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Phase II Environmental Site Assessment

3432 Greenbank Road
Ottawa, Ontario

Prepared For

Minto Communities

October 29, 2020

Report: PE4940-2

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for the property addressed 3432 Greenbank Road in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address the area of environmental concern (APEC) that were identified on the Phase II Property during the Phase I ESA.

The Phase II ESA consisted of drilling three (3) boreholes on the Phase II Property, all of which were constructed with groundwater monitoring well installations.

The soil profile generally consisted of topsoil, followed by either a silty sand or silty clay layer, underlain by glacial till and terminated at practical refusal to augering at depths ranging from 4.65 to 6.83 mbgs. Bedrock was inferred at these depths. Soil samples were obtained from the boreholes and screened based on visual observations. No visual or olfactory evidence of deleterious materials or contamination were identified during the subsurface investigation.

Based on the screening results in combination with sample depth and location, four (4) soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) and petroleum hydrocarbons (PHCs, F_1-F_4). No BTEX or PHC concentrations were above the laboratory detection limits. All of the soil samples analyzed were in compliance of the selected MECP Table 8 Residential Standards.

Groundwater samples were recovered and analyzed for BTEX and PHCs. No free-phase product was observed on the groundwater at any of the monitoring well locations during the groundwater sampling events. No BTEX or PHCs were detected in the groundwater samples analyzed. All groundwater results were in compliance with the MECP Table 8 Standards.

Recommendations

Monitoring Wells

If the monitoring wells installed on the subject site are not going to be used in the future, or will not be entirely removed, 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 Minto Communities, Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment for the property addressed 3432 Greenbank Road, in the City of Ottawa, Ontario, herein referred to as the Phase II Property. The purpose of this Phase II ESA was to address areas of potential environmental concern (APECs) identified on the Phase II Property, during the Phase I ESA conducted by Paterson.

1.1 Site Description

Address:	3432 Greenbank Road, Ottawa, Ontario
Legal Description:	Lot 12, Concession 3, Geographic Township of Nepean, City of Ottawa.
Location:	The site is located on the west side of Greenbank Road, south of the Jock River, in the City of Ottawa, Ontario. The subject site is shown on Figure 1 – Key Plan, following the body of this report (Figures section).
Latitude and Longitude:	45° 15’ 29.44" N, 75° 44' 27.89" W
Area:	23. 28 hectares (approximately)
Zoning:	DR –Development Reserved Zoning with the northeastern and northwestern sides of the site designated as a flood plain. A small section of Jock River transects the eastern property boundary of the Phase I Property in an approximate north to south direction.

1.2 Property Ownership

Paterson was retained to complete this Phase II ESA by Mr. Curtiss Scarlett from Minto Communities. The head office of Minto Communities is located at Suite #200, 180 Kent Street, Ottawa, Ontario. Mr. Scarlett can be reached by telephone at (613) 230-7051.

1.3 Current and Proposed Future Uses

The Phase II Property is currently used for agricultural purposes. The majority of the land is agricultural fields, while the eastern portion of the land is occupied by two (2) wooden barns for cattle and three (3) out-buildings use to store farm equipment and bales of hay.

It is our understanding that the proposed development of the Phase II Property includes a residential development including access roads and parkland.

1.4 Applicable Site Condition Standard

The site condition standards for the property were obtained from Table 8 of the document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", prepared by the Ministry of the Environment, Conservation and Parks (MECP), April 2011. The selected MECP Table 8 Standards are based on the following considerations:

- ❑ Coarse-grained soil conditions
- ❑ Generic site conditions for use within 30 m of a water body
- ❑ Potable groundwater conditions
- ❑ Residential/Parkland/Institutional/Industrial/Commercial land use

These standards were selected based on the future land use of the subject site. Coarse-grained soil standards, which are considered conservative, were chosen to represent the current site conditions of the Phase II Property.

Section 38 of O.Reg. 153/04 does apply to the Phase II Property in that the property relies upon potable groundwater.

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

Section 43.1 of O.Reg. 153/04 does apply to the Phase II Property in that the property is within 30m of a water body.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II Property is situated in a designated floodplain overlying the Jock River on the eastern and northern property boundaries.

The majority of the site is vacant agricultural land with the Jock River bordering the eastern and northern property boundaries. The site is below the grade of Greenbank Road with the eastern portion of the land somewhat undulating, while the remaining land is relatively flat. Site drainage occurs primarily through infiltration.

The topography of the site slopes gently down in an easterly and northerly direction towards the Jock River. Groundwater in the area is anticipated to flow in an easterly and northerly direction as well.

2.2 Past Investigations

A Phase I-ESA was completed by Paterson in May of 2020 in general accordance with the Ontario Regulation (O.Reg.) 153/04, as amended. The Phase I ESA identified one on-site PCA that resulted in an area of potential environmental concern (APEC) on the Phase I Property:

- ❒ APEC 1 – Resulting in *"Gasoline and Associated Products Storage in Fixed Tanks,"* associated with the diesel fuel tank on the eastern side of the Phase I Property (PCA 28).

This PCA was noted during the site visit of the Phase I ESA. A Phase II ESA was recommended to address the aforementioned APEC on the Phase I Property, as shown in Drawing PE4940-1 – Site Plan (Phase I ESA, Report PE4940-1).

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation was conducted on October 9, 2020, which consisted of drilling three (3) boreholes, all of which were instrumented with groundwater monitoring wells. Boreholes were drilled to a maximum depth of 6.83 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 the media is based on the Contaminants of Potential Concern (CPCs) identified in the Phase I ESA. These CPCs included Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) and Petroleum hydrocarbons (PHCs, F1-F4) in soil and/or groundwater.

3.3 Phase I Conceptual Site Model

Geological and Hydrogeological Setting

Based on the information from the Geological Survey of Canada, the overburden in the area consists of plain till and marine deposits with a drift thickness ranging from 5 to 25 m. Bedrock in the area consists of limestone and dolomite of the Gull River Formation and Dolomite of the Oxford Formation.

Based on the domestic well record for the Phase I Property, the stratigraphy consists of clay and overworked soil with some stones, underlain by limestone. Bedrock was reached at approximate 7.3 m below the ground surface.

Groundwater flow is interpreted to be in a northerly and/or easterly direction towards Jock River.

Subsurface Structures and Utilities

The Phase I Property is situated in an area where private wells and septic systems are relied upon, although new development in the area is municipally serviced. It is expected upon development, the site will be municipally serviced. There are no underground utilities with the exception of the domestic well used for livestock purposes. Above ground electricity entering from Greenbank Road services the Phase I Property.

Existing Buildings and Structures

The eastern portion of the Phase I Property is occupied by two (2) barns and three (3) out-buildings. Cattle are housed in the western buildings (barns), while the remaining three (3) buildings are used to store farm equipment and bales of hay. No other structures are present on the Phase I Property.

Water Bodies and Areas of Natural Significance

The Jock River boarders the eastern and northern property boundaries running in a north-south direction and east-west direction, respectively, and overlain by a designated flood plain. No areas of natural significance are known to exist within the 250 m search radius.

Potable Water Well Records and Monitoring Well Records

The Phase I Property is situated in an area where domestic wells are relied upon. One domestic well was located on-site, although new development in the area is municipally serviced and it is expected upon development the site will be municipally serviced as well.

Neighbouring Land Use

Neighbouring land use in the Phase I Study Area consists primarily of residential and agricultural fields.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

As per Section 2.2 of this report, one PCA was considered to result in an APEC on the Phase I Property:

- APEC 1 – Resulting in *"Gasoline and Associated Products Storage in Fixed Tanks,"* associated with the diesel fuel tank on the eastern side of the Phase I Property (PCA 28).

Contaminants of Potential Concern

The CPCs identified on the Phase I Property are:

- Benzene, ethylbenzene, toluene and xylenes (BTEX); and
- Petroleum hydrocarbons (PHCs, Fractions F_1-F_4),

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 is one on-site PCA that has resulted in an APEC 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

The Sampling and Analysis Plan for this project is included in Appendix 1 of this report.

3.5 Impediments

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

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation was conducted October 9, 2020. The field program consisted of drilling three (3) boreholes in the immediate area of the above ground storage tank, barns and outbuildings of the Phase II Property.

The boreholes were drilled to a maximum depth of 6.83 mbgs. All three (3) boreholes were completed as groundwater monitoring wells to access the groundwater table.

The boreholes were drilled using a low-clearance track mounted rig provided by Downing Drilling, of Hawksbury, Ontario, under the full-time supervision of Paterson personnel. The borehole locations are indicated on the attached Drawing PE4940-3 – Test Hole Location Plan, appended to this report.

4.2 Soil Sampling

A total of 23 soil samples were obtained from the boreholes by means of grab sampling from auger flights and split spoon sampling. Split spoon samples were taken at approximate 0.76 m intervals. The depths at which auger samples and split spoon samples were obtained from the boreholes are shown as "**AU**" and "**SS**" on the Soil Profile and Test Data Sheets appended to this report.

The soil stratigraphy at the borehole locations consisted of a topsoil, followed by either silty sand or silty clay, underlain by glacial till. Bedrock was not confirmed but rather inferred at practical refusal to augering at depths ranging from 4.65 to 6.83 mbgs.

4.3 Field Screening Measurements

All soil samples collected were subjected to a preliminary screening procedure, which included visual screening for colour and evidence of metals, as well as soil vapour screening with a MiniRAE 2000 Portable VOC Monitor.

The technical protocol was obtained from Appendix C of the MECP document entitled “Interim Guidelines for the Remediation of Petroleum Contamination at Operating Retail and Private Fuel Outlets in Ontario”, dated March 1992.

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 ambient temperature prior to conducting the vapour survey. Allowing the samples to stabilize to ambient temperature ensures consistency of readings between samples.

The soil vapours were measured by inserting the analyzer probe into the nominal headspace above the soil sample. Samples were then agitated/manipulated gently as the measurements were taken. The peak reading registered within the first 15 seconds was recorded as the vapour measurement.

The vapour readings were in the range of 0 to 0.7 ppm in the soil samples obtained. No visual or olfactory odours were identified in the soil samples. Soil samples were selected based on a combination of the results of visual and olfactory screening, sample depth and/or sample location. Vapour readings are noted on the Soil Profile and Test Data Sheets in Appendix 1.

4.4 Groundwater Monitoring Well Installation

Three (3) groundwater monitoring wells were installed on the Phase II Property as part of the 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.

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	91.78	6.27	3.27-6.27	2.5-6.27	0.18-2.5	Stick-up
BH2	91.24	4.64	3.14-4.64	2.5-4.64	0.18-2.5	Stick-up
BH3	91.68	6.82	3.82-6.82	3.05-6.82	0.18-3.05	Stick-up

4.5 Field Measurement of Water Quality Parameters

Groundwater samples were collected on October 14, 2020. The water levels were the only parameter measured in the field during the November sampling events.

4.6 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.

4.7 Analytical Testing

Based on the guidelines outlined in the Sampling and Analysis Plan in Appendix 1, the soil and groundwater samples submitted for analytical testing are presented in Tables 3 and 4.

Table 3: Soil Samples Submitted and Analyzed Parameters

Sample ID	Sample Depth (m) and Stratigraphic Unit	Parameters Analyzed		Rationale
		BTEX	PHCs (F1-F4)	
October 9, 2020				
BH1-SS6	3.81-4.42 Till	X	X	Assess the potential impact due to the presence of a diesel AST.
BH2-SS6	3.81-4.42 Till	X	X	Assess the potential impact due to the presence of a diesel AST.
BH3-SS5	3.05-3.66 Till	X	X	Assess the potential impact due to the presence of a diesel AST.
DUP (BH1-SS6)	3.81-4.42 Till	X	X	A duplicate sample for QA/QC purposes.

Table 4: Groundwater Samples Submitted and Analyzed Parameters				
Sample ID	Screened Interval (m)	Parameters Analyzed		Rationale
		BTEX	PHCs (F1-F4)	
October 14, 2020				
BH1-GW1	3.27-6.27	X	X	Assess the potential impact due to the presence of a diesel AST.
BH2-GW1	3.14-4.64	X	X	Assess the potential impact due to the presence of a diesel AST.
BH3-GW1	3.82-6.82	X	X	Assess the potential impact due to the presence of a diesel AST.
DUP*	3.27-6.27	X	X	A duplicate sample for QA/QC purposes.
Note: ▪ * Only BTEX and PHC-F1 were analyzed				

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.

4.8 Residue Management

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

4.9 Elevation Surveying

The borehole locations were selected by Paterson. Boreholes were located and surveyed in the field by Paterson. The locations and elevations of the boreholes are presented on Drawing PE4940-3 – Test Hole Location Plan, appended to this report.

4.10 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 generally consist of topsoil, followed by a silty clay or sily sand, underlain by glacial till. Practical refusal was encountered at depths ranging form 4.65 to 6.83 mbgs, where bedrock was inferred.

Groundwater was encountered within overburden/till at depths ranging from approximately 1.54 to 2.15 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 during the groundwater sampling event which occurred on October 14, 2020, using an electronic water level meter. 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	91.78	1.98	89.80	October 14, 2020
BH2	91.24	1.54	89.70	October 14, 2020
BH3	91.68	2.15	89.53	October 14, 2020

Based on the groundwater elevations measured during the sampling event, a groundwater contour plan was completed. The groundwater contour mapping is shown on Drawing PE4940-3 – Groundwater Contour Plan. Based on the contour mapping, groundwater flow beneath the Phase II Property is in a northerly direction. A horizontal hydraulic gradient of approximately 0.012 m/m was calculated.

5.3 Fine-Course Soil Texture

No grain size analysis was completed for the subject site. Coarse grained standards were chosen as the site consists of coarse grained soils.

5.4 Soil: Field Screening

The vapour readings were generally 0.7ppm or less in the soil samples obtained. No visual or olfactory odours were identified in the soil samples. Soil samples were

selected based on a combination of the results of visual and olfactory screening, sample depth and/or sample location.

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

Three (3) soil samples plus a duplicate were submitted for BTEX and PHC (F_1-F_4) analyses. 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 PHC (F_1-F_4)

Parameter	MDL (µg/g)	Soil Samples (µg/g) October 9, 2020			MECP Table 8 Standards (µg/g)
		BH1-SS6	BH2-SS6	BH3-SS5	
Benzene	0.02	nd	nd	nd	0.02
Ethylbenzene	0.05	nd	nd	nd	0.05
Toluene	0.05	nd	nd	nd	0.2
Xylenes (total)	0.05	nd	nd	nd	0.05
PHC F_1	7	nd	nd	nd	25
PHC F_2	4	nd	nd	nd	10
PHC F_3	8	nd	nd	nd	240
PHC F_4	6	nd	nd	nd	120

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Underlined and BOLD** – Parameter exceeds the selected MECP standards

No detectable BTEX or PHC concentrations were identified in any of the soil samples analyzed. All test results are in compliance with the MECP Table 8 Residential Standards. The analytical results for BTEX and PHC parameters tested in soil are shown on Drawing PE4940-4– Analytical Testing Plan – Soil.

5.6 Groundwater Quality

Groundwater samples from monitoring wells installed in BH1, BH2 and BH3 were submitted for laboratory analysis of BTEX and PHC (F_1-F_4) parameters. The groundwater samples were obtained from the screened intervals noted on Table 2.

The results of the analytical testing are presented in Table 7. The laboratory certificates of analysis are provided in Appendix 1.

