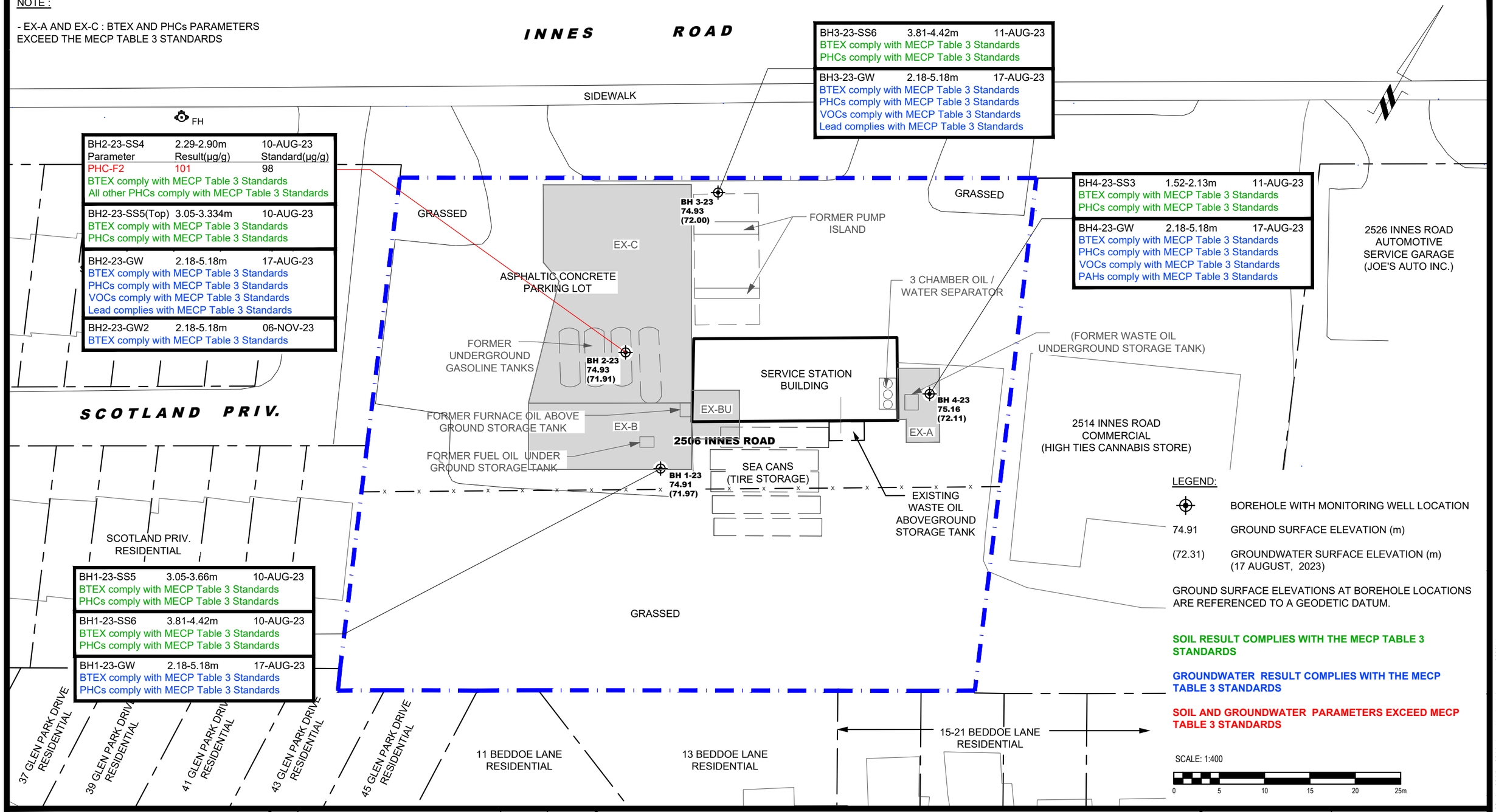
NOTE :

- EX-A AND EX-C : BTEX AND PHCs PARAMETERS EXCEED THE MECP TABLE 3 STANDARDS



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NO.	REVISIONS	DATE	INITIAL

CONCORDE PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
2506 INNES ROAD

OTTAWA, ONTARIO

Title:

SOIL REMEDIATION

Scale: 1:400	Date: 11/2023
Drawn by: GK	Report No.: PE6214-2R
Checked by: MW	Dwg. No.: PE6214-5R
Approved by: MSD	Revision No.:

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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

LABORATORY CERTIFICATES OF ANALYSIS

PATERSON GROUP

Sampling and Analysis Plan

Phase II-Environmental Site Assessment
2506 Innes Road
Ottawa, Ontario

Prepared for Concorde Properties

Report: PE6214-SAP
August 2023

TABLE OF CONTENTS

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Concorde Properties to conduct a Phase II Environmental Site Assessment (ESA) for the Phase II ESA Property located at 2506 Innes Road, Ottawa, Ontario.

The Phase II ESA was carried out to address the APECs identified in the Paterson Phase I ESA that was completed in August of 2023. The following subsurface investigation programs were developed to identify and delineate potential environmental concerns that were identified in the Phase I ESA.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1-23	Assess the soil and groundwater conditions on the Phase II Property due to APEC 4.	Boreholes to be advanced to approximately 6.10 m to intercept the groundwater table.
BH2-23	Assess the soil and groundwater conditions on the Phase II Property due to APEC 1.	
BH3-23	Assess the soil and groundwater conditions on the Phase II Property due to APEC 2.	
BH4-23	Assess the soil and groundwater conditions on the Phase II Property due to APEC 5.	

At each borehole, split-spoon samples of overburden soils will be obtained at 0.76 m (2'6") intervals until groundwater was intercepted. All soil samples will be retained, and samples will be selected for submission following a preliminary screening analysis.

Following borehole drilling, monitoring wells will be installed in selected boreholes (as above) for the measurement of water levels and the collection of groundwater samples. Borehole locations are shown on the Test Hole Location Plan appended to the main report.

2.0 ANALYTICAL TESTING PROGRAM

The analytical testing program for soil at the subject site is based on the following general considerations:

- ❒ At least one sample from each borehole should be submitted, in order to delineate the horizontal extent of contamination across the site.
- ❒ At least one sample from each stratigraphic unit should be submitted, in order to delineate the vertical extent of contamination at the site.
- ❒ In boreholes where there is visual or olfactory evidence of contamination, or where organic vapour meter or photoionization detector readings indicate the presence of contamination, the 'worst-case' sample from each borehole should be submitted for comparison with MECP's site condition standards.
- ❒ In boreholes with evidence of contamination as described above, a sample should be submitted from the stratigraphic unit below the 'worst-case' sample to determine whether the contaminant(s) have migrated downward.
- ❒ Parameters analyzed should be consistent with the Contaminants of Potential Concern identified in the Phase I ESA.

The analytical testing program for groundwater at the subject site is based on the following general considerations:

- ❒ Groundwater monitoring wells should be installed in all boreholes with visual or olfactory evidence of soil contamination, in stratigraphic units where soil contamination was encountered, where those stratigraphic units are at or below the water table (i.e., a water sample can be obtained).
- ❒ Groundwater monitoring well screens should straddle the water table at sites where the contaminants of concern are suspected to be LNAPLs.
- ❒ At least one groundwater monitoring well should be installed in a stratigraphic unit below the suspected contamination, where said stratigraphic unit is water-bearing.
- ❒ Parameters analyzed should be consistent with the Contaminants of Concern identified in the Phase I ESA and with the contaminants identified in the soil samples.

3.0 STANDARD OPERATING PROCEDURES

3.1 Environmental Drilling Procedure

Purpose

The purpose of environmental boreholes is to identify and/or delineate contamination within the soil and/or to install groundwater monitoring wells in order to identify contamination within the groundwater.

