

March 10, 2025
File: PE4886-LET.03

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Hydrogeology
Materials Testing
Building Science
Rural Development Design
Temporary Shoring Design
Retaining Wall Design
Noise and Vibration Studies

Attention: **Mr. Martin Chenier**

Subject: **Phase II-Environmental Site Assessment Update
1015 Tweddle Road
Ottawa, Ontario**

patersongroup.ca

Dear Sir,

Further to your request, Paterson Group (Paterson) has completed a Phase II Environmental Site Assessment (ESA) Update for the aforementioned property. This report updates a Phase II ESA entitled "Phase II Environmental Site Assessment, Southern Portion of 1009 Trim Road, Ottawa, Ontario" prepared by Paterson Group, dated August 20, 2020. For the purposes of this update, the associated roadway has been renamed, and the current site is addressed 1015 Tweddle Road, Ottawa, Ontario.

This update is intended to meet the requirements for an updated Phase II ESA, as per the MECP O.Reg. 153/04, as amended. This update report is to be read in conjunction with the 2020 report.

Background Information

The Phase II Property is located on the northeast corner of the Tweddle Road and Jeanne D'Arc Boulevard Intersection, in the City of Ottawa, Ontario. Refer to Figure 1 - Key Plan following the text of this letter.

The Phase I Property is an irregular shaped lot with a footprint of 3.49 hectares. The Phase I Property is situated to the west of a newly developed residential area where municipal water and sewer systems have been installed.

Drainage on the Phase II Property consists primarily of surface infiltration throughout the property. The site and regional topography slope downward to the north, towards the Ottawa River.



Past Assessments

- ❑ “Phase One Environmental Site Assessment – Part of Lot 3, Concession 1, Parts 1 & 2, Cumberland, Ontario (1009 Trim Road)” prepared by WSP, dated March 2016.

Based on the Phase I ESA report, one on-site potentially contaminating activity (PCA) was identified and two (2) off-site PCAs located at 1125 Tweddle Road (formerly Trim Road), resulted in areas of potential environmental concern (APECs):

- ❑ APEC 1 – Resulting from fill material of an unknown quality imported on-site in the 1980s, 2009 and 2014, which significantly increased the original ground level.
- ❑ APEC 2 – Resulting from fuel storage tanks and bulk storage of road salt (salt dome) at 1125 Tweddle Road (formerly Trim Road; property to the south, across Jeanne d’Arc Boulevard).

A subsequent Phase II ESA was conducted to address the APECs on the Phase I Property.

- ❑ “Phase II Environmental Site Assessment – Part of Lot 3, Concession 1, Parts 1 & 2, Cumberland, Ontario (1009 Trim Road)” prepared by WSP, dated September 2016.

Based on the Phase II ESA, six (6) boreholes were drilled across the subject land as well as four (4) test pits to assess the APECs. Soil samples at locations MW16-5, MW16-6 and TP-1 through TP-4 were retrieved and submitted for benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons fractions F1 to F4 (PHCs, F1-F4) and metals as well as electrical conductivity (EC) and sodium adsorption ratio (SAR) analyses. Based on the analytical test results, the fill material on-site was impacted with metals, PAHs, PHC F2 and EC/SAR.

Groundwater samples from MW16-1 through MW16-6 were collected and submitted for BTEX, PAHs, PHCs (F1-F4) and metals analyses. Based on these results, groundwater contained elevated levels of chloride, sodium and uranium in excess of the applicable site standards.

Soil and groundwater remediation were recommended prior to or during site development.

- ❑ “Phase I Environmental Site Assessment, Southern Portion of 1009 Trim Road, Ottawa, Ontario” prepared by Paterson Group Inc. (Paterson), dated August 17, 2020.

This Phase I ESA was completed for a parcel of land addressed as the southern portion of 1009 Trim Road (currently addressed 1015 Tweddle Road). The current Phase I Property consists of vacant land. The historical research completed as part of the 2020 Phase I ESA indicated that the Phase I Property has always consisted of vacant land that



has been infilled over the past three decades. Properties surrounding the Phase I Property consisted of vacant land to the east and west, the Ottawa River to the north and a highway maintenance yard (including bulk storage of road salt and fuel storage tanks) to the south. The importation of unknown fill material onto the Phase I Property and the operations of the property to the south were considered to pose an environmental concern to the Phase I Property.

Following a site visit, no environmental concerns were noted with regard to the present use of the Phase I Property. The property to the south was observed to have a salt dome in the northwestern portion of the property, which was previously identified and remains an environmental concern to the Phase I Property. The report concluded that further Phase II ESA work was required to address the identified environmental concerns.

- ❑ “Phase II Environmental Site Assessment, Southern Portion of 1009 Trim Road, Ottawa, Ontario” prepared by Paterson Group Inc. (Paterson), dated August 20, 2020.

Four (4) boreholes (BH1-20 to BH4-20) were placed on the subject site during the interim June 29, 2020 to July 17, 2020, in conjunction with a Geotechnical Investigation. Three (3) of the boreholes were instrumented with groundwater monitoring wells, to assess groundwater quality.

Soil and groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum hydrocarbons (PHCs F1-F4), polycyclic aromatic hydrocarbons (PAHs), metals and EC/SAR. No detectable BTEX parameters were identified in the soil samples and thus the BTEX results comply with the MECP Table 3 Standards. PHC F2, PAHs, metals and EC/SAR concentrations in several samples were observed to exceed the selected MECP Table 1 Residential Standards.

Groundwater samples were recovered from all three (3) wells as well as a monitoring well that was drilled as part of the 2016 investigation (MW16-4). Based on the analytical test results, BTEX, PHCs and metals were in compliance with the selected MECP Table 3 Standards. The sodium, chloride and uranium concentrations in the groundwater were observed to exceed of the MECP Table 1 Standards.

Based on the results of the Phase II ESA, it was recommended that the site be remediated in conjunction with the site redevelopment.

- ❑ “Phase I Environmental Site Assessment Update, 1015 Tweddle Road, Ottawa, Ontario” prepared by Paterson Group Inc. (Paterson), dated January 7, 2025.

Based on a review of more recent historical environmental records, in conjunction with a visual inspection of the property, the information and findings were generally confirmed from the previous Phase I ESA report completed by Paterson. Since that time, no potential environmental concerns were identified with respect to the use of the subject site or its neighbouring properties. It was indicated that the Phase I Property has never been used



for snow disposal purposes. The report concluded that further Phase II ESA work will be required for site plan application purposes.

Applicable Site Condition Standard

The site condition standards for the property were obtained from Table 1 of the document entitled “Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act”, prepared by the Ontario Ministry of the Environment, Conservation and Parks (MECP), April 2011. The intended use of the Phase II Property is residential, and therefore, the residential standards have been selected for the purpose of this Phase II ESA. The MECP Table 1 Standards are based on the following considerations:

- ☐ Coarse-grained soil conditions
- ☐ Full depth background (sensitive) site conditions
- ☐ Residential land use

Section 35 of O.Reg. 153/04 does apply to the Phase II Property in that properties within the Phase I Study Area rely upon municipal drinking water.

Section 41 of O.Reg. 153/04 does apply to the Phase II Property, as the property is within 30m of an environmentally sensitive area.

Section 43.1 of O.Reg. 153/04 does not apply to the Phase II Property in that the property is not situated where Shallow Soils are present.

Impediments

Two (2) wells (BH16-2 and BH16-6) from 2016 located on the northern half of the Phase II Property were deemed not viable (either damaged or not found). No other impediments were encountered during this Phase II ESA Update.

Investigation Method

The groundwater levels were measured and then the wells purged prior to collecting groundwater samples on November 27, 2024 by Paterson.



Review and Evaluation

Groundwater Elevations, Flow Direction and Hydraulic Gradient

Groundwater levels were measured during the groundwater sampling event on November 27, 2024 using an electronic water level meter. Groundwater levels were recorded from the monitoring wells installed in MW16-3 to MW16-5, and BH1-20 and BH3-20.

The groundwater at the Phase II ESA Property was encountered within the overburden at depths ranging from approximately 1.48 to 4.27m below the existing ground surface.

Using the groundwater elevations recorded during the November 27, 2024 sampling event, groundwater contour mapping was completed as part of this assessment. According to the mapped contour data, groundwater flow is northwesterly in direction, with a hydraulic gradient of 0.04m/m. Groundwater contours are shown on Drawing PE4886-3 – Test Hole Location Plan, appended to this report.

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

Soil Quality

As part of the previous environmental investigations on the Phase II Property, 30 soil samples were submitted for laboratory analysis of petroleum hydrocarbons (PHCs, Fractions F1-F4), Benzene, Toluene, Ethylbenzene and Xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs) metals and/or electrical conductivity (EC) and sodium adsorption ratio (SAR). The results of the analytical testing are presented in Table 4 – Soil Analytical Test Results, as well as on the laboratory certificates of analysis, appended to this report.

PHCs (F1-F4)

The concentrations of PHCs F2 in soil samples MW16-2-2, MW16-6-2 and BH1-20-SS5 were in excess of the MECP Table 1 Standards, likely from the presence of shale fragments within the fill material.

All remaining PHC parameters detected in the soil samples comply with the MECP Table 1 Standards.

The analytical results for PHCs in the tested soil are shown on Drawing PE4886-5 – Analytical Testing Plan – Soil (PHCs), appended to this report.



BTEX

All BTEX parameters were non-detect and comply with the MECP Table 1 Standards.

The analytical results for BTEX in the tested soil are shown on Drawing PE4886-7 – Analytical Testing Plan – Soil (BTEX), appended to this report.

PAHs

The concentrations of several PAH parameters in soil sample MW16-6-2 were in excess of the MECP Table 1 Standards.

All remaining PAH parameters detected in the soil samples comply with the MECP Table 1 Standards.

The analytical results for PAHs in the tested soil are shown on Drawing PE4886-6 – Analytical Testing Plan – Soil (PAHs), appended to this report.

Metals

The concentrations of several metal parameters, which include barium, chromium, cobalt, cyanide, molybdenum, uranium and vanadium in soil samples throughout the Phase II Property were in excess of the MECP Table 1 Standards.

All remaining metal parameters detected in the soil samples comply with the MECP Table 1 Standards.

The analytical results for metals in the tested soil are shown on Drawing PE4886-4 – Analytical Testing Plan – Soil (Metals), appended to this report.

EC/SAR

The concentrations of EC and SAR in several samples throughout the Phase II Property were in excess of the MECP Table 1 Standards.

The analytical results for EC and SAR in the tested soil are shown on Drawing PE4886-4 -Analytical Testing Plan – Soil (Metals), appended to this report.

It is our opinion that the soil analytical test results from the previous environmental investigations on the Phase II Property remain valid and are considered sufficient for the purposes of this Phase II ESA Update.

Groundwater Quality

Five groundwater samples, obtained from the monitoring wells installed in MW16-3 to MW16-5 and BH1-20 and BH3-20 were submitted for laboratory analysis of metals and



chloride as part of the current Phase II ESA Update. The results of the analytical testing are presented in Table 5 – Groundwater Analytical Test Results, as well as on the laboratory certificates of analysis, appended to this report.

All metals parameter concentrations detected in the groundwater samples analyzed as part of this Phase II ESA Update comply with the selected MECP Table 1 Standards, with the exception of sodium, chloride and uranium in all samples tested.

The analytical results for the tested groundwater are shown on Drawing PE4886-8 – Analytical Testing Plan – Groundwater (Metals), appended to this report.

Phase II Conceptual Site Model

Potentially Contaminating Activity (PCA) and Area of Potential Environmental Concern (APEC)

As per the recent Phase I ESA Update, the PCAs considered to result in APECs on the Phase II Property have been summarized in the table below.

Areas of Potential Environmental Concern					
Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1: Resulting from importation of fill material	Majority of the southern portion of the Phase II Property	PCA 28 – <i>“Importation of Fill Material of Unknown Quality”</i>	On-site	PAHs Metals	Soil
APEC 2: Resulting from presence of a salt dome and fuel storage at 1125 Tweddle Road	Southern portion of the Phase II Property	PCA 48 – <i>“Salt Manufacturing, Processing and Bulk Storage</i>	Off-site	BTEX PHCs (F1-F4) EC SAR	Soil
		PCA 28 – <i>“Gasoline and Associated Products Storage in Fixed Tanks”</i>		BTEX PHCs (F1-F4) Metals Chloride	Groundwater



Contaminants of Potential Concern (CPCs)

The contaminants of potential concern (CPCs) in soil and/or groundwater include:

- ☐ Benzene, Toluene, Ethylbenzene and Xylenes (BTEX);
- ☐ Petroleum Hydrocarbons (PHCs, Fractions F1-F4);
- ☐ Polycyclic Aromatic Hydrocarbons (PAHs);
- ☐ Metals (including mercury and hexavalent chromium);
- ☐ Cyanide
- ☐ Electrical Conductivity (EC) and Sodium Adsorption Ratio (SAR);
- ☐ Chlorides.

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

Subsurface Structures and Utilities

The Phase II Property is undeveloped land presently with no services on-site. It is expected that upon development, the subject land will be municipally serviced.

Physical Setting

Site Stratigraphy

The stratigraphy of the Phase II ESA Property generally consists of:

- ☐ Fill material generally comprised of silty sand and/or silty clay, crushed stone, gravel, organics with occasional fragments of wood, brick and plastic extended to depths ranging from approximately 3.69 to 6.10m below the existing grade. Groundwater was encountered in this unit at BH1-20 and BH2-20.
- ☐ Silty clay was identified beneath the fill material at ranges between 3.69 to 6.10m and terminated at 15.54 to 15.85m below the existing grade. Groundwater was encountered in this unit at BH3-20.

The site topography, from ground surface to the deepest aquifer or aquitard investigated, is provided in the Soil Profile and Test Data Sheets, appended to this report.

Hydrogeological Characteristics

Groundwater at the Phase II Property was encountered within the fill material and native clay soil. During the most recent groundwater monitoring event, groundwater flow was measured in a north-northwesterly direction, with a hydraulic gradient of 0.04m/m. Groundwater contours are shown on Drawing PE4886-3 – Test Hole Location Plan.



Approximate Depth to Bedrock

Bedrock was not encountered during the subsurface investigation, however, a DCPT was conducted and reached refusal at approximately 36.98m below ground surface, where bedrock beneath the Phase II Property was inferred.

Approximate Depth to Water Table

Depth to the water table at the Phase II Property varies between approximately 1.48 to 4.27m below ground surface and is expected to fluctuate seasonally.

Sections 35, 41 and 43.1 of the Regulation

Section 35 of O.Reg. 153/04 does apply to the Phase II Property in that properties within the Phase I Study Area rely upon municipal drinking water.

Section 41 of O.Reg. 153/04 does apply to the Phase II Property, as the property is within 30m of an environmentally sensitive area.

Section 43.1 of O.Reg. 153/04 does not apply to the Phase II Property in that the property is not situated where Shallow Soils are present.

Fill Placement

Fill material was identified across the Phase II Property at depths ranging from 3.69 to 6.10m below ground surface. The fill material consisted of silty sand and/or silty clay with gravel, crushed stones, fragments of plastic and shale with some organics and wood, which had been imported onto the property between 1990 to 2014.

Existing Buildings and Structures

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

Proposed Buildings and Other Structures

It is our understanding that the Phase II Property will be redeveloped with several multi-storey residential buildings with underground parking covering the majority of the site. The proposed buildings will be surrounded by paved walkways and landscaped areas.

Drinking Water Wells

No known drinking water wells are located on the Phase II Property, nor are any suspected to be present within the 250m study area.



Water Bodies and Areas of Natural Significance

The northern portion of the Phase I Property is situated within a provincially significant wetland, addressed Petrie Island Wetland. No other areas of natural significance or features were identified on the Phase II Property or within the 250m study area. The Ottawa River, the most significant body of water in the vicinity of the Phase II Property, is present adjacent to the north.

Environmental Condition

Areas Where Contaminants are Present

PHC F2, PAHs, Metals, EC and SAR concentrations in the soil/fill are in excess of the selected MECP Table 1 Standards across the Phase II Property.

Sodium, chloride and uranium concentrations in the groundwater beneath the Phase II Property were in excess of the MECP Table 1 Standards.

Types of Contaminants

The contaminants present in the soil/fill material in excess of the selected standards include: PHC F2, EC, SAR, Metals (barium, chromium, cobalt, cyanide, molybdenum, uranium and vanadium) and PAHs (acenaphthene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b,j]fluoranthene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene and pyrene).

The contaminants present in groundwater include sodium, chloride and uranium concentrations.

Contaminated Media

Some of the native/fill material across the Phase II Property is impacted with PHCs, Metals, PAHs and EC and/or SAR concentrations.

Groundwater is contaminated with sodium, chloride and uranium concentrations.

What Is Known About Areas Where Contaminants Are Present

Contaminants are present in the fill material and groundwater beneath the Phase II Property.



Distribution and Migration of Contaminants

The impacted soil appears to be confined to the fill material, resultant from the importation of fill material of an unknown quality with no indication of distribution of contaminants into the groundwater. Therefore, concerns regarding the distribution or migration of contaminants via the groundwater is not considered to be an issue on the Phase II Property.

Discharge of Contaminants

The impacted fill material containing metals, PAHs and PHC F2 is a result of the importation of fill material of unknown quality onto the Phase II Property. EC and SAR contaminants present in the soil/fill is likely a result of the salt dome located upgradient from the Phase II Property. It is expected that the groundwater level fluctuates throughout the year and as such, it is likely that the EC and SAR impacts extend into the native soils.

The groundwater impacts are considered to be a result of the neighbouring salt dome.

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 by means of the infiltration of precipitation, and the migration of contaminants via groundwater levels and/or flow, which may fluctuate seasonally.

Potential for Vapour Intrusion

Currently, the Phase II Property is vacant and there is no risk related to vapour intrusion on the property. It is our understanding that any contamination on the site will be remediated prior to site redevelopment. As such, the potential for vapour intrusion at the Phase II Property is considered to be negligible.



Recommendations

Soil

Based on the findings of this assessment, as well as the findings of previous environmental investigations conducted for the Phase II Property, impacted soil/fill is present across the Phase II Property.

It is our understanding that the Phase II Property is to be redeveloped with several multi-storey residential buildings in the near future. It is our recommendation that an environmental site remediation program be completed in conjunction with the redevelopment of the Phase II Property. This will require the segregation of clean soils from impacted soils, the latter of which will require disposal at an approved waste disposal facility.

Impacted fill material can be removed from the Phase II Property as part of the development activities. The presence of the impacted fill is not considered to have an impact on the current use of the Phase II Property. It is recommended that the excavation of soil be monitored and confirmed by Paterson. Following removal of impacted material, underlying native material will require testing to confirm compliance with site standards.

Non-impacted soil removed for construction from the Phase II Property must be managed in accordance with Ontario Regulation 406/19 (On-Site and Excess Soil Management). Additional information regarding excess soil requirements for this property can be provided, if required.

Groundwater

The removal of impacted groundwater can be conducted by a licensed pumping contractor (a feasible option for smaller volumes), while an on-site treatment system could be used for larger volumes over a longer period of time. An on-site treatment system would presumably discharge any treated water into the City of Ottawa sewer system. Prior to discharge to the municipal system, a Sanitary Sewer Agreement will be required by the City of Ottawa's Sewer Use Program.

It is recommended that the monitoring wells installed on the Phase II Property remain viable for future monitoring. Prior to site redevelopment, the monitoring wells must be decommissioned in accordance with O.Reg. 903.



Statement of Limitations

This Phase II - Environmental Site Assessment Update report has been prepared under the supervision of a qualified person, in general accordance with Ontario Regulation 153/04, as amended. The conclusions presented herein are based on information gathered from a limited historical review and field inspection program.

The findings of the Phase II - ESA Update are based on the review of the previous subsurface program completed on the Phase II Property in conjunction with the most recent analytical test results. Should any conditions be encountered at the Phase II Property that differ from our findings, we request that we be notified immediately.

This report was prepared for the sole use of Vuze Construction. Permission and notification from the above noted party and Paterson will be required to release this report to any other party.

We trust that this submission satisfies your current requirements. Should you have any questions please contact the undersigned.

Regards,

Paterson Group Inc.

Joshua Dempsey, B.Sc.

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



Report Distribution:

- ☐ Vuze Construction
- ☐ Paterson Group

Appendix

- ☐ Figure 1 – Key Plan
- ☐ Drawing PE4886-1R – Site Plan
- ☐ Drawing PE4886-2R – Surrounding Land Use Plan
- ☐ Drawing PE4886-3 – Test Hole Location Plan
- ☐ Drawing PE4886-4 – Analytical Testing Plan – Soil (Metals)
- ☐ Drawing PE4886-4A – Cross-Section A-A' – Soil (Metals)
- ☐ Drawing PE4886-4B – Cross-Section B-B' – Soil (Metals)
- ☐ Drawing PE4886-5 – Analytical Testing Plan – Soil (PHCs)
- ☐ Drawing PE4886-5A – Cross-Section A-A' – Soil (PHCs)



- ☐ Drawing PE4886-5B – Cross-Section B-B' – Soil (PHCs)
- ☐ Drawing PE4886-6 – Analytical Testing Plan – Soil (PAHs)
- ☐ Drawing PE4886-6A – Cross-Section A-A' – Soil (PAHs)
- ☐ Drawing PE4886-6B – Cross-Section B-B' – Soil (PAHs)
- ☐ Drawing PE4886-7 – Analytical Testing Plan – Soil (BTEX)
- ☐ Drawing PE4886-7A – Cross-Section A-A' – Soil (BTEX)
- ☐ Drawing PE4886-7B – Cross-Section B-B' – Soil (BTEX)
- ☐ Drawing PE4886-8 – Analytical Testing Plan – Groundwater (Metals)
- ☐ Drawing PE4886-8A – Cross-Section A-A' – Groundwater (Metals)
- ☐ Drawing PE4886-8B – Cross-Section B-B' – Groundwater (Metals)
- ☐ Drawing PE4886-9 – Analytical Testing Plan – Groundwater (BTEX, PHCs & PAHs)
- ☐ Drawing PE4886-9A – Cross-Section A-A' – Groundwater (BTEX, PHCs & PAHs)
- ☐ Drawing PE4886-9B – Cross-Section B-B' – Groundwater (BTEX, PHCs & PAHs)
- ☐ Soil Profile and Test Data Sheets
- ☐ Symbols and Terms
- ☐ Laboratory Certificates of Analysis
- ☐ Table 1 – Test Hole Summary Details
- ☐ Table 2 – Soil Testing Summary
- ☐ Table 3 – Groundwater Testing Summary
- ☐ Table 4 – Soil Analytical Test Results
- ☐ Table 4A – Maximum Concentrations – Soil
- ☐ Table 5 – Groundwater Analytical Test Results
- ☐ Table 5A – Maximum Concentrations – Groundwater
- ☐ Table 6 – QA/QC Calculations – Relative Percent Difference – Soil
- ☐ Table 7 – QA/QC Calculations – Relative Percent Difference – Groundwater
- ☐ Table 8 – Groundwater Levels
- ☐ Table 9 – Stabilized Water Quality Parameters



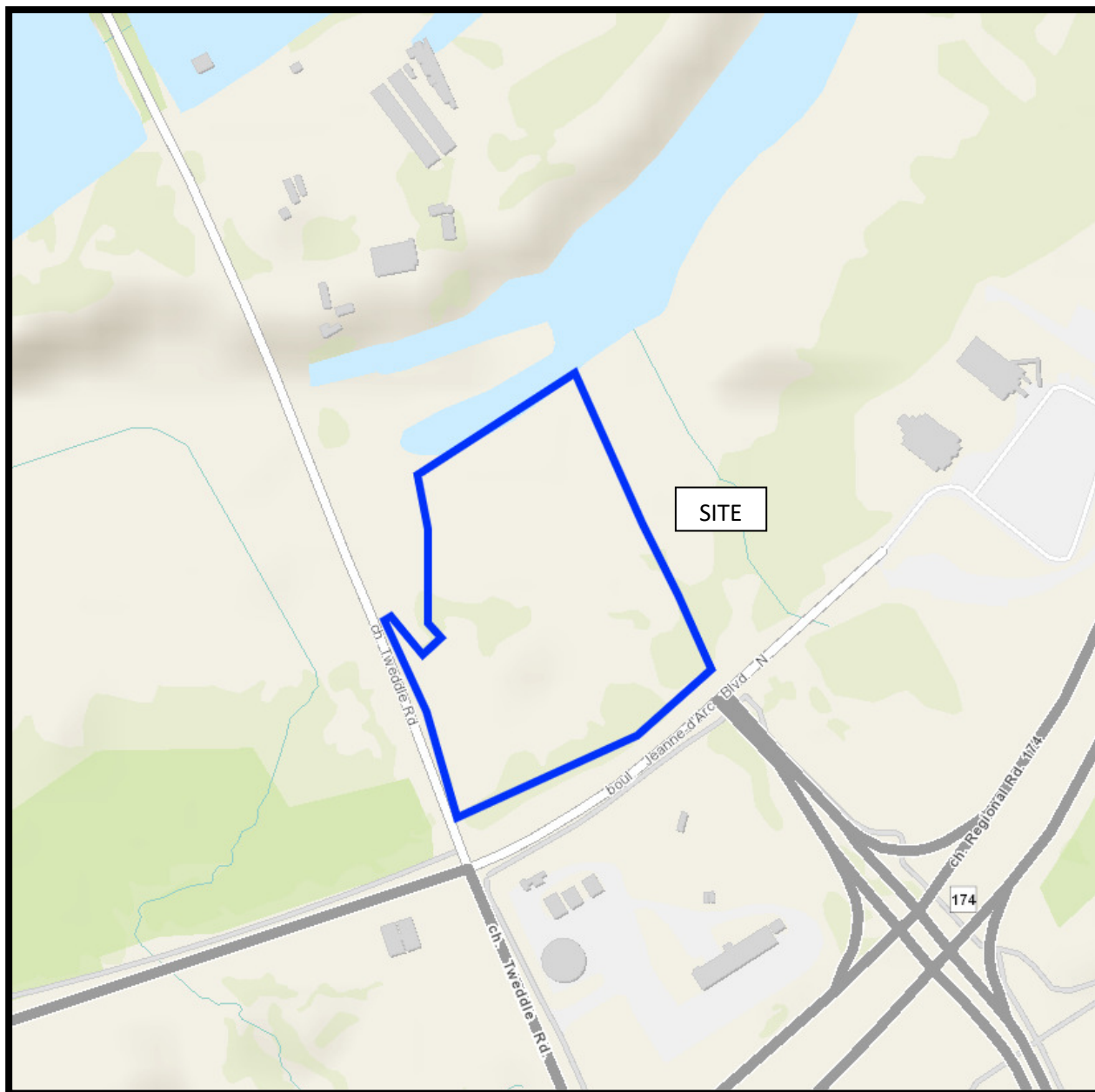
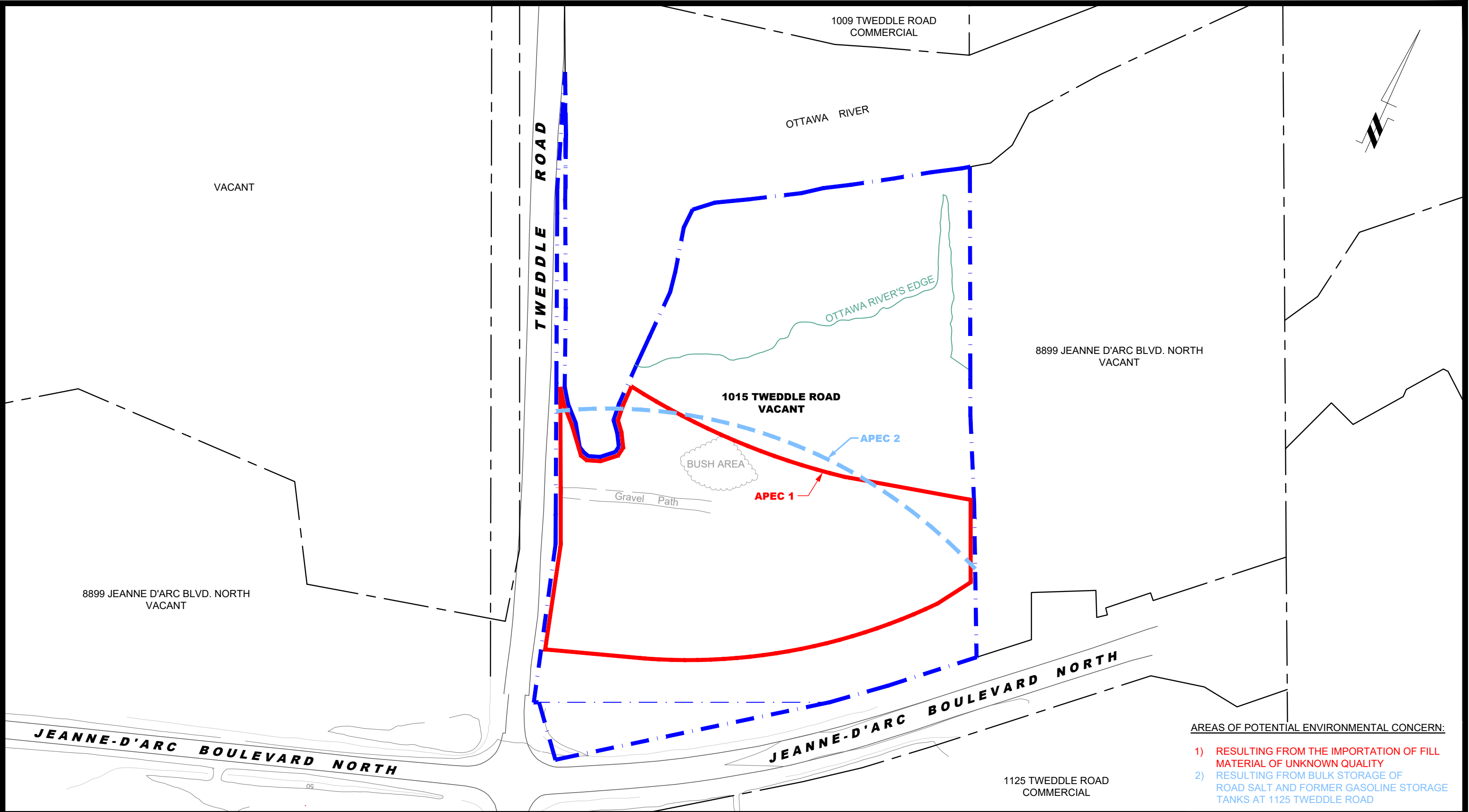


FIGURE 1
KEY PLAN



AREAS OF POTENTIAL ENVIRONMENTAL CONCERN:

- 1) RESULTING FROM THE IMPORTATION OF FILL MATERIAL OF UNKNOWN QUALITY
- 2) RESULTING FROM BULK STORAGE OF ROAD SALT AND FORMER GASOLINE STORAGE TANKS AT 1125 TWEDDLE ROAD



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OTTAWA,
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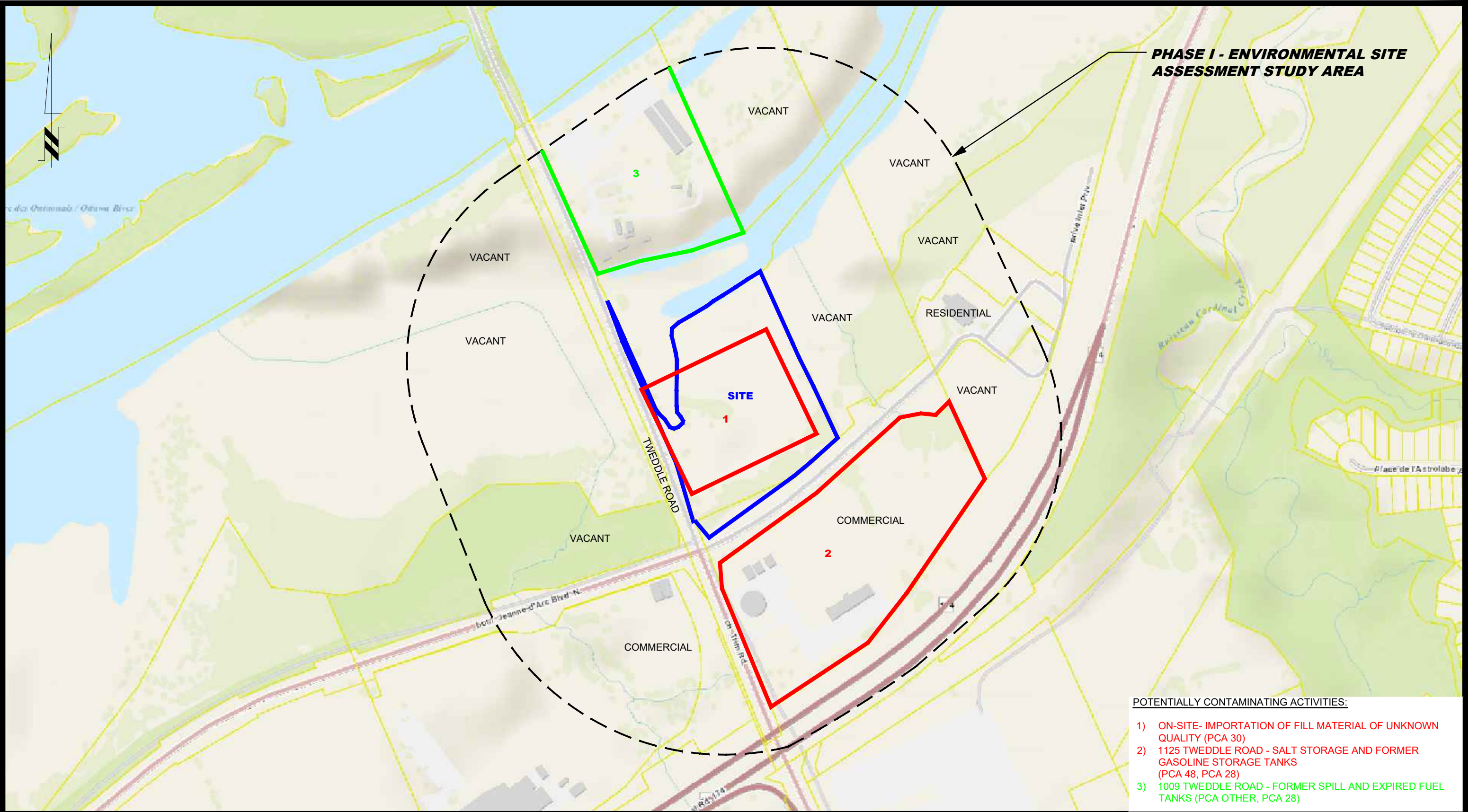
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VUZE CONSTRUCTION
PHASE I - ENVIRONMENTAL SITE ASSESSMENT
1015 TWEDDLE ROAD

SITE PLAN

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Drawn by:	GK	Report No.:	PE4886-LET.02
Checked by:	JD	Dwg. No.:	PE4886-1R
Approved by:	MSD	Revision No.:	

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PHASE I - ENVIRONMENTAL SITE ASSESSMENT STUDY AREA

- POTENTIALLY CONTAMINATING ACTIVITIES:
- 1) ON-SITE- IMPORTATION OF FILL MATERIAL OF UNKNOWN QUALITY (PCA 30)
 - 2) 1125 TWEDDLE ROAD - SALT STORAGE AND FORMER GASOLINE STORAGE TANKS (PCA 48, PCA 28)
 - 3) 1009 TWEDDLE ROAD - FORMER SPILL AND EXPIRED FUEL TANKS (PCA OTHER, PCA 28)



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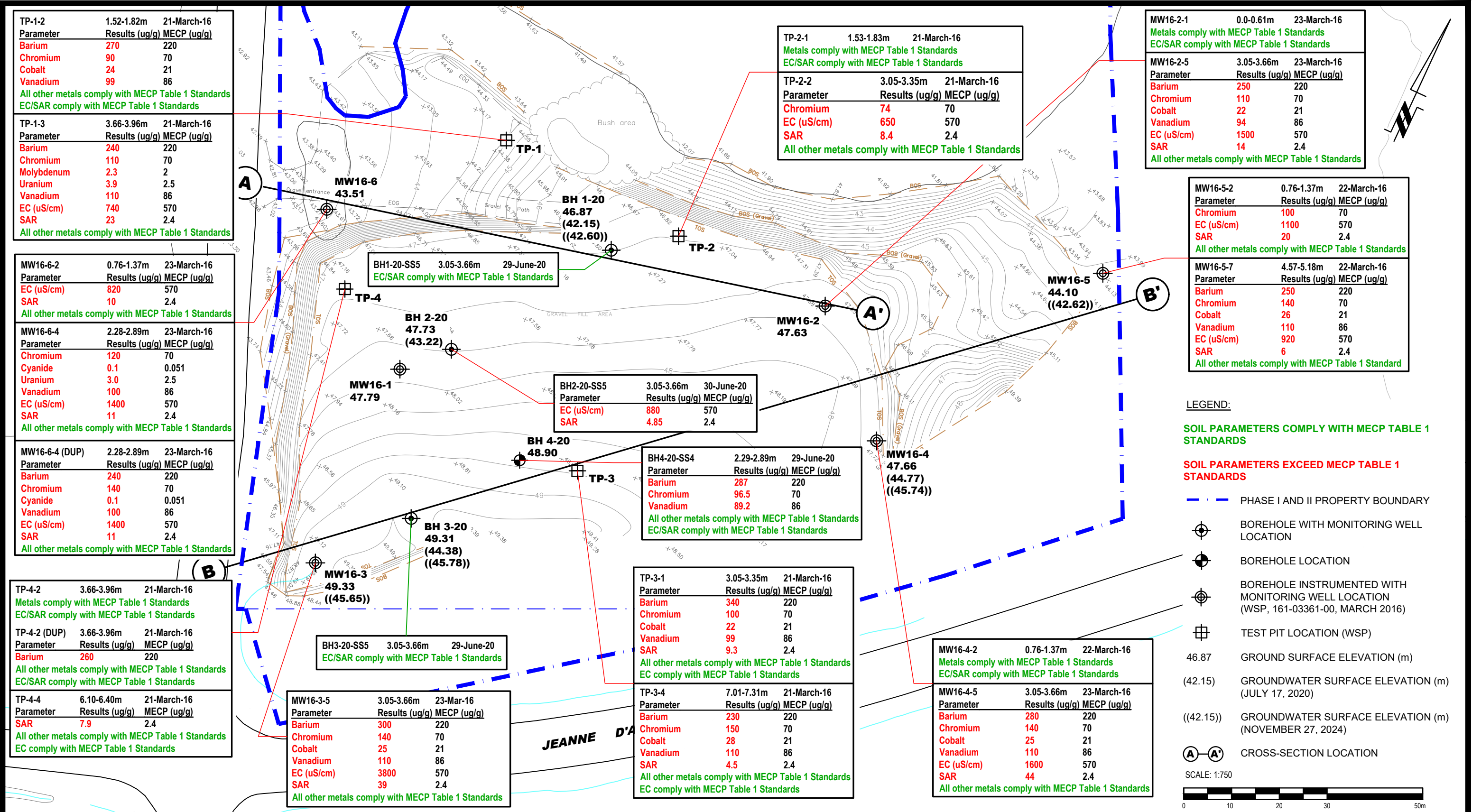
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PHASE I - ENVIRONMENTAL SITE ASSESSMENT
1015 TWEDDLE ROAD
ONTARIO

SURROUNDING LAND USE PLAN

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Drawn by:	GK	Report No.:	PE4886-LET.02
Checked by:	JD	Dwg. No.:	PE4886-2R
Approved by:	MSD	Revision No.:	

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OTTAWA,
Title:

ONTARIO

ANALYTICAL TESTING PLAN - SOIL (METALS)

Scale: 1:750

Drawn by: GK

Checked by: JD

Approved by: MSD

Date: 12/2024

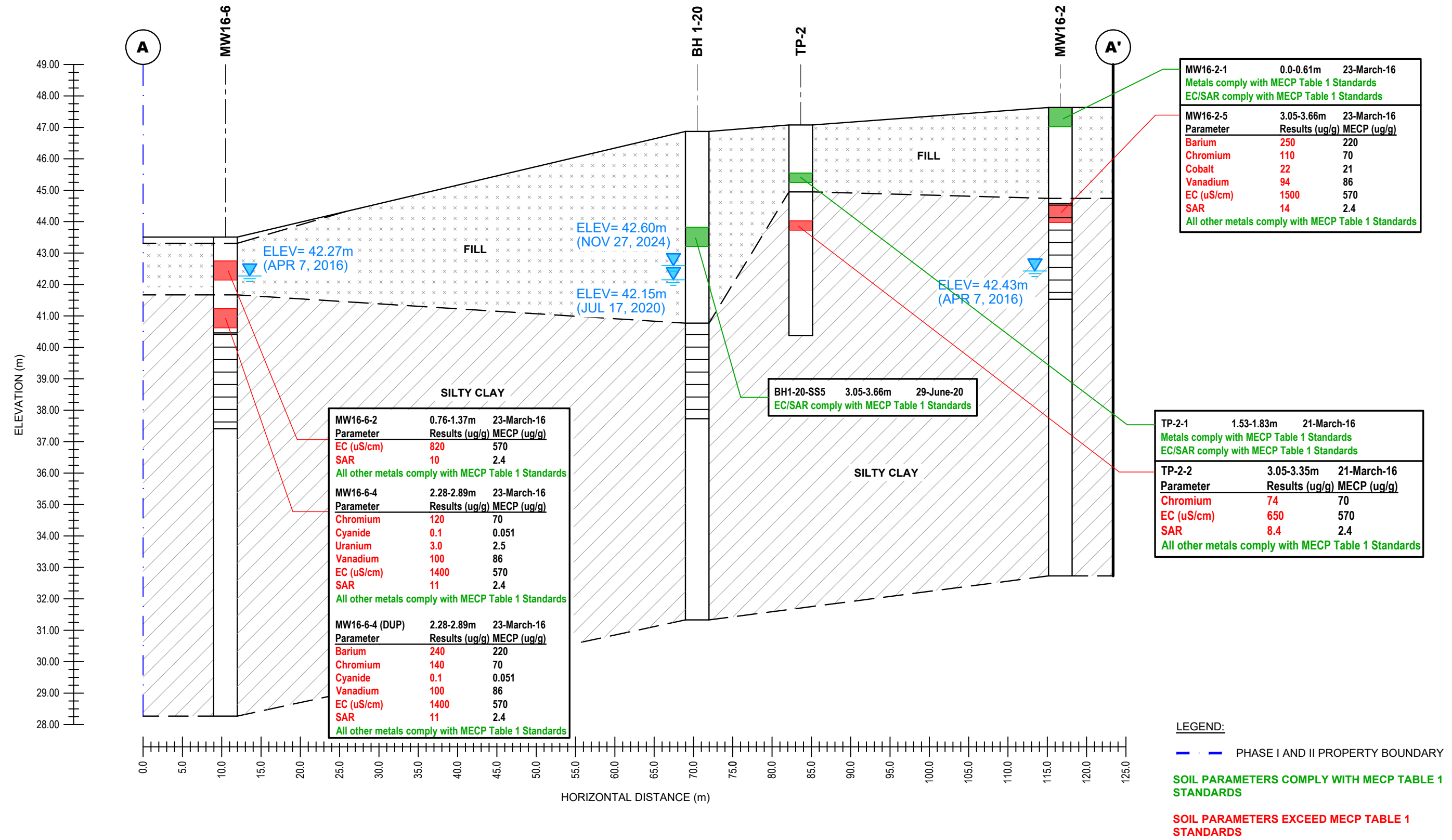
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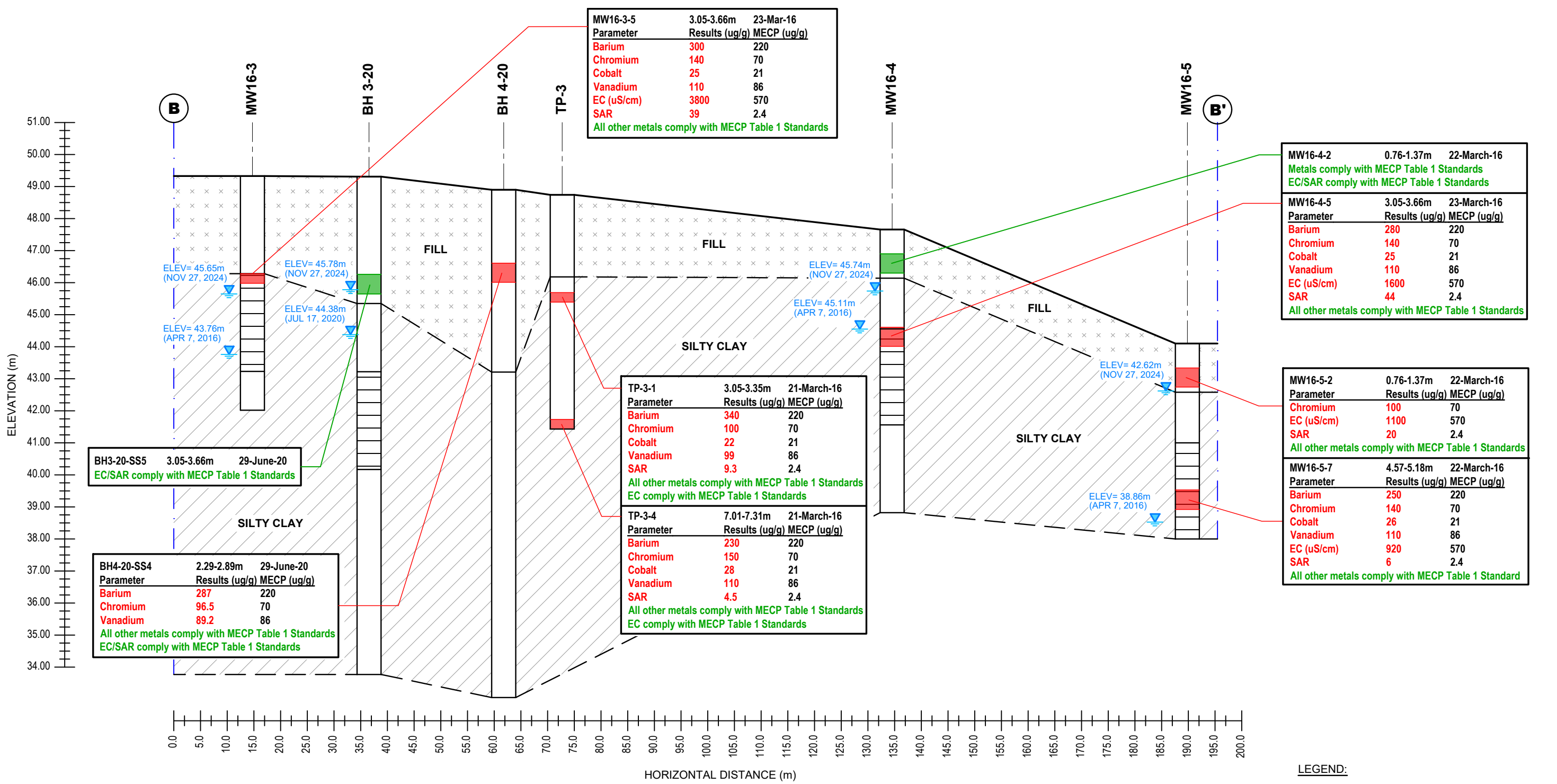
PHASE II - ENVIRONMENTAL SITE ASSESSMENT

1015 TWEDDLE ROAD

OTTAWA, ONTARIO

Title: CROSS-SECTION A-A' - SOIL (METALS)

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Checked by:	JD	Dwg. No.:	PE4886-4A
Approved by:	MSD	Revision No.:	



LEGEND:

— — — — — PHASE I AND II PROPERTY BOUNDARY

SOIL PARAMETERS COMPLY WITH MECP TABLE 1 STANDARDS

SOIL PARAMETERS EXCEED MECP TABLE 1 STANDARDS

0			
NO.	REVISIONS	DATE	INITIAL

VUZE CONSTRUCTION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

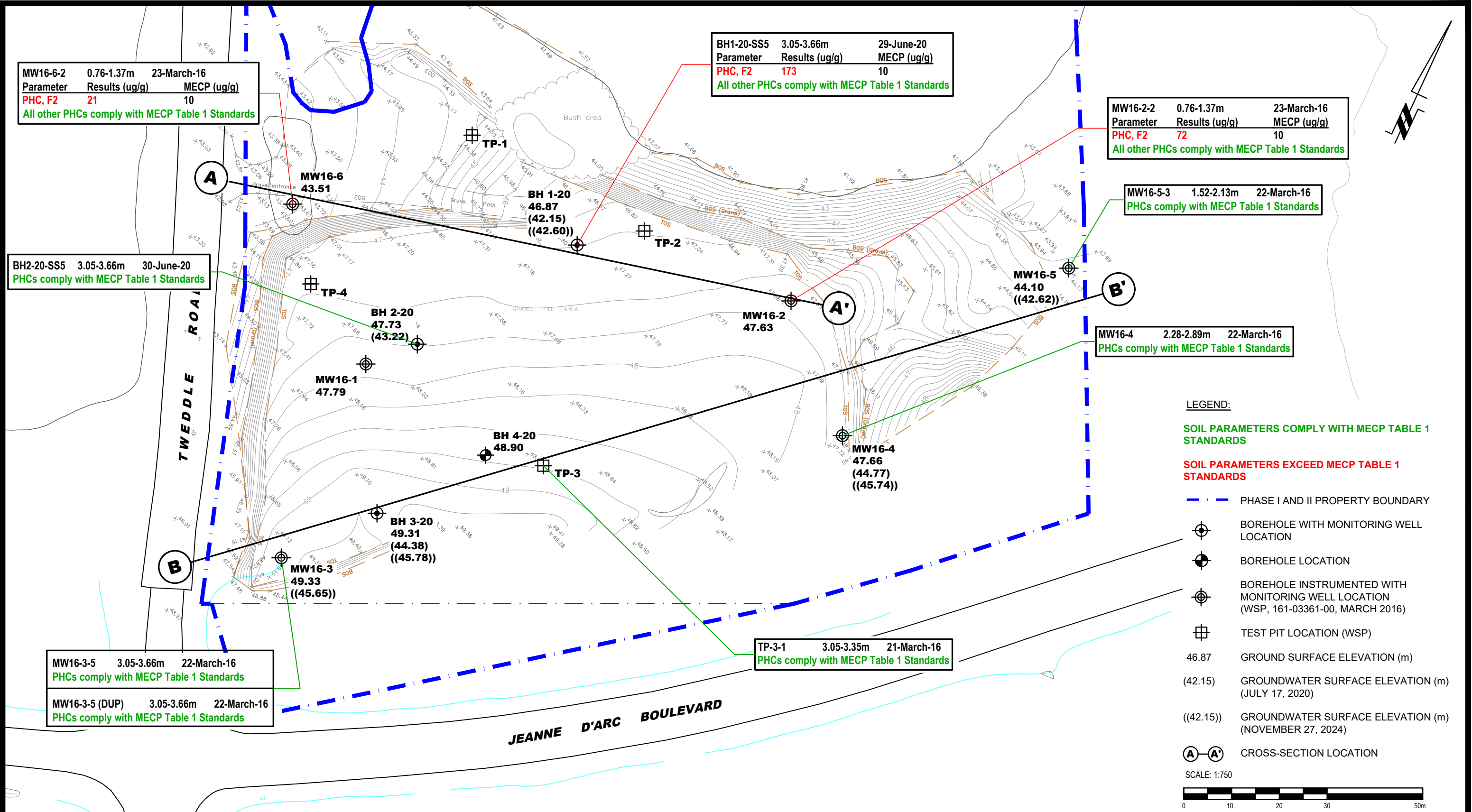
1015 TWEDDLE ROAD

OTTAWA, ONTARIO

OTTA

CROSS-SECTION B-B' - SOIL (METALS)

Scale:	AS SHOWN	Date:	12/2024
Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-4B
Approved by:	MSD	Revision No.:	





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

NO.	REVISIONS	DATE	INITIAL

VUZE CONSTRUCTION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

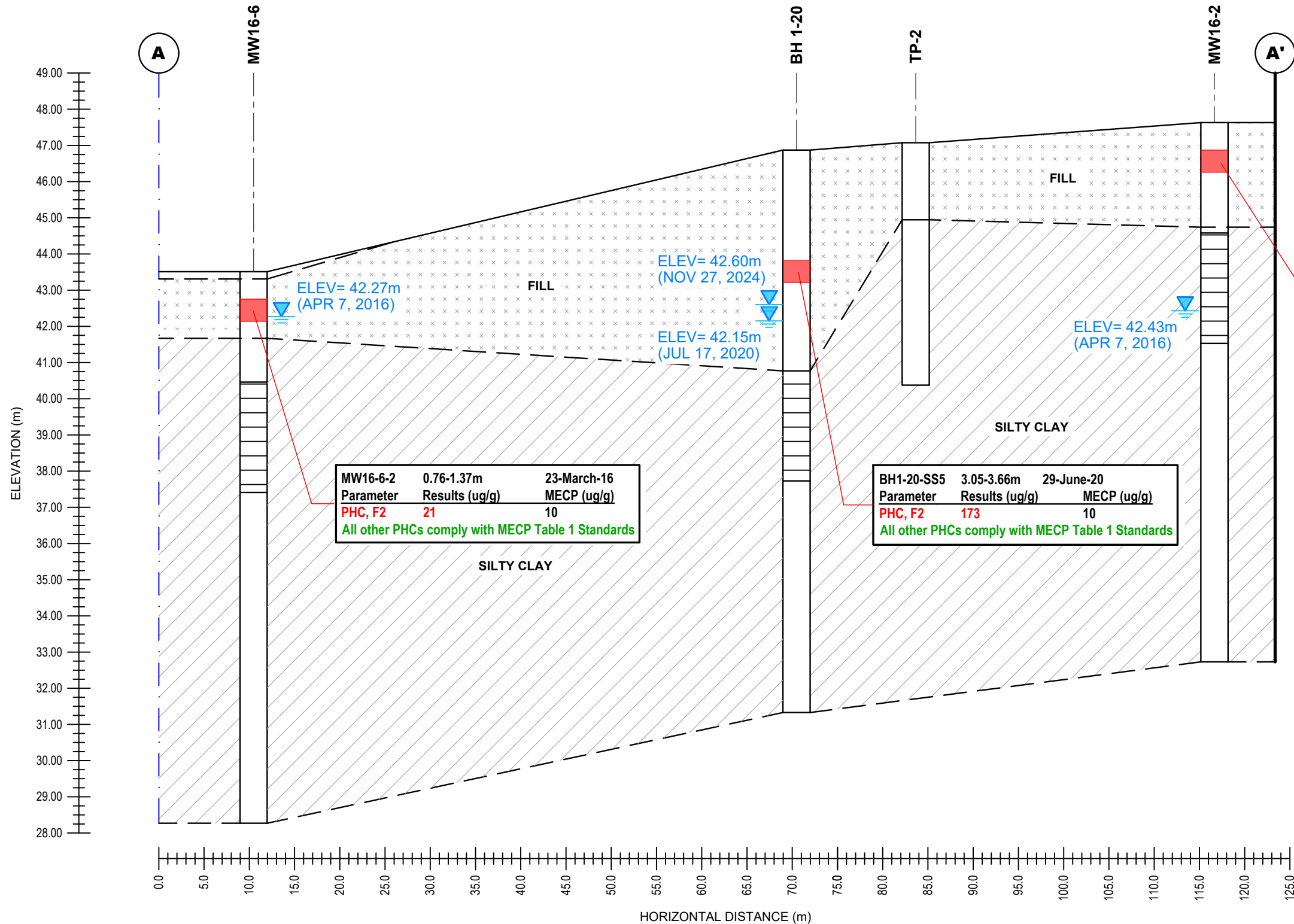
1015 TWEDDLE ROAD

OTTAWA,
Title:

ONTARIO

ANALYTICAL TESTING PLAN - SOIL (PHCs)

Scale:	1:750	Date:	12/2024
Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-5
Approved by:	MSD	Revision No.:	



LEGEND:

— — PHASE I AND II PROPERTY BOUNDARY

SOIL PARAMETERS COMPLY WITH MECP TABLE 1 STANDARDS

SOIL PARAMETERS EXCEED MECP TABLE 1 STANDARDS



PATERSON GROUP
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NO.	REVISIONS	DATE	INITIAL

VUZE CONSTRUCTION

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

1015 TWEDDLE ROAD

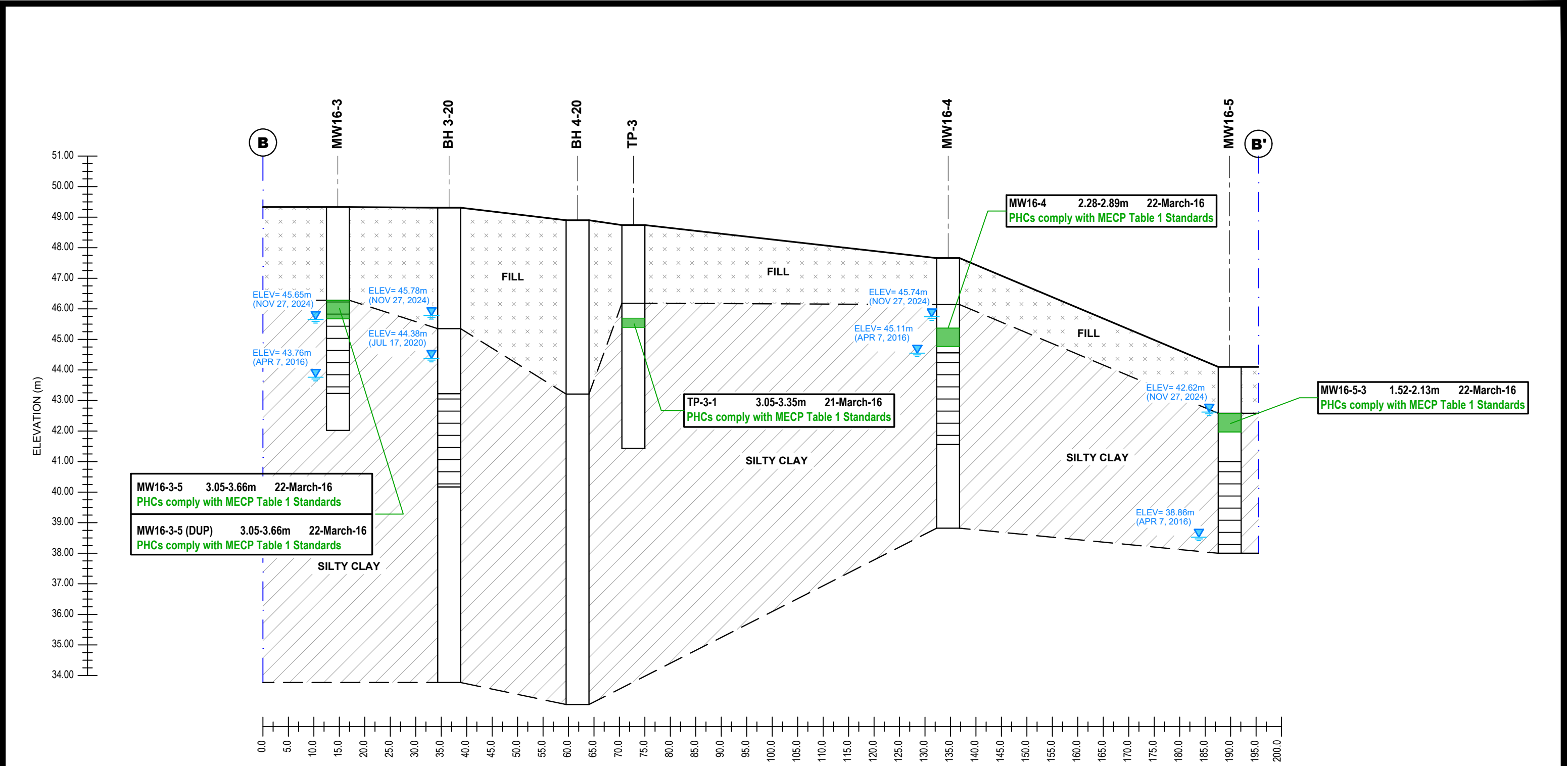
OTTAWA,

Title:

ONTARIO

CROSS-SECTION A-A' - SOIL (PHCs)

Scale:	AS SHOWN	Date:	12/2024
Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-5A
Approved by:	MSD	Revision No.:	



LEGEND:

— — — — — PHASE I AND II PROPERTY BOUNDARY

SOIL PARAMETERS COMPLY WITH MECP TABLE 1 STANDARDS



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NO.	REVISIONS	DATE	INITIAL

OTTAWA, ONTARIO

Title: **CROSS-SECTION B-B' - SOIL (PHCs)**

VUZE CONSTRUCTION
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1015 TWEDDLE ROAD

Scale: **AS SHOWN**

Drawn by: **GK**

Checked by: **JD**

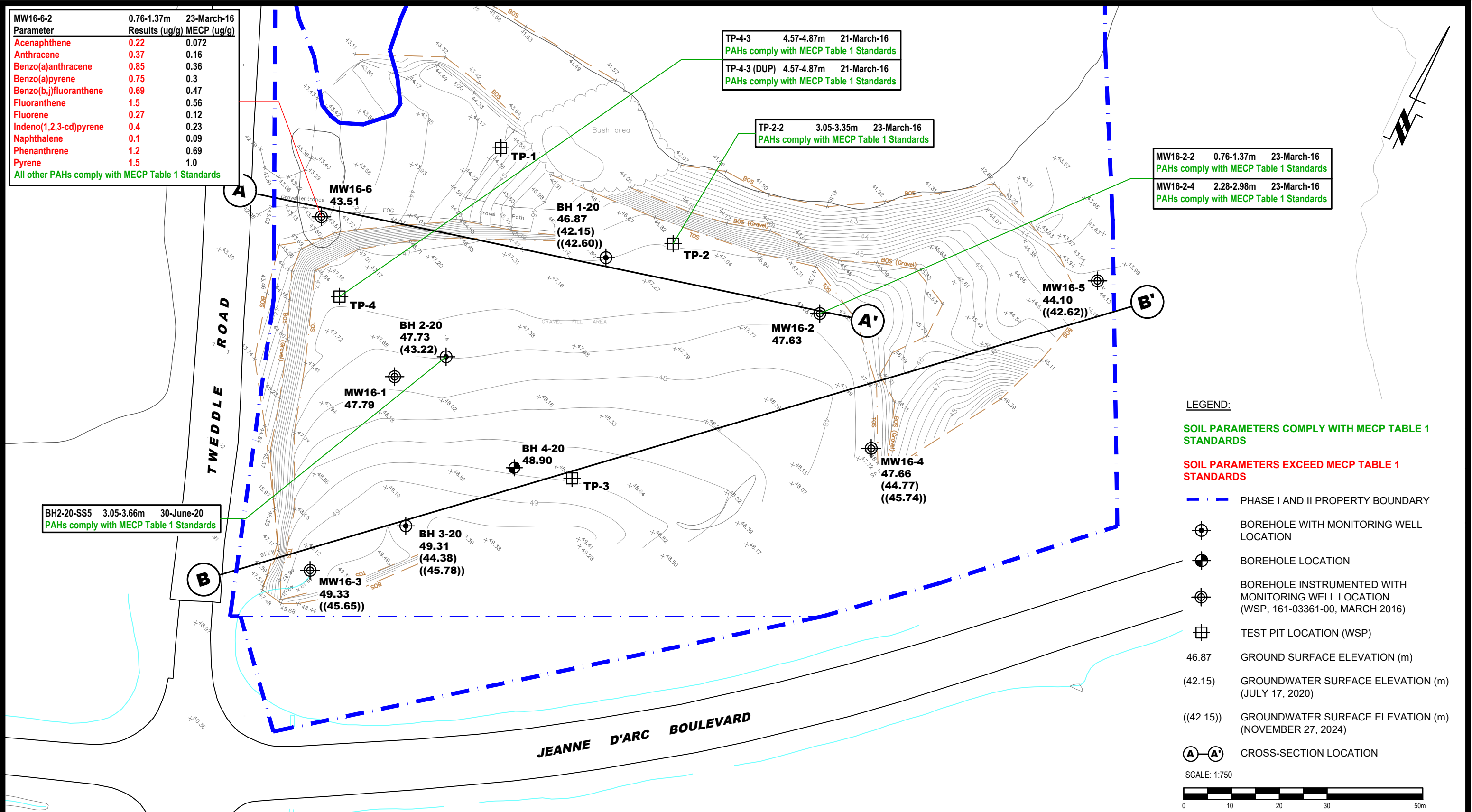
Approved by: **MSD**

Date: **12/2024**

Report No.: **PE4886-LET.03**

Dwg. No.: **PE4886-5B**

Revision No.:



9 AURIGA DRIVE
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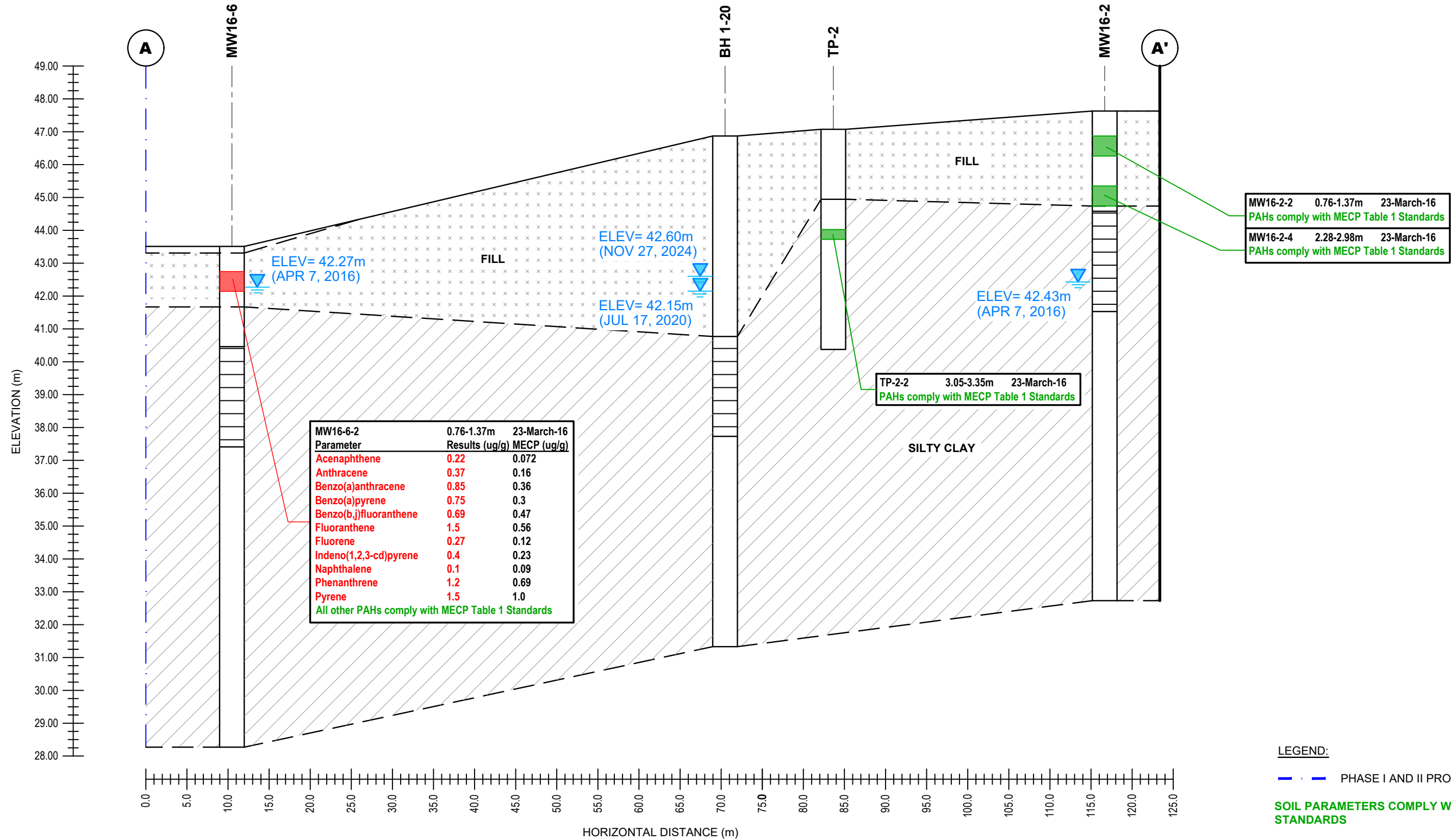
OTTAWA,
Title:

ONTARIO

VUZE CONSTRUCTION
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1015 TWEDDLE ROAD

ANALYTICAL TESTING PLAN - SOIL (PAHs)

Scale:	1:750	Date:	12/2024
Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-6
Approved by:	MSD	Revision No.:	



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NO.	REVISIONS	DATE	INITIAL

VUZE CONSTRUCTION

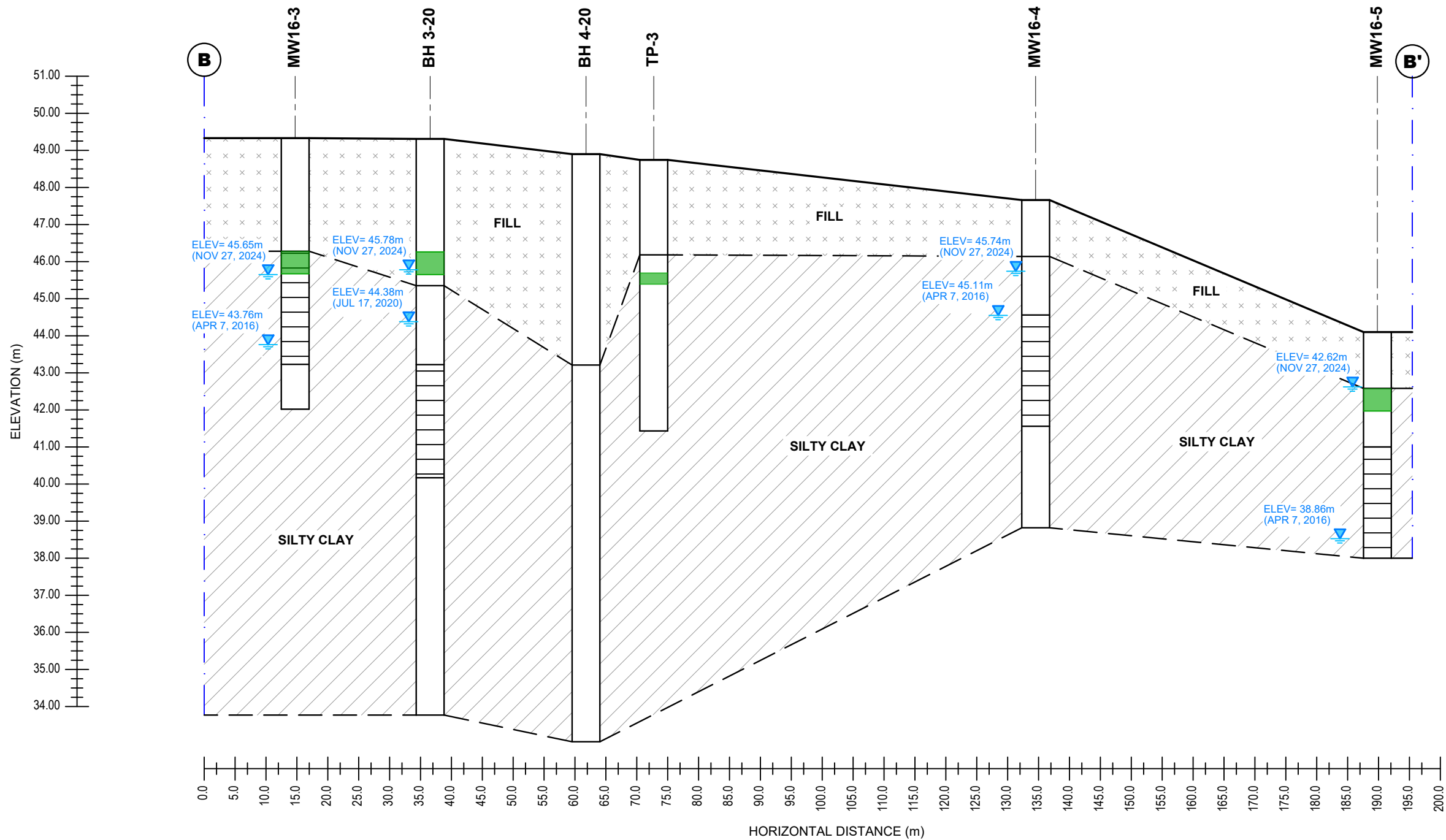
PHASE II - ENVIRONMENTAL SITE ASSESSMENT

1015 TWEDDLE ROAD

OTTAWA, ONTARIO

CROSS-SECTION A-A' - SOIL (PAHs)

Scale:	AS SHOWN	Date:	12/2024
Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-6A
Approved by:	MSD	Revision No.:	



LEGEND:

— — — — — PHASE I AND II PROPERTY BOUNDARY

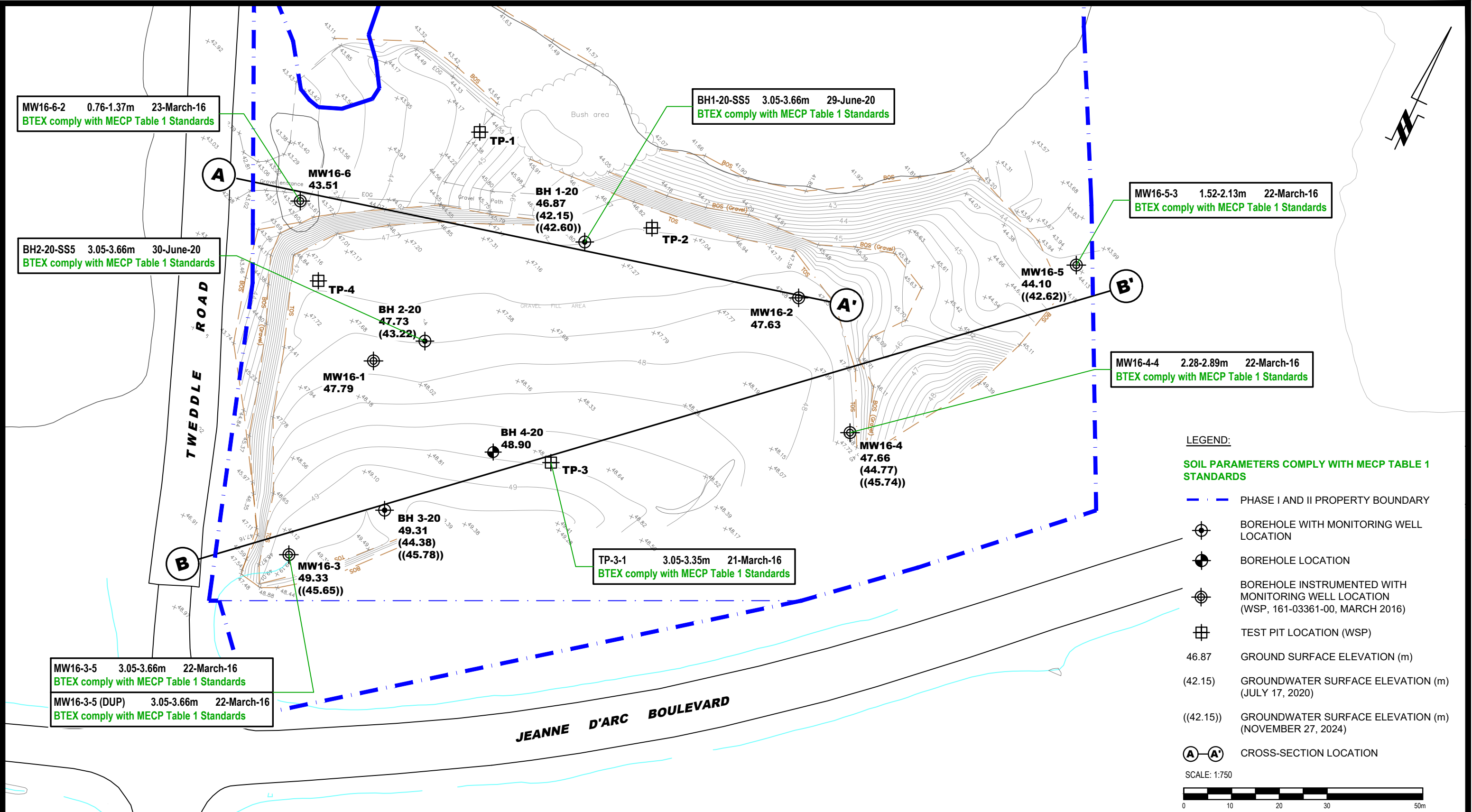
SOIL PARAMETERS COMPLY WITH MECP TABLE 1 STANDARDS

SOIL PARAMETERS EXCEED MECP TABLE 1 STANDARDS

0			
NO.	REVISIONS	DATE	INITIAL

VUZE CONSTRUCTION	
PHASE II - ENVIRONMENTAL SITE ASSESSMENT	
1015 TWEDDLE ROAD	
OTTAWA,	ONTARIO
Title:	CROSS-SECTION A-A' - SOIL (PAHs)

Scale:	AS SHOWN	Date:	12/2024
Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-6B
Approved by:	MSD	Revision No.:	





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NO.	REVISIONS	DATE	INITIAL
0			

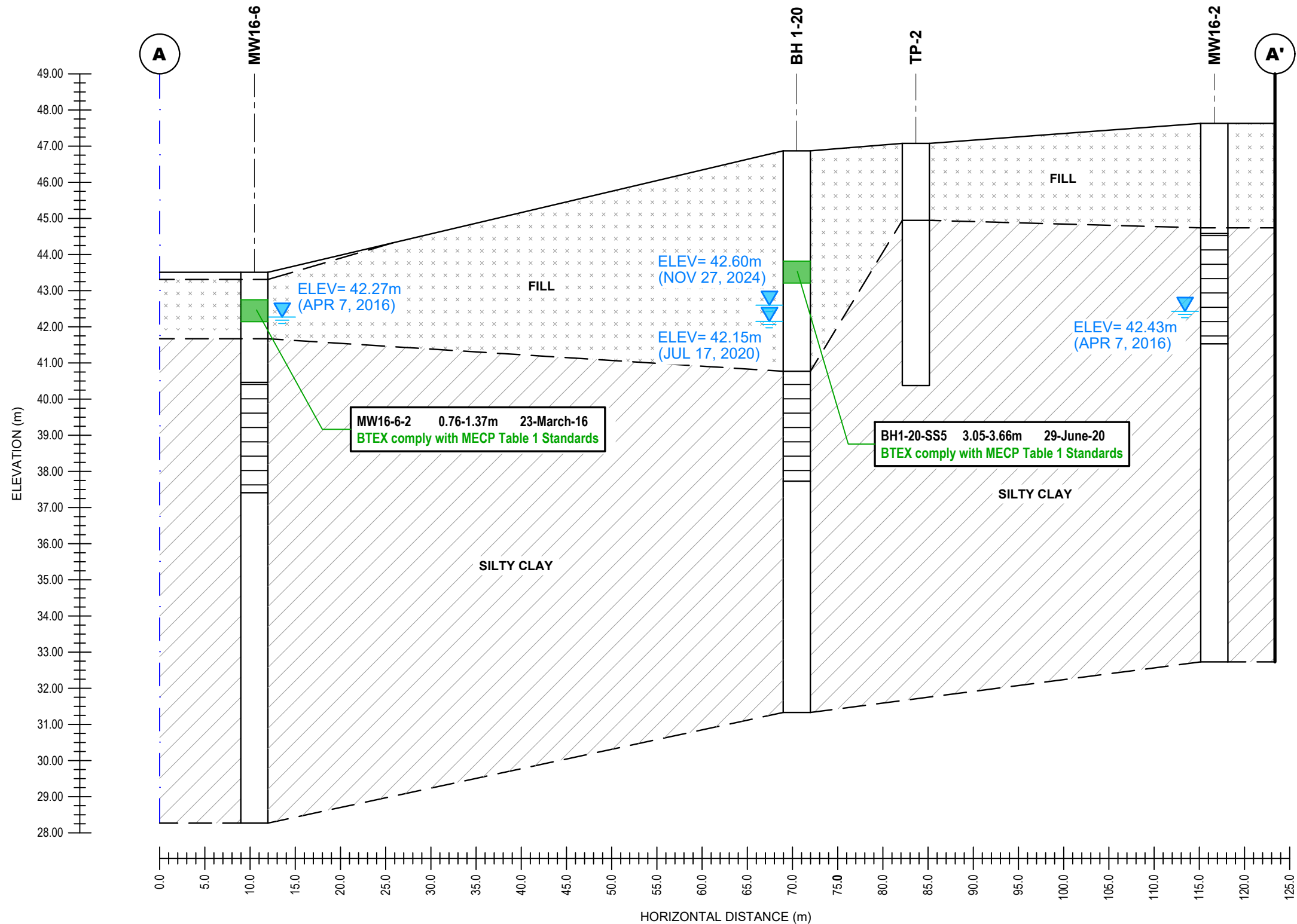
OTTAWA,
Title:

ONTARIO

VUZE CONSTRUCTION
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1015 TWEDDLE ROAD

ANALYTICAL TESTING PLAN - SOIL (BTEX)

Scale:	1:750	Date:	12/2024
Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-7
Approved by:	MSD	Revision No.:	



LEGEND:
- - - PHASE I AND II PROPERTY BOUNDARY
SOIL PARAMETERS COMPLY WITH MECP TABLE 1 STANDARDS



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NO.	REVISIONS	DATE	INITIAL

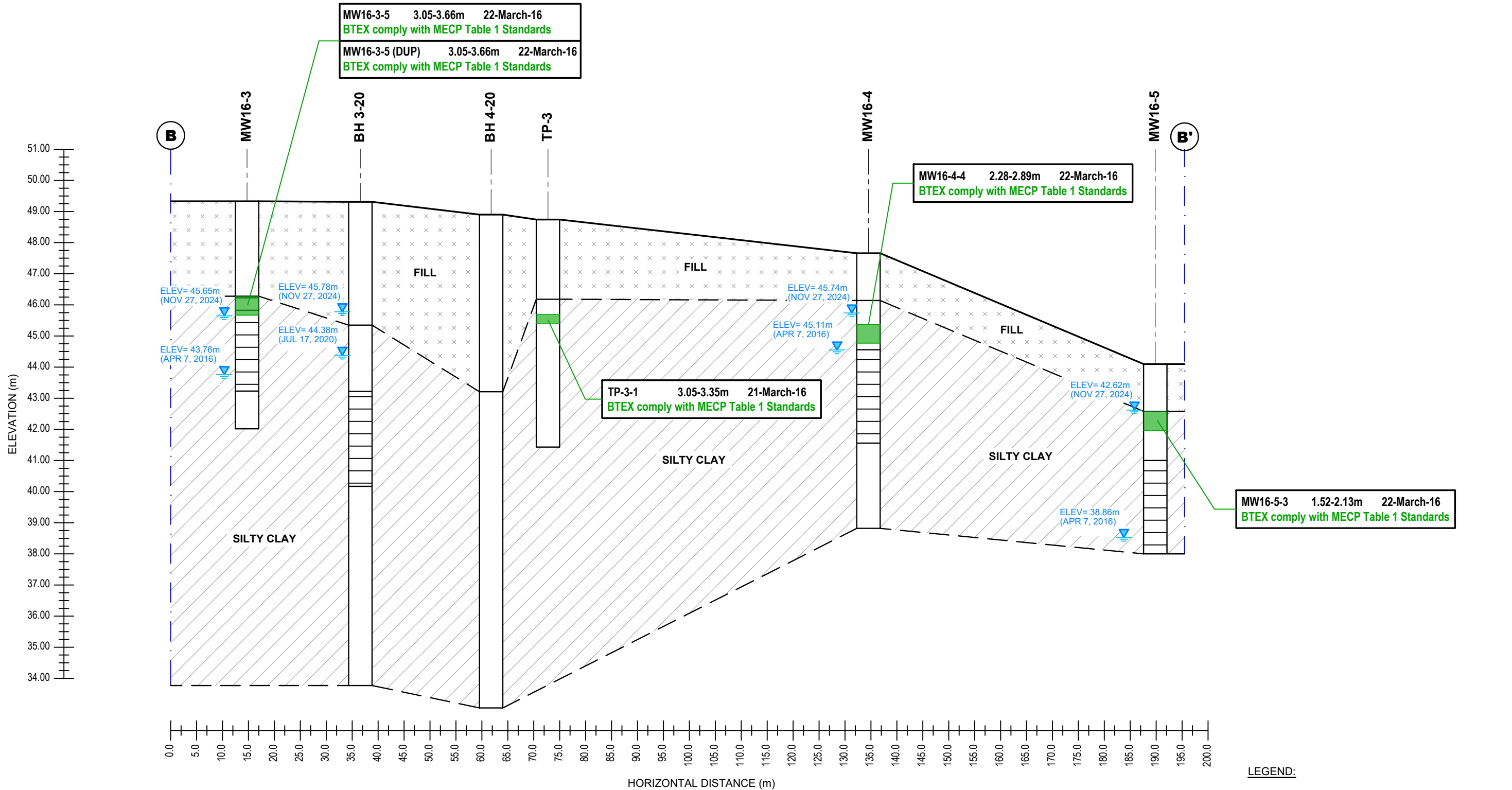
VUZE CONSTRUCTION
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1015 TWEDDLE ROAD

OTTAWA,
Title:

ONTARIO

CROSS-SECTION A-A' - SOIL (BTEX)

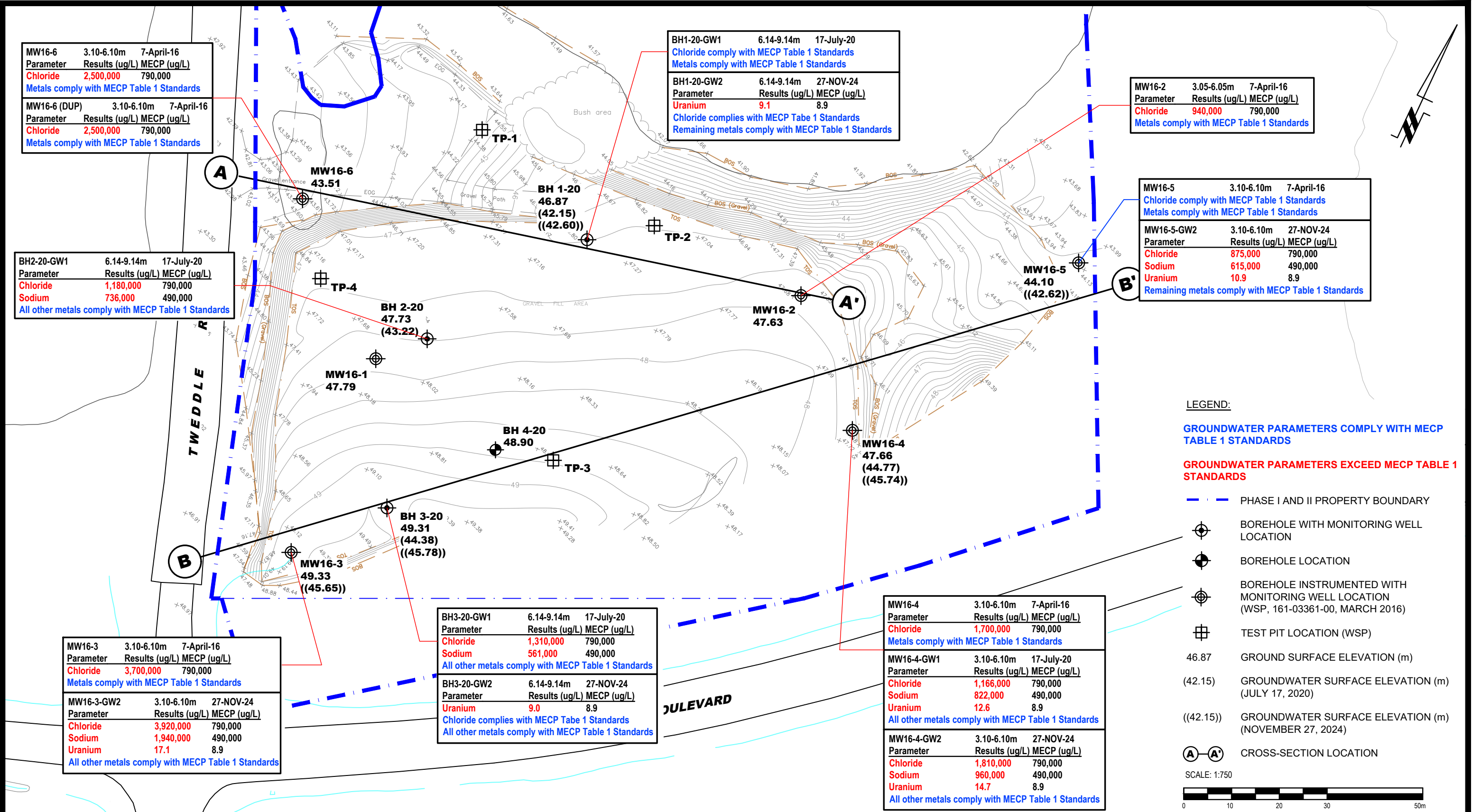
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Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-7A
Approved by:	MSD	Revision No.:	



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NO.	REVISIONS	DATE	INITIAL

VUZE CONSTRUCTION	
PHASE II - ENVIRONMENTAL SITE ASSESSMENT	
1015 TWEDDLE ROAD	
OTTAWA,	ONTARIO
Title: CROSS-SECTION B-B' - SOIL (BTEX)	

Scale:	AS SHOWN	Date:	12/2024
Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-7B
Approved by:	MSD	Revision No.:	





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NO.	REVISIONS	DATE	INITIAL
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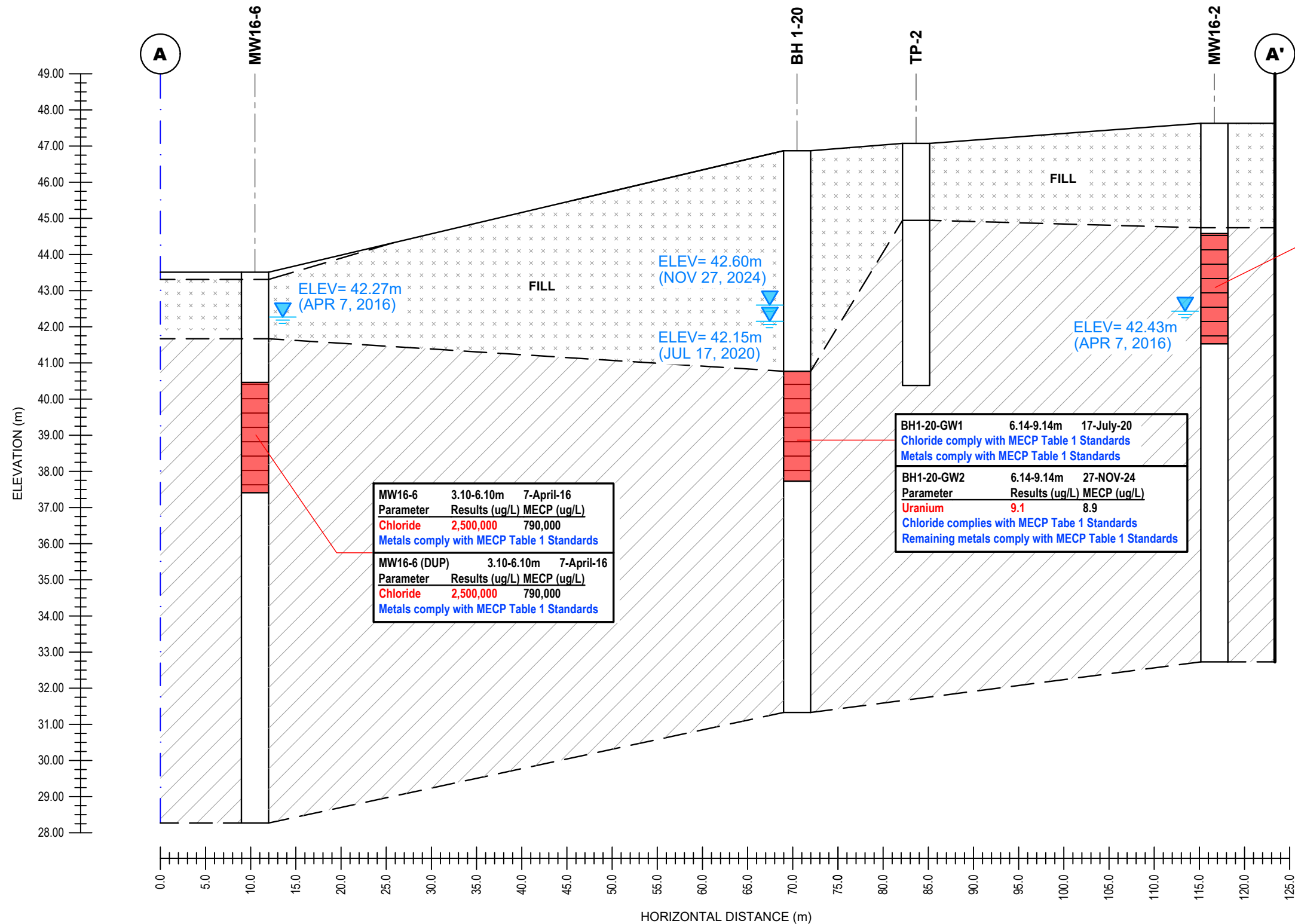
OTTAWA,
Title:

ANALYTICAL TESTING PLAN - GROUNDWATER (METALS)

VUZE CONSTRUCTION
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1015 TWEDDLE ROAD

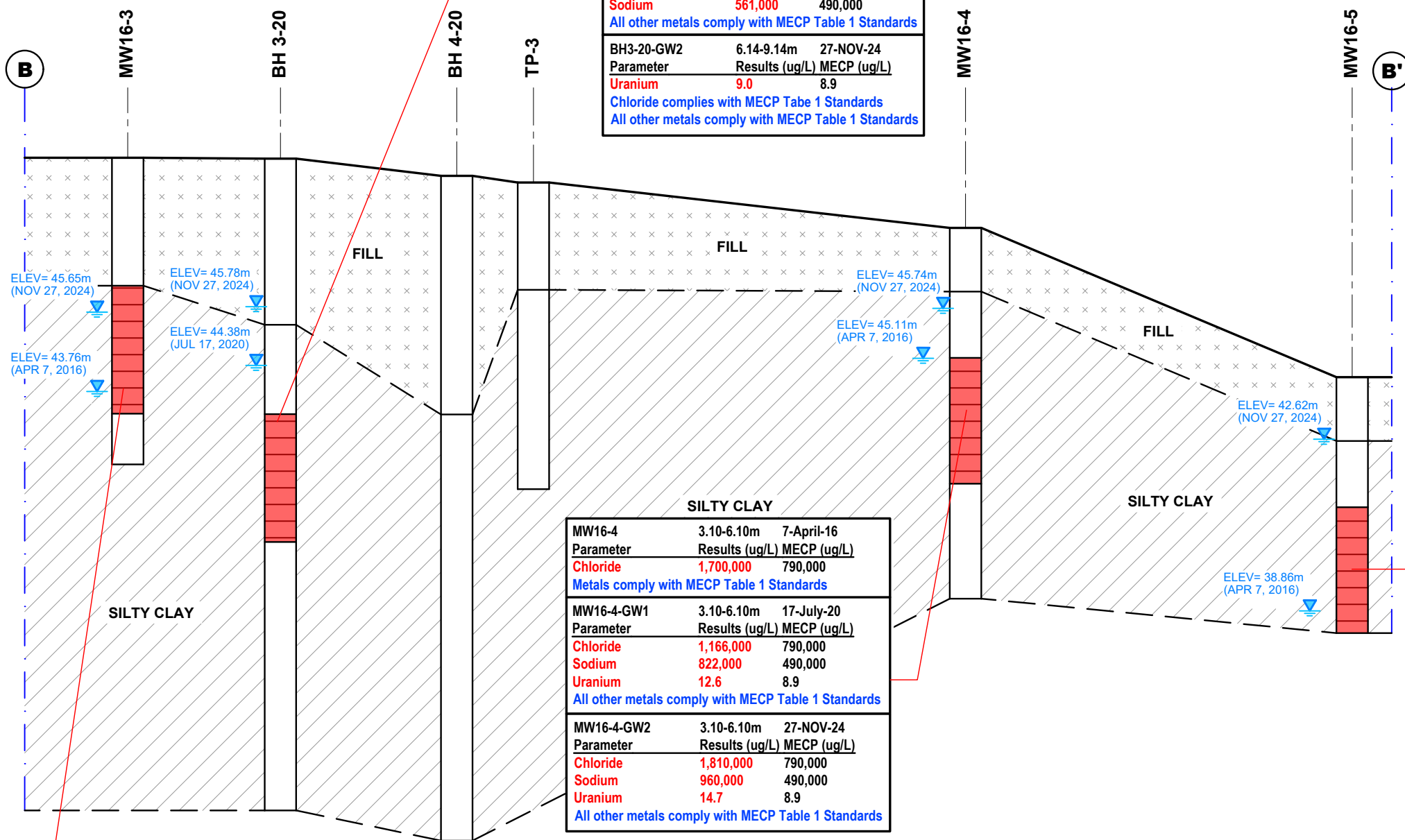
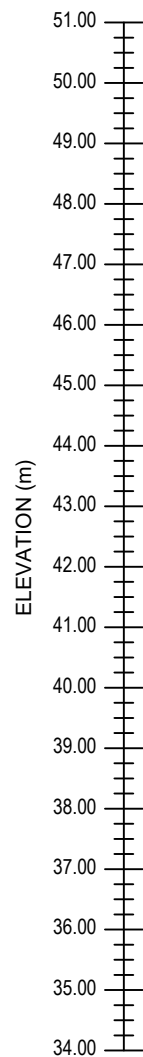
ONTARIO

Scale:	1:750	Date:	12/2024
Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-8
Approved by:	MSD	Revision No.:	



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NO.	REVISIONS	DATE	INITIAL

Scale:	AS SHOWN	Date:	12/2024
Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-8A
Approved by:	MSD	Revision No.:	

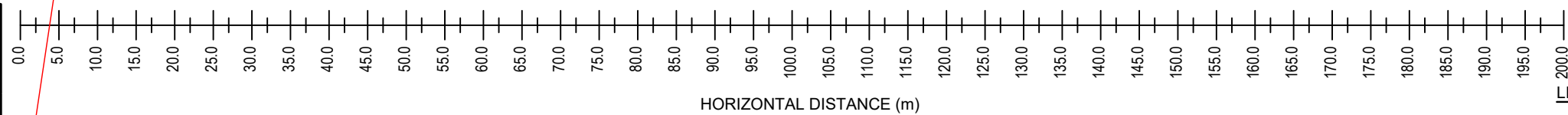


BH3-20-GW1	6.14-9.14m	17-July-20
Parameter	Results (ug/L)	MECP (ug/L)
Chloride	1,310,000	790,000
Sodium	561,000	490,000
All other metals comply with MECP Table 1 Standards		
BH3-20-GW2	6.14-9.14m	27-NOV-24
Parameter	Results (ug/L)	MECP (ug/L)
Uranium	9.0	8.9
Chloride complies with MECP Table 1 Standards		
All other metals comply with MECP Table 1 Standards		

MW16-4	3.10-6.10m	7-April-16
Parameter	Results (ug/L)	MECP (ug/L)
Chloride	1,700,000	790,000
Metals comply with MECP Table 1 Standards		
MW16-4-GW1	3.10-6.10m	17-July-20
Parameter	Results (ug/L)	MECP (ug/L)
Chloride	1,166,000	790,000
Sodium	822,000	490,000
Uranium	12.6	8.9
All other metals comply with MECP Table 1 Standards		
MW16-4-GW2	3.10-6.10m	27-NOV-24
Parameter	Results (ug/L)	MECP (ug/L)
Chloride	1,810,000	790,000
Sodium	960,000	490,000
Uranium	14.7	8.9
All other metals comply with MECP Table 1 Standards		

MW16-5	3.10-6.10m	7-April-16
Chloride comply with MECP Table 1 Standards		
Metals comply with MECP Table 1 Standards		
MW16-5-GW2	3.10-6.10m	27-NOV-24
Parameter	Results (ug/L)	MECP (ug/L)
Chloride	875,000	790,000
Sodium	615,000	490,000
Uranium	10.9	8.9
Remaining metals comply with MECP Table 1 Standards		

MW16-3	3.10-6.10m	7-April-16
Parameter	Results (ug/L)	MECP (ug/L)
Chloride	3,700,000	790,000
Metals comply with MECP Table 1 Standards		
MW16-3-GW2	3.10-6.10m	27-NOV-24
Parameter	Results (ug/L)	MECP (ug/L)
Chloride	3,920,000	790,000
Sodium	1,940,000	490,000
Uranium	17.1	8.9
All other metals comply with MECP Table 1 Standards		



LEGEND:

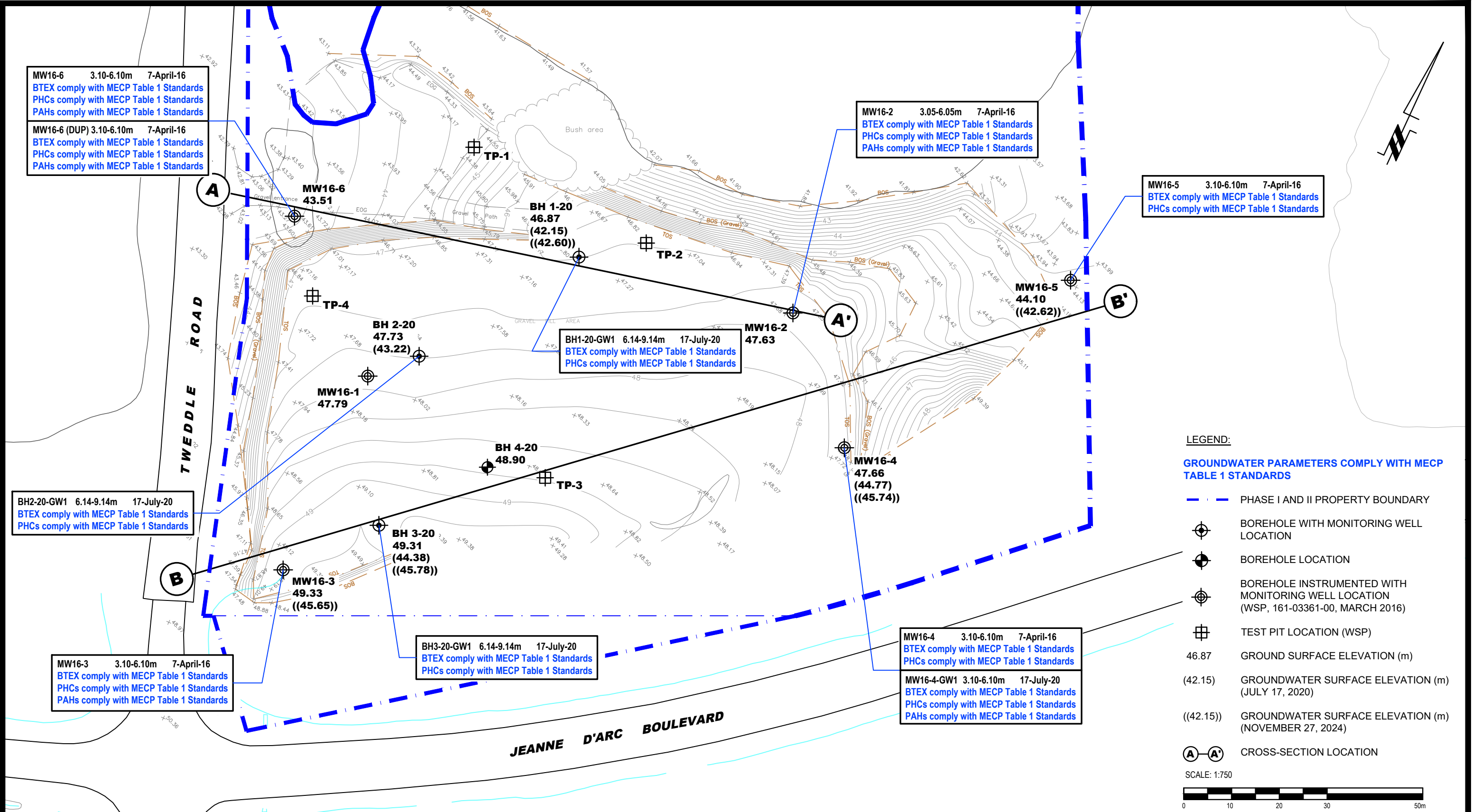
— — — PHASE I AND II PROPERTY BOUNDARY

GROUNDWATER PARAMETERS COMPLY WITH MECP TABLE 1 STANDARDS

GROUNDWATER PARAMETERS EXCEED MECP TABLE 1 STANDARDS

NO.	REVISIONS	DATE	INITIAL
0			

Scale:	AS SHOWN	Date:	12/2024
Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-8B
Approved by:	MSD	Revision No.:	





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NO.	REVISIONS	DATE	INITIAL
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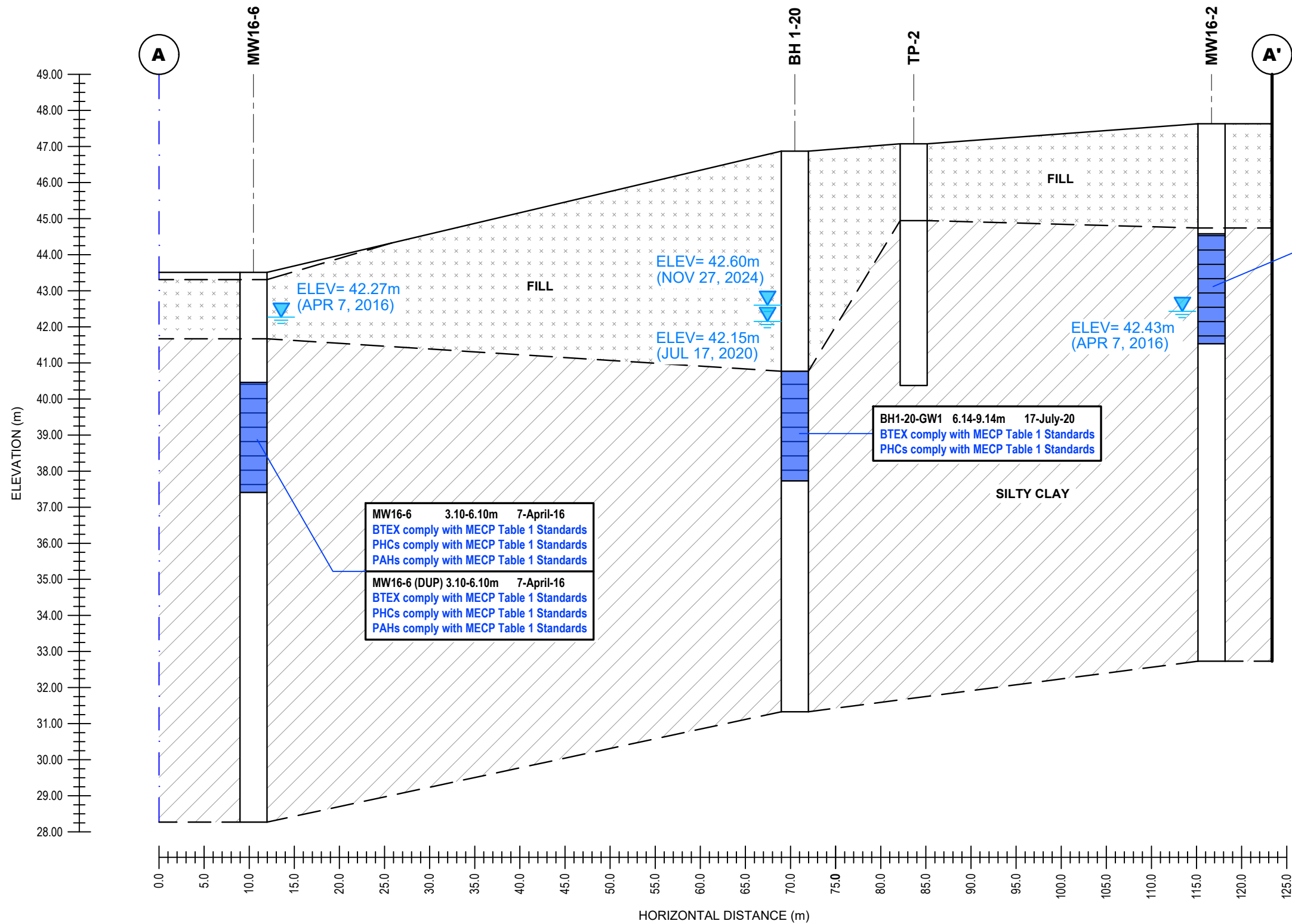
OTTAWA,
Title:

ONTARIO

VUZE CONSTRUCTION
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1015 TWEDDLE ROAD

**ANALYTICAL TESTING PLAN - GROUNDWATER
(BTEX, PHCs & PAHs)**

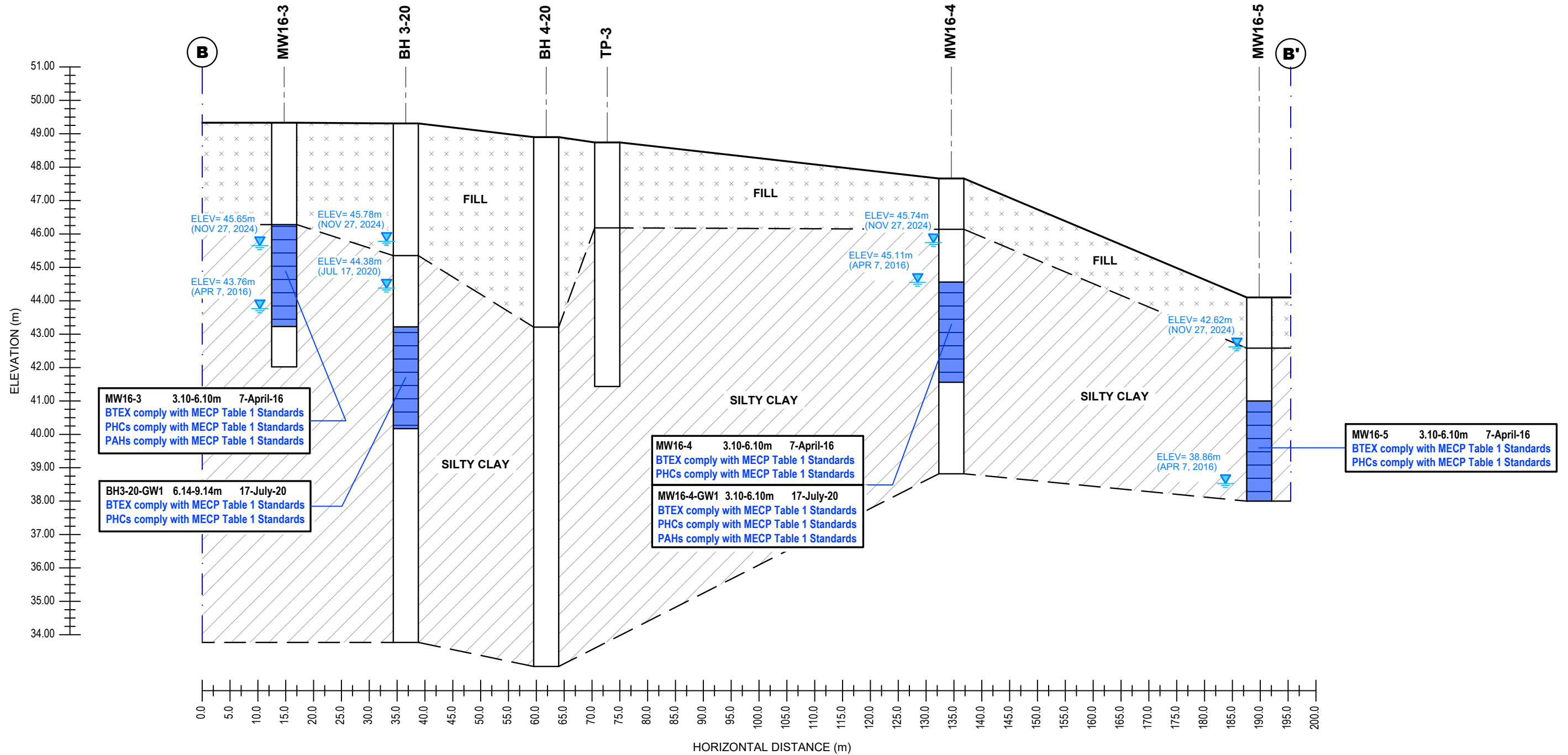
Scale:	1:750	Date:	12/2024
Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-9
Approved by:	MSD	Revision No.:	



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NO.	REVISIONS	DATE	INITIAL

VUZE CONSTRUCTION	
PHASE II - ENVIRONMENTAL SITE ASSESSMENT	
1015 TWEDDLE ROAD	
OTTAWA,	ONTARIO
Title: CROSS-SECTION A-A' - GROUNDWATER	
(BTEX, PHCs & PAHs)	

Scale:	AS SHOWN	Date:	12/2024
Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-9A
Approved by:	MSD	Revision No.:	



0			
NO.	REVISIONS	DATE	INITIAL

VUZE CONSTRUCTION	
PHASE II - ENVIRONMENTAL SITE ASSESSMENT	
1015 TWEDDLE ROAD	
OTTAWA,	ONTARIO
Title: CROSS-SECTION B-B' - GROUNDWATER (BTEX, PHCs & PAHs)	

Scale:	AS SHOWN	Date:	12/2024
Drawn by:	GK	Report No.:	PE4886-LET.03
Checked by:	JD	Dwg. No.:	PE4886-9B
Approved by:	MSD	Revision No.:	

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE June 29, 2020

FILE NO. **PE4886**

HOLE NO. **BH 1-20**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)					
GROUND SURFACE									20	40	60	80	
FILL: Brown silty sand with gravel, crushed stone, trace cobbles, boulders and blast rock		AU	1			0	46.87						
1.12		SS	2	57	50+	1	45.87						
FILL: Brown/black silty clay with gravel, trace sand, brick, occasional cobbles and boulders		SS	3	58	11	2	44.87						
2.13		SS	4	50	38	3	43.87						
FILL: Brown/black sand with crushed stone, shale fragments, some clay, occasional cobbles and boulders		SS	5	79	14	4	42.87						
3.05		SS	6	75	17	5	41.87						
FILL: Grey-brown silty clay, some sand, gravel, trace cobbles, plastic, organics		SS	7	50	P	6	40.87						
6.10		SS	8	54	P	7	39.87						
Hard to very stiff, brown SILTY CLAY		SS	9	88		8	38.87						
		SS	10	92		9	37.87						
		SS	11	83		10	36.87						
		SS	12	100		11	35.87						
		SS	13	100		12	34.87						
		SS	14	50	P	13	33.87						
	SS	15			14	32.87							
15.54					15	31.87							
End of Borehole													
(GWL @ 4.72m - July 17, 2020)													
									100	200	300	400	500
									RKI Eagle Rdg. (ppm)				
									▲ Full Gas Resp. △ Methane Elim.				

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE June 30, 2020

FILE NO.

PE4886

HOLE NO.

BH 2-20

[illegible]

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

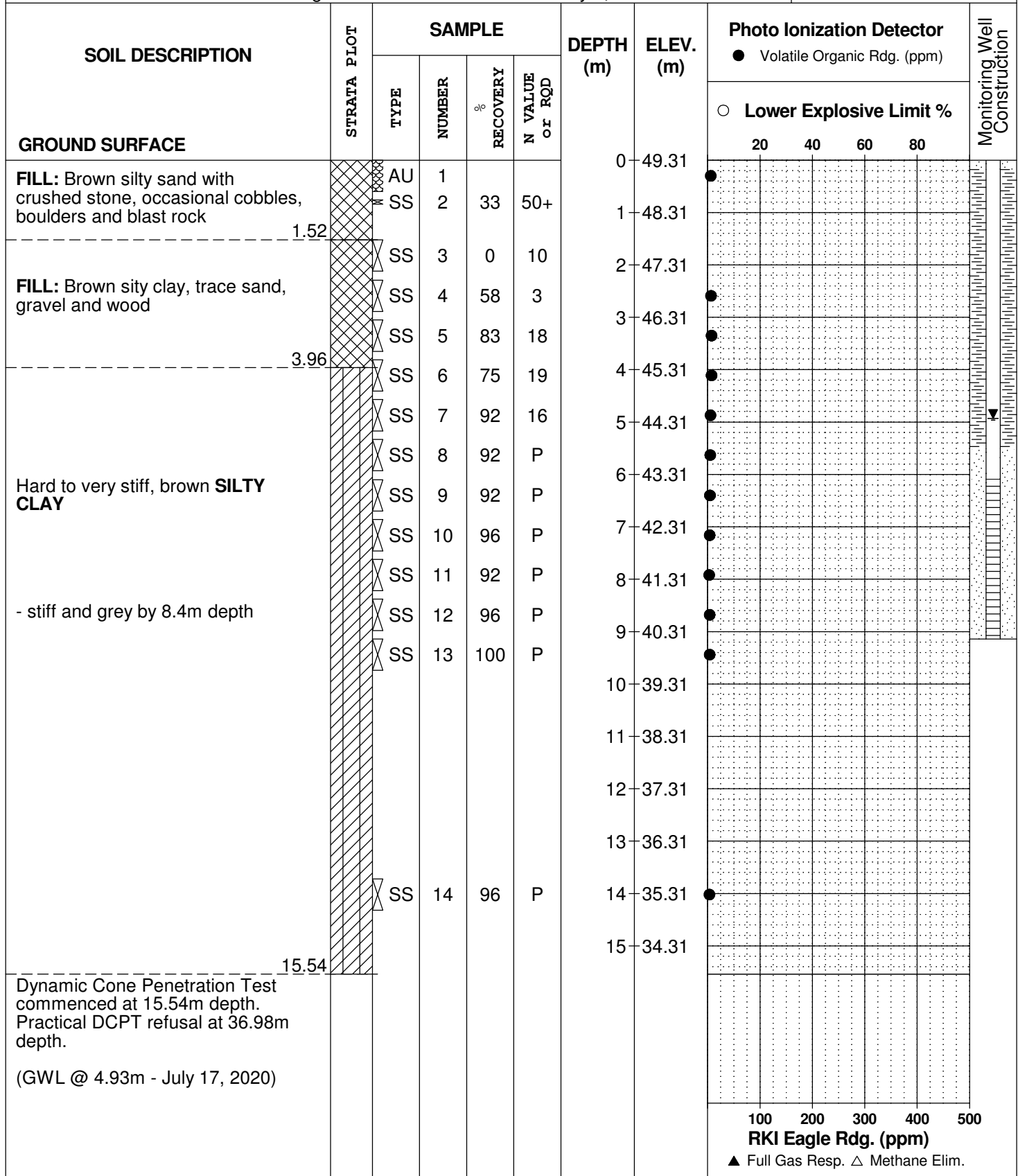
DATE July 2, 2020

FILE NO.

PE4886

HOLE NO.

BH 3-20



DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger

DATE June 30, 2020

FILE NO.

PE4886

HOLE NO.

BH 4-20

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Photo Ionization Detector				Monitoring Well Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			● Volatile Organic Rdg. (ppm)				
								○ Lower Explosive Limit %				
GROUND SURFACE								20	40	60	80	
FILL: Brown silty sand, some gravel, trace organics, cobbles and boulders	0.60	AU	1			0	48.90	▲				
	0.76	SS	2	33	14	1	47.90	▲				
FILL: Brown sand with crushed stone		SS	3	4	9	2	46.90	▲				
		SS	4	75	5	3	45.90	▲				
		SS	5	29	P	4	44.90	▲				
		SS	6	92	7	5	44.90	▲				
		SS	7	62	4	5	43.90	▲				
- trace wood by 5.2m depth	5.69	SS	8	88	6	6	42.90	▲				
		SS	9	100	P	6	42.90	▲				
		SS	10	100	P	7	41.90	▲				
		SS	11	100	P	8	40.90	▲				
		SS	12	100	P	9	39.90	▲				
		SS	13	83	P	10	38.90	▲				
		SS	14	100	P	10	38.90	▲				
						11	37.90					
						12	36.90					
						13	35.90					
						14	34.90					
						15	33.90	▲				
	15.85	SS	15	100	P							
Dynamic Cone Penetration Test commenced at 15.85m depth. Practical DCPT refusal at 41.78m depth.												
								100	200	300	400	500
								RKI Eagle Rdg. (ppm)				
								▲ Full Gas Resp. △ Methane Elim.				

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)
D _{xx}	-	Grain size at which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D ₁₀	-	Grain size at which 10% of the soil is finer (effective grain size)
D ₆₀	-	Grain size at which 60% of the soil is finer
C _c	-	Concavity coefficient = $(D_{30})^2 / (D_{10} \times D_{60})$
C _u	-	Uniformity coefficient = D_{60} / D_{10}

C_c and C_u are used to assess the grading of sands and gravels:

Well-graded gravels have: $1 < C_c < 3$ and $C_u > 4$

Well-graded sands have: $1 < C_c < 3$ and $C_u > 6$

Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.

C_c and C_u 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

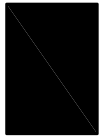
p' _o	-	Present effective overburden pressure at sample depth
p' _c	-	Preconsolidation pressure of (maximum past pressure on) sample
C _{cr}	-	Recompression index (in effect at pressures below p' _c)
C _c	-	Compression index (in effect at pressures above p' _c)
OC Ratio		Overconsolidation ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
W _o	-	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.
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SYMBOLS AND TERMS (continued)

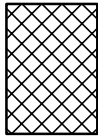
STRATA PLOT



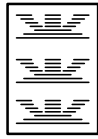
Topsoil



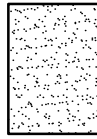
Asphalt



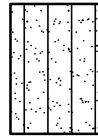
Fill



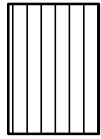
Peat



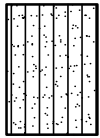
Sand



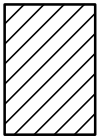
Silty Sand



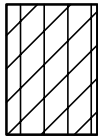
Silt



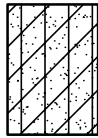
Sandy Silt



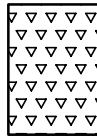
Clay



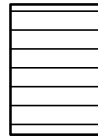
Silty Clay



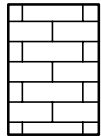
Clayey Silty Sand



Glacial Till



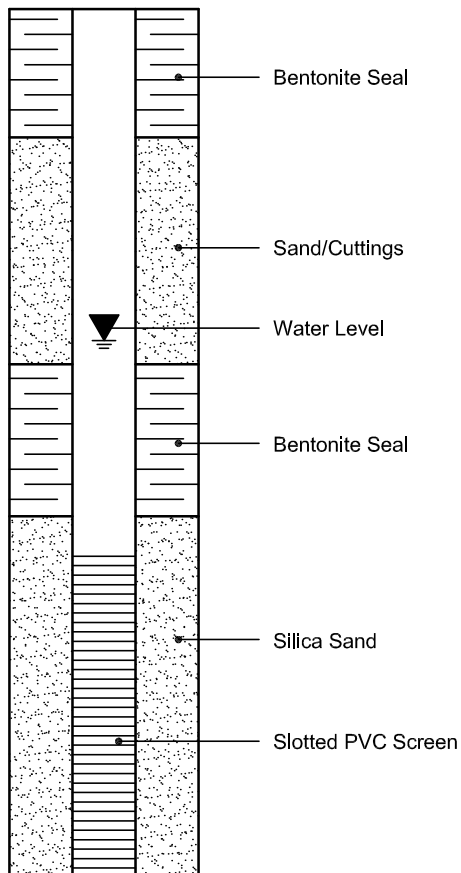
Shale



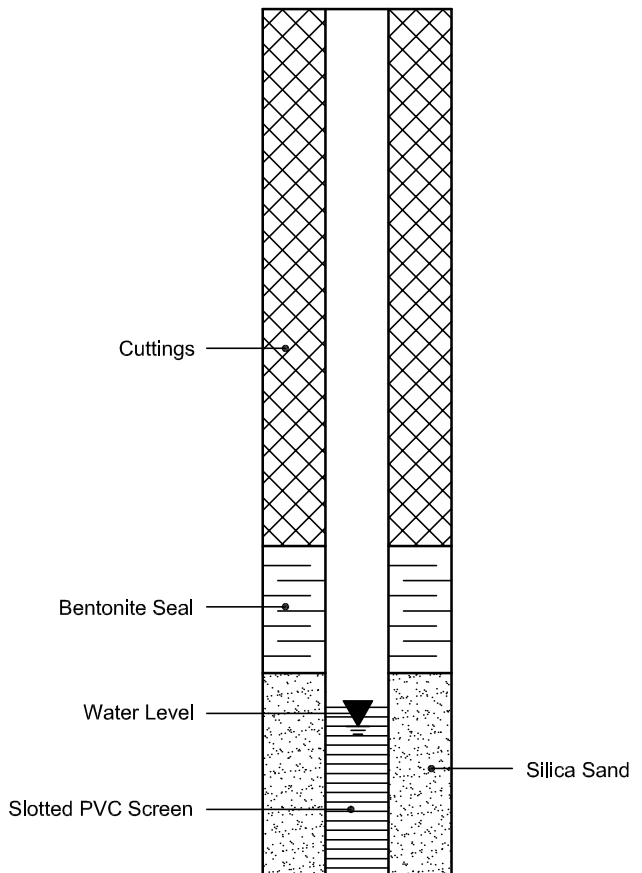
Bedrock

MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



Certificate of Analysis

Paterson Group Consulting Engineers

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

Client PO: 30311
Project: PE4886
Custody: 51633

Report Date: 10-Jul-2020
Order Date: 6-Jul-2020

Order #: 2028054

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

Paracel ID	Client ID
2028054-01	BH1-20-SS5
2028054-02	BH2-20-SS5
2028054-03	BH4-20-SS4
2028054-04	BH3-SS5

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 10-Jul-2020

Client: Paterson Group Consulting Engineers

Order Date: 6-Jul-2020

Client PO: 30311

Project Description: PE4886

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	6-Jul-20	6-Jul-20
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	7-Jul-20	8-Jul-20
Conductivity	MOE E3138 - probe @25 °C, water ext	8-Jul-20	8-Jul-20
Mercury by CVAA	EPA 7471B - CVAA, digestion	8-Jul-20	8-Jul-20
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	7-Jul-20	7-Jul-20
PHC F1	CWS Tier 1 - P&T GC-FID	6-Jul-20	6-Jul-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	7-Jul-20	8-Jul-20
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	8-Jul-20	8-Jul-20
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	7-Jul-20	8-Jul-20
SAR	Calculated	8-Jul-20	9-Jul-20
Solids, %	Gravimetric, calculation	10-Jul-20	10-Jul-20

Certificate of Analysis

Report Date: 10-Jul-2020

Client: Paterson Group Consulting Engineers

Order Date: 6-Jul-2020

Client PO: 30311

Project Description: PE4886

	Client ID:	BH1-20-SS5	BH2-20-SS5	BH4-20-SS4	BH3-SS5
	Sample Date:	29-Jun-20 09:00	30-Jun-20 09:00	29-Jun-20 09:00	03-Jul-20 09:00
	Sample ID:	2028054-01	2028054-02	2028054-03	2028054-04
	MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	74.5	76.1	73.3	75.8
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General Inorganics

SAR	0.01 N/A	0.93	4.85	0.68	2.00
Conductivity	5 uS/cm	421	880	358	355
pH	0.05 pH Units	7.57	-	-	-

Metals

Antimony	1.0 ug/g dry	-	-	<1.0	-
Arsenic	1.0 ug/g dry	-	-	3.4	-
Barium	1.0 ug/g dry	-	-	287	-
Beryllium	0.5 ug/g dry	-	-	0.6	-
Boron	5.0 ug/g dry	-	-	<5.0	-
Cadmium	0.5 ug/g dry	-	-	<0.5	-
Chromium	5.0 ug/g dry	-	-	96.5	-
Chromium (VI)	0.2 ug/g dry	-	-	<0.2	-
Cobalt	1.0 ug/g dry	-	-	19.4	-
Copper	5.0 ug/g dry	-	-	42.8	-
Lead	1.0 ug/g dry	-	-	6.7	-
Mercury	0.1 ug/g dry	-	-	<0.1	-
Molybdenum	1.0 ug/g dry	-	-	<1.0	-
Nickel	5.0 ug/g dry	-	-	54.3	-
Selenium	1.0 ug/g dry	-	-	<1.0	-
Silver	0.3 ug/g dry	-	-	<0.3	-
Thallium	1.0 ug/g dry	-	-	<1.0	-
Uranium	1.0 ug/g dry	-	-	<1.0	-
Vanadium	10.0 ug/g dry	-	-	89.2	-
Zinc	20.0 ug/g dry	-	-	97.6	-

Volatiles

Benzene	0.02 ug/g dry	<0.02	<0.02	-	<0.02
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	-	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Toluene-d8	Surrogate	108%	114%	-	117%

Hydrocarbons

Certificate of Analysis

Report Date: 10-Jul-2020

Client: Paterson Group Consulting Engineers

Order Date: 6-Jul-2020

Client PO: 30311

Project Description: PE4886

	Client ID: Sample Date: Sample ID:	BH1-20-SS5 29-Jun-20 09:00 2028054-01	BH2-20-SS5 30-Jun-20 09:00 2028054-02	BH4-20-SS4 29-Jun-20 09:00 2028054-03	BH3-SS5 03-Jul-20 09:00 2028054-04
	MDL/Units	Soil	Soil	Soil	Soil
F1 PHCs (C6-C10)	7 ug/g dry	13	<7	-	<7
F2 PHCs (C10-C16)	4 ug/g dry	173	<4	-	<4
F3 PHCs (C16-C34)	8 ug/g dry	117	<8	-	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	-	<6

Semi-Volatiles

Acenaphthene	0.02 ug/g dry	-	<0.02	-	-
Acenaphthylene	0.02 ug/g dry	-	<0.02	-	-
Anthracene	0.02 ug/g dry	-	<0.02	-	-
Benzo [a] anthracene	0.02 ug/g dry	-	0.02	-	-
Benzo [a] pyrene	0.02 ug/g dry	-	<0.02	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	-	<0.02	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	-	<0.02	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	-	<0.02	-	-
Chrysene	0.02 ug/g dry	-	0.02	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	-	<0.02	-	-
Fluoranthene	0.02 ug/g dry	-	0.05	-	-
Fluorene	0.02 ug/g dry	-	<0.02	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	-	<0.02	-	-
1-Methylnaphthalene	0.02 ug/g dry	-	<0.02	-	-
2-Methylnaphthalene	0.02 ug/g dry	-	<0.02	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	-	<0.04	-	-
Naphthalene	0.01 ug/g dry	-	<0.01	-	-
Phenanthrene	0.02 ug/g dry	-	0.04	-	-
Pyrene	0.02 ug/g dry	-	0.04	-	-
2-Fluorobiphenyl	Surrogate	-	93.6%	-	-
Terphenyl-d14	Surrogate	-	104%	-	-

Certificate of Analysis

Report Date: 10-Jul-2020

Client: Paterson Group Consulting Engineers

Order Date: 6-Jul-2020

Client PO: 30311

Project Description: PE4886

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Conductivity	ND	5	uS/cm						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (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						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	1.20		ug/g		89.9	50-140			
Surrogate: Terphenyl-d14	1.36		ug/g		102	50-140			
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	3.39		ug/g		106	50-140			

Certificate of Analysis

Report Date: 10-Jul-2020

Client: Paterson Group Consulting Engineers

Order Date: 6-Jul-2020

Client PO: 30311

Project Description: PE4886

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	11.1	0.01	N/A	10.4			6.8	30	
Conductivity	1590	5	uS/cm	1590			0.3	5	
pH	7.55	0.05	pH Units	7.52			0.4	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g wet	ND			NC	40	
F2 PHCs (C10-C16)	398	4	ug/g dry	173			78.9	30	QR-04
F3 PHCs (C16-C34)	239	8	ug/g dry	117			68.7	30	QR-04
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND			NC	30	
Metals									
Antimony	1.0	1.0	ug/g dry	ND			NC	30	
Arsenic	2.9	1.0	ug/g dry	2.7			6.7	30	
Barium	742	1.0	ug/g dry	676			9.4	30	
Beryllium	0.6	0.5	ug/g dry	ND			NC	30	
Boron	20.6	5.0	ug/g dry	17.7			15.0	30	
Cadmium	ND	0.5	ug/g dry	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g dry	ND			NC	35	
Chromium	22.3	5.0	ug/g dry	20.5			8.3	30	
Cobalt	5.9	1.0	ug/g dry	5.2			11.8	30	
Copper	16.8	5.0	ug/g dry	15.0			11.7	30	
Lead	19.1	1.0	ug/g dry	18.2			4.9	30	
Mercury	ND	0.1	ug/g dry	ND			NC	30	
Molybdenum	1.5	1.0	ug/g dry	1.2			25.8	30	
Nickel	13.9	5.0	ug/g dry	12.4			11.1	30	
Selenium	ND	1.0	ug/g dry	ND			NC	30	
Silver	ND	0.3	ug/g dry	ND			NC	30	
Thallium	ND	1.0	ug/g dry	ND			NC	30	
Uranium	ND	1.0	ug/g dry	ND			NC	30	
Vanadium	28.4	10.0	ug/g dry	25.7			10.3	30	
Zinc	29.7	20.0	ug/g dry	27.0			9.6	30	
Physical Characteristics									
% Solids	98.0	0.1	% by Wt.	98.0			0.0	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g dry	ND			NC	40	
Anthracene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [b] fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Chrysene	ND	0.02	ug/g dry	ND			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND			NC	40	
Fluoranthene	ND	0.02	ug/g dry	ND			NC	40	
Fluorene	ND	0.02	ug/g dry	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND			NC	40	
Naphthalene	ND	0.01	ug/g dry	ND			NC	40	
Phenanthrene	ND	0.02	ug/g dry	ND			NC	40	
Pyrene	ND	0.02	ug/g dry	ND			NC	40	
Surrogate: 2-Fluorobiphenyl	1.37		ug/g dry		98.5	50-140			
Surrogate: Terphenyl-d14	1.50		ug/g dry		108	50-140			
Volatiles									
Benzene	ND	0.02	ug/g wet	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g wet	ND			NC	50	

Certificate of Analysis

Report Date: 10-Jul-2020

Client: Paterson Group Consulting Engineers

Order Date: 6-Jul-2020

Client PO: 30311

Project Description: PE4886

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Toluene	ND	0.05	ug/g wet	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g wet	ND			NC	50	
o-Xylene	ND	0.05	ug/g wet	ND			NC	50	
Surrogate: Toluene-d8	3.67		ug/g wet		115	50-140			

Certificate of Analysis

Report Date: 10-Jul-2020

Client: Paterson Group Consulting Engineers

Order Date: 6-Jul-2020

Client PO: 30311

Project Description: PE4886

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	177	7	ug/g	ND	88.5	80-120			
F2 PHCs (C10-C16)	286	4	ug/g	173	105	60-140			
F3 PHCs (C16-C34)	398	8	ug/g	117	107	60-140			
F4 PHCs (C34-C50)	184	6	ug/g	ND	110	60-140			
Metals									
Antimony	42.3	1.0	ug/g	ND	84.2	70-130			
Arsenic	50.5	1.0	ug/g	1.1	98.8	70-130			
Barium	325	1.0	ug/g	270	110	70-130			
Beryllium	45.2	0.5	ug/g	ND	90.0	70-130			
Boron	46.2	5.0	ug/g	7.1	78.2	70-130			
Cadmium	43.8	0.5	ug/g	ND	87.4	70-130			
Chromium (VI)	0.1	0.2	ug/g	ND	53.0	70-130			QM-05
Chromium	57.1	5.0	ug/g	8.2	97.8	70-130			
Cobalt	48.9	1.0	ug/g	2.1	93.6	70-130			
Copper	49.8	5.0	ug/g	6.0	87.7	70-130			
Lead	49.5	1.0	ug/g	7.3	84.4	70-130			
Mercury	1.48	0.1	ug/g	ND	99.0	70-130			
Molybdenum	47.1	1.0	ug/g	ND	93.2	70-130			
Nickel	50.7	5.0	ug/g	5.0	91.4	70-130			
Selenium	45.8	1.0	ug/g	ND	91.6	70-130			
Silver	41.1	0.3	ug/g	ND	82.2	70-130			
Thallium	45.0	1.0	ug/g	ND	89.9	70-130			
Uranium	47.4	1.0	ug/g	ND	94.5	70-130			
Vanadium	59.5	10.0	ug/g	10.3	98.5	70-130			
Zinc	53.8	20.0	ug/g	ND	86.0	70-130			
Semi-Volatiles									
Acenaphthene	0.155	0.02	ug/g	ND	88.7	50-140			
Acenaphthylene	0.152	0.02	ug/g	ND	87.1	50-140			
Anthracene	0.159	0.02	ug/g	ND	91.2	50-140			
Benzo [a] anthracene	0.148	0.02	ug/g	ND	85.1	50-140			
Benzo [a] pyrene	0.151	0.02	ug/g	ND	86.5	50-140			
Benzo [b] fluoranthene	0.202	0.02	ug/g	ND	116	50-140			
Benzo [g,h,i] perylene	0.165	0.02	ug/g	ND	94.3	50-140			
Benzo [k] fluoranthene	0.172	0.02	ug/g	ND	98.6	50-140			
Chrysene	0.184	0.02	ug/g	ND	106	50-140			
Dibenzo [a,h] anthracene	0.159	0.02	ug/g	ND	91.1	50-140			
Fluoranthene	0.171	0.02	ug/g	ND	98.0	50-140			
Fluorene	0.171	0.02	ug/g	ND	97.8	50-140			
Indeno [1,2,3-cd] pyrene	0.160	0.02	ug/g	ND	91.5	50-140			
1-Methylnaphthalene	0.230	0.02	ug/g	ND	132	50-140			
2-Methylnaphthalene	0.241	0.02	ug/g	ND	138	50-140			
Naphthalene	0.177	0.01	ug/g	ND	102	50-140			
Phenanthrene	0.140	0.02	ug/g	ND	80.2	50-140			
Pyrene	0.175	0.02	ug/g	ND	100	50-140			
Surrogate: 2-Fluorobiphenyl	1.29		ug/g		92.1	50-140			
Surrogate: Terphenyl-d14	1.28		ug/g		91.6	50-140			
Volatiles									
Benzene	3.00	0.02	ug/g	ND	74.9	60-130			

Certificate of Analysis

Report Date: 10-Jul-2020

Client: Paterson Group Consulting Engineers

Order Date: 6-Jul-2020

Client PO: 30311

Project Description: PE4886

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Ethylbenzene	4.44	0.05	ug/g	ND	111	60-130			
Toluene	4.33	0.05	ug/g	ND	108	60-130			
m,p-Xylenes	8.66	0.05	ug/g	ND	108	60-130			
o-Xylene	4.57	0.05	ug/g	ND	114	60-130			
Surrogate: Toluene-d8	2.67		ug/g		83.5	50-140			

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 30311

Report Date: 10-Jul-2020

Order Date: 6-Jul-2020

Project Description: PE4886

Qualifier Notes:

Login Qualifiers :

Container(s) - Labeled improperly/insufficient information - Date indicates July 2nd on Jar+Vial

Applies to samples: BH2-20-SS5

QC Qualifiers :

QM-05 : The spike recovery was outside acceptance limits for the matrix spike due to matrix interference.

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

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

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.

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

CCME PHC additional information:

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



Certificate of Analysis

Paterson Group Consulting Engineers

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

Client PO: 30408
Project: PE4886
Custody: 128319

Report Date: 24-Jul-2020
Order Date: 21-Jul-2020

Order #: 2030209

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

Paracel ID	Client ID
2030209-01	BH1-20-GW1
2030209-02	BH2-20-GW1
2030209-03	BH3-20-GW1
2030209-04	MW16-4-GW1

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 24-Jul-2020

Client: Paterson Group Consulting Engineers

Order Date: 21-Jul-2020

Client PO: 30408

Project Description: PE4886

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Anions	EPA 300.1 - IC	22-Jul-20	22-Jul-20
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	22-Jul-20	22-Jul-20
Chromium, hexavalent - water	MOE E3056 - colourimetric	22-Jul-20	22-Jul-20
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	22-Jul-20	23-Jul-20
Metals, ICP-MS	EPA 200.8 - ICP-MS	22-Jul-20	22-Jul-20
PHC F1	CWS Tier 1 - P&T GC-FID	22-Jul-20	22-Jul-20
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	22-Jul-20	23-Jul-20

Certificate of Analysis

Report Date: 24-Jul-2020

Client: Paterson Group Consulting Engineers

Order Date: 21-Jul-2020

Client PO: 30408

Project Description: PE4886

Client ID:	BH1-20-GW1	BH2-20-GW1	BH3-20-GW1	MW16-4-GW1
Sample Date:	17-Jul-20 09:00	17-Jul-20 09:00	17-Jul-20 09:00	17-Jul-20 09:00
Sample ID:	2030209-01	2030209-02	2030209-03	2030209-04
MDL/Units	Water	Water	Water	Water

Anions

Chloride	1 mg/L	758	1180	1310	1660
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Metals

Mercury	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Antimony	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Arsenic	1 ug/L	<1	<1	<1	<1
Barium	1 ug/L	260	255	277	104
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Boron	10 ug/L	176	58	133	44
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Chromium	1 ug/L	<1	<1	<1	<1
Chromium (VI)	10 ug/L	<10	<10	<10	<10
Cobalt	0.5 ug/L	1.2	2.2	0.8	1.2
Copper	0.5 ug/L	2.2	5.0	3.3	3.5
Lead	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Molybdenum	0.5 ug/L	2.7	6.1	8.0	2.9
Nickel	1 ug/L	3	4	2	12
Selenium	1 ug/L	<1	<1	<1	<1
Silver	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Sodium	200 ug/L	468000	736000	561000	822000
Thallium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Uranium	0.1 ug/L	5.1	4.5	7.5	12.6
Vanadium	0.5 ug/L	1.9	<0.5	1.1	0.9
Zinc	5 ug/L	<5	<5	<5	9

Volatiles

Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene-d8	Surrogate	96.5%	96.4%	94.8%	95.2%

Hydrocarbons

F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100

Certificate of Analysis

Report Date: 24-Jul-2020

Client: Paterson Group Consulting Engineers

Order Date: 21-Jul-2020

Client PO: 30408

Project Description: PE4886

	MDL/Units	Client ID:	BH1-20-GW1	BH2-20-GW1	BH3-20-GW1	MW16-4-GW1
		Sample Date:	17-Jul-20 09:00	17-Jul-20 09:00	17-Jul-20 09:00	17-Jul-20 09:00
		Sample ID:	2030209-01	2030209-02	2030209-03	2030209-04
			Water	Water	Water	Water
F4 PHCs (C34-C50)	100 ug/L		<100	<100	<100	<100

Certificate of Analysis

Report Date: 24-Jul-2020

Client: Paterson Group Consulting Engineers

Order Date: 21-Jul-2020

Client PO: 30408

Project Description: PE4886

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	ND	1	mg/L						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Metals									
Mercury	ND	0.1	ug/L						
Antimony	ND	0.5	ug/L						
Arsenic	ND	1	ug/L						
Barium	ND	1	ug/L						
Beryllium	ND	0.5	ug/L						
Boron	ND	10	ug/L						
Cadmium	ND	0.1	ug/L						
Chromium (VI)	ND	10	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Lead	ND	0.1	ug/L						
Molybdenum	ND	0.5	ug/L						
Nickel	ND	1	ug/L						
Selenium	ND	1	ug/L						
Silver	ND	0.1	ug/L						
Sodium	ND	200	ug/L						
Thallium	ND	0.1	ug/L						
Uranium	ND	0.1	ug/L						
Vanadium	ND	0.5	ug/L						
Zinc	ND	5	ug/L						
Volatiles									
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	76.8		ug/L		96.0	50-140			

Certificate of Analysis

Report Date: 24-Jul-2020

Client: Paterson Group Consulting Engineers

Order Date: 21-Jul-2020

Client PO: 30408

Project Description: PE4886

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Metals									
Mercury	ND	0.1	ug/L	ND			NC	20	
Antimony	ND	0.5	ug/L	ND			NC	20	
Arsenic	ND	1	ug/L	ND			NC	20	
Barium	44.5	1	ug/L	44.8			0.6	20	
Beryllium	ND	0.5	ug/L	ND			NC	20	
Boron	20	10	ug/L	20			0.9	20	
Cadmium	ND	0.1	ug/L	ND			NC	20	
Chromium (VI)	ND	10	ug/L	ND			NC	20	
Chromium	ND	1	ug/L	ND			NC	20	
Cobalt	ND	0.5	ug/L	ND			NC	20	
Copper	ND	0.5	ug/L	ND			NC	20	
Lead	ND	0.1	ug/L	ND			NC	20	
Molybdenum	2.90	0.5	ug/L	2.82			2.6	20	
Nickel	1.5	1	ug/L	1.4			4.2	20	
Selenium	ND	1	ug/L	ND			NC	20	
Silver	ND	0.1	ug/L	ND			NC	20	
Sodium	16900	200	ug/L	17100			1.2	20	
Thallium	ND	0.1	ug/L	ND			NC	20	
Uranium	2.3	0.1	ug/L	2.2			3.8	20	
Vanadium	ND	0.5	ug/L	ND			NC	20	
Zinc	ND	5	ug/L	9			NC	20	
Volatiles									
Benzene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: Toluene-d8	76.2		ug/L		95.2	50-140			

Certificate of Analysis

Report Date: 24-Jul-2020

Client: Paterson Group Consulting Engineers

Order Date: 21-Jul-2020

Client PO: 30408

Project Description: PE4886

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	10.1	1	mg/L	ND	101	85-115			
Hydrocarbons									
F1 PHCs (C6-C10)	1600	25	ug/L	ND	80.2	68-117			
F2 PHCs (C10-C16)	1630	100	ug/L	ND	102	60-140			
F3 PHCs (C16-C34)	4380	100	ug/L	ND	112	60-140			
F4 PHCs (C34-C50)	3060	100	ug/L	ND	123	60-140			
Metals									
Mercury	3.57	0.1	ug/L	ND	119	70-130			
Antimony	52.5	0.5	ug/L	ND	105	80-120			
Arsenic	55.7	1	ug/L	ND	111	80-120			
Barium	48.7	1	ug/L	ND	97.4	80-120			
Beryllium	45.4	0.5	ug/L	ND	90.8	80-120			
Boron	67	10	ug/L	20	94.1	80-120			
Cadmium	56.3	0.1	ug/L	ND	113	80-120			
Chromium (VI)	183	10	ug/L	ND	91.5	70-130			
Chromium	53.6	1	ug/L	ND	107	80-120			
Cobalt	48.8	0.5	ug/L	ND	96.6	80-120			
Copper	44.9	0.5	ug/L	ND	89.1	80-120			
Lead	42.9	0.1	ug/L	ND	85.7	80-120			
Molybdenum	49.0	0.5	ug/L	2.82	92.4	80-120			
Nickel	48.4	1	ug/L	1.4	93.9	80-120			
Selenium	51.0	1	ug/L	ND	102	80-120			
Silver	43.7	0.1	ug/L	ND	87.5	80-120			
Sodium	26400	200	ug/L	17100	92.3	80-120			
Thallium	50.1	0.1	ug/L	ND	100	80-120			
Uranium	55.0	0.1	ug/L	2.2	105	80-120			
Vanadium	54.3	0.5	ug/L	ND	108	80-120			
Zinc	46	5	ug/L	ND	92.0	80-120			
Volatiles									
Benzene	38.6	0.5	ug/L	ND	96.4	60-130			
Ethylbenzene	34.7	0.5	ug/L	ND	86.8	60-130			
Toluene	33.0	0.5	ug/L	ND	82.4	60-130			
m,p-Xylenes	69.6	0.5	ug/L	ND	87.0	60-130			
o-Xylene	35.0	0.5	ug/L	ND	87.4	60-130			
Surrogate: Toluene-d8	76.3		ug/L		95.4	50-140			

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 30408

Report Date: 24-Jul-2020

Order Date: 21-Jul-2020

Project Description: PE4886

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

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

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

CCME PHC additional information:

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



2030209

Nº 128319

Client Name: PATERSON	Project Ref: PE4886	Page 1 of 1
Contact Name: Mark D'Arcy; Mike Beaudoin	Quote #:	Turnaround Time ☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Address: 154 Colonnade Road	PO #: 30408	
Telephone: 613-226-7381	E-mail: mdarcy@patersongroup.ca mbeaudoin@patersongroup.ca	
Date Required: _____		

Regulation 153/04		Other Regulation		Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)		Required Analysis																	
☐ Table 1	☐ Res/Park ☐ Med/Fine	☐ REG 558	☐ PWQO	Matrix	Air Volume	# of Containers	Sample Taken	Date	Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	Chloride						
☐ Table 2	☐ Ind/Comm ☐ Coarse	☐ CCME	☐ MISA																				
☒ Table 3	☐ Agri/Other	☐ SU - Sani	☐ SU - Storm																				
Mun: _____																							
For RSC: ☐ Yes ☐ No																							
Sample ID/Location Name																							
1	BH1-20-GW1	GW	7							X			X	X	X		X						
2	BH2-20-GW1																						
3	BH3-20-GW1																						
4	MW16-4-GW1																						
5																							
6																							
7																							
8																							
9																							
10																							

Comments:		Method of Delivery: Paracel	
Relinquished By (Sign): [Signature]	Received By Driver/Depot: [Signature]	Received at Lab: [Signature]	Verified By: [Signature]
Relinquished By (Print): Joshua D'Arcy	Date/Time: 21/07/20 4:00	Date/Time: 21/07/20 14:44	Date/Time: 2-2-2/2020
Date/Time: July 26 / 2020	Temperature: 14.8 °C	Temperature: 14.8 °C	pH Verified: X

Certificate of Analysis

Paterson Group Consulting Engineers (Ottawa)

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mark Bujaki

Client PO: 61858
Project: PE4886

Custody:

Report Date: 3-Dec-2024
Order Date: 27-Nov-2024

Order #: 2448318

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

Paracel ID	Client ID
2448318-01	BH1-20-GW2
2448318-02	MW16-4-GW2
2448318-03	MW16-5-GW2
2448318-04	BH3-20-GW2
2448318-05	MW16-3-GW2

Approved By:



Mark Foto, M.Sc.

Lab Supervisor

Certificate of Analysis

Report Date: 03-Dec-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Nov-2024

Client PO: 61858

Project Description: PE4886

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Anions	EPA 300.1 - IC	28-Nov-24	29-Nov-24
Metals, ICP-MS	EPA 200.8 - ICP-MS	28-Nov-24	29-Nov-24

Certificate of Analysis

Report Date: 03-Dec-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Nov-2024

Client PO: 61858

Project Description: PE4886

Client ID:	BH1-20-GW2	MW16-4-GW2	MW16-5-GW2	BH3-20-GW2		
Sample Date:	27-Nov-24 09:00	27-Nov-24 09:00	27-Nov-24 09:00	27-Nov-24 09:00	-	-
Sample ID:	2448318-01	2448318-02	2448318-03	2448318-04		
Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
MDL/Units						

Anions

Chloride	1 mg/L	342	1810	875	730	-	-
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Metals

Antimony	0.5 ug/L	<0.5	<0.5	<0.5	<0.5	-	-
Arsenic	1 ug/L	<1	<1	<1	4	-	-
Barium	1 ug/L	55	68	62	62	-	-
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5	-	-
Boron	10 ug/L	149	60	213	95	-	-
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1	-	-
Chromium	1 ug/L	<1	<1	<1	<1	-	-
Cobalt	0.5 ug/L	0.9	1.8	0.9	0.9	-	-
Copper	0.5 ug/L	0.7	0.7	1.8	1.7	-	-
Lead	0.1 ug/L	0.1	<0.1	<0.1	<0.1	-	-
Molybdenum	0.5 ug/L	1.1	2.2	3.1	2.8	-	-
Nickel	1 ug/L	3	12	4	2	-	-
Selenium	1 ug/L	<1	<1	<1	<1	-	-
Silver	0.1 ug/L	<0.1	<0.1	<0.1	<0.1	-	-
Sodium	200 ug/L	357000	960000	615000	314000	-	-
Thallium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1	-	-
Uranium	0.1 ug/L	9.1	14.7	10.9	9.0	-	-
Vanadium	0.5 ug/L	0.8	0.8	1.2	0.6	-	-
Zinc	5 ug/L	<5	<5	<5	<5	-	-

Certificate of Analysis

Report Date: 03-Dec-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Nov-2024

Client PO: 61858

Project Description: PE4886

Client ID:	MW16-3-GW2					
Sample Date:	27-Nov-24 09:00					
Sample ID:	2448318-05					
Matrix:	Ground Water					
MDL/Units						

Anions

Chloride	1 mg/L	3920	-	-	-	-
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Metals

Antimony	0.5 ug/L	<0.5	-	-	-	-
Arsenic	1 ug/L	<1	-	-	-	-
Barium	1 ug/L	99	-	-	-	-
Beryllium	0.5 ug/L	<0.5	-	-	-	-
Boron	10 ug/L	54	-	-	-	-
Cadmium	0.1 ug/L	<0.1	-	-	-	-
Chromium	1 ug/L	<1	-	-	-	-
Cobalt	0.5 ug/L	<0.5	-	-	-	-
Copper	0.5 ug/L	1.7	-	-	-	-
Lead	0.1 ug/L	<0.1	-	-	-	-
Molybdenum	0.5 ug/L	5.4	-	-	-	-
Nickel	1 ug/L	3	-	-	-	-
Selenium	1 ug/L	<1	-	-	-	-
Silver	0.1 ug/L	<0.1	-	-	-	-
Sodium	200 ug/L	1940000	-	-	-	-
Thallium	0.1 ug/L	<0.1	-	-	-	-
Uranium	0.1 ug/L	17.1	-	-	-	-
Vanadium	0.5 ug/L	1.1	-	-	-	-
Zinc	5 ug/L	<5	-	-	-	-

Certificate of Analysis

Report Date: 03-Dec-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Nov-2024

Client PO: 61858

Project Description: PE4886

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions								
Chloride	ND	1	mg/L					
Metals								
Antimony	ND	0.5	ug/L					
Arsenic	ND	1	ug/L					
Barium	ND	1	ug/L					
Beryllium	ND	0.5	ug/L					
Boron	ND	10	ug/L					
Cadmium	ND	0.1	ug/L					
Chromium	ND	1	ug/L					
Cobalt	ND	0.5	ug/L					
Copper	ND	0.5	ug/L					
Lead	ND	0.1	ug/L					
Molybdenum	ND	0.5	ug/L					
Nickel	ND	1	ug/L					
Selenium	ND	1	ug/L					
Silver	ND	0.1	ug/L					
Sodium	ND	200	ug/L					
Thallium	ND	0.1	ug/L					
Uranium	ND	0.1	ug/L					
Vanadium	ND	0.5	ug/L					
Zinc	ND	5	ug/L					

Certificate of Analysis

Report Date: 03-Dec-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Nov-2024

Client PO: 61858

Project Description: PE4886

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	21.2	1	mg/L	21.3			0.3	20	
Metals									
Antimony	1.15	0.5	ug/L	ND			NC	20	
Arsenic	ND	1	ug/L	ND			NC	20	
Barium	125	1	ug/L	127			1.5	20	
Beryllium	ND	0.5	ug/L	ND			NC	20	
Boron	65	10	ug/L	65			0.6	20	
Cadmium	ND	0.1	ug/L	ND			NC	20	
Chromium	ND	1	ug/L	ND			NC	20	
Cobalt	ND	0.5	ug/L	ND			NC	20	
Copper	4.61	0.5	ug/L	4.76			3.2	20	
Lead	ND	0.1	ug/L	ND			NC	20	
Molybdenum	1.41	0.5	ug/L	1.15			NC	20	
Nickel	ND	1	ug/L	ND			NC	20	
Selenium	ND	1	ug/L	ND			NC	20	
Silver	ND	0.1	ug/L	ND			NC	20	
Sodium	204000	200	ug/L	211000			3.5	20	
Thallium	ND	0.1	ug/L	ND			NC	20	
Uranium	5.7	0.1	ug/L	6.0			5.3	20	
Vanadium	ND	0.5	ug/L	ND			NC	20	
Zinc	ND	5	ug/L	ND			NC	20	

Certificate of Analysis

Report Date: 03-Dec-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Nov-2024

Client PO: 61858

Project Description: PE4886

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	30.3	1	mg/L	21.3	90.5	70-124			
Metals									
Arsenic	49.6	1	ug/L	ND	98.6	80-120			
Barium	167	1	ug/L	127	80.0	80-120			QM-07
Beryllium	46.2	0.5	ug/L	ND	92.4	80-120			
Boron	101	10	ug/L	65	73.2	80-120			QM-07
Cadmium	40.7	0.1	ug/L	ND	81.3	80-120			
Chromium	52.1	1	ug/L	ND	104	80-120			
Cobalt	49.7	0.5	ug/L	ND	99.2	80-120			
Copper	50.3	0.5	ug/L	4.76	91.0	80-120			
Lead	42.5	0.1	ug/L	ND	85.0	80-120			
Molybdenum	45.4	0.5	ug/L	1.15	88.5	80-120			
Nickel	48.8	1	ug/L	ND	96.4	80-120			
Selenium	46.0	1	ug/L	ND	91.3	80-120			
Silver	36.8	0.1	ug/L	ND	73.6	80-120			QM-07
Sodium	9140	200	ug/L	ND	91.4	80-120			
Thallium	45.0	0.1	ug/L	ND	89.9	80-120			
Uranium	54.4	0.1	ug/L	6.0	96.8	80-120			
Vanadium	52.7	0.5	ug/L	ND	105	80-120			
Zinc	41	5	ug/L	ND	79.2	80-120			QM-07

Certificate of Analysis

Report Date: 03-Dec-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 27-Nov-2024

Client PO: 61858

Project Description: PE4886

Qualifier Notes:**QC Qualifiers:**

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

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

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.



0448318

Client Name: <u>Paterson</u>	Project Ref: <u>PE4886</u>	Page <u>1</u> of <u>1</u>
Contact Name: <u>Mark Byjak</u>	Quote #:	Turnaround Time ☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular Date Required: _____
Address: <u>9 Meriga Dr.</u>	PO #: <u>61858</u>	
Telephone: <u>613-226-7381</u>	E-mail: <u>mbyjak@patersongroup.ca</u> <u>jdempsey@patersongroup.ca</u>	

☒ REG 153/04 ☐ REG 406/19 Other Regulation		Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)		Required Analysis														
☐ Table 1 ☐ Agri/Other ☐ Med/Fine ☐ Table 2 ☐ Res/Park ☐ Coarse ☐ Table 3 ☐ Ind/Comm ☐ Table _____ For RSC: ☐ Yes ☐ No		☐ REG 558 ☐ PWQO ☐ CCME ☐ MISA ☐ SU - Sani ☐ SU - Storm Mun: _____ ☐ Other: _____		Sample Taken Date Time		PHCs F1-F4+BTEX VOCs PAHs Metals by ICP Hg Cr/VI B (HWS) chloride												
Sample ID/Location Name		Matrix	Air Volume	# of Containers	Field Filtered													
1 BH1-20-GW2		GW		2	X	Nov 27/24												
2 MW16-4-GW2				2	X													
3 MW16-5-GW2				2	X													
4 BH3-20-GW2				2	X													
5 MW16-3-GW2				2	X													
6																		
7																		
8																		
9																		
10																		

Comments:

Relinquished By (Sign): <u>Mark Byjak</u>		Received at Depot:		Received at Lab:		Method of Delivery: <u>Paracel Courier</u>	
Relinquished By (Print): <u>Mark Byjak</u>		Date/Time:		Date/Time: <u>SS</u>		Verified By: <u>JM</u>	
Date/Time: <u>Nov 27 2024</u>		Temperature: _____ °C		Date/Time: <u>21 Nov 24 1639</u>		Date/Time: <u>11-28-24 902</u>	
				Temperature: <u>6.1</u>		pH Verified: <u>7</u> By: <u>SS</u>	

Test Hole ID	Date of Construction	Well Diameter (mm)	Ground Surface Elevation (masl)	Test Hole Depth (m)	Test Hole Bottom Elevation (masl)	Well Screen Length (m)	Well Screen Interval (mbgs)	Well Screen Interval (masl)	Geologic Media Intercepted by Well Screen
MW16-1	29-Mar-2016	31	47.32	28.37	18.95	1.53	26.84 - 28.37	20.48 - 18.95	Silty Clay
MW16-2	23-Mar-2016	31	47.97	33.90	14.07	3.05	3.05 - 6.1	44.92 - 41.87	Silty Clay
MW16-3	22-Mar-2016	31	48.78	7.32	41.46	3.05	3.05 - 6.1	45.73 - 42.68	Silty Clay
MW16-4	22-Mar-2016	31	47.07	8.84	38.23	3.05	3.05 - 6.1	44.02 - 40.97	Silty Clay
MW16-5	22-Mar-2016	31	43.64	6.10	37.54	3.05	3.05 - 6.1	40.59 - 37.54	Silty Clay
MW16-6	24-Mar-2016	31	42.96	40.26	2.7	3.05	3.05 - 6.1	39.91 - 36.86	Silty Clay
BH1-20	29-Jun-2020	50	46.87	15.54	31.33	3.05	6.09 - 9.14	40.78 - 37.73	Silty Clay
BH2-20	30-Jun-2020	50	47.73	15.54	32.19	3.05	6.09 - 9.14	41.64 - 38.59	Silty Clay
BH3-20	2-Jul-2020	50	49.31	15.54	33.77	3.05	6.09 - 9.14	43.22 - 40.17	Silty Clay
BH4-20	30-Jun-2020	50	48.90	15.54	33.36			-	

Sample ID and Laboratory ID	Sample Depth (mbgs)	Sampling Date	Rationale	PID Vapour Reading (ppm)	Parameter Groups Analyzed								
					PHCs	BTEX	PAHs	Metals	Hg	Cr ^{VI}	EC	SAR	pH
MW16-2-1	0-0.61	23-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
MW16-2-2	0.76-1.37	23-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0	✓	✓	✓						
MW16-2-4	2.28-2.89	23-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0			✓						
MW16-2-5	3.05-3.66	23-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
MW16-3-5	3.05-3.66	22-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0	✓	✓		✓	✓	✓	✓	✓	✓
MW16-3-105 (Duplicate of MW16-3-5)	3.05-3.66	22-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0	✓	✓							
MW16-4-2	0.76-1.37	22-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
MW16-4-4	2.28-2.89	22-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0	✓	✓							
MW16-4-5	3.05-3.66	22-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
MW16-5-2	0.76-1.37	22-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
MW16-5-3	1.52-2.13	22-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0	✓	✓							
MW16-5-7	4.57-5.18	22-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
MW16-6-2	0.76-1.37	23-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW16-6-4	2.28-2.89	23-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
MW16-6-104 (Duplicate of MW16-6-4)	2.28-2.89	23-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
TP-1-2	1.52-1.82	21-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
TP-1-3	3.66-3.96	21-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
TP-2-1	1.53-1.83	21-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
TP-2-2	3.05-3.35	21-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0			✓	✓	✓	✓	✓	✓	✓
TP-3-1	2.29-2.59	21-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0	✓	✓		✓	✓	✓	✓	✓	✓
TP-3-4	7.01-7.31	21-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
TP-4-2	3.66-3.96	21-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
TP-4-102 (Duplicate of TP-4-2)	3.66-3.96	21-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
TP-4-3	4.57-4.87	21-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0			✓						
TP-4-103 (Duplicate of TP-4-3)	4.57-4.87	21-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0			✓						
TP-4-4	6.10-6.40	21-Mar-2016	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	0				✓	✓	✓	✓	✓	✓
BH1-20-SS5	3.05-3.66	29-Jun-2020	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	25	✓	✓					✓	✓	✓
BH2-20-SS5	3.05-3.66	30-Jun-2020	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	10	✓	✓	✓				✓	✓	
BH4-20-SS4	2.29-2.89	29-Jun-2020	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	5				✓	✓	✓	✓	✓	
BH3-SS5	3.05-3.66	3-Jul-2020	To assess potential impacts due to the use of the adjacent property to the south and quality of the fill material	1.5	✓	✓					✓	✓	

Sample ID and Laboratory ID	Sample Depth (mbgs)	Sampling Date	Rationale	Parameter Groups Analyzed							
				PHCs	BTEX	PAHs	Sodium	Chloride	Metals	Hg	Cr ^{VI}
MW16-2	3.05 - 6.1	7-Apr-2016	Assess potential groundwater impacts due to the use of the adjacent property to the south.	✓	✓	✓	✓	✓	✓	✓	✓
MW16-3	3.05 - 6.1	7-Apr-2016	Assess potential groundwater impacts due to the use of the adjacent property to the south.	✓	✓	✓	✓	✓	✓	✓	✓
MW16-4	3.05 - 6.1	7-Apr-2016	Assess potential groundwater impacts due to the use of the adjacent property to the south.	✓	✓		✓	✓	✓	✓	✓
MW16-5	3.05 - 6.1	7-Apr-2016	Assess potential groundwater impacts due to the use of the adjacent property to the south.	✓	✓		✓	✓	✓	✓	✓
MW16-6	3.05 - 6.1	7-Apr-2016	Assess potential groundwater impacts due to the use of the adjacent property to the south.	✓	✓	✓	✓	✓	✓	✓	✓
MW16-106 (Duplicate of MW16-6)	3.05 - 6.1	7-Apr-2016	Assess potential groundwater impacts due to the use of the adjacent property to the south.	✓	✓	✓	✓	✓	✓	✓	✓
BH1-20-GW1	6.09 - 9.14	17-Jul-2020	Assess potential groundwater impacts due to the use of the adjacent property to the south.	✓	✓	✓	✓	✓	✓	✓	✓
BH2-20-GW1	6.09 - 9.14	17-Jul-2020	Assess potential groundwater impacts due to the use of the adjacent property to the south.	✓	✓	✓	✓	✓	✓	✓	✓
BH3-20-GW1	6.09 - 9.14	17-Jul-2020	Assess potential groundwater impacts due to the use of the adjacent property to the south.	✓	✓	✓	✓	✓	✓	✓	✓
MW16-4-GW1	3.05 - 6.1	17-Jul-2020	Assess potential groundwater impacts due to the use of the adjacent property to the south.	✓	✓	✓	✓	✓	✓	✓	✓
BH1-20-GW2	6.09 - 9.14	27-Nov-2024	Assess potential groundwater impacts due to the use of the adjacent property to the south.				✓	✓	✓	✓	✓
BH3-20-GW2	6.09 - 9.14	27-Nov-2024	Assess potential groundwater impacts due to the use of the adjacent property to the south.				✓	✓	✓	✓	✓
MW16-3-GW2	3.05 - 6.1	27-Nov-2024	Assess potential groundwater impacts due to the use of the adjacent property to the south.				✓	✓	✓	✓	✓
MW16-4-GW2	3.05 - 6.1	27-Nov-2024	Assess potential groundwater impacts due to the use of the adjacent property to the south.				✓	✓	✓	✓	✓
MW16-5-GW2	3.05 - 6.1	27-Nov-2024	Assess potential groundwater impacts due to the use of the adjacent property to the south.				✓	✓	✓	✓	✓

Parameter	Units	Regulation	TP-1-2	TP-1-3	TP-2-1	TP-2-2	TP-3-1	TP-3-4	TP-4-2	TP-4-102 (Duplicate of TP-4-2)	TP-4-3	TP-4-103 (Duplicate of TP-4-3)	TP-4-4	MW16-3-5	MW16-3-105 (Duplicate of MW16-3-5)	MW16-4-2	MW16-4-4	MW16-4-5
Sample Depth (m)		Reg 153/04 - Table 1 Residential	1.52-1.82	3.66-3.96	1.53-1.83	3.05-3.35	2.29-2.59	7.01-7.31	3.66-3.96	3.66-3.96	4.57-4.87	4.57-4.87	6.10-6.40	3.05-3.66	3.05-3.66	0.76-1.37	2.28-2.89	3.05-3.66
Sample Date			21-Mar-2016	21-Mar-2016	21-Mar-2016	21-Mar-2016	21-Mar-2016	21-Mar-2016	21-Mar-2016	21-Mar-2016	21-Mar-2016	21-Mar-2016	21-Mar-2016	21-Mar-2016	22-Mar-2016	22-Mar-2016	22-Mar-2016	22-Mar-2016
Physical Characteristics																		
% Solids	% by Wt.		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
General Inorganics																		
SAR	N/A	2.4	0.2	23	0.2	8.4	9.3	4.5	0.81	0.77	NA	NA	7.9	39	NA	0.25	NA	44
Conductivity	uS/cm	570	0.3	0.74	0.25	0.65	0.57	0.35	0.43	0.42	NA	NA	0.53	3.8	NA	0.18	NA	1.6
pH	N/A	5-9 (surf); 5-11 (subsurf)	7.2	6.5	7.52	7.51	7.69	7.28	7.63	7.65	NA	NA	6.25	7.31	NA	7.56	NA	8
Metals																		
Antimony	ug/g dry	1.3	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	0.44	0.22	NA	NA	ND (0.2)	ND (0.2)	NA	ND (0.2)	NA	ND (0.2)
Arsenic	ug/g dry	18	ND (1.0)	1.3	2.3	1.4	1.2	2	2.1	1.9	NA	NA	ND (1.0)	1.9	NA	1.2	NA	1.8
Barium	ug/g dry	220	270	240	160	160	340	230	220	260	NA	NA	180	300	NA	190	NA	280
Beryllium	ug/g dry	2.5	0.8	0.77	0.67	0.68	0.68	0.92	0.48	0.51	NA	NA	0.53	0.87	NA	0.51	NA	0.92
Boron	ug/g dry	36	ND (5.0)	ND (5.0)	6.3	6	ND (5.0)	10	5.7	5.8	NA	NA	ND (5.0)	8.3	NA	ND (5.0)	NA	7.1
Cadmium	ug/g dry	1.2	ND (0.1)	ND (0.1)	0.18	ND (0.1)	0.11	0.14	0.15	0.16	NA	NA	0.19	0.12	NA	0.1	NA	ND (0.1)
Chromium (VI)	ug/g dry	0.66	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	NA	NA	ND (0.2)	ND (0.2)	NA	ND (0.2)	NA	ND (0.2)
Chromium	ug/g dry	70	90	110	58	74	100	150	54	56	NA	NA	46	140	NA	51	NA	140
Cobalt	ug/g dry	21	24	18	12	14	22	28	13	14	NA	NA	11	25	NA	13	NA	25
Copper	ug/g dry	92	29	16	28	35	50	62	32	31	NA	NA	15	54	NA	26	NA	55
Cyanide, free	ug/g dry	0.051	ND (0.01)	0.02	0.01	ND (0.01)	ND (0.01)	ND (0.01)	0.01	0.01	NA	NA	0.04	ND (0.01)	NA	ND (0.01)	NA	ND (0.01)
Lead	ug/g dry	120	7.6	8.6	49	7.7	15	11	19	19	NA	NA	10	8.9	NA	6.5	NA	9.4
Mercury	ug/g dry	0.27	ND (0.05)	ND (0.05)	0.069	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	ND (0.05)	NA	ND (0.05)
Molybdenum	ug/g dry	2.0	0.77	2.3	0.79	1.1	0.98	0.56	1.1	1.1	NA	NA	0.75	ND (0.5)	NA	ND (0.5)	NA	ND (0.5)
Nickel	ug/g dry	82	48	49	35	40	59	82	36	36	NA	NA	22	76	NA	28	NA	76
Selenium	ug/g dry	1.5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (0.5)	NA	ND (0.5)	NA	ND (0.5)
Silver	ug/g dry	0.5	ND (0.2)	ND (0.2)	0.2	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	NA	NA	ND (0.2)	ND (0.2)	NA	ND (0.2)	NA	ND (0.2)
Thallium	ug/g dry	1.0	0.37	0.26	0.29	0.21	0.46	0.39	0.31	0.32	NA	NA	0.14	0.45	NA	0.24	NA	0.39
Uranium	ug/g dry	2.5	1.5	3.9	0.82	1.1	1	1.2	0.76	0.79	NA	NA	0.77	0.95	NA	0.77	NA	1.3
Vanadium	ug/g dry	86	99	110	52	66	99	110	55	59	NA	NA	63	110	NA	63	NA	110
Zinc	ug/g dry	290	100	99	80	73	140	120	110	90	NA	NA	100	130	NA	71	NA	120
BTEX																		
Benzene	ug/g dry	0.02	NA	NA	NA	NA	ND (0.02)	NA	NA	NA	NA	NA	NA	ND (0.02)	ND (0.02)	NA	ND (0.02)	NA
Ethylbenzene	ug/g dry	0.05	NA	NA	NA	NA	ND (0.02)	NA	NA	NA	NA	NA	NA	ND (0.02)	ND (0.02)	NA	ND (0.02)	NA
Toluene	ug/g dry	0.2	NA	NA	NA	NA	ND (0.02)	NA	NA	NA	NA	NA	NA	ND (0.02)	ND (0.02)	NA	ND (0.02)	NA
m/p-Xylene	ug/g dry	0.05	NA	NA	NA	NA	ND (0.02)	NA	NA	NA	NA	NA	NA	ND (0.02)	ND (0.02)	NA	ND (0.02)	NA
o-Xylene	ug/g dry	0.05	NA	NA	NA	NA	ND (0.02)	NA	NA	NA	NA	NA	NA	ND (0.02)	ND (0.02)	NA	ND (0.02)	NA
Xylenes, total	ug/g dry	0.05	NA	NA	NA	NA	ND (0.04)	NA	NA	NA	NA	NA	NA	ND (0.04)	ND (0.04)	NA	ND (0.04)	NA
Hydrocarbons																		
F1 PHCs (C6-C10)	ug/g dry	25	NA	NA	NA	NA	ND (10)	NA	NA	NA	NA	NA	NA	ND (10)	ND (10)	NA	ND (10)	NA
F2 PHCs (C10-C16)	ug/g dry	10	NA	NA	NA	NA	ND (10)	NA	NA	NA	NA	NA	NA	ND (10)	ND (10)	NA	ND (10)	NA
F3 PHCs (C16-C34)	ug/g dry	240	NA	NA	NA	NA	ND (50)	NA	NA	NA	NA	NA	NA	ND (50)	ND (50)	NA	ND (50)	NA
F4 PHCs (C34-C50)	ug/g dry	120	NA	NA	NA	NA	ND (50)	NA	NA	NA	NA	NA	NA	ND (50)	ND (50)	NA	ND (50)	NA
Semi-Volatiles																		
Acenaphthene	ug/g dry	0.072	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.0087	ND (0.005)	NA	NA	NA	NA	NA	NA
Acenaphthylene	ug/g dry	0.093	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.0091	ND (0.005)	NA	NA	NA	NA	NA	NA
Anthracene	ug/g dry	0.16	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.024	ND (0.005)	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	ug/g dry	0.36	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.069	0.015	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	ug/g dry	0.3	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.051	0.011	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	ug/g dry	0.47	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.081	0.02	NA	NA	NA	NA	NA	NA
Benzo[g,h,i]perylene	ug/g dry	0.68	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.029	0.0073	NA	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	ug/g dry	0.48	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.025	0.0055	NA	NA	NA	NA	NA	NA
Chrysene	ug/g dry	2.8	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.071	0.018	NA	NA	NA	NA	NA	NA
Dibenzo[a,h]anthracene	ug/g dry	0.1	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.0088	ND (0.005)	NA	NA	NA	NA	NA	NA
Fluoranthene	ug/g dry	0.56	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.16	0.035	NA	NA	NA	NA	NA	NA
Fluorene	ug/g dry	0.12	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.01	ND (0.005)	NA	NA	NA	NA	NA	NA
Indeno [1,2,3-cd] pyrene	ug/g dry	0.23	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.038	0.0092	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	ug/g dry	0.59	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	ND (0.005)	ND (0.005)	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	ug/g dry	0.59	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	ND (0.005)	ND (0.005)	NA	NA	NA	NA	NA	NA
Methylnaphthalene (1&2)	ug/g dry	0.59	NA	NA	NA	ND (0.071)	NA	NA	NA	NA	ND (0.071)	ND (0.071)	NA	NA	NA	NA	NA	NA
Naphthalene	ug/g dry	0.09	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	ND (0.005)	ND (0.005)	NA	NA	NA	NA	NA	NA
Phenanthrene	ug/g dry	0.69	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.088	0.018	NA	NA	NA	NA	NA	NA
Pyrene	ug/g dry	1.0	NA	NA	NA	ND (0.005)	NA	NA	NA	NA	0.11	0.025	NA	NA	NA	NA	NA	NA

2.00 Result exceeds Reg 153/04 - Table 1 Residential Standards
ND (0.2) MDL exceeds Reg 153/04 - Table 1 Residential Standards
ND (0.2) No concentrations identified above the MDL
N/A Parameter not analysed
NV No value given for indicated parameter

Parameter	Units	Regulation	MW16-5-2	MW16-5-3	MW16-5-7	MW16-2-1	MW16-2-2	MW16-2-4	MW16-2-5	MW16-6-2	MW16-6-4	MW16-6-104 (Duplicate of MW16-6-4)	BH1-20-SS5	BH4-20-SS4	BH2-20-SS5	BH3-SS5
Sample Depth (m)		Reg 153/04 - Table 1 Residential	0.76-1.37	1.52-2.13	4.57-5.18	0-0.61	0.76-1.37	2.28-2.89	3.05-3.66	0.76-1.37	2.28-2.89	2.28-2.89	3.05-3.66	2.29-2.89	3.05-3.66	3.05-3.66
Sample Date			22-Mar-2016	22-Mar-2016	22-Mar-2016	23-Mar-2016	23-Mar-2016	23-Mar-2016	23-Mar-2016	23-Mar-2016	23-Mar-2016	23-Mar-2016	23-Mar-2016	29-Jun-2020	29-Jun-2020	30-Jun-2020
Physical Characteristics																
% Solids	% by Wt.		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	74.5	73.3	76.1	75.8
General Inorganics																
SAR	N/A	2.4	20	NA	6	0.22	NA	NA	14	10	9.4	11	0.93	0.68	4.85	2
Conductivity	uS/cm	570	1.1	NA	0.92	0.22	NA	NA	1.5	0.82	1.4	1.4	421	358	880	355
pH	N/A	5-9 (surf); 5-11 (subsurf)	7.41	NA	7.56	7.16	NA	NA	7.39	7.44	6.54	7.49	7.57	NA	NA	NA
Metals																
Antimony	ug/g dry	1.3	ND (0.2)	NA	ND (0.2)	0.43	NA	NA	ND (0.2)	0.32	ND (0.2)	ND (0.2)	NA	ND (1.0)	NA	NA
Arsenic	ug/g dry	18	2.3	NA	2.3	3.7	NA	NA	1.3	3.9	1.5	1.9	NA	3.4	NA	NA
Barium	ug/g dry	220	210	NA	250	140	NA	NA	250	110	220	240	NA	287	NA	NA
Beryllium	ug/g dry	2.5	1.1	NA	0.85	0.56	NA	NA	0.83	0.39	0.92	0.85	NA	0.6	NA	NA
Boron	ug/g dry	36	8.4	NA	11	5.6	NA	NA	ND (5.0)	ND (5.0)	6.2	7	NA	ND (5.0)	NA	NA
Cadmium	ug/g dry	1.2	ND (0.1)	NA	ND (0.1)	0.19	NA	NA	0.17	0.22	0.13	0.15	NA	ND (0.5)	NA	NA
Chromium (VI)	ug/g dry	0.66	ND (0.2)	NA	ND (0.2)	ND (0.2)	NA	NA	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	NA	ND (0.2)	NA	NA
Chromium	ug/g dry	70	100	NA	140	50	NA	NA	110	35	120	140	NA	96.5	NA	NA
Cobalt	ug/g dry	21	19	NA	26	13	NA	NA	22	8.5	20	24	NA	19.4	NA	NA
Copper	ug/g dry	92	43	NA	52	35	NA	NA	43	23	24	50	NA	42.8	NA	NA
Cyanide, free	ug/g dry	0.051	ND (0.01)	NA	ND (0.01)	0.02	NA	NA	0.02	0.01	0.1	ND (0.01)	NA	NA	NA	NA
Lead	ug/g dry	120	11	NA	8.9	21	NA	NA	9.9	28	9.3	9.6	NA	6.7	NA	NA
Mercury	ug/g dry	0.27	ND (0.05)	NA	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	0.077	ND (0.05)	ND (0.05)	NA	ND (0.1)	NA	NA
Molybdenum	ug/g dry	2.0	ND (0.5)	NA	0.8	1.5	NA	NA	0.59	0.78	1.8	1.3	NA	ND (1.0)	NA	NA
Nickel	ug/g dry	82	58	NA	75	38	NA	NA	60	23	56	75	NA	54.3	NA	NA
Selenium	ug/g dry	1.5	ND (0.5)	NA	ND (0.5)	ND (0.5)	NA	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	ND (1.0)	NA	NA
Silver	ug/g dry	0.5	ND (0.2)	NA	ND (0.2)	ND (0.2)	NA	NA	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	NA	ND (0.3)	NA	NA
Thallium	ug/g dry	1.0	0.33	NA	0.36	0.35	NA	NA	0.37	0.15	0.27	0.31	NA	ND (1.0)	NA	NA
Uranium	ug/g dry	2.5	1.5	NA	1.1	1.1	NA	NA	1.4	0.92	3	1.6	NA	ND (1.0)	NA	NA
Vanadium	ug/g dry	86	84	NA	110	46	NA	NA	94	40	110	100	NA	89.2	NA	NA
Zinc	ug/g dry	290	89	NA	130	94	NA	NA	110	75	120	110	NA	97.6	NA	NA
BTEX																
Benzene	ug/g dry	0.02	NA	ND (0.02)	NA	NA	NA	NA	NA	ND (0.02)	NA	NA	ND (0.02)	NA	ND (0.02)	ND (0.02)
Ethylbenzene	ug/g dry	0.05	NA	ND (0.02)	NA	NA	NA	NA	NA	ND (0.02)	NA	NA	ND (0.05)	NA	ND (0.05)	ND (0.05)
Toluene	ug/g dry	0.2	NA	ND (0.02)	NA	NA	NA	NA	NA	ND (0.02)	NA	NA	ND (0.05)	NA	ND (0.05)	ND (0.05)
m/p-Xylene	ug/g dry	0.05	NA	ND (0.02)	NA	NA	NA	NA	NA	ND (0.02)	NA	NA	ND (0.05)	NA	ND (0.05)	ND (0.05)
o-Xylene	ug/g dry	0.05	NA	ND (0.02)	NA	NA	NA	NA	NA	ND (0.02)	NA	NA	ND (0.05)	NA	ND (0.05)	ND (0.05)
Xylenes, total	ug/g dry	0.05	NA	ND (0.04)	NA	NA	NA	NA	NA	ND (0.04)	NA	NA	ND (0.05)	NA	ND (0.05)	ND (0.05)
Hydrocarbons																
F1 PHCs (C6-C10)	ug/g dry	25	NA	ND (10)	NA	NA	NA	NA	NA	ND (10)	NA	NA	13	NA	ND (7)	ND (7)
F2 PHCs (C10-C16)	ug/g dry	10	NA	10	NA	NA	72	NA	NA	21	NA	NA	173	NA	ND (4)	ND (4)
F3 PHCs (C16-C34)	ug/g dry	240	NA	73	NA	NA	150	NA	NA	110	NA	NA	117	NA	ND (8)	ND (8)
F4 PHCs (C34-C50)	ug/g dry	120	NA	ND (50)	NA	NA	ND (50)	NA	NA	ND (50)	NA	NA	ND (6)	NA	ND (6)	ND (6)
Semi-Volatiles																
Acenaphthene	ug/g dry	0.072	NA	NA	NA	NA	0.015	ND (0.005)	NA	0.22	NA	NA	NA	NA	ND (0.02)	NA
Acenaphthylene	ug/g dry	0.093	NA	NA	NA	NA	0.0092	ND (0.005)	NA	0.035	NA	NA	NA	NA	ND (0.02)	NA
Anthracene	ug/g dry	0.16	NA	NA	NA	NA	0.015	ND (0.005)	NA	0.37	NA	NA	NA	NA	ND (0.02)	NA
Benzo[a]anthracene	ug/g dry	0.36	NA	NA	NA	NA	0.029	ND (0.005)	NA	0.85	NA	NA	NA	NA	0.02	NA
Benzo[a]pyrene	ug/g dry	0.3	NA	NA	NA	NA	0.026	ND (0.005)	NA	0.75	NA	NA	NA	NA	ND (0.02)	NA
Benzo[b]fluoranthene	ug/g dry	0.47	NA	NA	NA	NA	0.037	ND (0.005)	NA	0.69	NA	NA	NA	NA	ND (0.02)	NA
Benzo[g,h,i]perylene	ug/g dry	0.68	NA	NA	NA	NA	0.019	ND (0.005)	NA	0.34	NA	NA	NA	NA	ND (0.02)	NA
Benzo[k]fluoranthene	ug/g dry	0.48	NA	NA	NA	NA	0.013	ND (0.005)	NA	0.2	NA	NA	NA	NA	ND (0.02)	NA
Chrysene	ug/g dry	2.8	NA	NA	NA	NA	0.034	ND (0.005)	NA	0.53	NA	NA	NA	NA	0.02	NA
Dibenzo[a,h]anthracene	ug/g dry	0.1	NA	NA	NA	NA	ND (0.005)	ND (0.005)	NA	0.096	NA	NA	NA	NA	ND (0.02)	NA
Fluoranthene	ug/g dry	0.56	NA	NA	NA	NA	0.053	0.0066	NA	1.5	NA	NA	NA	NA	0.05	NA
Fluorene	ug/g dry	0.12	NA	NA	NA	NA	ND (0.01)	ND (0.005)	NA	0.27	NA	NA	NA	NA	ND (0.02)	NA
Indeno [1,2,3-cd] pyrene	ug/g dry	0.23	NA	NA	NA	NA	0.018	ND (0.005)	NA	0.4	NA	NA	NA	NA	ND (0.02)	NA
1-Methylnaphthalene	ug/g dry	0.59	NA	NA	NA	NA	0.019	ND (0.005)	NA	0.072	NA	NA	NA	NA	ND (0.02)	NA
2-Methylnaphthalene	ug/g dry	0.59	NA	NA	NA	NA	0.03	ND (0.005)	NA	0.079	NA	NA	NA	NA	ND (0.02)	NA
Methylnaphthalene (1&2)	ug/g dry	0.59	NA	NA	NA	NA	0.049	ND (0.071)	NA	0.15	NA	NA	NA	NA	ND (0.04)	NA
Naphthalene	ug/g dry	0.09	NA	NA	NA	NA	0.0073	ND (0.005)	NA	0.1	NA	NA	NA	NA	ND (0.01)	NA
Phenanthrene	ug/g dry	0.69	NA	NA	NA	NA	0.071	ND (0.005)	NA	1.2	NA	NA	NA	NA	0.04	NA
Pyrene	ug/g dry	1.0	NA	NA	NA	NA	0.057	0.0063	NA	1.5	NA	NA	NA	NA	0.04	NA

2.00 Result exceeds Reg 153/04 - Table 1 Residential Standards
ND (0.2) MDL exceeds Reg 153/04 - Table 1 Residential Standards
ND (0.2) No concentrations identified above the MDL
N/A Parameter not analysed
NV No value given for indicated parameter

Parameter	Sample ID / Depth (m)	Units	Reg 153/04 - Table 1 Residential Standards	Concentration
SAR	MW16-4-5 - 3.05-3.66	N/A	2.4	44
Conductivity	BH2-20-SS5 - 3.05-3.66	uS/cm	570	880
pH	MW16-4-5 - 3.05-3.66	N/A	5-9 (surf); 5-11 (subsurf)	8
Antimony	TP-4-2 - 3.66-3.96	ug/g dry	1.3	ND (1.0)
Arsenic	MW16-2-1 - 0-0.61	ug/g dry	18	3.7
Barium	TP-3-1 - 2.29-2.59	ug/g dry	220	340
Beryllium	MW16-5-2 - 0.76-1.37	ug/g dry	2.5	1.1
Boron	MW16-5-7 - 4.57-5.18	ug/g dry	36	11
Cadmium	MW16-6-2 - 0.76-1.37	ug/g dry	1.2	ND (0.5)
Chromium (VI)	TP-1-2 - 1.52-1.82	ug/g dry	0.66	ND (0.2)
Chromium	TP-3-4 - 7.01-7.31	ug/g dry	70	150
Cobalt	TP-3-4 - 7.01-7.31	ug/g dry	21	28
Copper	TP-3-4 - 7.01-7.31	ug/g dry	92	62
Cyanide, free	MW16-6-4 - 2.28-2.89	ug/g dry	0.051	0.1
Lead	TP-2-1 - 1.53-1.83	ug/g dry	120	49
Mercury	MW16-6-2 - 0.76-1.37	ug/g dry	0.27	ND (0.1)
Molybdenum	TP-1-3 - 3.66-3.96	ug/g dry	2.0	2.3
Nickel	TP-3-4 - 7.01-7.31	ug/g dry	82	82
Selenium	BH4-20-SS4 - 2.29-2.89	ug/g dry	1.5	ND (1.0)
Silver	TP-2-1 - 1.53-1.83	ug/g dry	0.5	ND (0.3)
Thallium	TP-3-1 - 2.29-2.59	ug/g dry	1.0	ND (1.0)
Uranium	TP-1-3 - 3.66-3.96	ug/g dry	2.5	3.9
Vanadium	TP-1-3 - 3.66-3.96	ug/g dry	86	110
Zinc	TP-3-1 - 2.29-2.59	ug/g dry	290	140
Benzene	TP-3-1 - 2.29-2.59	ug/g dry	0.02	ND (0.02)
Ethylbenzene	BH1-20-SS5 - 3.05-3.66	ug/g dry	0.05	ND (0.05)
Toluene	BH1-20-SS5 - 3.05-3.66	ug/g dry	0.2	ND (0.05)
m/p-Xylene	BH1-20-SS5 - 3.05-3.66	ug/g dry	0.05	ND (0.05)
o-Xylene	BH1-20-SS5 - 3.05-3.66	ug/g dry	0.05	ND (0.05)
Xylenes, total	BH1-20-SS5 - 3.05-3.66	ug/g dry	0.05	ND (0.05)
F1 PHCs (C6-C10)	BH1-20-SS5 - 3.05-3.66	ug/g dry	25	13
F2 PHCs (C10-C16)	BH1-20-SS5 - 3.05-3.66	ug/g dry	10	173
F3 PHCs (C16-C34)	MW16-2-2 - 0.76-1.37	ug/g dry	240	150
F4 PHCs (C34-C50)	TP-3-1 - 2.29-2.59	ug/g dry	120	ND (50)
Acenaphthene	MW16-6-2 - 0.76-1.37	ug/g dry	0.072	0.22
Acenaphthylene	MW16-6-2 - 0.76-1.37	ug/g dry	0.093	0.035
Anthracene	MW16-6-2 - 0.76-1.37	ug/g dry	0.16	0.37
Benzo[a]anthracene	MW16-6-2 - 0.76-1.37	ug/g dry	0.36	0.85
Benzo[a]pyrene	MW16-6-2 - 0.76-1.37	ug/g dry	0.3	0.75
Benzo[b]fluoranthene	MW16-6-2 - 0.76-1.37	ug/g dry	0.47	0.69
Benzo[g,h,i]perylene	MW16-6-2 - 0.76-1.37	ug/g dry	0.68	0.34
Benzo[k]fluoranthene	MW16-6-2 - 0.76-1.37	ug/g dry	0.48	0.2
Chrysene	MW16-6-2 - 0.76-1.37	ug/g dry	2.8	0.53
Dibenzo[a,h]anthracene	MW16-6-2 - 0.76-1.37	ug/g dry	0.1	0.096
Fluoranthene	MW16-6-2 - 0.76-1.37	ug/g dry	0.56	1.5
Fluorene	MW16-6-2 - 0.76-1.37	ug/g dry	0.12	0.27
Indeno [1,2,3-cd] pyrene	MW16-6-2 - 0.76-1.37	ug/g dry	0.23	0.4
1-Methylnaphthalene	MW16-6-2 - 0.76-1.37	ug/g dry	0.59	0.072
2-Methylnaphthalene	MW16-6-2 - 0.76-1.37	ug/g dry	0.59	0.079
Methylnaphthalene (1&2)	MW16-6-2 - 0.76-1.37	ug/g dry	0.59	0.15
Naphthalene	MW16-6-2 - 0.76-1.37	ug/g dry	0.09	0.1
Phenanthrene	MW16-6-2 - 0.76-1.37	ug/g dry	0.69	1.2
Pyrene	MW16-6-2 - 0.76-1.37	ug/g dry	1.0	1.5
Note: ND (x) = parameter analysed was reported non-detect				

Parameter		Units	Regulation	MW16-2	MW16-3	MW16-4	MW16-5	MW16-6	MW16-106 (Duplicate of MW16-6)	BH1-20-GW1	BH2-20-GW1	BH3-20-GW1	MW16-4-GW1	BH1-20-GW2	BH3-20-GW2	MW16-3-GW2	MW16-4-GW2	MW16-5-GW2
Sample Depth (m)			Reg 153/04 - Table 1 Groundwater	3.05 - 6.1	3.05 - 6.1	3.05 - 6.1	3.05 - 6.1	3.05 - 6.1	3.05 - 6.1	6.09 - 9.14	6.09 - 9.14	6.09 - 9.14	3.05 - 6.1	6.09 - 9.14	6.09 - 9.14	3.05 - 6.1	3.05 - 6.1	3.05 - 6.1
Sample Date				7-Apr-2016	7-Apr-2016	7-Apr-2016	7-Apr-2016	7-Apr-2016	7-Apr-2016	17-Jul-2020	17-Jul-2020	17-Jul-2020	17-Jul-2020	27-Nov-2024	27-Nov-2024	27-Nov-2024	27-Nov-2024	27-Nov-2024
Anions																		
Chloride	mg/L	790	940	3700	1700	650	2500	2500	758	1180	1310	1660	342	730	3920	1810	875	
Metals																		
Mercury	ug/L	0.1	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	NA	NA	NA	NA	NA
Antimony	ug/L	1.5	0.0033	ND (0.0025)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0025)	ND (0.0025)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Arsenic	ug/L	13	0.0051	ND (0.005)	ND (0.0005)	0.0019	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	4	ND (1)	ND (1)	ND (1)
Barium	ug/L	610	0.11	0.2	0.1	0.15	0.27	0.24	260	255	277	104	55	62	99	68	62	
Beryllium	ug/L	0.5	ND (0.0005)	ND (0.0025)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0025)	ND (0.0025)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Boron	ug/L	1700	0.3	0.1	0.06	0.38	0.23	0.22	176	58	133	44	149	95	54	60	213	
Cadmium	ug/L	0.5	ND (0.0001)	ND (0.0005)	0.00028	ND (0.0001)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Chromium	ug/L	11	ND (0.005)	ND (0.025)	ND (0.005)	ND (0.005)	ND (0.025)	ND (0.025)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Chromium (VI)	ug/L	25	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (10)	ND (10)	ND (10)	ND (10)	NA	NA	NA	NA	NA	NA
Cobalt	ug/L	3.8	0.0017	ND (0.0025)	ND (0.0005)	ND (0.0005)	0.0028	0.0027	1.2	2.2	0.8	1.2	0.9	0.9	ND (0.5)	1.8	0.9	
Copper	ug/L	5.0	0.0029	ND (0.005)	0.0016	0.0012	ND (0.005)	ND (0.005)	2.2	5	3.3	3.5	0.7	1.7	1.7	0.7	1.8	
Cyanide, free	ug/L	5.0	ND (2)	3	ND (2)	ND (2)	ND (2)	ND (2)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	ug/L	1.9	ND (0.0005)	ND (0.0025)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0025)	ND (0.0025)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.1	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Molybdenum	ug/L	23	0.055	0.0043	0.0019	0.009	0.004	0.0037	2.7	6.1	8	2.9	1.1	2.8	5.4	2.2	3.1	
Nickel	ug/L	14	0.0079	ND (0.005)	0.012	0.0025	0.0058	0.0063	3	4	2	12	3	2	3	12	4	
Selenium	ug/L	5.0	ND (0.002)	ND (0.01)	ND (0.002)	ND (0.002)	ND (0.01)	ND (0.01)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Silver	ug/L	0.3	ND (0.0001)	ND (0.0005)	ND (0.0001)	ND (0.0001)	ND (0.0005)	ND (0.0005)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Sodium	ug/L	490000	1200	2400	810	600	1200	1300	468000	736000	561000	822000	357000	314000	1940000	960000	615000	
Thallium	ug/L	0.5	0.000067	ND (0.00025)	ND (0.00005)	ND (0.00005)	ND (0.00025)	ND (0.00025)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Uranium	ug/L	8.9	0.054	0.012	0.014	0.0052	0.0079	0.0075	5.1	4.5	7.5	12.6	9.1	9	17.1	14.7	10.9	
Vanadium	ug/L	3.9	0.0037	ND (0.0025)	ND (0.0025)	0.0031	ND (0.0025)	ND (0.0025)	1.9	ND (0.5)	1.1	0.9	0.8	0.6	1.1	0.8	1.2	
Zinc	ug/L	160	0.0087	ND (0.025)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.025)	ND (0.025)	ND (5)	ND (5)	ND (5)	9	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
BTEX																		
Benzene	ug/L	0.5	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA
Ethylbenzene	ug/L	0.5	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA
Toluene	ug/L	0.8	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA
m/p-Xylene	ug/L	72	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA
o-Xylene	ug/L	72	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA
Xylenes, total	ug/L	72	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA
Hydrocarbons																		
F1 PHCs (C6-C10)	ug/L	420	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	NA	NA	NA	NA	NA
F2 PHCs (C10-C16)	ug/L	150	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)	NA	NA	NA	NA	NA
F3 PHCs (C16-C34)	ug/L	500	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (100)	ND (100)	ND (100)	ND (100)	NA	NA	NA	NA	NA
F4 PHCs (C34-C50)	ug/L	500	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (100)	ND (100)	ND (100)	ND (100)	NA	NA	NA	NA	NA
Semi-Volatiles																		
Acenaphthene	ug/L	4.1	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	ug/L	1.0	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	ug/L	0.1	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	ug/L	0.2	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	ug/L	0.01	ND (0.01)	ND (0.01)	NA	NA	ND (0.01)	ND (0.01)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	ug/L	0.1	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[g,h,i]perylene	ug/L	0.2	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	ug/L	0.1	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	ug/L	0.1	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo[a,h]anthracene	ug/L	0.2	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	ug/L	0.4	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	ug/L	120	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno [1,2,3-cd] pyrene	ug/L	0.2	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	ug/L	2.0	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	ug/L	2.0	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylnaphthalene (1&2)	ug/L	2.0	ND (0.071)	ND (0.071)	NA	NA	ND (0.071)	ND (0.071)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	ug/L	7.0	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	ug/L	0.1	0.034	ND (0.03)	NA	NA	ND (0.03)	ND (0.03)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	ug/L	0.2	ND (0.05)	ND (0.05)	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

2.00 Result exceeds Reg 153/04 - Table 1 Groundwater Standards

ND (0.2) MDL exceeds Reg 153/04 - Table 1 Groundwater Standards

ND (0.2) No concentrations identified above the MDL

N/A Parameter not analysed

NV No value given for indicated parameter

Parameter	Sample ID / Screen Interval (m)	Units	Reg 153/04 - Table 1 Groundwater Standards	Concentration
Chloride	MW16-3-GW2 - 3.05 - 6.1	mg/L	790	3920
Mercury	MW16-2 - 3.05 - 6.1	ug/L	0.1	ND (0.1)
Antimony	MW16-2 - 3.05 - 6.1	ug/L	1.5	ND (0.5)
Arsenic	BH3-20-GW2 - 6.09 - 9.14	ug/L	13	4
Barium	BH3-20-GW1 - 6.09 - 9.14	ug/L	610	277
Beryllium	BH1-20-GW1 - 6.09 - 9.14	ug/L	0.5	ND (0.5)
Boron	MW16-5-GW2 - 3.05 - 6.1	ug/L	1700	213
Cadmium	MW16-4 - 3.05 - 6.1	ug/L	0.5	ND (0.1)
Chromium	BH1-20-GW1 - 6.09 - 9.14	ug/L	11	ND (1)
Chromium (VI)	BH1-20-GW1 - 6.09 - 9.14	ug/L	25	ND (10)
Cobalt	BH2-20-GW1 - 6.09 - 9.14	ug/L	3.8	2.2
Copper	BH2-20-GW1 - 6.09 - 9.14	ug/L	5.0	5
Lead	BH1-20-GW2 - 6.09 - 9.14	ug/L	1.9	ND (0.1)
Molybdenum	BH3-20-GW1 - 6.09 - 9.14	ug/L	23	8
Nickel	MW16-4-GW1 - 3.05 - 6.1	ug/L	14	12
Selenium	BH1-20-GW1 - 6.09 - 9.14	ug/L	5.0	ND (1)
Silver	BH1-20-GW1 - 6.09 - 9.14	ug/L	0.3	ND (0.1)
Sodium	MW16-3-GW2 - 3.05 - 6.1	ug/L	490000	1940000
Thallium	MW16-2 - 3.05 - 6.1	ug/L	0.5	ND (0.1)
Uranium	MW16-3-GW2 - 3.05 - 6.1	ug/L	8.9	17.1
Vanadium	BH1-20-GW1 - 6.09 - 9.14	ug/L	3.9	1.9
Zinc	MW16-4-GW1 - 3.05 - 6.1	ug/L	160	9
Benzene	BH1-20-GW1 - 6.09 - 9.14	ug/L	0.5	ND (0.5)
Ethylbenzene	BH1-20-GW1 - 6.09 - 9.14	ug/L	0.5	ND (0.5)
Toluene	BH1-20-GW1 - 6.09 - 9.14	ug/L	0.8	ND (0.5)
m/p-Xylene	BH1-20-GW1 - 6.09 - 9.14	ug/L	72	ND (0.5)
o-Xylene	BH1-20-GW1 - 6.09 - 9.14	ug/L	72	ND (0.5)
Xylenes, total	BH1-20-GW1 - 6.09 - 9.14	ug/L	72	ND (0.5)
F1 PHCs (C6-C10)	MW16-2 - 3.05 - 6.1	ug/L	420	ND (25)
F2 PHCs (C10-C16)	MW16-2 - 3.05 - 6.1	ug/L	150	ND (100)
F3 PHCs (C16-C34)	MW16-2 - 3.05 - 6.1	ug/L	500	ND (200)
F4 PHCs (C34-C50)	MW16-2 - 3.05 - 6.1	ug/L	500	ND (200)
Acenaphthene	MW16-2 - 3.05 - 6.1	ug/L	4.1	ND (0.05)
Acenaphthylene	MW16-2 - 3.05 - 6.1	ug/L	1.0	ND (0.05)
Anthracene	MW16-2 - 3.05 - 6.1	ug/L	0.1	ND (0.05)
Benzo[a]anthracene	MW16-2 - 3.05 - 6.1	ug/L	0.2	ND (0.05)
Benzo[a]pyrene	MW16-2 - 3.05 - 6.1	ug/L	0.01	ND (0.01)
Benzo[b]fluoranthene	MW16-2 - 3.05 - 6.1	ug/L	0.1	ND (0.05)
Benzo[g,h,i]perylene	MW16-2 - 3.05 - 6.1	ug/L	0.2	ND (0.05)
Benzo[k]fluoranthene	MW16-2 - 3.05 - 6.1	ug/L	0.1	ND (0.05)
Chrysene	MW16-2 - 3.05 - 6.1	ug/L	0.1	ND (0.05)
Dibenzo[a,h]anthracene	MW16-2 - 3.05 - 6.1	ug/L	0.2	ND (0.05)
Fluoranthene	MW16-2 - 3.05 - 6.1	ug/L	0.4	ND (0.05)
Fluorene	MW16-2 - 3.05 - 6.1	ug/L	120	ND (0.05)
Indeno [1,2,3-cd] pyrene	MW16-2 - 3.05 - 6.1	ug/L	0.2	ND (0.05)
1-Methylnaphthalene	MW16-2 - 3.05 - 6.1	ug/L	2.0	ND (0.05)
2-Methylnaphthalene	MW16-2 - 3.05 - 6.1	ug/L	2.0	ND (0.05)
Methylnaphthalene (1&2)	MW16-2 - 3.05 - 6.1	ug/L	2.0	ND (0.071)
Naphthalene	MW16-2 - 3.05 - 6.1	ug/L	7.0	ND (0.05)
Phenanthrene	MW16-2 - 3.05 - 6.1	ug/L	0.1	0.034
Pyrene	MW16-2 - 3.05 - 6.1	ug/L	0.2	ND (0.05)
Note: ND (x) = parameter analysed was reported non-detect.				

Parameter	MDL	TP-4-2	TP-4-102	RPD (%)	QA/QC Result
General Inorganics					
SAR	0.01	0.81	0.77	5.1%	Within the acceptable range
Conductivity	5	0.43	0.42	2.4%	Within the acceptable range
pH	0.05	7.63	7.65	0.3%	Within the acceptable range
Metals					
Antimony	1	0.44	0.22	66.7%	Outside the acceptable range
Arsenic	1	2.1	1.9	10.0%	Within the acceptable range
Barium	1	220	260	16.7%	Within the acceptable range
Beryllium	0.5	0.48	0.51	6.1%	Within the acceptable range
Boron	5	5.7	5.8	1.7%	Within the acceptable range
Cadmium	0.5	0.15	0.16	6.5%	Within the acceptable range
Chromium (VI)	0.2	ND (0.2)	ND (0.2)	0.0%	Within the acceptable range
Chromium	5	54	56	3.6%	Within the acceptable range
Cobalt	1	13	14	7.4%	Within the acceptable range
Copper	5	32	31	3.2%	Within the acceptable range
Cyanide, free		0.01	0.01	0.0%	Within the acceptable range
Lead	1	19	19	0.0%	Within the acceptable range
Mercury	0.1	ND (0.05)	ND (0.05)	0.0%	Within the acceptable range
Molybdenum	1	1.1	1.1	0.0%	Within the acceptable range
Nickel	5	36	36	0.0%	Within the acceptable range
Selenium	1	ND (0.5)	ND (0.5)	0.0%	Within the acceptable range
Silver	0.3	ND (0.2)	ND (0.2)	0.0%	Within the acceptable range
Thallium	1	0.31	0.32	3.2%	Within the acceptable range
Uranium	1	0.76	0.79	3.9%	Within the acceptable range
Vanadium	10	55	59	7.0%	Within the acceptable range
Zinc	20	110	90	20.0%	Outside the acceptable range

Parameter	MDL	TP-4-3	TP-4-103	RPD (%)	QA/QC Result
Semi-Volatiles					
Acenaphthene	0.02	0.0087	ND (0.005)	78.75%	Outside the acceptable range
Acenaphthylene	0.02	0.0091	ND (0.005)	74.91%	Outside the acceptable range
Anthracene	0.02	0.024	ND (0.005)	18.18%	Within the acceptable range
Benzo[a]anthracene	0.02	0.069	0.015	128.57%	Outside the acceptable range
Benzo[a]pyrene	0.02	0.051	0.011	129.03%	Outside the acceptable range
Benzo[b]fluoranthene	0.02	0.081	0.02	120.79%	Outside the acceptable range
Benzo[g,h,i]perylene	0.02	0.029	0.0073	119.56%	Outside the acceptable range
Benzo[k]fluoranthene	0.02	0.025	0.0055	127.87%	Outside the acceptable range
Chrysene	0.02	0.071	0.018	119.10%	Outside the acceptable range
Dibenzo[a,h]anthracene	0.02	0.0088	ND (0.005)	77.78%	Outside the acceptable range
Fluoranthene	0.02	0.16	0.035	128.21%	Outside the acceptable range
Fluorene	0.02	0.01	ND (0.005)	66.67%	Outside the acceptable range
Indeno [1,2,3-cd] pyrene	0.02	0.038	0.0092	122.03%	Outside the acceptable range
1-Methylnaphthalene	0.02	ND (0.005)	ND (0.005)	0.00%	Within the acceptable range
2-Methylnaphthalene	0.02	ND (0.005)	ND (0.005)	0.00%	Within the acceptable range
Methylnaphthalene (1&2)	0.04	ND (0.071)	ND (0.071)	0.00%	Within the acceptable range
Naphthalene	0.01	ND (0.005)	ND (0.005)	0.00%	Within the acceptable range
Phenanthrene	0.02	0.088	0.018	132.08%	Outside the acceptable range
Pyrene	0.02	0.11	0.025	125.93%	Outside the acceptable range

Parameter	MDL	MW16-3-5	MW16-3-105	RPD (%)	QA/QC Result
BTEX					Within the acceptable range
Benzene	0.02	ND (0.02)	ND (0.02)	0	Within the acceptable range
Ethylbenzene	0.05	ND (0.02)	ND (0.02)	0	Within the acceptable range
Toluene	0.05	ND (0.02)	ND (0.02)	0	Within the acceptable range
m/p-Xylene	0.05	ND (0.02)	ND (0.02)	0	Within the acceptable range
o-Xylene	0.05	ND (0.02)	ND (0.02)	0	Within the acceptable range
Xylenes, total	0.05	ND (0.04)	ND (0.04)	0	Within the acceptable range
Hydrocarbons					Within the acceptable range
F1 PHCs (C6-C10)	7	ND (10)	ND (10)	0	Within the acceptable range
F2 PHCs (C10-C16)	4	ND (10)	ND (10)	0	Within the acceptable range
F3 PHCs (C16-C34)	8	ND (50)	ND (50)	0	Within the acceptable range
F4 PHCs (C34-C50)	6	ND (50)	ND (50)	0	Within the acceptable range

Parameter	MDL	MW16-6-4	MW16-6-104	RPD (%)	QA/QC Result
General Inorganics					
SAR	0.01	9.4	11	15.7%	Within the acceptable range
Conductivity	5	1.4	1.4	0.0%	Within the acceptable range
pH	0.05	6.54	7.49	13.5%	Within the acceptable range
Metals					
Antimony	1	ND (0.2)	ND (0.2)	0.0%	Within the acceptable range
Arsenic	1	1.5	1.9	23.5%	Outside the acceptable range
Barium	1	220	240	8.7%	Within the acceptable range
Beryllium	0.5	0.92	0.85	7.9%	Within the acceptable range
Boron	5	6.2	7	12.1%	Within the acceptable range
Cadmium	0.5	0.13	0.15	14.3%	Within the acceptable range
Chromium (VI)	0.2	ND (0.2)	ND (0.2)	0.0%	Within the acceptable range
Chromium	5	120	140	15.4%	Within the acceptable range
Cobalt	1	20	24	18.2%	Within the acceptable range
Copper	5	24	50	70.3%	Outside the acceptable range
Cyanide, free		0.1	ND (0.01)	200.0%	Outside the acceptable range
Lead	1	9.3	9.6	3.2%	Within the acceptable range
Mercury	0.1	ND (0.05)	ND (0.05)	0.0%	Within the acceptable range
Molybdenum	1	1.8	1.3	32.3%	Outside the acceptable range
Nickel	5	56	75	29.0%	Outside the acceptable range
Selenium	1	ND (0.5)	ND (0.5)	0.0%	Within the acceptable range
Silver	0.3	ND (0.2)	ND (0.2)	0.0%	Within the acceptable range
Thallium	1	0.27	0.31	13.8%	Within the acceptable range
Uranium	1	3	1.6	60.9%	Outside the acceptable range
Vanadium	10	110	100	9.5%	Within the acceptable range
Zinc	20	120	110	8.7%	Within the acceptable range

Parameter	MDL	MW16-6	MW16-106	RPD (%)	QA/QC Result
Anions					
Chloride	0.01	2500	2500	0.00%	Within the acceptable range
Metals					
Mercury	0.1	ND (0.1)	ND (0.1)	0.00%	Within the acceptable range
Antimony	0.5	ND (0.0025)	ND (0.0025)	0.00%	Within the acceptable range
Arsenic	1	ND (0.005)	ND (0.005)	0.00%	Within the acceptable range
Barium	1	0.27	0.24	11.76%	Within the acceptable range
Beryllium	0.5	ND (0.0025)	ND (0.0025)	0.00%	Within the acceptable range
Boron	10	0.23	0.22	4.44%	Within the acceptable range
Cadmium	0.1	ND (0.0005)	ND (0.0005)	0.00%	Within the acceptable range
Chromium	1	ND (0.025)	ND (0.025)	0.00%	Within the acceptable range
Chromium (VI)	10	ND (0.5)	ND (0.5)	0.00%	Within the acceptable range
Cobalt	0.5	0.0028	0.0027	3.64%	Within the acceptable range
Copper	0.5	ND (0.005)	ND (0.005)	0.00%	Within the acceptable range
Cyanide, free		ND (2)	ND (2)	0.00%	Within the acceptable range
Lead	0.1	ND (0.0025)	ND (0.0025)	0.00%	Within the acceptable range
Molybdenum	0.5	0.004	0.0037	7.79%	Within the acceptable range
Nickel	1	0.0058	0.0063	8.26%	Within the acceptable range
Selenium	1	ND (0.01)	ND (0.01)	0.00%	Within the acceptable range
Silver	0.1	ND (0.0005)	ND (0.0005)	0.00%	Within the acceptable range
Sodium	200	1200	1300	8.00%	Within the acceptable range
Thallium	0.1	ND (0.00025)	ND (0.00025)	0.00%	Within the acceptable range
Uranium	0.1	0.0079	0.0075	5.19%	Within the acceptable range
Vanadium	0.5	ND (0.0025)	ND (0.0025)	0.00%	Within the acceptable range
Zinc	5	ND (0.025)	ND (0.025)	0.00%	Within the acceptable range
BTEX					
Benzene	0.5	ND (0.2)	ND (0.2)	0.00%	Within the acceptable range
Ethylbenzene	0.5	ND (0.2)	ND (0.2)	0.00%	Within the acceptable range
Toluene	0.5	ND (0.2)	ND (0.2)	0.00%	Within the acceptable range
m/p-Xylene	0.5	ND (0.4)	ND (0.4)	0.00%	Within the acceptable range
o-Xylene	0.5	ND (0.2)	ND (0.2)	0.00%	Within the acceptable range
Xylenes, total	0.5	ND (0.4)	ND (0.4)	0.00%	Within the acceptable range
Hydrocarbons					
F1 PHCs (C6-C10)	25	ND (25)	ND (25)	0.00%	Within the acceptable range
F2 PHCs (C10-C16)	100	ND (100)	ND (100)	0.00%	Within the acceptable range
F3 PHCs (C16-C34)	100	ND (200)	ND (200)	0.00%	Within the acceptable range
F4 PHCs (C34-C50)	100	ND (200)	ND (200)	0.00%	Within the acceptable range
Semi-Volatiles					
Acenaphthene	0.05	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
Acenaphthylene	0.05	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
Anthracene	0.01	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
Benzo[a]anthracene	0.01	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
Benzo[a]pyrene	0.01	ND (0.01)	ND (0.01)	0.00%	Within the acceptable range
Benzo[b]fluoranthene	0.05	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
Benzo[g,h,i]perylene	0.05	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
Benzo[k]fluoranthene	0.05	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
Chrysene	0.05	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
Dibenzo[a,h]anthracene	0.05	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
Fluoranthene	0.01	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
Fluorene	0.05	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
Indeno [1,2,3-cd] pyrene	0.05	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
1-Methylnaphthalene	0.05	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
2-Methylnaphthalene	0.05	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
Methylnaphthalene (1&2)	0.10	ND (0.071)	ND (0.071)	0.00%	Within the acceptable range
Naphthalene	0.05	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range
Phenanthrene	0.05	ND (0.03)	ND (0.03)	0.00%	Within the acceptable range
Pyrene	0.01	ND (0.05)	ND (0.05)	0.00%	Within the acceptable range

Test Hole ID	Ground Surface Elevation (masl)	Water Level Depth (mbgs)	Water Level Elevation (masl)	Date of Measurement
MW16-1	47.32	1.46	45.86	7-Apr-2016
MW16-2	47.97	5.54	42.43	7-Apr-2016
MW16-3	48.78	5.02	43.76	7-Apr-2016
MW16-4	47.07	1.96	45.11	7-Apr-2016
MW16-5	43.64	4.78	38.86	7-Apr-2016
MW16-6	42.96	0.69	42.27	7-Apr-2016
BH1-20	46.87	4.72	42.15	17-Jul-2020
BH2-20	47.73	4.51	43.22	17-Jul-2020
BH3-20	49.31	4.93	44.38	17-Jul-2020
MW16-1	47.32	3.79	43.53	17-Jul-2020
MW16-2	47.97	2.83	45.14	17-Jul-2020
MW16-3	48.78	4.10	44.68	17-Jul-2020
MW16-4	47.07	2.86	44.21	17-Jul-2020
MW16-6	42.96	1.10	41.86	17-Jul-2020
BH1-20	46.87	4.27	42.60	27-Nov-2024
BH3-20	49.31	3.53	45.78	27-Nov-2024
MW16-3	48.78	3.68	45.10	27-Nov-2024
MW16-4	47.07	1.92	45.15	27-Nov-2024
MW16-5	43.64	1.48	42.16	27-Nov-2024

Test Hole ID	Temperature (°C)	Conductivity (µS)	pH	Date of Measurement
BH1-20	10.8	2372	7.0	27-Nov-2024
BH3-20	10.3	2502	7.3	27-Nov-2024
MW16-3	11.1	>3999	7.4	27-Nov-2024
MW16-4	11.1	>3999	7.2	27-Nov-2024
MW16-5	10.5	2902	7.4	27-Nov-2024