PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
200 ELGIN STREET, OTTAWA, ONTARIO

Project No.: CCO-22-3539

Prepared for:

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1.0 EXECUTIVE SUMMARY

McIntosh Perry was retained by Mr. Michael Morin of Elgar Holdings Inc. (the 'Client') to conduct a Phase Two Environmental Site Assessment (ESA) for the property located at 200 Elgin Street, Ottawa, Ontario (the 'Phase Two Property' or 'Site'). The Phase Two Property is currently occupied by an eleven-storey commercial/office building with a one basement level containing office and storage space. The Phase Two Property represents a portion of a larger contiguous building and property with municipal addresses of 167, and 169 Lisgar Street and 18 Nepean Street (the 'Entire Property'). The present-day commercial building at 200 Elgin Street was constructed in the mid-1960s and is proposed for conversion to residential land use; buildings and underground parking on the remainder of the Entire Site were constructed later and do not form a portion of the Phase Two Property.

It is understood that this Phase Two ESA is being completed in support of the redevelopment of the Site as a multi-unit residential building with commercial space on the main level. This represents a change to a more sensitive land use, and as such, a Record of Site Condition (RSC) is required under the Ontario Environmental Protection Act and Ontario Regulation (O. Reg.) 153/04 (as amended). Accordingly, this report has been prepared in general accordance with O. Reg. 153/04 (as amended).

McIntosh Perry conducted a Phase One ESA at the Phase Two Property (referred to as Phase One Property during the Phase One ESA), the findings of which are outlined in the draft report entitled "*Phase One Environmental Site Assessment, 200 Elgin Street, Ottawa, Ontario*", prepared for the Client and dated January 21, 2022 (2021 McIntosh Perry Phase One ESA). Based on the findings of the 2021 McIntosh Perry Phase One ESA, several Potentially Contaminating Activities (PCAs) were identified on the Phase One Property and within the Phase One Study Area including the presence of two (2) aboveground storage tanks on-Site, containing diesel fuel and associated with the backup generator, historic oil-fired boilers used for heating the Phase One Property, historic printing operation that occurred at the Phase One Property, and a 30 litre (L) oil spill, all of which are considered to represent on-Site PCAs resulting in Areas of Potential Environmental Concern (APECs). One off-Site PCA associated with past underground storage tanks which serviced a gasoline outlet and garage was considered to represent an APEC in relation to the Phase One Property.

Based on the above-noted APECs and their proximity to the Phase One Property, a Phase Two ESA was required before an RSC can be filled.

The Phase Two ESA involved drilling five (5) boreholes to a maximum depth of 4.57 metres below ground surface (mbgs) on the Phase Two Property, all of which were completed as groundwater monitoring wells. Select "worst case" soil samples collected from the Phase Two Property were submitted for laboratory analyses of volatile organic compounds (VOCs) and petroleum hydrocarbons (PHCs) in the F1 to F4 fraction ranges (F1-F4), including BTEX. Groundwater samples collected from the Phase Two Property were submitted for laboratory analyses of VOCs, PHCs (BTEX/F1-F4), and metals & inorganics.

The appropriate regulatory criteria were determined to be the standards outlined in Table 3 (medium-fine textured soils in a non-potable groundwater environment for residential/parkland/institutional land uses) in 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), dated April 15, 2011 (*Table 3 SCS*). All concentrations of analyzed parameters within the soil and groundwater samples submitted for laboratory analyses were below *Table 3 SCS.* As such, site condition standards are met for the Phase Two Property, and an RSC can be filed.

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2.0 INTRODUCTION

McIntosh Perry was retained by Mr. Michael Morin of Elgar Holdings Inc. (the 'Client') to conduct a Phase Two Environmental Site Assessment (ESA) for the property located at 200 Elgin Street, Ottawa, Ontario (the 'Phase Two Property' or 'Site'). The Phase Two Property is currently occupied by an eleven-storey commercial/office building with a one basement level containing office and storage space. The Phase Two Property represents a portion of a larger contiguous building and property with municipal addresses of 167, and 169 Lisgar Street and 18 Nepean Street (the 'Entire Property'). The present-day commercial building at 200 Elgin Street was constructed in the mid-1960s and is proposed for conversion to residential land use; buildings and underground parking on the remainder of the Entire Site were constructed later and do not form a portion of the Phase Two Property.

It is understood that this Phase Two ESA is being completed in support of the redevelopment of the Phase Two Property as a multi-unit residential building with commercial space on the main level. This represents a change to a more sensitive land use, and as such, a Record of Site Condition (RSC) is required under the Ontario Environmental Protection Act and Ontario Regulation (O. Reg.) 153/04 (as amended). Accordingly, this report has been prepared in general accordance with O. Reg. 153/04 (as amended).

McIntosh Perry conducted a Phase One ESA at the Phase Two Property (referred to as Phase One Property during the Phase One ESA), the findings of which are outlined in the draft report entitled "*Phase One Environmental Site Assessment, 200 Elgin Street, Ottawa, Ontario*", prepared for the Client and dated January 21, 2022 (2021 McIntosh Perry Phase One ESA). Based on the findings of the 2021 McIntosh Perry Phase One ESA, several Potentially Contaminating Activities (PCAs) were identified on the Phase One Property and within the Phase One Study Area including the presence of two (2) aboveground storage tanks on-Site, containing diesel fuel and associated with the backup generator, historic oil-fired boilers used for heating the Phase One Property, historic printing operation that occurred at the Phase One Property, and a 30 litre (L) oil spill, all of which are considered to represent on-Site PCAs resulting in Areas of Potential Environmental Concern (APECs). One off-Site PCA associated with past underground storage tanks which serviced a gasoline outlet and garage was considered to represent an APEC in relation to the Phase One Property.

Based on the above-noted APECs and their proximity to the Phase One Property, a Phase Two ESA was required before an RSC can be filled.

A Phase Two ESA is typically used to confirm the presence (or absence) of contaminant(s) of potential concern (COPCs) and to characterize impacts, if any, to soil and/or groundwater. The Phase Two ESA was conducted in accordance with McIntosh Perry's Standard Operating Procedures (SOPs).

2.1 Site Description

The Phase Two Property is located at 200 Elgin Street, in Ottawa, Ontario. The Phase Two Property is currently occupied by an eleven-storey commercial office building with one (1) basement level with office and storage space (the 'Phase Two Building' or 'Site Building'). The Site Building is currently utilized for commercial and multitenant office space. The Phase Two Property is bounded by 180 Elgin Street to the north, Elgin Street to the east, Lisgar Street to the south, and the remainder of the Entire Site (high-rise office and residential buildings with underground parking) to the west. The total area of the Phase Two Property is approximately 0.1303 hectares (ha).

The Phase Two Property is currently zoned as Traditional Mainstreet Zone (TM5 Subzone) as per the City of Ottawa Zoning By-Law Number 2008-250 sections 197-198.

The Site location is shown on Figure 1 (Site Location), the Site layout is shown on Figure 2 (Site Layout), and the Phase Two Study Area, including surrounding land use, is shown on Figure 3 (Phase Two Study Area).

2.1.1 Property Identification

The legal description of the Phase Two Property is as follows:

PT LT 55 S/S NEPEAN ST. AND PT LT 55 N/S LISGAR ST. AND ALL LTS 56 & 57 N/S LISGAR ST. ON PLAN 2996

PIN: 04115-0270 (LT) (Part)

The approximate UTM coordinates of the centre of the Site are zone 18 T, 445863.401 m E, 5029755.430 m N.

2.2 Property Ownership and Contact Details

McIntosh Perry was retained to complete this Phase Two ESA by Mr. Michael Morin of Elgar Holdings Inc. (the ‘Client’). McIntosh Perry’s primary contact for the Phase Two Property is Mr. Morin, who can be contacted by email at michaelmorin@districtrealty.com.

The current owner of the Phase Two Property is Elgar Holdings Inc.

2.3 Current and Proposed Future Uses

The interior of the Phase Two Property is currently occupied by commercial/multitenant office spaces with one (1) basement level. The layout of the Phase Two Property is shown on Figure 2 (Site Layout).

It is understood that this Phase Two ESA is being completed in relation to the proposed future use of the Phase Two Property as a residential building with commercial space on the main level. This represents a change to a more sensitive land use and, as such, an RSC is required prior to the redevelopment of the Phase Two Property in accordance with O. Reg. 153/04 (as amended).

2.4 Applicable Site Condition Standards

The following parameters were used to select the most appropriate Site Condition Standards (SCS) for the Phase Two Property:

- The intended future use of the Phase Two Property is residential;
- The Phase Two Property is serviced by the municipal water supply, which is obtained by the City of Ottawa from the Ottawa River, located approximately 1 kilometre (km) northwest of the Site, at its closest point. Therefore, non-potable groundwater standards are applicable to the Phase Two Property;

- Based on the drilling results of this Phase Two ESA, bedrock is situated greater than 2 mbgs at the Phase Two Property. As such, the Phase Two Property is not considered to be located in an area with shallow soil;
- The Phase Two Property is not located within 30 m of a water body. The Rideau Canal is the nearest water body and is located approximately 400 m northeast of the Site, at its closest point;
- The Phase Two Property is not located within, adjacent to, or within 30 m of any areas of natural significance (e.g., Provincially Significant Wetland, Area of Natural and Scientific Interest, etc.);
- Analytical results obtained during this Phase Two ESA indicated that surficial soil at the Site has a pH value between 5 and 9 and subsurface soil has a pH value between 5 and 11. Therefore, the Phase Two Property is not considered an "environmentally sensitive area", as per section 41 of O. Reg. 153/04; and
- Based on grain size analysis results obtained during this Phase Two ESA, native soil at the Phase Two Property was determined to be fine textured.

Given the above-noted information, it was determined that the applicable Ontario Ministry of the Environment, Conservation and Parks (MECP) SCS are those outlined in Table 3 (medium-fine textured soils in a non-potable groundwater environment for residential/parkland/institutional property use) in the document entitled "*Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*" prepared by the former Ontario Ministry of the Environment (present-day MECP), dated April 15, 2011 (*Table 3 SCS*).

3.0 BACKGROUND INFORMATION

3.1 Physical Setting

3.1.1 Water Bodies and Areas of Natural Significance

No water bodies are located within the Phase Two Study Area. The closest permanent waterbody to the Phase Two Property is the Rideau Canal, located approximately 400 m northeast of the Site at its closest point. Additionally, the Ottawa River is located approximately 1 km northwest of the Site, at its closest point.

When completing the 2021 McIntosh Perry Phase One ESA, considerations were made for the following Ministry of Northern Development, Mines, Natural Resources and Forestry (MNRF)-maintained areas of natural significance:

- Provincial Parks and Conservation Reserves;
- Areas of Natural and Scientific Interest (ANSIs);
- Provincially Significant Wetlands (PSWs);
- Areas identified by the MNRF as a significant habitat of a threatened or endangered species or area of habitat of a species classified under section 7 of the Endangered Species Act; and
- Areas set apart under the Wilderness Areas Act.

No areas of natural significance were identified within the Phase Two Study Area. The Phase Two Property is also not located within 250 m of any areas of natural significance identified within the City of Ottawa's Official Plan.

3.1.2 Topography and Surface Water Drainage Features

The elevation of the Phase Two Property is approximately 72 m above sea level (masl). The Phase Two Property is relatively flat.

Surface water drainage at the Phase Two Property consists of sheet flow to municipal catch basins located along Elgin Street and Lisgar Street. The topography of the Phase Two Property and surrounding area is shown on Figure 4 (Drainage and Topograpy).

3.1.3 Potable Water Source

The Phase Two Property and properties within the Phase Two Study Area are situated in the City of Ottawa. It is our understanding that the Phase Two Property and other properties within the Phase Two Study Area are currently serviced by the City of Ottawa's municipal water supply system. The Phase Two Property is located within the Mississippi-Rideau Source Water Protection Region under the City of Ottawa but is not located within the capture zone of any water supply wells. Potable water is obtained by the City of Ottawa from the Ottawa River, located approximately 1 km northwest of the Site; groundwater is not used as a source of potable water.

During the Site reconnaissance conducted by McIntosh Perry for the 2021 Phase One ESA, potable water wells were not observed on the Phase Two Property or on properties within the Phase One Study Area.

3.1.4 Hydrology

The Phase Two Property occurs within the Rideau Falls – Rideau River watershed. The Ottawa River is located approximately 1 km northwest of the Site, and the Rideau Canal is located approximately 400 m northeast of the Site, at their closest points. No additional water bodies are located within the Phase Two Study Area.

3.1.5 Geology and Hydrogeology

Geological maps of the area classify the overburden at the Site as fine-textured glaciomarine deposits of massive to well-laminated silt and clay with minor sand and gravel (OGS, 2019).

Geological maps of the area classify the bedrock under the Site as part of the Georgian Bay/Blue Mountain/Billings Formation consisting predominantly of shale, limestone, dolostone, and siltstone (OGS, 2019).

Groundwater at the Site is inferred to flow southwest based on a groundwater contour map prepared for the Site. Further details are provided in Section 6.2 of this report.

3.2 Past Investigations

3.2.1 *"Phase One Environmental Site Assessment, 200 Elgin, Ottawa, Ontario",* prepared by Mcintosh Perry, dated February 2, 2022

Mcintosh Perry completed a Phase One ESA in 2022 in accordance with O. Reg. 153/04 – Records of Site Condition and the Canadian Standards Association (CSA), Z768-01: Phase I Environmental Site Assessment, CSA International, Toronto, 2001 (Updated 2003, Reaffirmed 2016). The Phase One ESA consisted of a Site reconnaissance and a review of historical and regulatory information for the Phase One Property.

The Phase One Building was occupied by commercial/office space, including a Royal Bank of Canada located on the main floor, as well as one (1) basement level. Additionally, a diesel generator was observed on the eleventh floor and two diesel above ground storage tanks (ASTs) were observed in the penthouse, as well as the basement level of the portion of the building immediately west of the Phase Two Property.

Based on a review of historical records, one off-Site PCA representing an APEC in relation to the Site was identified within the Phase One Study Area. This PCA was associated with a historic gasoline outlet and a garage located north adjacent to the Site. The following on-Site PCAs were considered to represent APECs in relation to the Site:

- Historic oil-fired boilers used for heating the Site building;
- Historic printing operations that occurred at the Site;
- Historic 30-L oil spill that occurred at the Site;
- Day tank containing diesel fuel for diesel generator in penthouse; and

- Aboveground storage tank containing diesel fuel for penthouse generator, immediately adjacent to Site to the west.

Based on the above-noted APECs and their proximity to the Site, a Phase Two ESA was recommended before an RSC can be filled for the Site.

4.0 SCOPE OF INVESTIGATION

4.1 Overview of Site Investigation

The Phase Two ESA Site investigation at the Phase Two Property consisted of the following components:

- Underground service locate clearance was provided by public utility service through Ontario One Call and a private utility locating service (Ottawa Locates);
- The advancement of five (5) boreholes at the Phase Two Property to a maximum depth of 4.57 mbgs, all of which were completed with monitoring wells by a licensed water well contractor in accordance with O. Reg. 903;
- Submission of select "worst case" soil samples collected from each borehole, as determined through field screening, for laboratory analyses of Volatile Organic Compounds (VOCs) and Petroleum Hydrocarbons (PHCs);
- Submission of groundwater samples collected from each monitoring well for laboratory analyses of VOCs, PHCs, and metals & inorganics;
- Submission of representative soil samples for analyses of pH and grain size for determination of the appropriate MECP SCS for the Phase Two Property;
- Completion of a quality assurance/quality control (QA/QC) program consisting of the submission of field duplicate samples; and
- Completion of a relative elevation survey of the ground surface elevation of each borehole advanced at the Phase Two Property.

The Phase Two ESA was completed in accordance with the requirements of O. Reg. 153/04 (as amended).

4.2 Media Investigated

Soil samples were obtained from each borehole advanced during the investigation and select "worst case" samples were submitted for laboratory analyses of the selected COPCs. Each borehole was instrumented with a monitoring well and groundwater was subsequently sampled for each of the selected COPCs.

No water bodies were present on the Phase Two Property and, as such, no sediment samples were collected as part of this Phase Two ESA.

4.2.1 Contaminants of Potential Concern

Based on the nature of the APECs identified at the Phase Two Property, the following COPCs were identified:

- VOCs – this parameter group consists of several volatile parameters, including chlorinated solvents, benzene, toluene, ethylbenzene and xylenes (BTEX). VOCs were selected as a COPC for the Site due to the historic gasoline outlet and garage north adjacent to the Phase Two Property, the historic presence of printing operations, a historic 30-L oil spill, and the ASTs containing diesel fuel used for the generator on the Phase Two Property;

- PHCs (F1-F4) – this parameter group includes hydrocarbon chains of various lengths associated with gasoline (F1), diesel and kerosene (F2), and heavy oils (F3 and F4). PHCs (F1-F4) were selected as a COPC for the historic gasoline outlet and garage north adjacent to the Entire Property, a historic 30-L oil spill, and the ASTs containing diesel fuel used for the generator on the Phase Two Property; and
- Metals and inorganics (M&I), including metals, hydride-forming metals, and other regulated parameters – this parameter group includes metals such as arsenic, antimony, selenium, boron, mercury, and chromium IV. Metals were selected as a COPC for the Site due to the historic gasoline outlet and garage north adjacent to the Phase Two Property and the potential historical presence of leaded fuel.

4.3 Phase One Conceptual Site Model

During the 2021 McIntosh Perry Phase One ESA, a Phase One Conceptual Site Model (CSM) was developed. A Phase One CSM provides a summary of environmental conditions at the Site, as identified through the completion of a Phase One ESA. The purpose of the CSM is to identify the location and nature of all PCAs within the Phase One Study Area, including the Phase One Property, and to determine whether these PCAs result in APECs in relation to the Phase One Property. The Phase One CSM presents the following information:

- The locations of existing buildings and structures;
- The location of any water bodies within the Phase One Study Area;
- The locations of any areas of natural significance within the Phase One Study Area;
- The locations of any potable drinking water wells on the Phase One Property;
- Roads within the Phase One Study Area;
- Uses of properties within the Phase One Study Area outside of the Phase One Property;
- Areas where any PCAs have occurred within the Phase One Study Area; and
- The locations of APECs on the Phase One Property.

The following subsections provide a discussion of the information presented in Figures 1 through 6.

4.3.1 Phase One Property and Phase One Study Area

The Phase One Property consists of an approximate 0.1303 ha property located at 200 Elgin, in Ottawa, Ontario. The Site is developed with an eleven-storey commercial/office building with one (1) basement level. The Site is bounded by commercial properties to the north and west, Elgin Street to the East, and Lisgar Street to the south.

The location of the Phase One Property is shown on Figures 1 and 2 and the Phase One Study Area is shown on Figure 3.

4.3.2 Existing Buildings and Structures on the Phase One Property

4.3.2.1 Structures and Other Improvements

The Phase One Property is developed with an eleven-storey commercial/office building with one (1) basement level. A plan of the Phase One Property layout is provided as Figure 2.

4.3.2.2 Below Ground Structures

A basement level is present at the Phase One Building.

4.3.3 Water Bodies

No water bodies are located within the Phase One Study Area. The closest permanent waterbody to the Phase One Property is the Rideau Canal (located approximately 400 m northeast of the Site at its closest point) which flows north towards the Ottawa River which is located approximately 1 km north of the Site, at its closest point.

The location of the Phase One Study Area relative to the closest permanent water bodies is presented on Figure 4.

4.3.4 Areas of Natural Significance

When completing the 2021 McIntosh Perry Phase One ESA, considerations were made for the following MNRF-maintained areas of natural significance:

- Provincial Parks and Conservation Reserves;
- Areas of Natural and Scientific Interest (ANSIs);
- Provincially Significant Wetlands (PSWs);
- Areas identified by MNRF as significant habitat of a threatened or endangered species or areas of habitat of a species classified under section 7 of the Endangered Species Act; and
- Areas set apart under the Wilderness Areas Act.

No areas of natural significance were identified within the Phase One Study Area. The Phase One Property is also not located within 250 m of any areas of natural significance identified within the City of Ottawa's Official Plan.

Based on our review of the above-noted information, it was determined that the Phase One Property is not located in or within 30 m of an area of natural and scientific interest and, as such, the Phase One Property is not located within an environmentally sensitive area.

4.3.5 Potable Water Wells

The Phase One Property and properties within the Phase One Study Area are situated in the City of Ottawa. It is our understanding that the Phase One Property and other properties within the Phase One Study Area are currently serviced by the City of Ottawa's municipal water supply system. Potable water is obtained by the City of Ottawa from the Ottawa River, located approximately 1 km northwest of the Site; groundwater is not used as a source of potable water.

No potable water wells were observed on the Phase One Property or within the Phase One Study Area during the Site reconnaissance. As part of this Phase One ESA, McIntosh Perry reviewed well records within the Phase One Study Area, as identified in the Water Well Information System (WWIS) database searched by ERIS. The search results did not indicate the presence of wells on the Phase One Property; however, fourteen (14) well records were listed within Phase One Study Area. The wells were listed as monitoring or abandoned and unused.

4.3.6 Potentially Contaminating Activities

A total of twenty (20) PCAs were identified within the Phase One Study Area, six (6) of which were considered to be APECs in relation to the Phase One Property. The PCAs are outlined in the Table below.

Potentially Contaminating Activities						
No.	**Potential Contaminating Activity (PCA)**	**Location of PCA**	**Proximity of PCA to Phase One ESA Property**	**Time Frame Associated with PCA**	**Information Source**	**Does the PCA warrant an Area of Potential Environmental Concern (APEC)**
1	#28 Gasoline and Associated Products Storage in Fixed Tanks Oil fired boilers	On-Site	On-Site	Historic	FIPs	**Yes, occurred on Site**
2	Other (Not Listed) Spill – Oil to ground	On-Site	On-Site	Historic	ERIS	**Yes, occurred on Site**
3	#31 Ink Manufacturing, Processing and Bulk Storage	On-Site	On-Site	Historic	ERIS	**Yes, occurred on Site**
4	#28 Gasoline and Associated Products Storage in Fixed Tanks Day tank and connected generator in penthouse	On-Site	On-Site	Historic/Current	Site Visit	**Yes, due to location on-Site**

Potentially Contaminating Activities						
No.	**Potential Contaminating Activity (PCA)**	**Location of PCA**	**Proximity of PCA to Phase One ESA Property**	**Time Frame Associated with PCA**	**Information Source**	**Does the PCA warrant an Area of Potential Environmental Concern (APEC)**
5	#28 Gasoline and Associated Products Storage in Fixed Tanks 900-L Diesel tank supplying generator	Off-Site	Immediately adjacent to west	Historic/Current	Site Visit	**Yes, due to proximity to the Site**
6	#28 Gasoline and Associated Product Storage in Fixed Tanks Off-Site automotive garage	196 Elgin Street	North adjacent of property	Historic	FIPs, ERIS, Aerials	**Yes, due to proximity to the Site**
7	#42 Pharmaceutical Manufacturing and Processing	Corner of Elgin and Maria Street (Present day Laurier Street)	Approximately 200 m northeast of Site	Historic	FIPs	**No, due to location**
8	#37 Operation of Dry-Cleaning Equipment (where chemicals are used)	34A Nepean Street	Approximately 35 m northwest of Site	Historic	FIP	**No, due to distance and down-gradient location from the Site**
9	#28 Gasoline and Associated Product Storage in Fixed Tanks	170 Elgin Street	Approximately 55 m north of the Site	Historic	FIP	**No, due to distance and down-gradient location from the Site**

Potentially Contaminating Activities						
No.	**Potential Contaminating Activity (PCA)**	**Location of PCA**	**Proximity of PCA to Phase One ESA Property**	**Time Frame Associated with PCA**	**Information Source**	**Does the PCA warrant an Area of Potential Environmental Concern (APEC)**
10	#10 Commercial Autobody Shops Off-Site automotive garage	15 Gloucester Street	Approximately 95 m north of the Site	Historic	FIP	**No, due to distance and down-gradient location from the Site**
11	Other (Not Listed) PCBs	180 Elgin Street	Immediately north of the Site	Historic/Current	ERIS	**No, due to down-gradient location of PCA**
12	#51 Solvent Manufacturing, Processing and Bulk Storage	180 Elgin Street	Immediately north of the Site	Historic	ERIS	**No, due to down-gradient location of PCA**
13	Other (Not Listed) Spill – Hydraulic oil to ground	160 Elgin Street	Immediately north of the Site	Historic	ERIS	**No, due to down-gradient location of PCA**
14	Other (Not Listed) Spill – Hydraulic oil to ground	Corner of Gloucester Road and Elgin Street	Approximately 85 m north of the Site	Historic	ERIS	**No, due to distance and down-gradient location of PCA from the Site**
15	Other (Not Listed) Spill – Diesel to ground	161 Elgin Street	Approximately 70 m northeast of the Site	Historic	ERIS	**No, due to distance and down-gradient location from the Site**

Potentially Contaminating Activities						
No.	**Potential Contaminating Activity (PCA)**	**Location of PCA**	**Proximity of PCA to Phase One ESA Property**	**Time Frame Associated with PCA**	**Information Source**	**Does the PCA warrant an Area of Potential Environmental Concern (APEC)**
16	Other (Not Listed) Spill – Electrical Oil	161 Elgin Street	Approximately 70 m northeast of the Site	Historic	ERIS	**No, due to distance and down-gradient location from the Site**
17	#1 Acid and Alkali Manufacturing, Processing and Bulk Storage #8 Chemical Manufacturing, Processing and Bulk Storage #39 Paints Manufacturing, Processing and Bulk Storage	161 Elgin Street	Approximately 70 m northeast of the Site	Historic	ERIS	**No, due to distance and down-gradient location from the Site**
18	#37 Operation of Dry-Cleaning Equipment (where chemicals are used)	268 Elgin Street	Approximately 190 m south of Site	Historic	ERIS	**No, due to distance from the Site**
19	#28 Gasoline and Associated Products Storage in Fixed Tanks	280 Elgin Street	Approximately 185 m south of Site	Historic	ERIS	**No, due to distance from the Site**
20	#28 Gasoline and Associated Products Storage in Fixed Tanks	280 Elgin Street	Approximately 185 m south of Site	Historic	ERIS	**No, due to distance from the Site**

The locations of the PCAs are shown on Figure 5 (Potentially Contaminating Activities).

4.3.7 Areas of Potential Environmental Concern and Contaminants of Potential Concern

A total of six (6) APECs were identified as part of the Phase One ESA. These APECs and their associated COPCs are outlined in the Table below.

Areas of Potential Environmental Concern					
Area of Potential Environmental Concern (APEC)	**Location of APEC on Phase One Property**	**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	Southwest corner of property	#28 Gasoline and Associated Products Storage in Fixed Tanks Oil-Fired Boilers	On-Site	PHCs, BTEX	Soil and Groundwater
APEC-2	Unknown	#31 Ink Manufacturing, Processing and Bulk Storage	On-Site	VOCs	Soil and Groundwater
APEC-3	Unknown	Other (Not Listed) Spill – Oil to ground	On-Site	PAHs, PHCs	Soil and Groundwater
APEC-4	Southwest corner of property	#28 Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs, BTEX	Soil and Groundwater
APEC-5	Southwest corner of property	#28 Gasoline and Associated Products Storage in Fixed Tanks	Off-site (167 Lisgar Street)	PHCs, BTEX	Groundwater
APEC-6	Northeast corner of property	#28 Gasoline and Associated Product Storage in Fixed Tanks #10 Commercial Autobody Shops (off-Site automotive garage)	Off-Site 196 Elgin Street	PHCs, BTEX, Metals, VOCs	Groundwater

The locations of the APECs are shown on Figure 6 (Areas of Potential Environmental Concern).

4.3.8 Underground Utilities

During the Site reconnaissance, several underground utilities were noted be likely present at the Site including, but not limited to, municipal water and sewer services, electricity, natural gas and telecommunications services. The locations and depths of these underground utilities were not determined as part of this Phase One ESA. In general, underground service trenches have the potential to act as preferential contaminant transport pathways; however, no Site-specific concerns regarding underground utility service trenches were identified.

4.3.9 Geology

4.3.9.1 Surficial Geology

Geological maps of the area classify the overburden at the Site as fine-textured glaciomarine deposits of massive to well-laminated silt and clay with minor sand and gravel (OGS, 2019).

4.3.9.2 Bedrock Geology

Geological maps of the area classify the bedrock under the Site as part of the Georgian Bay/Blue Mountain/Billings Formation consisting predominantly of shale, limestone, dolostone, and siltstone (OGS, 2019).

4.3.10 Hydrogeology

The Site occurs within the Rideau Falls – Rideau River watershed. The Rideau Canal is located approximately 400 m northeast of the Site and the Ottawa River is located approximately 1 km northwest of the Site, at their closest points. Site drainage is presumed to consist of overland flow to municipal storm sewers along Elgin and Lisgar Street.

4.3.11 Validity of Conceptual Site Model

During the Phase One ESA, McIntosh Perry obtained and reviewed all readily available historical and regulatory information available. In our review of the information, no data gaps that would question the validity of this CSM were identified.

4.4 Deviations from Sampling and Analysis Plan

The field investigation and sampling program was carried out in general accordance with the requirements of the Sampling and Analysis Plan (SAP) in Appendix A. However, it is noted that soil samples were not analyzed for metals and inorganics.

Select "worst case" soil samples from each borehole were submitted for laboratory analyses of PHCs (BTEX/F1-F4) and VOCs (including BTEX), and M&I. McIntosh Perry requested that soil samples submitted for M&I be kept on hold by AGAT Laboratories under a Long-Term Storage Agreement until groundwater samples could be collected and analyzed. Groundwater samples were submitted for laboratory analyses of PHCs (BTEX/F1-F4), VOCs, and M&I. As M&I were only considered contaminants of concern in groundwater due to the potential of leaded gasoline at the off-Site historic retail fuel outlet to the north, if concentrations of M&I in groundwater samples exceeded the selected Site Condition Standards, the soil samples on hold would be analyzed for M&I. However, no exceedances for M&I were detected in groundwater samples, and as such, no M&I analyses were conducted on the select "worst case" soil samples.

No additional deviations occurred from the initial scope of work in the SAP.

4.5 Impediments

No physical impediments or denial of access were encountered during this Phase Two ESA.

5.0 INVESTIGATION METHOD

5.1 General

The APECs identified during the 2021 McIntosh Perry Phase One ESA were investigated through the advancement of five (5) boreholes in the basement level of the Phase Two Property: two (2) boreholes were drilled near the southwestern section of the Phase Two Property (BH3(MW) and BH4(MW)), two (2) boreholes were drilled on the northeastern section of the Phase Two Property (BH1(MW) and BH2(MW)), and one (1) borehole was drilled near the southeast section of the Phase Two Property (BH5(MW)). Borehole and monitoring well locations are presented in Figure 7 (Borehole and Monitoring Well Location Plan). A description of this investigation is provided in the following subsections.

5.2 Drilling and Excavating

On February 9, 10, and 11, 2022, Strata Drilling Group (Strata) advanced five (5) boreholes at the Phase Two Property under the supervision and direction of McIntosh Perry personnel. The boreholes were advanced using an electric Hilti drill equipped with a diamond coring bit and a Pionjar electric portable drill to a maximum depth of 4.57 mbgs.

Soil samples were collected from each borehole at continuous intervals. Soil samples were obtained from each borehole using single-use disposable polyvinyl chloride (PVC) liners.

The borehole locations are provided on Figure 7. Monitoring well construction details are provided on the borehole logs in Appendix B and in Table 1.

5.3 Soil: Sampling

Soil samples were collected from each of the five (5) boreholes advanced at the Site. Each soil sample was retrieved from the single-use PVC liners using single-use nitrile gloves and placed directly into Ziploc bags for field screening. Based on the results of field screening, two selected “worse case” soil samples from each borehole were transferred from the Ziploc bags into laboratory-supplied containers using single-use nitrile gloves, then stored on ice within coolers. The selected “worst case” soil samples were submitted for laboratory analyses of PHCs (BTEX/F1-F4) and VOCs.

Under the concrete floor slab of the basement level, the overburden/subsurface materials at the Phase Two Property generally consisted of silty clay materials that extended to the maximum borehole completion depth of 4.57 mbgs. Bedrock and fill material were not encountered as part of this drilling program. A detailed description of the stratigraphy encountered at the Phase Two Property is provided on the borehole logs in Appendix B.

5.4 Field Screening Measurements

Soil headspace vapour concentration readings of soil samples obtained from the boreholes were taken using an RKI Eagle 2 gas meter, which is a combined combustible gas indicator (CGI) and photoionization detector

(PID). The CGI was operated in methane elimination mode and calibrated to hexane, and the PID was calibrated to isobutylene.

The CGI component of the RKI Eagle 2 detected petroleum-based vapours and the PID component of the RKI Eagle 2 detected VOC-based vapours. The RKI Eagle 2 has an accuracy of +/- 25 parts per million by volume (ppm_v) or +/- 5% of the reading (whichever is greater). The RKI Eagle 2 was calibrated prior to use in the field by the equipment supplier (i.e., Maxim Environmental and Safety Inc.), following the manufacturer's specifications.

The field screening measurements were used to direct the selection of "worst case" soil samples for laboratory analyses. Vapour readings ranged from 0 parts per million (ppm) to 65 ppm on the CGI and 1 ppm to 15 ppm on the PID.

5.5 Ground Water: Monitoring Well Installation

A total of five (5) monitoring wells were installed on February 9, 10, and 11, 2022, by Strata, under the supervision of McIntosh Perry personnel.

The groundwater monitoring wells were instrumented with 1.25-inch (32 millimetre) diameter PVC monitoring well components and sealed at the surface with a lockable J-plug and a steel flush-mount casing.

The wells were constructed using Schedule 40 PVC well screen (10 slot), flush-threaded to Schedule 40 PVC riser pipe. A silica sand 'filter pack' was installed in the annular space around the well screen. A bentonite clay seal was installed above the screened interval to prevent infiltration of surface water into the well. Monitoring well installation was conducted in accordance with O. Reg. 903 (as amended).

To ensure the collection of representative groundwater samples prior to sampling, each monitoring well was developed using dedicated positive displacement pumps consisting of polyethylene tubing. Each monitoring well was purged of a minimum of three well volumes on February 25, 2022, where possible.

Monitoring well construction details are provided on the borehole logs included in Appendix B and in Table 1.

5.6 Ground Water: Field Measurement of Water Quality Parameters

During the groundwater sampling event on February 25, 2022, physical parameter measurements (i.e., dissolved oxygen, turbidity, pH, temperature, specific conductance, and oxidation/reduction potential) were monitored during purging activities. These parameters were collected using a Hanna multi-parameter water quality meter. Upon stabilization of these parameters in groundwater purged from the monitoring wells, groundwater samples were collected.

5.7 Ground Water: Sampling

McIntosh Perry carried out groundwater monitoring and sampling activities on February 25 and 28, and March 1, 2022, a week after the wells had been installed. Prior to collecting samples, the static water level was measured at each well using an electronic water level tape. The range for static groundwater level was found to be between 0.988 and 2.740 mbgs relative to the basement concrete floor slab. Groundwater levels are summarized in Table 2.

The groundwater monitoring wells were purged a minimum of three well volumes to ensure the groundwater samples were representative of on-Site groundwater conditions. Groundwater samples were collected directly into laboratory-supplied bottles and jars using a peristaltic pump, stored in a cooler with ice, and submitted for analyses of PHCs (BTEX/F1-F4), VOCs, and M&I.

Groundwater sampling was completed in general accordance with MECP's "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario" (May 1996) and McIntosh Perry's internal SOPs.

5.8 Sediment: Sampling

No water bodies are present on the Phase Two Property. As such, sediment sampling was not conducted as part of this Phase Two ESA.

5.9 Analytical Testing

All soil and groundwater samples selected for laboratory analyses were submitted to AGAT Laboratories (AGAT), based out of Mississauga, Ontario, under strict Chain of Custody documentation protocols.

The laboratory used for this investigation, AGAT, is accredited by the Standards Council of Canada and the Canadian Association for Laboratory Accreditation, in accordance with the international standard ISO/IEC 17025:2017 and ISO 9001:2015 – *General Requirements for the Competence of Testing and Calibration Laboratories*. AGAR is accredited for analysis of all parameters required under the O. Reg. 153/04 – RSC, as outlined in the MECP Technical Update entitled '*Laboratory Accreditation Requirements Under the New Record of Site Condition Regulation (O. Reg. 153/04)*'.

Soil and groundwater analytical results are presented in Tables 3 and 4, respectively. Maximum concentration data of parameters analysed in soil and groundwater are presented in Tables 5 and 6, respectively. Laboratory Certificates of Analysis are presented in Appendix C.

5.10 Residue Management Procedures

Soil cuttings and purged groundwater generated as part of this Phase Two ESA were stored within five (5) 5-gallon buckets on the Phase Two Property. Arrangements are to be made to have the soil cuttings and purged groundwater removed for off-Site disposal at a registered waste disposal site by a licensed third-party waste hauler. No other wastes were generated as part of this Phase Two ESA that would require management.

5.11 Elevation Surveying

A relative elevation survey of the ground surface of each borehole/monitoring well was conducted using Spectra Precision 3000 surveying equipment during the initial groundwater sampling event on February 25, 2022. The benchmark for the elevation survey was the top of a floor drain cover located in the basement level of the Phase Two Property, approximately 5 m east from BH4(MW), and was assigned an assumed elevation of 100 m relative elevation (mREL).

5.12 Quality Assurance and Quality Control Measures

Soil samples collected as part of this Phase Two ESA were directly deposited into the following laboratory-supplied containers:

- PHCs (F1-F4) and VOCs – one (1) 40 millilitre (mL) glass vial preserved with methanol, and with a corresponding Terra Core Sampler, and one (1) 120 mL glass vial; and
- Metals & inorganics – one (1) plastic bag.

Groundwater samples collected as part of this Phase Two ESA were directly deposited into the following laboratory-supplied containers:

- PHCs (F1-F4)/BTEX – two (2) 100 mL amber glass bottles preserved with hydrochloric acid, and three (3) 40 mL amber glass vials preserved with sodium bisulfate;
- VOCs – three (3) 40 mL amber glass vials preserved with sodium bisulfate; and
- Metals & inorganics – one (1) 120 mL plastic bottle preserved with ammonia (field filtered), one (1) 60 mL plastic bottle preserved with nitric acid (field filtered), one (1) 250 mL plastic bottle with no preservative, two (2) 40 mL amber glass vials preserved with hydrochloric acid, and one (1) 60 mL plastic bottle preserved with sodium hydroxide.

Field duplicates of soil sample BH2(MW) SS5 (BH2(MW)-DUP) and groundwater sample BH3(MW) (BH3(MW)-DUP) were collected as part of the Phase Two ESA sampling for QA/QC purposes. Upon collection, each sample was stored on ice within a cooler and delivered directly to AGAT for analysis. All soil and groundwater samples submitted as part of this assessment were handled in accordance with laboratory analytical protocols with respect to holding time, preservation method, storage requirements, and container type. Certificates of Analysis were received for the samples submitted for analysis and are appended to this report.

All non-dedicated equipment used during soil and groundwater sampling (e.g., water level tape, measuring tape, etc.) were cleaned between sampling with a mixture of Alconox® and water. Additionally, prior to use on-Site, the RKI Eagle 2 and Hanna multi-parameter water quality meter used as part of this Phase Two ESA were calibrated to manufacturer specifications by the equipment supplier (Maxim Environmental and McIntosh Perry). Given the limited nature of the field program (i.e., one to three days per use of each piece of equipment), further calibration checks on this equipment were not deemed to be necessary.

No additional deviations beyond those mentioned in Section 4.4 were made from the QA/QC program outlined in the Sampling and Analysis Plan.

6.0 REVIEW AND EVALUATION

6.1 Geology

Soil stratigraphy observed during the Phase Two ESA is summarized in the Table below.

Stratigraphy at the Phase Two Property			
Stratigraphic Unit	Thickness (m)	Top Elevation (mREL)	Bottom Elevation (mREL)
Concrete Slab	0.25 to 1.31	100.04 to 100.14	98.75 to 99.66
Silty Clay	3.26 to 4.32	98.75 to 99.66	95.47-95.57

The unconfined aquifer at the Phase Two Property is considered to consist of silty clay. Although silty clay is of generally low hydraulic conductivity, it is interpreted to function as a shallow aquifer in this case, as the low hydraulic conductivity is interpreted to limit downward migration of contamination to underlying aquifer units. Groundwater was detected within all monitoring wells installed at depths of 4.57 mbgs. Groundwater was detected at depth ranging between 0.99 and 2.74 mbgs.

Given that all concentrations of analyzed parameters within groundwater were below the *Table 3 SCS*, it was McIntosh Perry's opinion that evaluation of groundwater within additional aquifers was not warranted during this Phase Two ESA.

6.2 Ground Water: Elevations and Flow Direction

Five (5) monitoring wells were installed on the Phase Two Property and were screened within the saturated silty clay unit, representing the unconfined aquifer at the Site to determine if the APECs identified had impacted the groundwater on the Site.

No visual or olfactory observations of impacts were noted within the groundwater samples collected from the Phase Two Property. Light non-aqueous phase liquids and dense non-aqueous phase liquids were not detected during monitoring activities conducted at the Phase Two Property.

Static water levels were measured using a water level tape during the sampling event on February 25, 2022. The groundwater elevations at the Site varied between 97.303 metres relative to the surveying benchmark (MREL) at monitoring well BH4(MW) and 99.092 mREL at monitoring well BH2(MW).

Based on the groundwater elevations measured during this Phase Two ESA, groundwater is interpreted to flow towards the southwest.

The groundwater elevations and inferred groundwater flow directions are presented on Figure 8.

6.3 Ground Water: Hydraulic Gradients

The horizontal hydraulic gradient was estimated for the water table of the aquifer based on the groundwater elevations measured on February 25, 2022.

The horizontal hydraulic gradient is calculated using the following equation:

$i = \Delta h/\Delta s$

Where,

i = horizontal hydraulic gradient

Δh (m) = groundwater elevation difference; and,

Δs (m) = separation distance.

The horizontal hydraulic gradient was calculated to be approximately 0.034 m/m, indicating that the groundwater generally flows in a southwesterly direction.

Given that all concentrations of analyzed parameters within the groundwater samples obtained as part of this Phase Two ESA were below the *Table 3 SCS*, vertical hydraulic gradients were not evaluated as part of this Phase Two ESA.

6.4 Fine-Medium Soil Texture

One (1) grain size sample (GSA-COMP) was submitted for laboratory analysis. The sample was selected as it appeared to be representative of native subsurface material observed within the boreholes advanced at the Phase Two Property.

As per O. Reg. 153/04 (as amended), medium and fine textured soil consists of at least 50% by mass of particles that are smaller than 75 micrometres in diameter. Results of the grain size analyses classified the soil as fine-grained within soil sample GSA-COMP, considered representative of the silty clay material at the Site. Based on the results of grain size analysis conducted during this Phase Two ESA, as well as the soil type observed within the boreholes advanced at the Phase Two Property, it is our opinion that the soil type at the Phase Two Property is fine-grained for the purposes of this Phase Two ESA.

6.5 Soil: Field Screening

Soil headspace vapour concentration readings of soil samples obtained from the boreholes were taken using a RKI Eagle 2 gas meter, which is a combined CGI and PID. During field screening conducted as part of this Phase Two ESA, vapour readings ranged from 0 ppm to 65 ppm on the CGI and 1 ppm to 15 ppm on the PID. Visual and olfactory evidence of PHC impacts were visible on soil sample BH2(MW) SS1. A slightly organic odour was detected on BH3(MW), BH4(MW), and BH5(MW). No additional visual or olfactory evidence of impacts (e.g., staining or odours) were observed within the soil samples collected as part of the field program. Based on the results of field screening, “worst case” soil samples were chosen based on the inferred contaminant depth.

A summary of the vapour readings collected as part of this Phase Two ESA are provided on the borehole logs in Appendix B.

6.6 Soil Quality

The soil samples submitted for laboratory analyses were as follows:

Summary of Soil Samples Submitted for Laboratory Analysis			
Borehole ID	Soil Sample ID	Soil Sample Depth Interval (m bgs)	Parameters Analyzed
BH1(MW)	SS1	0.48 – 0.90	PHCs (BTEX/F1-F4) and VOCs
BH1(MW)	SS5	3.60 – 4.57	PHCs (BTEX/F1-F4) and VOCs
BH2(MW)	SS1	0.25 – 0.90	PHCs (BTEX/F1-F4) and VOCs
BH2(MW)	SS5	3.60 – 4.57	PHCs (BTEX/F1-F4) and VOCs
Duplicate of BH2(MW)-SS5	BH2(MW)-DUP	3.60 – 4.57	PHCs (BTEX/F1-F4) and VOCs
BH3(MW)	SS1	1.10 – 1.80	PHCs (BTEX/F1-F4) and VOCs
BH3(MW)	SS4	3.60 – 4.57	PHCs (BTEX/F1-F4) and VOCs
BH4(MW)	SS1	1.04 – 1.80	PHCs (BTEX/F1-F4) and VOCs
BH4(MW)	SS4	3.60 – 4.57	PHCs (BTEX/F1-F4) and VOCs
BH5(MW)	SS1	1.04 – 1.80	PHCs (BTEX/F1-F4) and VOCs

Summary of Soil Samples Submitted for Laboratory Analysis			
Borehole ID	**Soil Sample ID**	**Soil Sample Depth Interval (m bgs)**	**Parameters Analyzed**
BH5(MW)	SS4	3.60 – 4.57	PHCs (BTEX/F1-F4) and VOCs

These samples were selected as "worst case", based on the results of field screening and on anticipated contaminant depth. The analytical results are presented in Table 3 of this report and are summarized in the following subsections.

PHCs (BTEX/F1-F4)

All concentrations of PHCs (BTEX/F1-F4) within the soil samples submitted for laboratory analysis were in compliance with *Table 3 SCS*.

VOCs

All concentrations of VOCs within the soil samples submitted for laboratory analysis were in compliance with *Table 3 SCS*.

6.7 Groundwater Quality

The groundwater samples submitted for laboratory analyses were as follows:

Summary of Ground Water Samples Submitted for Laboratory Analysis			
Borehole/Well ID	**Groundwater Sample ID**	**Date Collected**	**Parameters Analyzed**
BH1(MW)	BH1(MW)	February 28, 2022	PHCs (BTEX/F1-F4), VOCs, M&I
BH2(MW)	BH2(MW)	February 28, 2022	PHCs (BTEX/F1-F4), VOCs, M&I
BH3(MW)	BH3(MW)	February 28, 2022 and March 1, 2022	PHCs (BTEX/F1-F4), VOCs, M&I
Duplicate of BH3(MW)	BH3(MW)-DUP	February 28, 2022 and March 1, 2022	PHCs (BTEX/F1-F4), VOCs, M&I
BH4(MW)	BH4(MW)	February 28, 2022	PHCs (BTEX/F1-F4), VOCs, M&I

Summary of Ground Water Samples Submitted for Laboratory Analysis			
Borehole/Well ID	**Groundwater Sample ID**	**Date Collected**	**Parameters Analyzed**
BH5(MW)	BH5(MW)	February 28, 2022	PHCs (BTEX/F1-F4), VOCs, M&I

The analytical results are presented in Table 4 and are summarized in the following subsections.

PHCs (BTEX/F1-F4)

All concentrations of PHCs (BTEX/F1-F4) within the groundwater samples submitted for laboratory analyses were in compliance with *Table 3 SCS*.

VOCs

All concentrations of VOCs within the groundwater samples submitted for laboratory analyses were in compliance with *Table 3 SCS*.

Metals and Inorganic Parameters (Metals, Hydride-Forming Metals and Other Regulated Parameters)

All concentrations of metals within the groundwater samples submitted for laboratory analyses were in compliance with *Table 3 SCS*.

Inorganics

All concentrations of inorganics within the groundwater samples submitted for laboratory analyses were in compliance with *Table 3 SCS.*

6.8 Sediment Quality

Sediment quality was not assessed as part of this Phase Two ESA.

6.9 Quality Assurance and Quality Control Results

Data quality objectives for this Phase Two ESA were implemented to ensure the precision, accuracy, reproducibility, representativeness, and completeness of field data obtained. In order to ensure that these data quality objectives were met, one (1) field duplicate soil sample (BH2(MW)-DUP) and one (1) field duplicate groundwater sample (BH3(MW)-DUP) were collected and submitted for laboratory analysis of VOCs, PHCs, and M&I (groundwater only).

The soil samples collected for laboratory analyses of PHCs and VOCs were preserved in the field with laboratory-supplied methanol, which was issued in pre-filled vials. The remaining soil samples were placed directly in laboratory-supplied plastic bags. The groundwater samples collected from the Phase Two Property were preserved in the field with various laboratory-supplied preservatives in pre-filled vials and bottles. Immediately upon collection, the soil and groundwater samples we placed directly on ice within a cooler and delivered to the analytical laboratory to be analyzed within their allotted holding time.

The soil and groundwater samples were submitted to AGAT. During analysis, AGAT followed internal QA/QC procedures to confirm the validity of the analytical results, which included the analysis of laboratory duplicate samples, laboratory control samples, method blanks, matrix spikes, and comparison to internal reference material. The analytical report for the groundwater results clarified that the detection limit was raised for metals & inorganics analyses in all groundwater samples due to a required dilution as a result of the high concentration of sample analyte. Detection limits were also raised for VOC analyses for sample BH2(MW) as dilution was required due to the sample being foamy. No additional remarks were made within the Certificates of Analysis that qualified any of the analytical results, nor were the validity of any results qualified within the Certificate of Analysis. A copy of the Certificate of Analysis provided for the analyzed soil and groundwater samples are included as Appendix C.

The relative percent difference (RPD) between field duplicate samples and their corresponding original samples were calculated to evaluate whether the analytical data meets the overall data quality objectives of this Phase Two ESA. The RPDs of the original and field duplicate samples were not calculated in situations where one or both of the original and field duplicate samples exhibit concentrations of analyzed parameters that are below the laboratory Reporting Detection Limits (RDLs). The majority analyzed parameters for soil samples were below laboratory RDLs, and as such no RPD values were calculated. Similarly, VOC parameters in groundwater samples were below laboratory RDLs and RPD values were also not calculated. All other RPD values for the groundwater sample pairing met the data quality objectives with the exception of dissolved nickel, which had an RPD of 23.73% versus the data quality objective of 20%.

Given the heterogenous nature of soil these pairings were collected from, it is McIntosh Perry's opinion that the exception to the data quality objectives do not affect the overall validity of the Phase Two ESA. As such, it is McIntosh Perry's opinion that the data meets the data quality objectives of this Phase Two ESA.

6.10 Phase Two Conceptual Site Model

The Phase Two Property consists of an approximate 0.1303 ha property located at 200 Elgin Street, Ottawa, Ontario. The Phase Two Property is developed with an eleven-storey commercial/office building with one (1) basement level. The Phase Two Property is situated at an elevation of approximately 72 mASL. Plans showing the location and layout of the Phase Two Property are provided on Figure 1 and 2, respectively.

Properties surrounding the Phase Two Property generally consist of residential, commercial, institutional, and recreational land uses and are shown on Figure 3.

6.10.1 Potentially Contaminating Activities

As part of the Phase One ESA completed by McIntosh Perry in 2022, a total of twenty (20) PCAs were identified within the Phase One Study Area, six (6) of which were considered to be APECs in relation to the Phase One Property. The PCAs are outlined in the Table below.

Potentially Contaminating Activities						
No.	**Potential Contaminating Activity (PCA)**	**Location of PCA**	**Proximity of PCA to Phase One ESA Property**	**Time Frame Associated with PCA**	**Information Source**	**Does the PCA warrant an Area of Potential Environmental Concern (APEC)**
1	#28 Gasoline and Associated Products Storage in Fixed Tanks Oil fired boilers	On-Site	On-Site	Historic	FIPs	**Yes, occurred on Site**
2	Other (Not Listed) Spill – Oil to ground	On-Site	On-Site	Historic	ERIS	**Yes, occurred on Site**
3	#31 Ink Manufacturing, Processing and Bulk Storage	On-Site	On-Site	Historic	ERIS	**Yes, occurred on Site**
4	#28 Gasoline and Associated Products Storage in Fixed Tanks Day tank and connected generator in penthouse	On-Site	On-Site	Historic/Current	Site Visit	**Yes, due to location on-Site**
5	#28 Gasoline and Associated Products Storage in Fixed Tanks 900-L Diesel tank supplying generator	Off-Site	Immediately adjacent to west	Historic/Current	Site Visit	**Yes, due to proximity to the Site**
6	#28 Gasoline and Associated Product Storage in Fixed Tanks Off-Site automotive garage	196 Elgin Street	North adjacent of property	Historic	FIPs, ERIS, Aerials	**Yes, due to proximity to the Site**

Potentially Contaminating Activities						
No.	**Potential Contaminating Activity (PCA)**	**Location of PCA**	**Proximity of PCA to Phase One ESA Property**	**Time Frame Associated with PCA**	**Information Source**	**Does the PCA warrant an Area of Potential Environmental Concern (APEC)**
7	#42 Pharmaceutical Manufacturing and Processing	Corner of Elgin and Maria Street (Present day Laurier Street)	Approximately 200 m northeast of Site	Historic	FIPs	**No, due to location**
8	#37 Operation of Dry-Cleaning Equipment (where chemicals are used)	34A Nepean Street	Approximately 35 m northwest of Site	Historic	FIP	**No, due to distance and down-gradient location from the Site**
9	#28 Gasoline and Associated Product Storage in Fixed Tanks	170 Elgin Street	Approximately 55 m north of the Site	Historic	FIP	**No, due to distance and down-gradient location from the Site**
10	#10 Commercial Autobody Shops Off-Site automotive garage	15 Gloucester Street	Approximately 95 m north of the Site	Historic	FIP	**No, due to distance and down-gradient location from the Site**
11	Other (Not Listed) PCBs	180 Elgin Street	Immediately north of the Site	Historic/Current	ERIS	**No, due to down-gradient location of PCA**
12	#51 Solvent Manufacturing, Processing and Bulk Storage	180 Elgin Street	Immediately north of the Site	Historic	ERIS	**No, due to down-gradient location of PCA**

Potentially Contaminating Activities						
No.	**Potential Contaminating Activity (PCA)**	**Location of PCA**	**Proximity of PCA to Phase One ESA Property**	**Time Frame Associated with PCA**	**Information Source**	**Does the PCA warrant an Area of Potential Environmental Concern (APEC)**
13	Other (Not Listed) Spill – Hydraulic oil to ground	160 Elgin Street	Immediately north of the Site	Historic	ERIS	**No, due to down-gradient location of PCA**
14	Other (Not Listed) Spill – Hydraulic oil to ground	Corner of Gloucester Road and Elgin Street	Approximately 85 m north of the Site	Historic	ERIS	**No, due to distance and down-gradient location of PCA from the Site**
15	Other (Not Listed) Spill – Diesel to ground	161 Elgin Street	Approximately 70 m northeast of the Site	Historic	ERIS	**No, due to distance and down-gradient location from the Site**
16	Other (Not Listed) Spill – Electrical Oil	161 Elgin Street	Approximately 70 m northeast of the Site	Historic	ERIS	**No, due to distance and down-gradient location from the Site**
17	#1 Acid and Alkali Manufacturing, Processing and Bulk Storage #8 Chemical Manufacturing, Processing and Bulk Storage #39 Paints Manufacturing, Processing and Bulk Storage	161 Elgin Street	Approximately 70 m northeast of the Site	Historic	ERIS	**No, due to distance and down-gradient location from the Site**

Potentially Contaminating Activities						
No.	**Potential Contaminating Activity (PCA)**	**Location of PCA**	**Proximity of PCA to Phase One ESA Property**	**Time Frame Associated with PCA**	**Information Source**	**Does the PCA warrant an Area of Potential Environmental Concern (APEC)**
18	#37 Operation of Dry-Cleaning Equipment (where chemicals are used)	268 Elgin Street	Approximately 190 m south of Site	Historic	ERIS	**No, due to distance from the Site**
19	#28 Gasoline and Associated Products Storage in Fixed Tanks	280 Elgin Street	Approximately 185 m south of Site	Historic	ERIS	**No, due to distance from the Site**
20	#28 Gasoline and Associated Products Storage in Fixed Tanks	280 Elgin Street	Approximately 185 m south of Site	Historic	ERIS	**No, due to distance from the Site**

The locations of the PCAs are shown on Figure 5.

6.10.2 Areas of Potential Environmental Concern

Six (6) PCAs identified within the Phase One Study Area were determined to constitute APECs in relation to the Phase Two Property. A summary of these APECs is provided below and followed by a discussion of the analytical results.

APEC #1

Based on a review of the 2021 McIntosh Perry Phase One ESA, historic oil-fired boilers were identified at the Phase Two Property. The historical presence of the use of oil-fired boilers as the main heating source of the building was determined to be a PCA that constituted an APEC in relation to the Phase Two Property. No details on the exact location of the historic boilers and tanks were available, however they are interpreted to have been present in the southwest corner of the Site. The COPCs associated with these known soil impacts were determined to be PHCs and BTEX. Given the on-Site location of the historic boilers and the absence of soil groundwater data for the Phase Two Property, the media of concern within this APEC were determined to be both soil and groundwater. Two (2) boreholes (BH3(MW) and BH4(MW)) were advanced on the southwestern section of the Phase Two Property in the inferred location of the historical boilers and associated fuel tanks and were instrumented with groundwater monitoring wells to assess soil and groundwater conditions.

APEC #2

Based on a review of the 2021 McIntosh Perry Phase One ESA, historic printing operations occurred at the Phase Two Property. The historical presence of the printing operation was determined to be a PCA that constituted an APEC in relation to the Phase Two Property. The COPCs associated with these known soil impacts were determined to be VOCs. Given the on-Site location of the operations and the absence of soil groundwater data for the Phase Two Property, the media of concern within this APEC were determined to be both soil and groundwater. Five (5) boreholes (BH1(MW), BH2(MW), BH3(MW), BH4(MW) and BH5(MW)) were advanced throughout the Site to provide general coverage of any areas potentially affected by printing operations and were instrumented with groundwater monitoring wells to assess soil and groundwater conditions.

<u>APECs #3</u>

A 30-L oil spill that occurred at the Site was identified during the 2021 McIntosh Perry Phase One ESA. The location of the spill is unknown. The COPCs associated with this APEC was determined to be BTEX and PHCs. The media of concern associated with these PCAs were determined to be soil and groundwater. Five (5) boreholes (BH1(MW), BH2(MW), BH3(MW), BH4(MW) and BH5(MW)) were advanced throughout the Site for general coverage of potential areas where the spill may have occurred or where contaminants could have been present and were instrumented with groundwater monitoring wells to assess soil and groundwater conditions.

<u>APEC #4</u>

Based on a review of the 2021 McIntosh Perry Phase One ESA, an aboveground storage tank containing diesel fuel for a backup generator was observed in the southeast corner of the penthouse level of the Site building. The presence of this tank was determined to be a PCA that constituted an APEC in relation to the Phase Two Property. The COPCs associated with the tank were determined to be PHCs and BTEX. Given the absence of soil groundwater data for the Phase Two Property, the media of concern within this APEC were determined to be both soil and groundwater. Two (2) boreholes (BH3(MW) and BH4(MW)) were advanced on the southeast portion of the Phase Two Property and was instrumented with a groundwater monitoring well to assess soil and groundwater conditions.

<u>APEC #5</u>

Based on a review of the 2021 McIntosh Perry Phase One ESA, an aboveground storage tank containing diesel fuel for the penthouse backup generator was observed immediately outside the Phase Two Property, in the basement level of the adjacent building to the west (part of the Entire Property). The presence of this tank was determined to be a PCA that constituted an APEC in relation to the Phase Two Property. The COPCs associated with the diesel generators were determined to be PHCs and BTEX. Given the absence of soil groundwater data for the Phase Two Property, the media of concern within this APEC were determined to be both soil and groundwater. One (1) borehole (BH5(MW)) was advanced on the southeast portion of the Phase Two Property and was instrumented with a groundwater monitoring well to assess soil and groundwater conditions.

<u>APEC #6</u>

Based on a review of the 2021 McIntosh Perry Phase One ESA, a historic gasoline outlet and automotive service garage were identified north adjacent to the Site Building within the Phase Two Study area. The presence of historic gasoline outlet and associated garage were determined to be a PCA that constituted an APEC in relation to the Phase Two Property. The COPCs associated with the historic gasoline outlet and automotive service garage were determined to be PHCs, BTEX, metals, and VOCs. Given the absence of soil groundwater data for the Phase Two Property, the media of concern within this APEC were determined to be both soil and groundwater. Two (2) boreholes (BH1(MW) and BH2(MW)) were advanced on the northeast section of the Phase Two Property and were instrumented with a groundwater monitoring well to assess soil and groundwater conditions.

The locations of the APECs are shown on Figure 6.

6.10.3 Subsurface Structures and Utilities

As part of the Phase Two ESA, utility service clearances were provided by public and private locating companies. The depths of these utilities were not determined during the Phase Two ESA. Given that the concentrations of COPCs within groundwater at the Phase Two Property were below *Table 3 SCS*, it is our opinion that the potential presence of utilities within the identified APECs is unlikely to affect contaminant distribution at the Phase Two Property.

6.10.4 Physical Setting

6.10.4.1 Stratigraphy

During the field program conducted at the Phase Two Property, subsurface soil was determined to consist of concrete, which extended between approximately 0.25 to 1.31 mbgs, underlain by silty clay that extended to the maximum borehole completion depth of 4.57 mbgs. A detailed description of the stratigraphy observed during the Phase Two ESA is provided on borehole logs within Appendix B and shown on Cross-Sections A-A' and B-B' (Figures 10 and 11 respectively).

6.10.4.2 Hydrogeology

The Phase Two Property is located within the Rideau Falls – Rideau River watershed. Groundwater likely flows north based on topography at the Phase Two Property as well as the location of the nearest water body (Ottawa River) in relation to the Phase Two Property. Groundwater was encountered at depths ranging from 0.99 to 2.74 mbgs (97.30 to 99.09 m relative to local benchmark). The shallow groundwater flow direction in the overburden at the Phase Two Property is estimated to be towards the southwest, based on groundwater elevation surveys conducted as part of this Phase Two ESA. The horizontal hydraulic gradient within the unconfined aquifer at the Phase Two Property is approximately 0.034 m/m in a southwesterly direction. Groundwater elevation plans are provided as Figure 8.

Given that all concentrations of analyzed parameters within the groundwater samples obtained as part of this Phase Two ESA were below the *Table 3 SCS*, vertical hydraulic gradients were not evaluated as part of this Phase Two ESA.

6.10.4.3 Bedrock

Bedrock was not encountered in any of the boreholes advanced during the Phase Two ESA, which were advanced to a maximum depth of 4.57 mbgs. Given that the entirety of the Phase Two Property consists of soil equal or more than 2 m in depth beneath the soil surface (excluding any non-soil surface treatment such as asphalt, concrete or aggregate), the Phase Two Property is not considered to be a shallow soil property under Section 43.1 of O. Reg. 153/04 (as amended).

Based on information reviewed as part of the 2021 McIntosh Perry Phase One ESA, bedrock within the Phase Two Study Area is located at a depth of greater than 14 mbgs and expected to consist of shale and limestone.

6.10.5 Potable Site Condition Standards

The Phase Two Property is serviced by the municipal water supply, which obtains water from the Ottawa River, located approximately 1 km northwest of the Site, at its closest point. Groundwater is not used as a source of potable water.

6.10.6 Water Bodies and Areas of Natural Significance

The Phase Two Property does not contain, nor is it adjacent to or located within 30 m of a water body. No additional water bodies are located within a 250 m radius of the Phase Two Property; the closest permanent waterbody to the Phase Two Property is the Rideau Canal (located approximately 400 m northeast of the Site at its closest point) and the Ottawa River (located approximately 1 km northwest of the Site at its closest point). As such, the Phase Two Property is not considered to be located within 30 m of a water body as per Section 43.1 of O. Reg. 153/04 (as amended).

When completing the 2021 McIntosh Perry Phase One ESA, considerations were made for the following MNRF-maintained areas of natural significance:

- Provincial Parks and Conservation Reserves;
- Areas of Natural and Scientific Interest (ANSIs);
- Provincially Significant Wetlands (PSWs);
- Areas identified by the MNRF as a significant habitat of a threatened or endangered species or area of habitat of a species classified under section 7 of the Endangered Species Act; and
- Areas set apart under the Wilderness Areas Act.

No areas of natural significance were identified within the Phase Two Study Area. The Phase Two Property is also not located within 250 m of any areas of natural significance identified within the City of Ottawa's Official Plan.

In addition to the above, the pH levels measured within soil at the Phase Two Property during the Phase Two ESA were determined to be within the acceptable range for non-sensitive sites (i.e., within 5 to 9 for surface soil and within 5 to 11 for subsurface soil). It is the QP_{ESA}'s position that the characteristics of the Phase Two Property do not qualify it as an environmentally sensitive area.

6.10.7 Depth To Water Table

The groundwater table at the Phase Two Property was determined to be located within the silty clay unit that are interpreted to comprise part of the unconfined aquifer. The depth to the water table across the Phase Two Property ranged between 0.99 and 2.74 mbgs.

6.10.8 Excess Soil

Excess soil was not removed from or deposited onto the Phase Two Property as part of this Phase Two ESA.

6.10.9 Proposed Buildings and Other Structures

It is McIntosh Perry's understanding that the Phase Two Property is intended to be redeveloped for mixed commercial/residential land use.

6.10.10 Site Condition Standards - N/A or N/V Values

During this Phase Two ESA, no contaminants were found at the Phase Two Property that do not have corresponding criteria listed within *Table 3 SCS*.

6.10.11 Concentrations of COPCs above the Table 3 Standards

6.10.11.1 Soil

All concentrations of COPCs within the soil samples submitted for laboratory analyses were below *Table 3 SCS.*

6.10.11.2 Groundwater

All concentrations of COPCs within the groundwater samples submitted for laboratory analyses were below the *Table 3 SCS*.

6.10.12 Climatic or Meteorological Conditions

Climatic or meteorological conditions have the potential to impact contaminant concentrations at the Site chiefly by the downward percolation of precipitation through the fill layers into underlying native soil and to the groundwater table. Groundwater sampling results, and soil sampling results from the native soil at the Site, indicates that this has not resulted in significant migration of contaminants into the native soil or groundwater table.

Groundwater at the Site is expected to fluctuate somewhat with seasonal variation. Groundwater and soil analytical results at the Site were in compliance with *Table 3 SCS.* As such, groundwater fluctuation is not expected to result in contaminant migration at the Site.

6.10.13 Potential for Soil Vapour Intrusion

No volatile parameter exceedances above *Table 3 SCS* were identified at the Phase Two Property. As such, soil vapour intrusion at the Phase Two Property is not considered to be a concern.

7.0 CONCLUSIONS

Six (6) APECs were investigated during this Phase Two ESA through the advancement of five (5) boreholes in the interior of the Phase Two Property, all of which were completed with groundwater monitoring wells.

Select soil and groundwater samples collected from the boreholes and monitoring wells advanced at the Phase Two Property were submitted for laboratory analyses of PHCs (BTEX/F1-F4), VOCs, and M&I (groundwater only), which were determined to be the COPCs associated with the APECs. All concentrations of analyzed parameters within the soil and groundwater samples submitted for laboratory analyses were below *Table 3 SCS.* As such, site condition standards are met for the Phase Two Property, and an RSC can be filed.

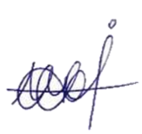
7.1 Signatures

This Phase Two ESA has been conducted under the supervision of Dan Arnott, P.Eng., QP_{ESA}. Dan has over 13 years of experience in conducting and managing Phase One and Two ESAs in accordance with O. Reg. 153/04 (as amended), is a licensed professional engineer in Ontario and is a Qualified Person (QP_{ESA}) under O. Reg. 153/04 (as amended). It is the opinion of the QP_{ESA} that this Phase Two ESA has been conducted in accordance with O. Reg. 153/04 (as amended) and that no deficiencies were present within the assessment that would affect the validity of the Phase Two ESA. Robert Purdon, M.Sc., P.Geo. provided a senior review of the report. Mr. Purdon has over 30 years experience with Phase One/I and Two/II environmental site assessments and is a licensed professional geoscientist and a Qualified Person under O.Reg. 153/04 (as amended).

We trust that this information is satisfactory for your present requirements. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Respectfully submitted,

McIntosh Perry



Pamela Muniz, G.I.T.
Environmental Scientist

Robert Purdon, M.Sc., P.Geo.
Senior Geoscientist

8.0 LIMITATIONS

This report has been prepared, and the work referred to in this report has been undertaken by, McIntosh Perry for the Client. It is intended for the sole, and exclusive use of the Client and respective financial Institutions, affiliated companies, partners, insurers, agents, employees and advisors with respect to the current (within 18 months of report date) activities associated with the Phase Two Property located at the municipal address of 200 Elgin Street, Ottawa, Ontario.

The report may not be relied upon by any other person or entity without the express written consent of McIntosh Perry. Any use which a third party makes of this report, or any reliance on decisions made based on it, without a Reliance Letter are the responsibility of such third parties. McIntosh Perry accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The investigation undertaken by McIntosh Perry with respect to this report and any conclusions or recommendations made in this report reflect McIntosh Perry's judgment based on the site conditions observed at the time of the site investigations, inspections and sampling on the date(s) set out in this report and on information available at the time of the preparation of this report.

This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

9.0 REFERENCES

City of Ottawa: GeoOttawa Interactive Map accessed through < https://maps.ottawa.ca/geoottawa/>

Mississippi-Rideau Source Protection Region: Clickable Map Tool accessed through <https://www.mrsourcewater.ca/en/library/maps/29-clickable-map-tool>

Natural Resources Canada, 2011. Geobase online mapping tool: Hydro Network GIS Data accessed through <http://geobase.ca/geobase/en/viewer.jsp?group=nhn>.

Ontario Geologic Survey (OGS), 2017. GIS Data for bedrock and surficial geology stratigraphy.

Ontario Ministry of Environment (MOE), 2011: Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.

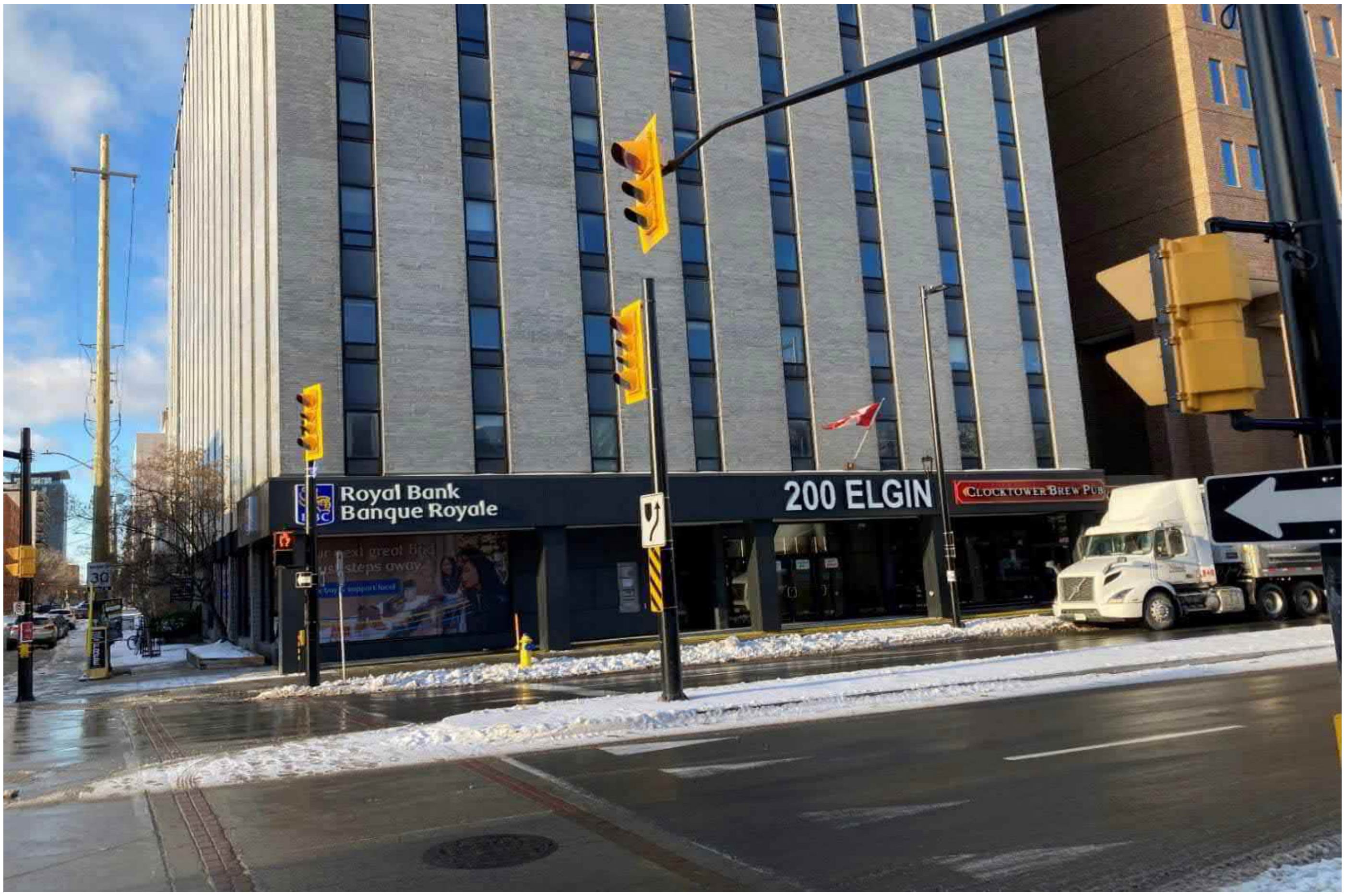
Ontario Ministry of Environment, Ontario Regulation 153/04; Records of Site Condition – Part XV.1 of the Act (i.e. The Environmental Protection Act), as amended.

Ontario Ministry of Natural Resources and Forestry: Make a Map: Natural Heritage Areas accessed through <https://www.lioapplications.lrc.gov.on.ca/Natural_Heritage/index.html?viewer=Natural_Heritage.Natural_Heritage&locale=en-CA>.

Ontario Ministry of Natural Resources and Forestry: Ontario Watershed Boundaries accessed through < Ontario Watershed Boundaries (OWB) | Ontario GeoHub (gov.on.ca)>

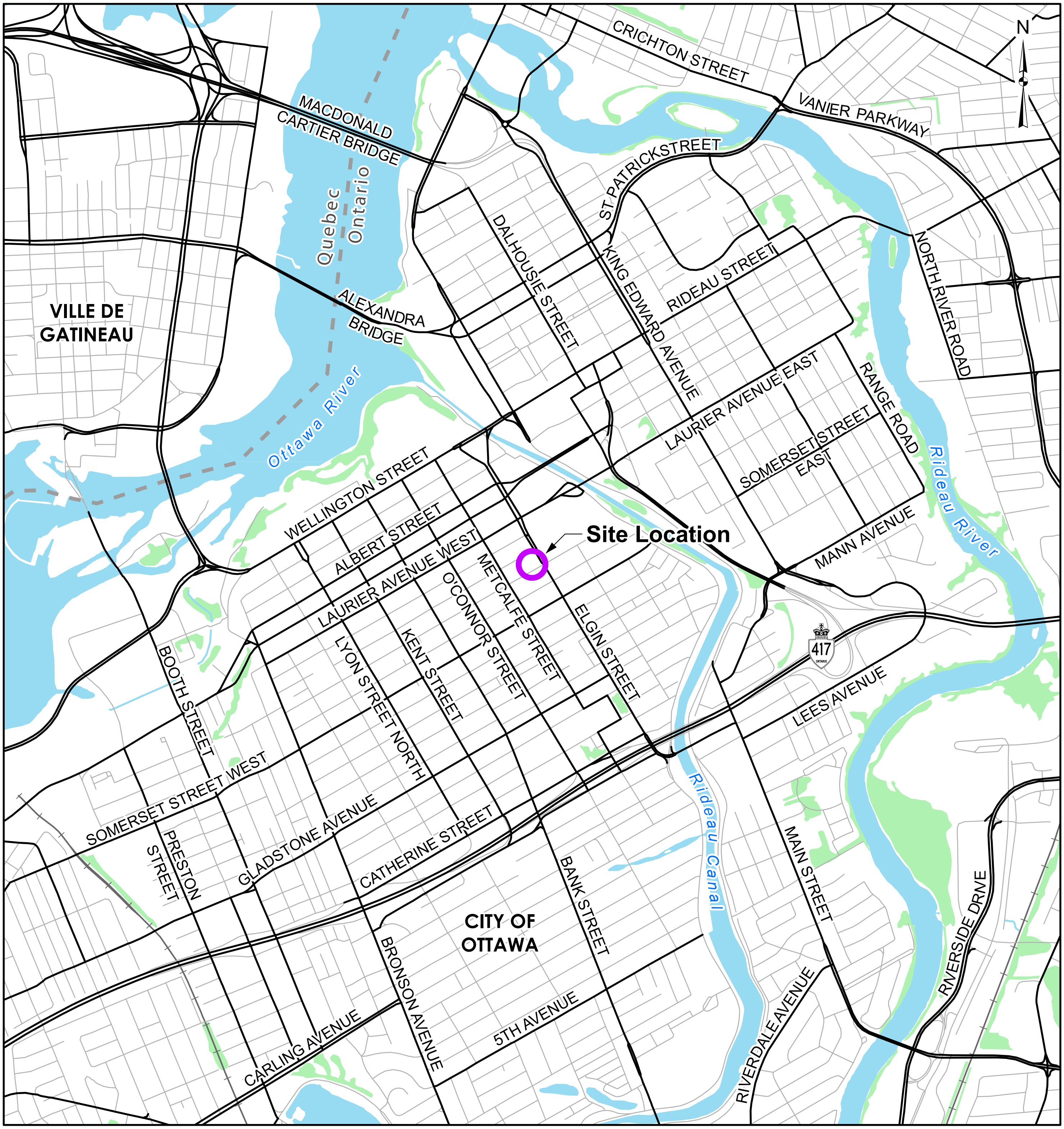
"*Phase One Environmental Site Assessment, 200 Elgin Street, Ottawa, Ontario*", prepared for Client and dated February 9, 2022

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
200 ELGIN STREET, OTTAWA, ONTARIO



FIGURES AND TABLES

McINTOSH PERRY



600 300 0 600

Scale 1:25,000 Metres

LEGEND

Site Location	Railroad
Local Road	Watercourse
Major Road	Waterbody
	Wooded Area

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2022.

CLIENT:	ELGAR HOLDINGS INC.
PROJECT:	PHASE TWO ESA 200 ELGIN STREET, OTTAWA, ON
TITLE:	SITE LOCATION

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

PROJECT NO:	CCO-22-3539	FIGURE: 1
Date	Jan., 24, 2022	
GIS	EU	
Checked By	KC	

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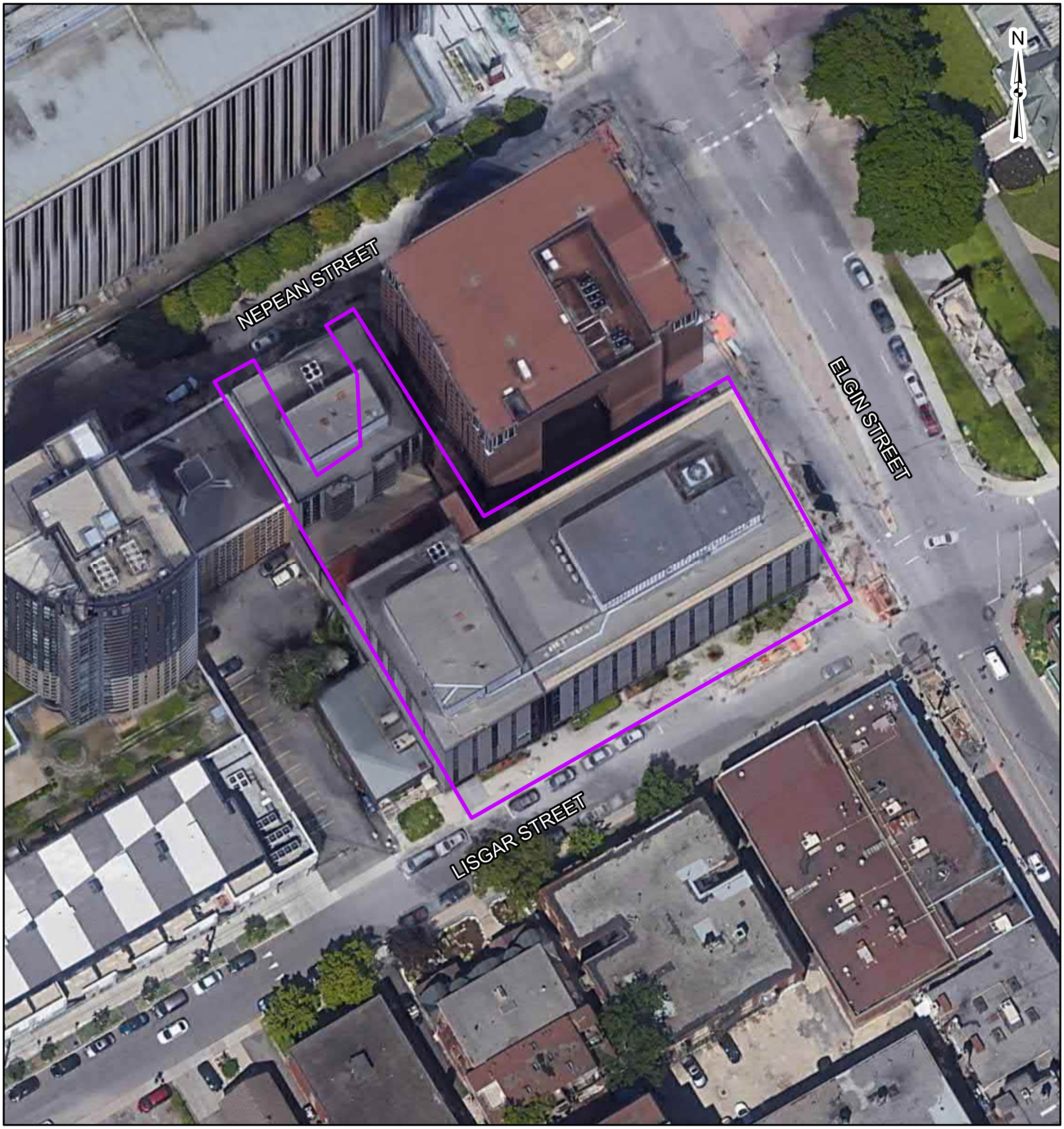

20 10 0 20

Scale 1:750 Metres

LEGEND

Approximate Site Boundary

CLIENT:

ELGAR HOLDINGS INC.

PROJECT:

PHASE TWO ESA
200 ELGIN STREET, OTTAWA, ON

TITLE:

SITE LAYOUT

McINTOSH PERRY

115 Walgreen Road, RR3, Carp, ON K0A1L0
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PROJECT NO:CCO-22-3539		FIGURE:
Date	Jan., 24, 2022	2
GIS	EU	
Checked By	KC	

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2022.

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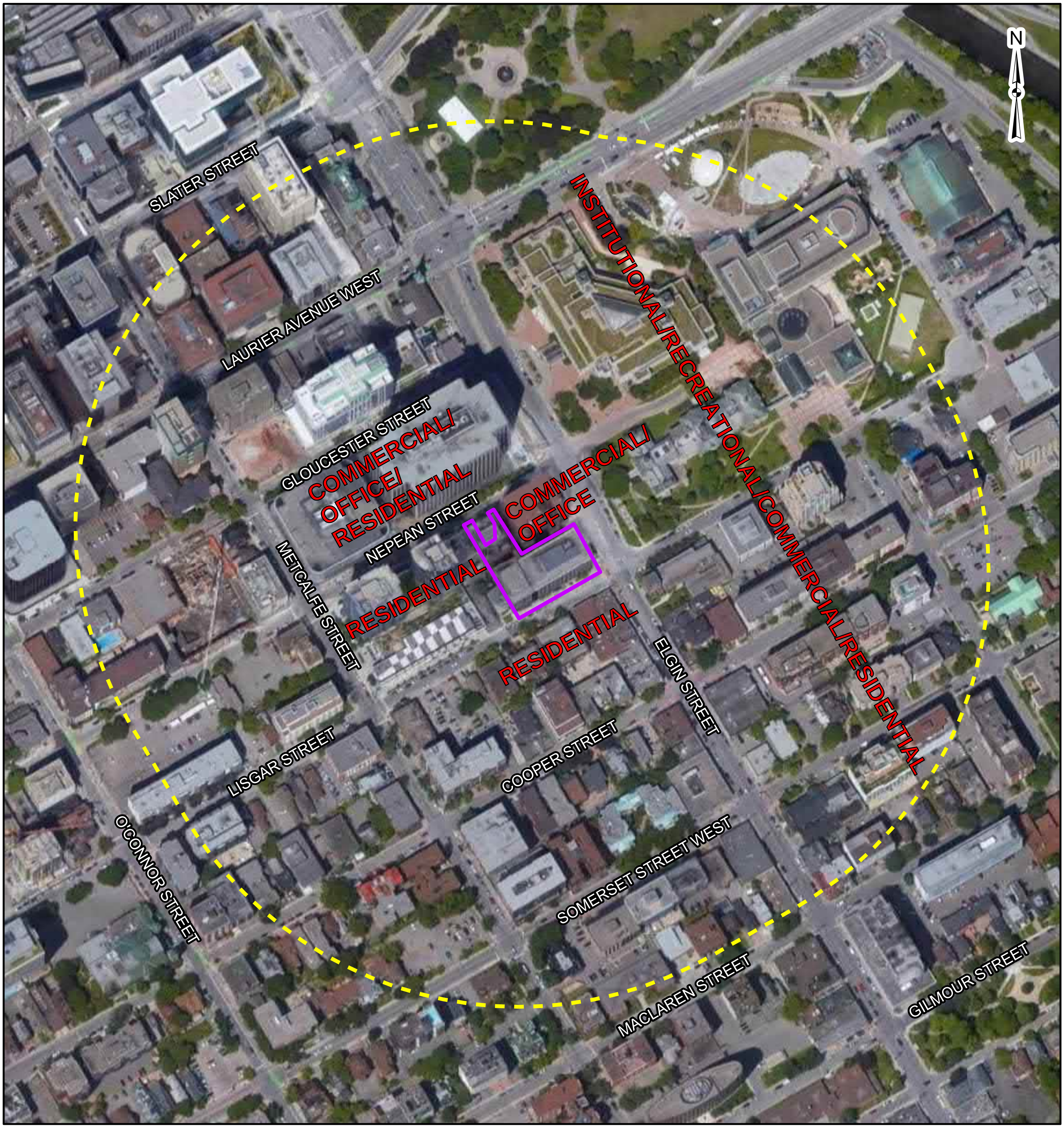

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Scale 1:3,500 Metres

LEGEND

- Approximate Site Boundary
- 250m Buffer

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2022.

CLIENT:	ELGAR HOLDINGS INC.
PROJECT:	PHASE TWO ESA 200 ELGIN STREET, OTTAWA, ON
TITLE:	PHASE TWO STUDY AREA

MCINTOSH PERRY

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PROJECT NO: CCO-22-3539		FIGURE:
Date	Jan., 24, 2022	3
GIS	EU	
Checked By	KC	

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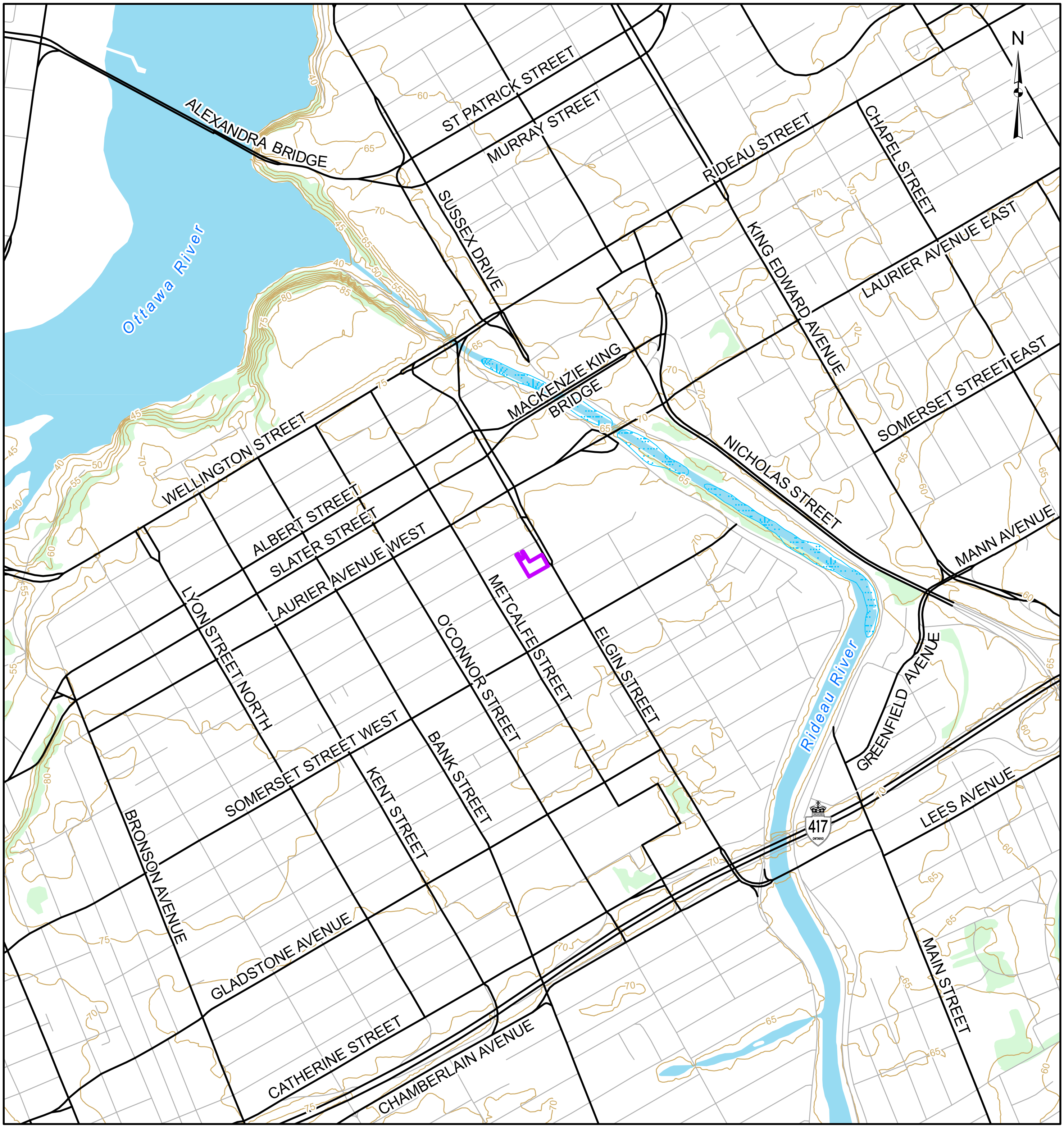

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Scale 1:15,000 Metres

LEGEND

- Approximate Site Boundary
- Contour (masl)
- Local Road
- Major Road
- Watercourse
- Waterbody
- Unevaluated Wetland
- Wooded Area

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2022.

CLIENT: ELGAR HOLDINGS INC.

PROJECT: PHASE TWO ESA
200 ELGIN STREET, OTTAWA, ON

TITLE: DRAINAGE AND TOPOGRAPHY

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PROJECT NO:	CCO-22-3539	FIGURE:
Date	Jan., 24, 2022	4
GIS	EU	
Checked By	KC	

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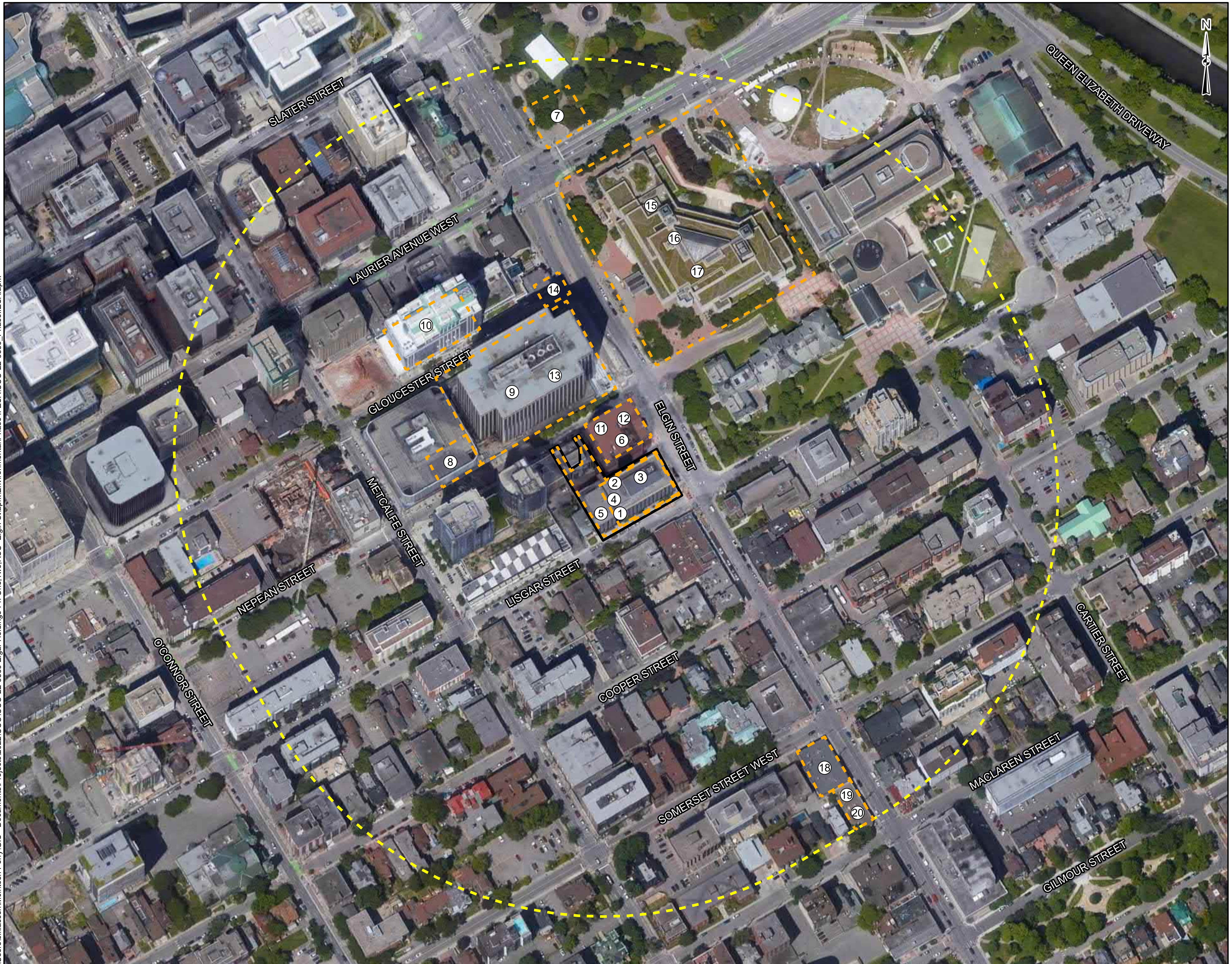

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LEGEND

Approximate Site Boundary

250m Buffer

PCA

1 200 Elgin Street
- Gasoline and Associated Products Storage in Fixed Tanks (Historic Oil Fired boilers)

2 200 Elgin Street
- Other (Not listed) – Spill, oil to ground

3 200 Elgin Street
- Ink Manufacturing, Processing and Bulk Storage (Commercial printing)

4 200 Elgin Street
- Gasoline and associated products in fixed tanks (generator and day tank in penthouse)

5 167 Lisgar Street.
- Gasoline and associated products in fixed tanks (900 L diesel AST

6 196 Elgin Street
- Gasoline and Associated Product Storage in Fixed Tanks, Commercial Autobody Shops (off-Site automotive garage and fuel service station)

7 Corner of Elgin and Maria Street (Present day Laurier Street)
- Pharmaceutical Manufacturing and Processing

8 34A Nepean Street
- 37 Operation of Dry cleaning equipment (Where chemicals are used)

9 170 Elgin Street
- Gasoline and Associated Product Storage in Fixed Tanks

10 15 Gloucester Street
- Commercial Autobody Shops (off-Site automotive garage)

11 180 Elgin Street
- Other (Not listed) – PCBs

12 180 Elgin Street
- Solvent Manufacturing, Processing and Bulk Storage (aliphatic solvents)

13 160 Elgin Street
- Other (Not Listed) – Hydraulic oil spill to ground

14 Corner of Gloucester Road and Elgin Street
- Ontario Spill Record (see table 2 of report)

15 161 Elgin Street
- Other (Not listed) – Diesel Spill to ground

16 161 Elgin Street
- Other (Not listed) – Electrical oil Spill to ground

17 161 Elgin Street
- Acid and Alkali Manufacturing, Processing and Bulk Storage, Chemical Manufacturing, Processing and Bulk Storage, Paints Manufacturing, Processing and Bulk Storage

18 268 Elgin Street
- Operation of Dry cleaning equipment (Where chemicals are used)

19 280 Elgin Street
- Gasoline and Associated Products Storage in Fixed Tanks (8000-L UST)

20 280 Elgin Street
- Gasoline and Associated Products Storage in Fixed Tanks (Retail fuel outlet)

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2022.

80 40 0 80

Scale 1:2,500 Metres

CLIENT:
ELGAR HOLDINGS INC.

PROJECT:
PHASE TWO ESA
200 ELGIN STREET, OTTAWA, ON

TITLE:
POTENTIALLY CONTAMINATING ACTIVITIES (PCA'S)

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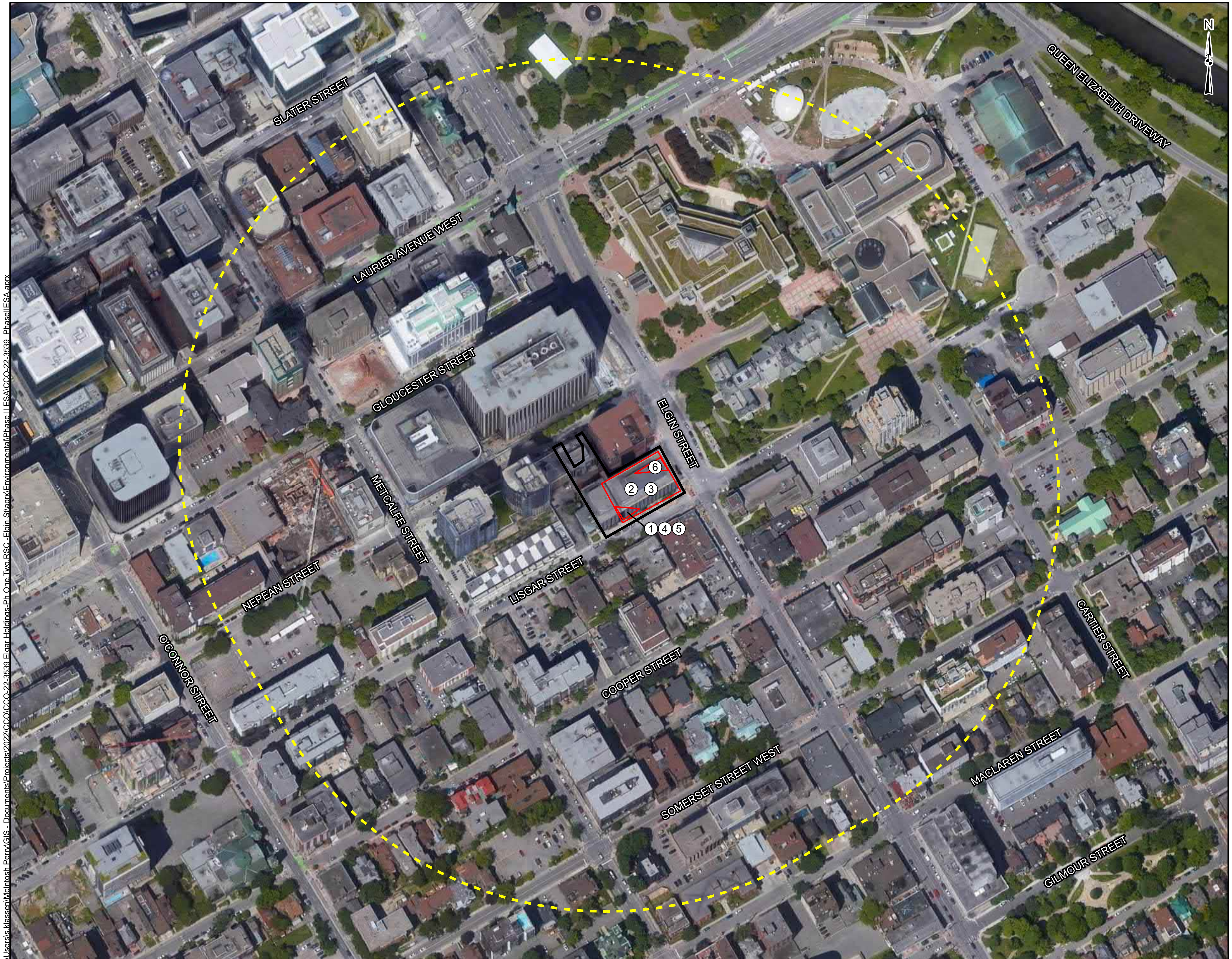
PROJECT NO:	CCO-22-3539
Date	Mar., 30, 2022
GIS	EU
Checked By	KC

FIGURE: 5



LEGEND

- Approximate Site Boundary
- 250m Buffer
- APEC

1. 200 Elgin Street
   - Southwest corner of Site - Potential soil and groundwater impacts from historic on-site oil-fired boulders
2. 200 Elgin Street
   - Entire Site - Spill record 30 L of oil to ground
3. 200 Elgin Street
   - Entire Site - Historic presence of printing business
4. 200 Elgin Street
   - Southwest corner of Site - Gasoline and associated products in fixed tanks (generator and day tank in penthouse)
5. 196 Elgin Street
   - Southwest corner of Site - Gasoline and associated products in fixed tanks (900 L diesel AST associated with generator in penthouse)
6. 196 Elgin Street
   - Northeast corner of Site - potential soil and groundwater impacts from historic retail fuel outlet and automotive service garage at 196 Elgin Street

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2022.

80 40 0 80

Scale 1:2,500 Metres

CLIENT: ELGAR HOLDINGS INC.

PROJECT: PHASE TWO ESA
200 ELGIN STREET, OTTAWA, ON

TITLE: AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

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PROJECT NO: CCO-22-3539		FIGURE:
Date	Mar., 30, 2022	6
GIS	EU	
Checked By	KC	

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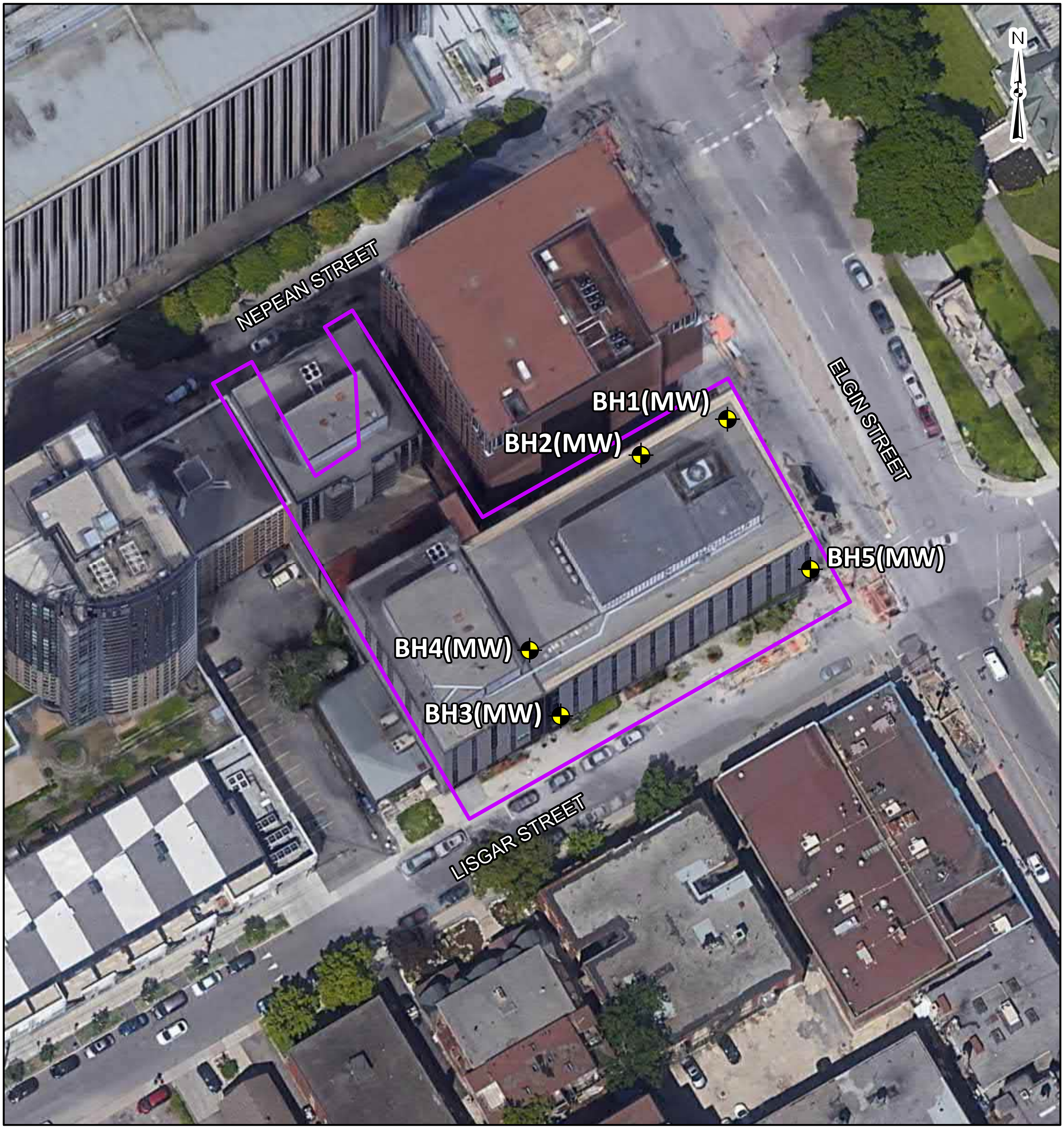

20 10 0 20

Scale 1:750 Metres

LEGEND

- Approximate Site Boundary
- Borehole Location

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2022.

CLIENT: ELGAR HOLDINGS INC.

PROJECT: PHASE TWO ESA
200 ELGIN STREET, OTTAWA, ON

TITLE: BOREHOLE AND MONITORING WELL LOCATION PLAN

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115 Walgreen Road, RR3, Carp, ON K0A1L0
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PROJECT NO:CCO-22-3539		FIGURE: 7
Date	Mar., 25, 2022	
GIS	EU	
Checked By	KC	

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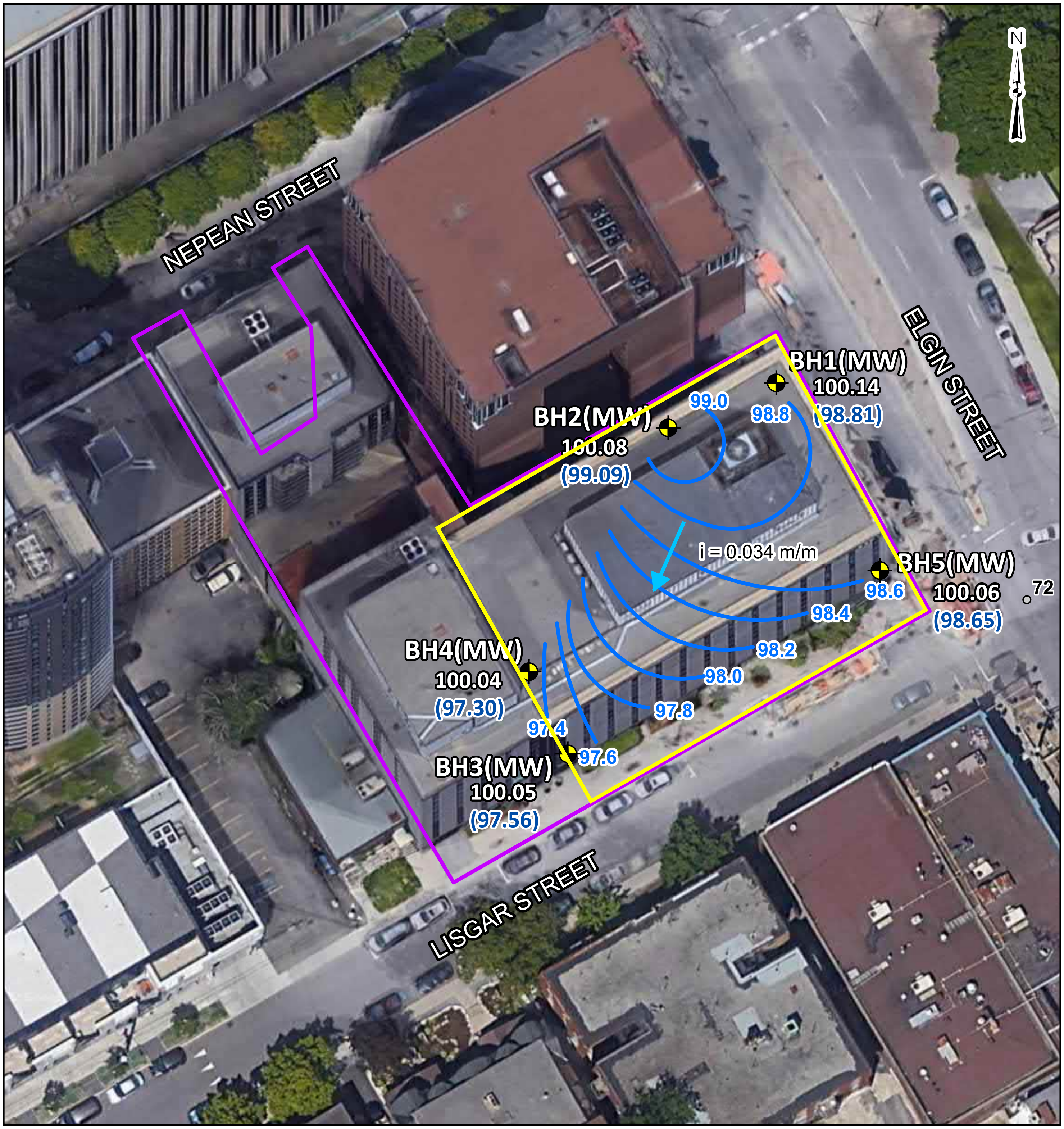

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Scale 1:600 Metres

LEGEND

Phase One ESA Property

Phase Two ESA Property

Groundwater Elevation Contour

Horizontal Hydraulic Gradient
i = 0.034 m/m

Borehole Location

100.05 Ground Surface Elevation (masl)

(97.56) Groundwater Elevation (masl)

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2022.

CLIENT: ELGAR HOLDINGS INC.

PROJECT: PHASE TWO ESA
200 ELGIN STREET, OTTAWA, ON

TITLE: GROUNDWATER ELEVATION PLAN

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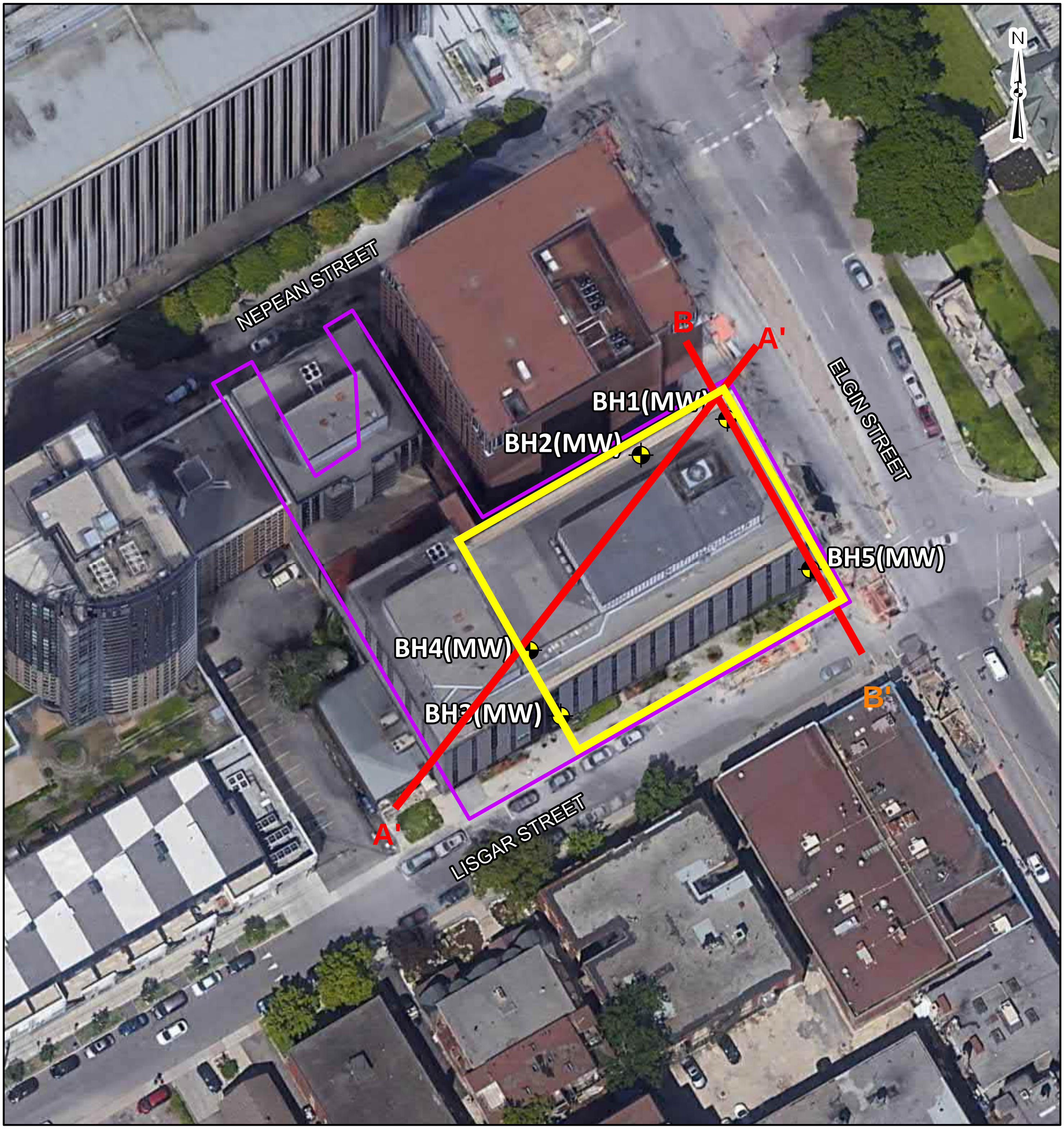
PROJECT NO:CCO-22-3539		FIGURE:
Date	Mar., 30, 2022	8
GIS	EU	
Checked By	KC	



20 10 0 20

Scale 1:750 Metres

LEGEND

Phase One ESA Property

Borehole Location

Phase Two ESA Property

A Cross-Section Location

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2022.

CLIENT:	ELGAR HOLDINGS INC.
PROJECT:	PHASE TWO ESA 200 ELGIN STREET, OTTAWA, ON
TITLE:	CROSS-SECTION LOCATION PLAN

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Tel: 613-836-2184 Fax: 613-836-3742
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PROJECT NO:CCO-22-3539		FIGURE:
Date	Mar., 25, 2022	9
GIS	DJA	
Checked By	PM	

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LEGEND

CLIENT: ELGAR HOLDINGS INC.

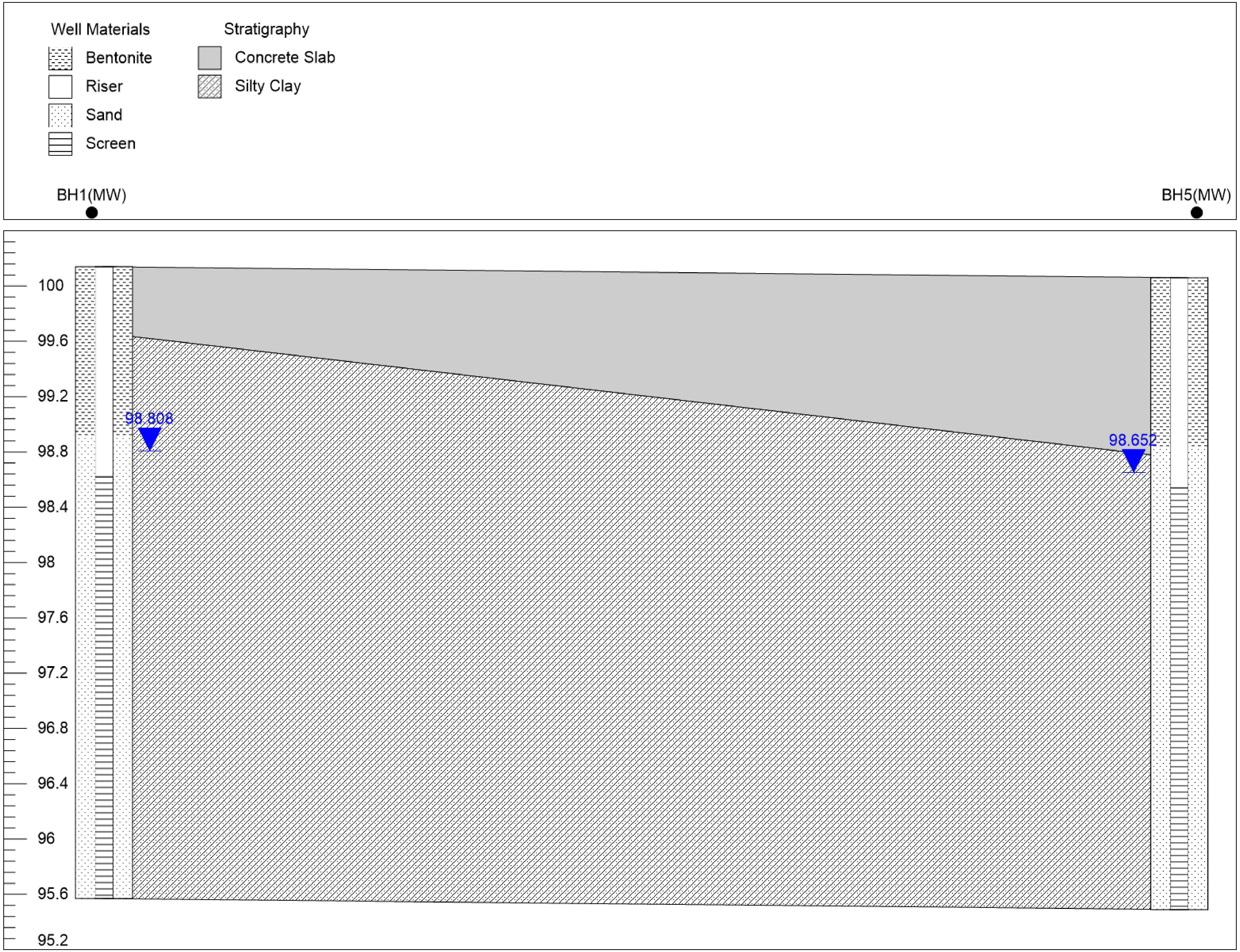
PROJECT: PHASE TWO ESA
200 ELGIN STREET, OTTAWA, ON

TITLE: CROSS-SECTION A-A'

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

PROJECT NO:	CCO-22-3539
Date	Apr. 17, 2022
GIS	DJA
Checked By	PM

FIGURE: 10



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LEGEND

CLIENT: ELGAR HOLDINGS INC.

PROJECT: PHASE TWO ESA
200 ELGIN STREET, OTTAWA, ON

TITLE: CROSS-SECTION B-B'

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
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PROJECT NO: CCO-22-3539		FIGURE:
Date	Apr. 17, 2022	11
GIS	DJA	
Checked By	PM	

Table 1 - Monitoring Well Installation

Phase Two Environmental Site Assessment

200 Elgin Street, Ottawa Ontario

Well ID	Well Depth (mbgs)	Well Diameter (cm)	Top of Casing Elevation (mREL)	Bottom of Well Elevation (mREL)	Screened Interval (mbgs)	Screen Length (m)	Top of Screen Elevation (mREL)	Bottom of Screen Elevation (mREL)	Benseal Thickness (m)	Sand Thickness (m)
BH1(MW)	4.570	3.175	100.140	95.57	1.52 - 4.57	3.05	98.62	95.57	1.22	3.35
BH2(MW)	4.570	3.175	100.080	95.51	1.52 - 4.57	3.05	98.56	95.51	1.22	3.35
BH3(MW)	4.570	3.175	100.048	95.48	1.52 - 4.57	3.05	98.53	95.48	1.22	3.35
BH4(MW)	4.570	3.175	100.043	95.47	1.52 - 4.57	3.05	98.52	95.47	1.22	3.35
BH5(MW)	4.570	3.175	100.057	95.49	1.52 - 4.57	3.05	98.54	95.49	1.22	3.35

Legend:

mgbs	*metres below ground surface*
cm	*centimetres*
m	*metres*
mREL	*Relative elevation (Benchmark is top of floor drain cover located in hallway by BH4(MW), assigned local elevation of 100.0)*

Table 2 - Ground Water Levels

Phase Two Environmental Site Assessment

200 Elgin Street, Ottawa Ontario

Well ID	Monitoring Date (yyyy-mm-dd)	Depth to Groundwater (mbgs)	Groundwater Elevation (mREL)
BH1(MW)	2022-02-25	1.332	98.808
BH2(MW)	2022-02-25	0.988	99.092
BH3(MW)	2022-02-25	2.485	97.563
BH4(MW)	2022-02-25	2.740	97.303
BH5(MW)	2022-02-25	1.405	98.652

Legend:

mbgs *metres below ground surface*

m *metres*

mREL *Relative elevation (Benchmark is top of floor drain cover located in hallway by BH4(MW), assigned local elevation of 100.0)*

Table 3 - Soil Data
Phase Two Environmental Site Assessment
200 Elgin Street, Ottawa Ontario

Sample Location			BH1(MW)	BH1(MW)	BH2(MW)	BH2(MW)	BH2(MW)-DUP	BH3(MW)	BH3(MW)	BH4(MW)	BH4(MW)	BH5(MW)	BH5(MW)	MECP Site Condition Standards **
Sample Identifier			BH1(MW)-SS1	BH1(MW)-SS5	BH2(MW)-SS1	BH2(MW)-SS5	BH2(MW)-DUP	BH3(MW)-SS1	BH3(MW)-SS4	BH4(MW)-SS1	BH4(MW)-SS4	BH5(MW)-SS1	BH5(MW)-SS4	
Sample Depth (mbgs)			0.48 - 0.90	3.60 - 4.57	0.25 - 0.90	3.60 - 4.57	3.60 - 4.57	1.10 - 1.80	3.60 - 4.57	1.04 - 1.80	3.60 - 4.57	1.31 - 1.80	3.60 - 4.57	
Sample Collection Date (dd/mm/yyyy)			09-Feb-2022	09-Feb-2022	09-Feb-2022	09-Feb-2022	09-Feb-2022	11-Feb-2022	11-Feb-2022	11-Feb-2022	11-Feb-2022	11-Feb-2022	11-Feb-2022	
Laboratory Sample Identification Number			3507372	3507373	3507374	3507375	3507376	3515920	3515927	3515928	3515929	3515930	3515931	
Volatile Organic Compounds (VOCs)	**Units**	**Detection Limit**												
Dichlorodifluoromethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**25**
Vinyl Chloride	µg/g	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.022**
Bromomethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.05**
Trichlorofluoromethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**5.8**
Acetone	µg/g	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**28**
1,1-Dichloroethylene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.05**
Methylene Chloride	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.96**
Trans- 1,2-Dichloroethylene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.75**
Methyl tert-butyl Ether	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**1.4**
1,1-Dichloroethane	µg/g	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**11**
Methyl Ethyl Ketone	µg/g	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**44**
Cis- 1,2-Dichloroethylene	µg/g	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**30**
Chloroform	µg/g	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	**0.18**
1,2-Dichloroethane	µg/g	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	**0.05**
1,1,1-Trichloroethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**3.4**
Carbon Tetrachloride	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.12**
Benzene	µg/g	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.17**
1,2-Dichloropropane	µg/g	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	**0.085**
Trichloroethylene	µg/g	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	**0.52**
Bromodichloromethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**13**
Methyl Isobutyl Ketone	µg/g	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**4.3**
1,1,2-Trichloroethane	µg/g	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	**0.05**
Toluene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**6**
Dibromochloromethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**9.4**
Ethylene Dibromide	µg/g	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	**0.05**
Tetrachloroethylene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**2.3**
1,1,1,2-Tetrachloroethane	µg/g	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	**0.05**
Chlorobenzene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**2.7**
Ethylbenzene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**15**
m & p-Xylene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**No SCS**
Bromoform	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.26**
Styrene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**2.2**
1,1,2,2-Tetrachloroethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.05**
o-Xylene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**No SCS**
1,3-Dichlorobenzene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**6**
1,4-Dichlorobenzene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.097**
1,2-Dichlorobenzene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**4.3**
Xylenes (Total)	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**25**
1,3-Dichloropropene (Cis + Trans)	µg/g	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	**0.083**
n-Hexane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**34**
Petroleum Hydrocarbon (PHCs)	**Units**													
F1 (C6-C10)	µg/g	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	**65**
F1(C6-C10) minus BTEX	µg/g	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	**65**
F2 (C10-C16)	µg/g	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	**150**
F3 (C16-C34)	µg/g	50	<50	<50	1000	<50	<50	<50	<50	<50	<50	<50	<50	**1300**
F4 (C34-C50)	µg/g	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**5600**

Legend:

**	*Table 3 Standards for medium-fine textured soils in a non-potable groundwater environment for residential/parkland/institutional land use, as outlined in the MECP document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act".*
n/a	*Not applicable*
No SCS	*No Site Condition Standard*
<0.013	*Non Detectable (i.e. the analytical result was below the method reporting limit for the test)*
124	*Sample result exceeds the corresponding Site Condition Standard*
<0.070	*Minimum laboratory detection exceeds Site Condition Standard*
µg/g	*microgam per gram*
mbgs	*metres below ground surface*

Table 4 - Ground Water Data

Phase Two Environmental Site Assessment
200 Elgin Street, Ottawa Ontario

		Sample Location	BH1(MW)	BH2(MW)	BH3(MW)	BH3(MW)-DUP	BH4(MW)	BH5(MW)	MECP Site Condition Standards **
		Sample Identifier	BH1(MW)	BH2(MW)	BH3(MW)	BH3(MW)-DUP	BH4(MW)	BH5(MW)	
		Sample Depth (mbgs)	n/a	n/a	n/a	n/a	n/a	n/a	
		Sample Collection Date (dd/mm/yyyy)	28-Feb-2022	28-Feb-2022	28-Feb-2022 & 01-Mar-2022	28-Feb-2022 & 01-Mar-2022	28-Feb-2022	28-Feb-2022	
		Laboratory Sample Identification Number	3572279	3571461	3571531	3571532	3572327	3572326	
Inorganics	**Units**	**Detection Limit**							
Electrical Conductivity	µS/cm	2	1440	3650	612	606	481	2470	**No SCS**
pH	pH Unit	n/a	7.96	7.99	8.22	8.15	8.52	9.32	**No SCS**
Chloride	µg/L	100	350000	920000	83000	82300	17600	765000	**2300000**
Dissolved Sodium	µg/L	250	138000	420000	89500	89300	83300	367000	**2300000**
Cyanide	µg/L	2	<2	<2	<2	<2	<2	<2	**66**
Metals	**Units**	**Detection Limit**							
Dissolved Antimony	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**20000**
Dissolved Arsenic	µg/L	1.0	2.7	1.7	6.9	5.7	7.6	1.8	**1900**
Dissolved Barium	µg/L	2.0	47.8	88.6	11.0	10.5	8.0	40.8	**29000**
Dissolved Beryllium	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**67**
Dissolved Boron	µg/L	10.0	215	218	365	342	446	94.7	**45000**
Dissolved Cadmium	µg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	**2.7**
Dissolved Chromium	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**810**
Dissolved Cobalt	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**66**
Dissolved Copper	µg/L	1.0	<1.0	<1.0	1.8	1.5	1.5	<1.0	**87**
Dissolved Lead	µg/L	0.50	0.61	1.17	<0.50	<0.50	<0.50	0.74	**25**
Dissolved Molybdenum	µg/L	0.50	7.12	3.77	5.70	5.47	8.43	6.82	**9200**
Dissolved Nickel	µg/L	1.0	3.0	2.1	2.6	3.3	4.2	5.3	**490**
Dissolved Selenium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**63**
Dissolved Silver	µg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	**1.5**
Dissolved Thallium	µg/L	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	**510**
Dissolved Uranium	µg/L	0.50	2.39	<0.50	2.43	2.43	2.60	<0.50	**420**
Dissolved Vanadium	µg/L	0.40	6.14	1.10	12.0	11.9	10.7	20.1	**250**
Dissolved Zinc	µg/L	5.0	11.7	6.4	10.7	<5.0	13.7	<5.0	**1100**
Mercury	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**2.8**
Chromium VI	µg/L	2.000	<2.000	<2	<2	<2	<2.000	<2.000	**140**
Volatile Organic Compounds (VOCs)	**Units**	**Detection Limit**							
Dichlorodifluoromethane	µg/L	0.40	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40	**4400**
Vinyl Chloride	µg/L	0.17	<0.17	<0.34	<0.17	<0.17	<0.17	<0.17	**1.7**
Bromomethane	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**56**
Trichlorofluoromethane	µg/L	0.40	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40	**2500**
Acetone	µg/L	1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	**130000**
1,1-Dichloroethylene	µg/L	0.30	<0.30	<0.60	<0.30	<0.30	<0.30	<0.30	**17**
Methylene Chloride	µg/L	0.30	<0.30	<0.60	<0.30	<0.30	<0.30	<0.30	**5500**
trans- 1,2-Dichloroethylene	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**17**
Methyl tert-butyl ether	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**1400**
1,1-Dichloroethane	µg/L	0.30	<0.30	<0.60	<0.30	<0.30	<0.30	<0.30	**3100**
Methyl Ethyl Ketone	µg/L	1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	**1500000**
cis- 1,2-Dichloroethylene	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**17**
Chloroform	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**22**
1,2-Dichloroethane	µg/L	0.20	0.85	<0.40	<0.20	<0.20	<0.20	<0.20	**12**
1,1,1-Trichloroethane	µg/L	0.30	<0.30	<0.60	<0.30	<0.30	<0.30	<0.30	**6700**
Carbon Tetrachloride	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**8.4**
Benzene	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**430**
1,2-Dichloropropane	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**140**

Table 4 - Ground Water Data

Phase Two Environmental Site Assessment
200 Elgin Street, Ottawa Ontario

Sample Collection Date (dd/mm/yyyy)			28-Feb-2022	28-Feb-2022	28-Feb-2022 & 01-Mar-2022	28-Feb-2022 & 01-Mar-2022	28-Feb-2022	28-Feb-2022	**Standards ****
Laboratory Sample Identification Number			3572279	3571461	3571531	3571532	3572327	3572326	
Trichloroethylene	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**17**
Bromodichloromethane	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**85000**
Methyl Isobutyl Ketone	µg/L	1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	**580000**
1,1,2-Trichloroethane	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**30**
Toluene	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**18000**
Dibromochloromethane	µg/L	0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	**82000**
Ethylene Dibromide	µg/L	0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	**0.83**
Tetrachloroethylene	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**17**
1,1,1,2-Tetrachloroethane	µg/L	0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	**28**
Chlorobenzene	µg/L	0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	**630**
Ethylbenzene	µg/L	0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	**2300**
m & p-Xylene	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**No SCS**
Bromoform	µg/L	0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	**770**
Styrene	µg/L	0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	**9100**
1,1,2,2-Tetrachloroethane	µg/L	0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	**15**
o-Xylene	µg/L	0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	**No SCS**
1,3-Dichlorobenzene	µg/L	0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	**9600**
1,4-Dichlorobenzene	µg/L	0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	**67**
1,2-Dichlorobenzene	µg/L	0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	**9600**
1,3-Dichloropropene	µg/L	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	**45**
Xylenes (Total)	µg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	**4200**
n-Hexane	µg/L	0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	**520**
Petroleum Hydrocarbons (PHCs)									
F1 (C6-C10)	µg/L	25	<25	<25	<25	<25	<25	<25	**750**
F1 (C6-C10) minus BTEX	µg/L	25	<25	<25	<25	<25	<25	<25	**750**
F2 (C10-C16)	µg/L	100	<100	<100	<100	<100	<100	<100	**150**
F3 (C16-C34)	µg/L	100	<100	<100	<100	<100	<100	<100	**500**
F4 (C34-C50)	µg/L	100	<100	<100	<100	<100	<100	<100	**500**

Legend:

**	*Table 3 Standards for medium-fine textured soils in a non-potable groundwater environment for residential/parkland/institutional land use, as outlined in the MECP document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act".*
n/a	*Not applicable*
No SCS	*No Site Condition Standard*
<0.013	*Non Detectable (i.e. the analytical result was below the method reporting limit for the test)*
124	*Sample result exceeds the corresponding Site Condition Standard*
<0.070	*Minimum laboratory detection exceeds Site Condition Standard*
µg/L	*microgam per litre*
mbgs	*metres below ground surface*
µS/cm	*microsiemens per centimetre*

Table 5 - Soil Maximum Concentration Data

Phase Two Environmental Site Assessment
200 Elgin Street, Ottawa Ontario

Parameter	Concentration	Units	Sample Location	Sample Identifier	Sample Depth (mbgs)	MECP Site Condition Standards **
Volatile Organic Compounds (VOCs)						
Dichlorodifluoromethane	<0.05	µg/g	All Samples Analyzed			**25**
Vinyl Chloride	<0.02	µg/g	All Samples Analyzed			**0.022**
Bromomethane	<0.05	µg/g	All Samples Analyzed			**0.05**
Trichlorofluoromethane	<0.05	µg/g	All Samples Analyzed			**5.8**
Acetone	<0.50	µg/g	All Samples Analyzed			**28**
1,1-Dichloroethylene	<0.05	µg/g	All Samples Analyzed			**0.05**
Methylene Chloride	<0.05	µg/g	All Samples Analyzed			**0.96**
Trans- 1,2-Dichloroethylene	<0.05	µg/g	All Samples Analyzed			**0.75**
Methyl tert-butyl Ether	<0.05	µg/g	All Samples Analyzed			**1.4**
1,1-Dichloroethane	<0.02	µg/g	All Samples Analyzed			**11**
Methyl Ethyl Ketone	<0.50	µg/g	All Samples Analyzed			**44**
Cis- 1,2-Dichloroethylene	<0.02	µg/g	All Samples Analyzed			**30**
Chloroform	<0.04	µg/g	All Samples Analyzed			**0.18**
1,2-Dichloroethane	<0.03	µg/g	All Samples Analyzed			**0.05**
1,1,1-Trichloroethane	<0.05	µg/g	All Samples Analyzed			**3.4**
Carbon Tetrachloride	<0.05	µg/g	All Samples Analyzed			**0.12**
Benzene	<0.02	µg/g	All Samples Analyzed			**0.17**
1,2-Dichloropropane	<0.03	µg/g	All Samples Analyzed			**0.085**
Trichloroethylene	<0.03	µg/g	All Samples Analyzed			**0.52**
Bromodichloromethane	<0.05	µg/g	All Samples Analyzed			**13**
Methyl Isobutyl Ketone	<0.50	µg/g	All Samples Analyzed			**4.3**
1,1,2-Trichloroethane	<0.04	µg/g	All Samples Analyzed			**0.05**
Toluene	<0.05	µg/g	All Samples Analyzed			**6**
Dibromochloromethane	<0.05	µg/g	All Samples Analyzed			**9.4**
Ethylene Dibromide	<0.04	µg/g	All Samples Analyzed			**0.05**
Tetrachloroethylene	<0.05	µg/g	All Samples Analyzed			**2.3**
1,1,1,2-Tetrachloroethane	<0.04	µg/g	All Samples Analyzed			**0.05**
Chlorobenzene	<0.05	µg/g	All Samples Analyzed			**2.7**
Ethylbenzene	<0.05	µg/g	All Samples Analyzed			**15**
m & p-Xylene	<0.05	µg/g	All Samples Analyzed			**No SCS**
Bromoform	<0.05	µg/g	All Samples Analyzed			**0.26**
Styrene	<0.05	µg/g	All Samples Analyzed			**2.2**
1,1,2,2-Tetrachloroethane	<0.05	µg/g	All Samples Analyzed			**0.05**
o-Xylene	<0.05	µg/g	All Samples Analyzed			**No SCS**
1,3-Dichlorobenzene	<0.05	µg/g	All Samples Analyzed			**6**
1,4-Dichlorobenzene	<0.05	µg/g	All Samples Analyzed			**0.097**
1,2-Dichlorobenzene	<0.05	µg/g	All Samples Analyzed			**4.3**
Xylenes (Total)	<0.05	µg/g	All Samples Analyzed			**25**
1,3-Dichloropropene (Cis + Trans)	<0.04	µg/g	All Samples Analyzed			**0.083**
n-Hexane	<0.05	µg/g	All Samples Analyzed			**34**
Petroleum Hydrocarbons (PHCs)						
F1 (C6-C10)	<5	µg/g	All Samples Analyzed			**65**
F1(C6-C10) minus BTEX	<5	µg/g	All Samples Analyzed			**65**
F2 (C10-C16)	<10	µg/g	All Samples Analyzed			**150**
F3 (C16-C34)	1000	µg/g	BH2(MW)	BH2(MW)-SS1	0.25-0.90	**1300**
F4 (C34-C50)	<50	µg/g	All Samples Analyzed			**5600**

Legend:

**	*Table 3 Standards for medium-fine textured soils in a non-potable groundwater environment for residential/parkland/institutional land use, as outlined in the MECP document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act".*
No SCS	*No Site Condition Standard*
<0.013	*Non Detectable (i.e. the analytical result was below the method reporting limit for the test)*
124	*Sample result exceeds the corresponding Site Condition Standard*
<0.070	*Minimum laboratory detection exceeds Site Condition Standard*
µg/g	*microgam per gram*
mbgs	*metres below ground surface*
mS/cm	*microSiemens per centimetre*

Table 6 - Ground Water Maximum Concentration Data

Phase Two Environmental Site Assessment

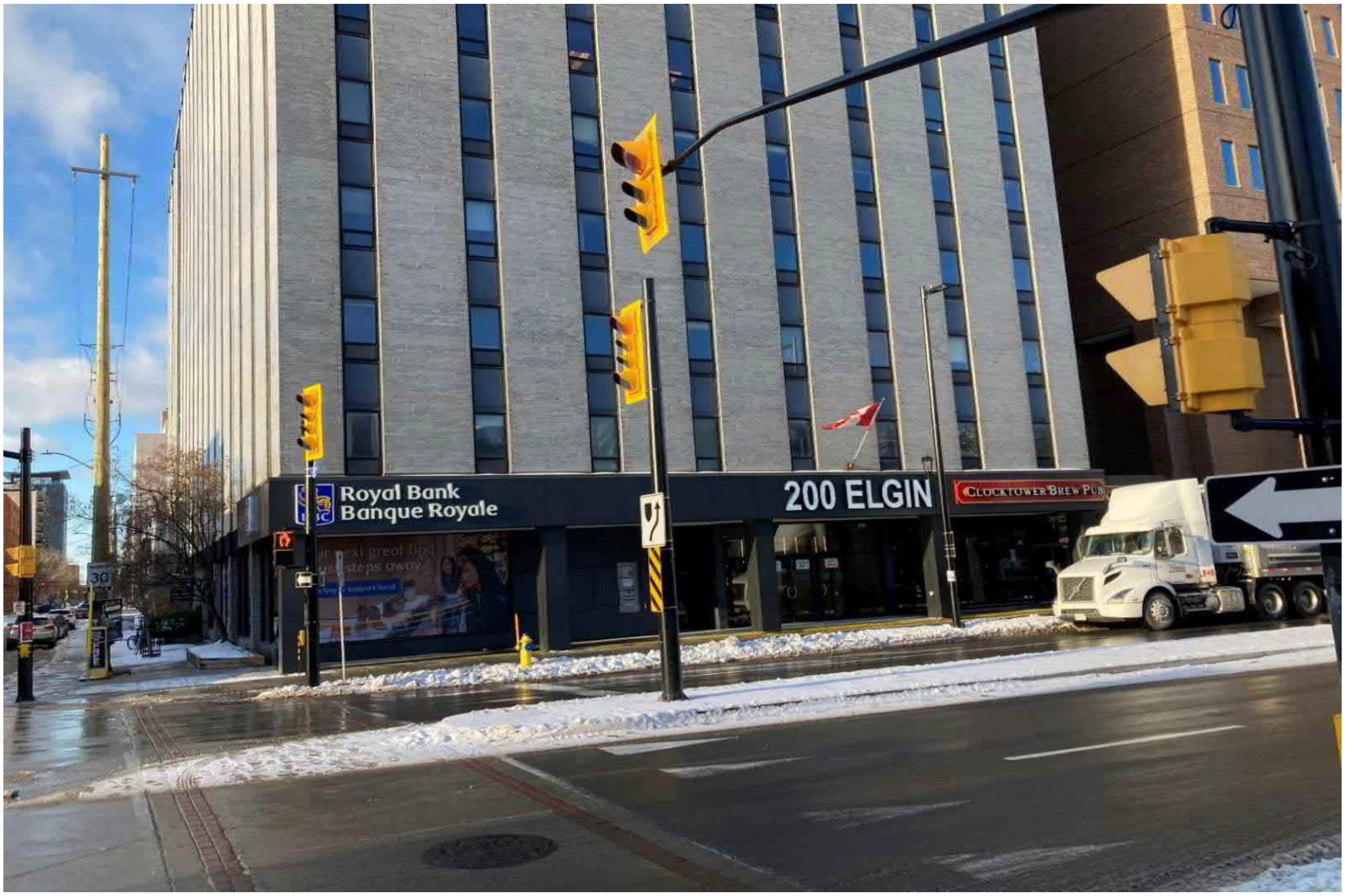
200 Elgin Street, Ottawa Ontario

Parameter	Concentration	Units	Sample Location	Sample Identifier	Sample Depth (mbgs)	MECP Site Condition Standards **
Inorganics						
Electrical Conductivity	3650	µS/cm	BH2(MW)	BH2(MW)	n/a	**No SCS**
pH	9.32	pH Unit	BH5(MW)	BH5(MW)	n/a	**No SCS**
Chloride	920000	µg/L	BH2(MW)	BH2(MW)	n/a	**2300000**
Dissolved Sodium	420000	µg/L			n/a	**2300000**
Cyanide	<2	µg/L	All Samples Analyzed		n/a	**66**
Metals						
Dissolved Antimony	<1.0	µg/L	All Samples Analyzed		n/a	**20000**
Dissolved Arsenic	7.6	µg/L	BH4(MW)	BH4(MW)	n/a	**1900**
Dissolved Barium	88.6	µg/L	BH2(MW)	BH2(MW)	n/a	**29000**
Dissolved Beryllium	<0.50	µg/L	All Samples Analyzed		n/a	**67**
Dissolved Boron	446	µg/L	BH4(MW)	BH4(MW)	n/a	**45000**
Dissolved Cadmium	<0.20	µg/L	All Samples Analyzed		n/a	**2.7**
Dissolved Chromium	<2.0	µg/L	All Samples Analyzed		n/a	**810**
Dissolved Cobalt	<0.50	µg/L	All Samples Analyzed		n/a	**66**
Dissolved Copper	1.8	µg/L	BH3(MW)	BH3(MW)	n/a	**87**
Dissolved Lead	1.17	µg/L	BH2(MW)	BH2(MW)	n/a	**25**
Dissolved Molybdenum	8.43	µg/L	BH4(MW)	BH4(MW)	n/a	**9200**
Dissolved Nickel	5.3	µg/L	BH5(MW)	BH5(MW)	n/a	**490**
Dissolved Selenium	<1.0	µg/L	All Samples Analyzed		n/a	**63**
Dissolved Silver	<0.20	µg/L	All Samples Analyzed		n/a	**1.5**
Dissolved Thallium	<0.30	µg/L	All Samples Analyzed		n/a	**510**
Dissolved Uranium	2.6	µg/L	BH4(MW)	BH4(MW)	n/a	**420**
Dissolved Vanadium	20.1	µg/L	BH5(MW)	BH5(MW)	n/a	**250**
Dissolved Zinc	13.7	µg/L	BH4(MW)	BH4(MW)	n/a	**1100**
Mercury	<0.02	µg/L	All Samples Analyzed		n/a	**2.8**
Chromium VI	<2	µg/L	All Samples Analyzed		n/a	**140**
Volatile Organic Compounds (VOCs)						
Dichlorodifluoromethane	<0.80	µg/L	BH2(MW)	BH2(MW)	n/a	**4400**
Vinyl Chloride	<0.34	µg/L	BH2(MW)	BH2(MW)	n/a	**1.7**
Bromomethane	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**56**
Trichlorofluoromethane	<0.80	µg/L	BH2(MW)	BH2(MW)	n/a	**2500**
Acetone	<2.0	µg/L	BH2(MW)	BH2(MW)	n/a	**130000**
1,1-Dichloroethylene	<0.60	µg/L	BH2(MW)	BH2(MW)	n/a	**17**
Methylene Chloride	<0.60	µg/L	BH2(MW)	BH2(MW)	n/a	**5500**
Trans- 1,2-Dichloroethylene	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**17**
Methyl tert-butyl Ether	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**1400**
1,1-Dichloroethane	<0.60	µg/L	BH2(MW)	BH2(MW)	n/a	**3100**
Methyl Ethyl Ketone	<2.0	µg/L	BH2(MW)	BH2(MW)	n/a	**1500000**
Cis- 1,2-Dichloroethylene	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**17**
Chloroform	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**22**
1,2-Dichloroethane	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**12**
1,1,1-Trichloroethane	<0.60	µg/L	BH2(MW)	BH2(MW)	n/a	**6700**
Carbon Tetrachloride	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**8.4**
Benzene	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**430**
1,2-Dichloropropane	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**140**
Trichloroethylene	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**17**
Bromodichloromethane	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**85000**
Methyl Isobutyl Ketone	<2.0	µg/L	BH2(MW)	BH2(MW)	n/a	**580000**
1,1,2-Trichloroethane	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**30**
Toluene	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**18000**
Dibromochloromethane	<0.20	µg/L	BH2(MW)	BH2(MW)	n/a	**82000**
Ethylene Dibromide	<0.20	µg/L	BH2(MW)	BH2(MW)	n/a	**0.83**
Tetrachloroethylene	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**17**
1,1,1,2-Tetrachloroethane	<0.20	µg/L	BH2(MW)	BH2(MW)	n/a	**28**
Chlorobenzene	<0.20	µg/L	BH2(MW)	BH2(MW)	n/a	**630**
Ethylbenzene	<0.20	µg/L	BH2(MW)	BH2(MW)	n/a	**2300**
m & p-Xylene	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**No SCS**
Bromoform	<0.20	µg/L	BH2(MW)	BH2(MW)	n/a	**770**
Styrene	<0.20	µg/L	BH2(MW)	BH2(MW)	n/a	**9100**
1,1,2,2-Tetrachloroethane	<0.20	µg/L	BH2(MW)	BH2(MW)	n/a	**15**
o-Xylene	<0.20	µg/L	BH2(MW)	BH2(MW)	n/a	**No SCS**
1,3-Dichlorobenzene	<0.20	µg/L	BH2(MW)	BH2(MW)	n/a	**9600**
1,4-Dichlorobenzene	<0.20	µg/L	BH2(MW)	BH2(MW)	n/a	**67**
1,2-Dichlorobenzene	<0.20	µg/L	BH2(MW)	BH2(MW)	n/a	**9600**
Xylenes (Total)	<0.30	µg/L	BH2(MW)	BH2(MW)	n/a	**45**
1,3-Dichloropropene (Cis + Trans)	<0.20	µg/L	BH2(MW)	BH2(MW)	n/a	**4200**
n-Hexane	<0.40	µg/L	BH2(MW)	BH2(MW)	n/a	**520**
Petroleum Hydrocarbons (PHCs)						
F1 (C6-C10)	<25	µg/L	All Samples Analyzed			**750**
F1 (C6-C10) minus BTEX	<25	µg/L	All Samples Analyzed			**750**
F2 (C10-C16)	<100	µg/L	All Samples Analyzed			**150**
F3 (C16-C34)	<100	µg/L	All Samples Analyzed			**500**
F4 (C34-C50)	<100	µg/L	All Samples Analyzed			**500**

Legend:

**	*Table 3 Standards for medium-fine textured soils in a non-potable groundwater environment for residential/parkland/institutional land use, as outlined in the MECP document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act".*
No SCS	*No Site Condition Standard*
<0.013	*Non Detectable (i.e. the analytical result was below the method reporting limit for the test)*
124	*Sample result exceeds the corresponding Site Condition Standard*
<0.070	*Minimum laboratory detection exceeds Site Condition Standard*
µg/g	*microgam per gram*
mbgs	*metres below ground surface*
mS/cm	*microSiemens per centimetre*

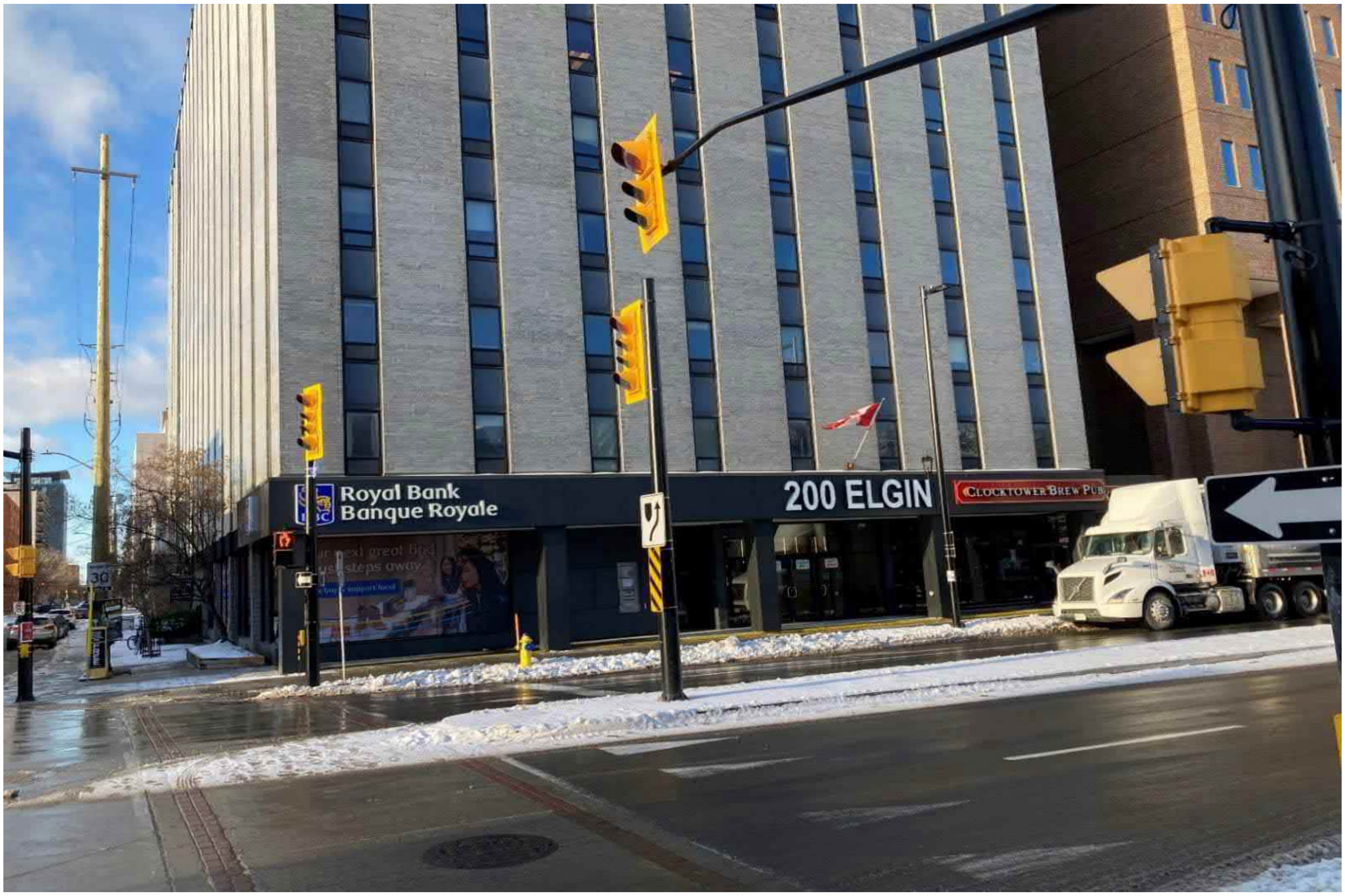
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
200 ELGIN STREET, OTTAWA, ONTARIO



APPENDIX A: SAMPLING AND ANALYSIS PLAN

MCINTOSH PERRY

SAMPLING AND ANALYSIS PLAN
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
200 ELGIN STREET, OTTAWA, ONTARIO



Project No.: CCO-22-3539

Prepared for:

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March 24, 2022

MCINTOSH PERRY

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Appendix A – Borehole Location Plan

Appendix B – SOPs for the Proposed Phase Two ESA

1.0 INTRODUCTION

1.1 Background

McIntosh Perry was retained by Mr. Kelly Kerrigan of Elgar Holdings Inc. (the 'Client') to conduct a Phase Two Environmental Site Assessment (ESA) for the property located at 200 Elgin Street, Ottawa, Ontario (the 'Phase Two Property' or 'Site'). The Phase Two Property is currently occupied by an eleven storey commercial/office multiplex building with a basement level containing underground parking.

It is understood that this Phase Two ESA is being completed in support of the redevelopment of the Phase Two Property as a multi-unit residential building with commercial space on the main level. This represents a change to a more sensitive land use, and as such, a Record of Site Condition (RSC) is required under the Ontario Environmental Protection Act and Ontario Regulation (O. Reg.) 153/04, as amended. Accordingly, this report has been prepared in general accordance with O. Reg. 153/04, as amended.

McIntosh Perry conducted a Phase One ESA at the Phase Two Property (referred to as Phase One Property during the Phase One ESA), the findings of which are outlined in the draft report entitled "*Phase One Environmental Site Assessment, 200 Elgin Street, Ottawa, Ontario*", prepared for the Client and dated January 21, 2022 (2021 McIntosh Perry Phase One ESA). Based on the findings of the 2021 McIntosh Perry Phase One ESA, several Potentially Contaminating Activities (PCAs) were identified on the Phase One Property and within the Phase One Study Area including the presence of two (2) aboveground storage tanks on-Site, containing diesel fuel and associated with the backup generator, historic oil-fired boilers used for heating the Phase One Property, historic printing operation that occurred at the Phase One Property, and a 30 litre (L) oil spill, all of which which are considered to represent on-Site PCAs resulting in Areas of Potential Environmental Concern (APECs). One off-Site PCA associated with past underground storage tanks which serviced a gasoline outlet and garage was considered to represent an APEC in relation to the Phase One Property.

Based on the above-noted APECs and their proximity to the Phase One Property, a Phase Two ESA was required before an RSC can be filled.

This Sampling and Analysis Plan (SAP) presents the sampling program proposed for the Site to assess all APECs on the Phase Two Property, the recommended procedures and protocols for sampling and related field activities, the data quality objectives, and the quality assurance/ quality control (QA/QC) measures that will be undertaken to provide for the collection of accurate, reproducible, and representative data. These components are described in further detail below.

1.2 Objectives

As per the requirements of O. Reg. 153/04 (as amended), the objectives of this Sampling and Analysis Plan are as follows:

- Plan an investigation that will achieve the general objectives of a Phase Two Environmental Site Assessment:

  - Through the use of an appropriate and complete information base concerning the Phase Two Property; and
  - Through the conduct of an investigation based both on information obtained before the Phase Two Environmental Site Assessment and on the incorporation of information obtained during the subsurface investigation.

- To develop a Sampling and Analysis Plan that will adequately assess all areas of the subsurface investigation property where contaminants may be present in land or water on, in or under the property.
- To develop a quality assurance program that is designed to effectively limit errors and bias in sampling and analysis through implementation of assessment and control measures that will ensure data are useful, appropriate and accurate in the determination of whether the Phase Two Property meets applicable Ontario Ministry of the Environment, Conservation and Parks (MECP) Site Condition Standards.

2.0 SAMPLING PROGRAM

2.1 Areas of Potential Environmental Concern and Contaminates of Potential Concern

Based on a preliminary review of the Site and surrounding areas, the following Areas of Potential Environmental Concern and Contaminants of Potential Concern have been identified:

Areas of Potential Environmental Concern Identified in 2021 McIntosh Perry Phase One ESA Report					
Area of Potential Environmental Concern	**Location of Area of Potential Environmental Concern on Phase One Property**	**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	Southwest corner of property	#28 Gasoline and Associated Products Storage in Fixed Tanks Oil-Fired Boilers	On-Site	PHCs, BTEX	Soil and Groundwater
APEC-2	Unknown	#31 Ink Manufacturing, Processing and Bulk Storage	On-Site	VOCs, Heavy Metals	Soil and Groundwater
APEC-3	Unknown	Other (Not Listed) Spill – Oil to ground	On-Site	PAHs, PHCs	Soil and Groundwater
APEC-4	Southwest corner of property	#28 Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs, BTEX	Soil and Groundwater
APEC-5	North adjacent of property	#28 Gasoline and Associated Product Storage in Fixed Tanks #10 Commercial Autobody Shops (off-Site automotive garage)	196 Elgin Street	PHCs, BTEX, Metals, VOCs	Soil and groundwater

2.2 Borehole Locations

The boreholes proposed under this investigation are located to assess the above-noted APECs. A summary of proposed borehole locations is provided below.

Borehole (BH) ID	Location and Rationale	Depth
BH1(MW)	200 Elgin Street; APEC-5	4.57 m; shallow water table
BH2(MW)	200 Elgin Street; APEC-5	4.57 m; shallow water table
BH3(MW)	200 Elgin Street; APECs- 1, 2, and 3	4.57 m; shallow water table
BH4(MW)	200 Elgin Street; APECs- 1, 2, and 3	4.57 m; shallow water table
BH5(MW)	200 Elgin Street; APEC-4	4.57 m; shallow water table

A plan showing proposed borehole locations is appended to this SAP as Figure 1.

2.3 Groundwater Monitoring Well Locations

The groundwater monitoring wells proposed under this investigation are located to assess the above-noted APECs. A summary of proposed groundwater monitoring well locations is provided below.

Borehole (BH) ID	Location and Rationale	Depth
BH1(MW)	200 Elgin Street; APEC-5	4.57 m; shallow water table
BH2(MW)	200 Elgin Street; APEC-5	4.57 m; shallow water table
BH3(MW)	200 Elgin Street; APECs- 1, 2, and 3	4.57 m; shallow water table
BH4(MW)	200 Elgin Street; APECs- 1, 2, and 3	4.57 m; shallow water table
BH5(MW)	200 Elgin Street; APEC-4	4.57 m; shallow water table

A plan showing proposed monitoring well locations is appended to this SAP as Figure 1.

2.4 Proposed Soil and Groundwater Samples

A summary of proposed environmental soil and groundwater samples to be submitted for laboratory analysis is provided in the following table.

BH/MW ID	Sample ID	Medium Sampled	Approx. Depth/ Stratigraphy	Chemical Analysis	Rationale
BH1(MW)	BH1(MW) -SS1	Soil	Native 0 to 1.80 m	PHCs, VOCs, metals & inorganics	General characterization
	BH1(MW) -SS4 or SS5	Soil	Native 3.60 to 4.57 m	PHCs, VOCs, metals & inorganics	General characterization
	BH1(MW)	Groundwater	2 – 4.57 m; shallow water table	PHCs, VOCs, metals & inorganics	General characterization
BH2(MW)	BH1(MW) -SS1	Soil	Native 0 to 1.80 m	PHCs, VOCs, metals & inorganics	General characterization
	BH2(MW) -SS4 or SS5	Soil	Native 3.60 to 4.57 m	PHCs, VOCs, metals & inorganics	General characterization
	BH2(MW)	Groundwater	2 – 4.57 m; shallow water table	PHCs, VOCs, metals & inorganics	General characterization
BH3(MW)	BH3(MW) -SS1	Soil	Native 0 to 1.80 m	PHCs, VOCs, metals & inorganics	General characterization
	BH3(MW) - SS4 or SS5	Soil	Native 3.60 to 4.57 m	PHCs, VOCs, metals & inorganics	General characterization
	BH3(MW)	Groundwater	2 – 4.57 m; shallow water table	PHCs, VOCs, metals & inorganics	General characterization
BH4(MW)	BH4(MW) -SS1	Soil	Native 0 to 1.80 m	PHCs, VOCs, metals & inorganics	General characterization
	BH4(MW) -SS4 or SS5	Soil	Native 3.60 to 4.57 m	PHCs, VOCs, metals & inorganics	General characterization
	BH4(MW)	Groundwater	2 – 4.57 m; shallow water table	PHCs, VOCs, metals & inorganics	General characterization
BH5(MW)	BH5(MW) -SS1	Soil	Native 0 to 1.80 m	PHCs, VOCs, metals & inorganics	General characterization
	BH5(MW) -SS4 or SS5	Soil	Native 3.60 to 4.57 m	PHCs, VOCs, metals & inorganics	General characterization
	BH5(MW)	Groundwater	2 – 4.57 m; shallow water table	PHCs, VOCs, metals & inorganics	General characterization

It is noted that if visual or olfactory evidence of contamination is encountered during the subsurface investigation, different or additional samples may be submitted for laboratory analysis to capture the true "worst-case" scenario with respect to potential subsurface impacts in relation to the identified APECs at the Site.

Additionally, one (1) field duplicate soil sample and one (1) field duplicate groundwater sample will be submitted for laboratory analyses for QA/QC purposes.

2.5 Field Screening

Given the potential presence of volatile contaminants (PHCs, VOCs), soil samples will be screened using a photoionization detector (PID) and/or combustible gas indicator (CGI) in an attempt to determine the "worst-case" samples for laboratory analysis. Field screening measurements will be recorded in McIntosh Perry's field notes and summarized in the Phase Two ESA Report.

2.6 Groundwater Monitoring Well Installation

A total of five (5) groundwater monitoring wells are proposed to be installed at the Phase Two Property. Groundwater monitoring wells will be constructed using 1.25-inch (31.75 millimetre) diameter Schedule 40 PVC well screen (10 slot) flush-threaded to Schedule 40 PVC riser pipe. A silica sand 'filter pack' will be installed in the annular space around the well screen. A bentonite clay seal will be installed above the screened interval to prevent infiltration of surface water into the well, and the monitoring wells will be sealed at the surface with a lockable J-plug and a steel flush-mount casing.

Monitoring well installation will be conducted in accordance with O. Reg. 903 (as amended).

3.0 QUALITY ASSURANCE AND QUALITY CONTROL

A summary of quality assurance and quality control measures to be employed during the investigation is provided below.

3.1 Decontamination of Equipment

Boreholes will be advanced using direct push methods with single-use PVC liners. Direct push rods will arrive at the Site in a pre-cleaned condition.

During groundwater monitoring, all non-dedicated equipment (i.e., water level tape) will be cleaned using a water and Alconox™ solution**.**

No other non-dedicated sampling equipment is expected to be used during the completion of the Phase Two ESA.

3.2 Field Duplicate Samples

At least one (1) field duplicate soil and groundwater samples will be collected and analysed for each ten (10) soil or groundwater samples submitted for laboratory analysis. Field duplicates will be analyzed for all parameters for which their corresponding samples are analyzed.

3.3 Sampling Protocols

Soil samples collected as part of this Phase Two ESA were directly deposited into the following laboratory-supplied containers:

- PHCs (F1-F4) and VOCs – one (1) 40 millilitre (mL) glass vial preserved with methanol, and with a corresponding Terra Core Sampler, and one (1) 120 mL glass vial; and
- Metals & inorganics – one (1) plastic bag.

Groundwater samples collected as part of this Phase Two ESA were directly deposited into the following laboratory-supplied containers:

- PHCs (F1-F4)/BTEX – two (2) 100 mL amber glass bottle preserved with hydrochloric acid, and three (3) 40 mL amber glass vials preserved with sodium bisulfate;
- VOCs – three (3) 40 mL amber glass vials preserved with sodium bisulfate; and
- Metals & inorganics – one (1) 120 mL plastic bottle preserved with ammonia (field filtered), one (1) 60 mL plastic bottle preserved with nitric acid (field filtered), one (1) 250 mL plastic bottle with no preservative, two (2) 40 mL amber glass vials preserved with hydrochloric acid, and one (1) 60 mL plastic bottle preserved with sodium hydroxide.
- The jars, bottles and preservatives (where applicable) used in the collection of soil and groundwater samples will be supplied by the analytical laboratory. Samples will be stored in ice-packed coolers until the samples are transported to the laboratory for chemical analysis. Samples will be either handed over

to or dropped off at the laboratory by MP personnel. Chains of Custody for the samples will be prepared using laboratory-provided Chain of Custody forms.

- Groundwater and soil sampling will be completed in general accordance with MECP's "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario" (May 1996) and McIntosh Perry's internal Standard Operating Procedures (SOPs).

4.0 DATA QUALITY OBJECTIVES

The purpose of the collection of field duplicate samples is to measure the precision or reproducibility of the field and laboratory methodology used in the collection and analysis of the samples. The precision is evaluated in terms of the relative percent difference (RPD) between the analyses of the field duplicate sample and its corresponding original sample. The RPDs of the original and field duplicate samples will not be calculated in situations where one or both of the original and field duplicate samples exhibit concentrations of analyzed parameters that are below the laboratory Reporting Detection Limits (RDLs).

The RPD between the involved samples will be calculated using the following formula:

$$RPD = \frac{(A - B)}{\frac{(A + B)}{2}} \times 100\%$$

Where:
A = concentration of compound in the primary sample
B = concentration of compound in the duplicate sample

Notes:

- RPD is calculated only for result pairs with concentrations greater than 5 times of the method detection limit in both samples.
- RPDs are not calculated where results are below the laboratory RDLs for sample pair.

The acceptable RPD limits for various analyzed groups are listed in the following table.

Parameter Group	Recommended RPD in Soil	Recommended RPD in Groundwater
PHC	30%	30%
VOCs	50%	30%
PAHs	40%	30%
PCBs	40%	30%
1,4-Dioxane	50%	30%
Dioxins/Furans	40%	30%
Organochlorine (OC) Pesticides	40%	30%
Metals	30%	20%
Hexavalent Chromium, Cr(VI)	35%	20%

Parameter Group	Recommended RPD in Soil	Recommended RPD in Groundwater
Cyanide (CN−)	35%	20%
Fraction Organic Carbon (FOC), Chloride	35%	20%
Methyl Mercury	40%	30%
Electric Conductivity	10%	-
pH	Within 0.3 pH units	-
** Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act - Laboratory Services Branch Ministry of the Environment - March 9, 2004, amended as of July 1, 2011*		

Laboratory quality control limits for duplicate, method blank, method blank spike, matrix spike and surrogate recoveries will also be reviewed.

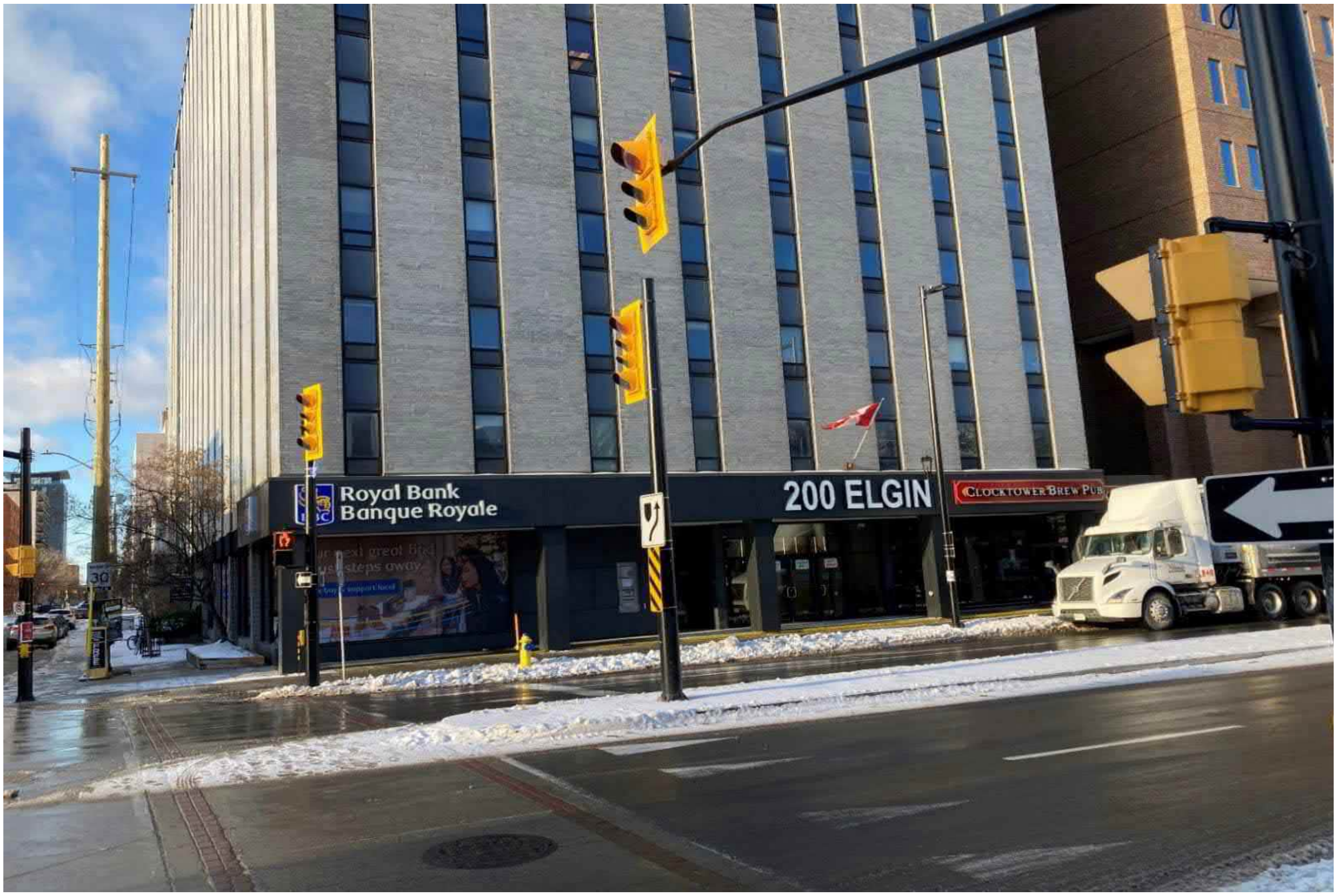
5.0 STANDARD OPERATING PROCEDURES

MP has implemented a SOP program for environmental field activities. The SOPs are regularly updated and are provided to field staff as needed. SOPs applicable to this program will include:

- SOP 1-01: General Field Notes and Record Keeping
- SOP 1-03: Handling, Storage and Shipment of Samples
- SOP 3-01: Planning a Phase 2 Environmental Site Assessment and Creating a Sampling and Analysis Plan
- SOP 3-02: Naming Conventions for Sampling Locations
- SOP 3-03: Naming Conventions for Individual Soil and Groundwater Samples
- SOP 3-04: Duplicate Samples
- SOP 3-05: Underground Service Locates
- SOP 3-07: Management of Drill Cuttings and Purge Water
- SOP 3-10: Overburden Drilling – Portable Rig
- SOP 3-16: Monitoring Well Installation and Development
- SOP 3-19: Water Level and Headspace Vapour Measurement
- SOP 3-20: Field Measurement of Water Quality Parameters
- SOP 3-21: Groundwater Sampling
- SOP 3-22: Description of Soil Samples
- SOP 3-24: Field Screening and Soil Vapour Measurements
- SOP 3-27: Phase 2 Environmental Site Assessment Reports

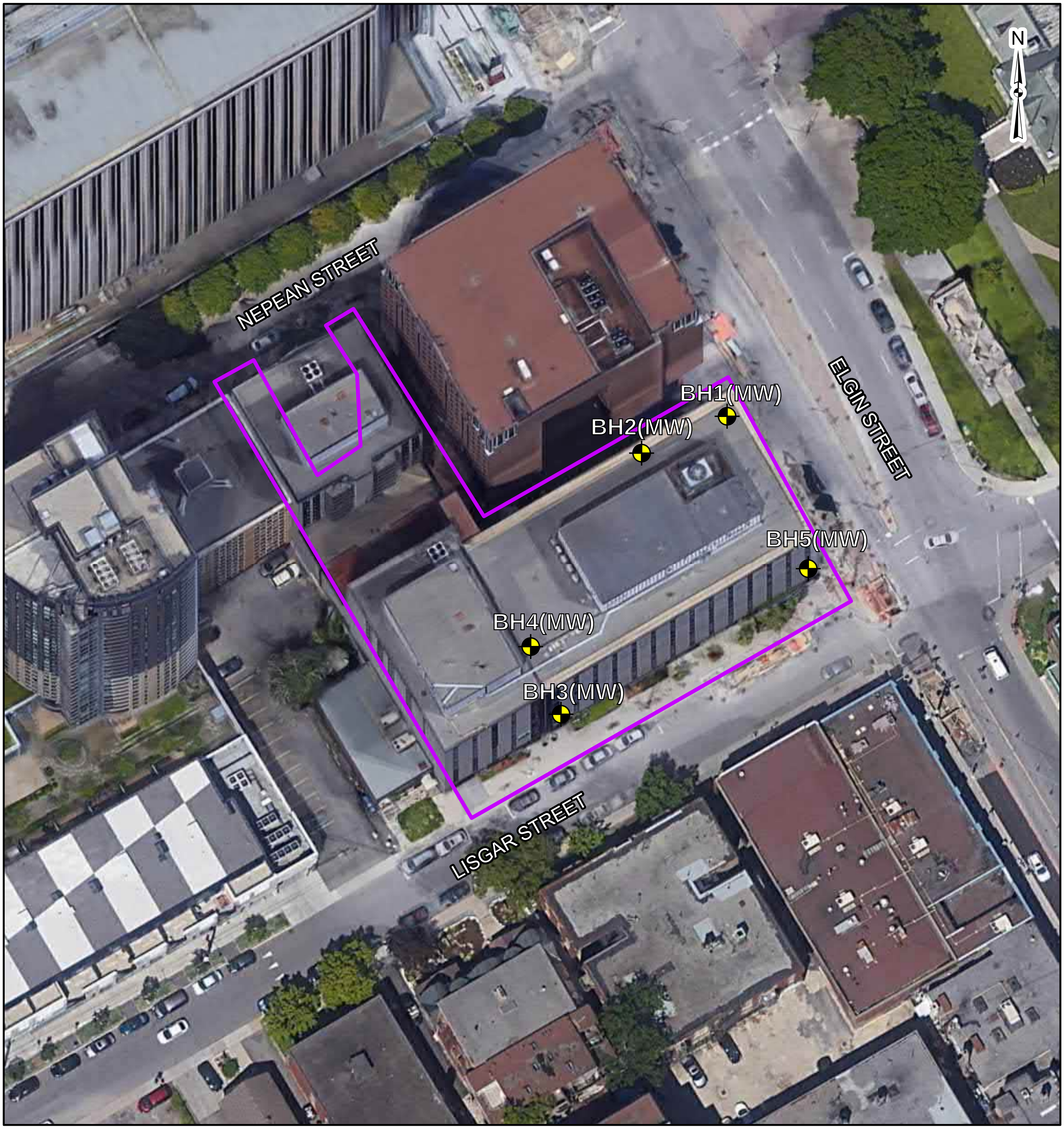
Copies of these SOPs are provided as an appendix to this SAP.

SAMPLING AND ANALYSIS PLAN
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
200 ELGIN STREET, OTTAWA, ONTARIO



APPENDIX A: PROPOSED BOREHOLE AND MONITORING WELL LOCATION PLAN

McINTOSH PERRY



LEGEND

Approximate Site Boundary

Borehole/Monitoring Well Location

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2022.

CLIENT: ELGAR HOLDINGS INC.

PROJECT: PHASE TWO ESA
200 ELGIN STREET, OTTAWA, ON

TITLE: BOREHOLE AND MONITORING WELL LOCATION PLAN

MCINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

PROJECT NO:CCO-22-3539		FIGURE: 1
Date	Jan., 24, 2022	
GIS	EU	
Checked By	KC	

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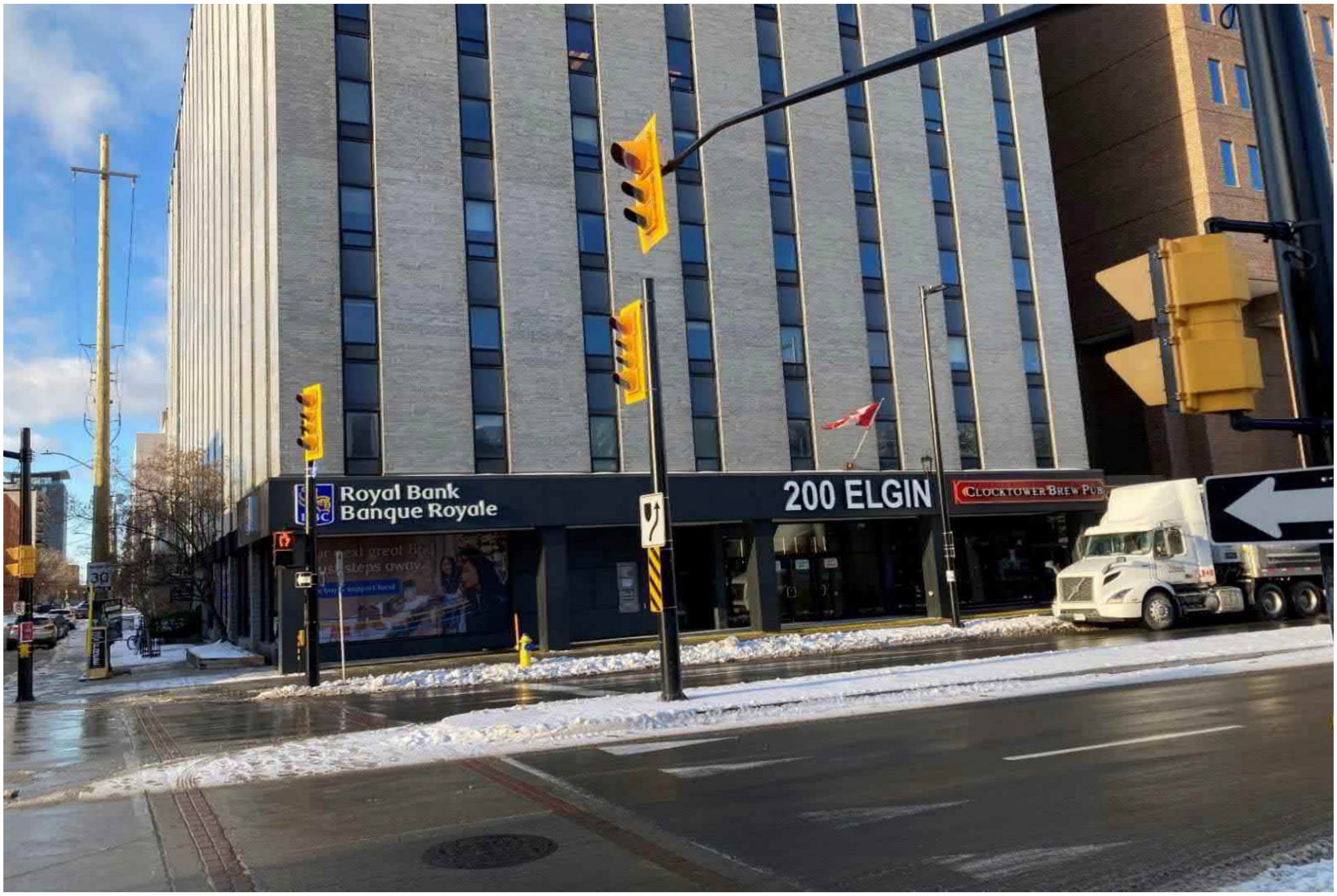
SAMPLING AND ANALYSIS PLAN
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
200 ELGIN STREET, OTTAWA, ONTARIO



APPENDIX B: STANDARD OPERATING PROCEDURES

McINTOSH PERRY

SOP 1-01: GENERAL FIELD NOTES AND RECORD KEEPING

Objective

In environmental geoscience and engineering, what we do depends on, and effects, conditions in the real world. And since our field notes are the record of our observations of, and interactions with, the real world, they are the foundation of the project. Everything depends on the quality of data collected in the field, and our ability to clearly record those data and find them when we need them.

Because we never quite know what will happen on a project, we never know when, why, and in what capacity our field notes may be called on in the future. They may be called upon in regulatory proceedings or court cases, and in this sense, they are ***legal documents***. But of equal importance is ***telling the story*** of what happened on-site and why it happened. Hard data (such as sample depths and IDs, survey data) are important, but so are weather conditions, time of arrival on-site, and information such as why a borehole was moved or terminated at a certain depth, whether a surface water location was dry or inaccessible, or whether anything interesting was going on on-site since the last time you were there. It may not seem very important now but might be more important later, especially when trying to make sense of something unexpected.

The guiding principle of your field notes should be "***memorize nothing***." Somebody unfamiliar with the project should be able to get a good idea of what was done, and the reasoning behind it, from properly collected and managed field notes.

Field notes may be recorded in field books (which may hold notes from multiple projects) or on paper pads (e.g., McIntosh Perry graph paper) or field forms (e.g., borehole log forms).

Procedure: Field Books

- Use Cansel, Duksbak, or Rite-In-The-Rain field books depending on availability and weather conditions;
- Name of field staff along with McIntosh Perry should be clearly printed on the outside and inside cover of the book. Project numbers/table of contents should also appear on the first few pages (most surveying-type field books have dedicated pages for this). A business card taped on the inside cover with clear tape is also a good idea;
- Every staff member's field books should be numbered sequentially and should show the date range in which the book was used;
- For long/ongoing projects, a dedicated project field book is recommended;
- For multiple-project field books, the following should appear at the top of every page:
    - Project number;
    - Date;
    - Name or initials; and,
    - Page number (e.g. 1 of 3, 2 of 3, 3 of 3).

- The project number need not appear on each page for project-specific field books; and,
- Pages should never be intentionally torn out of a field book. If this happens accidentally, replace the page with tape if possible, and if not, provide an explanation on the following page.

Procedure: Individual Pages or Field Forms

- If notes are being taken on paper pads or field forms, these pages should be secured within a binder or clipboard at all times, especially during windy conditions;
- Appropriate protection from weather should be provided (e.g., cover with a plastic bag if raining);
- If notes are made directly on plans, retain the plans in the project file and make reference to the plans in the project field notes. Date, project number, and name or initials should appear on each marked-up plan used in the field; and,
- Project number, date, name/initials, and page number should appear on each page as above (McIntosh Perry graph paper has fields provided for this information).

Procedure: Field Notes

- Whether using individual sheets of paper, plans, or field books, all field notes should be photocopied and/or scanned and placed/saved in the project file upon the completion of field work;
- Ink or pencil are both acceptable for field notes. If using ink, blue or black are preferable;
- Do not erase or black out any errors or corrections. Instead, strike through so that original text is legible, and provide your initials and reason for correction;
- Write notes as clearly and legibly as possible;
- Use neutral language and report facts and professional (not personal) opinions;
- For each day of field work, the following should appear on the ***first*** page of your field notes:
    - Site location (address if known), client, project description, any other information useful in uniquely identifying the site (e.g. MTO contract number);
    - Individuals on site (McIntosh Perry staff, contractors, client representatives, MOECC or MOL representatives, etc.) and time of arrival (for yourself and, if known, for others);
    - Vehicle mileage if applicable;
    - Weather conditions (e.g. overcast, -3°C, light wind from southwest);
    - Objectives/reason for visit (e.g. “McIntosh Perry staff on-site to complete drilling and monitoring well installation for Phase 2 ESA; McIntosh Perry staff on-site to complete quarterly groundwater monitoring”); and,
    - Field equipment used.
- For each day of field work, the following should appear on ***last*** page of your field notes:
    - Brief summary of work completed;
    - Summary of intentions or important tasks to be completed next day or next time on-site;
    - Time off-site (for yourself and, if known, for others); and,
    - Summary of major expenses and/or consumables used.

- To the extent that you can reasonably find out while doing your job, record who enters and leaves the site during your time there, and why (e.g., MOL staff on-site to conduct surprise inspection, MOECC staff on-site to inspect pump-and-treat system, client on-site to review progress, etc.);
- Record any instructions you receive from clients, project managers, contractors, regulatory authorities, etc., or if you are calling the office for advice, provide a brief description of questions and answers;
- Record any instructions you give to contractors, clients, etc.;
- Note the cause and duration of any delays;
- Note interaction with neighbours, public, wildlife, etc., if relevant; and,
- Note any changes to work plan (e.g., can't drill in a select location due to locates issues, can't find a MW, etc.), who (if anyone) you informed, what their response was, and how you decided to proceed.

Procedure: Field Plans

- Whenever possible, take a copy of an existing plan or air photo with you into the field to mark up. This will allow you to scale and/or orient any features observed in the field with real-world objects;
- Existing plans, air photos, or field sketches should all have the following information clearly shown:
  - Project number;
  - Date;
  - North arrow; and,
  - Your initials.
- If shooting GPS coordinates of site features, indicate waypoint identification on plan, or name your waypoints corresponding to the site features you are shooting;
- Sometimes, a field sketch must be created from scratch. Field sketches should show all relevant site features, ideally in sufficient detail to locate everything later without GPS coordinates (although shooting GPS coordinates is recommended);
- Field sketches should either be drawn to scale using graph paper (with the scale factor or scale bar, i.e., metres per square of graph paper, clearly shown), or should clearly state "not to scale" with all relevant dimensions shown; and,
- As with field notes, field sketches should be scanned upon return to the office.

Procedure: Office Notes

- Much of what goes on in the office does not need to be documented in the same level of detail as field notes. Meeting minutes are beyond the scope of this SOP, and personal timekeeping/ project notes are left to the discretion of the individual;
- However, certain things should always be documented, including:
  - Any discussions regarding change of scope or budget with the client;
  - Communication with regulatory authorities; and,
  - Contact information of key personnel.

- In this age of email, most communication of this nature can be saved in the electronic project folder. However, if you have a phone call with a client, contractor, or regulatory authority, it is best to write down a summary of the phone call or to send an email summarizing what was discussed and action items for their record and/or review.

Revision History

Original version in file dated December 2013
Updated by D. Arnott January 2017
Reviewed by Mark Priddle February 2018
Updated by D. Arnott March 2018

SOP 1-03: HANDLING, STORAGE, AND SHIPMENT OF SAMPLES

Objective

Analytical testing of soil, groundwater, surface water, and asbestos samples is a critical component of much of the work we do – Phase 2 ESAs, designated substance surveys, groundwater monitoring programs for solar farms, hydrogeological investigations, landfill monitoring programs, and domestic well testing programs. Often, acquiring a sample comes at great expense – our time, travel expenses, and subcontractor costs such as drilling contractors or pump rental. It's not unusual to travel a day out and a day back for what can be as little as an hour's work to acquire a few samples (particularly for northern MTO work). If, for whatever reason, a sample can't be analyzed, or if its results are called into question and can't be relied upon, all the costs associated with acquiring those samples go out the window.

With planning and communication, it's possible to consistently obtain high-quality samples and get them to the lab within their specified hold time, at an appropriate temperature and in good condition. The following SOP outlines a few things that are helpful to remember.

When in doubt, ***talk to the laboratory***. Give them the full context of what you're trying to accomplish with your sampling program, and they will tell you what you need from their perspective. This should be done ***before you go into the field to take your samples***.

Procedure: Sample Labelling

- Sample bottles should be labelled with an indelible writing instrument. Different labs use different types of labels - sometimes pencil won't leave a mark, or pen or marker will wipe off - so see what works before you go out into the field. Test your writing out with a little water to see if it washes off, since your sample bottles will likely get wet. Most labs can pre-label bottles if sample IDs are known prior to entering the field - in this case only date and time of sample will need to be added to the label;
- Sharpies are sometimes discouraged from use for labelling bottles because they contain BTEX, but it's been our experience that writing on the exterior of the bottle won't affect the contents inside unless you get sharpie on your gloves and then handle samples (don't do this; change your gloves if you have to);
- Methanol and other chemicals from preserved laboratory vials and bottles will cause permanent marker to run. Place your soil cores within the preserved vials to prevent any splashback down the exterior of the vial which might cause the marker to run (this is also covered in various SOPs in Section 3). Be careful not to spill preservative found in these vials or water sample bottles; also do not use a sample bottle if it appears to have leaked (this is evidenced by a yellow staining on the label, or strong smell);
- Your writing must be legible by staff at the lab, or they will call you to inquire about sample IDs. Even if you can read your writing and they can't, you won't have the bottle in front of you. There's no reason to have to guess what a sample ID is;

- The following information should appear on every sample bottle, usually in lab-provided fields:
    - Sample ID;
    - Date;
    - Time (particularly important when sampling wastewater or drinking water for bacteriological parameters with short hold times);
    - Company name (McIntosh Perry); and,
    - Project number and phase.

- Sample IDs used on sample jars or bottles should be completely consistent with what appears on plans and chains of custody. Putting "BH7-1" on one and "7-1" or "BH7-SS1" on the other is unacceptable. Our sample IDs are short and simple and there's no reason not to be consistent;
- If possible, and if you're fairly certain which samples you're going to take (e.g., a landfill with set sampling locations instead of a contaminated site investigation where you're not sure what will be contaminated), label your bottles and jars ahead of time. This makes the field day quicker. Do it in the warmth of your car if you can, or as noted above have the lab pre-label the bottles;
- This isn't very common anymore, but sometimes jars or bottles don't have labels stuck on them yet. If you can, stick these on before you get out into the field (cold/wet can affect label adhesion);
- If you order pre-labelled bottles check these labels against sample locations on plans and make sure the lab labelled the bottle correctly. Re-label lab containers if necessary. If the lab has made an error, make note of which locations need to be corrected and let the lab know before the next sampling event;
- Duplicate samples should be labelled as per the conventions outlined in SOP 3-02. Make sure you record which location a field duplicate sample was taken at; and,
- Trip blanks should be provided by the laboratory and should appear on the chain of custody as they are labelled by the lab.

Procedure: Sample Handling (Transportation and Storage)

- No matter which parameters are analyzed, it's always good practice to store your samples in an ice-filled cooler for transport. Strictly speaking, you don't need a cooler if they are to be submitted within 24 hours of sampling, but sometimes complications arise unexpectedly. A cooler will keep your samples warm in the winter and cool in the summer, as well as protect the bottles from breakage when handling;
- Labs should always provide coolers. Ask the labs to underfill the coolers when they pack them with your sample bottles and send them. An underfilled cooler gives us enough room to pack them with ice;
- Ice can be bought at most variety stores, gas stations, grocery stores, etc. BUY ICE. Charge it to the job. It's worth the stop;
- If for whatever reason you can't stop for ice, and its winter, pack some sealable bags with snow or naturally-occurring ice. Try to use clean material;

- Ice should ***not*** be kept loose in coolers. Put it in Ziploc bags. Likewise, sample bottles should be kept in sealable bags (usually provided by the lab). The point of this is that sample bottles or jars should never be floating in meltwater in the bottom of the cooler. All bottles will (of course) be properly sealed, but if they're floating in meltwater, there's the chance that some could get in and contaminate your samples. Or, more likely, the lab will put a qualifier on your samples;
- If possible, especially in summer/on hot days, get ice in the morning and pre-fill/pre-chill your coolers at the beginning of the day. Get more ice at the end of the day if necessary;
- If you are submitting your samples the next day, put them in the office fridge overnight. Often, the lab ships samples with cool packs, which can be kept in the freezer until the job is done, and then put in the cooler on the day you're shipping your samples back to the lab;
- If there's no room in the fridge AND you need to keep your samples overnight/submit them the next day, get some more ice to keep them cool overnight;
- Don't leave your samples in the car overnight during winter. They might freeze and the bottles might crack;
- Bubble-wrap 40 mL vials as a minimum. Bubble wrap as many glass bottles as you have bubble wrap for. Bottles should not be rolling loose around the cooler. Ice can help to cushion bottles, and so can choosing the right sized cooler (this will somewhat depend on what the lab sends you);
- Don't write on the septa of 40 mL vials with a sharpie or other marker - this gets pierced by lab equipment, and if it's written on/contaminated, could introduce false positives to your sample;
- If shipping the coolers, indicate cooler number and total number of coolers on each cooler (e.g. 7 of 9);
- If shipping the coolers, make sure the drain plug on each cooler is closed. Couriers will not ship a leaking cooler. Theoretically, nothing should get out anyway since all your ice is in sealed bags and all your bottles are packed so as not to break, but better safe than sorry. It is also a good idea when shipping coolers long distances to line the cooler with a large garbage bag and place sealed sample and ice bags within the garbage bag and tape it shut; if an ice bag happens to break there will be no leakage from the cooler; and,
- For long distance shipping it is good practice to place ice filled bags on the bottom of the cooler, then samples bottles wrapped and sealed with bubble wrap, then another layer of ice filled bags on the top. All sealed within in a garbage bag, as noted above and then use bubble wrap or air filled bags to pad any empty voids in the cooler to prevent breakage.

Procedure: Chain of Custody Records

- Chain of Custody protocols stipulate that you have care and control of the samples you take, so don't let them out of your sight unless they're in a secure location. It's best to take them with you if you're travelling to different areas on the site. Lock your car if you stop for a coffee. Sometimes (especially with landfills) they must be left unattended in the back of a truck, but this should be avoided if possible;

- It always helps to lay your samples out when you're filling out your chain of custody - this ensures that everything on the COC is in the cooler and vice versa, and provides an extra double-check for consistency between sample containers, field notes, and COCs;
- Confirm which standards you're comparing your samples to, and whether it's in support of an RSC and/or for drinking water. For some labs, samples submitted for RSC and drinking water projects may require a certain type of COC. Noting the applicable site condition standards will determine which methods/detection limits the lab uses when analyzing your samples;
- Use AGAT for Quebec samples. Be advised that there are different parameter groups and even analytical methods (especially for PAHs) when comparing to Quebec's MDDELCC or Federal CCME criteria;
- Fill out COCs completely, and double-check anything you're not sure of with the project manager;
- If samples are to be held by the lab, indicate "HOLD" next to the sample or in the comments section on the COC. We might do this if we have taken/jarred TCLP or delineation samples, but don't know if we need them (or have client approval to bill for their analysis) until we get the results of the first few samples. If you think a sample might be analyzed, it's always safer in the hands of the lab (which is to say, it puts the liability on them);
- Fill out all fields on COCs completely. For date, etc., if you have multiple samples taken on the same date, don't use ditto marks or arrows. Write the date out completely for every sample. This takes a little extra time but shows that we are careful and thorough (and if any notes etc. are called into question/go to court, it adds credibility);
- Show the work order number, quote number, or standing offer number on the COC. Often, we will be getting a better price than the lab's standard rates, and if they don't have a reference, they may charge an increased rate;
- Sign and date the COC prior to sample pick-up or shipping, with your name and the date legibly printed as well; and,
- Avoid submitting samples for bacteriological analysis on a Friday. The analytical process takes 2 days, and not all labs have analysts on-call on the weekends, and if your sample sits all weekend, the hold time will be exceeded. Ask the lab beforehand if you have any questions. Sometimes they can accommodate us or outsource the sample. Also check with labs in areas you are not familiar working in (i.e. some labs in Mississauga ship bacteria samples to Ottawa, so bottles need to be received before 3 pm); also several labs only have depots in some areas and need to time to ship the samples to their full labs (e.g., Thunder Bay).

Procedure: Trip Blanks

- The lab will provide trip blanks for VOC analysis if requested. It is good practice to request a trip blank if you are sampling groundwater for VOCs in support of an RSC application. You will have to budget for the analysis of one more VOC sample. It is recommended that one trip blank be completed for every day of sampling, although one trip blank per project is usually fine too;
- DO NOT OPEN THE TRIP BLANKS. See SOP 3-04 for field blanks;

- Trip blanks will usually come pre-labelled by the lab. If so, use their labelling on your COC. Date will usually be "N/A". If not, name the trip blank "Trip Blank" - no need to use blind IDs; they prepared it, they know what it is; and,
- Keep your trip blank in the cooler all day as you sample. This is another good reason to pre-chill your cooler. As you add samples, if one of your samples is exuding VOCs strongly enough to contaminate other (possibly clean) samples, the trip blank will pick it up. You won't be able to rely on data from that day of sampling, but now you know and can make recommendations to sample again.

Procedure: Sample Storage (Office)

- Soil samples which are not going to be submitted should be stored in the shed in a clearly-labelled box. Samples should be held for 6 months and then discarded (this is further discussed in SOP 3-06). Boxes should contain project name and number, dates of drilling, and possibly date of projected disposal. Set an Outlook reminder for date of disposal;
- Samples which may be submitted should be kept in the fridge until they have exceeded their hold time. After that, they can go into storage boxes with the rest of the soil samples; and,
- Do not store samples at your desk and for short term storage store samples somewhere out-of-the-way where people won't trip over them.

Revision History

Original version (Record Keeping and Data Quality Protocols) in file dated December 2013
Updated by D. Arnott February 2017
Reviewed by M. Coyle March 2018
Reviewed by J. Bowman March 2018
Updated by D. Arnott March 2018

SOP 3-01: PLANNING A PHASE 2 ENVIRONMENTAL SITE ASSESSMENT AND CREATING A SAMPLING AND ANALYSIS PLAN

Objective

When completing a Phase 2 ESA to O.Reg. 153/04 (as amended), a Sampling and Analysis Plan is one of the required appendices. Although these have historically not been prepared for all Phase 2 ESAs (especially in Ottawa and Kingston), it's a good practice to begin to implement, as it can help us get a clear idea of exactly what the objectives are, and give us a handy reference document in the field.

Phase 2 ESA field programs, and Sampling and Analysis Plans, are always subject to change based on field conditions.

Procedure: Planning a Phase 2 ESA

- The planning of the Phase 2 ESA begins in the proposal stage (if a Phase 2 ESA is part of the Terms of Reference for the assignment), or during the completion of the Phase 1 ESA (when the APECs are being identified);
- Confirm and clarify the scope and objectives of the Phase 2 ESA with the client, depending on the context of the report:
  - Are we recommending the Phase 2 based on a Phase 1, and are we unsure whether there is contamination? We should put our holes in the areas most likely to contain contamination, to determine whether contamination **is present or absent**;
  - Do we have some background info, or do we know there is contamination but don't know how much? We should put enough holes in to determine **the vertical and lateral extent of soil and/or groundwater contamination**. This is sometimes done as a separate "supplemental" Phase 2;
  - Make sure you discuss this with the client and understand their expectations. If we deliver a presence/absence Phase 2 when they're expecting a full delineation Phase 2, they may feel that we have not met their expectations on the assignment; and,
  - It is recommended to complete a presence/absence Phase 2 first if we are not sure samples will exceed the Site Condition Standards for Contaminants of Potential Concern. If we submit extra/delineation samples and the suspected worst-case samples are in compliance with the SCS, it's an unnecessary expenditure. However, sometimes if obvious contamination is found and SCS exceedances are certain, it's sometimes worth talking to the client and doing some more work while the drill rig is on-site. This requires budget adjustments and approvals, and is usually to be avoided.

- When doing a Phase 1 ESA site visit, if you see APECs which might require a Phase 2, make note of how accessible those APECs are to a drill rig or a backhoe for test pits. Make note of overhead services, underground services (if visible by old markings or asphalt cut), parking lanes, clearances from buildings, other constraints, etc.;

- When preparing a budget and proposal for a Phase 2 ESA, keep track of how much time you spend and build it into the quote if possible (sometimes we can charge for the Phase 2 ESA planning process if tasks are done during proposal preparation);
- Based on site conditions, determine how you are going to take your samples – drill rig or backhoe/shovel:
  - Drilled or cored boreholes are often best for the initial investigation – they have a smaller footprint, and allow for the sampling of soil AND groundwater (if wells are installed) for situations where we don't know which (if any) media are contaminated;
  - Test pits are useful for delineation programs in cases where we have shallow soil impacts but no groundwater impacts, OR for sites where we want to determine groundwater infiltration conditions in preparation for remediation (a test pit is an analogue for a small remedial excavation and will allow you to observe GW infiltration in ways that a borehole won't); and,
  - For delineation programs with shallow soil impacts, solid-stem augers or Geoprobe/Geomachine type rigs can be useful as well for many shallow, quick holes.
- Determine where your boreholes or test pits will be located, based on identified APECs (see SOP 2-01) and on site conditions. Put your proposed BHs or TPs directly in the footprint of the APEC if you can, or adjacent or as close as possible in the downgradient direction if you can't (site access constraints, operational facility, existing tank you don't want to drill through, etc.):
  - This may change sometimes once you receive your locates, and a proposed location is cleared or not. When laying out your BHs or TPs, include a few extra locations, in the event that there are utility conflicts with one or more of them.
- Determine how deep you would like your BHs or TPs to go. Usually to refusal, to intercept the GW table, or in the case of delineation Phase 2 ESAs, below the lowest observed depth of contamination. For sites with shallow bedrock or refusal expected, know that you will need to core bedrock (or drill it with an air hammer) in order to install a MW and obtain a GW sample;
- Determine which contaminants you would like to test for. This will be based on your Contaminants of Concern (see SOP 2-01);
- Regardless of your Contaminants of Concern, it is prudent to plan on submitting one (1) sample for analysis of pH (this may affect which analytical tables you use, and is especially important for RSCs) and one sample for Grain Size Analysis;
- If you have some idea of the anticipated level of contamination, plan for the appropriate level of decontamination, personal protective equipment, and cuttings management/disposal;
- After you have decided which parameters you are analyzing for, determine which laboratory you are using. Use our Standing Offer prices to determine your analytical cost, or request competitive quotes if the budget is tight;
- Start the Ontario One-Call public utility locates process. See SOP 3-05;

- Retain a drilling contractor. Give them as much detail as you can about the job, and ask them to submit a quote. Select a successful quote based on price, availability, equipment, and/or relationship with driller;
- Determine which MP field staff will complete the field program. If possible, the same staff should remain involved through the entire project for consistency and a feeling of investment;
- Determine whether any rental equipment is required to complete the job. This can be rented from PINE (or we may have it in-house);
- Ensure the availability of any in-house equipment – See SOP 1-02;
- Determine your vehicle needs, and either drive your own or rent one, per MP corporate policy;
- Procedure: Creating a Sampling and Analysis Plan;
- SAPs should be created in draft prior to the completion of field work and finalized after, for reasons discussed below;
- According to O.Reg. 153/04 (as amended), the Sampling and Analysis Plan should include the following:

    - Location, depth, and rationale for all sampling locations;
    - Quality assurance and quality control program;
    - Data quality objectives;
    - Standard operating procedures; and,
    - Descriptions of any physical impediments that interfere with or limit the ability to conduct sampling and analysis (this is one section which may change based on the results of the field investigation).

- It is useful to summarize the location, depth, and rationale for all sampling locations in tabular form. This can/will change based on the results of the field program;
- The QAQC component of the SAP should include the following:

    - Specification of minimum requirements for number, type, and frequency of field QC measures including trip blanks, field duplicates, and calibration checks on field instruments (for most of our purposes, one equipment calibration at the start of the project is sufficient);
    - Confirmation that one duplicate is submitted for every 10 samples in a given medium (see SOP 3-04);
    - Confirmation that a trip blank was submitted if VOCs were analysed (this is good practice and should be expanded from the current procedure of only submitting trip blanks for RSCs, or sites with known VOC contamination); and,
    - Statement that all non-dedicated sampling and monitoring equipment is cleaned after each use (although this info is also contained in the SOPs).

- The SAP should contain a statement of the data quality objectives for each set of field data, such that the decision making is not affected and the overall objectives of the assessment are met. This is usually stated in terms of relative percent difference (RPD). Bob/CCI have a good section for this;

- The SAP should contain, as an appendix, all SOPs pertaining to the activities undertaken as part of the Phase 2 ESA, including, as applicable:
  - Borehole drilling (MP SOP 3-07 to 3-12);
  - Excavating (MP SOP 3-13);
  - Soil sampling (MP SOP 3-14, 3-15, 3-25);
  - Field screening measurements, including calibration procedures (MP SOP);
  - Monitoring well installation (MP SOP 3-16);
  - Monitoring well development (MP SOP 3-16);
  - Field measurement of water quality indicators, including calibration procedures (MP SOP 3-20);
  - Sediment sampling (MP SOP 3-31); and,
  - Groundwater sampling (MP SOP 3-21).
- The “Location, depth, and rationale” section should include identification of and rationale and procedures for:
  - The choice of sampling system (referring sample selection rationale – judgemental, random, or grid);
  - Sample media;
  - Number of samples;
  - Sampling frequency;
  - Sampling points (in this case, refer to figures in body of report);
  - Sampling depth intervals, including the screened intervals of the monitoring wells; and,
  - Samples to be submitted for lab analysis.
- A sample Sampling and Analysis Plan will be prepared and provided shortly.

Revision History

Original material taken from ‘Phase II Environmental Site Assessment Methodology, McIntosh Perry Consulting Engineers Ltd.’, March 2007

SOP 3-02: NAMING CONVENTIONS FOR SAMPLING LOCATIONS

Objective

In general, the goals for the naming of new sampling stations should be clarity, consistency with previous and current work, and efficiency. What this means is, for every report we write or plan we draft, there should be no duplicate sampling location numbers (i.e. MP will drill many BH1s over many projects, but there should never be two BH1s in the same report or on the same plan that might be confused).

Existing sampling locations established by others should not be changed unless there is a very good reason to do so. If we find, for example, monitoring wells, and we do not have any information on their location names, we can assign names for the purposes of the project. It should be made clear that these were not drilled by us. See below.

Procedure: Naming Boreholes

- Boreholes should be numbered sequentially, starting with BH1, BH2, etc. No dashes or spaces;
- If multiple sites or multiple areas of a site are being investigated under the same project number, or will appear on the same plan or in the same report, you can add a two or three letter prefix, as appropriate, relating to the name of the site:

  BH1, BH2, BH3

  - See our Lanark County rails-to-trails Phase 2: The first boreholes at Pakenham, Almonte, and Carleton Place were labelled PKN-BH1, ALM-BH1, and CP-BH1, respectively:

  PKN-BH1, ALM-BH1, CP-BH1

- If others have previously done investigative work at the site, and have used different nomenclature, we can still start with BH1, etc. But if they have used BH1, etc., we can add a McIntosh Perry prefix – MP-BH1, MP-BH2, etc.:

  MP-BH1, MP-BH2, MP-BH3

- If we have completed previous work at the site, and done, say, BH1 through BH6, and we're going back to do more work, we should ideally resume with BH7, BH8, etc. We can differentiate between different drilling programs on site plans using different coloured borehole symbols corresponding to the date;
- Locations to be recorded on plan and in field book. Details in BH logs.

Procedure: Naming Environmental Monitoring Wells

- We often have environmental sites where some BHs are instrumented with MWs and some are not. NEVER re-start numbering when the first MW is installed (i.e., if collocating the first monitoring well with the BH3, do name the well MW1). Instead, label boreholes and MWs as follows:

BH1(MW), BH2, BH3(MW), BH4

- If other consultants use the MW1, MW2, MW3 convention, our BH#(MW) convention should be sufficiently clear. However, in this case, as with boreholes, it might be good to label your MWs as MP-BH#(MW):

MP-BH1(MW), MP-BH2, MP-BH3(MW), MP-BH4

- Site-specific naming conventions can be applied as above, with (MW) in brackets after those BHs in which MWs are installed:

PKN-MP-BH1(MW), ALM-MP-BH1

- It is not recommended that multiple nested piezometers or MWs be installed within the same borehole (see SOP 3-16). However, if several monitoring wells are drilled immediately adjacent to each other and completed at different depths, they are considered a "nest" and are labelled as follows:
    - Two wells (a deep and a shallow) BH1(MW)-I and BH1(MW)-II respectively:
        - "Shallow" and "deep" names can be used if there are only two wells, i.e., BH1(MW)-D and BH1(MW)-S.
    - Three wells (deep, intermediate, shallow) BH1(MW)-I, BH1(MW)-II, BH1(MW)-III respectively; and,
    - Four wells (deep, deep intermediate, shallow intermediate, shallow) BH1(MW)-I, BH1(MW)-II, BH1(MW)-III, BH1(MW)-IV.
- Locations to be recorded on plan. Details in BH logs.

Procedure: Naming Test Pits

- As with boreholes, recommend simple numbering – TP1, TP2, etc.;
- If you need to distinguish between consultants, use MP-TP1, MP-TP2, etc.;
- If you need to distinguish between sites, use site initials, e.g. CP-TP1, ALM-TP1, etc.;
- Year- and Phase-specific identifiers are not recommended;
- TP implies a test pit dug by a powered machine (backhoe or excavator), but can also be used to mean a test pit dug with a hand shovel. Grab sample (GS) is recommended for shovel sampling, but if both sample methods are used for an investigation, make sure that they are NOT both labelled as TP samples, to keep things clear; and,
- Locations to be recorded on plan. Details in TP logs.

Procedure: Naming Hydrogeological Test Wells

- As with boreholes and MWs, recommend simple numbering – TW1, TW2, etc.;
- If you need to distinguish between consultants (this is unlikely with hydrogeological investigations), use MP-TW1, MP-TW2, etc.;

- If you need to distinguish between sites use letter prefixes;
- Year- and phase-specific identifiers are not recommended;
- Recommend using TW designation for hydrogeological test wells drilled by water well drillers and constructed with 6" steel casing only – MWs constructed with PVC pipe by enviro/geo drillers should be labelled MW; and,
- Locations to be recorded on plan. Details in well logs.

Procedure: Naming Surface Water Stations

- As above, use SW1, SW2, etc.;
- Surface water sampling stations are generally used year after year at landfills, contaminated sites, etc. and are usually outlined in C of A/ECA documents, so they don't change much and we don't often add them. But the above-noted conventions for different consultants and sites should apply;
- Locations to be shown on plan. Depths to be recorded in field notes;

Procedure: Naming Domestic Water Supply Wells

- We usually don't drill these unless as TWs for a hydrogeological study, so we don't get to name them;
- When sampling, use name of occupant/resident wherever possible, or address;
- See SOP 4-02; and,
- Details, if available, incl. well tag, to be recorded.

Procedure: Naming Sediment Sample Locations

- As above, use SED1, SED2, etc.;
- The above-noted conventions for consultants, sites, years, phases should apply; and,
- Locations and depths to be shown on a plan/recorded in field notes.

Procedure: Naming Shallow Soil Grab Samples (non-stockpile)

- Often done for due diligence Phase 2 ESAs in areas of surface staining, as a practical common-sense method of seeing how deep the staining goes, whether it is surface staining or indicative of a deeper problem, etc. See SOP 3-14;
- As above, use GS1, GS2, etc.;
- The above-noted conventions for different consultants and sites should apply; and,
- Locations and depths to be shown on a plan/recorded in field notes.

Procedure: Naming Hand Auger Holes

- Often done for due diligence Phase 2 ESAs in areas of surface staining, as a practical common-sense method of seeing how deep the staining goes, whether it is surface staining or indicative of a deeper problem, etc. See SOP 3-14;
- As above, use HA1, HA2, etc. There can be multiple auger flight samples within a hand auger hole;

- The above-noted conventions for consultants, sites, years, phases should apply; and,
- Locations and depths to be shown on a plan/recorded in field notes.

Procedure: Naming Grab/Stockpile Samples

- First, name your stockpiles sequentially – SP1, SP2, etc.;
- Then, name your grab samples – SP1-G1, SP2-G3, etc.;
- If you're doing composite sampling of a stockpile, SP1-COMP etc.;
- It is unlikely we will be doing this in multiple phases or during multiple years, but whenever possible, use the above conventions re. consultants, sites, years, phases etc.;
- If material is added to a stockpile, or if it substantially changes for any reason, up to you whether you want to call it the same stockpile or a different one. This will also depend on your reason for sampling the stockpile;
- Stockpile sample density requirements are given in O.Reg. 153/04 as amended and in SOP 6-05; and,
- Locations to be shown on plan.

Procedure: Sample Locations By Others

- If our site has sampling locations installed by others, and we are adding our own sampling locations, the most important thing is to avoid duplication and confusion;
- If there are sampling locations by others, and we know what they are called, we should name our locations to avoid duplication, adding prefixes usually;
- If there are sampling locations by others and we don't know what they are called, i.e. we find some old MWs during a Phase 1 and want to show them on the plan, we should give our own locations the simplest possible names, and assign names to locations by others that don't conflict with ours; and,
- For example, the "100" series. MWs by others would become MW101, MW102, etc., and shown on legend as such.

Procedure: Laying Out Sampling Locations

- Sometimes, if drilling order is unknown, or if BH/TP/etc. locations are likely to change in the field, OR if we want to clear some extra locations during the locates phase but won't necessarily drill all of them, it helps to mark up the locations on a plan with letters – BH A, BH B, BH C, etc. – so that if they don't all get drilled, BH A becomes BH1, BH B gets dropped, BH C = BH2, etc., the people in the field and the office can still communicate with absolute clarity about particular potential/actual BH locations; and,
- If we're sure we're going to drill them all, labelling them BH1, BH2, BH3, etc. in the field is fine.

Revision History

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Updated by D. Arnott March 2017
Updated by J. Bowman January 2018
Updated by D. Arnott March 2018

SOP 3-03: NAMING CONVENTIONS FOR INDIVIDUAL SOIL AND GROUNDWATER SAMPLES

Objective

As with sampling station locations, the goals for the naming of individual samples are clarity, consistency, efficiency, and the elimination of any duplication. We need to account for every sample taken, even if it is not submitted or if it is superseded. Depth intervals do not necessarily form a part of the sample name itself, but should always be shown with samples in reports, on logs, in tables, on figures, etc.

Assume for the purposes of this SOP that all BH logs, TPs, MWs, etc. have been named in accordance with SOP 3-02.

Procedure: Naming Individual Samples - Soil

- Soil samples should reflect the way the sample was collected. This is especially important if multiple sampling methods were used at the same location – this can often happen with boreholes (we might take a grab sample from the auger flights, split spoon samples, Shelby tubes, shear vanes, and core rock all within the same BH – this isn't likely to happen, but it is possible, depending on the program);
- Samples should be numbered sequentially, no matter what type of sample they are. For example, if we take an auger flight sample and 2 split spoon samples, they would be labelled as BH1-AU1, BH1-SS2, BH1-SS3:
    - The exception to this is rock core, where sample numbering starts over again – see next section.
- Sample numbers start over again at each new borehole. That is to say, sample IDs need to be unique within the borehole, but NOT within the project, because borehole numbers are already unique within the project. Say we have two BHs, each with 6 split spoon samples:
    - Not recommended: BH1-SS1, BH1-SS2, … BH1-SS6, BH2-SS7, BH2-SS8, etc.;
    - Recommended: BH1-SS1, BH1-SS2, … BH1-SS6, BH2-SS1, BH2-SS2, etc.; and,
    - The reason for this is, when we look at sample IDs, it's easier to think of SS1, SS2, etc. as shallow samples and higher SS numbers as deeper samples. If we drill 10 boreholes and we have up to, for example, SS42, this can be confusing (is it a deep sample from an early borehole or a shallow sample from a borehole drilled later in the day?).
- Samples should be **numbered sequentially** and recorded, regardless of whether or not we retain a sample for review or submit it for analysis. Any time the driller takes a sample, we name it and record it. That being said, we should retain ALL samples for review and at least include a soil description in our logs;
- Sample depth interval is **as important as the sample ID itself**, and should be considered a part of the sample ID. There should never be any doubt at what depth a sample was taken;
- Likewise, sample date is as important as the sample ID itself;

- Auger Flight Samples – BH1-AU1, BH1-AU2, etc. Can also be taken from hand auger holes – HA1-AU1, HA1-AU2, etc.;
- Split spoon samples – BH1-SS1, BH1-SS2, etc. If a change of soil type occurs within a split spoon sampler, the sample can be recorded as, say, BH1-SS2 on the log, but the different types of soil should be bagged separately – BH1-SS2-1 for the upper part, and BH1-SS2-2 for the lower part, with depth intervals noted on the bags. This is important for samples which are to be analyzed and for delineating fill;
- Sampling tube samples (direct-push drill rig) – while these are not technically split spoon samples, we often label them SS as well. Where different soil types are encountered within a single sample, split as above (this is more likely to happen since the tubes are 4'-5' long);
- Shelby tubes or thin-wall samplers – BH1-TW1, BH1-TW2, etc. These are mainly used for geotechnical and are very unlikely to be used on an enviro job;
- Shear vanes – these are used in geotechnical boreholes sometimes – Geotech does not record them as samples, simply lists the shear strength. If doing a combined geotechnical/enviro investigation, if you want a sample, push a spoon, even if a shear vane has already been taken. Your environmental sample will be disturbed, but can then be labelled as "SS" and you will obtain more sample volume this way than if you had sampled whatever soil had adhered to the shear vane itself;
- Grab samples – usually these would be taken from an excavator bucket or with a hand shovel while digging test pits – TP1-G1, TP1-G2, etc;
- Sediment samples, stockpile samples, etc. covered under SOP 3-02; and,
- Remediation sidewall and base samples covered under SOP 6-04.

Procedure: Naming Individual Samples - Rock

- Rock core samples – BH1-RC1, BH1-RC2, etc.; and,
- In this case, we **do** start numbering over again. When we hit rock and start coring, we start with RC1.

Procedure: Naming Individual Samples – Groundwater (Brownfields)

- Groundwater samples – BH1(MW)-GW, BH2(MW)-GW, etc.; and,
- Depending on the context of the site, if multiple groundwater sampling events are anticipated, we can name GW samples sequentially – BH1(MW)-GW1 for the first event, BH1(MW)-GW2 for the second event, etc. But the problem with this is, if we sample NOT ALL of the wells on-site for a given event, and then sample ALL wells for a subsequent event, numbering might not match up.

Procedure: Naming Individual Samples – Groundwater (Landfills)

- Since landfill GW monitoring wells are sampled year after year, multiple times, we just label samples with the MW ID and date.

Procedure: Naming Individual Surface Water Samples

- As above, these are sampled year after year, so label samples with the station ID and date only.

Procedure: Naming Individual Samples - Hydrogeology

- When completing a pump test for a hydrogeological study for water supply, it is standard procedure to sample once at the beginning and once at the end. See SOP 4-07 for more details. Say our well is called TW1; we would call the sample from the start of the test TW1-1 and the sample from the end of the test TW1-2; and,
- If we go back and sample due to a coliform exceedance, we would label that sample TW1-3, etc.

Revision History

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SOP 3-04: DUPLICATE SAMPLES

Objective

The collection and analysis of duplicate samples is a good way to understand how reliable and repeatable our field sampling methods and laboratory analytical methods are. Ideally, two samples obtained under identical conditions and sampled for the same parameters ought to return the exact same concentrations of those parameters. This is never quite the case, but with proper field duplicate collection methods, we can get reasonably close for most parameter groups. This is a good way of increasing a client or regulator's confidence in our work, and in the case of Phase 2 ESAs being completed to MOECC standards, as well as some landfill sampling programs, the collection and submission of duplicate samples is required.

Trip blanks, as the name suggests, indicate whether any contamination or cross-contamination has been introduced to your samples on the trip from the field to the lab. They are prepared by the lab and analyzed by the lab for VOCs or BTEX, and they simply ride along in your cooler. If the trip blank has detections, it means that somewhere along the way, contamination was introduced to your samples and the results are not considered reliable. Detections in trip blanks are rare, but it does happen.

Procedure: Field Duplicate Sample Selection and Labelling

- Locations at which duplicate samples are to be taken can be determined beforehand or in the field, but the number of duplicate samples and the parameters for which the duplicates are to be analyzed should be determined before the field program begins;
- Determine the number of samples to be analyzed as part of the field program, based on the quote, the contaminants of concern, and/or the pre-set sampling program (in the case of landfill monitoring):
    - For each medium (soil, groundwater, surface water, sediment, etc.), divide the total number of samples by 10, and round up for number of duplicates. In the case of 11 or 12 samples, we can get away with 1 duplicate, but any more than that, we need a second duplicate.
- Select the location at which the duplicate sample will be analyzed (if applicable), and determine which parameters you're going to analyze the duplicate sample for:
    - For landfill sampling, the duplicate is analysed for the full set of parameters and,
    - For Phase 2 ESA sampling, the parameters analysed depend on the contaminants we expect to find. We want to try to take a duplicate sample where there will be detections – if both the duplicate and the original have all parameters below detection limits, it's of limited usefulness. So this sometimes means taking the duplicate at the most contaminated location (or location most likely to be contaminated)
- When you've decided to take a duplicate sample, label clearly in bold text on the field notes which location the duplicate sample was taken from;

- Determine with a name for the duplicate sample:

  - It is acceptable if the laboratory knows they're analysing a duplicate sample, but they should NOT know which field location the duplicate sample comes from. Therefore, give the duplicate sample a name that is easily recognized by McIntosh Perry staff as a duplicate, but that does not hint at the location at which the sample was taken;
  - For soil samples, DUP1, DUP2, etc.;
  - For groundwater samples, GW-DUP1, GW-DUP2, etc.;
  - For surface water samples, SW-DUP1, SW-DUP2, etc.;
  - Refer to the naming conventions outlined in SOP 3-01; and,
  - Can also create "fictional" locations – e.g. MW500, BH100, etc., as long as it doesn't cause confusion with any existing actual sampling locations on-site.

- Soil samples: when you have selected a soil sample for duplicate analysis, split the sample as evenly as possible into two identical sampling jars. If the sample is heterogeneous within the split spoon, try to homogenize the sample as much as possible in a plastic bag so that the original and duplicate will be as close as possible in composition;
- Groundwater samples: Fill one type of bottle at a time (i.e. fill the VOC vials of the original and duplicate first, then move on to, say, metals, PAHs, etc.). Fill the original bottle 1/3 full, then fill the duplicate bottle 1/3 full. Repeat with 2/3 full and completely full. The purpose of this is to make sure that the original and duplicate samples are as close in quality and composition as possible;
- Surface water samples: Similar to groundwater samples, except in some cases, both the original and duplicate bottle can be immersed at the same time if conditions are favourable, e.g. if it's unlikely that sediment will get into one bottle but not the other. Bottles with preservative should not be immersed but should be filled carefully, 1/3 at a time, as above;
- Tap water samples: similar to groundwater samples. See SOP 4-02; and,
- Duplicate samples should be stored in the same cooler as original samples, but not in the same bag – that would indicate to the lab which samples are duplicates.

Procedure: Trip Blanks

- Trip blanks should be ordered from the laboratory prior to setting out into the field. Order trip blanks if:

  - You are preparing a Phase 2 in support of a RSC;
  - Your project manager has stated in a quote/scope of work that trip blanks will be submitted (some larger clients require this, but it is generally good practice, especially for VOC sites where significant contamination is possible); and,
  - It is required per a landfill C of A/ECA.

- Trip blanks should be picked up the morning of sampling or the night before. They should stay cool, but it is not recommended that they sit in sample storage fridges in case they pick up any contamination from the fridge. Ideally, the cooler should be pre-cooled and kept cool, and the trip blank should be kept in the cooler;

- Do not open the trip blank, but keep it in the same cooler as your samples, subjected to conditions identical to your samples, during the whole sampling day;
- Submit the trip blank to the lab with your samples. It is OK if your trip blank spends sometime in the fridge after sampling, as long as your samples are in there too; and,
- The trip blank should be noted on the Chain of Custody, and VOC or BTEX analysis selected.

Procedure: Lab QA/QC

- Laboratories perform their own QA/QC on samples. This is summarized in their analytical reports. There are a variety of lab QA/QC methods, including blanks, duplicates, and spikes. The lab discusses their own QA/QC and has targets for each test. If the targets are not met, the lab will indicate this on the report, and if it is likely to affect sample results, it should be mentioned in our report. The lab can often provide more discussion if necessary.

Procedure: Comparing Duplicate Samples to Site Condition Standards

- If both the original and duplicate sample at a given location are in compliance with the SCS, the location is considered to be in compliance;
- If both the original and duplicate sample at a given location exceed the SCS, the location is considered to exceed the SCS;
- If the original fails and the duplicate passes, or vice versa, either the location is considered to exceed the SCS, or a recommendation is made for further sampling:
    - In the case of a groundwater sample, it's relatively easy to re-sample the location and see if we get the same results.

Procedure: Relative Percent Difference (RPD) Calculations

- Relative percent difference (RPD) calculations are a method of comparing original and duplicate samples. RPD calculations are calculated using the following formula:

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

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

- Acceptable RPD limits for each parameter group are found in the table below:

Analysed Group	Recommended RPD in Soil*	Recommended RPD in Groundwater*
PHC	30%	30%
VOCs	50%	30%
PAHs	40%	30%
PCBs	40%	30%
1,4-Dioxane	50%	30%
Dioxins/Furans	40%	30%
OC Pesticides	40%	30%
Metals	30%	20%
Hexavalent Chromium, Cr(VI)	35%	20%
Cyanide (CN−)	35%	20%
Fraction Organic Carbon (FOC), Chloride	35%	20%
Methyl Mercury	40%	30%
Electric Conductivity	10%	-
pH	Within 0.3 pH units	-
** Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act - Laboratory Services Branch Ministry of the Environment - March 9, 2004, amended as of July 1, 2011*		

- RPD calculations are not performed where parameter concentrations are below laboratory detection limits for the original or duplicate samples;
- RPD calculations are not performed where detected parameter concentrations are less than 5 times the laboratory detection limit; and,
- Where RPD values fall outside the limits set in the above table, discuss with your project manager possible causes and/or recommendations for re-sampling.

References

O.Reg. 153/04 (as amended).

Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act - Laboratory Services Branch Ministry of the Environment - March 9, 2004, amended as of July 1, 2011.

Revision History

Updated by D. Arnott April 2017
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SOP 3-05: UNDERGROUND SERVICE LOCATES

Objective

Underground service locates are of critical importance for field investigations for several reasons. First, they prevent us or our subcontractors from hitting and damaging underground services when we drill or dig – this is important from a health/safety and liability perspective. Second, they instill a level of confidence in our subcontractors – many times I have seen drillers refuse to drill in a certain location because underground service locates have been incomplete. Third, an often forgotten benefit is that sometimes identifying underground service trenches can be important in understanding contaminant transport pathways at a site.

Whenever possible, the responsibility of obtaining underground service locates should be handled by the client. This is always a good idea when doing soil management work for contractors on an excavation job (they will have locates anyway for work they're doing). Solar farms where construction is ongoing will also likely have locates. When test wells are being put in for a hydrogeological study, the drillers or owner will often obtain locates. However, for most Phase 2 ESAs, especially in urban areas, obtaining locates is something our client is paying us to do. So while the locators do the actual work, we are responsible for making the request and reviewing the results in such a manner that we can protect the interests of ourselves and our clients.

Procedure: Public (One-Call) Locates

- Before calling or logging in to OneCall (Ontario) or comparable Provincial locates service, it's best to have a good idea of where your site is, what the exact limits of your area of investigation are, and approximately where you want your boreholes. This is especially important if your site consists of multiple properties;
- Know your site address and cross-streets, and the township, lot, and concession if the site does not appear to have a municipal address (this information can be obtained from survey plans, municipal restructuring maps, municipally-available GIS tools, and some layers on Google Earth – Susanne and José in Ottawa can provide help with this);
- Log in using the company login. We are considered a "contractor":
    - The following steps may vary depending on out-of-Ontario provincial underground locates services.
- Caller/contractor fields are pre-populated, so check to make sure it's up-to-date. The communication info on the left side of the page should belong to the person coordinating the locates from the office, not necessarily the field person (the locates should be done before anyone goes in the field to drill/dig;
- Select the municipality/township from the drop down menu. Begin typing, and select from the list that appears;
- For properties with a municipal address, start typing in the street and select from the list that appears. Once you select a street, it will limit your options for Intersection 1 and Intersection 2

accordingly. Start typing, and select what makes sense. The lists that appear are usually pretty complete and up-to-date;

- If your site consists of multiple parcels, click "Add" (top right) to add another address;
- Draw your property on the mapping tool which comes up. Click on the "pencil", then on the pencil drawing the polygon. Double-click to finish your polygon, and give it a label ("Lot" or "Site" usually sufficient);
- Enter your dig information. You don't have to enter length or width, but maximum depth is required. Usually enter 50 feet unless you think your boreholes will be deeper. Click "Public" or "Private" property depending on your site;
- Click "Area not marked". Often when individual locators go out to site, they will call you to discuss borehole locations, but we don't usually mark the site before we start the locates;
- Select "machine dig" as your method of excavation;
- Select "mark and fax" (these days, they mark and email instead);
- For "work to begin", leave the date that automatically populates. This is the soonest possible date that they can get the locates completed – 5 business days from the request date. Usually it takes longer than this, but we want locates as soon as possible;
- Type of work, select "bore holes";
- Save your work and submit your ticket. OneCall will email you with a summary of the utility owners which have been contacted. Make sure you receive either clearances or locate sheets from **ALL** the utility owners on the list before you start to dig or drill; and,
- For planning purposes, try to leave at least two (2) weeks between locate request date and projected drill date, plus whatever time is required for private locates.

Procedure: Private Locates, Site Meets, and Test Hole Layout

- It is our policy to request private locates for all sites unless they are remote or known conclusively never to have been developed;
- Private locates should be requested for any site with private services. These include but are not limited to:
  - Underground electrical for lighting or block heaters;
  - Gas or fuel pipes;
  - Water lines (well to building);
  - Underground electrical or gas associated with a backup generator; and,
  - Telecommunication or telemetry systems.
- For sites with septic systems, gas or fuel piping, private water services, or other potentially hard-to-trace private services, wherever possible, try to obtain a plan from the owner or client showing the location of these services. This can be of use to the locators when they're on-site;
- Contact several private locators and obtain competitive prices, or sole-source depending on relationship and project requirements (clarify with your project manager if uncertain);

- Upon award of the job (or upon receipt of a change order authorizing a Phase 2 to be completed), contact the locator who you're carrying for the assignment and tell them to proceed. Set up a time for a site meet, usually after the public locates are likely to be done;
- Tell the property owner when the private locator will be on-site, and if there's a building, make sure that the private locator will have access to the place where the water service enters/leaves the building. Sometimes they will need to hook on to the pipe to run a trace;
- This will vary from job to job, but preferably after the public locates have been completed, on the day of the site meet with the private locator, show up early and mark out your boreholes where you want them to be, based on your APECs. You may have to adjust your locations slightly based on the location of public services or other site constraints. So it's always helpful to spray or stake out a few extra boreholes in the locations you want and get the private locator to clear them all; and,
- When the private locator shows up, show them where you have marked out your boreholes and get a preliminary sense of whether the boreholes will be easy to clear. If so, you can leave site and they will send you the locate sheet. If not, stay on-site and collaboratively work out locations for the boreholes that will be clear of services AND address the APECs.

Revision History

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SOP 3-07: MANAGEMENT OF DRILL CUTTINGS AND PURGE WATER

Objective

For the purposes of this SOP, drill cuttings are defined as overburden soil brought up on the auger flights of a conventional rig during drilling, or rock cuttings brought up by compressed air while advancing a borehole into bedrock using air percussion methods. Purge water is defined as water that is pumped from a monitoring well, either by bailer, inertial lift pump, peristaltic pump or other sampling method, during the development, purging, or sampling of the well.

Although they are often a part of a drilling and sampling program that is not paid much attention, the management of drill cuttings and purge water is important for several reasons. The first is compliance, in spirit and letter, with environmental regulations. The second is the appearance of a diligent consulting firm. Poor management of cuttings or purge water can result in client dissatisfaction on otherwise well-executed jobs.

Procedure: Field Management of Drill Cuttings

- Wherever possible, discuss with drillers what is to be done with drill cuttings before you get out into the field (don't assume drillers will bring drums, or will manage cuttings for you – they will help you move cuttings but will not find a final destination for them);
- If contamination is suspected (most/all enviro sites), arrangements should be made with the driller to place the cuttings into drums. Drillers should provide drums and should load cuttings in drums. There is often a cost associated with this, which should be provided by the drillers and included on the quote to the client;
- Drums will usually not be able to be moved once filled (without a backhoe, excavator, forklift, or other power equipment). Do not assume drillers will be able to move full drums. Place drums in a location where they are able to remain for a period of time (check this with the client) and if necessary, transport cuttings to drums via wheelbarrow (request that drillers do this);
- Label the drums at the time of drilling with contents (drill cuttings) as a minimum;
- In remote areas, cuttings do not necessarily need to be drummed, as the cost of getting the drums in and out is often prohibitive;
- If cuttings are drummed, after analytical results are received, make an assessment of what to do with the drums. Arrange this with client and get funds approved if necessary:
    - If all sample results are clean, material in drums is considered clean and may be disposed of as clean fill, however the client sees fit;
    - If sample results fail, a composite TCLP sample may be taken from the drum contents. Once the TCLP results are received, off-site disposal of the drums as contaminated material is possible. Sometimes, the client will have to register as a Waste Generator if they are not already. We can help them with this; and,

  - If a remediation is to be completed at the Site, the drums can remain and the contaminated material in the drums can be hauled off-site as contaminated material concurrently with the site remediation program.

- Do not leave cuttings in a pile by the borehole, against a property line, or in plastic bags anywhere on-site;
- Do not bring cuttings back to the office for any reason (usually requires several loads by pick-up);
- Clean cuttings may be used to backfill a borehole where no MW is installed, but should be mixed with some bentonite. Do not reuse contaminated cuttings; and,
- Cuttings may be used as backfill above the screen of a monitoring well, if they are uncontaminated AND if they are mixed with some bentonite AND if there is a seal of at least 0.6 m of pure bentonite above the sandpack. This being said, this is not recommended and wells should not be constructed with cuttings if possible.

Procedure: Field Management of Purge Water

- During the drilling program, and following the receipt of any soil analytical results, make an assessment of the anticipated degree of contamination based on visual or olfactory observations, and arrange for buckets or drums to contain purge water if contamination is anticipated:

  - Soil drums may also be used to contain purge water; however, if these drums are completely full, especially with cohesive or fine-grained soils, there may not be room in the drums for purge water.

- If no contamination is anticipated, purge water may be discharged to a permeable ground surface are on-site where it will infiltrate and not cause a nuisance (this is particularly important if the purge water is silty);
- If contamination is anticipated or encountered, retain each bucket of purge water. After measuring field chemistry parameters, either seal up the buckets with provided lids (available at the hardware store), or decant each bucket into a soil cuttings drum or a dedicated drum for purge water;
- Obtain a representative sample of the purge water (if decanted into dedicated buckets or drums) and submit for laboratory analysis of contaminants of concern, if the purge water is to be hauled off-site for disposal at an approved waste disposal facility;
- Label drums or buckets as containing purge water;
- Drums and buckets containing purge water should be stored on-site in a relatively unobtrusive area, preferably as out-of-sight as possible, where they are unlikely to be hit by any vehicles (including snow ploughs) or to block any access routes; and,
- Drums containing purge water may be removed by a licensed contractor in a similar manner to cuttings. Usually, bulk analytical results must be provided to the contractor prior to disposal.

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SOP 3-10: OVERBURDEN AND BEDROCK DRILLING - PORTABLE RIG

Objective

Portable rigs are the equipment of choice for indoor boreholes and for drilling in tight conditions. They can fit into areas conventional rigs can't, but they are also less powerful, slower, and often the noise they make is much more disruptive in an indoor environment. They also require electrical power as a minimum, and sometimes hydraulic power or core water, depending on the situation. Therefore, indoor drilling often requires careful logistical planning, and a site visit beforehand is mandatory, as is careful communication with the client and/or tenant(s).

Types of Portable Rigs

- There are several types of indoor drilling setups commonly seen these days:
    - Hilti electric rig: Electric motor mounted on a post, moves up and down like a drill press. Water can be run through it for the purpose of coring. Often used to core concrete, run casing, and core bedrock;
    - Jackhammer with split spoon attachment – this does not give you blow counts but can obtain soil samples. Often used in cooperation with Hilti electric rig;
    - Pionjar: jackhammer-type rig with self-contained gasoline engine often used for remote work; and,
    - Geoprobe 420M – basically works the same as a Geoprobe direct-push rig, but derrick is small/portable and attached to external motor/generator/hydraulic pump with cables. Runs casing via percussion, very loud. Better for overburden applications only.

Procedure: Overburden Drilling using Conventional Rig

- Confirm that a portable rig is appropriate rig with project manager prior to booking;
- From mapping or water well records, estimate the depth to refusal or maximum depth you might need to drill, and make sure that the drillers bring appropriate equipment for bedrock and/or overburden;
- Arrange site access with client, confirm site access/mobilization requirements with driller, send photos if necessary to ensure there's space to set up the rig, access to water and/or power (the Hilti runs on 3-phase, 240-volt, I believe. Drillers can bring a generator, but confirm power requirements just in case);
- Ensure underground service locates are available to drillers, and that all borehole locations are cleared of private and public services, per SOP 3-05. Private locates are particularly important for indoor applications, and you should obtain building plans whenever possible;
- Boreholes should be named per SOP 3-02;
- Individual samples should be named per SOP 3-03;
- Cuttings should be managed per SOP 3-07;

- On the day of drilling, mobilize to borehole location(s). Let owner/tenant know in advance what you are doing, and approximately how long it will take;
- Ensure drillers have a shop-vac to vacuum up core water and cuttings and to minimize mess, if required by the site. Cuttings and core water may then be drummed or placed in pails and disposed of per SOP 3-07;
- Core through floor slab (this is usually the case), and measure thickness of concrete and underlying crushed stone layer (if present). All measurements will be relative to floor;
- Take split spoon samples per SOP 3-09, or direct-push samples per SOP 3-08;
- Bag or jar the sample, and screen as soon as possible;
- If using a split spoon, wash the split spoon in a bucket of soapy water. Rinse with clean water at a minimum. A spray bottle of dilute methanol or alconox solution is recommended for decontaminating the spoon. Either assemble the spoon yourself or allow the drillers to do it, according to preference. Sometimes the drillers prefer to wash the spoons themselves;
- If using Geoprobe, discard tubes after every sample;
- If coring into rock to install MW, log core per SOP 3-11. Note that it will take longer than with a conventional rig, since the drill rods will have to be pulled each time to retrieve the core, instead of simply withdrawing the core catcher with the wireline;
- Logs may be kept in Imperial or Metric units, as long as they are converted to metric in the office. Imperial is often easier with imperial rods and tools;
- Continue sampling until target depth is reached or until refusal is encountered (Geoprobe refusal or split spoon refusal, depending on system – auger refusal is not applicable);
- Install MW or seal up BH, drum cuttings, bag and screen samples, move on to next location, repeat until end of field day;
- At the end of the day, leave the site as close to the way you found it as possible. This is especially critical for commercial/residential areas; and,
- If drilling at a known contaminated site, set up a decontamination area for the equipment, preferably outside the building, and definitely away from any potential human receptors. Depending on how contaminated the site is/may be, we may have to put special safety protocols in place – talk to Scott. If you run into a hole much more contaminated than suspected, the best thing to do is call your PM, abandon the hole, and come back another day with a re-examined strategy. It is critical that there are no human health risks as a result of our activities on a site.

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SOP 3-16: MONITORING WELL INSTALLATION AND DEVELOPMENT

Objective

Monitoring wells are our primary means of obtaining groundwater samples, and their proper installation and development will ensure the success of a groundwater sampling program. Monitoring wells should always be installed by a licensed water well contractor. Confirm that your drillers are licensed water well contractors before retaining them to install MWs.

O.Reg. 903 (Wells) sets out the requirements for well installation in the province of Ontario. All monitoring wells installed by McIntosh Perry should meet the requirements of this regulation.

Procedure: Monitoring Well Installation

- Drill to the required target depth or until groundwater is encountered, per SOP 3-08, 3-09, 3-10, 3-11, or 3-12;
- The monitoring well should be installed while the casing is still in the ground. Sometimes the hole will stay open when the casing is pulled, but usually it sloughs and you get (at best) some material in the hole and (at worst) a completely collapsed hole unsuitable for installing a MW;
- Well supplies are usually supplied by the driller. Let the driller know in advance that you want MWs installed, and the approximate depths, so they bring enough supplies;
- Wells consist of the following components (in general):
  - Screen: white PVC pipe with slots cut to allow for the entry of water. The screen goes at the bottom of the well, at the targeted stratigraphic interval from which the water sample will be collected;
  - Riser: white PVC pipe without slots, which keeps the water from entering;
  - End cap: a cap that threads onto the bottom of the screen, to keep material from coming into the well from the bottom;
  - Sand pack: clean coarse-grained silica sand which goes around the screen, to keep finer material from the formation from clogging the screen (development of the well will result in finer particles being pulled into and then purged out of the well; the sand pack and formation are naturally “sorted” by grain size as they would be in a river, and therefore form an effective filter around the screen);
  - Bentonite: a swelling clay that has a very low permeability. Soaks up a large volume of water to a relatively small volume of solids. Serves as an effective barrier to migration of water within the borehole annulus;
  - Slip cap: a plastic cap that slips onto the top of the well to keep debris out. Not usually entirely watertight. Usually used with stick-up casings;
  - J-plug: a rubber plug with a twist top that allows it to be tightened into the top of the well and form a watertight seal. Usually used with flushmount casings or where there’s the potential that surface water could enter the well;

  - Stick-up casing: a protector that extends above ground surface and surrounds the well pipe and keeps it from being damaged or tampered with. Usually made of steel, and square or circular; and,
  - Flushmount casing: a small protective cover resembling a manhole cover, with threaded bolts on either side, that protects a MW where the pipe is cut off below ground surface. Commonly used in parking lots or other places where a stick-up casing would be dangerous or inconvenient.

- Indicate to the driller the length of screen to be installed (5' or 10' usually – do NOT use more than 10' of screen for wells installed in support of an RSC. This is generally good practice, because water from any vertical point in the screened interval can theoretically migrate to any other vertical point in the screened interval, especially during purging/development. Short screens minimize cross-contamination and provide better point estimates of hydraulic head (water level) in an aquifer:

  - If you are installing a well in overburden in the shallow unconfined aquifer (water table) AND/OR if you suspect LNAPL (light non-aqueous-phase liquid) contamination (like gasoline or diesel), install the well so the screen straddles the water level. For example, if from your soil samples, the soil appears to be saturated at 17'2", installing a screen between 15' and 20' would theoretically straddle the water table.

- Observe the drillers threading the end cap onto the screen, lowering the screen downhole, and then thread as much riser as necessary for the pipe to extend above (in the case of a stick-up casing) or just below (in the case of a flushmount casing) ground surface when the screen is at the bottom. Confirm the depth of the well;
- The drillers should have a "sounding tape" (measuring tape with a weight on the end) that they can lower between the pipe and the wall of the borehole. As they add silica sand, they should check with the sounding tape how far the silica sand rises within the annulus. The silica sand should extend 1'-2' above the screen so that there's a buffer between the screen itself and the bentonite seal overlying the sandpack. For example":

  - For a well with a screened interval of 15'-20', the sandpack should extend from 14'-20' or 13'-20'.

- The drillers should place a bentonite seal above the sand pack. This should be at least 2' of pure bentonite. Pure bentonite can then extend to ground surface, or be mixed with cuttings. The purpose of this is that the bentonite will swell and prevent surface water, or water from other stratigraphic units the well passes through on its way to the target depth, from entering the screened interval;
- Bentonite comes in several forms. Common forms and their applications:

  - Holeplug: the most common form for MW installation. Comes in 3/8" grey clay chips in 50 lb bags. Good for most overburden applications. But for deep wells, it can hydrate and get sticky before it sinks all the way to the depth it's supposed to get to, causing "bridging" and incomplete infilling. It is also too big to fit in the annulus if a well is being installed in a cored hole;

  - Coated pellets: same as holeplug but they come in a pail and are coated with an environmentally-friendly water-repellent compound that eventually dissolves but allows them to sink before swelling/bridging. Can be done in-house with holeplug and canola oil;
  - Grout: the most common form for water well installations. Mixed in a grout mixer, sometimes with cement added. Usually in a powdered or granular form. Pumped to the target depth using a rigid or flexible pipe (“tremie”), which is then withdrawn. The tremie and the liquid consistency of the grout eliminate bridging issues; and,
  - Granular: smaller-sized pellets, good for cored holes and soil vapour probes but must be introduced carefully because it bridges easily.

- Bentonite should extend to about 2’ below ground surface. If bentonite extends to ground surface, it usually swells up and erupts from the annulus. It is recommended that the uppermost 2’ (0.6 m) of the annulus be backfilled with silica sand;
- The drillers will then install a flushmount or stickup casing and cement it into place;
- The drillers will tag the well per the requirements of O.Reg. 903. They are responsible for completing the well log but will request well ID and stratigraphic information (and sometimes a site plan) from you. If multiple MWs are installed on the same property, they can be installed as a “cluster” requiring only a single well tag;
- Record the following:

  - Depth of well (total);
  - Screened interval;
  - Interval of riser;
  - Interval Sand pack;
  - Interval of Bentonite seal;
  - Stick-up or flushmount casing;
  - If stick-up casing, length of well pipe above ground (this is called the “stick-up”);
  - If flushmount casing, how far the top of the PVC well pipe is below ground surface;
  - Well ID;
  - Materials used;
  - Diameter of well (usually 1 ¼” or 2”); and,
  - Well tag number.

- We don’t often lock wells, but this may sometimes be required by the project – check with PM. J-plugs allow for the locking of flushmounts, and stickup casings can be locked directly; and,
- Develop the well as best as you can before leaving site.

Procedure: Monitoring Well Development

- Before you leave site, check the water level in the well and record;
- "Developing" the well means pumping out as much water as you can from the well. This serves several purposes:
  - Removing any water introduced during the drilling process (or as much of it as possible) to ensure that the water sampled from the well is representative of site groundwater. This is mainly a problem with cored wells or wash boring; and,
  - Sorts the particles in the sand pack and removes particles fine enough to enter the slots of the screen. The sand pack is then considered "developed" when the particles of the sand pack and surrounding formation have sorted themselves according to size, like gravel in a river. This ensures that the water entering the well is relatively free of fines.
- Using the water level and the known depth of the well, calculate the approximate volume of standing water in the well using the formula for a volume of a cylinder with a length equaling the length of water in the well and a diameter equaling the diameter of the well pipe (to simplify things, this works out to about 2 L of water per metre of 2" well). This is considered one "well volume":
  - For example, say your well is 7.6 m deep, and your water level is at 4.2 m below ground surface. You have (7.6 -4.2 = 3.4 m) of standing water in the well. If it is a 2" well, this works out to 6.8 L of water. Round up to 7.
- Using a graduated bucket, purge at least 3 well volumes and up to 20 volumes, or purge the well until it goes dry at least 3 times:
  - Purging can be done with an inertial lift pump or with a submersible electric pump (for wells 2" diameter or greater). If water is particularly silty, it is recommended that the electric pump be placed at least 1 m above the bottom of the well, where the silt is most likely to collect. Waterra tubing can handle a large amount of silt but may sometimes clog.
- Not always done but recommended: check field chemistry after each volume purged. Generally, formation water will have different properties (pH, conductivity) than water introduced during the drilling process, so the field chemistry will change for a while between volumes and then stabilize;
- Record the volume of water removed from the well during development; and,
- Also watch to see if the water becomes clearer as you're purging – this is a good sign that the well is becoming developed.

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SOP 3-19: WATER LEVEL MEASUREMENT

Objective

By having a standard method for measuring water levels, we can ensure consistency between monitoring events and field personnel – if everyone takes water levels the same way, we can be sure that the trends we observe are actually due to fluctuating water levels and not differences in the way that measurements were taken.

Procedure: Water Level Measurements (Clean or Suspected Clean/Not Very Contaminated Wells (no free product))

- Locate the well and open the casing;
- Remove the well cap:
  - If this is a landfill well or contaminated site, depending on the program, you may need to measure combustible vapours or landfill gas in the well headspace. Please see SOP 3-20.
- Measure the monitoring well stickup above the ground surface (if a stick-up type well). This is generally measured from the **highest point** of the ground surface **immediately adjacent** to the well, to the top of the riser pipe, **unless** the ground surface is artificially influenced by cuttings or bentonite;
- If a flushmount, measure the distance between the top of the well pipe and the **highest** point of the ground surface **immediately adjacent** to the well;
- Confirm your water level tape is on, by pressing the button on the side. Sensitivity may need to be adjusted (knob on side) if water level tape does not sound. Lower slowly until it sounds. Double-check your water level, withdrawing the tape to confirm the measurement (sometimes, if you have a reading of, say. 7.88 m, people will see the "8" metre mark on the tape closest to the pipe (the "7" is downhole) and erroneously write 8.88);
- Measure the water level relative to the **highest point on the well pipe** and record accordingly, in metres below top of pipe (m BTOP). For open hole wells with steel casings only (no riser pipe), this would be recorded as metres below top of casing (m BTOC) but the same principle applies;
- Sometimes if we are measuring WLs at wells installed by other consultants, they will mark a measuring point on the pipe with marker. This is not recommended, since there is a chance (admittedly very slim) of introducing VOC contamination due to VOCs in the marker. But this can also be confusing, since they do not always mark the **highest point** on the pipe;
- Measure the depth of the well with the water level tape (sound can be turned off with the sensitivity knob to complete this step). This serves as a good check to ensure that you've found the right well, and in some cases, can identify sedimentation or other problems; as well as be used for calculating well volume for purging:
  - If the well is suspected to be deeper than 25 m, use of the water level tape is not recommended, as these depths can damage the pressure transducer. Use of a reel tape is more appropriate in these cases.

- Record, and proceed to sampling, slug testing, or close up the well and leave it the way you found it (or better).

Procedure: Water Level Measurements (Dirty Wells, Free Product Suspected)

- As above, with the following modifications;
- Use an interface probe instead of a water level tape if free product is suspected. A solid tone means product has been encountered, whereas an intermittent/beeping tone indicates water. Sometimes with heavy oil, smearing of the oil on the probe tip can cause a high bias for your product reading. Let the monitoring well site for 2 minutes, then confirm with a bailer if this is critical;
- It is not necessary to sound the bottom of the well, if by so doing, you would drag the entire tape through a layer of free product;
- Clean interface probe with Alconox and water between wells; and,
- If water quality is known, leave most heavily contaminated wells to last, if possible.

Procedure: Well Headspace Vapour Measurements

- Depending on the type of well headspace vapour measurements you are taking, select the appropriate instrument (your PM will assist with this):
    - Landfill: RKI Eagle or Gastech in full-gas mode (methane elimination off) or landfill gas meter;
    - Contaminated site (BTEX/PHCs or VOCs): Photoionization detector (PID); and,
    - Contaminated site (BTEX/PHCs): RKI Eagle or Gastech in methane elimination mode.
- Open the well cap as little as possible to slip the vapour probe into the well headspace. Cover any open space with a gloved hand to prevent the fresh air from getting in;
- Record the peak reading, or 0 if no reading after approximately 30 seconds; and,
- Remove the cap and proceed with water level measurements as above.

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Updated by J. Bowman January 22, 2018
Updated by M. Coyle January 23, 2018
Updated by D. Arnott March 2018

SOP 3-20: FIELD MEASUREMENT OF WATER QUALITY PARAMETERS

Objective

Field measurement of water quality parameters may be directly related to the objectives of a sampling program (for example, the measurement of turbidity as part of an erosion and sediment control inspection), or it may be a useful tool in assessing data quality as part of the larger objectives of a sampling program (for example, when sampling groundwater, field chemistry can let you know when you've purged enough and are getting water representative of the formation that hasn't been in contact with air). Field chemistry is sometimes dismissed as an unnecessary formality, but it is actually required explicitly by many landfill ECAs and O.Reg. 153/04 compliant Phase 2 ESAs. In any case, it is good practice to complete.

Procedure: Field Turbidity Measurements

- Identify your sampling location;
- The turbidimeter works by passing light through samples of a known turbidity (calibration standards), and then passing light through your sample, and comparing. Most meters need to be calibrated every time they are used. Fortunately, turbidity meters come with calibration standards which can be used in the field;
- Fill one of the turbidimeter's dedicated glass sampling bottles with water from your station. Wipe away condensation/moisture/debris with a KimWipe. Do not use cloth or paper towels, as these have the potential to either scratch the surface of the bottles or leave residue which will bias your turbidity samples high by blocking the light that would otherwise pass through;
- Calibrate your turbidimeter using the calibration standards, following on-screen instructions;
- Insert and measure your sample. Record the reading;
- Pour out your sample and clean the sample bottle with deionized water and KimWipes, leaving it clean for the next user. Do not leave sediment in the bottom of a sample bottle, as it can dry and be difficult to remove;
- Never leave a sample or standard bottle in the turbidity meter, as it can freeze or leak, causing irreparable damage to the unit; and,
- Some sample and standard bottles have asymmetrical or 'notched' lids – this indicates they fit in a particular way into the meter. Never force a bottle if it does not appear to fit in a certain way.

Procedure: Field Measurement of Groundwater Quality Parameters

- Commonly-measured parameters include temperature, pH, electrical conductivity, total dissolved solids, turbidity, dissolved oxygen, and redox potential:
    - Temperature of groundwater should be approximately equal to the annual average temperature of a given area (10 degrees C or so in southern Ontario). Shallower wells will show more seasonal groundwater temperature variation than deep wells – water purged from deep wells on cold clear days may actually appear to "steam" even though it is generally not what we'd consider hot. Temperature is also a good direct measurement of the condition of a stream, and may

indicate whether the stream is gaining or losing (gaining streams may be colder due to the influx of groundwater);
  - pH (potential of hydrogen) measures the acidity of the water. Some natural variation is common in clean water; high or low pH may be indicative of contamination (e.g., acid mine drainage);
  - Electrical conductivity is an indirect measure of the dissolved ions in the water. The higher concentration of dissolved ions, the more conductive the water is (think of the old experiment where you dissolve salt in water and gradually see the light bulb light up). Groundwater that has been sitting in bedrock, especially carbonate rock, tends to be more conductive than surface water, though high conductivity can also be a sign of salt impacts;
  - Total dissolved solid concentration correlates well to conductivity but is expressed in µg/L or mg/L instead of µS/cm;
  - Turbidity is measured in nephelometric turbidity units (NTUs), which are a measure of how much light can pass through a quantity of water. Suspended solids or other particulate matter tend to increase the turbidity. High turbidity is often a natural occurrence; however this negatively impacts the water user's ability to treat water; and,
  - Dissolved oxygen sometimes requires a specialized dedicated probe, which is generally more sensitive (and expensive to rent). Oxygen is increasingly soluble as temperature decreases, and water must be in contact with air for oxygen to dissolve. Cold turbulent streams are typically highest in DO. Groundwater which has infiltrated a long time ago, especially in bedrock, is particularly low in DO, as is warm surface water, or waters with significant microbial activity/biological or chemical oxygen demand, where the oxygen is consumed by various processes.

- For contaminated sites, the "parameter pen"-type field chemistry analyzer is often sufficient (these are commonly made by Hanna Instruments). They are durable and cheap, but difficult to calibrate, and the parameter list is limited (temperature, pH, conductivity, TDS). However, they are often sufficient to determine whether groundwater quality has stabilized when sampling;
- For landfills, the larger, more complex Horiba or YSI meters are preferred. These often are able to analyze a larger suite of parameters, sometimes with greater accuracy, and the probes (or 'sondes') are connected to the display with a cable, so they are more practical for groundwater and surface water sampling. Check with your PM which one to use;
- Make sure the instrument is calibrated according to manufacturers' instructions before taking it in the field (rental equipment generally comes pre-calibrated; certificates of calibration should be saved in the project file);
- Purge one well volume (calculations are summarized in SOP 3-16). Purge the water into a bucket. Make note of the colour, relative turbidity, any odour, sheen, or any other observations (if there is bentonite in the water, it may have a slightly "greasy" or "soapy" feel on the gloves, for instance);
- Insert the analyzer probe into the bucket. The instrument will sometimes have a timer to let you know that it's done taking a reading. This can sometimes take up to several minutes; be patient. If the instrument does not have a timer, wait until the readings appear to stabilize;
- Record the parameters in your field book or on dedicated field sheets, along with the purge volume;

- Dump the water into a drum or, if clean and approved by the client, onto the ground in an appropriate location;
- Repeat until you have purged three (3) well volumes, recording field parameters after each;
- Field parameters should be fairly stable between the 2nd and 3rd purge volume. If not, continue purging. Usually a 4th or 5th volume is sufficient; sometimes, in the case of shallow wells, water in the sand pack (not just the well pipe itself) isn't representative:
    - Did you know that DO should go down with successive purge volumes, and be nearly 0.0 in representative formation water?
- Continue with sampling; and,
- Field parameters will probably be discussed in the report, so be clear, write down units whenever possible, and discuss any anomalous results with your PM.

Procedure: Field Measurement of Surface Water Quality Parameters

- See above for commonly-measured parameters;
- YSI or Horiba type instruments are much more commonly used for measurement of surface water parameters;
- Probes are simply placed in the water and allowed to stabilize; try to place the probe somewhere where it will be completely submerged, with surface water conditions representative of the surface water station as a whole. Do not throw the probe;
- Allow to stabilize and record as above; and,
- As a minimum, note direction of flow.

General Notes

- Most water sampling meters are not water proof (other than the probe section), meters should not be fully submerged and if being used in rainy conditions the meters should be placed in a water proof (i.e., Ziploc) bag to take readings; and,
- Probes can also freeze and break if left in a car overnight.

Revision History

Updated by D. Arnott May 2017
Updated by J. Bowman January 22, 2018
Updated by M. Coyle January 23, 2018
Updated by D. Arnott March 2018

SOP 3-21: GROUNDWATER SAMPLING

Objective

Many of the projects we complete (Phase 2 ESAs, hydrogeological investigations, landfill jobs) involve groundwater sampling. The purpose of this SOP is to outline a few of the most commonly used techniques, as well as some general guidelines for when to select one over another, while not only meeting the project objectives, but also completing the required sampling program as quickly and budget-consciously as possible.

Procedure: Selecting Groundwater Sampling Method

- Does the contract or project terms-of-reference specify which groundwater sampling methodology to use? If so, follow contract, TOR, or other applicable specification;
- Is a Record of Site Condition being filed for the property, AND there are volatile organic compounds and/or BTEX/PHC F1 on the list of contaminants of concern? Recommend sampling with a peristaltic pump if wells are less than 10 m deep. Proper sampling methods can be used to prevent volatilization of target contaminants during sampling with other methods, but use of a peristaltic pump represents industry standard for volatile contaminants;
- Is free petroleum hydrocarbon product or other LNAPL suspected at the well? Do we need an estimate of free product thickness? Recommend sampling with a bailer;
- Sampling at a landfill? Recommend sampling with 1/2-inch ID PE tubing and foot valve (most landfill wells will be equipped with this already). For deep wells at landfills, a “power pack” can be used that can be run from a portable generator and will purge the well for you – please see SOP 5-01);
- Is an extremely deep well being sampled or is low-flow/no-purge sampling required? Consider sampling using passive diffusion bags or double-valve pumps (discuss these applications with senior staff). These situations are relatively rare and should be discussed with your project manager, and consequently are not covered in this SOP; and,
- 1/2-inch ID PE tubing and foot valve is generally a good default sampling technology if none of the above situations apply (for speed, reliability, ease of use, and availability/simplicity of equipment).

Procedure: Groundwater Sampling (1/2-inch ID PE tubing/inertial lift pump (foot valve))

- Measure water level per SOP 3-19.
- Estimate the amount of standing water in the well, as follows:

  $$V = 1000(\Delta h)\pi r^2$$

  Where V is the volume of standing water in the well in litres, Δh is the standing water within the well (in metres), r is the radius of the well in metres (0.016 m for a 1 ¼” (32 mm) well, 0.0254 m for a 2” (51 mm) well), and 1000 is the conversion factor between m^3 and litres.
- If there is no 1/2-inch ID PE tubing already in the well, thread a foot valve onto the bottom of some clean 1/2-inch ID PE tubing and advance down the well until it reaches the bottom (make sure you’re not hung up on a thread joint between PVC well pipe sections by rotating the 1/2-inch ID PE tubing

every so often as you advance it). Cut off the tubing such that it extends about 1-1.5 m above the top of the well pipe. This extra bit makes it easier to grab the tubing and to sample with it;

- Purge 3 well volumes into a bucket or drum. Calculate purge volume as per SOP 3-16. Measure field chemistry after every well volume per SOP 3-20;
- Collect sample directly from the 1/2-inch ID PE tubing into laboratory-provided sample bottles:
  - If sampling for metals, attach a disposable metals filter to the end of the tubing. Pump some water through the filter before you sample and ensure that it appears to be running clear; and,
  - If sampling for VOCs, pump as carefully and smoothly as possible, and tip tubing downward when filling vials. Try to minimize turbulence when filling vials.
- Following sampling, drain standing water from the 1/2-inch ID PE tubing by inverting the up-hole end of the tubing down into the well, while simultaneously pulling the down-hole end upward (this will form a loop above the well). Continue until the foot valve is above the static water level and the pressure in the tubing is released. In the event that we need to resample in the winter, this will prevent standing water within the tubing from freezing. (if water is frozen in the tubing, it can be thawed by turning the tubing upside down and placing the frozen portion in the (warmer) water in the bottom of the well); and,
- Replace the well cap/lid.

Procedure: Groundwater Sampling (peristaltic pump)

- Measure water level per SOP 3-19;
- Estimate the amount of standing water in the well, as above;
- Advance the disposable HDPE tubing down to the bottom of the well, THEN lift it approximately 0.3 m above the bottom of the well (this helps prevent it from getting clogged with sediment). Sometimes a small (1-2 cm) piece of silicone tubing, the end of which is cut at an angle, placed at the end of the HDPE tubing, will help the tubing advance down the well past joints in the PVC well pipe;
- Place the top of the down-hole tubing into a length of silicone tubing, which will be placed in the peristaltic pump (the exact configuration depends on the pump, ask rental suppliers or refer to manufacturer's instructions). Take another short length of HDPE tubing and attach this to the other end of the silicone tubing – this allows bottles to be filled more easily. Metals filters can be attached to the HDPE tubing using a short piece of silicone;
- Purge 3 well volumes into a bucket or drum. Calculate purge volume as per SOP 3-16. Measure field chemistry after every well volume per SOP 3-20;
- Sample directly from the peristaltic tubing into laboratory-provided sample bottles:
  - If sampling for metals, attach a disposable metals filter to the end of the tubing. Pump some water through the filter before you sample; and,
  - If sampling for VOCs, set the flow rate reasonably low.

- After sampling, remove the downhole tubing and discard – if left in the well, it will likely slip down and become impossible to retrieve. Close up the well.

Procedure: Groundwater Sampling (bailer)

- Measure water level per SOP 3-19;
- Estimate the amount of standing water in the well, as above;
- Advance the bailer slowly until you hear it contact the water. Pull it up and take a look at whether there's any free product in it (if product is suspected, you should be using an interface probe, but a bailer is a good second check, especially if the project is F2 or higher and viscous, which can affect interface probe measurements;
- Purge 3 well volumes into a bucket or drum. Calculate purge volume as per SOP 3-16. Measure field chemistry after every well volume per SOP 3-20;
- Sample directly from the bailer into laboratory-provided sample bottles:
    - Sampling for metals using a bailer is not recommended since it's very difficult to attach a metals filter inline. Some labs will filter metals in-house if you provide some extra sample volume. However, samples of this nature don't get preserved and this method is not as reliable;
    - Instead of pouring the water out the top of the bailer (it comes out fast), it is recommended that a small angled piece of 1/2-inch ID PE tubing be cut and placed in the bottom of the bailer. If this tubing is pushed up far enough, it will push up the check ball at the bottom of the bailer and allow the water to flow. This can also be done with a gloved finger; and,
    - When sampling for VOCs, keep the flow as slow and laminar as you can.
- Close up the well.

Revision History

Updated by D. Arnott March 2018

SOP 3-22: DESCRIPTION OF SOIL SAMPLES

Objective

Within our industry, there are certain standard ways of describing soil, and the more detailed our description is and the more consistent it is with industry standards, the more useful it will be to the most people. Theoretically, soil descriptions should be consistent between Environmental and Geotechnical departments, even though we are describing soils for different reasons. The Canadian Foundation Engineering Manual (CFEM) and our own internal 'Symbols and Terms' sheets are good references.

Using the following procedure, you will be able to produce a soil description that is detailed, consistent, and understandable to a wide variety of people.

Procedure: Description of Soil Samples

- Soil samples should be collected per SOP 3-08, 3-09, 3-10, 3-13, 3-14;
- If time and field conditions permit, provide a written description of the soil sample on the field log sheet to the highest level of detail possible. Details can also be added later during office review, but because some properties will change between the field and office (such as soil structure, compactness/density, moisture content), log as much as possible as soon as possible;
- Determine the MAJOR COMPONENT of the soil sample (this will be one of the following, based on grain size: **sand, silt, clay, gravel, peat, organics, crushed stone, topsoil**, or if you are test pitting and can observe particles too big to fit in split spoon samplers or geoprobe tubes**, cobbles, and boulders**:
  - Boulders are greater than 200 mm;
  - Cobbles are between 76.2 and 200 mm;
  - Gravel is between 4.75 and 76.2 mm;
  - Sand is between 0.075 and 4.75 mm (rule of thumb – if you can see the particles or if it is not cohesive, it is sand);
  - Silt is between 0.002 and 0.075 mm;
  - Clay is less than 0.002 mm;
  - Practically, it is difficult to tell the difference between silt and clay without doing a lab hydrometer test, but here are some simple field tests that can be done:
    - Silt exhibits "dilatancy" – displays a "corn-starchy" texture and behaviour, appears to have a sheen of water when agitated and appears "dry" when pressure is exerted – clay generally does not; and,
    - Clay will smear smoothly on a nitrile glove, whereas silt will have a more irregular or floury texture when smeared.
- Determine any MINOR COMPONENTS of the soil sample. For the following examples, let's assume the soil sample is composed of sand and silt. Depending on the proportions of major and minor components, describe the soil as follows:

   - >35%: “and” (“sand and silt, silt and sand”);
   - 20-35%: adjective/”y” (“silty sand”);
   - 10-20%: “some” (“sand, some silt”); and,
   - o <10%: “trace” (“sand, trace silt”).

- Note the colour of the soil. This can be subjective, but there are a few important colours to note:

   - Grey means that the material is fresh, not weathered (freshly-placed crushed stone fill or soils that are beneath the long-term water table);
   - Orange or reddish-brown can indicate the presence of iron;
   - Purple suggests that potassium permanganate has been used as the site as a chemical oxidant; and,
   - Also note “light”, “medium”, “dark” (e.g. “light brown silty sand”).

- Determine the moisture content of the soil: “dry”, “moist”, “wet”, “saturated” (e.g., “light brown silty sand, moist”). Note that “saturated” corresponds to soils below the water table (long-term or perched);
- For cohesive soils, do a quick field Atterberg Limits test and indicate whether the soil is drier or wetter than the plastic limit (see following section). (e.g., “light brown silty clay, moist, DTPL”);
- For cohesive soils, describe the consistency of the soil, as follows. Use blow counts as a guide if split spoon samples were taken; if not, use your judgement:

   - Very soft: N value of <2;
   - Soft: N value of 2-4;
   - Firm: N value of 4-8;
   - Stiff: N value of 8-15;
   - Very stiff: N value of 15-30;
   - Hard: N value of >30; and,
   - e.g., “light brown silty clay, moist, DTPL, firm.”

- For cohesionless soils, describe the denseness of the soil, as follows. Once again, use blow counts as a guide if available, and if not, use your judgement:

   - Very loose: N value of 0-5;
   - Loose: N value of 5-10;
   - Compact: N value of 10-30;
   - Dense: N value of 30-50;
   - Very dense: N value of >50; and,
   - e.g., “light brown silty sand, moist, compact”.

- Describe any other properties observed in the soil samples:

   - “Desiccated”: usually observed in upper clay units; visible cracking, shrinkage, oxidation, etc. (applies to silt and clay);

  - "Fissured" or "blocky": having cracks and a blocky structure (applies to silt and clay);
  - "varved": having regularly alternating layers of silt and/or clay of varying colour/particle size, generally corresponding to seasonal variation;
  - "stratified": having distinct layers within the soil sample;
  - "well graded" or "poorly sorted": having a wide variety of particle sizes; and,
  - "uniformly graded" or "well sorted": predominantly one particle size.

- If possible, make an assessment of whether the material is fill or native. Fill is generally present immediately under parking structures, in landscaped/graded areas, and is often less dense or compact and has material mixed in that would not have gotten there naturally. Another good indicator of fill is if it overlies what appears to be original native ground surface (grass, organics, topsoil, etc.). This determination can be left for senior review if necessary;
- If the material is native, does it have characteristics consistent with glacial till (i.e. a wide variation in particle size inconsistent with a marine, lacustrine, fluvial, or deltaic depositional environment)? Once again, this can be left for senior review to determine, and in the final description, the material will be described as "apparent till", as the prevailing wisdom is that we should not call it till unless we've seen the glacier deposit it; and,
- Note if there is any visual or olfactory evidence of contamination in the sample (odour, sheen, staining, etc.). Also note if there are any other smells (sometimes a swampy smell may be present with organic material).

Procedure: Field Determination of Atterberg Limits

- Take a small portion of the (cohesive) soil sample in your gloved hands and roll it into a small "snake";
- If the "snake" can be rolled out until it is thinner than 3 mm without cracking or crumbling, the sample is wetter than the plastic limit (WTPL);
- If the "snake" crumbles or cracks before it is rolled out to 3 mm diameter, the sample is drier than the plastic limit (DTPL); and,
- If the sample is too wet to roll into a "snake", it is WTPL.

Revision History

Updated by D. Arnott July 2017
Updated by D. Arnott March 2018

SOP 3-24: FIELD SCREENING AND SOIL VAPOUR MEASUREMENTS

Objective

We often take far more samples than there is budget to submit, and we need a way to select and narrow down samples of interest within a borehole or on a site, or sometimes to identify areas that need further investigation. While no substitute for lab analysis, it is possible through field screening and soil vapour measurements to get an idea of which samples are most likely to be contaminated. This SOP is intended to resume where SOPs 3-08, -09, and -10 leave off, with soil samples in bags ready for screening.

Procedure: Soil Screening

- Either between soil samples, between boreholes, or at the end of the day as you're deciding what to send to the lab, take a close look at the soil sample in the bag in a well-lit environment. Here are some things to look for:
    - Black colour – could be organics/peat/decomposing vegetation, could be indications of coal or combustion by-products. Odour will help you determine this ("swampy" odour is likely organics);
    - Orange/rusty colour – could be iron staining (natural or indicative of fill/debris), could be crushed brick – usually indicative of fill/impacted material, though can result from natural processes;
    - White colour – could be naturally occurring calcareous deposits (marl), especially if coupled with organic soils – could also be indicative of fill/debris/mortar/building lime, especially if "crumbly" in texture;
    - Actual visible debris (glass, wood, charcoal/coal, metal, etc.) – indicative of fill material, and if poor quality/mixed bag fill material, it's often worth testing a sample to determine proper disposal method if it's going to be shipped off site for development;
    - Yellow colour/looks like turmeric – potentially indicative of impacted fill/metals contam. Some native soils have this appearance but it's uncommon in Ottawa area;
    - Any soil overlying an organic/topsoil layer (or what appears to be original ground surface) can be considered fill – not always worth testing fill, depends on project;
    - Does it have a viscous or oily/tarry appearance? Could be a hydrocarbon; and,
    - Sticky like molasses? Could be a higher-fraction hydrocarbon like Bunker C, or coal tar, though usually not the latter (unless you have good reason to expect it).

- Make sure the samples do not freeze, or if they are cold, try to let them come up to room temperature before taking your vapour readings. If in the field, you can place the samples in your vehicle to warm up;
- Before trying to smell the sample, take a headspace vapour reading with your instrument of choice. This is very important, since VOCs may be present which are not necessarily detectable by scent, and you could avoid a potential health and safety concern if the instrument identifies high vapour levels before you smell the sample;

- Choose your vapour screening instrument, based on the APECs identified at the beginning of the project:
  - RKI Eagle – if PHCs/BTEX are the expected contaminants of concern (make sure you use this instrument in methane elimination mode, or it will pick up false positive readings from soils with higher organic content);
  - miniRAE or comparable photoionization detector (PID) for VOCs – this instrument picks up a larger range of VOCs; and,
  - Gastech/Gastechtor type analog instruments are very rare these days and generally not recommended.
- Calibrate your instrument according to manufacturers' instructions OR check that Pine/rental company has calibrated it before using it. For most jobs, the Ottawa office will rent a pre-calibrated instrument from Pine;
- Turn the instrument on and let it sit for 5 minutes or so to warm up (generally a good idea for the Eagle and the miniRAE). Screen your samples in a space that's not too enclosed, as well-ventilated as possible, and fairly free of background vapours (this is also important for your health);
- 'Zero' the instrument if the display doesn't return to zero;
- Stick the probe of the instrument into the bag. Try to close the bag around the probe as much as possible to keep ambient air from getting in. Agitate the sample and keep the probe in the bag for at least 30 seconds. Watch the display of the instrument – the readings should increase and then decline, usually within the 30-second window. Record the highest reading as the vapour reading for that sample:
  - If there are significant vapours present and the readings continue to increase after 30 seconds, keep the probe in the bag until readings peak and then begin to decline.
- It is difficult to correlate organic vapour readings to analytical results (whether a sample will pass or fail) unless you're analyzing a large number samples with the same relative proportions of contaminants. However, comparing organic vapour readings within the same site gives you an idea of which samples are more or less contaminated;
- Without sticking your nose directly in the bag, try to smell the sample. One good way to do this is to press the air out of the bag and "waft" it towards you with your hand. Smells of concern:
  - Gasoline;
  - Diesel;
  - Kerosene/paint thinner;
  - Mothballs/musty;
  - Railway ties; and,
  - Swampy smell is not usually a concern.
- A small bag of coffee beans may be kept with your field kit and sniffed periodically to "reset" your nose between sniffs of contaminated material; and,

- Select samples for lab analysis per SOP 3-15.

Revision History

Updated by D. Arnott September 2017
Updated by F. Armstrong March 2018
Updated by D. Arnott March 2018

SOP 3-27: PHASE 2 ENVIRONMENTAL SITE ASSESSMENT REPORTS

Objective

Standards for Phase 2 ESA reports in support of RSCs are given in great detail in O.Reg. 153/04 (as amended). While the requirements of O.Reg. 153/04 are above and beyond what may be required for simple due diligence Phase 2 ESAs, they serve as a good guideline and a good place to start. The requirements of a particular Phase 2 ESA should be discussed with your project manager at various times throughout the field work, sampling, analysis, and reporting stages, but the following sections provide some generally useful guidelines for completing Phase 2 ESAs.

Procedure: Phase 2 ESA Reporting

- Phase 2 ESAs to O.Reg. standards require a Sampling and Analysis Plan. This is ideally developed before we drill the site, and will eventually incorporate some of these SOPs. The S&AP should tell you where you are drilling, which samples you are submitting and why (general rationale OR particular depths targeted), and a general overview of field procedures. These can be created after the fact if necessary, but it is not recommended;
- Our borehole, test pit and monitoring well locations should directly correlate to APECs identified in the Phase 1 ESA. Where the exact area of the APEC cannot be drilled, we should put a borehole or TP as close to it (preferably in a downgradient direction) as possible. Make sure our rationale for this is discussed, as well as any constraints that prevent us from getting where we want to;
- APEC and PCA names and numbers should be consistent between a Phase One ESA and a Phase Two ESA. If this changes for any reason, the discrepancy must be discussed, especially if an RSC is being filed;
- Field notes and photos should be saved in the file as soon as possible after drilling, in case the field personnel responsible are assigned to another job and someone else has to write the report. Remember, your field notes must tell the entire story of what happened and why;
- The client should be notified immediately (or as soon as possible) after contamination is identified. Sometimes this can even be during drilling, if you are sure that significant contaminant (i.e., free product) is encountered (otherwise, you should wait for sample results to come back – sometimes they can be surprising). Unless you are dealing with the client directly, it is strongly recommended that you contact the PM and they contact the client, especially when bad news is involved;
- The ‘Phase 1 Conceptual Site Model’ and ‘Phase 2 Conceptual Site Model’ sections required by O.Reg. 153/04 are not recommended unless an RSC is required, as they can be redundant and confusing to the client. However, the important site features should be discussed as required, and as a minimum, the following should be stated clearly:
    - Contaminants present (SCS exceedances);
    - Areas and depths where exceedances occurred;
    - Reason for exceedances, if known;

  - Risks and/or transport pathways associated with exceedances (most of the time, no immediate risk to human or ecological health is present, but it is always worth considering); and,
  - Recommendations and/or data gaps.

- It is recommended that drafting of BH logs and figures commence as soon as possible after getting back from the field – these tools can also help you while sampling and in determining further work;
- Exceedances of SCS should be shown on at least one plan for soil and at least one plan for groundwater. If filing an RSC, MOECC requires exceedances to be broken down by parameter group (BTEX, PHCs, VOCs, PAHs, metals, etc.). They also require exceedances to be shown on a cross-section, and the vertical and horizontal extent of contamination to be shown somehow (usually with shading);
- Cross-sections are not necessarily required unless an RSC is being filed – however, depending on site context, they may be a good idea, especially if the Phase 2 ESA is being prepared in support of a remediation or Soil Management Plan;
- If a Phase 2 ESA is being prepared in support of an RSC, and a remediation was completed, O.Reg. 153/04 requires the remediation report to be submitted as an appendix of the Phase 2 ESA. When entering the names of reports in the RSC submission form, multiple Phase 2 ESA reports are permitted, and for reporting purposes, it is useful and recommended to break up the original Phase 2, the supplemental Phase 2 (if any), and the remediation report. Ensure that in one of those reports, i.e., the one summarizing or following up on the remediation, and that all samples are clean, and all concentrations of any contaminants of concern identified in the Phase 1 and Phase 2 are in compliance with the SCS:

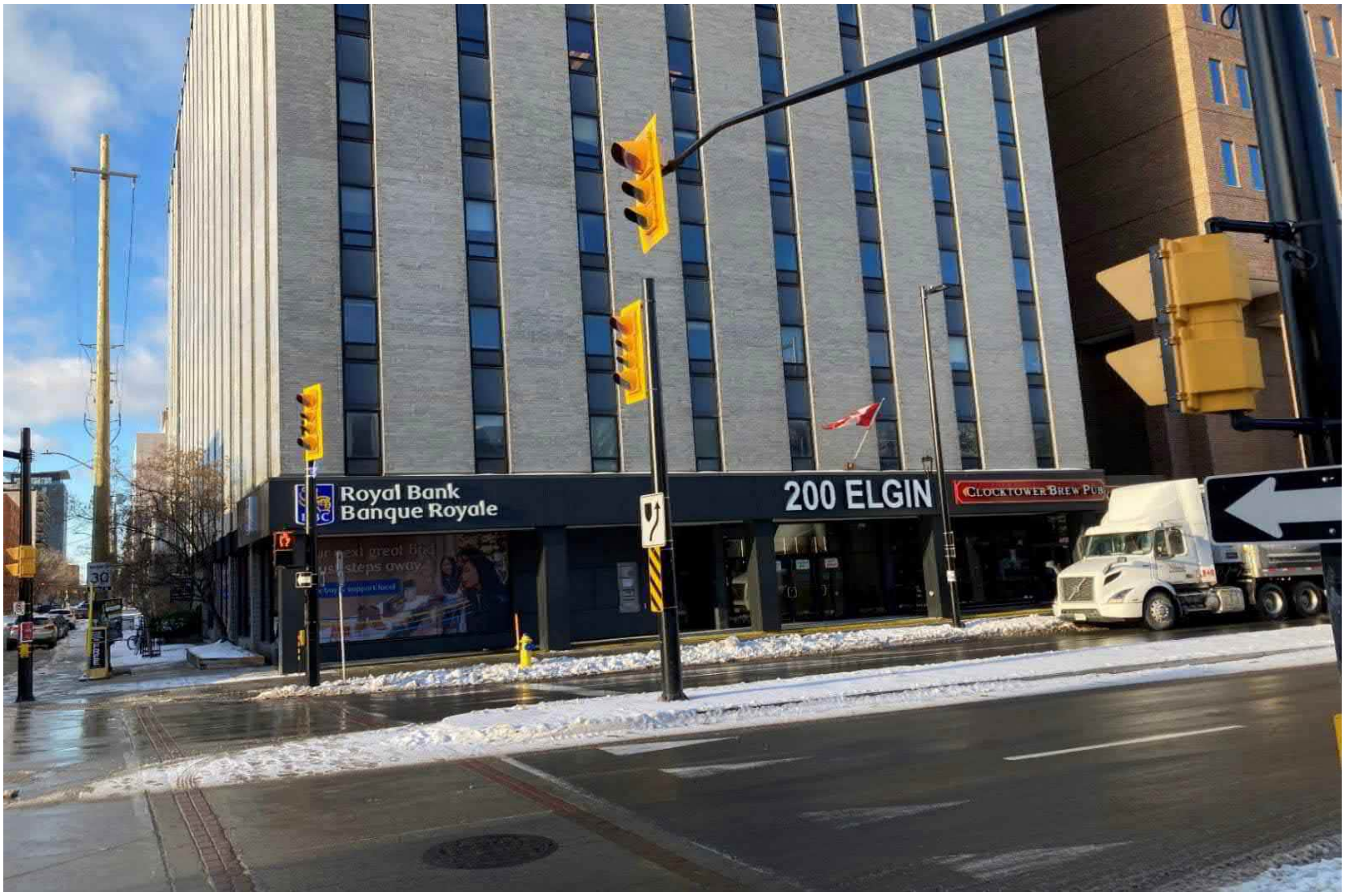
  - o Make sure the required number of confirmatory groundwater sampling events were completed before filing RSC – one quarterly if contaminated soil and groundwater were excavated, four quarterly if any other groundwater remediation method was used.

- • A typical table of contents for a Phase 2 ESA is given in O.Reg. 153/04. Use this as a starting point and customize per the requirements of your site. If filing an RSC, it is HIGHLY recommended that you use this table of contents as closely as possible.

Revision History

Updated by D. Arnott October 2017
Updated by D. Arnott March 2018

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
200 ELGIN STREET, OTTAWA, ONTARIO



APPENDIX B: GRAPHIC BOREHOLE LOGS

MCINTOSH PERRY

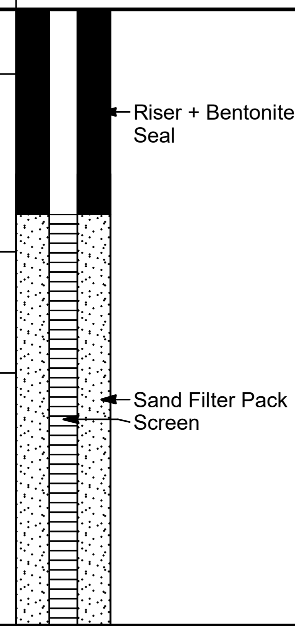
BORING NUMBER BH1(MW)

McIntosh Perry Construction Engineers

CLIENT Elgar Holdings Inc.
PROJECT NAME Phase One and Two ESA and Record of Site Condition
PROJECT NUMBER CCO-22-3539
PROJECT LOCATION 200 Elgin Street, Ottawa, Ontario
DATE STARTED 22-2-9 **COMPLETED** 22-2-9
GROUND ELEVATION 100.14 m local **HOLE SIZE**
DRILLING CONTRACTOR Strata Drilling Group
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING ---
LOGGED BY PM **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING 1.33 m / Elev 98.81 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	SOIL HEADSPACE (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION
0.48					Cementious CONCRETE floor slab with rebar
	SS 1		15/1		Light grey SILTY CLAY, stiff, damp, no odour
1.80	SS 2		0/1		
2	SS 3		15/1		Light grey SILTY CLAY, stiff to firm, damp to moist, no odour
2.70					
	SS 4		15/1		Light grey SILTY CLAY, firm to soft, moist to wet, no odour
4	SS 5		25/1		
4.57					

WELL DIAGRAM



Bottom of hole at 4.57 m.

BORING NUMBER BH2(MW)

McIntosh Perry Construction Engineers

CLIENT Elgar Holdings Inc.

PROJECT NAME Phase One and Two ESA and Record of Site Condition

PROJECT NUMBER CCO-22-3539

PROJECT LOCATION 200 Elgin Street, Ottawa, Ontario

DATE STARTED 22-2-9 **COMPLETED** 22-2-9

GROUND ELEVATION 100.08 m local **HOLE SIZE**

DRILLING CONTRACTOR Strata Drilling Group

GROUND WATER LEVELS:

DRILLING METHOD

AT TIME OF DRILLING ---

LOGGED BY PM **CHECKED BY**

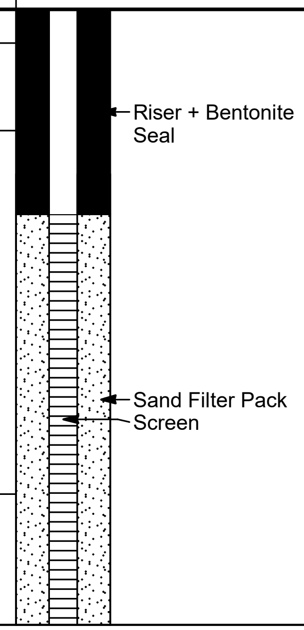
AT END OF DRILLING ---

NOTES

AFTER DRILLING 0.99 m / Elev 99.09 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	SOIL HEADSPACE (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION
0.25					Cementious CONCRETE floor slab with rebar
0.90	SS 1		10/15		Light grey SILTY CLAY, stiff to firm, dry to damp, with faint horizontal layered cracking, a wet patchy clear to brown sheen with PHC smell and metallic grey to brown blobs to 5 mm in size
	SS 2		15/2		Light grey SILTY CLAY, firm, damp to wet, no odour
2	SS 3		20/1		
3.60	SS 4		20/1		
4	SS 5		25/1		Light grey SILTY CLAY, firm to soft, wet to saturated, no odour
4.57					

WELL DIAGRAM



Bottom of hole at 4.57 m.

BORING NUMBER BH3(MW)

McIntosh Perry Construction Engineers

CLIENT Elgar Holdings Inc.
PROJECT NAME Phase One and Two ESA and Record of Site Condition
PROJECT NUMBER CCO-22-3539
PROJECT LOCATION 200 Elgin Street, Ottawa, Ontario
DATE STARTED 22-2-10 **COMPLETED** 22-2-11
GROUND ELEVATION 100.05 m local **HOLE SIZE**
DRILLING CONTRACTOR Strata Drilling Group
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING ---
LOGGED BY PM **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING 2.48 m / Elev 97.56 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	SOIL HEADSPACE (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				1.10	Cementious CONCRETE floor slab with rebar	Riser + Bentonite Seal
	SS 1		0/5		Light grey SILTY CLAY, soft to firm, moist, slight organic odour	
2	SS 2		10/8	2.70		
	SS 3		10/5	3.60	Light grey SILTY CLAY, soft to firm, moist to wet, slight organic odour	Sand Filter Pack Screen
4	SS 4		10/4	4.57	Light grey SILTY CLAY, soft, moist to saturated, slight organic odour	

Bottom of hole at 4.57 m.

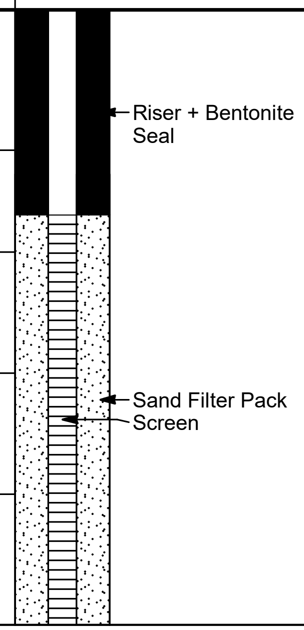
BORING NUMBER BH4(MW)

McIntosh Perry Construction Engineers

CLIENT Elgar Holdings Inc.
PROJECT NAME Phase One and Two ESA and Record of Site Condition
PROJECT NUMBER CCO-22-3539
PROJECT LOCATION 200 Elgin Street, Ottawa, Ontario
DATE STARTED 22-2-10 **COMPLETED** 22-2-11
GROUND ELEVATION 100.04 m local **HOLE SIZE**
DRILLING CONTRACTOR Strata Drilling Group
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING ---
LOGGED BY PM **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING 2.74 m / Elev 97.30 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	SOIL HEADSPACE (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION
				1.04	Cementious CONCRETE floor slab with rebar
	SS 1		45/1	1.80	Light grey SILTY CLAY, firm to soft, moist to wet, no odour
2	SS 2		40/2	2.70	Light grey SILTY CLAY, firm to soft, moist to wet, slight organic odour
	SS 3		45/1	3.60	Light grey SILTY CLAY, soft, moist to wet, no odour
4	SS 4		45/1	4.57	Light grey SILTY CLAY, soft to firm, wet to saturated, slight organic odour

WELL DIAGRAM



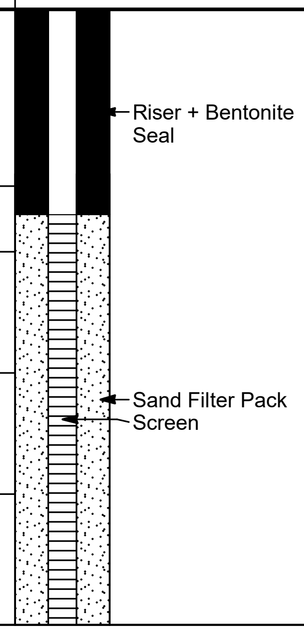
Bottom of hole at 4.57 m.

BORING NUMBER BH5(MW)

McIntosh Perry Construction Engineers

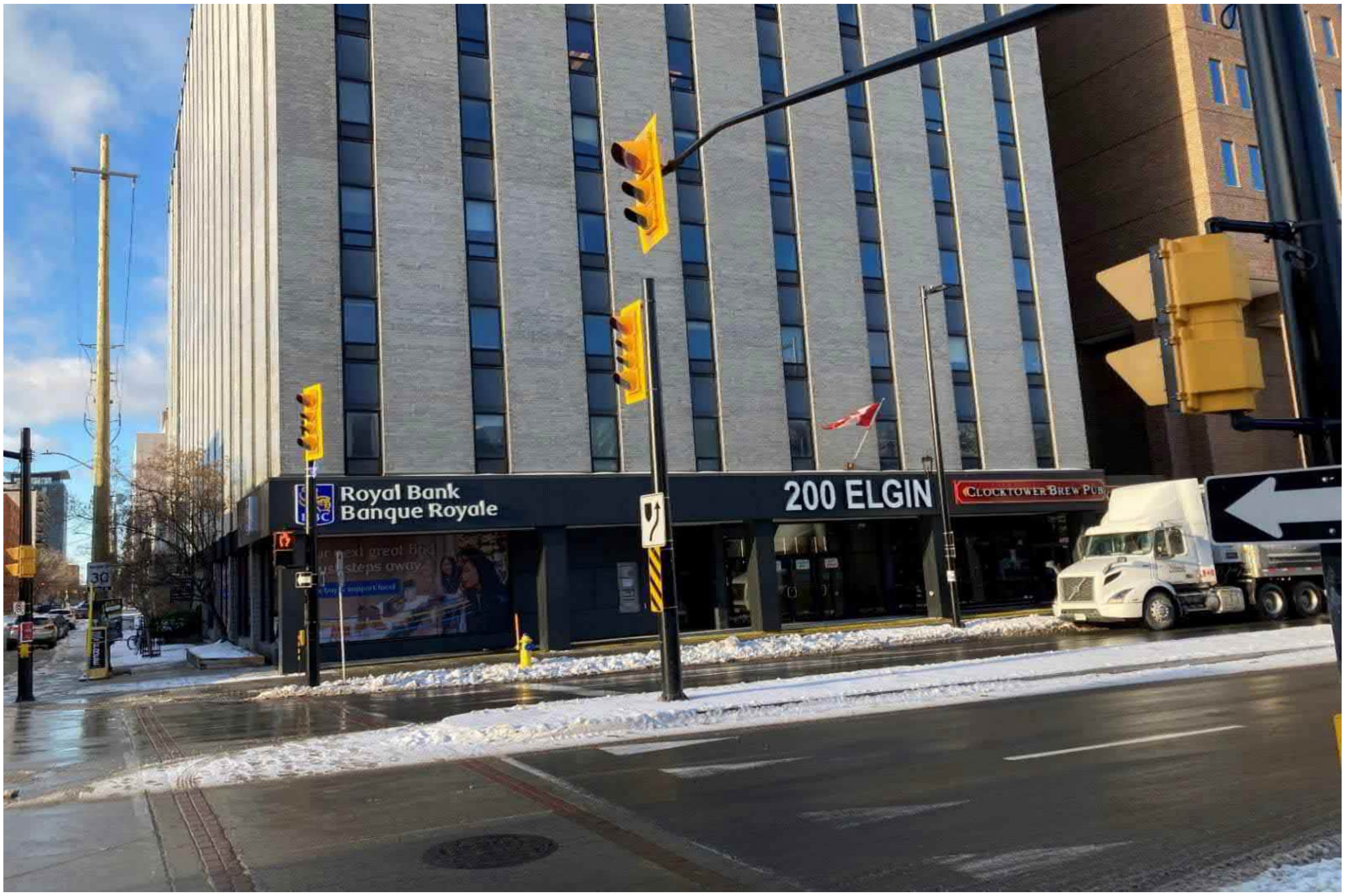
CLIENT Elgar Holdings Inc.
PROJECT NAME Phase One and Two ESA and Record of Site Condition
PROJECT NUMBER CCO-22-3539
PROJECT LOCATION 200 Elgin Street, Ottawa, Ontario
DATE STARTED 22-2-10 **COMPLETED** 22-2-11
GROUND ELEVATION 100.06 m local **HOLE SIZE**
DRILLING CONTRACTOR Strata Drilling Group
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING ---
LOGGED BY PM **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING 1.41 m / Elev 98.65 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	SOIL HEADSPACE (ppm)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
					Cementious CONCRETE floor slab with rebar	
	SS 1		65/8	1.31	Light grey SILTY CLAY, firm to soft, moist, no odour	
2	SS 2		60/3	1.80	Light grey to brown SILTY CLAY, firm, moist to wet	
	SS 3		15/1	2.70	Light grey SILTY CLAY, soft, moist to wet, slightly organic odour	
4	SS 4		40/3	3.60	Light grey SILTY CLAY, soft, wet to saturated, no odour	
				4.57	Bottom of hole at 4.57 m.	



ENVIRONMENTAL BH 200 ELGIN_TEST.GPJ GINT STD CANADA.GDT 22-2-15

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
200 ELGIN STREET, OTTAWA, ONTARIO



APPENDIX C: LABORATORY CERTIFICATES OF ANALYSIS

McINTOSH PERRY

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CANADA L4Z 1Y2
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CLIENT NAME: MCINTOSH PERRY LIMITED
RR#3 115 WALGREEN ROAD
CARP, ON K0A1L0
(613) 836-2184

ATTENTION TO: Dan Arnott

PROJECT: CCO-22-3539

AGAT WORK ORDER: 22Z862804

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Feb 18, 2022

PAGES (INCLUDING COVER): 9

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 22Z862804
PROJECT: CCO-22-3539

CLIENT NAME: MCINTOSH PERRY LIMITED **ATTENTION TO: Dan Arnott**
SAMPLING SITE: **SAMPLED BY:**

O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Soil)

DATE RECEIVED: 2022-02-10 **DATE REPORTED: 2022-02-18**

			SAMPLE DESCRIPTION:	BH1(MW)-SS1	BH1(MW)-SS5	BH2(MW)-SS1	BH2(MW)-SS5	BH(MW)-DUP
			SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
			DATE SAMPLED:	2022-02-09 11:50	2022-02-09 13:10	2022-02-09 14:50	2022-02-09 15:40	2022-02-09
Parameter	**Unit**	**G / S**	**RDL**	**3507372**	**3507373**	**3507374**	**3507375**	**3507376**
F1 (C6 - C10)	µg/g	65	5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	65	5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	150	10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	1300	50	<50	<50	1000	<50	<50
F4 (C34 to C50)	µg/g	5600	50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	5600	50	NA	NA	NA	NA	NA
Moisture Content	%		0.1	38.7	41.9	39.1	43.0	42.7
Surrogate	**Unit**	**Acceptable Limits**						
Toluene-d8	% Recovery	50-140		87	113	86	111	82
Terphenyl	%	60-140		103	96	96	120	115

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Soil - Residential/Parkland/Institutional Property Use - Medium and Fine Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3507372-3507376 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contribution.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: NPopukolof

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Certificate of Analysis

AGAT WORK ORDER: 22Z862804
PROJECT: CCO-22-3539

CLIENT NAME: MCINTOSH PERRY LIMITED
ATTENTION TO: Dan Arnott
SAMPLING SITE:
SAMPLED BY:

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2022-02-10 **DATE REPORTED: 2022-02-18**

			SAMPLE DESCRIPTION:	BH1(MW)-SS1	BH1(MW)-SS5	BH2(MW)-SS1	BH2(MW)-SS5	BH(MW)-DUP
			SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
			DATE SAMPLED:	2022-02-09 11:50	2022-02-09 13:10	2022-02-09 14:50	2022-02-09 15:40	2022-02-09
Parameter	**Unit**	**G / S**	**RDL**	**3507372**	**3507373**	**3507374**	**3507375**	**3507376**
Dichlorodifluoromethane	µg/g	25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.022	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	5.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	28	0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.96	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.75	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	1.4	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	11	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	44	0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	30	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.18	0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	3.4	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.12	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.17	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.085	0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.52	0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	13	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	4.3	0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	6	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	9.4	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	2.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	2.7	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	15	0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: NPopukoloff

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CLIENT NAME: MCINTOSH PERRY LIMITED **ATTENTION TO: Dan Arnott**

SAMPLING SITE: **SAMPLED BY:**

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2022-02-10 **DATE REPORTED: 2022-02-18**

			SAMPLE DESCRIPTION:	BH1(MW)-SS1	BH1(MW)-SS5	BH2(MW)-SS1	BH2(MW)-SS5	BH(MW)-DUP
			SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
			DATE SAMPLED:	2022-02-09 11:50	2022-02-09 13:10	2022-02-09 14:50	2022-02-09 15:40	2022-02-09
Parameter	**Unit**	**G / S**	**RDL**	**3507372**	**3507373**	**3507374**	**3507375**	**3507376**
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	ug/g	0.26	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	2.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	6	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.097	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	4.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.083	0.04	<0.04	<0.04	<0.04	<0.04	<0.04
n-Hexane	µg/g	34	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	38.7	41.9	39.1	43.0	42.7
Surrogate	**Unit**	**Acceptable Limits**						
Toluene-d8	% Recovery	50-140		106	111	108	110	104
4-Bromofluorobenzene	% Recovery	50-140		89	100	92	80	84

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Soil - Residential/Parkland/Institutional Property Use - Medium and Fine Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3507372-3507376 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: NPopukolof

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Quality Assurance

CLIENT NAME: MCINTOSH PERRY LIMITED | **AGAT WORK ORDER: 22Z862804**

PROJECT: CCO-22-3539 | **ATTENTION TO: Dan Arnott**

SAMPLING SITE: | **SAMPLED BY:**

Trace Organics Analysis

RPT Date: Feb 18, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Soil)															
F1 (C6 - C10)	3514613		<5	<5	NA	< 5	87%	60%	140%	104%	60%	140%	97%	60%	140%
F2 (C10 to C16)	3512789		< 10	< 10	NA	< 10	106%	60%	140%	104%	60%	140%	127%	60%	140%
F3 (C16 to C34)	3512789		< 50	< 50	NA	< 50	102%	60%	140%	123%	60%	140%	115%	60%	140%
F4 (C34 to C50)	3512789		< 50	< 50	NA	< 50	117%	60%	140%	87%	60%	140%	88%	60%	140%
O. Reg. 153(511) - VOCs (Soil)															
Dichlorodifluoromethane	3507374	3507374	<0.05	<0.05	NA	< 0.05	74%	50%	140%	109%	50%	140%	101%	50%	140%
Vinyl Chloride	3507374	3507374	<0.02	<0.02	NA	< 0.02	95%	50%	140%	89%	50%	140%	104%	50%	140%
Bromomethane	3507374	3507374	<0.05	<0.05	NA	< 0.05	107%	50%	140%	87%	50%	140%	71%	50%	140%
Trichlorofluoromethane	3507374	3507374	<0.05	<0.05	NA	< 0.05	98%	50%	140%	82%	50%	140%	96%	50%	140%
Acetone	3507374	3507374	<0.50	<0.50	NA	< 0.50	93%	50%	140%	97%	50%	140%	105%	50%	140%
1,1-Dichloroethylene	3507374	3507374	<0.05	<0.05	NA	< 0.05	91%	50%	140%	103%	60%	130%	119%	50%	140%
Methylene Chloride	3507374	3507374	<0.05	<0.05	NA	< 0.05	94%	50%	140%	86%	60%	130%	84%	50%	140%
Trans- 1,2-Dichloroethylene	3507374	3507374	<0.05	<0.05	NA	< 0.05	115%	50%	140%	110%	60%	130%	91%	50%	140%
Methyl tert-butyl Ether	3507374	3507374	<0.05	<0.05	NA	< 0.05	84%	50%	140%	110%	60%	130%	115%	50%	140%
1,1-Dichloroethane	3507374	3507374	<0.02	<0.02	NA	< 0.02	97%	50%	140%	116%	60%	130%	102%	50%	140%
Methyl Ethyl Ketone	3507374	3507374	<0.50	<0.50	NA	< 0.50	97%	50%	140%	107%	50%	140%	102%	50%	140%
Cis- 1,2-Dichloroethylene	3507374	3507374	<0.02	<0.02	NA	< 0.02	89%	50%	140%	87%	60%	130%	97%	50%	140%
Chloroform	3507374	3507374	<0.04	<0.04	NA	< 0.04	81%	50%	140%	93%	60%	130%	94%	50%	140%
1,2-Dichloroethane	3507374	3507374	<0.03	<0.03	NA	< 0.03	89%	50%	140%	110%	60%	130%	85%	50%	140%
1,1,1-Trichloroethane	3507374	3507374	<0.05	<0.05	NA	< 0.05	120%	50%	140%	99%	60%	130%	89%	50%	140%
Carbon Tetrachloride	3507374	3507374	<0.05	<0.05	NA	< 0.05	107%	50%	140%	103%	60%	130%	104%	50%	140%
Benzene	3507374	3507374	<0.02	<0.02	NA	< 0.02	105%	50%	140%	101%	60%	130%	91%	50%	140%
1,2-Dichloropropane	3507374	3507374	<0.03	<0.03	NA	< 0.03	105%	50%	140%	109%	60%	130%	97%	50%	140%
Trichloroethylene	3507374	3507374	<0.03	<0.03	NA	< 0.03	101%	50%	140%	96%	60%	130%	83%	50%	140%
Bromodichloromethane	3507374	3507374	<0.05	<0.05	NA	< 0.05	83%	50%	140%	94%	60%	130%	107%	50%	140%
Methyl Isobutyl Ketone	3507374	3507374	<0.50	<0.50	NA	< 0.50	98%	50%	140%	101%	50%	140%	104%	50%	140%
1,1,2-Trichloroethane	3507374	3507374	<0.04	<0.04	NA	< 0.04	101%	50%	140%	108%	60%	130%	117%	50%	140%
Toluene	3507374	3507374	<0.05	<0.05	NA	< 0.05	91%	50%	140%	114%	60%	130%	101%	50%	140%
Dibromochloromethane	3507374	3507374	<0.05	<0.05	NA	< 0.05	86%	50%	140%	101%	60%	130%	105%	50%	140%
Ethylene Dibromide	3507374	3507374	<0.04	<0.04	NA	< 0.04	100%	50%	140%	97%	60%	130%	107%	50%	140%
Tetrachloroethylene	3507374	3507374	<0.05	<0.05	NA	< 0.05	81%	50%	140%	98%	60%	130%	86%	50%	140%
1,1,1,2-Tetrachloroethane	3507374	3507374	<0.04	<0.04	NA	< 0.04	113%	50%	140%	97%	60%	130%	94%	50%	140%
Chlorobenzene	3507374	3507374	<0.05	<0.05	NA	< 0.05	103%	50%	140%	118%	60%	130%	95%	50%	140%
Ethylbenzene	3507374	3507374	<0.05	<0.05	NA	< 0.05	83%	50%	140%	101%	60%	130%	87%	50%	140%
m & p-Xylene	3507374	3507374	<0.05	<0.05	NA	< 0.05	101%	50%	140%	117%	60%	130%	103%	50%	140%
Bromoform	3507374	3507374	<0.05	<0.05	NA	< 0.05	97%	50%	140%	104%	60%	130%	107%	50%	140%
Styrene	3507374	3507374	<0.05	<0.05	NA	< 0.05	82%	50%	140%	84%	60%	130%	94%	50%	140%
1,1,2,2-Tetrachloroethane	3507374	3507374	<0.05	<0.05	NA	< 0.05	94%	50%	140%	108%	60%	130%	99%	50%	140%
o-Xylene	3507374	3507374	<0.05	<0.05	NA	< 0.05	89%	50%	140%	104%	60%	130%	107%	50%	140%

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Quality Assurance

CLIENT NAME: MCINTOSH PERRY LIMITED **AGAT WORK ORDER: 22Z862804**
PROJECT: CCO-22-3539 **ATTENTION TO: Dan Arnott**
SAMPLING SITE: **SAMPLED BY:**

Trace Organics Analysis (Continued)

RPT Date: Feb 18, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
1,3-Dichlorobenzene	3507374	3507374	<0.05	<0.05	NA	< 0.05	105%	50%	140%	102%	60%	130%	113%	50%	140%
1,4-Dichlorobenzene	3507374	3507374	<0.05	<0.05	NA	< 0.05	114%	50%	140%	94%	60%	130%	116%	50%	140%
1,2-Dichlorobenzene	3507374	3507374	<0.05	<0.05	NA	< 0.05	101%	50%	140%	100%	60%	130%	109%	50%	140%
n-Hexane	3507374	3507374	<0.05	<0.05	NA	< 0.05	110%	50%	140%	93%	60%	130%	89%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

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Method Summary

CLIENT NAME: MCINTOSH PERRY LIMITED **AGAT WORK ORDER: 22Z862804**
PROJECT: CCO-22-3539 **ATTENTION TO: Dan Arnott**
SAMPLING SITE: **SAMPLED BY:**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
F1 (C6 - C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
Toluene-d8	VOL-91-5009	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Dichlorodifluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: MCINTOSH PERRY LIMITED **AGAT WORK ORDER: 22Z862804**

PROJECT: CCO-22-3539 **ATTENTION TO: Dan Arnott**

SAMPLING SITE: **SAMPLED BY:**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Toluene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS
Moisture Content	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE

AGAT Laboratories

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Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 22T862804

Cooler Quantity: one - free ice.

Arrival Temperatures: 0.7 | 0.7 | 1.0
0.6 | 0.8 | 1.1

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: On Ice

Report Information:

Company: McIntosh Perry Consulting Engineers
Contact: Dan Arnott & Pamela Muniz
Address: 115 Walgreen Rd, Carp, ON. K0A 1L0
Phone: 613-650-7977 Fax:
Reports to be sent to:
1. Email: p.muniz@mcintoshperry.com
2. Email: d.arnott@mcintoshperry.com

Regulatory Requirements:

(Please check all applicable boxes)

☒ Regulation 153/04
Table 3 (Indicate One)
☐Ind/Com
☒Res/Park
☐Agriculture
Soil Texture (Check One)
☐Coarse
☒Fine

☐ Excess Soils R406
Table (Indicate One)
☐ Regulation 558
☐ CCME

☐ Sewer Use
☐Sanitary ☐Storm
Region
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
Indicate One

Is this submission for a **Record of Site Condition?** ☒ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☒ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT (Most Analysis) ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
*TAT is exclusive of weekends and statutory holidays

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: CCO-22-3539
Site Location: 200 Elgin Street, Ottawa, ON K2P 1L5
Sampled By: Pamela Muniz
AGAT ID #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐
Company: McIntosh Perry Consulting Engineers
Contact: Pamela Muniz
Address: 115 Walgreen Rd, Carp, ON
Email: p.muniz@mcintoshperry.com

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	BTEX, F1-F4 PHCs / Analyze F4G if required ☐ Yes ☐ No	PAHs	Total PCBs ☐ Aroclor	VOC	O. Reg 558: Landfill Disposal Characterization TCLP: TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	Potentially Hazardous or High Concentration (Y/N)
BH1(MW)-SS1	Feb9/22	11:50 AM PM	3	S	Hold metals & inorganics	N	X		X			X					
BH1(MW)-SS5	Feb9/22	1:10 AM PM	3	S	Hold metals & inorganics	N	X		X								
BH2(MW)-SS1	Feb9/22	2:50 AM PM	3	S	Hold metals & inorganics	N	X		X			X					
BH2(MW)-SS5	Feb9/22	3:40 AM PM	3	S	Hold metals & inorganics	N	X		X								
BH(MW)-DUP	Feb 9/22	AM PM	3	S	Hold metals & inorganics	N	X		X								
		AM PM															
		AM PM															
		AM PM															
		AM PM															
		AM PM															
		AM PM															

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Pamela Muniz	Feb 10/22		C. Griffith	22/02/10	16h30
C. Griffith Purolator	22/02/11	16h00	Anthony Baalbaki	12/02/22	1035

Page 1 of 1

Nº: T 122955

Document ID: DIV-78-1511.020

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Date Issued: December 9, 2020

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CLIENT NAME: MCINTOSH PERRY LIMITED
RR#3 115 WALGREEN ROAD
CARP, ON K0A1L0
(613) 836-2184
ATTENTION TO: Dan Arnott
PROJECT: CCO-22-3539
AGAT WORK ORDER: 22Z863491
TRACE ORGANICS REVIEWED BY: Pinkal Patel, Report Reviewer
DATE REPORTED: Feb 22, 2022
PAGES (INCLUDING COVER): 9
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

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Certificate of Analysis

AGAT WORK ORDER: 22Z863491
PROJECT: CCO-22-3539

CLIENT NAME: MCINTOSH PERRY LIMITED **ATTENTION TO: Dan Arnott**
SAMPLING SITE: **SAMPLED BY:**

O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Soil)

DATE RECEIVED: 2022-02-14 **DATE REPORTED: 2022-02-22**

			SAMPLE DESCRIPTION:	BH3-SS1	BH3-SS4	BH4-SS1	BH4-SS4	BH5-SS1	BH5-SS4
			SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil
			DATE SAMPLED:	2022-02-11 09:30	2022-02-11 09:35	2022-02-11 11:30	2022-02-11 11:35	2022-02-11 14:15	2022-02-11 14:50
Parameter	**Unit**	**G / S**	**RDL**	**3515920**	**3515927**	**3515928**	**3515929**	**3515930**	**3515931**
F1 (C6 - C10)	µg/g	65	5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	65	5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	150	10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	1300	50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	5600	50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	5600	50	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	39.0	42.5	42.9	39.0	46.2	6.23
Surrogate	**Unit**	**Acceptable Limits**							
Toluene-d8	% Recovery	50-140		119	96	112	98	90	74
Terphenyl	%	60-140		102	98	101	105	96	116

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Soil - Residential/Parkland/Institutional Property Use - Medium and Fine Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3515920-3515931 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contribution.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories
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Certificate of Analysis

AGAT WORK ORDER: 22Z863491
PROJECT: CCO-22-3539

CLIENT NAME: MCINTOSH PERRY LIMITED
ATTENTION TO: Dan Arnott
SAMPLING SITE:
SAMPLED BY:

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2022-02-14 **DATE REPORTED: 2022-02-22**

			SAMPLE DESCRIPTION:	BH3-SS1	BH3-SS4	BH4-SS1	BH4-SS4	BH5-SS1	BH5-SS4
			SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil
			DATE SAMPLED:	2022-02-11 09:30	2022-02-11 09:35	2022-02-11 11:30	2022-02-11 11:35	2022-02-11 14:15	2022-02-11 14:50
Parameter	**Unit**	**G / S**	**RDL**	**3515920**	**3515927**	**3515928**	**3515929**	**3515930**	**3515931**
Dichlorodifluoromethane	µg/g	25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.022	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	5.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	28	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.96	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.75	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	1.4	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	11	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	44	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	30	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.18	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	3.4	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.12	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.17	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.085	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.52	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	13	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	4.3	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	6	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	9.4	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	2.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	2.7	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	15	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: Pinkal Patel

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 22Z863491

PROJECT: CCO-22-3539

CLIENT NAME: MCINTOSH PERRY LIMITED **ATTENTION TO: Dan Arnott**

SAMPLING SITE: **SAMPLED BY:**

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2022-02-14 **DATE REPORTED: 2022-02-22**

			SAMPLE DESCRIPTION:	BH3-SS1	BH3-SS4	BH4-SS1	BH4-SS4	BH5-SS1	BH5-SS4
			SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil
			DATE SAMPLED:	2022-02-11 09:30	2022-02-11 09:35	2022-02-11 11:30	2022-02-11 11:35	2022-02-11 14:15	2022-02-11 14:50
Parameter	**Unit**	**G / S**	**RDL**	**3515920**	**3515927**	**3515928**	**3515929**	**3515930**	**3515931**
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	ug/g	0.26	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	2.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	6	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.097	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	4.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.083	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
n-Hexane	µg/g	34	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	39.0	42.5	42.9	39.0	46.2	6.23
Surrogate	**Unit**	**Acceptable Limits**							
Toluene-d8	% Recovery	50-140		107	109	108	107	104	102
4-Bromofluorobenzene	% Recovery	50-140		88	107	88	102	87	88

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Soil - Residential/Parkland/Institutional Property Use - Medium and Fine Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3515920-3515931 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Pinkal Patel

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Quality Assurance

CLIENT NAME: MCINTOSH PERRY LIMITED | **AGAT WORK ORDER: 22Z863491**

PROJECT: CCO-22-3539 | **ATTENTION TO: Dan Arnott**

SAMPLING SITE: | **SAMPLED BY:**

Trace Organics Analysis

RPT Date: Feb 22, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Soil)															
F1 (C6 - C10)	3515931	3515931	<5	<5	NA	< 5	96%	60%	140%	97%	60%	140%	101%	60%	140%
F2 (C10 to C16)	3510868		< 10	< 10	NA	< 10	123%	60%	140%	72%	60%	140%	63%	60%	140%
F3 (C16 to C34)	3510868		< 50	< 50	NA	< 50	120%	60%	140%	67%	60%	140%	60%	60%	140%
F4 (C34 to C50)	3510868		< 50	< 50	NA	< 50	86%	60%	140%	101%	60%	140%	82%	60%	140%
O. Reg. 153(511) - VOCs (Soil)															
Dichlorodifluoromethane	3507374		<0.05	<0.05	NA	< 0.05	74%	50%	140%	109%	50%	140%	101%	50%	140%
Vinyl Chloride	3507374		<0.02	<0.02	NA	< 0.02	95%	50%	140%	89%	50%	140%	104%	50%	140%
Bromomethane	3507374		<0.05	<0.05	NA	< 0.05	107%	50%	140%	87%	50%	140%	71%	50%	140%
Trichlorofluoromethane	3507374		<0.05	<0.05	NA	< 0.05	98%	50%	140%	82%	50%	140%	96%	50%	140%
Acetone	3507374		<0.50	<0.50	NA	< 0.50	93%	50%	140%	97%	50%	140%	105%	50%	140%
1,1-Dichloroethylene	3507374		<0.05	<0.05	NA	< 0.05	91%	50%	140%	103%	60%	130%	119%	50%	140%
Methylene Chloride	3507374		<0.05	<0.05	NA	< 0.05	94%	50%	140%	86%	60%	130%	84%	50%	140%
Trans- 1,2-Dichloroethylene	3507374		<0.05	<0.05	NA	< 0.05	115%	50%	140%	110%	60%	130%	91%	50%	140%
Methyl tert-butyl Ether	3507374		<0.05	<0.05	NA	< 0.05	84%	50%	140%	110%	60%	130%	115%	50%	140%
1,1-Dichloroethane	3507374		<0.02	<0.02	NA	< 0.02	97%	50%	140%	116%	60%	130%	102%	50%	140%
Methyl Ethyl Ketone	3507374		<0.50	<0.50	NA	< 0.50	97%	50%	140%	107%	50%	140%	102%	50%	140%
Cis- 1,2-Dichloroethylene	3507374		<0.02	<0.02	NA	< 0.02	89%	50%	140%	87%	60%	130%	97%	50%	140%
Chloroform	3507374		<0.04	<0.04	NA	< 0.04	81%	50%	140%	93%	60%	130%	94%	50%	140%
1,2-Dichloroethane	3507374		<0.03	<0.03	NA	< 0.03	89%	50%	140%	110%	60%	130%	85%	50%	140%
1,1,1-Trichloroethane	3507374		<0.05	<0.05	NA	< 0.05	120%	50%	140%	99%	60%	130%	89%	50%	140%
Carbon Tetrachloride	3507374		<0.05	<0.05	NA	< 0.05	107%	50%	140%	103%	60%	130%	104%	50%	140%
Benzene	3507374		<0.02	<0.02	NA	< 0.02	105%	50%	140%	101%	60%	130%	91%	50%	140%
1,2-Dichloropropane	3507374		<0.03	<0.03	NA	< 0.03	105%	50%	140%	109%	60%	130%	97%	50%	140%
Trichloroethylene	3507374		<0.03	<0.03	NA	< 0.03	101%	50%	140%	96%	60%	130%	83%	50%	140%
Bromodichloromethane	3507374		<0.05	<0.05	NA	< 0.05	83%	50%	140%	94%	60%	130%	107%	50%	140%
Methyl Isobutyl Ketone	3507374		<0.50	<0.50	NA	< 0.50	98%	50%	140%	101%	50%	140%	104%	50%	140%
1,1,2-Trichloroethane	3507374		<0.04	<0.04	NA	< 0.04	101%	50%	140%	108%	60%	130%	117%	50%	140%
Toluene	3507374		<0.05	<0.05	NA	< 0.05	91%	50%	140%	114%	60%	130%	101%	50%	140%
Dibromochloromethane	3507374		<0.05	<0.05	NA	< 0.05	86%	50%	140%	101%	60%	130%	105%	50%	140%
Ethylene Dibromide	3507374		<0.04	<0.04	NA	< 0.04	100%	50%	140%	97%	60%	130%	107%	50%	140%
Tetrachloroethylene	3507374		<0.05	<0.05	NA	< 0.05	81%	50%	140%	98%	60%	130%	86%	50%	140%
1,1,1,2-Tetrachloroethane	3507374		<0.04	<0.04	NA	< 0.04	113%	50%	140%	97%	60%	130%	94%	50%	140%
Chlorobenzene	3507374		<0.05	<0.05	NA	< 0.05	103%	50%	140%	118%	60%	130%	95%	50%	140%
Ethylbenzene	3507374		<0.05	<0.05	NA	< 0.05	83%	50%	140%	101%	60%	130%	87%	50%	140%
m & p-Xylene	3507374		<0.05	<0.05	NA	< 0.05	101%	50%	140%	117%	60%	130%	103%	50%	140%
Bromoform	3507374		<0.05	<0.05	NA	< 0.05	97%	50%	140%	104%	60%	130%	107%	50%	140%
Styrene	3507374		<0.05	<0.05	NA	< 0.05	82%	50%	140%	84%	60%	130%	94%	50%	140%
1,1,2,2-Tetrachloroethane	3507374		<0.05	<0.05	NA	< 0.05	94%	50%	140%	108%	60%	130%	99%	50%	140%
o-Xylene	3507374		<0.05	<0.05	NA	< 0.05	89%	50%	140%	104%	60%	130%	107%	50%	140%

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Quality Assurance

CLIENT NAME: MCINTOSH PERRY LIMITED **AGAT WORK ORDER: 22Z863491**
PROJECT: CCO-22-3539 **ATTENTION TO: Dan Arnott**
SAMPLING SITE: **SAMPLED BY:**

Trace Organics Analysis (Continued)

RPT Date: Feb 22, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
1,3-Dichlorobenzene	3507374		<0.05	<0.05	NA	< 0.05	105%	50%	140%	102%	60%	130%	113%	50%	140%
1,4-Dichlorobenzene	3507374		<0.05	<0.05	NA	< 0.05	114%	50%	140%	94%	60%	130%	116%	50%	140%
1,2-Dichlorobenzene	3507374		<0.05	<0.05	NA	< 0.05	101%	50%	140%	100%	60%	130%	109%	50%	140%
n-Hexane	3507374		<0.05	<0.05	NA	< 0.05	110%	50%	140%	93%	60%	130%	89%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

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Method Summary

CLIENT NAME: MCINTOSH PERRY LIMITED | **AGAT WORK ORDER: 22Z863491**

PROJECT: CCO-22-3539 | **ATTENTION TO: Dan Arnott**

SAMPLING SITE: | **SAMPLED BY:**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
F1 (C6 - C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
Toluene-d8	VOL-91-5009	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Dichlorodifluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: MCINTOSH PERRY LIMITED **AGAT WORK ORDER: 22Z863491**
PROJECT: CCO-22-3539 **ATTENTION TO: Dan Arnott**
SAMPLING SITE: **SAMPLED BY:**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Toluene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS
Moisture Content	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE

1 Large

AGAT Laboratories

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Laboratory Use Only

Work Order #: 22T863491

Cooler Quantity: one-bagged + ice

Arrival Temperatures: -0.5 | -0.6 | -0.7 ; 1.3 | 1.4 | 1.9

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: Ice / Ice Pack

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: McIntosh Perry
Contact: Dan Arnott
Address: 115 Walgreen Rd, Carp, ON
Phone: 613.714.4589 Fax: 613.836.3724
Reports to be sent to:
1. Email: d.arnott@mcintoshperry.com
2. Email:

Regulatory Requirements:

(Please check all applicable boxes)

- ☒ Regulation 153/04 — Table 3 (Indicate One): ☐ Ind/Com ☒ Res/Park ☐ Agriculture
- Soil Texture (Check One): ☐ Coarse ☒ Fine
- ☐ Excess Soils R406 — Table ____ (Indicate One)
- ☐ Regulation 558
- ☐ CCME
- ☐ Sewer Use: ☐ Sanitary ☐ Storm — Region ____
- ☐ Prov. Water Quality Objectives (PWQO)
- ☐ Other ____ (Indicate One)

Is this submission for a Record of Site Condition? ☒ Yes ☐ No

Report Guideline on Certificate of Analysis: ☒ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT (Most Analysis): ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply): ☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply): ____

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: CCO-22-3539
Site Location: 200 Elgin St
Sampled By: Dan Arnott
AGAT ID #: ____ PO: CCO-22-3539

Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs; Analyze F4G if required ☒ Yes ☐ No	PAHs	Total PCBs ☐ Aroclor	VOC	O. Reg 558: Landfill Disposal Characterization TCLP: TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	Potentially Hazardous or High Concentration (Y/N)
BH3-SS1	11-Feb-22	9:30 AM	3	S	Hold M+I		Y		Y			Y					
BH3-SS4	11-Feb-22	9:35 AM	3	S	Hold M+I		Y		Y			Y					
BH4-SS1	11-Feb-22	11:30 AM	3	S	Hold M+I		X		X			X					
BH4-SS4	11-Feb-22	11:35 AM/PM	3	S	Hold M+I		X		X			X					
BH5-SS1	11-Feb-22	2:15 PM	3	S	Hold M+I		X		X			X					
BH5-SS4	11-Feb-22	2:50 PM	3	S	Hold M+I.		X		X			X					

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Dan Arnott [signature]	14-Feb-2022	11:05 AM	C. Griffith	22/02/14	11h10
C. to Purolator	22/02/14	16h00	Anthony Dasilva [signature]		

22FEB15 9:38AM

Page 1 of ____

Nº: T 122956

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Document ID: DIV-78-1511.020

Date Issued: December 9, 2020

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http://www.agatlabs.com

CLIENT NAME: MCINTOSH PERRY LIMITED
RR#3 115 WALGREEN ROAD
CARP, ON   K0A1L0
(613) 836-2184

ATTENTION TO: Dan Arnott

PROJECT: CCO-22-3539

AGAT WORK ORDER: 22Z868318

TRACE ORGANICS REVIEWED BY: Pinkal Patel, Report Reviewer

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Lab Manager

DATE REPORTED: Mar 08, 2022

PAGES (INCLUDING COVER): 13

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

Certificate of Analysis

AGAT WORK ORDER: 22Z868318
PROJECT: CCO-22-3539

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CLIENT NAME: MCINTOSH PERRY LIMITED **ATTENTION TO: Dan Arnott**

SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5 **SAMPLED BY:Pamela Muniz**

O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Water)

DATE RECEIVED: 2022-02-28 **DATE REPORTED: 2022-03-08**

			SAMPLE DESCRIPTION:	BH-1		BH-5	BH-4
			SAMPLE TYPE:	Water		Water	Water
			DATE SAMPLED:	2022-02-28 14:10		2022-02-28 13:10	2022-02-28 12:45
Parameter	**Unit**	**G / S**	**RDL**	**3572279**	**RDL**	**3572326**	**3572327**
F1 (C6 - C10)	µg/L	750	25	<25	25	<25	<25
F1 (C6 to C10) minus BTEX	µg/L	750	25	<25	25	<25	<25
F2 (C10 to C16)	µg/L	150	100	<100	100	<100	<100
F3 (C16 to C34)	µg/L	500	100	<100	100	<100	<100
F4 (C34 to C50)	µg/L	500	100	<100	100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500	NA	500	NA	NA
Sediment				NO		TRACE	NO
Surrogate	**Unit**	**Acceptable Limits**					
Toluene-d8	% Recovery	50-140		106	**1**	116	100
Terphenyl	%	60-140		92	**1**	72	113

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3572279-3572327 The C6-C10 fraction is calculated using Toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6-C50 results are corrected for BTEX contribution.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.
Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Pinkal Patel

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 22Z868318

PROJECT: CCO-22-3539

CLIENT NAME: MCINTOSH PERRY LIMITED

ATTENTION TO: Dan Arnott

SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5

SAMPLED BY:Pamela Muniz

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2022-02-28

DATE REPORTED: 2022-03-08

			SAMPLE DESCRIPTION:	BH-1	BH-5	BH-4
			SAMPLE TYPE:	Water	Water	Water
			DATE SAMPLED:	2022-02-28 14:10	2022-02-28 13:10	2022-02-28 12:45
Parameter	**Unit**	**G / S**	**RDL**	**3572279**	**3572326**	**3572327**
Dichlorodifluoromethane	µg/L	4400	0.40	<0.40	<0.40	<0.40
Vinyl Chloride	µg/L	1.7	0.17	<0.17	<0.17	<0.17
Bromomethane	µg/L	56	0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	2500	0.40	<0.40	<0.40	<0.40
Acetone	µg/L	130000	1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L	17	0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/L	5500	0.30	<0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	17	0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L	1400	0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	3100	0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L	1500000	1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	17	0.20	<0.20	<0.20	<0.20
Chloroform	µg/L	22	0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane	µg/L	12	0.20	0.85	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	6700	0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	8.4	0.20	<0.20	<0.20	<0.20
Benzene	µg/L	430	0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L	140	0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/L	17	0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L	85000	0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L	580000	1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L	30	0.20	<0.20	<0.20	<0.20
Toluene	µg/L	18000	0.20	<0.20	<0.20	<0.20
Dibromochloromethane	µg/L	82000	0.10	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L	0.83	0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L	17	0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	28	0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/L	630	0.10	<0.10	<0.10	<0.10
Ethylbenzene	µg/L	2300	0.10	<0.10	<0.10	<0.10

Certified By: Pinkal Patel

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Certificate of Analysis

AGAT WORK ORDER: 22Z868318
PROJECT: CCO-22-3539

CLIENT NAME: MCINTOSH PERRY LIMITED
SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5

ATTENTION TO: Dan Arnott
SAMPLED BY:Pamela Muniz

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2022-02-28 **DATE REPORTED: 2022-03-08**

			SAMPLE DESCRIPTION:	BH-1	BH-5	BH-4
			SAMPLE TYPE:	Water	Water	Water
			DATE SAMPLED:	2022-02-28 14:10	2022-02-28 13:10	2022-02-28 12:45
Parameter	**Unit**	**G / S**	**RDL**	**3572279**	**3572326**	**3572327**
m & p-Xylene	µg/L		0.20	<0.20	<0.20	<0.20
Bromoform	µg/L	770	0.10	<0.10	<0.10	<0.10
Styrene	µg/L	9100	0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	15	0.10	<0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	<0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L	9600	0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	67	0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	9600	0.10	<0.10	<0.10	<0.10
1,3-Dichloropropene	µg/L	45	0.30	<0.30	<0.30	<0.30
Xylenes (Total)	µg/L	4200	0.20	<0.20	<0.20	<0.20
n-Hexane	µg/L	520	0.20	<0.20	<0.20	<0.20
Surrogate	**Unit**	**Acceptable Limits**				
Toluene-d8	% Recovery	50-140		112	116	116
4-Bromofluorobenzene	% Recovery	50-140		89	89	89

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3572279-3572327 Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 22Z868318
PROJECT: CCO-22-3539

CLIENT NAME: MCINTOSH PERRY LIMITED
ATTENTION TO: Dan Arnott
SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5
SAMPLED BY:Pamela Muniz

O. Reg. 153(511) - Metals & Inorganics (Water)

DATE RECEIVED: 2022-02-28
DATE REPORTED: 2022-03-08

			SAMPLE DESCRIPTION:	BH-1	BH-5		BH-4
			SAMPLE TYPE:	Water	Water		Water
			DATE SAMPLED:	2022-02-28 14:10	2022-02-28 13:10		2022-02-28 12:45
Parameter	**Unit**	**G / S**	**RDL**	**3572279**	**3572326**	**RDL**	**3572327**
Dissolved Antimony	µg/L	20000	1.0	<1.0	<1.0	1.0	<1.0
Dissolved Arsenic	µg/L	1900	1.0	2.7	1.8	1.0	7.6
Dissolved Barium	µg/L	29000	2.0	47.8	40.8	2.0	8.0
Dissolved Beryllium	µg/L	67	0.50	<0.50	<0.50	0.50	<0.50
Dissolved Boron	µg/L	45000	10.0	215	94.7	10.0	446
Dissolved Cadmium	µg/L	2.7	0.20	<0.20	<0.20	0.20	<0.20
Dissolved Chromium	µg/L	810	2.0	<2.0	<2.0	2.0	<2.0
Dissolved Cobalt	µg/L	66	0.50	<0.50	<0.50	0.50	<0.50
Dissolved Copper	µg/L	87	1.0	<1.0	<1.0	1.0	1.5
Dissolved Lead	µg/L	25	0.50	0.61	0.74	0.50	<0.50
Dissolved Molybdenum	µg/L	9200	0.50	7.12	6.82	0.50	8.43
Dissolved Nickel	µg/L	490	1.0	3.0	5.3	1.0	4.2
Dissolved Selenium	µg/L	63	1.0	<1.0	<1.0	1.0	<1.0
Dissolved Silver	µg/L	1.5	0.20	<0.20	<0.20	0.20	<0.20
Dissolved Thallium	µg/L	510	0.30	<0.30	<0.30	0.30	<0.30
Dissolved Uranium	µg/L	420	0.50	2.39	<0.50	0.50	2.60
Dissolved Vanadium	µg/L	250	0.40	6.14	20.1	0.40	10.7
Dissolved Zinc	µg/L	1100	5.0	11.7	<5.0	5.0	13.7
Mercury	µg/L	2.8	0.02	<0.02	<0.02	0.02	<0.02
Chromium VI	µg/L	140	2.000	<2.000	<2.000	2.000	<2.000
Cyanide, Free	µg/L	66	2	<2	<2	2	<2
Dissolved Sodium	µg/L	2300000	250	138000	367000	50	83300
Chloride	µg/L	2300000	100	350000	765000	100	17600
Electrical Conductivity	uS/cm	NA	2	1440	2470	2	481
pH	pH Units		NA	7.96	9.32	NA	8.52

Amanjot Bhela — CHARTERED CHEMIST — ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

Certified By:

Results relate only to the items tested. Results apply to samples as received.

Certificate of Analysis

AGAT WORK ORDER: 22Z868318
PROJECT: CCO-22-3539

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CLIENT NAME: MCINTOSH PERRY LIMITED | **ATTENTION TO: Dan Arnott**

SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5 | **SAMPLED BY:Pamela Muniz**

O. Reg. 153(511) - Metals & Inorganics (Water)

DATE RECEIVED: 2022-02-28 | **DATE REPORTED: 2022-03-08**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3572279-3572327 Metals analysis completed on a filtered sample.
Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

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Quality Assurance

CLIENT NAME: MCINTOSH PERRY LIMITED

PROJECT: CCO-22-3539

SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5

AGAT WORK ORDER: 22Z868318

ATTENTION TO: Dan Arnott

SAMPLED BY:Pamela Muniz

Trace Organics Analysis

RPT Date: Mar 08, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Water)															
F1 (C6 - C10)	3570365		<25	<25	NA	< 25	85%	60%	140%	108%	60%	140%	107%	60%	140%
F2 (C10 to C16)	3570037		< 100	< 100	NA	< 100	107%	60%	140%	71%	60%	140%	109%	60%	140%
F3 (C16 to C34)	3570037		< 100	< 100	NA	< 100	107%	60%	140%	70%	60%	140%	121%	60%	140%
F4 (C34 to C50)	3570037		< 100	< 100	NA	< 100	105%	60%	140%	62%	60%	140%	105%	60%	140%
O. Reg. 153(511) - VOCs (Water)															
Dichlorodifluoromethane	3572326	3572326	<0.40	<0.40	NA	< 0.40	94%	50%	140%	93%	50%	140%	104%	50%	140%
Vinyl Chloride	3572326	3572326	<0.17	<0.17	NA	< 0.17	85%	50%	140%	109%	50%	140%	73%	50%	140%
Bromomethane	3572326	3572326	<0.20	<0.20	NA	< 0.20	113%	50%	140%	106%	50%	140%	92%	50%	140%
Trichlorofluoromethane	3572326	3572326	<0.40	<0.40	NA	< 0.40	88%	50%	140%	96%	50%	140%	87%	50%	140%
Acetone	3572326	3572326	<1.0	<1.0	NA	< 1.0	97%	50%	140%	78%	50%	140%	87%	50%	140%
1,1-Dichloroethylene	3572326	3572326	<0.30	<0.30	NA	< 0.30	87%	50%	140%	98%	60%	130%	74%	50%	140%
Methylene Chloride	3572326	3572326	<0.30	<0.30	NA	< 0.30	103%	50%	140%	109%	60%	130%	97%	50%	140%
trans- 1,2-Dichloroethylene	3572326	3572326	<0.20	<0.20	NA	< 0.20	96%	50%	140%	119%	60%	130%	93%	50%	140%
Methyl tert-butyl ether	3572326	3572326	<0.20	<0.20	NA	< 0.20	117%	50%	140%	102%	60%	130%	108%	50%	140%
1,1-Dichloroethane	3572326	3572326	<0.30	<0.30	NA	< 0.30	111%	50%	140%	110%	60%	130%	108%	50%	140%
Methyl Ethyl Ketone	3572326	3572326	<1.0	<1.0	NA	< 1.0	91%	50%	140%	91%	50%	140%	87%	50%	140%
cis- 1,2-Dichloroethylene	3572326	3572326	<0.20	<0.20	NA	< 0.20	115%	50%	140%	107%	60%	130%	96%	50%	140%
Chloroform	3572326	3572326	<0.20	<0.20	NA	< 0.20	109%	50%	140%	114%	60%	130%	105%	50%	140%
1,2-Dichloroethane	3572326	3572326	<0.20	<0.20	NA	< 0.20	107%	50%	140%	99%	60%	130%	113%	50%	140%
1,1,1-Trichloroethane	3572326	3572326	<0.30	<0.30	NA	< 0.30	90%	50%	140%	87%	60%	130%	88%	50%	140%
Carbon Tetrachloride	3572326	3572326	<0.20	<0.20	NA	< 0.20	75%	50%	140%	71%	60%	130%	73%	50%	140%
Benzene	3572326	3572326	<0.20	<0.20	NA	< 0.20	86%	50%	140%	70%	60%	130%	72%	50%	140%
1,2-Dichloropropane	3572326	3572326	<0.20	<0.20	NA	< 0.20	106%	50%	140%	74%	60%	130%	75%	50%	140%
Trichloroethylene	3572326	3572326	<0.20	<0.20	NA	< 0.20	107%	50%	140%	83%	60%	130%	75%	50%	140%
Bromodichloromethane	3572326	3572326	<0.20	<0.20	NA	< 0.20	114%	50%	140%	89%	60%	130%	96%	50%	140%
Methyl Isobutyl Ketone	3572326	3572326	<1.0	<1.0	NA	< 1.0	79%	50%	140%	87%	50%	140%	112%	50%	140%
1,1,2-Trichloroethane	3572326	3572326	<0.20	<0.20	NA	< 0.20	112%	50%	140%	111%	60%	130%	87%	50%	140%
Toluene	3572326	3572326	<0.20	<0.20	NA	< 0.20	112%	50%	140%	95%	60%	130%	91%	50%	140%
Dibromochloromethane	3572326	3572326	<0.10	<0.10	NA	< 0.10	117%	50%	140%	108%	60%	130%	100%	50%	140%
Ethylene Dibromide	3572326	3572326	<0.10	<0.10	NA	< 0.10	98%	50%	140%	107%	60%	130%	106%	50%	140%
Tetrachloroethylene	3572326	3572326	<0.20	<0.20	NA	< 0.20	113%	50%	140%	97%	60%	130%	87%	50%	140%
1,1,1,2-Tetrachloroethane	3572326	3572326	<0.10	<0.10	NA	< 0.10	115%	50%	140%	108%	60%	130%	117%	50%	140%
Chlorobenzene	3572326	3572326	<0.10	<0.10	NA	< 0.10	107%	50%	140%	98%	60%	130%	104%	50%	140%
Ethylbenzene	3572326	3572326	<0.10	<0.10	NA	< 0.10	104%	50%	140%	82%	60%	130%	78%	50%	140%
m & p-Xylene	3572326	3572326	<0.20	<0.20	NA	< 0.20	111%	50%	140%	93%	60%	130%	87%	50%	140%
Bromoform	3572326	3572326	<0.10	<0.10	NA	< 0.10	88%	50%	140%	107%	60%	130%	85%	50%	140%
Styrene	3572326	3572326	<0.10	<0.10	NA	< 0.10	111%	50%	140%	76%	60%	130%	81%	50%	140%
1,1,2,2-Tetrachloroethane	3572326	3572326	<0.10	<0.10	NA	< 0.10	105%	50%	140%	108%	60%	130%	99%	50%	140%
o-Xylene	3572326	3572326	<0.10	<0.10	NA	< 0.10	97%	50%	140%	96%	60%	130%	97%	50%	140%

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Quality Assurance

CLIENT NAME: MCINTOSH PERRY LIMITED **AGAT WORK ORDER: 22Z868318**
PROJECT: CCO-22-3539 **ATTENTION TO: Dan Arnott**
SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5 **SAMPLED BY:Pamela Muniz**

Trace Organics Analysis (Continued)

RPT Date: Mar 08, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
1,3-Dichlorobenzene	3572326	3572326	<0.10	<0.10	NA	< 0.10	114%	50%	140%	106%	60%	130%	97%	50%	140%
1,4-Dichlorobenzene	3572326	3572326	<0.10	<0.10	NA	< 0.10	91%	50%	140%	107%	60%	130%	104%	50%	140%
1,2-Dichlorobenzene	3572326	3572326	<0.10	<0.10	NA	< 0.10	112%	50%	140%	103%	60%	130%	107%	50%	140%
n-Hexane	3572326	3572326	<0.20	<0.20	NA	< 0.20	80%	50%	140%	76%	60%	130%	90%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

AGAT Laboratories

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Quality Assurance

CLIENT NAME: MCINTOSH PERRY LIMITED | **AGAT WORK ORDER: 22Z868318**

PROJECT: CCO-22-3539 | **ATTENTION TO: Dan Arnott**

SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5 | **SAMPLED BY:Pamela Muniz**

Water Analysis

RPT Date: Mar 08, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
O. Reg. 153(511) - Metals & Inorganics (Water)															
Dissolved Antimony	3572279	3572279	<1.0	<1.0	NA	< 1.0	97%	70%	130%	100%	80%	120%	99%	70%	130%
Dissolved Arsenic	3572279	3572279	2.7	2.5	NA	< 1.0	96%	70%	130%	106%	80%	120%	109%	70%	130%
Dissolved Barium	3572279	3572279	47.8	44.9	6.3%	< 2.0	94%	70%	130%	94%	80%	120%	103%	70%	130%
Dissolved Beryllium	3572279	3572279	<0.50	<0.50	NA	< 0.50	102%	70%	130%	103%	80%	120%	110%	70%	130%
Dissolved Boron	3572279	3572279	215	218	1.4%	< 10.0	100%	70%	130%	102%	80%	120%	108%	70%	130%
Dissolved Cadmium	3572279	3572279	<0.20	<0.20	NA	< 0.20	102%	70%	130%	100%	80%	120%	105%	70%	130%
Dissolved Chromium	3572279	3572279	<2.0	<2.0	NA	< 2.0	98%	70%	130%	97%	80%	120%	106%	70%	130%
Dissolved Cobalt	3572279	3572279	<0.50	<0.50	NA	< 0.50	99%	70%	130%	98%	80%	120%	104%	70%	130%
Dissolved Copper	3572279	3572279	<1.0	<1.0	NA	< 1.0	98%	70%	130%	99%	80%	120%	103%	70%	130%
Dissolved Lead	3572279	3572279	0.61	0.61	NA	< 0.50	95%	70%	130%	95%	80%	120%	95%	70%	130%
Dissolved Molybdenum	3572279	3572279	7.12	6.23	13.3%	< 0.50	105%	70%	130%	103%	80%	120%	110%	70%	130%
Dissolved Nickel	3572279	3572279	3.0	2.0	NA	< 1.0	100%	70%	130%	100%	80%	120%	106%	70%	130%
Dissolved Selenium	3572279	3572279	3.1	4.7	NA	< 1.0	101%	70%	130%	110%	80%	120%	114%	70%	130%
Dissolved Silver	3572279	3572279	<0.20	<0.20	NA	< 0.20	98%	70%	130%	98%	80%	120%	100%	70%	130%
Dissolved Thallium	3572279	3572279	<0.30	<0.30	NA	< 0.30	98%	70%	130%	99%	80%	120%	99%	70%	130%
Dissolved Uranium	3572279	3572279	2.39	2.32	NA	< 0.50	95%	70%	130%	101%	80%	120%	104%	70%	130%
Dissolved Vanadium	3572279	3572279	6.14	6.47	5.2%	< 0.40	100%	70%	130%	98%	80%	120%	110%	70%	130%
Dissolved Zinc	3572279	3572279	11.7	<5.0	NA	< 5.0	100%	70%	130%	106%	80%	120%	109%	70%	130%
Mercury	3572279	3572279	<0.02	<0.02	NA	< 0.02	101%	70%	130%	98%	80%	120%	102%	70%	130%
Chromium VI	3563850		<2.000	<2.000	NA	< 2	98%	70%	130%	104%	80%	120%	108%	70%	130%
Cyanide, Free	3572279	3572279	<2	<2	NA	< 2	95%	70%	130%	108%	80%	120%	99%	70%	130%
Dissolved Sodium	3573160		34100	33700	1.2%	< 50	105%	70%	130%	105%	80%	120%	96%	70%	130%
Chloride	3572326	3572326	765000	765000	0.0%	< 100	94%	70%	130%	108%	80%	120%	NA	70%	130%
Electrical Conductivity	3568900		46600	46700	0.2%	< 2	108%	90%	110%	NA			NA		
pH	3568900		7.58	7.52	0.8%	NA	102%	90%	110%	NA			NA		

Comments: NA Signifies Not Applicable
Duplicate NA: results are under 5X the RDL and will not be calculated.
Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Lower	Upper	Recovery	Lower	Upper	Recovery	Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Water)															
Chromium VI	3572326	3572326	<2.000	<2.000	NA	< 2	98%	70%	130%	98%	80%	120%	93%	70%	130%

Comments: NA Signifies Not Applicable
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By:

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Method Summary

CLIENT NAME: MCINTOSH PERRY LIMITED **AGAT WORK ORDER: 22Z868318**

PROJECT: CCO-22-3539 **ATTENTION TO: Dan Arnott**

SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5 **SAMPLED BY:Pamela Muniz**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Toluene-d8	VOL-91-5009	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
F1 (C6 - C10)	VOL-91- 5010	modified from MOE PHC E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	modified from MOE PHC E3421	(P&T)GC/FID
F2 (C10 to C16)	VOL-91-5010	modified from MOE PHC E3421	GC / FID
F3 (C16 to C34)	VOL-91-5010	modified from MOE PHC E3421	GC / FID
F4 (C34 to C50)	VOL-91-5010	modified from MOE PHC E3421	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	modified from MOE PHC E3421	BALANCE
Terphenyl	VOL-91-5009	modified from MOE PHC E3421	GC/FID
Sediment			
Dichlorodifluoromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: MCINTOSH PERRY LIMITED **AGAT WORK ORDER: 22Z868318**

PROJECT: CCO-22-3539 **ATTENTION TO: Dan Arnott**

SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5 **SAMPLED BY:Pamela Muniz**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Toluene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: MCINTOSH PERRY LIMITED | **AGAT WORK ORDER: 22Z868318**
PROJECT: CCO-22-3539 | **ATTENTION TO: Dan Arnott**
SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5 | **SAMPLED BY:Pamela Muniz**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Dissolved Antimony	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Arsenic	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Barium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Beryllium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cadmium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Chromium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cobalt	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Copper	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Lead	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Molybdenum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Nickel	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Selenium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silver	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Thallium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Uranium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Vanadium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Zinc	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Chromium VI	INOR-93-6073	modified from SM 3500-CR B	LACHAT FIA
Cyanide, Free	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	TECHNICON AUTO ANALYZER
Dissolved Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE

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Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 22T868318

Cooler Quantity: one - free ice

Arrival Temperatures: 10.0 | 10.3 | 10.5
3.6 | 4.2 | 3.8

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: ice

Report Information:

Company: McIntosh Perry Consulting Engineers
Contact: Dan Arnott & Pamela Muniz
Address: 115 Walgreen Rd, Carp, ON
K0A 1L0
Phone: 613-650-7977 Fax:
Reports to be sent to:
1. Email: p.muniz@mcintoshperry.com
2. Email: d.arnott@mcintoshperry.com

Regulatory Requirements:

(Please check all applicable boxes)

☒ Regulation 153/04
Table 3 *(Indicate One)*
☐Ind/Com
☒Res/Park
☐Agriculture
Soil Texture *(Check One)*
☐Coarse
☒Fine

☐ Excess Soils R406
Table ____ *(Indicate One)*
☐ Regulation 558
☐ CCME

☐ Sewer Use
☐Sanitary ☐Storm
____ *Region*
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
____ *Indicate One*

Is this submission for a Record of Site Condition? ☒ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☒ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply): ____

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: CCO-22-3539
Site Location: 200 Elgin St, Ottawa, ON, K2P 1L5
Sampled By: Pamela Muniz
AGAT Quote #: ____ PO: ____
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company: McIntosh Perry
Contact: Pamela Muniz
Address: p.muniz@mcintoshperry.com
Email: 115 Walgreen Rd, Carp, ON

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☒CrVI, ☐Hg, ☐HWSB	O. Reg 153: BTEX, F1-F4 PHCs / Analyze F4G if required ☐Yes ☐No	PAHs	PCBs	VOC	O. Reg 558: Landfill Disposal Characterization TCLP: TCLP: ☐M&I ☐VOCs ☐ABNs ☐B(a)P ☐PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐Metals ☐VOCs ☐SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR							Potentially Hazardous or High Concentration (Y/N)
BH-1	Feb 28/22	2:10 PM	14	GW		Y	X	+	X			X											
BH-5	Feb 28/22	1:10 PM	14	GW		Y	X	+	X			X											
BH-4	Feb 28/22	12:45 PM	14	GW		Y	X	+	X			X											
		AM PM																					
		AM PM																					
		AM PM																					
		AM PM																					
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		AM PM																					
		AM PM																					
		AM PM																					
		AM PM																					

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Pamela Muniz [signature]	Feb 28/22	4:15PM	C. Griffith [signature]	22/02/28	16h15
CC to Purolator	22/03/01	16h00	Simon Z [signature]	22/3/2	8:55

Page ____ of ____

Nº: T130951

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CLIENT NAME: MCINTOSH PERRY LIMITED
RR#3 115 WALGREEN ROAD
CARP, ON K0A1L0
(613) 836-2184
ATTENTION TO: Dan Arnott
PROJECT: CCO-22-3539
AGAT WORK ORDER: 22Z868633
TRACE ORGANICS REVIEWED BY: Pinkal Patel, Report Reviewer
WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer
DATE REPORTED: Mar 08, 2022
PAGES (INCLUDING COVER): 13
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

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Certificate of Analysis

AGAT WORK ORDER: 22Z868633
PROJECT: CCO-22-3539

CLIENT NAME: MCINTOSH PERRY LIMITED
SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5

ATTENTION TO: Dan Arnott
SAMPLED BY:Pamela Muniz

O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Water)

DATE RECEIVED: 2022-03-01

DATE REPORTED: 2022-03-08

			SAMPLE DESCRIPTION:	BH-2	BH-3	BH-DUP
			SAMPLE TYPE:	Water	Water	Water
			DATE SAMPLED:	2022-02-28 13:45	2022-02-28 11:30	2022-02-28
Parameter	**Unit**	**G / S**	**RDL**	**3571461**	**3571531**	**3571532**
F1 (C6 - C10)	µg/L	750	25	<25	<25	<25
F1 (C6 to C10) minus BTEX	µg/L	750	25	<25	<25	<25
F2 (C10 to C16)	µg/L	150	100	<100	<100	<100
F3 (C16 to C34)	µg/L	500	100	<100	<100	<100
F4 (C34 to C50)	µg/L	500	100	<100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500	NA	NA	NA
Sediment				NO	NO	NO
Surrogate	**Unit**	**Acceptable Limits**				
Toluene-d8	% Recovery	50-140		112	77.8	87.5
Terphenyl	%	60-140		80	75	109

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3571461-3571532 The C6-C10 fraction is calculated using Toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6-C50 results are corrected for BTEX contribution.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.
Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 22Z868633
PROJECT: CCO-22-3539

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CLIENT NAME: MCINTOSH PERRY LIMITED
SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5
ATTENTION TO: Dan Arnott
SAMPLED BY:Pamela Muniz

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2022-03-01 **DATE REPORTED: 2022-03-08**

		SAMPLE DESCRIPTION:		BH-2		BH-3	BH-DUP
		SAMPLE TYPE:		Water		Water	Water
		DATE SAMPLED:		2022-02-28 13:45		2022-02-28 11:30	2022-02-28
Parameter	**Unit**	**G / S**	**RDL**	**3571461**	**RDL**	**3571531**	**3571532**
Dichlorodifluoromethane	µg/L	4400	0.80	<0.80	0.40	<0.40	<0.40
Vinyl Chloride	µg/L	1.7	0.34	<0.34	0.17	<0.17	<0.17
Bromomethane	µg/L	56	0.40	<0.40	0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	2500	0.80	<0.80	0.40	<0.40	<0.40
Acetone	µg/L	130000	2.0	<2.0	1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L	17	0.60	<0.60	0.30	<0.30	<0.30
Methylene Chloride	µg/L	5500	0.60	<0.60	0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	17	0.40	<0.40	0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L	1400	0.40	<0.40	0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	3100	0.60	<0.60	0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L	1500000	2.0	<2.0	1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	17	0.40	<0.40	0.20	<0.20	<0.20
Chloroform	µg/L	22	0.40	<0.40	0.20	<0.20	<0.20
1,2-Dichloroethane	µg/L	12	0.40	<0.40	0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	6700	0.60	<0.60	0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	8.4	0.40	<0.40	0.20	<0.20	<0.20
Benzene	µg/L	430	0.40	<0.40	0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L	140	0.40	<0.40	0.20	<0.20	<0.20
Trichloroethylene	µg/L	17	0.40	<0.40	0.20	<0.20	<0.20
Bromodichloromethane	µg/L	85000	0.40	<0.40	0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L	580000	2.0	<2.0	1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L	30	0.40	<0.40	0.20	<0.20	<0.20
Toluene	µg/L	18000	0.40	<0.40	0.20	<0.20	<0.20
Dibromochloromethane	µg/L	82000	0.20	<0.20	0.10	<0.10	<0.10
Ethylene Dibromide	µg/L	0.83	0.20	<0.20	0.10	<0.10	<0.10
Tetrachloroethylene	µg/L	17	0.40	<0.40	0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	28	0.20	<0.20	0.10	<0.10	<0.10
Chlorobenzene	µg/L	630	0.20	<0.20	0.10	<0.10	<0.10
Ethylbenzene	µg/L	2300	0.20	<0.20	0.10	<0.10	<0.10

Certified By: Pinkal Patel

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CLIENT NAME: MCINTOSH PERRY LIMITED
SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5

ATTENTION TO: Dan Arnott
SAMPLED BY:Pamela Muniz

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2022-03-01 **DATE REPORTED: 2022-03-08**

			SAMPLE DESCRIPTION:	BH-2		BH-3	BH-DUP
			SAMPLE TYPE:	Water		Water	Water
			DATE SAMPLED:	2022-02-28 13:45		2022-02-28 11:30	2022-02-28
Parameter	**Unit**	**G / S**	**RDL**	**3571461**	**RDL**	**3571531**	**3571532**
m & p-Xylene	µg/L		0.40	<0.40	0.20	<0.20	<0.20
Bromoform	µg/L	770	0.20	<0.20	0.10	<0.10	<0.10
Styrene	µg/L	9100	0.20	<0.20	0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	15	0.20	<0.20	0.10	<0.10	<0.10
o-Xylene	µg/L		0.20	<0.20	0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L	9600	0.20	<0.20	0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	67	0.20	<0.20	0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	9600	0.20	<0.20	0.10	<0.10	<0.10
1,3-Dichloropropene	µg/L	45	0.30	<0.30	0.30	<0.30	<0.30
Xylenes (Total)	µg/L	4200	0.20	<0.20	0.20	<0.20	<0.20
n-Hexane	µg/L	520	0.40	<0.40	0.20	<0.20	<0.20
Surrogate	**Unit**	**Acceptable Limits**					
Toluene-d8	% Recovery	50-140		112	**1**	110	113
4-Bromofluorobenzene	% Recovery	50-140		84	**1**	88	86

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3571461 Dilution factor=2
The sample was diluted because it was foamy. The reporting detection limit has been corrected for the dilution factor used.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

3571531-3571532 Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

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Certificate of Analysis

AGAT WORK ORDER: 22Z868633
PROJECT: CCO-22-3539

CLIENT NAME: MCINTOSH PERRY LIMITED
SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5
ATTENTION TO: Dan Arnott
SAMPLED BY:Pamela Muniz

O. Reg. 153(511) - Metals & Inorganics (Water)

DATE RECEIVED: 2022-03-01 **DATE REPORTED: 2022-03-08**

			SAMPLE DESCRIPTION:	BH-2		BH-3	BH-DUP
			SAMPLE TYPE:	Water		Water	Water
			DATE SAMPLED:	2022-02-28 13:45		2022-02-28 11:30	2022-02-28
Parameter	**Unit**	**G / S**	**RDL**	**3571461**	**RDL**	**3571531**	**3571532**
Dissolved Antimony	µg/L	20000	1.0	<1.0	1.0	<1.0	<1.0
Dissolved Arsenic	µg/L	1900	1.0	1.7	1.0	6.9	5.7
Dissolved Barium	µg/L	29000	2.0	88.6	2.0	11.0	10.5
Dissolved Beryllium	µg/L	67	0.50	<0.50	0.50	<0.50	<0.50
Dissolved Boron	µg/L	45000	10.0	218	10.0	365	342
Dissolved Cadmium	µg/L	2.7	0.20	<0.20	0.20	<0.20	<0.20
Dissolved Chromium	µg/L	810	2.0	<2.0	2.0	<2.0	<2.0
Dissolved Cobalt	µg/L	66	0.50	<0.50	0.50	<0.50	<0.50
Dissolved Copper	µg/L	87	1.0	<1.0	1.0	1.8	1.5
Dissolved Lead	µg/L	25	0.50	1.17	0.50	<0.50	<0.50
Dissolved Molybdenum	µg/L	9200	0.50	3.77	0.50	5.70	5.47
Dissolved Nickel	µg/L	490	1.0	2.1	1.0	2.6	3.3
Dissolved Selenium	µg/L	63	1.0	<1.0	1.0	<1.0	<1.0
Dissolved Silver	µg/L	1.5	0.20	<0.20	0.20	<0.20	<0.20
Dissolved Thallium	µg/L	510	0.30	<0.30	0.30	<0.30	<0.30
Dissolved Uranium	µg/L	420	0.50	<0.50	0.50	2.43	2.43
Dissolved Vanadium	µg/L	250	0.40	1.10	0.40	12.0	11.9
Dissolved Zinc	µg/L	1100	5.0	6.4	5.0	10.7	<5.0
Mercury	µg/L	2.8	0.02	<0.02	0.02	<0.02	<0.02
Chromium VI	µg/L	140	2	<2	2	<2	<2
Cyanide, Free	µg/L	66	2	<2	2	<2	<2
Dissolved Sodium	µg/L	2300000	500	420000	50	89500	89300
Chloride	µg/L	2300000	100	920000	100	83000	82300
Electrical Conductivity	uS/cm	NA	2	3650	2	612	606
pH	pH Units		NA	7.99	NA	8.22	8.15

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Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 22Z868633

PROJECT: CCO-22-3539

CLIENT NAME: MCINTOSH PERRY LIMITED

ATTENTION TO: Dan Arnott

SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5

SAMPLED BY:Pamela Muniz

O. Reg. 153(511) - Metals & Inorganics (Water)

DATE RECEIVED: 2022-03-01

DATE REPORTED: 2022-03-08

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3571461 Metals analysis completed on a filtered sample.

Dilution required, RDL has been increased accordingly.

3571531-3571532 Metals analysis completed on a filtered sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

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Quality Assurance

CLIENT NAME: MCINTOSH PERRY LIMITED | **AGAT WORK ORDER: 22Z868633**

PROJECT: CCO-22-3539 | **ATTENTION TO: Dan Arnott**

SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5 | **SAMPLED BY:Pamela Muniz**

Trace Organics Analysis

RPT Date: Mar 08, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Water)															
F1 (C6 - C10)	3571532	3571532	<25	<25	NA	< 25	85%	60%	140%	108%	60%	140%	107%	60%	140%
F2 (C10 to C16)	3570037		< 100	< 100	NA	< 100	107%	60%	140%	71%	60%	140%	109%	60%	140%
F3 (C16 to C34)	3570037		< 100	< 100	NA	< 100	107%	60%	140%	70%	60%	140%	121%	60%	140%
F4 (C34 to C50)	3570037		< 100	< 100	NA	< 100	105%	60%	140%	62%	60%	140%	105%	60%	140%
O. Reg. 153(511) - VOCs (Water)															
Dichlorodifluoromethane	3572326		<0.40	<0.40	NA	< 0.40	94%	50%	140%	93%	50%	140%	104%	50%	140%
Vinyl Chloride	3572326		<0.17	<0.17	NA	< 0.17	85%	50%	140%	109%	50%	140%	73%	50%	140%
Bromomethane	3572326		<0.20	<0.20	NA	< 0.20	113%	50%	140%	106%	50%	140%	92%	50%	140%
Trichlorofluoromethane	3572326		<0.40	<0.40	NA	< 0.40	88%	50%	140%	96%	50%	140%	87%	50%	140%
Acetone	3572326		<1.0	<1.0	NA	< 1.0	97%	50%	140%	78%	50%	140%	87%	50%	140%
1,1-Dichloroethylene	3572326		<0.30	<0.30	NA	< 0.30	87%	50%	140%	98%	60%	130%	74%	50%	140%
Methylene Chloride	3572326		<0.30	<0.30	NA	< 0.30	103%	50%	140%	109%	60%	130%	97%	50%	140%
trans- 1,2-Dichloroethylene	3572326		<0.20	<0.20	NA	< 0.20	96%	50%	140%	119%	60%	130%	93%	50%	140%
Methyl tert-butyl ether	3572326		<0.20	<0.20	NA	< 0.20	117%	50%	140%	102%	60%	130%	108%	50%	140%
1,1-Dichloroethane	3572326		<0.30	<0.30	NA	< 0.30	111%	50%	140%	110%	60%	130%	108%	50%	140%
Methyl Ethyl Ketone	3572326		<1.0	<1.0	NA	< 1.0	91%	50%	140%	91%	50%	140%	87%	50%	140%
cis- 1,2-Dichloroethylene	3572326		<0.20	<0.20	NA	< 0.20	115%	50%	140%	107%	60%	130%	96%	50%	140%
Chloroform	3572326		<0.20	<0.20	NA	< 0.20	109%	50%	140%	114%	60%	130%	105%	50%	140%
1,2-Dichloroethane	3572326		<0.20	<0.20	NA	< 0.20	107%	50%	140%	99%	60%	130%	113%	50%	140%
1,1,1-Trichloroethane	3572326		<0.30	<0.30	NA	< 0.30	90%	50%	140%	87%	60%	130%	88%	50%	140%
Carbon Tetrachloride	3572326		<0.20	<0.20	NA	< 0.20	75%	50%	140%	71%	60%	130%	73%	50%	140%
Benzene	3572326		<0.20	<0.20	NA	< 0.20	86%	50%	140%	70%	60%	130%	72%	50%	140%
1,2-Dichloropropane	3572326		<0.20	<0.20	NA	< 0.20	106%	50%	140%	74%	60%	130%	75%	50%	140%
Trichloroethylene	3572326		<0.20	<0.20	NA	< 0.20	107%	50%	140%	83%	60%	130%	75%	50%	140%
Bromodichloromethane	3572326		<0.20	<0.20	NA	< 0.20	114%	50%	140%	89%	60%	130%	96%	50%	140%
Methyl Isobutyl Ketone	3572326		<1.0	<1.0	NA	< 1.0	79%	50%	140%	87%	50%	140%	112%	50%	140%
1,1,2-Trichloroethane	3572326		<0.20	<0.20	NA	< 0.20	112%	50%	140%	111%	60%	130%	87%	50%	140%
Toluene	3572326		<0.20	<0.20	NA	< 0.20	112%	50%	140%	95%	60%	130%	91%	50%	140%
Dibromochloromethane	3572326		<0.10	<0.10	NA	< 0.10	117%	50%	140%	108%	60%	130%	100%	50%	140%
Ethylene Dibromide	3572326		<0.10	<0.10	NA	< 0.10	98%	50%	140%	107%	60%	130%	106%	50%	140%
Tetrachloroethylene	3572326		<0.20	<0.20	NA	< 0.20	113%	50%	140%	97%	60%	130%	87%	50%	140%
1,1,1,2-Tetrachloroethane	3572326		<0.10	<0.10	NA	< 0.10	115%	50%	140%	108%	60%	130%	117%	50%	140%
Chlorobenzene	3572326		<0.10	<0.10	NA	< 0.10	107%	50%	140%	98%	60%	130%	104%	50%	140%
Ethylbenzene	3572326		<0.10	<0.10	NA	< 0.10	104%	50%	140%	82%	60%	130%	78%	50%	140%
m & p-Xylene	3572326		<0.20	<0.20	NA	< 0.20	111%	50%	140%	93%	60%	130%	87%	50%	140%
Bromoform	3572326		<0.10	<0.10	NA	< 0.10	88%	50%	140%	107%	60%	130%	85%	50%	140%
Styrene	3572326		<0.10	<0.10	NA	< 0.10	111%	50%	140%	76%	60%	130%	81%	50%	140%
1,1,2,2-Tetrachloroethane	3572326		<0.10	<0.10	NA	< 0.10	105%	50%	140%	108%	60%	130%	99%	50%	140%
o-Xylene	3572326		<0.10	<0.10	NA	< 0.10	97%	50%	140%	96%	60%	130%	97%	50%	140%

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Quality Assurance

CLIENT NAME: MCINTOSH PERRY LIMITED | **AGAT WORK ORDER: 22Z868633**

PROJECT: CCO-22-3539 | **ATTENTION TO: Dan Arnott**

SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5 | **SAMPLED BY:Pamela Muniz**

Trace Organics Analysis (Continued)

RPT Date: Mar 08, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
1,3-Dichlorobenzene	3572326		<0.10	<0.10	NA	< 0.10	114%	50%	140%	106%	60%	130%	97%	50%	140%
1,4-Dichlorobenzene	3572326		<0.10	<0.10	NA	< 0.10	91%	50%	140%	107%	60%	130%	104%	50%	140%
1,2-Dichlorobenzene	3572326		<0.10	<0.10	NA	< 0.10	112%	50%	140%	103%	60%	130%	107%	50%	140%
n-Hexane	3572326		<0.20	<0.20	NA	< 0.20	80%	50%	140%	76%	60%	130%	90%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

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Quality Assurance

CLIENT NAME: MCINTOSH PERRY LIMITED | **AGAT WORK ORDER: 22Z868633**

PROJECT: CCO-22-3539 | **ATTENTION TO: Dan Arnott**

SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5 | **SAMPLED BY:Pamela Muniz**

Water Analysis

RPT Date: Mar 08, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
O. Reg. 153(511) - Metals & Inorganics (Water)															
Dissolved Antimony	3572279		<1.0	<1.0	NA	< 1.0	97%	70%	130%	100%	80%	120%	99%	70%	130%
Dissolved Arsenic	3572279		2.7	2.5	NA	< 1.0	96%	70%	130%	106%	80%	120%	109%	70%	130%
Dissolved Barium	3572279		47.8	44.9	6.3%	< 2.0	94%	70%	130%	94%	80%	120%	103%	70%	130%
Dissolved Beryllium	3572279		<0.50	<0.50	NA	< 0.50	102%	70%	130%	103%	80%	120%	110%	70%	130%
Dissolved Boron	3572279		215	218	1.4%	< 10.0	100%	70%	130%	102%	80%	120%	108%	70%	130%
Dissolved Cadmium	3572279		<0.20	<0.20	NA	< 0.20	102%	70%	130%	100%	80%	120%	105%	70%	130%
Dissolved Chromium	3572279		<2.0	<2.0	NA	< 2.0	98%	70%	130%	97%	80%	120%	106%	70%	130%
Dissolved Cobalt	3572279		<0.50	<0.50	NA	< 0.50	99%	70%	130%	98%	80%	120%	104%	70%	130%
Dissolved Copper	3572279		<1.0	<1.0	NA	< 1.0	98%	70%	130%	99%	80%	120%	103%	70%	130%
Dissolved Lead	3572279		0.61	0.61	NA	< 0.50	95%	70%	130%	95%	80%	120%	95%	70%	130%
Dissolved Molybdenum	3572279		7.12	6.23	13.3%	< 0.50	105%	70%	130%	103%	80%	120%	110%	70%	130%
Dissolved Nickel	3572279		3.0	2.0	NA	< 1.0	100%	70%	130%	100%	80%	120%	106%	70%	130%
Dissolved Selenium	3572279		3.1	4.7	NA	< 1.0	101%	70%	130%	110%	80%	120%	114%	70%	130%
Dissolved Silver	3572279		<0.20	<0.20	NA	< 0.20	98%	70%	130%	98%	80%	120%	100%	70%	130%
Dissolved Thallium	3572279		<0.30	<0.30	NA	< 0.30	98%	70%	130%	99%	80%	120%	99%	70%	130%
Dissolved Uranium	3572279		2.39	2.32	NA	< 0.50	95%	70%	130%	101%	80%	120%	104%	70%	130%
Dissolved Vanadium	3572279		6.14	6.47	5.2%	< 0.40	100%	70%	130%	98%	80%	120%	110%	70%	130%
Dissolved Zinc	3572279		11.7	<5.0	NA	< 5.0	100%	70%	130%	106%	80%	120%	109%	70%	130%
Mercury	3588699		<0.02	<0.02	NA	< 0.02	105%	70%	130%	104%	80%	120%	102%	70%	130%
Chromium VI	3572326		<2	<2	NA	< 2	98%	70%	130%	98%	80%	120%	93%	70%	130%
Cyanide, Free	3572279		<2	<2	NA	< 2	95%	70%	130%	108%	80%	120%	99%	70%	130%
Dissolved Sodium	3573160		34100	33700	1.2%	< 50	105%	70%	130%	105%	80%	120%	96%	70%	130%
Chloride	3572326		765000	765000	0.0%	< 100	94%	70%	130%	108%	80%	120%	NA	70%	130%
Electrical Conductivity	3568900		46600	46700	0.2%	< 2	108%	90%	110%						
pH	3568900		7.58	7.52	0.8%	NA	102%	90%	110%						

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Certified By:

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Method Summary

CLIENT NAME: MCINTOSH PERRY LIMITED **AGAT WORK ORDER: 22Z868633**

PROJECT: CCO-22-3539 **ATTENTION TO: Dan Arnott**

SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5 **SAMPLED BY:Pamela Muniz**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Toluene-d8	VOL-91-5009	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
F1 (C6 - C10)	VOL-91- 5010	modified from MOE PHC E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	modified from MOE PHC E3421	(P&T)GC/FID
F2 (C10 to C16)	VOL-91-5010	modified from MOE PHC E3421	GC / FID
F3 (C16 to C34)	VOL-91-5010	modified from MOE PHC E3421	GC / FID
F4 (C34 to C50)	VOL-91-5010	modified from MOE PHC E3421	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	modified from MOE PHC E3421	BALANCE
Terphenyl	VOL-91-5009	modified from MOE PHC E3421	GC/FID
Sediment			
Dichlorodifluoromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: MCINTOSH PERRY LIMITED | **AGAT WORK ORDER: 22Z868633**
PROJECT: CCO-22-3539 | **ATTENTION TO: Dan Arnott**
SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5 | **SAMPLED BY:Pamela Muniz**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Toluene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: MCINTOSH PERRY LIMITED **AGAT WORK ORDER: 22Z868633**

PROJECT: CCO-22-3539 **ATTENTION TO: Dan Arnott**

SAMPLING SITE:200 Elgin St, Ottawa, ON K2P 1L5 **SAMPLED BY:Pamela Muniz**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Dissolved Antimony	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Arsenic	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Barium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Beryllium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cadmium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Chromium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cobalt	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Copper	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Lead	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Molybdenum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Nickel	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Selenium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silver	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Thallium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Uranium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Vanadium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Zinc	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Chromium VI	INOR-93-6073	modified from SM 3500-CR B	LACHAT FIA
Cyanide, Free	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	TECHNICON AUTO ANALYZER
Dissolved Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE

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Laboratory Use Only

Work Order #: 22Z868633

Cooler Quantity: one - free ice

Arrival Temperatures: 4.9 | 4.5 | 4.4 / 2.6 | 2.8 | 3.4

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: 1 medium / free ice

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: McIntosh Perry Consulting Engineers
Contact: Dan Arnott & Pamela Muniz
Address: 115 Walgreen Rd, Carp, ON K0A 1L0
Phone: 613-650-7977 Fax:
Reports to be sent to:
1. Email: p.muniz@mcintoshperry.com
2. Email: d.arnott@mcintoshperry.com

Regulatory Requirements:

(Please check all applicable boxes)

☒ Regulation 153/04 — Table 3 (Indicate One)
☐ Ind/Com
☒ Res/Park
☐ Agriculture

Soil Texture (Check One)
☐ Coarse
☒ Fine

☐ Excess Soils R406 — Table ___ (Indicate One)
☐ Regulation 558
☐ CCME

☐ Sewer Use — ☐ Sanitary ☐ Storm — Region ___
☐ Prov. Water Quality Objectives (PWQO)
☐ Other ___ (Indicate One)

Is this submission for a Record of Site Condition? ☒ Yes ☐ No

Report Guideline on Certificate of Analysis: ☒ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT (Most Analysis) ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply): ___

Please provide prior notification for rush TAT
*TAT is exclusive of weekends and statutory holidays

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: CCO-22-3539
Site Location: 200 Elgin St, Ottawa, ON K2P 1L5
Sampled By: Pamela Muniz
AGAT ID #: PO:

Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company: McIntosh Perry
Contact: Pamela Muniz
Address: 115 Walgreen Rd
Email: p.muniz@mcintoshperry.com

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☒ CrVI, ☒ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs / Analyze F4G if required ☐ Yes ☐ No	PAHs	Total PCBs ☐ Aroclor	VOC	O. Reg 558: Landfill Disposal Characterization TCLP: TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	Potentially Hazardous or High Concentration (Y/N)
BH-2	Feb28/22	1:45 PM	14	GW		Y	X	X	X			X					
BH-3	Feb28/22	11:30 AM	14	GW		Y	X	X	X			X					
BH-DUP	Feb28/22	AM PM	14	GW		Y	X	X	X			X					
		AM PM															
		AM PM															
		AM PM															
		AM PM															
		AM PM															
		AM PM															
		AM PM															
		AM PM															
		AM PM															

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Pamela Muniz	Feb 28/22	12 PM	C. Griffith	22/03/01	12h05
C. to Purolator	22/03/01	16h00	Anthony Daolva		

'22 MAR 2 9:08AM

Page 1 of 1

Nº: T 122960

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CLIENT NAME: **MCINTOSH PERRY LIMITED**
RR#3 115 WALGREEN ROAD
CARP, ON K0A1L0
(613) 836-2184

ATTENTION TO: **Dan Arnott**

PROJECT: **CCO-22-3539**

AGAT WORK ORDER: **22Z878292**

SOIL ANALYSIS REVIEWED BY: **Nivine Basily, Inorganics Report Writer**

DATE REPORTED: **Mar 30, 2022**

PAGES (INCLUDING COVER): **5**

VERSION*: **1**

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

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Certificate of Analysis

AGAT WORK ORDER: 22Z878292
PROJECT: CCO-22-3539

CLIENT NAME: MCINTOSH PERRY LIMITED **ATTENTION TO: Dan Arnott**
SAMPLING SITE: **SAMPLED BY:**

O. Reg. 153(511) - ORPs (Soil)

DATE RECEIVED: 2022-03-29 **DATE REPORTED: 2022-03-30**

			SAMPLE DESCRIPTION:	BH2(MW)-SS4
			SAMPLE TYPE:	Soil
			DATE SAMPLED:	2022-03-09 15:20
Parameter	**Unit**	**G / S**	**RDL**	**3692086**
pH, 2:1 CaCl2 Extraction	pH Units		NA	6.39

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3692086 pH was determined on the 0.01M CaCl2 extract obtained from 2:1 leaching procedure (2 parts extraction fluid:1 part wet soil).

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

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Quality Assurance

CLIENT NAME: MCINTOSH PERRY LIMITED | **AGAT WORK ORDER: 22Z878292**

PROJECT: CCO-22-3539 | **ATTENTION TO: Dan Arnott**

SAMPLING SITE: | **SAMPLED BY:**

Soil Analysis

RPT Date: Mar 30, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
O. Reg. 153(511) - ORPs (Soil)															
pH, 2:1 CaCl2 Extraction	3619145		6.63	6.87	3.6%	NA	96%	80%	120%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Certified By:

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Method Summary

CLIENT NAME: MCINTOSH PERRY LIMITED

AGAT WORK ORDER: 22Z878292

PROJECT: CCO-22-3539

ATTENTION TO: Dan Arnott

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
pH, 2:1 CaCl2 Extraction	INOR-93-6075	modified from EPA 9045D, MCKEAGUE 3.11 E3137	PC TITRATE

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Laboratory Use Only

Work Order #: 22Z878292

Cooler Quantity: n/a - loose jar.

Arrival Temperatures: 16.9 | 16.8 | 16.9 / 3.6 | |

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: Ice pack

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: McIntosh Perry
Contact: Dan Arnott
Address: 115 Walgreen Rd, Carp ON K0A 1L0
Phone: 613.714.4559 Fax: 613.836.3742
Reports to be sent to:
1. Email: d.arnott@mcintoshperry.com
2. Email:

Regulatory Requirements:
(Please check all applicable boxes)

☒ Regulation 153/04 — Table 1 *(Indicate One)*: ☐Ind/Com ☐Res/Park ☐Agriculture
Soil Texture *(Check One)*: ☐Coarse ☒Fine

☐ Excess Soils R406 — Table ___ *(Indicate One)*
☐ Regulation 558
☐ CCME

☐ Sewer Use: ☐Sanitary ☐Storm — ___ *Region*
☐ Prov. Water Quality Objectives (PWQO)
☐ Other ___ *Indicate One*

Is this submission for a Record of Site Condition? ☒ Yes ☐ No

Report Guideline on Certificate of Analysis ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT (Most Analysis) ☐ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply) ☐ 3 Business Days ☐ 2 Business Days ☒ Next Business Day

OR Date Required (Rush Surcharges May Apply): ___

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: CCO-22-3539
Site Location: 200 Elgin St
Sampled By: P. Muniz
AGAT ID #: ___ PO: CCO-22-3539

Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	Metals - ☐CrVI, ☐Hg, ☐HWSB	BTEX, F1-F4 PHCs	Analyze F4G if required ☐Yes ☐No	PAHs	Total PCBs ☐Aroclor	VOC	O. Reg 558: Landfill Disposal Characterization TCLP: TCLP: ☐M&I ☐VOCs ☐ABNs ☐B(a)P ☐PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐Metals ☐VOCs ☐SVOCs	Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	PHC							Potentially Hazardous or High Concentration (Y/N)
BH2(MW)-SS4	9-Feb-22	3:20 PM	1	S														X							
		AM PM																							
		AM PM																							
		AM PM																							
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Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Dan Arnott	28mar.22	10:05am	C. Griffith	22/03/29	10h10
CC to purolator	22/03/29	16h00	Anthony Dasilva		

'22 MAR 30 8:49AM

Page 1 of 1

Nº: T 120179

McINTOSH PERRY

SOIL SAMPLE REQUISITION

Project: CCO-22-3539	Location: 200 Elgin St, Ottawa, ON
Field Work By: P Muniz/D Arnott	Results Reported To: D Arnott
Field Work Completion Date: 11-Feb-2022	Test Procedure Requested
Sample Requisition Date: 23-Feb-2022	
Sample Disposal Date:	

Samples Received:	☐ Yes	☐ No
Testing Commenced:	☐ Yes	☐ No
Testing Complete:	☐ Yes	☐ No

Borehole Number	Sample Type	Sample Number	Laboratory Sample No.	Moisture Content	Grain Size Distribution (Gradation)	Particle Size Dist. (Hydrometer)	Atterberg Limits	Specific Gravity	Proctor – Standard or Modified	Organic Content (Burn)	Unconfined Compression	Laboratory Vane	Unsondoliated Undrained Comp.	Consolidated Undrained with Pore Pressure Measurement	Consolidation – C_{50}	Consolidation – C_{100}	Other
GSA-COMP	composite	GSA-COMP	OL-	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			OL-	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
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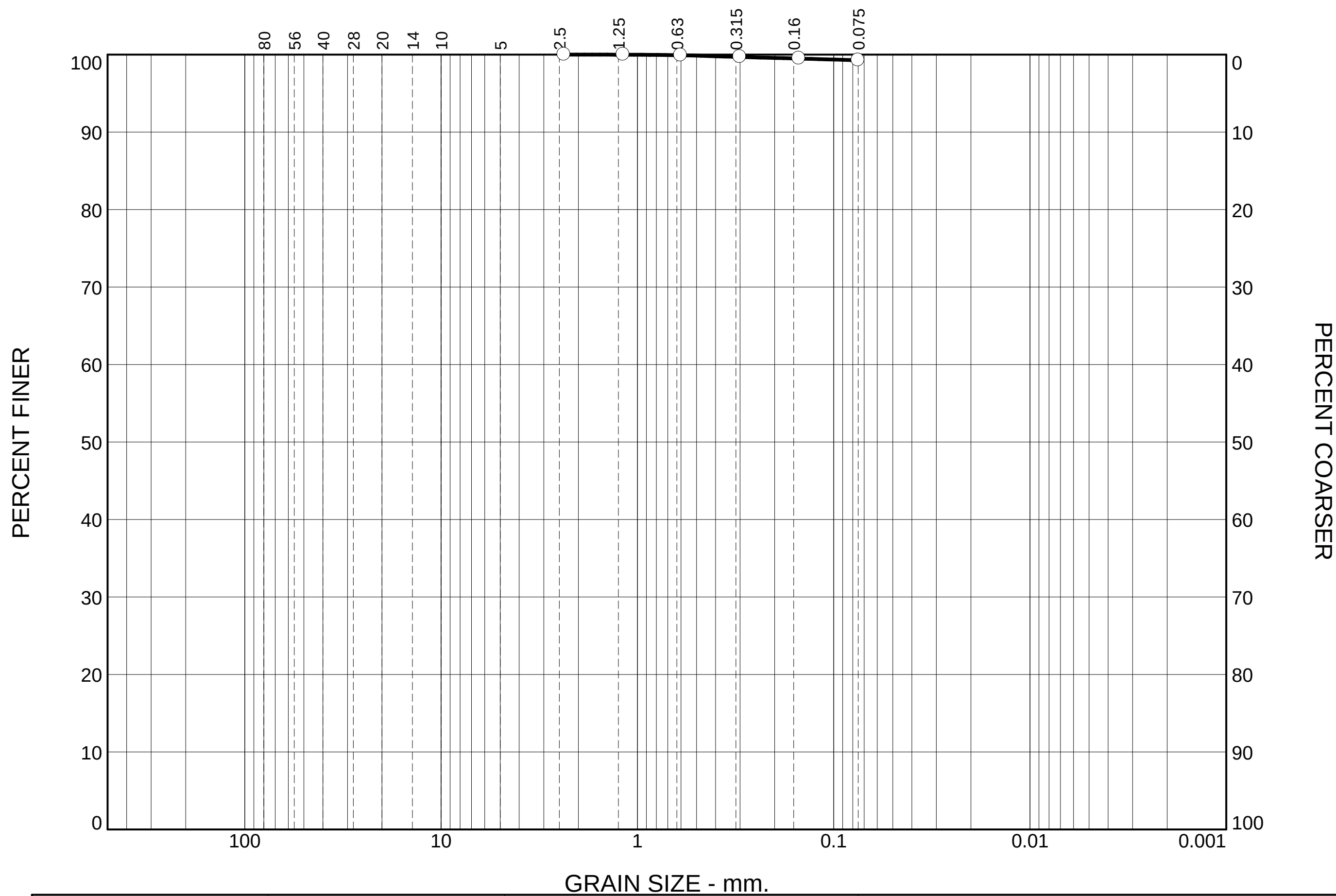
			OL-	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Tested by:	Date Completed:
Checked by:	Date Reported:

Particle Size Distribution Report



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.2	0.5	99.3	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (m.)	Material Description	USCS
○	200 Elgin St.	GSA-COMP		Silt/Clay trace fine Sand	

McINTOSH PERRY

Client: Elgar Holding INC.
Project: 200 Elgin St.

Project No.: CCO-22-3539 **Figure**

Tested By: R.C **Checked By:** J.Hopwood-Jones

GRAIN SIZE DISTRIBUTION TEST DATA

2022-02-25

Client: Elgar Holding INC.
Project: 200 Elgin St.
Project Number: CCO-22-3539
Location: GSA-COMP
Sample Number: GSA-COMP
Material Description: Silt/Clay trace fine Sand
Tested by: R.C **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
451.21	0.00	0.00	2.36mm	0.00	100.0	0.0
			1.18mm	0.09	100.0	0.0
			0.600mm	0.42	99.9	0.1
			0.300mm	1.41	99.7	0.3
			0.150mm	2.34	99.5	0.5
			0.075mm	3.35	99.3	0.7

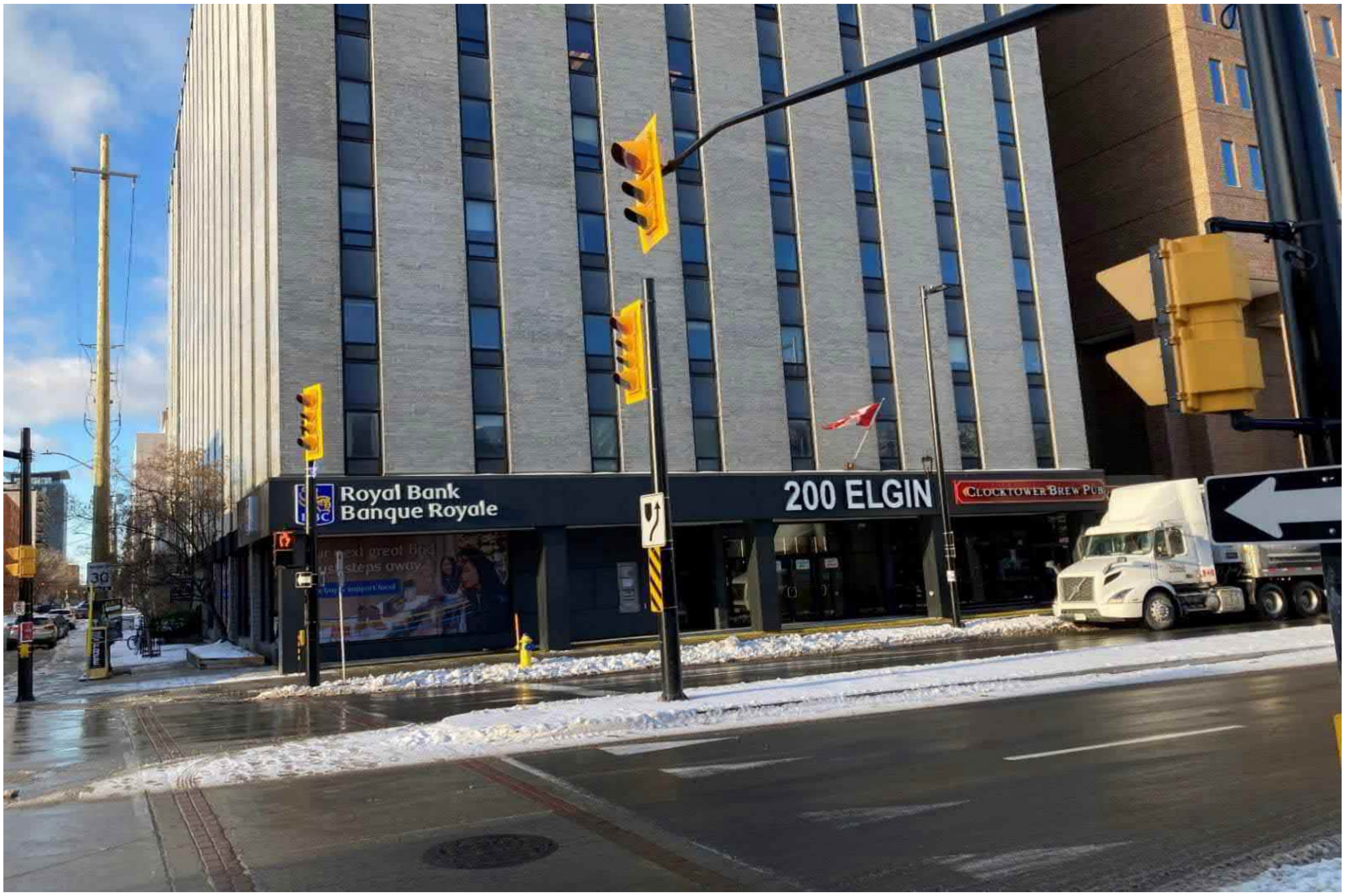
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.7			99.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.01

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
200 ELGIN STREET, OTTAWA, ONTARIO



APPENDIX D: SURVEY OF PHASE TWO PROPERTY

McINTOSH PERRY

SURVEYING
ANNIS
O'SULLIVAN
VOLLEBEKK

ONTARIO LAND SURVEYORS
T.J. Allison
A.J. Broxham
G.T. Hartwick
E.H. Herweyer
J.H. Kennedy
B.W. Kerr
E.K. Ketchum
V.A. Shelp
D.R. Vollebekk

G.D. Annis (1939-2013)

DEVELOPMENT
J.F. Penney

CONDOMINIUMS
A.Z. Pichette

OTTAWA
14 Concourse Gate
Suite 500
Nepean, Ontario
K2E 7S6
613 727-0850
613 727-1079 Fax
nepean@aovltd.com

EMBRUN
165 Bay Street
Embrun, Ontario
K0A 1W1
613 443-3364
embrun@aovltd.com

KEMPTVILLE
136 Prescott Street
PO Box 1340
Kemptville, Ontario
K0G 1J0
613 258-1717
kemptville@aovltd.com

www.aovltd.com

February 9, 2022

District Realty Corporation
50 Bayswater Avenue
Ottawa, Ontario
K1Y 2E9

Attn: Michael Morin
Senior Commercial Property Manager

Re: 200 Elgin Street
Lots 56 and 57
And Part of Lot 55
(North Lisgar Street)
Registered Plan 2996
City of Ottawa
Being Part of PIN 04115-0270
Our Reference 22663-22

Please find copies of the Plan of Survey prepared for the above noted premises, together with our account for the same. I trust this meets with your approval.

During our examination of the Property Register for PIN 04115-0270, it was noted that the property is subject to a registered easement in favour of Rogers Communications Inc. as described by Instrument OC1649094. The property is subject to and together with a registered easement as described by Instrument LT494415. PIN 04115-0270 is subject to a registered easement in favour of Carleton Condominium Corporation No. 365 over Lot 55 (North Lisgar Street) and Lot 55 (South Nepean Street) as described by Instrument LT1242133.

A multi-storey building exists on the subject parcel. Roof flashing along the southerly boundary of the property extends up to 0.02 metres south of the boundary. Signs mounted to the southerly façade of the existing building project up to 0.80 metres south of the southerly boundary. An air conditioner mounted along the southerly façade projects up to 0.45 metres south of the southerly boundary. The metal canopy along the easterly façade of the building projects up to 0.16 metres south of the southerly boundary. A sign mounted on the metal canopy projects up to 0.14 metres east of the easterly boundary. A flag pole attached to the easterly façade of the building projects up to 1.3 metres east of the easterly boundary.

Survey monuments were set at the southerly property corners. A cut cross found in the vicinity of the northeasterly property corner is 1.12 metres west of the actual corner. The westerly and northwesterly boundaries are defined by the face of the existing walls between 200 Elgin Street and 169 Lisgar Street. The area of the subject property is 1305.8 square metres.

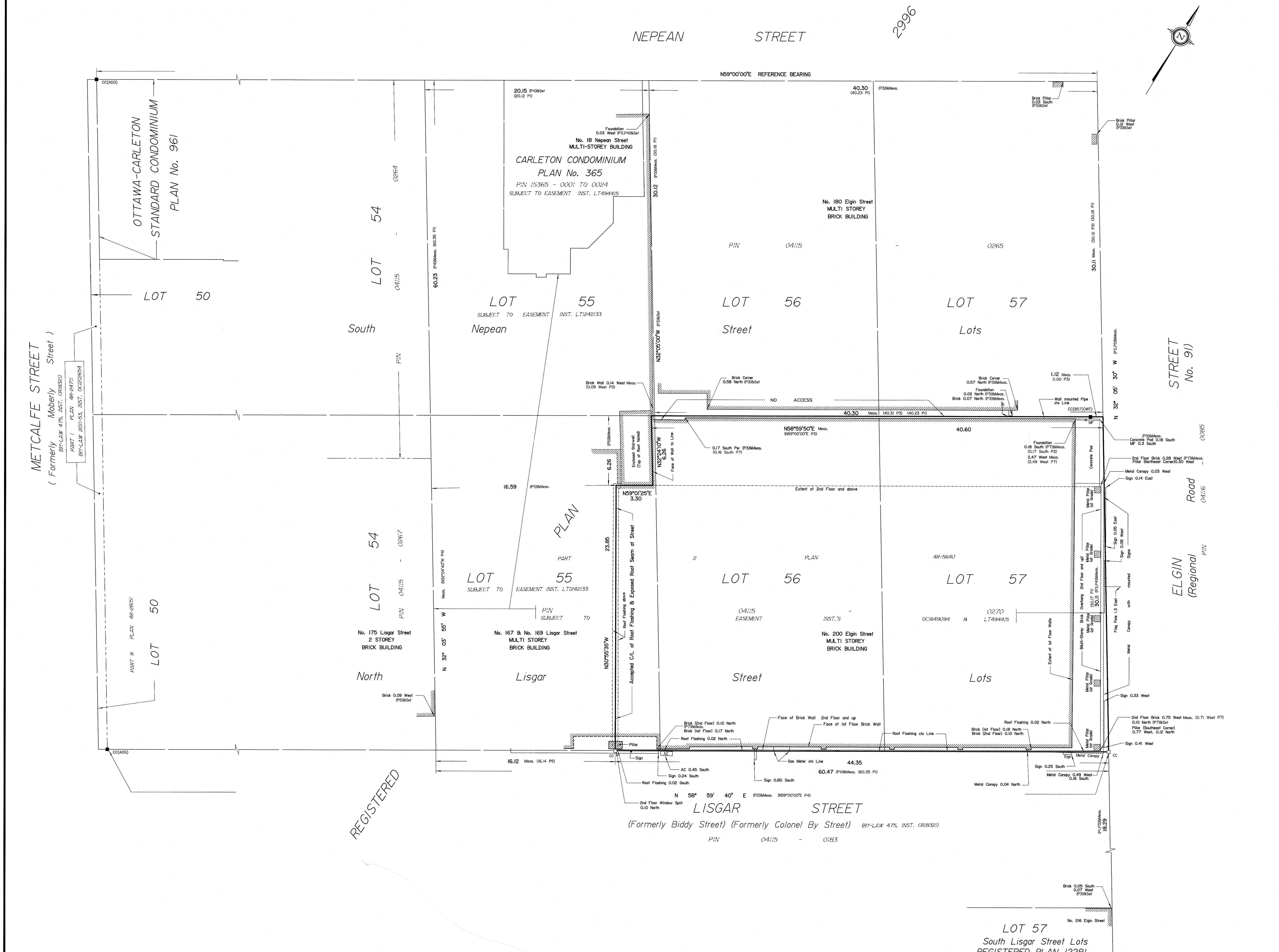
If you have any questions concerning the plan, please do not hesitate to contact me.

Yours truly,

A. J. Broxham

Andrew J. Broxham
Ontario Land Surveyor
Direct Line: 613-727-4352, Ext. 237

AJB:kj
Encl.



PLAN OF SURVEY OF

LOTS 56, 57 and
PART OF LOT 55
North Lisgar Street
REGISTERED PLAN 2996
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 150

6 4.5 3.0 1.5 0 3 6 Metres

Metric

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act and the Surveyors Act and the regulations made under them.
2. The survey was completed on the 3rd day of February, 2022.

February 9, 2022
Date

A. J. Broxham
Andrew J. Broxham
Ontario Land Surveyor

Notes & Legend

	Denotes	
—□—	"	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
CC	"	Cut Cross
(WIT)	"	Witness
Meas.	"	Measured
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	"	Registered Plan 2996
(P2)	"	Plan 4R-30340
(P3)	"	(857) Plan May 22, 2008
(P4)	"	Plan 4R-5640
(P5)	"	(725) Plan October 30, 1984
(P7)	"	(725) Plan June 23, 1965
BF	"	Board Fence
MF	"	Metal Fence
AC	"	Air Conditioner
C/L	"	Centreline
	"	
	"	

Bearings are grid, derived from the southerly limit of Nepean Street shown to be N59°00'00"E on Ottawa-Carleton Standard Condominium Plan No. 961 and are referred to MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V-22556

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29 (3).

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 22663-22 District Lt 56 PL 2996 D F | ig