TABLE 7: Analytical Test Results – Groundwater – BTEXs and PHCs						
Parameter	MDL (µg/L)	Groundwater Samples (µg/L)				MECP Table 8 Standards (µg/L)
		October 14, 2020				
		BH1-GW1	BH2-GW1	BH3-GW1	DUP	
Benzene	0.5	nd	nd	nd	nd	5
Ethylbenzene	0.5	nd	nd	nd	nd	2.4
Toluene	0.5	nd	nd	nd	nd	22
Xylenes (total)	0.5	nd	nd	nd	nd	300
PHC F_1	25	nd	nd	nd	nd	420
PHC F_2	100	nd	nd	nd	NA	150
PHC F_3	100	nd	nd	nd	NA	500
PHC F_4	100	nd	nd	nd	NA	500

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

No detectable BTEX of PHC concentrations were identified in the groundwater samples analyzed. All test results are in compliance with the MECP Table 8 Standards.

Analytical results of groundwater sampled with respect to borehole locations are shown on Drawing PE4940-5– Analytical Testing Plan – Groundwater.

5.7 Quality Assurance and Quality Control Results

All samples submitted as part of this Phase II ESA were handled in accordance with the Analytical Protocol with respect to preservation method, storage requirement, and container type.

As per the sampling and analysis plan, duplicate soil and groundwater samples (DUP) from BH1-SS6 and BH1-GW1 were obtained, respectively, and analyzed for BTEX and PHC parameters. All parameter concentrations were undetected.

Overall, the quality of the field data collected during this Phase II-ESA is considered to be sufficient to meet the overall objectives of this assessment.

5.8 Phase II Conceptual Site Model

The following section has been prepared in general 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 Section 2.2 of this report, as per Table 2 of the O.Reg. 153/04, a PCA was identifed and considered to represent an APEC on the Phase II Property:

- APEC 1 – Resulting in *"Gasoline and Associated Products Storage in Fixed Tanks,"* associated with the diesel fuel tank on the eastern side of the Phase II Property (PCA 28).

Contaminants of Potential Concern

Based on the APECs identified on the Phase II Property, the contaminants of potential concern (CPCs) present in soil and/or groundwater include:

- Benzene, ethylbenzene, toluene and xylenes (BTEX); and
- Petroleum hydrocarbons (PHCs, Fractions F_1-F_4).

Subsurface Structures and Utilities

The Phase II Property is situated in an area where private wells and septic systems are relied upon, although new development in the area is municipally serviced. It is expected upon development, the site will be municipally serviced. There are no underground utilities with the exception of the domestic well used for livestock purposes. Above ground electricity entering from Greenbank Road services the Phase II Property.

Physical Setting

Site Stratigraphy

The site stratigraphy, from ground surface to the deepest aquifer or aquitard investigated, is illustrated on Drawings PE4940-6–Cross-section A-A' – Soil and Groundwater. The site stratigraphy consists of:

- Topsoil was encountered in all of the boreholes with an approximate thickness ranging between 0.2 to 0.25 m. Groundwater was not encountered in this layer.

- Silty sand and silty clay were encountered in BH1 and BH3, respectively, extending to a depth of 1.52 and 1.27 mbgs. Groundwater was not encountered in this layer.
- Glacial till consisting of silty sand with cobbles, some gravel and traces of clay was encountered in all three (3) boreholes and extended to depths ranging from approximately 4.65 to 6.83 mbgs. Groundwater was encountered in this layer.

Hydrogeological Characteristics

Groundwater at the Phase II Property was encountered in the glacial till ranging from depths of approximately 1.54 to 2.15 mbgs. Groundwater flow was measured in a northerly direction with a hydraulic gradient of 0.012m/m. Groundwater contours are shown on Drawing PE4940-3–Test Hole Location Plan.

Approximate Depth to Water Table

Depth to the water table at the subject site varied between approximately 1.54 to 2.15 mbgs.

Approximate Depth to Bedrock

Bedrock was not encountered during the field program. Practical refusal to augering was reached at depths ranging from 4.65 to 6.83 mbgs, where bedrock was inferred.

Sections 41 and 43.1 of the Regulation

Section 41 of the Regulation does not apply to the Phase II Property, in that the subject property is not within 30m of an environmentally sensitive area.

Section 43.1 of the Regulation does apply to the Phase II Property as the subject land is located within 30 m of a water body.

Fill Placement

Based on the findings of the subsurface investigation, no fill was encountered during the field program.

Existing Buildings and Structures

The eastern portion of the Phase II Property is occupied by two (2) barns and three (3) out-buildings. Cattle are housed in the western buildings (barns), while the remaining three (3) buildings are used to store farm equipment and bales of hay. No other structures are present on the Phase II Property.

Proposed Buildings and Other Structures

The proposed development of the Phase II Property includes a residential development including access roads and parkland.

Water Bodies and Areas of Natural Significance

The Jock River transects the eastern property boundary running in a north-south direction, while the northern portion of the subject land is overlain by a designated flood plain. No areas of natural significance are known to exist within the Study Area.

Environmental Condition

Areas Where Contaminants are Present

Based on the analytical results, soil and groundwater are in compliance with the MECP Table 8 Standards for residential land use.

Types of Contaminants

Based on the analytical results for soil and groundwater, there are no contaminants present on or beneath the Phase II Property.

Contaminated Media

Based on the findings of the Phase II ESA, no contaminated media is present on or beneath the Phase II Property.

What Is Known About Areas Where Contaminants Are Present

No contaminants exceeding MECP Table 8 Standards are present in the soil or groundwater on or beneath the Phase II Property.

Distribution and Migration of Contaminants

Based on the findings of the Phase II ESA, the distribution and migration of contaminants is not considered to have occurred on the Phase II Property.

Discharge of Contaminants

Based on the findings of the Phase II ESA, no contaminants have been discharged on the Phase II Property.

Climatic and Meteorological Conditions

No contaminants are present in the soil or groundwater beneath the Phase II Property and therefore climatic and meteorological conditions are not considered to have contributed to contaminant transport.

Potential for Vapour Intrusion

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

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for the property addressed 3432 Greenbank Road in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address the area of environmental concern (APEC) that were identified on the Phase II Property during the Phase I ESA.

The Phase II ESA consisted of drilling three (3) boreholes on the Phase II Property, all of which were constructed with groundwater monitoring well installations.

The soil profile generally consisted of topsoil, followed by either a silty sand or silty clay layer, underlain by glacial till and terminated at practical refusal to augering at depths ranging from 4.65 to 6.83 mbgs. Bedrock was inferred at these depths. Soil samples were obtained from the boreholes and screened based on visual observations. No visual or olfactory evidence of deleterious materials or contamination were identified during the subsurface investigation.

Based on the screening results in combination with sample depth and location, four (4) soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) and petroleum hydrocarbons (PHCs, F_1-F_4). No BTEX or PHC concentrations were above the laboratory detection limits. All of the soil samples analyzed were in compliance of the selected MECP Table 8 Residential Standards.

Groundwater samples were recovered and analyzed for BTEX and PHCs. No free-phase product was observed on the groundwater at any of the monitoring well locations during the groundwater sampling events. No BTEX or PHCs were detected in the groundwater samples analyzed. All groundwater results were in compliance with the MECP Table 8 Standards.

Recommendations

Monitoring Wells

If the monitoring wells installed on the subject site are not going to be used in the future, or will not be entirely removed, 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 in general accordance with O.Reg. 153/04, as amended, and meets the requirements of CSA Z769-00. 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.

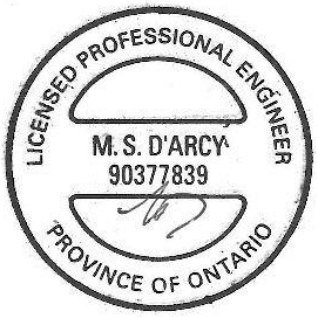
Should any conditions be encountered at the subject site and/or historical information that differ from our findings, we request that we be notified immediately in order to allow for a reassessment.

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

Paterson Group Inc.

Mandy Witteman, B.Eng., M.A.Sc.

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



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FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE4940-3 – TEST HOLE LOCATION PLAN

DRAWING PE4940-4 – ANALYTICAL TESTING PLAN – SOIL

DRAWING PE4940-5 – ANALYTICAL TESTING PLAN – GROUNDWATER

DRAWING PE4940-6 – CROSS-SECTION A – A' – SOIL & GROUNDWATER

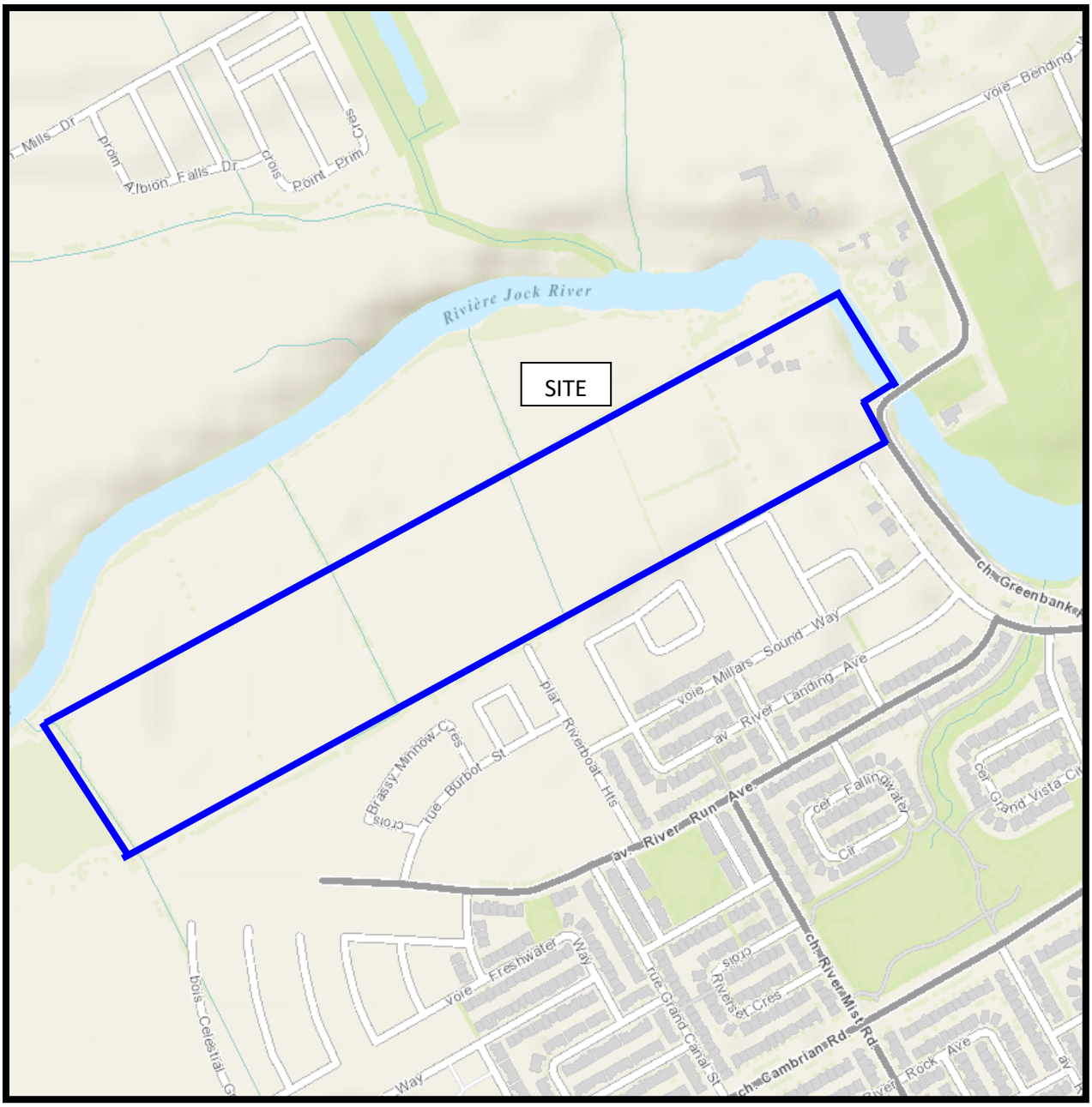
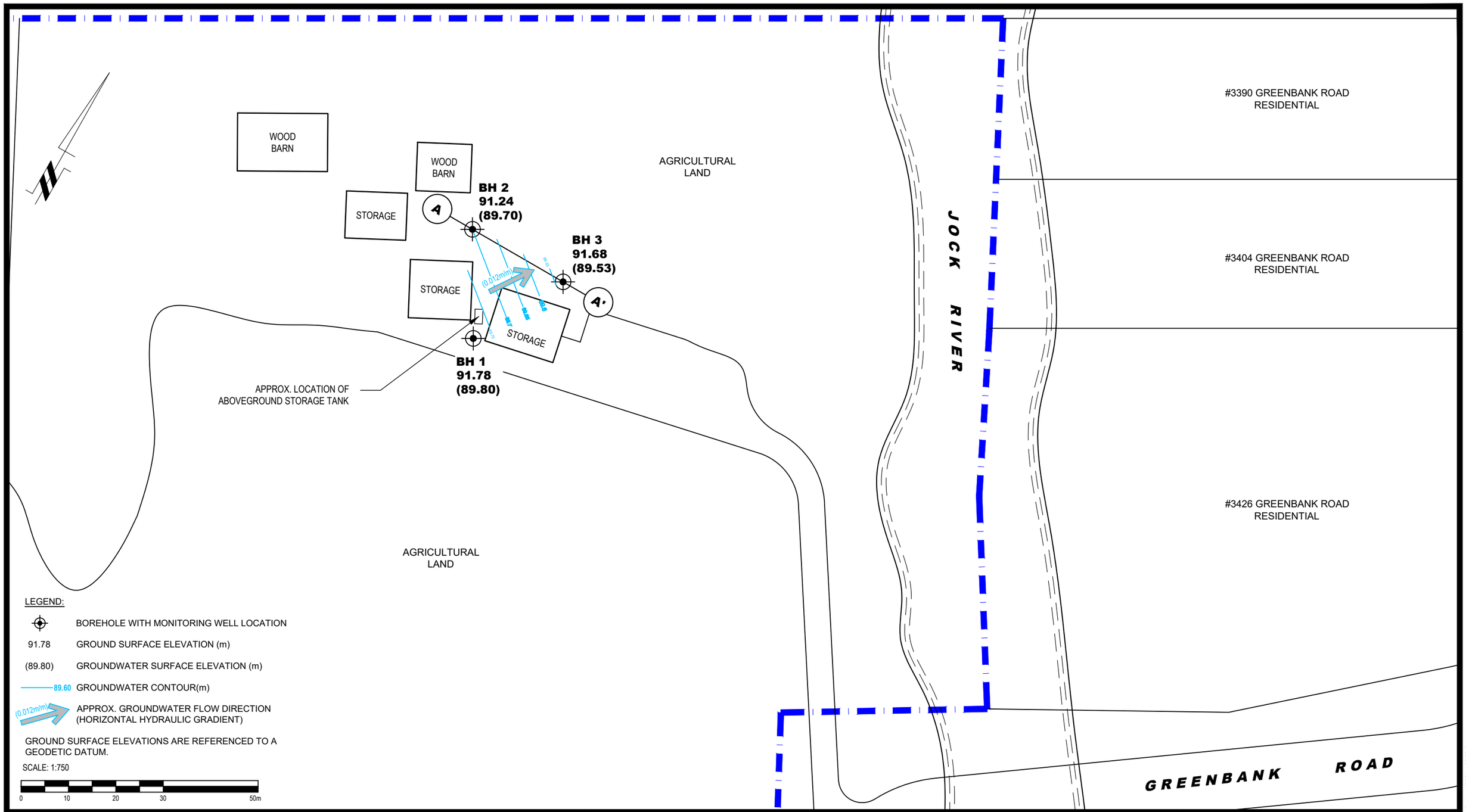


FIGURE 1

KEY PLAN



LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- 91.78 GROUND SURFACE ELEVATION (m)
- (89.80) GROUNDWATER SURFACE ELEVATION (m)
- 89.60 GROUNDWATER CONTOUR(m)
- (0.012m/m) APPROX. GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)

GROUND SURFACE ELEVATIONS ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:750

0 10 20 30 50m

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL
0			

MINTO COMMUNITIES INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
3432 GREENBANK ROAD

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:750	Date: 10/2020
Drawn by: MPG	Report No.: PE4940-2
Checked by: MW	Dwg. No.: PE4940-3
Approved by: MSD	Revision No.:

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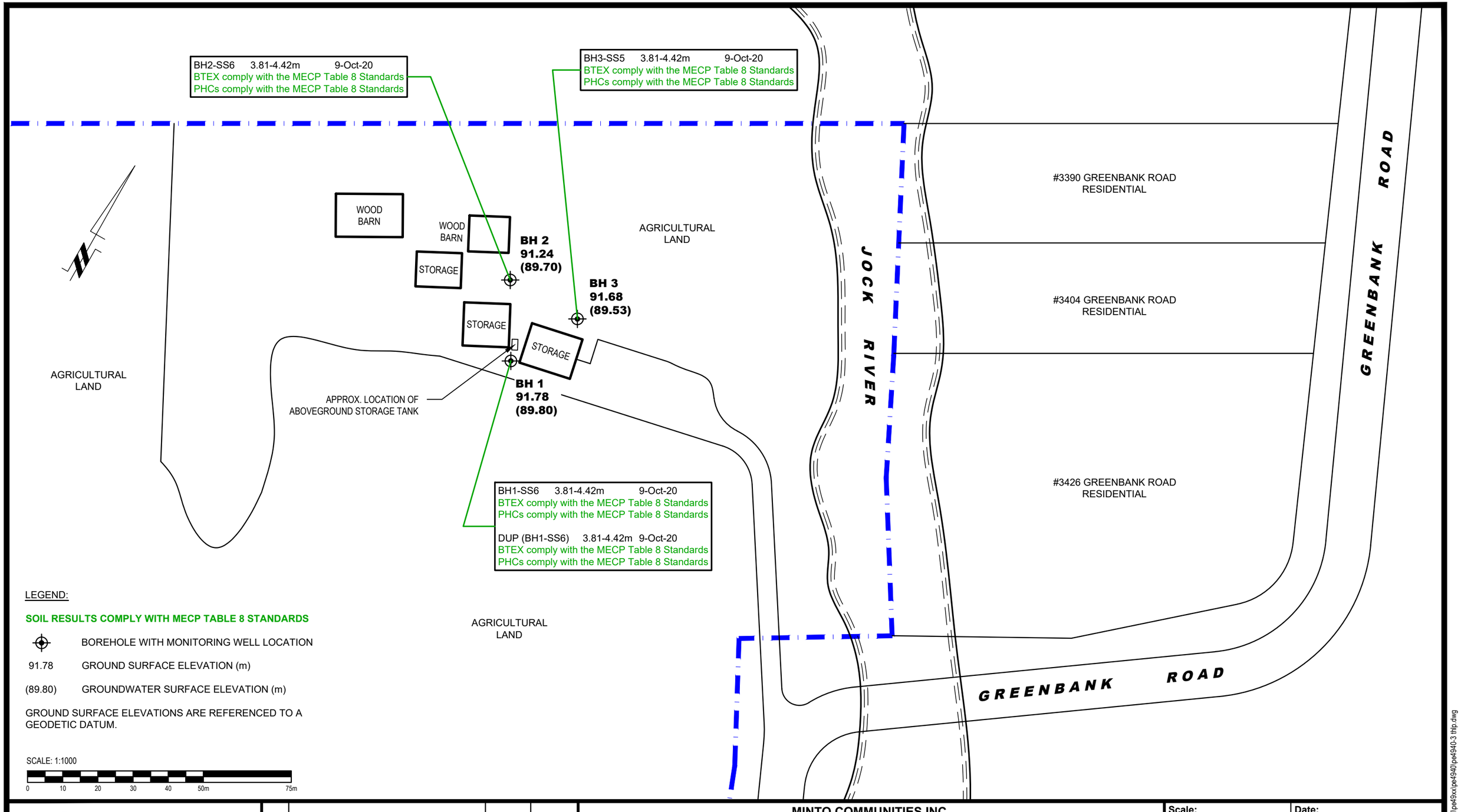

LEGEND:

SOIL RESULTS COMPLY WITH MECP TABLE 8 STANDARDS

⌖ BOREHOLE WITH MONITORING WELL LOCATION

91.78 GROUND SURFACE ELEVATION (m)

(89.80) GROUNDWATER SURFACE ELEVATION (m)

GROUND SURFACE ELEVATIONS ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:1000

0 10 20 30 40 50m 75m

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MINTO COMMUNITIES INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
3432 GREENBANK ROAD

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL

Scale: 1:1000	Date: 10/2020
Drawn by: MPG	Report No.: PE4940-2
Checked by: MW	Dwg. No.: PE4940-4
Approved by: MSD	Revision No.:

11x17

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BH2-GW1 3.13-4.65m 14-Oct-20
BTEX comply with the MECP Table 8 Standards
PHCs comply with the MECP Table 8 Standards

BH3-GW1 3.78-6.83m 14-Oct-20
BTEX comply with the MECP Table 8 Standards
PHCs comply with the MECP Table 8 Standards

WOOD BARN

WOOD BARN

STORAGE

STORAGE

STORAGE

BH 2
91.24
(89.70)

BH 3
91.68
(89.53)

BH 1
91.78
(89.80)

AGRICULTURAL LAND

AGRICULTURAL LAND

APPROX. LOCATION OF ABOVEGROUND STORAGE TANK

BH1-GW1 3.22-6.27m 14-Oct-20
BTEX comply with the MECP Table 8 Standards
PHCs comply with the MECP Table 8 Standards

DUP (BH1-GW1) 3.22-6.27m 14-Oct-20
BTEX comply with the MECP Table 8 Standards
PHCs comply with the MECP Table 8 Standards

AGRICULTURAL LAND

JOCK RIVER

#3390 GREENBANK ROAD
RESIDENTIAL

#3404 GREENBANK ROAD
RESIDENTIAL

#3426 GREENBANK ROAD
RESIDENTIAL

GREENBANK ROAD

GREENBANK ROAD

LEGEND:

GROUNDWATER RESULTS COMPLY WITH MECP TABLE 8 STANDARDS

⊕ BOREHOLE WITH MONITORING WELL LOCATION

91.78 GROUND SURFACE ELEVATION (m)

(89.80) GROUNDWATER SURFACE ELEVATION (m)

GROUND SURFACE ELEVATIONS ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:1000

0 10 20 30 40 50m 75m

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NO.	REVISIONS	DATE	INITIAL
0			

MINTO COMMUNITIES INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
3432 GREENBANK ROAD

OTTAWA, ONTARIO

Title: **ANALYTICAL TESTING PLAN - GROUNDWATER**

Scale: 1:1000	Date: 10/2020
Drawn by: MPG	Report No.: PE4940-2
Checked by: MW	Dwg. No.: PE4940-5
Approved by: MSD	Revision No.:

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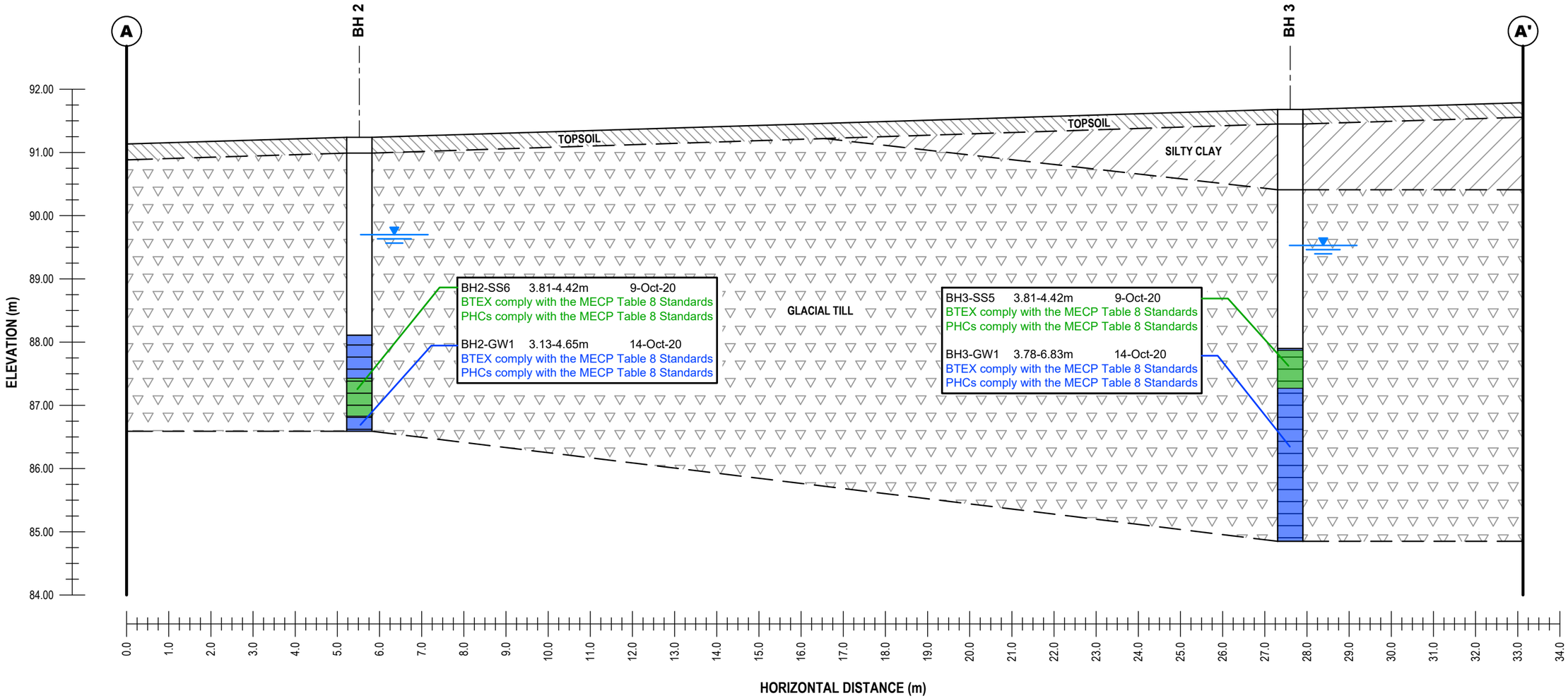

SOIL RESULTS COMPLY WITH MECP TABLE 8 STANDARDS

GROUNDWATER RESULTS COMPLY WITH MECP TABLE 8 STANDARDS

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NO.	REVISIONS	DATE	INITIAL
0			

MINTO COMMUNITIES INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
3432 GREENBANK ROAD

OTTAWA, ONTARIO

Title:

CROSS-SECTION A-A'

Scale: AS SHOWN	Date: 10/2020
Drawn by: MPG	Report No.: PE4940-2
Checked by: MW	Dwg. No.: PE4940-6
Approved by: MSD	Revision No.:

11x17

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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

LABORATORY CERTIFICATES OF ANALYSIS

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

Paterson Group Inc.

Consulting Engineers
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patersongroup

Sampling & Analysis Plan

Phase II Environmental Site Assessment
3432 Greenbank Road
Ottawa, Ontario

Prepared For

Minto Communities

October 2020

Report: PE4940-SAP

Table of Contents

1.0 SAMPLING PROGRAM

Paterson was retained by Mr. Curtiss Scarlett of Minto Communities, to conduct a Phase II Environmental Site Assessment (ESA) for the property 3432 Greenbank Road, in the City of Ottawa, Ontario.

The Phase II ESA was carried out to address the areas of potential environmental concern on the Phase II Property. The following subsurface investigation program was developed.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1	Place in the immediate area of the above ground storage tank to assess APEC 1.	Boreholes to be advanced to at least 6 m within the groundwater table to facilitate installation of groundwater monitoring wells.
BH2	Place in the general areas of the barns/outbuildings for general coverage and to triangulation.	Boreholes to be advanced to at least 4 m within the groundwater table to facilitate installation of groundwater monitoring wells.
BH3	Place in the general areas of the barns/outbuildings for general coverage and to triangulation.	Boreholes to be advanced to at least 6 m within the groundwater table to facilitate installation of groundwater monitoring wells.

At each borehole, split-spoon samples of overburden soils will be obtained at 0.76 m (2'6") intervals until practical refusal to augering. 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 MOECC 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. Boreholes were located and surveyed in the field by Paterson.

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 MECP 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.

patersongroup Consulting Engineers

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
3432 Greenbank Road
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4940

REMARKS

HOLE NO. BH 1

BORINGS BY CME-55 Low Clearance Drill **DATE** October 9, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.20		AU	1			0	91.78
Loose, brown **SILTY SAND,** some clay		SS	2	75	7	1	90.78
1.52		SS	3	42	37	2	89.78
		SS	4	46	26		
GLACIAL TILL: Dense to very dense, brown silty sand with gravel, cobbles and boulders, trace clay		SS	5	42	21	3	88.78
- grey by 3.0m depth		SS	6	38	55	4	87.78
		SS	7	33	34	5	86.78
		SS	8	60	50+		
6.27		SS	9	14	50+	6	85.78
End of Borehole							
Practical refusal to augering at 6.27m depth							
(GWL @ 1.98m - Oct. 14, 2020)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
3432 Greenbank Road
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4940

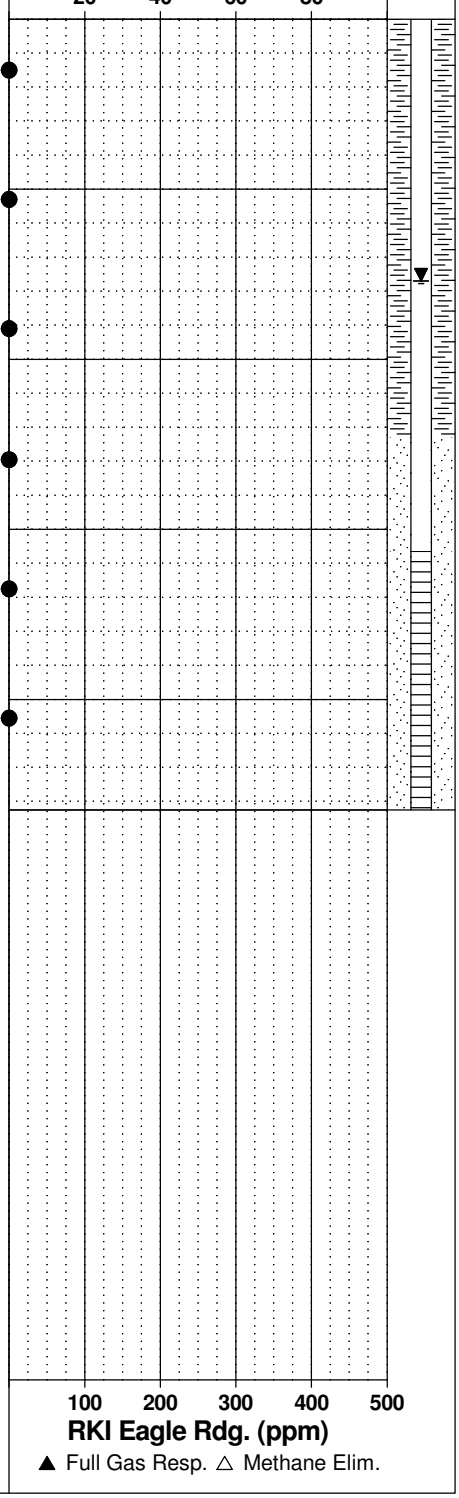
REMARKS

HOLE NO. BH 2

BORINGS BY CME-55 Low Clearance Drill **DATE** October 9, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.25		AU	1			0	91.24
		SS	2	29	25	1	90.24
		SS	3	50	37	2	89.24
GLACIAL TILL: Compact ot dense, brown silty sand with gravel, cobbles and boulders		SS	4	67	28	3	88.24
- grey by 2.3m depth		SS	5	54	35		
		SS	6		18	4	87.24
4.65							
End of Borehole							
Practical refusal to augering at 4.65m depth							
(GWL @ 1.54m - Oct. 14, 2020)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ **Lower Explosive Limit %**



Monitoring Well Construction

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
3432 Greenbank Road
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4940

REMARKS

HOLE NO. BH 3

BORINGS BY CME-55 Low Clearance Drill **DATE** October 9, 2020

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	91.68
TOPSOIL 0.23		AU	1				
Brown **SILTY CLAY,** some sand, trace gravel		SS	2	67	17	1	90.68
1.27		SS	3	58	103	2	89.68
		SS	4	62	18		
GLACIAL TILL: Compact to very dense, brown silty sand with gravel, cobbles and boulders		SS	5	42	23	3	88.68
- grey by 3.0m depth		SS	6	33	25	4	87.68
		SS	7	46	100	5	86.68
		SS	8	94	100+	6	85.68
6.83							
End of Borehole							
Practical refusal to augering at 6.83m depth							
(GWL @ 2.15m - Oct. 14, 2020)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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 relative strength of cohesionless soils is the compactness condition, 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. An SPT N value of "P" denotes that the split-spoon sampler was pushed 300 mm into the soil without the use of a falling hammer.

Compactness Condition	'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 shear vane tests, unconfined compression tests, or occasionally by the Standard Penetration Test (SPT). Note that the typical correlations of undrained shear strength to SPT N value (tabulated below) tend to underestimate the consistency for sensitive silty clays, so Paterson reviews the applicable split spoon samples in the laboratory to provide a more representative consistency value based on tactile examination.

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, S_t, is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil. The classes of sensitivity may be defined as follows:

Low Sensitivity:	$S_t < 2$
Medium Sensitivity:	$2 < S_t < 4$
Sensitive:	$4 < S_t < 8$
Extra Sensitive:	$8 < S_t < 16$
Quick Clay:	$S_t > 16$

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 NQ or larger size core. However, it can be used on smaller core sizes, such as BQ, 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, generally recovered using a piston sampler
G	-	"Grab" sample from test pit or surface materials
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size BQ, NQ, HQ, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

WC%	-	Natural water 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 at 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

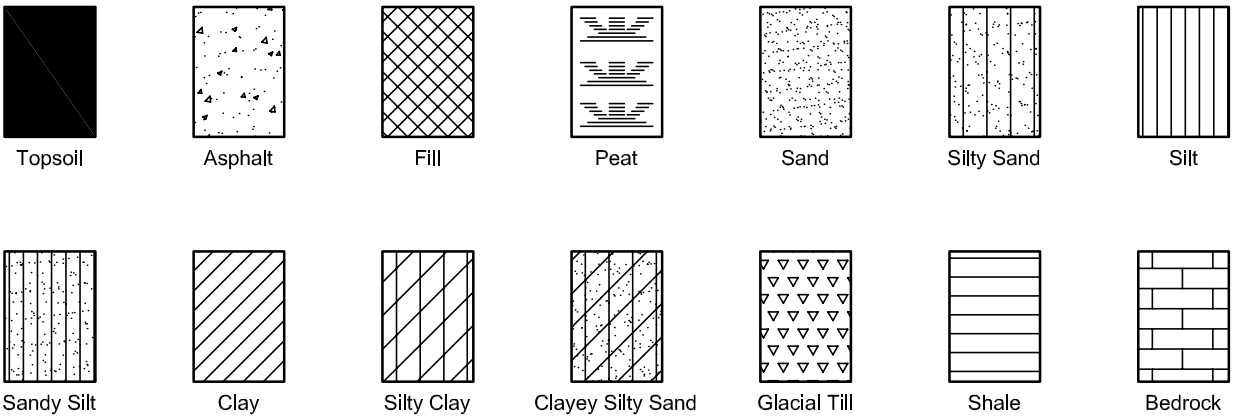
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void 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.

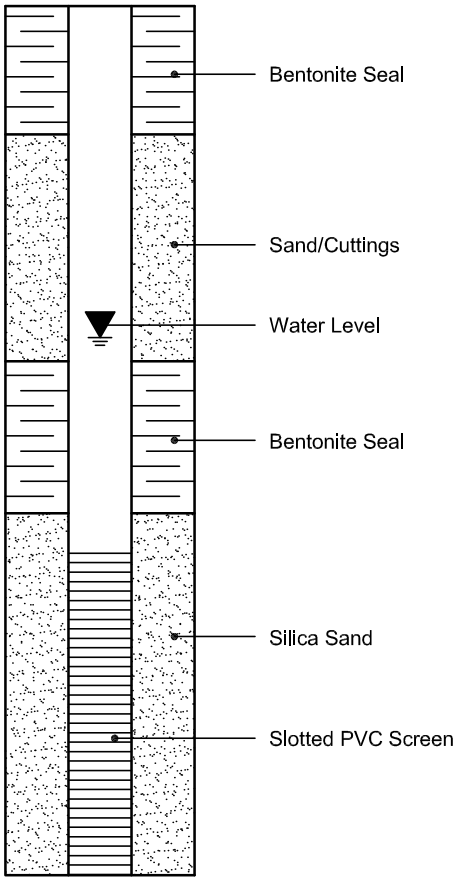
SYMBOLS AND TERMS (continued)

STRATA PLOT

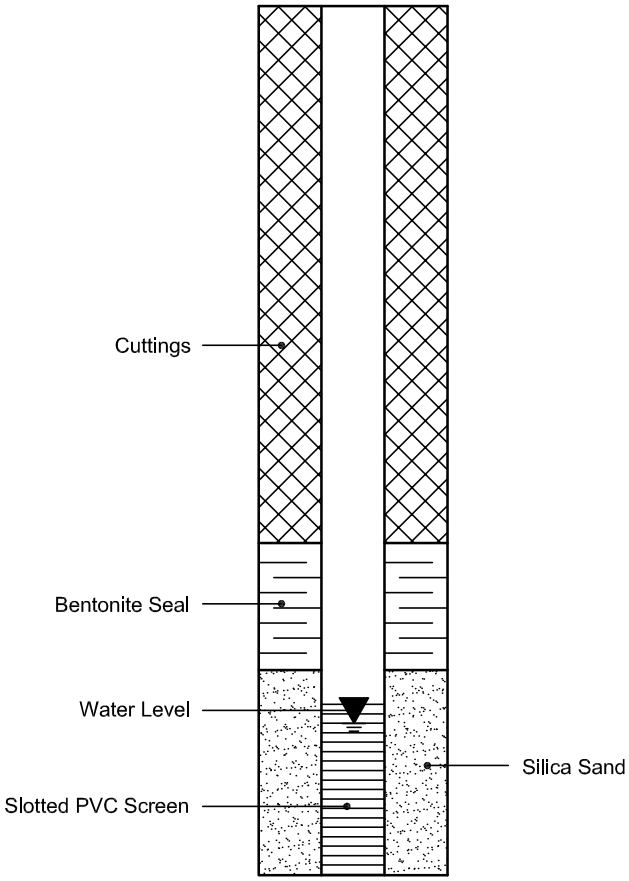


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Mark D'Arcy

Client PO: 31379
Project: PE4940
Custody:

Report Date: 16-Oct-2020
Order Date: 13-Oct-2020

Order #: 2042169

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

Paracel ID	Client ID
2042169-01	BH1-SS6
2042169-02	BH2-SS6
2042169-03	BH3-SS5
2042169-04	Dup

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 16-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 13-Oct-2020

Client PO: 31379

Project Description: PE4940

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	14-Oct-20	14-Oct-20
PHC F1	CWS Tier 1 - P&T GC-FID	14-Oct-20	14-Oct-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	14-Oct-20	15-Oct-20
Solids, %	Gravimetric, calculation	14-Oct-20	14-Oct-20

Certificate of Analysis

Report Date: 16-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 13-Oct-2020

Client PO: 31379

Project Description: PE4940

	Client ID:	BH1-SS6	BH2-SS6	BH3-SS5	Dup
	Sample Date:	09-Oct-20 09:00	09-Oct-20 09:00	09-Oct-20 09:00	09-Oct-20 09:00
	Sample ID:	2042169-01	2042169-02	2042169-03	2042169-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	91.4	90.7	91.2	91.5
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene-d8	Surrogate	108%	107%	107%	107%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6

Certificate of Analysis

Report Date: 16-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 13-Oct-2020

Client PO: 31379

Project Description: PE4940

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Volatiles									
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	*8.24*		*ug/g*		*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 dry	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND			NC	30	
Physical Characteristics									
% Solids	87.8	0.1	% by Wt.	88.4			0.7	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g dry	ND			NC	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: Toluene-d8	*9.41*		*ug/g dry*		*107*	*50-140*			

Certificate of Analysis

Report Date: 16-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 13-Oct-2020

Client PO: 31379

Project Description: PE4940

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	176	7	ug/g	ND	88.2	80-120			
F2 PHCs (C10-C16)	115	4	ug/g	ND	132	60-140			
F3 PHCs (C16-C34)	285	8	ug/g	ND	133	60-140			
F4 PHCs (C34-C50)	179	6	ug/g	ND	132	60-140			
Volatiles									
Benzene	4.01	0.02	ug/g	ND	100	60-130			
Ethylbenzene	3.93	0.05	ug/g	ND	98.4	60-130			
Toluene	3.96	0.05	ug/g	ND	99.0	60-130			
m,p-Xylenes	8.09	0.05	ug/g	ND	101	60-130			
o-Xylene	3.99	0.05	ug/g	ND	99.6	60-130			
Surrogate: Toluene-d8	*8.09*		*ug/g*		*101*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

Paracel ID: 2042169

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2042169	

Client Name: PATERSON	Project Ref: PE4940	Page 1 of 1
Contact Name: Mark D'Arcy	Quote #:	Turnaround Time
Address: 154 Colonnade Road	PO #: 31379	☐ 1 day ☐ 3 day
Telephone: 613-226-7381	E-mail: mdarcy@patersongroup.ca	☐ 2 day ☒ Regular
		Date Required:

Regulation 153/04	Other Regulation
☐ 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:

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-SS6	S		2	Oct 9/2020		✓						
2	BH2-SS6	S		2			✓						
3	BH3-SS5	S		2			✓						
4	DUP	S		2			✓						
5													
6													
7													
8													
9													
10													

Comments:

Method of Delivery: Drop Box

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: Jinnee'Pom Dokmai	Verified By:
Relinquished By (Print): Joshua Quigley	Date/Time:	Date/Time: Oct 13, 2020 04:19	Date/Time: 10-14-20 11:34
Date/Time: Oct 13/2020	Temperature: °C	Temperature: 9.5 °C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Mark D'Arcy

Client PO: 30473
Project: PE4940
Custody: 128380

Report Date: 20-Oct-2020
Order Date: 14-Oct-2020

Order #: 2042277

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

Paracel ID	Client ID
2042277-01	BH1-GW1
2042277-02	BH2-GW1
2042277-03	BH3-GW1
2042277-04	Dup

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 20-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 14-Oct-2020

Client PO: 30473

Project Description: PE4940

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	17-Oct-20	17-Oct-20
PHC F1	CWS Tier 1 - P&T GC-FID	16-Oct-20	17-Oct-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	15-Oct-20	17-Oct-20

Certificate of Analysis

Report Date: 20-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 14-Oct-2020

Client PO: 30473

Project Description: PE4940

	Client ID:	BH1-GW1	BH2-GW1	BH3-GW1	Dup
	Sample Date:	14-Oct-20 11:00	14-Oct-20 12:00	14-Oct-20 12:30	14-Oct-20 12:00
	Sample ID:	2042277-01	2042277-02	2042277-03	2042277-04
	MDL/Units	Water	Water	Water	Water
Volatiles					
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene-d8	Surrogate	110%	111%	109%	111%
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	-

Certificate of Analysis

Report Date: 20-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 14-Oct-2020

Client PO: 30473

Project Description: PE4940

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*91.4*		*ug/L*		*114*	*50-140*			

Certificate of Analysis

Report Date: 20-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 14-Oct-2020

Client PO: 30473

Project Description: PE4940

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	
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	*89.0*		*ug/L*		*111*	*50-140*			

Certificate of Analysis

Report Date: 20-Oct-2020

Client: Paterson Group Consulting Engineers

Order Date: 14-Oct-2020

Client PO: 30473

Project Description: PE4940

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	2070	25	ug/L	ND	103	68-117			
F2 PHCs (C10-C16)	1760	100	ug/L	ND	110	60-140			
F3 PHCs (C16-C34)	4570	100	ug/L	ND	117	60-140			
F4 PHCs (C34-C50)	2610	100	ug/L	ND	105	60-140			
Volatiles									
Benzene	44.4	0.5	ug/L	ND	111	60-130			
Ethylbenzene	38.9	0.5	ug/L	ND	97.3	60-130			
Toluene	40.2	0.5	ug/L	ND	100	60-130			
m,p-Xylenes	78.6	0.5	ug/L	ND	98.2	60-130			
o-Xylene	38.9	0.5	ug/L	ND	97.2	60-130			
Surrogate: Toluene-d8	*76.9*		*ug/L*		*96.1*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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Paracel ID: 2042277

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2042277	Nº 128380

Client Name: Paterson Group, Inc.	Project Ref: PE4940	Page 1 of 1
Contact Name: Mark D'Arcy / Jesse Andrechek	Quote #:	Turnaround Time
Address: 154 Colonnade Rd, S Ottawa, ON	PO #: 30473	☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Telephone: 613-226-7381	E-mail: jandrechek@patersongroup.ca mdarcy @ " " "	Date Required:

Regulation 153/04	Other Regulation
☐ 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:

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 + PHC (F1)					
							Required Analysis												
1	BH1 - GW1	GW		3	14-Oct-2020	11 AM	X												
2	BH2 - GW1	GW		3	↓	12 PM	X												
3	BH3 - GW1	GW		3		12:30 PM	X												
4	DUP	GW		2	↓	12 PM								X					
5																			
6																			
7																			
8																			
9																			
10																			

Comments:

Method of Delivery: Drop Box

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Jesse Andrechek	Date/Time:	Date/Time: Oct 14, 2020 16:30	Date/Time: 10-14-2020 17:27
Date/Time: 14-Oct-2020 1PM	Temperature: °C	Temperature: 12.3 °C	pH Verified: ☐ By: