

## **Phase II – Environmental Site Assessment**

Part of 155 Dun Skipper Drive  
Ottawa, Ontario

Prepared for 2668867 Ontario Inc.

Report: PE6616-2  
October 25, 2024



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## EXECUTIVE SUMMARY

### Assessment

A Phase II ESA was conducted for part of the property addressed 155 Dun Skipper Drive, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address the potentially contaminating activities (PCAs) that were identified during the Phase I ESA and were considered to result in areas of potential environmental concern (APECs) on the Phase II Property.

The subsurface investigation for this assessment was conducted on September 13 and September 16, 2024, and consisted of drilling seven boreholes (BH1-24 to BH5-24, as well as BH1A-24 and BH1B-24) throughout the Phase II Property. The boreholes were advanced to depths ranging from approximately 2.44 m to 6.71 m below the existing ground surface and terminated either within the bedrock or within the overburden layer of glacial till on practical refusal to augering on the inferred bedrock surface. Upon completion, three of the boreholes (BH1B-24, BH2-24, and BH3-24) were instrumented with groundwater monitoring wells in order to access the water table.

In general, the subsurface soil profile encountered at the borehole locations consists of fill material (loose, brown, silty fine sand, with clay and trace gravel), underlain by native glacial till (dense, brown, silty fine sand with gravel, cobbles, and boulders). Bedrock, consisting of excellent quality sandstone, was confirmed in borehole BH1B-24 at a depth of approximately 5.18 m below ground surface. Practical refusal to augering on the inferred bedrock surface was measured in all the remaining boreholes at depths ranging from approximately 2.44 m to 5.97 m below ground surface. The groundwater beneath the Phase II Property was encountered within the bedrock unit at depths ranging from approximately 1.17 m to 4.79 m below the existing ground surface.

Eight soil samples were submitted for laboratory analysis of BTEX, PHCs (F<sub>1</sub>-F<sub>4</sub>), metals, PAHs, and/or PCB parameters. The test results indicated that the concentrations of PHCs F<sub>2</sub> and F<sub>3</sub> detected in Sample BH1-24-SS3A exceed the selected MECP Table 2 Coarse-Grained Residential Soil Standards. All other parameters tested in the remaining soil samples comply with the standards.

Three groundwater samples were also submitted for laboratory analysis of VOC and PHC (F<sub>1</sub>-F<sub>4</sub>) parameters. No VOC parameters were identified in the groundwater samples analyzed, apart from a chloroform concentration in Sample BH1B-24-GW1. The chloroform concentration identified complies with the MECP Table 2 Potable Standards.

## **Recommendations**

### **Impacted Soil**

Based on the findings of this assessment, the lower layer of soil/fill material localized in the vicinity of BH1-24 is contaminated, requiring remedial action. This contamination was identified at a depth interval of approximately 1 m to 2 m below the existing ground surface.

Given our understanding that the Phase II Property is to be redeveloped in the near future, it is our recommendation that the contaminated soil be remediated in conjunction with site excavation activities. At such a time, the contaminated soil will be excavated from the site and transported to a licensed waste disposal facility. It is recommended that Paterson personnel be present on-site at the time of remedial activities to assist with coordination, directing the excavation and segregation of contaminated soil from clean soils, as well as to fulfill the confirmatory soil sampling requirements in accordance with Table 2 of O. Reg. 153/04.

Prior to the off-site disposal of impacted soil at a licensed waste disposal facility, a leachate analysis of a representative sample of contaminated soil must be conducted in accordance with O. Reg. 347/90 and O. Reg. 558/00.

### **Excess Soil**

Non-impacted excess soil from the Phase II Property must be managed in accordance with O.Reg. 406/19: On-Site and Excess Soil Management. It is recommended that excess soil planning occurs prior to the site redevelopment.

### **Monitoring Wells**

If the groundwater monitoring wells installed on-site are not going to be used in the future, or will be destroyed during future construction activities, then they must be decommissioned in accordance with O. Reg. 903/90 (Ontario Water Resources Act). Further information can be provided upon request in this regard.

It is our recommendation that the monitoring wells currently be maintained for future sampling purposes, until such a time when future site excavation activities have commenced. The monitoring wells will be registered with the MECP under this regulation.

## 1.0 INTRODUCTION

At the request of 2668867 Ontario Inc., Paterson Group (Paterson) conducted a Phase II – Environmental Site Assessment (Phase II ESA) for part of the property addressed 155 Dun Skipper Drive, in the City of Ottawa, Ontario (the Phase II Property).

The purpose of this Phase II ESA has been to address the areas of potential environmental concern (APECs) identified on the Phase II Property as a result of the findings of the Phase I ESA.

### 1.1 Site Description

Address: Part of 155 Dun Skipper Drive, Ottawa, Ontario.

Location: The Phase II Property is situated on the southwest side of the Bank Street and Dun Skipper Drive intersection, in the City of Ottawa, Ontario. Refer to Figure 1 – Key Plan, for the site location context.

Latitude and Longitude: 45° 18' 34.3" N, 75° 35' 16.5" W.

#### **Site Description:**

Configuration: Rectangular.

Site Area: 5,250 m<sup>2</sup> (approximate).

Zoning: GM – General Mixed-Use Zone.

Current Uses: The Phase II Property is currently vacant of any buildings or structures.

Services: The Phase II Property is not currently serviced. The majority of the surrounding properties are serviced with municipal sewer and water infrastructure, however, one nearby property along Bank Street is expected to have a potable water well.

### 1.2 Property Ownership

The Phase II Property is currently owned by 2668867 Ontario Inc. Paterson was retained to complete this Phase II ESA by Ms. Alison Clarke of the Stirling Group Development Initiatives, who can be contacted via telephone at 613-299-5654.

### **1.3 Applicable Site Condition Standard**

The site condition standards for the subject property were obtained from Table 2 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), and dated April 15, 2011. The selected MECP standards are based on the following considerations:

- ☐ Full-depth soil conditions
- ☐ Coarse-grained soil conditions
- ☐ Potable groundwater conditions
- ☐ Residential land use

The residential standards were selected based on the proposed future land use of the Phase II Property. Grain size analysis was not conducted as part of this assessment, and as such, the coarse-grained soil standards were selected as a conservative approach.

According to the City of Ottawa, one nearby property along Bank Street, situated within a 250 m radius of the Phase II Property, is expected to have a potable water well. For this reason, the potable groundwater standards were selected for this assessment.

## **2.0 BACKGROUND INFORMATION**

### **2.1 Physical Setting**

The Phase II Property is currently vacant of any buildings or structures and consists mainly of bare patches of exposed surficial soil with some overgrown grassy areas. A small asphalt-covered parking area is also present within the eastern portion of the site.

The site topography slopes gradually towards the east, in the direction of Bank Street, while the regional topography appears to slope down towards the northwest, in the general direction of the Rideau River. The Phase II Property is considered to be at grade with respect to the adjacent streets and surrounding properties. Water drainage on-site occurs primarily via infiltration within the landscaped areas, as well as via sheet flow towards catch basins present on Dun Skipper Drive and towards a drainage ditch present along Bank Street.

## **3.0 SCOPE OF INVESTIGATION**

### **3.1 Overview of Site Investigation**

The subsurface investigation for this assessment was conducted on September 13 and September 16, 2024, and consisted of drilling seven boreholes (BH1-24 to BH5-24, as well as BH1A-24 and BH1B-24) throughout the Phase II Property. The boreholes were advanced to depths ranging from approximately 2.44 m to 6.71 m below the existing ground surface and terminated either within the bedrock or within the overburden layer of glacial till on practical refusal to augering on the inferred bedrock surface. Upon completion, three of the boreholes (BH1B-24, BH2-24, and BH3-24) were instrumented with groundwater monitoring wells to access the water table.

### **3.2 Media Investigated**

During this subsurface investigation, soil and groundwater samples were obtained from the Phase II Property and submitted for laboratory analysis. The rationale for sampling and analyzing these media is based on the contaminants of potential concern identified in the Phase I ESA.

The contaminants of potential concern for the soil and groundwater on the Phase II Property include the following:

- ☐ Volatile Organic Compounds (VOCs)
- ☐ Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)
- ☐ Petroleum Hydrocarbons, fractions 1 – 4 (PHCs F<sub>1</sub>-F<sub>4</sub>)
- ☐ Polycyclic Aromatic Hydrocarbons (PAHs)
- ☐ Metals (including Arsenic [As], Antimony [Sb], and Selenium [Se])
- ☐ Mercury
- ☐ Hexavalent Chromium
- ☐ Polychlorinated Biphenyls (PCBs).

These CPCs have the potential to be present in the soil matrix and/or the groundwater situated beneath the Phase II Property.

### **3.3 Phase I ESA Conceptual Site Model**

#### **Geological and Hydrogeological Setting**

Based on the available mapping information, the bedrock beneath the Phase I Property generally consists of interbedded sandstone and dolomite of the March Formation. The surficial geology consists of glacial till plains, with an overburden ranging from approximately 3 m to 5 m in thickness.

Groundwater is anticipated to be encountered within the overburden and flow in a northerly direction.

#### **Water Bodies and Areas of Natural and Scientific Interest**

No water bodies or areas of natural and scientific interest are present on the Phase I Property.

The nearest water body with respect to the Phase II Property is an unnamed creek, approximately 125 m to the east.

#### **Drinking Water Wells**

While most of the properties within the Phase I Study Area are serviced with municipal water infrastructure, it is believed that one viable potable water well remains in use within the area.

#### **Existing Buildings and Structures**

No buildings or structures are currently present on the Phase II Property.

#### **Current and Future Property Use**

Although the Phase II Property is currently vacant, the most recent land use for the site was for commercial purposes.

It is our understanding that the Phase II Property is to be redeveloped with a residential mid-rise apartment building.

Since the proposed change in land use is considered to be more sensitive than the existing use, a record of site condition (RSC) will be required to be filed with the MECP.

## **Neighbouring Land Use**

The surrounding lands within the Phase I Study Area consist largely of residential, institutional, and commercial properties. Current land use is depicted on Drawing PE6616-2 – Surrounding Land Use Plan, in the Figures section of this report.

## **Potentially Contaminating Activities and Areas of Potential Environmental Concern**

As per Section 7.1 of the Phase I ESA report, four potentially contaminating activities (PCAs), considered to result in areas of potential environmental concern (APECs), were identified on the Phase I Property.

APEC #1 – The presence of fill material of unknown quality, situated throughout the Phase I Property.

APEC #2 – The historical presence of an aboveground diesel fuel storage tank, located within the northern portion of the Phase I Property.

APEC #3 – The historical presence of an underground gasoline fuel storage tank, located within the central portion of the Phase I Property.

APEC #4 – The presence of an existing pole-mounted electrical transformer, located within the southern portion of the Phase I Property.

Some existing and historical off-site PCAs were identified on properties situated within the Phase I Study Area, however, due to either their separation distances or their inferred down or cross-gradient orientation with respect to the anticipated groundwater flow to the north, none of these historical off-site activities are considered to have had the potential to impact the Phase I Property.

## **Contaminants of Potential Concern**

The contaminants of potential concern (CPCs) associated with the aforementioned APECs are considered to be:

- ☐ Volatile Organic Compounds (VOCs)
- ☐ Petroleum Hydrocarbons, fractions 1 – 4 (PHCs F<sub>1</sub>-F<sub>4</sub>)
- ☐ Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)
- ☐ Metals (including Arsenic [As], Antimony [Sb], and Selenium [Se])
- ☐ Mercury
- ☐ Hexavalent Chromium
- ☐ Polychlorinated Biphenyls (PCBs).

These CPCs have the potential to be present in the soil matrix and/or the groundwater situated beneath the Phase II Property.

### **Assessment of Uncertainty and/or Absence of Information**

The information available for review as part of the preparation of the Phase I ESA is considered to be sufficient to conclude that there are PCAs and APECs associated with the Phase I Property.

The presence of any PCAs was confirmed by a variety of independent sources, 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 the Sampling and Analysis Plan**

No deviations from the Sampling and Analysis were made during the course of this Phase II ESA.

## **3.5 Physical Impediments**

No physical impediments were encountered during the course of the field drilling program.

## 4.0 INVESTIGATION METHOD

### 4.1 Subsurface Investigation

The subsurface investigation for this assessment was conducted on September 13 and September 16, 2024, and consisted of drilling seven boreholes (BH1-24 to BH5-24, as well as BH1A-24 and BH1B-24) throughout the Phase II Property. The boreholes were advanced to depths ranging from approximately 2.44 m to 6.71 m below the existing ground surface and terminated either within the bedrock or within the overburden layer of glacial till on practical refusal to augering on the inferred bedrock surface. Upon completion, three of the boreholes (BH1B-24, BH2-24, and BH3-24) were instrumented with groundwater monitoring wells in order to access the water table.

Under the full-time supervision of Paterson personnel, the boreholes were drilled using a low-clearance drill rig provided by George Downing Estate Drilling of Hawkesbury, Ontario. The locations of the boreholes are illustrated on “Drawing PE6616-3 – Test Hole Location Plan”, appended to this report.

### 4.2 Soil Sampling

Soil 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.

The samples were recovered using a stainless-steel split spoon, while wearing protective gloves (changed after each sample), and immediately placed into plastic bags. If significant contamination was encountered, the samples were instead placed into glass jars. Sampling equipment was routinely washed in soapy water and rinsed with methylhydrate after each split spoon to prevent any cross contamination of the samples. The samples were also stored in coolers to reduce analyte volatilization during transportation.

A total of 31 soil samples were obtained from the boreholes by means of auger and split spoon sampling. The depths at which auger, split spoon, and rock core samples were obtained from the boreholes are shown as “**AU**”, “**SS**”, and “**RC**” respectively, on the Soil Profile and Test Data Sheets, appended to this report.

### **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 Photo Ionization Detector.

The recovered soil samples 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, ensuring consistency of readings between samples. To measure the soil vapours, the analyzer probe was inserted into the nominal headspace above the sample. The sample was then agitated and manipulated gently by hand as the measurement was taken. The peak reading registered within the first 15 seconds was recorded as the vapour measurement. The parts per million (ppm) scale was used to measure concentrations of organic vapours.

The results of the vapour survey are presented on the Soil Profile and Test Data Sheets, appended to this report.

### **4.4 Groundwater Monitoring Well Installation**

Three groundwater monitoring wells were installed on the Phase II Property as part of this subsurface investigation. These monitoring wells were constructed using 50 mm diameter Schedule 40 threaded PVC risers and screens. A sand pack consisting of silica sand was placed around the screen with a bentonite seal placed above to minimize cross-contamination. A summary of the monitoring well construction details are listed below in Table 1 as well as on the Soil Profile and Test Data Sheets provided in Appendix 1.

Upon completion, the groundwater monitoring wells were developed using a dedicated inertial lift pump, with a minimum of three well volumes being removed from the wells at the time of installation. The wells were developed until the appearance of the water was noted to have stabilized. In addition, the ground surface elevations of each borehole were subsequently surveyed with respect to a known geodetic elevation.

| <b>Table 1<br/>Monitoring Well Construction Details</b> |                                  |                     |                           |                   |                        |             |
|---------------------------------------------------------|----------------------------------|---------------------|---------------------------|-------------------|------------------------|-------------|
| Well ID                                                 | Ground Surface Elevation (m ASL) | Total Depth (m BGS) | Screened Interval (m BGS) | Sand Pack (m BGS) | Bentonite Seal (m BGS) | Casing Type |
| BH1B-24                                                 | 100.55                           | 6.71 m              | 3.53-6.53                 | 3.20-6.53         | 2.59-3.20              | Flushmount  |
| BH2-24                                                  | 100.52                           | 5.97 m              | 2.94-5.94                 | 2.59-5.94         | 1.68-2.59              | Flushmount  |
| BH3-24                                                  | 100.12                           | 2.95 m              | 1.27-2.77                 | 0.91-1.27         | 0.46-0.91              | Flushmount  |

## 4.5 Field Measurement of Water Quality Parameters

Groundwater monitoring and sampling was conducted on-site on September 27, 2024. Following their development and stabilization during the field sampling event, select water quality parameters were measured at each monitoring well location using a multi-reader probe device. The stabilized field parameter values are summarized below in Table 2.

| <b>Table 2<br/>Measurement of Water Quality Parameters</b> |                  |                   |            |
|------------------------------------------------------------|------------------|-------------------|------------|
| Well ID                                                    | Temperature (°C) | Conductivity (µS) | pH (Units) |
| BH1B-24                                                    | 16.8             | 803               | 7.72       |
| BH2-24                                                     | 18.3             | 2,076             | 7.37       |
| BH3-24                                                     | 21.8             | 1,123             | 7.38       |

## 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.

Standing water was purged from each monitoring well prior to the recovery of the groundwater samples using dedicated sampling equipment. The samples were then stored in coolers to reduce possible analyte volatilization during their transportation. Further details of our standard operating procedure for groundwater sampling are provided in the Sampling and Analysis Plan, appended to this report.

## 4.7 Analytical Testing

The following soil and groundwater samples were submitted for laboratory analysis:

| <b>Table 3</b>                                       |                                   |                     |                                        |        |     |                  |      |      |    |                                                                                                                                                  |
|------------------------------------------------------|-----------------------------------|---------------------|----------------------------------------|--------|-----|------------------|------|------|----|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Testing Parameters for Submitted Soil Samples</b> |                                   |                     |                                        |        |     |                  |      |      |    |                                                                                                                                                  |
| Sample ID                                            | Sample Depth & Stratigraphic Unit | Parameters Analyzed |                                        |        |     |                  |      |      |    | Rationale                                                                                                                                        |
|                                                      |                                   | BTEX                | PHCs (F <sub>1</sub> -F <sub>4</sub> ) | Metals | Hg+ | Cr <sup>VI</sup> | PAHs | PCBs | pH |                                                                                                                                                  |
| BH1-24-SS2                                           | 0.76 – 1.37 m<br>Fill Material    |                     |                                        | X      | X   | X                | X    |      |    | To assess potential impacts resulting from the presence of fill material of unknown quality.                                                     |
| BH1-24-SS3A                                          | 1.52 – 1.68 m<br>Fill Material    | X                   | X                                      |        |     |                  |      |      |    | To assess potential impacts resulting from the identification of petroleum hydrocarbon odours detected in this sample.                           |
| BH1-24-SS4                                           | 2.29 – 2.49 m<br>Glacial Till     |                     | X                                      |        |     |                  |      |      | X  | For vertical delineation of soil contaminants identified in the fill material.                                                                   |
| BH2-24-AU1                                           | 0.00 – 0.61 m<br>Fill Material    | X                   | X                                      |        |     |                  |      |      |    | To assess potential impacts resulting from the presence of a former aboveground diesel fuel storage tank.                                        |
| BH2-24-AU1/SS2A                                      | 0.00 – 0.91 m<br>Fill Material    |                     |                                        | X      | X   | X                | X    |      |    | To assess for potential impacts resulting from the presence of fill material of unknown quality.                                                 |
| BH3-24-SS2/SS3                                       | 0.76 – 2.13 m<br>Fill Material    | X                   | X                                      | X      | X   | X                | X    |      |    | To assess potential impacts resulting from the presence of a former underground gasoline fuel storage tank and fill material of unknown quality. |
| BH4-24-AU1                                           | 0.00 – 0.61 m<br>Fill Material    |                     |                                        | X      | X   | X                | X    |      | X  | To assess potential impacts resulting from the presence of fill material of unknown quality.                                                     |
| BH5-24-AU1                                           | 0.00 – 0.61 m<br>Fill Material    |                     | X                                      | X      | X   | X                | X    | X    |    | To assess potential impacts resulting from the presence of fill material of unknown quality and a pole-mounted electrical transformer.           |
| DUP-1 <sup>1</sup>                                   | 0.00 – 0.61 m<br>Fill Material    |                     |                                        |        |     |                  |      |      |    | For laboratory QA/QC purposes.                                                                                                                   |
| 1 – Duplicate sample of BH5-24-AU1                   |                                   |                     |                                        |        |     |                  |      |      |    |                                                                                                                                                  |

| <b>Table 4</b>                                              |                                        |                     |                                        |                                                                                                                         |
|-------------------------------------------------------------|----------------------------------------|---------------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Testing Parameters for Submitted Groundwater Samples</b> |                                        |                     |                                        |                                                                                                                         |
| Sample ID                                                   | Screened Interval & Stratigraphic Unit | Parameters Analyzed |                                        | Rationale                                                                                                               |
|                                                             |                                        | VOCs                | PHCs (F <sub>1</sub> -F <sub>4</sub> ) |                                                                                                                         |
| BH1B-24-GW1                                                 | 3.53 – 6.53 m<br>Glacial Till          | X                   | X                                      | For geotechnical and general coverage purposes.                                                                         |
| BH2-24-GW1                                                  | 2.94 – 5.94 m<br>Glacial Till          | X                   | X                                      | To assess potential groundwater impacts resulting from the presence of a former aboveground diesel fuel storage tank.   |
| BH3-24-GW1                                                  | 1.27 – 2.77 m<br>Fill Material         | X                   | X                                      | To assess potential groundwater impacts resulting from the presence of a former underground gasoline fuel storage tank. |
| DUP1-24 <sup>1</sup>                                        | 3.53 – 6.53 m<br>Glacial Till          | X                   |                                        | For laboratory QA/QC purposes.                                                                                          |
| 1 – Duplicate sample of BH1B-24-GW1                         |                                        |                     |                                        |                                                                                                                         |

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) and is accredited and certified by the SCC/CALA for specific tests registered with the association.

## 4.8 Residue Management

All soil cuttings were removed from the site following the field program, while all purge water and equipment cleaning fluids were retained on-site.

## 4.9 Elevation Surveying

The ground surface elevations at each borehole location were surveyed using a GPS device by Paterson personnel and referenced to a geodetic datum.

## 4.10 Quality Assurance and Quality Control Measures

A summary of the quality assurance and quality control (QA/QC) measures, undertaken as part of this assessment, is provided in the Sampling and Analysis Plan in Appendix 1.

## 5.0 REVIEW AND EVALUATION

### 5.1 Geology

In general, the subsurface soil profile encountered at the borehole locations consists of fill material (loose, brown, silty fine sand, with clay and trace gravel), underlain by native glacial till (dense, brown, silty fine sand with gravel, cobbles, and boulders)

Bedrock, consisting of excellent quality sandstone, was confirmed in borehole BH1B-24 at a depth of approximately 5.18 m below ground surface. Practical refusal to augering on the inferred bedrock surface was measured in all the remaining boreholes at depths ranging from approximately 2.44 m to 5.97 m below ground surface.

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

### 5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels beneath the Phase II Property were most recently measured using an electronic water level meter on September 27, 2024. The groundwater levels are summarized below in Table 5.

| <b>Table 5<br/>Groundwater Level Measurements</b> |                                     |                                          |                                      |                            |
|---------------------------------------------------|-------------------------------------|------------------------------------------|--------------------------------------|----------------------------|
| <b>Borehole Location</b>                          | <b>Ground Surface Elevation (m)</b> | <b>Water Level Depth (m below grade)</b> | <b>Water Level Elevation (m ASL)</b> | <b>Date of Measurement</b> |
| BH1B-24                                           | 100.55                              | 4.58 m                                   | 95.97 m                              | September 27, 2024         |
| BH2-24                                            | 100.52                              | 4.79 m                                   | 95.73 m                              |                            |
| BH3-24                                            | 100.12                              | 1.17 m                                   | 98.95 m                              |                            |

The groundwater at the Phase II Property was encountered within the bedrock at depths ranging from approximately 1.17 m to 4.79 m below ground surface.

No unusual visual observations were identified within the recovered groundwater samples at the time of the field sampling event.

Using the groundwater elevations recorded during the sampling event, groundwater contour mapping was completed as part of this assessment. According to the mapped contour data, illustrated on Drawing PE6616-3 – Test Hole Location Plan in the appendix, the groundwater flow beneath the Phase II Property was calculated to be in a northwesterly direction.

A horizontal hydraulic gradient of approximately 0.10 m/m was also calculated as part of this assessment.

It should be noted that groundwater levels are expected to fluctuate throughout the year with seasonal variations.

### **5.3 Fine/Coarse Soil Texture**

Grain size analysis was not completed as part of this investigation. As a result, the coarse-grained soil standards were chosen as a conservative approach.

### **5.4 Field Screening**

Field screening of the soil samples collected during the drilling program resulted in organic vapour readings ranging from 0.2 ppm to 23.0 ppm. While the vapour readings measured for most of the samples indicated that there is a negligible potential for the presence of volatile substances, it should be noted that Sample BH1-24-SS3A contained a noticeable petroleum hydrocarbon odour. This sample was specifically selected for additional testing to confirm the presence of petroleum hydrocarbons within the soil.

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**

As part of this assessment, eight soil samples were submitted for laboratory analysis of BTEX, PHCs (F<sub>1</sub>-F<sub>4</sub>), metals, PAHs, and/or PCB parameters. The results of the analytical testing are presented below in Tables 6 to 9, as well as on the laboratory Certificates of Analysis included in Appendix 1.

| Table 6<br>Analytical Test Results – Soil<br>BTEX & PHCs (F <sub>1</sub> -F <sub>4</sub> )                                                                                                                                                                                                       |               |                      |                   |                   |                    |                   |                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------|-------------------|-------------------|--------------------|-------------------|---------------------------------------------------------------------------|
| Parameter                                                                                                                                                                                                                                                                                        | MDL<br>(µg/g) | Soil Samples (ug/g)  |                   |                   |                    |                   | MECP Table 2<br>Coarse-Grained<br>Residential<br>Soil Standards<br>(µg/g) |
|                                                                                                                                                                                                                                                                                                  |               | Sept. 13,<br>2024    | Sept. 13,<br>2024 | Sept. 13,<br>2024 | Sept. 13,<br>2024  | Sept. 16,<br>2024 |                                                                           |
|                                                                                                                                                                                                                                                                                                  |               | BH1-24-<br>SS3A      | BH1-24-<br>SS4    | BH2-24-<br>AU1    | BH3-24-<br>SS2/SS3 | BH5-24-<br>AU1    |                                                                           |
|                                                                                                                                                                                                                                                                                                  |               | Sample Depth (m bgs) |                   |                   |                    |                   |                                                                           |
|                                                                                                                                                                                                                                                                                                  |               | 1.52 – 1.68 m        | 2.29 – 2.49 m     | 0.00 – 0.61 m     | 0.76 – 2.13 m      | 0.00 – 0.61 m     |                                                                           |
| Benzene                                                                                                                                                                                                                                                                                          | 0.02          | nd                   | nt                | nd                | nd                 | nt                | 0.21                                                                      |
| Ethylbenzene                                                                                                                                                                                                                                                                                     | 0.05          | nd                   | nt                | nd                | nd                 | nt                | 1.1                                                                       |
| Toluene                                                                                                                                                                                                                                                                                          | 0.05          | nd                   | nt                | nd                | nd                 | nt                | 2.3                                                                       |
| Xylenes                                                                                                                                                                                                                                                                                          | 0.05          | nd                   | nt                | nd                | nd                 | nt                | 3.1                                                                       |
| PHCs F <sub>1</sub>                                                                                                                                                                                                                                                                              | 7             | 30                   | nd                | nd                | nd                 | nd                | 55                                                                        |
| PHCs F <sub>2</sub>                                                                                                                                                                                                                                                                              | 4             | <b>577</b>           | 44                | 97                | 21                 | 6                 | 98                                                                        |
| PHCs F <sub>3</sub>                                                                                                                                                                                                                                                                              | 8             | <b>327</b>           | 37                | 67                | 115                | 82                | 300                                                                       |
| PHCs F <sub>4</sub>                                                                                                                                                                                                                                                                              | 6             | nd                   | nd                | 28                | 105                | 156               | 2,800                                                                     |
| PHCs F <sub>4</sub><br>gravimetric                                                                                                                                                                                                                                                               | 50            | nt                   | nt                | nt                | 605                | 1,470             | 2,800                                                                     |
| Notes:<br><input type="checkbox"/> MDL – Method Detection Limit<br><input type="checkbox"/> nt – not tested for this parameter<br><input type="checkbox"/> nd – not detected above the MDL<br><input type="checkbox"/> <b><u>Bold and Underlined</u></b> – value exceeds selected MECP standards |               |                      |                   |                   |                    |                   |                                                                           |

The concentrations of PHCs F<sub>2</sub> and F<sub>3</sub> detected in Sample BH1-24-SS3A exceed the selected MECP Table 2 Coarse-Grained Residential Soil Standards.

No BTEX parameters were identified in any of the samples analyzed. All other PHC concentrations detected in the remaining soil samples comply with the selected MECP Table 2 Coarse-Grained Residential Soil Standards.

| Table 7<br>Analytical Test Results – Soil Metals                                                                            |            |                      |                 |                |                |                |                                                               |
|-----------------------------------------------------------------------------------------------------------------------------|------------|----------------------|-----------------|----------------|----------------|----------------|---------------------------------------------------------------|
| Parameter                                                                                                                   | MDL (µg/g) | Soil Samples (ug/g)  |                 |                |                |                | MECP Table 2 Coarse-Grained Residential Soil Standards (µg/g) |
|                                                                                                                             |            | Sept. 13, 2024       | Sept. 13, 2024  | Sept. 13, 2024 | Sept. 13, 2024 | Sept. 16, 2024 |                                                               |
|                                                                                                                             |            | BH1-24-SS2           | BH2-24-AU1/SS2A | BH3-24-SS2/SS3 | BH4-24-AU1     | BH5-24-AU1     |                                                               |
|                                                                                                                             |            | Sample Depth (m bgs) |                 |                |                |                |                                                               |
|                                                                                                                             |            | 0.76 – 1.37 m        | 0.00 – 0.91 m   | 0.76 – 2.13 m  | 0.00 – 0.61 m  | 0.00 – 0.61 m  |                                                               |
| Antimony                                                                                                                    | 1.0        | nd                   | nd              | nd             | nd             | nd             | 7.5                                                           |
| Arsenic                                                                                                                     | 1.0        | 8.4                  | 2.9             | 3.7            | 4.7            | 6.6            | 18                                                            |
| Barium                                                                                                                      | 1.0        | 138                  | 46.2            | 227            | 63.2           | 59.7           | 390                                                           |
| Beryllium                                                                                                                   | 0.5        | 0.8                  | nd              | nd             | nd             | nd             | 4                                                             |
| Boron                                                                                                                       | 5.0        | 10.1                 | 7.7             | 14.5           | 9.7            | 8.6            | 120                                                           |
| Cadmium                                                                                                                     | 0.5        | nd                   | nd              | nd             | nd             | nd             | 1.2                                                           |
| Chromium VI                                                                                                                 | 0.2        | nd                   | nd              | nd             | nd             | nd             | 8                                                             |
| Chromium                                                                                                                    | 5.0        | 36.7                 | 14.1            | 16.7           | 17.0           | 14.6           | 160                                                           |
| Cobalt                                                                                                                      | 1.0        | 13.1                 | 4.8             | 7.4            | 7.3            | 7.5            | 22                                                            |
| Copper                                                                                                                      | 5.0        | 29.9                 | 15.7            | 16.6           | 23.1           | 16.2           | 140                                                           |
| Lead                                                                                                                        | 1.0        | 10.7                 | 4.6             | 10.1           | 8.4            | 16.0           | 120                                                           |
| Mercury                                                                                                                     | 0.1        | nd                   | nd              | nd             | nd             | nd             | 0.27                                                          |
| Molybdenum                                                                                                                  | 1.0        | 1.3                  | nd              | 1.4            | 1.4            | 3.6            | 6.9                                                           |
| Nickel                                                                                                                      | 5.0        | 28.9                 | 11.3            | 16.2           | 16.1           | 16.6           | 100                                                           |
| Selenium                                                                                                                    | 1.0        | nd                   | nd              | nd             | nd             | nd             | 2.4                                                           |
| Silver                                                                                                                      | 0.3        | nd                   | nd              | nd             | nd             | nd             | 20                                                            |
| Thallium                                                                                                                    | 1.0        | nd                   | nd              | nd             | nd             | nd             | 1                                                             |
| Uranium                                                                                                                     | 1.0        | nd                   | nd              | nd             | nd             | nd             | 23                                                            |
| Vanadium                                                                                                                    | 10.0       | 51.1                 | 23.7            | 20.4           | 24.7           | 23.0           | 86                                                            |
| Zinc                                                                                                                        | 20.0       | 60.0                 | 23.0            | 26.1           | 37.9           | 28.6           | 340                                                           |
| Notes:<br><input type="checkbox"/> MDL – Method Detection Limit<br><input type="checkbox"/> nd – not detected above the MDL |            |                      |                 |                |                |                |                                                               |

All detected metal parameter concentrations in the soil samples analyzed comply with the selected MECP Table 2 Coarse-Grained Residential Soil Standards.

**Table 8**  
**Analytical Test Results – Soil**  
**PAHs**

| Parameter                                                                                                                   | MDL<br>(µg/g) | Soil Samples (ug/g)  |                     |                    |                   |                   | MECP Table 2<br>Coarse-Grained<br>Residential<br>Soil Standards<br>(µg/g) |
|-----------------------------------------------------------------------------------------------------------------------------|---------------|----------------------|---------------------|--------------------|-------------------|-------------------|---------------------------------------------------------------------------|
|                                                                                                                             |               | Sept. 13,<br>2024    | Sept. 13,<br>2024   | Sept. 13,<br>2024  | Sept. 13,<br>2024 | Sept. 16,<br>2024 |                                                                           |
|                                                                                                                             |               | BH1-24-<br>SS2       | BH2-24-<br>AU1/SS2A | BH3-24-<br>SS2/SS3 | BH4-24-<br>AU1    | BH5-24-<br>AU1    |                                                                           |
|                                                                                                                             |               | Sample Depth (m bgs) |                     |                    |                   |                   |                                                                           |
|                                                                                                                             |               | 0.76 –<br>1.37 m     | 0.00 –<br>0.91 m    | 0.76 –<br>2.13 m   | 0.00 –<br>0.61 m  | 0.00 –<br>0.61 m  |                                                                           |
| Acenaphthene                                                                                                                | 0.02          | nd                   | nd                  | nd                 | nd                | nd                | 7.9                                                                       |
| Acenaphthylene                                                                                                              | 0.02          | nd                   | nd                  | 0.05               | nd                | nd                | 0.15                                                                      |
| Anthracene                                                                                                                  | 0.02          | nd                   | nd                  | 0.03               | nd                | nd                | 0.67                                                                      |
| Benzo[a]anthracene                                                                                                          | 0.02          | nd                   | nd                  | 0.05               | nd                | nd                | 0.5                                                                       |
| Benzo[a]pyrene                                                                                                              | 0.02          | nd                   | nd                  | 0.06               | nd                | nd                | 0.3                                                                       |
| Benzo[b]fluoranthene                                                                                                        | 0.02          | nd                   | nd                  | 0.06               | nd                | 0.02              | 0.78                                                                      |
| Benzo[g,h,i]perylene                                                                                                        | 0.02          | nd                   | nd                  | 0.05               | nd                | 0.05              | 6.6                                                                       |
| Benzo[k]fluoranthene                                                                                                        | 0.02          | nd                   | nd                  | 0.03               | nd                | nd                | 0.78                                                                      |
| Chrysene                                                                                                                    | 0.02          | nd                   | nd                  | 0.05               | nd                | nd                | 7                                                                         |
| Dibenzo[a,h]anthracene                                                                                                      | 0.02          | nd                   | nd                  | nd                 | nd                | nd                | 0.1                                                                       |
| Fluoranthene                                                                                                                | 0.02          | nd                   | nd                  | 0.10               | nd                | 0.03              | 0.69                                                                      |
| Fluorene                                                                                                                    | 0.02          | nd                   | nd                  | nd                 | nd                | nd                | 62                                                                        |
| Indeno [1,2,3-cd] pyrene                                                                                                    | 0.02          | nd                   | nd                  | 0.04               | nd                | 0.02              | 0.38                                                                      |
| 1-Methylnaphthalene                                                                                                         | 0.02          | nd                   | nd                  | nd                 | nd                | nd                | 0.99                                                                      |
| 2-Methylnaphthalene                                                                                                         | 0.02          | nd                   | nd                  | nd                 | nd                | nd                | 0.99                                                                      |
| Methylnaphthalene (1&2)                                                                                                     | 0.04          | nd                   | nd                  | nd                 | nd                | nd                | 0.99                                                                      |
| Naphthalene                                                                                                                 | 0.01          | nd                   | nd                  | nd                 | nd                | nd                | 0.6                                                                       |
| Phenanthrene                                                                                                                | 0.02          | nd                   | nd                  | 0.04               | nd                | nd                | 6.2                                                                       |
| Pyrene                                                                                                                      | 0.02          | nd                   | nd                  | 0.12               | nd                | 0.03              | 78                                                                        |
| Notes:<br><input type="checkbox"/> MDL – Method Detection Limit<br><input type="checkbox"/> nd – not detected above the MDL |               |                      |                     |                    |                   |                   |                                                                           |

No PAH parameters were identified in Samples BH1-24-SS2, BH2-24-AU1/SS2A, or BH4-24-AU1. Parameters identified in the remaining samples analyzed comply with the selected MECP Table 2 Coarse-Grained Residential Soil Standards.

**Table 9**  
**Analytical Test Results – Soil**  
**PCBs**

| Parameter                                                                                                                   | MDL<br>(µg/g) | Soil Samples (ug/g)  | MECP Table 2<br>Coarse-Grained<br>Residential<br>Soil Standards |
|-----------------------------------------------------------------------------------------------------------------------------|---------------|----------------------|-----------------------------------------------------------------|
|                                                                                                                             |               | Sept. 16,<br>2024    |                                                                 |
|                                                                                                                             |               | BH5-24-AU1           |                                                                 |
|                                                                                                                             |               | Sample Depth (m bgs) |                                                                 |
|                                                                                                                             |               | 0.00 – 0.61 m        |                                                                 |
| PCBs                                                                                                                        | 0.05          | nd                   | 0.35                                                            |
| Notes:<br><input type="checkbox"/> MDL – Method Detection Limit<br><input type="checkbox"/> nd – not detected above the MDL |               |                      |                                                                 |

No PCB parameter concentrations were detected in the soil sample analyzed. The results comply with the selected MECP Table 2 Coarse-Grained Residential Soil Standards.

| <b>Table 10<br/>Maximum Concentrations – Soil</b>                                                            |                                             |                  |                                   |
|--------------------------------------------------------------------------------------------------------------|---------------------------------------------|------------------|-----------------------------------|
| <b>Parameter</b>                                                                                             | <b>Maximum<br/>Concentration<br/>(µg/g)</b> | <b>Sample ID</b> | <b>Depth Interval<br/>(m BGS)</b> |
| PHCs F <sub>1</sub>                                                                                          | 30                                          | BH1-24-SS3A      | 1.52 – 1.68 m                     |
| PHCs F <sub>2</sub>                                                                                          | <b><u>577</u></b>                           | BH1-24-SS3A      | 1.52 – 1.68 m                     |
| PHCs F <sub>3</sub>                                                                                          | <b><u>327</u></b>                           | BH1-24-SS3A      | 1.52 – 1.68 m                     |
| PHCs F <sub>4</sub>                                                                                          | 156                                         | BH5-24-AU1       | 0.00 – 0.61 m                     |
| PHCs F <sub>4</sub> gravimetric                                                                              | 1,470                                       | BH5-24-AU1       | 0.00 – 0.61 m                     |
| Arsenic                                                                                                      | 8.4                                         | BH1-24-SS2       | 0.76 – 1.37 m                     |
| Barium                                                                                                       | 227                                         | BH3-24-SS2/SS3   | 0.76 – 2.13 m                     |
| Beryllium                                                                                                    | 0.8                                         | BH1-24-SS2       | 0.76 – 1.37 m                     |
| Boron                                                                                                        | 14.5                                        | BH3-24-SS2/SS3   | 0.76 – 2.13 m                     |
| Chromium                                                                                                     | 36.7                                        | BH1-24-SS2       | 0.76 – 1.37 m                     |
| Cobalt                                                                                                       | 13.1                                        | BH1-24-SS2       | 0.76 – 1.37 m                     |
| Copper                                                                                                       | 29.9                                        | BH1-24-SS2       | 0.76 – 1.37 m                     |
| Lead                                                                                                         | 16.0                                        | BH5-24-AU1       | 0.00 – 0.61 m                     |
| Molybdenum                                                                                                   | 3.6                                         | BH5-24-AU1       | 0.00 – 0.61 m                     |
| Nickel                                                                                                       | 28.9                                        | BH1-24-SS2       | 0.76 – 1.37 m                     |
| Vanadium                                                                                                     | 51.1                                        | BH1-24-SS2       | 0.76 – 1.37 m                     |
| Zinc                                                                                                         | 60.0                                        | BH1-24-SS2       | 0.76 – 1.37 m                     |
| Acenaphthylene                                                                                               | 0.05                                        | BH3-24-SS2/SS3   | 0.71 – 2.13 m                     |
| Anthracene                                                                                                   | 0.03                                        | BH3-24-SS2/SS3   | 0.71 – 2.13 m                     |
| Benzo[a]anthracene                                                                                           | 0.05                                        | BH3-24-SS2/SS3   | 0.71 – 2.13 m                     |
| Benzo[a]pyrene                                                                                               | 0.06                                        | BH3-24-SS2/SS3   | 0.71 – 2.13 m                     |
| Benzo[b]fluoranthene                                                                                         | 0.06                                        | BH3-24-SS2/SS3   | 0.71 – 2.13 m                     |
| Benzo[g,h,i]perylene                                                                                         | 0.05                                        | BH3-24-SS2/SS3   | 0.71 – 2.13 m                     |
| Benzo[k]fluoranthene                                                                                         | 0.03                                        | BH3-24-SS2/SS3   | 0.71 – 2.13 m                     |
| Chrysene                                                                                                     | 0.05                                        | BH3-24-SS2/SS3   | 0.71 – 2.13 m                     |
| Fluoranthene                                                                                                 | 0.10                                        | BH3-24-SS2/SS3   | 0.71 – 2.13 m                     |
| Indeno [1,2,3-cd] pyrene                                                                                     | 0.04                                        | BH3-24-SS2/SS3   | 0.71 – 2.13 m                     |
| Phenanthrene                                                                                                 | 0.04                                        | BH3-24-SS2/SS3   | 0.71 – 2.13 m                     |
| Pyrene                                                                                                       | 0.12                                        | BH3-24-SS2/SS3   | 0.71 – 2.13 m                     |
| Notes:<br><input type="checkbox"/> <b><u>Bold and Underlined</u></b> – value exceeds selected MECP standards |                                             |                  |                                   |

All other parameter concentrations analyzed were below the laboratory detection limits. The laboratory Certificates of Analysis are provided in Appendix 1.

## 5.6 Groundwater Quality

As part of this assessment, three groundwater samples were submitted for laboratory analysis of VOCs and PHCs (F<sub>1</sub>-F<sub>4</sub>) parameters. The results of the analytical testing are presented below in Tables 11 and 12, as well as on the laboratory Certificates of Analysis included in Appendix 1.

**Table 11**  
**Analytical Test Results – Groundwater**  
**Volatile Organic Compounds (VOCs)**

| Parameter                                                                                          | MDL<br>(µg/L) | Groundwater Samples (ug/L) |                   |                   | MECP Table 2<br>Potable<br>Groundwater<br>Standards<br>(µg/L) |
|----------------------------------------------------------------------------------------------------|---------------|----------------------------|-------------------|-------------------|---------------------------------------------------------------|
|                                                                                                    |               | Sept. 27,<br>2024          | Sept. 27,<br>2024 | Sept. 27,<br>2024 |                                                               |
|                                                                                                    |               | BH1B-24-GW1                | BH2-24-GW1        | BH3-24-GW1        |                                                               |
|                                                                                                    |               | Screening Interval (m bgs) |                   |                   |                                                               |
|                                                                                                    |               | 3.53 – 6.53 m              | 2.94 – 5.94 m     | 1.27 – 2.77 m     |                                                               |
| Acetone                                                                                            | 5.0           | nd                         | nd                | nd                | 2,700                                                         |
| Benzene                                                                                            | 0.5           | nd                         | nd                | nd                | 5                                                             |
| Bromodichloromethane                                                                               | 0.5           | nd                         | nd                | nd                | 16                                                            |
| Bromoform                                                                                          | 0.5           | nd                         | nd                | nd                | 25                                                            |
| Bromomethane                                                                                       | 0.5           | nd                         | nd                | nd                | 0.89                                                          |
| Carbon Tetrachloride                                                                               | 0.2           | nd                         | nd                | nd                | 0.79                                                          |
| Chlorobenzene                                                                                      | 0.5           | nd                         | nd                | nd                | 30                                                            |
| Chloroform                                                                                         | 0.5           | 1.0                        | nd                | nd                | 2.4                                                           |
| Dibromochloromethane                                                                               | 0.5           | nd                         | nd                | nd                | 25                                                            |
| Dichlorodifluoromethane                                                                            | 1.0           | nd                         | nd                | nd                | 590                                                           |
| 1,2-Dichlorobenzene                                                                                | 0.5           | nd                         | nd                | nd                | 3                                                             |
| 1,3-Dichlorobenzene                                                                                | 0.5           | nd                         | nd                | nd                | 59                                                            |
| 1,4-Dichlorobenzene                                                                                | 0.5           | nd                         | nd                | nd                | 1                                                             |
| 1,1-Dichloroethane                                                                                 | 0.5           | nd                         | nd                | nd                | 5                                                             |
| 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                | 5                                                             |
| 1,3-Dichloropropene                                                                                | 0.5           | nd                         | nd                | nd                | 0.5                                                           |
| Ethylbenzene                                                                                       | 0.5           | nd                         | nd                | nd                | 2.4                                                           |
| Ethylene Dibromide                                                                                 | 0.2           | nd                         | nd                | nd                | 0.2                                                           |
| Hexane                                                                                             | 1.0           | nd                         | nd                | nd                | 51                                                            |
| Methyl Ethyl Ketone                                                                                | 5.0           | nd                         | nd                | nd                | 1,800                                                         |
| Methyl Isobutyl Ketone                                                                             | 5.0           | nd                         | nd                | nd                | 640                                                           |
| Methyl tert-butyl ether                                                                            | 2.0           | nd                         | nd                | nd                | 15                                                            |
| Methylene Chloride                                                                                 | 5.0           | nd                         | nd                | nd                | 50                                                            |
| Styrene                                                                                            | 0.5           | nd                         | nd                | nd                | 5.4                                                           |
| 1,1,1,2-Tetrachloroethane                                                                          | 0.5           | nd                         | nd                | nd                | 1.1                                                           |
| 1,1,2,2-Tetrachloroethane                                                                          | 0.5           | nd                         | nd                | nd                | 1                                                             |
| Tetrachloroethylene                                                                                | 0.5           | nd                         | nd                | nd                | 1.6                                                           |
| Toluene                                                                                            | 0.5           | nd                         | nd                | nd                | 24                                                            |
| 1,1,1-Trichloroethane                                                                              | 0.5           | nd                         | nd                | nd                | 200                                                           |
| 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                | 150                                                           |
| Vinyl Chloride                                                                                     | 0.5           | nd                         | nd                | nd                | 0.5                                                           |
| Xylenes                                                                                            | 0.5           | nd                         | nd                | nd                | 300                                                           |
| Notes:                                                                                             |               |                            |                   |                   |                                                               |
| <input type="checkbox"/> MDL – Method Detection Limit                                              |               |                            |                   |                   |                                                               |
| <input type="checkbox"/> nd – not detected above the MDL                                           |               |                            |                   |                   |                                                               |
| <input type="checkbox"/> <b><u>Bold and Underlined</u></b> – value exceeds selected MECP standards |               |                            |                   |                   |                                                               |

No VOC parameters were identified in the groundwater samples analyzed, apart from a chloroform concentration in Sample BH1B-24-GW1. The chloroform concentration identified complies with the MECP Table 2 Potable Standards.

| Table 12<br>Analytical Test Results – Groundwater<br>PHCs (F <sub>1</sub> -F <sub>4</sub> )        |               |                            |                   |                   |                                                               |
|----------------------------------------------------------------------------------------------------|---------------|----------------------------|-------------------|-------------------|---------------------------------------------------------------|
| Parameter                                                                                          | MDL<br>(µg/L) | Groundwater Samples (ug/L) |                   |                   | MECP Table 2<br>Potable<br>Groundwater<br>Standards<br>(µg/L) |
|                                                                                                    |               | Sept. 27,<br>2024          | Sept. 27,<br>2024 | Sept. 27,<br>2024 |                                                               |
|                                                                                                    |               | BH1B-24-GW1                | BH2-24-GW1        | BH3-24-GW1        |                                                               |
|                                                                                                    |               | Screening Interval (m bgs) |                   |                   |                                                               |
|                                                                                                    |               | 3.53 – 6.53 m              | 2.94 – 5.94 m     | 1.27 – 2.77 m     |                                                               |
| PHCs F <sub>1</sub>                                                                                | 25            | nd                         | nd                | nd                | 750                                                           |
| PHCs F <sub>2</sub>                                                                                | 100           | nd                         | nd                | nd                | 150                                                           |
| PHCs F <sub>3</sub>                                                                                | 100           | nd                         | nd                | nd                | 500                                                           |
| PHCs F <sub>4</sub>                                                                                | 100           | nd                         | nd                | nd                | 500                                                           |
| Notes:                                                                                             |               |                            |                   |                   |                                                               |
| <input type="checkbox"/> MDL – Method Detection Limit                                              |               |                            |                   |                   |                                                               |
| <input type="checkbox"/> nd – not detected above the MDL                                           |               |                            |                   |                   |                                                               |
| <input type="checkbox"/> <b><u>Bold and Underlined</u></b> – value exceeds selected MECP standards |               |                            |                   |                   |                                                               |

No PHC parameter concentrations were detected above the laboratory method detection limits in any of the groundwater samples analyzed. The results comply with the MECP Table 2 Potable Groundwater Standards.

| <b>Table 13</b><br><b>Maximum Concentrations – Groundwater</b>                                               |                              |             |                        |
|--------------------------------------------------------------------------------------------------------------|------------------------------|-------------|------------------------|
| Parameter                                                                                                    | Maximum Concentration (µg/g) | Sample ID   | Depth Interval (m BGS) |
| Chloroform                                                                                                   | 1.0                          | BH1B-24-GW1 | 3.53 – 6.53 m          |
| Notes:<br><input type="checkbox"/> <b><u>Bold and Underlined</u></b> – value exceeds selected MECP standards |                              |             |                        |

All other parameter concentrations analyzed were below the laboratory detection limits. The laboratory certificates of analysis are provided in Appendix 1.

## 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 protocols with respect to holding time, preservation method, storage requirement, and container type.

As per Subsection 47(3) of O. Reg. 153/04, as amended by the Environmental Protection Act, the certificates of analysis have been received for each sample submitted for laboratory analysis and have been appended to this report.

As per the Sampling and Analysis Plan, a duplicate soil sample was obtained from sample BH5-24-AU1 and submitted for laboratory analysis of PHCs and metal parameters. The relative percent difference (RPD) calculations for the original and duplicate samples are provided below in Table 14.

| <b>Table 14<br/>QA/QC Calculations – Soil</b>                                                                                      |                       |                   |             |                    |                                                   |
|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------|-------------|--------------------|---------------------------------------------------|
| <b>Parameter</b>                                                                                                                   | <b>MDL<br/>(µg/g)</b> | <b>BH5-24-AU1</b> | <b>DUP1</b> | <b>RPD<br/>(%)</b> | <b>QA/QC Result<br/>(Target: &lt;20%<br/>RPD)</b> |
| PHCs F <sub>1</sub>                                                                                                                | 7                     | nd                | nd          | 0                  | Meets Target                                      |
| PHCs F <sub>2</sub>                                                                                                                | 4                     | 6                 | nd          | N/A                | Does Not Meet Target                              |
| PHCs F <sub>3</sub>                                                                                                                | 8                     | 82                | 72          | 13.0               | Meets Target                                      |
| PHCs F <sub>4</sub>                                                                                                                | 6                     | 156               | 132         | 16.7               | Meets Target                                      |
| PHCs F <sub>4</sub> gravimetric                                                                                                    | 50                    | 1,470             | 404         | 113.8              | Does Not Meet Target                              |
| Antimony                                                                                                                           | 1.0                   | nd                | nd          | 0                  | Meets Target                                      |
| Arsenic                                                                                                                            | 1.0                   | 6.6               | 6.4         | 3.1                | Meets Target                                      |
| Barium                                                                                                                             | 1.0                   | 59.7              | 49.1        | 19.5               | Meets Target                                      |
| Beryllium                                                                                                                          | 0.5                   | nd                | nd          | 0                  | Meets Target                                      |
| Boron                                                                                                                              | 5.0                   | 8.6               | 7.2         | 17.7               | Meets Target                                      |
| Cadmium                                                                                                                            | 0.5                   | nd                | nd          | 0                  | Meets Target                                      |
| Chromium                                                                                                                           | 5.0                   | 14.6              | 12.7        | 13.9               | Meets Target                                      |
| Cobalt                                                                                                                             | 1.0                   | 7.5               | 7.5         | 0                  | Meets Target                                      |
| Copper                                                                                                                             | 5.0                   | 16.2              | 16.7        | 3.0                | Meets Target                                      |
| Lead                                                                                                                               | 1.0                   | 16.0              | 16.8        | 4.9                | Meets Target                                      |
| Molybdenum                                                                                                                         | 1.0                   | 3.6               | 3.4         | 5.7                | Meets Target                                      |
| Nickel                                                                                                                             | 5.0                   | 16.6              | 16.9        | 1.8                | Meets Target                                      |
| Selenium                                                                                                                           | 1.0                   | nd                | nd          | 0                  | Meets Target                                      |
| Silver                                                                                                                             | 0.3                   | nd                | nd          | 0                  | Meets Target                                      |
| Thallium                                                                                                                           | 1.0                   | nd                | nd          | 0                  | Meets Target                                      |
| Uranium                                                                                                                            | 1.0                   | nd                | nd          | 0                  | Meets Target                                      |
| Vanadium                                                                                                                           | 10.0                  | 23.0              | 21.4        | 7.2                | Meets Target                                      |
| Zinc                                                                                                                               | 20.0                  | 28.6              | 29.1        | 1.7                | Meets Target                                      |
| <b>Notes:</b><br><input type="checkbox"/> MDL – Method Detection Limit<br><input type="checkbox"/> nd – not detected above the MDL |                       |                   |             |                    |                                                   |

The RPD calculated for most of the parameters fell within the acceptable range of 20%, with two exceptions. These discrepancies are likely attributed to either the variability between the low concentrations of certain parameters detected in the samples, or the non-homogeneous nature of the fill material from where both samples were sourced. Given that there is a similarity in the list of parameters detected in both the original and duplicate sample, and that both samples comply with the site standards, the data quality objectives outlined in the Sampling and Analysis Plan, appended to this report, are considered to have been met.

Similarly, a duplicate groundwater sample was obtained from sample BH1B-24-GW1 and submitted for laboratory analysis of VOC parameters. The relative percent difference (RPD) calculations for the original and duplicate samples are provided below in Table 14.

**Table 14**  
**QA/QC Calculations – Groundwater**

| Parameter                                                                                                                   | MDL<br>(µg/L) | BH1B-24-<br>GW1 | DUP1-24 | RPD<br>(%) | QA/QC Result<br>(Target: <20%<br>RPD) |
|-----------------------------------------------------------------------------------------------------------------------------|---------------|-----------------|---------|------------|---------------------------------------|
| Acetone                                                                                                                     | 5.0           | nd              | nd      | 0          | Meets Target                          |
| Benzene                                                                                                                     | 0.5           | nd              | nd      | 0          | Meets Target                          |
| Bromodichloromethane                                                                                                        | 0.5           | nd              | nd      | 0          | Meets Target                          |
| Bromoform                                                                                                                   | 0.5           | nd              | nd      | 0          | Meets Target                          |
| Bromomethane                                                                                                                | 0.5           | nd              | nd      | 0          | Meets Target                          |
| Carbon Tetrachloride                                                                                                        | 0.2           | nd              | nd      | 0          | Meets Target                          |
| Chlorobenzene                                                                                                               | 0.5           | nd              | nd      | 0          | Meets Target                          |
| Chloroform                                                                                                                  | 0.5           | 1.0             | 1.0     | 0          | Meets Target                          |
| Dibromochloromethane                                                                                                        | 0.5           | nd              | nd      | 0          | Meets Target                          |
| Dichlorodifluoromethane                                                                                                     | 1.0           | nd              | nd      | 0          | Meets Target                          |
| 1,2-Dichlorobenzene                                                                                                         | 0.5           | nd              | nd      | 0          | Meets Target                          |
| 1,3-Dichlorobenzene                                                                                                         | 0.5           | nd              | nd      | 0          | Meets Target                          |
| 1,4-Dichlorobenzene                                                                                                         | 0.5           | nd              | nd      | 0          | Meets Target                          |
| 1,1-Dichloroethane                                                                                                          | 0.5           | nd              | nd      | 0          | Meets Target                          |
| 1,2-Dichloroethane                                                                                                          | 0.5           | nd              | nd      | 0          | Meets Target                          |
| 1,1-Dichloroethylene                                                                                                        | 0.5           | nd              | nd      | 0          | Meets Target                          |
| cis-1,2-Dichloroethylene                                                                                                    | 0.5           | nd              | nd      | 0          | Meets Target                          |
| trans-1,2-Dichloroethylene                                                                                                  | 0.5           | nd              | nd      | 0          | Meets Target                          |
| 1,2-Dichloropropane                                                                                                         | 0.5           | nd              | nd      | 0          | Meets Target                          |
| 1,3-Dichloropropane                                                                                                         | 0.5           | nd              | nd      | 0          | Meets Target                          |
| Ethylbenzene                                                                                                                | 0.5           | nd              | nd      | 0          | Meets Target                          |
| Ethylene Dibromide                                                                                                          | 0.2           | nd              | nd      | 0          | Meets Target                          |
| Hexane                                                                                                                      | 1.0           | nd              | nd      | 0          | Meets Target                          |
| Methyl Ethyl Ketone                                                                                                         | 5.0           | nd              | nd      | 0          | Meets Target                          |
| Methyl Isobutyl Ketone                                                                                                      | 5.0           | nd              | nd      | 0          | Meets Target                          |
| Methyl tert-butyl ether                                                                                                     | 2.0           | nd              | nd      | 0          | Meets Target                          |
| Methylene Chloride                                                                                                          | 5.0           | nd              | nd      | 0          | Meets Target                          |
| Styrene                                                                                                                     | 0.5           | nd              | nd      | 0          | Meets Target                          |
| 1,1,1,2-Tetrachloroethane                                                                                                   | 0.5           | nd              | nd      | 0          | Meets Target                          |
| 1,1,1,2,2-Tetrachloroethane                                                                                                 | 0.5           | nd              | nd      | 0          | Meets Target                          |
| Tetrachloroethylene                                                                                                         | 0.5           | nd              | nd      | 0          | Meets Target                          |
| Toluene                                                                                                                     | 0.5           | nd              | nd      | 0          | Meets Target                          |
| 1,1,1-Trichloroethane                                                                                                       | 0.5           | nd              | nd      | 0          | Meets Target                          |
| 1,1,2-Trichloroethane                                                                                                       | 0.5           | nd              | nd      | 0          | Meets Target                          |
| Trichloroethylene                                                                                                           | 0.5           | nd              | nd      | 0          | Meets Target                          |
| Trichlorofluoromethane                                                                                                      | 1.0           | nd              | nd      | 0          | Meets Target                          |
| Vinyl Chloride                                                                                                              | 0.5           | nd              | nd      | 0          | Meets Target                          |
| Xylenes                                                                                                                     | 0.5           | nd              | nd      | 0          | Meets Target                          |
| Notes:<br><input type="checkbox"/> MDL – Method Detection Limit<br><input type="checkbox"/> nd – not detected above the MDL |               |                 |         |            |                                       |

The RPD calculated for all parameters fell within the acceptable range of 20%, and as a result, the data quality objectives outlined in the Sampling and Analysis Plan, appended to this report, are considered to have been met.

Based on the results of the QA/QC analysis, the quality of the field data collected during this Phase II ESA is sufficient to meet the overall objectives of this assessment.

## 5.8 Phase II Conceptual Site Model

The following section has been prepared in accordance with the requirements of O. Reg. 153/04 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 described in Section 7.1 of the Phase I ESA report, as well as Section 2.2 of this report, the following PCAs, as defined by Table 2 of O. Reg. 153/04, are considered to result in APECs on the Phase II Property:

| <b>Table 15<br/>Areas of Potential Environmental Concern</b>       |                                             |                                                                           |                                              |                                                        |                                                                        |
|--------------------------------------------------------------------|---------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------|
| <b>Area of Potential Environmental Concern</b>                     | <b>Location of APEC on Phase I Property</b> | <b>Potentially Contaminating Activity (Table 2 – O. Reg. 153/04)</b>      | <b>Location of PCA (On-Site or Off-Site)</b> | <b>Contaminants of Potential Concern</b>               | <b>Media Potentially Impacted (Groundwater, Soil, and/or Sediment)</b> |
| <b>APEC 1</b><br><br>Fill Material of Unknown Quality              | Entirety of Phase I Property                | <i>“Item 30: Importation of Fill Material of Unknown Quality”</i>         | On-Site                                      | Metals<br>PAHs                                         | Soil/Fill                                                              |
| <b>APEC 2</b><br><br>Former Aboveground Diesel Fuel Storage Tank   | Northern Portion of Phase I Property        | <i>“Item 28: Gasoline and Associated Products Storage in Fixed Tanks”</i> | On-Site                                      | VOCs<br>BTEX<br>PHCs (F <sub>1</sub> -F <sub>4</sub> ) | Soil and Groundwater                                                   |
| <b>APEC 3</b><br><br>Former Underground Gasoline Fuel Storage Tank | Central Portion of Phase I Property         | <i>“Item 28: Gasoline and Associated Products Storage in Fixed Tanks”</i> | On-Site                                      | VOCs<br>BTEX<br>PHCs (F <sub>1</sub> -F <sub>4</sub> ) | Soil and Groundwater                                                   |
| <b>APEC 4</b><br><br>Existing Pole-Mounted Electrical Transformer  | Southern Portion of Phase I Property        | <i>“Item 55: Transformer Manufacturing, Processing, and Use”</i>          | On-Site                                      | PHCs (F <sub>1</sub> -F <sub>4</sub> )<br>PCBs         | Soil and Groundwater                                                   |

#### Contaminants of Potential Concern (CPCs)

The contaminants of potential concern (CPCs) associated with the aforementioned APECs are considered to be:

- ☐ Volatile Organic Compounds (VOCs)
- ☐ Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)
- ☐ Petroleum Hydrocarbons, fractions 1 – 4 (PHCs F<sub>1</sub>-F<sub>4</sub>)
- ☐ Polycyclic Aromatic Hydrocarbons (PAHs)
- ☐ Metals (including Arsenic [As], Antimony [Sb], and Selenium [Se])
- ☐ Mercury
- ☐ Hexavalent Chromium
- ☐ Polychlorinated Biphenyls (PCBs).

These CPCs have the potential to be present in the soil matrix and/or the groundwater situated beneath the Phase II Property.

### **Subsurface Structures and Utilities**

Underground service locates were completed prior to the subsurface investigation, which did not identify any buried utilities present beneath the Phase II Property.

## **Physical Setting**

### **Site Stratigraphy**

The stratigraphy of the Phase II Property generally consists of:

- ☐ Crushed stone and fill material (loose, brown, silty fine sand, with clay and trace gravel); extending to depths ranging from approximately 0.91 m to 3.38 m below ground surface.
- ☐ Glacial till (dense, brown, silty fine sand with gravel, cobbles, and boulders); extending to depths ranging from approximately 2.44 m to 5.97 m below ground surface.
- ☐ Excellent quality sandstone bedrock, encountered at a depth of approximately 5.18 m below ground surface.

The site stratigraphy, from ground surface to the deepest aquifer or aquitard investigated, is provided in the Soil Profile and Test Data Sheets in Appendix 1.

### **Hydrogeological Characteristics**

The groundwater beneath the Phase II Property was encountered within the shale bedrock unit at depths ranging from approximately 1.17 m to 4.79 m below the existing ground surface.

Based on the measured groundwater levels, the groundwater was calculated to flow in a northwesterly direction.

### **Approximate Depth to Bedrock**

Bedrock, consisting of excellent quality sandstone, was confirmed in borehole BH1B-24 at a depth of approximately 5.18 m below ground surface. Practical refusal to augering on the inferred bedrock surface was measured in all the remaining boreholes at depths ranging from approximately 2.44 m to 5.97 m below ground surface.

### **Approximate Depth to Water Table**

The depth to the water table is approximately 1.17 m to 4.79 m below the existing ground surface.

### **Section 35 of Ontario Regulation 153/04**

Section 35 of the Regulation does not apply to the Phase II Property, as there are known potable water wells in use within a 250 m radius. As such, the potable groundwater standards are considered to be applicable.

### **Sections 41 and 43.1 of Ontario Regulation 153/04**

Section 41 of the Regulation does not apply to the Phase II Property, as there are no bodies of water or areas of natural significance located on or within 30 m of the Phase II Property. The Phase II Property is therefore not considered to be environmentally sensitive.

Section 43.1 of the Regulation does not apply to the Phase II Property, since the bedrock is situated at depths greater than 2 m below ground surface, and thus is not considered to be a shallow soil property.

### **Existing Buildings and Structures**

No buildings or structures are currently present on the Phase II Property.

## **Environmental Condition**

### **Areas Where Contaminants are Present**

Based on the analytical test results obtained during this assessment, the lower layer of soil/fill material identified in BH1-24, located within the eastern portion of the Phase II Property, is contaminated with petroleum hydrocarbons (fractions 2 and 3).

This impacted layer of fill material, approximately 1 meter in thickness (1.0 m to 2.0 m below ground surface), is suspected to be limited to a small radius around the vicinity of BH1-24. For vertical delineation purposes, the underlying native soil sample was also tested for these contaminant parameters, the results of which returned concentrations in compliance with the site standards. As a result, the contamination appears to be contained solely within this layer of fill material and has not migrated downwards into the underlying native soil.

The groundwater beneath the Phase II Property is not considered to be contaminated.

### **Types of Contaminants**

The following contaminants were detected on the Phase II Property at concentrations exceeding the selected MECP Table 2 Coarse-Grained Residential Soil Standards:

#### Petroleum Hydrocarbons (PHCs)

- ☐ Fraction 2
- ☐ Fraction 3

These contaminants were identified solely within the lower layer of soil/fill material in BH1-24, located within the western portion of the Phase II Property.

### **Contaminated Media**

#### Soil

The lower layer of soil/fill material within the vicinity of BH1-24 is considered to be contaminated with petroleum hydrocarbons.

#### Groundwater

The groundwater beneath the Phase II Property is not considered to be contaminated.

### **What Is Known About Areas Where Contaminants Are Present**

Based on what is known about the history of the Phase II Property, BH1-24 is situated in what was formerly a vehicle parking lot for the former commercial retail building which occupied the site. Given the absence of any other known sources, it is suspected that the petroleum hydrocarbon impacts are the result of a minor fuel and/or oil leak originating from a vehicle.

## **Distribution and Migration of Contaminants**

Given the suspected source of the contamination, the vertical delineation from the deeper clean native soil layer, as well as the clean groundwater results, the contamination does not appear to have migrated downwards into the underlying native soils or the water table.

## **Discharge of Contaminants**

Based on the types of contaminants identified on the Phase II Property, as well as their containment within the layer of fill material, the discharge source of the contamination is suspected to have been the result of a minor vehicle fuel leak.

## **Climatic and Meteorological Conditions**

In general, climatic and meteorological conditions have the potential to affect contaminant distribution. Two (2) ways by which climatic and meteorological conditions may affect contaminant distribution include the downward leaching of contaminants via the infiltration of precipitation, and the migration of contaminants via groundwater levels and/or flow, which may fluctuate seasonally.

Based on the clean native soil results obtained from underneath the impacted layer of fill material, as well as the clean groundwater results, no significant downward migration of contaminants via leaching is suspected to have occurred. Migration of contaminants via groundwater levels and flow is not considered to have occurred at the Phase II Property.

## **Potential for Vapour Intrusion**

Currently, no permanent structures with foundations within the impacted layer of fill material are present on the Phase II Property, and as a result, there is no risk of vapour intrusion occurring on the site.

Given that the Phase II Property will be redeveloped, all contaminated soil will be removed from the site during construction activities. As such, there is no anticipated potential for future vapour intrusion at the Phase II Property.

## 6.0 CONCLUSIONS

### Assessment

A Phase II ESA was conducted for part of the property addressed 155 Dun Skipper Drive, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address the potentially contaminating activities (PCAs) that were identified during the Phase I ESA and were considered to result in areas of potential environmental concern (APECs) on the Phase II Property.

The subsurface investigation for this assessment was conducted on September 13 and September 16, 2024, and consisted of drilling seven boreholes (BH1-24 to BH5-24, as well as BH1A-24 and BH1B-24) throughout the Phase II Property. The boreholes were advanced to depths ranging from approximately 2.44 m to 6.71 m below the existing ground surface and terminated either within the bedrock or within the overburden layer of glacial till on practical refusal to augering on the inferred bedrock surface. Upon completion, three of the boreholes (BH1B-24, BH2-24, and BH3-24) were instrumented with groundwater monitoring wells in order to access the water table.

In general, the subsurface soil profile encountered at the borehole locations consists of fill material (loose, brown, silty fine sand, with clay and trace gravel), underlain by native glacial till (dense, brown, silty fine sand with gravel, cobbles, and boulders). Bedrock, consisting of excellent quality sandstone, was confirmed in borehole BH1B-24 at a depth of approximately 5.18 m below ground surface. Practical refusal to augering on the inferred bedrock surface was measured in all the remaining boreholes at depths ranging from approximately 2.44 m to 5.97 m below ground surface. The groundwater beneath the Phase II Property was encountered within the bedrock unit at depths ranging from approximately 1.17 m to 4.79 m below the existing ground surface.

Eight soil samples were submitted for laboratory analysis of BTEX, PHCs (F<sub>1</sub>-F<sub>4</sub>), metals, PAHs, and/or PCB parameters. The test results indicated that the concentrations of PHCs F<sub>2</sub> and F<sub>3</sub> detected in Sample BH1-24-SS3A exceed the selected MECP Table 2 Coarse-Grained Residential Soil Standards. All other parameters tested in the remaining soil samples comply with the standards.

Three groundwater samples were also submitted for laboratory analysis of VOC and PHC (F<sub>1</sub>-F<sub>4</sub>) parameters. No VOC parameters were identified in the groundwater samples analyzed, apart from a chloroform concentration in Sample BH1B-24-GW1. The chloroform concentration identified complies with the MECP Table 2 Potable Standards.

## **Recommendations**

### **Impacted Soil**

Based on the findings of this assessment, the lower layer of soil/fill material localized in the vicinity of BH1-24 is contaminated, requiring remedial action. This contamination was identified at a depth interval of approximately 1 m to 2 m below the existing ground surface.

Given our understanding that the Phase II Property is to be redeveloped in the near future, it is our recommendation that the contaminated soil be remediated in conjunction with site excavation activities. At such a time, the contaminated soil will be excavated from the site and transported to a licensed waste disposal facility. It is recommended that Paterson personnel be present on-site at the time of remedial activities to assist with coordination, directing the excavation and segregation of contaminated soil from clean soils, as well as to fulfill the confirmatory soil sampling requirements in accordance with Table 2 of O. Reg. 153/04.

Prior to the off-site disposal of impacted soil at a licensed waste disposal facility, a leachate analysis of a representative sample of contaminated soil must be conducted in accordance with O. Reg. 347/90 and O. Reg. 558/00.

### **Excess Soil**

Non-impacted excess soil from the Phase II Property must be managed in accordance with O.Reg. 406/19: On-Site and Excess Soil Management. It is recommended that excess soil planning occurs prior to the site redevelopment.

### **Monitoring Wells**

If the groundwater monitoring wells installed on-site are not going to be used in the future, or will be destroyed during future construction activities, then they must be decommissioned in accordance with O. Reg. 903/90 (Ontario Water Resources Act). Further information can be provided upon request in this regard.

It is our recommendation that the monitoring wells currently be maintained for future sampling purposes, until such a time when future site excavation activities have commenced. The monitoring 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 CSA Z769-00 (reaffirmed, 2022). 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 Phase II Property 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 2668867 Ontario Inc. Permission and notification from 2668867 Ontario Inc. and Paterson Group will be required prior to the release of this report to any other party.

**Paterson Group Inc.**



Nick Sullivan, B.Sc.



Karyn Munch, P.Eng., QP<sub>ESA</sub>



**Report Distribution:**

- 2668867 Ontario Inc.
- Paterson Group Inc.

# **FIGURES**

**FIGURE 1 – KEY PLAN**

**DRAWING PE6616-1 – SITE PLAN**

**DRAWING PE6616-2 – SURROUNDING LAND USE PLAN**

**DRAWING PE6616-3 – TEST HOLE LOCATION PLAN**

**DRAWING PE6616-4 – ANALYTICAL TESTING PLAN – SOIL (PHCs)**

**DRAWING PE6616-4A – CROSS SECTION A-A' – SOIL (PHCs)**

**DRAWING PE6616-4B – CROSS SECTION B-B' – SOIL (PHCs)**

**DRAWING PE6616-5 – ANALYTICAL TESTING PLAN – SOIL  
(BTEX, METALS, PAHs, PCBs)**

**DRAWING PE6616-5A – CROSS SECTION A-A' – SOIL  
(BTEX, METALS, PAHs, PCBs)**

**DRAWING PE6616-5B – CROSS SECTION B-B' – SOIL  
(BTEX, METALS, PAHs, PCBs)**

**DRAWING PE6616-6 – ANALYTICAL TESTING PLAN – GROUNDWATER**

**DRAWING PE6616-6A – CROSS SECTION A-A' – GROUNDWATER**

**DRAWING PE6616-6B – CROSS SECTION B-B' – GROUNDWATER**

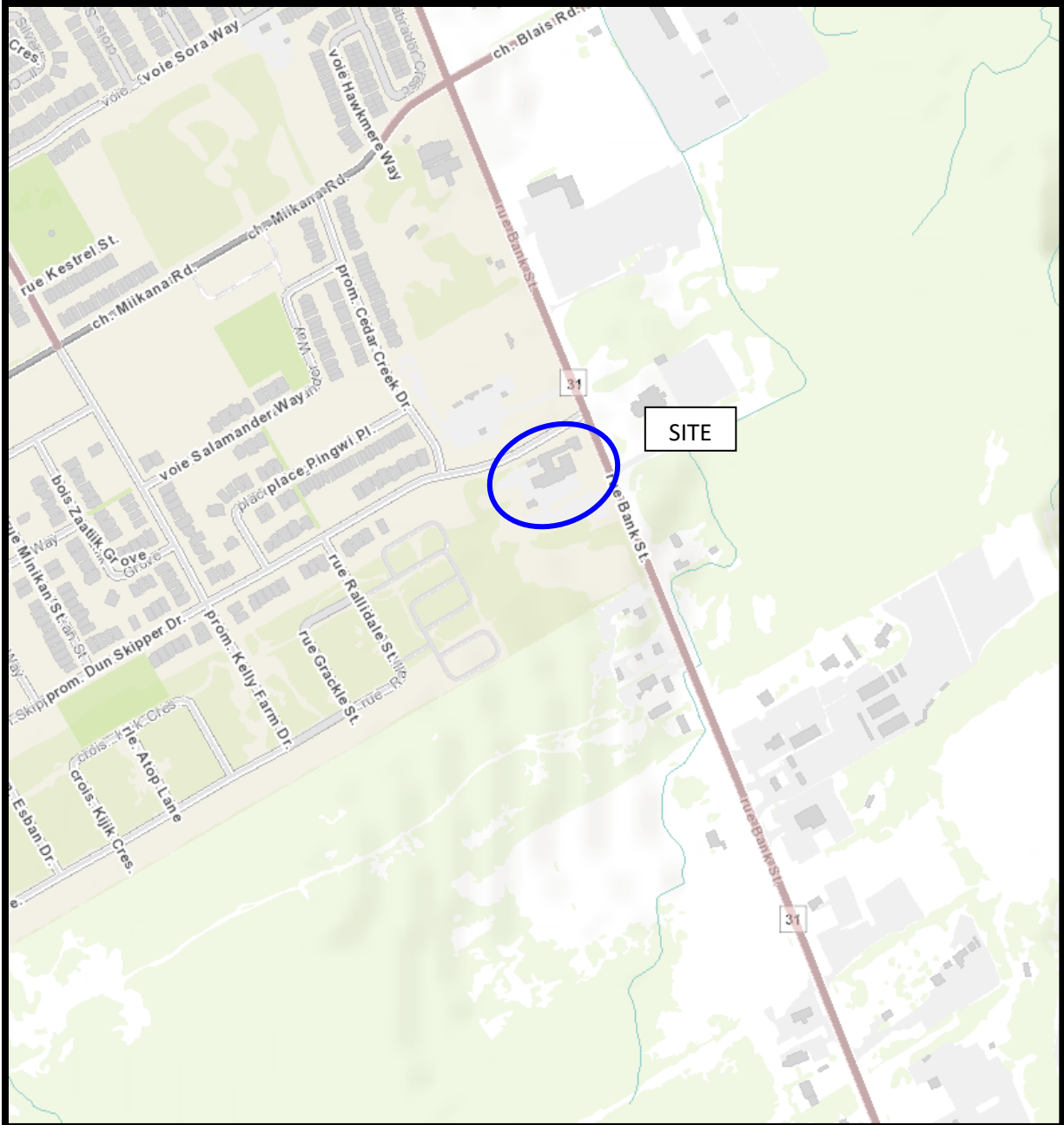
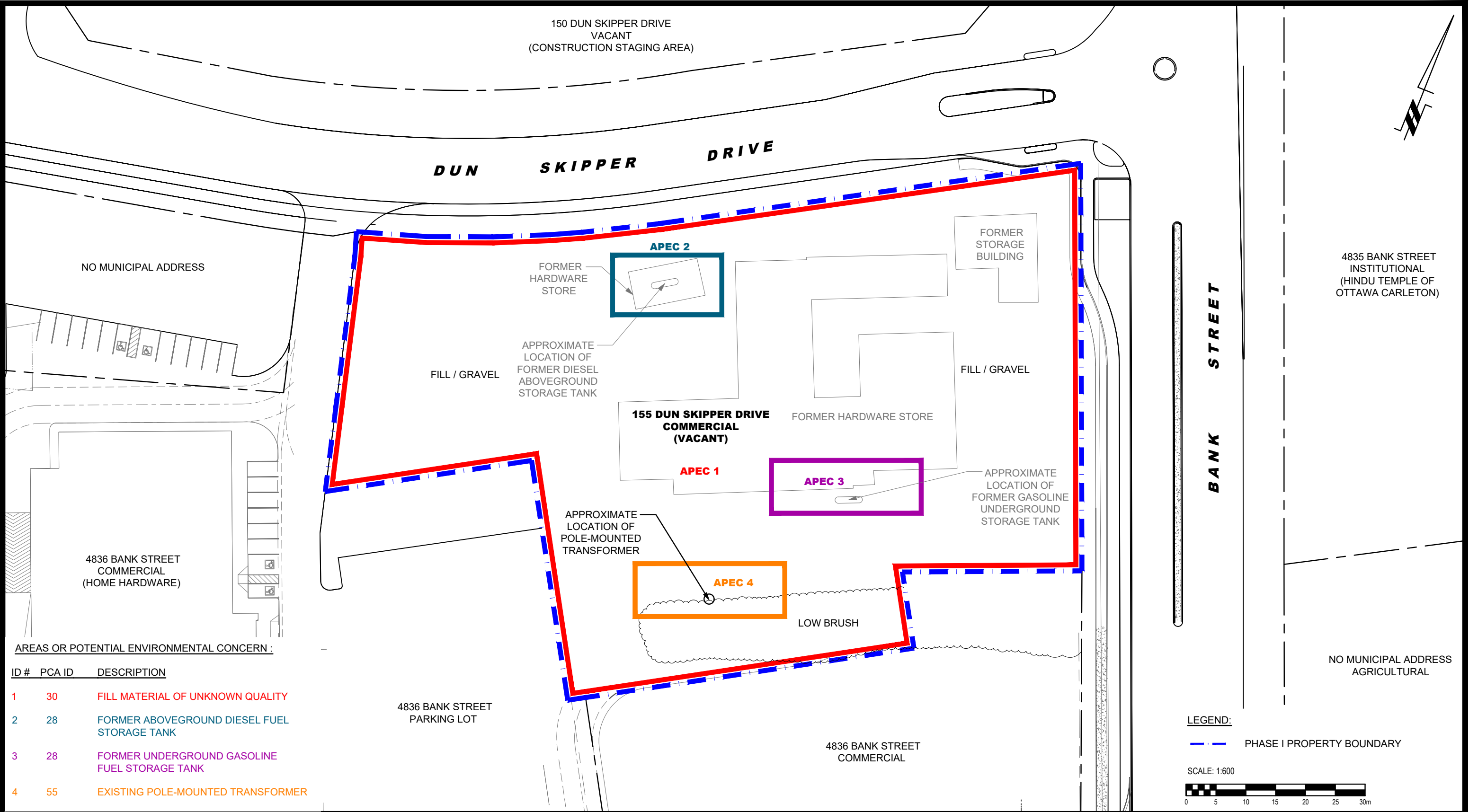


FIGURE 1  
KEY PLAN



AREAS OR POTENTIAL ENVIRONMENTAL CONCERN :

| ID # | PCA ID | DESCRIPTION                                   |
|------|--------|-----------------------------------------------|
| 1    | 30     | FILL MATERIAL OF UNKNOWN QUALITY              |
| 2    | 28     | FORMER ABOVEGROUND DIESEL FUEL STORAGE TANK   |
| 3    | 28     | FORMER UNDERGROUND GASOLINE FUEL STORAGE TANK |
| 4    | 55     | EXISTING POLE-MOUNTED TRANSFORMER             |



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| NO. | REVISIONS | DATE | INITIAL |
|-----|-----------|------|---------|
|     |           |      |         |
|     |           |      |         |
|     |           |      |         |
|     |           |      |         |

2668867 ONTARIO INC.

PHASE I - ENVIRONMENTAL SITE ASSESSMENT

155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

Title:

SITE PLAN

|              |       |               |          |
|--------------|-------|---------------|----------|
| Scale:       | 1:600 | Date:         | 10/2024  |
| Drawn by:    | YA    | Report No.:   | PE6616-1 |
| Checked by:  | NS    | Dwg. No.:     | PE6616-1 |
| Approved by: | KM    | Revision No.: |          |

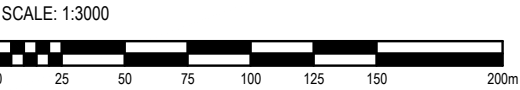
PHASE I - ENVIRONMENTAL SITE ASSESSMENT STUDY AREA



POTENTIALLY CONTAMINATING ACTIVITIES :

| ID # | PCA ID | ADDRESS      | DESCRIPTION                                   |
|------|--------|--------------|-----------------------------------------------|
| 1    | 30     | ON-SITE      | FILL MATERIAL OF UNKNOWN QUALITY              |
| 2    | 28     | ON-SITE      | FORMER ABOVEGROUND DIESEL FUEL STORAGE TANK   |
| 3    | 28     | ON-SITE      | FORMER UNDERGROUND GASOLINE FUEL STORAGE TANK |
| 4    | 55     | ON-SITE      | EXISTING POLE-MOUNTED TRANSFORMER             |
| 5    | 52     | 4852 BANK ST | EXISTING AUTOMOTIVE DEALERSHIP                |
| 6    | 52     | 4815 BANK ST | EXISTING RECREATIONAL VEHICLE DEALERSHIP      |

LEGEND:  
— PHASE I PROPERTY BOUNDARY





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2668867 ONTARIO INC.

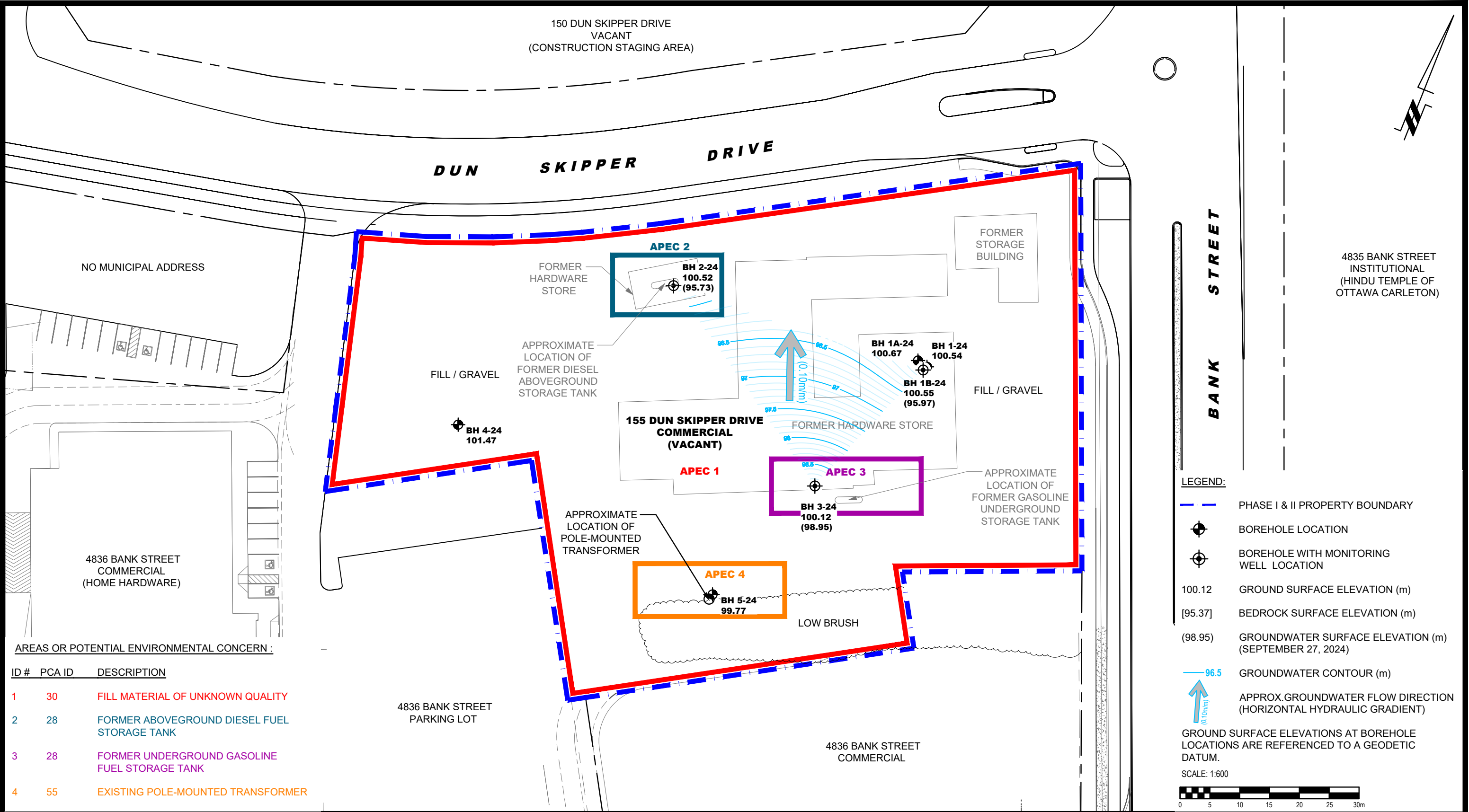
PHASE I - ENVIRONMENTAL SITE ASSESSMENT  
155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

Title:

SURROUNDING LAND USE PLAN

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|--------------|--------|---------------|----------|
| Scale:       | 1:3000 | Date:         | 10/2024  |
| Drawn by:    | YA     | Report No.:   | PE6616-1 |
| Checked by:  | NS     | Dwg. No.:     | PE6616-2 |
| Approved by: | KM     | Revision No.: |          |



AREAS OR POTENTIAL ENVIRONMENTAL CONCERN :

| ID # | PCA ID | DESCRIPTION                                   |
|------|--------|-----------------------------------------------|
| 1    | 30     | FILL MATERIAL OF UNKNOWN QUALITY              |
| 2    | 28     | FORMER ABOVEGROUND DIESEL FUEL STORAGE TANK   |
| 3    | 28     | FORMER UNDERGROUND GASOLINE FUEL STORAGE TANK |
| 4    | 55     | EXISTING POLE-MOUNTED TRANSFORMER             |

**LEGEND:**

- PHASE I & II PROPERTY BOUNDARY
- ⊕ BOREHOLE LOCATION
- ⊕ BOREHOLE WITH MONITORING WELL LOCATION
- 100.12 GROUND SURFACE ELEVATION (m)
- [95.37] BEDROCK SURFACE ELEVATION (m)
- (98.95) GROUNDWATER SURFACE ELEVATION (m) (SEPTEMBER 27, 2024)
- 96.5 GROUNDWATER CONTOUR (m)
- ↑ (0.10m/m) APPROX. GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)

GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:600

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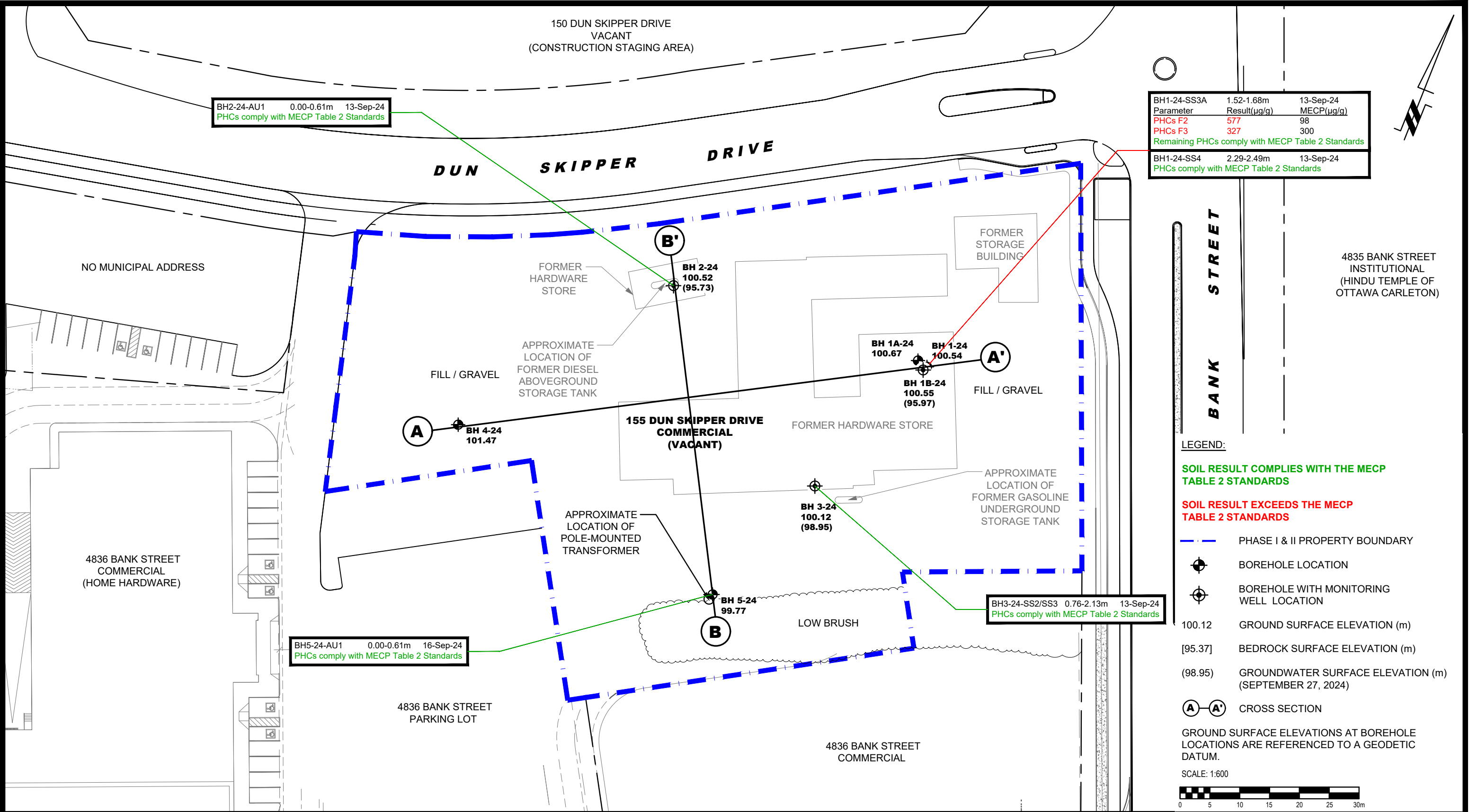
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PHASE II - ENVIRONMENTAL SITE ASSESSMENT  
155 DUN SKIPPER DRIVE

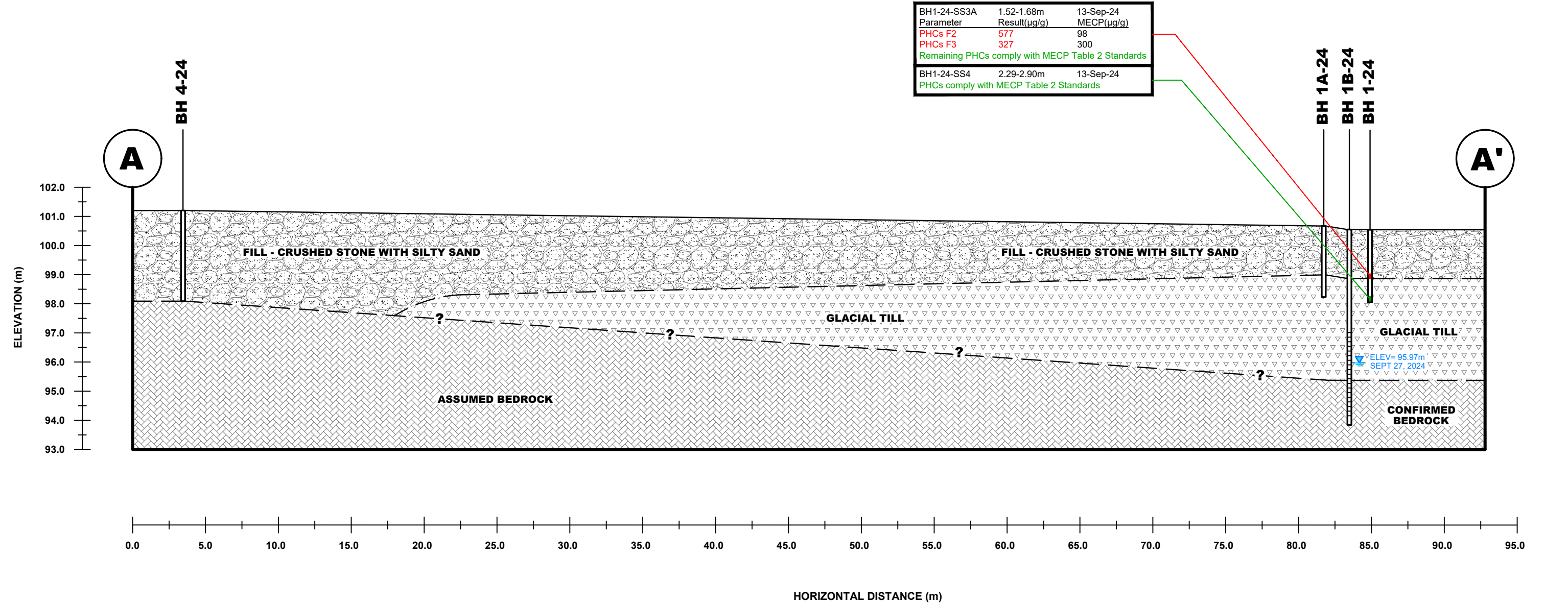
OTTAWA, ONTARIO

Title: **TEST HOLE LOCATION PLAN**

|              |       |               |                 |
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| Scale:       | 1:600 | Date:         | 10/2024         |
| Drawn by:    | YA    | Report No.:   | PE6616-2        |
| Checked by:  | NS    | Dwg. No.:     | <b>PE6616-3</b> |
| Approved by: | KM    | Revision No.: |                 |



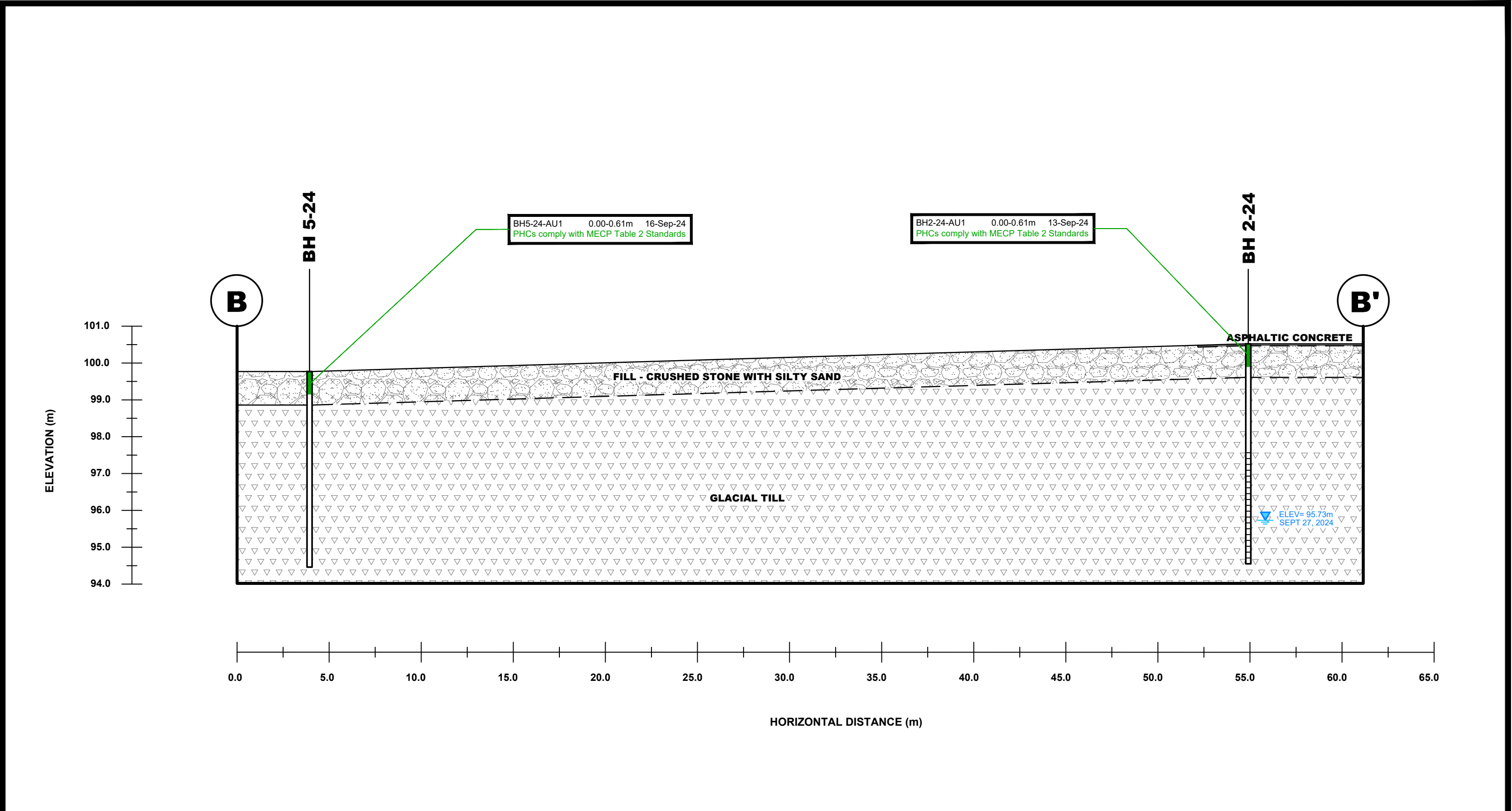
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| <div><p><b>PATERSON<br/>GROUP</b></p><p>9 AURIGA DRIVE<br/>OTTAWA, ON<br/>K2E 7T9<br/>TEL: (613) 226-7381</p></div> |     |           |      |         | 2668867 ONTARIO INC.<br><br>PHASE II - ENVIRONMENTAL SITE ASSESSMENT<br>155 DUN SKIPPER DRIVE<br><br>OTTAWA, ONTARIO | Scale: 1:600                                 | Date: 10/2024                |
|                                                                                                                                                                                                        |     |           |      |         |                                                                                                                      | Drawn by: YA                                 | Report No.: PE6616-2         |
|                                                                                                                                                                                                        |     |           |      |         |                                                                                                                      | Checked by: NS                               | Dwg. No.:<br><b>PE6616-4</b> |
|                                                                                                                                                                                                        |     |           |      |         |                                                                                                                      | Approved by: KM                              |                              |
|                                                                                                                                                                                                        |     |           |      |         |                                                                                                                      | Title: ANALYTICAL TESTING PLAN - SOIL (PHCs) |                              |
|                                                                                                                                                                                                        |     |           |      |         |                                                                                                                      |                                              |                              |
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SOIL RESULT COMPLIES WITH THE MECP TABLE 2 STANDARDS

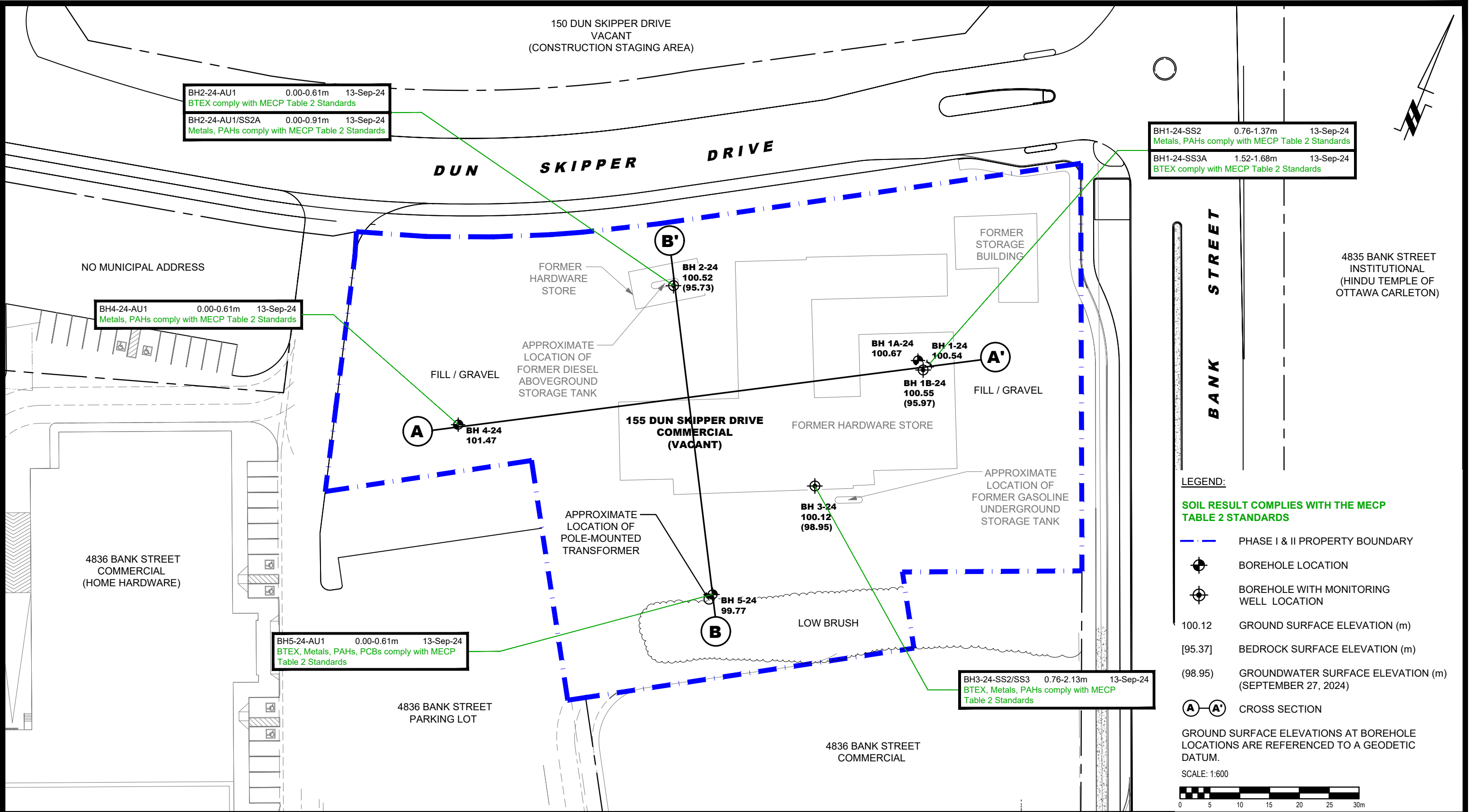
SOIL RESULT EXCEEDS THE MECP TABLE 2 STANDARDS

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|  <div>9 AURIGA DRIVE<br/>OTTAWA, ON<br/>K2E 7T9<br/>TEL: (613) 226-7381</div> |     |           |      |         | 2668867 ONTARIO INC.<br><br>PHASE II - ENVIRONMENTAL SITE ASSESSMENT<br>155 DUN SKIPPER DRIVE<br><br>OTTAWA, ONTARIO | Scale: AS SHOWN | Date: 10/2024        |
|                                                                                                                                                                  |     |           |      |         |                                                                                                                      | Drawn by: YA    | Report No.: PE6616-2 |
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|                                                                                                                                                                  |     |           |      |         |                                                                                                                      | Approved by: KM | Revision No.:        |
|                                                                                                                                                                  |     |           |      |         |                                                                                                                      |                 |                      |
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SOIL RESULT COMPLIES WITH THE MECP TABLE 2 STANDARDS

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| <div><p>9 AURIGA DRIVE<br/>OTTAWA, ON<br/>K2E 7T9<br/>TEL: (613) 226-7381</p></div> |           |      |         |  | 2668867 ONTARIO INC.<br><br>PHASE II - ENVIRONMENTAL SITE ASSESSMENT<br>155 DUN SKIPPER DRIVE<br><br>OTTAWA, ONTARIO | Scale:                                                | AS SHOWN | Date:                         | 10/2024       |
|                                                                                                                                                                        |           |      |         |  |                                                                                                                      | Drawn by:                                             | YA       | Report No.:                   | PE6616-2      |
|                                                                                                                                                                        |           |      |         |  |                                                                                                                      | Checked by:                                           | NS       | Dwg. No.:<br><b>PE6616-4B</b> |               |
|                                                                                                                                                                        |           |      |         |  |                                                                                                                      | Approved by:                                          | KM       |                               | Revision No.: |
|                                                                                                                                                                        |           |      |         |  |                                                                                                                      | Title:<br><b>CROSS SECTION B-B' - SOIL<br/>(PHCs)</b> |          |                               |               |
|                                                                                                                                                                        |           |      |         |  |                                                                                                                      |                                                       |          |                               |               |
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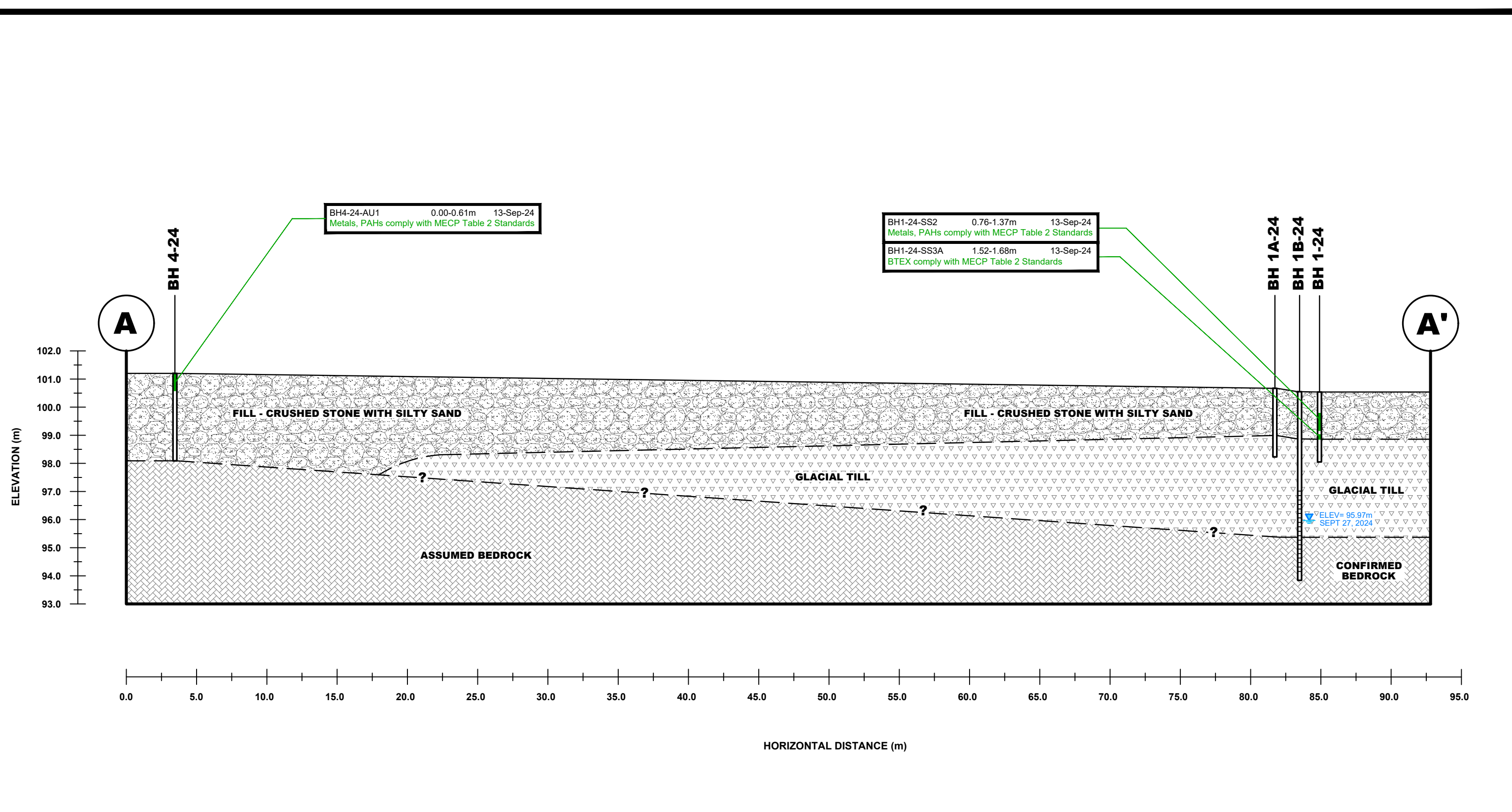
2668867 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT  
155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

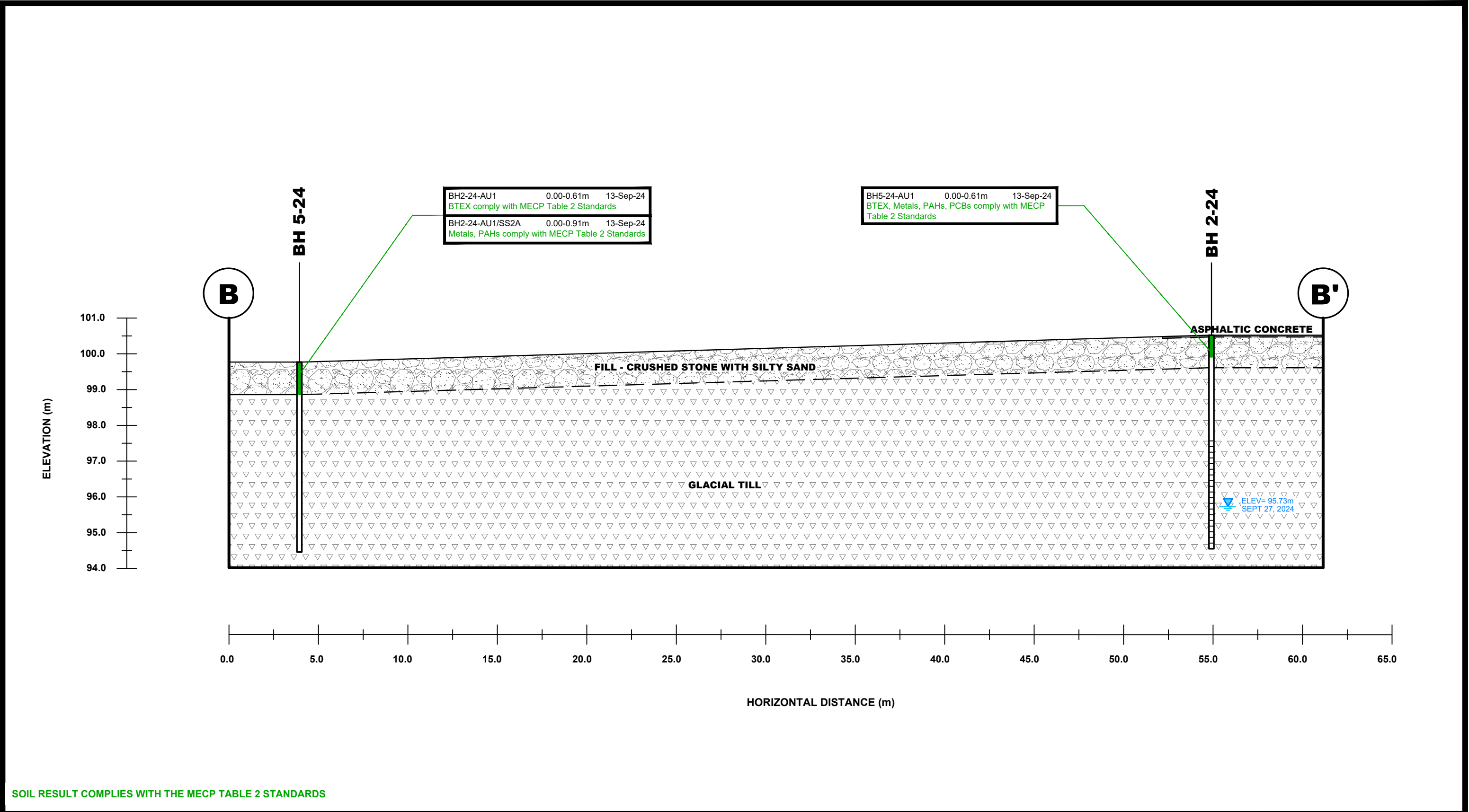
Title: **ANALYTICAL TESTING PLAN - SOIL  
(BTEX, METALS, PAHs, PCBs)**

|                 |                           |
|-----------------|---------------------------|
| Scale: 1:600    | Date: 10/2024             |
| Drawn by: YA    | Report No.: PE6616-2      |
| Checked by: NS  | Dwg. No.: <b>PE6616-5</b> |
| Approved by: KM | Revision No.:             |



SOIL RESULT COMPLIES WITH THE MECP TABLE 2 STANDARDS

| <div><div><div></div><div></div></div><div><div>PATERSON</div><div>GROUP</div></div><div><div>9 AURIGA DRIVE</div><div>OTTAWA, ON</div><div>K2E 7T9</div><div>TEL: (613) 226-7381</div></div></div> |                                                                                                                                                                                                                                                                                         |      |         |  | 2668867 ONTARIO INC.                                    |  |  |  | Scale:       | AS SHOWN | Date:         | 10/2024   |     |           |      |         |  |  |  |  |  |  |  |  |  |  |  |
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|                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                         |      |         |  | PHASE II - ENVIRONMENTAL SITE ASSESSMENT                |  |  |  | Drawn by:    | YA       | Report No.:   | PE6616-2  |     |           |      |         |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                         |      |         |  | 155 DUN SKIPPER DRIVE                                   |  |  |  | Checked by:  | NS       | Dwg. No.:     | PE6616-5A |     |           |      |         |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                         |      |         |  | OTTAWA, ONTARIO                                         |  |  |  | Approved by: | KM       | Revision No.: |           |     |           |      |         |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                         |      |         |  | CROSS SECTION A-A' - SOIL<br>(BTEX, METALS, PAHs, PCBs) |  |  |  |              |          |               |           |     |           |      |         |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                     | <table><tr><th>NO.</th><th>REVISIONS</th><th>DATE</th><th>INITIAL</th></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></table> |      |         |  |                                                         |  |  |  |              |          |               |           | NO. | REVISIONS | DATE | INITIAL |  |  |  |  |  |  |  |  |  |  |  |
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SOIL RESULT COMPLIES WITH THE MECP TABLE 2 STANDARDS

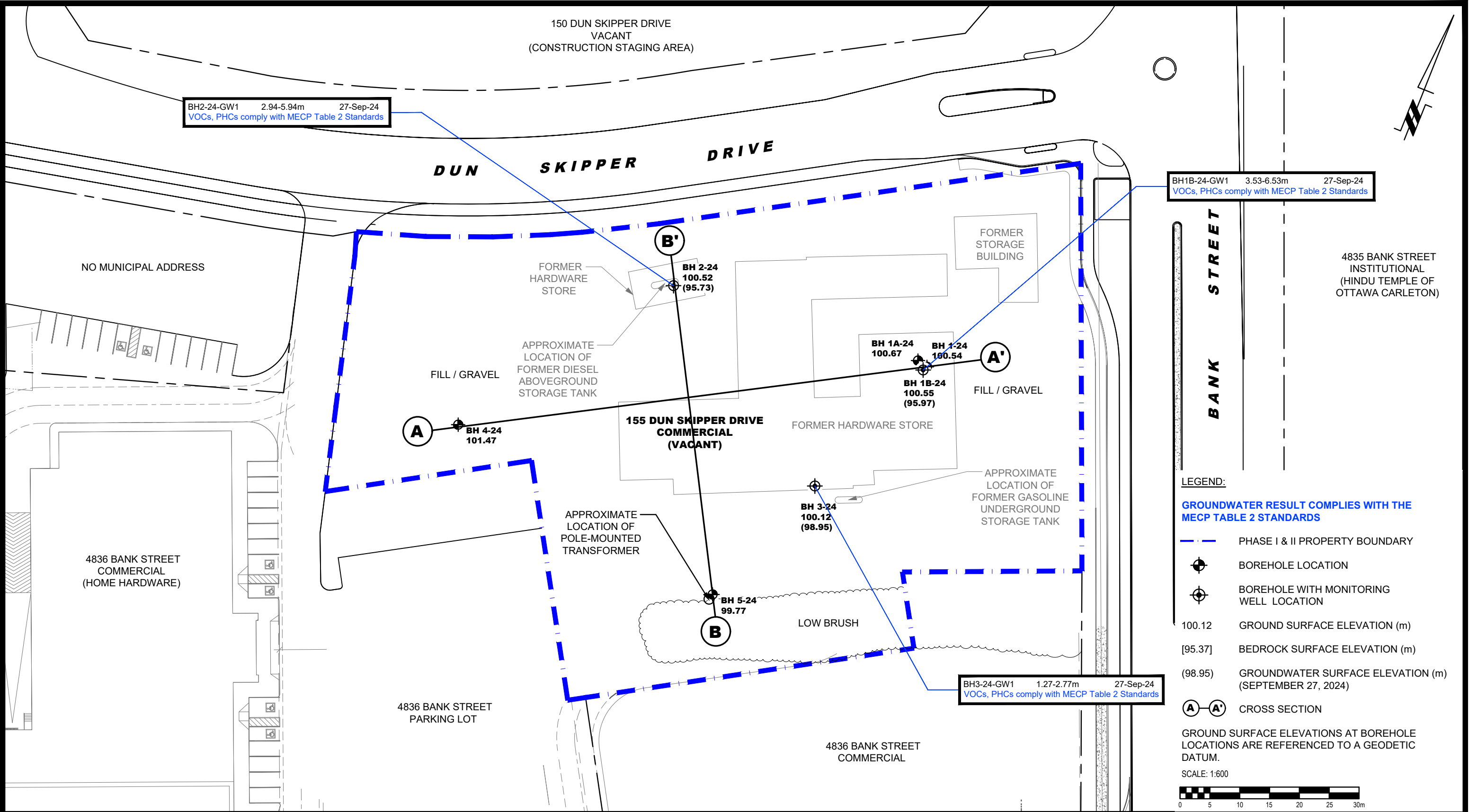
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2668867 ONTARIO INC.  
PHASE II - ENVIRONMENTAL SITE ASSESSMENT  
155 DUN SKIPPER DRIVE  
OTTAWA, ONTARIO

**CROSS SECTION B-B' - SOIL  
(BTEX, METALS, PAHs, PCBs)**

|              |          |               |                  |
|--------------|----------|---------------|------------------|
| Scale:       | AS SHOWN | Date:         | 10/2024          |
| Drawn by:    | YA       | Report No.:   | PE6616-2         |
| Checked by:  | NS       | Dwg. No.:     | <b>PE6616-5B</b> |
| Approved by: | KM       | Revision No.: |                  |





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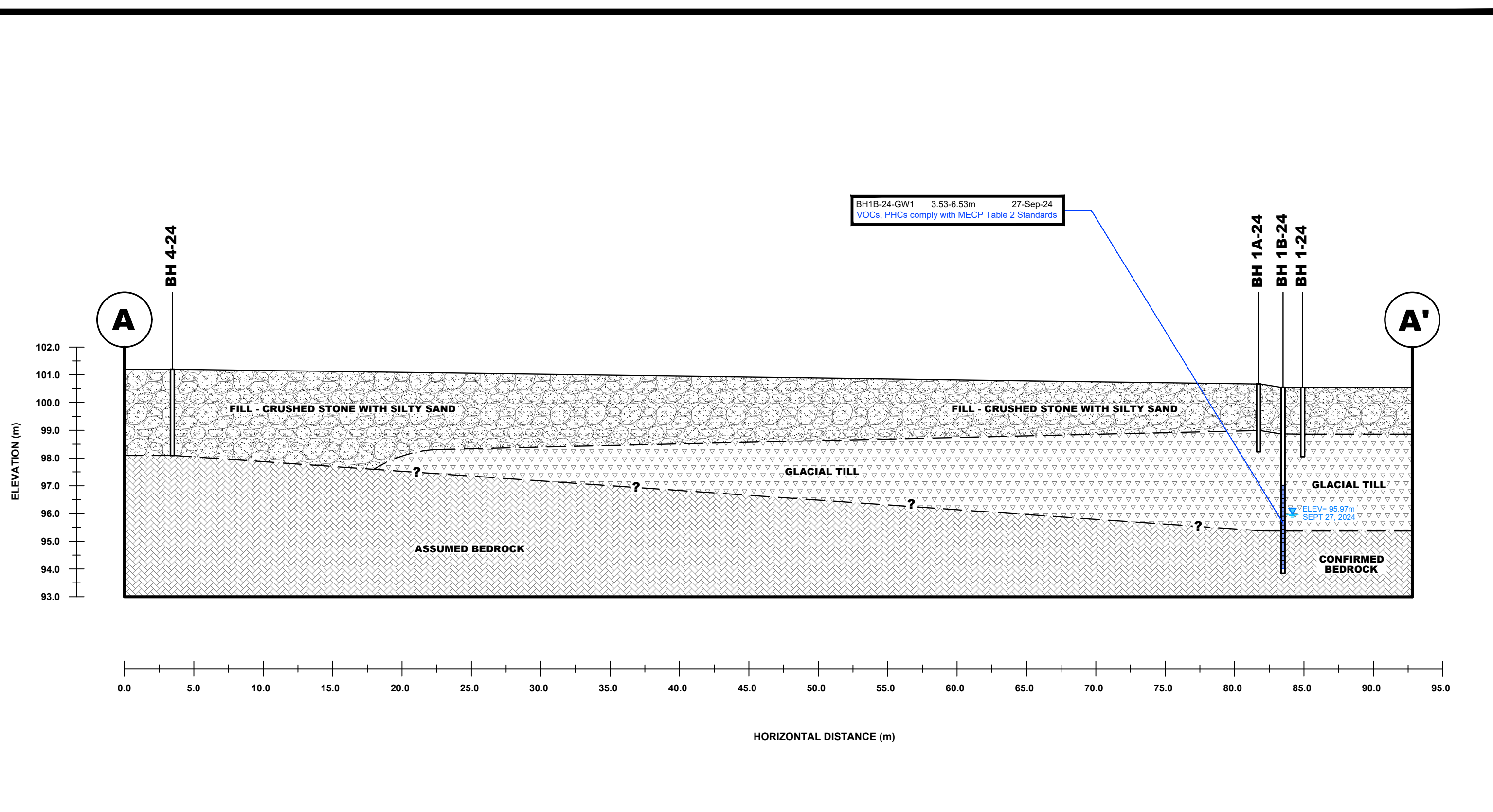
2668867 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT  
155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

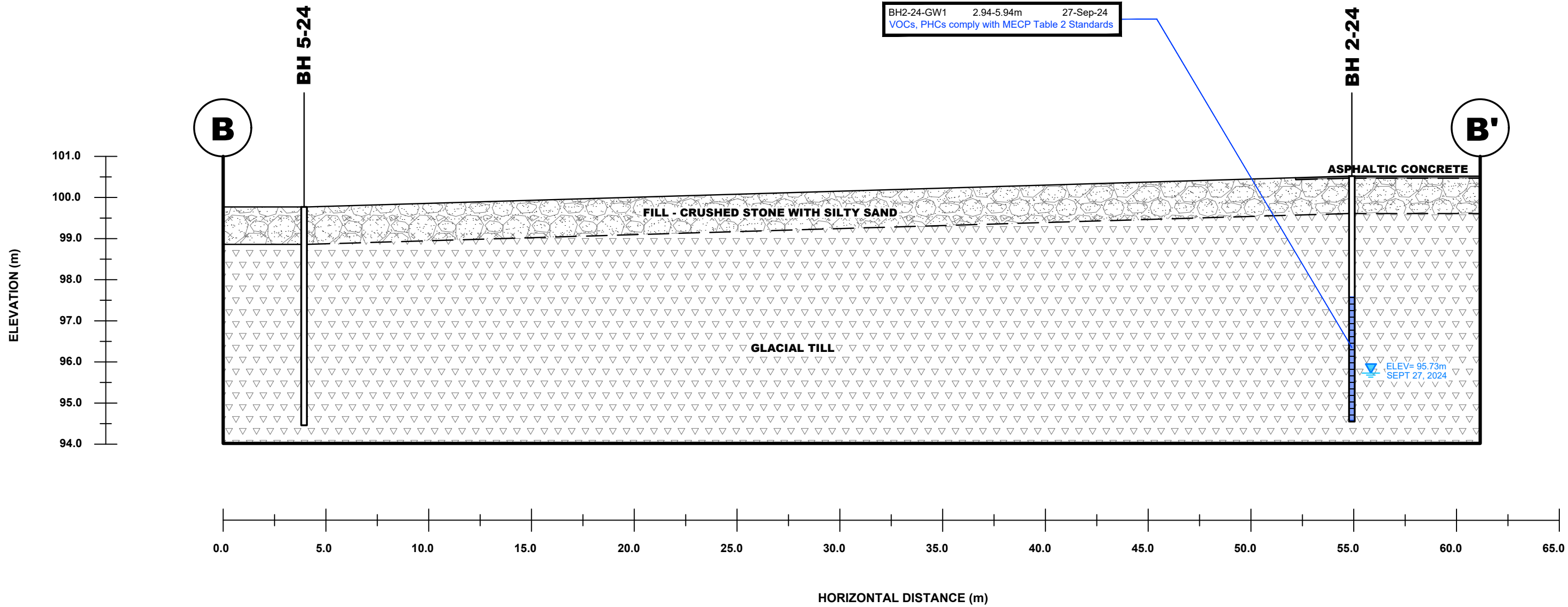
ANALYTICAL TESTING PLAN - GROUNDWATER  
(VOCs, PHCs)

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| Scale:       | 1:600 | Date:         | 10/2024  |
| Drawn by:    | YA    | Report No.:   | PE6616-2 |
| Checked by:  | NS    | Dwg. No.:     | PE6616-6 |
| Approved by: | KM    | Revision No.: |          |



GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 2 STANDARDS

|                                                                                                                                                                            |     |           |      |         |                                                                                                                      |                                                            |                               |
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| <div><div>9 AURIGA DRIVE<br/>OTTAWA, ON<br/>K2E 7T9<br/>TEL: (613) 226-7381</div></div> |     |           |      |         | 2668867 ONTARIO INC.<br><br>PHASE II - ENVIRONMENTAL SITE ASSESSMENT<br>155 DUN SKIPPER DRIVE<br><br>OTTAWA, ONTARIO | Scale:<br>AS SHOWN                                         | Date:<br>10/2024              |
|                                                                                                                                                                            |     |           |      |         |                                                                                                                      | Drawn by:<br>YA                                            | Report No.:<br>PE6616-2       |
|                                                                                                                                                                            |     |           |      |         |                                                                                                                      | Checked by:<br>NS                                          | Dwg. No.:<br><b>PE6616-6A</b> |
|                                                                                                                                                                            |     |           |      |         |                                                                                                                      | Approved by:<br>KM                                         |                               |
|                                                                                                                                                                            |     |           |      |         |                                                                                                                      | Title:<br>CROSS SECTION A-A' - GROUNDWATER<br>(VOCs, PHCs) |                               |
|                                                                                                                                                                            |     |           |      |         |                                                                                                                      |                                                            |                               |
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GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 2 STANDARDS

|                                                                                                                                                                                          |     |           |      |         |                                                                                                              |  |              |          |               |           |
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| <div><div><div></div></div><div><div>PATERSON</div><div>GROUP</div></div><div><div>9 AURIGA DRIVE</div><div>OTTAWA, ON</div><div>K2E 7T9</div><div>TEL: (613) 226-7381</div></div></div> |     |           |      |         | 2668867 ONTARIO INC.<br>PHASE II - ENVIRONMENTAL SITE ASSESSMENT<br>155 DUN SKIPPER DRIVE<br>OTTAWA, ONTARIO |  | Scale:       | AS SHOWN | Date:         | 10/2024   |
|                                                                                                                                                                                          |     |           |      |         |                                                                                                              |  | Drawn by:    | YA       | Report No.:   | PE6616-2  |
|                                                                                                                                                                                          |     |           |      |         |                                                                                                              |  | Checked by:  | NS       | Dwg. No.:     | PE6616-6B |
|                                                                                                                                                                                          |     |           |      |         |                                                                                                              |  | Approved by: | KM       | Revision No.: |           |
|                                                                                                                                                                                          | NO. | REVISIONS | DATE | INITIAL | Title: CROSS SECTION B-B' - GROUNDWATER (VOCs, PHCs)                                                         |  |              |          |               |           |

# **APPENDIX 1**

**SAMPLING AND ANALYSIS PLAN**

**SOIL PROFILE AND TEST DATA SHEETS**

**SYMBOLS AND TERMS**

**LABORATORY CERTIFICATES OF ANALYSIS**

# **Sampling & Analysis Plan**

Part of 155 Dun Skipper Drive  
Ottawa, Ontario

Prepared for 2668867 Ontario Inc.

**Report: PE6616-SAP**  
**September 2, 2024**

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## 1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by 2668867 Ontario Inc., to conduct a Phase II – Environmental Site Assessment (Phase II ESA) for part of 155 Dun Skipper Drive, Ottawa, Ontario.

Based on the findings of the Phase I ESA, the following subsurface investigation program was developed.

| Borehole | Location                                 | Rationale                                                                                                                                          | Proposed Depth & Rationale                                                                    |
|----------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| BH1-24   | Eastern portion of the Phase I Property  | To assess for potential impacts resulting from the presence of fill material of unknown quality.                                                   | 5-7 m; for the purpose of installing a groundwater monitoring well to access the water table. |
| BH2-24   | Northern portion of the Phase I Property | To assess for potential impacts resulting from the presence of fill material of unknown quality and a former aboveground diesel fuel storage tank. |                                                                                               |
| BH3-24   | Central portion of the Phase I Property  | To assess for potential impacts resulting from the presence of fill material of unknown quality and a former underground gasoline storage tank.    |                                                                                               |
| BH4-24   | Western portion of the Phase I Property  | To assess for potential impacts resulting from the presence of fill material of unknown quality.                                                   | 3-5 m; for geotechnical and general coverage purposes.                                        |
| BH5-24   | Southern portion of the Phase I Property | To assess for potential impacts resulting from the presence of fill material of unknown quality and a pole-mounted electrical transformer.         |                                                                                               |

Borehole locations are shown on Drawing PE6616-3 – Test Hole Location Plan, appended to the main report.

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

Following the borehole drilling, groundwater monitoring wells will be installed in all three boreholes to allow for the collection of groundwater samples.

## 2.0 ANALYTICAL TESTING PROGRAM

The analytical testing program for soil at the Phase I Property 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 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 soil at the Phase I Property 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)
- ☐ RKL 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 and orientations of boreholes with respect to site features (buildings, roadways, etc.) must be provided. Distances should be measured using a measuring tape or wheel rather than paced off. Ground surface elevations at each borehole should be surveyed relative to a geodetic benchmark, if one is available, or a temporary site benchmark which can be tied in at a later date if necessary.

## **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 F<sub>1</sub>, 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" threaded sections of Schedule 40 PVC slotted well screen (5' x 1 1/4" if installing in cored hole in bedrock)
- ☐ 5' x 2" threaded sections of Schedule 40 PVC riser pipe (5' x 1 1/4" 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 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

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.



**COORD. SYS.:** MTM ZONE 9      **EASTING:** 376313.80      **NORTHING:** 5019255.98      **ELEVATION:** 100.54

**PROJECT:** Proposed High-rise development      **FILE NO. :** PG2934

**BORINGS BY:** CME-55 Low Clearance Drill

**REMARKS:**      **DATE:** September 13, 2024      **HOLE NO. :** BH 1-24

| SAMPLE DESCRIPTION                                                                                                           | STRATA PLOT | DEPTH (m) | SAMPLE       |              |                  |                     | GASTECH (ppm)<br>GASTECH (% LEL) |     |     |     | PIEZOMETER<br>CONSTRUCTION | ELEVATION (m) |     |
|------------------------------------------------------------------------------------------------------------------------------|-------------|-----------|--------------|--------------|------------------|---------------------|----------------------------------|-----|-----|-----|----------------------------|---------------|-----|
|                                                                                                                              |             |           | TYPE AND NO. | RECOVERY (%) | N, Nc OR RQD     | ANALYTICAL<br>TESTS | 50                               | 100 | 150 | 200 |                            |               |     |
|                                                                                                                              |             |           |              |              |                  |                     | ▲ PID (ppm)<br>△ PID (% LEL)     |     |     |     |                            |               |     |
| GROUND SURFACE                                                                                                               |             | 0         | AU 1         |              |                  |                     |                                  | 20  | 40  | 60  | 80                         |               |     |
| FILL: Granular and crushed stone<br>0.30m [100.24m]                                                                          |             |           |              |              |                  |                     |                                  |     |     |     |                            |               |     |
| FILL: Loose, brown silty fine sand, with clay, trace gravel<br>1.45m [99.09m]                                                |             | 1         | SS 2         | 33           | 4-4-5-9<br>9     |                     |                                  |     |     |     |                            |               | 100 |
| FILL: Loose, grey sandy silt, trace brown silty sand<br>1.68m [98.86m]                                                       |             |           |              |              |                  |                     |                                  |     |     |     |                            |               | 99  |
| GLACIAL TILL: Compact, brown silty sand, with gravel, cobbles and boulders<br>- Very dense by 2.44 m depth<br>2.49m [98.05m] |             | 2         | SS 3         | 100          | 4-15-14-14<br>29 |                     |                                  |     |     |     |                            |               |     |
| End of Borehole                                                                                                              |             |           | SS 4         | 76           | P                |                     |                                  |     |     |     |                            |               | 98  |
| Practical refusal to augering at 2.49 m depth                                                                                |             | 3         |              |              |                  |                     |                                  |     |     |     |                            |               | 97  |
|                                                                                                                              |             | 4         |              |              |                  |                     |                                  |     |     |     |                            |               | 96  |
|                                                                                                                              |             | 5         |              |              |                  |                     |                                  |     |     |     |                            |               | 95  |
|                                                                                                                              |             | 6         |              |              |                  |                     |                                  |     |     |     |                            |               | 94  |
|                                                                                                                              |             | 7         |              |              |                  |                     |                                  |     |     |     |                            |               | 93  |
|                                                                                                                              |             | 8         |              |              |                  |                     |                                  |     |     |     |                            |               |     |

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**COORD. SYS.:** MTM ZONE 9      **EASTING:** 376312.01      **NORTHING:** 5019256.37      **ELEVATION:** 100.67

**PROJECT:** Proposed High-rise development      **FILE NO. :** PG2934

**BORINGS BY:** CME-55 Low Clearance Drill

**REMARKS:**      **DATE:** September 13, 2024      **HOLE NO. :** BH 1A-24

| SAMPLE DESCRIPTION                                                                           | STRATA PLOT | DEPTH (m) | SAMPLE       |              |              |                  | <div> <div> <div>■ GASTECH (ppm)</div> <div>□ GASTECH (% LEL)</div> </div> <div> <div>▲ PID (ppm)</div> <div>△ PID (% LEL)</div> </div> </div> |     |     |     | PIEZOMETER CONSTRUCTION | ELEVATION (m) |
|----------------------------------------------------------------------------------------------|-------------|-----------|--------------|--------------|--------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-------------------------|---------------|
|                                                                                              |             |           | TYPE AND NO. | RECOVERY (%) | N, Nc OR RQD | ANALYTICAL TESTS | 50                                                                                                                                             | 100 | 150 | 200 |                         |               |
|                                                                                              |             |           |              |              |              |                  | 20                                                                                                                                             | 40  | 60  | 80  |                         |               |
| GROUND SURFACE                                                                               |             | 0         |              |              |              |                  |                                                                                                                                                |     |     |     |                         | 100.67        |
| FILL: Granular and crushed stone<br>0.30m [100.37m]                                          |             |           |              |              |              |                  |                                                                                                                                                |     |     |     |                         |               |
| FILL: Loose, brown silty fine sand, with clay, trace gravel<br>1.45m [99.22m]                |             | 1         |              |              |              |                  |                                                                                                                                                |     |     |     |                         |               |
| FILL: Loose, grey sandy silt, trace brown silty sand<br>1.68m [98.99m]                       |             |           |              |              |              |                  |                                                                                                                                                |     |     |     |                         |               |
| GLACIAL TILL: Compact, brown silty sand, with gravel, cobbles and boulders<br>2.44m [98.23m] |             | 2         |              |              |              |                  |                                                                                                                                                |     |     |     |                         |               |
| End of Borehole                                                                              |             |           |              |              |              |                  |                                                                                                                                                |     |     |     |                         |               |
| Practical refusal to augering at 2.44 m depth                                                |             | 3         |              |              |              |                  |                                                                                                                                                |     |     |     |                         |               |
|                                                                                              |             | 4         |              |              |              |                  |                                                                                                                                                |     |     |     |                         |               |
|                                                                                              |             | 5         |              |              |              |                  |                                                                                                                                                |     |     |     |                         |               |
|                                                                                              |             | 6         |              |              |              |                  |                                                                                                                                                |     |     |     |                         |               |
|                                                                                              |             | 7         |              |              |              |                  |                                                                                                                                                |     |     |     |                         |               |
|                                                                                              |             | 8         |              |              |              |                  |                                                                                                                                                |     |     |     |                         |               |

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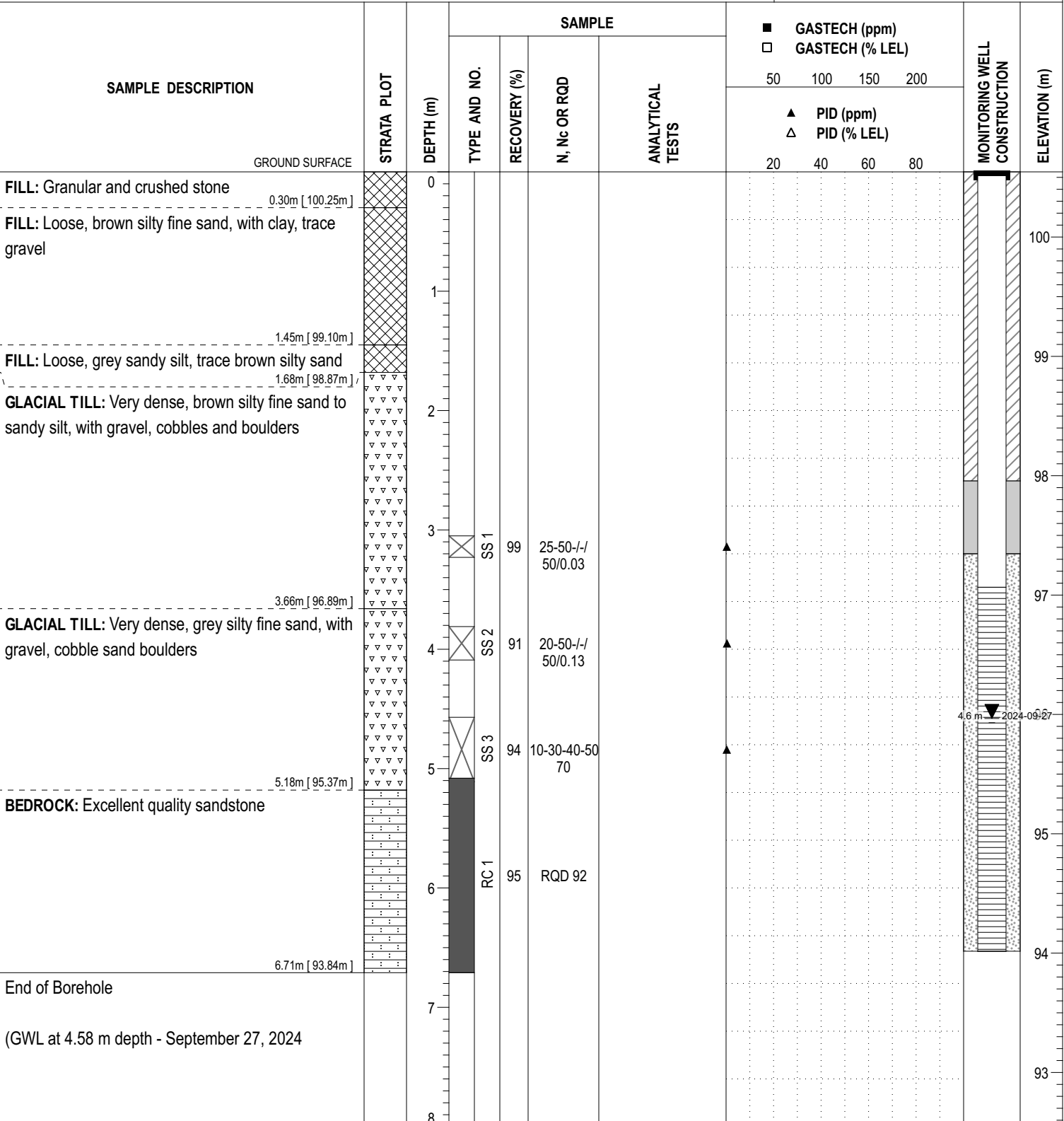
**COORD. SYS.:** MTM ZONE 9      **EASTING:** 376313.42      **NORTHING:** 5019255.24      **ELEVATION:** 100.55

**PROJECT:** Proposed High-rise development

**FILE NO. :** PG2934

**BORINGS BY:** CME-55 Low Clearance Drill

**HOLE NO. :** BH 1B-24

**REMARKS:**
**DATE:** September 16, 2024


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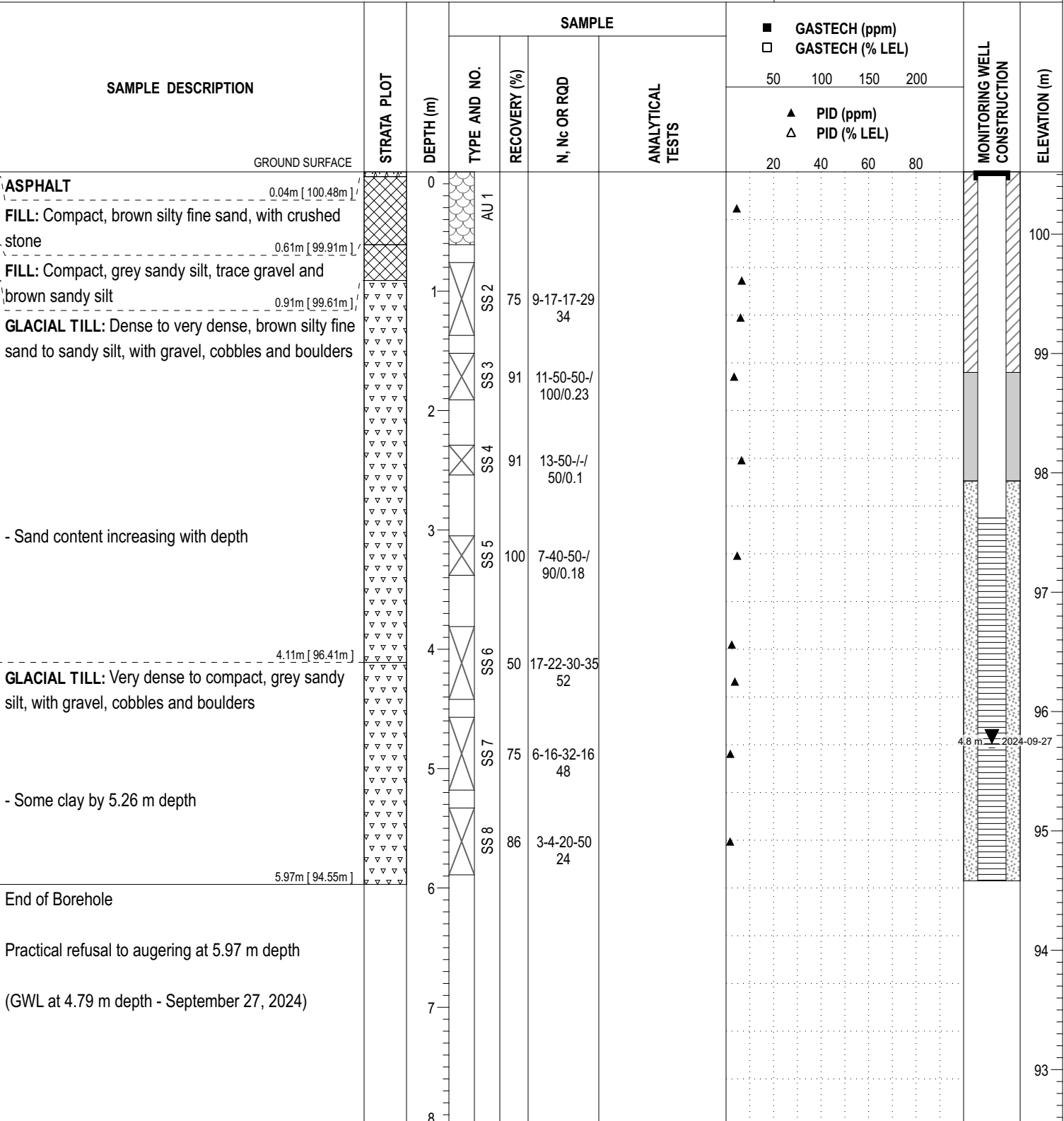
**COORD. SYS.:** MTM ZONE 9      **EASTING:** 376269.35      **NORTHING:** 5019252.07      **ELEVATION:** 100.52

**PROJECT:** Proposed High-rise development

**FILE NO. :** PG2934

**BORINGS BY:** CME-55 Low Clearance Drill

**REMARKS:**
**DATE:** September 13, 2024

**HOLE NO. :** BH 2-24


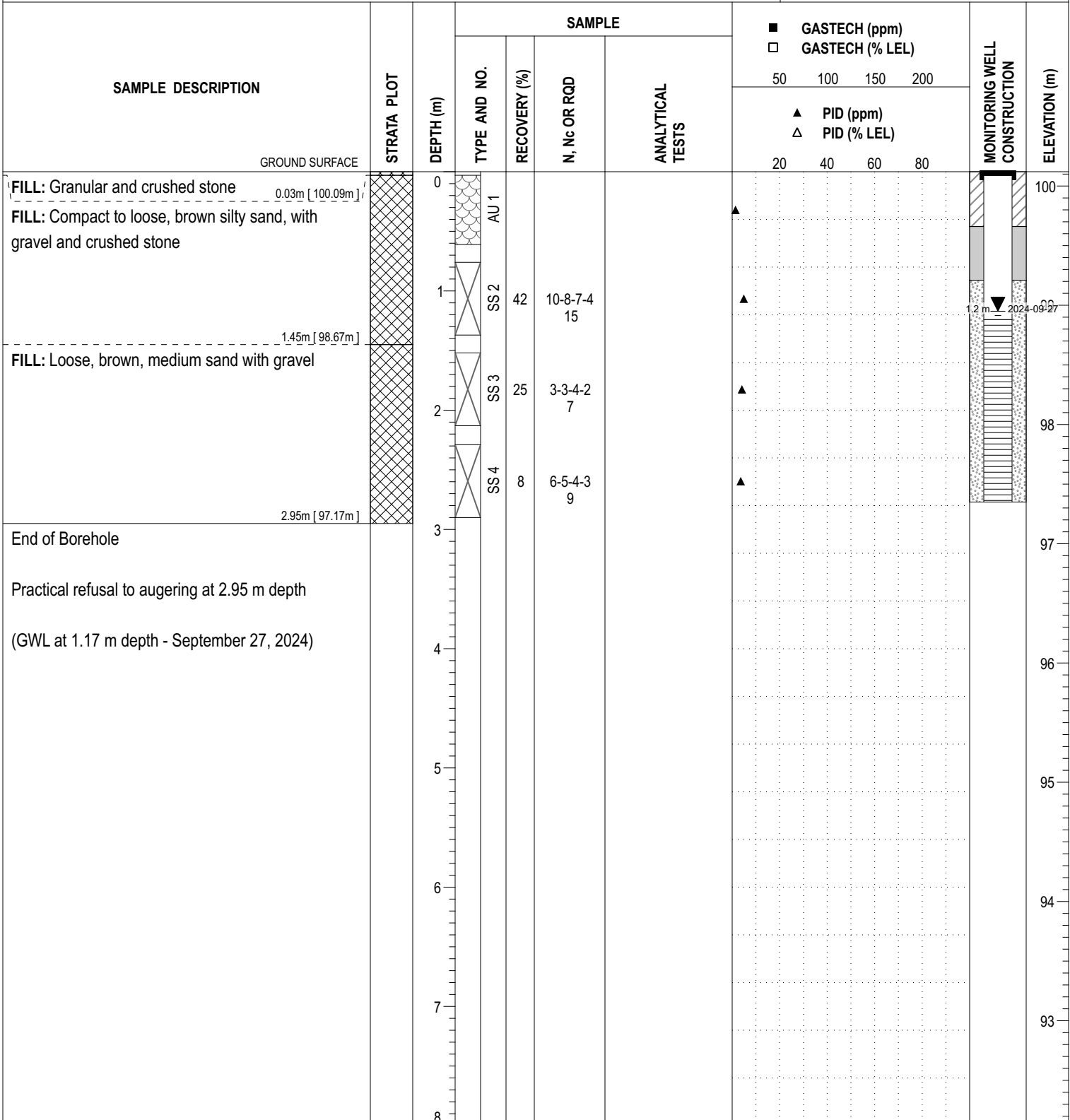
**COORD. SYS.:** MTM ZONE 9      **EASTING:** 376304.22      **NORTHING:** 5019230.26      **ELEVATION:** 100.12

**PROJECT:** Proposed High-rise development

**FILE NO. :** PG2934

**BORINGS BY:** CME-55 Low Clearance Drill

**REMARKS:**
**DATE:** September 13, 2024

**HOLE NO. :** BH 3-24


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**COORD. SYS.:** MTM ZONE 9      **EASTING:** 376245.10      **NORTHING:** 5019216.58      **ELEVATION:** 101.47

**PROJECT:** Proposed High-rise development      **FILE NO. :** PG2934

**BORINGS BY:** CME-55 Low Clearance Drill

**REMARKS:**      **DATE:** September 13, 2024      **HOLE NO. :** BH 4-24

| SAMPLE DESCRIPTION                                                                   | STRATA PLOT | DEPTH (m) | SAMPLE       |              |                       |                  | <div> <div> <div>■ GASTECH (ppm)</div> <div>□ GASTECH (% LEL)</div> </div> <div> <div>▲ PID (ppm)</div> <div>△ PID (% LEL)</div> </div> </div> |     |     |     | PIEZOMETER CONSTRUCTION | ELEVATION (m) |
|--------------------------------------------------------------------------------------|-------------|-----------|--------------|--------------|-----------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-------------------------|---------------|
|                                                                                      |             |           | TYPE AND NO. | RECOVERY (%) | N, Nc OR RQD          | ANALYTICAL TESTS | 50                                                                                                                                             | 100 | 150 | 200 |                         |               |
|                                                                                      |             |           |              |              |                       |                  | 20                                                                                                                                             | 40  | 60  | 80  |                         |               |
| GROUND SURFACE                                                                       |             | 0         | AU 1         |              |                       |                  |                                                                                                                                                |     |     |     |                         | 101           |
| FILL: Compact, brown silty sand, with grave, trace cobbles                           |             |           |              |              |                       |                  |                                                                                                                                                |     |     |     |                         |               |
| 0.91m [100.56m]                                                                      |             | 1         | SS 2         | 27           | 6-37-23-19<br>60      |                  |                                                                                                                                                |     |     |     |                         | 100           |
| Very dense to dense, brown silty sand, with gravel, cobbles and boulders             |             |           |              |              |                       |                  |                                                                                                                                                |     |     |     |                         |               |
|                                                                                      |             | 2         | SS 3         | 17           | 13-15-16-8<br>31      |                  |                                                                                                                                                |     |     |     |                         |               |
|                                                                                      |             |           |              |              |                       |                  |                                                                                                                                                |     |     |     |                         |               |
| 2.62m [98.85m]                                                                       |             |           | SS 4         | 62           | 15-17-16-14<br>33     |                  |                                                                                                                                                |     |     |     |                         | 99            |
| FILL: Dense, grey silty sand, with gravel, cobbles and boulders                      |             |           |              |              |                       |                  |                                                                                                                                                |     |     |     |                         |               |
| 2.97m [98.50m]                                                                       |             | 3         | SS 5         | 62           | 18-17-50-/<br>67/0.18 |                  |                                                                                                                                                |     |     |     |                         | 98            |
| FILL: Dense, grey silty fine sand, with gravel, cobbles and boulders, trace organics |             |           |              |              |                       |                  |                                                                                                                                                |     |     |     |                         |               |
| 3.38m [98.09m]                                                                       |             |           |              |              |                       |                  |                                                                                                                                                |     |     |     |                         |               |
| End of Borehole                                                                      |             | 4         |              |              |                       |                  |                                                                                                                                                |     |     |     |                         |               |
| Practical refusal to augering at 3.38 m depth                                        |             | 5         |              |              |                       |                  |                                                                                                                                                |     |     |     |                         | 97            |
|                                                                                      |             | 6         |              |              |                       |                  |                                                                                                                                                |     |     |     |                         | 96            |
|                                                                                      |             | 7         |              |              |                       |                  |                                                                                                                                                |     |     |     |                         | 95            |
|                                                                                      |             | 8         |              |              |                       |                  |                                                                                                                                                |     |     |     |                         | 94            |

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**COORD. SYS.:** MTM ZONE 9      **EASTING:** 376295.46      **NORTHING:** 5019206.85      **ELEVATION:** 99.77

**PROJECT:** Proposed High-rise development

**FILE NO. :** PG2934

**BORINGS BY:** CME-55 Low Clearance Drill

**HOLE NO. :** BH 5-24

**REMARKS:**
**DATE:** September 13, 2024

| SAMPLE DESCRIPTION                                                                         | STRATA PLOT | SAMPLE    |              |              |                      |                  | GASTECH (ppm)<br>GASTECH (% LEL) |     |     |     | PIEZOMETER<br>CONSTRUCTION | ELEVATION (m) |
|--------------------------------------------------------------------------------------------|-------------|-----------|--------------|--------------|----------------------|------------------|----------------------------------|-----|-----|-----|----------------------------|---------------|
|                                                                                            |             | DEPTH (m) | TYPE AND NO. | RECOVERY (%) | N, Nc OR RQD         | ANALYTICAL TESTS | 50                               | 100 | 150 | 200 |                            |               |
|                                                                                            |             |           |              |              |                      |                  | PID (ppm)<br>PID (% LEL)         |     |     |     |                            |               |
|                                                                                            |             |           |              |              |                      |                  | 20                               | 40  | 60  | 80  |                            |               |
| GROUND SURFACE                                                                             |             | 0         |              |              |                      |                  |                                  |     |     |     |                            |               |
| FILL: Compact, brown silty fine sand, with gravel                                          |             |           | AU 1         |              |                      |                  |                                  |     |     |     |                            |               |
| 0.91m [ 98.86m ]                                                                           |             | 1         | SS 2         | 100          | 9-12-18-19<br>30     |                  |                                  |     |     |     |                            | 99            |
| GLACIAL TILL: Dense to very dense brown silty fine sand, with gravel, cobbles and boulders |             |           |              |              |                      |                  |                                  |     |     |     |                            |               |
| 1.68m [ 98.09m ]                                                                           |             | 2         | SS 3         | 67           | 12-27-25-17<br>52    |                  |                                  |     |     |     |                            | 98            |
| GLACIAL TILL: Very dense to dense, grey silty fine sand, with gravel, cobbles and boulders |             |           |              |              |                      |                  |                                  |     |     |     |                            |               |
| - Trace clay by 2.29 m depth                                                               |             |           | SS 4         | 100          | 6-18-30-32<br>48     |                  |                                  |     |     |     |                            | 97            |
|                                                                                            |             | 3         | SS 5         | 51           | 33-50-/-/<br>50/0.05 |                  |                                  |     |     |     |                            |               |
|                                                                                            |             |           |              |              |                      |                  |                                  |     |     |     |                            |               |
|                                                                                            |             | 4         | SS 6         | 100          | 14-22-29-31<br>51    |                  |                                  |     |     |     |                            | 96            |
| - Sand content increasing                                                                  |             |           |              |              |                      |                  |                                  |     |     |     |                            |               |
|                                                                                            |             | 5         | SS 7         | 139          | 19-22-26-50<br>48    |                  |                                  |     |     |     |                            | 95            |
| 5.31m [ 94.46m ]                                                                           |             |           |              |              |                      |                  |                                  |     |     |     |                            |               |
| End of Borehole                                                                            |             |           |              |              |                      |                  |                                  |     |     |     |                            |               |
| Practical refusal to augering at 5.31 m depth                                              |             | 6         |              |              |                      |                  |                                  |     |     |     |                            | 94            |
|                                                                                            |             |           |              |              |                      |                  |                                  |     |     |     |                            |               |
|                                                                                            |             | 7         |              |              |                      |                  |                                  |     |     |     |                            | 93            |
|                                                                                            |             |           |              |              |                      |                  |                                  |     |     |     |                            |               |
|                                                                                            |             | 8         |              |              |                      |                  |                                  |     |     |     |                            | 92            |

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## 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<br>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 = $(D_{30})^2 / (D_{10} \times D_{60})$                                                                                   |
| Cu  | - | Uniformity coefficient = $D_{60} / D_{10}$                                                                                                      |

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

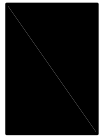
|            |   |                                                                |
|------------|---|----------------------------------------------------------------|
| $p'_o$     | - | Present effective overburden pressure at sample depth          |
| $p'_c$     | - | Preconsolidation pressure of (maximum 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   |   | Overconsolidation 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)

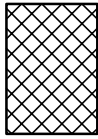
### STRATA PLOT



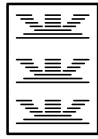
Topsoil



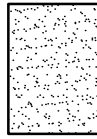
Asphalt



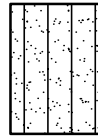
Fill



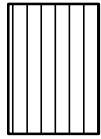
Peat



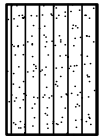
Sand



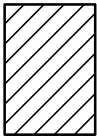
Silty Sand



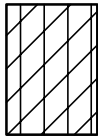
Silt



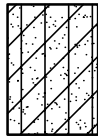
Sandy Silt



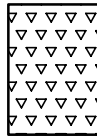
Clay



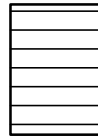
Silty Clay



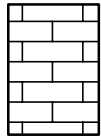
Clayey Silty Sand



Glacial Till



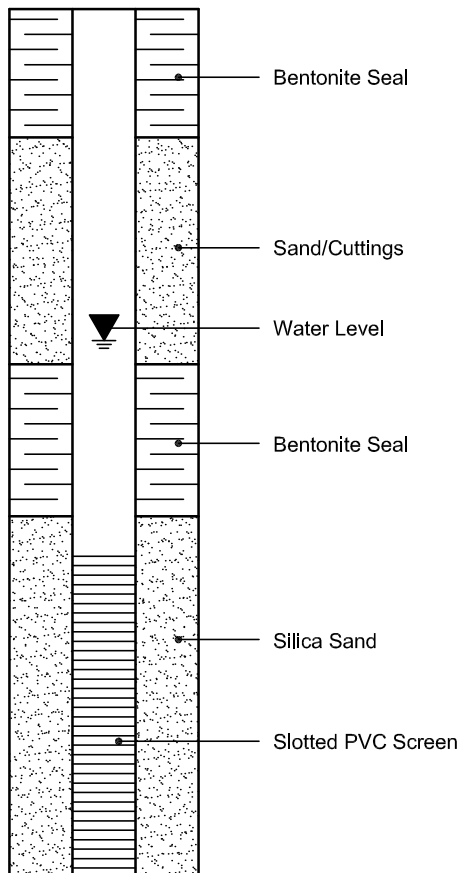
Shale



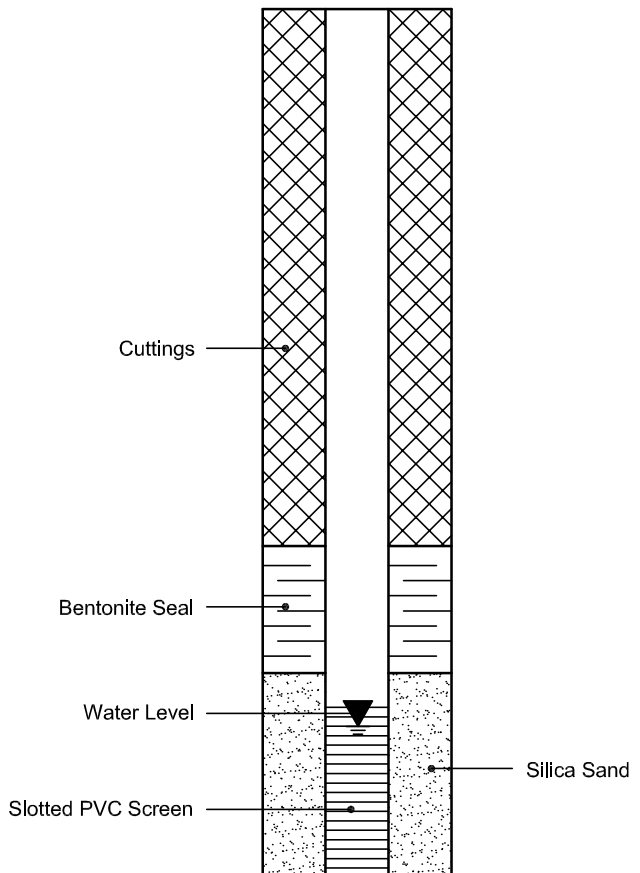
Bedrock

### MONITORING WELL AND PIEZOMETER CONSTRUCTION

#### MONITORING WELL CONSTRUCTION



#### PIEZOMETER CONSTRUCTION



## Certificate of Analysis

**Paterson Group Consulting Engineers (Ottawa)**

9 Auriga Drive  
Ottawa, ON K2E 7T9  
Attn: Nick Sullivan

Client PO: 61298  
Project: PE6616

Custody:

Report Date: 1-Oct-2024

Order Date: 17-Sep-2024

Revised Report

**Order #: 2438165**

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

| Paracel ID | Client ID       |
|------------|-----------------|
| 2438165-01 | BH1-24-SS2      |
| 2438165-02 | BH1-24-SS3A     |
| 2438165-03 | BH1-24-SS4      |
| 2438165-05 | BH2-24-AU1      |
| 2438165-06 | BH2-24-AU1/SS2A |
| 2438165-07 | BH3-24-SS2/SS3  |
| 2438165-08 | BH4-24-AU1      |
| 2438165-09 | BH5-24-AU1      |
| 2438165-10 | DUP-1           |

Approved By:



Mark Foto, M.Sc.

Lab Supervisor

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

## Analysis Summary Table

| Analysis                        | Method Reference/Description                     | Extraction Date | Analysis Date |
|---------------------------------|--------------------------------------------------|-----------------|---------------|
| BTEX by P&T GC-MS               | EPA 8260 - P&T GC-MS                             | 18-Sep-24       | 19-Sep-24     |
| Chromium, hexavalent - soil     | MOE E3056 - Extraction, colourimetric            | 19-Sep-24       | 23-Sep-24     |
| Mercury by CVAA                 | EPA 7471B - CVAA, digestion                      | 19-Sep-24       | 19-Sep-24     |
| PCBs, total                     | SW846 8082A - GC-ECD                             | 18-Sep-24       | 18-Sep-24     |
| pH, soil                        | EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext. | 18-Sep-24       | 18-Sep-24     |
| PHC F1                          | CWS Tier 1 - P&T GC-FID                          | 18-Sep-24       | 19-Sep-24     |
| PHC F4G (gravimetric)           | CWS Tier 1 - Extraction Gravimetric              | 18-Sep-24       | 20-Sep-24     |
| PHCs F2 to F4                   | CWS Tier 1 - GC-FID, extraction                  | 18-Sep-24       | 18-Sep-24     |
| REG 153: Metals by ICP/MS, soil | EPA 6020 - Digestion - ICP-MS                    | 19-Sep-24       | 20-Sep-24     |
| REG 153: PAHs by GC-MS          | EPA 8270 - GC-MS, extraction                     | 18-Sep-24       | 18-Sep-24     |
| Solids, %                       | CWS Tier 1 - Gravimetric                         | 17-Sep-24       | 18-Sep-24     |

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

|              |                 |                 |                 |                 |   |   |
|--------------|-----------------|-----------------|-----------------|-----------------|---|---|
| Client ID:   | BH1-24-SS2      | BH1-24-SS3A     | BH1-24-SS4      | BH2-24-AU1      |   |   |
| Sample Date: | 13-Sep-24 09:00 | 13-Sep-24 09:00 | 13-Sep-24 09:00 | 13-Sep-24 09:00 | - | - |
| Sample ID:   | 2438165-01      | 2438165-02      | 2438165-03      | 2438165-05      |   |   |
| Matrix:      | Soil            | Soil            | Soil            | Soil            |   |   |
| MDL/Units    |                 |                 |                 |                 |   |   |

**Physical Characteristics**

|          |              |      |      |      |      |   |   |
|----------|--------------|------|------|------|------|---|---|
| % Solids | 0.1 % by Wt. | 82.1 | 84.2 | 93.0 | 91.8 | - | - |
|----------|--------------|------|------|------|------|---|---|

**General Inorganics**

|    |               |   |   |      |   |   |   |
|----|---------------|---|---|------|---|---|---|
| pH | 0.05 pH Units | - | - | 7.38 | - | - | - |
|----|---------------|---|---|------|---|---|---|

**Metals**

|               |           |      |   |   |   |   |   |
|---------------|-----------|------|---|---|---|---|---|
| Antimony      | 1.0 ug/g  | <1.0 | - | - | - | - | - |
| Arsenic       | 1.0 ug/g  | 8.4  | - | - | - | - | - |
| Barium        | 1.0 ug/g  | 138  | - | - | - | - | - |
| Beryllium     | 0.5 ug/g  | 0.8  | - | - | - | - | - |
| Boron         | 5.0 ug/g  | 10.1 | - | - | - | - | - |
| Cadmium       | 0.5 ug/g  | <0.5 | - | - | - | - | - |
| Chromium      | 5.0 ug/g  | 36.7 | - | - | - | - | - |
| Chromium (VI) | 0.2 ug/g  | <0.2 | - | - | - | - | - |
| Cobalt        | 1.0 ug/g  | 13.1 | - | - | - | - | - |
| Copper        | 5.0 ug/g  | 29.9 | - | - | - | - | - |
| Lead          | 1.0 ug/g  | 10.7 | - | - | - | - | - |
| Mercury       | 0.1 ug/g  | <0.1 | - | - | - | - | - |
| Molybdenum    | 1.0 ug/g  | 1.3  | - | - | - | - | - |
| Nickel        | 5.0 ug/g  | 28.9 | - | - | - | - | - |
| Selenium      | 1.0 ug/g  | <1.0 | - | - | - | - | - |
| Silver        | 0.3 ug/g  | <0.3 | - | - | - | - | - |
| Thallium      | 1.0 ug/g  | <1.0 | - | - | - | - | - |
| Uranium       | 1.0 ug/g  | <1.0 | - | - | - | - | - |
| Vanadium      | 10.0 ug/g | 51.1 | - | - | - | - | - |
| Zinc          | 20.0 ug/g | 60.0 | - | - | - | - | - |

**Volatiles**

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

|              |                 |                 |                 |                 |   |   |
|--------------|-----------------|-----------------|-----------------|-----------------|---|---|
| Client ID:   | BH1-24-SS2      | BH1-24-SS3A     | BH1-24-SS4      | BH2-24-AU1      | - | - |
| Sample Date: | 13-Sep-24 09:00 | 13-Sep-24 09:00 | 13-Sep-24 09:00 | 13-Sep-24 09:00 | - | - |
| Sample ID:   | 2438165-01      | 2438165-02      | 2438165-03      | 2438165-05      | - | - |
| Matrix:      | Soil            | Soil            | Soil            | Soil            | - | - |
| MDL/Units    |                 |                 |                 |                 |   |   |

#### 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 | - | 120%  | - | 115%  | - | - |

#### Hydrocarbons

|                   |        |   |     |    |    |   |   |
|-------------------|--------|---|-----|----|----|---|---|
| F1 PHCs (C6-C10)  | 7 ug/g | - | 30  | <7 | <7 | - | - |
| F2 PHCs (C10-C16) | 4 ug/g | - | 577 | 44 | 97 | - | - |
| F3 PHCs (C16-C34) | 8 ug/g | - | 327 | 37 | 67 | - | - |
| F4 PHCs (C34-C50) | 6 ug/g | - | <6  | <6 | 28 | - | - |

#### Semi-Volatiles

|                          |           |       |   |   |   |   |   |
|--------------------------|-----------|-------|---|---|---|---|---|
| Acenaphthene             | 0.02 ug/g | <0.02 | - | - | - | - | - |
| Acenaphthylene           | 0.02 ug/g | <0.02 | - | - | - | - | - |
| Anthracene               | 0.02 ug/g | <0.02 | - | - | - | - | - |
| Benzo [a] anthracene     | 0.02 ug/g | <0.02 | - | - | - | - | - |
| Benzo [a] pyrene         | 0.02 ug/g | <0.02 | - | - | - | - | - |
| Benzo [b] fluoranthene   | 0.02 ug/g | <0.02 | - | - | - | - | - |
| Benzo [g,h,i] perylene   | 0.02 ug/g | <0.02 | - | - | - | - | - |
| Benzo [k] fluoranthene   | 0.02 ug/g | <0.02 | - | - | - | - | - |
| Chrysene                 | 0.02 ug/g | <0.02 | - | - | - | - | - |
| Dibenzo [a,h] anthracene | 0.02 ug/g | <0.02 | - | - | - | - | - |
| Fluoranthene             | 0.02 ug/g | <0.02 | - | - | - | - | - |
| Fluorene                 | 0.02 ug/g | <0.02 | - | - | - | - | - |

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

|              |                 |                 |                 |                 |   |   |
|--------------|-----------------|-----------------|-----------------|-----------------|---|---|
| Client ID:   | BH1-24-SS2      | BH1-24-SS3A     | BH1-24-SS4      | BH2-24-AU1      |   |   |
| Sample Date: | 13-Sep-24 09:00 | 13-Sep-24 09:00 | 13-Sep-24 09:00 | 13-Sep-24 09:00 | - | - |
| Sample ID:   | 2438165-01      | 2438165-02      | 2438165-03      | 2438165-05      |   |   |
| Matrix:      | Soil            | Soil            | Soil            | Soil            |   |   |
| MDL/Units    |                 |                 |                 |                 |   |   |

**Semi-Volatiles**

|                          |           |       |   |   |   |   |
|--------------------------|-----------|-------|---|---|---|---|
| Indeno [1,2,3-cd] pyrene | 0.02 ug/g | <0.02 | - | - | - | - |
| 1-Methylnaphthalene      | 0.02 ug/g | <0.02 | - | - | - | - |
| 2-Methylnaphthalene      | 0.02 ug/g | <0.02 | - | - | - | - |
| Methylnaphthalene (1&2)  | 0.04 ug/g | <0.04 | - | - | - | - |
| Naphthalene              | 0.01 ug/g | <0.01 | - | - | - | - |
| Phenanthrene             | 0.02 ug/g | <0.02 | - | - | - | - |
| Pyrene                   | 0.02 ug/g | <0.02 | - | - | - | - |
| 2-Fluorobiphenyl         | Surrogate | 62.0% | - | - | - | - |
| Terphenyl-d14            | Surrogate | 87.6% | - | - | - | - |

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

|              |                 |                 |                 |                 |   |   |
|--------------|-----------------|-----------------|-----------------|-----------------|---|---|
| Client ID:   | BH2-24-AU1/SS2A | BH3-24-SS2/SS3  | BH4-24-AU1      | BH5-24-AU1      |   |   |
| Sample Date: | 13-Sep-24 09:00 | 13-Sep-24 09:00 | 13-Sep-24 09:00 | 16-Sep-24 09:00 | - | - |
| Sample ID:   | 2438165-06      | 2438165-07      | 2438165-08      | 2438165-09      |   |   |
| Matrix:      | Soil            | Soil            | Soil            | Soil            |   |   |
| MDL/Units    |                 |                 |                 |                 |   |   |

#### Physical Characteristics

|          |              |      |      |      |      |   |   |
|----------|--------------|------|------|------|------|---|---|
| % Solids | 0.1 % by Wt. | 89.8 | 92.0 | 90.6 | 93.6 | - | - |
|----------|--------------|------|------|------|------|---|---|

#### General Inorganics

|    |               |   |   |      |   |   |   |
|----|---------------|---|---|------|---|---|---|
| pH | 0.05 pH Units | - | - | 7.43 | - | - | - |
|----|---------------|---|---|------|---|---|---|

#### Metals

|               |           |      |      |      |      |   |   |
|---------------|-----------|------|------|------|------|---|---|
| Antimony      | 1.0 ug/g  | <1.0 | <1.0 | <1.0 | <1.0 | - | - |
| Arsenic       | 1.0 ug/g  | 2.9  | 3.7  | 4.7  | 6.6  | - | - |
| Barium        | 1.0 ug/g  | 46.2 | 227  | 63.2 | 59.7 | - | - |
| Beryllium     | 0.5 ug/g  | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| Boron         | 5.0 ug/g  | 7.7  | 14.5 | 9.7  | 8.6  | - | - |
| Cadmium       | 0.5 ug/g  | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| Chromium (VI) | 0.2 ug/g  | <0.2 | <0.2 | <0.2 | <0.2 | - | - |
| Chromium      | 5.0 ug/g  | 14.1 | 16.7 | 17.0 | 14.6 | - | - |
| Cobalt        | 1.0 ug/g  | 4.8  | 7.4  | 7.3  | 7.5  | - | - |
| Copper        | 5.0 ug/g  | 15.7 | 16.6 | 23.1 | 16.2 | - | - |
| Lead          | 1.0 ug/g  | 4.6  | 10.1 | 8.4  | 16.0 | - | - |
| Mercury       | 0.1 ug/g  | <0.1 | <0.1 | <0.1 | <0.1 | - | - |
| Molybdenum    | 1.0 ug/g  | <1.0 | 1.4  | 1.4  | 3.6  | - | - |
| Nickel        | 5.0 ug/g  | 11.3 | 16.2 | 16.1 | 16.6 | - | - |
| Selenium      | 1.0 ug/g  | <1.0 | <1.0 | <1.0 | <1.0 | - | - |
| Silver        | 0.3 ug/g  | <0.3 | <0.3 | <0.3 | <0.3 | - | - |
| Thallium      | 1.0 ug/g  | <1.0 | <1.0 | <1.0 | <1.0 | - | - |
| Uranium       | 1.0 ug/g  | <1.0 | <1.0 | <1.0 | <1.0 | - | - |
| Vanadium      | 10.0 ug/g | 23.7 | 20.4 | 24.7 | 23.0 | - | - |
| Zinc          | 20.0 ug/g | 23.0 | 26.1 | 37.9 | 28.6 | - | - |

#### Volatiles

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

|              |                 |                 |                 |                 |   |   |
|--------------|-----------------|-----------------|-----------------|-----------------|---|---|
| Client ID:   | BH2-24-AU1/SS2A | BH3-24-SS2/SS3  | BH4-24-AU1      | BH5-24-AU1      | - | - |
| Sample Date: | 13-Sep-24 09:00 | 13-Sep-24 09:00 | 13-Sep-24 09:00 | 16-Sep-24 09:00 | - | - |
| Sample ID:   | 2438165-06      | 2438165-07      | 2438165-08      | 2438165-09      | - | - |
| Matrix:      | Soil            | Soil            | Soil            | Soil            | - | - |
| MDL/Units    |                 |                 |                 |                 |   |   |

#### Volatiles

|                |           |   |       |   |   |   |   |
|----------------|-----------|---|-------|---|---|---|---|
| Benzene        | 0.02 ug/g | - | <0.02 | - | - | - | - |
| Ethylbenzene   | 0.05 ug/g | - | <0.05 | - | - | - | - |
| Toluene        | 0.05 ug/g | - | <0.05 | - | - | - | - |
| m,p-Xylenes    | 0.05 ug/g | - | <0.05 | - | - | - | - |
| o-Xylene       | 0.05 ug/g | - | <0.05 | - | - | - | - |
| Xylenes, total | 0.05 ug/g | - | <0.05 | - | - | - | - |
| Toluene-d8     | Surrogate | - | 119%  | - | - | - | - |

#### Hydrocarbons

|                        |         |   |         |   |         |   |   |
|------------------------|---------|---|---------|---|---------|---|---|
| F1 PHCs (C6-C10)       | 7 ug/g  | - | <7      | - | <7      | - | - |
| F2 PHCs (C10-C16)      | 4 ug/g  | - | 21      | - | 6       | - | - |
| F3 PHCs (C16-C34)      | 8 ug/g  | - | 115     | - | 82      | - | - |
| F4 PHCs (C34-C50)      | 6 ug/g  | - | 105 [1] | - | 156 [1] | - | - |
| F4G PHCs (gravimetric) | 50 ug/g | - | 630     | - | 1470    | - | - |

#### Semi-Volatiles

|                          |           |       |       |       |       |   |   |
|--------------------------|-----------|-------|-------|-------|-------|---|---|
| Acenaphthene             | 0.02 ug/g | <0.02 | <0.02 | <0.02 | <0.02 | - | - |
| Acenaphthylene           | 0.02 ug/g | <0.02 | 0.05  | <0.02 | <0.02 | - | - |
| Anthracene               | 0.02 ug/g | <0.02 | 0.03  | <0.02 | <0.02 | - | - |
| Benzo [a] anthracene     | 0.02 ug/g | <0.02 | 0.05  | <0.02 | <0.02 | - | - |
| Benzo [a] pyrene         | 0.02 ug/g | <0.02 | 0.06  | <0.02 | <0.02 | - | - |
| Benzo [b] fluoranthene   | 0.02 ug/g | <0.02 | 0.06  | <0.02 | 0.02  | - | - |
| Benzo [g,h,i] perylene   | 0.02 ug/g | <0.02 | 0.05  | <0.02 | 0.05  | - | - |
| Benzo [k] fluoranthene   | 0.02 ug/g | <0.02 | 0.03  | <0.02 | <0.02 | - | - |
| Chrysene                 | 0.02 ug/g | <0.02 | 0.05  | <0.02 | <0.02 | - | - |
| Dibenzo [a,h] anthracene | 0.02 ug/g | <0.02 | <0.02 | <0.02 | <0.02 | - | - |
| Fluoranthene             | 0.02 ug/g | <0.02 | 0.10  | <0.02 | 0.03  | - | - |

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

|              |                 |                 |                 |                 |   |   |
|--------------|-----------------|-----------------|-----------------|-----------------|---|---|
| Client ID:   | BH2-24-AU1/SS2A | BH3-24-SS2/SS3  | BH4-24-AU1      | BH5-24-AU1      |   |   |
| Sample Date: | 13-Sep-24 09:00 | 13-Sep-24 09:00 | 13-Sep-24 09:00 | 16-Sep-24 09:00 | - | - |
| Sample ID:   | 2438165-06      | 2438165-07      | 2438165-08      | 2438165-09      |   |   |
| Matrix:      | Soil            | Soil            | Soil            | Soil            |   |   |
| MDL/Units    |                 |                 |                 |                 |   |   |

#### Semi-Volatiles

|                          |           |       |       |       |       |   |   |
|--------------------------|-----------|-------|-------|-------|-------|---|---|
| Fluorene                 | 0.02 ug/g | <0.02 | <0.02 | <0.02 | <0.02 | - | - |
| Indeno [1,2,3-cd] pyrene | 0.02 ug/g | <0.02 | 0.04  | <0.02 | 0.02  | - | - |
| 1-Methylnaphthalene      | 0.02 ug/g | <0.02 | <0.02 | <0.02 | <0.02 | - | - |
| 2-Methylnaphthalene      | 0.02 ug/g | <0.02 | <0.02 | <0.02 | <0.02 | - | - |
| Methylnaphthalene (1&2)  | 0.04 ug/g | <0.04 | <0.04 | <0.04 | <0.04 | - | - |
| Naphthalene              | 0.01 ug/g | <0.01 | <0.01 | <0.01 | <0.01 | - | - |
| Phenanthrene             | 0.02 ug/g | <0.02 | 0.04  | <0.02 | <0.02 | - | - |
| Pyrene                   | 0.02 ug/g | <0.02 | 0.12  | <0.02 | 0.03  | - | - |
| 2-Fluorobiphenyl         | Surrogate | 63.7% | 55.0% | 68.4% | 70.6% | - | - |
| Terphenyl-d14            | Surrogate | 95.0% | 74.7% | 102%  | 76.6% | - | - |

#### PCBs

|                    |           |   |   |   |       |   |   |
|--------------------|-----------|---|---|---|-------|---|---|
| PCBs, total        | 0.05 ug/g | - | - | - | <0.05 | - | - |
| Decachlorobiphenyl | Surrogate | - | - | - | 122%  | - | - |

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

|              |                 |  |  |  |   |
|--------------|-----------------|--|--|--|---|
| Client ID:   | DUP-1           |  |  |  |   |
| Sample Date: | 16-Sep-24 09:00 |  |  |  | - |
| Sample ID:   | 2438165-10      |  |  |  | - |
| Matrix:      | Soil            |  |  |  |   |
| MDL/Units    |                 |  |  |  |   |

#### Physical Characteristics

|          |              |      |   |   |   |   |
|----------|--------------|------|---|---|---|---|
| % Solids | 0.1 % by Wt. | 94.0 | - | - | - | - |
|----------|--------------|------|---|---|---|---|

#### Metals

|            |           |      |   |   |   |   |
|------------|-----------|------|---|---|---|---|
| Antimony   | 1.0 ug/g  | <1.0 | - | - | - | - |
| Arsenic    | 1.0 ug/g  | 6.4  | - | - | - | - |
| Barium     | 1.0 ug/g  | 49.1 | - | - | - | - |
| Beryllium  | 0.5 ug/g  | <0.5 | - | - | - | - |
| Boron      | 5.0 ug/g  | 7.2  | - | - | - | - |
| Cadmium    | 0.5 ug/g  | <0.5 | - | - | - | - |
| Chromium   | 5.0 ug/g  | 12.7 | - | - | - | - |
| Cobalt     | 1.0 ug/g  | 7.5  | - | - | - | - |
| Copper     | 5.0 ug/g  | 16.7 | - | - | - | - |
| Lead       | 1.0 ug/g  | 16.8 | - | - | - | - |
| Molybdenum | 1.0 ug/g  | 3.4  | - | - | - | - |
| Nickel     | 5.0 ug/g  | 16.9 | - | - | - | - |
| Selenium   | 1.0 ug/g  | <1.0 | - | - | - | - |
| Silver     | 0.3 ug/g  | <0.3 | - | - | - | - |
| Thallium   | 1.0 ug/g  | <1.0 | - | - | - | - |
| Uranium    | 1.0 ug/g  | <1.0 | - | - | - | - |
| Vanadium   | 10.0 ug/g | 21.4 | - | - | - | - |
| Zinc       | 20.0 ug/g | 29.1 | - | - | - | - |

#### Hydrocarbons

|                   |        |         |   |   |   |   |
|-------------------|--------|---------|---|---|---|---|
| F1 PHCs (C6-C10)  | 7 ug/g | <7      | - | - | - | - |
| F2 PHCs (C10-C16) | 4 ug/g | <4      | - | - | - | - |
| F3 PHCs (C16-C34) | 8 ug/g | 72      | - | - | - | - |
| F4 PHCs (C34-C50) | 6 ug/g | 132 [1] | - | - | - | - |

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

|              |                 |  |  |  |   |   |
|--------------|-----------------|--|--|--|---|---|
| Client ID:   | DUP-1           |  |  |  |   |   |
| Sample Date: | 16-Sep-24 09:00 |  |  |  | - | - |
| Sample ID:   | 2438165-10      |  |  |  |   |   |
| Matrix:      | Soil            |  |  |  |   |   |
| MDL/Units    |                 |  |  |  |   |   |

Hydrocarbons

|                        |         |     |   |   |   |   |
|------------------------|---------|-----|---|---|---|---|
| F4G PHCs (gravimetric) | 50 ug/g | 404 | - | - | - | - |
|------------------------|---------|-----|---|---|---|---|

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

## Method Quality Control: Blank

| Analyte                       | Result | Reporting Limit | Units | %REC | %REC Limit | RPD | RPD Limit | Notes |
|-------------------------------|--------|-----------------|-------|------|------------|-----|-----------|-------|
| <b>Hydrocarbons</b>           |        |                 |       |      |            |     |           |       |
| F1 PHCs (C6-C10)              | ND     | 7               | ug/g  |      |            |     |           |       |
| F2 PHCs (C10-C16)             | ND     | 4               | ug/g  |      |            |     |           |       |
| F3 PHCs (C16-C34)             | ND     | 8               | ug/g  |      |            |     |           |       |
| F4 PHCs (C34-C50)             | ND     | 6               | ug/g  |      |            |     |           |       |
| F4G PHCs (gravimetric)        | ND     | 50              | ug/g  |      |            |     |           |       |
| <b>Metals</b>                 |        |                 |       |      |            |     |           |       |
| Antimony                      | ND     | 1.0             | ug/g  |      |            |     |           |       |
| Arsenic                       | ND     | 1.0             | ug/g  |      |            |     |           |       |
| Barium                        | ND     | 1.0             | ug/g  |      |            |     |           |       |
| Beryllium                     | ND     | 0.5             | ug/g  |      |            |     |           |       |
| Boron                         | ND     | 5.0             | ug/g  |      |            |     |           |       |
| Cadmium                       | ND     | 0.5             | ug/g  |      |            |     |           |       |
| Chromium (VI)                 | ND     | 0.2             | ug/g  |      |            |     |           |       |
| Chromium                      | ND     | 5.0             | ug/g  |      |            |     |           |       |
| Cobalt                        | ND     | 1.0             | ug/g  |      |            |     |           |       |
| Copper                        | ND     | 5.0             | ug/g  |      |            |     |           |       |
| Lead                          | ND     | 1.0             | ug/g  |      |            |     |           |       |
| Mercury                       | ND     | 0.1             | ug/g  |      |            |     |           |       |
| Molybdenum                    | ND     | 1.0             | ug/g  |      |            |     |           |       |
| Nickel                        | ND     | 5.0             | ug/g  |      |            |     |           |       |
| Selenium                      | ND     | 1.0             | ug/g  |      |            |     |           |       |
| Silver                        | ND     | 0.3             | ug/g  |      |            |     |           |       |
| Thallium                      | ND     | 1.0             | ug/g  |      |            |     |           |       |
| Uranium                       | ND     | 1.0             | ug/g  |      |            |     |           |       |
| Vanadium                      | ND     | 10.0            | ug/g  |      |            |     |           |       |
| Zinc                          | ND     | 20.0            | ug/g  |      |            |     |           |       |
| <b>PCBs</b>                   |        |                 |       |      |            |     |           |       |
| PCBs, total                   | ND     | 0.05            | ug/g  |      |            |     |           |       |
| Surrogate: Decachlorobiphenyl | 0.119  |                 | %     | 119  | 60-140     |     |           |       |
| <b>Semi-Volatiles</b>         |        |                 |       |      |            |     |           |       |
| Acenaphthene                  | ND     | 0.02            | ug/g  |      |            |     |           |       |
| Acenaphthylene                | ND     | 0.02            | ug/g  |      |            |     |           |       |

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

**Method Quality Control: Blank**

| Analyte                     | Result | Reporting Limit | Units | %REC | %REC Limit | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|------|------------|-----|-----------|-------|
| Anthracene                  | ND     | 0.02            | ug/g  |      |            |     |           |       |
| Benzo [a] anthracene        | ND     | 0.02            | ug/g  |      |            |     |           |       |
| Benzo [a] pyrene            | ND     | 0.02            | ug/g  |      |            |     |           |       |
| Benzo [b] fluoranthene      | ND     | 0.02            | ug/g  |      |            |     |           |       |
| Benzo [g,h,i] perylene      | ND     | 0.02            | ug/g  |      |            |     |           |       |
| Benzo [k] fluoranthene      | ND     | 0.02            | ug/g  |      |            |     |           |       |
| Chrysene                    | ND     | 0.02            | ug/g  |      |            |     |           |       |
| Dibenzo [a,h] anthracene    | ND     | 0.02            | ug/g  |      |            |     |           |       |
| Fluoranthene                | ND     | 0.02            | ug/g  |      |            |     |           |       |
| Fluorene                    | ND     | 0.02            | ug/g  |      |            |     |           |       |
| Indeno [1,2,3-cd] pyrene    | ND     | 0.02            | ug/g  |      |            |     |           |       |
| 1-Methylnaphthalene         | ND     | 0.02            | ug/g  |      |            |     |           |       |
| 2-Methylnaphthalene         | ND     | 0.02            | ug/g  |      |            |     |           |       |
| Methylnaphthalene (1&2)     | ND     | 0.04            | ug/g  |      |            |     |           |       |
| Naphthalene                 | ND     | 0.01            | ug/g  |      |            |     |           |       |
| Phenanthrene                | ND     | 0.02            | ug/g  |      |            |     |           |       |
| Pyrene                      | ND     | 0.02            | ug/g  |      |            |     |           |       |
| Surrogate: 2-Fluorobiphenyl | 0.916  |                 | %     | 68.7 | 50-140     |     |           |       |
| Surrogate: Terphenyl-d14    | 1.34   |                 | %     | 100  | 50-140     |     |           |       |
| <b>Volatiles</b>            |        |                 |       |      |            |     |           |       |
| 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       | 9.03   |                 | %     | 113  | 50-140     |     |           |       |

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

## Method Quality Control: Duplicate

| Analyte                       | Result | Reporting Limit | Units    | Source Result | %REC | %REC Limit | RPD  | RPD Limit | Notes |
|-------------------------------|--------|-----------------|----------|---------------|------|------------|------|-----------|-------|
| <b>General Inorganics</b>     |        |                 |          |               |      |            |      |           |       |
| pH                            | 7.41   | 0.05            | pH Units | 7.44          |      |            | 0.4  | 2.3       |       |
| <b>Hydrocarbons</b>           |        |                 |          |               |      |            |      |           |       |
| F1 PHCs (C6-C10)              | ND     | 7               | ug/g     | ND            |      |            | NC   | 40        |       |
| F2 PHCs (C10-C16)             | ND     | 4               | ug/g     | ND            |      |            | NC   | 30        |       |
| F3 PHCs (C16-C34)             | ND     | 8               | ug/g     | ND            |      |            | NC   | 30        |       |
| F4 PHCs (C34-C50)             | ND     | 6               | ug/g     | ND            |      |            | NC   | 30        |       |
| <b>Metals</b>                 |        |                 |          |               |      |            |      |           |       |
| Antimony                      | ND     | 1.0             | ug/g     | ND            |      |            | NC   | 30        |       |
| Arsenic                       | 2.5    | 1.0             | ug/g     | 2.8           |      |            | 11.7 | 30        |       |
| Barium                        | 136    | 1.0             | ug/g     | 156           |      |            | 14.2 | 30        |       |
| Beryllium                     | 0.5    | 0.5             | ug/g     | 0.6           |      |            | 12.5 | 30        |       |
| Boron                         | 12.2   | 5.0             | ug/g     | 13.5          |      |            | 10.2 | 30        |       |
| Cadmium                       | ND     | 0.5             | ug/g     | ND            |      |            | NC   | 30        |       |
| Chromium (VI)                 | ND     | 0.2             | ug/g     | ND            |      |            | NC   | 35        |       |
| Chromium                      | 24.8   | 5.0             | ug/g     | 30.0          |      |            | 18.8 | 30        |       |
| Cobalt                        | 7.5    | 1.0             | ug/g     | 8.9           |      |            | 16.2 | 30        |       |
| Copper                        | 16.8   | 5.0             | ug/g     | 18.6          |      |            | 10.4 | 30        |       |
| Lead                          | 55.8   | 1.0             | ug/g     | 58.0          |      |            | 3.9  | 30        |       |
| Mercury                       | ND     | 0.1             | ug/g     | ND            |      |            | NC   | 30        |       |
| Molybdenum                    | ND     | 1.0             | ug/g     | ND            |      |            | NC   | 30        |       |
| Nickel                        | 15.2   | 5.0             | ug/g     | 17.5          |      |            | 13.9 | 30        |       |
| Selenium                      | ND     | 1.0             | ug/g     | ND            |      |            | NC   | 30        |       |
| Silver                        | ND     | 0.3             | ug/g     | ND            |      |            | NC   | 30        |       |
| Thallium                      | ND     | 1.0             | ug/g     | ND            |      |            | NC   | 30        |       |
| Uranium                       | ND     | 1.0             | ug/g     | ND            |      |            | NC   | 30        |       |
| Vanadium                      | 29.5   | 10.0            | ug/g     | 34.4          |      |            | 15.3 | 30        |       |
| Zinc                          | 69.2   | 20.0            | ug/g     | 73.4          |      |            | 5.8  | 30        |       |
| <b>PCBs</b>                   |        |                 |          |               |      |            |      |           |       |
| PCBs, total                   | ND     | 0.05            | ug/g     | ND            |      |            | NC   | 40        |       |
| Surrogate: Decachlorobiphenyl | 0.139  |                 | %        |               | 130  | 60-140     |      |           |       |

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

## Method Quality Control: Duplicate

| Analyte                         | Result | Reporting Limit | Units    | Source Result | %REC | %REC Limit | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|----------|---------------|------|------------|------|-----------|-------|
| <b>Physical Characteristics</b> |        |                 |          |               |      |            |      |           |       |
| % Solids                        | 84.6   | 0.1             | % by Wt. | 85.5          |      |            | 1.1  | 25        |       |
| <b>Semi-Volatiles</b>           |        |                 |          |               |      |            |      |           |       |
| Acenaphthene                    | ND     | 0.02            | ug/g     | ND            |      |            | NC   | 40        |       |
| Acenaphthylene                  | 0.021  | 0.02            | ug/g     | 0.023         |      |            | 9.9  | 40        |       |
| Anthracene                      | 0.034  | 0.02            | ug/g     | 0.070         |      |            | NC   | 40        |       |
| Benzo [a] anthracene            | 0.143  | 0.02            | ug/g     | 0.257         |      |            | NC   | 40        |       |
| Benzo [a] pyrene                | 0.142  | 0.02            | ug/g     | 0.222         |      |            | NC   | 40        |       |
| Benzo [b] fluoranthene          | 0.181  | 0.02            | ug/g     | 0.253         |      |            | 32.9 | 40        |       |
| Benzo [g,h,i] perylene          | 0.137  | 0.02            | ug/g     | 0.175         |      |            | 24.8 | 40        |       |
| Benzo [k] fluoranthene          | 0.091  | 0.02            | ug/g     | 0.151         |      |            | NC   | 40        |       |
| Chrysene                        | 0.155  | 0.02            | ug/g     | 0.260         |      |            | NC   | 40        |       |
| Dibenzo [a,h] anthracene        | 0.026  | 0.02            | ug/g     | 0.038         |      |            | 37.1 | 40        |       |
| Fluoranthene                    | 0.440  | 0.02            | ug/g     | 0.896         |      |            | 68.2 | 40        | QR-04 |
| Fluorene                        | ND     | 0.02            | ug/g     | ND            |      |            | NC   | 40        |       |
| Indeno [1,2,3-cd] pyrene        | 0.107  | 0.02            | ug/g     | 0.151         |      |            | 33.6 | 40        |       |
| 1-Methylnaphthalene             | ND     | 0.02            | ug/g     | ND            |      |            | NC   | 40        |       |
| 2-Methylnaphthalene             | ND     | 0.02            | ug/g     | ND            |      |            | NC   | 40        |       |
| Naphthalene                     | ND     | 0.01            | ug/g     | ND            |      |            | NC   | 40        |       |
| Phenanthrene                    | 0.158  | 0.02            | ug/g     | 0.409         |      |            | NC   | 40        |       |
| Pyrene                          | 0.367  | 0.02            | ug/g     | 0.708         |      |            | 63.5 | 40        | QR-04 |
| Surrogate: 2-Fluorobiphenyl     | 0.991  |                 | %        |               | 62.7 | 50-140     |      |           |       |
| Surrogate: Terphenyl-d14        | 1.36   |                 | %        |               | 86.4 | 50-140     |      |           |       |
| <b>Volatiles</b>                |        |                 |          |               |      |            |      |           |       |
| 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           | 10.2   |                 | %        |               | 112  | 50-140     |      |           |       |

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

## Method Quality Control: Spike

| Analyte                       | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|-------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| <b>Hydrocarbons</b>           |        |                 |       |               |      |            |     |           |       |
| F1 PHCs (C6-C10)              | 196    | 7               | ug/g  | ND            | 98.2 | 85-115     |     |           |       |
| F2 PHCs (C10-C16)             | 98     | 4               | ug/g  | ND            | 105  | 60-140     |     |           |       |
| F3 PHCs (C16-C34)             | 242    | 8               | ug/g  | ND            | 106  | 60-140     |     |           |       |
| F4 PHCs (C34-C50)             | 109    | 6               | ug/g  | ND            | 75.0 | 60-140     |     |           |       |
| F4G PHCs (gravimetric)        | 1040   | 50              | ug/g  | ND            | 104  | 80-120     |     |           |       |
| <b>Metals</b>                 |        |                 |       |               |      |            |     |           |       |
| Arsenic                       | 56.2   | 1.0             | ug/g  | 1.1           | 110  | 70-130     |     |           |       |
| Barium                        | 116    | 1.0             | ug/g  | 62.5          | 107  | 70-130     |     |           |       |
| Beryllium                     | 55.2   | 0.5             | ug/g  | ND            | 110  | 70-130     |     |           |       |
| Boron                         | 60.7   | 5.0             | ug/g  | 5.4           | 111  | 70-130     |     |           |       |
| Cadmium                       | 52.0   | 0.5             | ug/g  | ND            | 104  | 70-130     |     |           |       |
| Chromium (VI)                 | 0.2    | 0.2             | ug/g  | ND            | 82.5 | 70-130     |     |           |       |
| Chromium                      | 73.5   | 5.0             | ug/g  | 12.0          | 123  | 70-130     |     |           |       |
| Cobalt                        | 61.8   | 1.0             | ug/g  | 3.5           | 117  | 70-130     |     |           |       |
| Copper                        | 61.7   | 5.0             | ug/g  | 7.5           | 109  | 70-130     |     |           |       |
| Lead                          | 80.2   | 1.0             | ug/g  | 23.2          | 114  | 70-130     |     |           |       |
| Mercury                       | 1.51   | 0.1             | ug/g  | ND            | 101  | 70-130     |     |           |       |
| Molybdenum                    | 58.2   | 1.0             | ug/g  | ND            | 116  | 70-130     |     |           |       |
| Nickel                        | 63.7   | 5.0             | ug/g  | 7.0           | 113  | 70-130     |     |           |       |
| Selenium                      | 51.9   | 1.0             | ug/g  | ND            | 103  | 70-130     |     |           |       |
| Silver                        | 47.0   | 0.3             | ug/g  | ND            | 94.0 | 70-130     |     |           |       |
| Thallium                      | 50.3   | 1.0             | ug/g  | ND            | 100  | 70-130     |     |           |       |
| Uranium                       | 55.7   | 1.0             | ug/g  | ND            | 111  | 70-130     |     |           |       |
| Vanadium                      | 75.6   | 10.0            | ug/g  | 13.8          | 124  | 70-130     |     |           |       |
| Zinc                          | 81.7   | 20.0            | ug/g  | 29.4          | 105  | 70-130     |     |           |       |
| <b>PCBs</b>                   |        |                 |       |               |      |            |     |           |       |
| PCBs, total                   | 0.511  | 0.05            | ug/g  | ND            | 120  | 60-140     |     |           |       |
| Surrogate: Decachlorobiphenyl | 0.131  |                 | %     |               | 123  | 60-140     |     |           |       |
| <b>Semi-Volatiles</b>         |        |                 |       |               |      |            |     |           |       |
| Acenaphthene                  | 0.137  | 0.02            | ug/g  | ND            | 82.2 | 50-140     |     |           |       |

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

## Method Quality Control: Spike

| Analyte                     | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Acenaphthylene              | 0.147  | 0.02            | ug/g  | ND            | 87.9 | 50-140     |     |           |       |
| Anthracene                  | 0.141  | 0.02            | ug/g  | ND            | 84.3 | 50-140     |     |           |       |
| Benzo [a] anthracene        | 0.103  | 0.02            | ug/g  | ND            | 61.7 | 50-140     |     |           |       |
| Benzo [a] pyrene            | 0.087  | 0.02            | ug/g  | ND            | 52.0 | 50-140     |     |           |       |
| Benzo [b] fluoranthene      | 0.089  | 0.02            | ug/g  | ND            | 53.2 | 50-140     |     |           |       |
| Benzo [g,h,i] perylene      | 0.089  | 0.02            | ug/g  | ND            | 53.4 | 50-140     |     |           |       |
| Benzo [k] fluoranthene      | 0.088  | 0.02            | ug/g  | ND            | 53.1 | 50-140     |     |           |       |
| Chrysene                    | 0.120  | 0.02            | ug/g  | ND            | 71.8 | 50-140     |     |           |       |
| Dibenzo [a,h] anthracene    | 0.097  | 0.02            | ug/g  | ND            | 58.4 | 50-140     |     |           |       |
| Fluoranthene                | 0.137  | 0.02            | ug/g  | ND            | 82.1 | 50-140     |     |           |       |
| Fluorene                    | 0.125  | 0.02            | ug/g  | ND            | 74.8 | 50-140     |     |           |       |
| Indeno [1,2,3-cd] pyrene    | 0.084  | 0.02            | ug/g  | ND            | 50.6 | 50-140     |     |           |       |
| 1-Methylnaphthalene         | 0.107  | 0.02            | ug/g  | ND            | 64.5 | 50-140     |     |           |       |
| 2-Methylnaphthalene         | 0.114  | 0.02            | ug/g  | ND            | 68.5 | 50-140     |     |           |       |
| Naphthalene                 | 0.138  | 0.01            | ug/g  | ND            | 82.7 | 50-140     |     |           |       |
| Phenanthrene                | 0.148  | 0.02            | ug/g  | ND            | 88.6 | 50-140     |     |           |       |
| Pyrene                      | 0.144  | 0.02            | ug/g  | ND            | 86.4 | 50-140     |     |           |       |
| Surrogate: 2-Fluorobiphenyl | 0.838  |                 | %     |               | 62.9 | 50-140     |     |           |       |
| Surrogate: Terphenyl-d14    | 1.22   |                 | %     |               | 91.6 | 50-140     |     |           |       |
| <b>Volatiles</b>            |        |                 |       |               |      |            |     |           |       |
| Benzene                     | 3.22   | 0.02            | ug/g  | ND            | 80.6 | 60-130     |     |           |       |
| Ethylbenzene                | 4.13   | 0.05            | ug/g  | ND            | 103  | 60-130     |     |           |       |
| Toluene                     | 4.14   | 0.05            | ug/g  | ND            | 104  | 60-130     |     |           |       |
| m,p-Xylenes                 | 8.73   | 0.05            | ug/g  | ND            | 109  | 60-130     |     |           |       |
| o-Xylene                    | 4.57   | 0.05            | ug/g  | ND            | 114  | 60-130     |     |           |       |
| Surrogate: Toluene-d8       | 8.67   |                 | %     |               | 108  | 50-140     |     |           |       |

Certificate of Analysis

Report Date: 01-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

Qualifier Notes:

**Sample Qualifiers :**

- 1: GC-FID signal did not return to baseline by C50  
Applies to Samples: BH3-24-SS2/SS3, BH5-24-AU1, DUP-1

**QC Qualifiers:**

- QR-04 Duplicate results exceeds RPD limits due to non-homogeneous matrix.

Sample Data Revisions:

None

## Certificate of Analysis

Client: Paterson Group Consulting Engineers (Ottawa)

Client PO: 61298

Report Date: 01-Oct-2024

Order Date: 17-Sep-2024

Project Description: PE6616

**Work Order Revisions / Comments:**

Revision 1 - Revised report includes PHC F1-F4 analysis on sample #3 per client request.

**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 unless 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.

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Paracel ID: 2438165



Paracel Order Number  
(Lab Use Only)

2438165

Chain Of Custody  
(Lab Use Only)

|                                                     |                                    |                                                                                                                                                                       |
|-----------------------------------------------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Client Name: Paterson Group                         | Project Ref: PE6616                | Page 1 of 1                                                                                                                                                           |
| Contact Name: Nick Sullivan                         | Quote #:                           | <b>Turnaround Time</b><br><input type="checkbox"/> 1 day <input type="checkbox"/> 3 day<br><input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular |
| Address: 9 Auriga Drive<br>Ottawa, Ontario, K2E 7T9 | PO #: 61298                        |                                                                                                                                                                       |
| Telephone: 613-226-7381                             | E-mail: nsullivan@patersongroup.ca |                                                                                                                                                                       |
| Date Required: _____                                |                                    |                                                                                                                                                                       |

| <input checked="" type="checkbox"/> REG 153/04<br><input type="checkbox"/> Table 1<br><input type="checkbox"/> Table 2<br><input checked="" type="checkbox"/> Table 3<br><input type="checkbox"/> Table _____<br>For RSC: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> REG 406/19<br><input type="checkbox"/> Med/Fine<br><input type="checkbox"/> Ind/Comm<br><input checked="" type="checkbox"/> Coarse<br><input type="checkbox"/> Agri/Other | <b>Other Regulation</b><br><input type="checkbox"/> REG 558<br><input type="checkbox"/> CCME<br><input type="checkbox"/> SU - Sani<br><input type="checkbox"/> SU - Storm<br><input type="checkbox"/> PWQO<br><input type="checkbox"/> MISA<br><input type="checkbox"/> Other: _____ | <b>Matrix Type:</b> S (Soil/Sed.) GW (Ground Water)<br>SW (Surface Water) SS (Storm/Sanitary Sewer)<br>P (Paint) A (Air) O (Other) | <b>Required Analysis</b> |                 |              |      |      |              |            |              |             |      |      |    |  |  |  |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------|--------------|------|------|--------------|------------|--------------|-------------|------|------|----|--|--|--|------|
| Sample ID/Location Name                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                      | Matrix                                                                                                                             | Air Volume               | # of Containers | Sample Taken |      | BTEX | PHCs (F1-F4) | ICP Metals | Mercury (Hg) | Chromium VI | PAHs | PCBs | pH |  |  |  | HOLD |
|                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                      |                                                                                                                                    |                          |                 | Date         | Time |      |              |            |              |             |      |      |    |  |  |  |      |
| 1                                                                                                                                                                                                                                                                                             | BH1-24-SS2                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                      | S                                                                                                                                  |                          | 1               | 13-Sept-2024 |      |      |              |            |              |             |      |      |    |  |  |  |      |
| 2                                                                                                                                                                                                                                                                                             | BH1-24-SS3A                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                      | S                                                                                                                                  |                          | 2               | 13-Sept-2024 |      |      |              |            |              |             |      |      |    |  |  |  |      |
| 3                                                                                                                                                                                                                                                                                             | BH1-24-SS4                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                      | S                                                                                                                                  |                          | 2               | 13-Sept-2024 |      |      |              |            |              |             |      |      |    |  |  |  |      |
| 4                                                                                                                                                                                                                                                                                             | BH1B-24-SS3                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                      | S                                                                                                                                  |                          | 2               | 16-Sept-2024 |      |      |              |            |              |             |      |      |    |  |  |  |      |
| 5                                                                                                                                                                                                                                                                                             | BH2-24-AU1                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                      | S                                                                                                                                  |                          | 2               | 13-Sept-2024 |      |      |              |            |              |             |      |      |    |  |  |  |      |
| 6                                                                                                                                                                                                                                                                                             | BH2-24-AU1/SS2A                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                      | S                                                                                                                                  |                          | 1               | 13-Sept-2024 |      |      |              |            |              |             |      |      |    |  |  |  |      |
| 7                                                                                                                                                                                                                                                                                             | BH3-24-SS2/SS3                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                      | S                                                                                                                                  |                          | 2               | 13-Sept-2024 |      |      |              |            |              |             |      |      |    |  |  |  |      |
| 8                                                                                                                                                                                                                                                                                             | BH4-24-AU1                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                      | S                                                                                                                                  |                          | 1               | 13-Sept-2024 |      |      |              |            |              |             |      |      |    |  |  |  |      |
| 9                                                                                                                                                                                                                                                                                             | BH5-24-AU1                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                      | S                                                                                                                                  |                          | 2               | 16-Sept-2024 |      |      |              |            |              |             |      |      |    |  |  |  |      |
| 10                                                                                                                                                                                                                                                                                            | DUP-1                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                      | S                                                                                                                                  |                          | 1               |              |      |      |              |            |              |             |      |      |    |  |  |  |      |

|                                            |                    |                                 |                                       |     |  |
|--------------------------------------------|--------------------|---------------------------------|---------------------------------------|-----|--|
| Comments:                                  |                    |                                 | Method of Delivery: Paracel Courier   |     |  |
| Relinquished By (Sign): <i>N. Sullivan</i> | Received at Depot: | Received at Lab: <i>Jillian</i> | Verified By: <i>SO</i>                |     |  |
| Relinquished By (Print): Nick Sullivan     | Date/Time:         | Date/Time: 17-Sept-24 15:28     | Date/Time: Sept 17, 2024 3:43pm       |     |  |
| Date/Time: September 17, 2024              | Temperature: °C    | Temperature: 23.1               | pH Verified: <input type="checkbox"/> | By: |  |

## Certificate of Analysis

**Paterson Group Consulting Engineers (Ottawa)**

9 Auriga Drive  
Ottawa, ON K2E 7T9  
Attn: Nick Sullivan

Client PO: 61414  
Project: PE6616

Custody:

Report Date: 2-Oct-2024  
Order Date: 27-Sep-2024

**Order #: 2439564**

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

| Paracel ID | Client ID         |
|------------|-------------------|
| 2439564-01 | BH1B-24-GW1       |
| 2439564-02 | BH2-24-GW1        |
| 2439564-03 | BH3-24-GW1        |
| 2439564-04 | DUP1-24 (BH1B-24) |

Approved By:



Mark Foto, M.Sc.

Lab Supervisor

Certificate of Analysis

Report Date: 02-Oct-2024

**Client:** Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Sep-2024

**Client PO:** 61414

**Project Description:** PE6616

### Analysis Summary Table

| Analysis                   | Method Reference/Description    | Extraction Date | Analysis Date |
|----------------------------|---------------------------------|-----------------|---------------|
| PHC F1                     | CWS Tier 1 - P&T GC-FID         | 30-Sep-24       | 1-Oct-24      |
| PHCs F2 to F4              | CWS Tier 1 - GC-FID, extraction | 30-Sep-24       | 1-Oct-24      |
| REG 153: VOCs by P&T GC/MS | EPA 624 - P&T GC-MS             | 30-Sep-24       | 1-Oct-24      |

Certificate of Analysis

Report Date: 02-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Sep-2024

Client PO: 61414

Project Description: PE6616

|              |                 |                 |                 |                   |   |   |
|--------------|-----------------|-----------------|-----------------|-------------------|---|---|
| Client ID:   | BH1B-24-GW1     | BH2-24-GW1      | BH3-24-GW1      | DUP1-24 (BH1B-24) |   |   |
| Sample Date: | 27-Sep-24 12:00 | 27-Sep-24 13:00 | 27-Sep-24 11:00 | 27-Sep-24 12:30   | - | - |
| Sample ID:   | 2439564-01      | 2439564-02      | 2439564-03      | 2439564-04        |   |   |
| Matrix:      | Ground Water    | Ground Water    | Ground Water    | Ground Water      |   |   |
| MDL/Units    |                 |                 |                 |                   |   |   |

**Volatiles**

|                                    |          |      |      |      |      |   |   |
|------------------------------------|----------|------|------|------|------|---|---|
| Acetone                            | 5.0 ug/L | <5.0 | <5.0 | <5.0 | <5.0 | - | - |
| Benzene                            | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| Bromodichloromethane               | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| Bromoform                          | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| Bromomethane                       | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| Carbon Tetrachloride               | 0.2 ug/L | <0.2 | <0.2 | <0.2 | <0.2 | - | - |
| Chlorobenzene                      | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| Chloroform                         | 0.5 ug/L | 1.0  | <0.5 | <0.5 | 1.0  | - | - |
| Dibromochloromethane               | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| Dichlorodifluoromethane            | 1.0 ug/L | <1.0 | <1.0 | <1.0 | <1.0 | - | - |
| 1,2-Dichlorobenzene                | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| 1,3-Dichlorobenzene                | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| 1,4-Dichlorobenzene                | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| 1,1-Dichloroethane                 | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| 1,2-Dichloroethane                 | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| 1,1-Dichloroethylene               | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| cis-1,2-Dichloroethylene           | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| trans-1,2-Dichloroethylene         | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| 1,2-Dichloropropane                | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| cis-1,3-Dichloropropylene          | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| trans-1,3-Dichloropropylene        | 0.5 ug/L | <0.5 | <0.5 | <0.5 | <0.5 | - | - |
| 1,3-Dichloropropene, total         | 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 | - | - |
| Ethylene dibromide (dibromoethane, | 0.2 ug/L | <0.2 | <0.2 | <0.2 | <0.2 | - | - |
| Hexane                             | 1.0 ug/L | <1.0 | <1.0 | <1.0 | <1.0 | - | - |

Certificate of Analysis

Report Date: 02-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Sep-2024

Client PO: 61414

Project Description: PE6616

|                     |                 |                 |                 |                   |   |   |
|---------------------|-----------------|-----------------|-----------------|-------------------|---|---|
| <b>Client ID:</b>   | BH1B-24-GW1     | BH2-24-GW1      | BH3-24-GW1      | DUP1-24 (BH1B-24) |   |   |
| <b>Sample Date:</b> | 27-Sep-24 12:00 | 27-Sep-24 13:00 | 27-Sep-24 11:00 | 27-Sep-24 12:30   | - | - |
| <b>Sample ID:</b>   | 2439564-01      | 2439564-02      | 2439564-03      | 2439564-04        |   |   |
| <b>Matrix:</b>      | Ground Water    | Ground Water    | Ground Water    | Ground Water      |   |   |
| <b>MDL/Units</b>    |                 |                 |                 |                   |   |   |

**Volatiles**

|                                  |           |       |       |       |       |   |   |
|----------------------------------|-----------|-------|-------|-------|-------|---|---|
| Methyl Ethyl Ketone (2-Butanone) | 5.0 ug/L  | <5.0  | <5.0  | <5.0  | <5.0  | - | - |
| Methyl Isobutyl Ketone           | 5.0 ug/L  | <5.0  | <5.0  | <5.0  | <5.0  | - | - |
| Methyl tert-butyl ether          | 2.0 ug/L  | <2.0  | <2.0  | <2.0  | <2.0  | - | - |
| Methylene Chloride               | 5.0 ug/L  | <5.0  | <5.0  | <5.0  | <5.0  | - | - |
| Styrene                          | 0.5 ug/L  | <0.5  | <0.5  | <0.5  | <0.5  | - | - |
| 1,1,1,2-Tetrachloroethane        | 0.5 ug/L  | <0.5  | <0.5  | <0.5  | <0.5  | - | - |
| 1,1,2,2-Tetrachloroethane        | 0.5 ug/L  | <0.5  | <0.5  | <0.5  | <0.5  | - | - |
| Tetrachloroethylene              | 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  | - | - |
| 1,1,1-Trichloroethane            | 0.5 ug/L  | <0.5  | <0.5  | <0.5  | <0.5  | - | - |
| 1,1,2-Trichloroethane            | 0.5 ug/L  | <0.5  | <0.5  | <0.5  | <0.5  | - | - |
| Trichloroethylene                | 0.5 ug/L  | <0.5  | <0.5  | <0.5  | <0.5  | - | - |
| Trichlorofluoromethane           | 1.0 ug/L  | <1.0  | <1.0  | <1.0  | <1.0  | - | - |
| Vinyl chloride                   | 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 | 109%  | 109%  | 108%  | 109%  | - | - |
| 4-Bromofluorobenzene             | Surrogate | 90.0% | 91.2% | 91.4% | 90.0% | - | - |
| Dibromofluoromethane             | Surrogate | 107%  | 108%  | 109%  | 108%  | - | - |

**Hydrocarbons**

|                   |          |      |      |      |   |   |   |
|-------------------|----------|------|------|------|---|---|---|
| F1 PHCs (C6-C10)  | 25 ug/L  | <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: 02-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Sep-2024

Client PO: 61414

Project Description: PE6616

## Method Quality Control: Blank

| Analyte                                  | Result | Reporting Limit | Units | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------------------------------|--------|-----------------|-------|------|------------|-----|-----------|-------|
| <b>Hydrocarbons</b>                      |        |                 |       |      |            |     |           |       |
| 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  |      |            |     |           |       |
| <b>Volatiles</b>                         |        |                 |       |      |            |     |           |       |
| Acetone                                  | ND     | 5.0             | ug/L  |      |            |     |           |       |
| Benzene                                  | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Bromodichloromethane                     | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Bromoform                                | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Bromomethane                             | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Carbon Tetrachloride                     | ND     | 0.2             | ug/L  |      |            |     |           |       |
| Chlorobenzene                            | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Chloroform                               | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Dibromochloromethane                     | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Dichlorodifluoromethane                  | ND     | 1.0             | ug/L  |      |            |     |           |       |
| 1,2-Dichlorobenzene                      | ND     | 0.5             | ug/L  |      |            |     |           |       |
| 1,3-Dichlorobenzene                      | ND     | 0.5             | ug/L  |      |            |     |           |       |
| 1,4-Dichlorobenzene                      | ND     | 0.5             | ug/L  |      |            |     |           |       |
| 1,1-Dichloroethane                       | ND     | 0.5             | ug/L  |      |            |     |           |       |
| 1,2-Dichloroethane                       | ND     | 0.5             | ug/L  |      |            |     |           |       |
| 1,1-Dichloroethylene                     | ND     | 0.5             | ug/L  |      |            |     |           |       |
| cis-1,2-Dichloroethylene                 | ND     | 0.5             | ug/L  |      |            |     |           |       |
| trans-1,2-Dichloroethylene               | ND     | 0.5             | ug/L  |      |            |     |           |       |
| 1,2-Dichloropropane                      | ND     | 0.5             | ug/L  |      |            |     |           |       |
| cis-1,3-Dichloropropylene                | ND     | 0.5             | ug/L  |      |            |     |           |       |
| trans-1,3-Dichloropropylene              | ND     | 0.5             | ug/L  |      |            |     |           |       |
| 1,3-Dichloropropene, total               | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Ethylbenzene                             | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Ethylene dibromide (dibromoethane, 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  |      |            |     |           |       |

Certificate of Analysis

Report Date: 02-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Sep-2024

Client PO: 61414

Project Description: PE6616

### Method Quality Control: Blank

| Analyte                         | Result | Reporting Limit | Units | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|------|------------|-----|-----------|-------|
| Methyl tert-butyl ether         | ND     | 2.0             | ug/L  |      |            |     |           |       |
| Methylene Chloride              | ND     | 5.0             | ug/L  |      |            |     |           |       |
| Styrene                         | ND     | 0.5             | ug/L  |      |            |     |           |       |
| 1,1,1,2-Tetrachloroethane       | ND     | 0.5             | ug/L  |      |            |     |           |       |
| 1,1,2,2-Tetrachloroethane       | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Tetrachloroethylene             | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Toluene                         | ND     | 0.5             | ug/L  |      |            |     |           |       |
| 1,1,1-Trichloroethane           | ND     | 0.5             | ug/L  |      |            |     |           |       |
| 1,1,2-Trichloroethane           | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Trichloroethylene               | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Trichlorofluoromethane          | ND     | 1.0             | ug/L  |      |            |     |           |       |
| Vinyl chloride                  | ND     | 0.5             | ug/L  |      |            |     |           |       |
| m,p-Xylenes                     | ND     | 0.5             | ug/L  |      |            |     |           |       |
| o-Xylene                        | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Xylenes, total                  | ND     | 0.5             | ug/L  |      |            |     |           |       |
| Surrogate: 4-Bromofluorobenzene | 73.6   |                 | %     | 92.0 | 50-140     |     |           |       |
| Surrogate: Dibromofluoromethane | 84.2   |                 | %     | 105  | 50-140     |     |           |       |
| Surrogate: Toluene-d8           | 88.8   |                 | %     | 111  | 50-140     |     |           |       |

Certificate of Analysis

Report Date: 02-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Sep-2024

Client PO: 61414

Project Description: PE6616

## Method Quality Control: Duplicate

| Analyte                                  | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| <b>Hydrocarbons</b>                      |        |                 |       |               |      |            |     |           |       |
| F1 PHCs (C6-C10)                         | ND     | 25              | ug/L  | ND            |      |            | NC  | 30        |       |
| <b>Volatiles</b>                         |        |                 |       |               |      |            |     |           |       |
| 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                               | 1.07   | 0.5             | ug/L  | 1.02          |      |            | 4.8 | 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                 | ND     | 0.5             | ug/L  | ND            |      |            | NC  | 30        |       |
| trans-1,2-Dichloroethylene               | ND     | 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        |       |
| Methyl tert-butyl ether                  | ND     | 2.0             | ug/L  | ND            |      |            | NC  | 30        |       |
| Methylene Chloride                       | ND     | 5.0             | ug/L  | ND            |      |            | NC  | 30        |       |

Certificate of Analysis

Report Date: 02-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Sep-2024

Client PO: 61414

Project Description: PE6616

**Method Quality Control: Duplicate**

| Analyte                         | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| 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               | ND     | 0.5             | ug/L  | ND            |      |            | NC  | 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 | 71.9   |                 | %     |               | 89.9 | 50-140     |     |           |       |
| Surrogate: Dibromofluoromethane | 87.7   |                 | %     |               | 110  | 50-140     |     |           |       |
| Surrogate: Toluene-d8           | 87.2   |                 | %     |               | 109  | 50-140     |     |           |       |

Certificate of Analysis

Report Date: 02-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Sep-2024

Client PO: 61414

Project Description: PE6616

## Method Quality Control: Spike

| Analyte                                  | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|------------------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| <b>Hydrocarbons</b>                      |        |                 |       |               |      |            |     |           |       |
| F1 PHCs (C6-C10)                         | 1940   | 25              | ug/L  | ND            | 113  | 85-115     |     |           |       |
| F2 PHCs (C10-C16)                        | 1920   | 100             | ug/L  | ND            | 120  | 60-140     |     |           |       |
| F3 PHCs (C16-C34)                        | 4720   | 100             | ug/L  | ND            | 120  | 60-140     |     |           |       |
| F4 PHCs (C34-C50)                        | 2580   | 100             | ug/L  | ND            | 104  | 60-140     |     |           |       |
| <b>Volatiles</b>                         |        |                 |       |               |      |            |     |           |       |
| Acetone                                  | 130    | 5.0             | ug/L  | ND            | 130  | 50-140     |     |           |       |
| Benzene                                  | 45.0   | 0.5             | ug/L  | ND            | 112  | 60-130     |     |           |       |
| Bromodichloromethane                     | 43.8   | 0.5             | ug/L  | ND            | 110  | 60-130     |     |           |       |
| Bromoform                                | 31.1   | 0.5             | ug/L  | ND            | 77.8 | 60-130     |     |           |       |
| Bromomethane                             | 43.8   | 0.5             | ug/L  | ND            | 110  | 50-140     |     |           |       |
| Carbon Tetrachloride                     | 38.2   | 0.2             | ug/L  | ND            | 95.6 | 60-130     |     |           |       |
| Chlorobenzene                            | 47.4   | 0.5             | ug/L  | ND            | 118  | 60-130     |     |           |       |
| Chloroform                               | 47.0   | 0.5             | ug/L  | ND            | 117  | 60-130     |     |           |       |
| Dibromochloromethane                     | 36.1   | 0.5             | ug/L  | ND            | 90.3 | 60-130     |     |           |       |
| Dichlorodifluoromethane                  | 47.6   | 1.0             | ug/L  | ND            | 119  | 50-140     |     |           |       |
| 1,2-Dichlorobenzene                      | 40.8   | 0.5             | ug/L  | ND            | 102  | 60-130     |     |           |       |
| 1,3-Dichlorobenzene                      | 40.1   | 0.5             | ug/L  | ND            | 100  | 60-130     |     |           |       |
| 1,4-Dichlorobenzene                      | 43.8   | 0.5             | ug/L  | ND            | 109  | 60-130     |     |           |       |
| 1,1-Dichloroethane                       | 46.6   | 0.5             | ug/L  | ND            | 116  | 60-130     |     |           |       |
| 1,2-Dichloroethane                       | 46.0   | 0.5             | ug/L  | ND            | 115  | 60-130     |     |           |       |
| 1,1-Dichloroethylene                     | 42.5   | 0.5             | ug/L  | ND            | 106  | 60-130     |     |           |       |
| cis-1,2-Dichloroethylene                 | 43.4   | 0.5             | ug/L  | ND            | 109  | 60-130     |     |           |       |
| trans-1,2-Dichloroethylene               | 41.7   | 0.5             | ug/L  | ND            | 104  | 60-130     |     |           |       |
| 1,2-Dichloropropane                      | 44.4   | 0.5             | ug/L  | ND            | 111  | 60-130     |     |           |       |
| cis-1,3-Dichloropropylene                | 34.2   | 0.5             | ug/L  | ND            | 85.5 | 60-130     |     |           |       |
| trans-1,3-Dichloropropylene              | 37.8   | 0.5             | ug/L  | ND            | 94.5 | 60-130     |     |           |       |
| Ethylbenzene                             | 38.6   | 0.5             | ug/L  | ND            | 96.5 | 60-130     |     |           |       |
| Ethylene dibromide (dibromoethane, 1,2-) | 40.7   | 0.2             | ug/L  | ND            | 102  | 60-130     |     |           |       |
| Hexane                                   | 44.3   | 1.0             | ug/L  | ND            | 111  | 60-130     |     |           |       |
| Methyl Ethyl Ketone (2-Butanone)         | 79.0   | 5.0             | ug/L  | ND            | 79.0 | 50-140     |     |           |       |

Certificate of Analysis

Report Date: 02-Oct-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Sep-2024

Client PO: 61414

Project Description: PE6616

### Method Quality Control: Spike

| Analyte                         | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|---------------|------|------------|-----|-----------|-------|
| Methyl Isobutyl Ketone          | 84.7   | 5.0             | ug/L  | ND            | 84.7 | 50-140     |     |           |       |
| Methyl tert-butyl ether         | 79.1   | 2.0             | ug/L  | ND            | 79.1 | 50-140     |     |           |       |
| Methylene Chloride              | 41.3   | 5.0             | ug/L  | ND            | 103  | 60-130     |     |           |       |
| Styrene                         | 39.1   | 0.5             | ug/L  | ND            | 97.7 | 60-130     |     |           |       |
| 1,1,1,2-Tetrachloroethane       | 40.7   | 0.5             | ug/L  | ND            | 102  | 60-130     |     |           |       |
| 1,1,2,2-Tetrachloroethane       | 46.4   | 0.5             | ug/L  | ND            | 116  | 60-130     |     |           |       |
| Tetrachloroethylene             | 36.7   | 0.5             | ug/L  | ND            | 91.8 | 60-130     |     |           |       |
| Toluene                         | 44.8   | 0.5             | ug/L  | ND            | 112  | 60-130     |     |           |       |
| 1,1,1-Trichloroethane           | 38.4   | 0.5             | ug/L  | ND            | 96.0 | 60-130     |     |           |       |
| 1,1,2-Trichloroethane           | 47.3   | 0.5             | ug/L  | ND            | 118  | 60-130     |     |           |       |
| Trichloroethylene               | 42.1   | 0.5             | ug/L  | ND            | 105  | 60-130     |     |           |       |
| Trichlorofluoromethane          | 44.7   | 1.0             | ug/L  | ND            | 112  | 60-130     |     |           |       |
| Vinyl chloride                  | 45.7   | 0.5             | ug/L  | ND            | 114  | 50-140     |     |           |       |
| m,p-Xylenes                     | 83.0   | 0.5             | ug/L  | ND            | 104  | 60-130     |     |           |       |
| o-Xylene                        | 42.2   | 0.5             | ug/L  | ND            | 106  | 60-130     |     |           |       |
| Surrogate: 4-Bromofluorobenzene | 67.6   |                 | %     |               | 84.4 | 50-140     |     |           |       |
| Surrogate: Dibromofluoromethane | 87.2   |                 | %     |               | 109  | 50-140     |     |           |       |
| Surrogate: Toluene-d8           | 84.5   |                 | %     |               | 106  | 50-140     |     |           |       |

## Certificate of Analysis

Client: Paterson Group Consulting Engineers (Ottawa)

Client PO: 61414

Report Date: 02-Oct-2024

Order Date: 27-Sep-2024

Project Description: PE6616

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.

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