Equipment

The following is a list of equipment that is in addition to regular drilling equipment stated in the geotechnical drilling SOP:

- ❒ glass soil sample jars
- ❒ two buckets
- ❒ cleaning brush (toilet brush works well)
- ❒ dish detergent
- ❒ methyl hydrate
- ❒ water (if not available on site - water jugs available in trailer)
- ❒ latex or nitrile gloves (depending on suspected contaminant)
- ❒ RKI Eagle organic vapour meter or MiniRae photoionization detector (depending on contamination suspected)

Determining Borehole Locations

If conditions on site are not as suspected, and planned borehole locations cannot be drilled, **call the office to discuss**. Alternative borehole locations will be determined in conversation with the field technician and supervising engineer.

After drilling is completed a plan with the borehole locations must be provided. Distances should be measured using a measuring tape or wheel rather than paced off. Elevations were surveyed at geodetic elevations by Paterson personnel.

Drilling Procedure

The actual drilling procedure for environmental boreholes is the same as geotechnical boreholes (see SOP for drilling and sampling) with a few exceptions as follows:

- ❒ Continuous split spoon samples (every 0.6 m or 2') or semi-continuous (every 0.76 m or 2'6") are required.
- ❒ Make sure samples are well sealed in plastic bags with no holes prior to screening and are kept cool but unfrozen.
- ❒ If sampling for VOCs, BTEX, or PHCs F1, a soil core from each soil sample which may be analyzed must be taken and placed in the laboratory-provided methanol vial.
- ❒ Note all and any odours or discolouration of samples.
- ❒ Split spoon samplers must be washed between samples.
- ❒ If obvious contamination is encountered, continue sampling until vertical extent of contamination is delineated.
- ❒ As a general rule, environmental boreholes should be deep enough to intercept the groundwater table (unless this is impossible/impractical - call project manager to discuss).
- ❒ If at all possible, soil samples should be submitted to a preliminary screening procedure on site, either using a RKI Eagle, PID, etc. depending on type of suspected contamination.

Spoon Washing Procedure

All sampling equipment (spilt spoons, etc.) must be washed between samples in order to prevent cross contamination of soil samples.

- ❒ Obtain two buckets of water (preferably hot if available)
- ❒ Add a small amount of dish soap to one bucket
- ❒ Scrub spoons with brush in soapy water, inside and out, including tip
- ❒ Rinse in clean water
- ❒ Apply a small amount of methyl hydrate to the inside of the spoon. (A spray bottle or water bottle with a small hole in the cap works well)
- ❒ Allow to dry (takes seconds)
- ❒ Rinse with distilled water, a spray bottle works well.

The methyl hydrate eliminates any soap residue that may be on the spoon and is especially important when dealing with suspected VOCs.

Screening Procedure

The RKI Eagle is used to screen most soil samples, particularly where petroleum hydrocarbon contamination is suspected. The MiniRae is used when VOCs are suspected, however it also can be useful for detecting petroleum. These tools are for screening purposes only and cannot be used in place of laboratory testing. Vapour results obtained from the RKI Eagle and the PID are relative and must be interpreted.

Screening equipment should be calibrated on an approximately monthly basis, more frequently if heavily used.

- ❒ Samples should be brought to room temperature; this is specifically important in colder weather. Soil must not be frozen.
- ❒ Turn instrument on and allow to come to zero - calibrate if necessary
- ❒ If using RKI Eagle, ensure instrument is in methane elimination mode unless otherwise directed.
- ❒ Ensure measurement units are ppm (parts per million) initially. RKI Eagle will automatically switch to %LEL (lower explosive limit) if higher concentrations are encountered.
- ❒ Break up large lumps of soil in the sample bag, taking care not to puncture bag.
- ❒ Insert probe into soil bag, creating a seal with your hand around the opening.
- ❒ Gently manipulate soil in bag while observing instrument readings.
- ❒ Record the highest value obtained in the first 15 to 25 seconds
- ❒ Make sure to indicate scale (ppm or LEL); also note which instrument was used (RKI Eagle 1 or 2, or MiniRae).
- ❒ Jar samples and refrigerate as per Sampling and Analysis Plan.

3.2 Monitoring Well Installation Procedure

Equipment

- ❒ 5’ x 2” [1.52 m x 50 mm] threaded sections of Schedule 40 PVC slotted well screen (5’ x 1 ¼” [1.52 m x 32 mm] if installing in cored hole in bedrock)
- ❒ 5’ x 2” [1.52 m x 50 mm] threaded sections of Schedule 40 PVC riser pipe (5’ x 1 ¼” [1.52 m x 32 mm] if installing in cored hole in bedrock)
- ❒ Threaded end-cap
- ❒ Slip-cap or J-plug
- ❒ Asphalt cold patch or concrete
- ❒ Silica Sand
- ❒ Bentonite chips (Holeplug)
- ❒ Steel flushmount casing

Procedure

- ❒ Drill borehole to required depth, using drilling and sampling procedures described above.
- ❒ If borehole is deeper than required monitoring well, backfill with bentonite chips to required depth. This should only be done on wells where contamination is not suspected, in order to prevent downward migration of contamination.
- ❒ Only one monitoring well should be installed per borehole.
- ❒ Monitoring wells should not be screened across more than one stratigraphic unit to prevent potential migration of contaminants between units.
- ❒ Where LNAPLs are the suspected contaminants of concern, monitoring wells should be screened straddling the water table in order to capture any free product floating on top of the water table.
- ❒ Thread the end cap onto a section of screen. Thread second section of screen if required. Thread risers onto screen. Lower into borehole to required depth. Ensure slip-cap or J-plug is inserted to prevent backfill materials entering well.
- ❒ As drillers remove augers, backfill borehole annulus with silica sand until the level of sand is approximately 0.3 m above the top of the screen.
- ❒ Backfill with holeplug until at least 0.3 m of holeplug is present above the top of the silica sand.
- ❒ Backfill remainder of borehole with holeplug or with auger cuttings (if contamination is not suspected).
- ❒ Install flushmount casing. Seal space between flushmount and borehole annulus with concrete, cold patch, or holeplug to match surrounding ground surface.

3.3 Monitoring Well Sampling Procedure

Equipment

- ❒ Water level metre or interface probe on hydrocarbon/LNAPL sites
- ❒ Spray bottles containing water and methanol to clean water level tape or interface probe
- ❒ Peristaltic pump
- ❒ Polyethylene tubing for peristaltic pump
- ❒ Flexible tubing for peristaltic pump
- ❒ Latex or nitrile gloves (depending on suspected contaminant)
- ❒ Allen keys and/or 9/16" socket wrench to remove well caps
- ❒ Graduated bucket with volume measurements
- ❒ pH/Temperature/Conductivity combo pen
- ❒ Laboratory-supplied sample bottles

Sampling Procedure

- ❒ Locate well and use socket wrench or Allan key to open metal flush mount protector cap. Remove plastic well cap.
- ❒ Measure water level, with respect to existing ground surface, using water level meter or interface probe. If using interface probe on suspected NAPL site, measure the thickness of free product.
- ❒ Measure total depth of well.
- ❒ Clean water level tape or interface probe using methanol and water. Change gloves between wells.
- ❒ Calculate volume of standing water within well and record.
- ❒ Insert polyethylene tubing into well and attach to peristaltic pump. Turn on peristaltic pump and purge into graduated bucket. Purge at least three well volumes of water from the well. Measure and record field chemistry. Continue to purge, measuring field chemistry after every well volume purged, until appearance or field chemistry stabilizes.
- ❒ Note appearance of purge water, including colour, opacity (clear, cloudy, silty), sheen, presence of LNAPL, and odour. Note any other unusual features (particulate matter, effervescence (bubbling) of dissolved gas, etc.).
- ❒ Fill required sample bottles. If sampling for metals, attach 75-micron filter to discharge tube and filter metals sample. If sampling for VOCs, use low flow rate to ensure continuous stream of non-turbulent flow into sample bottles. Ensure no headspace is present in VOC vials.
- ❒ Replace well cap and flushmount casing cap.

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

The QA/QC program for this Phase II ESA is as follows:

- ❒ All non-dedicated sampling equipment (split spoons) will be decontaminated according to the SOPs listed above.
- ❒ All groundwater sampling equipment is dedicated (polyethylene and flexible peristaltic tubing is replaced for each well).
- ❒ Where groundwater samples are to be analyzed for VOCs, one laboratory-provided trip blank will be submitted for analysis with every laboratory submission.
- ❒ Approximately one (1) field duplicate will be submitted for every ten (10) samples submitted for laboratory analysis. A minimum of one (1) field duplicate per project will be submitted. Field duplicates will be submitted for soil and groundwater samples
- ❒ Where combo pens are used to measure field chemistry, they will be calibrated on an approximately monthly basis, according to frequency of use.

5.0 DATA QUALITY OBJECTIVES

The purpose of setting data quality objectives (DQOs) is to ensure that the level of uncertainty in data collected during the Phase II ESA is low enough that decision-making is not affected, and that the overall objectives of the investigation are met.

The quality of data is assessed by comparing field duplicates with original samples. If the relative percent difference (RPD) between the duplicate and the sample is within 20%, the data are considered to be of sufficient quality so as not to affect decision-making. The RPD is calculated as follows:

$$RPD = \left| \frac{x_1 - x_2}{(x_1 + x_2)/2} \right| \times 100\%$$

Where x_1 is the concentration of a given parameter in an original sample and x_2 is the concentration of that same parameter in the field duplicate sample.

For the purpose of calculating the RPD, it is desirable to select field duplicates from samples for which parameters are present in concentrations above laboratory detection limits, i.e. samples which are expected to be contaminated. If parameters are below laboratory detection limits for selected samples or duplicates, the RPD may be calculated using a concentration equal to one half (0.5 x) the laboratory detection limit.

It is also important to consider data quality in the overall context of the project. For example, if the DQOs are not met for a given sample, yet the concentrations of contaminants in both the sample and the duplicate exceed the MOE site remediation standards by a large margin, the decision-making usefulness of the sample may not be considered to be impaired. The proximity of other samples which meet the DQOs must also be considered in developing the Phase II Conceptual Site Model; often there are enough data available to produce a reliable Phase II Conceptual Site Model even if DQOs are not met for certain individual samples.

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS TO SAMPLING & ANALYSIS PLAN

Physical impediments to the Sampling and Analysis plan may include:

- ❒ The location of underground utilities
- ❒ Poor recovery of split-spoon soil samples
- ❒ Insufficient groundwater volume for groundwater samples
- ❒ Breakage of sampling containers following sampling or while in transit to the laboratory
- ❒ Elevated detection limits due to matrix interference (generally related to soil colour or presence of organic material)
- ❒ Elevated detection limits due to high concentrations of certain parameters, necessitating dilution of samples in laboratory
- ❒ Drill rig breakdowns
- ❒ Winter conditions
- ❒ Other site-specific impediments

Site-specific impediments to the Sampling and Analysis plan are discussed in the body of the Phase II ESA report.

SOIL PROFILE AND TEST DATA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

2506 Innes Road

DATUM: Geodetic **EASTING:** 377603.672 **NORTHING:** 5032559.801 **ELEVATION:** 74.91

PROJECT: Phase II - Environmental Site Assessment

BORINGS BY: CME Low Clearance Drill

REMARKS:

DATE: August 10, 2023

FILE NO. PE6214

HOLE NO. BH 1-23

SAMPLE DESCRIPTION	STRATA PLOT	Sample No.	SAMPLE % RECOVERY	N VALUE or RQD	ANALYTICAL TESTS	DEPTH (m)	PID (ppm) 0 16.67 33.33 50	Gas Tech (ppm) 0 50 100 150 200	Monitoring Well Construction
Ground Surface EL 74.91 m									
FILL: Brown silty sand with gravel and crushed stone, trace organics		AU1				0	(169.8)		
0.41 m EL 74.5 m		SS2	92	19		1	(67.9)		
FILL: Brown silty sand, trace gravel		SS3	33	14		2			
		SS4	75	13			(73.3)		
		SS5	50	12		3	(101.9)		
3.73 m EL 71.18 m									
Grey SILTY CLAY, some sand		SS6	50	1		4	(80.1)		
		SS7	100	P		5	(88.6)		
		SS8	100	P			(77.3)		
6.1 m EL 68.81 m						6			
End of Borehole									
(GWL @ 2.94m - Nov. 6, 2023)						7			
						8			

SOIL PROFILE AND TEST DATA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

2506 Innes Road

DATUM: Geodetic **EASTING:** **NORTHING:** **ELEVATION:**

PROJECT: Phase II - Environmental Site Assessment

BORINGS BY: CME Low Clearance Drill

REMARKS: **DATE:** August 10, 2023

FILE NO. **PE6214**

HOLE NO. BH 2-23

SAMPLE DESCRIPTION	STRATA PLOT	Sample No.	SAMPLE % RECOVERY	N VALUE or RQD	ANALYTICAL TESTS	DEPTH (m)	PID (ppm) 0 16.67 33.33 50	Gas Tech (ppm) 0 50 100 150 200	Monitoring Well Construction
Ground Surface									
Asphaltic concrete 0.05 m		AU1				0	21.5		
FILL: Brown silty sand with gravel and crushed stone 0.15 m		AU2					17.7		
		SS2	50	27		1	(311.5)		
FILL: Brown silty sand, trace to some gravel		SS4	100	35		2	(92.4)		
		SS5	100	16			(74.8)		
3.66 m		SS6	75	30		3	(86.6)		
		SS7	100	P		4	41.1		
Grey SILTY CLAY		SS8	100	P		5	38.6		
		SS9	100	P			39.2		
6.71 m						6			
End of Borehole						7			
(GWL @ 3.02m - Nov. 6, 2023)						8			

SOIL PROFILE AND TEST DATA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

2506 Innes Road

DATUM: Geodetic **EASTING:** 377594.113 **NORTHING:** 5032589.393 **ELEVATION:** 74.93

PROJECT: Phase II - Environmental Site Assessment

BORINGS BY: CME Low Clearance Drill

REMARKS:

DATE: August 10, 2023

FILE NO. **PE6214**

HOLE NO. BH 3-23

SAMPLE DESCRIPTION	STRATA PLOT	Sample No.	SAMPLE % RECOVERY	N VALUE or RQD	ANALYTICAL TESTS	DEPTH (m)	PID (ppm) 0 16.67 33.33 50	Gas Tech (ppm) 0 50 100 150 200	Monitoring Well Construction
Ground Surface EL 74.93 m									
Asphaltic concrete 0.05 m EL 74.88 m		AU1				0	10.2		
FILL: Brown silty sand with gravel and crushed stone 0.1 m EL 74.83 m		SS2	67	8		1	9.2		
FILL: Brown silty sand, trace gravel		SS3	33	6		2	9.1		
		SS4	83	3		3	8.8		
		SS5	33	P			4.4		
3.81 m EL 71.12 m						4			
Firm, grey SILTY CLAY, trace sand		SS6	100	P			17.3		
		SS7	100	P		5	41.2		
		SS8	100	P			27.5		
6.1 m EL 68.83 m						6			
End of Borehole									
(GWL @ 2.93m - Nov. 6, 2023)						7			
						8			

SOIL PROFILE AND TEST DATA

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

2506 Innes Road

DATUM: Geodetic **EASTING:** 377625.371 **NORTHING:** 5032581.632 **ELEVATION:** 75.16

PROJECT: Phase II - Environmental Site Assessment

BORINGS BY: CME Low Clearance Drill

REMARKS:

DATE: August 10, 2023

FILE NO. **PE6214**

HOLE NO. BH 4-23

SAMPLE DESCRIPTION	STRATA PLOT	Sample No.	SAMPLE % RECOVERY	N VALUE or RQD	ANALYTICAL TESTS	DEPTH (m)	PID (ppm) 0 16.67 33.33 50	Gas Tech (ppm) 0 50 100 150 200	Monitoring Well Construction
Ground Surface EL 75.16 m									
Asphaltic concrete 0.05 m EL 75.11 m		AU1				0	5.8		Standpipe
FILL: Brown silty sand with gravel and crushed stone 0.15 m EL 75.01 m		SS2	50	9		1	3.2		
FILL: Brown silty sand, trace gravel		SS3	25	4		2	4.5		
		SS4	25	3			4.4		
3.05 m EL 72.11 m		SS5	75	1		3	6.3		
Firm, grey SILTY CLAY		SS6	100	P		4	7.4		
		SS7	100	P		5	8.9		
		SS8	100	P			11.7		
6.1 m EL 69.06 m						6			
End of Borehole									
(GWL @ 3.05m - Nov. 6, 2023)						7			
						8			

SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

Relative Density	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

Consistency	Undrained Shear Strength (kPa)	'N' Value
Very Soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their “sensitivity”. The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NXL size core. However, it can be used on smaller core sizes, such as BX, if the bulk of the fractures caused by drilling stresses (called “mechanical breaks”) are easily distinguishable from the normal in situ fractures.

RQD %	ROCK QUALITY
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture content or water content of sample, %
LL	-	Liquid Limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic limit, % (water content above which soil behaves plastically)
PI	-	Plasticity index, % (difference between LL and PL)
Dxx	-	Grain size which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D30)^2$ / (D10 x D60)
Cu	-	Uniformity coefficient = D60 / D10

Cc and Cu are used to assess the grading of sands and gravels:
Well-graded gravels have: $1 < Cc < 3$ and $Cu > 4$
Well-graded sands have: $1 < Cc < 3$ and $Cu > 6$
Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.
Cc and Cu are not applicable for the description of soils with more than 10% silt and clay
(more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

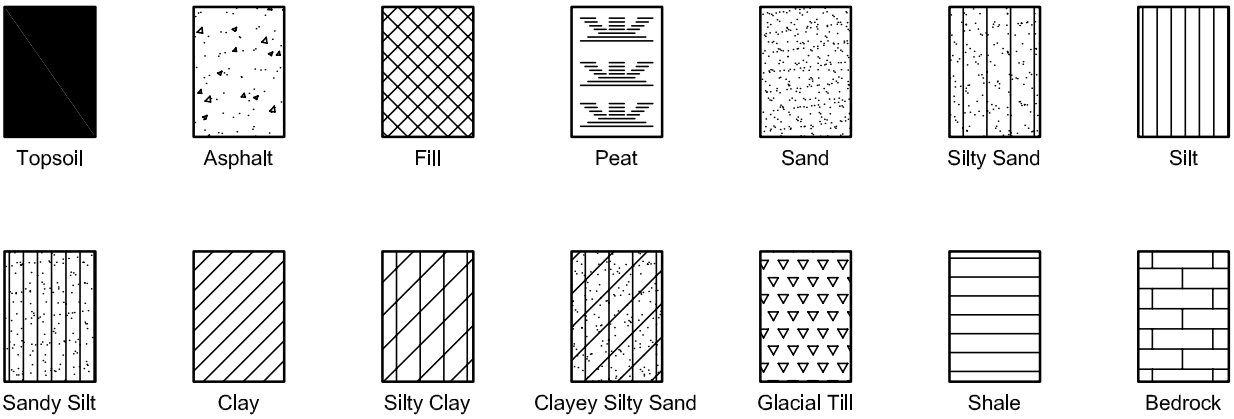
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

PERMEABILITY TEST

k	-	Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.

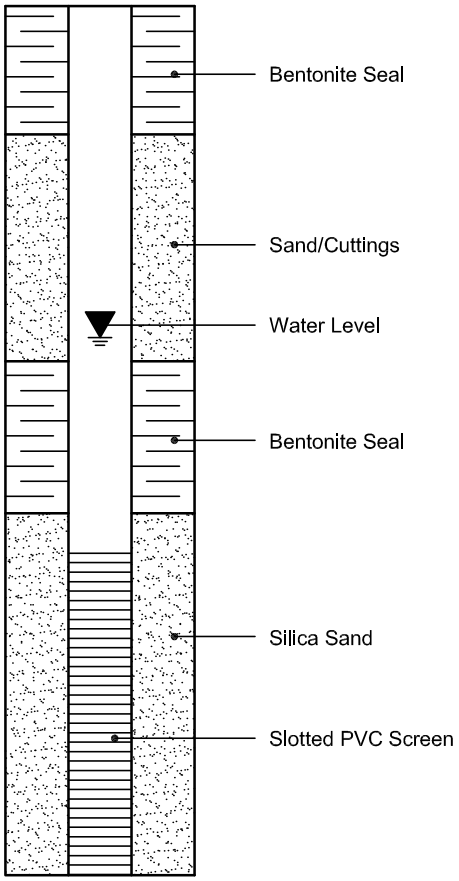
SYMBOLS AND TERMS (continued)

STRATA PLOT

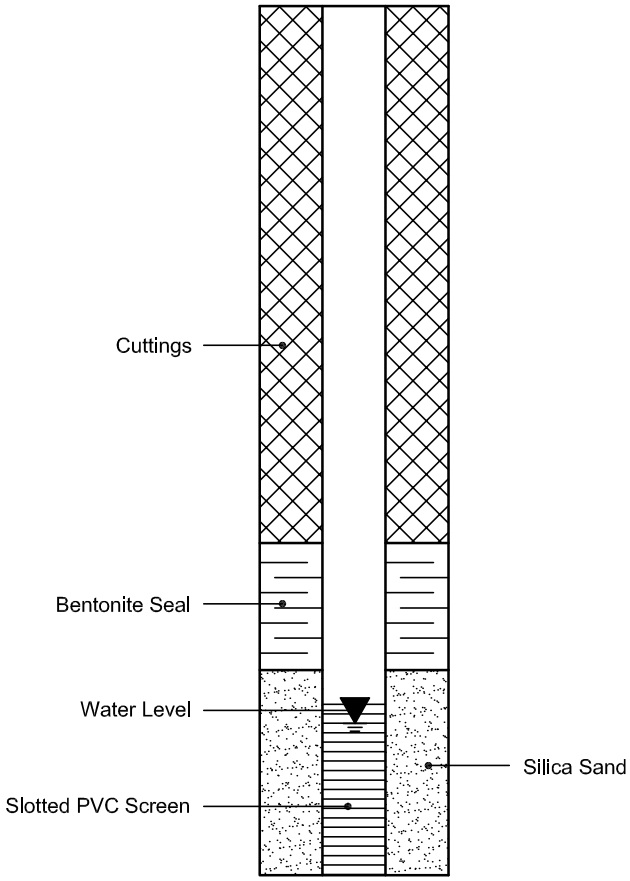


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers
9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mandy Witteman

Client PO: 58126
Project: PE6214
Custody:

Report Date: 16-Aug-2023
Order Date: 11-Aug-2023

Order #: 2332357

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

Paracel ID	Client ID
2332357-01	BH1-23-SS5
2332357-02	BH1-23-SS6
2332357-05	BH2-23-SS4
2332357-06	BH2-23-SS5 (Top)

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	14-Aug-23	15-Aug-23
PHC F1	CWS Tier 1 - P&T GC-FID	14-Aug-23	15-Aug-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	14-Aug-23	16-Aug-23
Solids, %	CWS Tier 1 - Gravimetric	14-Aug-23	15-Aug-23

Certificate of Analysis

Report Date: 16-Aug-2023

Client: **Paterson Group Consulting Engineers**

Order Date: 11-Aug-2023

Client PO: 58126

Project Description: PE6214

	Client ID:	BH1-23-SS5	BH1-23-SS6	BH2-23-SS4	BH2-23-SS5 (Top)	-	-
	Sample Date:	10-Aug-23 09:00	10-Aug-23 09:00	10-Aug-23 09:00	10-Aug-23 09:00		
	Sample ID:	2332357-01	2332357-02	2332357-05	2332357-06		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	86.4	63.5	89.2	87.1	-	-
Volatiles							
Benzene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Toluene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Toluene-d8	Surrogate	113%	122%	112%	111%	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	<7	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g	14	<4	101	7	-	-
F3 PHCs (C16-C34)	8 ug/g	77	<8	168	25	-	-
F4 PHCs (C34-C50)	6 ug/g	40	<6	31	17	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons								
F1 PHCs (C6-C10)	ND	7	ug/g					
F2 PHCs (C10-C16)	ND	4	ug/g					
F3 PHCs (C16-C34)	ND	8	ug/g					
F4 PHCs (C34-C50)	ND	6	ug/g					
Volatiles								
Benzene	ND	0.02	ug/g					
Ethylbenzene	ND	0.05	ug/g					
Toluene	ND	0.05	ug/g					
m,p-Xylenes	ND	0.05	ug/g					
o-Xylene	ND	0.05	ug/g					
Xylenes, total	ND	0.05	ug/g					
Surrogate: Toluene-d8	*8.23*		*%*	*103*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
Physical Characteristics									
% Solids	85.6	0.1	% by Wt.	84.9			0.8	25	
Volatiles									
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	*9.31*		*%*		*109*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	179	7	ug/g	ND	89.7	85-115			
F2 PHCs (C10-C16)	81	4	ug/g	ND	101	80-120			
F3 PHCs (C16-C34)	182	8	ug/g	ND	92.9	80-120			
F4 PHCs (C34-C50)	120	6	ug/g	ND	96.8	80-120			
Volatiles									
Benzene	3.05	0.02	ug/g	ND	76.3	60-130			
Ethylbenzene	3.63	0.05	ug/g	ND	90.8	60-130			
Toluene	3.59	0.05	ug/g	ND	89.7	60-130			
m,p-Xylenes	7.77	0.05	ug/g	ND	97.1	60-130			
o-Xylene	3.89	0.05	ug/g	ND	97.4	60-130			
Surrogate: Toluene-d8	*9.56*		*%*		*120*	*50-140*			

Qualifier Notes:

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis unlesss otherwise noted.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.

- F1 range corrected for BTEX.

- F2 to F3 ranges corrected for appropriate PAHs where available.

- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.

- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

- When reported, data for F4G has been processed using a silica gel cleanup.

PARACEL LABORATORIES LTD.

Paracel ID: 2332357

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2332357	

Client Name: Paterson Group Inc.
Contact Name: Mandy Witteman + Marie D'Arcy
Address: 9 Auriga Dr. Ottawa, ON
Telephone: (613) 800-5575

Project Ref: PE6214
Quote #:
PO #: 58122
E-mail: mwitteman@patersongroup.ca mdarcy@patersongroup.ca

Page 1 of 1

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

☒ REG 153/04 ☐ REG 406/19

Other Regulation: ☐ REG 558 ☐ PWQO ☐ CCME ☐ MISA ☐ SU - Sani ☐ SU - Storm ☐ Mun: ☐ Other:

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☒ Table 3 ☐ Agri/Other
☐ Table
For RSC: ☐ Yes ☐ No

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)
1	BH1-23-SS5	S		2	Aug. 10/23	9 AM	X						
2	BH1-23-SS6	S		2			X						
3	BH2-23-SS2 (HOLD)	S		2			X	→		→	HOLD		
4	BH2-23-SS3 (HOLD)	S		2			X	→		→	HOLD		
5	BH2-23-SS4	S		2			X						
6	BH2-23-SS5 (TOP)	S		2			X						
7	BH2-23-SS6 (HOLD)	S		2			X	→		→	HOLD		
8													
9													
10													

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: HP	Verified By: SO
Relinquished By (Print): Mandy Witteman	Date/Time:	Date/Time: Aug 11/23, 16:32	Date/Time: Aug 11 2023 4:36p
Date/Time: Aug 10/2023	Temperature: °C	Temperature: 16.9°C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers
9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mandy Witteman

Client PO: 58127
Project: PE6214
Custody:

Report Date: 18-Aug-2023
Order Date: 14-Aug-2023

Order #: 2333079

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

Paracel ID	Client ID
2333079-03	BH3-23-SS6
2333079-05	BH4-23-SS3

Approved By:

Dale Robertson, BSc
Laboratory Director

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	15-Aug-23	15-Aug-23
PHC F1	CWS Tier 1 - P&T GC-FID	15-Aug-23	15-Aug-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	15-Aug-23	18-Aug-23
Solids, %	CWS Tier 1 - Gravimetric	15-Aug-23	15-Aug-23

	Client ID:	BH3-23-SS6	BH4-23-SS3	-	-	-	-
	Sample Date:	11-Aug-23 09:00	11-Aug-23 09:00	-	-		
	Sample ID:	2333079-03	2333079-05	-	-		
	Matrix:	Soil	Soil	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	64.9	92.0	-	-	-	-
Volatiles							
Benzene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Toluene	0.05 ug/g	<0.05	<0.05	-	-	-	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	-	-	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	-	-	-	-
Toluene-d8	Surrogate	125%	110%	-	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	<7	-	-	-	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	-	-	-	-
F3 PHCs (C16-C34)	8 ug/g	<8	159	-	-	-	-
F4 PHCs (C34-C50)	6 ug/g	<6	69	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons								
F1 PHCs (C6-C10)	ND	7	ug/g					
F2 PHCs (C10-C16)	ND	4	ug/g					
F3 PHCs (C16-C34)	ND	8	ug/g					
F4 PHCs (C34-C50)	ND	6	ug/g					
Volatiles								
Benzene	ND	0.02	ug/g					
Ethylbenzene	ND	0.05	ug/g					
Toluene	ND	0.05	ug/g					
m,p-Xylenes	ND	0.05	ug/g					
o-Xylene	ND	0.05	ug/g					
Xylenes, total	ND	0.05	ug/g					
Surrogate: Toluene-d8	*8.31*		*%*	*104*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	55	4	ug/g	48			13.5	30	
F3 PHCs (C16-C34)	76	8	ug/g	54			NC	30	
F4 PHCs (C34-C50)	12	6	ug/g	6			NC	30	
Physical Characteristics									
% Solids	87.4	0.1	% by Wt.	87.1			0.4	25	
Volatiles									
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	*9.38*		*%*		*109*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	171	7	ug/g	ND	99.2	85-115			
F2 PHCs (C10-C16)	163	4	ug/g	48	133	60-140			
F3 PHCs (C16-C34)	310	8	ug/g	54	121	60-140			
F4 PHCs (C34-C50)	173	6	ug/g	6	124	60-140			
Volatiles									
Benzene	3.57	0.02	ug/g	ND	89.3	60-130			
Ethylbenzene	4.30	0.05	ug/g	ND	107	60-130			
Toluene	4.22	0.05	ug/g	ND	105	60-130			
m,p-Xylenes	9.19	0.05	ug/g	ND	115	60-130			
o-Xylene	4.64	0.05	ug/g	ND	116	60-130			
Surrogate: Toluene-d8	*7.88*		*%*		*98.6*	*50-140*			

Qualifier Notes:

QC Qualifiers:

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis unlesss otherwise noted.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.

- F1 range corrected for BTEX.

- F2 to F3 ranges corrected for appropriate PAHs where available.

- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.

- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

- When reported, data for F4G has been processed using a silica gel cleanup.

PARACEL LABORATORIES LTD.

Paracel ID: 2333079

Paracel Order Number (Lab Use Only)	**Chain Of Custody** (Lab Use Only)

Client Name: Paterson Group
Contact Name: Mandy Witteman
Address: 9 Auriga Dr. Ottawa, ON
Telephone: (613) 800-5575

Project Ref: PE6214
Quote #:
PO #: 58127
E-mail: mwitteman@patersongroup.ca
mdarcy@ " " .ca

Page 1 of 1

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

☒ REG 153/04 ☐ REG 406/19

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☒ Ind/Comm ☐ Coarse
☒ Table 3 ☐ Agri/Other
☐ Table ___
For RSC: ☐ Yes ☐ No

Other Regulation
☐ REG 558 ☐ PWQO
☐ CCME ☐ MISA
☐ SU - Sani ☐ SU - Storm
Mun:
☐ Other:

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

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)					
1	BH3-23-SS3 (HOLD)	S		2	Aug 11/23	9-12	X	(HOLD)										
2	BH3-23-SS4 (HOLD)						X	(HOLD)										
3	BH3-23-SS6						X											
4	BH3-23-SS7 (HOLD)						X	(HOLD)										
5	BH4-23-SS3						X											
6	BH4-23-SS4 (HOLD)						X	(HOLD)										
7	BH4-23-SS5 (HOLD)						X	(HOLD)										
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courr

Relinquished By (Sign):	Received at Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Mandy Witteman	Date/Time:	Date/Time: Aug 14/23 16:18	Date/Time: Aug/14/23 1644
Date/Time: Aug. 14/23 @ 2pm	Temperature: °C	Temperature: 9.8	pH Verified: ☐ By:

Chain of Custody (Blank).xlsx

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Certificate of Analysis

Paterson Group Consulting Engineers
9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mandy Witteman

Client PO: 58149
Project: PE6214
Custody:

Report Date: 24-Aug-2023
Order Date: 18-Aug-2023

Order #: 2333523

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

Paracel ID	Client ID
2333523-01	BH1-23-GW
2333523-02	BH2-23-GW
2333523-03	BH3-23-GW
2333523-04	BH4-23-GW

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	21-Aug-23	21-Aug-23
Metals, ICP-MS	EPA 200.8 - ICP-MS	22-Aug-23	22-Aug-23
PHC F1	CWS Tier 1 - P&T GC-FID	21-Aug-23	21-Aug-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	21-Aug-23	21-Aug-23
REG 153: PAHs by GC-MS	EPA 625 - GC-MS, extraction	23-Aug-23	23-Aug-23
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	21-Aug-23	21-Aug-23

	Client ID:	BH1-23-GW	BH2-23-GW	BH3-23-GW	BH4-23-GW	-	-
	Sample Date:	17-Aug-23 09:00	17-Aug-23 09:00	17-Aug-23 09:00	17-Aug-23 09:00		
	Sample ID:	2333523-01	2333523-02	2333523-03	2333523-04		
	Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
	MDL/Units						
Metals							
Lead	0.1 ug/L	-	<0.1	<0.1	-	-	-
Volatiles							
Acetone	5 ug/L	-	<5.0	<5.0	<5.0	-	-
Benzene	0.5 ug/L	-	1.1	<0.5	<0.5	-	-
Bromodichloromethane	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
Bromoform	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
Bromomethane	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
Carbon Tetrachloride	0.2 ug/L	-	<0.2	<0.2	<0.2	-	-
Chlorobenzene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
Chloroform	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
Dibromochloromethane	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
Dichlorodifluoromethane	1 ug/L	-	<1.0	<1.0	<1.0	-	-
1,2-Dichlorobenzene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
1,3-Dichlorobenzene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
1,1-Dichloroethane	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
1,2-Dichloroethane	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
1,1-Dichloroethylene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
1,2-Dichloropropane	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
Ethylene dibromide (dibromoethane,	0.2 ug/L	-	<0.2	<0.2	<0.2	-	-

Certificate of Analysis

Report Date: 24-Aug-2023

Client: **Paterson Group Consulting Engineers**

Order Date: 18-Aug-2023

Client PO: **58149**

Project Description: **PE6214**

	Client ID:	BH1-23-GW	BH2-23-GW	BH3-23-GW	BH4-23-GW	-	-
	Sample Date:	17-Aug-23 09:00	17-Aug-23 09:00	17-Aug-23 09:00	17-Aug-23 09:00		
	Sample ID:	2333523-01	2333523-02	2333523-03	2333523-04		
	Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
	MDL/Units						
Volatiles							
Ethylbenzene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
Hexane	1 ug/L	-	<1.0	<1.0	<1.0	-	-
Methyl Ethyl Ketone (2-Butanone)	5 ug/L	-	<5.0	<5.0	<5.0	-	-
Methyl Isobutyl Ketone	5 ug/L	-	<5.0	<5.0	<5.0	-	-
Methyl tert-butyl ether	2 ug/L	-	<2.0	<2.0	<2.0	-	-
Methylene Chloride	5 ug/L	-	<5.0	<5.0	<5.0	-	-
Styrene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
Tetrachloroethylene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
Toluene	0.5 ug/L	-	1.1	<0.5	<0.5	-	-
1,1,1-Trichloroethane	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
1,1,2-Trichloroethane	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
Trichloroethylene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
Trichlorofluoromethane	1 ug/L	-	<1.0	<1.0	<1.0	-	-
Vinyl chloride	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
m,p-Xylenes	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
o-Xylene	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
Xylenes, total	0.5 ug/L	-	<0.5	<0.5	<0.5	-	-
4-Bromofluorobenzene	Surrogate	-	84.8%	88.2%	89.9%	-	-
Dibromofluoromethane	Surrogate	-	110%	109%	109%	-	-
Toluene-d8	Surrogate	-	92.0%	92.1%	93.0%	-	-
Benzene	0.5 ug/L	<0.5	-	-	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-	-	-

	Client ID:	BH1-23-GW	BH2-23-GW	BH3-23-GW	BH4-23-GW	-	-
	Sample Date:	17-Aug-23 09:00	17-Aug-23 09:00	17-Aug-23 09:00	17-Aug-23 09:00		
	Sample ID:	2333523-01	2333523-02	2333523-03	2333523-04		
	Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
	MDL/Units						
Volatiles							
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-	-	-
Toluene-d8	Surrogate	95.2%	-	-	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100	-	-
Semi-Volatiles							
Acenaphthene	0.05 ug/L	-	-	-	<0.05	-	-
Acenaphthylene	0.05 ug/L	-	-	-	<0.05	-	-
Anthracene	0.01 ug/L	-	-	-	<0.01	-	-
Benzo [a] anthracene	0.01 ug/L	-	-	-	<0.01	-	-
Benzo [a] pyrene	0.01 ug/L	-	-	-	<0.01	-	-
Benzo [b] fluoranthene	0.05 ug/L	-	-	-	<0.05	-	-
Benzo [g,h,i] perylene	0.05 ug/L	-	-	-	<0.05	-	-
Benzo [k] fluoranthene	0.05 ug/L	-	-	-	<0.05	-	-
Chrysene	0.05 ug/L	-	-	-	<0.05	-	-
Dibenzo [a,h] anthracene	0.05 ug/L	-	-	-	<0.05	-	-
Fluoranthene	0.01 ug/L	-	-	-	<0.01	-	-
Fluorene	0.05 ug/L	-	-	-	<0.05	-	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	-	-	-	<0.05	-	-
1-Methylnaphthalene	0.05 ug/L	-	-	-	<0.05	-	-
2-Methylnaphthalene	0.05 ug/L	-	-	-	<0.05	-	-

	Client ID:	BH1-23-GW	BH2-23-GW	BH3-23-GW	BH4-23-GW	-	-
	Sample Date:	17-Aug-23 09:00	17-Aug-23 09:00	17-Aug-23 09:00	17-Aug-23 09:00		
	Sample ID:	2333523-01	2333523-02	2333523-03	2333523-04		
	Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
	MDL/Units						
Semi-Volatiles							
Methylnaphthalene (1&2)	0.1 ug/L	-	-	-	<0.10	-	-
Naphthalene	0.05 ug/L	-	-	-	<0.05	-	-
Phenanthrene	0.05 ug/L	-	-	-	<0.05	-	-
Pyrene	0.01 ug/L	-	-	-	<0.01	-	-
2-Fluorobiphenyl	Surrogate	-	-	-	68.6%	-	-
Terphenyl-d14	Surrogate	-	-	-	70.3%	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons								
F1 PHCs (C6-C10)	ND	25	ug/L					
F2 PHCs (C10-C16)	ND	100	ug/L					
F3 PHCs (C16-C34)	ND	100	ug/L					
F4 PHCs (C34-C50)	ND	100	ug/L					
Metals								
Lead	ND	0.1	ug/L					
Semi-Volatiles								
Acenaphthene	ND	0.05	ug/L					
Acenaphthylene	ND	0.05	ug/L					
Anthracene	ND	0.01	ug/L					
Benzo [a] anthracene	ND	0.01	ug/L					
Benzo [a] pyrene	ND	0.01	ug/L					
Benzo [b] fluoranthene	ND	0.05	ug/L					
Benzo [g,h,i] perylene	ND	0.05	ug/L					
Benzo [k] fluoranthene	ND	0.05	ug/L					
Chrysene	ND	0.05	ug/L					
Dibenzo [a,h] anthracene	ND	0.05	ug/L					
Fluoranthene	ND	0.01	ug/L					
Fluorene	ND	0.05	ug/L					
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/L					
1-Methylnaphthalene	ND	0.05	ug/L					
2-Methylnaphthalene	ND	0.05	ug/L					
Methylnaphthalene (1&2)	ND	0.10	ug/L					
Naphthalene	ND	0.05	ug/L					
Phenanthrene	ND	0.05	ug/L					
Pyrene	ND	0.01	ug/L					
Surrogate: 2-Fluorobiphenyl	*12.1*		*%*	*60.5*	*50-140*			
Surrogate: Terphenyl-d14	*16.0*		*%*	*80.1*	*50-140*			
Volatiles								
Acetone	ND	5.0	ug/L					
Benzene	ND	0.5	ug/L					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromodichloromethane	ND	0.5	ug/L					
Bromoform	ND	0.5	ug/L					
Bromomethane	ND	0.5	ug/L					
Carbon Tetrachloride	ND	0.2	ug/L					
Chlorobenzene	ND	0.5	ug/L					
Chloroform	ND	0.5	ug/L					
Dibromochloromethane	ND	0.5	ug/L					
Dichlorodifluoromethane	ND	1.0	ug/L					
1,2-Dichlorobenzene	ND	0.5	ug/L					
1,3-Dichlorobenzene	ND	0.5	ug/L					
1,4-Dichlorobenzene	ND	0.5	ug/L					
1,1-Dichloroethane	ND	0.5	ug/L					
1,2-Dichloroethane	ND	0.5	ug/L					
1,1-Dichloroethylene	ND	0.5	ug/L					
cis-1,2-Dichloroethylene	ND	0.5	ug/L					
trans-1,2-Dichloroethylene	ND	0.5	ug/L					
1,2-Dichloropropane	ND	0.5	ug/L					
cis-1,3-Dichloropropylene	ND	0.5	ug/L					
trans-1,3-Dichloropropylene	ND	0.5	ug/L					
1,3-Dichloropropene, total	ND	0.5	ug/L					
Ethylbenzene	ND	0.5	ug/L					
Ethylene dibromide (dibromoethane, 1,2-)	ND	0.2	ug/L					
Hexane	ND	1.0	ug/L					
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L					
Methyl Isobutyl Ketone	ND	5.0	ug/L					
Methyl tert-butyl ether	ND	2.0	ug/L					
Methylene Chloride	ND	5.0	ug/L					
Styrene	ND	0.5	ug/L					
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L					
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L					
Tetrachloroethylene	ND	0.5	ug/L					
Toluene	ND	0.5	ug/L					
1,1,1-Trichloroethane	ND	0.5	ug/L					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
1,1,2-Trichloroethane	ND	0.5	ug/L					
Trichloroethylene	ND	0.5	ug/L					
Trichlorofluoromethane	ND	1.0	ug/L					
Vinyl chloride	ND	0.5	ug/L					
m,p-Xylenes	ND	0.5	ug/L					
o-Xylene	ND	0.5	ug/L					
Xylenes, total	ND	0.5	ug/L					
Surrogate: 4-Bromofluorobenzene	*83.1*		*%*	*104*	*50-140*			
Surrogate: Dibromofluoromethane	*66.3*		*%*	*82.9*	*50-140*			
Surrogate: Toluene-d8	*88.6*		*%*	*111*	*50-140*			
Benzene	ND	0.5	ug/L					
Ethylbenzene	ND	0.5	ug/L					
Toluene	ND	0.5	ug/L					
m,p-Xylenes	ND	0.5	ug/L					
o-Xylene	ND	0.5	ug/L					
Xylenes, total	ND	0.5	ug/L					
Surrogate: Toluene-d8	*88.6*		*%*	*111*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Metals									
Lead	ND	0.1	ug/L	ND			NC	20	
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	ND	0.5	ug/L	ND			NC	30	
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	47.6	0.5	ug/L	45.8			3.9	30	
trans-1,2-Dichloroethylene	0.50	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-)	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	4.18	0.5	ug/L	4.03			3.7	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*96.0*		*%*		*120*	*50-140*			
Surrogate: Dibromofluoromethane	*80.7*		*%*		*101*	*50-140*			
Surrogate: Toluene-d8	*86.5*		*%*		*108*	*50-140*			
Benzene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: Toluene-d8	*86.5*		*%*		*108*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1880	25	ug/L	ND	110	85-115			
F2 PHCs (C10-C16)	1820	100	ug/L	ND	114	60-140			
F3 PHCs (C16-C34)	4480	100	ug/L	ND	114	60-140			
F4 PHCs (C34-C50)	2740	100	ug/L	ND	110	60-140			
Metals									
Lead	44.6	0.1	ug/L	ND	89.1	80-120			
Semi-Volatiles									
Acenaphthene	5.67	0.05	ug/L	ND	113	50-140			
Acenaphthylene	6.46	0.05	ug/L	ND	129	50-140			
Anthracene	5.38	0.01	ug/L	ND	108	50-140			
Benzo [a] anthracene	5.94	0.01	ug/L	ND	119	50-140			
Benzo [a] pyrene	5.56	0.01	ug/L	ND	111	50-140			
Benzo [b] fluoranthene	6.24	0.05	ug/L	ND	125	50-140			
Benzo [g,h,i] perylene	5.98	0.05	ug/L	ND	120	50-140			
Benzo [k] fluoranthene	4.86	0.05	ug/L	ND	97.1	50-140			
Chrysene	5.70	0.05	ug/L	ND	114	50-140			
Dibenzo [a,h] anthracene	5.68	0.05	ug/L	ND	114	50-140			
Fluoranthene	5.11	0.01	ug/L	ND	102	50-140			
Fluorene	5.13	0.05	ug/L	ND	103	50-140			
Indeno [1,2,3-cd] pyrene	5.09	0.05	ug/L	ND	102	50-140			
1-Methylnaphthalene	5.21	0.05	ug/L	ND	104	50-140			
2-Methylnaphthalene	6.00	0.05	ug/L	ND	120	50-140			
Naphthalene	4.71	0.05	ug/L	ND	94.2	50-140			
Phenanthrene	5.64	0.05	ug/L	ND	113	50-140			
Pyrene	5.10	0.01	ug/L	ND	102	50-140			
Surrogate: 2-Fluorobiphenyl	*12.1*		*%*		*60.5*	*50-140*			
Surrogate: Terphenyl-d14	*15.7*		*%*		*78.5*	*50-140*			
Volatiles									
Acetone	97.7	5.0	ug/L	ND	97.7	50-140			
Benzene	38.3	0.5	ug/L	ND	95.7	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromodichloromethane	36.4	0.5	ug/L	ND	91.0	60-130			
Bromoform	31.9	0.5	ug/L	ND	79.8	60-130			
Bromomethane	45.9	0.5	ug/L	ND	115	50-140			
Carbon Tetrachloride	32.6	0.2	ug/L	ND	81.6	60-130			
Chlorobenzene	39.1	0.5	ug/L	ND	97.8	60-130			
Chloroform	37.3	0.5	ug/L	ND	93.3	60-130			
Dibromochloromethane	31.7	0.5	ug/L	ND	79.2	60-130			
Dichlorodifluoromethane	35.6	1.0	ug/L	ND	88.9	50-140			
1,2-Dichlorobenzene	37.1	0.5	ug/L	ND	92.8	60-130			
1,3-Dichlorobenzene	37.0	0.5	ug/L	ND	92.5	60-130			
1,4-Dichlorobenzene	36.5	0.5	ug/L	ND	91.4	60-130			
1,1-Dichloroethane	41.2	0.5	ug/L	ND	103	60-130			
1,2-Dichloroethane	36.8	0.5	ug/L	ND	92.0	60-130			
1,1-Dichloroethylene	38.4	0.5	ug/L	ND	96.0	60-130			
cis-1,2-Dichloroethylene	41.0	0.5	ug/L	ND	102	60-130			
trans-1,2-Dichloroethylene	40.1	0.5	ug/L	ND	100	60-130			
1,2-Dichloropropane	34.9	0.5	ug/L	ND	87.2	60-130			
cis-1,3-Dichloropropylene	40.3	0.5	ug/L	ND	101	60-130			
trans-1,3-Dichloropropylene	39.4	0.5	ug/L	ND	98.4	60-130			
Ethylbenzene	39.8	0.5	ug/L	ND	99.4	60-130			
Ethylene dibromide (dibromoethane, 1,2-)	35.2	0.2	ug/L	ND	88.1	60-130			
Hexane	43.6	1.0	ug/L	ND	109	60-130			
Methyl Ethyl Ketone (2-Butanone)	99.2	5.0	ug/L	ND	99.2	50-140			
Methyl Isobutyl Ketone	99.7	5.0	ug/L	ND	99.7	50-140			
Methyl tert-butyl ether	110	2.0	ug/L	ND	110	50-140			
Methylene Chloride	35.4	5.0	ug/L	ND	88.6	60-130			
Styrene	36.5	0.5	ug/L	ND	91.4	60-130			
1,1,1,2-Tetrachloroethane	33.1	0.5	ug/L	ND	82.8	60-130			
1,1,2,2-Tetrachloroethane	33.9	0.5	ug/L	ND	84.8	60-130			
Tetrachloroethylene	39.3	0.5	ug/L	ND	98.4	60-130			
Toluene	40.2	0.5	ug/L	ND	100	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,1,1-Trichloroethane	38.8	0.5	ug/L	ND	97.0	60-130			
1,1,2-Trichloroethane	35.9	0.5	ug/L	ND	89.7	60-130			
Trichloroethylene	39.2	0.5	ug/L	ND	97.9	60-130			
Trichlorofluoromethane	41.5	1.0	ug/L	ND	104	60-130			
Vinyl chloride	46.2	0.5	ug/L	ND	115	50-140			
m,p-Xylenes	81.2	0.5	ug/L	ND	101	60-130			
o-Xylene	40.0	0.5	ug/L	ND	99.9	60-130			
Surrogate: 4-Bromofluorobenzene	*81.4*		*%*		*102*	*50-140*			
Surrogate: Dibromofluoromethane	*86.7*		*%*		*108*	*50-140*			
Surrogate: Toluene-d8	*79.6*		*%*		*99.5*	*50-140*			
Benzene	38.3	0.5	ug/L	ND	95.7	60-130			
Ethylbenzene	39.8	0.5	ug/L	ND	99.4	60-130			
Toluene	40.2	0.5	ug/L	ND	100	60-130			
m,p-Xylenes	81.2	0.5	ug/L	ND	101	60-130			
o-Xylene	40.0	0.5	ug/L	ND	99.9	60-130			
Surrogate: Toluene-d8	*79.6*		*%*		*99.5*	*50-140*			

Certificate of Analysis

Report Date: 24-Aug-2023

Client: **Paterson Group Consulting Engineers**

Order Date: 18-Aug-2023

Client PO: **58149**

Project Description: PE6214

Qualifier Notes:

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.

- F1 range corrected for BTEX.

- F2 to F3 ranges corrected for appropriate PAHs where available.

- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.

- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

- When reported, data for F4G has been processed using a silica gel cleanup.

PARACEL LABORATORIES LTD.

Paracel ID: 2333523

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2333523	

Client Name: PATERSON GROUP	Project Ref: PE6214	Page 1 of 1
Contact Name: Mandy Witteman	Quote #:	Turnaround Time
Address: 9 Auriga Drive	PO #: 58149	☐ 1 day ☐ 3 day
Telephone: 613-226-7381	E-mail: mwitteman@patersongroup.ca	☐ 2 day ☒ Regular
		Date Required:

☒ REG 153/04 ☐ REG 406/19	Other Regulation	Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)
☐ Table 1 ☐ Res/Park ☐ Med/Fine	☐ REG 558 ☐ PWQO	
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ CCME ☐ MISA	
☐ Table 3 ☐ Agri/Other	☐ SU - Sani ☐ SU - Storm	
☐ Table ___	Mun:	
For RSC: ☐ Yes ☐ No	☐ Other:	

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Lead
1	BH1-23-GW	GW		3	Aug 17/23		X							
2	BH2-23-GW	"		4	"		X	X						X
3	BH3-23-GW	"		4	"		X	X						X
4	BH4-23-GW	"		4	"		X	X	X					
5														
6														
7														
8														
9														
10														

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By: SD
Relinquished By (Print): Joshua Dempsey	Date/Time:	Date/Time: Aug 18/23 4:25pm	Date/Time: Aug 18, 2023 4:47p
Date/Time: Aug 18/2023	Temperature: °C	Temperature: 14.4°C	pH Verified: ☑ By: SD

Chain of Custody (Blank).xlsx

Revsion 4.0

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www.paracellabs.com

Certificate of Analysis

Paterson Group Consulting Engineers (Ottawa)
9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mark D'Arcy

Client PO: 58869
Project: PE6214
Custody:

Report Date: 20-Nov-2023
Order Date: 17-Nov-2023

Order #: 2346502

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

Paracel ID	Client ID
2346502-01	BH2-23-GW2
2346502-02	BH12-23-GW

Approved By:

Dale Robertson, BSc
Laboratory Director

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	20-Nov-23	20-Nov-23

	Client ID:	BH2-23-GW2	BH12-23-GW	-	-		
	Sample Date:	06-Nov-23 09:00	06-Nov-23 09:00	-	-	-	-
	Sample ID:	2346502-01	2346502-02	-	-		
	Matrix:	Ground Water	Ground Water	-	-		
	MDL/Units						
Volatiles							
Benzene	0.5 ug/L	1.5	1.5	-	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	-	-	-	-
Toluene	0.5 ug/L	<0.5	<0.5	-	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	-	-	-	-
o-Xylene	0.5 ug/L	<0.5	<0.5	-	-	-	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	-	-	-	-
Toluene-d8	Surrogate	103%	106%	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles								
Benzene	ND	0.5	ug/L					
Ethylbenzene	ND	0.5	ug/L					
Toluene	ND	0.5	ug/L					
m,p-Xylenes	ND	0.5	ug/L					
o-Xylene	ND	0.5	ug/L					
Xylenes, total	ND	0.5	ug/L					
Surrogate: Toluene-d8	*82.8*		*%*	*103*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Benzene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: Toluene-d8	*86.5*		*%*		*108*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Benzene	44.5	0.5	ug/L	ND	111	60-130			
Ethylbenzene	42.7	0.5	ug/L	ND	107	60-130			
Toluene	45.4	0.5	ug/L	ND	114	60-130			
m,p-Xylenes	78.5	0.5	ug/L	ND	98.2	60-130			
o-Xylene	41.9	0.5	ug/L	ND	105	60-130			
Surrogate: Toluene-d8	*65.2*		*%*		*81.5*	*50-140*			

Qualifier Notes:

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

PARACEL LABORATORIES LTD.

Paracel ID: 2346502

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2346502	

Client Name: PATERSON GROUP	Project Ref: PE6214
Contact Name: Mark D'Arcy ; Joshua Dempsey	Quote #:
Address: 9 Auriga Drive	PO #: 58869
Telephone: 613-226-7381	E-mail: mdarcy@patersongroup.ca jdempsey@patersongroup.ca

Page 1 of 1

Turnaround Time

☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular

Date Required:

☒ REG 153/04 ☐ REG 406/19

Other Regulation	
☐ REG 558	☐ PWQO
☐ CCME	☐ MISA
☐ SU - Sani	☐ SU - Storm
Mun:	
☐ Other:	

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other
☐ Table ___
For RSC: ☐ Yes ☐ No

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	BTEX				
1	BH2-23-GW2	GW		2	Nov 6/23									X				
2	BH12-23-GW	GW		2	"									X				
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Drift

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By: SO
Relinquished By (Print): Joshua Dempsey	Date/Time:	Date/Time: Nov. 17 2023 1550	Date/Time: Nov 17, 2023 4:02 pm
Date/Time: Nov 16/23	Temperature: °C	Temperature: 13.4 °C	pH Verified: ☐ By: